

NON-TECHNICAL SUMMARY

Introduction

The Environmental Impact Assessment Report (EIAR) and this accompanying Non-Technical Summary (NTS) has been prepared by McCarthy Keville O’Sullivan Ltd. (MKO) on behalf of Bord na Móna Powergen Ltd. and ESB Wind Development Ltd. who intend to apply for planning permission to construct a large scale solar farm which will comprise mainly of a solar photovoltaic (PV) array, and associated infrastructure, a battery storage compound as well as a 110 kV (kilovolt) substation and associated works to connect to the national grid at Timahoe, Co. Kildare.

The Proposed Project is located in northwest Co. Kildare, approximately 6.5km (kilometres) north of the village of Allenwood, 6km east of Carbury and 3km south of Johnstownbridge. The townlands within which the Proposed Project will be located are listed on Table 1.1.

Table 1.1 Townlands containing proposed infrastructure.

Project Components	Townland
Solar Farm, Battery storage & Associated works	Drehid, Mulgeeth, Ballynamullagh, Mucklon, Kilmurry (Carbury By), Killyon and Timahoe East.
Substation & Grid Connection	Timahoe East

Planning Process

Due to the nature of the Proposed Project, which requires the provision of 110 kV infrastructure which will form part of the national electricity transmission network, two separate planning applications are required. One planning application will be submitted to An Bord Pleanála (‘the Board’) seeking permission for the 110 kV infrastructure and associated works in accordance with Section 182A of the Planning and Development Acts 2000 to 2018, as it is treated in planning terms as if it were strategic infrastructure, and the other planning application will be made to Kildare County Council under Section 34 of the same Act for the Solar Farm, battery storage compound and associated works.

References to the Proposed Project

For the purposes of this NTS and in the EIAR, where the ‘Proposed Project’ is referred to, this relates to the entirety of the project i.e. the Solar Farm which includes the solar array and all infrastructure supporting this, amenity proposals, replanting lands, peat repositories, battery storage facility; as well as the Substation and Grid Connection works, as delineated on Figure 1.1.

Where the ‘Solar Farm’ is referred to, this means the solar photovoltaic array, inverters, access roads and parking, battery storage, site compounds and security fencing, amenity trails and landscaping, peat and subsoil storage areas, site drainage and all associated works. The planning application for the Solar Farm is made to Kildare County Council.

Where the ‘Substation and Grid Connection’ are referred to, this means the substation and the works required to connect to the national grid. The application for the Substation and Grid connection is made to the Board.

For clarity, in the EIAR, the Solar Farm has been assessed, the Substation and Grid Connection has been assessed and the entirety of the Proposed Project has been assessed cumulatively with each other and in combination with other plans and projects to aid the competent authorities in each carrying out EIA on the separate parts of the Proposed Project that come within their respective jurisdictions.

Background

The Proposed Project is located on Timahoe North Bog which is currently a brownfield site (former commercial scale cutaway peatland) and forms part of the Bord na Móna Allan Bog Group. The Timahoe North Bog site measures approximately 807 hectares and was formerly used for the production of sod peat for power generation and domestic heating purposes. Timahoe North is not currently in commercial use and has been out of large-scale commercial production for over 20 years. A low level of ‘turf on the spread’ peat extraction activity is undertaken within the site and this will cease prior to construction, should the project be consented.

The Proposed Project is a joint venture project between Bord na Móna Powergen Ltd. and ESB Wind Development Ltd., the ‘Applicant’. Bord na Mona Powergen Ltd. is a subsidiary of Bord na Móna plc. ESB Wind Development Ltd. is a subsidiary of ESB.

Bord na Móna plc is a publicly owned company, originally established in 1946 to develop and manage some of Ireland’s extensive peat resources on an industrial scale, in accordance with government policy at the time. Bord na Móna’s lands extend to approximately 80,000 hectares in total and are located mainly in the Irish midlands. Bord na Móna Powergen currently manages and operates a portfolio of thermal and renewable assets, namely Edenderry Power Plant a peat/biomass generating unit, Cushaling peaking plant, Bellacorick, Mountlucas and Bruckana wind farms, and the Drehid landfill gas facility.

ESB was established in 1927 as a statutory corporation in the Republic of Ireland. As a strong, diversified, vertically integrated utility, ESB operates right across the electricity market: from generation, through transmission and distribution to supply. In addition, ESB extracts further value at certain points along this chain: supplying gas, using their networks to carry fibre for telecommunications, developing electric vehicle public charging infrastructure and more.

Description of the Project

The Proposed Project comprises a large scale solar PV farm with an export capacity of approximately 70 Megawatts (MW), as well as a battery storage facility with an estimated capacity of approximately 20MW.

It will consist of a solar photovoltaic array and associated infrastructure, inverters, a battery storage compound, access roads and parking, site compounds and security fencing, amenity trails and landscaping, peat and subsoil storage areas (repositories), site drainage and all associated works. The Proposed Project will also include the construction of a 110 kV substation within the site. It is then envisaged to connect from this substation to the Derryiron-Maynooth 110 kV overhead line that traverses the southern section of the Timahoe North site.

The layout of the Proposed Project has been constraints-led, thereby avoiding the more environmentally sensitive parts of the site. The roads layout for the Proposed Project makes use of the existing onsite access roads and tracks where possible, with approximately 12.05 kilometres of existing roadway/ tracks requiring upgrading.

The recreational amenity proposals will require the placement of approximately 5 km of a 2.5m wide gravel walking track predominantly along a former machine track and the construction access track will be re-purposed to form part of the amenity walkway, in addition to being used for maintenance access during operation. A dedicated gated entrance and car parking area will also be provided for recreational use during the operational stage.

Need for the Development

Ireland faces significant challenges through efforts to meet its mandatory national renewable 2020 energy targets, its contribution to EU targets for renewable energy by 2030 and its commitment to transition to a low carbon economy by 2050. It is now clear that Ireland is falling behind meeting its 2020 target for renewable energy as well as the longer-term movement away from fossil fuels. The Proposed Project is of significant importance to Ireland, by helping Ireland to address these challenges as well as addressing the country's over-dependence on imported fossil fuels.

The need for the Proposed Project is driven by the following factors:

1. A legal commitment from Ireland to limit greenhouse gas emissions under the Kyoto protocol to reduce global warming;
2. A requirement to increase Ireland's national energy security as set out in the Energy White Paper;
3. A requirement to diversify Irelands energy sources, with a view to achievement of national renewable energy targets and an avoidance of significant compliance costs from the EU (the EU Renewables Directive);
4. Provision of cost-effective power production for Ireland which would deliver local benefits; and
5. Increasing energy price stability in Ireland through reducing an over reliance on imported gas.

Purpose and Structure of this EIAR

The purpose of the EIAR is to document the current state of the environment in the vicinity of the Proposed Project site and to quantify the likely significant effects of the Proposed Project on the environment in accordance with the requirements of the EIA Directive, as amended. The compilation of this document served to highlight any areas where mitigation measures may be necessary in order to protect the surrounding environment from the possibility of any negative impacts arising from the Proposed Project. The EIAR submitted by the applicant provides the relevant environmental information to enable the Environmental Impact Assessment (EIA) to be carried out by the competent authority.

The information to be contained in the EIAR is prescribed by statutory regulation and informed by various guidelines. The Environmental Protection Agency (EPA) recently published its *'Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports'* (EPA, August 2017), which are intended to guide practitioners during the transition to new Regulations transposing the updated Directive. These draft guidelines have also been used in the compiling of this EIAR.

The chapters of this EIAR are as follows:

- Introduction
- Background to the Proposed Project
- Site Selection & Alternatives
- Description of the Proposed Project
- Population & Human Health (including Glint and Glare)
- Biodiversity
- Land, Soils and Geology
- Water
- Air and Climate
- Noise and Vibration
- Landscape and Visual
- Cultural Heritage
- Material Assets (including Traffic and Transport, Telecommunications and Aviation)
- Interactions of the Foregoing
- Schedule of Mitigation Measures

A Natura Impact Statement has also been prepared in line with the requirements of the Habitats Directive, and will be submitted to the Planning Authority as part of the planning application documentation.

Policy Background

The background section of the EIAR presents information on renewable energy and climate change policy and targets and the strategic planning context for the Proposed Project.

Energy and Climate Change Targets

Renewable energy development is recognised as a vital component of Ireland's strategy to tackle the challenges of combating climate change and ensuring a secure supply of energy. Ireland is heavily dependent on the importation of fossil fuels to meet its energy needs, with imported fossil fuels accounting for 69% of Ireland's dependency in 2016 at an estimated cost of €3.4 billion. It is noted that this high dependency on energy imports is highly risky and Ireland is currently extremely vulnerable both in terms of meeting future energy needs and ensuring price stability.

The contribution of renewables to gross final consumption (GFC) was 9.5% in 2016, compared to a 2020 target of 16%. In 2016, with four years to go, Ireland was just over halfway towards each of the separate targets for contributions of renewable energy in electricity, transport and heat ('Energy in Ireland 1990 – 2016', Sustainable Energy Authority of Ireland, 2017). While the EU as a whole is projected to exceed its 2020 target of reducing GHG emissions by 20%, Ireland is currently one of the countries projected to miss its national targets. The European Commission report '*Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions*' was published in February 2017. Four Member States, of which Ireland is one, along with Luxembourg, the Netherlands and the United Kingdom are currently projected not to meet their national binding targets. In 2018, the EPA published an update on Ireland's Greenhouse Gas Emission Projections 2017-2035. The report provides an assessment of Ireland's progress towards achieving its emission reduction targets set under the EU Effort Sharing Decision (Decision No 406/2009/EU) – i.e. to achieve a 20% reduction of non-Emission Trading Scheme (non-ETS) sector emissions, i.e.

agriculture, transport, residential, commercial, non-energy intensive industry and waste, on 2005 levels, with annual binding limits set for each year over the 2013-2020 period. The 2018 EPA report states that “*Failure to meet 2020 renewable and energy efficiency targets will result in Ireland’s emission levels moving even further from its emission reduction targets*”.

The report finds that:

- The latest projections estimate that by 2020 non-ETS emissions will be at best 11% below 2005 levels compared to the 20% reduction target. Emission trends from agriculture and transport are key determinants in meeting targets, however emissions from both sectors are projected to increase in the period to 2020.
- Ireland is not projected to meet 2020 emissions reduction targets and is not on the right trajectory to meet longer term EU and national emission reduction commitments.

Kildare County Development Plan 2017-2023

The Kildare Development Plan 2017-2023 was adopted on the 1st of February 2017. The Plan sets out the overall strategy for the proper planning and sustainable development of the administrative area of County Kildare. This spatially based strategic framework seeks to manage and coordinate change in land use in the County setting out a clear view ahead in development terms together with clear priorities to drive growth. The County Development Plan places importance on *‘living more sustainably is essential if future generations in Kildare are to enjoy an environment equal to or better than the one we experience today. Awareness about sustainable practices is a critical first step in supporting a sustainable county’*.

The council recognises that climate change is one of the biggest issues facing the environment and is widely regarded as being caused by the warming effect of greenhouse gases. Section 8.1 of the CDP notes that:

“The burning of carbon based fossil fuels is responsible for over half of all greenhouse gas emissions globally. These emissions are mainly generated from energy generation, transportation, industry and residential and commercial buildings. European and national energy policy prioritise measures to support climate change resilience, through reduced energy consumption and increasing the proportion of energy consumed from alternative non-polluting, low carbon and renewable energy sources (wind, solar, hydro, and geothermal) across the sectors.”

This CDP aims to support the development of indigenous renewable energy resources and the maximisation of electricity production in a manner that is in accordance with the principles of proper planning and sustainable development. The Council’s strategy aims:

- To support national and EU policy for the provision of new and innovative sources of renewable energy.
- To facilitate energy supply and distribution in the county in order to support an efficient and vibrant economy.
- To ensure that the location of renewable energy structures should minimise and/or mitigate any adverse visual and environmental impacts on the built or natural environment.

- To encourage the improvement of energy efficiency of the existing building stock, and to promote energy conservation in the design and development of all new buildings in the county.
- To promote sustainable approaches to residential development through spatial planning, layout, design and construction.

With the overall increase of energy requirements at a national level and the need to meet binding targets, the Kildare County Development Plan recognises that the 'electricity supply must be augmented by alternative forms of generation'. The council highlights that there is a range of new and developing technologies that can contribute to minimising greenhouse gas emissions and to securing a greater proportion of our energy needs from renewable resources. Section 8.7 of the County Development Plan lists the Council's aims, objectives and policies surrounding Solar Energy for the lifetime of the plan. They note that '*as solar energy technologies have become more effective, areas in northern Europe like Ireland have become viable for technologies including solar panels/tubes on roof spaces and the commercial development of Solar Farms together with storage facilities*'. As a result, solar generated energy is increasingly contributing to a reduction in energy demand and energy costs for a range of commercial, industrial and residential properties. The Council has attached the following policies in relation to solar energy:

SE 1: *Promote the development of solar energy infrastructure in the county, in particular for on-site energy use, including solar PV, solar thermal and seasonal storage technologies. Such projects will be considered subject to environmental safeguards and the protection of natural or built heritage features, biodiversity views and prospects.*

SE 2: Ensure that the assessment of solar energy development proposals will have regard to:

- site selection, by focusing in the first instance on developing Solar Farms on previously developed and non-agricultural land, provided that it is not of high environmental value;
- where a proposal involves greenfield land, whether (i) the proposed use of any agricultural land has been shown to be necessary and poorer quality land has been used in preference to higher quality land; and (ii) the proposal allows for continued agricultural use where applicable and/or encourages biodiversity improvements around arrays;
- the nature of Solar Farms as normally temporary structures. Decommissioning and site rehabilitation plans will be required providing for the land be restored to its previous use;
- the proposal's impact through glint and glare on neighbouring uses and on transportation and aviation safety;
- the proposal's visual and landscape impact and the potential to mitigate these impacts through, for example, screening with native hedges;
- the guidance provided in relation to compatibility with landscape designations of Tables 14.3 and 14.4 of Chapter 14 of this plan;
- the need for, and impact of, security measures such as lights and fencing;
- the need to ensure that heritage assets are conserved in a manner appropriate to their significance, including the impact of proposals on protected views and scenic routes etc. As the significance of a heritage asset derives not only from its physical presence, but also

from its setting, careful consideration should be given to the impact of large scale Solar Farms on such assets, e.g. historic demesnes. Depending on their scale, design and prominence, a large scale Solar Farm within the setting of a heritage asset may cause substantial harm to the significance of the asset;

- the need to consider ecology so as to avoid or minimise damage on important species or protected habitats;
- the energy-generating potential, which can vary for a number of reasons including latitude and aspect;
- the design of the scheme needs to be carefully considered including layout, scale, land cover panel, height, landscaping, access roads, noise, cumulative impacts and the design of ancillary elements;

Landscape Designations

Chapter 14 of the CDP details the landscape designations for the county. The site of the Proposed Project is located within the Western Boglands LCA. This is listed as a Class 3 landscape of “high sensitivity”, on a scale of 5 classes, ranging from Class 1 “Low Sensitivity”, to Class 5 “Unique Sensitivity”. Therefore, the site of the Proposed Project is mid-range in the scale of landscape sensitivity within County Kildare. In this regard the CDP states Class 3 landscapes are generally:

“Areas with reduced capacity to accommodate uses without significant adverse effects on the appearance or character of the landscape having regard to prevalent sensitivity factors.”

As per table 14.3 which depicts the likely compatibility between a range of land-uses and Principle LCAs there is a five-point range on the compatibility key from “least compatible” (purple), through low, medium and high, until it reaches “most compatible” (azure blue). The only use that is classified as “most compatible” in the Western Boglands is agriculture, whilst rural housing and urban expansion have low compatibility, while all other uses (including solar energy) have “medium compatibility”.

Scoping and Consultations

Scoping is the process of determining the content, depth and extent of topics to be covered in the environmental information to be submitted to a competent authority for projects that are subject to an Environmental Impact Assessment (EIA).

Preplanning meetings were held with both Kildare County Council and An Bord Pleanála throughout the application process. In these meeting various topics were discussed include traffic, landscape, environment and the SID process. As well as this a number of public information events were held to present the proposed site layout and to invite feedback from the local community.

Further details surrounding scoping and consultations can be found within section 2.5 of the EIAR.

Cumulative Impact Assessment

The EIA Directive and associated guidance documents state that as well as considering any indirect, secondary, transboundary, short-, medium-, and long-term, permanent and temporary, positive and negative effects of the project (all of which are considered in the various chapters of this EIAR), the description of likely significant effects should include an assessment of cumulative impacts that may arise. The factors to be considered in relation to cumulative effects include

population and human health, biodiversity, land, soil, water, air, climate, material assets, landscape, and cultural heritage as well as the interactions between these factors. The Cumulative Impact Assessment is detailed in full under section 2.6.

SITE SELECTION AND REASONABLE ALTERNATIVES

This Chapter indicates the main reasons for selecting the option chosen based on a comparison of the various potential environmental effects. Accordingly, this Chapter sets out the reasoning and justification for:

- The location of the Proposed Project in Timahoe North, Co Kildare;
- The proposed design being the most appropriate for this particular site.

The process of identifying a suitable solar energy development site is influenced by a number of factors. While the area of suitable or available land, and planning policy are very important, the grid connection, or the method by which a proposed solar farm is connected to the national grid to export electricity from the site is also of crucial importance.

Over the coming decades, increasingly greater areas of the Bord na Móna land bank will come out of peat production and be available for alternative land uses, which are being explored on an ongoing basis including solar energy development. From an early stage in the design process, it was considered optimal to seek a site capable of accommodating a large solar array that would be commercially viable as a solar resource. In order to produce renewable energy at the most cost effective rate to the end consumer, projects of larger scale are more appropriate.

The main policy, planning and environmental considerations for the selection of a potential solar farm site include:

- County Development Plans and Zoning
- Grid Access/Capacity
- Proximity to Houses
- Environmental Sensitivity & Designations
- Flood Plain Analysis
- Supporting Infrastructure.
- Visual Amenity

The proposed site offers scale with minimal grid connection works in an isolated unobtrusive location and with the potential to generate recreational and amenity facilities for those living locally. The alternative is to not use this site however this is not considered preferable given the site's conformity with the various site selection criteria.

Details of the alternatives considered for the proposed solar development are provided in Section 3.5 of the EIAR.

Description of the Proposed Project

The Proposed Project and its component parts will be the subject of two separate but inter-related proposed applications for planning permission. As set out earlier, one planning application will be submitted to An Bord Pleanála ('the Board') seeking permission for the 110 kV infrastructure and associated works and the other planning application will be made to Kildare County Council for the solar farm, battery storage compound and associated works (the 'Solar Farm'). The Proposed Project comprises:

- I. the construction and operation of 2 areas of solar photovoltaic arrays mounted on metal frames over an area of approximately 200ha, and having a maximum overall height of 3 metres over ground level;
- II. Internal solar farm underground cabling;
- III. 2 no. temporary construction compounds;
- IV. recreation and amenity works, including looped walk (upgrade of existing tracks and provision of new tracks, car parking and vehicular access);
- V. 1 no. Battery Storage compound;
- VI. 1 no. 110kV onsite Electrical substation with associated electrical plant, electrical equipment, welfare facilities, waste water holding tank and security fencing;
- VII. 110 kV overhead Line grid connection cabling with associated angle lattice masts and supporting polesets;
- VIII. Upgrade of existing tracks and provision of new site access roads;
- IX. Site drainage;
- X. Forestry Felling and Replanting;
- XI. Permanent signage; and
- XII. All associated site development and ancillary works

The Proposed Project will have an operational life of 35 years from the date of commissioning. The components of the Proposed Project have been described in detail in Chapter 4 of the EIAR. All elements of the Proposed Project, comprising both Substation and Grid Connection and the Solar Farm have been assessed as part of this EIAR.

It is estimated that the construction phase of the Proposed Project will take approximately 25 months, from commencing enabling works on site to the commissioning of the Solar Farm and Substation and Grid Connection.

1. Enabling Works

Prior to main construction works there will be a period of approx. 5 months of site preparation, clearance of forestry and vegetation which is required to be removed to enable main construction works to proceed. This may also include preparing the perimeter and erecting where necessary a temporary fence. Temporary welfare amenities for construction workers will be installed close to the substation area during this period. A percentage of access tracks will be constructed at this stage to facilitate enabling works. Furthermore, some of the initial drainage works may be completed.

2. Main Construction Works

The final programme will be developed in consultation with the Project Supervisor Construction Stage, based on availability of plant, materials and projected delivery dates, and should be completed in approximately 20 months duration.

The Works shall include the following activities:

- Erection of fences & gates
- Preparation of onsite tracks and laydown areas.
- Restoration of existing drainage and installation of new site drainage works
- Construction of inverter pads
- Installation of piling for the panel supports
- Delivery of panels, frames, centralised electrical stations
- Installation of frames and panels
- Construction of 110 KV Substation
- Cable trenching and cable laying
- Erection of security cameras
- Installation of centralised electrical stations
- Commissioning of the panels and grid connection
- Site reinstatement and ecological enhancement
- Demobilisation from site.

Construction works will be undertaken in approximately the order listed above. However, many of the tasks would be undertaken concurrently in order to minimise the duration of this phase.

Construction work will be scheduled to only occur between the hours of 07:00 to 19:00 on Monday to Friday and 07:00 to 13:00 on Saturday. Construction activities will be restricted to this times except where the nature of particular specialist works requires continuous working for longer periods. Any such exceptions will be agreed in advance with the local authority.

Construction methodologies are described in Section 4.9 of this EIAR. Information on the operation and decommissioning of the Proposed Project are also provided in Sections 4.10 and 4.11 of the EIAR respectively.

Population & Human Health

One of the principle concerns in the development process is that people, as individuals or communities, should experience no diminution in their quality of life from the direct or indirect impacts arising from the construction and operation of a development.

Information used in this study was sourced from the Census of Ireland 2011 and 2016, which is the most recent census, the Census of Agriculture 2010 and from the CSO website, www.cso.ie, along with the Kildare County Development Plan 2017-2023, Fáilte Ireland and any other literature pertinent to the area. Census information is divided into Republic of Ireland, Kildare and District Electoral Division (DED). In order to make inferences about the population and other statistics in the vicinity of the main project site, the Study Area for this section of this EIAR was defined in terms of the Electoral Divisions (EDs) within Kildare. The Proposed Project site lies within Dunfirth ED, Drehid ED and Timahoe North ED and is adjacent to Windmill Cross ED and Timahoe South ED. The total Study Area (for the purposes of the Human Beings assessment) has a combined population of 4,191 persons and comprises of a total land area of 104.63km².

As the grid connection route is within the Proposed Project site and the substation will connect to the Derryiron-Maynooth 110 kV overhead line within the Bord na Móna landowner boundary; the potential impact on population and human health from the

grid connection will be low. However, the route has been assessed in regard to human health, where the Proposed Project site is currently used and will in the future be used by the public for recreational activity.

Previous land-use onsite includes commercial scale peat extraction, which ceased in the 1990's. Currently, there is no industrial activity on site.

The Proposed Project site is located 3km south of Johnstownbridge, 6.5km north of the village of Allenwood and 6km east of Carbury and these are the nearest settlements to provide services to the area. Services that would potentially provide for the site include local shops, construction and supplies companies, accommodation and health services. The nearest primary school to the boundary of the site of Proposed Project site is the National School Scoil Treasa, Enfield, Co. Kildare, located approximately 1.65km to the northwest of Proposed Project site. The closest secondary school to Proposed Project site is St Farnan's Post Primary School, Prosperous, located approximately 9km to the southeast of Proposed Project site.

The majority of amenities and community facilities, including GAA and other sports clubs, youth clubs and recreational areas available in the area are located in the centres of settlement throughout the wider area. Retail and personal services within the vicinity are provided in the larger settlements such as Edenderry, Prosperous and Maynooth.

The nearest designated walking route is the Donadea Forest Park Slí & Walking Trails, and the Barrow Way, located approximately 5.3km east and 5.1km south respectively of Proposed Project site at its nearest point.

The Proposed Project site is informally used by locals as a walking route. As part of the development, amenity facilities, including visitor access, car parking and a looped walk are proposed, allowing the area to be used by locals and increasing the amenity options in the wider area.

Glint and Glare is an impact that is described as the reflection of sunlight from reflective surfaces, in this case the solar array. The other elements of the Proposed Project including the Substation and Grid Connection do not have any potential for glint and glare effects. The effect of glint and glare can occur on many different receptors and can cause a direct reflection of the sun being experienced by residents in surrounding property and all road users such as motorists. It has been determined that there will be no adverse effects generated from glint and glare along surrounding dwellings or roads as a result of the proposed Solar Farm. Details of the assessment are given in Section 5.5 of the EIAR.

Biodiversity

The Biodiversity chapter assesses the likely significant effects that the Proposed Development may have on Biodiversity, Flora and Fauna and mitigates any potential effects that are identified.

The desk study undertaken for this assessment included a thorough review of available ecological data on the site and surrounding area. A comprehensive survey of the biodiversity of the site of the Proposed Project has been undertaken throughout 2017 and 2018 and this followed previous ecological surveys of the bog that were undertaken by the Bord na Móna ecology team in 2010, 2014 and 2016. The MKO walkover surveys were undertaken in order to ground truth the information provided

in previous ecological surveys of the bog that were undertaken by the Bord na Móna ecology team.

The entire study area comprises a large cutover raised bog with remnant uncut bog at various locations at its edges. This bog has been out of commercial peat production by Bord na Móna for at least 20 years and vegetation has regenerated over much of the area. There is still third party sod peat extraction being undertaken in some sections of the site. The main habitat types on the site were identified and classified and included woodlands and scrub, secondary dry heath communities, poor fen and bare peat with some open water communities and grasslands (alongside railway tracks). There were also some remnant areas of uncut raised bog within the study area.

Bird species of conservation interest that were noted in the area included snipe, buzzard, whooper swan and cuckoo. Breeding birds also include Snipe and Lapwing. Occasional small flocks of golden plover and lapwing use the site during winter as do peregrine and hen harrier. The wetland bird species observed during surveys included Grey Heron, Little Grebe, Mallard, Moorhen and Teal. None of these species were observed in any great abundance during either breeding or winter walkover surveys

The study area is assigned Local Importance Higher Value for wintering bird species and for non-wetland breeding birds on the basis that it provides habitats with high biodiversity in the local context. Bats as an Ecological Receptor have been assigned *Local Importance (higher value)* on the basis of resident and/or locally occurring populations. Badger as an ecological receptor has been assigned *Local Importance (Higher value)* on the basis that the habitats within and adjacent to the study area are likely to be utilised by a locally occurring badger population of Local Importance. The butterfly Small Skipper has only been recorded at this location within Ireland and as such it is of importance. The habitats in which it has been recorded are common and widespread throughout Kildare and Ireland in general but the species is rare and has a restricted distribution in Ireland around Timahoe Bogs. It is likely that the species was introduced. Nonetheless, the species is assigned County importance as it is rare in Ireland.

The aquatic fauna within the study area is assigned *Local Importance (Lower Value)* due to the highly modified and silty aquatic habitats that are present. The downstream watercourses and fauna within them is assigned *Local Importance (Higher Value)* due to the known populations of salmon, trout and lamprey species along with Otter. River lamprey (*Lampetra fluviatilis*), salmon and otter are all among the qualifying interests of the River Boyne and Blackwater SAC that is located approximately 15.3km (hydrological distance) downstream of the study area. These species are assigned International importance where they occur within the SAC.

Various best practice mitigation measures will be implemented to ensure no significant negative effects will occur on Key Ecological Receptors (KERs) at the site. The layout of the Proposed Project has been constraints-led, thereby avoiding the more environmentally and ecologically sensitive parts of the site. There are also further opportunities for rewetting areas of the site and biodiversity enhancement. For example, the Proposed Project has been positioned on the higher and drier sections of the study area. This will allow drainage from the development footprint to the lower lying sections in the center of the bog. These areas are more capable of being rewetted as part of the rehabilitation of the site.

The Proposed Project on its own, will not result in any significant effects on any of the identified Key Ecological Receptors. The highest magnitude impact is of Long Term Moderate Direct Negative Effect on cutover bog/woodland mosaic within the site. No significant effects on receptors of International or National Importance were identified.

The potential for effects on the European designated sites are fully described in the Natura Impact Statement that accompanies this application. The NIS concludes that, in view of best scientific knowledge and on the basis of objective information, the Proposed Project either individually or in combination with other plans or projects, is not likely to have significant effects on the European Sites in view of their conservation objectives that were assessed as part of the Appropriate Assessment process. No complete impact source-pathway-receptor chain was identified between the proposal and Nationally designated sites.

The proposed Solar Farm, Substation and Grid Connection development will be constructed and operated in strict accordance with the design, best practice and mitigation that is described within this application and as such, significant effects on ecology are not anticipated at any geographical scale on any of the identified KERs.

Land, Soils and Geology

Comprehensive intrusive investigations have been completed to determine the site geology.

The geology of the site predominately comprises peat over glacial tills, over limestone bedrock. The peat is underlain by glacial deposits interbedded with glacio-fluvial deposits over limestone bedrock. The glacial deposits generally consist of soft to very stiff grey gravelly clay/silt. These deposits are interbedded with gravels and sands within the stratum. A total of approximately 570 no. peat probes were undertaken at the proposed project site as part of the investigations. 506 of these recorded a peat depth <3m. Ground slope angle recorded at the site is <3°.

All proposed construction works will be at or within a couple of metres (i.e. shallow earthworks) of existing ground surface. Estimated volumes of peat/spoil to be excavated are 63,400m³. Excavated peat/spoil will also be used for any required reinstatement and landscaping works as close to the excavation point as possible, and residual material will be placed in peat repositories.

Storage and handling of hydrocarbons/chemicals will be carried out using best practice methods. Measures to prevent peat and subsoil erosion during excavation, and reinstatement will be undertaken to prevent water quality impacts.

A Peat Stability Risk Assessment (PSRA) was completed. for the development. This involved analysis of over 49 no. separate locations, and these analyses have demonstrated that there is a low risk of peat instability at the site (solar farm and substation & grid connection works areas). The flat topography and the drained nature of the terrain on site are critical factors for the low risk of peat failure determined for the proposed project, including the substation and grid connection elements.

With respect to potential health effects, solar farms nor grid connections are not a recognized source of pollution and so the potential for effects during the construction, operational and decommissioning phase are negligible.

No significant impacts on the soil and geological environmental are anticipated during the construction, operation or decommissioning of the Proposed Project.

There will be no cumulative impacts on the land, soils and geology environment as a result of the proposed solar farm and substation & grid connection.

Hydrology and Hydrogeology

The baseline hydrology/hydrogeology for the Project site has been characterised using a significant quantity of site investigation data and monitoring data.

Regionally the Proposed Project site, is in the River Boyne surface water catchment within Hydrometric Area 07 of the Eastern River Basin District (ERBD). There are two outfalls from the Timahoe North bog. One to the southeast to the Mulgeeth Stream, and a second (smaller) one to the northwest to the Fear English River. Both the Mulgeeth and the Fear English rivers drain to the River Blackwater. The River Boyne and Blackwater SAC is ~15km downstream (along streams and river flowpaths) of the Proposed Project site.

The Project site has large wide man-made drains running in a northwest-southeast longitudinal direction, spaced c. 250m apart and totalling 11 main (continuous) longitudinal drains across the full width of the bog. There are a number of other, similarly orientated, drains that are discontinuous and contain standing water only. Two raised disused rail line tracks running transversely across the bog from the southwest to northeast are present which facilitated a narrow-gauge rail line to the site during past peat production.

Peat depths at the site range between 0.05 to 5.2m. The peat is underlain by glacial deposits interbedded with glacio-fluvial deposits over limestone bedrock. The glacial deposits generally consist of soft to very stiff grey gravelly clay/silt. These deposits are interbedded with gravels and sands within the stratum. As a result of the site geology the peat water table across the Proposed Project site is expected to be high (confirmed by monitoring), and also perched above the underlying regional groundwater table. The ability of the shallow peat water to interact with the underlying regional groundwater flows is limited by the permeability of the underlying glacial deposits. As such the potential for the project works to interact or effect underlying groundwater is very limited, and the main potential impacts will be via the surface water environment, i.e. drainage and discharges from the Proposed Project site. The Proposed Project, including the Solar Farm and the Substation and Grid Connection will not impact on local groundwater quantity (flows) and groundwater wells, and will not effect local or regional groundwater quality.

A comprehensive and detailed surface water management design proposal is included with this assessment, and implementation of these proposals, as outlined, will ensure protection of downstream surface water streams and rivers (quantity of flow and quality of water). The proposed surface water management will be implemented, and it will also ensure prevention of any significant impact on the downstream designated sites. Furthermore, there are no groundwater dependent designated sites of relevance to this hydrological / hydrogeological assessment as all designated sites are sufficiently remote (including: Carbury Bog NHA; Hodgestown Bog NHA; Ballynafagh Lake SAC; and Ballynafagh Bog SAC) from the Proposed Project site to state with scientific certainty that they are hydrogeologically disconnected from the Proposed Project site, and therefore cannot be impacted by the Proposed Project.

Storage and handling of hydrocarbons/chemicals will be carried out using best practice methods. Measures to prevent surface water impacts from these potential sources are outlined and assessed in detail and will be implemented.

There will be no cumulative impacts on the water environment as a result of the proposed Solar Farm and Substation and Grid Connection and other local developments.

Overall, no significant impacts on the water environment are anticipated during the construction, operation or decommissioning of the Solar Farm and the Substation and Grid Connection.

Air and Climate

Due to the nature of the development, the general character of the surrounding environment and publicly available information on air quality, air quality sampling, was deemed to be unnecessary for the EIAR.

The Environmental Protection Agency (EPA) has designated four Air Quality Zones for Ireland:

- Zone A: Dublin City and environs
- Zone B: Cork City and environs
- Zone C: 16 urban areas with population greater than 15,000
- Zone D: Remainder of the country.

These zones were defined to meet the criteria for air quality monitoring, assessment and management described in the Framework Directive and Daughter Directives. The site of the Proposed Project lies within Zone D, which represents rural areas located away from large population centres.

The ambient air quality monitoring carried out closest to the Proposed Project site is at Newbridge, Co. Kildare, located approximately 19.0 kilometres south of the Proposed Project site. The air quality in the vicinity of the Proposed Project site is typical of that of rural areas in the south of Ireland, i.e. Zone D. As the ambient air quality monitoring mentioned above is carried out in Zone C; lower measurement values for all air quality parameters would be expected for the Proposed Project site as it lies in a rural location, within Zone D.

The production of energy from the solar panels has no direct emissions as would be expected from fossil fuel-based power stations. Harnessing more energy by means of solar energy will reduce dependency on fossil fuels, thereby resulting in a reduction in harmful emissions that can be damaging to human health and the environment. Some minor short-term or temporary indirect emissions associated with the construction of the Proposed Project site include vehicular and dust emissions. Dust is a common emission from construction sites and requires management. As limited excavation works are proposed, the potential for dust generation is limited however mitigation measures have been developed to reduce any potential dust levels.

Ireland has a temperate, oceanic climate, resulting in mild winters and cool summers. The Met Éireann weather station at Mullingar, Co. Westmeath, is the nearest weather and climate monitoring station to the Proposed Project site that has

meteorological data recorded for the 30-year period from 1979-2008¹. The monitoring station is located approximately 36 kilometres northwest of the site. Section 9.2.3 of the EIAR provides details of carbon calculations for the Proposed Project. It is estimated that the volume of CO₂ that will be lost to the atmosphere will be offset by the Proposed Project during its first 5.8 years of operation.

Noise and Vibration

AWN Consulting Limited completed an assessment into the likely noise & vibration impact of the Proposed Project.

The existing noise climate has been surveyed for a period of five days at locations representative of the nearest noise sensitive properties and typical background noise levels for day and night periods have been derived using best practice guidance. Prevailing noise levels are primarily due to local road traffic noise and other agricultural and anthropogenic sources in the area.

When considering a development of this nature, the potential noise & vibration effects on the surroundings must be considered for each of two distinct stages: the short-term construction phase and the longer-term operational phase.

Subject to good working practice during the construction phase and not exceeding any limits proposed within the Noise and Vibration chapter of the EIAR, it is anticipated that for most of the construction phase the associated noise and vibration will not cause perceptible negative effects.

The solar farm as well as the substation are not known as significant noise sources and are generally quiet. Based on detailed information on the site layout and noise emissions from associated plant items and infrastructure, noise levels have been predicted at the relevant noise-sensitive locations. These predicted levels have been compared against the derived day and night time noise criteria that are based on the prevailing background noise levels in the area and best practice guidance. The assessment here considers the cumulative impact of other developments in the study area as well as noise emissions from the proposed solar array, substation and battery compound. The predicted noise levels are low and not likely to cause any perceptible effects.

No significant vibration effects are associated with the day to day operation of the site.

In summary, the noise and vibration impact of the Proposed Project is not significant.

Landscape and Visual

The Landscape & Visual assessment is based on desk study of the study area, field surveys of the site and surrounds and the use of photographs and photomontages from representative viewpoints of the site. The landscape of the area is described in terms of its existing character, which includes a description of the physical and visual character, landscape values and the landscape's sensitivity to change. The potential impacts in both landscape and visual terms are then assessed, including cumulative impact.

¹ The station at Mullingar closed in 2007/2008, so data is available between the periods of 1979-2008, rather than the typical 1981-2010.

The site is extremely flat with elevations ranging from 77.9m to 86m across the whole site. The site is dominated by large coniferous forests which border and screen the site. Apart from the coniferous forests on the site's periphery, mature hedgerows, naturally regenerating woodlands, bog habitats and tree lines form field boundaries beyond the Project Boundary. Within the site sits broad vegetation formations of shrubland and dry Birch woodland in patches across the site. The wider area generally comprises improved or semi-improved agricultural land, bordered by drainage ditches, mature hedgerows and tree lines similar to that recorded on site. There are no site buildings or other man-made structures on the site, however there are scattered farm buildings and residential properties in the wider landscape screened again by the large coniferous forests and mature hedgerows.

Visibility of the site was found to be extremely limited due to the presence of hedgerows and tree lines, both immediately adjacent to roads and in the intervening landscape, but also due to the vegetation surrounding the site coupled with the flat topography of the site itself. Visibility was only evident in very few locations beyond the viewpoints listed in Table 11.9 of this EIAR and these photomontages are considered representative of potential visibility. There is no open visibility from the scenic route which was assessed on the ground in March 2018. A total of 9 no. photomontage locations were selected and are detailed in Section 11.9.3 of the EIAR.

It is clear from the photomontages that there is limited visibility off or on to site due to the dense screening from the mature trees that border the site.

Route Screening Analysis as its name suggests considers the actual visibility of the Proposed Project from surrounding roads. Within 3km of the Proposed Project, the area incorporates a network of forested areas, agricultural land, trees and hedgerows, and settlements in order to get a clearer understanding of visibility, screening the actual nature of visibility in the study area Route Screening Analysis was undertaken. Figure 11.4 of the EIAR outlines the Route Screening within and extending beyond a 3-kilometre radius of the Proposed Project site. This map indicates that many of the roads within 2 kilometres of the site are densely screened. By comparison, relatively few areas have stretches of partial or intermittent screening, and the areas with no screening are also limited.

Visual Effects

The desktop study, site visit, Proposed Project layout and photomontages all inform the assessment of visual effects. Assessment of the road network around the site as well as other amenity routes during the site visits established that the actual visibility of the Proposed Project site is extremely limited and localised.

As discussed above, the Proposed Project can only be seen from a very limited area outside the site as illustrated in Viewpoint 2, a view taken from a high point south west of the Project Boundary. Viewpoint 6 is taken on the southern Project Boundary, showing the character of the vegetation on site, resulting in no visibility of the Solar Farm development from this location. Viewpoints from the West, North and East of the site also resulted in zero visibility.

Therefore, the potential for any visual impact of the site is extremely localised, as changes will only be visible between intermitting vegetation or within the site.

During the site visit, visibility from the local road network was also mapped, with an emphasis on residential dwellings. A screening process was undertaken which

identified dense screening with extremely limited visibility, and only small glimpses of the site visible through intermittent gaps in vegetation.

Overall, the potential visual impact is considered as Imperceptible

Landscape Effects

There are no rare landscape features or cultural or heritage associations on site with the potential for visual effects. The site is considered modified due to its historical peat extraction uses and subsequent revegetation and therefore does not have the characteristics of a peat bog but more a woodland area.

The proposed Solar Farm is in an area classed in the Kildare CDP as Western Boglands. Western Boglands are characterised by their flat topography and smooth terrain. They are described as generally unproductive due to the high-water table and poor drainage present on many of these sites.

The site is not an intact peat bog and is not perceived as such when viewed from viewpoints surrounding the site. From a landscape and visual perspective it reads as a low lying, flat woodland area site and does not share any of the common visual characteristics of a peat bog. The careful siting of the Proposed Project, centrally within the site in combination with the proposed retention of the established vegetation on site and the utilisation of the existing vegetation within the surrounding area it is considered that the susceptibility of the landscape to the proposed type of change is deemed Low.

The landscape assessment provides a detailed review of the character and potential impact of the Proposed Project and clarifies that the proposed solar array will not be visible from locations external to the site due to the presence of heavy screening provided by on site vegetation which is (and will remain) under the control of Bord na Móna. The proposed Substation and Grid Connection works will only be partially visible from close to the site and the effects will be generally imperceptible. The designations set out above relate to the potential visual compatibility of the land uses with the relevant LCA's and landscape factors. The site of the current proposal is distinctive in that it can accommodate the Proposed Project without impacting on any views to or from the site.

In conclusion, the predicted landscape and visual impacts are considered low and the overall landscape character of the area will not be affected.

Archaeological & Cultural Heritage

An assessment of the potential effects of a proposed Solar Farm, Substation and Grid Connection at Timahoe North Bog, Co. Kildare on the surrounding archaeological, architectural and cultural heritage landscape was carried out by Tobar Archaeologists. The assessment was based on desktop research, GIS analysis, and field survey.

One recorded monument is located within the Project Boundary but is excluded from the area of the solar arrays. Mitigation measures in the form of a buffer zone and archaeological monitoring are recommended and will be implemented.

No new archaeological sites were noted during field surveys, however, raised bogs such as that at Timahoe North are considered areas of archaeological potential. Where potential effects on as yet unknown sub-surface features within the bog have

been identified, appropriate mitigation measures have been recommended in order to minimise any such impacts and these will be implemented. Recommended mitigation includes archaeological monitoring during the construction stage of the Project. The predicted residual effects as a result of the Proposed Project are likely to be not significant-imperceptible once the recommended mitigation measures have been implemented.

Indirect impacts or effects on setting on the archaeological, architectural and cultural heritage resource were also assessed. No significant indirect effects as a result of the Proposed Project have been identified. An assessment of cumulative impacts with regard to other existing and proposed projects was also undertaken and this was not found to increase as a result of the Proposed Project.

Material Assets

Introduction

An assessment of the traffic impact was undertaken for the Proposed Project. The assessment considered the impact that the traffic generated by the Proposed Project would have on the local highway network, and the geometric requirements of the delivery route. In general, there will be very low traffic volumes associated with the Proposed Project once it is built and operational. Traffic will be generated by occasional maintenance staff and those using the proposed recreational and amenity trails. Traffic will inevitably be generated during the construction phase at different levels depending on what phase of construction is ongoing. Any traffic during this period will be of a temporary duration.

Traffic Route & Study Area

The proposed transport route for the project components is likely to be via the M4, followed by the R402 and the L-5025 Derrymahon Road towards the Proposed Project site.

Vehicle types and network geometry

The types of vehicles that will be required to negotiate the local network will generally comprise of standard large articulated HGV's. An assessment of the geometry of the proposed route was undertaken based on this vehicle type.

The proposed access route was established to be able to accommodate all vehicle types that will require access to the Proposed Project site.

Traffic impact on local network

It is forecast that all roads on the delivery route will operate within capacity for all stages of the Proposed Project construction phase.

Schedule of Mitigation Measures

Chapter 15 of the EIAR includes a Schedule of Mitigation Measures for reference purposes which draws on all of the relevant chapters of the EIAR.

Interaction of the Foregoing

Chapters 5 to 13 of the EIAR identify the potential environmental impacts that may occur as a result of the Proposed Project in terms of Population and Human Health, Biodiversity, Land, Geology and Soils, Water, Air and Climate, Noise and Vibration, Landscape and Visual, Cultural Heritage and Material Assets, as a result of the

proposed Solar Farm and Substation and Grid Connection (the 'Proposed Project'). All of the potential significant effects of the Proposed Project and the measures proposed to mitigate them have been outlined in the preceding sections of this E.I.A.R. However, for any development with the potential for significant environmental effects there is also the potential for interaction between these potential significant effects. The result of interactive effects may exacerbate the magnitude of the effects or ameliorate them, or have a neutral effect.

A matrix is presented in Table 14.1 of the E.I.A.R to identify potential interactions between the various aspects of the environment already assessed in this E.I.A.R. The matrix highlights the occurrence of potential positive or negative effects during both the construction (C) and operational (O) phases.

Interactions have been identified between effects on Population and Human Health and effects on Noise & Vibration, Air & Climate, Water, Material Assets and Landscape. Interactions have been identified between effects on Biodiversity, Flora and Fauna with effects on Soils and Geology, Water, Air & Climate, Noise & Vibration and Landscape. Interactions have been identified between effects on Biodiversity, Birds with effects on Water, Air & Climate, and Noise & Vibration. Interactions have been identified between effects on Landscape with effects on Cultural Heritage. Interactions have been identified between effects on Air and Climate with effects on Material Assets.

Where any potential interactive effects have been identified, appropriate mitigation is included in the relevant sections (Sections 5-13) of the E.I.A.R and the residual effects are not significant.