An Bord Pleanála

Inspector's Report

PA0046

Development	Erection of 25no. wind turbines of 169m tip height and all ancillary works including 18km new site tracks, 3.5km upgraded, drainage and stream crossings, 2no. borrow pits, 1no. 110kv substation, 33kv MV underground cabling and communications, 16km 110kv HV underground cabling and communications to national grid connection to existing substation at Gorman, 2no. temporary construction compounds, ancillary infrastructure and parking, upgrading of existing entrances and provision of new entrances to public road, coniferous tree-felling. 10-year permission. 30-year operational life from date of commissioning.
Location	Within the following townland of County Meath: Balreask, Reask, Gravelstown, Emlagh, Castletownmoor, St. John's Rath, Drakesrath, Clooney, Drakestown, Dowdstown, Dowthstown, Fletcherstown, Glebe, Clongill, Oristown, Rossmeen, Grange Glebe, Wilkinstown, Balsaw, Demailestown, Scottstown, Mullagha, Corballis, Rathcoon, Dunderk, Carniaghanstown, Stackallan, Causestown and Mountainstown. Part located in Gaeltacht Area in townlands of Clongill and Oristown.
Planning Authority	Meath County Council.

Applicant(s)	North Meath Wind Farm Limited.
Type of Application	Strategic Infrastructure Development
Observer(s)	408no. observers
Date of Site Inspection	06/01/17, 07/01/17, 31/01/17, 25/03/17
Inspector	John Desmond.

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Appendix 1 Summary of Observations

1.0 Site Location and Description

1.1. The application site may be seen to comprise an irregular shaped collection of five interconnected parcels of land accommodating the wind farm proper, contained within an area extending c.6.2km west to east and c.6.2km north to south. In addition, the application site includes a c.12km linear spur to the southeast pertaining to the proposed HV grid connection to the southeast of the main body of the application site.

1.2. The proposed wind farm site is located in north County Meath, contained within the line of the N52 to the northwest, the R162 to the east and the R163 to the south, but the proposed 110kv HV cable route extend east of the R162 and south of the R162 to connect to the existing substation at Gorman, near Stackallan.

1.3. The main body of the site is c.3.5km northwest of the centre of the settlement of Kells, which is the largest settlement in the vicinity (the centre of Navan town is c.9km to the southeast of the main body of the site). The surrounding area is characterised by small rural villages and hamlets and prolific one-off rural housing dispersed along the rural road network. The village of Carlanstown is the nearest identifiable settlement to the proposed site of the wind turbines, located c.920m to the west at the nearest point. Castletown is located c.1.9km to the northeast, Wilkinstown c.2.2km to the east and Baile Ghib (Gaeltacht Area) c.2.9km to the south of the eastern end of the site. The population density of the DEDs within which the main wind farm site is located ranges from 23-27 people per square km, rising to between 34-42 in the southeast section of the site. This range of density is representative of the wider area, expect for the significantly higher population density of Carlanstown (up to 572.7 per sq.km) and Kells (up to 3,328.6 per sq.km)[1] being the main urban centres in the vicinity.

1.4. The linear portion of the application site pertaining to the proposed HV cable route and grid connection runs through the settlement of Wilkinstown, the only defined settlement indicated along the proposed route on the OSI digital maps. However, the proposed HV route is quite highly built up with one-off housing, similar to that

[1] Census 2011 - http://map.geohive.ie/mapviewer.html

apparent within Wilkinstown, and this is also true of much of the rural road network surrounding the wind farm site. The population density of the DEDs along the route range from 27.1-56.2 per sq.km.

1.5. The wind farm site is centred on Emlagh bog, but is does not appear to encompass any part of the active raised bog, but rather includes drainage, degraded, afforested or natural woodland regeneration areas around the periphery. The vast majority of the wind farm site comprises agricultural lands, excluding the said area surrounding Emlagh bog and an area at the southwest corner. The land is quite flat, ranging generally between 50-60m OD (based on OS Discovery Series).

1.6. The Moynalty River flows through the west of the site to confluence with the River Blackwater c.3.5km to the south. The River Blackwater, as well as the final c.140m of the Moynalty River, is within the River Boyne and River Blackwater SPA and within the River Boyne and River Blackwater SAC (albeit a slightly shorter length of the Moynalty River, at 102m). The Reask River and the Aghnaneane or Hermitage River and Grange River, all being tributaries of the Moynalty, flow through the centre and east of the site, respectively, in addition to numerous smaller streams or watercourses. An unnamed tributary of the Yellow [Blackwater (Kells)] River flows through and drains the southeast section of the site. Numerous watercourses drain the lands through which the proposed HV cable route would run, including the Yellow River (and Wilkinstown), Demailestown and Balsaw which confluence with the Blackwater at Tatestown (within the aforementioned SAC and SPA), and Craigs River and tributaries which confluence with the River Boyne at Cruicetown / Castlefin Lock, east of Stackallan within the River Boyne and River Blackwater SAC and SPA (note the last c.570m of the said watercourse, itself, falls within the River Boyne and River Blackwater SAC).

2.0 **Proposed Development**

2.1. In the interest of clarity and to ensure compliance with requirements concerning Appropriate Assessment having regard to the EC guidance[2] (section 3.1.3), the proposed development may be described as follows:

- Erection of 25no. wind turbines of 169m tip height including construction of foundations and hardstanding areas. The turbines are typically 4-5m diameter at base tapering to 2-3m at nacelle, with a foundation base c.22m in diameter and c.4m in depth (c.3m depth to base and 3.7m to base of concreted cable trench indicated on drawing P0177-0101-012).
- Hardstanding areas of c.30m X 50m (c.1500-sq.m), plus two set-down areas (c.122.5-sq.m each)[3] per turbine.
- Temporary set-down hardstanding area of 10m X 60m for blade set down area for each turbine.
- Construction of c.18km new site tracks (width of track is indicated as c.4.5m[4] wide at straight sections but wider at bends) and c.3.5km upgraded tracks[5] (width increased by up to c.5m[6], but locally wider at bends) with associated drainage. Depth of tracks not stated but drawings[7] indicate depth will vary, measuring typically 900mm for floating track and 700mm (these drawings may not be to the stated scale). Construction material intended to be sourced from onsite borrow pits, with imported limestone as surface layer.
- Provision of 2no. borrow pits and associated infrastructure (combined c.2.77ha and 115,917cu.m[8]; and max depth measures 6.2m and 7.7m in pit 1

[2] European Commission, 'Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC' (2001)
[3] Drawing P0177-0101-002
[4] Drawing P0177-0501-003 indicates 4.5m minimum.
[5] EIS Chapter 2 states 17km and 3km, respectively.
[6] EIS Chapter 9, s.9.6.4.
[7] P0177-0501-004
[8] The area is consistent with Chapter 8 of the EIS but the quantity of resource is significantly greater than that indicated as available according to Chapter 8 at 99,874cu.m.

and 2 respectively[9], but is stated as 3.5m-4m below current ground level in the EIS[10])

- All associated drainage and sediment control.
- Stream crossings (within the site 14no. proposed and 3no. existing[11] but some may need modification).
- Construction of 1no. 110kv substation inclusive of 2no. control buildings with welfare facilities, electrical infrastructure, parking, wastewater holding tank, all associated infrastructure, services, site works and landscaping. Approximately 93m X 64m total area
- Installation of medium voltage (MV) 33kV underground cabling and associated communications cabling between the proposed turbines and the proposed substation. The total length is not stated but the route mirrors that of the most of the internal tracks (Figure 9.6 of EIS Vol.2(a)) and is estimated at maximum 18.5km. No joint bays proposed.
- Provision of connection to the national grid at existing substation at Gorman via c.16km underground High Voltage (HV) 110kV cabling and associated communications cabling. Stated to be in accordance with ESB requirements for 110kV circuits (attached in Appendix P, EIS, Vol.3(2)), and the HV trench cross section dimensions on Drawings P0177-501-009 generally conforms to same. The HV joint bays are indicated as 6m X 2.5m X 2m[12] but total number not stated. Assuming 900m cable lengths, at least 17no. joint bays would be required.
- Provision of 2no. temporary construction compounds and associated ancillary infrastructure including parking and storage. The typical compound layout (P0177-0101-003) extends to c.1.3ha in total[13].
- Upgrading of existing entrances and provision of new entrance onto the public road. The drawings indicate that there are existing (agricultural) entrances at

[9] From drawings P0177-0101-009 and -010.
[10] Chapter 2, s.2.3.7
[11] EIS Chapter 9, s.9.6.6.
[12] ESB standards require 2.7m depth.
[13] Note, the southern of the two temporary compounds is not shown in full on the 1:2500 drawings, with only the eastern section shown on P0177-0100-011.

junction 1, junction 2, junction 5 (2no. or forestry type) and junction 7. Entrance junction 3, junction 4 (2no.) and junction 6 (2no.) are newly proposed[14].

- Tree felling is stated as comprising of coniferous trees (predominantly Norway Spruce) at maximum of 16.6ha (Figure 2.8 refers)[15], planted in 2000 and 2009 mainly on shallow cutover peat, within the environs of T4, T6, T14 and T15 and associated infrastructure and access. Replanting will not take place within 30m of all access tracks and within a c.1.3ha area at each turbine location and around the proposed substation (0.4ha).
- 11no. nodes on the proposed turbine delivery route will require upgrade works (identified in Figure 2.10, EIS Vol.2(a)) between the M3 and the proposed site access at junction 7. The works required at the nodes are set out in the Turbine Delivery Report in Appendix K, EIS Vol.3(2). In general, the works are relatively minor, including areas of over sail where trees / vegetation would be required to be trimmed or removed, and those where physical upgrade works would be required ((CTM 03 roundabout junction N52 / R147; CTM 04 roundabout junction N52/R164; CTM08, CTM09 and CTM10 N52 at Glenrath; and CTM11 Clooney / Drakerath requiring c.360m of local road to be widened to 4.5m).
- 10-year permission and 30-year operational life from date of commissioning of entire wind farm.

3.0 Submissions Received

3.1 Prescribed bodies

Meath County Council

The County Council submitted a very detailed report informed by reports from (appended to MCC report) from the following: Caroline Corrigan, Senior Executive

[14] These junctions are shown, in order, on Site layout plans P0177-0100-003, P0177-0100-011, P0177-0100-006, P0177-0100-010, P0177-0100-011, P0177-0100-005, P0177-0100-007

[15] EIS Chapter 2, S.2.3.11 indicates that the specifications in the Forest Service Forestry and Water Quality Guidelines (2000) and Forestry Harvesting and Environmental Guidelines (2000) will be followed in the felling methodology.

Engineer, Environment; David Keyes, Senior Executive Engineer, Environment (flooding); Jim Gibney, Senior Executive Engineer, Transportation; Jill Chadwick, Conservation Officer; Loreto Guinan, Heritage Officer; Paul O'Brien, Executive Engineer, Water Services; Fiona Beers, Senior Executive Engineer, Kells Municipal District; and a report by CAAS on the '*Assessment of Likely Effects on Designated Views in County Meath*'.

In summary, **Meath County Council considers the proposed development does not overcome the reasons for refusal in the Board's decision PA0038** and, in particular, regarding the significant visual impact on the landscape of 25 wind turbines up to 169m in height that will directly and indirectly impact upon an historic landscape, including built and natural heritage features of local, regional, national, European and global importance.

The main points of the assessment may be summarised as follows:

- EIS – Is considered adequate overall.
- **Principle of the development** – Accepts that it generally supported by national, regional and local planning policy and the landscape character area could absorb such a development and there is a general presumption in favour of wind energy as expressed in government guideline, but subject to it being appropriate from an environmental, technical and visual perspective.

Regarding environmental matters –

- **Siting**: Has concern relating to siting and stability issues relating to peat depth (further information required);
- **Air and Climate**: Has concern about potential dust impact from borrow pits in proximity to a number of dwellings (beside main site access north of T25 along the county road) in view of existing context of no evident borrow pits (further information required);
- **Noise and vibration**: The details of predicted noise emissions and mitigation requirement noted, but no concerns stated regarding noise. No objection from Environment Section concerning vibration subject to conditions;

- **Shadow Flicker**: Further information required regarding the potential exceedance of 30 h/yr limit at buildings nos.159, 160 and 296. Environment Section recommends mitigation measures by condition.
- **Water quality and hydrology**: No concerns stated. Water Services Section recommend conditions.
- **Soils and Geology**: Highlights reference in the EIS concerning material in the borrow pits possibly being unsuitable for use as structural fill beneath turbines. The applicant should be required to carry out appropriate site testing to demonstrate suitability of material to be utilised and to specify alternative sources of aggregate where the material is deemed unsuitable, in the context of the Planning Authority's site inspection which indicated there are appeared to be insufficient reserves at the locations indicated and in the context of potential traffic generation.
- **Traffic and transport**: Traffic volumes will increase over a much smaller area (than PA0038) and could have a greater impact on roads and their carrying capacity, but the Transportation Department concludes that it can be accommodated with appropriate consultation, planning and management. Sightlines are generally satisfactory at 160m, but may be excessive given the operational speed of minor county roads (50-60kph) would warrant only 70-90m, and must comply with TD 42-42/11 and TD9. Cable trenching works can be carried out with appropriate traffic management. The proposed use of two borrow pits to reduce movements on the local roads is reasonable, but there is concern that there is insufficient volume of material to cater for the 18km of new access road and 3.5km of upgraded road. Further information is required regarding the capacity and quality of material available in the borrow pits and the quantity that will be required from alternative specified sources. This should clearly specify additional traffic routes and movements derived as well as the impact on local roads and associated externalities such as potential congestion, impact on air quality, noise, etc. In addition, the applicant should be requested to clarify the construction stage HGV and LGV data on table 12.4 which is of questionable accuracy regarding trip generation having regard to, for example, the concrete foundations per turbine (and the

concrete base for the crane platform) and the 7.5m3 capacity of an average cement lorry, inclusive of aggregates and soil movements.

- **Landscape and heritage**: The site as a whole is located within an area of likely potential for archaeological remains to be uncovered and the turbines and access roads may have a direct impact on archaeology. Further archaeological testing may be required as a precautionary principle and should be conditioned as part of a planning permission, with submission of appropriate mitigation measures based on the outcome of test trenching. Impact on the archaeological landscape of the county is critical, with the Conservation Officer highlighting the impacts on the settings of a number of protected structures, 2 ACAs – Kells and Headfort Demesne, and other demesne landscapes, and visual impacts on long range views from important historic vantage points such as Loughcrew, Tara and Tower of Lloyd.
- **Landscape and heritage**: Based on the CAAS report, there will be significant effects on 12 key viewpoints from the MCDP, including some of the most significant and sensitive in the county being of national and regional significance. These include view nos.6 (Slieve na Calliagh), 13 (Tower of Lloyd), 14 (R163 between Kells and Drumbaragh), 15 (county road between Carlanstown and Ardlonan), 16 (county road north of Moydorragh), 24 (county road between Rathkenny and Parsonstown Demesne), 25 (county road between Rathkenny and Parsonstown Demesne), 26 (county road between Rathkenny and Dreminstown), 33 (at Proudstown Cross Roads on R162), 44 (Hill of Tara), 47 (Skryne Church) and 52 (Hill of Ward). The proposed development will significantly alter the established appearance and character of a large part of north and central County Meath and that further information should be sought to enable the applicant to address these finds, possibly through erection of pole structure or similar at each site.
- **Landscape and heritage**: Conservation Officer disagrees with EIS definition of setting for heritage structures (identified as identical to the curtilage, with little importance attached to the visual impact on the wider landscape setting) and with it's a number of its conclusions. She is of the opinion that adverse impacts will occur in the wider landscape setting of the Hill of Lloyd, with adverse impacts on Rosmeen House (MH017-123), Dowdstown House

(MH11-124) and Mountainstown House and Demesne (MH012-100) and St Columcille's Church (MH0180-101). She generally agrees with the EIS assessment of impact on Cruicetown Church and Cross (ME0005-094---), the magnitude of impact is considered greater than the 'slight significance' rating determined in the EIS.

For the Headfort Demesne (ACA) of national importance for interiors, the CO raises concerns about applicant's photomontages in view of the effect of screening, the winter view and the impact on long distance views to the north from the sunken driveway which was never intended to be screened but to afford distant views of specimen trees, and the views from upper windows in the context of public functions and viewings held for the building.

The CO agrees that the change to the setting of **Brú na Bóinne UNESCO WHS** would be negligible but raises concern of cumulative impacts on intrusive elements on this landscape. The Heritage Officer considers the assessment inadequate concerning the impact on Brú na Bóinne.

Regarding **UNESCO Heritage Tentative List sites**: the visual intrusion from partial views of wind turbines visible adjacent St Columba's Church at the centre of the site is considered likely to detract from the experience and sense of place of the historic town and the monastic site of **Kells**; the expanse of wind farm visible on the northern horizon would detract from the landscape and setting of the site of **Tara**. The Heritage Officer considers the EIS does not adequately address the impacts on the existing UNESCO World Heritage Site or the two candidate WHSs and that the proposal must be considered in the context of the World Heritage Convention. The CO and HO both advise the Board to seek the opinion of an independent expert on World Heritage Properties concerning the potential impact on these sites and likely implications for their potential designation as WHSs

Further information is required concerning the impacts on candidate WHSs of Kells and Tara, Protected Structures and ACAs.

The Heritage Officer highlights the importance of Meath's landscape as a core asset to Ireland's Ancient East which is very much related to the future viability and marketing of the local tourist industry and advises that the extent

and capacity of the WF should be considered within a national planning context and in particular within the National Landscape Character Assessment as set out in the National Landscape Strategy for Ireland 2015-2025 (Actions 2-4)

LCA 3 has medium capacity to accommodate WF development, however despite the view of the applicant in photomontages and conclusions regarding slight to moderate potential impacts, there will be significant detrimental changes within the wider rural landscape apparently with long lasting impacts to an area rich in heritage and culture with the 169m high alien structures significantly altering the landscape whether from near or distant views. Cumulative impacts, including from the north-south interconnector traversing the wind farm site will have significant adverse impacts on the landscape and which will be significantly greater than outlined in the EIS.

- **Ecology and NIS**: The Heritage Officer notes the hydrological connections between the site and three Natura 2000 sites (River Boyne and River Blackwater cSAC, River Boyne and River Blackwater SPA and Kilconny Bog cSAC) and also notes the recent discovery of Greenland White-Fronted Goose not previously recorded within the study area. The HO highlights issues related to the location of T14 and T15 and substation on a conifer plantation within a wider complex of wetland habitat **adjoining an area of high bog that supports EU Annex I Habitat (Degraded Raised Bog)**, which is of high conservation value (as well as the wet grassland habitat at T7) in the Meath context regardless of whether or not designated under European legislation, and is one of the most ecologically sensitive areas within the study site and, in accordance with the mitigation hierarchy, **all works should be avoided in that area**. Further information is required given that the substation is a critical component of the development. The sites of T6, T11 and T12 are associated with high bat activity and therefore, in accordance with best practice, should be relocated. Any works impacting on Otter require a derogation license under Regulation 54 of EC (Birds and Natural Habitats) Regulations 2011.

Meath County Council advises that **FURTHER INFORMATION** is required concerning 14no. issues (summarised below), in order to facilitate a more comprehensive and accurate assessment:

1. A revised site selection report to adequately address the potential of connection to other substations with capacity and to provide sufficient data on wind speeds at this site over a significant period.
2. (a) Further archaeological testing of T2, T9 and T17, which, the EIS indicates, may impact on archaeological remains. (b) Consider relocation of T2, T9, T17 and T6, T7, T8, T14, T15, T16, T18 and T20 (located in a bog where archaeological remains are located) or further mitigation measures.
3. Provide reasoning and justification for the re-siting of T13 and T24 from PA0038 (all application documents state the positions are unchanged) to assist in an accurate technical assessment of the proposals, having regard to the main impact arising from the proposed development being the visual impact.
4. Address the potential visual impacts on archaeological remains – Cruicetown Church and Cross.
5. Address (through additional photomontages, supplementary information and mitigation measures) the significant visual impacts on curtilage and settings of the following Protected Structures: (a) Rosmeen House MH017-123 and farm buildings MH017; (b) Dowdstown House MH11-0124; (c) Mountainstown House and demesne MH012-100; (d) St Colmcille's Church MH018-101.
6. In respect of Headfort House MH017-116, rated of National Importance for its interiors, the following should be addressed, including submission of revised and additional photomontages: (a) the reliance on tree screening in the photomontage from the front façade; (b) the important internal views of parkland to the north, framed by woods; (c) views from upper windows.
7. Having regard to objective LCOBJ5 MCDP, address the impacts on views (12no.) identified in the CAAS report through revised photomontages, including consideration of use of erection of pole structures or balloons to tip height at each site, with specific reference to: significant effect on view 44 Hill of Tara and view 47 Skryne Church; to the profound / very high significance effect on view 6 Slieve na Calliagh and view 13 Tower of Lloyd.

8. Carry out all necessary hydro-geological investigations to enable a full assessment of potential impacts on the hydrology of the high bog.
9. Consider the relocation of T14 and T15 away the conifer plantation (habitat map fig.7.18.1), which County Meath Wetlands Survey (2008) identified a part of the wider complex of wetland habitats associated with Carlanstown Bog, being a raised bog that supports EU Annex 1 Habitat – Degraded Raised Bog (7120), and which is considered of high conservation value in the Meath context regardless of designation or not under national or European legislation.
10. Consider the cumulative impact with North-South 400Kv Interconnector (EIRGRID) application on Annex 1 species, Whooper Swan and Greenland White-fronted Goose.
11. Consider alternative locations for T6, T11 and T12 to address impact on bat activity by submission of further data.
12. Comment on the failure of the EIS to accurately identify sources of the significant aggregate material required to be imported to the site and potential for further impacts to arise, including increased traffic movements, road congestion, traffic hazards, etc.
13. With regard to section 8.3.6 of EIS, undertake appropriate site testing to demonstrate the suitability of material to be excavated to be utilised as structural fill beneath turbines and tracks, and provided specific detail on alternative sources of aggregate where same is found to be unsuitable.
14. Having regard to the potentially inadequate reserves in the borrow pits for the construction of the proposed development, details of the source of the additional material required, the haulage routes to the site and the resulting additional volumes of vehicular movements on the local road are required.

In the event of a decision to grant permission, Meath County Council advises that in 33no. conditions should be attached, which are generally standard type conditions for such developments. Site specific conditions include the provision of a permanent piezometer monitoring of Castletown borehole and 3-year annual monitoring programme of sites used by Whooper Swan and by Greenland White-fronted Goose.

An Taisce (22/09/16) – The points raised can be summarised as follows under the following headings:

Impact on residential amenity

- The location and layout of the proposed 25no. WTs are the same as those refused under PA0038
- The separation distance from existing villages is unchanged for Carlanstown (1.3km), Wilkinstown (3km) and Kells (4.25km).
- Figure 10.1 EIS shows a large number of one-off rural dwellings within 1km of proposed wind turbines (acknowledged under S.10.2.2 EIS), a pattern of development which significantly limits future infrastructure including wind turbines and electricity grid development.
- Assessment of any residential impact is required.

Cultural heritage

- Impact over a wide area of landscape.
- Impact on archaeological monuments and Protected Structures (including country houses) needs to be assessed, including the designated landscape setting which form part of the setting of Protected Structures (e.g. 54 within 3km of WT and 4 within 1km – Mountainstown and Dowdstown Demesnes, farmhouse in Rossmeen and St. Columcille's Church).
- In addition to impact on each 88 RMP archaeological monuments within 3km of WT, the landscape impact on grounds of monuments along Blackwater River Valley, etc., must be considered.
- Consider 5 National monuments within 5km zone, Brú na Bóinne World Heritage Site and Buffer Area within 30km, and candidate WHS of Tara and Kells.
- The Board did not accept the Inspector's opinion (S.7.52) of no likely significant adverse impact on cultural heritage under PA0038. As noted, the proposed 25no. WTs are unchanged and the Board's concerns unresolved.

Ecological impact

- P.8, Ch.7 EIS refers to possible exclusion of badgers and pine martin from foraging areas due to screening / fencing erected during construction, considered 'unlikely to be significant' impact given short duration. Extent and location of fencing not stated – cordoning off entire WF could trap and displace mammals, reduced habitat and foraging for up to 18 months.

Commissioner for Railway Regulation (CRR, 13/09/16) - The points raised can be summarised as follows under the following headings:

- Iarnród Éireann should be consulted to ensure risk of railway trespass not increased during / after construction.
- Any works that may affect safe operation of railway should be undertaken with consultation of Iarnród Éireann and in accordance with RSC Guideline RSC-G-010-A, with particular care to be taken with works near railway boundary that may affect stability of embankments or change the water table / drainage.
- Iarnród Éireann should be consulted regarding all road-rail interfaces on access routes which may increase flow or abnormal loads during construction.

Fáilte Ireland (23/09/16) - The points raised can be summarised as follows under the following headings:

- Still comprises a large development (under DoE Guidance) with vast zone of visual influence within an LCA area of 'medium' suitability for WE development, but surrounded by LAC of high sensitivity.
- Fáilte Ireland commissioned an assessment of the proposed WF to determine the potential impacts of the proposal on tourism industry, the main conclusions of which are (my understanding is that the overall concern is for the unplanned approach to WF development in the county and region):
    - Whilst MCC will support the production of a Wind Energy Strategy (EC POL 20 of CDP) in association with the other Councils of the GDA, there is no clear plan-led guidance with respect to specific locations of development (such as provided by other Planning Authorities) or power generating output expected to be contributed by the County.

- The cumulative impacts of existing (7no. WF) and permitted (8no. WF, 103no. WTs) WFs in the county and neighbouring counties have not been assessed in the absence of a Wind Energy Strategy and the visual impact that may result from same is unclear. Note, 47no. WTs are in planning, plus 25no.in this current application, which would bring total to 175no. within the EIS study area (table 14.15 EIS), plus the north-south interconnector proposal.
- Given the scale of the development clear guidance is necessary and, given the potential regional impact in power generation, a regional assessment of alternative site locations would have been beneficial.
- Highlight the importance of Meath as the 'heritage capital' of Ireland, with Boyne Valley considered (by Fáilte Ireland) one of the priority tourist destinations in Ireland for volume of heritage sites of local, regional and international importance, with 'Boyne Valley Drive' and 'Ireland's Ancient East' ways of presenting the diverse attractions, with Brú na Bóinne complex is one of only three UNESCO world heritage sites in the island of Ireland.
- The EIS states the impact on Brú na Bóinne is 'imperceptible-slight', the impacts on sites within the Boyne Valley Drive are stated as 'moderate-slight'. The proposal will alter the view from these important sites.
- The Hill of Tara is on the candidate list of UNESCO world heritage sites. Whilst the EIS considers the impact to be 'moderate-slight' the view will be altered for the lifetime of the project.
- The heritage of county Meath is of international importance and the tourism impact of the proposal is considered to be potentially significant, particularly in the absence of a Wind Energy Strategy or Renewable Energy Strategy for Meath or the Greater Dublin Area.

- Additional pertinent points from the commissioned report include:
  - Most recent survey by FI on tourist attitudes to WFs found that most respondents did not consider the possibility of more WFs would impact

on their decision to visit Ireland again, although since 2007 there has been a marked change from ‘positive’ to ‘no impact’ opinion. The research suggest that WF should be constructed with large WT but in small numbers, away from the coast.

- Appendix C of the EIS (Site Selection) indicates that the site was selected primarily on the basis of the connection offered by EirGrid at Gorman substation. No meaningful assessment of alternative sites within the GDA appears to have been carried out, excepting the cursory evaluation of the Areas Suitable for Wind Development in County Louth. Given the broad expanse of heritage in County Meath, such an assessment would have been useful.

HSE (22/09/16) - The points raised and recommendations made by the HSE can be summarised as follows under the following headings:

- **Monitoring:** The transposition of EIA Directive 14/52/EU will require post construction monitoring, but is not referred to by the applicant.
- **HSE consultation**: The HSE response of 5th May 2016 to the scoping document is not referred to in the EIS.
- **Public consultation**: There is no indication of how public consultation undertaken influenced the project design.
- **Shadow flicker**: The proposal to undertake a procedure, in consultation, to ensure no exceedance of the guideline limit at three identified residences, should be carried out prior to commencement of construction works; Post construction monitoring should be pro-actively carried out to ensure proposed mitigation measures are effective.
- **Noise and vibration**: The proposed operational noise limits are based on WEDG, published in 2006 at a time when WE was of a different nature and scale and located predominantly away from communities, and is currently under review. It is the experience of the HSE that adherence to absolute noise levels does not always protect residences from nuisance occurrence.

The HSE considers the significance of change in noise environment and its possible impacts on residents should be fully assessed in the EIS. S.6.3.3.2 EIS (table 6.2) under assessment criteria BS4142 an increase in 10dB in noise environment is 'likely to be an indication of a significant adverse impact', whereas under the derived absolute exposure limits (table 6.4) the increase in noise levels from background noise is up to and above 20dB. It is the HSE's experience that an increase in this magnitude will be subject to complaints and will significantly adversely impact on health and well-being.

It is recommended that the existing background noise level and predicted noise level for each noise sensitive receptor is provide in a table, not only where predicted noise levels meets derived absolute exposure limits.

WHO Night Noise Guidelines for Europe recommends annual average night exposure not exceeding 40Db, noting that sleepers exposed to night noise levels in excess of same can suffer health effects like sleep disturbance and awakenings, and above 55Db long term average exposure, noise can trigger elevated blood pressure and lead to ischaemic heart disease.

Noise monitoring should be carried out post construction during operation to ensure compliance with predicted noise criteria, with appropriate corrective measures taken to ensure compliance where non-compliance identified.

- **Construction noise**: no issues with proposals, details and mitigation measures.
- **Dust**: no issues with proposals, details and mitigation measures.
- **Drinking water**: no issues with proposals, details and mitigation measures.
- **Complaints procedures**: no issues with proposals and details in CEMP.
- **Recommended conditions (paraphrased)**:
    1. A full assessment of the significance of the change in the noise environment and the effect on local residents should be carried out as part of the EIA.
    2. Noise monitoring plan for operation phase of wind farm should be implemented and remedial action to bet taken in event of exceedances should be specified.

3. A plan for controlling shadow flicker should be implemented prior to commencement of construction and post operational monitoring carried out to ensure compliance and that no nuisance arises.
4. A physical site walkover should be carried out to ensure there are no wells or boreholes within 200m radius of final WT location or near proposed access tracks or cable routes. Appropriate mitigation measures to protect groundwater during construction phase should be outlined and agreed with the planning authority prior to commencement of work on site.

Inland Fisheries Ireland (23/09/16) - The points raised and recommendations made by the IFI can be summarised as follows under the following headings:

- IFI policy is aimed at maintaining a sustainable fisheries resource through preserving the productive capacity of fish habitat by avoiding habitat loss, or mitigating harmful alteration to habitat.
- The potential impacts on fisheries relate largely to construction of WT and access roads and cable layout where carried out in close proximity to a watercourse, potentially negatively impacting on aquatic habitat.
- The observations are of a general nature as construction proposals and method statements are not provided. The site (described in general terms only) is located adjacent to and has potential to impact on a wide range of important fisheries waters, including areas designated as SACs, angling waters, adult holding areas, nursery and spawning waters forming part of the Eastern River Basin District.
- The site is located within the Moynalty and Yellow River catchments, sub-catchments of River Kells Blackwater. Both contain salmonid spawning and nursery habitat which contribute to the population in the Kells Blackwater / Boyne and both are valuable to fisheries, holding stock of Salmon, Brown Trout, Eels and other species.
- The site is located within the River Boyne catchment tributaries at Ablestown and Stackallen, which contain salmonid spawning and nursery habitat which contribute to the population in the Boyne both are valuable to fisheries, holding stock of Salmon, Brown Trout, Eels and other species.

- A significant amount of fish rearing occurs in vary small channels and seasonal streams which may not be recognised as fish or macroinvertebrate habitat and their importance to fisheries overlooked.

Recommendation conditions (paraphrased):

1. All natural watercourses to be traverse should be bridged, with IFI approval necessary regarding specification and timing of temporary installations where circumstances preclude use of clear span structures.
2. Use of piped culverts to be avoided and are appropriate only for use on minor watercourses and drainage ditches where demonstrated as not being significant habitat.
3. Any bank protection works required upstream / downstream of new structures should not comprise gabions unless access constraints prevent installation of rock armour.
4. Works in watercourse should normally be carried out during July-September, inclusive (except where agreed otherwise with IFI), unless otherwise constrained by catchment specific Bye Laws and Regulations, to minimise impacts on fisheries resource.
5. The **soil type and structure** at proposed WT, access track and temporary stockpiling locations should be critically reviewed in terms of **stability during construction and operation**, with particular reference to **peat soils.**
6. Best practice construction methods and strategies should be incorporated to minimise discharges of silt / suspended solids to waters.
7. A comprehensive plan should be drawn up with specific measures to address prevent potential silt pollution of nearby watercourse during works, with provision for appropriately designed silt traps (including buffer zone from watercourses) and silt fences.
8. In order to prevent erosion, natural flow paths should not be interrupted or diverted during construction during construction.
9. Precast concrete should be used whenever possibly to eliminate risk to aquatic life from changes in pH level of water from uncured concrete.
10. Oils and fuels should be stored in secure bunded areas and care should be taken when refuelling and undertaking plant / equipment maintenance.
11. No instream works shall be carried out without written approval of IFI.

12. The precautionary principle should be applied throughout the development and attention paid to environmental directives and legislation, including the WFD, the Habitats and Birds Directives, the Fisheries Acts and the Local Government (Water Pollution) Acts, in particular.

Irish Aviation Authority (31/08/16) – No objection raised subject to the following conditions:

Recommendation conditions (paraphrased):

1. An agreed scheme of aviation obstacle warning lighting for the wind turbines.
2. Coordinates and elevation details of the built turbines should be supplied to the Authority for charting purposes.
3. The Authority should be notified at least 30 days prior to the erection of the development.
4. Note that marking requirements is that the turbines are painted white.

Irish Water (23/09/16) - The points raised can be summarised as follows under the following headings:

- The proposed development is within 1.5km of the well source for Castletown. In the event of a grant of permission it should be a requirement by condition that a piezometer be installed at the borehole at least 6 months in advance of commencement of works and shall continue to be monitored and information recorded for a period of 6 months post completion of the project.
- The proposed development is in proximity to Irish Water assets, including water mains contiguous to site 3 and along the proposed cabling routes at sites 14-18 inclusive. A site investigation is required prior to the laying of cables in the public roads and any proposals to address interference with existing water services infrastructure shall be submitted to Irish Water for agreement.
- The applicant's figures for water usage during construction are conservative and do not take sufficient cognisance of water required for wash-down and cleaning. Should an existing or proposed groundwater source be used for construction purposes, the applicant should notify IW of the proposed use and consumption data.

Department of Arts, Heritage, Regional and Gaeltacht Affairs (23/09/16) – The main points raised and recommendations of the DAHRGA may be summarised as follows:

- The proposed development is located within an area rich in archaeological remains in continuum from Neolithic and Post-Medieval periods. There is potential for discover of archaeological material during construction. The following conditions are recommended.
    1. Archaeological mitigation measures specified under section 13.5.1 of the EIS shall be implemented in full.
    2. All areas of construction works (permanent or temporary) shall be subject to archaeological test excavations and / or archaeological monitoring licensed under the National Monuments Acts 1930 (as amended), subject to the approval of archaeological method statements by the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

Transport Infrastructure Ireland (23/09/16) – No objection in principle subject to the clarification and / or resolution of the following issues prior to a decision to grant permission, the details of which are summarised below:

- The proposal to facilitate all access to turbine locations via the local road network prior to national roads is consistent with official policy under section 5.2 of the 'Spatial Planning and National Roads Guidelines' (DoECLG, 2012).

M3

- The applicant should consult Eurolink Motorway Operations (M3) Ltd on any works proposed that affect the M3 PPP Scheme in terms of operational requirements prior to approval of the proposed development.
- Any works (such as that proposed un Appendix K – Turbine Delivery Route Report) to the N52/M3 roundabout junction, which forms part of the motorway designation, require approval under Section 53 of the Roads Act 2007 prior to commencement.

N52

- TII has no objection in principle to the proposed works to existing roundabout junctions to N52 Kells Bypass, subject to compliance with TII DMRB and to the outcome of a Road Safety Audit as appropriate.
- TII concurs with the recommendations of Meath County Council in Appendix B of the EIS. All proposals impacting on national roads to be agreed between the road authority and the developer should be referred to TII.

Structures

- A permit is required from each Local Authority concerned to transport a vehicle / load of weight outside the limits of the Road Traffic (Construction Equipment & Use of Vehicles) Regulations 2003, SI 5/2003.
- All structures on the proposed haul route should be checked by the developer to confirm capacity to accommodate any abnormal loads.
- The TII is seriously concerned at the absence of any technical load assessment of structures concerned. An assessment review of all structures concerned is required to confirm that all structures can accommodated the proposed loading associated with the delivery of WT components where combined vehicle / load weight exceeds that permissible under the Road Traffic Regulations.
- It is critical that a full assessment of all structures on the national road network along the haul route is undertaken and the relevant road authorities along the haul routes should confirm their acceptance of the applicant's proposals and all proposals agreed between the road authorities and the applicant that impact on national roads should be referred to TII.

Cabling / Trenching

- A license may be required from the road authority for trenching / cabling on the road network. All proposals agreed and licensed between the road authorities and the applicant that impact on national roads should be referred to TII.

3.2 Observers

Submissions were received from almost 400 observers (listed in Appendix 1), excluding prescribed bodies. These comprise submissions from individuals and families, interest groups and umbrella groups.

Issues raised by observers are summarised in Appendix 1. Of note, issues are raised in respect of:

Summary of issues raised relating to procedural, policy and guidance matters

1. Procedural and legal matters

- The designation of application as Strategic Infrastructure; argue that it should not be a SID; criticism of SID provisions under the Act concerning appeals (only by judicial review) and fairness.
- Criticism of public consultation process and engagement with the public; contrary to Aarhus and European Landscape Convention; problems with access to information and format and scale of documentation.
- Grid connection.
- 10-year period of permission.
- Legal issues concerning landownership and extend of applicant's interest in other lands in the vicinity, site boundary and site notice issues (not in Irish).
- Failure to undertake SEA for the NREAP.

2. EU and National policies and standards

- Development standards for wind energy are out of date; contrary to EU Machinery Directive 2006/42/EU.
- Justification of need: National policy and targets – need for development; disputes that it is justified on grounds of CO^2 reduction, energy security, cost effective of power production and price stability; requires largescale subsidies.
- Justification of location: no national spatial wind policy; locating wind farms in such low wind speed areas (IEC Class 3a) contrary to EU policy objective to reduce subsidies; spatial policy should direct wind farms to areas with high

wind speeds and remote from housing; Energy white paper '*Ireland's Transition to a Low Carbon Energy Future 2015-2030*' envisages a spatial analysis and community support.

- Changing policies in other jurisdictions
- EU policy and climate change – does not take account of EU policies underpinning 2020 Targets, including need to reduce energy usage and improve resource efficiency.

3. **Regional planning policy** - Premature pending completion of study to determine the most efficient location for wind energy development within the region.

4. **Meath County Development Plan**

- Scale contrary to 'medium capacity' designation under LCA. Not zoned for industrial development. No wind energy strategy. Contrary to heritage and landscape objectives.

5. **2006 Wind Energy Development Guidelines -** Guidelines out of date, inadequate and don't apply to such large wind turbines.

- Doesn't comply with guidelines (chapters 3 and 6) for hilly and flat farmland and populated landscape.
- Guideline noise limits standard non-compliant with precautionary principle and EIA Directive.
- Contrary to provisions of WEDG concerning protection of tourism (economy) and residential amenities.

6. **Other institutional guidance**

7. **Dependent on subsidies**

Summary of issues raised relating to impact on material assets

8. **Tourism assets** – impact on tourism dependent on the highly sensitive and renowned historic heritage and it landscape context.

9. **Value of residential and other property** – Direct impact due to proximity to turbines (consequential on noise, visual and shadow flicker) and indirect due to uncertainties for future development.
10. **Traffic and transport network** – Traffic impacts and damage to physical during construction. EIS does not take account of true extent of traffic due to underestimation of quantities of concrete required and unsuitability of extraction material available on site.
11. **Agricultural assets** – Direct loss of land, sterilisation of lands within 500m and reduced potential to access loans due to devaluation. Impact on farm animals (chicken farm, bees and cattle) including stress from noise and consequential illnesses.
12. **Equine assets** – Direct impact on thoroughbred industry, therapeutic riding facilities and recreational horse riding facilities including business and private use. Stress, spooking, safety risk and direct risk of consequential illnesses.
13. **Other assets** – Impact on nursing home (Dowdstown House), film industry and preschool premises. Impact on telecoms and water infrastructure.
14. **General economy** – Undermining investment potential for Kells.
15. **Positive impacts** – Beneficial use of marginal lands. Alternative income streams for farmers and Local Authority. Direct and indirect employment during construction and operation. Spin off development and green image for county.

Summary of issues raised relating to impacts on human beings

16. **Residential amenity** – Impact on large local population and tranquil rural quality of area from visual, noise and shadow flicker due to size, scale and proximity. Impact on amenity space. Population underestimated. Risks depopulation.
17. **Noise annoyance and loss of amenity** – invasive, excessive and extensive.
18. **Noise and sleep disturbance** – crucial nature of sleep. Findings that current standards are inadequate to protect against sleep disturbance for population in vicinity; that level of sleep disturbance is greater than reported as it is not

remembered. Existing methodologies don't take due account of amplitude modulation and wind shear. 1.5km setback required at minimum.

19. **Low Frequency Noise, sleep disturbance and consequential health impacts** – Major adverse impact on health from turbines is from sleep disturbance from both audible noise and LFN and infrasound. Complex impacts, with wide range of symptoms comprising Wind Turbine Syndrome, that requires proper study. WHO Guidelines for Community Noise (1999) recognises need for special consideration of noise with LFN components. Large range of studies cited supporting this area of concern.
20. **Impact on people with ASD** – ASD people and others with special need and/or sensory processing disorders / sensitives, epilepsy, etc., are particularly sensitive to noise (LFN and infrasound), shadow flicker and blade movement. Recognised in UK planning decisions. Requires further study.
21. **Shadow flicker** – Impacts on homes, schools, recreational facilities, gardens and farms in the vicinity. Impact on people with specific conditions (epilepsy, etc.). Strobing.
22. **Health Impact Assessment** - Healthy Ireland: A framework for Improved Health and Wellbeing 2013-2025' (DoH, 2013). HIA required.
23. **Other impacts** – Construction related impacts. Light pollution.
24. **No negative impacts** – Scaremongering. Personal experience of no adverse impacts. Protections provided by Irish planning law and constitution. Outweighed by positive impacts.
25. **Safety issues** - tower collapse, blade failure, tower strike (when blade hits support tower), fire, lightning strike and ice throw / fall.
26. **Adverse community and social impacts** – Visual impacts on social capital (e.g. recreational facilities). Impact on schools. Depopulation will affect community and clubs, businesses, etc. Dividing the community.
27. **Positive community and social impacts** – Community funds. Development will reverse depopulation trend.

Summary of issues raised relating to landscape and visual impacts

28. **Severe long-term impact on rich historical landscape and heritage** – Impact on a particularly sensitive historic and cultural landscape – setting for Loughcrew, Tara, Hill of Slane, Brú na Bóinne, etc. Excessive scale and extent. Change from rural to industrial. Contrary to National Landscape Strategy. Landscape and visual assessment not objective.
29. **No negative visual impacts**
30. **Impact on protected views**
31. **Visual Impact Assessment** – Photomontages viewpoints don't reflect real impact, are inadequate and hazy or in poor light. VP8, VP9, VP15, H13 and H14 show severe impacts. Does not represent moving visual impact.
32. **Policy context** – Contrary to provisions of CDP and scale not envisaged under LCA for 'medium potential capacity'.
33. **Other visual** – decommissioning. Numerous precedent for refusal on landscape and visual grounds.

Summary of issues raised relating to built and archaeological heritage impacts

34. **Adverse impacts on architectural heritage** – Impact on settings of extensive number of protected structures, including demesnes (Headfort, Mountainstown, etc.,), ACAs and villages and historical sites (Brú na Bóinne, etc.). Contrary to European Landscape Convention, National Landscape Strategy and Architectural Heritage Protection Guidelines.
35. **Adverse impacts on archaeology** – Impact on settings of extensive archaeological heritage, including UNESCO WHS and two candidate WHS. Potential impacts on unrecorded heritage.
36. **Neutral impacts on heritage** – Wind farm developments coexist with Rock of Cashel without impact.
37. **Interactions / direct impacts** – Noise impacts greater on protected structures which has single glazing.

38. **EIS** – Doesn't list all items or provide adequate assessment of impact. Underplays impact and significance of impacts on built heritage. Doesn't cover visual and tangible connections between sites. Photomontages exclude many potential viewpoints from sensitive sites.
39. **Positive** – Minimal visual impacts from many sites. Visibility of turbines doesn't mean impact is significant.

Summary of issues raised relating to Air and Climate

40. **CO2 and GHG emissions** – Efficiency losses resulting from back-up (fossil fuel) electricity generation and from preventing shadow flicker not taken into account. Not the most economic method for reduction of emissions. NREAP not subject to SEA or public consultation. Small communities should not bear the burden of 2020 targets. Disputes benefits
41. **Energy supply positive** – Clean, stable, low cost, secure source of energy to help meet GHG reduction targets.
42. **Energy supply negative** – AC energy cannot be stored.

Summary of issues raised concerning impacts on flora and fauna

43. **General** - Adverse unacceptable direct and indirect impact on birds, mammals, bats, ecology and habitats (including European Sites and also bogs) during construction and during operational period, contrary to the protections afforded same under national and EU legislation. Inaccurate and inadequate assessment of impacts.

Summary of issues raised concerning impacts on water and hydrology, and on soil

44. **Water supply and water quality** – Disruption or loss of supply. Contamination.
45. **Drainage and flooding** – Inadequate and incomplete information. Flood risk from increased runoff in area of poor natural drainage, with development in areas of high flood risk.

46. **Impact of concrete** – quantity of concrete and hard surface.

Summary of issues raise concerning assessments carried out by applicant

47. **Noise assessment**

- Inadequate, non-scientific approach to baseline survey based on readings from only 4 locations. Ignores 'temporal filtering'.
- No information on wind direction. No wind shear profile. Wind shear profile changes between 39-169m rotor and will cause turbulence and vibration.
- Wind speed will be <8m/s for c.90%, with implications for noise impact. Studies show forecast noise and actual noise output differ.
- A-weighted scale doesn't take due account of LFN.
- Assessment is non-compliant with IOA Good Practice Guide or WEDG. Extraneous noise not removed from background noise levels.
- EIS shows under normal operating conditions the wind farm will be non-compliance with noise limits and the mitigation measures are designed to comply with limits not derived using the correct methodology.
- Not independent.

48. **Traffic and transport** – Not independent and estimated construction traffic levels not assessed by Meath County Council. All traffic will travel though small rural village.

49. **Shadow flicker** – Excluded consideration of sensitive properties (schools) outside 10R distance. Evidence that assessment not accurate presented to PA0038.

Summary of issues raise concerning cumulative impacts

50. **Cumulative development** – Greenwire project – **project splitting**. SID designation will encourage more wind farm development. N/S interconnector and permitted pig farm. All associated required infrastructure (back-up, interconnectors) not identified.

51. Non-technical summary is Inadequate detail and fails to meet legal requirements. Chapter 4 schedule and response of 3rd party stakeholders in insufficient. Project

splitting. Does not comply with EIA Directive 2011/92/EC. The request to have EIA to be carried out under **Directive 2014/52/EU** disadvantages the public. Excessive documentation. Insufficient information. Inadequate assessment of impact on properties or of long term impacts. Wind turbine drawings not to scale and not representative of proposed proportions (hub height : rotor diameter). Precedent for refusal by Board on grounds of deficient EIS.

Summary of general issues concerning alternatives

52. 39 planned wind farm sites forming part of Greenwire Project (no information provided by applicant - 1000 turbine export project) are alternative sites. Alternative technologies not considered.

Summary of general issues concerning appropriate assessment

53. Precedent for refusal on grounds of deficient AA and / or due to effects.

4.0 Planning History

4.1 Relevant recent on site planning history

VA0017 – Permission **GRANTED** (19/12/16) by the Board, subject to nine conditions, for proposed North-South 400 kilovolt Interconnection Development (a Strategic Infrastructure Development and a designated Project of Common Interest) located in Counties Monaghan, Cavan and Meath, approximately 103.35 kilometres long (part of an overall interconnector of 138km, 34km of which is located in Northern Ireland), consisting of A new single circuit 400-kilovolt overhead transmission line (approximately 100.5 kilometres), comprising 299 new lattice steel support structures (ranging in height from c.26 metres to c.51 metres over ground level), with associated conductors, insulators, and other apparatus. The proposal also entailed modifications to three existing 110kV overhead lines, the addition of a new 400kV circuit for c.2.85km along the currently unused northern side of the existing Oldstreet to Woodland 400kV transmission line, extending from

Bogganstown (ED Culmullin) to the existing ESB Woodland 400kV substation in Woodland, Co. Meath and crossing the following townlands in County Meath: Bogganstown (ED Culmullin), Curraghtown (ED Culmullin), Gaulstown (ED Culmullin), Hayestown, Creemore and Woodland using the existing steel lattice towers of between 52-62m height AGL. Plus associated works on 0.544ha within and adjacent to the existing ESB Woodland substation in Woodland, Co. Meath, and all associated and ancillary works. The interconnector site crosses the eastern section of application site PA0046.

PC0214 – Decision of the Board (011/05/16) that Castletownmoor Wind Farm, consisting of 25 no. Turbines, Substation and Grid Connection (which previously formed part of the Emlagh Wind Farm Application, 17.PA0038) would comprise strategic infrastructure development.

PA0038 – Permission **REFUSED** (04/02/16) by the Board for a 46 turbine windfarm (being Strategic Infrastructure Development) with wind turbine tip height of 169m, referred to as Emlagh wind farm, on lands encompassing, almost entirely, the current application site subject of PA0046 in addition to other surrounding lands. The single reason for refusal was on the grounds that:

'*a windfarm of the scale, extent and height proposed would visually dominate this populated rural area, would seriously injury to amenities of property in the vicinity, would interfere with the character of the landscape and would not be in accordance with the overall development objectives of the current County Development Plan.*'

Furthermore, the Board further considered the proposed development did not align with the Wind Energy Development Guidelines which:

'*did not envisage the construction of such extensive large scale turbines in an area primarily characterised as a hilly and flat farmland landscape and in such proximity to high concentrations of dwellings*'.

Notwithstanding the provisions of the NREAP and other national and European Union policies supporting such renewable energy development, the Board considered:

'…*the impacts of this very large development on the substantial local residential population, and the impacts of the proposed development on the landscape and cultural heritage, would not be acceptable in this location.*

And '*that the number and height of the proposed turbines would significantly exceed the landscape's "medium potential capacity" to accommodate windfarm development as set out in the Landscape Character Assessment of the County Development Plan.'*

PL17.243902 / reg.ref.KA14/0597: Permission **GRANTED** (12/02/15) by the Board, subject to revised conditions, for the continuation of use of an existing lattice type meteorological mast, 80m in height and associated instruments to measure local climatic conditions for a period of 30 years, at Drakestown, Carlanstown, Kells, Co. Meath. The site is within the northern section of the current application site PA0046.

PL17.218893 / Reg.ref.SA/50483: Permission **GRANTED** (02/02/07) by the Board, with revised conditions, for the erection of a 26.8km length of 110kv single circuit overhead line linking the Gorman 220kv substation at Causestown in Co. Meath with the Meath Hill 110kv substation at Meath Hill Co. Meath. The proposed line will be erected over, or in the vicinity of the County Meath Townlands of Causestown, Graigs, Rathcoon, Castletown, Kilberry, Scottstown, Chamberstown, Coghalstown, Ladyrath, Rathkenny, Knock, Killary, Ricetown, Painestown, Fringestown, Carnacop, Julianstown (E.D Posseckstown), Kilbride, Posseckstown, Hennigan, Cloghmacoo, Cloghreagh, Rathlagan and Meath Hill. The first 0.9km out of Gorman 220kv substation consists of seven continuous wires supported on double circuit lattice steel towers of c.28 metres, changing to a single circuit line with 5 continuous wires supported on double woodpole structures c.19 metres in height from the border of the townlands of Graigs and Rathcoon, with an average distance between structures of c.200 metres.

SA/120024: Extension of Duration of Planning Permission SA50483 was **GRANTED** (06/03/12) by Meath County Council.

4.2 Pertinent planning history in the wider vicinity

PL17.244357 / reg.ref.KA14/0921 – Permission **REFUSED** (16/06/15) by the Board for a 10-year permission for six 150m tip-height turbine wind farm, ancillary works, substation, meteorological mast, cabling and access tracks at Cregg, College, and Rathgillen townlands, Nobber, County Meath. The single reason for refusal related to the undue interference with views from Whitewood House, a protected structure (MH005-104) and to the failure to demonstrate adequate consideration of

alternatives, which would be contrary to CH OBJ 22 of the County Meath Development Plan which seeks “to discourage development that would lead to a loss of, or cause damage to, the character, the principle components of, or the setting of historic parks, gardens and demesnes of heritage significance”.

PA0041 – Permission **REFUSED** (12/10/16) by the Board for a Strategic Infrastructure Development application for the erection of 47 turbines of 169m tip-height ancillary works, substation, meteorological mast, cabling and access tracks, grid connection, etc., in north and central County Kildare and south County Meath. The three reasons for refusal may be summarised as follows:

1. Premature development in the absence of a national wind energy strategy with a spatial dimension or of wind energy strategies at local level, given the scale and extensive geographical spread of the proposed wind farm.
2. Adverse effects including a disproportionately large visual envelope, the need for extensive underground cabling in poor quality minor roads and undue proximity to areas of sensitivity from a heritage or residential point of view arising from widely dispersed cluster-based layout.
3. Potential from extensive cable trenching works for significant adverse effects on the long term structural integrity of significant elements of the local road network, including substantial sections of substandard legacy roads, likely to give rise to the creation of traffic hazards and to potentially increased maintenance costs to the local authority.

Ref.07/3 - (P) 2 wind turbines of up to 55m hub height and up to 26m blade length, site track & associated ancillary works at Dunmore, Co. Louth.

Ref. no.09/54 - Planning Permission (Ref. No. 09/54) for the erection of a single wind turbine at Leaby Cross, Collon, Co. Louth, with a maximum height (tower height) of 80m, a maximum blade length of 40m, site access road and a crane hard standing area, the combined maximum hub height & blade length is 120m.

Ref. No. 12/194 - Permission to amend an already granted Planning Permission (Ref. No. 09/54), to increase the maximum hub height and blade length from 120m

to 125.5m and to move the centre of the turbine 5m to the east, Leaby Cross, Co. Louth.

Ref. No.14/83 - Extension of Duration of Planning Permission Ref. No. 12/194.

5.0 Policy Context

5.1 European Energy Policy

Renewable Energy Directive 2009/28/EC **(23/04/09)**– Concerns the promotion of the use of energy from renewable sources. Article 4 requires each member state to produce a national renewable energy plan to achieve an overall reduction in GHG emissions of 20%, a 20% increase in energy efficiency and 20% of energy consumption across the EU to come from renewable energy by 2020. Member states are to achieve their individual binding target across the heat, transport and electricity sectors and apart from a sub-target of a minimum of 10% in the transport sector that applies to all Member States. There is flexibility for each country to choose how to achieve their individual target across the sectors. Ireland's overall target is to achieve 16% of energy from renewable sources by 2020.

2030 Climate and Energy Policy Framework **(European Council, 24/10/14).** The European Council endorsed a binding EU target of at least 40% reduction in GHG emissions by 2030 and a binding EU target of at least 27% is set for the share of renewable energy consumed in the EU in 2030.

A policy framework for climate and energy in the period from 2020 to 2030 (European Commission, 22/01/14).

Energy Roadmap 2050 (European Commission, 15.12.11)

5.2 National Energy Policy

National Renewable Energy Action Plan -

Ireland's National Renewable Energy Action Plan (NREAP) sets out the State's national targets for the share of energy from renewable sources to be consumed in transport, electricity and heating and cooling in 2020, and how it intends achieving the overall national target established under the Directive. NREAP sets target of 40% electricity consumption from renewable sources by 2020 (financially supported by REFIT). NREAP recognised that as Ireland moves towards achieving this target, the Irish grid increasingly has to cope with the challenges posed by large amounts of intermittent power and that EirGrid (the Irish Transmission System Operator) is involved in detailed examination of the issues and is pioneering several renewables facilitation studies with a view to ensuring the appropriate management of the grid and stability of the electricity system during this transition.

Strategy for Renewable Energy 2012-2020 **(DCENR, May 2012)** - Strategic Goal 1 - Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets.

Further strategic deployment of onshore wind projects will develop a base of indigenous and foreign companies and create employment in the short-term in wind farm construction, possible turbine component manufacturing and servicing, the opportunity to capture international supply chain opportunities and the manufacture of niche onshore renewable energy generating equipment. (p.9)

Key action include to support the delivery of the 40% target for renewable electricity through the existing GATE processes and to implement REFIT 2 for onshore renewable energy and maintain a predictable and transparent REFIT support framework for onshore wind which is cost competitive (REFIT (Renewable Energy Feed in Tariff) is a feed in-tariff support scheme for new renewable generation which is designed to accommodate new renewable generation built to the end of 2015 and its aim is to ensure sufficient new renewable electricity is built to make a significant contribution to our legally binding 2020 target under Directive 2009/28/EC). (p.13)

Government Policy Statement on the Strategic Importance of Transmission and Other Energy Infrastructure **(DCENR, 17/07/12).** Ireland needs to deliver a world class electricity transmission system in all the regions which meets the needs of Ireland in the 21st Century which will, inter alia, enable Ireland to meet its

renewable energy targets and reducing the country's dependence on imported gas and oil and reduce CO2 emissions.

Ireland's Transition to a Low Carbon Energy Future 2015-2030 (Policy Whitepaper, DCENR, 2015)

***Draft Renewable Electricity Policy and Development Framework - Draft Strategic Environmental Assessment Scoping Report* – 2016 (DCENR).** Closing date for consultations was 22/04/16. It is intended that the Renewable Electricity Policy and Development Framework will, *inter alia*:

- set out a clear national policy context to facilitate renewable electricity developments at large scale on land;
- broadly identify a limited number of suitable, strategic areas in Ireland for renewable electricity generation of scale (these can be incorporated into a revised National Spatial Strategy, Regional Guidelines and development plans subsequently) having regard to considerations of amenity, heritage and efficacy;
- provide guidance to planning authorities, including An Bord Pleanála, when considering proposals for renewable electricity generation, supplementing the guidance contained in the existing Wind Energy Development Guidelines for Planning Authorities, 2006;

Wind Energy Development Guidelines **(DoEHLG, 2006)** -

The WEDG 2006 constitutes statutory guidance for wind energy development, including on provisions of the development plan and, in development management, in the consideration of design, siting, spatial extent and scale, cumulative effect and spacing, layout and height of wind turbines having regard to its location within one of six landscape character types and their particular sensitivities.

5.3 Regional Policy

Regional Planning Guidelines for the GDA 2010-2022 **(DRA & MERA, 2010)** –

Strategic recommendation PIR28 - To ensure that planning policy at Local Authority Level reflects and adheres to the principles and planning guidance set out

within Department of the Environment Heritage and Local Government publications relating to 'Telecommunications Antennae and Support Structures', 'Wind Energy Development' and any other relevant guidance which may be issued in relation to communications and sustainable energy provisions.

Strategic recommendation PIR34 - That a study is undertaken on wind energy potential by local authorities jointly in the GDA focusing on suitable areas for larger wind energy projects, role of micro wind energy in urban and rural settings and the potential for wind energy within industrial areas with the outcome presenting regionally consistent new land-use policies and objectives and associated development management guidance to potential projects.

5.4 Local Policy

Meath County Development Plan 2013-2019 – The Council has set out what it considers to be the relevant development strategies, goals, objectives and policies of the Development Plan, the Landscape Character Assessment and protected views and prospects, and of the Kells Development Plan in pages 36 to 81 of its submission. The following are the main relevant areas:

Chapter 2 Core Strategy – Core principles include (3) the promotion of sustainable economic development to support the population, (4) to support and safeguard cultural, natural and built heritage, (7) to protect and support rural areas through appropriate sustainable development, and (11) to integrate climate change considerations into policies and objectives of MCC. It is the (s.2.5) to protect the unique cultural heritage and sensitively integrated with sustainable development, to integrated tourist and recreational facilities in a sustainable way with natural heritage, and to protect the landscape character, quality and distinctiveness.

Chapter 4 Economic Development Strategy - ED POL 29 '*To protect and conserve those natural, built and cultural heritage features that form the basis of the county's tourism attraction and to seek to restrict development which would be detrimental to scenic and identified natural and cultural heritage assets*.'

Chapter 6 Transportation - TRAN POL 2, 3, 4 and 5 concerning protection of aviation.

Chapter 7 Water, drainage and environmental services – S.7.14 concerning protection of water quality of surface and ground waters; s.7.15 concerning flood risk management; and s.71.8 concerning pollution control including air and noise.

Chapter 8 Energy and Communications – This Includes policies encouraging wind energy and other renewable energy sources (EC POL3 and EC POL 20) subject to planning considerations including potential impacts on sensitive landscapes (EC POL 38) and environments, etc., in support of the preparation of a wind energy study (EC POL 21) and the investigation of the preparation of a renewable energy strategy to promote technologies most viable to the county.

Chapter 9 Cultural and Natural Assets – There are numerous policies and objectives concerning the protection of the county's cultural and landscape heritage (CSA SP1, CSA SP3), including the UNESCO World Heritage Site Brú na Bóinne (CH POL1, CH OBJ1, CHOBJ2) and those on the WHS tentative list, and the setting of such heritage (CH POL7, CH OBJ8), and architectural heritage and its setting including protected structure and ACAs (CH POL10, CH OBJ13, CH POL16, CH POL 18, CH OBJ21, CH OBJ22 and CH OBJ23). Extensive policies and objectives concerning the protection of natural heritage are set out under s.9.6, in addition to a general policy (CSA SP2) to protect natural heritage, green infrastructure and biodiversity.

Landscape policies and objectives are set out under s.9.8. Those of particular pertinence include LC OBJ 1 (to preserve uniqueness of landscape character types and maintain the visual integrity of areas of exceptional value and high sensitivity), LC ObJ5 (preserve views and prospects), LC POL3 (to protect the archaeological heritage, rural character, setting and amenity of the Tara landscape and Loughcrew and Slieve na Calliagh Hills), LC OBJ7 (consider designating a Landscape Conservation Area in respect of Loughcrew and Slieve na Calliagh Hills) and LC OBJ8 (to implement a Landscape Action Plan for Tara Skryne landscape).

Chapter 10 Rural Development – The extractive industry is addressed under S.10.12.

Chapter 11 Development Management Guidelines and Standards – The standards and assessment of renewable energy development and wind energy developments are set out under s.11.5.

Appendix 7 – Landscape Character Assessment

Appendix 12 – Protected views and prospects

Kells Development Plan 2013-2019 – It is a Strategic Aim (no.3) to build upon heritage town status and develop niche tourism product and associated job growth. The plan contains additional policies to protect and develop its natural and built heritage as a tourism asset (TOUR POL1, TOUR POL4, HER POL1, HER POL2, HER POL 7, HER POL8, HER POL13) including through ACA designations of Kells Historic Core Area ACA and Headfort Plan ACA and the support of UNESCO WHS designation for Kells (HER POL12).

Carlanstown Written Statement – S.8.1 Views and Prospects – view west and east of Carlanstown Bridge (protected structure) south of village.

5.5 Reference Documents

'*Guidance Note on Noise Assessment of Wind Turbine Operations at EPA Licensed Sites (NG3)*' (EPA, 2011)

'*A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise*' (IOA, 2013)

'*Guidelines for Landscape and Visual Impact Assessment Guidelines'* (IEMA, 2013)

6.0 Natural Heritage Designations

There are three European Sites within 15km:

- Site Code 002299 - River Boyne and River Blackwater cSAC
- Site Code 004232 – River Boyne and River Blackwater SPA
- Site Code 000006 – Kilconny Bog (Cloughbally) cSAC
- Site Code 002203 – Girley (Drewstown Bog) SAC (also part of a more expansive Girley Bog NHA Site Code 001580)

Two other distant European Sites (>130km) are relevant to this case:

- Site Code 004076 – Wexford Harbour and Slobs SPA.
- Site Code 004019 – The Raven SPA

In addition to Girley Bog NHA, there is one other NHA within 15km, Jamestown Bog NHA Site Code 001324.

7.0 Planning Assessment

I have examined the details, documents and submission on file raised by prescribed bodies and observers, the planning history, considered national and local policies and guidance and inspected the site. I consider the key issues in determining this Strategic Infrastructure Development application to be as follows:

7.1 Policy

7.2 Landscape and visual

7.3 Cultural and built heritage

7.4 Noise

7.5 Shadow flicker

7.6 Health impacts

7.7 Ecology

7.8 Hydrology and water quality

7.9 Material assets – socioeconomics

7.10 Traffic and transport

7.11 Telecommunications and aviation

7.12 Soils, geology and hydrogeology

7.13 Air and Climate

7.1 Policy

7.1.1 The national policy context for the proposed development is set out in detail in chapter 3 of the EIS. It is evident from the Board's decision under PA0038 that it accepted that national and European policies supported renewable energy development including wind. For sake of completeness, I would briefly highlight the binding obligations on the State under the *EU Renewable Energy Directive 2009/28/EC* to achieve 16% of overall gross energy consumption to be from renewable sources by 2020. Under the *National Renewable Energy Action Plan 2010* (NREAP), the Government has set a target of 40% electricity consumption from renewable energy sources (RES-E target) by 2020, with a target of 10% and 12% for consumption from renewable energy sources for transport (RES-T) and heating and cooling (RES-H&C) by 2020 in order to achieve the overall target of 16%. It should be noted that neither NREAP, nor the Directive, set targets for the proportion of renewable energy from specific sources, such as wind, biomass, etc.

7.1.2 The international and national policy context has not materially changed since the decision of the Board on 04/02/16, however it is evident from EU policy documents published since 2010, including *2030 Climate and Energy Policy Framework* (European Council, 24/10/14) which endorsed a binding EU target of at least 40% reduction in GHG emissions by 2030 and a binding EU target of at least 27% is set for the share of renewable energy consumed in the EU in 2030, that the targets for renewable energy are likely to significantly increase from 2020.

7.1.3 Under the Government's *Strategy for Renewable Energy: 2012-2020* (DCENR, 2012), it is a strategic goal (no.1) [to provide] '*Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets*.' Key actions include inter alia supporting delivery of the 40% target for renewable electricity through the existing GATE processes; overcoming environmental, permitting and emerging regulatory barriers and streamlining authorisation and planning processes and '*to assist in developing Local Authority Renewable Energy Strategies for renewable energy development commensurate with spatial planning and environmental needs*'. In contrast with the *Offshore*

Renewable Energy Development Plan (DCENR, 2014), there is no spatial dimension in the strategy.

7.1.4 The *Strategy for Renewable Energy* recognises the market possibilities for onshore wind projects of significant scale, including the potential to export to the UK market, possibly facilitated by the development of commercial large scale electricity storage. '*The strategy envisages that Ireland's 2020 renewable electricity target can be met by onshore renewable generation, primarily from wind. This informed the decision in 2012 to confine the Renewable Energy Feed In Tariff (REFIT 2) support scheme to onshore wind*' (p.11). It can therefore be seen that national policy goes beyond existing EU binding targets, with onshore and offshore wind energy considered of broader strategic economic importance to the state. As highlighted by the applicant in its Planning Report for Castletownmore Wind Farm, Co. Meath[16], the Board is required to have regard to '*the national interest and any effect the performance of the Board's functions may have on issues of strategic economic or social importance to the State*' under the *Planning and Development Act, 2000*, as amended (section 143(b)).

7.1.5 The principle of wind farm development is therefore not in question; however, it is evident from the Board's refusal under PA0038 (for 46no. wind turbines in three clusters) that the means of implementing this policy across the state is at issue. The Board's refusal to PA0038 was on grounds of unacceptable impacts on the local residential populations and on the landscape and cultural heritage of this area with specific reference to '*the scale, extent and height*' the wind farm which it regarded as a '*very large development*' not envisaged under the Wind Energy Development Guideline (2006) '*for an area primarily characterised as a hilly and flat farmland landscape and in such proximity to high concentrations of dwellings*'.

7.1.6 The Boards decision to refuse permission for 47no. wind turbines under PA0041, is also relevant to the means implementation of the said policy. The reasons for refusal included grounds of premature development in the absence of a national wind energy strategy with a spatial dimension, or wind energy strategies at

[16] Albeit in the context of 'national interest' and potential fines for non-compliance with the binding targets of the Directive.

local level, given the scale and extensive geographical spread of the proposed wind farm straddling the boundary between two counties. The Board did not include a similar reason under PA0038, which, although a wind energy development is similar scale (46no. turbines), was more restricted in its geographical spread and was contained within a single county. Furthermore, unlike the Meath County Development, the Kildare County Development Plan 2011-2017's Landscape Character Assessment did not provide any guidance on the differing potential for wind energy development within its defined landscape character areas. Although the policy context has not changed in the interim, the Board may consider the reason to be less pertinent to the current proposal, being reduced to 25no. wind turbines standing within a single cluster.

7.1.7 The *Draft Renewable Electricity Policy and Development Framework - Draft Strategic Environmental Assessment Scoping Report* (DCENR, 02/02/16[17] states, '*Following consideration of the submissions made in response to an initial consultation, the Minister has decided to formulate a Renewable Electricity Policy and Development Framework (with a spatial dimension), replacing the previous approach*' (p.7)[18]. The framework intended inter alia to:

- '*set out a clear national policy context to facilitate renewable electricity developments at large scale on land*

- *broadly identify a limited number of suitable, strategic areas in Ireland for renewable electricity generation of scale (these can be incorporated into a revised National Spatial Strategy, Regional Guidelines and development plans subsequently) having regard to considerations of amenity, heritage and efficacy;*

- *provide guidance to planning authorities, including An Bord Pleanála, when considering proposals for renewable electricity generation, supplementing the guidance contained in the existing Wind Energy Development Guidelines for Planning Authorities, 2006;*' (p.7)

[17] Decision PA0038 was signed 04/02/16.
[18] Under *Strategy for Renewable Energy 2012-2020*.

At time of writing, the final framework document has yet to be published. Given the scale (large spatial extent and tall height) of the proposed development and the precedent a grant of permission would set for similar development within the region, the Board may consider it reasonable to determine the proposed development premature pending the adoption of a *Renewable Electricity Policy and Development Framework.*

7.1.8 The *Regional Planning Guidelines 2010-2022* recognises the potential for wind energy development and (strategic recommendation ER6) supports policies that would facilitate opportunities for clustering activities having a tangible locational requirement outside, including those relating to wind energy. But it also recognises the need for a spatial policy to guide such development across the region, suggesting (PIR34) that larger wind energy projects should be informed by a study on wind energy potential by local authorities (jointly) in the GDA to establish regionally consistent new land-use policies and objectives and associated development management guidance. I am not aware that any such study has been completed.

7.1.9 The WEDG 2006 remains statutory guidance for wind energy development, offering advice to planning authorities on wind energy development through the development plan process (e.g. plan-led) and in the determination of applications for permission[19]. It advises that '*The development plan must achieve a reasonable balance between responding to overall Government Policy on renewable energy and enabling the wind energy resources of the planning authority's area to be harnessed in a manner that is consistent with proper planning and sustainable development… within the context of a "plan-led" approach* (p.9), informed by sieve analysis to identify areas suitable for wind energy, and highlights possible conflicts that may arise with natural and built heritage and with tourism and recreation (p.15). Whilst it does not constitute national or regional spatial policy, it includes key considerations in the design approach to wind energy development in terms of siting, spatial extent and scale, cumulative effect and spacing, layout and height of wind turbines having regard to its location within one of six landscape character types and their particular

[19] The targeted review of the WEDG, addressing noise, proximity and shadow flicker, is yet to be published.

sensitivities. The general principle of wind energy development can be considered acceptable within any of the six landscape character types, subject to the aforementioned design and layout considerations[20].

7.1.10 The WEDG recommends different scales of spatial extent (generally either small or large) and turbines of different heights (short, medium or tall) as appropriate for different landscape character types. The Board considered the application site under PA0038 to be predominantly '*flat and hilly farmland*', where wind energy development should generally be limited to those of small spatial extent and where medium turbine height is preferred (but tall may be may acceptable). Whilst the current application site is contained within the same landscape, the applicant has made a detailed argument concerning the categorisation of the landscape character type of the site having regard to the proportion of the site claimed to fall within '*flat peatland*' landscape character type. This issue warrants a more detailed assessment (see s.7.2 *Landscape and Visual*, below).

7.1.11 The county policy context remains unchanged since the Board's decision on PA0038. It is an objective of the current plan that Meath County Council to investigate the potential of renewable energy identified in the initial assessment areas with a view to developing a renewable energy strategy for the County (p.196). Section 8.1.5 Wind Energy Development acknowledges the plan led approach required under the WEDG 2006 and that the Landscape Characterisation Assessment identifies areas of the County that are sensitive to wind energy development from a landscape perspective. It is also the aim to promote a policy of preferential avoidance of siting wind energy projects in Natura 2000 sites, or sites that are on the flight lines of wintering birds unless it can be proven that there are no risks to the integrity of the sites (by carrying out Appropriate Assessment).

7.1.12 The applicant indicates that the site is located within LCA 3 (North Navan Lowlands) which is indicated as of moderate landscape value, of medium sensitivity and of regional importance and which is identified as having '*medium potential capacity'* to accommodate wind farms and turbines. However, having reviewed the Council's LCA maps and the proposed site layout plan, it is apparent that turbine T4

[20] Table 1 p.78.

is located within LCA20 (Blackwater Valley) which is indicated as of very high landscape value, of high sensitivity and of regional importance and as having '*medium to low potential capacity*' to accommodate wind turbines. The more expansive development proposed under PA0038 was also contained principally within LCA3, with the southwest section encroaching on LCA4.

7.1.13 The Development Plan does not define what is meant by low, medium-low, medium or high '*potential capacity to accommodate wind turbines*' and the determination of same therefore requires more in-depth assessment having regard to the specific landscape character context and the aesthetic considerations in siting and design under the WEDG.

7.1.14 To provide the Board with a broader context of the Council's policy approach, it should be noted that the wind energy development is effectively not permitted within only one of the 20 LCAs, Loughcrew and Slieve na Calliagh Hills (LCA19). It does not rule out wind farm development in other of its most highly valued (exceptional), sensitive (high) and important (international) landscapes such as LCA5 Boyne Valley. No LCA has rating higher than '*medium potential capacity*' to accommodate wind farms in County Meath[21]. It should be noted that the landscape character areas under the LCA do not align with the landscape character types under the WEDG.

7.1.15 It is the policy of the Council (EC POL 3 and EC POL 4) to encourage the production of energy renewable sources, including wind energy specifically, subject to normal planning considerations and to environmental and landscape sensitivity, in accordance with Government policy and having regard to the Landscape Characterisation Assessment and to the WEDG (2006). It is also policy (EC POL 21) to support the preparation of a study of wind energy potential by local authorities, jointly, in the GDA.

7.1.16 **Conclusion** –Wind energy development is supported by European and National policy concerning the reduction of CO^2 and GHG emissions. It is also

[21] Of 20 LCAs, five LCAs have 'medium', three have 'low-medium', 11 have 'low' and one has 'no' capacity to accommodate wind farm development.

supported by regional and local policy documents. The need for and the intention to provide improved spatial dimension for planning the future development of wind energy development is recognised at national, regional and local policy levels, but this has yet to be solidified in an adopted policy document at national or regional level. In particular, the *Draft Renewable Electricity Policy and Development Framework,* which intends providing a broad spatial dimension identifying suitable strategic areas for renewable energy generation of scale to inform the revised NSS, Regional Planning Guidelines and development plans, is still awaiting publishing and no relevant regional study has been completed jointly by the Local Authorities of the GDA.

7.1.17 Meath County Council has adopted an approach to wind energy development based on the differing potential of its defined Landscape Character Assessment areas to accommodate wind turbines and / or wind farms, subject to consideration of normal planning issues and environmental and landscape sensitivities. Wind energy development may be regarded as open for consideration within the two landscape character areas (LCA3 and LCA20) under the Development Plan and as generally acceptable in principle under WEDG 2006, subject to detailed consideration of *inter alia* design and siting considerations, including spatial extent of the wind farm and height of turbines within specific landscape character types.

7.1.18 It is in this context that consideration of the reduced spatial extent of the current wind energy proposal (reduced from 46 turbines to 25), and the applicant's submission that they are willing to accept a reduction in overall tip-height to 159m from 169m (if deemed necessary), warrants more detailed assessment as set out below.

7.2 Landscape and Visual impact

7.2.1 The potential impact of the proposed development in terms of visual amenity and the landscape and consequential impacts on cultural heritage and tourism, is raised by the planning authority, prescribed bodies and the majority of observers.

These issues are addressed expansively by the applicant, in the '*Planning Report for Castletownmoor Wind Farm*' and in the EIS, chapter 13 Archaeology, Architecture and Cultural Heritage, chapter 14 Landscape and Visual, and in Appendix I6 Residential Amenity Assessment (but not in chapter 10 Human Environment, to which I6 is stated as appended, according to the Planning Report).

7.2.2 **Broad landscape character type** – At the outset I would highlight that the recommended design response for wind farms under WEDG (section 6.9) differs based on six broad landscape character types: mountain moorland; hilly and flat farmland; flat peatland; transitional marginal land; urban / industrial; and coast. The applicant's landscape and visual assessment and justification of the scale of the proposed development is largely based on the contextual landscape (within <10km of the site) containing a balance of landscape characteristics from both *Flat Peatland* and *Flat and Hilly Farmland*, that is, a broad scale land use pattern consisting of cutaway peatland, scrubby peatland fringes and coniferous forest plantations, combined with large farmed fields defined by mature tree lines and tree-lined hedgerows. It is on this basis that the applicant considers the proposed development not to be over-scaled in terms of spatial extent or turbine height for this particular setting, and to be consistent with the WEDG. The applicant also considers the differing guidance applicable to each of the two landscape character types are only '*slightly contrasting'*.

7.2.3 Having inspected the site and its environs and having reviewed sections 6.9.2 *Hilly and Flat Farmland* and 6.9.3 *Flat Peatland* of the WEDG, I am satisfied that the application site and its surrounding context overwhelmingly fall within the *Hilly and Flat Farmland* character. It comprises '*a patchwork of fields delineated by hedgerows varying in size; farmsteads and houses are scattered throughout, as well as occasional villages and towns…; and a working and inhabited landscape type*'. The peatland area, whilst being a locally significant feature central to but largely outside of the site, is a discrete landscape feature within the encompassing farmland context and it does not constitute '*a vast planar*' with sparse evidence of human habitation[22]. A visit to wind energy developments on flat peatland areas, such as at Mount Lucas, clearly illustrate why there are such contrasting planning

[22] See s.6.9.3 Flat Peatland, WEDG (2006).

considerations arising in hilly and flat farmland areas, as emphasized in the guidelines. I do not consider of great relevance the applicant's argument that the subject bog is proportionately a much greater influence on the character of the current, more limited site area, notwithstanding that the reduced spatial extent of the current development may go some way to address the Board's refusal.

7.2.4 The concerns raised in the WEDG for the siting and design of wind turbines on *Hilly and Flat Farmland* is very different from those for *Flat Peatland* and include '*respect for scale and human activities, with due regard given to houses, farmsteads and centres of populations*', with development generally limited to small wind energy developments (7no. is indicated in figure 2(b)) and medium height (typically 75m-100m tip-height) being preferred, although tall turbines (>100m) *may* be acceptable[23]. It is not unduly concerned with visual impact on hilly flat landscapes, themselves, which it considers '*usually not highly sensitive in terms of scenery*' (p.52). In contrast, the preferred approach to *Flat Peatlands* is one of large-scale response in terms of spatial extent and turbine height. There is precedent for turbines of the height proposed – the applicant cites PA0029 (Oweninny, Co. Mayo), PA0032 (Yellow River, Co. Offaly), PL.244903 (Yellow River and Meenwaun, respectively, Co. Offaly) and. Whilst Oweninny is wholly incomparable in terms of landscape character, the landscape character areas associated with the Yellow River and Meenwaun wind farms are somewhat closer to that of hilly and flat farmland, however both are surrounded by extensive flat peatland and Meenwaun is not comparable to the current application site in terms of the density and extent of human habitation evident, being very lightly populated and with sparsely spread with homesteads.

7.2.5 The proposed turbines, at 169m tip height and hub height of 104m are at the largest scale of turbines referred to under the WEDG (60m tip-height is considered short, 75m-100m medium and over 100m tip-height tall[24], but it also notes 100m hub height as near-future technology in 2005[25]) are consistent with the approach recommended for *Flat Peatlands.* For *Flat and Hilly Farmland* medium height is

[23] See table 1: *Matrix summarising landscape character based recommendations*, p.78, WEDG 2006
[24] Footnote 12, p.36.
[25] P.12.

typically preferred under WEDG, although the Board will be aware that tall turbines may also be acceptable[26]. But it also advises that the spatial extent be limited to small wind energy developments and that the establishment of sufficient distance from buildings likely to be critical to avoid dominance by wind energy development. Figures 2(a) and (b) of the WEDG (p.53) provide an indication of what constitutes large (15no.) and small (7no.) spatial extents for wind energy development within the hilly and flat farmland landscape context. It is therefore evident that the proposed wind farm, notwithstanding the reduction it spatial extent from 46no. turbines in three clusters under PA0038 to 25no. turbines in a single cluster under this current application, can still be defined as of *large* spatial extent under the WEDG.

7.2.6 I am satisfied that the large spatial extent of the proposed wind energy development and tall height of the proposed turbines is contrary to the recommended approach to wind energy development in hilly and flat landscape contexts under the WEDG. My interpretation of the guidance is generally consistent with the decision of the Board to refuse permission for PA0038, on the basis that the proposed development did not align with the Wind Energy Development Guidelines which '*did not envisage the construction of such extensive large scale turbines in an area primarily characterised as a hilly and flat farmland landscape and in such proximity to high concentrations of dwellings'*.

7.2.7 **Landscape and Visual impacts** – Chapter 14 of the EIS addresses landscape and visual impacts, including a very detailed, expansive and systematic Landscape and Visual Impact Assessment (LVIA) which comprises:

- a **Landscape Impact Assessment** (LIA), which relates to changes to the physical landscape (resource-based impacts), its character and how it is experienced;
- and a **Visual Impact Assessment** (VIA), which relates to changes in the composition of views as a result of changes to the landscape and how such changes are perceived in terms of impact on visual amenity (population-based impacts).

[26] Table 1, p.78.

7.2.8 The assessment is supported by the zone of theoretical visibility detailed in maps 4a(i), (ii) and (iii), a route screening assessments (i.e. visibility from the public road network) set out in maps 4.A.3(i) and (ii), three books of photomontages (images VP1-VP59 and H1-H17). In addition, the *Planning Report* addresses similar issues and there are a number of detailed appendices, including a *Review of Key Landscape and Visual Issues* (by Stephen Halliday (Irl) Ltd) and the *Residential Visual Amenity Assessment* (also by Halliday) with its own appendices[27]. Related issues arise under chapter 10 Human Environment and chapter 13 Archaeology, Architecture and Cultural Heritage.

7.2.9 The methodology and assessment criteria for landscape and visual impacts is based on the *IEMA Guidelines for Landscape and Visual Impact Assessment Guidelines* (2013). However, in my professional opinion, the scale and complexity of the assessments are such as to make the identification of the most obvious significant effects more difficult[28].

7.2.10 The applicant submits that the hub structure is the most visually prominent element of the turbines. Section 2.3.2.1 of the EIS states that '*each discipline within the EIS have appraised the model of turbine which would yield the largest impact'*, however the LVIA is based on 169m-high wind turbines, with hub height of *104m* and rotor diameter of 130m[29], whereas the drawings accompanying the application show a typical hub-height of 110m. The maximum possible hub height is c.113m for a 169m tip-height turbine[30]. The assessment is therefore not based on the worst case scenario.

7.2.11 Landscape Impact Effects (including impacts on landscape setting of items heritage) – The GLVIA (p.70) explains that the '*assessment of landscape effects deal with the effects of change and development on landscape as a resource …[and] is concerned with how the proposal will affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character*.'

[27] Appended to the RAA report contained in appendix I6, EIS Vol.3.
[28] GLVIA (p.41) notes that overly complex assessments risks obscuring significant effects.
[29] The actual hub height and rotor will not be determined until procurement stage, subject to an overall tip height of 169m.
[30] Calculated based on a Vestas V112 from table 2.2 of EIS (chapter 2).

7.2.12 The applicant considered the most highly sensitive physical landscape receptor to be the Blackwater River corridor, a designated European Site. In terms of landscape setting and landscape character the UNESCO World Heritage Site of Brú na Bóinne and the candidate site of the Hill of Tara were considered the most sensitive receptors, but other important heritage location listed in section 14.8.3.3 (such as Lough Crew, Hill of Skryne, etc.) were also noted as sensitive to landscape setting. Of the 20no. landscape character areas defined under Appendix 7 of the County Development Plan, the applicant considered LCA20 (Blackwater River Corridor) and LCA4 (Rathkenny Hills) to be highly sensitive due to the general sense of heritage derived from the concentration of stately houses and associated demesne landscapes. In addition, the scenic routes and views designated under the MCPD 2013 were considered sensitive on the basis that they represent a consensus on scenic amenity.

7.2.13 The predicted significance of impact on landscape character is set out under table 14.11 of the EIS, with the main points summarised under section 14.11.3.1. The highest level of impact on landscape is on the River Blackwater (LCA20), the impact being rated 'moderate' based on the landscape being of 'high-medium' sensitivity and the magnitude of the impact being 'medium-low'. The applicant submits that the landscape and heritage impact on LCA20 was mitigated at pre-planning stage through removal of those wind turbines proposed nearer LCA20. However, turbine T4 is actually located within River Blackwater LCA20 and turbines T1, T2, T3, T5 and T14 are located within 2km of the LCA and another seven (T6, T8, T10, T13 and T15-17) are within 3km. The likely potential impact on LCA20 would therefore be far greater than is acknowledged in the EIS. Whilst the impact on the landscape character will vary with distance and openness of view, photomontage VP34, taken from within LCA20 c.1.75km from the nearest turbine, T4, gives some indication of the significance of impact.

7.2.14 The potential impact on LCA3, 'North Navan Lowlands', is deemed moderate-slight, with the impact on the immediate vicinity of the site (classified as flat rural and bog landscape and south-central study area) being medium and the sensitivity of the area being medium-low, and the impact on central study area lands to the northeast (transitional drumlin zone) being medium-low, but the landscape being rated slightly

more sensitive at 'medium'. It is submitted that whilst the subject landscape contains some heritage assets, the overall character of the landscape is not as influenced by them as neighbouring LCA4 and LCA20. The magnitude of landscape effect is considered mid-range largely due to the assimilation of the turbines within a productive rural landscape of relatively broad-scale terrain and land-use patterns.

7.2.15 The impacts on all other landscapes are deemed slight, slight-imperceptible or imperceptible, including LCA5 (Brú na Bóinne, Hill of Slane), LCA12 (Hill of Tara, Hill of Skryne), LCA10 (Hill of Ward) and LCA19 (Lough Crew Hills). The assessment of potential landscape impacts on the surrounding LCAs would appear to relate in the main to visual impacts on the broader setting of key heritage sites. I would accept that the impact on Brú na Bóinne is slight, partly due to separation distance[31] but mainly due to the low level of inter-visibility between the complex and the proposed wind farm due to the rolling nature of intervening lands which largely obscures the wind farm. The Council Planning Report raised no concerns and the Conservation Officer agreed that the change was negligible and the CAAS report (prepared for Council and appended to its submission) did not consider the impact to be significant. Although the Council's Heritage Officer raised concern regarding cumulative visual impacts on the UNESCO WHS, I would point out that contrary to the applicant's assertion that turbines are already a familiar feature of its middle distance background setting of Brú na Bóinne, only the rotor of one of the cluster of turbines (81m tip height) in Leaby Cross and Dunmore, Co. Louth appears to be visible above the northern horizon (see VP27) when viewed from Knowth[32].

7.2.16 In terms of the impact on the Tara Complex, the proposed wind farm, in itself and taken cumulatively with other permitted wind energy developments, will be clearly visible in its entirety from certain parts of that heritage site (VP15, H10-H14) and would form a significant feature in the landscape to the north, notwithstanding the separation distance (c.19km at the nearest point and c.25km at the greatest). The salience of the wind energy development will be further emphasized in the movement of the turbines. I would not agree with the impact rating of *slight-*

[31] The nearest proposed wind turbine (T13) is c.16.2km from the outer buffer Brú na Bóinne WHS, c.17.5km from the core area boundary, c.17.8km from the site of Knowth, c.19km from Newgrange and less than 21km from Dowth and the visitor centre.
[32] Note, I was not able to access Knowth which was closed to public access, but I could view the turbine from the adjoining OPW lands.

imperceptible but consider the landscape impact to be significant. The significance of the potential visual impact is increased due to the outward looking nature of this heritage site.

7.2.17 The Council's Planning Report similarly considered the proposed development to be likely to detract from the landscape setting of the Tara Complex, which is a candidate UNESCO WHS. The CAAS report considered the impact on Tara Complex to be significant and adverse. The Council's Conservation Officer and Heritage Officer both advised that the opinion of an independent expert on World Heritage Properties be sought concerning the potential impact on both the Tara Complex and Kells Early Medieval Monastic site and the likely implications for their potential designation as World Heritage Sites. This recommendation was not included in the planning authority's 14no. points of further information, but the Council did advise that revised photomontages were required to address concerns about visual impacts on these and 10no. other sites (from the CAAS report), including consideration of the erection of pole structures or balloons to tip height.

7.2.18 The magnitude of visual impacts on the expansive Tara Complex site is much more evident in photomontages H10-H14 compared to VP15, which formed the basis of the applicant's assessment. But I am not satisfied that the applicant has justified that H10-H14, themselves, necessarily constitute the worst-case scenario views from Tara Complex. In my opinion, it would not be feasible to adequately mitigate this potential impact by condition. Whilst there will be a visual impact on Kells, and I note the Council's concerns regarding potential visual intrusion from partial views of wind turbines visible adjacent to St Columba's Church at the centre of the historic town and Early Medieval Monastic site, I consider it less sensitive than the Tara Complex due to the usual visual clutter associated with urban centres and I would not consider the impact detrimental notwithstanding the far nearer proximity (<4km).

7.2.19 The LVIA summarises the landscape and visual impacts on other significant landscape and heritage sites including Hill of Skryne (LCA12, VP14), Hill of Ward (LCA10, VP24), Hill of Slane (LCA5, VP18), Lough Crew Hills (Slieve na Calliagh, LC19, VP9), etc., as *imperceptible* to *slight-imperceptible* (or visual impacts as *negligible*, *low-negligible* or *low*), largely due to the separation distance from the development site (tables 14.11 and 14.13 refer). I would disagree with the

applicant's estimation of low impacts on the elevated sites of Skryne (VP14), Ward (VP24) and Lough Crew (VP9) for the similar reasons as applies to the Tara Complex. These are open and outward looking sites which actively invite the viewer to look out onto the surrounding lowland landscape as a major part of the experience of visiting the historic heritage. The CAAS report rated the landscape and visual impacts on these sites as significant and the Council's Planner's Report concluded that the proposed development would significantly alter the established appearance of a large part of north and central Meath and advised that further information be sought in respect of the 12no. receptors for which significant impacts were identified by CAAS[33].

7.2.20 This is not least for the elevated Lough Crew site (situated within LCA19 in the northwest of the county), which offers dramatic open views across the landscape, but which is also specifically orientated (i.e. the portal to the tomb) to the east to the rising sun on the equinox, along which axis the proposed development would be centrally located. The proposed development is therefore located in a critical position relative to a crucial element of the experience (and history) of the site. Although the EIS addresses the potential impact on the view from the site in the context of the equinox sunrise (Vol.4.E), it fails to address the significance of this view otherwise. Lough Crew is oriented to the east, directly towards the proposed wind farm (within 19km) and the visitor's view is directed from the tomb portal towards the location of the development, regardless of the equinox sunrise.

7.2.21 In addition, there are already several large clusters of turbines clearly visible on the distant hills to the north and northeast and several other wind farm developments to the northeast and to the south of Lough Crew that are permitted but as yet not constructed[34]. Although geographically extensive, the existing turbines visually they are confined to a limited section of the view from Lough Crew, close to the northern horizon. They are more distant (c.25km compared to c.19km) and are significantly smaller turbines than those proposed under the current application. The visual

[33] But also some regionally important views to the County Road between Rathkenny and Parsonstown Demesne (VP19, and VP20) and locally important views VP23, VP6, VP16.
[34] Based on the information on map 2.11 *Wind Farms in the Vicinity*, EIS Chapter 2, and that available at http://www.thewindpower.net/country_maps_en_18_ireland.php (28/03/17), it would appear that the visible turbines belonged to Mountainstown, Ratrussan/Bindoo and Gartnaneane wind farms. Several others, including Teevurcher, Taghart and Raragh wind farms to the north and Crowinstown and Dryderstown to the south are permitted but not constructed.

impact of the Castletownmoor development on Lough Crew must be seen in the context of cumulative impact with the existing wind farms in Cavan. Whilst the EIS does address cumulative visual impacts (s.14.12.3) in a seemingly thorough and systematic manner and does acknowledges (table 14.16) that cumulative visual impacts will result at Lough Crew (through combined and succession views), it provides no actual assessment of the significance of that impact on Lough Crew, and the existing and permitted wind turbines are not shown in photomontages within the context of views from that site. I address this issue further under cumulative impacts, below.

7.2.22 LCA19, located c.16km to the west of the application site, is the only one of the 20 landscape character areas in the Council's LCA identified as having *no potential capacity* for wind turbines due to the historic significance, relative remoteness and unspoilt nature of this LCA, particularly its hilltops. But the adjoining LCA18 and LCA17 (to the west and east, respectively of LCA 19) are identified as having low potential to accommodate such development due to potential for adverse impacts on views from Lough Crew, further emphasizing the sensitivity and importance of the Lough Crew site. I am satisfied that the visual impact of the proposed Castletownmoor wind farm, in itself and taken cumulatively with existing and permitted wind energy development to the north will significantly adversely impact on Lough Crew.

7.2.23 I would question the rating of impact on the Hill of Lloyd (VP8) as *moderate-slight* given its proximity to (c.5.5km to T4), the open views over the site and the direction of views from the hill which fall naturally towards the nestled town of Kells and the open lowlands beyond. The Council's CAAS report rated the level of potential impact on the Hill of Lloyd as *profound / very high significance* and the Council advised that further information was required concerning visual impact thereon.

7.2.24 It is clear that mid and north county Meath have a very high density of pre-historic (and other) heritage sites (maps 06 and 07 of the Council's LCA show this clearly), many of which are elevated relative to the surrounding landscape and are strongly related to and dependent on their wider landscape context and / or long distance views. The Board needs, therefore, to consider whether a development as expansive and salient as a wind farm of such high turbines is an appropriate

development within a landscape that is notable for such significant and interrelated heritage items. The GLVIA advises that archaeological or historical or cultural interest can add to the value of the landscape as well as having value in their own right and advises that historic landscape characterisation is complementary to LCA. I am not satisfied that the applicant has attributed appropriate weight to the landscape and visual impacts in this context, in particular regarding the potential for significant adverse impacts on the landscapes associated with highly sensitive and valuable heritage items such as Lough Crew and the Hill of Tara. Any judgement on the acceptability or not of the landscape and visual impact in the heritage context of County Meath will, however, ultimately be subjective, notwithstanding the employment of any systematic and methodical approach.

7.2.25 **Visual impact assessment** – The VIA submitted by the applicant looks at how changes in the composition of views are perceived and effect visual amenity. The GLVIA states that the purpose of the VIA is the assessment of how the surroundings of individuals or groups of people may be specifically affected by changes in the content and character of views as a result of the change or loss of existing elements of the introduction of new elements.

7.2.26 The applicant submits (s.14.10.1) that tall turbines are used as part of its mitigation strategy, with the *slightly* increased sense of visual dominance imparted by the proposed 169m high turbines 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. The applicant indicates that several case studies and surveys, including one by the Fáilte Ireland in 2008, indicate that respondents preferred wind farms containing a small group of large turbines to a large group of small turbines (55% versus 18% in the Fáilte Ireland study). The applicant does not provide details of the survey, including what was deemed 'tall/large' in the survey, to enable the Board understand the import of the survey's findings. I would note that an updated survey (Fáilte Ireland, 2012) found the respondents' preference was for a group of 5 turbines, then two groups of 10 and finally a wind farm of 25. In comparison the proposed development would seem to comprise both numerous and large turbines and therefore I am not satisfied that the applicant has demonstrated that these surveys support the proposed layout.

7.2.27 In terms of visual impact on sensitive receptor sites, only six of the 59no. sites studied are predicted to have a significance of visual effect of moderate or higher. VP36 local road at Castletownmoor (N of site), and VP45 Connells Crossroads (N of site) are determined to be likely to have a *substantial-moderate* impact; a *moderate* visual impact is predicted at VP6 close to a house on local road at Kilbeg Upper (NW of site), at VP8 Hill of Lloyd (W of site), at VP32 housing estate Carlanstown (W of site), and at VP57 street in Kells (W of site). The detail of the predicted visual effect is contained in Appendix M of the EIS, not within chapter 14 due to high number of visual receptor points examined.

7.2.28 **Impact on residential receptors** – The applicant[35] correctly points out that the overall visual impact on residential receptors is reduced relative to PA0038 due to the reduced spatial extent of the proposed wind farm from 46no. to 25no. turbines. There are now only 136no. residential dwellings within 1km, compared to 416no. previously (a reduction of c.67%). However, the impact on those 136no. receptors is largely unchanged.

7.2.29 The applicant[36] cites precedent in the Board's decision to permission for wind energy development of this spatial extent and height in comparative areas, such as PA0032 (Yellow River Wind Farm, Co. Offaly) where there were c.200 houses within c.1.13km of a turbine. Extending the catchment slightly, as has been done in the applicant's noise impact assessment, demonstrates the relatively densely populated nature of this part of rural county Meath, where 452no. sensitive receptors are identified by the applicant within 1.31km of the proposed turbines. I am not satisfied that the two areas are comparable.

7.2.30 The applicant commissioned Stephenson Halliday[37] to conduct a *Residential Visual Amenity Assessment* (contained in an appendix to Chapter 10 Human Environment, EIS) of all properties within 1km of the site. It is worth noting that the detailed RVAA is contained in an appendix (1) of appendix I6 (Part 2 of Vol.3 of EIS) which contains a broader Residential Amenity Assessment and which forms part of Appendix I to

[35] In the Stephen Halliday Report.
[36] In the Planning Report.
[37] Stephenson Halliday Ltd is an environmental planning, landscape architecture and design consultancy, specialising in, inter alia, renewable energy development, with particular expertise in the landscape and visual assessment of onshore wind farm proposals (completed LVA for over 150 onshore wind farm proposals throughout the UK).

chapter 10 of the EIS. Neither the RAA nor the RVAA appear to form part of Chapter 10 Human Environment and do not contribute to any conclusions on potential impacts on Human Beings in the EIS. The report is relied upon in the conclusions on residential / community visual impacts in chapter 14 and in the applicant's Planning Report. The Halliday report (p.14) concludes that: there would be no unacceptable effects on the visual component of residential amenity whether in the case of any individual dwelling, group of dwellings or settlements and that at no individual property would the turbines be visually overbearing, overwhelming or oppressive; the effects on outlook would not cross the public interest line here at Castletownmoor; and there would be no potential for unacceptable effects on living conditions on individual dwellings beyond 2km.

7.2.31 Regarding Stephen Halliday's assertion that no individual has the right to a particular view, whilst correct, this is quite the issue at hand. The proposed development wind farm will not obscure the view from residential properties and the outward view of the surrounding landscape will generally remain open and visible as the turbines are slender structures. The critical visual effect is visual intrusion onto residential properties, resulting in visual overbearing, oppression or intrusion. I note the *Residential Visual Amenity Assessment* submitted by the applicant[38], but notwithstanding its systematic and ostensibly objective approach, I am not convinced by it. In particular, I note that it does not expressly take into account the height and blade spread of the proposed turbines and that the photomontage views selected are not those that would be experienced by the nearest clusters of dwellings (e.g., in particular nos.156-160 and 229-269). It is not clear how the assessor determined each property's principle views (i.e. from windows) and the assessment takes no account of the impact on amenity space, which forms a significant element of the residential amenity of a property. Also, the grading of properties in terms of distance from the proposed turbines is very coarse (0-800m; 800m-1km) and does not explain or acknowledge any potential for increased impact arising on the nearest dwellings, i.e. those at c.500m distance.

7.2.32 Photomontage VP36(i) best illustrates the scale of the turbines close to the 500m mark. The turbine is c.560m distant from the camera point, whereas the nearest

[38] Appendix 1 of Appendix I6, EIS Vol.3, which informs Stephen Halliday Report and the applicant's Planning Report.

dwelling (apparently no.158[39]) is c.522m from T19 at the centre of the said photomontage. The side profile view of the turbine presented in the VP36(i) would occur only in a northerly wind (but a similar profile would obviously occur in a southerly), whereas the prevailing wind from the southwest would mean the turbine would normally present a broader profile to the nearest dwellings and the image should not be considered the worst-case, or even the common case scenario. Similarly, I do not consider photomontages R5 or R6 (appended to the RVAA) to represent the worst-case scenario for residential properties located to the southeast, or R4 (mislabelled T4 on Figure RVAA01) for properties to the southwest. Whilst the applicant has attempted to be objective in categorising the potential impact, there is necessarily subjective judgement in determining what is significant and / or negative, including distance, the number of turbines visible and the obliqueness of view. That a clear methodology is set out, does not make that judgement any less subjective.

7.2.33 The RVAA does not explicitly examine the visual impact of the vertical component on amenity. Whilst horizontal distance may be seen as a proxy, the impact of distance on the vertical component in the view is not set explained and the RVAA would only seem to take account of the horizontal spread rather than a combination of the two (see section 3.3 of the RVAA). The RVAA only takes account of views from main living room windows, but does not explain how those windows were determined without site access and consultation with the property owner. Limiting the assessment to impacts on the main living room windows is also unduly restrictive. Residential amenity of the property has to be considered in light of the amenity offered by external private amenity space, but the RVAA takes no account of same. The impact on the private garden areas of many of the properties concerned are likely to be highly exposed to views of multiple turbines which will tower above screening afforded by garden vegetation, even where there are tall trees.

7.2.34 In the applicant's visual impact assessment in chapter 14 of the EIS, VP36 can be regarded as located near to the worst-case visual impact scenario. The viewing point is close to turbines (the nearest c.500m distant) and it is effectively surrounded by turbines in all directions and it a reasonable proxy to estimate the visual impact on

[39] This is not clear from the two relevant maps. There appear to be five dwellings - Map 10.1 Chapter 10 of the EIS shows 6, which it numbers 156-160 and 296, whereas Figure RVAA01 in appendix 1 of appendix I6, Part 2 of Vo.3 of the EIS shows five but numbers only four (156, 157, 159 and 160).

the residential dwellings immediately to the north in this farmland landscape. The applicant has determined the *visual sensitivity* of VP36 as *medium-low, which would seem low given that it is approximating the sensitivity of a residential dwelling*. The VIA does acknowledge the high level of sensitivity of residential property (in accordance with the GLVIA and as implied under section 6.9.2 of WEDG), however the methodology used dilutes the sensitivity level of this (and of all viewing points) through the unweighted-consideration of 12no. other landscape factors together (see table 14.12), some of which (e.g. sense of place) are subjective. As no one site can score highly on all factors, this reduces the level of sensitivity of all viewing locations.

7.2.35 In addition, the applicant employs little gradation in the predicted *magnitude of visual impacts*. For example, the magnitude of impact (*high*) at VP36 (c.500m distant, with views of turbines in many directions) is determined to be the same as applied to more distant VRPs (e.g. VP45 at c.1.14km) with single directional views of turbines. I do not consider this undifferentiated rating of magnitude of impact within 3km of the nearest turbine to be realistic or reasonable. Accordingly, I would conclude that the visual impacts on those dwellings located close to VP36 will be far more significant and adverse than has been determined in the EIS, would be visually overbearing, overwhelming and oppressive, possibly rating as a profound adverse visual impact, notwithstanding screening by vegetation. I would again highlight that for hilly and flat farmland, WEDG (s.6.9.2) advises that the essential key includes respect for scale and human activities and that due regard must be given to houses, farmsteads and centres of population and that the design and layout approach be generally limited to small spatial extent (7no. is indicated as small in Figure 2(b)), with medium height turbines (75m-100m tip height[40]) typically preferred although tall turbines (>100m tip height) may be acceptable[41].

7.2.36 Similarly, significant visual impacts will likely be experienced by residential properties located on the surrounding road network, particularly those within 800m, including from within LC20 to the southwest (along local road from Carlanstown N52 to Sedenrath Crossroads on R163). It can also be seen from VP32 (housings estate in Carlanstown) that visual impacts up to and beyond 1km would not be insignificant and would affect at least 137no. residential dwellings. I therefore consider it likely

[40] Footnote 12, p.36.
[41] Table 1 p.78.

that the proposed wind turbines, given their scale and proximity to residential properties is likely to significantly adversely affect the residential amenity of the extensive number of residential properties in the near vicinity.

7.2.37 The applicant has indicated a willingness to reduce the height of the proposed turbines to 159m[42], should the Board consider a reduced height more appropriate. In this regard, however, Stephenson Halliday refers to the comparative visual study contained in Appendix M3 *Considerations of Alternative Turbine Heights*[43] and concludes that the reduction would not result in a material difference[44]. Having reviewed the comparative photomontages in Vol.4C (VP15, VP19 and VP37(i) and (ii)), I would conclude that an incremental reduction in height of this order would not be particular effective as a visual impact mitigation measure.

7.2.38 **Impact on community receptors** - The EIS addresses impacts on community views under section 14.12.2.3, considering views experienced by people living, working and moving around within c.5km of the site. The applicant (referring to the Route Screen Analysis in Vol.4A of EIS) explains that it is highly likely that the turbines will be substantially screened in one aspect of the vista even if fully visible in another as vegetation within the central study area seldom allows open views in all directions, althoug brief windows of open view between screening elements is far more common. It is clear, however that the nearest residential properties, where turbines would be visually more imposing, will also have least potential for screening. The majority of the community views are ratied 'medium-low' sensitivity due to the balance between a relatively high degree of susceptibility for views from dwellings weighed against the typical rural scenes on offer, which are landscapes generally only of local value. This aspect of the assessment ignores that the development and many of the community receptors are located within the higher rated landscape of LAC20 to the southwest, where using the applicant's own rating system the visual impact would be higher.

[42] P.30/60, EIS Chapter 14.
[43] Vol.3, Part 2 of EIS.
[44] Appendix M3 only considers a single reduced height of 159m, presumably because a reduction much below this height (<150m) would not be viable, as suggested in Chapter 14 (p.30/60) of the EIS.

7.2.39 In terms of impacts on settlements, the VRPs were selected on the basis of trying to find *something of a worst-case-scenario* (p.47/60), but also include additional contextual or illustrative views to demonstrate that the worst-case views are not perceived as the typical views and that the wind farm will not be a constant feature from within the settlements considered - this only appears to relate to Carlanstown (VP32 & VP33) and to the more distant settlement of Kells (VP57 & VP58) and Moynalty (VP4 & VP5), rather than to Castletown (VP30), Lobinstown (VP31) and Wilkinstown (VP35). The EIS does not review the findings of the potential significance of the visual impact on these small settlements within 5km.

7.2.40 Table 14.13 indicates that the highest impact on a settlement will be 'moderate', concerning VP32 from Castletown and VP57 from Kells. Community receptors within the two settlements are predicted to experience the same significance of visual impact as Carlanstown, notwithstanding the greater proximity of Carlanstown to the development (c.1km compared to 3km from Kells), illustrates the influence of the *visual receptor sensitivity* rating applied by the applicant, which increases sensitivity of Kells due to the heritage value of the town. Whilst this may be relevant to Kells as a heritage, tourist and economic factor, it is less relevant to local community residents and, in my opinion, obscures the potential impact. As I've alluded to elsewhere, I do not consider the sensitivity rating applied by the applicant to community / residential amenity to be reasonable or reflective of its true sensitivity. Other heritage and amenity features are addressed separately in the EIS and those aspects of a settlement should also be considered separately from the concerns relating to residential and community impacts.

7.2.41 **Impacts on heritage** - In terms of visual impact on heritage, the visual impact assessment is concerned with views experienced by people in accordance with the GLVIA (2013) and is not concerned with heritage features contained within private land and / or those that do not attract significant numbers of heritage visitors. Private residents of stately homes / castles, or visitors thereto, are considered as residents of dwellings using *local community* VRP. The LVIA is concerned with the lay perspective, leaving expert analysis of particular heritage setting to the cultural heritage chapter (13) of the EIS.

7.2.42 Whilst Headfort House, Mountainstown House and Dowdstown House were considered by the project heritage consultant and Meath County Council to be the most important stately houses and demesnes, only Headfort House was considered in the VIA as clear views of the latter two properties were not readily afforded and the applicant considered Headfort House a more legitimate public visual receptor as it hosts a school and golf course, which is reasonable. VP53 is taken from the front (north or main elevation) of Headfort House, with VP54 taken from the golf course to the rear. Due to the screening afforded by trees and vegetation the applicant deemed the visual impact to be negligible. The orientation of Headfort House and the arrangement of mature vegetation relative to the location of the proposed wind turbines, coupled with the distance from the nearest turbine (c.1.8km from T4) would appear to be such as to mitigate the potential for significant adverse impacts on the heritage item from the VRP location. It is certain, however that the proposed wind turbines would be visible from many parts of the grounds (acknowledged in the EIS as a designated Architectural Area), which are integral to the protected structure and likely also from rooms with northern views within the house. It is likely that the proposed development will adversely affect the character of the ACA and the broader setting of the Protected Structure, however the significance of the impact is less certain to me.

7.2.43 I have greater concern for the potential impacts on Mountainstown House (c.1.25km from T21) and Dowdstown House (c.620m from T11) to the east, which are nearer to the development and would have more expansive and surrounding views. Regarding Mountainstown House, there is potential for an adverse impact on the heritage value of the Protected Structure as an intact demesne, but also to a lesser extent the impact on its residential amenity. The impact on Dowdstown House (also a Protected Structure) primarily concerns the cumulative impact on the residential amenity of the property, including its stated use as a nursing home. Neither of the two properties appear to be publicly accessible heritage sites.

7.2.44 **Cumulative impacts** - In terms of cumulative landscape and visual impacts, the EIS examined the impact of the proposed development taken cumulatively with existing and permitted and/or proposed wind energy developments (15no. in total) and with the permitted North-South Electricity Interconnector which traverses the east of the

proposed development (between wind turbines T20 and T21; T9 and T11; and T8 and T10). These are included and referenced within the VRPs.

7.2.45 The potential for cumulative impacts arise from combined visibility when viewed from one viewpoint, either in combination (where visible in same direction) or succession (where the observer must turn to view other development), and also arises from sequential effects where the developments are separately visible as an observer moves between viewpoints.

7.2.46 Overall the EIS considers the proposed wind farm to contribute an additional cumulative effect that is low (see table 14.14), and will be one of only a few wind farms in the surrounding area, and will be viewed in isolation from most receptors. In my opinion the views H10-H14 for the Hill of Tara are pertinent to cumulative impacts, offering largely unobscured views over the lowlands to the north. The distant wind farms beyond Castletownmoor do not appear to register, but the single turbine permitted at Knockumber reads as part of the Castletownmoor wind farm when viewed from this location, increasing its visual extent and impact. There is no consideration of the cumulative visual impact of Dumore and Leaby wind turbines (5no.) on Tara, but whilst they may be visible, given that these are sited c.24km distant and are 75-125.5m in height, the potential for cumulative impact may be expected to be quite low.

7.2.47 As noted above, the potential for cumulative visual impacts on Lough Crew have not been considered or assessed to any reasonable degree in the EIS, in view of the number and proximity of existing wind farms visible to the north of the site, and the number permitted but as yet not constructed wind energy development to the north and south of the site. The proposed development is not shown in the context of the said existing and / or permitted wind energy developments in the wider area. Having regard to the visibility of existing wind turbines to the north and northeast, and to the extensive wind energy development permitted to the north and south of Lough Crew, and to the location (and scale and extent) of the proposed Castletownmoor Wind Farm along the critical eastern axis between the portal of the tomb and the equinox sunrise to which it is aligned, I am of the opinion that the proposed development will significantly to profoundly adversely impact on the heritage value of this highly

sensitive historic site which is explicitly valued in the Council's Landscape Character Assessment.

7.2.48 The EIS submits, regarding cumulative impact of the North-South electricity interconnector (400kv power line supported by 43m high lattice steel towers), that the interconnector will be much less noticeable in the landscape compared to the proposed wind farm due to the lower height, the recessive grey colour and fine lattice structure which will be more commonly seen against a backdrop of vegetation than silhouetted against the skyline, and because such structures are a relatively common feature crossing the skyline. The EIS accepts there will be some cumulative impacts within 0.5km-1km of the line, but beyond that the pylons will tend to become screened (based on Route Screening Analysis) and cumulative impacts will be mid-low magnitude where are both developments are in close proximity (<1km) and reduce to imperceptible shortly thereafter.

7.2.49 Although the applicant's conclusion appears reasonable, none of the VRPs show any unobscured combined near views towards the interconnector and turbines. The most relevant VRPs that would be expected to enable the Board to assess the potential impact on sensitive receptors are VP38 and VP37, in particular, but these views are almost totally obscured by foreground vegetation and they are not representative of the worst-case scenario for affected residents at Clooney, Drakerath, Mountainstown, Dowdstown and Oristown and Clongill.

7.2.50 **Conclusion** – In my professional opinion, the scale and complexity of the applicant's landscape and visual assessments are such as to make the identification of the most obvious significant effects more difficult. In addition, they did not assess the worst case scenario, but were based on a lower hub height.

7.2.51 The main potential landscape and visual impacts relate to the Lough Crew, Tara Complex and to a range of similar, highly valuable and sensitive historic sites that are highly dependent on their elevated landscape context and their command of expansive views over the wide landscape, including the towards the proposed development site, such as the Hill of Skryne and the Hill of Ward. Indeed, the openness and outward expansive views may be regarded as critical aspects on a visitor's experience of these sites. Having inspected the sites, the surrounding

context and reviewed the photomontages and details and documentation on file, and the reports of the prescribed bodies, I am satisfied that the impact on the aforementioned sites would be significant and adverse. Regarding the impact on the Tara Complex, it may risk the candidate UNESCO WHS potential for future designated as WHS.

7.2.52 I also considered that the landscape and visual impacts on Lough Crew are underrated in the EIS. The EIS provides no assessment of the cumulative landscape and visual impact on Lough Crew from the proposed development taken with the existing and permitted wind turbines to the north and south, which are visible from the heritage site. No cumulative impact photomontages are provided for Lough Crew as is provided for the Tara Complex and other sites. Having visited the monument and having regard to the details and documents on file and the provision of the Council's Landscape Character Assessment which acknowledge the particular sensitivity of this heritage site and the LCA in which it is located, and given the view of the proposed wind farm from the portal of the tomb, which is oriented directly east towards the application site, it is apparent that the proposed development will be intrusive and will significantly adversely impact the landscape setting of this highly important heritage site. The cumulative landscape and visual impact on Lough Crew therefore has the potential to be significantly to profoundly adverse.

7.2.53 I would strongly disagree with some the of assumptions underlying the applicant's approach to the assessment, the most critical of these being the misapplication of WEDG guidance for *flat peatland* to the application site when it clearly falls within the definition of *flat and hilly farmland*. In my view this undermines the applicant's assessment of impacts on community receptors and residential property in particular and also undermines the design approach (spatial extent and height) employed by the applicant, which is contrary to that recommended under WEDG (s.6.9.2 and table 1). The visual impacts on residential receptors, especially those located to the north of VP36, which would have turbines within close proximity to the front and rear, will be of a far greater magnitude than that predicted by the applicant and would constitute a highly significant or possibly a profound visual impact on those receptors, notwithstanding screening by vegetation. The impacts on residential properties located on the surrounding road network, particularly those within 800m,

including from within LC20 to the southwest (along local road from Carlanstown N52 to Sedenrath Crossroads on R163), whilst less than that experienced close to VP36, would also be significant and adverse. It can also be seen from VP32 (housing estate in Carlanstown) that visual impacts up to and beyond 1km would not be insignificant.

7.2.54 I also have concerns regarding the cumulative impacts of the wind energy development on Mountainstown House and on Dowdstown House, taken with the permitted North-South Interconnector development. Regarding Mountainstown House the cumulative impact of the two projects will adversely impact on its heritage value as an intact demesne. The impact on Dowdstown House primarily concerns the cumulative impact on the residential amenity of the property, including its apparent use as a nursing home.

7.2.55 Having regard to the details and documentation submitted by the applicant, the nature, large spatial extent and tall height of the turbines proposed within this wind energy development, the local and wider landscape setting, the nature and sensitivity of particular visual receptors, including a wide range of heritage items, in addition to residential and community receptors, it is my conclusion that the proposed development will result in significant to profound long term adverse landscape and visual impacts.

7.3 Cultural and built heritage

7.3.1 The site and the surrounding area contain a high level of archaeological and cultural heritage, from prehistoric times, in addition to a less prolific level of architectural heritage dating mainly from the 17th century and later. Given the tall height and large spatial extent of the proposed wind energy development, the impact on cultural and built heritage, including its landscape setting is an obvious concern. I note the points detailed by Meath County Council and its Conservation and Heritage Officers in this regard. The Department of Arts, Heritage, Regional and Gaeltacht Affairs has indicated no objections to the proposed development from subject to standard conditions including compliance with proposed mitigation measures under s.13.5.1.

An Taisce raised concerns regarding potential impacts on the setting of Protected Structures, National Monuments and World Heritage Site and candidate WH Sites, and RMPS. Fáilte Ireland outlined extensive concerns about potential impacts on heritage sites in the context of Meath's status as the 'heritage capital' of Ireland, Ireland's Ancient East, Boyne Valley Drive, Brú na Bóinne and Tara and items of heritage and related tourism. These concerns have been echoed in a significant proportion of the observations received.

7.3.2 The EIS includes what appears to be a comprehensive survey of the archaeological, architectural and cultural heritage of the area in Appendix L (in Vol.3(2) of the EIS), comprising an archaeological and cultural heritage field assessment (L1), an inventory and field assessment of UNESCO WH Sites and candidate WH sites, and National Monuments within 5km and prominent NMs within 30km (L2), ACAs and demesnes / country houses within 3km (L3), RMP sites and Protected Structures within 1-3km (L4), relevant standards, guidelines and legislation (L5), archaeological, architectural and cultural heritage designations (L6), relevant Meath CDP 2013 policies (L7) and the results of geophysical site investigations (L8). These are supported by figures 13.1-13.5 (Vol.2(a) of EIS). A very interesting and detailed overview of the existing items of archaeological, architectural and cultural heritage is provided in chronological order in context of the historical development of the study area under chapter 13, which also contains an assessment of the potential impact on items of archaeological, architectural and/or cultural heritage arising from the proposed development. I consider the associated figures (in Vol.2(a)) are less than optimal in their identification of the items referred to within the assessment.

7.3.3 UNESCO World Heritage and Candidate WH Sites (figure 13.1) – Brú na Bóinne Archaeological Ensemble of the Bend of the Boyne, is internationally renowned for its elaborate Neolithic passage tombs (including Newgrange, Knowth and Dowth) and the largest assemblage of megalithic art in Europe. Castletownmoor wind farm (from nearest turbine T13) is located c.16km northwest of the buffer zone and 17.5km from the core area designated for this World Heritage Site. The assessment of the contribution that the landscape setting makes to the WHS is included in appendix L2[45]. This concludes the impact on the setting will be of slight significance

[45] Not K2 as stated by the applicant.

as the turbines will not be visible from most of the core area, except from the top of Knowth where the blades of eight turbines will be viewed at a distance of >18km[46]. The assessor considers this to be an extremely limited visual change that will not affect the visitors' experience of Knowth or the wider WHS and submits that most visitors would be entirely unaware of the presence of the turbines unless their attention was deliberately drawn to it.

7.3.4 I have already indicated under my assessment of landscape and visual impacts, above, I accept the impact on the setting of Brú na Bóinne would be negligible, as does Meath County Council, notwithstanding concerns about cumulative impacts raised by its Heritage Officer, and those of Failte Ireland.

7.3.5 The Royal Sites of Ireland candidate WHS relates to the sites of major royal inauguration, ceremony and assembly representing the four provinces of Ireland in addition to Meath. The sites are strongly linked to myth and legend and associated with Saint Patrick and the transformation of Ireland to Christianity. The Tara Complex is the only royal site relevant to the proposed development, being c.20km distant from the nearest proposed turbine (T13). A draft landscape conservation area was produced relating to the Tara Skryne area (this is shown in Illus.L2.11 of L2)[47], which encompasses a rather expansive area surrounding and centred on the Hill of Tara. The proposed wind farm (from T13) would be >15.5km from the boundary with same.

7.3.6 The visual impact contained in L2 notes that the wind farm will not interfere with the inter-visibility of historic features related to the Hill of Tara and therefore would not affect the ability to experience and appreciate the relationships between these sites. It determined that the open panoramic views which form part of the heritage value of Tara would not be restricted in any way by the presence of the wind farm, which would be faintly visible in the northwest on days with good visibility at a range of 20-23.5km, and the wind farm would not challenge the hill for visual dominance in the landscape. Also, the presence of the wind farm would not constitute a distracting feature within the modern Irish landscape which also features the modern town of

[46] The nearest turbine would actually be located c.17.86km from the viewing platform atop Knowth.
[47] It is an objective of the MCDP 2013 LC OBJ 6 to progress the designation but it would seem to remain a draft.

Navan in the foreground. The assessment concludes that the attributes associated with the outstanding unique value of the candidate site will remain intact, the authenticity and setting of the Tara Complex and its individual components and views to and from the site will remain unchanged and therefore there will be no impact on the site.

7.3.7 As I have already alluded to in my assessment of Landscape and Visual impacts, I do not concur with the applicant's conclusions regarding visual impacts and impacts on the landscape setting of the Hill of Tara and other important archaeological and heritage sites (Lough Crew, Hill of Skyrne and Hill of Ward,). Despite the c.20km distance between the main body of the Hill of Tara and the proposed development, I am of the opinion that the visual impact of the proposed development, in itself and taken cumulatively with other such development, will have a significant visual impact on the setting of Tara and other such sites. I do not agree that the turbines will be faintly visible and I do not consider the potential visual impact of the wind farm to be in any way similar to the muted visual impact of Navan town. Even within the static representation of the proposed development within the photomontages, the wind turbines are salient and eye-attracting elements. In motion they can be expected to be much more so. Given the historical and cultural significance of the Hill of Tara, the visual impact of the proposed development is far greater than it would otherwise be. As Failte Ireland points out, the visual impact will remain for the life of the project. The Council's Conservation Officer and Heritage Officer and the commissioned report from CAAS each highlighted the potential impact on the setting of the Tara Complex as a concern. The Council recommended that further information be sought in this regard (F.I. item no.7).

7.3.8 In addition to the large number of observers who had concerns about the impact on the Tara Complex and other such sites, a number of observers referred to the experience of the Rock of Cashel, from where several wind farms are alleged to be visible, but where they are of the opinion that the said wind energy development have not diminished the visitor experience of that renowned heritage site.

7.3.9 Kells is one of a group of early medieval monastic sites selected as a candidate WHS, which embody the Celtic Church's rich cultural and historical past and playing a crucial role in Europe's educational and artistic development. Although the

boundary of the candidate WHS is not provided, the centre of Kells (junction of John Street and Market Street) is c.4km from proposed turbine T4. Appendix L2 includes an impact assessment on the candidate WHS, which concludes that there will be no impact on the outstanding unique value of the site as the sense of historic enclosure (critical to the heritage value of the monastic settlement) will prevail and the glimpses of turbines in the distant rural landscape from above the modern rooftops of the town will not detract from the setting. Whilst the Council's Conservation Officer and Heritage Officer are concerned about the impact on the setting, the latter recommending that expert advice be sought concerning the impact on the possible WHS designation, the Council did not raise concerns in this regard and, on balance, I am of the opinion that no significant adverse effect will result on this site.

7.3.10 National Monuments / RMP 5-30km distant (figure 13.1) – The EIS identified five nationally significant sites in elevated positions within the 30km ZTV where long-range views of the proposed development were considered to have potential to affect site value: The Hill of Ward / Tlaghta (NM ref.150; ME 030-001) c.14km south-southwest; Trim Castle (NM ref.514; ME036-0487004) c.20km to the south; Mountfortescue Hillfort (NM ref.651; ME013-012001) 11km to the west; Loughcrew (Slieve na Calliagh, NM ref.No.290 & 155, see appendix L2 p.41/48 for list of RMP nos.) . 17.3km to the west; and Hill of Slane (National Monument Ref.No.666, 188 and RMP ME019-060002 to -0060915). No direct physical impacts are predicted during construction.

7.3.11 The EIS predicts no impact on the Hill of Slane from the operational phase or on Mountfortescue Hillfort. Photomontage VP18 supports the conclusion in respect of the Hill of Slane. The ZVT indicates that up to 25no. turbines would be visible Mountfortescue within as close as c.11km, suggesting a large magnitude visual impact. No photomontage image is provided from Mountfortescue, which is not publicly accessible, therefore the significance of the impact on its setting is uncertain.

7.3.12 The EIS predicts a negligible impact on the other three National Monuments, including the Hill of Ward, Trim Castle and Loughcrew. The EIS acknowledges that the wind farm could affect the viewer experience of the equinox sunrise at Tomb T, Loughcrew, which is illuminated internally for several minutes after sunrise at the equinox, twice a year. Although this would result in the sun being observed rising

above the horizon through the turbine blades, it is submitted that this would not affect the observation of sunlight falling on the back wall of the tomb and that there is no evidence that observation (by the living) of the equinox sunrise was important to the tomb builders and that this modern ritual of observation is a secondary, albeit valued, part of the experience of this site. The EIS considers, moreover, that given the limited and uncertain occurrence of this potentially adverse effect (it is weather dependent), the impact is judged to be negligible impact and of slight significance on the heritage value of Loughcrew.

7.3.13 The photomontages in Vol.4E(i-iii) refer. These show that the proposed turbines are directly in line with the sunrise and that the view of any observers would directed thereto. It is evident that the wind turbines would not likely be very visible under the weather conditions pertaining at the time the image was taken, but it can be assumed the level of visibility will be weather dependent and that the proposed wind farm has the potential to have a significant direct impact on the experience of the National Monument at a very critical time, under such conditions. I therefore conclude that the impact on the visitor experience of the equinox sunrise at Lough Crew site, a critical feature of the heritage item, has the potential to be far greater than predicted by the applicant.

7.3.14 In my assessment of landscape and visual impacts, above, I have already concluded that the likely potential cumulative landscape and visual impact on Lough Crew would be significantly to profoundly adverse. Meath County Council also considers the likely impact on Lough Crew to be profound.

7.3.15 National Monuments / RMP approximately >3km<5km distant (figure 13.1 and 13.2) – The EIS identifies six National Monuments within 5km: Cruicetown Church and Cross (NM Ref.264, ME005-094, ME005-094004) c.4.5km northwest of T25; Robertstown Ringfort/Rath (NM Ref.542; ME0011-009) c.3.9km north of T17; Robertstown Castle (NM Ref.256; ME011-006) c.4.4km north of T17; Hill of Lloyd Hillfort (ME016-054) c.5.4km from T4; the Spire of Lloyd MH016-123/NIAH 14401601 c.5.5km from T4; and Rath Dhú and Teltown (Zone of Archaeological Amenity) inclusive of Knockauns, Donagh Patrick and Ráith Airthir c.2.3km south of T6 (see EIS Vol.2a, figure 13.2).

7.3.16 The EIS determines the magnitude of the potential operational impacts on Robertstown ringfort/rath, on Robertstown castle and the Hill of Lloyd hillfort as no impact; on Cruicetown church and cross and on Rath Dhú and Teltown as negligible and on the Spire of Lloyd as minor and being of 'moderate/slight' significance. It is apparent from the photomontages submitted by the applicant that the proposed development will have a significant visual impact on the setting of the Spire of Lloyd (VP8) and on Cruicetown Church and Graveyard (H15). The visual impact on the National Monuments at Robertstown are not insignificant. The potential impact on the setting of the collection of RMP within the Teltown ZAA would appear far less intrusive, with only partial views of turbine blades from various locations within the site due to the lie of the land and the siting of Teltown along the NW/SE orientated Blackwater Valley.

7.3.17 Meath County Council submits that the impact on Cruicetown Church and Graveyard and on the Spire of Lloyd would be significantly adverse and advises that further information is required in this regard (item no.4 and item no.7 of the request). Whilst the visual impact on the setting of these monuments would be significant, I do not consider the impact to be critical.

7.3.18 RMPs >1km<3km (figure 13.2)– Appendix L4 contains an inventory and brief review of potential impact on recorded archaeological (c.39no.) and architectural heritage (14no. collection) features between 1-3km distant from the proposed development. A summary review of the potential impacts does not appear to be not summarised within the EIS proper.

7.3.19 Of the sites included in appendix L4, I consider there to be potential to significantly affect the setting of the following recorded monuments which are accessible to (or at least easily observed from the roadside) and relatively easy to interpret by the public: ME011-020 church (and etc.) at Kilbeg Lower c.2.5km north of T1, which appears to have open views towards the proposed development; ME011-025 church (and etc.) at Staholmog c.1.4km north of T17, which appears to have open views to the west, south and southeast over the wind farm; ME017-019 tower house ((Clongill Castle and etc.) and ME017-018 church (and etc.) at Clongill, c.1.2km and c1km south of T13, respectively; ME017-014 church and etc.) and at Clongil, Oristown c.1.7km south of T17 which appears to have open views over much of the development (see

photomontage VP38(i-ii)). The applicant determined that all these (bar ME017-18, not referred to) RMPs were of medium value and that '*no impact'* would arise, which would seem unrealistic based on the classification of impact magnitude used in the EIS (table 13.9) given the scale, proximity and extent of the turbines to the RMPs concerned.

7.3.20 Conservation Areas (figure 13.3) – The assessment of the potential impact on three Architectural Conservation Areas within the vicinity is contained in appendix L3. Headfort Demesne ACA (designated under the Meath CDP 2013) is within c.1km of T4; Headfort Place ACA (designated under the Kells Development Plan 2013) is c.3.65km southwest of T4 and Kells Historical Core ACA (designated under KDP 2013) is c.3.9km southwest of T4.

7.3.21 Headfort Demesne (Protect Structure and ACA) - The EIS (table 13.28) predicts that the proposed development will have negligible impact, of slight significance, on the heritage value of Headfort Demesne ACA, which it deems to be of medium value. The six photomontages relating to Headfort Demesne (H15, H16, H17, VP22, VP53 and VP54[48]) would appear to support the applicant's determination of magnitude of impact and appraisal of impact on views, however as one moves through the site to/from the R163 to the south the wind turbines can be expected to become exposed to view. In response, the applicant submits that historically the area to the northeast of the entrance avenues were densely planted woodlands. Also, as one moves north from Headfort House it can be expected that turbines will become exposed to the site. In this regard the applicant accepts that at the curving northern boundary defining the curtilage of the main house will the turbines be in full view to the northeast. It would also seem certain, as raised by third parties, that turbines will be clearly visible from north-facing rooms within the Protected Structure, however this has not been considered by the applicant in the context of Headfort Demesne ACA. It is likely that the proposed development will adversely affect the character of the ACA and the broader setting of the Protected Structure, however the significance of the impact is less certain to me.

7.3.22 The Meath CDP (appendix 09) describes the ACA as a highly complex landscape site of enormous cultural significance, with a major country house (one of a number

[48] Appendix L3 incorrectly refers to VP16 and VP17.

of Protected Structures within the ACA) of international architectural and artistic value which contains the only surviving Robert Adam's[49] interior in the state. The demesne is one of the most noted examples of picturesque English Landscape in Ireland, punctuated by 18th century bridge by Thomas Cooley, a Gothic-Revival Mausoleum, a Gothic viewing grotto, outbuildings of fine architectural quality and planting of great botanical significance including the Yew Avenue, the American Garden an early 20th century Pineturn. A special feature of the demesne is the visual link to the outside world, including to Kells and Lloyd Tower, in addition to the site's (and Kells') setting within an unspoilt rural landscape which together form a historical cultural landscape of great richness. The Planning Authority's description of the ACA would suggest a higher rating than medium, particularly due to the rarity of the Adam's interior and the relative intactness of the demesne[50], although I also note that none of the structures on site are rated above regional importance by the NIAH.

7.3.23 The *Architectural Heritage Protection Guidelines* (2011) make recommendations on the control of development arising generally only within ACAs, although it advises (s.3.12) that planning authorities may consider the use of other forms of conservation designations in parallel to ACAs, such as objectives to preserve the landscape, including views and prospects in combination with rural ACAs, in particular[51]. It is the objective (CH OBJ 21) of the Meath CDP to ensure that any new development within or contiguous to an ACA is, *inter alia*, sympathetic to the character of the area and (CH OBJ 23[52]) to require proposals for development in and adjoining designated landscapes and demesnes to include an appraisal of the landscape, designed views and vistas, which shall ensure that development proposals respect and are consistent with the historic landscape and its protection and comply with the policies and AHPG (2011). The EIS does contain a reasonably comprehensive visual impact appraisal under appendix L3, supported by photomontages, but not by a map indicating features of note referred to in the ACA and it is therefore difficult to

[49] An influential 18th Century architect and a leader in the first phase of the classical revival in England and Scotland from 1760. https://en.wikipedia.org/wiki/Robert_Adam (22/02/17)
[50] Some loss of integrity of the demesne is noted in the NIAH garden survey, however the survey is not intended as an indication of (and does not provide a rating of) a site's heritage importance.
[51] It suggests that this would be particularly important where it is necessary to preserve a long-distance related vista between structure (s.3.4.3)
[52] Adopted as Variation 2 on 19/05/14

determine whether adverse impacts of significance are likely on same (i.e. on associated structures and botanics).

7.3.24 It is an objective (no.1) of the Headfort Demesne ACA that development within the demesne and surrounding area should not have an adverse effect on the special qualities of the demesne. I could find no relevant views or prospects designated under the Meath CDP (Map 9.5.1), however the ACA is contained within the Landscape Character designation LCA20 which refers to the said demesne (as well as Williamstown and Bloomsbury) as a key history and cultural characteristic of the LCA. The recommendations for LCA20 include the conservation of the wealth of historic features along the river corridor within an attractive landscape setting and the maintenance and enhancement of views to and from areas of visual value including extensive uninterrupted views across open countryside. In this context the potential visual impact of the proposed development on the Headfort ACA may be considered to constitute a more significant impact on the integrity of the ACA, particularly given the location of T4 within LCA20 (not acknowledged in the EIS) and the proximity of several other turbines thereto. Meath County Council and its Conservation Officer have concerns about the potential impact and advise that further information be sought (item no.6).

7.3.25 **Headfort Place ACA and Kells Historic Core ACA** – The EIS predicts no impact on Headfort Place and Kells Historic Core ACAs. No visual impact would appear likely on Headfort Place ACA. Although views of the wind energy development are likely from Kells HC ACA, due to the distance from the ACA and the context of the ACA within a developing rural town, I am inclined to agree with the applicant's assertion that the glimpses of turbines in the distant rural landscape from within the town above (relatively) rooftops will not detract from the setting of the early medieval monastic enclosure or on the character of the town.

7.3.26 **Record of Protected Structures (figure 13.3)** – The EIS considers 14no. Protected Structures or collections of Protected Structures associated with particular settlements (assessment set out under appendices L1, L2[53], L3 and L4). The EIS proper refers only to three Protected Structures – Rossmeen House and outbuildings (MH017-023, MH017-121), Mountainstown House (MH012-100) and Dowdstown

[53] As part of Headfort Demesne ACA.

House (MH011-124). The only predicted impact of significance is one of moderate magnitude and moderate significance on Mountainstown House, the impact on the other two Protected Structures being predicted as minor and of slight significance.

7.3.27 Rossmeen House, a detached Victorian house with earlier outbuildings, is located c.610m south of proposed turbine T5, 1.2km southeast of T4 and within 2km of T2, T3, T6, T7[54] and T14. The EIS determines that the alteration to the isolated rural backdrop, in which turbines will be seen over the top of the Protected Structures when travelling north along the local road, to be a 'noticeable' change of minor magnitude. Given the scale, number and proximity of the proposed turbines to the Protected Structure, I consider the change to the setting to be of greater magnitude and the impact to be 'moderate', having regard to the criteria in table 13.9. Based on a 'medium' rating heritage value (table 13.8), which I agree is reasonable, the significance of the impact on the Protected Structure would be 'moderate'.

7.3.28 Dowdstown House, a detached gentleman farmer's house on a slight rise, dating from 1793, and was allegedly designed not to be viewed from outside of the site through the provision of mature tree-lined boundaries. The proposed wind farm is arranged in an arc around the property to the northwest, west and south. The nearest turbines are T11 c.590m to the west-southwest, and T12 c.800m to the south from the house, with a total of ten turbines within 2km (T7-T13, T18, T20 and T21). The EIS notes that the turbines will intrude into the enclosed private demesne and will be visible behind the property as viewed from the southeast[55]. The EIS determined this impact to be a change of minor magnitude and of slight significance. Again, given the proximity to and scale and extent of wind turbines proposed to surround the Protected Structure in an arc of c.270°, I consider the change to the setting to be significant and the impact to therefore be 'moderate'. Based on a medium heritage value, the impact would be moderate.

7.3.29 Mountainstown House is described as a Queen Anne style house dating from c.1720, with demesne landscape representing an intact 18/19th century landscape, which is noted by the applicant as a rarity in this part of Meath where most larger demesne have been broken up. There are no inward designed views, but controlled

[54] The assessment excludes T7 from the 2km catchment.
[55] States southwest, but assumed to refer to view from southeast.

views of the house and parkland on approach to the house from the east and southeast, were carefully designed, with reciprocal views south and east from the house. Views from the demesne to the bogland in the west are less sensitive. The proposed wind turbines are arranged in an arc to the north, west and southwest of the demesne, but the nearest turbines are over 1km distance. The nearest turbine would appear to be T21 c.1.3km to the northwest, with T11 being the nearest to the south at c.1.4km, and the EIS indicates that 11 turbines would lie within 2km of the Protected Structure house.

7.3.30 The EIS submits that the lands of the proposed wind farm are outside of the demesne which do not contribute to its heritage value and that the wind turbines would not impact on the designed prospect from the house into its parkland to the south and east. It is accepted that the proposed wind farm would visually intrude into the designed picturesque views of the house on approach along the southern access (it would seem to me that a similar situation would arise on approach from the northeast access), will be in visual competition with the house and diminish the experience of the Protected Structure. The applicant notes that although the significance of the Protected Structure is not dependent on public access, the property is in private ownership and is not widely experienced by passers-by. The EIS determines the impact magnitude and significance as moderate. Based on the criteria in table 13.9 I would consider the 'moderate' impact magnitude to be reasonable. The heritage value of the Protected Structure, given its age and the intactness of its demesne, would appear to be higher than that of Rosmeen House and Dowdstown House, notwithstanding there is no indication in the RPS as to its value, it is not included in the NIAH building survey and that there is no information to indicate it has heritage value at national or international level. An impact of moderate / large, particularly when taken cumulatively with the permitted North-South Interconnector running through the west side of the demesne, would seem to be a more appropriate impact significance rating.

7.3.31 Meath County Council and its Conservation Officer advises that the potential impact on these Protected Structures, in addition to St. Columcille's Church, Fletcherstown (MH018-101) should be further investigated (further information item no.5).

7.3.32 RMPs onsite - There are six Record of Monuments and Places (RMP) sites within the application site (see table 13.13) including a cluster of three standing stones, of which ME0011-046/002 is the nearest to a turbine (154m from T2) although ME0011-046/001 is much closer to the proposed access trackway (within 46m). The third standing stone (ME0011-047) is noted as no longer upstanding, but it is unclear whether it has been removed. The other RMPs concern a fulacht fia c.196m southeast of T2, which was archaeologically investigated as part of a drainage works scheme; rock art (ME017-042) located almost exactly within the footprint of proposed turbine T9, but which is indicated as having had been relocated at some point in the past; and a ringfort (ME011:036) in Castletownmoor c.225m northwest of T17[56], the notification area of which encroaches on the applications site and may (based on the assessors' interpretation of the geophysical survey results) include related archaeological material within the site of T17. The geophysical survey report notes the proximity of ME011:036 to a possible area of archaeological potential c.50m southwest of the centre of T17, but makes no comment as to whether they are likely related to the RMP (Figure 3 of L8 refers) and concludes that further investigation may be required to establish any archaeological potential.

7.3.33 The EIS submits that there will be no direct impacts on the two standing stones (ME011-046001/002) and whilst the potential impact on the third stone (ME011-047) is not stated, the potential for impact on this more distant located stone can be assumed to be less. There is no potential for impact on the rock art RMP due to its earlier relocation (it is said to lie in safe-keeping in a garden near Slane), but there is potential for a direct impact on the RMPs original location from the proposed construction of the access track and turbine T9, where development may reveal further steadfast boulders[57]. This impact is described as of minor magnitude and of slight significance on the heritage value potential.

7.3.34 The EIS identifies seven RMP sites within 1km of the proposed wind farm (see table 13.14) including church (St Beccan's), graveyard, ecclesiastical enclosure and causeway at Emlagh (ME011-039, ME0011-039001/002). The assessment does not refer to the location of the causeway (under separate record ME011-039003) which

[56] Table 13.13 erroneously refers to T13, but the geophysical survey correctly refers to T17.
[57] The original description of the rock art located places it on the knoll of a hill at 200' among a number of other boulders

extends a distance from the other three clustered RMPS. There are no potential direct impacts on these sites during construction as the RMPs are not located within the site of development and the delivery route to the site does not traverse the location of the causeway which is assumed to have been incorporated into the current local road. The operational impacts on the setting of the aforementioned RMPs within the site and within 1km of the site are predicted to be slight to neutral/slight.

7.3.35 The applicant proposes to mitigate potential direct adverse impacts on the RMP sites referred to above by carrying out archaeological testing along the access track to T2, along the access track to and the area of T9 and T17 (see s.13.5.1). Having regard to the report of the DAHRGA, which has no objection subject to standard type conditions to protect archaeology, I am satisfied that potential direct adverse impacts on archaeology can be addressed by condition. Whilst I note that Meath County Council considers further archaeological testing necessary in the vicinity of T2, T9 and T17 and that the relocation of T2, T9, T17, T6, T7, T8, T14, T15, T16, T18 and T20 be investigated (FI item no.2), this item of the further information request does not appear to have been informed by the reports of the Council's Conservation Officer or Heritage Officer or by particular archaeological expertise.

7.3.36 Other cultural impacts – The EIS addresses impact on the Meath Gaeltachts / Gaeltachtaí n Midhe under socio-economic impacts affecting the Human Environment (chapter 10). The applicant submits that the proposed development will not result in a permanent influx of large numbers of people to the area such as likely to result in a significant impact on the cultural heritage of the Gaeltacht.

7.3.37 To mitigate any possible adverse impacts, the applicant proposes to provide any required signage within the Gaeltacht area in Irish and to provide temporary signage during construction stage. I am satisfied that the proposed development is unlikely to have a significant impact on the Gaeltacht.

7.3.38 Conclusion – The application site is situated within an area of extensive historical heritage ranging from prehistoric times up the 20th century, notwithstanding the reduction in the number of turbines from 46no. under PA0038 to 25no. in the current application. I consider that the proposed development is likely to result in significant

to profound adverse impacts on the setting and experience of archaeological and cultural heritage of considerable national and international significance, with particular regard to the visual impact (in itself and taken cumulatively) on the setting of Lough Crew, the Tara Complex (a candidate UNESCO World Heritage Site), the Hill of Skryne, and the Hill of Ward, I also consider the likely potential impact, in itself and / or taken cumulatively with the North-South Electrictity Interconnector, on architectural heritage to be more significant than predicted in the EIS, most particularly on Headfort Demesne ACA and its constituent Protected Structures and on Mountainstown House.

7.4 Noise

7.4.1 Potential impacts from noise are addressed in chapter 6 of the EIS. The impact of operational noise in terms of annoyance and loss of residential amenity, disturbance of sleep and consequential impact on health, and the impact of infrasound and low frequency noise including directs impact on people with particular sensitivities to same (those with ASD for example) and its role in sleep disturbance impacts and possible direct and indirect health impacts, were raised by many observers. Many also identified general and specific issues concerning the noise assessment methodology in the EIS and its non-adherence to guidance. The issue of construction and construction traffic noise was also raised.

7.4.2 The HSE considered the significance of change in the noise environment and its impact on local residents to have been inadequately assessed in the EIS, having regard to an increase in 10dB being a likely indication of significant adverse impact according to BE4142, and advised that further information (item no.1) is required. It also referred to the 40dB standard[58] for night exposure under the WHO Night Noise Guidelines for Europe.

7.4.3 Neither Meath County Council, nor the report from its Environment Section identified specific concerns with the ES had no objection subject to standard conditions for operational noise and construction noise.

[58] Annual average night exposure level.

7.4.4 The EIS identifies baseline noise levels measured at locations indicated as representative of the nearest noise sensitive receptors (NSR). Potential construction noise and vibration is determined with reference to 'BS 5228:2009+A1:2014 Code for Practice for Noise and Vibration Control on Construction and Open Sites Part 1 Noise'. Potential operational noise impacts have been determined with reference to UK Institute of Acoustics 'A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise' (the GPG) and compared with the WEDG 2006, although s.6.3.2 also refers to Irish Wind Energy Association 'Best Practice Guidance for the Irish Wind Energy Industry' (2012) and UK DTI 'ETSU-R-97, The Assessment and Rating of Noise from Wind Farms'. Operational noise impacts associated with the proposed substation have been determined with reference to 'BS 4142:2014, Methods for rating and assessing industrial and commercial sound.'

7.4.5 The operational noise study area extends 1.31km from the proposed wind turbines to match the predicted 35dBL90 noise contour in accordance with the ETSU-R-97 GPG (s.2.2.1)[59], and is detailed on figure 6.1 (EIS Vol.2(a)).

7.4.6 In relation to the monitoring locations, the GPS coordinates and photographs of the noise monitoring installations are contained in Appendix E1, and their location is shown in Figure E1 in Appendix E2 of the EIS. The WEDG (2006) advise that:

> '*Noise impact should be assessed by reference to the nature and character of noise sensitive locations … [which] includes [inter alia] any occupied dwelling house … and may include areas of particular scenic quality or special recreational amenity importance*' (p.29)[60].

7.4.7 The GPG advises that in many locations there will be significant variation in general background noise levels within the study area due to topography and the varying influence of existing noise sources, including roads, trees (particular significant source in rural areas at higher wind speeds) and watercourses. In large study areas where it is not feasible to study all noise sensitive receptors, representative locations

[59] Note, contrary to the IOA GPG the noise contours are stated as calculated based on 14m/s hub height wind speed, not 10m/s standardised wind speed, however table 6.3 of the EIS would indicates that the two are equivalent.
[60] WEG (2006) does not otherwise advise on the nature of noise assessment methodology.

can be used which can be reliably assigned to other groups of properties. No guidance is given on the number and location of NMLs as this is a site specific consideration.

7.4.8 The EIS provides no justification for the selection for the number and position of NMLs, however the number and overall distribution of initial NMLs surrounding, but within the vicinity of the application site, would appear reasonable. Of the 8 NMLs, two are either agricultural fields (NML2, NML7), two are agricultural fields adjacent to agricultural farmyards (NML5, NML6), three appear to be within mixed residential / farmyard sites (NML1, NML3, NML8) and one may be classified as predominantly residential (NML4), although it too would appear to be part of a farmstead cluster. The EIS claims the NMLs are representative of the different noise environments in the vicinity of the proposed wind farm, however I have reservations about the range of noise sensitive receptors selected, particular the absence of any standalone residential properties which constitute a significant proportion of NSRs surrounding the application site. In this regard, the EIS does not indicate that there were any constraints in gaining access to properties for baseline surveys.

7.4.9 In terms of siting of noise survey equipment at NMLs, the GPG provides detailed advice on appropriate siting. It advises that:

- Measures be made in the vicinity of a dwelling in an area frequently used for rest and recreation;
- Equipment should be placed at outdoor positions where noise levels are representative of typical 'low' levels likely to be experienced in the vicinity of a dwelling.

The overriding consideration is that the assessor should be able to reasonable justify that there are no other suitable noise-sensitive locations in the vicinity of the proposed development and close to a dwelling, where background noise levels would be expected to be consistently lower that the levels at the selected position. Whilst the aim is to measure 'typical' or indicative' rather than 'absolute lowest' levels, ideally the NML should be one that is exposed to noise from the wind turbines whilst screened from other noise sources such as nearby roads and vegetation.

7.4.10 The noise monitoring equipment at NML1, NML3, NML4 and NML8 was located directly under trees, which can be expected to have elevated the baseline noise determined in surveys. Neither the Noise Monitoring Installation Report (Appendix E2) nor the Baseline Noise Monitoring Analysis and Results (Appendix E3) makes reference to the influence of trees / vegetation on the baseline results.

7.4.11 In addition, agricultural traffic and, presumably farm operations and animals will also likely significantly contributed to background noise levels and may not necessarily be representative of most NSRs to the same extent as would be evident within / adjacent to farmyard complexes. Whilst agricultural traffic and barking dogs were anticipated as the *'potential predominant noise environment*' at seven of the NMLs, and '*residential with dogs*' at NML8, there is no reference to the influence of these factors in the analysis of results. The resulting baseline noise levels may not be truly representative of the majority of NSRs in the vicinity of the development. The duration of the surveys complies with the GPG.

7.4.12 The applicant's analysis of the baseline noise survey determined that the NML1, MNL3, MNL4 and MNL8 were most likely to have been influenced by local noise sources resulting in elevated noise levels (these are the same NMLs where I've noted the noise monitoring equipment was set up under trees). The application therefore justifiably excluded these results from consideration. As a consequent the determination of baseline noise characteristics for this extensive geographical area was based on only four NMLs (NML2, NML5, NML6 and NML7) which is exceedingly limited. That 50% of NMLs have had to be excluded reflects poorly on the overall approach to the baseline noise surveys. This is of increased concern given the possibility that much of the area may constitute a low noise environment where lower noise limits would apply under WEDG 2006. In my opinion, the failure to determine the presence and/ or extent of such areas within the study area is not acceptable and I would advise the Board that it would be appropriate to request the applicant to carry out and submit the results of an appropriately revised baseline noise assessment prior to making any decision to grant permission.

7.4.13 The results of the background noise survey[61] plotted against 10m height standardised wind speed[62] are detailed in graphs in Appendix E2 for all NMLs and are in table 6.3 summarised for the four included NMLs clearly set out to 10m standardised height wind speeds in addition to hub height wind speed. Where the baseline survey did not achieve sufficient data measurements for wind speeds, which occurred at each of the four included NMLs at night-time and at two for daytime survey periods[63], the applicant has not extended the polynomial curves beyond same. Rather, to determine appropriate noise limits at higher wind speeds (for which no data was obtained) the applicant used the noise levels recorded for the highest wind speed available.

7.4.14 In table 6.4 the applicant sets out the *average* noise levels per standardised 10m wind speeds *across all four NMLs* and applies the relevant noise limit from WEDG 2006 based on same. A standard 45.0dBL90 daytime limit and 43.0dBL90 at night-time limit is applied as per WEDG 2000. Whilst an outdoor noise limit of $40dBA_{L90\ 10min}$ is proposed under the *WEDG 2006 Targeted Review* (2013), this document has not been adopted at time of writing.

7.4.15 I am satisfied that the applicant's approach to characterising the baseline noise environment and corresponding noise limits is not appropriate or reasonable for the extensive area surrounding the application site, having regard to the GPG and to WEDG 2006. In particular, the averaging of background noise levels across all four NMLS obscures the fact that three of the NMLs may be termed low noise environments at lower wind speeds, where background noise is less than 30 dB(A). Safeguards for low noise environments are provided for under the WEDG 2006, which recommends (p.30) that the daytime level of the LA90, 10min of the wind energy development noise be limited to an absolute level within the range of 35-40 dB(A). In the circumstances, the applicant should define the extent of the low noise environment in the vicinity of the proposed development to ensure that the

[61] The influence of rainfall noise was correctly omitted.
[62] The calculations for wind shear for the site, to determine the standardised 10m height and hub height (stated as 110m) wind speeds are included in s.E2.3 of Appendix E2, Vol.3 of the EIS.
[63] Regarding claims by numerous observers that temporal filtering should have been applied, the applicant has applied temporal filtering for daytime and night-time corresponding to WEDG 2006 noise limits. Additional temporal filtering for Amenity Hours (18:00-23:00 Mon-Sun; 13:00-18 Sat; 07:00-18:00 Sun) and Night-time Hours (23:07:00), as per s.3.1.3 of the IOA GPG is not relevant under WEDG.

appropriate noise limits may be imposed having regard to the location of each turbine.

7.4.16 NML2, NML5 and NML7 are low noise environments. Looking at figures E4, E10 and E14, baseline noise levels do not reach 30dBL90 until wind speed of 3.7m/s for NML2, until 4.1m/s for NML5 and until 2.5m/s for NML7 (standardised 10m height wind speeds). The cut-in speed for turbine models of this height is indicated as typically 3m/s[64] [65] and, although it is not stated whether the cut-in speed is given to hub height or standardised 10m level, the GPG (s.2.9.2) would suggest it is measured to hub height[66]. This would mean the turbines will be operating when there is little wind at ground level to generate background noise to obscure turbine noise. This situation may possibly arise as much as 40% of the time for some locations (e.g. NML5) as the average hub height wind speed on this site is 7.5m/s[67] (equivalent to c.5.8m/s standardised 10m height wind speed)[68].

7.4.17 No information is provided on what percentage of time cut-in speed is exceeded at hub height level or, indeed, the ratio of different wind speeds that occur at that level such as would clarify the potential significance of the impact on ground level noise sensitive receptors.

7.4.18 In relation to the predicted attenuated noise levels generated by the operational turbines (which allows for 2dB added to account for uncertainty) I am satisfied that the methodology follows the ETSU-R-97 GPG and that the applicant has justified the turbine model that was used in those calculations. Table 6.11 sets out the sound power level (SPL) generated by the turbine model for a range of hub height wind speeds in 1m/s intervals from 4m/s to >10m/s. It would appear that SPL is not given for wind speeds above from 11m/s – 14m/s (maximum as SPL) as SPL is indicated

[64] S.6.2.2 of EIS
[65] The model considered by the applicant is the GE 3.2-130, which has a 94m hub height, selected as the basis for the assessment for the reason that it has source noise levels higher than other Section 2.3.2.1 of the EIS indicates that hub height and rotor diameter is to be determined at procurement stage subject to 169m tip height. It is my understanding that there will be little difference in speed between 94m and, say, 110m and therefore the assessment of a model of this lower hub height is acceptable.
[66] It indicates cut-in speed is generally 2-4m/s measured at hub height (actual cut-in speed is dependent on the model which is not decided).
[67] http://maps.seai.ie/wind/ (06/03/17)
[68] There is no information provided as what percentage of time cut-in speed is likely to be exceeded at hub height level for the site.

as plateauing at higher speeds and there would be little difference in resulting impact. Given that the predicted noise levels are given for the higher wind speeds, it would be appropriate to provide the SPLs on which these are based, in the interest of clarity and transparency.

7.4.19 A far more critical omission is the failure of the applicant to consider noise impacts below 4m/s wind speed as the turbines cut-in speed is 3m/s for the selected model and is as low as 2m/s for other wind turbine models. The potential impact of noise may be greatest at the lowest operational wind speeds due to absence of sufficient masking background noise. This would be even more critical as three of the NML may constitute low noise environments at lower wind speeds.

7.4.20 The predicted noise levels at 452 nearby receptors (inclusive of existing, and/ or proposed residences and non-residential properties) are contained Appendix E4. The EIS notes that the maximum predicted noise level was 45.8dBL90 at receptors H160 and H296, with predicted noise levels exceeding 45dBL90 (general WEDG daytime limit) at seven dwellings and exceeding 43dBL90 (general WEDG night-time limit) at 31 dwellings. I would direct the Board to the predicted maximum noise contours associated with the proposed development, set out in Figure 6.1 of Vol.2a (the number of each NSR is not identified on chapter 6 appended maps).

7.4.21 The applicant tabulates (table 6.15) the required noise modes necessary to meet 43dBL90 (night-time limit), necessitating the implementation of noise reduced mode for T8, T10, T11, T12, T13, T15, T16, T17, T18, T19, T20, T24, T25 for standardised 10m wind speed at and above 5.6m/s (8m/s hub height wind speed); and (table 6.14) to meet 45dBL90 (daytime limit), necessitating the implementation of noise reduced mode for T16, T19 and T20 for standardised 10m wind speed at and above 6.3m/s (9m/s hub height wind speed). The predicted noise impact at all 452no. receptors taking account of the specified noise reduce modes, are set out in table E5.3, would indicate that the derived daytime and night-time noise limits would be met by operating the potential turbines in noise reduced mode. Note, the SPL per wind speed (m/s) for each noise reduced mode is set out in table 6.11. The noise contours resulting from the implementation of noise reduced mode to comply with daytime and night-time noise limits are detailed in Figure 6.3 and 6.4, respectively.

7.4.22 It would seem possible, based on the applicant's assessment and the information contained in the EIS that the proposed development would be able to comply with the WEDG *standard* daytime (45dBL90) and night-time (43dBL90) limits (although the Board may consider it necessary to clarify by way of condition the point at which they apply to noise sensitive receptors – that is to the boundary with outdoor amenity space for daytime and to the nearest facing wall of the building concerned for night-time). However, this does not appear to be feasible where residential receptors are located in low noise environments, where WEDG applies more onerous daytime noise limits (35-40dB(A)$_{L90,\ 10\ min}$). In view of the concerns raised in my assessment, above, in terms of the serious inadequacies of the background noise surveys, the categorisation of three of four the NMLs as low noise environments at lower wind speeds and the failure of the applicant to assess noise impacts at lower wind speeds, I would advise the Board that the proposed wind farm wind farm poses potential to significantly adversely affect residential amenity through operational noise.

7.4.23 An appropriately revised, detailed and justified baseline noise survey clearly defining the baseline noise environment of the study area, and an appropriately revised noise prediction model providing predicted noise levels at NRSs from minimum feasible turbine cut-in speed could resolve these concerns and may demonstrate that the relevant WEDG noise limits may be complied with subject to specific mitigation measures. In this regard, I would advise the Board that prior to making a decision to grant permission further information is required.

7.4.24 Predicted noise & vibration impacts from construction – Noise will be generated by construction site traffic over a period of up to 18 months, extraction activities (2no. borrow pits) for approximately 6 months, preparation of access roads, hardstanding areas and drainage across the site, the preparation of wind turbine foundations, the erection of wind turbines and the carrying out of cable grid connections works (trenching, etc.,). I am reasonably satisfied that the impact from construction noise, although possibly noticeable and adverse at a number of noise sensitive receptors, will be within an acceptable range subject to appropriate mitigation where necessary.

7.4.25 It is proposed to erect a 2.4m high noise barrier along the northeast corner of the northern borrow pit to mitigate noise impact from borrow pit activities, which may

otherwise significantly adversely affect the amenities of properties located to the northeast of the application site. These properties will also experience elevated noise from haulage traffic and general construction traffic and from construction of the proposed access track in this location. I consider it necessary to mitigate the potential adverse impact by erecting a suitable noise barrier of c.2.4m along the length of the southern boundary of the site with the nearest residential property to the northernmost haulage entrance. I accept that the EIS conclusion that vibration impacts will not be significant.

7.4.26 Conclusion – The noise assessment carried out by the applicant is inadequate and contrary to the approach recommended under the IOA Good Practice Guide, which it is purported to follow. In my professional opinion the methodology may have obscured the fact that much of the surrounding environment would likely be classified as a low noise environment, where lower noise limits would apply. In addition, the potential impact of noise at the lowest operational wind speeds of the proposed wind turbines is not considered, when wind-generated background noise levels will be at their lowest and the addition of wind turbine noise will likely be most obvious and potentially intrusive. The mitigation measures, which are based on inadequate baseline data, cannot therefore be relied upon to protect residential, community and general amenities from significant, long-term and frequent adverse impact from wind turbine generated operational noise. It would not be appropriate to address this issue by condition.

7.4.27 I would advise the Board that it should consider requesting an appropriately revised, detailed and justified baseline noise survey prior to making a decision to grant permission further information is required.

7.5 Shadow flicker

7.5.1 Shadow flicker is a concern for many observers, including impacts on internal and external space, impacts on schools and facilities, impacts on people with particular sensitivities (those with epilepsy, ASD, etc.) and for horse owners / trainers / facilities in terms of spooking horses and endangering riders.

7.5.2 Meath County Council suggested that further information is required in respect of the potential exceedance of shadow flicker limits at three buildings, but did not include it as an item in its request. The Council's Environmental Section had no objection subject to mitigation of shadow flicker by condition. The HSE submitted that consultation with the three affected properties be carried out prior to commencement of development.

7.5.3 Shadow flicker is addressed under chapter 11 of the EIS, with a shadow flicker map (Figure J.1) is contained in Appendix J.

7.5.4 S.3.1.0 WEDG 2006 states '*shadow flicker occurs where the blades of a wind turbine cast a shadow* [from sunlight] *over a window in a nearby house and the rotation of the blades causes the shadow to flick on and off*' (p.33). It advises that developers should provide calculations to quantify the effect and, where possible, take appropriate measures to prevent or ameliorate the potential effect, such as turning off a particular turbine at certain times. It recommends '*that shadow flicker at neighbouring offices and dwellings within 500m should not exceed 30 hours per year or 30 minutes per day*' (p.33). WEDG considers the risk of shadow flicker to be very low at distances greater than 10 rotor diameters from the turbine, which implies that within 10 rotor diameter distance the risk is of some significance, yet it applies a restrictive standard only within 500m. An assessment area of 10 rotor diameter has been widely accepted across different European countries and UK guidance on assessment of shadow flicker in the Companion Guide to PPS22 (2004) indicates that there is potential for impact to occur within 130 degrees either side of north from a turbine (UK DoECC)[69], but only within 10 rotor diameter distance. Scottish guidance requires a 10 rotor diameter separation distance to address shadow flicker risk.

7.5.5 For the purposes of the methodology a rotor diameter of 131m (by deduction, this would entail a 103.5m hub height) was assumed in order to represent the worst case scenario. A field survey was carried out in April 2016 to identify all buildings within 1.31km (10 rotor diameters) of each turbine, which, in addition to all dwellings which

[69] '*Update of UK Shadow Flicker Evidence Base*', (2011?) https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48052/1416-update-uk-shadow-flicker-evidence-base.pdf (06/07/16)

have been subject of valid planning permission, have been included in the shadow flicker assessment.

7.5.6 It can reasonably be assumed potential for shadow flicker at sensitive properties has been determined through use of computer software, and the EIS refers to a 'model' on page 5 but omitted to state what model was used. It is therefore not possible to verify the suitability of the model, or, indeed to allow other parties to challenge it.

7.5.7 The calculations of estimated shadow flicker at any particular receptor assumes an average 32% sunshine per annum (based on the 30-year period 1981-2010; see table 11.1) and assumes the maximum probability of the rotor being oriented within 30° of the sun (turbine vector) at 40.8%[70] based on the most onerous wind direction. The effect of existing screening is not taken into account and every building is assumed to have windows to 2m height throughout 360 degrees (glass house model). There are no existing or proposed wind turbines within 2km to be considered for cumulative shadow flicker impacts.

7.5.8 The applicant determined that there are 45no. buildings where the annual shadow flicker guideline limit (30 hours) has potential to be exceeded, but that shadow flicker in excess of the 30-hour limit would result at only three residential structures (nos.159, 160 and 296; but nos.158 and 168 would meet 30 hours). No building is predicted to experience shadow flicker approaching 30 minutes per day, with the highest daily level being 15 minutes at residential dwelling no.167 (this dwelling is predicted to experience 30 hours shadow flicker per year).

7.5.9 Based on the applicant's assessment, the risk of significant adverse impact from shadow flicker is limited to three dwellings. The EIS submits that this estimate is conservative in that receivers may be screened from cloud cast and / or vegetation; the building affected may not have windows facing the turbines; between 500-1000m distant the rotor blade will not appear to be chopping the light but will appear as an object in front of the sun (it is not generally necessary to consider shadow casting at such distances); and the times at which the wind is blowing in a line between a turbine and a house may not coincide with sunny hours.

[70] Figure J.1 applies a slightly lower figure of 40.16%.

7.5.10 Regarding cloud cast, I would point out that application of 32% sunshine would appear to take due account of cloud cast already and screening from vegetation, where existing, will mostly be seasonal. Whilst not all potential receptors will have windows facing the turbines, I note that the assessment does not differentiate between single-storey and two storey dwellings and consequently may underestimate the number of buildings that may be affected.

7.5.11 Whereas the wind direction and sun direction will not always coincide such as to create shadow flicker at the relevant receptor(s), it would seem feasible to determine the likelihood of occurrence of the correct alignment that would create shadow flicker at specific receptors through reviewing long term average wind direction. The shadow flicker assessment does not use Met Eireann's long term wind data but rather wind frequency distribution is based on the applicant's own on-site measurements between 03/08/13 and 08/05/16. It does not provide these details in the EIS or its appendices and therefore it is not possible to determine its consistency with Met Eireann data.

7.5.12 The geographical extent of predicted hours of shadow flicker per annum is shown in Figure J.1 'Shadow Flicker Assessment Mapping' (EIS Vol.3(2)) based on 32% sunshine and 40.16% wind direction. This is consistent with the impacts listed table 11.2. The EIS does not provide tabulated and/or mapped results for the worst case shadow flicker scenario, which would be useful in understanding how the applicant's assumptions on sunshine and wind direction affect its determination of impacts, but is also necessary to determine the true extent of properties at risk from shadow flicker (i.e. where shadow flicker will occur when sunlight and wind conditions coincide). The applicant submits that the shadow flicker predictions are a conservative estimate of the actual shadow flicker likely to occur and that the likelihood of any actual shadow flicker exceedances (30 hours per year or 30 minutes per day) occurring is low.

7.5.13 In terms of mitigation it is proposed that should 'shadow flicker exceedences be experienced at any buildings, site visits will be undertaken to determine the level of occurrence and is annoyance is found, suitable mitigation measures (such as screening or turbine shut-down) will be employed. In an event of an exceedance,

the procedure for logging public complaints in outlined in Appendix 5 of the CEMP'[71] (Appendix D of the EIS). The applicant also indicates that in the event that the revised WEDG is finalised in advance of the Board's decision, the turbine shadow flicker control system will be modified to meet the planning requirements and guidelines in place. In this regard it is my interpretation of the *WEDG 2006 Targeted Review* that no affected property (dwelling or e.g. works places or schools) within 10R distance of a turbine should experience any shadow flicker due to site design and appropriate mitigation, including use of software.

7.5.14 In order to ensure no exceedance of the guideline limit for shadow flicker occur, the applicant intends a procedure of evaluating the existing screening, window orientation and the periods of actual shadow flicker occurrence to be undertaken in consultation with the relevant building owner. The applicant intends to mitigate such impacts through measures including the use of screening. Although this is suggested as a possible mitigation measure by the Irish Wind Energy Associations' own guidance document ('Best Practice Guidelines' (2012))[72], it is not consistent with WEDG which advises that the limits be achieved through careful site selection, design and planning and good use of relevant software for 'turning off a particular turbine at certain times' (p.33).

7.5.15 I would point out that the WEDG standard only applies to buildings within 500m and the applicant suggests that the shadow cast beyond 500m distance doesn't fall within the definition of shadow flicker (p.11, Chapter 11). This clearly results in uncertainty regarding the mitigation measures proposed by the applicant to comply with WEDG and leaves to the applicant the determination as to whether an impact constitutes shadow flicker, including having regard to the presence of existing screening. I feel that this could strongly disadvantage the local population concerned in getting potential future problems with shadow flicker satisfactorily resolved. However, it should be feasible to address this issue through an appropriately worded condition.

7.5.16 Conclusion – The applicant's assessment does not adequately address the worst case scenario within the context surrounding residential properties and does not

[71] P.12, EIS Chapter 11.
[72] Where this is acceptable to the relevant householder.

address the properties most at risk in that scenario having regard to the prevailing wind direction pertaining to the site. Although it is generally feasible to mitigate the level of shadow flicker to an acceptable level, the proposed mitigation measures proposed in the EIS are inadequate, are inappropriate (suggests reliance on screening and on receipt of complaints from the public) and are uncertain (dependent on the applicant's own determinations and would not appear to apply at distances greater than 500m) and are not sufficient to protect the amenities of residential property in the vicinity. The proposed development therefore presents a higher risk of significant adverse impacts on a limited number of residential properties from shadow flicker.

7.6 Health impacts

7.6.1 Many observers raised the matter of impacts on human health. In the EIS the applicant addressed potential health and safety impacts (in chapter 10), but related issues are included in chapter 6 Noise and chapter 11 Shadow Flicker.

7.6.2 **Noise related health Impacts** – I note the concerns of numerous observers regarding the indirect health impacts arising from wind turbine noise, through sleep disturbance, and possibly for direct impacts from infrasound and LFN, resulting a wide spectrum of symptoms that comprise Wind Turbine Syndrome.

7.6.3 A number of observers have made reference and/or submitted copies of studies carried out on wind turbine noise, sleep and health. For example, the report by Dr Chris Hanning of the Society for Wind Vigilance concludes that there is a weight of evidence demonstrating impacts on sleep quality and health from wind turbine noise, with potential for noise to adversely affect health through sleep disturbance at noise limits set under WEDG and that appropriate mitigation of sleep disturbance and annoyance requires a maximum external turbine noise level of 35dB(A) or a setback of at least 1.5km.

7.6.4 The specific issue of impact of infrasound and low frequency noise has also been raised as a significant concern by a substantial number of third parties in terms of the potential adverse impact on residential amenities, sleep disturbance, a suite of

health issues, concentration and mental health impacts, including its relationship to Wind Turbine Syndrome and the potential to impact on people who have particular sensitivity to sound, such as people with autistic spectrum disorders and those with hearing aids and cochlear implants. Reference is made to a number of studies and reports, such as by Professor Emeritus Alun Evans, which support the causal link between infrasound and LFN and these impacts. Evans refers to a report by Casella Stanger, commissioned by DEFRA (2001), which found the effect of infrasound and LFN to be exacerbated by sound insulation properties of the building envelope, with result in relatively lower attenuation of low frequencies of noise. He concludes that international consensus is emerging for 2-3km separation distance between habitations and wind turbines and notes that there is no monitoring of health impacts of wind turbine in Ireland.

7.6.5 Neither the WEDG 2006 nor in the ETSU-R-97 GPG address the issue of infrasound or of LFN. The applicant addresses this issue under section 6.2.2 Operational Noise of the EIS, referring to the UK Department of Trade and Industry (DTI) '*Low Frequency Noise Study, W/45/00656/00/00, The Measurement of Low Frequency Noise at Three UK Windfarms*' (by Hayes McKenzie). For the sake of clarity, I would highlight that the DTI explains that infrasound and LFN are not one and the same: infrasound is noise at frequencies below the normal range of human hearing, i.e. <20Hz; low frequency noise (LFN) is noise between 20Hz and 250Hz. This compares with the normal range of human hearing is between 20Hz to 20,000Hz. Therefore, infrasound can be expected to be inaudible, whereas LFN can be typically be expected to be audible. The report does not describe the nature or character of infrasound or LFN in any qualitative way.

7.6.6 As noted in the EIS, the UK DTI study concluded that '*infrasound noise emissions from wind turbines are significantly below the recognised threshold of perception for acoustic energy within this frequency range. Even assuming that the most sensitive members of the population have a hearing threshold which is 12 dB lower than the median hearing threshold, measured infrasound levels are well below this criterion'*. It goes on to state that, based on information from the World Health Organisation, '*there is no reliable evidence that infrasound below the hearing threshold produce physiological or psychological effects*' and that '*it may therefore be concluded that*

infrasound associated with modern wind turbines is not a source which may be injurious to the health of a wind farm neighbour' (p.2)73.

7.6.7 I consider the EPA '*Guidance Note on Noise Assessment of Wind Turbine Operations at EPA Licensed Sites (NG3)*' to be pertinent. It states infrasound '*was a prominent feature of passive yaw 'downwind' turbines where the blades were positioned downwind of the tower*' but that '*there is no significant infrasound from wind turbines…with modern active yaw turbines*' (p.11). I would therefore conclude that the generation of infrasound is not an issue of concern for the proposed development.

7.6.8 However, regarding LFN, the DTI report concludes that '*wind turbine noise may result in an internal noise level that is just above the threshold of audibility …* [and for] *a low frequency sensitive person, this may mean that low frequency noise associated with the operation of the three wind farms* [subject of the study concerned] *could be audible within dwelling*' (p.3)[74]. Accordingly, LFN would therefore appear to be a legitimate concern, at least for a certain sensitive section of the public.

7.6.9 The EIS explains that noise from modern wind turbines is essentially broadband in nature, with similar amounts of acoustic energy in all frequency bands. As distance from a wind farm increases, noise levels decrease due to the spreading out of sound energy and due to air absorption which increases within increasing frequency. This results in an increase in the ratio of low-frequency : high-frequency noise with increased distance from the site. The applicant submits that at such distances the overall noise level is so low that any bias in the frequency spectrum is insignificant (LFN did not form any part of the EIS assessment). This is contradicted by the EPA NG3 which reports that LFN may '*be a significant characteristic for a large wind farm site when heard from a distance, although close to the site it would not be significant*' (p.11) arising from the greater attenuation of middle to high frequency noise by

73 http://webarchive.nationalarchives.gov.uk/20090609003228/http://www.berr.gov.uk/files/file31270.pdf (15/03/17)

74 http://webarchive.nationalarchives.gov.uk/20090609003228/http://www.berr.gov.uk/files/file31270.pdf (15/03/17)

atmospheric effects. The EIS does not specifically address the issue of LFN but conflates it with infrasound.

7.6.10 However, the DTI report notes that the common cause of complaints associated with wind turbine noise were not related to LFN but to the audible modulation of aerodynamic noise (also known as amplitude modulation, aerodynamic modulation or blade swish) which, whilst deemed insufficient to wake up residents, once awoken, the noise can result in difficulties in returning to sleep. The potential impact of aerodynamic modulation has been raised as a concern by a large proportion of observers. The EPA guidance notes that '*evaluation of the significance of* [the effects of aerodynamic noise] *is not covered by any recognised process. Because such effects, like tonal noise, give the impression of a noise which is 5dB or more louder than a noise of the same level without any such components, methods are being development using complex signal processing to allow such evaluation to be repeatedly and consistently carried out such that appropriate corrections can be applied where necessary for regulatory purposes*' (p.11). The GPB indicates that the evidence in relation to "excess" or "other" amplitude modulation is still developing and, at time of writing it is current practice in the UK not to assign a planning condition to deal with it.

7.6.11 Regarding amplitude modulation (which may be as much as 6dB according to ETSU-R-97), the EIS notes that noise limits recommend in ETSU-R-97 take into account the character of wind turbine noise, including blade swish, which are consistent with those under the WEDG. The applicant is therefore justified in not separately assessing the impact of amplitude modulation.

7.6.12 **Shadow flicker health related impacts** - Based on the UK Department of Energy and Climate Change report '*Update of UK Shadow Flicker Evidence Base*'[75], modern large-scale turbines do not appear to pose any significant risk to epileptic sufferers and do not produce shadows at a frequency that would risk inducing epileptic seizures. That report also suggests that strobing (i.e. the flashing of reflected light) is not an issue for modern turbines due to the development of an industry standard (light grey semi-matt) for the colour and surface finish of turbine blades.

[75] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48052/1416-update-uk-shadow-flicker-evidence-base.pdf (07/04/16).

7.6.13 Health and safety - The EIS addresses construction health and safety issues and operational health and safety issues under s.10.3.7. A preliminary Safety and Health Management Plan is contained in the Outline CEMP, which will be further developed at construction stage to address construction health and safety, traffic safety, use of cranes, working with electricity, working at heights, substation construction and electrical cables. Standard-type mitigation measures are set out under s.10.4.6. This is satisfactory.

7.6.14 All turbines and components will come with a CE making indicating that it is compliant with applicable EC directives and turbines will be remotely monitored for faults 24/7 using a Supervisory Control and Data Acquisition (SCADA) system. There will be an ice-throw detection facility and if ice is detected on the blades the turbine will pause until the ice falls from the blades.

7.6.15 In addition, observers have raised concern about Electromagnetic Fields and EMF. Appendix I1of the EIS (Vol.3(2)) comprises a report on 'Extremely Low Frequency (ELF) and Electromagnetic Fields (EMF) on the Human Environment' which considers the potential impact 50m either side of the proposed 33kV and 110kV cable routes.

7.6.16 The current scientific consensus, as expressed most recently by the WHO, is that the research does not suggest that ELF-EMF causes any health effects at the levels typically encountered in our environments. Authoritative scientific organisations have not recommended exposure limits at these levels or steps to reduce exposure. The electric and magnetic fields expected to be associated with the operation of the proposed cables fully comply with the ICNIRP and EU guidelines on exposure of the general public to ELF-EMF (para.1.13). Accordingly, I do not consider significant impacts arising from ELF-EMF to be likely.

7.6.17 Conclusion - Subject to compliance with the WEDG noise limits appropriate to the relevant background noise environment within which noise sensitive receptors are located, there would appear to be no significant health impact risks associated with noise, including infrasound and LFN, arising from the proposed development. No other health effects, including from shadow flicker, ice-throw, fire and from EMF and ELF are considered likely to be of significance.

7.7 Flora and fauna

7.7.1 Observers raised general and specific concerns regarding potential impacts on ecological, birds, mammals, bats and habitats including those protected under European directives and the adequacy of the applicant's ecological assessments was questioned in this regard. Meath County Council had specific concerns about the impact of proposed turbines T14 and T15 on degraded raised bog and advised that the applicant consider relocating same (item no.9 of FI), and that further information was necessary to address the potential impact of T6, T11 and T12 on bats (item no.11), in addition to the potential impacts on Whooper Swan, Greenland White-Fronted Goose (item no.10) Potential impacts on Badger and Pine Marten from construction screen fencing were highlight by An Taisce. Potential impacts on water ecology and fisheries, including on salmonid spawning and raising habitat including the Moynalty and Yellow river catchments as sub-catchments of the River Blackwater Kells and also the River Boyne, arising from cable trenching and access track works in proximity to watercourses land Fisheries Ireland were some of the main points of Inland Fisheries Ireland.

7.7.2 Chapter 7 of the EIS provides a detailed review of the existing terrestrial and aquatic habitats on site and within the wider vicinity, addresses potential impacts on ecology. It includes a comprehensive and detailed survey of ecology of the site and surrounding area, in Appendix F (in Vol.3(1) of the EIS), comprising bird surveys (F1, F2 modified B&S winter bird surveys 2012/13 and dawn/dusk surveys 2013, 2014 and 2016), a Whooper Swan Total Flight Activity and Collision Risk Modelling (F3), recorded historical presence of bird species in the area (F11), plant survey (Plant Species List in F4), a peatland survey report (F5), a detailed bat survey report (F6), an aquatic ecology report (F7), avifauna key receptor impact significance criteria (F8), cable route hedgerow and structure survey (F9 and repeated in F11) and guidance documents and supporting literature referred to in chapter 13 (F10 and F12, respectively). These are supported by figures 7.1-7.24.2 (Vol.2(a) of EIS).

7.7.3 A detailed overview of the findings of significance of avifauna, terrestrial mammals, bats and habitats is provided under chapter 13, which also contains an assessment

of the potential impact on same arising from construction, operation and decommissioning of the proposed development itself and taken cumulatively with other development in the vicinity. Assertions made in chapter 13 are also supported by appropriately detailed references.

7.7.4 **Avifauna** – The target species of concern were determined as those listed on Annex 1 of the Birds Directive (2009/147/EC) in addition to Birds of Conservation Concern in Ireland (BoCCI, 2014) as set out in Table 7.1. Winter season surveys, comprising walkover survey (3no.), flight activity survey (primarily for Whooper Swan, using 3no. vantage points), a census of wintering wildfowl[76] and flyover surveys (4no.) were carried out from December 2012 to April 2016, with breading season surveys from April to August 2013 and April to June 2014. Bird surveying followed best practice in the Countryside Bird Survey (CBS), breeding wader surveys[77] followed established practice (Bird Census Techniques, 2nd Ed, 2000) and targeted species surveys (Barn Owl and Merlin) were implemented following best practice guidance in Ireland[78], with all surveys carried out by competent field ornithologists. The detailed methodology used is set out under section 7.2.4.1 and appears strongly justified and reasonable.

7.7.5 The 'importance value' or sensitivity of avifauna species is categorised in table 7.7, based on NRA ecological guidance (table 7.6) and further calculated from published guidance (Percival 2007), Scottish Natural Heritage (SNH) and a literature review of published information on birds and windfarms, but with receptor values increased to comply with those recommended in guidance in the Irish context in line with the precautionary principle.

7.7.6 A summary of the survey results and research are provided under section 7.3.8. The historic bird survey (desk study) found 53 rare or protected bird species have been recorded historically within the 10km square within which the development is

[76] This entailed surveyors visiting all known on site locations of feeding and/or roosting wildfowl and counting birds in situ, and included locations offsite known to have target species in the past and followed established best practice such as used for the International Whooper Swan Census. The search area extended southwards from Whitewood Lough, northwest of Nobber as far as Fordstown and eastwards from Carnaross as far as Lobinstown.
[77] Target species were cross-referenced with associated suitable breeding habitat as detailed in Table 7.3.
[78] Barn Owl and Merlin surveys were designed in conjunction with Dr. John Lusby of Birdwatch Ireland, with the Merlin survey also informed by consultation with the NPWS.

proposed. This is included as table 1 of appendix F11 (not, as is stated, within table 7.30 of chapter 13). 12no. are on the BoCCI red list, 39 on the amber list and 10 are Annex I species. The key avifauna receptors are identified in table 7.34. The sensitivity criteria for avifauna are set out under table 7.7 and are reasonable. Those rated of very high sensitivity by the applicant comprise Whooper Swan and Greenland White-fronted Goose, those rated of high sensitivity are Kingfisher, Peregrine, Merlin and Barn Owl.

7.7.7 Whooper Swan are protected under the Wildlife Acts, are Annex I species under the Birds Directive, are BoCCI amber listed and the EIS recognises them as a key receptor of very high sensitivity.

7.7.8 The survey results for Whooper Swan (in the broader study area) are set out in tables 7.28 and 7.29 (Figure 7.10 refers, with historical swan data in Figure 7.9), which indicate that the numbers within the study area were consistently close to National Importance (>130 birds) in 2014, but declined thereafter. In this regard there are no figures for 2015, but the number for 2016 are dramatically lower. The applicant submits that its findings support the most recent appraisal (by Boland and Crowe, 2012) that the main roost area would appears to be Tara Mines tailing ponds (6km to the southeast) inclusive of Newtown Lough near Clonmellon (c.16km southwest of site), which is of national importance.

7.7.9 Whooper Swan were first recorded on site in December 2012, with a total flock (on and adjacent the site, at Drakerath, Clooney and Raffin at northeast side of site) of up to 98 birds (see Figure 7.10 in Vol.2(a) for location). None were evident on site in winter 2013/14, explained in part due to crop rotation (no potato waste was present) and the drainage and filling of an existing lake[79] (this would appear to be in Clooney, northwest of proposed borrow pit 2). Birds were also noted within Wilkinstown / Fletcherstown as another key area, with 107 birds. Whether these birds were found within the site is unclear. Fletcherstown townland is part within the application site and the larger flock of birds are indicated (in Figure 7.10) as within Clongill townland, which also encroaches on the site, rather than Wilkinstown to the east. However, I

[79] Based on Google Earth images, this small lake would appear to have been drained and filled after July 2013.

would note that the flock locations are clearly shown to be outside of the site boundary. The other key areas are more distant to the site.

7.7.10 The flight activity survey results were that 40.75% of flight duration was within rotor envelope height (40-170m), comparable to observations in published literature, such as the Osterid Test Centre, Demark, which found 86.4% of individual birds were recorded below 45m (as referred to by the applicant). It should be noted that the two measurements are not directly comparable as the applicant refers to flight hours and the OTC to individuals. The applicant also counted individuals in its survey but does not provide this information for comparison with the OTC findings. Also, the Vantage Point survey did not record height and/or duration for all flight sightings. The applicant used the survey data to determine the collision risk in Collision Risk Modelling, which estimated that 0-1.68 birds would potentially collide with a rotor blade within the proposed development per year based on the worst-case scenario (see appendix F3 for CRM) and assumes the birds fly through the entirety of the 25no. turbine site twice daily, being an over-estimation, and assumes 80% operational rate.

7.7.11 Based on the applicant CRM, the potential risk of collision (direct operational impacts) would be low, with the magnitude assessed as negligible (0-2% of the local population) and the overall significance, in terms of disturbance and barrier effect, is appraised as low in itself and taken cumulatively with the North-South Interconnector. The applicant submits that 420no. birds would have to be removed from the Irish wintering population (i.e. 4%[80] of the 10,520 birds) to result in population decline, which would equate to 5.6 birds per annum when applied to the local population. The EIS reports that best scientific knowledge supports an overall high avoidance rates and consequent low fatality estimate for Whooper Swan by wind turbines. Potential disturbance is rated as of low significance as the site is greater than 5km from roost locations (Tara Mines Tilling Ponds). Barrier effect is also rated as of low significance as swans have been shown to exhibit horizontal avoidance as they fly past the outer edge of wind farms.

[80] This percentage is determined by SNH model on population model for Whooper Swan as likely to cause population decline.

7.7.12 Indirect impacts arising from disturbance is determined as negligible and overall significance as low. Whilst disturbance from feeding areas during the wintering period is a risk, the literature suggests

7.7.13 Based on land take of relevant habitat being negligible, the magnitude of direct impacts from construction are determined as temporary-high probability of negligible magnitude and low overall significant of impact, with a similar impact resulting from decommissioning, including when taken cumulatively with the north-south interconnector.

7.7.14 Greenland White-fronted Goose are protected under the Wildlife Acts, are Annex I species under the Birds Directive, are BoCCI amber listed and the EIS recognises them as a key receptor of very high sensitivity.

7.7.15 Over the survey period these birds were recorded (140no. on 30th and 37no. on 31st) only on spring passage (March 2016) only. Based on the applicant's CRM, the predicted mortality rate is one bird collision every 69.8 years, applying an avoidance rate of 99.8%. The migratory barrier effect is predicted to of low significance as is the likely disturbance impact as the site does not constitute constrained feeding area associated with the SPA. The direct operational impacts are therefore predicted to be of negligible magnitude and of low significance. The significant of Impacts from construction and decommissioning is determined as low (i.e. from disturbance) as the site is not a foraging site for the species.

7.7.16 Golden Plover are protected under the Wildlife Acts, are Annex I species under the Birds Directive, are BoCCI Red listed and the EIS recognises them as a key receptor of high sensitivity.

7.7.17 Impact from disturbance during construction and decommissioning will be temporary, with the literature suggesting low levels of permanent displacement and the impact is determined as of very low significance.

7.7.18 In terms of operational impacts, the EIS predicts that the impacts from disturbance from feeding or roosting locations during winter months is of high probability, but that ample displacement habitat is available, the numbers of birds on site are low in relation to the national threshold (for populations of significance) and literature

suggests differences in densities pre- and post-construction are not significant. The overall significance of the impact is therefore rated as low. Barrier effect is rated as of very low significance.

7.7.19 The operational impacts (disturbance or barrier impacts) on other birds of medium and high sensitivity rating (Kingfisher, Peregrine, Merlin, Barn Owl, Lapwing, Woodcock and Yellowhammer) are rated as low or very low. However, I do note table 7.38 does not address potential impacts on Common Snipe, which is rated as of medium sensitivity due to 34% published decline in national breeding distribution since 1968-1972[81].

7.7.20 In terms of construction and decommissioning impacts, the EIS identified potential adverse impacts of significance (medium rating) on Kingfisher indirectly through pollution events, runoff, etc., which might impact on water quality downstream from the site and affect pre availability / breeding success/foraging ability. It also predicts possible disturbance to Common Snipe during construction, with literature suggesting density declines post construction, which would seem to contradict the EIS rating of the impacts as temporary to short term. It is submitted that the numbers on site are low and habitat is limited and the impact is indicated as of medium overall significance. Common Snipe are BoCCI Amber listed in Ireland due to concerns over the European population which has undergone a moderate recent decline[82].

7.7.21 Construction impacts mitigation is set out under 7.6.1.5 and is generally acceptable. Points of note include, it is proposed to mitigate the impact on Common Snipe during construction with the implementation of a 500m exclusion zone place around recorded next sites from April to June, prior to the commencement of development to reduce disturbing birds, which will be monitored by the project ecologist. The potential construction impacts on Kingfisher comprise implementation of the mitigation measures outline in Chapter 8 'Soils and Geology' and Chapter 9 'Hydrology'. Potential impacts on Lapwing would be mitigated through surveying for breeding birds (if construction it to take place within the breeding season), with any works carried out under corresponding licence and supervised by the project

[81] Table 7.34
[82] http://www.birdwatchireland.ie/IrelandsBirds/Waders/Snipe/tabid/328/Default.aspx (27/02/17).

supervisor. Potential impacts on Barn Owl will be addressed through prior surveys of mature hedgerow trees for nesting Barn Owl and implementation of minimum protection zones.

7.7.22 Operational impacts mitigation is set out under 7.6.2.4, to include the installation of diverters on the North-South Interconnector subject to agreement of the ESB to address potential cumulative impacts, the implementation of a management agreement with landowners on site in regard to clearance of potato waste from fields in Drakerath to prevent attraction of swans, and the implementation of an agreed[83] post construction monitoring programme as a best practice mitigation measure comprising i) fatality monitoring, ii) flight activity survey, iii) monthly wildfowl census and iv) breeding water survey.

7.7.23 Avifauna Conclusion – I am satisfied that the proposed development, subject to implementation of the proposed mitigation measures, will not significantly adversely affect avifauna.

7.7.24 **Terrestrial mammals** – The baseline data was informed by a desktop survey including NPWS webpage, metadata from the NPWS mapping systems and the National Biodiversity Data Centre and natural heritage datasets (county surveys) commissioned by Meath County Council, although no datasets concerning terrestrial species specifically are referred to. Table 7.14 indicates that six rare or protected mammal species are recorded as present within the 10km grid squares (N87, N88, N77 and N78) including West European Hedgehog, Eurasian Badger, Fallow Deer, Eurasian Red Square, European Otter and Pine Marten, all protected species under the Wildlife Acts, with the latter two also protected under the Habitats Directive[84]. Otter is a Feature of Interest of the River Boyne and River Blackwater cSAC, within c.2km to the south of the site. Invasive mammal species recorded within the same 10km squares are Chinese Muntjac, American Mink, Eastern Greys Squirrel and American Mink.

[83] I would assume with the NPWS.
[84] Otter included under Annex II and IV; Pine Marten under Annex V. The table does not refer to any sightings of Irish Hare which is indicated as ubiquitous on sight.

7.7.25 Field assessment comprised mammal surveys[85] and winter walkover surveys over winter 2012/2013, with a targeted survey of the substation and internal road sections in May/June 2014 due to changes from previous proposed layout (PA0038) and within 100m either side of proposed bridges along the proposed grid connection cable route in July 2014 to check for evidence of Otter, in addition to recording holt locations. The survey results of the 2012/13 surveys do not appear to be included in the appendices, but mammal sightings are detailed in Figure 7.20 of EIS Vol.2(a). The results of the 2014 survey appear to be contained in Appendix F9, but there is no accompanying map illustrating the location of structures referred to.

7.7.26 Evidence of Badger was recorded at four locations, with two of three setts recoded within the environs of the site confirmed as occupied (mammal species of least concern on Ireland's Red List). Otter were evident on the Moynalty River, with a possible holt located adjacent to existing bridge (table 7.17) where the proposed access track runs between T2 and T3 (figure 7.20.1). The EIS considered it likely that it was not occupied as the only evidence was spraints, with no sign of tracks or runs to indicate ongoing access by Otter. It is proposed to resurvey this location prior to construction. Otter is listed as a 'near threatened' mammal species on Ireland's Red list[86]. Pine Marten was recorded as present in the area (as road casualty in 2013) and is of a species of 'least concern' on Ireland's Red List of terrestrial mammals. Red deer, Red Fox and Irish Hare were recorded on site (the latter two are present throughout, and red deer in the woodland east of T14), all of which are rated as 'least concern' on the Red List. Pygmy Shrew was recorded only in Merlin pellets, but like other mammals that were not recorded such as Irish Stoat, House Mouse, Hedgehog and Wood Mouse, they are likely widespread in the area (all are of 'least concern' on the Red List). Invasive species, American Mink, was noted on the Moynalty River.

7.7.27 Potential significant impacts on Badger have been mitigated through relocation of initial track layout to southeast of T23 to avoid a sett within a hedgerow. There is potential to impact on other setts created in the interval between the surveys (2012/2013) and development, however it is submitted that there is habitat available to accommodate disturbed badger and the impact is not considered significant.

[85] S.7.3.5.2 indicates that dedicated Badger and Otter surveys were carried out.
[86] https://www.npws.ie/sites/default/files/publications/pdf/RL3.pdf (03/03/17)

Indirect impacts arising from visual and noise disturbance is considered unlikely to be significance due to works being limited to daytime hours.

7.7.28 The removal of trees in the vicinity of the proposed substation, '*located in an area close to where Pine Marten have been recorded*' (p.77/137), has potential to impact on Pine Marten. The applicant considers the permanent loss of a small amount of conifer plantation is unlikely to impact negatively on the local Pine Marten community, however there is potential for significant impacts on Pine Marten if breeding or resting sites are disturbed during clear felling operations without mitigation measures. In this regard, on inspection the location of the proposed substation I noted that the existing pine trees are largely immature. The Indirect impacts may arise from visual and noise disturbance from works within the coniferous woods and also from temporary exclusion of the species from foraging areas by screening / fencing. These impacts are considered unlikely to be significant due to the duration of works.

7.7.29 Otter holts or couches may be directly impacted during construction of bridges and river crossings, which would be a significant impact if not mitigated. Potentially significant indirect impacts during construction may include disturbance at occupied breeding or nesting sites, adverse impacts on water quality affecting availability of prey species, loss of foraging grounds to construction and impairment of movements between foraging grounds from screening / fencing.

7.7.30 For Badger, Otter and Pine Marten, cumulative impacts may arise through agricultural and/or forestry activity or road works which remove nesting or breeding sites. Cumulative impacts will be limited through the implementation of best practice methods during construction in regard to mammals. No significant direct, indirect or cumulative impacts are likely during operation or decommissioning.

7.7.31 Mitigation measures to protect mammal species are set out under s.7.6.1.6. These include carrying out of construction during daylight hours to minimise disturbance to faunal species at night and requiring limited night time operations (e.g. concrete pours, turbine erection) to be supervised by the project ecologist. A qualified ecologist will re-survey for Badger setts and Otter 10-12 months and 12-14 month, respectively, prior to construction. Should Badger sett or Otter breeding or resting

sites be found, NRA best practice will be followed, works will be supervised by the project ecologist and the NPWS will be updated. Regarding Pine Marten, tree felling will be limited to time periods outside which Pine Marten may have young in dens (March and April), where possible, or otherwise the area to be felled will be surveyed by a suitable qualified ecologist to determine if occupied Pine Marten dens are present and a license will be applied for under the Wildlife Act for any site to be disturbed.

7.7.32 Terrestrial mammals conclusion - I am satisfied that the proposed development, subject to implementation of the proposed mitigation measures, will not significantly adversely affect terrestrial animals.

7.7.33 **Terrestrial mammals (bats)** – The applicant refers to a large number of guidance documents (s.7.2.1) that informed the appraisal of bat impacts in the EIS. The survey approach used is based on a strategic combination of techniques designed to investigate all potential bat activity onsite, based on the EUROBATS guidelines. The 'Bat Fauna Assessment Report' is contained in Appendix F6 Vo.3(1) of the EIS (the details of the ecologist concerned, Conor Kelleher, are set out above; assisted by Dr Isobel Abbot, Zoologist, PhD Ecology).

7.7.34 The assessment comprised a desk study and field survey, with the former reporting the presence or potential presence of nine bat species within 10km of the site – common pipistrelle, soprano pipistrelle, nathusius' pipistrelle, leisler's bat, brown long-eared bat, daubenton's bat, natterer's bat, whiskered bat and brandt's bat (table 7.24).

7.7.35 The field study (s.7.3.7.4) found common and soprano pipistrelle to be the most common species, ubiquitous along hedgerows, treelines and the edges of forests throughout the area. Brown-long eared bat was recorded in several areas, but it may also be present without being detected as it's a very quiet species. Leisler's bat was widespread. Daubenton's bat was observed on Moynalty River near Carlanstown and at pond north of Horan's Cross (offsite[87]) – this species travels considerable distances along watercourses and often roosts beneath stone masonry bridges. The bat survey findings in the vicinity of proposed turbines and substation

[87] Hence it does not appear in survey results on table 1-3

included in table 7.25 of the EIS are incorrect and relate to the proposed layout under application PA0038. The correct survey results concerning species and level of activity (in relation to turbine and substation location) are contained on table 1-3 of Appendix F6, which also indicates the risk to bats from the proposed development, the magnitude of potential impact (leisler's bat: high and major at four sites T2, T3, T4 and T6 and medium and moderate at six, T9, T16, T19, T21, T22 and T24; common and soprano pipistrelles: medium and moderate at 11 sites T2, T3, T4, T5, T6, T7, T11, T12, T14, T15 and T22; at all other sites the risk and magnitude was low and minor for the species concern, including leisler's bat, common and soprano pipistrelles and brown long-eared bat).

7.7.36 Four bat roosts were located using detector surveys. Three were minor night roosts of single animals. The most significant was a common pipistrelle maternity roost with 35 bats present in the Yellowleas Farmhouse c.3.5km east of the study site boundary[88]. Only 1no. structure (ST1[89], a culvert) along the proposed HV and MV cable roosts was found to be suitable for uncluttered access for bats. No known bat hibernation sites are located in the local area. Those trees that would be impacted to accommodate the proposed turbine delivery route (Carlanstown CTM06; Glenrath CTM09) were surveyed and found to be either unsuitable as a bat roost (CTM06) and/or not to show features that it may be used by bats (CTM09), however it is intended to undertake a confirmatory survey prior to tree removal.

7.7.37 S.7.3.7.9 sets out the main potential for impacts on bats from the development proposed arises from construction through the loss of woodland, mature deciduous trees and hedgerows, which are favourable foraging habitat for five bat species recorded in the survey of the area (generally indirect impact). Additional potential direct construction impacts[90] include loss of roosts in trees along the TDR and along bridges / culverts along the cable trench routes, with indirect impacts including disturbance due to increased human activity, and loss of prey species due to loss of

[88] The study boundary is not clear as there would appear to be no map on file, but may reasonably be assumed to coincide with the application site boundary.
[89] The location of these structures do not appear to be included on map on file.
[90] Construction impacts on bat is also set out under 7.5.3.1 p.78/137.

vegetation[91]. S.7.5.5 indicates that the potential impacts are the same as for construction, although the reasoning behind this is not explained.

7.7.38 According to s.7.3.7.9, the only bat at significant risk from the operation of the development is Leislers bat, which is classified as a high risk species in relation to wind turbines as it is a high flier, travelling considerable distances between roosts at foraging areas (up to 13.4km recorded in Ireland), evolved for fast flight (and consequently has poor manoeuvrability) and avoids clutter environments by flying usually between 10-70m above ground (recorded at up to 500m), bringing the species into direct conflict with wind turbines. Studies in Europe and USA have shown that bat mortality due to wind turbines are a serious issue and that bats can be killed even without making contact with a turbine due to the impact of change in atmospheric pressure on a bat's lung, resulting in haemorrhage[92]. The risk to Leislers bat is acknowledged in the EIS, although the significance of the impact is not alluded to. Table 1-3 of the Bat Fauna Assessment Report indicates that the magnitude of impact is major. I note that Leislers bat is rated as near threatened in the Red List for Terrestrial Mammals.

7.7.39 The EIS does not assess the potential for direct cumulative operational impacts on Leislers bat from existing and permitted wind farm development in the wider area[93]. As Leislers bat is a relatively far travelling species, there would seem to be potential cumulative impacts with wind turbines remote from this application site. This potential impact is therefore uncertain. I would also point out that the indirect cumulative impacts, including mortality and reduction in local populations, is not explained.

7.7.40 The mitigation measures to protect bats are set out under s.7.6.1.7 and is as per recommended in the 'Bats Fauna Assessment' report. In addition to 'standard mitigation measures', specific measures to protect bat (during operational stage) are set out in table 7.42 and are indicated as in line with NRA guidance on provisions for conservation of bat during planning and construction of roads. These require the

[91] S.7.5.3.2
[92] This impact has been questioned in subsequent studies. The *Bat Fauna Assessment* also questions the relevance of studies on bat mortality to the Irish context given the extent and scale of turbines and the species, population and travel patterns of the bats concerned in those studies (p.13/33).
[93] Nor does the *Bat Fauna Assessment*.

removal of hedgerow vegetation within 73m of turbine shaft of T2, T4, T7, T14 and T15 to reduce risk of collision and barotrauma. This mitigation measure is not reference to any particular guidelines. Whilst it is logical that the removal of vegetation would reduce the risk to bats, the loss of this vegetation would reduce roosting and foraging habitat species that are at low risk from turbine operation (due to level of flight) and therefore the provision of such cleared areas would seem, on balance, to put greater pressure on bat populations and I would query the need for these areas as a bat mitigation measure.

7.7.41 The operational mitigation measures include the curtailment of turbine T6, T11 and T12 during the hours of darkness within the months of June and July (period of peak bat activity, including nursing of young and first flights of juveniles), inclusive and the inclusion of T6, T11 and T12 in a corpse search / mortality survey. Curtailment entails increasing turbine cut-in speed to a higher wind speed at which bats are less likely to be on the wing, with 5.5m/s implemented 30 minutes prior to dust and post dawn suggested (based on published literature), but only when air temperature is 6°C (the minimum temperature required for bats' insect prey to fly). Curtailment proposals described in section 7.6.2.5 refers to implementation when air temperature measured on site is greater than 7°C, which is not consistent with the recommendations of the Bat Fauna Assessment report. The recommendation under s.7.6.2.5 that bat fatality monitoring be carried out for the first three years of operation (similar to the comprehensive onsite avian fatality monitoring programme proposed), in order to establish baseline data on bat/turbine interaction, does not constitute a concrete proposal. In s.7.7.6 the applicant states post construction bat fatality monitoring will be undertaken at the site. Should the Board decide to grant permission, the implementation of monitoring the proposals should be a required by condition.

7.7.42 No specific operational mitigation is proposed for Leisler's bat, the only bat species found in this area that is known to forage/hunt within the rotor envelop. It is submitted that there is uncertainty about what proportion of hunting time is spent at the upper height limit due to the distance limit of ultrasound detectors (60-80m), but that most activity can be expected to occur in the mid region of 40m, being the

average foraging height[94]. Bat Conservation Ireland[95] note that Leisler's bat is classified as a high risk species.

7.7.43 It is proposed to mitigate adverse construction impacts (removal of trees) through prior surveying of mature broadleaf trees proposed for felling for bat presence, the application for a derogation license where bats are present, the undertaking of felling during late August to early November to avoid bat roost disturbance (as per NRA guidance), and leaving any ivy-covered felled trees in-situ for 24 hours to allow bats escape overnight. Where possible, trees adjacent haul roads and not directly impacted will be retained intact, with impacts to be reduced through modified design and sensitivity during construction, and retained trees will be protected from root damage by temporary fencing an exclusion zone of at least 7m (or equivalent canopy height).

7.7.44 Loss of linear commuting routes (i.e. removed hedgerows) will be compensated for by reconnecting those routes where possible through planting of semi-mature trees under planted with hedgerow species (native), to be completed during the pre-construction phase. The exact location of planting is to be designed at detailed landscaping stage. In addition, habitat retention and landscaping is indicated as possible compensation. The details of tree / hedgerow planting and landscaping proposals and habitat retention are vague.

7.7.45 The mitigation measures proposed along the cable routes and turbine delivery routes are non-committal, only suggesting the following: bat presence surveys should be carried out prior to undertaking of any strengthening works to, re-pointing or pressure grouting of local culverts / bridges; where bats are found, some crevices should be left for continued use in accordance with best practice; should bats be found a derogation license should be made to the NPWS. The mitigation measures concerning artificial lighting (to be avoided where possible; use of directional lighting) is also non-committal.

[94] P.i/ii, *Bat Fauna Assessment* (EIS Vol3(1))
[95] '*Wind Turbine / Wind Fame Development, Bat Survey Guidelines'* (Bat Conservation Ireland, 2012). http://www.batconservationireland.org/pubs/reports/BCIreland%20Wind%20Farm%20Turbine%20Survey%20Guidelines%20Version%202%208.pdf (05/03/17).

7.7.46 Residual impacts - The EIS (s.7.7.6) concludes that the provision of vegetation cleared areas will reduce the risk of collision / barotrauma to bats such as pipistrelles, however these bats do not appear to be at any risk as they fly (commute and forage) below 10m (rotor envelope height is 39m) and the mitigation measure would appear unnecessary and ineffective to protect bats on site.

7.7.47 The EIS considers the worst case scenario may be the injury or death of a few individual specimens of leisler's bats, being high flying bat recorded in the vicinity. The level of risk and significance of the impact to this species, being the only Irish bat species rated as threatened on Ireland's Red List, is not determined in the EIS or in the Bat Fauna Assessment Report.

7.7.48 Terrestrial mammals (bats) conclusion: The overall residual impact on local bat populations is predicted as a minor negative with the favourable conservation status of bat species being unaffected and all species confirmed or expected on or near the study area anticipated to persist. However, the potential impact on Leislers is not adequately addressed or assessed and the potential significance of the impact is therefore uncertain and does not support the overall conclusion of the EIS concerning impact on bats.

7.7.49 Aquatic ecology – The EIS includes a very extensive review aquatic ecology. Field survey work was carried on in May 2016, supplementing the electrical fishing results from previous survey work undertaken August-October 2013 for PA0038. All watercourses / waterbodies within the site and within 500m of the site boundary were considered as part of the appraisal, generally limited only to those shown on the 1:50,000 Discovery Series Maps on the grounds that watercourses smaller than this are not normally of fisheries or aquatic significance. Those appraised are detailed on table 7.5 and shown in Plate 7-2 (p13). The aquatic habitat appraisal is purported to follow 'River Habitat Survey in Britain and Ireland Field Survey Guidance Manual' (Environment Agency (UK), 2003) and 'A Guide to Habitats in Ireland' (Irish Heritage Council, 2000), with suitability for salmonids determined in conjunction with 'The Evaluation of Habitat for Salmon and Trout' (DANI Advisory Leaflet No.1). The details of surveying techniques use are set out under s.7.2.4.5.

7.7.50 The proposed development affects the Blackwater (Kells) river catchment, with all components drained by the Moynalty and Yellow Rivers, tributaries of the Blackwater (designated cSAC). The River Blackwater is a tributary of the River Boyne (20km downstream of the site), the main channel of which is a designated Salmonid Water under the EC (Quality of Salmonid Waters) Regulations.

7.7.51 The applicant has determined that the waterbodies in the study area are not of any significant aquatic ecological importance and are not considered to be of any significant fisheries importance. Although the potential for Freshwater Pearl Mussel and White-Clawed crayfish (both protected) was identified, none were found and the EIS reports the vast majority of drains assessed were physically degraded and organically enriched, limiting their ability to support such species. Overall, the watercourse habitat within the study area is determined to be of limited aquatic ecological and fisheries value, with a rating of local importance, higher value. The lower reaches of the Moynalty River are rated as of County Importance.

7.7.52 Atlantic Salmon – The species is listed under Annex II and V of the Habitats Directive and Appendix III of the Bern Convention. Salmon use the tributaries and headwaters of the River Boyne and River Blackwater as spawning grounds (Atlantic Salmon is a Feature of Interest of the cSAC covering the said water system), however the watercourses in the study area (and those directly affected by the HV cable route) were found to be unsuitable / marginal with regard to the requirements of all life stages of salmon. The EIS notes that the Atlantic salmon populations in Ireland were rated as 'unfavourable – inadequate' by NPWS in the 2013 Article 17 Conservation Status Assessments.

7.7.53 White-Clawed Crayfish – The species listed on Annex II and Annex V of the Habitats Directive and the species is protected in Ireland under the Wildlife Acts. It is generally considered widespread in lowland rivers such as Kells Blackwater, Boyne and tributaries. Whilst they were not recorded within the study area but may occur in low densities. Its conservation status is rated 'inadequate' by the NPWS (2013).

7.7.54 Brook Lamprey – The species is listed on Annex II of the Habitats Directive and Annex III of the Bern Convention. They are found on most 2nd order and larger river and streams throughout the study area, though the lack of suitable spawning habitat

is a limiting factor. They are under significant threat from inter alia drainage and water quality deterioration, but its conservation status is rated 'favourable' by the NPWS (2013).

7.7.55 Fisheries – The Moynalty River is evaluated as being of county importance with regard to fisheries value (brown trout, salmon and coarse fish) and presence of Annex II species (table 7.18 of EIS refers). Whilst the minor watercourses including drains and 1st and 2nd order streams were found to be modified and evaluated ad being of poor ecological and hydrogeomorphological status, they are rated as of being of local importance (higher value) due to their direct connection to an important salmonid watercourse. Eel (critically endangered and Red Listed) are considered present and common throughout the study area, but are generally found only in larger watercourses, rivers and lakes.

7.7.56 Water quality – The EIS reports varying water quality is recorded on the River Boyne (moderate-satisfactory) and Blackwater (Kells) (unsatisfactory, poor and satisfactory), but the Moynalty River and Yellow River appear to generally be in unsatisfactory ecological condition, consistent with the applicant's finding of poor level of aquatic macroinvertebrates.

7.7.57 Aquatic Ecology & fisheries - potential impacts – The main potential for indirect adverse impacts during construction (and decommissioning) from releases of suspended solids and other substances / pollution, increased nutrients runoff associated with upgraded, realigned and construction of access roads, from cable trenching and excavation works associated with borrow pits (I would expect similar potential for turbine foundation excavation works) and from accidental spillage of cement and / or hydrocarbons affecting water quality. This could impact on salmon spawning sites and negatively impact on aquatic invertebrates and instream flora including eutrophication.

7.7.58 There is also potential for direct impacts on physical habitat (e.g. spawning grounds) where engineering works are carried out in the vicinity of streams and at stream crossings, including permanent loss of habitat and also obstruction of fish movement by culverts and changes to the drainage regime may also affect fisheries and aquatic invertebrate communities, including species within European sites, downstream.

There is also potential for invasive non-native species may be introduced to the site by machinery or materials imported.

7.7.59 Although the EIS identifies risks from general types of development proposed, I am not satisfied that the approach used takes due account of the risk of significant adverse impacts from the construction of specific development within specific areas. For example, the proposed new access road and MV cable route to the south of T6 is proposed to run along a reasonably large watercourse (a tributary of Moynalty River c.2km downstream) with steep unstable banks for a length of c.360m. The potential impacts from the construction of this track would present a far greater threat to water ecology than general access tracks.

7.7.60 The EIS recognises the potential for significant cumulative impacts on local water courses from agricultural and forestry activity in the area. It notes the potential for cumulative impact from the location of the support towers for the N-S Interconnector within the sub-catchments of the Staholmog Stream and Yellow River, but would seem to imply the cumulative impact is not likely to be significant.

7.7.61 I have some concern that the EIS takes a very generalised approach to consideration of potential construction impacts and does not draw attention to specific aspects of the proposal where the potential for risks appear greater and the avoidance of risk by design warrants more care consideration. For example, the access road south of T6 is proposed to run (for c.360m) along the bank of a reasonably significant watercourse, which has steep unstable earthen banks on the track side (north) and which discharges to the Moynalty River c.2km downstream. The field through which the track passes appears waterlogged. A construction compound is proposed to located (somewhat illogically from a logistics and operations perspective) to the south of the watercourse, necessitating an additional river crossing and increasing the risk of impacts on water ecology. The subject access track and construction compound warrant specific mitigation measures, ideally through relocation of the track and compound northwards and distant from the watercourse. It would not be feasible to provide the 50m setback from the stream suggested as general mitigation in the EIS. The generalised approach employed in the EIS is inadequate to address such issues.

7.7.62 There is very little likelihood of any significant direct impacts from the operational wind farm subject to proper management of lubricants and oils used on site. Potential indirect impacts on aquatic ecology include illegal dumping and fish poaching due to increased public access, and use of off-road vehicles, which can cause direct damage to streams.

7.7.63 Aquatic ecology: Mitigation – The mitigation measures to protect the aquatic environment during construction are set out under s.7.6.1.3 and during operation, under s.7.6.2.2, and appear to be consistent with those contained in the NIS, which I have summarised below, under Appropriate Assessment (Stage 2). These include implementation of a Construction Environmental Management Plan (CEMP), including Site Drainage Management Plan (SDMP), drawn up in consultation with the IFI and the NPWS (taking account of mitigation measures proposed under Chapter 9 Hydrology and Water Quality), to include the installation of site drainage and run off controls prior to site clearance works to control erosion and siltation as a key measure to protect aquatic species, prior to the commencement of construction works. The SDMP is identified as the key mitigation measure to protect the River Blackwater.

7.7.64 The only obvious discrepancy I have found is in respect of the carrying out of instream works outside of the salmonid close period, which is stated as July-September in the EIS and as October-March in the NIS, and the less onerous restriction proposed in the EIS (it only limits the carrying out of the most sensitive elements of riparian amelioration works to outside this period, compared to a commitment that no instream works will be carried out in the NIS).

7.7.65 The details of the EIS would suggest that the carrying out of the proposed development and the operating of the proposed development would not significantly adversely impact on the aquatic environment and its constituent elements on site or within the wider vicinity, subject to the full implementation of the mitigation measures and monitoring proposals detailed in the EIS and in the NIS. Compliance with the conditions recommended by the IFI would help mitigate impacts on water ecology. However, I have concerns that the EIS is based on generalised risks from generalised construction work within a generalised environment, ignoring the potential for significant adverse impacts on water ecology arising from the carrying

out of specific lengths of access track and cable trenching, etc., within specific locations. The construction of the southern access road, cable route and to construction compound, adjacent a significant watercourse tributary of the Moynalty River, from the local road southeast of T6 is a case in point. The works would run for c.360m adjacent to the steep and unstable bank of the watercourse, through a poorly drained and waterlogged field. The identification of specific such works and their higher potential to significantly adversely impact on water ecology (including, potentially, European Sites downstream) is necessary to enable proper, detailed, area-specific mitigation measures to be devised, including the relocation of such works if necessary. The applicant's approach undermines the EIS conclusions on impacts on water ecology and raises uncertainty of impact.

7.7.66 Habitats & flora – The habitats were determined by field survey (carried out on site in July 2013) and examination of Ortho-photographs. Hedgerows were also surveyed along the cable route in June and July 2014. Although the presence of rare or protected flora (within the 10km grid square in which the site is located) is noted (table 7.9), none where noted in the site survey. I've addressed the issue of European sites under Appropriate Assessment and I will avoid any repetition of same here.

7.7.67 The on-site (721.2ha) habitats (table 7.13) are demarcated on Figure 7.18.1 (EIS, Vol.2(a)). It shows that >75% of the total habitats comprise improved agricultural fields and arable crops, 11% is under coniferous plantation, which, along with areas of buildings and artificial surfaces, scattered trees and parkland, recolonising and bare ground, felled area, conifer plantation and dry meadows and grassy verges, conifer plantation and scrub, cutover bog, and bog woodland[96] are rated as of local importance (lower value). All but one of the remaining habitats on site are rated as of local importance (higher value), including treelines (33km), hedgerows (c.21km), hedgerow / treeline (10.5km), drainage ditches, dry meadows and grassy verges (mainly farm tracks), wet grassland, and mixed broadleaf / conifer woodland. The depositing / lowland rivers habitat (Moynalty River), traversing the southwest of the site is rated of county importance. These higher value habitats are indicated as key receptors (table 7.13).

[96] Not corresponding to Annex I habitat 'Bog Woodland'.

7.7.68 It should be noted that, although the site surrounds a discrete peat bog, it is stated that no turbines are proposed within an area of high bog, and based on the details on file and a site inspection, it would appear that the application site does not encroach on the active bog. A peatland survey is attached as Appendix F5. The main findings of the survey is that the bog is a remnant area of raised bog that has been severely impact by long term peat extraction and associated drainage with a dominance of degraded bog communities. The long term conservation of the site is threatened due to the effects of past and continuing peat extraction. The Council's Heritage Officer notes that T14 and T15 are located within a wider complex of wetlands habitat that supports EU Annex 1 Habitat (degraded raised bog) and the Council has requested that the applicant be requested to relocate the two turbines away from the conifer plantation in view of the high conservation value of this area within the context of Meath (item no.9). As the site is not within, adjacent to or connected to a European Site designated as a SAC with degraded raised bogs (still capable of natural regeneration) as specified as its special interest, and is not covered by any other natural heritage designation, I do not consider the Council's request to be necessary.

7.7.69 The potential for impacts on the habitats arise during construction / decommissioning and are described under s.7.5.3.1, including the loss of habitats amounting to 42.35ha (5.9% of the site; c.40ha is permanent loss), of which 97.3% is of low ecological value. The key receptors indicated as being impacts are wet grassland, dry meadows and grassy verges, depositing and lowland rivers, drains, hedgerows and treelines, which are submitted as not significant (subject to mitigation measures for drains and clear span bridges for depositing lowland rivers).

7.7.70 I note the location of T6 adjacent / within a mature broadleaf woodland, possibly birch and possibly originally an area of coppice judging by the multi-stemmed nature of trees. Contrary to the level of detail provided for most, if not all terrestrial habitats, the EIS provides very little information on the nature, value and significance of this mature woodland of native broadleaf species. It is uncertain whether the loss of the woodland is of significance. It may be feasible to retain this area of mature woodland through relocating T6 northwards by 150-160m.

7.7.71 No direct impacts will occur at operational stage, although indirect impacts from water quality deterioration could occur without mitigation.

7.7.72 It is proposed to provide a Habitat and Species Management Plan to detail habitat restoration measures, to avoid/minimise potential conflicts between the proposed development and the positive impacts on increasing habitat diversity close to the turbines. An appropriate qualified and experienced ecologist will review and, where required, amend the proposed HSMP in consultation with the NPWS. Any re-instated hedgerows will be of native suitable species and all works to trees, scrub or hedgerows shall adhere to NRA guidance for protection of same. I note reference to available replant lands which 'may be potentially be utilised for replanting' in lieu of necessary clear-felling at the site – this does not constitute a definite mitigation proposal.

7.7.73 In general I am satisfied that the impacts on habitats within the site will not be significantly adverse subject to implementation of mitigation, although the loss of mixed woodland in the footprint of T6 may be considered locally significant and, in my opinion it would be preferable to avoid this impact through relocation of the turbine northwards c.150-160m northwards to avoid clear-felling of this area, if such relocation is feasible.

7.7.74 **Conclusion** – I am generally satisfied that the proposed development will not significantly adversely impact on avifauna or terrestrial mammals (excluding bats), however, the proposed development would appear to pose a significant threat to Leislers Bat, a protected species and Ireland's only high flying bats, which have been recorded in the site surveys and which commonly hunt within the rotor sweep of the proposed turbines. The assessment of the potential impact and significance of the impact on this species is inadequate and undefined, and no mitigation is proposed to address same. I do not consider that deficit in information can this can be addressed by condition and I do not know whether it is feasible to resolve the potential adverse effects through mitigation measures.

7.7.75 The construction of the proposed development poses a significant risk to water ecology, including the River Boyne and River Blackwater cSAC downstream of the site and salmonid habitat on the Moynalty and Yellow River catchments, but these

impacts could generally be avoided through considered mitigation measures, as proposed by the applicant and as recommended by the IFI. However, the EIS, which focuses on generalised risks of impacts from generalised development in non-specific geographic locations, ignores specific and, ostensibly, very high risks of potentially very significant impacts arising from specific developments in highly sensitive locations (e.g. access track and construction compound south of T6) and fails to address same through appropriate mitigation measures including avoidance through simple and appropriate redesign (e.g. relocation of access route and compound and omission of water crossing). The potential for significant adverse impacts on water ecology would therefore appear to be far higher than anticipated in the EIS and far higher than they ought to be. It may not be feasible to address this issue by way of condition given the nature and extent of the development proposed.

7.7.76 Impacts on terrestrial habitats would, in general, appear not to be significantly adverse, however the failure of the EIS to provide a reasonable level of detail concerning the mature broadleaf woodland to be felled in the vicinity of T6 and objectively determine its ecological significance, if any, raises uncertainty about potential impacts.

7.8 Hydrology and water quality

7.8.1 Meath County Council identified no hydrology or water quality issues except as related to ecology. The issues raised by HSE and Irish Water concern water infrastructure and water as a material asset. Observer concerns primarily pertained to impacts on water supply and quality issues and also to increased flood risk.

7.8.2 Impacts on water as a factors of the environment are addressed under chapter 9 of the EIS.

7.8.3 The methodology comprised a desk-based study of surface water hydrology and water quality in the catchments relevant to the wind farm, including an assessment of the watercourses which will be intercepted by the proposed layout of the wind farm and those which will receive surface water run-off from the proposed wind farm development. A field assessment of the existing hydrological environment was also

carried out to verify the desk study and to record all significant hydrological features. The field assessment comprised two site walkovers from 15-17 July 2013, 12-13 June 2014 and 13 March 2013.

7.8.4 The EIS states that it has had regard to extensive relevant guidance and legislation, which is set out under s.9.2.1, including obligations under the Water Framework Directive. It also states that 'this chapter considers the responses [received at pre-application consultation stage], with particular regard to concerns relating to hydrology and water quality, expressed in particular by the Health Service Executive (HSE), Department of Agriculture, Food and Marine Forest Service, Inland Fisheries Ireland (IFI) and OPW' (p.4). However, the details of all consultations contained in chapter 4 of the EIS include no record of responses from the HSE, the DAFM Forestry Service or the OPW.

7.8.5 Baseline water environment – The majority of the application site is drained by the Owenroe / Moynalty River and tributaries, which confluence with the River Blackwater (Kells), a tributary of the River Boyne, c.3.4km south of the site boundary at Bloomsbury. The balance of the site (southeast section) drains to the Yellow River which confluences with the River Blackwater (Kells) c.8.4km south of the site at Tatestown. The River Boyne and River Blackwater is a candidate SAC and a designated SPA at the point (and upstream and downstream) of confluence with the said watercourses. The Owenroe / Moynalty River and the River Blackwater (Kells) are classified as salmonid, SPA and SAC rivers on the Water Framework Directive Register of Protected Areas. The River Boyne is classified as nutrient sensitive downstream of Navan Town. The individual river sub-catchments are described under section 9.3.2 and are shown overlain with the proposed development in Figure.9.1 of the EIS.

7.8.6 Predominant land uses within the site is agricultural land in tillage or grass, with forestry plots in various stages of growth and section of cut peat (no development is proposed within the peatland area). The TDR route and/or cable route extend out from the main site through Kells, Carlanstown, Castletown and Wilkinstown, crossing a number of watercourses. The soil is of a diverse mix, but predominantly limestone tills, cut peat, sediment and shale till, and limestone sands and gravel, with significant deposits of lake sediment in some locations. Alluvium is evident at

numerous locations in watercourses across the site, including the Moynalty and Blackwater Rivers.

7.8.7 The aquifer is predominantly rated moderate and high vulnerability, with isolated pockets of extreme vulnerability.

7.8.8 Based on OPW Flood Data Maps, the applicant indicates that no flood events are recorded on site, with the nearest recorded flood noted at Fyanstown (of R163, 1.5km to south; recurring event), Bloomsbury Bridge (2.5km downstream; 2008) and Donaghpatrick (8.5km downstream; 2009). Flood events and the 1% AEP pluvial and fluvial extents are shown in Figure 9.2. The EIS notes that that flood zones (in the vicinity of urban settlements) identified under Meath County Council's Strategic Flood Risk Assessment do not encroach on the application site, but that the TDR crosses a flood risk zone on the N52 through Carlanstown.

7.8.9 In terms of water quality, the EIS reports information from the Water Framework Directive Website (watermaps.wfdireland.ie) on the water quality of each of the five sub-catchments overlapping the main body of the site (it does not include the proposed grid connection route cable route). Two of the sub-catchments (EA_Boyne159BlackwaterkellsTRIB_Moynalty1_lower; EA_Boyne159Blackwater_YellowTRIB_Gibstown) have 'poor' status and the other three have 'moderate' status. All are at risk of not achieving good status by 2021 contrary to the objective to achieve 'Good' status by 2021.

7.8.10 The EIS also reports that the biological water quality of the Moynalty River between Carlantown Bridge and Fyanstown Bridge, and on the Yellow River near confluence with the Blackwater River were rated Q3 in 2012, which represented a deterioration in water quality on the Moynalty River and a continuation of the poor water quality on the Yellow River, compared to 2006 and 2009. The chemical status for the relevant monitoring locations are reported to be compliant with the environmental quality standards under the WFD (tables 9-5, refer).

7.8.11 The applicant undertook supplementary monitoring at seven locations (see Figures 9.3 and 9.3.1), the results of which are contained in tables 9-6 and 9-7 of the EIS and are shown to be compliant with the European Communities Environmental Objectives (Surface Waters) Regulations 2009, as amended in 2012 (S.I. No.272 of

2009, S.I. NO.327 of 2012) and the European Communities (Quality of Salmonid Waters) Regulations, 1988, S.I. No.293 of 1998, where applicable.

7.8.12 The EIS reviews the drainage pattern of the site and includes a detailed record of significant hydrological features (79no.) on site, including along the Turbine Delivery Route (TDR) and cable route, the details of which are included in Appendix H1 of the EIS (key map included in Figures 9.4 and 9.4.1). I would highlight that the small lough noted in the vicinity of the proposed borrow pit at Clooney in the site walkover surveys has since been infilled. No modifications are required to stream crossings identified (s.9.3.6) along the TDR. Six structures will be crossed by the cable route (at Dowdstown, Red Island, Dowthstown, two crossings at Wilkinstown and another at entrance to Gorman Station), either through open-cut methods or by trenchless crossing techniques either within the road line or, subject to agreement with the landowner and environmental review, off-line if found to be more optimal. No wide rivers (>6m) need to be crossed by cables, and trenchless techniques will provide a mechanism to cross bridges and culverts without disturbing the structures. The developer does not require to enter on other lands for any works to affected culverts and bridges and propose to complete all cable laying and ancillary works, along the public roadway, from and within the public roadway.

7.8.13 Potential impacts – The potential impacts on water are set out under s.9.4. The potential for adverse impacts arise mainly during construction and also during decommissioning.

7.8.14 The potential for indirect impacts from tree-felling and construction are detailed in s.9.4.2.2 (s.9.4.4 for decommissioning), which includes increased runoff rate, erosion and sedimentation and chemical pollution. In my opinion this section of the EIS does not clearly, or adequately, set out the potential risk to surface waters from increased water sedimentation arising from the actual undertaking of very extensive site excavations required to accommodate access tracks, turbine foundations, the substation, storage compounds and all associated permanent and temporary hard-standing areas, and from the extraction from the two proposed borrow pits. Even where such works are alluded to, they are not considered in terms of geographical extent or likely duration of such excavations being exposed. In this regard I have already drawn the Board's attention to the higher risk for potential adverse impacts

from the proposed construction track, MV cable trench and compound and compound access bridge to the south of T6 adjacent a significant watercourse with steep unstable banks. Otherwise the EIS does identify the main aspects of construction that have the potential to increased sedimentation, which I will not repeat here.

7.8.15 I am not satisfied with the applicant's conclusion that the disturbance of soils in agricultural grassland due to excavations for turbines would not result in any higher risk of transport of nutrients to watercourses downstream from previous fertilisers and slurry applications than under normal farming practices is justified. This would surely be dependent on the current nature of farming carried out on this site, which would appear to be predominantly grazing land, with more limited tillage.

7.8.16 The potential for pollutants, such as fuel / hydrocarbons, sanitary wastes, etc., to arise is taken into account, as has potential for flooding impact, concentration of flows and impacts on overall site drainage and on ground saturation in poorly drained areas.

7.8.17 No impacts are anticipated from the TDR, but there is potential for impacts from use of horizontal directional drilling techniques that may be used to cross watercourses where alternatives (open-cut techniques within structures, or placing cables on structures) are not practical. This may result in 'frac out' (the inadvertent release of drilling fluid or a release of sediment laden groundwater) into a watercourse. There is a risk of sediment laden water or other deleterious substances entering surface water as a result of grading, drilling excavations, equipment washing or other construction related activities during directional boring. Conventional cable trenching will expose bare soil for a temporary period over a short section of trench (it will be subject to time of year and a pre-construction survey), risking release of concentration of suspended solids to watercourses.

7.8.18 The potential for cumulative impacts on hydrology and water from the construction of other wind farms (Raragh, Teevurcher and Crowinstown – 9no. in total) is determined as negligible due to distance and scale. Cumulative impacts arising from construction of the Boliden Tara Mines turbine and for the extension of the mine tailing pond is rated as of low significance. The cumulative impact from the

construction of the North-South Interconnector is rated negligible. The EIS also considered the cumulative risk from the operations of the permitted piggery at Drakestown to be unlikely.

7.8.19 Impacts arising during decommission are anticipated to be similar but less than that at construction stage and are largely dependent on whether it is permitted to leave access tracks, turbine foundations and hardstanding, cable trenches, etc., in situ to be allowed to revegetate naturally, as is proposed by the applicant.

7.8.20 Potential operational impacts – The potential impacts are addressed under s.9.4.3.3, but are generally minor. Tree-felling, new site access roads, turbine hard-standing areas, the on-site substation and all new hard-surfaces will potentially increase surface water runoff, being a direct impact during operations. This is projected to be an increase of 0.22% to the River Blackwater catchment and will decrease over time as revegetation occurs, the impact is considered to be of low significance. The EIS does not address the likely significance of the level of increase within context of the sub-catchments of the Moynalty and Yellow Rivers into which the runoff would discharge.

7.8.21 During the operational period there is a risk of contamination of surface waters from runoff of hydrocarbons from impermeable trafficked areas and from potential for accidental low-volume release of oil used in cooling the transformers.

7.8.22 No significant cumulative impacts on water quality or hydrology are anticipated with other developments.

7.8.23 Potential flood risk – The application site is shown in context of the OPW predicted extent of fluvial and pluvial flood events (1% annual exceedance probability) on Figure 9.2. The EIS notes proposed turbines T5, T16 and T21 are within the fluvial floodplain, with proposed location of T18 and T20 said to 'skirt the indicative floodplain'. There is no risk to any turbines located within or near the flood zone during a flood event due to the sealed design of the structures. It is submitted that there will be no appreciable obstruction to flood flows as a result of the new access roads and turbine hardstanding areas which, it is indicated, will mostly be at grade with the existing terrain. Any stream crossings will be conveyed in structures sized to take the 1 in 100-year flood flow with a 20% allowance for climate change

(calculations contained in Appendix H3) and the increase in flooding is purported to be of minor significance due to the small percentage increase in runoff contribution to the catchment (0.22% increase in the Blackwater River) as a result of the proposed development.

7.8.24 A flood risk assessment was carried out to determine the impact of proposed increased hard surfaces on downstream flooding (see s.9.5.1). The location of all existing (3no.) and proposed stream crossings (14no.) are shown on Figure 9.6. A hydrological assessment was carried out to determine the flood estimate for the catchment at the proposed crossings (of EPA blue-line rivers) in the 1 in 100-year scenario. The required dimensions for clear span structures, which are the preference of the IFI in sensitive fisheries, are based on a hydrological assessment and are set out in table. A typical bottomless culvert / clear span Matiere-type arch structures is shown in Appendix H4, but the applicant only commits to consider use of on the Moynalty River and the Aghnaneane or Hermitage tributary of same.

7.8.25 The EIS considers the impact on 'benefitting lands[97]', as identified on OPW flood maps but determined that this definition is no longer relevant and does not reflect the current situation of these land which are generally well drained (see Appendix H5) and considered the PFRA mapping prepared for the CRAMs to be more relevant to reflect the zones subject to fluvial and pluvial flooding. This appears reasonable. Within benefiting lands, it is submitted that the turbine hard standing and associated tracks will drain satisfactorily during normal storm events, as is evident from the falls available in the drainage system, but that in an extreme event, drainage may be impeded, with temporary standing water occurring in the proposed swales draining hardstanding areas and tracks. It is not anticipated that drainage in low lying lands will lead to a significant increase in flooding.

7.8.26 The FRA determined that the increase in surface run off would have the potential to increase water levels at Fyanstown Bridge, which has been subject of recurring flood events, by only c.10mm. Currently there is 1.7m between the 1 in 100-year design flow and the top of the central arch of the bridge and therefore the additional flood

[97] OPW dataset of lands that are subject of flooding or poor drainage and which might benefit from implementation of arterial (major) drainage schemes and

water would not result in surcharge. The flood event is purported to have arisen from the blocking of a land drain and not from lack of capacity.

7.8.27 The proposed substation falls within the definition of 'essential infrastructure' under 'The Planning System and Flood Risk Management Guidelines for Planning Authorities' (OPW, 2009). It is proposed to be located 50m from the nearest stream, is outside the Flood Zone A and completely avoids the 1 in 100-year flood risk zone. The hydrology walkover survey noted the site of the substation as marshy harvested forest land with no functional drainage evident, which may potentially be a flood plan, however the EIS indicates that there is an existing drain to the west.

7.8.28 Having regard to the detailed assessment included in the EIS, there would appear to be no significant increase in flood risk arising from the proposed development.

7.8.29 Mitigation – Much of the mitigation of potential hydrological and water impacts is provided for as part of the overall design approach to drainage provision and control of surface water runoff which will be compliant in the use of SuDs (s.9.6.1), with use of swales and stilling ponds with diffuse outfalls to drain the development and is designed to minimise the impact of the proposed development on the drainage network in the area. It also incorporates a buffer zone of at least 50m from watercourses for turbines, new access tracks (where possible), on-site substation, borrow pits and site compounds. In principle this is acceptable and positive, but in practice a 50m setback will not be achievable in many locations, for example the access track south of T6, where minimal setback is proposed adjacent to a c.360m length of watercourse.

7.8.30 The EIS details how silt control measures will be put in place to protect fisheries sensitive waters (s.9.6.2), details drainage proposals for proposed associated hardsurfaces at turbine locations (9.6.3), for existing hard-core tracks and surfaced access roads (s.9.6.4) and new tracks and hardsurfaces (s.9.6.5), the approach to provision of proposed watercourse crossings (s.9.6.6), drainage of the proposed substation (s.9.6.7), for the temporary site compounds (s.9.6.8) and for the borrow pits and excavated material (9.6.9). Provision is also made for rainwater harvesting and for sanitary waste management during the operational phase by way of a sealed underground holding tank (to be routinely emptied by a contracted licensed provider)

for the proposed substation. Potable water and water required for construction (wheel wash, dust suppression, concrete wash-down, etc.) will be transported to the site.

7.8.31 The detailed proposed mitigation measures for construction are set out under s.9.7.1 (s.9.7.2 addresses construction of watercourse crossings, s.9.7.3 addresses cable route construction and TDR alterations), including the preparation of a detailed Construction Environmental Management Plan (CEMP), including a Site Drainage Management Plan (SDMP). These extensive and detailed measures are a repeat those included in the NIS, which I have summarised under the Appropriate Assessment. In general the detailed measures are appropriate, but they as they are generalised and not location and development specific, they fail to address the real risk posed to water by the development,

7.8.32 The mitigation measures proposed during operational stage consist of a drainage system maintenance regime, which I consider appropriate and sufficient, which will be retained during decommissioning. Water quality monitoring is proposed to be carried out over the course of the development to ensure that designed measures are working to protect water quality (s.9.7.7) as is also proposed in the NIS.

7.8.33 **Conclusion** – In general is should be feasible to carry out the proposed development without significantly adversely impacting on the water and hydrology through the implementation of the mitigation measures detailed in chapter 9 of the EIS. However, the generalised approach of the EIS assessment ignores the high risk of significant adverse impacts posed by specific aspects of the proposed development in particular, more sensitive, geographic locations within the application site which conflict with the mitigation measures proposed (e.g. the access track, MV cable route and construction compound south of T6 cannot feasibly achieve the 50m setback from watercourse). These risks should be addressed at design stage. Accordingly, I am not satisfied that the proposed construction mitigation measures are such as to protect the water environment and hydrology.

7.9 Material Assets – socioeconomics

7.9.1 The main issues raised by observers related to impacts on residential property and land value, tourism assets and related employment / income, agricultural and equine assets and on local business and enterprise (e.g. local nursing homes and preschools, film industry, etc.). Many observers noted the potential for positive socio-economic impacts, including for local engineering companies, local business generally, direct and indirect employment and investment, and alternative income for farming community. Failte Ireland highlighted the significance of heritage tourism in the county (Ireland's Heritage Capital) and its dependency on landscape setting, referring to the most important heritage items and the packaging of such heritage tourism product under 'Irelands Ancient East' and 'Boyne Valley Drive'. Failte Ireland submitted that it's 2012 survey found a change in attitudes to wind energy development from 2007 and submits that wind farms should be large turbines in small numbers, sited away from the coast. Meath County Council and its Heritage Officer had similar concerns. Inland Fisheries Ireland's concerns related to impacts on fish stocks as a material asset.

7.9.2 Impacts on material assets are not addressed in a standalone chapter of the EIS but are addressed as part of impacts on the Human Environment in chapter 10, but also concern traffic and transport impacts on road infrastructure, impacts on communications and water services infrastructure which are addressed separately and/or as part of consideration of other factors the environment.

7.9.3 The specific issues addressed include potential impacts on socio-economics (employment), land-use, recreation and amenity and tourism, the bloodstock industry, the Meath Gaeltachts, health and safety and material assets.

7.9.4 **General and community** – Positive impacts are predicted to arise to Ireland balance of payments if 40% of electricity is sourced from renewable energy (the proposed development would contribute 2% of the MW to achieve same). It will also provide short term jobs directly through construction (120no.) and indirectly through workers spending money in the local community, and long-term employment (20no. direct and 20no. indirect) (the EU Renewable Energy Council estimates that 0.4 jobs are created per MW installed) and will provide rates in the region of €560,000 to

€700,000 p.a. to Meath County Council. In addition, the applicant submits that there is potential for direct community gain from the project, indicating that that 'annual funding could be set aside of up to €85,000 p.a. or in the region of €2,000,000 over the life of the project' based on current proposals as part of Element Powers endeavour to develop new ways to direct increased gain towards local communities and people, with particular focus on those closest to the wind farm (see Appendix A8 for the Community Benefit information leaflet)[98]. Whilst this is laudable, I am not satisfied that there is a definite, unambiguous commitment to provide funding and / or a specific level of funding per annum over the life of the project and I do not believe it is possible to require this by way of condition.

7.9.5 As no negative impacts are identified, no mitigation measures are proposed.

7.9.6 **Impact on property prices** - The potential impact on house prices is also addressed under socio-economic impacts. The EIS submits that there is no evidence to indicate a negative impact on the Irish property market and there are no know studies undertaken to consider this impact in Ireland. It refers to five studies which found no or suggested no negative impact on property prices from wind farms (2007 Report of RICS and Oxford Brooks University; 2006 research by the ESPC; 2014 study by CEBR, commissioned by RenewableUK; US government-funded studies in 2009 and 2013).

7.9.7 Observers dispute the studies cited by the applicant and their relevance to the Irish context and/or the scale of the wind farm proposed. It is claimed that a material reduction in value of homes will result for properties located proximate to turbines, directly from visual impact (and etc.,) and indirectly (and cumulatively) from uncertainty concerning the potential future development of the Greenwire Project, which will make it difficult to find a buyer and from sterilisation of lands within 500m of a proposed wind turbine. Many refer to a study by London School of Economic which is purported to have found an 11% decrease in value of properties within 1.2 miles of wind farms over a 12-year period. A number of local estate agents / auctioneers have submitted that sales have fallen through on foot of the proposed

[98] For clarity, the EIS states that *'the applicant is committed to providing additional planning gain by a focused Community Gain fund'* (p.7/18, Chapter 2, EIS). Whether or not this is legally enforceable is another matter.

development and/or that certain properties may be significantly devalued (by up to 50%). Observers submit that in other jurisdictions the adverse impact on property value has been recognised – for example the Danish government is alleged to have introduced a compensation scheme. A large number of observers allege that the Ontario Supreme Court has accepted that a wind farm development has resulted in an adverse impact of up to 50% of property value[99]. Another observer submitted that the UK courts have upheld a 25% reduction in house valuations in Lincolnshire (for the purpose of rates based on property valuation) due to proximity of a wind farm[100].

7.9.8 The EIS addresses the particular potential for indirect adverse impacts on property due to the perceived impact on quality of life and health (referring to a range of symptoms that may collectively fall within the notion of wind turbine syndrome) arising from noise and infrasound. I address this in the section on human beings and will not repeat it here, other than it concludes the research cited and the position of the Department of Environment is that there is no evidence that wind farms cause adverse health effects in humans.

7.9.9 It would seem plausible that the proximity of a dwelling to wind turbines would be a determining factor in property value, and that the larger, more prominent and more numerous wind turbines are within a development, the more likely there is to be significant factor. Property value is also likely to be impacted by the perception of noise associated with the wind farm, again this will be related primarily with separation distance. However, there is clearly contradictory findings in different research studies in this hotly contested and sensitive area and it is not possible for me to reach a determination on the whether a permanent material impact will arise on residential property value in the vicinity based on the information at available to me. Given that the WEG 2006 do not refer to impact on property value but set standards in relation to minimum setback distance from and maximum noise impacts at residential properties, it may be reasonable of the Board to take the view that

[99] Wiggins v. WPD Canada Corporation. I am unable to confirm that this is factually correct.
[100] In this regard I have located a copy of a decision of Lincolnshire Valuation Tribunal concerning an appeal against the accuracy of Council Tax band and a material reduction resulting from the development of a wind farm within 930m of a residential property, where it was accepted that a reduction in value (estimated at c.20%) resulted from a real and detrimental effect on the Appellants' quiet enjoyment of their properties. http://info.valuation-tribunals.gov.uk/Decision_Documents/documents/CT_England/2525475651032C.pdf (15/03/17).

subject to compliance with the standards that the issue of permanent material impact on property value does not arise.

7.9.10 As the applicant does not accept there to be a negative impact, no mitigation is proposed.

7.9.11 Land use – I would agree with the EIS that there are no significant impacts on land use, as the predominantly agricultural use can continue as it is generally compatible with wind farm development. The wind farm may have implications for the development of one off housing in the area considering the 500m separation distance advised under the WEDG 2006. As the applicant does not accept there to be a negative impact, no mitigation is proposed.

7.9.12 Recreation, Amenity and Tourism – A major issue raised by a large number of observers concerned the impact on the tourism offer of the County, including the setting of its abundant historical heritage as part of the tourist product 'Ireland's Ancient East'. These concerns were also highlighted by Failte Ireland.

7.9.13 The EIS refers to the advice of the WEDG 2006 which states 'wind energy developments are not incompatible with tourism and leisure interests, but care needs to be taken to ensure that insensitively sited wind energy developments do not impact negatively on tourism potential. The results of survey works indicate that tourism and wind energy can co-exist happily' (p.6). The applicant refers to studies by Fáilte Ireland and the Northern Ireland Tourist Board (2008) which found most visitors were broadly positive towards wind farms in any context, that their presence did not detract from the quality of sightseeing and that greater numbers of wind turbines would either have no impact or a positive on their likelihood to visit Ireland in the future. The applicant presents similar evidence from the Scottish tourism agency, Visit Scotland. Furthermore, as noted by the applicant, Fáilte Ireland's 'Guidelines on the Treatment of Tourism in an Environmental Impact Statement' (2011)[101] consider that 'some types of new or improved large scale infrastructure….

[101] I could not locate a copy of this document on Failte Ireland's website and I am therefore unsure of its status. I obtained a copy at http://www.yellowriverwindfarm.com/files/EisAppendices/Appendix%20F%20-%20Statutory%20&%20Non-statutory%20Consultees/02.%20F%C3%A1ilte%20Ireland%20EIS%20and%20Tourism%20Guidelines%202011.pdf (16/13/17)

can convey a sense of environmental responsibility – such as wind turbines' (s.4) and that '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 a modern, informed and responsible attitude to the environment' (s.3).

7.9.14 The applicant makes the case that there is ample precedent for wind farms forming part of distant views from highly sensitive tourist / heritage locations, citing the views of Glenlough Wind Farm 16-18km from the Rock of Cashel, with the following permitted wind farms also to be visible from the Rock (a candidate UNESCO WHS) once constructed - Cappawhite (19km), Garracummer (22km), Glencarbry (17km), Milestone (23km) and Upperchurch (22km). Similarly, wind farms are visible from Mullaghmore (23-30km distant) and from the Cliffs of Moher (17km). Whilst there is logic to the applicant's argument, each proposed development (and consequential impacts) must be considered on its own merits and within its own specific context and precedence may not be directly applicable to the potential significance of impacts that might arise on heritage tourism sites within County Meath, including the Hill of Tara, Loughcrew, Brú na Bóinne, and etc.

7.9.15 A subsequent Failte Ireland survey (2012) on visitor attitudes, which has not been referred to by the applicant, suggests a somewhat hardening of negative attitudes, with fewer respondents having the opinion that wind farms have a positive impact (down 32% from 40%) and an increase in respondents with negative perceptions (up 21% from 15%). It also found a greater negativity expressed about potential wind farms on coastal (40%), fertile farmland (37%) and mountain moorland (35%) landscapes than on bogland (24%) and industrial lands (21%). The report recognises that the there is a challenge in striking a balance between maintenance of landscape character and scenery as a tourism asset and facilitating further wind farm development, including concerns about cumulative impacts and having regard to the preference amongst tourists for wind farms with a smaller number of turbines and in certain landscapes[102]. In its submission, Failte Ireland identifies the potential risk of cumulative impacts on the heritage tourism product of the county from wind farm development within County Meath and in the neighbouring counties in the

102 http://www.failteireland.ie/FailteIreland/media/WebsiteStructure/Documents/3_Research_Insights/4_Visitor_Insights/WindFarm-VAS-(FINAL)-(2).pdf?ext=.pdf (16/03/17)

absence of a Wind Energy Strategy and advises that a regional assessment of alternative locations for wind energy development would be beneficial.

7.9.16 I would accept the applicant's position that some wind farm developments can constitute visitor attractions in their own right (reference is made to the generation of 120,000 visitors to Whitelee Wind Farm in Scotland in 2009) and I note, in particular, the significant numbers of visitors to Mount Lucas Wind Farm, Co. Offaly, when I inspected the site in January. There is, however, no suggestion that the proposed wind farm site will be open to the public as an amenity. I would accept that there is not likely to be any appreciable adverse impact on the proposed Navan to Kingscourt Greenway along the disused railway line to the east.

7.9.17 The applicant concludes that the operational wind farm will have no negative impacts on recreation, amenity and tourism. As the applicant does not accept there to be a negative impact, no mitigation is proposed.

7.9.18 I consider the issue and the potential for long term impacts on the heritage related tourism offer of County Meath to be not so clear cut or certain. Based on the relatively high visibility of the proposed wind farm from significant heritage tourism sites (Tara, Loughcrew, etc.)., the location of the development predominantly on fertile farmland and the large spatial scale and tall height of the wind farm, having regard to the Fáilte Ireland survey of 2012 and to the concerns raised in the submission of Failte Ireland. I would have concern that the proposed development will have a negative impact on heritage tourism in County Meath, although the potential significance of the impact is uncertain.

7.9.19 **Equine industry and activities** – The applicant refers to the Marshall Day Acoustics report of 2014, which examined impact of noise on horses within three differing behavioural settings (in stables, breeding mares and racehorses) and found no significant impacts and that horses become habituated to noise. Precedent for granting of permission on appeal to the Board for similar wind farm development where potential impacts on bloodstock industry was a significant concern (nearest gallops indicated as within 533m) is noted (ref.no.221656103, Kill Hill Wind Farm, Cashel). The applicant refers to an operational wind farm permitted on appeal

[103] Tip height of 120m.

(ref.221313104, Mace Upper, Mayo) situated on an estate with an equestrian centre, with turbines located 200m, 280m and 450m of the equestrian centre buildings and areas where outdoor equestrian events are held.

7.9.20 I note in particular the Direction of the Board in its decision to refuse permission for a 47no. wind turbine wind farm at Maighne (PA0041), noted the lack of any specific evidence that wind turbines pose a threat to the welfare of horses. There is no information submitted file by any party, over and above that submitted to PA0041, that would demonstrate that the proposed wind turbines would post a threat to the welfare of horses.

7.9.21 Whilst I note the concerns of many observers (including Kells Riding for the Disabled Association of Ireland) about the potential impact on Kells Equestrian Centre for Therapeutic Riding and Equine Assisted Learning, there is no reason to expect that the equines at this facility would be any less able to become habituated to the possible noise (and indeed movement and shadow flicker) arising from the proposed wind farm development. Based on OSI ortho-photography (in the absence of details to the contrary provided by observers), I measure the distance to the nearest turbine (T3) at c.1.57km from the riding arena and c.1.38km from the riding field. Given the separation distance and the content of the WEDG 2006 on potential impacts from noise and shadow flicker, I consider it unlikely that the proposed wind farm would have the potential to significantly impact on the operation of the facility to any appreciable degree.

7.9.22 The applicant proposes to implement mitigation measures in respect of potential construction impacts on horses. This comprises communication to the local community details of the traffic management plan, road closures and alternative routes, construction periods and methods in order to familiarise horses involved in activities in close proximity. It is also intended to engage the services of an equine expert to advise on other recommended measures during the construction period. This is reasonable.

7.9.23 **Other resources** – I am satisfied, based on the information submitted by the applicant (s.10.3.7) that there will be no significant impacts on non-renewable

[104] This refers to a change of type of permitted wind turbine to a tip height of 81m.

resources (quarries) or on renewable resources (forestry) or on other utilities or infrastructure not otherwise addressed above.

7.9.24 Conclusion – Having regard to the large spatial extent of the proposed wind farm and the tall height of the proposed turbines, to the large number of internationally, nationally and regionally important heritage items located within the county which form a critical part of the heritage tourism within the county and the state as a whole, and the likely level of visual intrusion on the landscape character of the setting of those heritage sites, by the proposed development alone and taken cumulatively with other such development in the county and in neighbouring counties, I consider the proposed development would potentially significantly adversely tourism within County Meath contrary to policy ED POL 29 of the County Development Plan.

7.10 Traffic and transportation.

7.10.1 Overall, TII had no objections subject to issues that can be reasonably addressed by conditions, but noted the failure of the applicant to provide any technical load assessment of structures along the TDR. Meath County Council and its Transport Section suspects the accuracy of the applicant's construction traffic generation figures and disputes the volume of aggregates available onsite to accommodate development of the scale proposed and notes that accessing offsite aggregate resources will increase construction traffic generation and consequential impacts on road infrastructure, etc. Such concerns have been raised by a significant number of observers, although they are focused on the possible underestimating of traffic impact on residential amenities, public use of the road (e.g. for horse riding, etc.), disruption of access to property and traffic congestion. Meath County Council also considers the sightlines at the proposed entrances to be excessive given the low operational speed of the public roads. The Commission for Railway Regulation had no objection subject to standard type conditions.

7.10.2 Impacts on traffic and transport, which may be considered as impacts on material assets as a factor of the environment, are addressed under chapter 12 of the EIS.

7.10.3 The EIS takes due account of the nature of the road network concerned and the existing levels of traffic on same. The main impacts will occur during construction, arising from general haulage and construction worker traffic, from the delivery of turbine components and also from the carrying out of HV cable trenching along the public road between the main body of the site and the substation at Gorman. The impacts will comprise delays to existing traffic flows over the 18-month period of construction.

7.10.4 The proposed turbine delivery route was informed by a Delivery Route Selection and Assessment Report contained in Appendix K1. I am satisfied that the proposed route is reasonable and that the delivery can be accommodated with minimal physical impacts (minor works are required at 11no.nodes on the network). The delivery of large turbine components can only take place in consultation with An Garda Síochána and the roads authorities and the transportation usually take place at night. I am satisfied the resulting traffic impact will be relatively minor, although I would agree with TII that a technical loading assessment of critical structures along the proposed TDR is warranted.

7.10.5 Two main haulage routes are accessed a short distance off the N52, with internal access tracks used, as far as possible, to travel around the wind farm site. This will limit the impact on local roads, although there will be five other site entrances facilitating distribution of construction traffic onto the local network (see figure 12.1).

7.10.6 The EIS indicates that at peak the construction will generate 125no. HGV trips and 90no. LGV trips per day, but in reality much of this traffic will be geographically separated. In the worst case scenario construction traffic will result in an increase of 7.6% of the AADT on the N52 (from 2,831 to 3,046) and the R162 will temporarily see an increase of 3.4% (from 6,400 to 6,615). The EIS does not quantify the potential impact on the local road network, which includes carriageways as narrow as 3m and which carry less than vehicles per day. Multiple entrances will facilitate flexibility for delivery routes and site access (and hence traffic distribution) and the EIS anticipates that the local road network will be able to accommodate same subject special mitigation measures. The accuracy of the traffic generation figures is questioned by the County Council. In this regard I would note there are inconsistencies in the figures for excavations, extraction activity and deposition

materials detailed under chapter 8 (soil, geology and hydrogeology), upon which the traffic generation calculations are dependent and which would cast further doubt on the applicant's prediction of traffic generation and consequential impacts. A major factor in traffic generation and consequential impacts will be whether or not the aggregate resources within the site will be suitable for the intended use and will be sufficient in volume. Item no.12 of the Council's further information request refers.

7.10.7 HV cabling works are anticipated to take 4 months. Along regional roads it is expected to undertake trenching with rolling lane closures (i.e. two-way traffic will be facilitated by way of stop-go signs or temporary traffic lights), resulting in delays to traffic. On local roads it is expected that temporary road closures and diversions will be required, resulting in increased journey length and delays. The impact of delays will be exacerbated by the additional construction traffic generated on the network by the proposed development.

7.10.8 Operational traffic will have negligible impacts. Decommissioning traffic will be far less than construction traffic but will depend on whether it will be acceptable for access tracks, foundations and hardstanding areas to remain in place.

7.10.9 There is potential for cumulative traffic impacts with construction of the North-South Interconnector should its construction across the site occur over the period of construction of the proposed wind farm. The applicant calculates that this would result in 48no. additional trips on the network per tower, or 263 trips/day combined, with 9.3% increase on the AADT of the N52 and 4.1% on the R162. There is also potential for cumulative traffic impacts on the R163 near the Gorman substation, as 2km of the cable route overlaps with the intended haul route for construction traffic between a quarry in Slane where large volumes of HGV traffic will be experienced due to the Boliden Tara Mines tailing ponds development. Assuming the two construction periods overlap, this impact would be limited to the 4-6-week period taken to complete the relevant section of cable trenching.

7.10.10 The EIS indicates that the traffic impact has the potential to be locally significant and adverse, but any such impacts will be of relatively short duration. A suitable security condition to ensure reinstatement of public roads would resolve adverse physical impacts on the network.

7.10.11 Mitigation – Traffic and transportation mitigation measures are set out under s.12.5.1, which includes mitigation by design (TDR, haulage and borrow pits) to limit the impact of construction traffic. 21no. individual measures concerning general traffic mitigation (measures 1-13) by way of a traffic management plan (including restricted use of public roads) (note an outline TMP is included in the outline CEMP in Appendix D), the TDR (measures 14-15) and cable works (16-21). No mitigation measures are proposed for the operational stages. Traffic management at decommissioning stage is proposed to be agreed with the planning authority in advance of same. I consider the measures proposed to be appropriate.

7.10.12 **Conclusion** – Having regard to the concerns raised by Meath County Council and many observers regarding suitability of the proposed onsite aggregate resource and volume of same to accommodate a development of the scale proposed; having regard to the questionable accuracy of the trip generation figures for HGV and LGV traffic, noting the standard capacity volume of the vehicles concerned; and having regard to errors and inconsistencies in the baseline information regarding excavations, extractions and deposition material volumes included in chapter 8 of the EIS, the true potential significance of consequential impacts on the road network as a material asset, in addition to associated impacts (noise, fumes, dust) on residential and general environmental amenities, are uncertain and may be significantly higher than that anticipated by the applicant. The Board may consider it appropriate to request further information in this regard prior to making a final decision on this application. However, it may be feasible to address these concerns by an appropriately worded condition.

7.11 Telecommunications and aviation

7.11.1 The IAA has no objection to the proposed development subject to standard conditions and no telecommunications company has objected to the proposed development.

7.11.2 Impacts on telecommunications and aviation, which may be considered as impacts on material assets as a factor of the environment, are addressed under chapter 15 of the EIS.

7.11.3 The EIS acknowledges that the proposed development has the potential to cause interference with local telecommunications services, as is noted in the WEDG 2006. 13no. telecommunication operators have equipment in the area that may be affected. Impacts include reflection and signal scattering as a result of obstruction by turbine blades, signal obstruction by the swept rotor area or tower and electromagnetic filed associated with the turbine generator.

7.11.4 Regarding impacts on aviation, the EIS notes there are no major airports within vicinity, but four airfields – Navan Airfield (10km to southeast), Ballyboy (12km to southeast), Trim Airfield 18km to south) and Trevet Airfield (c.26km to southeast). In pre-planning consultation, neither the Irish Aviation Authority nor the Department of Defences raised objections. An Aviation Briefing Note prepared by Osprey Consulting Services Ltd., is included in Appendix N3, which concluded that the airfields concerned are within Class G uncontrolled airspace where terrain and obstacle avoidance is ultimately the pilot's responsibility and that the proposed development will not pose an unacceptable impact on the aviation operation conducted at the said four airfields.

7.11.5 Mitigation - It is submitted that all turbines are located outside the required 250m separation distance from existing telecommunication masts (see figure 15.1). Eight turbines do not achieve the 100m separation distance from known telecommunication links (see table 15.2), concerning T3, T7, T8, T11, T12, T13, T14 and T18. Consultation was undertaken with the operators concerned (details are contained in Appendix N1) and the EIS states 'all affected operators have confirmed that they were satisfied that mitigation would require detailed design and post planning is the appropriate time to carry out this work, taking into account potential discrepancies in database information and ongoing changes to the telecommunications networks. The developer has given the commitment to be responsible for the cost of implementing the necessary mitigation measures to prevent any degradation of service that is currently provided. Telecommunications mitigation measures are detailed under s.15.2.10 and appear generally acceptable,

however it may be the case that a separate grant of planning permission would be required to carry out some of the measures proposed.

7.11.6 Regarding impacts on TV signals, digital signals are less susceptible to interference than its predecessor, analogue. A standard protocol agreement between the developer and 2RN (formerly RTE NL) is attached in Appendix N4 and the developer has given a commitment to correct any deterioration in television and radio signal reception should they arise.

7.11.7 No mitigation is specified to address potential aviation impacts.

7.11.8 **Conclusion** – No significant impacts are likely on aviation. Suitable mitigation measures are proposed to address potential adverse impacts on telecommunications infrastructure and operations.

7.12 Soils, Geology and Hydrogeology

7.12.1 As noted elsewhere in this report, the suitability and volume of aggregate resources within the two proposed borrow pits on site, and the potential for indirect impacts arising from same (should it not be suitable in quality and quantity), is questioned by Meath County Council and by many observers. IFI submits that soil type and structures should be reviewed in terms of stability.

7.12.2 Impacts on soil, geology and hydrogeology as factors of the environment are addressed under chapter 8 of the EIS,. The methodology comprised a review of the published literature and data (set out in s.8.2.2) for the wider study area to establish regional baseline conditions, with a more focused assessment within the environs of proposed development, including 'windscreen and walkover' surveys. The site walkovers carried out between 17-21 June 2013 and 30 May to13 June 2014 that included a series of hand-held probes, hand shear vanes and gouge cores to determine the presence / depth of peat and / or soft soils on site, in addition to visual assessments of soil slopes and rock exposures across the site.

7.12.3 The description of the soils, geology and hydrogeology of the site and surrounding area are of good detail and are supported with relevant maps set out in the chapter and appended to the EIS (Vol2(a), Appendix 8) and I consider there would be little advantage to me repeating the information here.

7.12.4 The main potential for adverse impacts will arise during construction stage. The EIS clearly sets out the criteria used for rating the site importance of geological features, the estimate of magnitude of impact on geological features and the overall rating of impact significance. In general, the potential impacts on soils and geology typically associated with wind farm construction include slope stability, excavation of soils for wind farm elements, use of stone and aggregate for construction of elements (tracks, foundation, etc.) use of concrete for foundations and storage of fuels presenting a contamination risk and erosion of soils exposed during earthworks, and tree felling / replanting.

7.12.5 Potential impacts on hydrogeology are reported as being of much lower magnitude and occurrence and relating to use and storage of fuels presenting a contamination risk to ground water, construction of foundations below groundwater level, excavations requiring dewatering impacting on hydrology of intact bogs and the creation of preferential pathways along cable routes for movement of groundwater / contamination.

7.12.6 Slope stability – Based on the desk study and site walkover, the assessor considered that conditions conducive to peat instability may be present on site and a peat stability assessment was therefore carried out (see Appendix G1). The assessment determined that the maximum depth of peat at turbine locations was 1.2m, with the risk of slope instability rated as very low in the location of T15 and T18 where the deepest level of peat was recorded and rated extremely low or negligible for other proposed turbine locations. The overall risk associated with peat instability are determined as negligible to very low. A visual assessment of other soil and slopes, undertaken by a Senior Engineering Geologist, found no areas of concern and consider risk to be very low. No mitigation measures are therefore required in this regard, but best practice (stated as mitigation measures) to be followed during construction is set out under s.8.6.1.1.

7.12.7 Road and hardstand construction – The full details of anticipated excavation and aggregate fill required to complete 18km new track, 3.5km upgraded existing track, 18km of drainage swales (accounted for within new track), 4.35km of interceptor drains plus and 65no 40m3 settlement ponds, 25no. cranage platforms plus 50no. satellite cranage platforms, substation and construction compounds are set out under s.8.5.3.1.

7.12.8 The total volume of excavation stated in the EIS as 170,044m3 (predicted impact) however the sum of these given subtotals for each type of excavation falls considerably short of this figure at 105,283m3. On reviewing the applicant's calculations to determine where this conflict arises, it became apparent that there would appear to be significant errors in the applicant's calculations (p.21 and p.22) of the extraction volume subtotals. For example, using the base figures provided for new track construction (18,000m X 8.5m X 1m[105]), I arrived at a figure of 153,000m3 compared to that of 62,235m3 given in the EIS and for existing tracks (3500m X 2m X 0.5m) I arrived at 7,000m whereas the EIS states 2,532m3. These are the most glaring of the discrepancies. Using the base figures, the total excavation volume calculates at 197,967.45m3[106], which is not insignificantly greater than the direct impact predicted in the EIS. Associated potential impacts include potential for contamination of soil and groundwater from hydrocarbons / fuel from plant / machinery used, erosion of excavated materials, risk of landslides from incorrectly stockpiled excavated materials and soil compaction (and consequential increased runoff volumes).

7.12.9 Whilst the given subtotals for aggregate volume match the total volume of aggregate required (106,435m3), there would appear to be significant errors in the calculation of the subtotals themselves and revising same results in total aggregate volume of 88,190m3[107].

7.12.10 The apparent errors in the applicant's figures casts some doubt on applicant's assessment of traffic impact and the applicant's assessment of consequential

[105] I note that other dimensions are used in table 8.8 of the EIS, but there is a general contradiction and inconsistency in the figures and dimensions used in much of chapter 8.
[106] 153000+7000+3500+21725+3937+5865+2940=197,967.45
[107] 44550+7437.5+23897.5+3500+5865+2940=88190

impacts on road infrastructure and on residential and environmental amenities from construction traffic, which are ultimately based on these figures.

7.12.11 Turbine foundations – The calculations of total excavation (64,763m3) volumes for turbine foundations appear accurate, but will be dependent on whether a suitable baring stratum is encountered or not within 3m of ground surface. If not, deeper foundations (maximum feasible depth 5m) will be needed, necessitating engineered fill (this may need to be certified fill and therefore likely be sourced from a local quarry[108]) and / or use of pile foundations. The calculations for volume of aggregate fill (13,247m3) the concrete bind layer (1,250m3) and concrete for foundations (13,750m3) also appear reasonably accurate. The balance of the excavated space (36,516m3 or c.1460m3 per turbine) would be backfilled and the ground around the turbine restored. The potential impacts are as per road / tracks / hardstanding construction impacts.

7.12.12 Cabling – The calculations for cable trenches excavation and aggregate volumes for MV and HV cabling are generally consistent with the ESB requirement for 38kV and 110kV cable trenches, assuming a trefoil cable arrangement which requires a 600mm width and allows for a 5km section of dual MV circuit[109]. The EIS notes that a flat arrangement would require 1.1m trench width, but does not provide calculations for what would be the worst-case scenario[110]. The EIS notes the necessity of jointing bays, but submits that these will not be necessary within the wind farm due to the distance between turbines. For the HV cable route it is estimated that joint bays will be required at c.900m intervals or at acute bends, but this is not accounted for in the calculations. At least 17no. HV joint bays[111] and

[108] But not if used in conjunction with piles.
[109] The typical trench details attached on file are narrower (530mm) than that required by the ESB for a trefoil arrangement (600mm wide, as is stated in s.2.3.6 of the EIS) and no details or drawings of the alternative flat arrangement, which is acknowledged (s.2.3.6) as requiring a wider trench, is provided on file. The trench depth ESB standard is 1200mm, but only one of the three MV cable width typical designs complies with same and none show the correct minimum cable ducting depth of 950mm (to top duct level) but 900mm, although s.2.3.6 refers to the correct depth.
[110] There is no explanation as to under what circumstances a flat rather than trefoil arrangement would be necessary.
[111] Dimensions of 6m(L) X 2.5m(W) X 2.7m (D, but with additional depth at sump) but requires an associated '*comms chamber*' 1.1m X 1.52m X c.1.2m (estimate – this is not clear) at a 0.5m clearance distance from the joint bay, according to '*Standard Specification for ESB 110kV Networks Ducting / Cabling (Minimum Standards)*' https://www.esbnetworks.ie/docs/default-source/publications/summary-of-standard-specification-for-esb-networks-110kv-ducting.pdf?sfvrsn=4 (09/03/17)

associated comms chamber would be required along the HV grid connection route. I estimate that this would entail excavation of another c.5000m3. The potential impacts are as per road / tracks / hardstanding construction impacts.[112]

7.12.13 Turbine delivery routes – Necessary road improvement works, necessitating c.1,566m excavation and a similar volume of aggregate fill, are minor.

7.12.14 Borrow pits – The two borrow pits will have a combined footprint of c.2.77ha and will be excavated to a depth stated as between 4.2m and 4.4, with removal of 99,875m3 of aggregate. The material is primarily loose sand and gravel and extraction will not entail blasting. These details conflict with the details on drawing nos.P0177-0101-009 and -010 from which the maximum depth measures 6.2m and 7.7m in pit 1 and 2, respectively, and combined aggregate volume is significantly greater 115,917cu.m. In addition to similar potential impacts as per road / tracks / hardstanding construction impacts, additional potential impacts comprise temporarily increased aquifer vulnerability (excavations may extend below the water table but no dewatering will be conducted – no ground water was encountered in the trail holes but these extended to a depth of only 2.5m and 2.9m); and pit-face instability due to use of vertical pit sides to maximise aggregate resource.

7.12.15 Use of excavated material - As noted above, Meath County Council questions the suitability of the aggregate resource available within the two proposed onsite borrow pits, and the volume of material available to provide fill material. This primarily concerns, but is not limited to, access track foundations. The applicant submits that the 2.9m deep trail pits opened at the borrow pits (one at BP1 and two at BP2) revealed silty sandy grave and cobbles which it expects to be suitable for use in track and hardstand construction but might not be suitable as structural fill beneath the turbines (subject to further testing at detailed design stage). Table 8.8 clearly indicates that off-site aggregate resources are expected to be used for roads, main carnage and satellite carnage running courses, and also for turbine foundations and onsite cable trenches. The Board may consider it appropriate to request the applicant to clarify the information on excavations and extraction prior to making a decision on the matter, but in the context of the proposals to reuse most extracted

[112] The 110kV cable works are stated as in accordance with received s.5 declaration (planning ref.SA/S51534) but no details of (or other reference to) same appear on file.

materials within the site and the proposed mitigation measures set out under 8.6, and given that the site is considered to be of low importance with respect to soils, geology and hydrogeology, this may not be particularly important. In terms of indirect impacts, including traffic impacts (on road infrastructure) and consequential impacts on residential amenities and the environment arising from noise, dust and fumes from construction traffic, it will be of greater concern.

7.12.16 It is proposed to reuse the excavated materials on site: 99,875m3 to restore the borrow pits; 36,516m3 for use as ballast around turbine foundations; and 8,713m3 as backfill for inter-connecting cable trenches. It is indicated that 8,958m3 of material from grid connection cable trenching is likely to be disposed of to a waste management facility. The balance of material, 46,827m3, is proposed for reuse in landscaping along road verges and around hardstanding areas.

7.12.17 Overall, impacts arising from excavation works on soils, geology and hydrogeology are not likely to be significantly adverse. The site is considered to be of low importance with respect to soils, geology and hydrogeology.

7.12.18 In terms of indirect impacts, there will be a permanent impact on source quarries or borrow pits; no significant impacts are likely in terms of slope failure or instability within impacts on property; no significant impacts on wells (due to >500m separation distance), groundwater balance (dewatering will be directed to nearest stream) or on the high bog (groundwater connection unlikely due to overburden geology) are likely; there is a risk form tar-contaminated excavated material from in-road trenching; cabling may create preferential flow paths to convey contaminants; cable trenching under watercourse may result in loss of drilling fluids to the groundwater aquifer; 16.6h tree felling works using heavy machinery and replanting on replacement lands could cause soil erosion and consequential sedimentation and water quality impacts on receiving waters. The EIS considers these potential impacts, in the absence of mitigation, to be slight to moderate. Only minor cumulative impacts are considered likely in conjunction with the N-S interconnector. Only minor direct and indirect impacts are likely during operations, with no cumulative impacts. The impacts arising from decommission would be similar but of a lesser magnitude that those arising during construction.

7.12.19 Mitigation Measures – The proposed mitigation measures are set out under s.8.6 and are generally standard measures concerning slope stability, excavation, storage and removal of subsoils and rock, borrow pits and groundwater during the construction period and during decommissioning, where relevant. During operation, mitigation measures concern prevention of impacts on groundwater quality from oil usage / storage at the proposed substation transformer.

7.12.20 Conclusions – Based on the information contained in Chapter 8 of the EIS, I am satisfied that the proposed development is not likely to result in significant adverse impacts on soils, geology and hydrogeology subject to the implementation of the mitigation measures proposed under section 8.6. However, due to errors and inconsistencies in the calculations for required excavations, extractions and deposition volumes, the quantities of materials involved are uncertain and the potential consequential impacts on road infrastructure and on residential and environmental amenities from construction traffic are also uncertain. The Board may therefore consider it appropriate to clarify these issues prior to making a decision on this application.

7.13 Air and climate

7.13.1 A large proportion of observers disputed the predicted benefits of the proposed development in terms of reduction in CO2 and greenhouse gas emissions over the life of the project. In particular, it was highlighted that wind energy development is an unreliable source of energy production that is dependent on backup energy generation by fossil fuel to meet energy demand, effectively duplicating energy production. The focus of policy on alternative energy production rather than on energy conservation and use reduction was criticised and suggested as contrary to the obligations of the State under EU Directives. Meath County Council raised the issue of dust impacts, but the HSE was satisfied with proposed mitigation measures regarding same.

7.13.2 Impacts on air and climate factors of the environment are addressed under chapter 5 of the EIS. The chapter focuses on the potential emissions which may arise during

construction and decommissioning of the proposed development (and proposed cable route) including impacts on air quality. It also examines the indirect impacts of the proposed wind farm on GHG emission.

7.13.3 Potential air impacts: The principle potential source of air emissions are identified as traffic emissions from construction vehicles on site and on the turbine delivery and haulage routes, and dust emissions from construction, earthworks, trench excavation, borrow pit extraction and backfill, stockpiling materials, loading and unloading of aggregates and the movement of materials around the site.

7.13.4 Construction vehicles have the potential to increase concentrations of compounds such as NO2, benzene and PM10. A DMRB screening model was conducted to estimate the baseline for CO, benzene, NOx, NO2 and PM10 traffic emissions using 2014 surveyed traffic data for the proposed turbine access route, with emission levels calculated at represented receptors along the route.

7.13.5 The Based on NRA criteria[113] for soiling impacts arising from construction sites, the applicant determined that there is potential for soiling effects up to 100m from the main wind farm site (as a major scale development), with PM10 deposition and vegetation soiling potential for up to 25m. Construction from the proposed cable route (classified as a minor scale development by the applicant), soiling effects would potentially extend to 25m, and PM10 and vegetation effects to 10m.

7.13.6 The cable route construction works would be within a minimum of 1.5m of dust sensitive receptors, with works taking approximately three days, with potential dust impact being direct and temporary. There is potential for direct short term dust emissions impacts along the TDR where the closest dwellings are within as near as 7m, being a direct short term impact.

7.13.7 Based on the NRA criteria, dust emissions from borrow pit extraction and from construction of access tracks are predicted by the EIS to affect only a single dwelling due to its proximity - dwelling no.188 (building / sensitive receptor numbers are not generally not indicated on the EIS maps but are included on Figure J.1 in Vol.3(2))

[113] NRA Assessment Criteria for the Impact of Dust Emissions from Construction Activities with Standard Mitigation in Place. Appendix 8 '*Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes*' (NRA, 2011)

located adjacent the northeast entrance to the wind farm site. The impact is predicted as a direct short term impact. No significant impacts on air are predicted at decommissioning stage.

7.13.8 The EIS predicts dust generated from associated traffic to have an imperceptible impact on the surrounding environment, even if additional material is required to be imported to supplement that on the onsite borrow pits. Impacts from plant and machinery is predicted to be imperceptible also. The only emissions to air during the operational period is indicated as from the backup diesel generator required for the proposed substation. No significant cumulative impacts are predicted with other development within the wider area.

7.13.9 Mitigation measures to protect air quality during construction and decommissioning are set out under s.5.5.1 and are included in the outline CEMP in Appendix D of the EIS. These are generally standard type measures, which I will not repeat here. I am satisfied that the proposed mitigation measures, including to address dust impacts, are appropriate and acceptable.

7.13.10 Potential climate impact - In terms of greenhouse gas emissions, the EIS acknowledges there is potential for such emissions during construction arising from construction vehicles, onsite plant, etc., but it fails to quantify emissions or to state the potential significance of same. It also notes that the alteration from vegetative surfaces has the potential to affect micro-climate and for soil disturbance to increase CO2 release, but that the proposed development will only alter 2.6% of the site and consequently it is submitted that there will be no direct or indirect impact on air temperature or microclimate from the proposed development.

7.13.11 Regarding the operational period, the EIS predicts the development will have a long-term positive impact by providing a sustainable energy source. It is estimated that the potential output of 85MW for the proposed wind farm will result in net displacement of 115,000 tonnes CO2 per annum, with no negative operational impacts on climate.

7.13.12 The EIS calculates, based on the 'Scottish Government Windfarm Carson Assessment Tool', a total of c.69,546 tonnes of CO2 will be lost to the atmosphere through construction of the proposed wind farm (92.5% from turbine manufacturing

process and construction and 7.5% from tree-felling activities), taking no account of possible replant. Having regard to the predicted net 115,000 tones CO2 displacement arising per annum during the operational period, the applicant anticipates a carbon payback period of 8 months to offset the carbon released throught construction. Accordingly, the EIS submits that the proposed development will have an indirect positive impact on climate and no mitigation measures are proposed.

7.13.13 Conclusion – Based on the information contained in the EIS, I am satisfied that impacts on air will not be significant subject to implementation mitigation measures proposed under s.5.5.1 and that the impact on climate (having regard to GHG emissions) will be positive.

8.0 Environmental Impact Assessment

8.1 Environmental Impact Statement

8.1.1 The application was accompanied by an EIS. The EIS is laid out as follows:

Volume 1 – Non-technical summary

Volume 2 – Main EIS

Volume 2a – Figures for EIS

Volume 3 – Appendices to Main EIS

Volume 4 – (B) Existing views and photomontages; (A, D and E) ZTV Maps and Route Screening Analysis Maps, Newgrange Graphics and Loughcrew Graphics.

The EIS –

- Describes the project and provides information on the size, the design of the proposed development and the size of the project;
- Describes the measures to avoid, reduce and remedy significant adverse effects;

- Provides a description of the main alternatives studied by the developer and an indication of the main reasons for the choice of the alternative put forward, taking into account environmental effects;
- And includes a non-technical summary of the above information.

Although I have identified further information may be required to enable the Board to reach a conclusion that no significant impacts are likely to result from the proposed development in relation to a number of issues, the EIS submitted is generally consistent with A.94 of the Planning and Development Regulations, 2001, as amended.

8.2 Environmental Impact Assessment

In accordance with the requirements of Article 3 of the EIA Directive and Section 171A of the Planning and Development Act, 2000 (as amended), the environmental impact assessment is carried out by the competent authority under the following headings:

(a) Human beings, fauna and flora;

(b) Soil, water, air, climate and the landscape;

(c) Material assets and the cultural heritage;

(d) The interaction between the factors referred to in points (a), (b) and (c).

The EIA has had regard to the application documentation, including the EIS and its associated documentation, the NIS and the written submissions, in addition to any documents, reports and guidance referred to within the Inspectors report.

8.3 Likely significant direct and indirect effects

8.3.1 Human beings, fauna and flora

Human beings - The impacts on human beings are considered in the EIS ostensibly under chapter Human Environment, however that chapter considers only socio-economic impacts, some of which fall within impacts on material assets and other

issues which one might more reasonably consider as matters of planning policy. The main potential for direct and indirect impacts on human beings arise from impacts addressed in chapter 6 Noise and Vibration, Chapter 11 Shadow Flicker and chapter 14 Landscape and Visual. The noise impact assessment is inadequate and apparently misleading and insufficient to determine the potential significance of noise impacts on human beings. Given the large spatial extent of the proposed wind farm, the tall height of the proposed wind turbines and the proximity of the proposed turbines to residential dwellings within what would appear to largely be a low-noise environment, I consider the proposed development to present an unacceptably high risk of significant, long-term and frequent adverse impact from wind turbine generated operational noise.

Similarly, the assessment of potential shadow flicker on the surrounding residences is somewhat lacking and the applicant's approach to mitigation measures at operational stage are inadequate, uncertain and insufficient to protect residential amenities and the human environment. No significant health impacts on humans are considered likely.

In terms of visual impacts, the proposed development of a wind farm of large spatial extent and of tall turbines in close proximity to residential dwellings and residential property generally, including the erection of turbines to more than one side of such properties, will severely to profoundly adversely impact on the residential amenities of same, having regard to the recommended approach to such development under WEDG 2006.

Flora & fauna – There are no direct impacts on sites of conservation impacts. No significant direct or indirect effects are considered likely on avifauna, or terrestrial fauna (excluding bats) arising from the proposed development.

There is potential for significant direct effects on Leisler's Bat due to it being the only high flying bat species in Ireland. Leisler's Bat is a near threatened species, on the Red List for Terrestrial Mammals and, like all bats, is protected under the Habitats Directive (Annex IV species) and under the Wildlife Acts 1976 (as amended) and therefore can reasonably be regarded as highly sensitive. The EIS acknowledges

the risk posed by the proposed development to Leisler's Bat but does not comment on the likely significance of that impact. The EIS (and the associated Bat Fauna Assessment Report) provides no assessment of the potential cumulative impact on this far travelling species, taken with other relevant existing and permitted wind farm development, and the implications for its local and wider population. In the absence of a more thorough assessment determining to the contrary, it would appear that the potential impacts on Leisler's Bat would constitute significant adverse impacts on fauna. No measures are proposed at operational stage to specifically mitigate the potential impacts on Leisler's Bat.

There is potential for adverse impacts on aquatic ecology mainly from construction works, with a low risk during operations. The EIS would indicate that the proposed development would not result in significant adverse impacts subject to the implementation of the mitigation measures proposed in the EIS. I have concerns that the EIS is based on generalised risks from generalised construction work within a generalised environment, ignoring the potential for significant adverse impacts on water ecology arising from the carrying out of specific lengths of access track and cable trenching, etc., within specific locations. The construction of the southern access road, cable route and to construction compound, adjacent a significant watercourse tributary of the Moynalty River, from the local road southeast of T6 is a case in point. The works would run for c.360m adjacent to the steep and unstable bank of the watercourse, through a poorly drained and waterlogged field. The identification of specific such works and their higher potential to significantly adversely impact on water ecology (including, potentially, European Sites downstream) is necessary to enable proper, detailed, area-specific mitigation measures to be devised, including the relocation of such works if necessary. The applicant's approach undermines the EIS conclusions on impacts on water ecology and raises uncertainty of impact.

No significant adverse impacts are anticipated on terrestrial habitats subject to mitigation measures.

Cumulative impacts arising in conjunction with the North-South Interconnector and any other proposed projects are not likely to be of significance.

8.3.2 Soil, water, air, climate and the landscape

Soil – Potential impacts on soil are address in chapter 8 Soil, Geology and Hydrogeology. The proposed development is not likely to result in significant adverse impacts on soils, geology and hydrogeology subject to the implementation of the mitigation measures proposed under section 8.6.

Water – Potential impacts on the water environment are addressed in chapter 9 Hydrology and Water Quality. The generalised approach of the EIS assessment ignores the high risk of significant adverse direct and indirect impacts to watercourses and their water quality posed by specific significant proposed development within more sensitive specific geographic locations where suggested mitigation measures cannot be achieved (e.g. the access track, MV cable route and construction compound south of T6 cannot feasibly achieve the 50m setback from watercourse). These significant risks to the surface water environment should be identified and mitigated at design stage, or by site specific mitigation measures rather than generic measures.

Air and climate – Air and climate change impacts are assessed under chapter 5. Based on the information contained in the EIS, I am satisfied that impacts on air will not be significant subject to implementation mitigation measures proposed under s.5.5.1 and that the impact on climate (having regard to GHG emissions) will be positive.

Landscape – Impacts on landscape are set out under chapter 14 Landscape and Visual. I am satisfied that the applicant's assessment of landscape and visual impacts is deficient in how it determined the significance of visual impacts, including the sensitivity of receptors / landscapes and the magnitude of impacts and I am satisfied that the proposed development will result in significant to profound long term adverse landscape and visual impacts. Whilst the landscape is not in itself particularly sensitive, being a working and evolving agricultural landscape, it is highly important as the landscape setting or context for heritage items / sites of international, national and regional importance and for which the open landscape setting can be regarded as a critical element of those sites (including views in

specific directions, such as towards the rising sun on the equinox at Lough Crew) and an important part of the visitor's experience – Tara Complex candidate UNESCO WHS, Lough Crew, Hill of Ward and Hill of Skryne. The EIS is notably deficient in its assessment of cumulative impacts on Lough Crew, taken with existing significant wind energy developments and permitted wind energy developments to the north and south and, in this regard I am satisfied that the proposed development has the potential to significantly to profoundly adversely affect the setting of Lough Crew.

8.3.3 Material assets and the cultural heritage

Material assets – Impacts on material assets are not addressed as a standalone chapter in the EIS, but are addressed as part of impacts on the Human Environment in chapter 10, but also concern traffic and transport impacts on road infrastructure, impacts on communications and water services infrastructure which are addressed separately and/or as part of consideration of other factors the environment.

Having regard to the large spatial extent of the proposed wind farm and the tall height of the proposed turbines, to the large number of internationally, nationally and regionally important heritage items located within the county which form a critical part of the heritage tourism within the county and the state as a whole, and the likely level of visual intrusion on the landscape character of the setting of those heritage sites, by the proposed development alone and taken cumulatively with other such development in the county and in neighbouring counties, I consider the proposed development would potentially significantly adversely tourism and tourist related business and employment. Whether the proposed development would be sufficient to offset those impacts through benefits to the state (balance of payments from renewable energy) and county in the form of rates to the County Council, operational employment (20no. direct and 20no. indirect) and the community fund (the commitment to same is far from certain) is unclear.

Based on the information on file, impacts on the road network as a material asset would not be unduly severe and can be satisfactorily mitigated. No significant impacts are anticipated on aviation. Appropriate mitigation is proposed to resolve

potential adverse impacts on telecommunications, including on interference with TV signals.

Cultural heritage – Cultural heritage is primarily address under Chapter 13 Archaeological, Architectural and Cultural Heritage, but related issues are addressed under Chapter 14 Landscape and Visual and socio-cultural heritage is addressed under Chapter 10 Human Environment (impact on Meath Gaeltacht.

The application site is situated within an area of extensive historical heritage ranging from prehistoric times up the 20th century. I consider the proposed development to be likely to arise in significant to profoundly adverse impacts on the setting and experience of archaeological and cultural heritage of considerable national and international significance, with particular regard to the visual impact (in itself and taken cumulatively) on the setting of Lough Crew, the Tara Complex (a candidate UNESCO World Heritage Site), the Hill of Skryne, and the Hill of Ward, notwithstanding the reduction in the number of turbines from 46no. under PA0038 to 25 in the current application. I also consider the likely potential impact, in itself and / or taken cumulatively with the North-South Interconnector, on architectural heritage to be more significant than predicted in the EIS, most particularly on Headfort Demesne ACA and its constituent Protected Structures and on Mountainstown House.

No significant adverse impacts are likely on the Meath Gaeltacht.

Interactions between the factors referred to in points (a), (b) and (c) – Interactions are addressed explicitly in chapter 16 Interactions of the Foregoing, however interactions are also generally dealt with within individual chapter of the EIS. The main interactions include landscape, cultural heritage and material assets; interactions between landscape and human beings and air (dust and noise).

Alternatives - The applicant details the alternatives studied including (s.1.3) site location, wind turbine design and layouts and (s.1.4) cable route design and routing, having regard to the potential impacts. It also provided a review of alternative technologies (s.1.4.1).

Conclusion – In my professional opinion, the EIS is compliant with A.94 of the Planning and Development Regulations, 2001, as amended.

9.0 Appropriate Assessment

9.1.1 Stage 1 AA - Legal protection is provided for habitats and species of European importance under the Habitats Directive 92/43/EEC, which established a network of designated conservation areas known as Natura 2000 or European sites, which include Special Areas of Conservation (SAC) under the Habitats Directive and Special Protection Areas (SPA) under the Birds Directive (Directive 2009/147/EC). Article 6(3) of the Habitats Directive requires Appropriate Assessment to be carried out for any plan or project not directly connected with or necessary to the management of a European site (or sites) concerned, but that it likely to have a significant effect thereon, on its own or in combination with other plans or project, in view of its conservation objectives.

9.1.2 The proposed development is not directly connected with or necessary to the management of any European site and the applicant has submitted a Natura Impact Statement (NIS) addressing the possible likely effects, if any, on any European sites. Relevant maps, including site location in the context of European sites, are contained in a separate booklet as Appendix 6 of the NIS.

9.1.3 I note the relevant guidance published by the European Commission, 'Assessment of Plans and Projects Significantly Affecting Natura 200 Sites: Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC' (2001) and by the NPWS, 'Appropriate Assessment of Plans and Projects in Ireland, Guidance for Planning Authorities' (2009, revised 2010), both of which are purported to have been taken into account by the applicant (p.6 NIS).

9.1.4 Stage 1 screening – Stage 1 is concerned with determining whether a described development, not being a development directly connected with or necessary to the

management of a European site, in itself or in-combination with other described projects or plans, has the potential to have significant effects on any European site.

9.1.5 The submitted screening report provides a description of the proposed development; however, having regard to the guidance of the European Commission (section 3.1.3), I would direct the Board's attention to the more comprehensive description included under section 2.0 of my report.

9.1.6 The applicant (under section 5 of NIS) considered three European sites within 15km of the proposed development (see NIS Appendix 6, figure 7.1), as follows:

- Site Code 002299 - River Boyne and River Blackwater cSAC. The Features of Interests are river lamprey, salmon, otter, alkaline fens and alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-padion, Alnion incanae, Salicion albae) (the latter is priority habitat). The conservation objective for the site is generic, being 'to maintain or restore the favourable conservation condition of the Annex I habitats and/or the Annex II species for which the SAC has been selected'.

- Site Code 004232 – River Boyne and River Blackwater SPA. The Features of Interest is Kingfisher. The Conservation Objective is generic, being 'to maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interest for this SPA'.

- Site Code 000006 – Kilconny Bog (Cloughbally) cSAC. The Features of Interests consist of Active raised bogs (priority habitat) and Degraded raised bogs still capable of natural regeneration. The site specific Conservation Objective for Active raised bog habitat is 'to restore the favourable conservation condition of Active raised bogs in Kilconny Bog (Cloughbally) SAC, which is defined by the [a specified] list of attributes and targets. The site specific Conservation Objective for Degraded raised bogs is 'The long-term aim for Degraded raised bogs still capable of natural regeneration is that its peat-forming capability is re-established; therefore, the conservation objective for this habitat is inherently linked to that of Active raised bogs

(7110) and a separate conservation objective has not been set in Kilconny Bog SAC.

9.1.7 The screening assessment does not include Girley (Drewstown) Bog cSAC, Site Code 002203, located c.11km to the southwest of T14, which overlaps the southwest corner of Girley Bog NHA Site Code 001580. I could locate no information about this site on the NPWS website, other than its boundaries on the NPWS mapviewer. The information available for the overlapping NHA indicates that is a raised bog and it is likely that the SAC is also in respect of raised bog habitat, although this is uncertain.

9.1.8 In addition, two more distant (>130km from application site boundary) European Sites were considered for reason that one of the Features of Interests of those European sites, the Greenland White-Fronted Goose[114], was recorded in migrant passage over the site in surveys informing the applicant's appraisal and were traced back to specific European site. These European sites are:

- Site Code 004076 – Wexford Harbour and Slobs SPA. The Features of Interest for the site consists of 32no. bird species and one habitat (wetlands). Only one Feature of Interest is of concern to this stage 1 screening, being Greenland White-fronted goose (wintering). The Conservation Objective for Greenland White-fronted goose is 'to maintain the favourable conservation condition of Greenland White-fronted Goose in Wexford Harbour and Slobs SPA, which is defined by the following list of attributes and targets: long term population trend stable or increasing; no significant decrease in the numbers or range of areas used by waterbird species other than that occurring from natural patterns of variation.'

- Site Code 004019 – The Raven SPA. The Features of Interest consist of 6no. bird species and one habitat (wetlands). Only one Feature of Interest is of concern to the stage 1 screening, being Greenland White-fronted goose (wintering). The Conservation Objective for Greenland White-fronted goose is

[114] For clarity, whilst reference is made to presence of a small flock of Greenland White-fronted Goose at Stabannon, this species is not of Special Conservation Interest to the Stabannon SPA (site code 004091). The flock is reported to have relocated to Lurgangreen, Co. Louth, southwest of Castleblaney, which is not within a European site.

'to maintain the favourable conservation condition of Greenland White-fronted Goose in The Raven SPA, which is defined by the following list of attributes and targets: long term population trend stable or increasing; no significant decrease in the numbers or range of areas used by waterbird species other than that occurring from natural patterns of variation.'

9.1.9 The European sites, their Features of Interest, conservation objectives and main threats are set out under table 5.1. I consider the European sites considered in the stage 1 assessment to be the appropriate sites and consistent with the NPWS advice to the applicant (12/05/16) attached as appendix 1 to the NIS[115].

9.1.10 A summary of the main potential impacts arising on European sites are set out under table 5.2, which I consider reasonable and may be summarised as follows:

Construction and/or decommissioning -

- During construction/decommissioning works over and adjacent to watercourses there is potential for releases of suspended solids and other substances arising from works, including the construction / upgrading of access roads, cable trenching and excavation of borrow pits.
- Potential for eutrophication due to run-off entering the River Blackwater and tributaries during construction/decommissioning works.
- Potential pollution of the River Blackwater and tributaries from wet concrete operations, fuel spillages/leaks or leaking of sanitary waste.

Operations and maintenance period -

- Impact on water quality from potential increase in run-off from storm event resulting from change in land use and increase in impermeable ground area.
- Potential collision risk to migrating Greenland White-Fronted Goose from Wexford Harbour and Slobs SPA and The Raven SPA complex.

9.1.11 The detailed consideration of likely impacts on Natura 2000 sites is set out under section 5.3.2. In general, I am satisfied that the threats/pressures identified are

[115] The NPWS did not make a submission on the application.

consistent with those identified by the NPWS in the Natura 2000 Standard Data Forms (I have appended the list of same to my report for the Board's perusal). I would accept the applicant's conclusion that no direct impacts are likely on any European site as the proposed development is not within a European site.

9.1.12 The applicant identifies potential for indirect effects on the River Boyne and River Blackwater cSAC and the River Boyne and River Blackwater SPA due to the hydrological links with the proposed development site, arising from:

- the scale and size of the proposed project, including the generation of suspended solids (e.g. from track development works, borrow pit excavations, runoff from disposal sites or material deposition areas, increased impermeable areas increasing runoff), contaminants or pollution (from concrete wash-down areas) and increased nutrient runoff (due to surface water management within area of elevated nutrients);
- land-take to accommodate roads, cable trenching, compounds, structures and hard surfaces generally and the construction of same, potentially releasing suspended solids, other substances (accidental pollution events) and increased nutrients with risk to aquatic environments (eutrophication and overall water quality) and its capacity to support fish and invertebrate fauna, including species connected to the River Blackwater, such as spawning salmonids and white clawed crayfish. Tree felling and trimming may increase sediment in surface water runoff and excavation and storage of peat may risk increase suspended solids. Settlement ponds may affect drainage regimes on site and downstream via hydrological links.
- excavations and resource requirements pose a risk to the Features of Interest of the said European sites, similar to those outlined above, mainly from contaminated runoff and/or from overflow of drains. No water abstraction or dewatering is proposed. There is also a risk from trenchless technique for cabling crossing watercourses.
- accidental emissions / pollution events such as spillage of cement (wet cement works) or hydrocarbons (refuelling, leaks in trafficked areas, turbine lubricant spills) or wastewater (from on-site containerised facilities), or from

Horizontal Directional Drilling (alternative method for cabling crossing watercourses) from 'frac out'116, and from third party dumping (due to increased site accessibility). Resulting fish kills would also affect Otter.

- transportation requirements, with (in addition to issues raised above) wear and tear on access roads (crushing stone) and the carrying in of material on transport wheels leading to increased runoff of suspended solids. Also transportation of non-native invasive species.

9.1.13 No *indirect* impacts are possible for Kilconny Bog SAC, being upstream of the site, or for Wexford Harbour and Slobs SPA or The Raven SPA due to the separation distance. No time-related impacts (*duration* of construction or operations) and no *in combination* effects were identified for Kilconny Bog SAC, which I consider reasonable. In respect of possible operational (*duration*) impacts on the two said SPAs, the screening report determined that the 30 year operational period does not pose a significant threat to Greenland White-fronted Goose in terms of consequential Greenland White-fronted Goose collision mortality on the basis of its Collision Risk Model and a literature review which indicates high avoidance rate for the species (99.8% advised by SNH and 99.9% according to a Bulgarian study[117]) and therefore there are no potentially significant effects on either of the two aforementioned SPAs in Co. Wexford. The applicant determined that no significant *in combination* effects are likely to result on the two said SPAs, having regard the N-S Interconnector, met masts and telecommunications structures, existing and/or proposed windfarms (7no. considered, including Maighne WF which was refused by the Board PA0041[118]). The NIS includes a '*Finding of No Significant Effects Report'* contained in Appendix 2 of the NIS concerning the three European sites.

9.1.14 In terms of significant *in-combination* effects on the River Boyne and River Blackwater cSAC and the River Boyne and River Blackwater SPA, the applicant considers there to be a risk that consequential decline in water quality may add to

[116] Inadvertent release of sediment laden groundwater.
[117] See pages 94-95 and 98-99 of NIS.
[118] From table on p.94 - Dunmore 1 (2 WT constructed, 8km), Dunmore 2 (2WT constructed, 9km), Raragh 5 WT not operational, 14km), Teervurcher (5 WT permitted, 14.3km), Crowinstown (3 WT, permitted), Leaby Cross (1 WT, constructed), Maighne (47 WT, refused planning, 34km) and Boliden Tara Mine (1 WT, 6.6km).

existing pressures on Features of Interest (species and / or habitat). *In combination* effects may arise from forestry and agricultural activity in the area; the construction of N-S interconnector where towers in proximity of the Stahmolmog Stream and Yellow River; the proposed Carlanstown bypass (not yet designed); factories and businesses (but not from existing / proposed wind farms).

9.1.15 The applicant describes the likely consequential changes to the River Boyne and River Blackwater cSAC and the River Boyne and River Blackwater SPA arising from the above-stated potential significant effects, including: effective *reduction in habitat area* for aquatic species being Features of Interest (from decline in water quality); indirect *disturbance of key species* comprising spawning salmonids upstream of the European sites; and a *reduction in species density* primarily arising from adverse impacts on foraging behaviour of aquatic species of the SAC and the Kingfisher (Feature of Interest of the SPA) and consequently on the reproductive success of those species due to increased water turbidity / reduced water quality. Key indicators of conservation value comprise a reduction in numbers of Atlantic Salmon, River Lamprey and Otter for the cSAC and a reduction in the number of breeding pairs of Kingfisher or the number of successfully fledged young for the SPA.

9.1.16 There is not specific information available for Girley Bog cSAC on the NPWS publicly available records. On the basis of the site being a raised bog at a distance of c.10km from the application site, significant hydrological connections can be ruled out and consequent potential for indirect effects does not exist, similar to the conclusion for Kilconny Bog cSAC. Direct impacts can also be ruled out due to the European site's separation distance from the application site.

9.1.17 **Stage 1 screening conclusion** – It is reasonable to conclude that on the basis of information on the file, which I consider to be adequate in order to issue a screening determination, that the proposed development, individually or in combination with other plans or projects would not be likely to have a significant effect on European sites no. 000006 – Kilconny Bog (Cloughbally) cSAC, no. 004076 – Wexford Harbour and Slobs SPA and 004019 – The Raven SPA. It can also be reasonably concluded that there is no potential for significant effects on European site no.002203 – Girley

(Drewstown) Bog. However, the Board may consider it necessary to seek further information in this regard given the uncertainty that arises in this case.

9.1.18 Potential for significant indirect effects on the Features of Interest of European sites no.002299 - River Boyne and River Blackwater cSAC and no.004232 – River Boyne and River Blackwater SPA, arising from siltation or pollution of watercourses during construction / decommissioning or during operation / maintenance, potentially affecting water quality and turbidity, damaging relevant habitats and species of the SAC and reducing prey for relevant species in the SPA, cannot be screened out. Accordingly, a Stage 2 Appropriate Assessment is required to determine the potential of the proposed development to adversely affect the integrity of the River Boyne and River Blackwater cSAC and the River Boyne and River Blackwater SPA.

9.1.19 **Stage 2 Appropriate Assessment** – The Stage 2 Appropriate Assessment concerns European sites no.002299 - River Boyne and River Blackwater cSAC and no.004232 – River Boyne and River Blackwater SPA.

9.1.20 I have already extensively described the details of the proposed development under section 2.0, stated the Features of Interest and the conservation objectives of the two relevant European sites and detailed the main potential for significant effects on those sites, being indirect effects, only, on the aforementioned Features of Interest having regard to the conservation objectives for the Europeans sites arising from the proposed development, alone and in combination. To avoid unnecessary duplication, I shall not repeat that information here.

9.1.21 Under the Stage 2 appropriate assessment, it is summarised that the integrity of the two European sites could be directly affected by the proposed development through a reduction in water quality and foraging potential for aquatic species including River Lamprey, Atlantic Salmon and Otter, possibly leading to reduced numbers or reduced breeding success of same, being Features of Interest of the cSAC. Consequential changes to water quality has the potential to reduce prey densities for Kingfisher in the SPA, potentially leading to a decline in breeding numbers or lower reproduction success of same, being a Feature of Interest of the SPA.

9.1.22 The scale of the potential impacts is not addressed in the assessment as it relates only to carrying out of works in general, without regard to the specific nature of works being carried out in a specific geographic location with regard to the particular risks to and sensitivities of the environment within which those works are proposed. This obscures the potential severity and risk associated with the development. For example, the access track and cable trenching south of T6 will be constructed along a 360m length of significant watercourse, adjacent its steep and apparently unstable northern banks. The access road will also provide bridged access to the somewhat isolated construction compound located to the south of the watercourse. The watercourse confluences with the Moynalty River c.2km downstream and thence to the no.002299 - River Boyne and River Blackwater cSAC and no.004232 – River Boyne and River Blackwater SPA, a further c.2.4km downstream. Given the nature and location of the works, there is an increased threat to the said European sites. Mitigation by design (reallocation of access track, cable route and compound) would seem to be the only realistic way to avoid potential for significant effects.

9.1.23 The applicant details the proposed mitigation measures proposed to reduce or avoid specific adverse effects in table 6.2 of the report, inclusive of monitoring measures to prevent mitigation failure. These include implementation of a Construction Environmental Management Plan (CEMP), including Site Drainage Management Plan (SDMP), drawn up in consultation with the IFI and the NPWS, to include the installation of site drainage and run off controls prior to site clearance works to control erosion and siltation as a key measure to protect aquatic species, prior to the commencement of construction works.

9.1.24 In addition, 31no. detailed mitigation measures are proposed to be implemented during construction stage and decommissioning, which address potential impacts on water quality, as informed by relevant guidance documents set out under section 6.6 of the NIS. The mitigation measures may be summarised as follows:

- sediment runoff - by appropriate location of tracks (50m buffer from watercourses); limiting levels of traffic on site to a minimum; bunding of spoil heaps; covering of berms; provision of a method statement for bridge

installation to NRA and IFI guidance119 agreed with IFI; use of temporary settlement ponds prior to surface water discharge from areas of excavation; use of SEDIMATS; stabilising of banks in vicinity of crossing points; provision of a method statement for stream crossings; the locating of cable trenches underneath or directly adjacent tracks as far as possible; provision of an Emergency Silt Control and Spillage Response Procedure as part of the SDMP (to address potential mitigation failure); site personnel training in pollution incident control response; emergency spill response team at refuelling station; provision of emergency facility for accidental silt breakout; wheel washing facilities draining to silt traps; provision of 3-stage stilling ponds (swale – stilling pond – diffuse outflow) in advance of commencement of construction for site drainage; design of access tracks to reduce longitudinal slope of roadside drains where possible; clearance of roadside drains; protection of existing waterbodies with fencing and stilling ponds; use of silt fencing where access tracks proximate to streams; emergency facility to shut weir; roads will be capped as soon as practicable; tree felling to comply with FS Guidelines[120,] prior to construction and with protection of watercourse; water course diversion to follow NRA BPG; implementation of weekly and fortnightly inspections of erosion and sediment controls; maintenance of swales and stilling ponds as permanent feature during operation period;

- obstruction of movement of fishery populations - by sizing of culverts;
- impacts on spawning grounds - through single span bridge construction design; no instream works carried out during October-March salmonid close season; minor instream / riparian amelioration works to be carried out up and downstream of proposed crossings (with reference to 'Channels and Challenges: the Enhancement of Salmonid Rivers' (O'Grady, 2006)) to stabilize banks and reduce/ prevent soil loss; selection of optimal cable laying technique across watercourses on basis of detailed investigation of crossing location, in consultation with MCC, IFI and the statutory authorities.

[119] '*Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes*' (NRA, 2008) in Appendix 3 of NIS. '*Guidelines on Protection of Fisheries during Construction Works in an Adjacent to Waters*' (IFI, 2016), not appended to NIS.
[120] '*Forestry and Water Quality Guidelines*' (Forest Service, 2000) and *'Forest Harvesting and Environmental Guidelines'* (Forestry Service, 2016) included in Appendix 3 of the NIS.

- pollution from concrete works - prior risk assessment agreed with IFI for wet works; designated concrete wash-down at site compound with settlement lagoon;
- pollution from lubricants, oils and drilling fluid - through use of biodegradable lubricating fluid; provision of a contingency and resource protection plan (16no. individual points specified) to address potential mitigation failure; bunded and equipped temporary fuel stores;
- blockages, consequential flooding and generation of concentration flows – by use of 450mm diameter cross drains on access roads;
- other pollutants – use of licensed-provider portaloos / containerised toilets and welfare units provided for personnel;
- invasive non-native plants – implementation of preventative measures detailed in CEMP compliant with NRA guidance;
- overall water quality - implementation of detailed water quality monitoring programme detailed in section 6.5.1 of NIS;

The mitigation measures are proposed to be implemented and monitored by the developer and contractor as contractual obligation, in combination with competent supervisory staff overseeing the works. However, I am not satisfied that the mitigation measures proposed take due account of the specific works proposed within specific geographic locations, such as the poorly sited access track, cable route and construction compound south of T6.

9.1.25 **Stage 2 Appropriate Assessment Conclusion** – The Natura Impact Statement assessed the likely significant effects arising from the proposed development, individually and in combination with other relevant plans and projects, and the implications for the European sites concerned in view of those sites' conservation objectives pertaining the sites' Features of Interest for which those sites have been designated. There is no potential for any *direct* effects on any European site arising from the proposed development.

9.1.26 The River Boyne and River Blackwater cSAC and the River Boyne and River Blackwater SPA, located within the vicinity to the south (c.1.8km and c.2km,

respectively) of the application site, have been subject of a Stage 2 appropriate assessment.

9.1.27 I consider it reasonable to conclude on the basis of the information on the fiel, which I consider adequate in order to carry out a Stage 2 Appropriate Assessment, that the proposed development, individually or in combination with other plans or projects would not adversely affect the integrity of the European site no.002299 River Boyne and River Blackwater cSAC or European site no.004232 River Boyne and River Blackwater SPA, in view of those sites' Conservation Objectives.

10.0 Conclusion and recommendation

1. Having regard to:

   (a) the Wind Energy Development Guidelines – Guidelines for Planning Authorities issued by the Department of the Environment, Heritage and Local Government in June, 2006, and, in particular, the provisions of Chapter 3 'Wind Energy and the Development Plan' and Chapter 6, 'Aesthetic Considerations in Siting and Design';

   (b) the policies and objectives of the Meath County Development Plan 2013-2019, including, inter alia, in respect of renewable energy, wind energy, tourism, cultural heritage, protected structures, views and prospects and landscape character assessment (noting the lack of a Wind Energy Strategy in the Plan);

   (c) the need to treat wind farm development in this area with particular sensitivity given the proximity of the development to a large number of houses located in the open countryside and within Carlanstown and in the nearby town of Kells;

   (d) the location of the proposed development in an area with a history of settlement and an associated legacy of places and features of cultural importance from many historical periods;

   (e) the character of the receiving landscape, including the contextual setting of this landscape for cultural heritage of international, national and regional importance which forms an intrinsic part of the experience of such heritage, including Loughcrew, the Tara Complex (UNESCO World Heritage Site tentative list) and the Hill of Skryne, and the Hill of Ward, and the importance of that heritage to the tourist economy of Meath and the State, forming part of the 'Ireland's Ancient East' product;

   (f) the large spatial extent of the proposed wind farm and the tall height of the proposed wind turbines, and

   (g) the submissions and observations received in relation to the proposed development,

it is considered that a wind farm of the spatial extent and wind turbines of the height proposed would visually dominate this populated rural area, would seriously injure the amenities of property in the vicinity, would interfere with the character of the landscape and would not be in accordance with the overall development objectives of the Meath County Development Plan 2013-2019**.**

Furthermore, it is considered that the proposed development would not align with the Wind Energy Development Guidelines as this guidance document does not envisage the construction of wind farms of large spatial extent and generally does not envisage wind turbines of tall height within an area primarily characterised as a hilly and flat farmland landscape and in such proximity to high concentrations of dwellings. The proposed development would, therefore, be contrary to the proper planning and sustainable development of the area and would significantly exceed the "medium potential capacity" of LCA3 and the "low potential capacity" of LCA20 to accommodate wind farm development as set out in the Landscape Character Assessment of the Meath County Development Plan 2013-2019, and in the absence of a national wind energy strategy with a spatial dimension or of wind energy strategies at local level, is considered premature development.

John Desmond
Senior Planning Inspector
10th April 2017

Appendix 1

Summary of Observations

Approximately 400 submissions/observations have been submitted in respect of the application for approval from both individuals, community groups and elected representatives. A list of all observers by County is set out below in Part 1 of this Appendix.

It is evident from the submission made that there is considerable overlap in terms of the issues raised. In order to avoid undue repetition, the issues are summarised below under individual topics for the information of the Board (Part 2 of this Appendix). Third party observers against or for the proposed development was approximately 70:30.

Part 1

List of Observers (and assigned observation number)

Public Representatives

11 Byrne, Thomas TD
12 Cassells, Shane TD
13 Cassidy, Eugene Cllr
14 Doherty, Regina TD
15 Drew, Sean Cllr
16 Forde, Wayne and McDonagh, Seamus Cllrs
17 Harkin, Marian MEP
18 McEntee, Helen TD
19 Meade, Paddy Cllr
20 O'Loughlin, Fiona TD
21 O'Rourke, Darren Cllr
22 Reilly, Bryan Cllr

Observer Groups

23 Archdeaconry View Residents Committee
24 Balrath Wood Residents
25 Borora Crescent Residents Association
26 Cannon Street Residents Against Kells Wind Farm
27 Carlanstown/Kilbeg Community Development Ltd
28 Castletown G.A.A
29 Concerned Citizens Kells

30 Concerned Residents of Fyanstown
31 Concerned Residents of Sydenrath
32 Council of Riding for the Disabled Association Ireland
33 Curragh Park Residents' Association
34 Curragh Wood Residents Association
35 Fyanstown Residents
36 Headfort Demesne Management Limited
37 Headfort School
38 Irish Georgian Society
39 Irish Racehorse Trainers Association
40 Kells Concern Group
41 Kells District and Tourism Network
42 Kells Riding for The Disabled Association
43 Kildare Environmental Awareness Group
44 Meath IFA
45 Meath Wind Information Group
46 Moynalty Environmental and Heritage Group
47 Moynalty Old Graveyard Group
48 North East Pylon Pressure Campaign Limited
49 Rathcoinnig C.L.G
50 Scoil Mhuire Carlanstown Board of Management
51 Scoil Mhuire Carlanstown Parents Association
52 St. Michael's G.A.A.
53 Tara Hill Riding Club
54 Village Green Residents Association

Individual observations

55 Anderson, Richard WJ
56 Arkins, Gary and Others
57 Barrett, Martin and Phyllis
58 Behan, Paul and Others
59 Bennet, S.M and Co
60 Black, Sam
61 Blackburn, Stephen and Donna
62 Blayney, Aiden
63 Brennan, Tina and Thomas
64 Briody, Aileen and James
65 Brophy, Maureen and Others
66 Brown, Hamish and Others
67 Brunnock, Mari
68 Brunnock, Niall
69 Burns, Ollie
70 Byrne, Damien and Sinead
71 Byrne, Kevin
72 Byrne, Sandra
73 Cahalane, Derry
74 Cahill, Adrian
75 Cahill, Martina
76 Cahill, Peter
77 Cahill, Shane

78 Callaghan, Eamon and Tracy
79 Callaghan, Patrick and Sharon
80 Cameron, James
81 Carey, Mark
82 Carn Hill Agri Limited
83 Carolan, Ann
84 Carolan, Maura and Michael
85 Carolan, Niall
86 Carolan, Patsy
87 Carolan, Pauric
88 Carolan, Thomas
89 Carpenter, John
90 Carpenter, Paul and Sheila and Others
91 Carpenter, Thomas
92 Carr, Eddie and Kathleen and Family
93 Cassidy and O'Brien Family
94 Cassidy, Concepta
95 Cassidy, Debbie
96 Cassidy, Edward
97 Cassidy, Ollie
98 Cassoni, Ciara
99 Cassoni, Ciara and Murphy, Orlaith
100 Clarke, Bartle and Renée
101 Clarke, John
102 Clarke, Paula and Tony and Family
103 Clarke, Peter
104 Clinton, John
105 Cluskey, Michael and Others
106 Cogan, Deirdre and Shane
107 Coghlan, Bernie and Eamonn and Family
108 Colwell, Catherine
109 Colwell, Paula
110 Conlan, Marie and Family
111 Cooke, Jeremy and Janet
112 Corcoran, Jim
113 Crosby, Patrick and Others
114 Curran, Brian and Others
115 Curran, Carol and Concerned Residents
116 Curran, Ronán
117 Curtis, Aidan and Leesa
118 Curtis, Gabriel and Others
119 Cussen, Francis and Others
120 Daly, Eileen
121 Daly, James
122 Daly, Lorraine
123 Daly, Niall
124 Daly, Sharon
125 De Stacpoole Lynch, Daphne
126 Diaz, Mella Louise
127 Doherty, Joe and Mary and Others

128 Doherty, Thomas
129 Dolan, Padraic and Others
130 Dolan, Susan
131 Dolphin, Anne and Others
132 Dolphin, Jean-Anne and Others
133 Dowdall, Alan
134 Dowdall, Anne
135 Dowdall, Darren
136 Dowdall, Patsy
137 Doyle, Gretta
138 Drew, Lorraine and Paul
139 Duffy, Pat
140 Duffy, Tom
141 Duffy, Yvonne
142 Dunne, Rita
143 Dyhdalo, Serhiy
144 Dyhdalo, Vasyl
145 Ennis, Aidan
146 Farrell, Ben and Nicola
147 Farrell, Bernard and Joan
148 Farrell, James and Louise
149 Farrell, John
150 Farrell, Ronan
151 Farrelly, Denis
152 Farrelly, James
153 Farrelly, James Snr
154 Farrelly, Laura and Others
155 Farrelly, Patrick
156 Farrelly, Peter
157 Farrelly, Tony
158 Ferguson, Audrey
159 Ferguson, Olivia and Others
160 Fitzherbert, Trevor and Bernadette
161 Fitzsimons, John
162 Fleming, David
163 Flood, John
164 Flood, Sean
165 Fox, Dave and Deirdre
166 Gaffney, Jackie
167 Gaffney, Niall and Deirdre
168 Gaffney, Sean and Niamh
169 Gaffney, Thomas
170 Gaffney, Thomas and Ann
171 Gargan, Clodagh
172 Gargan, Frances
173 Gargan, Leonard
174 Gargan, Leonard Jnr
175 Gargan, Michael
176 Gargan, Mickey
177 Gargan, Shireen

178 Gargan, Val
179 Gavigan, Cara and Byrne, Darragh
180 Gavigan, Thomas P. and Marie
181 Giles, Helena and Others
182 Gilsenan, Matthew and Celestine
183 Gilsenan, Sean
184 Ginnelly, Patrick Jnr
185 Gorman, Catherine
186 Grimes, Anne and Others
187 Halligan, Aidan
188 Halpin, John
189 Hand, Ann
190 Hand, Gary
191 Hand, John
192 Hand, John Jnr
193 Hand, Kristine
194 Harnett, William
195 Harris, Lorraine
196 Harten, Gerard
197 Hashimoto, Hirokazu and Yasuko and Others
198 Hayes, Michael and Others
199 Heapes, Gerard
200 Heary, Philip and Others
201 Hennessy, Teresa
202 Hoch, Pamela Siobhan
203 Hoey, Kathleen
204 Hughes, Mary
205 Hunt, Helen and Others
206 Jenkins, David V.
207 Jenkins, Ilona H.
208 Jenkins, Penelope
209 Jessop, Neville
210 Keating, Stephanie and Others
211 Kenny, Alexander
212 Kenny, Alice
213 Kenny, Desmond and Glynne Kenny, Sharon
214 Kenny, Edward
215 Kenny, Robert
216 Kenny, Sarah
217 Kerins, Anthony
218 Kerins, John
219 Kerrigan, Gerard and Dorothy
220 Kim, Carol B and Others
221 Kindlan, Deirdre
222 Lee, John
223 Lee, Mary
224 Lee, Patrick
225 Lees, Terry
226 Leonard, John and Muldoon, Frank
227 Litovkins, Raimonds

228 Lynch, Bernard and Christine
229 Lynch, Brendan
230 Lynch, Brendan and Kearney Lynch, Philomena
231 Lynch, Ciaran and Others
232 Lynch, Jim
233 Lynch, John
234 Lynch, John
235 Lynch, Patrick and Kathleen and Others
236 Lynch, Sean
237 Lynch, Shane
238 Lynch, Thomas
239 Malone, Eamon
240 Matschke, Brian and Helga
241 McAleese, Simon and Lorraine
242 McCabe, Brendan and Others
243 McCann, David and Others
244 McCann, Violet
245 McCarthy, Justin and Joan
246 McCartney, Alan
247 McCaul, Mary and Others
248 McCormack, Nuala
249 McDonnell, Aidan and Lynch, Angela
250 McEntee, Ann
251 McEntee, Ann and Others
252 McEntee, Cormac
253 McGillick, Alan and Others
254 McGivern, Terry and Nickoline
255 McGrath, Christy and Others
256 McKeown, Susan
257 McKevett, Eithne and Others
258 McNeece, Kelly and Others
259 McPhillips, Bernard
260 McQuaid, Thomas and Fiona
261 Meegan, Seamus
262 Meehan, Christy and Josephine
263 Minifie, Gavin
264 Mohan, Janette and Philip
265 Monaghan, Barth
266 Monaghan, Colm
267 Monaghan, Declan
268 Monaghan, Fionnuala
269 Monaghan, Frances
270 Monaghan, Louise and Others
271 Monaghan, Peter
272 Monaghan, Shane
273 Moore, Anne and Others
274 Moorhead, Penelope
275 Morgan, Paul and Others
276 Moriarty, Thomas
277 Morris, Gerry and Dolores

278 Morris, James and Others
279 Morris, Sandra and Others
280 Mulligan, Sean
281 Mulvanny, Larry
282 Mulvanny, Tom and Julie
283 Mulvany, Geraldine
284 Murphy, Gerard and Others
285 Murray, Brian and Roisin
286 Murray, Karen
287 Murtagh, Michael and Others
288 Murtagh, Pat
289 Nelson, Larry
290 Nelson, Laurence
291 Newman, Michael Thomas
292 Newman, Valerie
293 Nolan, Bryan
294 Norris, David and Eimear
295 Nugent, Miriam
296 O'Brien O'Reilly, Mark
297 O'Brien, Ann and Tom
298 O'Brien, David and Valerie
299 O'Brien, Fergal
300 O'Brien, Gillian
301 O'Brien, Laurence
302 O'Brien, Noeline
303 O'Brien, Therese
304 O'Callaghan, Barry
305 O'Callaghan, John
306 O'Connell, Paddy
307 O'Connell, Pat
308 O'Connor, George
309 O'Connor, Jane (B135828)
310 O'Connor, Jane (B135697)
311 O'Connor, Lucia
312 O'Dea, James and Imelda
313 O'Donnell, Caroline and McGowan, Stephen
314 O'Hara, Clodagh
315 Oldak, Joanna
316 Olley, John
317 O'Loughlin, Ronan
318 O'Malley, Deirdre
319 O'Reilly, Charles
320 O'Reilly, Gerard
321 O'Reilly, Graham
322 O'Reilly, John
323 O'Reilly, Joseph
324 O'Reilly, Mary
325 O'Reilly, P
326 O'Reilly, Sonja
327 O'Rorke, Ann and Others

328 O'Sullivan, Eoin
329 O'Toole, Bertie
330 O'Toole, Elaine
331 Owen, Gethin
332 Owens, Paidi
333 Plunkett, Gerry
334 Pollock, Atalanta
335 Pondoff, Kim and Others
336 Prunty, Ciaran and Maureen 337 Reilly Family
338 Reilly, Catherina and Martin and Family
339 Reilly, Eileen
340 Reilly, Elizabeth
341 Reilly, Enda
342 Reilly, Gerard
343 Reilly, John and Marina
344 Reilly, Miriam
345 Reilly, Noel
346 Reilly, Pascal
347 Reilly, Vincent
348 Rogan, Ian
349 Rogers, Albert
350 Rogers, Alison
351 Rogers, Carmel
352 Rogers, Charles
353 Rogers, Christine
354 Rogers, Hugh
355 Rogers, Larry
356 Rogers, Margaret
357 Rogers, Marita
358 Rogers, Maureen
359 Rogers, Michael
360 Rogers, Patrick and Lucy
361 Rogers, Pete
362 Rogers, Pete (Hermitage)
363 Rogers, Peter (Ballinclieve)
364 Rogers, Philip
365 Rogers, Thomas
366 Rooney, Áine and McGivern, Stephen
367 Rooney, Aisling
368 Rooney, Bridget and Family
369 Rooney, David and Claire
370 Rooney, Vincent and Bríd
371 Rooney, Yvonne
372 Rourke, Carmel and Others
373 Royal, Percy
374 Ryan, Liam and Marie
375 Ryan, Sean and Brittny
376 Sands, G.C and Others
377 Sharkey, Louise and Colm
378 Shaw Family, The

379 Sheridan, Aisling and Andrew
380 Sheridan, Anthony
381 Sheridan, John
382 Shortall, Rita and Others
383 Smith, Charles and Alison
384 Smith, Jennifer
385 Smith, Michael
386 Smith, Richard and Kathryn
387 Smith, Yvonne
388 Smyth, Brendan and Mary
389 Smyth, Charles and Others
390 Smyth, Michelle
391 Stafford, Damien
392 Stafford, Jim
393 Stafford, Paul
394 Tighe, Pat and Sheila
395 Tighe, Patrick
396 Tinne, Louise
397 Tobin, Joe and Nancy
398 Townshend, Edward
399 Walsh, James and Mary
400 Walsh, Larry and Others
401 Walsh, Mary
402 Walsh, Tony and Caroline
403 Ward, Peter and Denise
404 Ward-Flanagan, Alice
405 Weldon, Frank
406 White, Margaret and Paddy
407 Woodroofe, Sarah
408 Young, Gary

Part 2

SUMMARY OF OBSERVATIONS MADE

Summary of issues raised relating to procedural and legal matters

SID designation

- Objects to designating scheme a SID despite that it formed part of the refused SID PA0038, using up public resources and suggesting collusion with the Board and corruption.
- The SID Act and procedures offend against the principles of fair procedure and the constitution, and the proposed development is scaled to be a SID and bypass the Local Authority, increasing cost and complexity for third parties
- The applicant is effectively using the SID procedure to appeal PA0038, rather than by way of Judicial Review if the applicant is contending the Board misunderstood policy and reached an irrational conclusion.
- The Board is requested to de-designate the project as SID Status (Justice Costello found in Callaghan v An Bord Pleanála ruled a decision to grant SID Status could be overturned when the planning application was made) on the basis that there is no need for the project and as the development requires state aid, contrary to EU guidelines / policy (Energy Policy, Competitive Market Policy)
- The Board found the proposal to be SID despite that the proposal for 68.75 76-85MW was based on hoarding massive amounts of transmission capacity contrary to CER policy, preventing alternatives being pursued by other developers. The normal arrangement is for the WF nameplate capacity to exceed the Maximum Export Capacity by 105-120%, but the SID status was granted for a WF with name plate capacity which is as little as 57.3% of the Maximum Export Capacity.
- The Inspector's report on SID status had regard to the possible liability of the state for fines for missing renewable energy targets, with the proposed development potentially reducing fines by €23m. The actual potential reduction in fines is calculated by the observer at €11.34m.
- Application is a SID on the basis that it is a means to achieving Ireland's 2020 targets for renewables (ESB 40% target) was based on much higher (pre-recessionary) electricity demand than is now predicted for 2020 (and 2025). The current regulatory arrangements have potential to secure a much higher penetration than 40% based on revised predicted demand.
- ESB indicates its pre-recession forecasts for 2025 are up to 55% off and that Ireland already had almost enough wind-power capacity to meet 2020 targets. http://www.thejournal.ie/esb-renewable-energy-1753843-Oct2014/ AND

http://www.dcenr.gov.ie/NR/rdonlyres/A53C-4A30-ABFD-OF1F9FF63B95/0/ESB.pdf

Public consultation, engagement and access to information

- No real meaningful consultation, such as is mandated by the Energy White Paper (pages, 89-90 refer). Public meeting in Kells took place on 12/04/16, after SID consultation with ABP concluded and not within community where WF is planned. No public consultation undertaken in initial stages, before contracts signed with landowners to accommodate WTs (considers this to be underhanded). Breach of best practice at European and International levels and lack of evidence information on the ground. No consultation or discussion of alternatives. Wholly inadequate engagement with those most to be affected.
- Contrary to 'UN Convention on the Rights of the Child' ratified by Ireland in 1992 - children living in the affected area have not be enabled to play an active role with regard to the proposed WF contrary to the convention that they should have participation rights.
- UNECE Convention on Access to Information, Public Participation in Decision Making and Access to Justice in Environmental Matters (AKA Aarhus Convention) - contrary to Aarhus.
- Not convinced farmers / landowners understood what they were signing up to in accepting WTs on their land
- The European Landscape Convention - 'the landscape is a key element of individual and social well-being and that its protection, management and planning entail rights and responsibilities for everyone' and a key aim is to 'promote landscape protection, management and planning, and to organise European co-operation on landscape issues' (article 3). Aarhus Convention ratified by Ireland. The National Landscape Strategy 2015-2025 Action 15 is to develop methods for the public to shape, review and monitor landscape policies and encourage sustainable management of the landscape. Failure to strategically plan energy development and conservation, with SEA, in consultation with the public at national level having regard to ELC and the impact on landscape.
- Conflict between ELC requirements and the provisions for SIDs contrary to A.5 of the ELC.
- The National Economic and Social Council (NESC) suggests three component principles are critical to building social support for WE developments - i) an overarching energy-transition process that facilitates and guides society-wide efforts to transform energy system; ii) an effective and inclusive process of public participation that helps shape and share local value; iii) enabling organisations and intermediary actors support problem solving and entrepreneurialism necessary to initiate renewable-energy development.

- Concern that the government is not looking out for the people but is looking after vested interests, big business and foreign investors.
- Contrary to principle of natural justice
- Development proposal displays weak sustainability (as defined in Brundtland Report), focusing on economic and environmental constructs, with little evidence of social equity and effective grass roots participation.
- Inaccessibility of relevant documentation, spread of important information within huge volume of documentation, prohibitive cost of purchasing hard copy of application (€1600), €50 cost of making an observation and inadequate time period for observers to make submissions, is inequitable.
- The applicant has gone to enormous effort to inform the community with an open day at Kells and an information leaflet drop to each household within 1km of the proposed development.
- Such limited consultation is contrary to strong recommendations of WEDG 2000 concerning community consultation.
- Development proposal displays weak sustainability (as defined in Brundtland Report), focusing on economic and environmental constructs, with little evidence of social equity and effective grass roots participation. Evaluation of social impacts needs to be undertaken to ensure a balance of contributing constructs to the provision of sustainable development, in compliance with EPA EIS guidelines para.2.3.7.
- Takes issue with the definition of near neighbour (for consultation), limited to those within 500m or so, when the impact will extend over people in the entire region.
- The campaign against the project is based on false information regarding impacts and is prejudiced against local landowners.

Grid connection

- Grid connection availability is not a relevant consideration in site selection alternatives. A.16.3 of the Renewable Energy Directive enjoins the construction and operation of Grid infrastructure such that developers are not disadvantages by using remote sites for renewable electricity development by way of incurring higher connection and transmission costs.
- The applicant has not considered the other potential sites that could have been connected to the 120MW grid capacity previously allocated to Oriel Offshore WF in Dundalk Bay, which envisage other potential viable connection points along any part of the 30K route north of Gorman.
- Grid connection needs to be clarified by the Board

- The grid connection capacity is 120MW, but only 85MW development proposed. Will applicant return with another application to use up the spare capacity?

Period of permission

- 10 years is in excess of any period needed to meet 2020 targets, would allow hoarding of grid connection capacity and impede implementation of alternative CHP technologies, and also leads to uncertainty.

Legal / technical

- Question of the extent of consent provided by the relevant landowners. Does consent extend to construction and operations on their land, that would be a source of nuisance to others and / or cause diminution of market value of neighbouring lands.
- Is the property interest to be conveyed to the WF Development Company sufficient to allow the Board to impose conditions to maximise CO2 and GHG avoidance on those lands, comprising the prohibition of livestock rearing?
- Concern about lack of transparency of Coillte regarding the terms of the lease contract with the developer. Concern about conflict with its remit to maximise the land bank on behalf of stakeholders (principally the MoAFF and MfFinance) and leasing lands to an American private equity fund.
- It is outside the remit of Coillte, a state body, to lease land to a private developer to fell trees and build development (e.g. substation). The applicant does not propose to remove the foundations and associated works at the end of life of project and therefore taxpayers will be left with the cost.
- Queries why the site boundary has changed surrounding the unchanged locations of the 25 WTs proposed under this current and the previous application. Has the developer relinquished land rights?
- No site notices in Irish which is to be expected in the Gaeltacht and therefore the validity of the application is in question.

NREAP

- The SEA Directive states that it sets the framework for EIA. As no SEA has been undertaken for NREAP, the EIS and EIS is invalid. The hierarchy begins with public participation aspect of Aarhus, next comes EU requirement for SEA on their renewable energy directive 2009/28/EC (for which none was carried out) and then the Irish government's requirement to carry out SEA on NREAP, then licensing arrangements for operation, followed by EIA and planning permission. Their absence could be fatal. Non-compliance with Aarhus Convention, SEA Directive and EIA Directive (because of non-compliance with SEA).

- The Irish planning authorities appear to be the only state body seeking to actively circumvent the law, even after this circumvention has been point out. This amounts to corruption. The decision maker should study the legal definition of corruption.
- Focus shifted from offshore WE under NREAP 2010 to onshore under NREAP 2012 without recourse to SEA. The UN has found the EU in breach of international law for accepting energy policies from member states which had not been subjected to SEA. The SEA process by DCENR is expected to be completed in late 2015 at earliest.
- No public consultation on NREAP and alternative methods to meet targets (e.g. heat pump, etc.)
- In JR of Rathaniska interconnector, Co. Laois, ABP indicated they would not refuse planning applications submitted without an SEA having been done.

Summary of issues raised relating to matters of development policy and standards

Standards for development

- 500m setback inadequate compared to international standards and has no regard to scale of turbines. E.g. setback in Northern Ireland is 10 X height; France 1km.
- Setback of 500m is acceptable, is more stringent that those in other parts of Europe and there is large quantity of hedgerows providing high volume screening.
- EU Machinery Directive 2006/42/EU applies to WTs - machinery cannot be put on market or into service unless it satisfies the provisions of the Directive and does not endanger health and safety of people, etc. Submits that Directive means noise impacts on people be minimised by applying the highest standard setback from housing in any member state to all member states.

National Policy & Targets - Need for the project

- Need related to CO2 reduction - 2641MW wind power now installed in Ireland. WE provided 24% of state's electricity in 2015 (EirGrid). At 31% operating capacity 2641MW (other says 2441MW) WE produces 6,633,319MW electricity, or 570kToe. Inclusive of hydropower (61kToe) and Bioenergy (152kToe), renewable energy production is c.783kToe or 32.5% of 2014 electricity production of 2638kToe (SEAI figure). ESB and EirGrid list of contracted WF shows there is several times the amount of capacity in development awaiting connection to more than meet 2020 targets for electricity.

- Need related to CO2 reduction - Increasing electricity output is not the solution to addressing shortfall in Heat and Transport 2020 Targets. The Waste Framework Directive's hierarchy which places avoidance / prevention as top priority.
- Need related to CO2 reduction - cited by the applicant as driven by the 'legal commitment from Ireland to limit GHG emission under the Kyoto protocol to reduce global warming', but it ignores the most effective ways of reducing CO2 and GHG emissions including replacing coal and peat (2,686,530 tonnes CO2 p.a. peat) with natural gas and higher efficiency generation with CHP use of waste heat, running trucks / tractors on gas, limit agri GHG emissions, use solar thermal heat power, heat pumps and better insulation. SEAI data shows gas power generation at 60% has the lowest CO2 emissions (compared to coal and peat). CO2 reduction is deemed by the Commission to be the most important of the 2020 Energy & Climate Targets and it should not be adverse impacted in order to assist renewables targets. Requests the Board to examine CO2 savings arising from change from coal to CCGT based gas power generation to demonstrate irrationality of current practice. Obligation to reduced GHG emissions also arise under EU Energy and Climate Package. Agriculture accounts for 47% of non-ETS GHG emissions (2020) but agriculture is being vastly expanded.
- Need related to CO2 reduction - Applicant's claim that WF will save 115000t CO2 p.a. is based on existing average CO2 emissions per tonne for coal and peat (460g/kWh), rather more efficiently CCGT (311g/kWh).
- Need related to CO2 reduction - Wheatly J, 'Quantifying CO2 savings from wind power' found WE only 53% effective at reducing CO2. For 25 2.75MW WT, the most CO2 savings (allowing for efficient impacts on providing back up generation for WP) are 250,000MW X 65/85X103X0.280t/mWh = 53,529 CO2 saving tonnes. Taking account of agricultural use on balance of application site, assuming beef farming, which would produce 19X13,333t CO2 p.a. (based on UN Food & Agricultural Organization, p.9 of http://www.fao.org/3/i3437epdf), theCO2 savings would be c.40,000t p.a. Cost of avoiding 40,000t CO2 p.a. under ETS @ €7.50/t CO2 is €300,000, compared to cost of direct WE subsidies above whole sale prove is €45/MWh+ for each 250,000MW at €11.25m.
- Need related to CO2 reduction - Running wind turbines in reduced noise mode (not quantified in EIS), dispatch down (c.5% in 2015, Eirgridgroup.com) and substantial future curtailments unless extensive exports facilitated through interconnectors would reduce CO2 savings.
- Need related to CO2 reduction - CO2 saving don't take account of CO2 footprint of construction, transmission and distribution networks, and backup generation. Each MW wind energy has firm capacity of 0.1MW, requiring 0.9MW backup. The CO2 savings are therefore nonsense and the CO2 payback period on resources invested are vastly extended.

- Need related to energy security - Wind energy is not reliable, cannot be stored and is dependent on thermal power plant backup.
- Need related to diversifying Ireland's energy sources - the applicant significantly underestimates the amount of wind energy connected in Ireland. Currently 2527.4MW, not 2100MW (p.14 NTS), with 1641MW contracted for connection to distribution system and 1581MW contracted for connection to the high voltage system. Total WE generated in 2015 is 6,536,210MW, which is 562ktoe, up 120ktoe on 2014. Renewable energy in 2015 was in the order of 655+120=775ktoe, indicating excellent progress is being made on renewable electricity towards 2020 target of 40%.
- Need related to cost effective power production - Wind energy not cost effective, requires stated aid, has fails to compete on price. Subsidies are not factored in to the cost benefit considerations or the reported megawatt cost of wind power.
- Need related to increasing energy price stability - wind energy (80/MWh, EirGrid data for 10/06/16) more expensive than gas (€33.22/MWh) and requires backup thermal power plants and subsidisation.
- Wind Farms rely on government subsidies and other government interventionist (risk mitigation) to be economic, which do not consider the externalities - e.g. impact on tourism industry, tourism jobs and impact on quality of life issues or local communities.
- At the oral hearing to PA0038 the applicant responded that any less than 46 WT was not economically viable.
- SEAI - renewable accounted for 25.3% in 2015, approximately halfway to 40% RES-E target for 2020. 4 years to complete other 15%, excluding consideration of the anticipated deficits in the Renewable Heat and Renewable Transport areas. Missing targets will have implications for fines national fines.

National Wind Energy Location policy

- Locating of WE development on IEC Class 3a wind speed site (in Meath - one of the lowest average wind speeds recorded in Ireland) rather than Class 1 or 2 lands is irrational, reduces viability and competitiveness, necessitates higher wind turbines, increases cost to consumers and will not help reduce the need for subsidies contrary to EU policy objective to eliminate same.
- Claim that SEAI commissioned wind speed measurements of the Irish Midlands, carried out by UK Met Office, found wind speeds for Mullingar at 5.6m/s, Birr at 6m/s and Ballyhaise at 4.8m/s, far lower than those claimed by applicant. The wind speeds on site will be far lower, due to friction, being 40 miles further east, and is inefficient for electricity generation by international standards.
- Wind energy should be directed to sites that are most remote from housing and with higher wind speeds to maximise viability and competitiveness.

- National Spatial Strategy makes no reference to development of wind energy, but acknowledges the 'world renowned landscape, the attractiveness and integrity of which are central to Ireland's tourism industry. Proposed development is at odds with NSS objective to achieve balanced pattern of development.
- The new Energy White Paper (Ireland's Transition to a Low Carbon Energy Future 2015-2030) envisages a spatial analysis as a basis for choosing wind energy generating locations and how grid resources are to be allocated. Premature and developer led.
- The new Energy White Paper - encourages Renewable Development and meeting of National Targets but it imposes conditions on a process for selection of locations and it requires community support.
- There is no national plan for the total number and location of WTs required to enable 2020 Targets to be met.

Changing policies in other jurisdictions

- Other European countries are changing their minds regarding WE and moving towards other more efficient renewable energy sources due to public health concern. The Irish government should research alternative renewable energy solutions that don't pose such a risk to the general public.
- Contrary to governmental and state policy changes in other countries - Australia, UK, Germany, France
- UK has already decided to no-longer subsidise onshore wind energy (DECC, UK press release 8/10/15), recognising that the public will no longer tolerate such development. The change of policy arose from the Campaign to Protect Rural England. Queries the provision of WE in Ireland to serve UK through onshore WE development not permitted in the UK.

EU Policy - Energy and Climate

- The binding 2020 Targets are underpinned by The Renewable Energy Directive 2009/28/EC, the Energy Efficiency Directive 2012/27/EU, Directive 2008/2008/98/EC on waste (Waste Framework Directive) including waste heat. Recital 44 of 2009/28/EC requires '*...Member State should take account of all Community environmental legislation and the contribution made by renewable energy sources towards meeting environmental and climate change objectives in particular when compared to non-renewable energy installations*'. WE increasingly requires backup thermal power plant contrary to the WFD and the EED and, taking a holistic approach to the directives to reduce energy and

improve resource efficiency as articulated in Recital 3 of EIA Directive 2014/52/EU to '*...align that procedure with the principles of smart regulation and enhance coherence and synergies with other Union legislation and policies...*'.

- A.5(4) of the TREU 'under the principle of proportionality, the content and form of Union action shall not exceed what is necessary to achieve the objectives of the Treaties'. This means the worst case scenario would be no more expensive than the cheapest way of meeting the targets - it would be much cheaper than doling out tax reliefs and subsidies to WP developers over 15 years. The EU does not have the power to impose fines.
- Contrary to the EU Machinery Directive 2006/42/EU applies to WTs - machinery cannot be put on market or into service unless it satisfies the provisions of the Directive and does not endanger health and safety of persons, etc., and it requires risks from emission of airborne noise to be reduced to the lowest level taking account of technical progress and availability of means of reducing noise, particularly at source. Submits that noise emissions should be minimised by locating turbines at such locations as would minimise noise impact on people, which would apply the largest setback standards in Europe to all jurisdictions to provide the lowest level of noise.
- Contrary to EU policy which is about developing energy projects with the agreement of the communities.

Regional Planning

- Contrary to RPGGDA due to scale of development. Premature pending completion of study to determine the most efficient location for wind energy development within the region (which accounts for only 4% of the National Wind Resource, the majority offshore) on the potential of wind energy, appropriate locations for varying types of wind turbines, and associated land-use policies to guide, assist and promote this new green business.
- There are no suitable areas for siting wind farm of this scale within the RPGGDA

Meath County Development Plan

- The zoning of extensive areas of the county as 'medium capacity' for wind energy does not envisage the scale of development proposed, but suggests that only very small turbines and small scale wind farms are considered due to the proximity of those areas to Tara and Newgrange
- No Wind Energy Strategy adopted to rationally inform WE development in county.
- There are no suitable areas for siting wind farms of this scale under the CDP.

- Would interfere with the character of the landscape and would not be in accordance with the overall objectives of the Meath CDP 2013-2019.
- Contrary to CDP by reason of impact on Moynalty ACA and other villages with similar status.
- Not zoned for purpose of WF, industrial or even mixed use. It is agricultural land use, not industrial.
- Inequitable situation - landowners are not permitted to build houses, or houses of 2-storeys, GAA refused permissions for 2-storey clubhouse, but industrial scale wind turbines are allowed.
- Impact on landscape would be contrary to heritage objectives in the CDP - e.g. LC POL3 protection of archaeological heritage, setting and amenity of Tara landscape, Loughcrew and Slieve na Calliagh; CH OBJ 8 protection of archaeological landscapes; and upland areas and scenic routes.
- Failure to zone county for wind energy development but to rely only on the LCA maps is contrary to the WEDG 2006. Format of layout is inadequacy to enable public participation in the development plan process and use of UK consultants is contrary to action 17 of the National Landscape Strategy and the public unaware that area designated 'medium capacity' for wind energy development.
- Existing LCA's are not fit for purpose. New methodologies to address heritage and boundaries to landscapes, especially on flat landscapes
- Contravenes MCDP and proper planning and sustainable development of the area.
- Premature pending Council's review of wind energy policy is under review in terms of maximising efficiencies.
- Contrary to policy concerning Tower of Lloyd
- Precedent for refusal on grounds of no wind energy strategy in Mayo CDP pl16.206517 (2004); pl08.241549 contrary to Kerry CDP 2009-2015 strategy; pl01.243364 visual & contrary to WEDG; pl21.206301 visual impact; pl07.239053 heritage impact Galway; pl23.242364 insufficient detail, policies of South Tipperary CDP; pl17.RL2461 importation and deposition of soil is works.

2006 Wind Energy Development Guidelines

- 2006 WEG is out of date. Proposal is premature pending adoption of new RWEG (already 2 years past deadline).
- WEG 2006 were meant for wind turbines of smaller size, 50m in height with 500m setback.
- Contrary to WEDG chapter 3 'Wind Energy and the Development Plan' and chapter 6 'Aesthetic considerations in siting and design.'

- Does not accord with WEDG regarding spacing (s.6.6), layout (s.6.7) and height (s.6.8) on hilly and flat farmland (s.6.9.2) and the applicant has failed to examine the potential of flat peatland to accommodate such a large wind farm which afford opportunities to separate development from people.
- WEDG did not envisage the construction of such extensive large scale wind turbines in an area primarily characterised as a hilly and flat farmland landscape and in such proximity to high concentrations of dwellings (as per refusal reason of the Board in decision on PA0038 the Board). Table 14.7.
- Spatial arrangement contravenes WEDG as the layout has no geometric or aesthetic design theme. Spacing determined by pragmatism of limited availability of land.
- The WEDG refers to but waters down the protection outlined in ESTU-R-97 in order to maximize wind energy generation by disregarding a 5dBA limit over background noise level. WEDG does not have same regard for EU's Precautionary Principal as other nations' guidelines and regulatory regimes and is contrary to EIA Directive (2011/92/EU) which envisage the harmonised level of protection across the EU, allowing individual states to apply more stringent standards.
- In absence of specific local regulations best international practice should apply - proposal is contrary to same and to proper planning. Best international practice has been revised and updated since WEDG were adopted. Why haven't our guidelines changed?
- Review of WEDG is too limited and does not take account of recommendations of Heritage Council, etc. Changes in technology and scale of WTs and WFs not followed by reive of landscape and other guidelines.
- Architectural heritage inadequately covered in WEDG.
- Section 5.6.1 of WEDG aims to *'seek to achieve a balance between the protection of residential amenity of neighbouring communities in the vicinity….and facilitation of the meeting of national renewable energy targets*'. Sleep is a human right not an amenity and cannot be protected by a 40dB absolute limit.
- WEDG did not envisage such large scale wind turbines in such a populated and scenic area.
- WEDG requires developers to assess impact on tourism and recreation activities and to consult with Failte Ireland. The applicant should provide the result of the required consultations.
- The WEDG 2006 notes that tourism and recreation underpin the local economy, which depends to varying degrees on the quality of the environment, in many rural areas. Wind energy development is not incompatible with tourism and leisure

interests, but care needs to be taken to ensure that sensitivity sited developments do not impact negatively on tourism potential.

- WEDG does not address impacts on human health from wind turbines of scale and size proposed.

Other institutional guidance

- IFA 'Harnessing Ireland's Wind Resources for Renewable Energy Production' (attached to observation 44) - recognises the state's renewable energy obligations and the potential for WE to provide an alternative income stream for host farmers, but also sets out key policy measures required to support local communities living in the vicinity of WF projects.
- European guidance does not allow a residence so close (i.e. within 500m) of a wind turbine.
- The applicant makes reference to IWEA Best Practice Guidelines. This a private association operating on behalf of the Wind Generation Industry. Best practice guidance should be issued by a national state body.
- Note 'Heritage England' publication 'The Setting of Heritage Assets Historic Environment Good Practice Advice in Planning' regarding totality of context
- Irish planning law and Irish Constitution protects citizens from inappropriate development.

Dependent on subsidies

- Offshore windfarm concession in Netherlands awarded to DONG Energy to build Borrssele 1 and 2, with an average bid price (excluding transmission costs) of €72.70 per MWh during 15 years, which is less than the REFIT subsidy to Irish WE of €80 per MWH.
- Government policy is moving to support wind energy offshore (http://www.dccae.gov.ie/energy/SiteCollectionDocuments/Renewable-Energy/20140204%20DCENR%20-%20Offshore%20Renewable%20Energy%20Development%20Plan.pdf) and (the DCCAE) are implementing an SEA process for Offshore wind power.
- Subsidies have distorted the market - demonstrated by the fact that over 75% of Co. Meath has been deemed suitable for WF development. Unsustainable
- REFT is a scandal, set up to drive profits for private companies. ESB, EirGrid, EU Commission and UN all commented that 20-20-20 climate change framework is

immoral, unethical and unworkable. Ireland is oversupplied 150% of electricity generating needs and EirGrid says we can't take any more renewable power.

- REFIT 2 cannot apply to this proposal
- It defies logic that the government can fund development that will devalue people's property values and adversely impacts on its people (e.g. leads to the physical and mental abuse of therapeutic riders at RDAI).

Summary of issues raised relating to impact on material assets

Tourism assets

- Impact on heritage tourism and future economic development of the region and its heritage and tourist locations / sites, including Ireland's Ancient East Tourism product (undermining of Failte Ireland's tourism strategy) - Kells, Tara, Loughcrew, Brú na Bóinne, Headfort House, Tailtean Games and numerous other sites.
- Newgrange attracts c.132,000, Battle of the Bóinne c.62,000, Knowth 54,000, Hill of Tara 9,000. Generates €44m for Meath. 200,000 tourist-employment in Ireland, c.137,000 employed in accommodation and food service sectors. The future sustainability of Irish Tourism is related to the scenic quality of its landscape, with 80% of overseas visitors rating it as an important reason for their trip. Newgrange is most visited site in Ireland according to 'Irish Central'. 435,000 visited Tayto Park in 2013. Landscape is the cornerstone of the tourist industry.
- World renowned landscape, the attractiveness and integrity of which are central to Ireland's tourism industry' noted in NSS.
- WEDG requires developers to assess impact on tourism and recreation activities and to consult with Failte Ireland. The applicant should provide the result of the required consultations.
- Impact on 300 acres zoned for tourism development at Kells on elevated site at Lloyd adjacent wind farm would be jeopardised.
- The whole picture of what this rural community represents needs to be taken into account, not just focusing on 2020 targets or the needs of the developer.
- The proposed development would not economically or environmentally justify the damage to the tourism potential of the region.
- Impact on local B&Bs and other tourist accommodation, restaurants and local businesses, etc., that rely on tourism.
- Importance of tourism for economy and employment has been increasing in recent years, worth €7.5bn in 2015

- Wind Farms rely on government subsidies and other government interventionist (risk mitigation) to be economic, which do not consider the externalities - e.g. impact on tourism industry, tourism jobs and impact on quality of life issues or local communities.
- Survey by 'Visit Scotland' found visitors less enthusiastic about wind turbines than expected, contradicting findings by British Wind Energy Association and Scottish Renewables Forum. 15% said they'd steer clear of an area with wind development, equivalent to a loss of 3,750 tourist-related jobs, 430,000 trips and 80m revenue. Additional 10% indicated they be less likely to return to Scottish countryside - total equivalent to loss 6,250 tourist-related jobs, 780,000 trips and c.£140m lost revenue
- Claims that it has been proved that tourists do not tend to make return visits to places blighted by turbines.
- The WEDG 2006 note that tourism and recreation underpin the local economy.
- Indirect impact on tourism from construction traffic
- Neutral impact - Claims that there would be no adverse impact on tourism. E.g. of Rock of Cashel and WTs which coexist without any negative impact on culture or tourism.

Property value

- Devaluation of property (e.g. from visual impact of WT from the properties concerned) far beyond the lands under the control of the applicant, with no compensation.
- Indirect impact - devaluation of property will decrease the opportunity to get a loan as a greater area of land will be required as loan security.
- Indirect impacts and cumulative impact on property value - uncertainty - forms part of Greenwire Project; a grant of permission would set precedent for further stages and / or for other developments of this nature. 10-year permission period adds to uncertainty. Evidence of sales already fallen through.
- Recognition of adverse impact on property value in other jurisdictions - Danish government introduced statutory compensation scheme; Ontario Supreme Court accepted that impact of up to 50% of value (Wiggins v. WPD Canada Corporation, 2013 ONSC 23, 24, 2650 (CanLII)). A real threat to property value and economic interests far beyond sites under the control of the developer.
- Principles laid down by Supreme Court on compensation for electricity infrastructure in ESB v. Gormley [1985] I.R.129 in Underwood v Dublin Corporation {1997}1 IR69, but proposed development not directly comparable as it is intermittent and unreliable form electricity production.

- Estate agents / auctioneers estimated devaluation of property in the region of 25-50%.
- London School of Economics - 11% decrease in property value within 1.2 miles (12-year period and >1m sales, dependent on visibility. E.g. Romney Marsh, Kent).
- UK Courts upheld house valuations in Lincolnshire (for purpose of rates) had dropped by 25% due to proximity to WF.
- Applicant's reference to other WFs including Little Cheyenne Court, Romney Marsh, UK, to support assertion of no property value impact over 5km radius. Not comparable - LCC is limited to 110m in height and is concentrated on 4km2, with the nearest settlement c.1700m away. Using property values over 10km diameter area dilutes the overall impacts.
- Applicant chose an American study to dispute impact on house value, ignoring a multitude of other studies proving otherwise. €5000 will not compensate for loss of house value. Hush money.
- Will effectively sterilise the lands surrounding WTs from future residential development, within 500m. E.g. for one observer this effects 78.5ha, affecting property value, or greater if a larger setback is considered given the scale of the WTs. Depopulation. Impact on land value.
- Developer offered observer €5000 to sign up straight away. If there are no impacts why would they offer money?
- Monetary gains to landlords and local authority must be offset against monetary losses to others, including loss of property value and potential damage to tourism.
- It is essential that 3-5 comparable sales are provided for any one asset, therefore at least 50 comparables are required to reasonably back up the applicant’s claim that values are not affected by WTs.
- Insufficient information for public to assess likely significant effects on their properties. It is essential that 3-5 comparable sales are provided for any one asset, therefore at least 50 comparables are required to reasonably back up the applicant's claim that values are not affected.
- Contravenes our legal, natural, constitutional and unenumerated rights in relation to property and proprietary rights.
- Trespass zoning - developer effectively acquires property interests at below market value.
- Externalities - Loss of house value to facilitate direct financial benefit of large private company
- No peer reviewed studies to prove negative impact.
- No property devaluation experience in Cavan near WF

Traffic and transport network

- Adverse impact on the condition of the rural road network from construction transportation and large vehicles / HGVs.
- Obstruction of access to landholdings and local residences over period of construction.
- Impact on bog roads.
- No autotrack analysis provided to demonstrate that access to sites and along the road network can be accommodated.
- Discrepancies between truck movements predicted and the truck movements that would be required for the actual quantities of concrete required for wind turbine bases, hardstanding areas, crane setup areas and works around culvers or road crossings and back filling of trenches.
- Specification 804 type material is required according to DoE, whereas type 803 is found in the subject pits, requiring the materials to be sourced elsewhere and imported, increasing HGV on the network during construction. Concrete batching plant is too small and will require import with increased HGV movements.
- Traffic impact will last 10 years (application for 10-year permission).
- Failure to take account of 3 culverts between Lobinstown, Knock Cross and Wilkinstown and other possible inaccuracies. Impact on existing underground service (telephone) not mentioned. Potential encroachment of works on third party lands, including MCC, Eircom and Íarnród Eireann without submission of comfort letter. Line Road and Bog Road & network in Fletcherstown
- Works to Ardlonnan Bridge and Stephenstown junction fall outside the red line boundary contrary to A.22(2)(b)(i) of the Planning and Development Regulations 2001-2013.
- Aviation - on flight path to Dublin airport. Have IAA and Aer Ríanta been consulted?
- EIS suggests that increased traffic is negligible, but the junction with the N52 is lethal, with many accidents, which will be of increased risk with construction vehicles.
- Will not be able to fly planes above the family farm.
- Positives - will result in road improvements being carried out.

Agricultural assets

- Direct loss of agricultural land.
- Obstruction of access to landholdings; impact on drainage and local water supply; impact of noise, health and shadow flicker on farming activity in local communities.
- Adverse impact on organic farming status (including 'Boyne Valley' food group).
- Will obstruct future development of farm holding, with wind turbines restricting the opportunity to obtain planning permission.
- Sterilisation of farm from future development, including houses for family members in farming
- Specific potential adverse impacts on free range egg production farm - (i) noise limits of (day) 45dB(A) - (night) 43dB(A) at distance of 370m would be detrimental as hen is sensitive to 13.9dB(A); sudden intrusive noise will disturb hens and cause excessive rejection of their eggs; stress from WT noise, low frequency resonance and infrasound (nearest WT is within 120m)will impact on hen's desire to range; stress is common reason for free range hen flocks to be terminated; stress - increased flock mortality (e.g. from peritonitis), induced loss egg production, reduced egg size, reduced egg quality, increased cannibalism, increased fright sensitivity, hen panic. (ii) shadow flicker - not properly addressed and SF modelling does not relate to the conditions of the site. Hens have different and better vision than humans (due to eye physiology) and are sensitive receptors and will be affected by SF (similar to the way of noise). (iii) Ice - ice throw could hit hen house and cause panic. Would have debilitating financial effect on business and on the health and welfare of the hens.
- Concern about impact on health and welfare of farm animals and farmer / farm workers / families, including risk arising for farmers handling cattle due to risk of stampede by startled animals (IFA and Teagasc can provide no reassurance regarding potential risk).
- Stress to housed animals and spooking of cattle.
- Concern about the effects on bees, as a bee keeper
- Concern for the potential spread of 'black leg', an acute, febrile, highly fatal disease of cattle and sheep caused by clostridium chauvoei. It is particularly prevalent in Co. Meath.

Equine industry

- Adverse impact on equine industry and on recreational horses.
- Impact on Kells Riding for the Disabled Association Ireland (RDAI) / Kells Equestrian Centre for Therapeutic Riding and Equine Assisted Learning

Programmes, which has 40 riders and c.40 volunteers at Kells Equestrian Centre, Carlanstown. Many of the riders have autism or epilepsy and will be seriously affected by vibrations, low frequency noise (LFN), shadow flicker and the visual impact of rotating blades. Kells RDAI has been providing therapeutic riding for positive health and wellbeing of hundreds of children and adults over 20 years. Extreme difficulty would be caused to many people in the Kells area if the application is granted. 1.3km distant.

- Impact on significant equine industry in and surrounding Carlanstown including Tara Hill RS (Carlanstown), training gallops at Oristown House (within 2116m of T5) and other gallops within 248m of WT4 and 294 from WT3, and many others not included on any map. Also may prohibit the fostering of horses on lands within the vicinity.
- The Irish Racehorse Trainers Association is concerned about the impact on a number of racing stables in the vicinity given the importance of racehorse trainers in the economies of many rural areas, which may result in reduction in future owners and future training facilities.
- Meath has 2nd highest number of licensed trainers per county (62no.) and is an ideal location for thoroughbred horses due to rich lime soil. Shadow flicker and turbine movement within a horse's direct range of vision will spook / startle the horse to take flight, causing grave concern for safety of horse and rider. May result in horses being withdrawn from the training facilities with huge loss of earnings and jobs. Also impact of sleep disturbance of trainers and animals through noise, infrasound, strobing and shadow flicker.
- Ireland is the third largest breeder of thoroughbreds in the world, accounting for 40% of the EU output an 11% world output. 17300 odd people are employed in the industry in Ireland. Gross value exceeds €0.9Bn. T
- The equine industry which employs 14,000 people directly and thousand more indirectly, contributing €1.1bn to economy
- Risk of 'acquired flexural deformation of the distal interphalangeal joints in foals' - link established between presence of wind farm close to a breeding facility.
- Impact on Tara Hill Riding Club based on Kells Equestrian Centre, Carlanstown - international studies indicate that horses are affected detrimentally by WT and there hearing is far more acute than that of humans. The Riding School will therefore be compromised and may not be able to take place.
- p.60 of EIS states there is no potential for SF on Carlanstown - does this also relate to the RDAI Kells?
- Ice-throw risk to humans and horses
- May result in inability to get insurance cover which is mandatory condition for Turf Club horse trainers license.

Other businesses

- Nursing home (Mullaghbawn) at Dowdstown House - impact from T10, T11, T12 and T13 - shadow diagrams attached to observation show impact of WT in blocking evening sun from the southwest and cause shadow flicker.
- Film industry - use of area as historical film setting would no longer be feasible.
- Impact on preschool at Castletownmoor which is also attended by children with ASD who are very sensitive to light and sound.

General economy

- Serial WE applications are undermining investment in Kells.
- Impact on telecoms - applicant submits that it can mitigate the adverse impact from WTs on telecoms, but does not mention any consultation with Sky Broadband provider. This could impact on people's ability to work from home and the development may actively stop the community from working.
- Water infrastructure - Concern for impact on drainage and on local water supply (generally in agricultural context)
- Negative - does not believe there will be any local jobs or benefit to the community or to people generally

Neutral / positive impacts

- Practising veterinarian in an area of wind farm development (Drimoleague found no visible evidence of an adverse impact on farm animals. No evidence of impacts on farm animals.
- Enables land of poor quality, unsuited to agriculture, to beneficial use; Steady alternative income stream for landowners / farmers; Farmers spend their money locally and wind farm earnings will therefore benefit local area.
- Will enable Meath to attract multi-national companies such as Facebook Data Centre (in Clonnee) which stipulate that its energy requirements must be met by renewables.
- Continuous annual stream of income (based on MW output) donated to local community organisations and clubs; including the educational benefit scheme. Community Development Fund; local community enterprise funds. Potential for €80,000-€85,000 p.a.

- Substantial rates income for Local Authority
- Will directly provide much needed jobs - temporary during construction and permanent during operation and is to be welcomed by contractors, etc., with positive impact on population by keeping young people employed in the area. E.g. quarries, engineering firms and also B&B accommodation will be required during construction.
- Will indirectly provide spin off income and jobs - e.g. for civil engineering and agricultural sector; would provide security in jobs in local businesses and is welcomed by contractors, etc.
- Positive economic impact for community, county and/or country; will enable the rejuvenation of North Meath
- Positive impacts experienced elsewhere - e.g. on population in vicinity of Gortnaneane due to the extra funding coming into the area from the wind farm. Positive experience of Bailieboro, Co. Cavan, including improved local infrastructure local sporting and community funding. Similar experience in Poland.
- Opportunity to develop a renewable energy industry based on wind - positive spin off.

Summary of issues raised relating to impacts on human beings

Residential amenity

- Adverse impact on residential amenities and quality of life of large population (rural and villages) due to size, scale and proximity of industrial wind turbines, and consequential noise and visual impact on landscape setting and tranquillity. Inadequate setback of wind turbines from and surrounding / overpowering of people's homes, in addition to proximity of substation and associated development.
- Noting Board's reason for refusal on PA0038 (contrary to WEDG), although the applicant increased separation distance from settlements of Moynalty, Castletown and Lobinstown, reducing the number of dwellings within 1km from 416 to 135, the impact on Carlanstown, etc., unchanged. Board's refusal reason therefore still stands.
- Impact on population - future development and investment within area will be severely curtailed, with loss of jobs and schools and will effectively sterilise lands surrounding wind turbines and dissuade young people from living locating, resulting in depopulation / population decline.
- Under representation of the population of Kells, Carlanstown and Moynalty in the NTS, thereby reducing apparent predicted impact in the EIS. The scale of human

impacts must be related to the size and proximity of the local populations. S.10.2.1 of the EIS seriously understates the population size, with reference to the populations figures by area available on AIRO and therefore underestimates the human impact of the proposed development.

- Inadequate assessment of impact on residential amenities and provides insufficient information for public to assess likely significant effects on their properties
- Minimum 500m separation distance not provided from blade tip to dwellings, or from private residential amenity space. Concerns raised about proximity to specific dwellings.
- Impact on private outdoor amenity space / garden and its enjoyment for family use.
- 224 wind farms built in 23 counties are built outside of communities. Why is this community unimportant?
- Impact of wind turbines located on absentee landowners' lands (such as at Fletcherstown), or on landowners living at a distance from the proposed wind turbines means there is little or no impact on landowner (or developers). 80% of landowners not resident in this area. Inequitable.
- Contravenes our legal, natural, constitutional and unenumerated rights in relation to peaceful enjoyment of family home and family rights.
- Impact on people with certain conditions, living in proximity, who would experience increased impacts from development. E.g. Observer's daughter has Meniere's disease (incurable inner ear disorder), her other daughter has Asperger's, her son has vertigo, her other son suffers from migraine and two other members suffer from mental illness, including schizophrenia. People who suffer from headaches, etc.
- Precedent for refusal - pl16.227098 overbearing impact on residential property; PL23.238184 impact on residential amenities through visual impact and noise cumulatively with other development contrary to WEDG; pl04.204928 injury to amenities having regard to landscape and pattern of residential development notwithstanding within designated strategic search area.
- Why is the applicant offering €5000 to soundproof house if there is no noise issue?
- Noise will have greater impact on common dormer bungalows than other type house designs due to their design.
- Claims that these super turbines can be heard over large distances (8-10 miles).
- The WEDG 2006 will not protect farmers from claims in the High Court for noise nuisance, injury-based actions and devaluation. E.g. of Supreme Court of Justice,

Portugal, decision no.2209/08.oTBTVD.L1.S1, 30, 31 May 2013 which ordered the removal of a wind farm.

Noise impacts - general annoyance & loss of amenity

- Adverse impact of invasive noise (including LFN and infrasound) as nuisance on large residential population within proximity (inadequate setback), over large area of dozens of square km. Adverse impact on residential amenities and concern that people will be forced from their homes by noise impact.
- Nature of noise increases impact - thrumming, thumping, repetitive sound etc.
- According to 'Audiology Today' July / August 2014 research shows annoyance from wind turbines at 35dBA, almost 10dBA less than the night-time proposed operating noise levels, correspond to the annoyance reported to other common community noise sources at 45dBA. The level of noise will be 10dBA above background levels, equates to at least a doubling of intensity.
- Noise impact extends up to 2km from wind turbine.
- Loss of amenity of places of worship, areas of entertainment, the peaceful countryside and other noise sensitive locations from noise impacts
- Impact should be viewed in context of existing baseline noise levels are very low as there are almost no existing noise sources in this quiet peaceful rural area.
- Wind turbine noise emitted (in a combination of mechanical and aerodynamic) is generally in the range 35-50dBA, which is comparable to indoor background noise. Perception of this noise differs between people with some finding it undesirable or unwanted (Australian Government NHMRC, 2010a).
- Noise levels will exceed 43dBA

Noise impacts - sleep disturbance

- 35-50dBA WT noise can be associated with sleep interruption among people living within 2.5km.
- Concern about annoyance, interference with sleep, impact on concentration, stress at people's homes.
- Will be unable to sleep with windows open in summer and occupants will have to choose between fresh air and noise disturbed sleep at night.
- Report by Dr Chris Hanning of The Society for Wind Vigilance, 'Wind Turbine Noise, Sleep and Health' (April 2010) - 'weight of evidence demonstrating impacts on sleep quality and health of wind turbine noise from existing installations... [and

accordingly] that present guidance to determine setbacks is inadequate. .... RIVM and WHO reports and draft DTI/HMP report confirm the potential for noise to adversely affect health through sleep disturbance and set maximum permissible noise levels which are less that those permitted by ETSU-R-97' standard which is 'inadequate to protect the sleep of residents living close to wind turbines.'

- Reported sleep disturbance is an insufficient indication of sleep disturbance, with the impact of unreported (and unremembered) arousals from sleep resulting in sleep fragmentation to be the more critical indicator, likely to be more common and insidious with consequences of fatigue and elevated blood pressure.

- New Zealand limit of 40dB(A) is to prevent severe annoyance, not prevent inaudibility and Thorne (2010) concludes that unreasonable noise occurs above 30dB(A) and states a limit of 30dB(A)L95 in conditions of low wind speed at dwellings and modulation restricted to 3dB.

- Based on the recommendations from various physicians and engineers, and WindVOiCe survey data, a minimum setback of 1.5km is appropriate.

- There is a large body of scientific information showing ETSU-R-97 methodology is in need of adjustment for wind shear and excess amplitude modulation and cannot be relied on by planners.

- overall conclusion - appropriate mitigation of sleep disturbance and annoyance from industrial WT noise is a maximum external turbine noise level of 35dB(A) or a setback of at least 1.5km (Hanning, April 2010).

- Section 5.6.1 of WEDG aims to 'seek to achieve a balance between the protection of residential amenity of neighbouring communities in the vicinity….and facilitation of the meeting of national renewable energy targets'. Sleep is a human right not an amenity and cannot be protected by a 40dB absolute limit.
- Experience of small turbines at wind farm in Bailieborough that noise not noticeable during the day but is similar to having a small fridge in your bedroom.

Noise & LFN - sleep disturbance and indirect health impacts

- Professor Emeritus Alun Evans (copy of submission to OH PA0038, 25/06/15) - Serious adverse noise-related health effects on people within 2km is the emerging international consensus. Consequential health effects not monitored in Ireland. Irish Deputy Chief Medical Office, Collette Bonner has indicated that there could be some substance in 'the Wind Farm Syndrome'. Australian NHMRC report has stated 'evidence ... suggests that there are unlikely to be any significant effects on physical or mental health at distances > 1500m from WFs.' The Australian Senate Special Committee recorded its concern with the issue of wind turbine emitted infrasound and low frequency noise (LFN) and the possible impact on human health and considered independent, multidisciplinary and high quality research into this field to be an urgent priority. Setback in Northern Ireland is 10 X height; France 1km;

- Consistent relationship between distance from wind turbine and human distress found by Lynn & Barker review of peer-review journal published studies.

- Major adverse health effects of wind turbines seem to be from sleep disturbance and sleep deprivation from loud noise in auditory range and LFN, particularly infrasound, which is propagated over large distances and penetrates and is possibly amplified by the fabric of dwellings and persists long after higher frequencies have been dissipated.

- Sleep deprived are vulnerable to a variety of health problems, particularly cardiovascular and a range of chronic illnesses, is associated with increased body weight in kids, reduced learning, memory and brain volume.

- The expression in a large range of genes is affected by sleep deprivation of fairly short duration, which may explain why the health effects of sleep deprivation are so diverse, such as the cluster of symptoms comprising Wind Turbine Syndrome (sleep disturbance, fatigue, headaches, dizziness, nausea, changes in mood and inability to concentrate).

- Three outer hair cells of the inner ear are more responsive to low frequency noise and transduce infrasound from wind turbines and transmit it to the brain resulting in sleep disturbance. The effect of infrasound and LFN is exacerbated by sound insulation properties of building envelope, with and mid to high frequencies attenuated to a much greater extent than low frequencies. When measured using tool that can detect it (using linear rather than A-weighted scale), infrasound and LFN are disturbingly high with sound power level greater than previously through possible and interferes with the micro-mechanics of the human ear.

- Need health studies into effect on wind turbines on those living in vicinity.

- Larger wind turbines generate noise, infrasound and LFN far above what's supposed to be permitted. There is no reasonable doubt that industrial wind turbines generate sufficient noise to disturb sleep of those living nearby.

- 2009 WHO report on night time noise which said sleep disturbance is emerging as one of the major public health concerns of 20thC (affecting children and older people in particular). Sleep is absolutely necessary for normal physiological functioning of brain and body and to facilitate learning.

- Concern that Public Health Agencies (in UK) are relying on non-peer reviewed document (Salford Report on health impacts of Wind Turbines, April 2013), written by a group of acousticians at University of Salford, which derives a significant proportion of its income from wind industry which raises the question of their scientific objectivity.
- Uncertainty of infrasound and LFN and impact on sleep and health. Not dealt with adequately in EIS.
- WHO Guidelines for Community Noise (1999) sound pressure level of 30dB(A)$_{LAeq}$ should apply indoors to avoid effects on sleep, but special

consideration to be given to sources with LFN components which may cause disturbance below 30dB(A).

- H. Moller and CS Pederson study (2011) - as wind turbines increase in size the relative amount of LFN emitted is greater and is statistically significant for 1/3 octave bands in frequency range 63-250Hz and that it is beyond doubt that the LFN part of the spectrum plays an important role in the noise at neighbours.
- K. Bugler et al (2014) study in Royal Society Open Science - even when people don't hear wind turbines, loud LFN may be affect hearing.
- Dr Amanda Harry study - all but 1 of 14 people living near Bear Downs Wind Farm, Cornwall, experienced increased incidents of headaches, migraines, nausea, dizziness, palpitations, tinniture, sleep disorders, stress anxiety and depression. The Noise Abatement Society is commissioning further research into health affects related to LFN and infrasound from on-shore WTs.
- Dr Nina Pierpont - health issues arising from vibrations from wind turbines (vibro-acoustic disease).
- There is no reliable scientific, medical or engineering basis for dismissing the possible effects of infrasound, which the EIS acknowledges as present in the frequency spectrum equal to that of audible noise. No long term studies have been done on medical or environmental effects of infrasound.
- The reference to a 10-year-old UK study on infrasound is misleadingly quoted to give the impression that the WHO agrees with its conclusion that infrasound effects should be ignored. The same report presents evidence that infrasound effects are perceived at a much greater distance than higher frequency noise and are particularly prevent at night due to atmospheric effects.
- Refers to 59 individual studies on impact of noise on humans, including resulting in annoyance, stress and distress, loss of sleep, links to suicidal tendency, link to hearing loss, the impact of infrasound on inner ear and consequential health risks with reference to wind turbines, the impact of electromagnetic waves in the form of poor power quality (dirty electricity) and ground current impacting on electrically hypertensive people, contention that the quantity, consistency and ubiquity of complaints of consequential sleep disturbance in vicinity of wind turbines constitute epidemiological evidence of a strong link between wind turbine noise, ill health and sleep disruption, the need for further research to develop authoritative guidelines for siting of wind turbines such as to protect health and welfare, the experience of family and rural physicians in consequential noise and health impacts on communities and how such information could inform appropriate setback of wind turbines.
- The health impact concerns of people are written off as scaremongering. Potential impacts on people are not given the same respect and due diligence afforded to wildlife and historic monuments.

- The health effects of long-term exposure to low levels of low-frequency noise (LFN), which may also be generated by wind turbines typically in 50-70dB range, are unknown (National Collaborating Centre for Environmental Health, 2010; British Wind Energy Association, 2005). Some claim noise from wind turbines causes headaches, dizziness, unsteadiness, nausea, exhaustion, anxiety, irritability, depression, chronic sleep problems, anger, tinnitus and concentration and learning issues (Heagle et al., 2011), symptoms collectively referred to as wind turbine syndrome.
- Australian Government National Health and Research Council draft report, quoted extensively by Element Power at OH PA0038 and in the Emlagh application has since been finalised (August 2015) concluded that further research is required into the effects of human health from wind turbines. Premature.
- Other European countries are changing their minds regarding WE and moving towards other more efficient renewable energy sources due to public health concern. The Irish government should research alternative renewable energy solutions that don't pose such a risk to the general public.
- The Board will be aware of the decisions directing the removal of WTs in many European countries primarily on the basis of established facts regarding adverse impacts on human and animal health. The applicant is unable to provide cogent studies to dispatch health fears.
- Impacts on humans and animals are not fully understood.
- Health impacts arising from stress, from repeated applications for the WF and potentially from the development in operation.
- Specific concern about health impact from infrasound from 3 proposed WTs within 4km of home. Adverse effects of long term exposure include unexplained nausea, headaches, sleep disturbance and fatigue.
- Alleges that parents living near wind turbines have told observers of their direct experience of wind turbines causing major disturbance to health
- Inadequate assessment of health impacts of local people
- Studies show serious side effects from WTs. Over 70% of all studies carried out on health and nose issues from WFs shown a negative effect on health. The Board have a duty to protect people from such environmentally dangerous development.
- Concern about health impact on school in Nobber
- General concern about health and safety impacts on observers and their children
- The Department of Health, to Helen McEntee TD, recognises the need for additional well designed studies to measure health impacts of WTs. A letter from the Department of Health attached to observation 343 (which acknowledges the

history of study of noise induced respiratory pathology and vibro-acoustic disease which developed as a consequence of excessive infrasound and LFN exposure, studied as part of the USA and USSR space programs and also studies of flight attendants) states ' In conclusion, wind turbines do not represent a threat to public health. However, there is a consistent cluster of symptoms [the symptoms described in the literature include sleep problems, headaches, dizziness, exhaustion, problems with concentration and learning, tinnitus] related to living in close proximity to wind turbines which occurs in a number of people in the vicinity of industrial wind turbines. These people must be treated appropriately and sensitively as these symptoms can be very debilitating. Anyone who experiences such symptoms should seek medical advice from their family doctor'. A cover note by McEntee TD states 'where it states that WTs do not represent a threat to public health. This is true for the entire population. For those living away from the WTs themselves. Public Health taking in the entire country. Public health also refers to the use of Sustainable Electricity etc., which is good in the long term for the health of a nation/country.'

- Including from recurrent applications. Stress impact on individuals and whole community.
- Impact on people with pre-existing conditions: depression and sleep problems will be exacerbated.
- Stress resulting from impact on house prices and inability to sell property.
- The EIS acknowledges indirect effects of wind farms on human health - 'Indirect effects of wind farms on human health through sleep disturbance, reduced sleep quality, quality of life and perhaps annoyance are possible.' This possibility is unacceptable for people living in the area.
- Health and wellbeing and / or amenities of the community must take priority over private financial gain, particular financial gain for export.

Impacts on people with ASD

- There is insufficient research to show that the development will not have a detrimental impact on health and wellbeing of residents with Autism Spectrum Disorders and/or special needs. Infrasound has been shown to impact on ASD and the applicant has not provided any conclusive research to the contrary and has not conducted primary research on the basis that it would not be unbiased (of those people who live beside WTs, those who have benefitted financially have no problem in contrast to those who haven't). There are many people with Autism Spectrum Disorders, Asperger's, epilepsy, vertigo, dyspraxia, middle ear problems, Meniere's disease, sensory processing disorders and sensorineural hearing difficulties living in the vicinity of proposal (or with observes or family).

Concern about impact on people with special needs. People with disorders will no longer be about to live in the area. Traumatic and life changing impact on susceptible people.

- In UK, planning authorities have refused permission for WE facilities on grounds of people living with ASD in the area. There are many people with ASD in the area, with ASD schools in the area funded by the DoE (http://oem.bmj.com/content/64/7/480.short), and ASD pupils attending other schools and facilities in the locality. Health impact and impact on ASD is uncertain risk.
- Need for research and studies (on health and mental health, particularly on children and those with sensory conditions) before more development - Lack of up to date relevant research is obvious from OH to PA0038. Lack of environmental and health studies on wind farms generally and by applicant.
- Having discussed the issue of potential impact on of wind farms on ASD with the applicant's medical expert, Martin Hogan, concludes that his judgement is clouded by the fact that he is on the payroll of the company. He has no experience of children with ASD and has carried out no primary research on the area of concern.
- It is unethical that there are no provisions to do a study on the impact of wind farms on those with ASD, particularly given the anecdotal evidence.
- Will force those with sensorineural hearing difficulties from the area as WT noise will render hearing aids useless, at best, and at worst will cause untold pain in inner ear, also causing mental health impacts.

Shadow flicker

- Shadow flicker impact not properly addressed, with no independent analysis.
- Concern about shadow flicker impact on Scoil Mhuire, Carlanstown, in the classroom and outside. It should have been included in the assessment notwithstanding the >10R separation distance due to the number of pupils.
- Impact on those people with epilepsy, sensory processing disorders (affected by noise and lights), sensorineural hearing difficulties or other rare conditions (may affect seizures of girls with Myoclonic Epilepsy with photosensitivity and Jevons Syndrome with eyelid Myclonia).
- Impact of strobing.
- Objects to practice of paying those affected a nominal sum in addition to the close neighbour grant for landscaping as a means of silencing people.

- Impact of shadow flicker on St. Michael's GAA, possibly destroying the vibrant GAA community
- Disorientation caused by shadow flicker
- A health impact assessment of shadow flicker is required
- Shadow flicker impact on Nursing home (Mullaghbawn) at Dowdstown House and J. McCarthy's house c.500m turbines - T10, T11, T12 and T13.
- Impacting on external amenity space, quality of life and working from home.
- Inaccuracies on shadow flicker maps including location of dwellings.
- Previous queries on PA0038 regarding shadow flicker were not fully addressed in the Inspector's Report (p.60) because the HSE was satisfied the requirements of WEDG were met, but the Board refused permission on grounds that the proposal did not align with the WEDG. The issue concerned use of the ReSoft Wind Farm software, which could have been used to make an accurate individual assessment of shadow flicker but was only used to assess the impact on one window per property.
- Concern that shadow flicker is understated due to approach used by applicant (arising from oral hearing to PA0038)
- Shadow flicker impact increases with distance

Health Impact Assessment

- Healthy Ireland: A framework for Improved Health and Wellbeing 2013-2025' (DoH, 2013). Proposes whole-government and whole society approach, with effective co-operation and collaboration and implementation of evidence-based policies at government, sectoral, community and local levels, with each sector helping to improve health and wellbeing. Highlights that health risk factors of major diseases or determinants of health are modified by measures often managed by other government sectors. Refers to Health Impact Assessments of projects, programmes or policies as an example of inter-sectoral approach. The Government's commitment has not yet been reflected in the planning process. Advises that the Board require a HIA be carried out to identify positive and negative health impacts in a systematic and coherent way, or an integrated Environmental and Health Impact Assessment.
- The Marmot Review: Fair Society, Healthy lives' (2010) submits that reducing evident health inequalities is a matter of fairness and social justice. The wind farm has the potential to widen the gap and increase the burden of health inequalities which the Government is trying to reduce through 'Healthy Ireland'. This will result as there are those who will gain financially form the development.

- More expansive health consultation - The developer should consult with more than just the regional office of the HSE, but with its relevant divisions including the Health and Wellbeing Division, Mental Health Division and Social Care Division to gain a better understanding of how the project can influence quality of life.
- Health impact assessment of population within vicinity required.

Other impacts on human beings and residential amenities

- Multiplicity of accesses will result in high level of disturbance to local residents.
- Disruption to the community during and after construction.
- Noise from construction and construction traffic - from 7am - for months
- Impact on properties fronting onto N52 and will be adversely affected by construction traffic.
- Vibration impact on houses built on soft bogland from construction traffic
- Construction impacts - Serious adverse impact on property proximate to borrow pit and construction access road, resulting in vibration, noise, dust and impact on well water supply over 15-18-month period. Mitigation / limitation of construction working hours in the EIS is ambiguous. How will impacts be monitored - does the EPA do it? Does the objector have to get an injunction if levels exceeded?
- Light pollution at night

No negative impacts on residential amenity or health

- Personal experience (from visiting and talking to locals, or living near wind farms) or otherwise that they have no negative impact on residential amenity, quality of life or health from noise or shadow flicker or any danger (Cavan, West Cork, Mount Lucas, Monahincha, Ireland and Europe (including within 500m), UK (within 1.5km), Dundalk IT (DKIT) WT 350m from dwelling), Gortnaneane (living and working in vicinity for 10 years), Bailieboro and Canningstown, Lisheen Mines, Tara Mines and Poland. They make good neighbours. Concerns disappeared once built.
- Irish planning law and Irish Constitution protect citizens from inappropriate development.
- Noise Neutral - wind turbine noise not intrusive (e.g. of Lisheen Mine WF) unless beside them on daily basis, in which case you would become accustomed.
- Negativity arising from misinformation from local posters and hearsay about impacts from noise levels, visual appearance and falling property prices.

- If there were impacts from noise, health and property devaluation there would be protests by local communities in those areas where they have been built.
- If there were any risks associated with Dundalk IT wind turbine, it can be assumed that the college authorities would not have allowed its construction.
- There are no health risks for wind turbines as there are with many other energy producing projects
- New wind turbines have a noise factor below that of the environment where they are being installed.
- Won't be heard in Kells due to background noise associated with towns.
- The Board's decision PA0038 accepted that there would be no negative impacts on people through noise and health.
- The applicant has agreed to no shadow flicker occurring on any residence through mitigation by setback and use of software.
- Scaremongering or misinformation spread about potential adverse impacts (health and otherwise) arising from noise and shadow flicker, not based on fact. None of the issues have peer reviewed studies which prove adverse impact.
- Benefits far outweigh health and safety risks.
- Health studies conducted worldwide are conclusive that there is nothing to fear from wind energy.

Safety issues

- According to the Occupational Safety and Health in the Wind Sector, European Risk Observatory Report, the following are operational issues with wind turbines - tower collapse, blade failure, tower strike (when blade hits support tower), fire, lightning strike, but also states 'ice throw / fall from blades can be extremely dangerous, particularly for operators and maintenance stall, with fragments of ice up to 2m long being thrown distances of over 100m (Morgan et al., 1998; Harsh Weather Testing Network, 2012; Sieffert et al., 2003).
- Vestas employees are not permitted within 400m of a wind turbine in motion.

Community and social impacts

- Visual impact will depreciate the social capital (facilities, parks, sports clubs, etc.,) and sense of community
- Indirect impact on GAA and other existing sporting and other institutions which are already under pressure from consequential depopulation.

- Direct impact on sports club facilities - visual impact on rural setting, shadow flicker and noise (e.g. Rathcoinnig GAA, St Michael's GAA, Blackwater Football Club, North Meath RFC, etc.)
- Divisive in the community - adverse impact on community spirit, causing rancour between neighbours and within families.
- The whole picture of what this rural community represents needs to be taken into account, not just focussing on 2020 targets or the needs of the developer.
- Concern for suicide risk of vulnerable at-risk individuals
- Severe impact (visual, noise, SF, WTS) on Scoil Mhuire NS, Carlanstown, within cluster of WTs 1-5 inclusive, with WT1 and WT2 within 1.5 and 1.915km respectively, by reason of number of height and size of wind turbines. Impact on Roscrea school near Monaincha WF (referred to in OH PA0038) is located at a considerable distance, is not visible from that school and is not comparable.
- Community gain - Does not arise as GAA clubs of Meath rejected €375,000 offer from Element Power for the Centre of Excellence at Dungany as it would be paid for by the rural community living with the industrial WTs.
- Impact on the natural habitat of local people should take precedence over impact on animals' natural habitats protected by Europe.
- At PA0038 the applicant was unable to identify a single community project prepared to accept funding from the developer.

Positive community impacts

- Continuous annual stream of income (based on MW output) donated to local community organisations and clubs and charity groups. This will benefit residential amenity of the area.
- People's concerns are being manipulated by people with a political agenda.
- Concern that permission could be refused as a result of pressure from misinformed public and misguided politicians.
- E.g. funding of development of the Deer Park outside Carlanstown, GAA and local athletics
- Population of county Meath - has dropped 7% since 2009 due to emigration, high compared to the national average. This development will enable the reverse of this trend and give hope to local families that their children can return.
- Divisions in the community have been encouraged by opponents to the project.

Summary of issues raised relating to landscape and visual impacts

General

- Severe adverse long-term impact on rich historical rural landscape and heritage (including Kells, Carlanstown, north Meath and Moynalty) - due to height, size and scale of WF and WTs, industrial nature of WTs on a flat rural landscape without screening. Not in keeping with rural landscape, where MCC restricts height to 7.5m. WTs completely out of scale with landscape. Visual impact on landscape by reason of scale. Out of scale and unsympathetic to landscape. impact on Rosmeen, Oristown, Nobber and surrounding areas also. Completely unsympathetic and destructive of landscape. Would be one of the biggest WF in Ireland by virtue of WT size and height and 85MW capacity. Equivalent to 53 storeys tall. Visual impact exacerbated by motion of blades. Eyesore. General loss of amenity through visual impact. Also flashing red anti-collision lights.
- Scale of impact - WTs 20m higher and area covered is 331,000m2 compared to 220,000m2 for Mount Lucas WF. Will have a much greater visual impact than Mount Lucas
- Low wind speed areas required massive extra swept areas and taller WTs and therefore the name plate capacity does not represent the scale of the large swept area to power capacity ratio.
- Would be largest WF ever constructed in Ireland in terms of Name Plate Capacity.
- >15 WT visible from Borora Crescent Estate, Carlanstown. Proximity of WTs 1=5 (1325m - 2850m) to houses in Carlanstown ((in general and the Village Green estate).).
- Push to meet renewable energy targets should not take precedence over protection of landscape.
- Board recognised the unsuitability of proposal which would visually dominate this populated rural area, on relatively flat farmland, not envisaged by the WEDG.
- Concern regarding cumulative landscape impact of future WF proposals currently being planned but not yet finalised.
- Change from rural pastoral landscape to an industrial one; or from residential to industrial.
- Near and imposing visual impact on Castletown Village, ugly and unattractive visual intrusion.
- The Board's refusal on PA0038 recognised that the local concerns for impact on rural heritage, considering that development to significantly exceed the landscape's 'medium potential capacity' to accommodate WF development as set out in the LCA in the MCDP. Reasons still stands.

- The EIS makes reference to the County Meath LCA in support for the WF location, but this LCA was carried out in 2007 when WTs height was expected to be considerably less than 169m and the LCA methodology was subject to considerable criticism and discussion during the drafting of the National Landscape Strategy and the LCA is of questionable fitness for purpose. Premature pending adoption of NLS
- New LCAs are to be drawn up in accordance with the National Landscape Strategy Actions 2, 3 and 4.
- Contrary to the objectives of the National Landscape Strategy
- Largest WTs in the world have not place in a small rural village and would be totally out of character.
- Impact on unbroken landscape with visibility from Lough Crew to Hill of Lloyd, to Tara, Newgrange, the Hill of Slane, Lough Crew and Brú na Bóinne (& etc.) and into the whole midlands area within Historic Landscape Characterisation (HLC) category. The hills are low but afford distant panoramic views from and to the hills as places of eminence up into modern times.
- There is nothing in Board decision on PA0038 to suggest that Castletownmoor lands are less sensitive to the negative impacts associated with the WF than those lands now omitted, or that they had greater capacity to absorb the impacts on landscape or cultural heritage.
- The Board's reason for refusal under PA0038 on grounds that 'the impacts of the proposed development on landscape and heritage, would not be acceptable in this location', still stands.
- Kells & District Tourism Network submit that care for landscape should not hinder good development, but development carried out should not hinder these views and landscape patters in any way.
- No information on make and model of WT. P.3 of Planning Report indicates that, notwithstanding this, the WF will have capacity up to 85MW. How can public make informed decision on impacts of WTs on landscape without this information.
- Statements on landscape, visual and cumulative impacts (s.5.10 EIS) lack independence and are open to contradiction. Predicts some minor visual clutter and scale ambiguity close to interconnector route, very localised and within a robust landscape. Eirgrid's own application for the Interconnector predicted the residual unavoidable impacts will include adverse effects on landscape character. The applicant clearly failed to undertake an objective cumulative impact analysis of the proposed WF and proposed Interconnector 400kv EirGrid powerline, or to even examine EirGrid's own planning application in this regard.
- Cumulative visual impact of WTs and proposed Interconnector in townlands of Mountainstown, Dowdstown and Fletcherstown, etc.

- Visual impact on Carlanstown, Castletownmore and Kells unchanged compared to previous refused application PA0038. Industrial and detrimental
- LC POL3 concerns protection of archaeological heritage, setting and amenity of Tara landscape, Loughcrew and Slieve na Calliagh; CH OBJ 8 concerns protection of archaeological landscapes.
- Failure to zone county for wind energy development but to rely only on the LCA maps is contrary to the WEDG 2006. Format of layout is of questionable adequacy to enable public participation in the development plan process and questions whether or not action 17 of the National Landscape Strategy was complied with in use of UK consultants. Concludes that no it doesn't and that no one was aware of the proposal to designated their district as 'medium' potential for WF development.
- Submits that existing LCA's are not fit for purpose but require new methodologies to address heritage issues and issue of 'boundaries' to landscapes, especially on flat landscapes
- Regarding Brú na Bóinne, Slane and Tara, these features, both in and outside the WHS, are interrelated and for a continuous history of over 6000 years - it is against this baseline that any change must be evaluated (Doug Corner). Much of Ireland's intangible national cultural heritage is rooted in this region, which was untouched by direct Roman influence, where Celtic culture persisted centuries after eradication in Britain and Europe. Tied to High Kings, to St Patrick and conversion to Christianity.
- It is useful to think of cultural landscapes as ideas embedded in a place, and to consider the recording of cultural landscapes as exercises in cognitive mapping rather than physical mapping…. cultural landscapes thus offer both identity and continuity - the living past in tangible form' (Julian Smith, World Heritage Papers no.27 Managing Historic Cities, 'Marrying the old with the old in historic urban landscape')
- Scale of WTs / WF - 'Wind Energy: International Practices to support a community engagement and acceptance' (SLR Consultants, February 2014) - Trade-off between scale and acceptance. Experience in Denmark appears to confirm observations from Irish experience that there appears to be a generally negative correlation between the scale of wind energy projects and a decline in community acceptance. If scale is required to achieve targets (both for decarbonising and economic) it should be recognised that this will necessitate a new approach to energy policy involving exchange investment in social engagement so that suitable projects are generally found socially acceptable. The Board should to take the size of the WF into perspective within a mixed geography of agricultural and residential lands.

- The county council has required the removal of chimneys 4.5m-high to proposed dwellings and to cutback hedging for the reason of visual impact, in an area where 169m high WTs are proposed.
- Density scale is far in excess of current norms for such development in this country.
- Experience from WFs in Texas is that they are of a huge scale and totally incompatible with the scale of the Irish country side.
- Under PA0038 the Board considered the outdated WEDG did not envisage the construction of such extensive large scale WTs in such an area.
- London School of Economics - People value natural landscapes and are willing to pay to preserve them. Reducing the amenity value of nature … constitutes a real economic cost that needs to be taken into account. Turbines should not be allowed in areas of outstanding natural beauty or of high ecological value, or, more generally, in any area where the full economic value of the local environment is very high.
- Visual impact on property 188
- The photomontages illustrate the devastation that the WTs will bring to Kells (Church Street) and also Lloyd's tower, and Carlanstown.
- Having regard to the WEDG 2006, the description of the landscape is completely inaccurate and is actually 'hilly and flat farmland', not 'flat peatland'. The extent of bogland in Emlagh is only 1.2km2 and not one WT is sited on bogland. The WEDG are flouted by the development based on the actual landscape type. The credibility of the Stephenson Halliday Report in the EIS is therefore questioned. The Board referred to as Hilly and Flat farmland in its reasons for refusal under PA0038. Considers wilful misrepresentation of LC and statutory planning regulations therefore breached.
- ELC - a development of so large a physical impact should not be contemplated without proper public participation as Ireland is a signatory of the ELC, but also because of the importance of this landscape internationally.
- Lived in Romney Marsh and know the awful impact the WF had on the rightful enjoyment of the flat landscape
- Visual impact on Lobinstown, with all 25 WTs visible.
- Concern about visual impact on home from WTs within 5km
- Impact on night sky from red warning lights not addressed
- Scale of WTs - WTs at Collons, etc. are quiet small compared to that proposed. How can the Board (or anyone) assess the impact of WTS on similar areas for comparison, when other existing WTs are not of same scale?

- The Board, in its refusal PA0038 noted the WEDG 'did not envisage the construction of such extensive large scale turbines in an area primarily characterised as hilly and flat farmland'.
- EIS ch.14 (p.6) - the applicant fails to look at counterview, that industrial WT radically alter a landscape in what many believe to be an entirely unsympathetic manner.
- Experience of negative visual impact on Old Mill Ballybay site, Monaghan, with road widening and loss of trees to accommodate WTS and the change from rural to industrial look.

No negative visual impacts

- Personal experience that visual impact of WFs is not negative and that people accept them as part of the general landscape once built, despite being anxious beforehand - refers to WF at Lanaght, Milane and Colomone. No objections were received for proposed 12 larger WTs at Dreenaspreague / Keeloveenogue.
- Having reviewed the photomontages and the route screening analysis, it is clear there will be minimal visibility from anywhere in Kells. The WTs that were to be visible over the rooftops of Castle Street under the previous application have been omitted. There will only be glimpses to WTs >5km away through gaps between houses on Cross Carrick Street and Church Street.
- The slow easy motion of very large WTs is visually therapeutic.
- Positive - misleading photomontages have been erected around the village of Carlanstown.
- If there is an understanding of the benefits of the proposed Castletownmoor WF then the psychological and aesthetic impact (which can only be perceived by humans) is likely to be favourable.
- WF located in a valley with large quantity of hedgerows to provide screening. 500m separation distance is acceptable from residences.
- elegant pieces of engineering

Protected Views & sensitive areas

- Protected views under the Meath CDP must be considered. Photomontages do not reflect true impact.
- Views 1-4 of 7 protected views for Moynalty would be compromised by the proposed development.

- Impact on scenic views
- Site located beside the Blackwater Corridor, designated of highest sensitivity in 2013-2019 CDP 2013-2019 Landscape Character Assessment Map 03.

Visual Impact Assessment

- Photomontage viewpoints not well located such as to reflect the real impact, the range of photomontages are inadequate and the images are often hazy low light photos or obscured by structures or vegetation. Blimps or balloons should be used to indicate the visual impact. Over the 25 sites. misleading
- Photomontages do not give true reflection, as selected views chosen by developer which does not allow the overall negative impact to be assessed.
- No photomontage from applicant's property or from St Columba's church and graveyard.
- Photomontage VP8 (base Tower of Lloyd), VP9 (Lough Crew) VP15 (Hill of Tara) H13 and H14 (Hill of Tara) show severe impact on views from these locations. Newgrange photomontages do not show the real impact from this monument. The photomontages show best case scenario from applicant's perspective and real impact would be much more severe.
- VIA is not fit for purpose - According to 'The Onshore Wind Farm Sector In Ireland: Planning in Harmony with World Heritage of 2013' (Heritage Council) WT are different to other development in the landscape as their moving parts draws the eye; obscuration of views by foliage; landscape is rarely experience in static views, but are moved through.
- VP34 is taken from outside observer’s home entrance. WTs will be on top of neighbours' homes. The visual impact is much greater if taken from junction of R163 with Grange Road to Carlanstown (grid ref. Co. Meath 53.728997, -6.826568), where the ground is much higher than at VP34.
- Some photomontages do not show real views from the historical (and other?) sites, such as H3 at St Columcille’s House, which shows only the cottages on the street and not the house. Tourists don't visit the cottages but the House. Why are images not taken from inside the graveyard at grounds of St Columba's church?
- objects to developer taking photographs of observers' property without permission
- Inadequate photomontages. Does not address concerns raised in previous application regarding lack of photomontages from other locations (such as that now provided from Oristown ruins).
- Headfort house photomontages does not include photo to rear of house and other photos obscured by vegetation and / or poorly / judiciously sited.

Policy Context

- MCDP section 9.9 Historic Landscape Characterisation - HLC to be used as a tool to inform LCA in the County. Section 9.10 Views and Prospects - ...to protect and conserve … The proposed development would make a mockery of the aims of the MCDP.
- Does not believe that reference to 'medium potential capacity' to accommodate WF development under the CDP under the Landscape Character Assessment envisaged that this scale of WE would ever be proposed.

Other visual impacts

- Decommissioning - need for Bond and comprehensive decommissioning plan to ensure decommissioning at end of life, to prevent useless eyesore. Adverse visual impact of obsolete WTs if not decommissioned. Not enough information.
- In Texas, when a WT breaks down it is too expensive to repair and they are left to rust and eventually collapse.
- Precedent for refusal for one off house deemed visually intrusive on observer's lands in 1993; refusal of playing pitch and clubhouse for Slane GFC on grounds of visual impact on Brú na Bóinne, with design subsequently reduced to single-storey.
- Specific visual impact on property no.187 due to proximity - WT 25 within 700m, cumulatively with WTs 21, 22, 23 and 24. Notes visual impact of existing met mast which is more distant and much smaller and less bulk.
- Precedent for refusal on landscape and visual grounds - pl05E.241596 impact on Glenveigh National Park contrary to Donegal CDP; pl15.240502 visual impact on landscape character contrary to Louth CDP; pl88.240462 visual impact and impact on tourism contrary to Cork CDP; pl25.237728 visual impact contrary to Westmeath CDP; pl22.214114 visual impact on landscape contrary to CDP; pl08.233632 visual impact on landscape and tourism contrary to Kerry CDP, deficient EIS, archaeology, access, residential amenities; pl05D.222535 visual impact / siting contrary to WEDG; pl24.212302 impact on heritage; pl27.221158 visual impact t and impact on landscape; pl04.215968 impact on archaeological heritage and setting;

Summary of issues raised relating to built and archaeology heritage impacts

Impacts on Architectural Heritage

- Impacts on Protected Structures in and around Kells and the surrounding area and built heritage generally and the landscape setting for same, including as yet undiscovered heritage items. Concern for setting precedent. Duty to protect heritage. Impact on cultural heritage treasures of the area.
- Impact on Protected Structures located along the proposed transportation route through Carlanstown - St Patrick's Well, Kiernan's Public House, vernacular buildings on Main Street (c.1820), Carlantown Old National School and Plubber Corn Mill.
- Meath has highest number of Protected Structures after Limerick and Cork counties. Notes reduction of PS within 3km by 53% and within site boundary by 40% in new application.
- Severe impact on Headfort, Mountainstown (a Queen Anne Country House with views framing Loughcrew), Bloomsbury and Dowdstown Houses and Demesnes and many others, including fragmentary demesnes (e.g. Curraghtown House and Kilbeg House). Also impact on the planned landscapes associated with 18th and 19th C demesnes, generally, which often entail views trained on natural or historic. Integrated house and landscape design of historic houses, such as Headfort and Mountainstown will be irreparable damaged due to the over-scaled and inimical character of the WF.
- Impact on Headfort House and Demesne, a Protected Structure and listed in the 2004 World Monuments Fund (New York) as one of the 100 most significant architectural sites in the world due to the beauty of its State Rooms designed by Robert Adam, from where the WT would be visible. Protected vista - The vista from Headfort House has been deemed in need of protection by MCC and the Heritage Council.
- Headfort House gardens includes a tree collection described by Thomas Pakenham, President of the Irish Tree Society as being in the top ten such collections in Ireland and Great Britain.
- The potential impact on Headfort House, Protected Structure and ACA, and on the Tower of Lloyd, are noted as of particular concern to the Irish Georgian Society. Constructed in the 1760's Headfort House, to an adaptation of a design by Dublin-based architect George Semple for Thomas Taylor (later 1st Earl of Bective) is owned by Headfort Trust, a building preservation trust and registered charity, which leases the building to a long established school. The pioneering neo-Classical architect Robert Adam designed the decorative treatment of the entrance and staircase halls and also the enfilade facing onto the gardens at the front, culminating in a great double height space (the 'Eating Parlour'). One of the

Adam's designed staircase faces towards Castletownmoor WF. It is of national significance for the calibre of the designs and it being one of only three Irish commissions Adam was involved in, with little surviving of the other two. In addition, the house and landscape (to the style of Capability Brown) were of single coherent design and many people have gone to great pains over the centuries to avoid the destruction of the associated designed landscape.

- The Inspector to PA0038 concluded that the visibility of WT from Headfort House should not be considered a significant negative impact on the setting or character of the PS and ACA if it is accepted that WTs are an acceptable part of the rural landscape, but that the Board should refuse permission if it did not accept this. That the Board decided to refused suggests that the Board did not concur.
- Headfort House bears a relationship with the Tower of Lloyd (built by 1st Earl of Bective in memory of his father). All WTs will be visible from the tower, and the WF will result in a dramatic change in the setting of the Tower and its interrelationship with Headfort House and the wider historic landscape. WF will dominate and diminish the value of this powerful historic landscape with significant negative impact on heritage value of Protected Structures and historic designed landscapes. Impact on Tower of Lloyd
- Ireland is a signatory of the ratified European Landscape Convention, the spirit of which is embedded in Ireland's National Landscape Strategy. Having regard to the predicted significant negative impact on architectural, archaeological and cultural heritage of the area and on the historic landscape of the region of high antiquity, permission should be refused as the proposed development is contrary there to.
- The European Landscape Convention - 'the landscape is a key element of individual and social well-being and that its protection, management and planning entail rights and responsibilities for everyone'. The National Landscape Strategy 2015-2025 Action 15 is to develop methods for the public to shape, review and monitor landscape policies and encourage sustainable management of the landscape. Failure to strategically plan energy development and conservation, with SEA, in consultation with the public at national level.
- European Landscape Convention and National Landscape Strategy - The procedures (concerning 'Landscape as defined in the 2010 Planning Laws) required for strategic infrastructure are exempt and the LCA under the CDPs have little import in procedures for planning Strategic Infrastructure Projects, contrary to the requirements of the ELC.
- Disputes applicant's submission that the application site / layout was chosen (from alternatives) to avoid direct impact on cultural heritage. There will be a visually dominating impact on Headfort House and Demesne, Mountainstown House and Demesne, Bloomsbury House, Williamstown House remains, Kells Town (UNESCO World Heritage Site Tentative List), Lloyd Tower Lands Complex, Tara

Complex (UNESCO World Heritage Site Tentative List), Newgrange Complex (UNESCO World Heritage Site), Loughcrew Complex, WHS Brú na Bóinne, Teltown, Rosmeen House, Drakerath House and Dowdstown House (640m from WT11), Hill of Slane, Hill of Ward, Time and many more heritage sites.

- Massive adverse impact on the setting of Moynalty village (within 5.3m), an ACA with 29 Protected Structures (and the setting of same), designed and built by the Farrell Estate in 1825/26 based on a Swiss design, which provided for it to be built as a one-sided street to preserve views of the Borora river and its valley to the S/SW side of the village. No building took place on the other side of the street until 20th C.
- In contravention of objectives CER OBJ1 and CER OBJ3 of the Moynalty WS CDP to encourage the development of a tourist trail. through villages of North Meath. (Moynalty Heritage Trail, Meath Heritage, is attached to observation 46).
- Impact on Moynalty church and graveyard.
- Impact on Meath's heritage, the heritage capital of Ireland
- Facilitating the application undermines laws protecting heritage, historical, architectural and cultural heritage. Planners not taking heritage seriously enough.
- Board's decision to refuse base on impact on heritage and culture still stands
- Impact on some of the most important historical sites in Europe - Lough Crew, Brú na Bóinne, Boyne Valley. Will destroy these sites. Duty to protect these highly important heritage sites.
- Impact on 1798 memorial and on adjacent Father Murphy Bridge.
- Impact on Dowdstown House (objection by owner occupier) built 1793, Listed in Buildings of Ireland (with links to Headfort House) which would be overshadowed by WTs
- Visual dominating impact on Arch Hall (PS ref.MH018-105) remains of 18thC country house designed by Edward Lovett Pearse. Clongill Castle 12/13th C Tower house & 17thC wind National Monument MH017-019 and protected structure MH017-142 plus adjacent medieval church. 19thC glebe house, MH018-001 base cross, Fletcherstown chapel PS MH018-101 rare intact pre-emancipation RC church from 18thC (c.1km from WT) and Fletcherstown School., Kilshine Church (PS MH012-0102) and national Monument MH012-038), former police barracks and adjoining court house at George's Cross, 1798 monument (battle of Knightstown Bog). Can't be screened
- Importance of the landscape setting to Ireland's most distinguished architectural heritage, including archaeology.
- Chapter 13 of EIS gives very little mention of the 18thC and later architecture and the associated designed landscapes

- Impact on Castletown, Wilkinstown, Kilberry, Oristown and Fletcherstown
- Heritage value of observer's cottage of 100+ years of age would be destroyed.
- impact on Curraghtown House; Kells, etc. WTs are within 5km of the Curraghtown house property and all 25 WTs will be clearly visible from front of dwelling PS. Refer to decision to refuse Cregg WF pl17.244357 concerning impact on heritage designed landscapes. Adverse effect on this property ignored by applicant and EIS is deficient.
- other jurisdictions (e.g. UK) are not granting permission in heritage areas.

Archaeology - Recorded Monuments

- Of particular concern: ME011-022 Gravelstown (tumulus), -027 Gravelstown (tumulus), 038 Gravelstown (fulacht fiadh), -04601 Gravelstown (standing stone), -047 Gravelstown (standing stone site), - 026 Drakerath (Castle site) Cross-slab and Church at Drakestown, -036 Castletownmoor (ringfort), -039 Emlagh (Church site) & Emlagh Graveyard & Ecclesiastical Enclosure, -04602 (standing stone), Enclosure and Ringfort / Rath at Grange Glebe, Rock Art, Wayside Cross and Burial Art at Fletcherstown, Castel / Motte at Williamstown, Souterrain at Dowdstown, etc.
- Inappropriate to grant permission for WF in close proximity to Kells, a heritage town, which is included as 'early medieval monastic sites' in tentative list for nomination as UNESCO world heritage site (and one of the most important monastic areas in the western world), a Protected Structure with several high crosses, road tower, St. Columcille's House and associated with the Book of Kells; adjacent Hill of Lloyd (being investigated for stone age settlement), near monastic settlement of Emlagh (St Beccan's / Redmoor, on former bog island and interconnected with other monasteries and settlements, and crannog) and the Neolithic (e.g. of standing stones) , megalithic and bronze age settlement at Marvelstown (e.g. of fulacht fiadh), and Nobber. Adjacent hill of Lloyd which is being investigated as a stone age settlement. Also the importance of the overall landscape setting and context of these monuments and heritage. Redmoor's Monastery (mentioned in the annals of 737-990). Socia-cultural importance of the history of these places, which were strategically geographically located, such as by rivers, lakes, causeways and with ancillary settlements. 6000 years of recorded settlement in Emlagh and Gravelstown. Hill of Slane, Hill of Skyrne, Scriebogue Hill.
- Should be refused as contrary to National Monuments Act 1930-2004 and Part IV of the Planning and Development Act 2000. Illegal to destruct or interfere with a NM. Contrary to legal protections and guidance for heritage protection, including protection orders.

- Loss of and damage to heritage assets, including unknown / undiscovered heritage items / sites through the proposed development, including unsupervised construction and excavation.
- Note the Archaeological Inventory of County Meath. Particular concern about impact on ringfort / rath at Castletownmoor, fulacht fia and 3 standing stones at Gravelstown, the Souterrain at Dowdstown and the rock art at Fletcherstown (MH017-042) where no archaeological investigations have been carried out and there may be more important artefacts underground. Dowdstown Cave field within 350m of WT, linked to other caves and examined by archaeologists and documented by MCC.
- Refers to publication of Michael J. Moore concerning the rich local heritage and culture of Meath.
- There is a Souterrain at Dowdstown in proximity to WT11 (ref.MH017-006). Another was discovered in the field where WT11 is proposed when a plough pulled off the cap-stone. It is probable that there are more in the vicinity and that there'll be a detrimental impact on archaeology.
- Importance of landscape to the location of archaeological heritage, such as Tara, Loughcrew, Carn T, etc., etc. Chapter 13 of the EIS effectively acknowledges the importance of the landscape dimension from the large to medium scale, but the landscape dimension and its significance and vulnerability in light of the proposed windfarm is not pursued. Sites were often visually related to one another. Sites are often layered with development over time, such as churches and motte and bailey over ringforts. E.g. Teltown, Rathdubh, church at Donagh Patrick, Cruicetown, Robertstown Kilbeg etc.,
- EIS ch.13 note 5 Souterrain dispersed within the 5km study area
- If surveys of archaeological sites had been carried out properly there would have been consultation with relevant landowners but this has not been done.
- Impact on sites of historical importance and heritage generally (as recognised by the Board in refusal PA0038).
- There is nothing in Board decision on PA0038 to suggest that Castletownmoor lands are less sensitive to the negative impacts associated with the WF than those lands now omitted, or that they had greater capacity to absorb the impacts on landscape or cultural heritage.
- The introduction of moving WTs of significant scale will confuse our understanding / interpretation and appreciation of the significance of these protected listed national assets / heritage / recorded monuments
- ICOMOS Ireland adversely commented on the proposal PA0038 at the oral hearing.

Positive / neutral impact on heritage

- Neutral impact on heritage - E.g. of Rock of Cashel and WTs which coexist without any negative impact on culture or tourism.

Other cultural impact

- Feis teamhra - A turn at Tara poetry and music festival. Concern by Cuala Foundation Inc. an organisation established to develop a strategy to promote Irish culture international to benefits sustainable Irish Cultural economic strategy
- Impact on Screibogue Hill not addressed in EIS including the cumulative impact with Collon WF
- Impact on the collective memory of the people of the area arising from damage from its cultural context.

Interactions / indirect impacts

- Greater noise impact on protected structures, such as Dowdstown House, have single glazed windows for heritage reasons and occupants will be exposed to higher decibel levels than buildings with double glazing

EIS

- EIS makes no attempt to list all the sites within 30km and fails to grasp the connections between the cultural heritage assets and landscape they occupy, makes no attempt to read these sites as part of a single unified landscape and fails to understand that the visual and intangible links between elevated sites are live and enjoyed and their importance understood by locals and visitors. There is no awareness of the cultural landscape in the EIS, it inadequately assesses impacts on WHSs and cultural landscapes of international significance. The impacts on high ground cannot be reduced.
- The assessment underplays the impact and impact significance in most cases. E.g. of Loughcrew impact stated as negligible, even though the WTs are located on the axis of the equinox dawn to which all visitors orientate themselves. The commercial forestry on Patrickstown (partially felled) will, if cleared, expose more of the WTs. MCDP objective to create a Landscape Conservation Area at Loughcrew Cairn T due to the multi-layered value of the cultural landscape.

Patrickstown is valuable in its own right with Neolithic cemetery and featuring in the legend of the hag. Cumulative impacts on Loughcrew and Hill of Slane with existing visible WTs can't be relied on and is completely inadequate for WH, tentative WH, etc. Disputes level of significance of impacts in EIS concerning Mountainstown House (will be severe, not moderate), Headfort Demesne (indirect neutral / slight impact) and therefore the assessments cannot be relied upon.

- Assessment should cover visual and tangible connections between tangible and vanished heritage sites, with assessment and mapping of connections across space and time, with view-sheds from points of significance within the landscape. The impact, in particular the cumulative impact on outstanding universal value of WH site and potential OUV of sites on the tentative list must be assessed and documented.
- Photomontages exclude many potential viewpoints and are a partial assessment; provide no views from upper stories of structure; does not include Girly Bog (NHA); view from top Cairn T (accessible to public) not included; views from ACAs not adequately assessed; 360degree view to assess cumulative impacts not included (e.g. from top Trim Castle); existing WTs must be assessed as cumulative impact not as part of existing landscape; impact of WTs downplayed in almost every case; should revisits sites when no foliage; narrow cone does not represent human experience and the eye is drawn to unnatural geometric objects in landscape; does not accord with advice of Hal Moggride in terms of replicating human vision and perception - accompany photomontage with single-frame equivalent to f70 for a 35mm camera, on which the proposal is shown as a bold image (otherwise invalid); light should be selected such that image is clearly visible when superimposed; exaggerated foreground must be avoided; if long horizontal images are included to incorporate peripheral vision, only the central 20% of image should be in sharp focus and the rest increasingly blurred or else the panoramic should be shown alongside a telescopic image.

Positive / neutral impact

- Having reviewed the photomontages and the route screening analysis, it is clear there will be minimal visibility from anywhere in Kells. The WTs that were to be visible over the rooftops of Castle Street under the previous application have been omitted. There will only be glimpses of WTs >5km away through gaps between houses on Cross Carrick Street and Church Street.
- It would be great to see WTs from Kells town and from historic sites and they would add greatly to the landscape. Many people in Dundalk have grown to love the urban WT at DKIT and Castletownmoor WF has the exact same capacity to entwine itself in the community for the benefit of all.

- Just because you can see a development from a particular heritage site does not mean that the significance of the site is diminished or that there is an impact.
- Kells is not on the World Heritage Site [tentative] list not because of its fleeting views between rooftops of houses towards Carlanstown or Castletown where WTs would be located, but due to the early medieval monastery located in the middle of the town, which will be completely unaffected. The view of far off WTs from Kells or Newgrange is not a factor for this observer in visiting such heritage sites.
- Time to embrace renewable energy project and let it blend in with existing heritage of the region.

Summary of issues raised relating to Air and Climate

CO2 and GHG emission reductions

- Objective of 1999 Electricity Act and EU Energy Efficiency Directive is to generate electricity efficiently. When the efficiency losses imposed by WE, in the form of back up and shadow generation, is taken into account, WE is not as effective as reducing CO2 and cannot operate independently of fossil fuel power. Wheatly J, 'Quantifying CO2 savings from wind power' found WE only 53% effective at reducing CO2 when wind power on the grid was much lower than now.
- WE costs >€200 per tonne to save CO2, compared to €10 per tonne under ETS. Having regard to A.3.3 of the Treaty on the European Union, which states 'The Union shall establish an internal market. It shall work for the sustainable development of Europe based on balanced economic growth and price stability, a highly competitive social market economy, aiming at full employment and social progress, and a high level of protection and improvement of the quality of the environment. It shall promote scientific and technological advance', the most economic methods must be deployed.
- Ireland's NREAP was not subjected to the SEA Directive and there has been a significant preliminary opinion from Advocate General Kokott in case C-290/15 Patrice D'Oultremont and Others v Région Wallonne on 14/07/17.
- No consultation on NREAP and appropriate ways to reduce energy consumption and / or to produce energy.
- Contrary to National Policy requiring renewable energy to be generated at maximum efficiency and minimum cost.
- It is nonsense that WE reduces prices. Gas is now €12/MWh. EU Commission data shows that gas prices drive prices down - https://ec.europa.eu/energy/sites/ener/files/documents/quarterly_report_on_european_electricity_markets_q4_2015-q1_2016.pdf

- CER approved PSO levy increase to cover cost of subsidies (WE cost >€70/MWh plus €10/MWh balancing payment plus creates necessity for most of the €700m p.a. spend on capacity and curtailment payments.
- Interconnector technology is advancing - option of importing hydropower from Norway or Iceland, and geothermal from Iceland, available on capacity factors of 100% at prices of under €40/MWh fixed for 12 years.
- Inefficient development - the output of electricity will be severely hampered by need to shut down WT to prevent SF and reduce noise levels. Contrary to requirement of national policy to minimise cost and maximise efficiency of generation.
- Current WT technology is obsolete and Ireland is being used as a European junkyard to support large investment companies get subsidies
- Interactions - loss of local heritage based tourism jobs will mean more people must commute longer distances and add to the CO2 emissions. More than half of the 80,000 workforce commute out of Meath to work.
- Small communities cannot bear the burden of 2020 targets. We have extensive sea areas and less populated areas which can accommodate WFs.
- The Inspector to PA0038 found (p.150 of his report) the environmental benefits difficult to quantify and not likely significant and the impacts on GHG dependent on the quantity and type of power generation it would displace. In the absence of the applicant being able to demonstrate the impact on GHG emissions it is not sustainable development and proper planning to grant permission. It must demonstrate the environmental benefits.
- No analysis of contribution of WE to electricity system has been carried out, and there is no agreed scientific method for doing so and the contribution may be tiny and may entail additional fuel to be burned due to WE's intermittent nature.
- If there are no environmental benefits (reduced CO2 emissions and reduced threat of climate change, reduction of important fossil fuel, creation of more jobs and cheaper electricity) then permission should be refused.
- does not state the extent to which national targets for generation of renewable electricity would be met or exceeded by proposed development
- 10% of WT in Donegal are not required by the National Grid. This could be higher in other counties
- WE is the most expensive means of generating inconsistent power, is already oversupplied to 3500MW and will only generated a tiny amount of power required whilst making no significant reduction in CO2.
- The emissions released in producing WTS is hugely damaging to the environment.

- Kyoto agreement has failed and the reason for the development, Kyoto commitments, is no more.
- During wind speed suitable for WT power, the main power station must be turned down to meet their remaining demand, resulting in higher output of toxic gases.
- If there are no environmental benefits (reduced CO2 emissions and reduced threat of climate change, reduction of important fossil fuel, creation of more jobs and cheaper electricity) then permission should be refused. The process for determining whether wind energy performs as claimed is through SEA under Directive 2001/42/EC. There was no SEA of NREAP (as admitted by the state in caste of Pat Swords v M.for Energy, Communications and Natural Resources) as it was a continuation of policy not a new policy and SEA was not therefore required.

Positive Energy supply

- It is a clean and sustainable energy for the country with positive impacts on CO2 & GHG emission reduction targets and climate change and protect the planet for future generations and will prevent fines from Europe for failing to meeting targets. Need to be conscious of 2020 targets.
- Positive - clean, renewable, secure and safe source of energy that will help reduce our dependence on imported fossil fuel. It and solar will become the dominant fuel source over the next few decades. Opportunity to move to low carbon economy
- Positives far outweigh health, safety and environmental concerns; or the benefits are too numerous to ignore
- Reduces the possibility of having to use nuclear power in future. Nuclear is the only real alternative to WE
- Low stable cost energy for the country, self-sufficiency for energy and energy security for county and country.
- Low cost energy for the country & self-sufficiency for energy for county and country.
- Wind energy is probably the most important source of untapped energy in Ireland with relatively consistent wind speeds off the Atlantic, a free resource. This development proposal overcomes the most important obstacle, lack of investment. Oil countries exploit oil; we should exploit our wind as our natural resource.
- Misinformation spread locally by anti-windfarm groups, negatively influencing people's perception of the positive impact WT have on reduction of GHG emissions.

- WT at Dundalk IT (DIT) supplies 30% of DIT's energy needs
- Climate change is biggest issue of our time, with wide ranging impacts too complex to discuss but is well documented and we our overreliance on fossil fuels can't continue and we need to pursue alternative energy. Can't pursue NIMBYism.
- Manufacturing of WTs and locating WTs on peat bogs increases CO2 emissions and will exacerbate global warming.
- If there are no environmental benefits (reduced CO2 emissions and reduced threat of climate change, reduction of important fossil fuel, creation of more jobs and cheaper electricity) then permission should be refused.

Negative energy supply

- The energy produced is AC not DC and therefore cannot be stored. Fossil fuel burning stations must continue to produce electricity as before.

Summary of issues raised concerning impacts on flora and fauna

General

- Adverse unacceptable impact on birds, mammals, bats and ecology - Direct impacts on buzzards, ravens, lapwing, redwing, fieldfare, whooper swan, kingfisher, owl, hare, pine martin, squirrel, rabbit, hedgehog, badger, bats, otter, stoat, dear (on bog) fox, mouse, rat, woodcock, snipe, crow, Red Harriers, Green Plover, jay, mink, buzzards, falcon, kestrel, and migrating swan. Birds Directive 2009/147/EC
- Headfort House is an important habitat for wild birds, bats, moths and other animals
- Cumulative impacts of WF along with 70,000 WTs built in Europe (or pending construction) must be considered in terms of impacts on migratory species.
- The failure to use 'Bird Sensitivity Mapping to Wind Energy Development' tools (http://birdwatchireland.ie/portals/0/POLICY/Guidance_document.pdf) will increase risk of cumulative impact on bird species.
- Ecological Survey for Moynalty LAP (November, 2008), is attached to observation 46, but no comment made in observation in this regard.
- Impact on bats - barotrauma, etc. Properly assessed?

- NPWS disputed that there was any agreement with the applicant regarding the erection of bat boxes under the previous application. The applicant's F&F assessment is therefore tainted.
- Evidence of range of bats in area from The Heritage Council report (apparently associated with the proposal to replace Dowdstown House's roof in 2009) which indicates that Nathusius Pipistrelle, Soprano, Natterer's, Daubenton's, Brown Long-eared and Leisler's bats may live around Dowdstown House and farm buildings.
- 200,000 bats were killed by WTs in Germany last year (213). Refer to wikipedia.org/wiki/Bat which refers to the detrimental effect of WT on bat colonies.
- Bats are protected under the 1996 wildlife act, the 2000 amendment Act, Stat 1st of 1997, Stat 1st 378 of 2005, the Habitats Directive, The Bonn and Bern Conventions and the Euro Bats Agreement and the EC (Natural Habitats) Regulations S.I, No.94/1997. The doAg advises the GLAS scheme giving payment for the encouragement and maintenance of wildlife (including bat boxes) - the Board should support agriculture and refuse permission
- Should never build WTs where bats inhabit. Natterer's and Liesler's in Moynalty with declining numbers.
- No details of scale of tree-felling, methodology, subsequent afforestation, disease control plans. No analysis of likely ecological impacts or discussion of mitigation measures. The details of proposed afforestation on lands in Roscommon, Clare and Kerry as offset measures shows a lack of expertise in relation to ecological impacts in situ in Castletownmoor.
- General concern for impact on flora and fauna / wildlife
- No consideration of Whooper swan. Impact on whooper swan
- 50-60 Whooper swans overwinter on the fields where WT11-WT13, inclusive, are proposed. Winter migrating swan.
- The Blackwater River running through Headfort GC and the grounds of Headfort House is a resting and roosting haven for Whooper Swan from November to February - 420 were counted in 2005 and the roost is classified as of National Importance. 9784 roosting Whooper were counted in Ireland in 2005, out of a total population of 26,366 birds. They are Annex I listed (Birds Directive) and annex II listed under Berne Convention and amber listed in Birds of Conservation Concern in Ireland as they accommodate >20% of European wintering population. Studies show a degree of site fidelity for breeding and wintering sites.
- Ravens, Common Buzzard, Long-Eared Owls and Barn Owls roost / are common at Headfort House.

- Contaminated surface water runoff (by volatile organic compounds coating WTs) from WTs poses risk to hydrochemistry and biota of sensitive area and catchment. Impact on insects, birds and bats.
- Boyne / Blackwater SAC - 100kms of roads to be constructed will dramatically alter the area's wetland's hydraulics by facilitating rapid linear drainage impacting on the bogs in Rosmeen hinterland and their faunal and flora diversity.
- Assessment of potential impacts on swan at Emlagh Bog in winter not sufficient. Their feeding grounds include fields not recorded in the application. NPWS study required.
- FER Ltd (scientific personnel - Dr Patrick Moran principle ecologist, Dr Kevin Black Forest Ecologist, Dr Emma Reeves Senior Ecologist and Dr Sarah Ryan Senior Ecologist) found the applicant's data completely deficient and inaccurate regarding Golden Plover, Whooper Swan and Leisler's Bat. Golden plover - no study of night-time activity or movements to/from roosting sites; Whooper Swan - failed to survey movements at appropriate time (missed October / November), or assess activity for duration of 3-5 years as per best practice, changed study method over course also contrary to BP, skewed viewpoints to produce more favourable results, did not use enough viewpoints to produce robust findings, failed to identity important flight corridors through development and made significant errors in calculations when using field survey recorded data; Leisler's bat - made incorrect statements describing Liesler's bat activities, failed to design bat survey fit for purpose or use correct equipment compliant with international best practice. FER Ltd concluded - North Meath Emlagh Wind Farm data used in EIS is entirely inadequate and not fit for purpose, concerns Annex I bird species and Annex IV bat species, and is contrary to legislation.
- The impact on ecology surrounding the 25 is unchanged from the previously refused application PA0038.
- Concerns raised under PA0038 (still relevant) about impact on Killary River and River Dee and Moynalty River - Salmon and Trout rivers - about impact of pollution during construction works such as excavations.
- Concerns raised under PA0038 (still relevant) about impact on fauna around Killary and Moynalty rivers and for whooper (annex I Birds Direction; annex II Berne Convention), Otter (annex II and IV of Habitats Directive and appendix II of Berne Convention) both fully protected under Wildlife Acts 1976 and 2000
- Particular difficulties for larger birds, such as eagles, which have trouble avoiding the blades.
- Birds and bats can't tune in to the hum of the WTs and die by the thousands. Impact on migratory birds. Properly assessed? Is it permissible to knowingly permit a development that will kill protected species?

- Assessment methodology not to standards, with whooper swan flight path diversions due to tree lines not considered, no record of hen harrier or red kite flight paths included.
- Whooper swan regularly use the lands as a flight paths crosses the proposed WT site
- Impact of cabling on mature trees along roads
- Concerned about the effect on bees (as a bee-keeper)
- Impact on Boyne Blackwater SAC and salmonid river and trout nursery - note Board decision PL05B.240166 15/5/2013
- Impact on raised bogland at Oristown - one of the few remaining largely undisturbed raised boglands in Ireland and the only one within 50 miles.
- If ecological surveys had been carried out properly there would have been consultation with relevant landowners but this has not been done.

Summary of issues raised concerning impacts on water and hydrology

Water supply and water quality

- Impact of digging up roads on water supplies would impose hardship (e.g. on Causetown, Stackallen)
- Concern about impact on hydrology for agriculture
- Concern about impact on well water quantity and quality arising from construction. Queries if it's been assessed.
- Contaminated runoff - Potential for leaching of volatile organic compounds form WT coatings, impact on natural environment. Runoff should be tested independently to minimise impact to hydrochemistry and the biota of this sensitive area and catchment.
- Stream from observers' property runs through proposed compound site at Red Island Road junction. No assessment or mitigation provided concerning spillages that may result.
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Drainage and flooding

- Surface water runoff - Precipitation-sourced point runoff is having unanticipated effect on local drainage at existing modest-sized WTs. Heavy volumes are discharged at the base of WTs during storm events. The windward surface of the WT towers is between 965-1294m2, with 369m2 impermeable plinth and collar to base, totalling 1334-1663m2 runoff. Total excluding hub and blades is 2,623m2. Using MET data from 1961-1990, 75m3 to 93m3 yielded in extreme storm discharge, between 6.22-7.75m3 discharge per hour at base. 12-hour storm of 26.6mm rainfall produces 35.5-44.2m3. 25 WT can be expected to change drainage pattern over Castletownmoor area and cause ephemeral channels to be carved (note absence of appropriate offset distance from Borora (Moynalty) River from T2 and T5.
- Very little information on land drainage with 25WTs covering 40 acres and tracks in an area prone to flooding
- Poor natural drainage and flood risk - Emlagh Bog is the site of a post glacial lake with impermeable base clays impeding vertical percolation and the surrounding lands tend to become saturated during winter, with (anecdotal evidence) of flooding of sections of bog roads including Rosmeen Lane annually prior to the Boyne drainage scheme.
- Poor natural drainage - No provision has been made to address impact of surface water runoff. T6 and T14 pose difficulties for additional discharge in particular due to relatively low ground level.
- Flood risk - from surface water runoff; impact on drainage
- Flood risk - T2, T3, T4, T5, T16, T18, T20 & T21 and a number of access tracks are positioned in areas of high flood risk on OPW flood maps. What mitigation measures are proposed to address this?
- Flood risk - box drains in area built in 50's and 60's about 8-10ft BGL, disrupted during construction of septic tank for dwelling. Will these be disrupted
- All watercourses, including one to rear of observers' property which intensively drains neighbouring farmer's lands, are not shown or taken into account even though it is on the OSI maps and links to Owenroe River, a tributary of the Blackwater SAC.

Summary of issues raised concerning impacts on soil

Concrete

- Adding tonnes of concrete to the land

- how much hardstanding required for each and all WTs

Summary of issues raise concerning assessments carried out by applicant

Noise assessment

- Inadequate, non-scientific approach to the noise impact assessment resulting flawed, inaccurate in unrepresentative noise data that cannot be relied upon to predict the impact on people, their health and amenities.
- Inadequate baseline survey - In context of the very low baseline noise environment, background noise reading should have been taken at the nearest NSL to each of the proposed WTs, i.e. 25 separate readings, but the applicant has used out of date 2014 readings from only 4 locations. Suggests the approach results in an elevated background noise level, meaning higher noise limits can be set and larger scale WTs installed and operated at the highest efficiency. Average of 4 areas enabled the 30, 31dB(A) level to be avoided. Noise monitoring should have been carried out at each noise sensitive location or dwelling. No greater or further information provided than for Emlagh application.
- Misleading baseline data - Use of wording loophole in WEDG 2006 enabled ignoring of best practice known as 'temporal filtering' by including noisier data collected from outside quiet daytime hours. If 'temporal filtering' was carried out in accordance with best practice under ETSU-R-97 and IoA GPG, background noise levels would have been significantly reduced to <30, 31dB(A). Cannot therefore be used as basis to predict noise impacts on health and amenities
- Baseline wind environment - The applicant does not provide details of wind speed and direction using a wind rose or frequency curve, or statistics such as average wind speed and shape of distributional parameters, which effects impact of noise emissions.
- Wind shear - No profile of wind shear at different wind speeds, or assessment of variation in climatic conditions affecting wind shear have been provided, which effects impact of noise emissions. Baseline data issues have implications in relation to the EIA Directive and Constitutional Justice.
- WT of 169m and rotor diameter of 130m require rotor tips to move between 39m and 169m AGL. The wind shear profile changes a great deal between 39m and 169m, as does power density. The rotors will rotate through 77% of the total height of the WT. Due to the very low wind speed on site, wind speed will be below 8m/s for substantial numbers of the 8760 hours of the year, thereby minimising the degree to which higher wind speeds makes WT generated noise. The large variation in power density in the wind shear profile will cause a lot of turbulence and vibration. Submits that it is most unlikely that the noise output tests were carried out in such adverse conditions. Noise modelling in this type of

environment is guess work. IN addition, the applicant has not described the climate conditions of the site.

- Wind shear - You cannot have trees to screen WTs and open terrain suitable for low wind shear to maximise power production and reduce turbulence. The site will have high wind shear due to extensive trees.
- Precautionary principle should apply - In such areas of very low wind speeds, ground level wind speed will be less than 8m/s for c.90% of the year which has consequences for noise impacts causing nuisance. It is not possible to add 20dB or more to background levels without creating risk of noise nuisance. Does not provide scientific certainty.
- Wind shear - Surface length parameter of .05 is recommended for calculating 10m wind speed from Met mast data, but for calculations the prevailing ground level wind speed will be determined by surface length parameters of the order of 0.1 and 0.2, producing much lower wind speeds that the idealised modelling. Actual climatic conditions will influence actual risk of noise nuisance, but idealised mathematical models of wind shear do not hold in all climatic conditions. Negative wind shear is a reality for up to 30, 31% of the time, particularly at night, as confirmed by the British Met Office review (2013) of the Wind Atlas.
- Uncertainty in noise output - Applicant's claim for CO2 saving assumed power production at higher end, then SPL will be also. There can be no certainty in CO2 savings without certainty in WT type and size. Critical wind speed varies per WT type and location and it is impossible to predict noise impact without WT type (based on section 4.2 'Assessing noise from wind farm developments in Ireland: A consideration of critical wind speeds and turbine choice' (E.A. King, F. Pilla, J. Mahon http://www.sciendirect.com/science/article/pii/S0301421511008937
- The recitals of the EIA Directive (2011/92/EU) inform the intent to protect people from potential risks, to quality of life, well-being, residential amenity and personal health (as opposed to typical or idealised individual). The recitals also envisage the harmonised level of protection across the EU, allowing individual states to apply more stringent standards. The WEDG refers to but waters down the protection outlined in ESTU-R-97 in order to maximize WE generation by disregarding a 5dBA limit by way of WT noise over background noise level.
- Forecast and actual output noise differ. Several studies show varied output of noise from WT that exceed forecasts. WT can emit noise at levels 5, 10, 15 and 20dB over prevailing background noise levels. Forecast are generally based on averages as are planning conditions. Peak sound events tend to influence noise nuisance as does level of noise over prevailing background noise.
- Within increasing WT size and output, the scale of variation in WT noise output also increases due to actual climate conditions and wind shear variations not following idealised Wind Shear Power Law, which anticipates wind shear varying with an idealised Surface Length Factor Z0 of 0.55 (see http://wind-

data.ch/tools/profile.php). Where SFL is underestimates, it will involve much higher ranges of wind speed difference between hub height and ground level. LFN from large WT - additional data and assessment of new Danish Regulations (http://vbn.aau.dk/files/227978180/2012_Petersen_et_al_LF_Straford_u_A.pdf)

- The application documentation lists noise levels at hundreds of houses but it is not possible to determine where these houses are located.
- Need for up to date background noise surveys at each house / NSL
- Methods used to measure noise may be misleading. Presenting mean amplitude data means 50% of peak noise is disguised. The Marshall Day Acoustics report for SEAI reproduces graphs form Moller and Pedersen (2011) which shows noise emitted by WT increases with size. Doubling of capacity from 1MW to 2MW may result in more than doubling of overall A-weighted SPL (i.e. more than 3dB), with the emission of LFN commensurately greater (it was noted that the relationship is not necessarily significant).
- Scoil Mhuire, Carlanstown not included in noise impact assessment
- Noise assessment doesn't take account of observer's dwelling - one within 500m of WT (T5);
- actual noise generation is not really known
- The A-weighting scale used by Fehily Timoney & CO. in their EIS is especially ill-suited to WT noise due to its devaluation of the effects of LFN according to 'Audiology Today' July / August (2010 - indicated as attached to 168, but not)
- New up to date monitoring should have been used to inform baseline noise data. The background noise data is the same as that used for the Castletownmoor WF is the same as that used for Emlagh WF. Disregard for standards.
- Noise assessment is not compliant with relevant standards ETSU-R-97 IAGPG and WEDG 2006. The derivation of noise limits is not compliant with any relevant standard and the limits assigned are far in excess of what they should be
- Irwin Carr Consulting report (previously Marshall Day Acoustic) (obs.no. 328) - WEDG 2006 references ETSU-R-97 as the methodology for carrying out NIA for WF development. IAGPG for ETSU-R-97 subsequently published 2013. EIS references these documents in chapter 6. For larger WF noise surveys area required at a range of nearby properties as the noise environmentamay vary significantly from one property to another and multiple surveys help ensure noise limits appropriate to a noisy location are not assigned to a quiet location. The applicant's approach doesn't comply with WEDG (p.5 chap 6) re application of 30dB(A) limit as it excludes all but 4 of the 17 NMLs carried out for Emlagh (tables 6.3 and 6.4 of PA0038), which showed a signficant number of properties with noise levels <30dB(A) (at 16 of the 17 NMLs) yet 45dB(A) is applied and the lowest measured noise levels are dicsounted with little or no justification. if

correct procedures were follwed the 35dB(A) daytime and night-time limit would apply in various locations, but instead quiet properties will be exposed to noise limits up to 10dB greater than allowed.

- Irwin Carr Consulting report (previously Marshall Day Acoustic) (obs.no. 328) - the measured noise levels have been averaged to increase the lower measured level (p.7 chp6) non-compliant with the specific requirement of IAGPG which states ' when choosing a location as a proxy for others, the basis for selection is that it can reasonably be claimed, from inspection of the property to be representative of the non-surveyed locations' (see also SB8 of IAGPG), and results in the misrepresentation of a large number of properties through deeming inflated noise levels as applicable to the receptor locations. Irwin Carr Consultant concludes that the 'averaged' method used should not act as a proxy for all residential receptors in the vicinity as they are not representative.
- None of the 4 NMLs used are compliant with IAGPG (or WEDG 2006) as they are not in the vicinity of a dwelling in an area frequently used for rest and recreation but are in agricultural fields where the measured noise levels are of no relevance.
- IAGPG advises that the background NML should be selected on the basis of professional judgement, but the applicant provides no indication as to the identity and experience of the individual who installed the equipment other than that it was carried out by Enfonic Ltd.
- Temporal filtering - the EIS (p.5 ch.6) used an incorrect definition of quiet daytime hours 07.00-23.00 which is not compliant with IAGPG (and ETSU-R-97), which includes amenity hours (18.00-23.00 Mon-Sun and 13.00-18.00 Sat and 7.00-18.00 Sun), and night-time hours (23-7.00 weekday and weekend). The time used by the EIS includes times of day when background noise is expected to be higher (e.g. morning and later afternoon traffic), which can lead to artificially high noise limits.
- The EIS has not removed extraneous noise data (e.g. NML 5) used to derive noise limits. This should have been removed to ensure that artificially inflated noise limits were not derived. NML 5 was located amongst overgrown vegetation assumed to be the reason for the extraneous data, and is contrary to SB14 of the IAGPG which state 'the presence of noise sources which are not common to the representative NMLs and neighbouring noise sensitive properties should be removed from the data.
- Wind shear - the EIS is non-compliant with the IAGPG requirement to presenting all the results to standardised 10m wind speed height, rather than to actual hub height or etc., making it impossible to compare the predicted noise levels with the relevant limits.
- Predicted noise levels - even with the artificially inflated limits, the EIS shows that under normal operating conditions the WF will not be compliant with the assigned noise limits as stated on p.19 ch.6 and that a mitigation strategy is proposed to (it

is claimed) demonstrate compliance with 43dB(A0 night time and 45dB(A) daytime fixed noise limits. However, the mitigation measures are designed to comply with limits which have not been derived in accordance with the requirements of ETSU-R-97, IAGPG or WEDG 2006. Significant additional mitigation measures would be required if the significantly lower levels applicable at each receptor location was considered and there is no evidence that the proposed WT would be capable of sufficient mitigation.

- Noise impact on homes, such as PS (Currraghtown house etc.), with single glazing only. The Board should direct the applicant to provide additional noise and vibration impact assessment in this regard.
- No independent expertise enrolled to examine the topic of noise and vibration, with detailed studies, analysis and exact details.
- Amplifying and reflecting noise effect of forestry reflecting noise not been taken into account in the noise assessment.

Traffic and transport

- S.49 Traffic and Transport (Ch.12 EIA) estimates 19,834 truckloads and 44717 trips per month in the absence of a detailed works plan per WT. No detailed analysis or input is provided by Meath Co. Co. And the traffic data recorded was not done by an independent body.0
- Traffic and transport impact during construction and moving same through small rural village and country roads and adverse impact on roads.
- Road infrastructure unsuitable to cater for construction project of this scale.

Shadow flicker

- Concern about SF impact on school (Scoil Mhuire, Carlanstown), in the classroom, playground and playing pitches. Notwithstanding the school falls outside the 10 rotor diameter catchment for assessment in the Shadow Flicker model, it should have been included considering the potential impact on such a large number of pupils on daily basis.
- It is evident from OH to PA0038 that the shadow flicker model is not as accurate as it could be, utilising a standard format not tailored to individual houses. Shadow flicker may therefore be greater than predicted.
- The assessments cannot be accurate as no final make and model of WT is decided or proposed

Summary of issues raise concerning cumulative impacts

Cumulative development

- SID 40 WF application; SID Interconnector application; claim that 39-40 planned WF sites forming part of Greenwire Project (no information provided by applicant) are at application pending stage. OFGEM UK granted an electricity interconnector license on 10/02/15 to Greenwire Transmission Ltd. Concern re cumulative impact with further planned WF development. This development is in the absence of an SEA-tested Energy Export Policy in place. Not enough information submitted concerning the long term plan by Greenwire.
- Designation as SID will encourage more speculative applications with cumulative impacts on property value etc. Will set precedent, with no one knows how many more WTs being built.
- Cumulative development and project splitting - SID Interconnector application; claim that this application is one of 40 planned WF sites forming part of Greenwire Project (no information provided by applicant) are proposed. Pre planning discussions with ABP under VC0094 to construct 500MW electricity interconnector from UK to Great Island substation, Wexford, in receipt of UK government funding. In addition, the continuance of leasehold agreements with farmers for other Greenwire sites and retention of the same size EirGrid connection, suggests Greenwire project being undertaken on piecemeal basis. This development is in the absence of an SEA-tested Energy Export Policy in place.
- If Element Power is successful with the Castletownmoor WF application, they will apply for the remaining WTs forming part of PA0038. Claim that this was stated at public consultation meeting at Headfort Arms Hotel, by a representative of Element Power. Project splitting.
- No coordination or communication evident between applicant and EirGrid concerning N/A interconnector - both applications should be assessed together.
- If Element Power is successful with the Castletownmoor WF application, they will apply for the remaining WTs forming part of PA0038.
- Cumulative impacts of WF along with 70,000 WTs built in Europe must be considered in terms of impacts on migratory species.
- The failure to use 'Brid Sensitivity Mapping to Wind Energy Development' tools (http://birdwatchireland.ie/portals/0/POLICY/Guidance_document.pdf) will increase risk of cumulative impact on bird species.

- The strategy of avoiding areas already containing WF by developing in unspoilt areas has not merit, as cumulative impacts are avoided by thrashing unspoilt areas.
- At the oral hearing to PA0038 the applicant responded that any less than 46 WT was not economically viable.
- Cumulative impact with interconnector and with permitted pig farm in area (Castletown)
- Alleged that an employee of Element Power indicated that if the application was successful they would revisit the original Emlagh application for 46 WTs,
- Impact on Screibogue Hill not addressed in EIS including the cumulative impact with Collon WF
- Totality of impact in terms of construction, WTs, borrow pits, access tracks etc., etc., is hard to comprehend.
- Cumulative impact with existing permitted and / or constructed WFs. Maighne

Other developments

- Having regard to the nature of the development and the quantity of WP name plate capacity already connected to the grid, much other infrastructure is necessary by way of grid reinforcements and expansion of interconnectors to export surpluses to avoid full potential production on which claims of CO2 savings are based to be achieved. The required infrastructure is not identified; it is not possible to evaluate the project for the purposes of the EIA Directive in terms of the limitations of the CO2 benefits should that infrastructure not be provided. O'Grianna decision is relevant, possibly leading to the consideration of the functionality of infrastructure in service.
- No independent analysis if cumulative impacts with N/S interconnector

Summary of general issues concerning EIS

- NTS does not explain how much electricity will be produced, when and how it would meet the national demand profile. Electrical output and payback period not clear.
- The name plate capacity of the WF, as 85MW, referred to in the NTS, does not really represent the scale of the WF as the height and rotor dimensions are scaled up to provide a large swept area to compensate for the low wind speeds and the power generated per unit swept area must be low.

- No identification of who or what specific expertise is responsible for key areas examined.
- Lack of definite detail - no make and model specified, up to (no definite no.) 25 WT, c.18km tracks and associated drainage, extent of tree felling. Inadequate to enable informed public opinion on project.
- Inadequate detail of Construction Programme (s.2.2.1 NTS). How can the public assess the merits of the application without detail? Proposals for site investigations post decision may result in material deviations or redesign in environmentally sensitive areas and should form part of EIA.
- S,2.2.4 generalised statement regarding dealing with wastes is wholly inadequate
- NTS fails to meet the legal requirements for NTS. Confusing
- The numbers of people living within, beside and near the WF are misrepresented in the NTS, with the population of Kells, Carlanstown and Moynalty massively underrepresented (or misrepresented), which suggests a strategy to reduce the human impact by undercounting.
- Under representation of the population of Kells, Carlanstown and Moynalty in the NTS, thereby reducing apparent predicted impact in the EIS.
- Inadequate EIS given the scale of proposed development and does not explain nature or detail such as distance between WT and dwellings

Other chapters

- Ch.4 of EIS schedule and response of 3rd party stakeholder is insufficient

General

- Overall scale of impact, relatively speaking, remains the same as the reduction of scale by c.50%, the scale of impact has been proportionately reduced also. The impact is the same for those living in proximity to the 25 proposed WTs and is the same on Castletownmoor lands, the surrounding area (including on ecology) as it was under PA0038, notwithstanding the impact on those living near previously proposed WTs is omitted. Environmental impacts and impact on heritage unchanged.
- It is not accurate to refer to the proposal as a scaled down version of Emlagh. IT is a section or a segment or slice of the earlier failed application.
- The impact on Carlanstown is the same as that of application PA0038.

- Project splitting - If Element Power is successful with the Castletownmoor WF application, they will apply for the remaining WTs forming part of PA0038, with EIS showing reduced impacts, but the overall impact of original PA0038 proposal will be unchanged.
- Requirements of EIA Directive 2011/92/EU not met regarding paragraph 7 in Annex IV, a-s
- The request to have the project assessed under Directive 2014/52/EU leaves public at disadvantage as they cannot determine the framework under which the application will be assessed prior to the making of a submission.
- Project splitting is anticipated as the Grid connection P230 is 120MEC (maximum export capacity), whereas the Board granted SID status for a 65-85MW WF. COMREG require that a generator must pass capacity test (including capacity test B, generating at least 95% of its MEC for = / > 30min, and must receive an Operational Certificate (see page 2 http://cer.ie/docs/001101/CER16165%20MEC%20Security%20Policy%20Amendement.pdf). The SOs propose that for large WF the capacity testing period allowed for generators to achieve capacity test B to be extended to beyond 12 months with an additional one month for every 1-MW of MEC (or part thereof) >50MW. The Board found the proposal to be SID despite that the proposal for 68.75-85MW was based on hoarding massive amounts of transmission capacity contrary to CER policy, which prevents alternatives being pursued by other developers whilst allowing a developer to pursue project splitting, which has major implications for complying with the EIA Directive. The normal arrangement for a WF is for the WF nameplate capacity to exceed the MEX by 105-120%, but the SID status was granted for a WF with name plate capacity which is as little as 57.3% of the MEC.
- Cumulative development and project splitting - SID Interconnector application; claim that this application is one of 40 planned WF sites forming part of Greenwire Project (no information provided by applicant) are proposed. Pre planning discussions with ABP under VC0094 to construct 500MW electricity interconnector from UK to Great Island substation, Wexford, in receipt of UK government funding. In addition, the continuance of leasehold agreements with farmers for other Greenwire sites.
- The nature of the application documentation is such that important information is spread throughout a huge volume of documentation.
- Insufficient information presented in EIS on which an informed decision can be made in respect of the likely significant effects of the proposed project, including failure to address direct and indirect impacts on residential amenities for the lifetime of the project.
- Insufficient information for public to assess likely significant effects on their properties

- No proper examination of the possible long term environmental effects on the region has been conducted,
- Concern about hydrological assessment - watercourses absent from maps; impact on Boyne Blackwater SAC; impact from borrow pits on SAC delta; impact arising from compound proposed to be located on stream not shown. Other - disposal of construction rubble to borrow pits; impact on CO2 of loss of peatland and trees;
- EIS study cannot remain current for 10 year grant permission.
- Inadequate detail of Construction Programme (s.2.2.1 NTS). How can the public assess the merits of the application without detail? Proposals for site investigations post decision may result in material deviations or redesign in environmentally sensitive areas and should form part of EIA.
- Mandatory for such applications to be accompanied by S.E.A.
- The applicant could not have completed an EIS for the application within 4 weeks. It is simply a version of the previous EIS for the failed Emlagh application.
- The drawings of the WT are not to scale and not representative of actual large WTs, with proportions underrepresented and not permitting determination of various cross sections of the proposed blades.
- How can an informed decision on impacts on landscape or other impacts (noise, etc.) be made without full details, including the make and model of turbine proposed? In absence of details, decision would be ultra vires.
- Precedent for refusal by Board - pl01.243364 (deficient info EIS)

Summary of issues raised concerning examination of alternatives

Alternative sites

- 39 planned WF sites forming part of Greenwire Project (no information provided by applicant - 1000 T export project) are alternative sites that should be assessed as alternative to proposed scheme. The selection of this site has not been justified. What other sites were considered?
- Meath falls into IEC Class 3 wind speeds which compares unfavourably with much higher Class 1 and 2 wins speed sites elsewhere in Ireland, where WE can be produced more cheaply, which would help reduce dependency on subsidies. The applicant claims wind speeds are suitable by reference to international comparisons not with reference to alternative sites in Ireland.
- Applicant has failed to consider adequately alternative technologies, sites, layouts and heights, or for smaller developments connected to the distribution system instead of one large development connected to Gorman. Gorman can be used to

connect many alternative sites and many alternative renewable energy developments (e.g. solar PV or concentrated solar power with storage) which can compete on a commercial basis and for which the UK has plans to import (http://www.landsvirkjun.com/reserachdevelopment/submarinecabletoeurope/)

- No information on alternatives, including those locations with higher wind speed. Not informed about alternatives
- The reasoning for site selection and alternatives inappropriately discounted considered in Natural 2000 and NHA designated sites as alternative sites and many alternative sites within Ireland have been dismissed without rational justification.
- The 40 WF sites at planning consultation application before the Board must be considered as potential alternatives for the WF.
- The alternative sites that can be connected to the eGrid in the Northeast Region have not been considered in accordance with A.5.3(d) of the Directive 2011/92/EU 'an outlines of the main alternatives studies by the developer and an indication of the main reasons for this choice, taking into account the environmental effects.
- Disputes that the site was selected to avoid areas with large settlements, with the layout being such that people will live within the WF rather than around the outside, with large numbers within 1, 2 and 3km, in an area with a much higher residential density that the area to the west of Kells. The population size and proximity is substantially understated.
- Disputes that the site was selected due to adequate site access and constructability. There are few areas of the country not accessible for such, particularly having regard to the alternatives for shipping WTs of this size.
- S.2.4 NTS - Alternative sites - if Castletownmoor is now so appropriate and fulfil A.5 of the EIA Directive (main alternatives and reasons for selection) why was a totally different submission made on PA0038?
- The adverse economic, social, environmental impacts have not been measured and justified. Any rational process of weighting or justifying impacts would have to assess alternatives.
- Offshore windfarms and wave power; there are better alternative sources of renewable energy, including solar, that don't destroy the country and ecological habitat.
- Wind energy is obsolete - it is being replaced by photovoltaic energy as is recognised by SEAI Best Practice Guidelines on Sustainable Energy which states 'If the 19th C was the age of coal and the 20th of oil, the 21st will be the age of the sun'.
- No consultation on alternatives

- Better than alternatives such as nuclear power
- Castletownmoor WF has not been properly researched or managed

Summary of issues raised concerning Appropriate Assessment

Not informed about alternatives

- pl16.231189 (deficient info AA), pl07.229362 (AA impact), pl07.236964 (AA impact), pl05E.235691 (AA impacts & deficient info), pl03.236950 (deficient info AA & EIS), pl88.239339 (deficient info AA & EIS).
- The NIS does not adequately address the impact on the River Boyne and River Blackwater SPA and associated habitat (refers specifically to kingfisher and to NTS EIS statement of potential impact on same), the measure by which mitigation measures will be deemed successful and what level of damage to the SAC is acceptable.
- Refers to NIS reference to potential impact on water quality and hence on the SAC during construction in combination with forestry and agricultural activities. Construction work will risk polluting the River Boyne and River Blackwater SAC and SPA