Proposed Larger Turbines and Met Masts at Authorised Upperchurch Windfarm

Non-Technical Summary of the Environmental Impact Assessment Report (EIAR) 2021

ECOPOWER

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NTS 1 Non-Technical Summary

This is the Non-Technical Summary of the Environmental Impact Assessment Report (EIAR 2021) which is part of a Strategic Infrastructure Development (SID) Planning Application, which goes directly to An Bord Pleanála.

This is a proposal to change the size of the twenty-two wind turbines at Upperchurch Windfarm that have already received planning permission, to twenty-two larger wind turbines. It is also proposed to increase the height and design of the already authorised met masts. Upperchurch Windfarm has not been constructed yet.

NTS 1.1 The Authorised Upperchurch Windfarm

Upperchurch Windfarm was granted planning permission in August 2014 for twenty-two wind turbines up to 126.6 metres to blade tip height, two met masts up to 80 metres in height, electrical substation and ancillary site works. *(An Bord Pleanála Reference PL 22.243040: Tipperary County Council File Ref. 13/51/0003).*

NTS 1.2 The Proposed Changes to the Authorised Upperchurch Windfarm

The proposal here is to change the maximum tip height from the authorised maximum tip height of 126.6m to a maximum tip height of upto 152m, by amending the hub height and the length of the blades of the authorised turbines. It is also proposed to change the height of the met masts from the authorised 80m to a maximum of 93.5m and to change the authorised mast design from a tubular tower to a lattice tower.

The generation capacity and size of multi-megawatt wind turbines has continued to increase since planning was granted for Upperchurch Windfarm in 2014. The new larger turbines are more technically advanced and capable of generating more electricity from a single turbine unit than the wind turbines already granted planning permission. They are also more controllable in terms of noise and shadow flicker than the older models.

Taller turbines have already been considered acceptable in the landscape by Tipperary County Council - planning was granted in March 2021 for a windfarm development with tip heights upto a maximum of 150m (Farranrory Windfarm).

NTS 1.3 The Applicant

Ecopower Developments Limited is the Applicant and part of the Ecopower Group of wind energy development and windfarm operation companies, and has been involved in wind energy developments in Ireland since 1996. For more information in Ecopower, visit the website at www.ecopower.ie

NTS 1.4 The Planning Application & Public Participation

The developer has been in contact with all households within 600m of the authorised turbines, to outline the proposed changes to the size of the turbines and met masts. The developer has also been in contact with the landowners involved in Upperchurch Windfarm, most of whom live locally.

The wider public were informed before the application was lodged by the erection of Public Site Notices, by publication of a Newspaper Notice in the local paper and a national newspaper and, on the EIA Portal hosted by the Department of Housing, Planning and Local Government, prior to the application being submitted. The EIA Portal web link is

http://housinggovie.maps.arcgis.com/apps/webappviewer/index.html?id=d7d5a3d48f104ecbb206e7e5f84b71f1

The planning documents submitted to An Bord Pleanála are available for inspection at their offices in 64 Marlborough St, Rotunda, Dublin 1, D01 V902 and at the offices of Tipperary County Council, Civic Offices, Nenagh, County Tipperary. Covid-19 restrictions may apply at the time of inspection, therefore prior arrangements with the planning authority may be required.

In addition, all the application documents are available on the Applicant's dedicated Project website at www.upperchurchwindfarmamendments.ie. The Project website will also include details of the submission/observation procedure for the public and contact details of the Applicant.

The public can make their views known to An Bord Pleanála only and in writing, within the given time period. The Board is obliged to take the public's views into account during the assessment of the Application.

NTS 1.5 How the Assessment was Carried Out

The impact on the environment of optimising the authorised Upperchurch Windfarm through amending the already authorised turbines and met masts to Larger Turbines and Met Masts is evaluated in the EIAR 2021. Also included is an assessment of the cross effects between environmental topics and the overall effects of the Whole Upperchurch Windfarm Project (Whole Upperchurch Windfarm Project), which includes the Other Elements - UWF Related Works; UWF Grid Connection; UWF Replacement Forestry and UWF Other Activities. The evaluation also includes the impact of the Whole Upperchurch Windfarm Project cumulatively with other projects and activities.

All stages including construction, operation and decommissioning of the Whole Upperchurch Windfarm Project are considered. The passage of time and changes in the environment since Upperchurch Windfarm was granted planning permission in 2014 and since the preparation of the planning documents for the Other Elements has been taken into consideration in EIAR 2021.

Environmental consultants who are experts in their field were engaged to study the various environmental topics defined in the environmental impact assessment process. These topics are **population and human health, biodiversity, land and soils, water, air, climate, material assets, cultural heritage and landscape**. Fieldwork and desktop studies were carried out in 2020 for all the topics examined. The 2020 field surveys included water sampling, mammal, bird, bat, amphibian, reptile, invertebrate and habitat surveys, built services surveys e.g. electricity lines, water pipes, telecommunications signals, road condition, traffic, houses, way marked walks and cycle routes. These surveys were used to update information already gathered during previous surveys, which started in 2010 and continued in 2011 & 2013 for Upperchurch Windfarm and thereafter in 2015, 2016, 2017, 2018 & 2019 for the Other Elements of the Whole Upperchurch Windfarm Project.

The experts used the latest guidelines from their own speciality and general best practice from Irish government and environmental organisations and UK and European Commission sources, to assess the effects of the proposed amendments to the previously authorised wind turbines and masts at Upperchurch Windfarm.

Reference Documents for the Other Elements of the Whole Upperchurch Windfarm Project were also used to facilitate the evaluation of Whole Upperchurch Windfarm Project and cumulative impacts (See below list):

- Reference Document 1 of 36: Upperchurch Windfarm Grant of Permission with Conditions and An Bord Pleanála Planning Inspector's Report 2014
- Reference Document 2 of 36: 2013 Upperchurch Windfarm Environmental Impact Statement (incl. Natura Impact Statement)
- Reference Document 3 of 36: 2013 Upperchurch Windfarm Response to Request for Further Information from Tipperary County Council (incl. Revised Natura Impact Statement)
- Reference Document 4 of 36: 2020 Amendments to Upperchurch Electrical Substation (incl. Grant, Planning Report, Screening for EIS and Screening for AA)
- Reference Document 5 of 36: Non-Technical Summaries for each Element of the Whole UWF Project
- Reference Document 6 of 36 to 17 of 36: UWF Related Works - Grant of Planning, Inspector's Report and 2019 Revised EIAR (including Appendices & Figures), EMP and AA Reporting
- Reference Document 18 of 36 to 25 of 36: UWF Grid Connection - Grant of Planning, Inspector's Report and 2019 EIAR (including Appendices & Figures), EMP and AA Reporting
- Reference Document 26 of 36 to 36 of 36: 2018 UWF Replacement Forestry EIAR (including Appendices & Figures) and AA Reporting

These documents can be found in the planning application pack and on the Project website www.upperchurchwindfarmamendments.ie

NTS 1.6 Alternatives Considered

NTS 1.6.1 Alternatives Previously Considered for Upperchurch Windfarm

The following alternatives were previously examined for Upperchurch Windfarm - windfarm location; turbine number and size; site layout including windfarm substation location; haul route and construction activities timing.

In summary, elevated areas with an adequate wind resource were examined and the final site location was chosen in the context of absence of natural heritage designations on site, suitable zoning in the Wind Capacity Strategy for North Tipperary and adequate site access.

The optimum site layout was chosen in the context of wind resource, residential amenity geotechnicals, hydrology, ecology, archaeology and landholdings.

Turbines of 2MW to 3MW size, which were considered large scale at the time of the examination in 2013, were chosen because building larger and more efficient turbines, results in fewer turbines required to contribute to greenhouse gases reduction targets and results in a requirement for less raw materials.

A relatively low elevation was chosen for the windfarm substation site to reduce visual impact.

The haul route already used for turbine components by previously constructed windfarms in the area, was chosen as the preferred haul route.

Construction activities were designed to reduce disruption to the local community.

NTS 1.6.2 Alternatives Previously Considered for UWF Related Works

Alternatives were considered for the Haul Route Works part of UWF Related Works application including construction traffic routes for normal and abnormal HGV traffic to reach areas of the windfarm which are not directly accessible from the R503 and which require access from Local Roads and, alternative turning areas to facilitate this traffic access. Alternative locations were considered for the Telecoms Relay Pole part of the application, which requires line of sight with the existing Foilnaman and the Laghtseefin masts. Alternative layouts were considered for the Internal Windfarm Cables and Realignment of 2 No. lengths of already consented windfarm roads and Alternative construction activities and timings were examined taking into account Local Residents, Water & Soils, Biodiversity (Badgers, Hen Harrier, Bats) and Built Services.

NTS 1.6.3 Alternatives Previously Considered for UWF Grid Connection

For the UWF Grid Connection, alternatives for were considered for the Grid Connection Node Location; Grid Connection Technology (Overhead Line v Underground Cable); Public Road Routes for the Underground Cable and Locations for Mountphilips Substation. An examination of the processes associated with the project**,** by the EIAR evaluation teams, resulted in alternative processes being devised to avoid, prevent or reduce environmental effects. These included the scheduling of construction works along the underground cabling works to occur outside of the hen harrier breeding season; scheduling of construction works to avoid overlap with the construction of other parts of the

Whole Upperchurch Windfarm Project; sequencing of watercourse crossing works, earthworks, dewatering and excavation dewatering within 50m of a watercourse and; designing the security lighting and restricting construction works to daylight hours, to minimise effects to bats.

NTS 1.6.4 Alternatives Previously Considered for the 'Do-Nothing' Alternative

The 'do-nothing' alternative to construction and operation of the Whole Upperchurch Windfarm Project was considered as;

- The most significant impact of Upperchurch Windfarm not being developed would be a **significant lost opportunity to contribute to Ireland's action on Climate Change remediation**. In the 'do-nothing' alternative, not developing the Upperchurch Windfarm Project means that there will be a consequential loss of the carbon offset potential **and emission of greenhouse gases every year from the generation of electricity by fossil fuel plant would not be avoided**.
- There would also be a consequential opportunity cost to **local economic activity** from the loss of construction and operation of Upperchurch Windfarm.

NTS 1.6.5 Alternatives Considered for this Application

Any consideration of alternatives to the size and design of the authorised turbines and met masts must be carried out in the context of national high-level strategic plans namely;

- **Renewable Energy Support Scheme** (RESS 1) - Upperchurch Windfarm has been successful in the Government's 2020 Renewable Electricity Support Scheme which has a lower guaranteed minimum price for the electricity generated than the previous scheme. RESS1 also has a mandatory payment to the local community every year of €2 per MW/hr of electricity produced at the windfarm.

- **Irish Government's Climate Action and Low Carbon Development (Amendment) Bill 2021** - On 23rd March, 2021 the Government approved the Climate Action and Low Carbon Development (Amendment) Bill 2021 with the aim of supporting Ireland's transition to Net Zero carbon and achieve a climate neutral economy, by no later than 2050.

- **Irish Government's Climate Action Plan (2019) -** One of the key measures of the Climate Action Plan 2019 is to increase reliance on renewables for the generation of electricity (RE-E) from 30% to 70% over the period 2021 to 2030. The Plan envisages up to 8,200MW RE-E to come from on-shore wind generated electricity – double that already installed on-shore in Ireland.

There are also previously approved plans specifically for the Upperchurch Windfarm Project namely;

- **Planning Grants for Upperchurch Windfarm (granted 2014)** for 22 wind turbines**, UWF Related Works (granted 2021)** to facilitate the construction of Upperchurch Windfarm and **UWF Grid Connection (granted 2021)** to connect Upperchurch Windfarm to the national grid.

- **Grid Connection Agreement for Upperchurch Windfarm** issued by ESB Networks. The capacity of the authorised Upperchurch Windfarm does not take up all the capacity available to Upperchurch Windfarm, under this grid connection agreement.

NTS 1.6.6 Consideration of Alternatives – Extra Turbine Sites or increase in Turbine Size

The following alternatives were considered for this application, in order to optimise the generation capacity of the authorised Upperchurch Windfarm;

1. Additional turbine sites in the Upperchurch area or
2. Larger turbines at the previously authorised turbine sites.

Both options can deliver the benefits of fully using the available grid capacity; increased generation of renewable electricity and increased community benefit, commercial rates and landowner rental payments.

Although additional turbine sites are not likely to be authorised unless the environmental impacts, both alone and cumulatively are not significant, there would be some level of cumulative impacts as a result of the additional infrastructure and additional turbine sites, whereas larger turbines at the already authorised Upperchurch turbine sites have far less potential for increased impacts because they would not require additional turbine structures, or additional site works or activity. Also the larger, more up to date turbines have enhanced controllability of noise and shadow flicker emissions.

Therefore, larger turbines at the authorised Upperchurch Windfarm turbine sites are considered the better environmental option when compared to developing new turbine sites in the area. Therefore this alternative is examined further as the preferred 'Alternative' for increasing the generation capacity of the authorised but not yet constructed, Upperchurch Windfarm.

NTS 1.6.7 Alternative Turbine Sizes

Wind turbine technology has progressed since the planning was granted to Upperchurch Windfarm, in 2014 and the typical on-shore turbines available on the Irish market now, have larger generation capacity, with larger rotor diameters and higher hubs.

These larger turbines were investigated as an alternative to the authorised turbines, in an effort to install the most technically advanced turbines at this site. This will result in increased generation capacity which is the optimum use of the authorised turbine stands and the grid connection capacity secured from ESB. These turbines are also more technically capable of controlling noise and shadow flicker effects.

The three alternative turbine sizes considered and compared for environmental effects, in EIAR 2021 are;

1. Turbines up to 126.6m to tip height (already authorised);
2. Turbines 145m to tip height;
3. Turbines up to 152m to tip height and
4. Turbines up to 170m to tip height.

The environmental impact of the different turbine sizes was compared and the result in summary was that **larger turbines at the authorised turbine sites will deliver a positive increase in clean renewable electricity generation and annual community benefit, commercial rates and landowner rental payments, without significant effects on the environment or people**.

On balance, the 152m to maximum tip height turbine has been chosen by the developer as the most suitable alternative turbine size for this Amendment Application because, while the 152m to tip height turbine mitigates visual impact on the Landscape locally compared to the 170m turbine, it still delivers a substantial increase in clean renewable electricity, Community Benefit and Commercial Rates but having no material increased impact on Biodiversity; Landscape; or Residential Amenity compared to the authorised turbines. However, a lower turbine of 145m to tip height would also be suitable for the site, albeit with lower electricity production but less visually intrusive locally. This turbine size is also within the range applied for in this application.

NTS 1.7 Description of the Development

This section is a summary description of the already authorised Upperchurch Windfarm and the changes that amendments to the turbines and met masts would cause.

See **NTS Figure 1: Layout of Upperchurch Windfarm** (at the end of this document)

NTS 1.7.1 Location of Upperchurch Windfarm Site

The Upperchurch Windfarm site is located in the townlands of Graniera, Shevry, Knockcurraghbola Commons, Knockmaroe, Grousehall, Cummer, Foilnaman, Gleninchnaveigh, Coumnageeha, Coumbeg, Knocknamena Commons, Glenbeg and Seskin. This is an area 2km west of Upperchurch village and 18km to the west of Thurles, County Tipperary. The land cover in the area is predominantly pasture fields, forestry and frequent areas of bog/reeds.

The windfarm is to be located on a series of hills ranging in elevation from 280m to 401m, set out generally over four areas. The electrical substation is authorised for a location in Knockcurraghbola Commons and the wind turbines will be connected by underground cables to this substation. There are two met masts to be erected, one in Grousehall and a second in Knocknamena townlands. Other authorised works include borrow pits in Shevry, Knocknamena, Knockmaroe and Grousehall; one site entrance from the Thurles to Limerick Road (R503) at Graniera; and ten site entrances from local public roads, through and around the site, to provide access to the windfarm.

NTS 1.7.2 Details of the Proposed Alterations

This proposal is to

- **Change** the maximum tip height of the authorised wind turbines from 126.6m to a maximum of 152m. The altered wind turbines will have a hub height within the design range 89 meters to 94 meters high and rotor diameter length within the range 112m to 117m in length, but with a maximum tip height not exceeding 152m.
- **Change the height and design** of the met masts from 80m high tubular tower masts to a lattice tower design with a maximum height of 93.5m.
- **No change** in the windfarm site location or the location of each turbine or met masts.
- **No change** to the location or layout of the crane hardstandings; turbine foundations; site roads and other works (site entrances, watercourse crossing, drainage system, construction compounds, borrow pits, fencing, forestry/hedgerow removal and replanting).

- **No change** to the size or location of the electrical substation (as amended by planning grant in 2020).
- **No change** to the construction materials and turbine component haul routes.
- **No change** to the windfarm underground electrical cabling.

NTS 1.7.3 Features of Upperchurch Windfarm

NTS 1.7.3.1 Wind turbines

The altered turbines will be the same basic design as the authorised turbines and like practically all of the turbines installed in Ireland, three-bladed, tubular steel tower turbines. Typically, the towers narrow from the base to the top where the nacelle box is mounted. The blades also get narrow towards the tip and have serrated edges which reduces aerodynamic noise. The nacelle box at the top of each turbine tower contains the electrical generator. In order to be allowed to connect to the National Grid, the turbines must be Eirgrid Grid Code compliant.

A turbine model of 152m to tip height was used for the Landscape, Noise, Shadow Flicker, Ecology and Telecommunications modelling. At this stage, for technical and commercial reasons, the turbine choice for the site cannot be finalised but the size of the landscape, noise, shadow flicker, ecology and telecommunication impacts resulting from the finally chosen turbine, will not be greater than that assessed in EIAR 2021.

NTS 1.7.3.2 Meteorological (Met) masts

It is an Eirgrid requirement that continuous site meteorological information, independent of the wind turbines, is available. It is proposed here to increase the height of the two authorised met masts from 80m to 93.5m. It is also proposed to change the design of the met masts from tubular tower masts to a lattice tower design.

NTS 1.7.3.3 Electrical Substation Compound and Control Building

The authorised Upperchurch Electrical Substation consists of a substation compound, which includes control buildings, transformers and other electrical equipment. The compound will be secured by a metal fence.

In December 2020, planning permission was granted for amendments to Upperchurch Windfarm electrical substation. The amendments consist of alterations to the layout of electrical equipment in the substation compound yard and changes to the size and design of the two control buildings. The amendments were required because of updates to ESB Networks specifications for 110kV substations, which specify larger spacing between electrical equipment, larger control buildings and the provision of toilet facilities.

The amended larger turbines and masts do not require any changes to the authorised Electrical Substation. The increased electricity production can be managed by the substation equipment.

NTS 1.7.3.4 WINDFARM ROADS

The authorised windfarm site access roads comprise of 11.6km of windfarm access roads, including 8km of newly built roads and 3.6km of existing farm roads, which will require widening and upgrading.

The altered larger turbines and met masts do not require any changes beyond what is already authorised.

NTS 1.7.3.5 CRANE HARDSTANDING AND TURBINE FOUNDATIONS

Twenty-two hardstanding areas beside each wind turbine location are authorised, to facilitate erection of the turbine and maintenance works. Each wind turbine is secured to a reinforced concrete foundation that is installed below the finished ground surface. The turbines require the construction of foundations comprising concrete, steel reinforcement and aggregate, designed to engineer's specifications depending on the turbine model chosen.

The authorised crane hardstanding areas and the authorised turbine foundations can accommodate the proposed larger turbines. The authorised hardstanding areas are adequately sized to cater for larger turbines and the concrete, steel and aggregates required for the larger turbine foundations will be in line with the requirements for the authorised turbines. This is because the original foundations and hardstanding areas were designed with headroom inbuilt, in order to cater for whichever turbine type was eventually chosen.

NTS 1.7.3.6 CONSTRUCTION HAUL ROUTES

As previously authorised, construction traffic will access the windfarm site from the R503 (Thurles to Limerick Regional Road) at Graniera, south of the site. Access for construction and operational traffic throughout the site is available from ten site entrances from the Local Roads. The authorised haul route on the public roads as far as the Site Entrance at Graniera, which will be used for the abnormal loads required for turbine component deliveries, has already been used before for the delivery of turbines to Glenough, Garracummer and Milestone Windfarms.

The construction traffic haul route and site entrances can accommodate the construction materials and the larger turbine components deliveries, without changes beyond that already authorised.

NTS 1.7.3.7 ANCILLARY WORKS

One stream crossing is authorised for the windfarm site. The construction of Upperchurch Windfarm will implement drainage measures according to the authorised Sediment and Erosion Plan. Access tracks with drainage ditches and surface water drains, will be provided around hardstandings, foundations and the substation compound. Upslope drains will be constructed so as to keep clean water separate from runoff that may be contaminated by sediment. Sediment Control Management will be deployed to ensure that all water discharged is clean.

Permission has been received to develop two site compounds, to be used during the construction phase of Upperchurch Windfarm. Following construction, one site compound will be retained for use as a site office by the maintenance personnel for the operational phase of the Upperchurch Windfarm.

There are six borrow pits authorised for the Upperchurch Windfarm site which will be used to quarry stone for construction. Post construction, borrow pits will be backfilled and covered with topsoil and reseeded.

Clear-felling of 4.4 hectares of conifer plantation prior to construction is authorised. Approximately 1km of hedgerow along field boundaries, is authorised to be removed as part of the construction of the windfarm, 360m of which is suitable bat foraging vegetation. To mitigate this loss of hedgerow, an equivalent amount of new hedgerow will be planted as part of the authorised development.

The authorised electrical substation will be fenced according to ESB regulation. There will be some agricultural fencing erected or replaced on the site either as required by the landowners, for Health & Safety reasons or to protect environmental/archaeological features.

The authorised stream crossing, drainage system, site compounds, borrow pits, felling, hedgerow removal and replanting and fencing do not need to be modified for the proposed larger turbines and met masts.

NTS 1.8 Use of Natural Resources

NTS 1.8.1 Land

The land in the area comprises predominantly agricultural grassland and commercial forestry, with isolated areas of wetter grassland/bog/heath.

Approximately 4.4 hectares of conifer plantation will require permanent clear-felling for the authorised windfarm. The authorised windfarm will utilise 46.5 hectares of agricultural land within the construction works site, which will reduced to 6.4 hectares during the operational phase.

The Proposed Larger Turbines and Met Masts will require no changes to the amount of clear-felling or to the use of agricultural lands beyond that already authorised for Upperchurch Windfarm.

NTS 1.8.2 Excavated Soils and Rock

Excavations (Soils & Rock): Construction of the authorised Upperchurch Windfarm access roads and drainage system, crane hard standings, met mast hardstanding areas, substation compound and twenty-two turbine bases will involve excavation of approximately 108,000m^3 of soils from the works areas. It is estimated that up to 43,000m^3 of rock will be excavated from the on-site borrow pits.

Imported Rock: If additional rock to that won on the Upperchurch Windfarm site (higher grade for road capping for example) is required, then this will be imported from the local Rear Cross Quarries.

The Proposed Larger Turbines and Met Masts will require no changes to the amount of excavations, imported rock, size and volume of the borrow pits and stone requirements beyond that already authorised.

NTS 1.8.3 Windtake

Due to the larger rotor diameter, the proposed larger turbines have potential to change wake effects experienced at the adjacent Milestone Windfarm site, from that already authorised.

The Proposed Larger Turbines will be compliant with the Government's Wind Energy Guidelines on Windtake, because the minimum separation distances in a Crosswind Direction between the proposed larger turbines and the nearest Milestone turbines, is greater than 3 rotor diameters.

In addition, the 7 rotor diameter (downwind) separation distance guideline value, does not apply.as there are no proposed larger turbines southwest of the Milestone Windfarm turbines. Southwest is downwind of the prevailing wind.

NTS 1.9 Upperchurch Windfarm Project Construction Phase

The construction works and activities, which are already authorised by Planning Grant for Upperchurch Windfarm; UWF Related Works; UWF Grid Connection and UWF Replacement Forestry, will be carried out in the same manner if planning is granted for the proposed larger turbines and met masts. It is planned to construct all elements of the Whole Upperchurch Windfarm Project at the same time. Construction is expected to take approx. 12 - 18 months, with c.277 people engaged in the civil, electrical, Project management, legal and financial services, material supply and component deliveries.

The proposed larger turbines and meteorological mast do not alter the length of the construction stage or the number of personnel involved during construction beyond that already authorised.

The Sediment and Erosion Plan, and the Ecological Management Plan that were prepared for Upperchurch Windfarm in 2013, do not require updating to accommodate the proposed larger turbines and met masts. The 2013 Preliminary Environmental Management Plan has been updated to include the Proposed Larger Turbines and Met Masts amendment, and accompanies this planning application.

NTS 1.9.1 Construction Stage Traffic

The Proposed Larger Turbines and Met Masts will not result in any increase in construction traffic and the same haul routes and site entrances can be used without modification.

The Appointed Contractor for Upperchurch Windfarm will prepare a detailed Traffic Management Plan prior to the works commencing. This Plan will be finalised in agreement with the Gardaí and Tipperary County Council.

Approximately 950 No. loads of concrete; 15 No. loads of reinforcing steel and 5 No. loads of general building materials and 212 No. loads of electrical plant and equipment (abnormal size loads) will be imported to the site by HGV. It is expected that the abnormal loads associated with turbine components will be transported from Foynes Port.

Construction traffic will be heaviest during the construction of roadways and foundations. HGV loads of aggregate and concrete will be delivered directly to construction works areas using newly built windfarm roadways, upgraded farm and forestry tracks and site entrances from the Local Road network within the site area. Other materials, such as geotextile, ducting, and other construction materials, will be transported to the Construction Site Compounds. The authorised haul routes have been agreed with the Area Roads Engineer.

NTS 1.9.2 Construction Stage Emissions

There will be no change to the level of construction activity, or to construction stage emissions of dust, machinery exhaust, noise, vibration or light as a result of the Proposed Larger Turbines and Met Masts beyond that already authorised for Upperchurch Windfarm.

There are no houses within 200m of an Upperchurch Windfarm turbine which is the main construction area and just 3 No. houses within 50m of site entrances.

NTS 1.9.3 Construction Stage Waste

There will be no change to the level of construction activity or to construction stage welfare, general and chemical waste as a result of the Proposed Larger Turbines and Met Masts beyond that already authorised for Upperchurch Windfarm.

Waste water from welfare facilities will be contained in self-contained units and emptied by a licenced operator or in the case of the Site Offices, will be treated in the existing septic tank. General and chemical waste will also arise from construction activities and processes. During operation, minimal general and chemical waste will arise on site. All waste will be stored in designated and secure areas, for collection by an appropriately licenced operator. All wastes will be managed under a site specific Waste Management Plan.

NTS 1.10 Upperchurch Windfarm Project Operation Phase

Upperchurch Windfarm is authorised to operate for 25 years from the date of commissioning of the wind turbines. There will be 8 permanent jobs created in operation and maintenance activities, legal, electricity sales and asset management for the Whole Upperchurch Windfarm Project. Four maintenance personnel will be employed at the windfarm site to service, maintain and monitor the turbines for operational safety and performance. Entrances from the Local Roads throughout the site will be used for operation and maintenance traffic, which will mainly be four wheel drive vehicles and personnel van and very occasional main component replacements.

There will be no change to the number of operational personnel, the levels of operational activities, emissions or wastes as a result of the proposed larger turbines and met masts beyond that already authorised.

NTS 1.11 Upperchurch Windfarm Project Decommissioning Phase

Condition 22 of the planning grant for Upperchurch Windfarm deals with decommissioning wherein on full or partial decommissioning of the wind farm, or if the wind farm ceases operation for a period of more than one year, the wind monitoring mast, the turbines concerned and all decommissioned structures and equipment shall be removed, and foundations removed or covered with soil to facilitate re-vegetation, all to be completed to the written satisfaction of the planning authority within three months of decommissioning or cessation of operation.

The proposed larger turbines and met masts are compatible with the decommissioning procedure as authorised.

NTS 1.12 The Whole Upperchurch Windfarm Project

Upperchurch Windfarm as a whole Project includes the following elements

- Authorised Upperchurch Windfarm (An Bord Pleanála Ref. 22.243040 and Tipperary County Council Ref. 13/51/0003 granted planning in 2014), which this Planning Application seeks to alter.
- Authorised UWF Related Works (An Bord Pleanála File Ref. 303634-19 and ABP Tipperary County Council Ref. No. 18/600913, granted planning in 2021).
- Authorised UWF Grid Connection (An Bord Pleanála File Ref. 306204-19, granted planning in 2021).
- Authorised UWF Replacement Forestry (afforestation licence granted 2019).
- UWF Other Activities (no planning required).

See **NTS Figure 2: The Whole Upperchurch Windfarm Project** (at the end of this document)

NTS 1.12.1 UWF Related Works

The UWF Related Works comprises of the following elements,

- **Internal Windfarm Cabling** to connect the turbines to the windfarm electrical substation, through the installation of underground cables in agricultural lands; forestry lands and across public roads.
- The **Realigned Windfarm Roads** are two sections of the already authorised windfarm roads which require realignment and one length of new road to link a new telecoms relay pole to a windfarm road.
- The **Haul Route Works** are proposed for public road verges, roadside boundaries and grassland fields located adjacent to the Local Roads in the windfarm area.
- The **Telecom Relay Pole** is an 18m wooden pole proposed for a location close to the existing Foilnaman Mast.
- **Related Works (RW) Ancillary Works** will facilitate the construction of the development.

The proposed larger turbines and met masts do not require any changes to any of the elements of UWF Related Works.

NTS 1.12.2 UWF Grid Connection

The UWF Grid Connection Project will connect Upperchurch Windfarm to the National Grid through the following elements:

- A **new electrical substation in Mountphilips townland, 2km north of Newport**, County Tipperary and about 23km west (as the crow flies) of Upperchurch Windfarm. The substation will connect to the existing Killonan to Nenagh 110kV overhead electricity line.

- Connecting the new substation in Mountphilips by circa.**30km in length of underground electrical and telecoms underground cables (UGC), to Upperchurch Windfarm substation** in Knockcurraghbola Commons and thereby connect Upperchurch Windfarm to the National Grid. The route from the entrance to Mountphilips Substation will be under the public road, including the Local Road network around Newport town then for c.22km under the Newport to Thurles Regional Road (R503), as far as the Borrisoleigh/ Knockmaroe junction. From there, the cable will be placed under Local Road and private road to Upperchurch Windfarm Electrical Substation.

- **Other Works at the Mountphilips Substation site** to support the construction of Mountphilips Substation.

UWF Grid Connection, has the capacity to accommodate the increased generation from the proposed higher capacity turbines.

NTS 1.12.3 UWF Replacement Forestry

The UWF Replacement Forestry lands are located in two adjoining parcels of agricultural lands in Foilnaman townland, near the village of Upperchurch in County Tipperary. A licence has been granted to plant six hectares (6ha) of agricultural grassland with 20,000 saplings of native woodland species, set in clusters of well-matched native species, to be managed as permanent forest. Wide ride-lines between deeper areas of core woodland will be provided which will create an open space with tree-lined boundaries, which is much favoured by birds of prey during the day (e.g. hen harrier) and bats at night, as hunting ground. The new native woodland will be protected by stock-proof fencing all around. A small headwater stream within the Clodiagh River catchment, flows through the western part of the lands. No planting works will take place within 10 metres of the banks of the stream. An existing agricultural entrance leading off the L-2264-34, will be used to access the new wood.

The proposed larger turbines and met masts do not require any changes to any of the element of UWF Replacement Forestry.

NTS 1.12.4 UWF Other Activities

Haul Route Activities to facilitate the transportation of turbine components to the Upperchurch Windfarm site.

Upperchurch Hen Harrier Scheme to enhance and protect foraging habitat for hen harrier in the vicinity of Upperchurch Windfarm, in order to fulfil planning condition No.18, attaching to the authorised Upperchurch Windfarm.

Monitoring Activities to monitor the Whole Upperchurch Windfarm Project for compliance with the environmental protection measures and mitigation measures authorised for the whole project.

Overhead Line Activities: to correct the tension of the existing overhead line, following the installation of the UWF Grid Connection End Masts, and fibre wrapping to provide a communication link to the new Mountphilips Substation.

The proposed larger turbines and met masts do not require any changes to any of the element of UWF Other Activities.

NTS 1.13 Vulnerability of UWF Grid Connection to Major Accidents and/or Disasters

In summary, the Whole Upperchurch Windfarm Project is not vulnerable to major accidents, natural disasters or climate change. **The proposed larger turbines and met masts will not alter the vulnerability status of the previously authorised development** because the larger turbines and met masts can be accommodated on the same footprint, comprise the same technology and fundamental design, and incorporate the same mitigation measures as the previously authorised turbines and masts.

NTS 1.14 Mitigation & Monitoring Requirements

NTS 1.14.1 Mitigation (Minimising the Effects)

Biodiversity mitigation measures form part of the authorised Upperchurch Windfarm and will be implemented for the proposed larger turbines and met masts. These include a 50m buffer from blade tip to the edge of forestry edges/trees/hedgerows to protect bats especially; a Sediment & Erosion Control Plan, Fuel Management Plan, wheel wash area during construction, concrete control measures, consultation with Inland Fisheries Ireland regarding the one stream crossing, all to prevent sediment and pollutant runoff during the construction phase; tree felling in accordance with the latest Forestry Services guidelines; replanting of exposed soils and hedgerows; and an Ecological Management Plan to be implemented for the construction phase.

Mitigation Measures are also included as conditions of planning (Conditions 2; 15; 17; 18; 19 & 21) for the authorised windfarm and these can be implemented without change if the proposed larger turbines and masts are authorised.

Additional Mitigation Measure for Leister's Bats: To mitigate collision risk to Leister's bats, the rotational speed of the turbine blades when idling will be reduced so they do not exceed 2rpms, in line with best practice. The more up-to-date best practice guidance will also be adopted during construction, operation and decommissioning of the windfarm.

Telecommunication Signals: Mitigation measures as proposed in EIS 2013, including

- the provision of a relay site so that an alternative radio path could be used for communications to/from the existing Knockmaroe mast, and
- Condition 13 of the authorised windfarm states that In the event that the proposed development causes interference with telecommunications signals in the area, effective measures shall be introduced to minimise interference. These measures can be implemented without change if the proposed larger turbines and masts are authorised.

Shadow Flicker: An additional mitigation measure will be implemented to eliminate Shadow Flicker effect, at all houses within 10 rotor diameters of a turbine. The turbines will be fitted with shadow flicker control modules, which can automatically turn off the turbine if shadow flicker is predicted to occur.

Mitigation Measures for other elements of the Whole Upperchurch Windfarm Project: The proposed larger turbines and met masts are also compatible with the Environmental Management Plans (EMP), prepared for the UWF Related Works and UWF Grid Connection.

NTS 1.14.2 Monitoring of the Development

Monitoring commitments in the Upperchurch Windfarm EIS 2013 and subject of planning condition (including monitoring of the Hen Harrier and Water Quality) can be carried out for the proposed larger turbines and met masts also. These commitments include;

- **Construction Phase Monitoring** of Sediment & Erosion Controls; Fuel, Oil & Waste Storage; Water Quality; Concrete Pours; Breeding Bird, Badger & Bat; Archaeological and Construction Noise. Monitoring of construction works on-site to be carried out by an appropriate professional including an ecologist, environmental scientist, archaeologist and noise specialist.
- **Operational Phase Monitoring** of birds, bats, badger and water quality for three years and habitat recovery for five years post-construction to be carried out. Also monitoring of operational noise and shadow flicker is required under planning condition.

The **monitoring commitments** from the environmental documents submitted with the planning and the **monitoring conditions of planning, will be implemented for the proposed larger turbines and met masts should they be authorised. The proposed larger turbines and masts will not change these monitoring commitments.**

Neither will the proposed larger turbines and masts interfere with monitoring commitments and **monitoring conditions of planning** in the **UWF Related Works** EIAR 2019 and Grant of Planning; **UWF Grid Connection** EIAR 2019 and Grant of planning; and **UWF Replacement Forestry** EIAR 2019 and Licence Conditions.

NTS 1.15 Environmental Topics which could be changed by the Proposed larger turbines and Mast

This proposal is to alter the maximum tip height of the turbines from 126.6m to tip height, to up to 152m to tip height. This will mean that both the tower and the rotor blade of the turbines will be longer. It is also proposed to amend the height and design of the met masts from 80m to up to 93.5m and to change the mast design from a single pole design to a lattice tower. The proposal is called the ***proposed larger turbines and met masts***.

The proposed larger turbines and met mast have the potential to effect;

- **Noise** at the nearest houses, because the turbine will be newer models.
- **Shadow Flicker** at the nearest houses, because the blades are longer and the turbines are taller and therefore more shadow flicker could be expected.
- **Climate Action** because the proposed larger turbines will generate substantially more electricity.

- **Ecology (especially Bats and Birds)** because the blades are longer and therefore there is an increased risk of collision with the operating turbines.
- The **Landscape** because the proposed larger turbines and met masts are bigger and therefore more visible.
- **Cultural Heritage** because the proposed larger turbines and met masts are bigger and therefore potentially more visible from heritage sites.
- **Telecommunication signals** because the turbine is blades are longer and therefore there is greater potential for interference with signals.
- **Population & Human Health,** because the Community Benefit Fund and Commercial Rates will be substantially increased because of the increased income from the windfarm.

These topics were studied by experts in the field and their assessment results are set out by topic below.

NTS 1.15.1 Noise Impacts

Background noise monitoring was undertaken at ten locations in the vicinity of the windfarm, for the 2013 EIS. At that stage, Milestone Windfarm was not operational and therefore was not part of the background noise.

The results showed that the background noise levels varied from location to location and as a result of wind speed. In general though, the area is typical of a quiet rural location. The main noise sources are associated with agricultural activity, wind borne noise and traffic on the local roads. Since 2018, four new operating turbines at Milestone Windfarm located to the south west of Upperchurch Windfarm, are also contributing to background noise in the area.

Operating Noise: In 2014, twenty-two turbines were authorised (not yet constructed) for Upperchurch Windfarm and are subject to the following noise Condition No. 11, set out under ABP Grant (Ref. 22.243040);

> *Wind turbine noise arising from the proposed development, by itself or in combination with other existing or authorised wind energy development in the vicinity, shall not exceed the greater of*
>
> *(a) 5 dB(A) above background noise levels or,*
>
> *(b) 43 dB(A) L90,10min*
>
> *when measured externally at dwellings or other sensitive receptors.*

The operational noise from Proposed Larger Turbines alone and in combination with Milestone Windfarm was modelled and evaluated for EIAR 2021, to establish if noise from the larger turbines would be in compliance with condition 11 of the planning grant for Upperchurch Windfarm.

In general turbine technology has advanced in the years since the planning grant in 2014, in particular with regard to noise reduction. Many turbine blades now have serrated edges which generate lower aerodynamic noise as they pass through the air, than turbine blades with non-serrated edges. The predicted noise levels from the Proposed Larger Turbines was modelled for all noise sensitive dwellings within 900m of a turbine. Noise levels from the wind speed which result in maximum noise levels are used for the examination. The noise modelling results were then compared against the previous EIS 2013 results and also against the noise limits authorised under the Grant of planning by An Bord Pleanála, for Upperchurch Windfarm.

As stated in the 2013 planning documentation, the wind turbines will operate in noise reduction modes to ensure compliance with the noise limits dictated by planning. Similarly, the Proposed Larger Turbines will be fitted with noise reduction modules which will control noise so that the Proposed Larger Turbines would also comply with noise Condition 11. The final turbine selection will be made to ensure that the noise limits under the previous planning grant will not be exceeded. Ultimately the most appropriate turbine operating in the most appropriate noise mode will be chosen in order to achieve any planning condition limits attaching to a grant of permission.

The EIAR 2021 modelling includes noise from Milestone Windfarm, and the modelling shows that the Proposed Larger Turbines, with noise reduction modes applied, will not exceed the An Bord Pleanála planning grant limits and can therefore **comply with the Planning Condition 11, and therefore significant impacts from the operational larger turbines, can be excluded.**

With regards to the Whole Upperchurch Windfarm Project, operation stage noise will not be significantly increased from the other elements of the windfarm, because there is negligible noise impact from UWF Related Works; UWF Replacement Forestry or UWF Other Activities. The only noise contribution from UWF Grid Connection is from the Mountphilips substation but this facility will not emit significant levels of noise and there is sufficient separation distance from the nearest dwellings to protect residential amenity. Noise from Upperchurch Windfarm electrical substation will not be significant because the substation itself does not emit significant levels of noise and the nearest sensitive dwelling is 360m away. **The Proposed Larger Turbines will not increase the operational noise impact from Upperchurch Windfarm and therefore will not contribute to any change in significance of impact from the Whole Upperchurch Windfarm Project which remains 'not significant'.**

Construction Noise: With regards to the Whole Upperchurch Windfarm Project, construction noise on dwellings will not be significant because there are no dwellings within 200m of the main construction work areas. Works nearer to dwellings along the public roads, although noticeable, these works will be very temporary at any one place. The Proposed Larger Turbines will not increase construction noise impact from Upperchurch Windfarm and therefore will not contribute to any change in significance of impact from the Whole Upperchurch Windfarm Project.

In conclusion, the Proposed Larger Turbines will not increase the operational noise impact from Upperchurch Windfarm because the noise from the larger turbines is similar to the authorised turbines and in any case the proposed larger turbines will be controlled to ensure that operational noise levels at the nearest dwellings will remain within the levels previously authorised by planning grant in 2014.

NTS 1.15.2 SHADOW FLICKER

The proposed larger turbines will have larger rotor blade length and a higher hub heights and therefore there have the potential to cause more shadow flicker than the turbines that have previously been authorised by An Bord Pleanála.

The turbines will be fitted with shadow flicker control modules, which have computer control units and light sensors. The control unit will predict the likelihood of shadow flicker at dwellings within 10 rotor diameters (1170m)of a turbine, based on information from the light sensors measuring the light intensity at the time, whether the turbine blades are rotating and what way the blade is facing the dwelling. This predicts whether shadow flicker is possible at the dwelling in real time. The computer unit can then automatically turn off the turbine, if pre-determined limits are predicted to be exceeded.

The objective of the Proposed Larger Turbine application Shadow Flicker modelling, was to demonstrate whether or not the increased tip height and rotor diameter can operate within the authorised shadow flicker thresholds as set down in Condition 12 of the planning for the authorised Upperchurch Windfarm which states:

a) *The proposed development shall be fitted with appropriate equipment and software to suitably control shadow flicker at nearby dwellings, in accordance with details which shall be submitted to, and agreed in writing with, the planning authority prior to the commencement of development.*
b) *Shadow flicker arising from the proposed development, by itself or in combination with other existing or authorised wind energy development in the vicinity, shall not exceed 30 hours per year or 30 minutes per day at dwellings that are existing or authorised or at other sensitive receptors.*
c) *A report shall be prepared by a suitably qualified person in accordance with the requirements of the planning authority, indicating compliance with the above shadow flicker requirements at dwellings. Within 12 months of commissioning of the proposed wind farm, this report shall be submitted to, and agreed in writing with, the planning authority.*

The modelling includes Milestone Windfarm turbines.

In summary the results of the modelling show that shadow flicker from the proposed larger turbines have potential to exceed the authorised shadow flicker levels at houses within 10 rotor diameters of the Proposed Larger Turbines. In the 2013 planning assessments, the (now authorised) turbines were also predicted to exceed shadow flicker thresholds without mitigation at some locations. It should be noted that these predictions are a predominately theoretical worst case scenario – while the modelling takes into account realistic sunshine levels in Ireland, it does not account for periods when the blades are not turning, nor for periods when the wind direction has turned the rotor parallel to the sun, nor does it account for any screening provided by trees, buildings or local topography which may occur between a house and the turbine(s).

The developer commits to the installation of Shadow Flicker Control Modules as a mitigation measure, to ensure that shadow flicker from either Upperchurch Windfarm alone, or cumulatively with Milestone Windfarm, does not exceed the authorised levels at dwellings. Equally the Shadow Flicker

Control Modules can be set to eliminate shadow flicker completely and the developer commits to use this setting at the relevant turbine(s) should a complaint regarding shadow flicker be received from a neighbouring dwelling. This will eliminate shadow flicker at the dwelling in question.

With regards to the Whole Upperchurch Windfarm Project, there is no potential for shadow flicker impact from the other elements of the whole project.

In conclusion, Operational shadow flicker occurrence resulting from the Proposed Larger Turbines will be controlled to ensure that the proposed amendment will remain within the levels authorised for Upperchurch Windfarm. In addition, the developer commits, as part of this application, to zero shadow flicker at dwellings where a shadow flicker compliant arises.

NTS 1.15.3 Climate Action

There will be a **Significant Positive** impact in relation to increased production of clean electricity from the Proposed Larger Turbines and therefore avoiding greenhouse gas emissions from coal, gas and oil electricity generation in Ireland. The installation of the larger turbines will result in an almost **doubling of emission savings** possible from the authorised turbines.

All action on the reduction of greenhouse gas emissions is worthwhile because climate change is such a very serious problem and a collective effort from all countries is required to tackle such a global problem. The proposed larger turbines will make a significant positive change to the potential for Upperchurch Windfarm to contribute to Ireland's share of the global effort on Climate Change action. The increased production of renewable electricity and the consequential avoidance of emissions from fossil fuel generation (CO_2e) will have a direct increased positive effect to the Climate at both a national and global level. The fossil fuel offsets of the increased renewable electricity (RE-E) production, is set out in the Table below;

Increased renewable energy electricity production and resulting greenhouse gas offsets

Effect	**Authorised turbines tip height to 126.6m**	**Proposed Larger Turbines tip height to 152m**
Electricity production per annum	150 million kWh	270 million kWh
Avoided emissions of Carbon Dioxide equivalent	56,250 tonnes of CO_2e per annum	101,250 tonnes of CO_2e per annum

Overall, the Whole Upperchurch Windfarm Project will have a positive and significant impact on Climate due to the production and export to the National Grid of clean renewable energy electricity.

In conclusion, the change in effects on Climate is the only significant impact, positive or negative, that changing the authorised turbines to larger turbines will bring about.

NTS 1.15.4 BIODIVERSITY (ECOLOGY)

NTS 1.15.4.1 AQUATIC HABITATS OR SPECIES, TERRESTRIAL HABITATS, AMPHIBIANS, REPTILES, INVERTEBRATES (MARSH FRITILLARY) OR MAMMALS

Aquatic Habitats and Species: The drainage in and around the Upperchurch Windfarm is dominated by forestry and agricultural drains. Three of the rivers in the vicinity of Upperchurch Windfarm are located within Freshwater Pearl Mussel areas, with the shortest water pathways from the windfarm boundary to these areas being 17.4km The upper reaches of the Clodiagh and Multeen Rivers, which are within the wider windfarm area are important juvenile habitat for Atlantic salmon and brown trout are also present. Twaite shad, Allis shad and White Clayed Crayfish potentially are using the waters downstream of the windfarm area.

Land Habitats and Species: The habitats on-site are dominated by improved agricultural grassland, conifer plantation and, to a lesser extent wet grassland.

No rare or protected plants were recorded on the windfarm site during any field surveys. There is a single (public roadside) record of Invasive Species, Japanese Knotweed and a second infestation recorded in Knockcurraghbola Commons townland (c.497m from the nearest Proposed Larger Turbine). No further invasive species were recorded during field surveys.

Amphibians & Reptiles: The surveys also show low usage of the windfarm site by amphibians and reptiles. No records were made of Smooth Newt but this is likely to occur in suitable habitat where that occurs.

Invertebrate species recorded during initial 2011/2012 surveys were the Large White butterfly, a drinker moth, Lycosid spiders, caddis fly larvae and mayfly. However, the windfarm site is generally of low invertebrate diversity. No Marsh Fritillary butterfly was recorded during the 2011/2012 windfarm surveys but during 2017 surveys for UWF Related Works, breeding Marsh Fritillary butterfly was recorded at Shevry within the windfarm site but outside the construction works area boundary. The size of the Shevry colony was classified as small.

Mammal surveys were carried out in 2012, 2013, 2016, 2017 and 2019. No signs or evidence of hedgehog or Irish Stoat were recorded within the windfarm site during any surveys. Irish hare was recorded once during 2013 and infrequently during 2017 surveys. Fallow Deer were recorded during 2017 surveys for UWF Replacement Forestry (1.1km from the authorised turbine T20) and during 2017 UWF Grid Connection surveys (228m from authorised turbine T22). Secondary evidence was also found during the 2020 survey, with records of tracks (near turbine T9) and pellets (near turbines T6 and T9). No signs or evidence of Red Squirrel was recorded at the windfarm site during any surveys, although it was recorded in forestry to the west of the site. Pygmy Shrew was recorded infrequently during 2012 surveys and Red Fox was recorded throughout the site during all surveys.

Furthermore, there has been negligible changes in habitat and species composition at the authorised windfarm site or in downstream watercourses in the passage of time between the initial 2011 surveys and the 2020 surveys for this amendment.

NTS 1.15.4.2 Effects of the Proposed Larger Turbines & Met Masts on Ecology

The proposed larger turbines and met masts, will not result in any change in the impact of the authorised Upperchurch Windfarm on aquatic habitats or species; on land habitats, amphibians, reptiles, invertebrates or mammals; nor construction and operational stage displacement/disturbance or habitat loss to Bats. This is due to the proposed larger turbines and met masts not resulting in any increase in excavated footprint than for the authorised wind turbines or met masts; nor any changes in forestry felling, habitat removal, modification, degradation or fragmentation beyond that already authorised. The proposed larger turbines and met masts can be constructed using the same turbine bases, hardstands, access roads, electrical substation and ancillary site works as already authorised for Upperchurch Windfarm. There will be no change to construction materials or turbine component haulage and there will be no change in activity levels at, or traffic movements into, the site, or numbers of personnel on site during the construction, operation or decommissioning of the windfarm. Therefore, there will be no change to habitat loss or reduction, or to displacement or disturbance effects or increase in risk of invasive species spread, beyond those already authorised.

In conclusion there will be no change in the impacts on aquatic habitats or species, terrestrial habitats, amphibians, reptiles, invertebrates or mammals nor displacement/disturbance or loss of habitat to bats from the Proposed Larger Turbines and Met Masts beyond that already authorised for Upperchurch Windfarm.

NTS 1.15.4.3 Operational Stage Collision risk to Bats

Common pipistrelle & Soprano pipistrelle were recorded frequently on site in 2020 and make up 91% of all recorded calls during 2020 surveys. This is in line with the abundance of pipistrelles nationally – being the most commonly occurring species. Due to the maintenance of the 50m buffer zone between forestry edges and hedgerows which is part of this amendment proposal also, together with the flight behaviour of pipistrelle species - the majority of the calls recorded were of common pipistrelle which fly at heights below the blades of the proposed larger turbines - it is evaluated here that the proposed larger turbines do not present any material increase in the significance of the collision risk to pipistrelle species, beyond what has already been authorised.

Other species – Daubenton's/Natterer's/Brown Long-Eared Bat: Due to the behavioural factors, such as preferring cluttered environments, keeping close to vegetation and their ability to manoeuvre in flight, these species are considered to have a low collision risk with turbines. Furthermore, due to the negligible or low activity of recorded calls, it is considered that there will be **no increase in the significance of impact** to these bat species also. There is a roost of County importance with roosting Natterer and Brown Long-eared Bat, located 401m from the closest turbine. The Proposed Larger Turbines will not result in any changes to the turbine locations or ancillary works, and therefore the separation distance between the turbine and the roosts will be maintained**.**

Leisler's bats were recorded periodically on site in 2020, making up 6% of all recorded calls during site surveys. This species typically flies at a higher height than Irish pipistrelles, and as a result is more likely to come into the sweep area of turbine blades. Therefore, the proposed larger turbines do represent a slightly increased risk to this species due to the increased swept area of the blades. It is evaluated here that **the significance of the impact will not increase** as a result of three factors – the infrequent use by Leisler's of the windfarm site; the relative abundance of Leisler's nationally; and the

availability of suitable habitat in the surrounding and wider landscape. Also the following mitigation measures form part of the authorised windfarm and will be implemented for the proposed larger turbines:

- 50m buffer from blade tip to the edge of forestry edges/trees/hedgerows
- Use of red aviation lights in place of white lights on the top of the turbines
- Post construction monitoring

Additional mitigation measure for Leisler's bat on Upperchurch Windfarm:
While the proposed larger turbines will not result in an increased significance of impact to bats, two additional mitigation measures are added to this proposal in order to alleviate the slightly increased risk to the species of Leisler's bat in the windfarm area:

1. Reduce the rotational speed of the turbine blades when idling so they do not exceed 2RPM, in line with best practice. This mitigation measure has been shown to significantly reduce collision risk to bats**.**
2. Adoption of the Scottish National Heritage best practice guidance 'Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation' (2019) during the construction, operation and decommissioning of the Upperchurch Windfarm.

Therefore, in conclusion there will be no material change in collision risk to bats from operating turbines beyond that already authorised for Upperchurch Windfarm.

NTS 1.15.4.4 Construction and Operational stage Displacement/Disturbance or Habitat loss to Birds

Substantial survey effort to identify the bird populations occurring at and surrounding the Upperchurch Windfarm site has been completed between 2010 and 2020. These surveys have shown that usage by **Hen Harriers** of the Upperchurch Windfarm site has remained consistently low. **Buzzard, Kestrel and Golden Plover** were observed flying within the site. It is considered that the Upperchurch Windfarm area is not an important breeding area for birds of prey, as no nesting birds of prey were recorded at the windfarm site during any of the surveys, recent or historical.

The perching bird species (passerines) recorded at the windfarm site during bird surveys are typical for the habitats at the windfarm site. Species recorded included **Meadow Pipit, Goldcrest, Greenfinch, House Sparrow, Linnet, Mistle Thrush, Robin, Sand Martin, Skylark, Swallow, Starling, Stonechat and Willow Warbler.**

No **Red Grouse** were recorded during surveys conducted between 2010 and 2020 in the Upperchurch Windfarm site area.

The Upperchurch Windfarm site is not of importance for **waterbird** species, as there are no extensive wetland or foraging habitat which would support substantial numbers of waterbirds within the site or wider hinterland.

There will be no additional habitat loss or disturbance/displacement of birds beyond that already authorised for Upperchurch Windfarm due to construction or operational activity, habitat loss, habitat

usage or availability of prey. This is because the proposed larger turbines and met masts will not result in any increase in excavated footprint for the wind turbines or met masts, nor any changes in forestry felling or vegetation removal, nor any changes in habitat removal, modification, degradation or fragmentation associated with the already authorised development. The proposed larger turbines and met masts can be constructed using the same turbine bases, hardstands, access roads, electrical substation and ancillary site works as already authorised for Upperchurch Windfarm. There will be no change to construction materials and turbine component haulage.

It is also noted that there are negligible differences in habitat composition and with the exception of Buzzard which was recorded more frequently, there has been no material change in the species recorded onsite or their usage of the site during the passage of time since the windfarm site records began in 2010.

Therefore, in conclusion there will be no material change to disturbance/displacement or habitat loss impacts to Birds beyond that already authorised for Upperchurch Windfarm.

NTS 1.15.4.5 Operational Stage Collision Risk to Birds

Passerines (perching birds): There is no change in impact significance of collision risk to Passerines, because there will be no material change to the sources of impact for the following reasons:

- No change to turbine locations;
- Passerines are not significantly affected by wind turbines due to the generally low heights at which passerines fly.

Hen Harrier: There is no change in impact significance of collision risk to the Hen Harrier bird because there will be no material change to the sources of impact for the following reasons:

- Continued infrequent and sporadic usage of the Upperchurch Windfarm site by Hen Harriers during the breeding season as evidenced by the 2019 & 2020 surveys;
- No turbines will be located within the core foraging range (2km) from known traditional nest sites; and no additional nesting sites are present within the likely zone of effect;
- No recorded winter roosts within 2km of the Upperchurch Windfarm;
- No material change to the habitat suitability within the site which remains as 'sub-optimal';
- No change to the location of turbines and met masts from the authorised locations;
- Considering the above points in the context of the increased turbine size, the significance of impact constitutes a neutral effect which is not significant.

Kestrel: There is no change in impact significance of collision risk to Kestrel because there will be no material change to the sources of impact for the following reasons:

- No material change to the habitat suitability within the site for Kestrel;
- No change to the location of turbines and met masts from the authorised locations;
- Following an evaluation of low flight activity levels for Kestrel within the Upperchurch Windfarm site, and taking into consideration the high sensitivity of Kestrel to collision, the

change in potential collision risk resulting from the proposed larger turbines and met masts is considered to remain as *not significant*.

Buzzard and Golden Plover: There is no change in impact significance of collision risk to the Buzzard or Golden Plover because there will be no material change to the sources of impact for the following same reasons for both bird species:

- No change to the location of turbines and met masts from the authorised locations;
- Following an evaluation of Buzzard and Golden Plover flight activity within the Upperchurch Windfarm site, and taking into consideration the sensitivity of Buzzard and Golden Plover to collision, the change in potential collision risk resulting from the proposed larger turbines and met masts is evaluated to be *not significant*.

Cumulative Collison Risk: Windfarms to the south which were either operational, consented, or under construction, were evaluated for cumulative collision effects in the 2013 EIS, and were predicted to have no significant cumulative impacts to bird species. The proposed larger turbines are not expected to materially increase collision risk to all bird species including importantly Hen Harrier, Kestrel, Buzzard, Golden Plover or Passerines. Optimal foraging, nesting or roosting habitat does not occur at the site for other raptors, waders or waterbird and no migratory routes or commuting routes were recorded over the windfarm site. Therefore it is considered that there will be no significant cumulative impact to bird species as a result of the proposed larger turbines.

In conclusion, there will be no material increase in collision impacts to bird species beyond that already authorised for Upperchurch Windfarm.

NTS 1.15.4.6 Cumulative Impacts on Ecology

UWF Grid Connection and UWF Related Works were the most recently authorised elements of the whole Upperchurch Project (February 2021).

The most recent Whole Upperchurch Windfarm Project evaluation was presented in the UWF Grid Connection EIA Report of 2019 where it was concluded by An Bord Pleanála that the cumulative impacts of the Whole Upperchurch Windfarm Project, together with other projects and activities and with proper implementation of Project design measures and best practice measures, together with implementation of environmental commitments under the Environmental Management Plan, impacts on water quality, habitats and species will be minimised to a non-significant level.

The Proposed Larger Turbines do not materially increase the impact on Biodiversity, of the Upperchurch Windfarm element of the whole Project and therefore the Whole Upperchurch Windfarm Project impact or the cumulative impact with other projects, does not change beyond that already authorised.

NTS 1.15.4.7 Effects of Climate Change on Ecology

Climate change was also considered, as it is now accepted that climate change poses a grave threat to species and habitats across the planet. Global climate change results in loss and fragmentation effects on biodiversity through changing weather patterns and increase in severe weather events and extreme temperatures. The Proposed Larger Turbines will have a significant positive impact on offsetting polluting gasses that cause climate change. The effects of this proposal is to offset almost

twice the polluting gases offsetting potential of the authorised turbines, because of the increased electricity generation potential from the Proposed Larger Turbines.

It is evaluated that, there are long term positive cumulative impacts because of the pollution offsets potential of the larger turbines, in preventing loss and fragmentation of biodiversity from global climate change.

NTS 1.15.5 Effects on the Landscape of Larger Turbines and Met Masts

The Upperchurch Windfarm site location is within an extensively managed upland rural landscape of farmland and forestry, within the eastern extents of the Slievefelim to Silvermine Mountains upland area. The landscape is wholly rural (agriculture) in terms of land use and character. The landscape of the study area is a productive rural one and this is reflected in the land cover. Within the lowland landscape in the northern and southern extents of the study area the predominant land uses are pastoral farming and tillage. Pasture remains a dominant land cover within the upland areas comprising of large geometric fields enclosed by broadleaf hedgerows. On higher slopes and ridges commercial conifer plantations take over, as the dominant land cover. Only on the upper slopes of the tallest peaks such as Keeper Hill is there a natural land cover of heathland. There are some small patches of broadleaf woodland within the study area as well as narrow woodlands lining the banks of the numerous watercourses. Wind energy developments are now a characteristic feature of the upland area particularly to the south of the Upperchurch Windfarm site.

In the County Development Plan, Upperchurch Windfarm is located in an *'Area Open for Consideration for New Wind Energy Development'* as per Map 11 of the Renewable Energy Strategy 2016. According to the Landscape Character Assessment for the County, the area has a '*Medium sensitivity to change or development*'.

In the Upperchurch Windfarm area there are two designated scenic routes which pass close by the authorised windfarm and three designated scenic route further away. Regional roads in the vicinity include the R503 Thurles to Newport road and the R497 Tipperary town to Nenagh road. There are single once off houses located along public roads and settlements at Upperchurch and Kilcommon villages. The settlements further away are Holycross and Borrisoleigh. Way-marked trails including the local Eamonn a Chnoic/ Knockalough/ Red Hugh Loop, Birchhill Loop and Kilcommon Pilgrim Route walking routes and the Ormond Way/Multeen Way which form part of long distance walking and cycle routes, pass through the Upperchurch Windfarm area.

The proposed larger turbines and met masts, will not result in any material change in the impact of the authorised Upperchurch Windfarm on the landscape and visual amenity of the area for the following reasons;

- Whilst the proposed larger turbines are noticeably larger than the authorised turbines, particularly up close, they do not appear over-scaled relative to the broad scale underlying landscape. Nor do they appear out of place next the smaller Milestone turbines. Indeed, a casual observer may not notice the difference in height between the proposed larger Upperchurch turbines and the existing Milestone turbines because this could easily be thought of as the effect of higher ground or distance away from the turbine, from many locations.

- The principle of twenty-two commercial scale wind turbines is already established on this site and a variation in size between one large scale turbine and another is difficult to discern.
- The area comprises a broad upland setting where the landform and land use patterns are considered capable of assimilating large turbines.

Consequently, the alteration of the size of the turbines is not considered to result in a noticeably increased effect on physical landscape elements or the overall character of the landscape in comparison to the authorised turbines. **For these reasons, it is considered that there would be no material change to the landscape impacts arising from the Proposed Larger Turbines and Met Masts beyond the impact of the already authorised turbines and met masts.**

A full set of Landscape Photomontages can be found in the EIAR Landscape Illustrations Pack (Comparative ZTVs and Photomontages)

The Whole Upperchurch Windfarm Project effect remains unchanged. The only large visual aspect of the other elements is Mountphilips Substation which is circa. 30km from the Upperchurch turbines and as such will not be intervisible. Additionally, because the number and location of turbines remains the same as for the authorised development and also there will be no material change to the landscape impacts arising from the Proposed Larger Turbines and Met Masts beyond the impact of the authorised turbines and met masts, there will be no additional impact with other windfarms in the area i.e. nearby Milestone and other windfarms to the south of Upperchurch.

NTS 1.15.6 Effects on Cultural Heritage of the Proposed Larger Turbines & Met Masts

This upland area is a region with a rich and diverse history of human settlement going back to prehistoric times. This extended period of occupation is reflected in the archaeological record. The broader upland landscape has many known monuments, recorded on the Record of Monuments and Places. While the spread of these monuments date from the Neolithic through to post medieval times, the upland region appears to have been most intensively settled in the late Neolithic, with populations dispersing to the lower slopes during later periods.

There are two sites that are listed on the Record of Monuments and Places (RMP) within the windfarm site boundary, but not within the construction works footprint of the windfarm. No works will take place within the Zone of Notification for these RMP sites. There are a further three RMP sites located within 500m of construction works areas.

In relation to visual impacts, there are 101 RMP sites within 4km of the authorised windfarm and eight sites listed on the National Inventory of Architectural Heritage (NIAH) have been recorded within 4km of the windfarm site, though none within the site boundary.

Cartographic analysis, aerial photography and a thorough field survey carried out in 2012 identified two previously unrecorded probable booleys, two small c-shaped enclosures and a rectangular enclosure, all within the windfarm site boundary. None of these heritage features occur within the construction works footprint of the windfarm.

Because much of the study area has been subject to intensive agriculture and later forestry planting, it is considered that unrecorded underground sites that may be exposed during the course of

construction ground works are most likely to involve levelled earthworks, back filled ditches or slot trenches cut directly into the natural subsoil, or areas of large scale burning such as might be found at a Fulacht Fiadh site. There is also the possibility for many other site types being exposed, including (but not limited to) artefact scatters, objects such as pottery, stone and bronze axes, foundations of buried structures, burials, and trackways.

NTS 1.15.6.1 Visual Impact on Cultural Heritage

It is considered that, cultural heritage sites in the vicinity of Upperchurch Windfarm are not particularly vulnerable to visual impacts. It was concluded that whilst the Proposed Larger Turbines are noticeably larger than the authorised turbines, particularly from closer viewpoints, they do not appear over-large in this broad scale landscape of pasture fields, hedgerows and forestry and there is no change to the number or location of the turbines and met masts. Therefore it is evaluated that the overall visual impact will not increase.

Aspects of the Other Elements which have potential to cause visual impacts are Mountphilips Substation (UWF Grid Connection) and the Telecom Relay Pole (UWF Related Works). The Mountphilips Substation, on its own, is not expected to cause visual impacts to cultural heritage sites. Furthermore, due to the separation distance between the authorised turbines and Mountphilips Substation, there is no potential for the Proposed Larger Turbines to interact cumulatively with Mountphilips Substation. The impact of the Telecoms Relay Pole, on its own, was evaluated as Imperceptible in the UWF Related Works Revised EIAR 2019. It is evaluated that the Telecoms Relay Pole will not contribute to increased visual impacts with the windfarm turbines and met masts (whether the authorised turbines or the larger turbines), as the Telecoms Relay Pole will be barely noticeable in the context of the windfarm. Additionally, the Telecoms Relay Pole will be similar in appearance to wooden telephone and electricity poles which are common in the area. Therefore, it is evaluated that the Whole Upperchurch Windfarm Project impact is not significant.

In summary, it is evaluated that the proposed Larger Turbines and Met Masts will be not materially increase the significance of the visual impact on cultural heritage sites, above the visual impact of the already authorised turbines and met masts.

It is considered, that there is no material increase in cumulative visual impact of the Whole Upperchurch Windfarm Project and therefore no increase in cumulative impact with Other Projects and Activities.

NTS 1.15.6.2 Cultural Heritage during Construction

The Proposed Larger Turbines and Met Masts will not result in any change in the impact on Cultural Heritage sites (i.e. Recorded Legally Protected Sites, Other Recorded Sites, Previously Unrecorded Sites and Unknown Subsurface Sites) during construction or decommissioning works, beyond that already authorised for Upperchurch Windfarm. This is because the Proposed Larger Turbines and Met Masts, will not result in any change to the footprint of the windfarm. There will be no change to the location or extent of construction works areas; no change to groundworks and no change to excavation locations or requirements as already authorised for Upperchurch Windfarm.

Therefore, the Proposed Larger Turbines and Met Masts will not result in any change in the impact of Upperchurch Windfarm on Cultural Heritage during construction. And also therefore, there will

be no increased cumulative effect of the Whole Upperchurch Windfarm Project or of Other Projects and Activities.

NTS 1.15.7 Effects on Telecommunication signals

Radio and Wireless Telecommunications Networks in the area: A radio and wireless telecommunication link (Three Ireland) between Laghtseefin Mast (near Glencarbry, Hollyford) and Foilnaman Mast (at Knockmaroe), passes through the Upperchurch Windfarm site. It was previously evaluated that it is likely that the authorised turbine T19 will disrupt this link path. To avoid interference to this link, the link path will be diverted around the turbines using the Telecom Relay Pole which was authorised in 2021 as part of the UWF Related Works planning grant.

The potential for the Proposed Larger Turbines to disrupt this link and the efficiency of the Telecom Relay Pole in mitigating this impact were examined. In summary, there would be no increase in the size or extent of the impact because there is;

- No change to turbine locations and no new signal paths being affected;
- As before only one turbine will cause interference and loss of signal – T19 and there will be no increase in the size or significance of the unmitigated impact from the Proposed Larger Turbines
- The fix which is the installation of a Telecom Relay Pole as a mitigation measure, can be used to divert the Three Ireland link around the turbines, so that the link path between the Foilnaman Mast and the Laghtseefin Mast is unaffected by the windfarm. This mitigation will work for the Proposed Larger Turbines and Met Masts proposal also.

The Proposed Larger Turbines and Met Masts require no changes to UWF Related Works; UWF Grid Connection; UWF Replacement Forestry or UWF Other Activities and therefore the Whole Upperchurch Windfarm Project impact on Telecommunications does not change as a result of this proposal. Additionally therefore, the cumulative impact of the Whole Upperchurch Windfarm Project with other projects will not change beyond that already authorised.

NTS 1.15.8 Effects on Population and Human Health

NTS 1.15.8.1 The Population in the Area

The authorised but not yet constructed, Upperchurch Windfarm is located in County Tipperary. The windfarm is authorised for a rural upland location, away from urban centres, being roughly the same distance from the towns of Thurles, Nenagh, Newport and Tipperary Town. Two regional roads, which cross the upland region pass close to the windfarm site – the R503 (Thurles to Newport road) which passes east –west to the south of the windfarm site, and the R497 (Nenagh to Tipperary Town road) which passes to in a north-south direction to the west. Upperchurch Windfarm is located in the Electoral Districts of Foilnaman and Upperchurch. The area is sparsely populated with residences and farmsteads scattered throughout the area. Grassland agriculture, and to a lesser extent commercial forestry, are the primary land uses in the area, with agriculture and forestry accounting for the majority of business premises in the area. Wind energy development is also a land use and source of capital for the area, with the operational Milestone Windfarm located to the southwest of the

authorised Upperchurch Windfarm and other wind energy developments in the wider area, particularly in the Hollyford-Cappawhite area.

There is an active community in the nearby villages of Upperchurch and Kilcommon. Both villages have a national school, child-care facilities and a community hall hosting many community based activities. Local amenities include a number of local way-marked trails and two scenic routes pass through the area, however there are very few tourism services in the area – with only c.4 accommodation services and c.1 food service recorded during desktop and site surveys.

NTS 1.15.8.2 Effects of the Proposal on the Population of the Area

There will be no changes to employment and local spend on materials for the project, during construction and operation, as a result of the Proposed Larger Turbines and Met Masts.

However, there will be a positive change in strengthening the local economy during the operation phase through;

- The Proposed Larger Turbines would result in a **large community benefit payment – increasing from €300,000 to an estimated €540,000 per annum** (based on a predicted production of 270,000,000 kW hours of electricity per annum). The amount of this payment is based on a community benefit fund payment of €2 per MW hour of electricity produced, payable per annum under RESS1 Terms & Conditions Section 7.2.6 (set out below);

  > *(a) in respect of Onshore Wind RESS 1 Projects, a minimum of €1,000 shall be paid to each household located within a distance of a 1 kilometre radius from the RESS 1 Project;*
  >
  > *(b) a minimum of 40% of the funds shall be paid to not-for-profit community enterprises whose primary focus or aim is the promotion of initiatives towards the delivery of the UN Sustainable Development Goals, in particular Goals 4, 7, 11 and 13, including education, energy efficiency, sustainable energy and climate action initiatives;*
  >
  > *(c) a maximum of 10% of the funds may be spent on administration. This is to ensure successful outcomes and good governance of the Community Benefit Fund. The Generator may supplement this spend on administration from its own funds should it be deemed necessary to do so; and*
  >
  > *(d) the balance of the funds shall be spent on initiatives successful in the annual application process, as proposed by clubs and societies and similar not for profit entities, and in respect of Onshore Wind RESS 1 Projects, on "near neighbour payments" for households located outside a distance of 1 kilometre from the RESS 1 Project but within a distance of 2 kilometres from such RESS 1 Project.*

- Landowner payments are linked to production levels, and the Proposed Larger Turbines increase the **direct payments to landowners**;
- Similarly, commercial rates payments to Tipperary County Council are linked to production, and likely to increase from circa. **€650,000 to circa. €1.17 million per annum** as a result of the Proposed Larger Turbines;

- As the community benefit fund will support a broad range of local projects and payments to local landowners is likely to result in induced spending locally, it is anticipated that these associated benefits will indirectly strengthen the local economy;
- The increased commercial rates paid to Tipperary County Council would directly benefit the communities living Tipperary by supporting County projects, programmes and infrastructure.

In conclusion, the impact on socio-economic factors for the duration of the operation of Upperchurch Windfarm would be a positive increase in monetary gain beyond that expected from the already authorised windfarm, due to increased electricity production from the Proposed Larger Turbines.

There will be a Neutral reduction in Tourism Revenue due to construction of the Proposed Larger Turbines because construction activities remain the same as for the authorised turbines. The impact will be the same for the operating turbines because although the turbines will be larger and more visible in the area, the larger turbines will not be noisier and are proposed for the same locations as those already authorised. In addition, according to the evaluations in the Landscape Chapter, **no material increase in the authorised visual impact along walking routes and heritage views are expected to occur, and therefore no change to the authorised impact is expected to tourism offerings.**

The cumulative impact of the Whole Upperchurch Windfarm Project including the Proposed Larger Turbines and the impact with other windfarms in the area, will also be positive for socio-economics in the area.

NTS 1.15.8.3 Human Health and Baseline Conditions in the Area

A review of statistics from the Public Health Well and Lenus Health Repository, show that health status in North Tipperary is marginally worse than the national average, for the majority of health status indicators. However, mortality from respiratory disease and mental health conditions are lower in North Tipperary compared to the national average. Self-reported statistics from the 2016 Census show that 89% of the Upperchurch Windfarm study area population reported Very Good or Good health, which is slightly better than the state average (87%). Furthermore, a total of 13% of the Upperchurch Windfarm study area population reported having a disability, which is in-line with the state average of 13.5%.

Water Supply: There are no wells or springs in close proximity (100m) to either the Proposed Larger Turbines/Met Masts or to any other part of the windfarm footprint.

Noise, Vibration, Air Quality: The area is a quiet rural location with no major existing or dominating sources of noise or vibration. There is a good air quality with very low background concentrations of air pollutants, substantially below EU limit values.

In relation to potential air quality and noise related effects during the construction stage, there are 35 local residences (and no community facilities) within 350m of construction works areas associated with Upperchurch Windfarm. In relation to potential noise related effects during the operational stage, there are 104 local residences within 900m of the authorised turbines. No community facilities

are present within this distance from the turbines. Existing sources of wind turbine noise is limited to the operational Milestone Windfarm.

Shadow Flicker: There are 135 local residences within 1170m (10 rotor diameters) of the Proposed Larger Turbines, and no community facilities occur within this distance from the turbines. Existing sources of Shadow Flicker occurrence in the area are limited to the operational turbines at Milestone Windfarm.

EMF: Due to the rural location and lack of intensive electrical infrastructure and industry in this area, levels of EMF are low and substantially below the International Commission on Non-Ionising Radiation Protection (ICNIRP) guideline levels. There are no local residences within 100m of the authorised turbines or the authorised substation at Upperchurch Windfarm or the authorised Mountphilips Substation. Due to separation distances, there is no potential for cumulative EMF with the operational Milestone Windfarm.

Built Services: Local residents and community facilities are generally serviced by overhead electricity lines and overhead telephone lines. Underground Irish Water mains occur along some roads in the area. There is just one airborne communication signal passing through the windfarm, this link relates to a Three Ireland signal between the Foilnaman Mast at Knockmaroe and the Laghtseefin Mast at Glencarbry near Hollyford village.

Public Roads: are lightly trafficked at present, with traffic speeds generally below the posted speed limit. A review of the Road Safety Authority (RSA) online collision database shows that the local and regional roads in the area do not have a significant history of accidents, with no collisions recorded on the local roads in the area, and although there have been some Minor road collisions recorded on the R503 – none have been recorded since 2011.

NTS 1.15.8.4 Effects of the Proposal on Human Health in the Area

The Proposed Larger Turbines and Met Masts **will not cause increased health impacts due to contamination of water supply or construction vehicle emissions and dust** because there is no requirement for additional groundworks of construction activity, there is no change to the extent or location of construction works or excavations, no change to use of machinery or vehicles and no change to the noise and vibration impacts from construction machinery and traffic beyond that of the already authorised windfarm construction impacts.

There will be neutral change to the impacts on health due to construction traffic as a result of the proposed larger turbines and met masts. Health and wellbeing effects (including access, pedestrian amenity and risk of accident/injury) due to increased traffic on local roads would be neutral, because the proposed larger turbines would not require changes to haulage routes or an increase in construction traffic, beyond that already authorised for the Whole Upperchurch Windfarm Project.

There will be neutral change to the impacts on health due to turbine noise or shadow flicker as a result of the proposed larger turbines. Health and wellbeing effects due to turbine noise or shadow flicker occurrence would be Neutral, because the proposed larger turbines would not increase the noise levels of the windfarm beyond that already authorised and the operation of the proposed more advanced turbine technology can be controlled to ensure that shadow flicker occurrence and noise emissions from the turbines stay at the levels already authorised. On the basis that the larger turbines

would adhere to the same noise constraints already evaluated for the authorised turbines, the change is negligible, with no material risk to public health. Shadow Flicker effect will be controlled so as to be negligible.

There will be neutral change to the impacts on health due to turbine EMF as a result of the proposed larger turbines. Health and wellbeing effects due to EMF would be Neutral, because although the Proposed Larger Turbines will result in a change to the electrical output of the turbines, there will be no notable difference in Electromagnetic Fields (EMF) levels emitted from the electrical equipment in the turbine, including the turbine transformer. Similarly, the rated capacity of the internal windfarm cabling and UWF Grid Connection will remain the same, which is substantially below the threshold values set to be protective of public health, by the International Commission on Non-Ionising Radiation Protection.

There will be positive change to the impacts on health due to an increase in renewable energy generation, carbon emission offset and energy security as a result of the proposed larger turbines. Primary climate change impacts (e.g. increased temperatures, increased CO_2, sea level rise and increased extreme weather events) can affect several environmental functions (e.g. water availability, salinisation, crop yields, wildfires and air pollutants), which in turn have the potential to alter a range of health outcomes. The amended scheme utilising higher capacity wind turbines, is predicted to produce approximately 270,000,000kWh which is enough to supply 64,285 houses annually with the average domestic electricity needs. This amount of electricity will offset 101,250 tonnes of CO_2e per annum that would otherwise be emitted if the electricity generated by Upperchurch windfarm, was instead generated by gas, coal and oil.

On the basis that the Project would contribute to renewable energy infrastructure, this would result in a positive change contributing towards national policy and global targets inherently linked to sustainability, health and wellbeing. As climate change is a global issue, when considered in an international context, the health and wellbeing benefits associated with carbon emission offsetting would be imperceptible. When considered in a national context, the Project has a larger benefit as it contributes to achieving national net zero carbon emission targets, however, the benefit to health and wellbeing remains positive and imperceptible.

In conclusion, the proposed larger turbines will not create additional negative impacts on health and will create positive cross-factor impact through increased production of renewable electricity, which will offset the climate change effects of the alternative which is electricity generation from fossil fuels, causing greenhouse gas emissions.

The Proposed Larger Turbines and Met Mast will only add positively (through increased renewable electricity) to the Whole Upperchurch Windfarm Project impact and the impact with other windfarms in the area.

NTS 1.16 Environmental Topics which will not be changed by the Proposed Larger Turbines and Mast

NTS 1.16.1 Land & Soils

Landuse: Similar to the surrounding area, landuse at Upperchurch Windfarm is predominately agricultural grassland (16 of 22 turbines, and both met masts), with the other 6 turbines to be located in commercial forestry. A four-turbine windfarm was built at Milestone in 2018 (*also known as Cappawhite B)*. Upperchurch Windfarm was granted planning for twenty-two turbines in 2014 and UWF Related Works (works supporting the construction of the windfarm) was granted planning in February, 2021.

Bedrock and Soils: During trial pit investigations, weathered bedrock was found at an average depth of 1.90m below the surface. Soil comprised of well-draining soils and poorly draining peaty soil were encountered over sandstone and shale tills. Much of the hilltop areas were originally covered in shallow peat but most of this has been reclaimed for agricultural use. The remaining peat areas are now almost exclusively used for forestry. Peat is typically less than a one meter in depth with many areas showing less than 30cm depth. Ground slope measurements were also taken at each turbine location during site investigations and found to be gently to moderately sloping. It was evaluated in previous EIA Reports for the whole project, that there is a very low risk of slippage or landslides at the windfarm sites because of the absence of significant peat coverage and the stable sub-surface ground condition found during site investigations.

A County Geological Heritage Site, Owenbeg Moraines, occurs in the southwest of the windfarm site, in Graniera and Shevry townlands.

NTS 1.16.1.1 Effects on Land & Soils of the Proposed Larger Turbines & Met Masts

The Proposed Larger Turbines and Met Masts, will not result in any change in the impact of Upperchurch Windfarm on Land & Soils beyond that already authorised. This is because the Proposed Larger Turbines and Met Masts will cause no increase in construction works areas or land take; no change to forestry felling; no change to the footprint of the windfarm; the proposal will still be in compliance with the separation distances between turbines of a neighbouring development (Milestone) as set out in the Wind Energy Development Guidelines; no change to the excavated footprint; no change to groundworks or storage of soils; no requirement for larger foundations; no change to borrow pits; no change to reinstatement works; no change to temporary infrastructure requirements; no change to the use of machinery; no change to the use of cement based compounds and no change to the use and storage of oils, fuels and chemicals. There is no change required for operational or decommissioning works or activities.

There will be no change to the Whole Upperchurch Windfarm Project effect on Land & Soils – the effect will remain 'Not Significant'. The proposal will not result in any changes to the cumulative impacts of the Whole Upperchurch Windfarm Project with Other Projects because the proposal relates to a change to the structures rather than the foundations, groundworks or construction activities associated with the authorised windfarm. The proposal will not result in changes to the impact on Land & Soils of the authorised Upperchurch Windfarm and the Proposed Larger Turbines and Met

Masts will not require any changes to the Other Elements of the Whole Upperchurch Windfarm Project.

NTS 1.16.2 WATER

Surface Water and Groundwater Bodies (SWB, GWB): The Upperchurch Windfarm site is located on a series of hilltops that occur at the catchment divides of the Suir / Lower Shannon & Mulkear Surface Water Bodies and the regional Templemore A / Slieve Phelim Ground Water Bodies. These waterbodies are connected to the windfarm location through the following rivers which occur in the windfarm area;

- Clodiagh (Tipperary), Owenbeg (Tipperary) and Multeen (East) Rivers which drain into the River Suir and;
- Inch (Bilboa) River which drains into the Lower River Shannon and Mulkear.

It is expected that local groundwater in Templemore A eventually drains into the River Suir, with local groundwater in the Slieve Phelim draining into the Lower River Shannon.

The windfarm is predominately located in the Suir waterbody area with 20 of the 22 turbines, the windfarm substation and 1 of the 2 met masts located in these catchments. The remainder of the site is located in the Lower Shannon & Mulkear area. Similarly, the windfarm is predominately located in the Templemore A groundwater area, with the remainder in the Slieve Phelim area.

Water Quality: The EPA River Water Quality Status (2013 – 2018) of the Inch (Bilboa) River is "Moderate", while the remaining Clodiagh (Tipperary), Owenbeg (Tipperary), Multeen (Tipperary) Rivers have a "Good" water quality status. Both the Slieve Phelim GWB and the Templemore A GWB are assigned 'Good Status' (www.catchments.ie).

Wells & Springs: Due to the sparsely populated nature of the area and the separation distance between the turbine locations and local residences, there are no wells or springs in close proximity to either the proposal or to any other part of the authorised windfarm. The nearest well or spring is 25m from any of the authorised windfarm works and 308m from the nearest turbine or met mast.

Drainage: The drainage in and around Upperchurch Windfarm is dominated by forestry and agricultural drains, and this is due to the elevated nature of the site above the local valleys. There will be a requirement for one watercourse crossing along the Upperchurch Windfarm footprint and this is over a headwater stream (with no in-stream works) of the Owenbeg River.

Flood Risk: Due to elevated and hilly nature of the topography in the area of Upperchurch Windfarm, no significant flooding would be expected. The Sediment Control Plan which forms part of the authorised windfarm means no increased flood risk downstream is expected.

NTS 1.16.2.1 EFFECTS ON WATER OF THE PROPOSED LARGER TURBINES & MET MASTS

The Proposed Larger Turbines and Met Masts, will not result in any change in the impact of Upperchurch Windfarm on Water beyond that already authorised. This is because, in addition to all of the reasons set out for Land & Soils above, there will be no change in dewatering requirements; no new/changed watercourse crossing structures; no change to culvert requirements; no change to the

extent of permanent access roads or hardstanding areas; no change to the windfarm drainage system and the construction, operation and decommissioning remain unchanged from the authorised windfarm.

There will be no change to the Whole Upperchurch Windfarm Project effect on Water, remaining 'Not Significant'. The proposal will not result in any changes to the cumulative impacts of the Whole Upperchurch Windfarm Project with Other Projects (authorised Castlewaller Windfarm or Bunkimalta Windfarm) because the proposal relates to a change to the structures rather than the foundations and there will be no change to the groundworks or construction activities that are associated with the authorised windfarm. The Proposed Larger Turbines and Met Masts will not require any changes to the Other Elements of the Whole Upperchurch Windfarm Project.

NTS 1.16.3 AIR - Air Quality, Construction Emissions & Traffic and Operational EMF

For the reasons set out in Section 1.15.8.4 Effects of the Proposal on Human Health in the Area above, where impacts on Air and resulting cross-factor effects on Human Health are examined, the Proposed Larger Turbines and Met Masts will not result in any change in the impact of Upperchurch Windfarm on contamination of water supply or construction vehicle emissions and dust; construction traffic and Electromagnetic Fields (EMF), beyond that already authorised for Upperchurch Windfarm.

NTS 1.16.4 Material Assets – Public Road Network and Built Services

NTS 1.16.4.1 Public Road Network

The public roads in the immediate vicinity of the authorised Upperchurch Windfarm consist of lightly trafficked Local Roads and the lightly trafficked Regional Road R503. The R503 passes under the east and south of the windfarm site, with the main Site Entrance off this road, at Graniera. Local roads in area include the L2264-50, L6188-0, L6185-13, L4138-12 and L4139-0, and are, for the most part, single lane roads with narrow verges, bounded by low level earthen embankments or hedgerows along either side. The road pavements generally consist of traditional tar and chippings pavement, with road surface water drained to open drains, running along each of the roadsides. Small site entrances onto the various parts of the authorised windfarm site occur off these roads.

Traffic Surveys were conducted in the windfarm and grid connection areas in 2012 and 2017 and these surveys confirm that roads in the area have low traffic volumes, are not congested and that the traffic speeds are generally maintained well within the posted speed limits (i.e. less than 80kph which is generally the speed limit on the local roads). Furthermore, a review of the Road Safety Authority on-line collision statistics demonstrates that the local and regional roads in the area do not have a significant history of accidents, with no recorded collisions on the local roads in the area, and some minor road collisions on the R503 (none since 2011).

Further from the Upperchurch Windfarm site, the Regional Road R497 links Nenagh to Tipperary Town, and passes 550m to the west of the Upperchurch Windfarm site.

Road users for the purposes of this study means road users locally, traffic commuting or passing through the area, tourists and pedestrians or cyclists. These road users are on the roads for commuting to work or school, for agricultural/forestry access, for local and regional business or leisure purposes.

There is a rural transport bus service between Upperchurch, Kilcommon and Rear Cross to the larger towns in Tipperary.

NTS 1.16.4.2 Effects on the Public Road Network of the Proposed Larger Turbines & Met Masts

The Proposed Larger Turbines and Met Masts can be constructed using the authorised construction footprint and there no requirement for wider site entrances; no change is required for the materials delivery routes or traffic volumes; no change to turbine component haulage route and no change to traffic management requirements. The Proposed Larger Turbines can be transported along the same component haul route as the already authorised turbines, without any requirement for additional works or activities along the route. There will be no change to operational or decommissioning activities or traffic. **Therefore, the Proposed Larger Turbines and Met Masts will not result in any change in the impact of Upperchurch Windfarm, on the Public Road Network.**

And also therefore, there will be no increased cumulative effect of the Whole Upperchurch Windfarm Project itself or with Other Projects and Activities.

NTS 1.16.5 Built Services - Telecoms, Electricity & Water Networks

The Electricity Transmission System comprises high voltage 110kV and 220kV networks. There are no Electricity Transmission System assets in the Upperchurch Windfarm area. Mountphilips Substation near Newport Town (part of UWF Grid Connection), is authorised to connect to the Kilronan to Nenagh 110kV transmission line.

Local Electricity & Telephone Lines: Overhead local electricity and telephone lines are generally located along roadside boundaries in the area. Due to the upland nature of the location, local residences and businesses are widely dispersed and are generally located at the end of the water, electricity and telephone networks. While there is no large concentration of residences along any section of any of the networks in the area, local residences and businesses are slightly more numerous in the Knockcurraghbola/Knockmaroe area.

Water Mains: Underground Irish Water mains occur in the L2264-50, L6188-0, L4138-12 and L4139-0 local roads in the Knockcurraghbola Commons/Shevry area. No Irish Water wastewater infrastructure or local Group Water Schemes occur along the local roads around the windfarm site or in close proximity to windfarm construction works. The grid connection underground cable passes close to the Newport Regional Water Supply location, however no effects are likely to the Regional Supply from the underground grid cable.

The Telecommunications Network in the vicinity of Upperchurch Windfarm, has the potential to be impacted by the Proposed Larger Turbines and Met Masts. This is discussed at NTS 1.15.7 Effects on Telecommunications Signals above.

NTS 1.16.5.1 Effects on Built Services of the Proposed Larger Turbines and Met Masts

The Proposed Larger Turbines and Met Masts will not result in in any change to the UWF Grid Connection and its impact on the Electricity System Network, beyond that authorised for Upperchurch Windfarm and UWF Grid Connection. This is because the increased production from the higher generation capacity turbines can be accommodated and exported using the equipment and cabling as authorised for both the windfarm Electrical Substation and UWF Grid Connection Mountphilips Substation and underground cable.

Also, the Proposed Larger Turbines and Met Masts can be delivered to site without any requirement for electricity pole removal/relocations.

The Proposed Larger Turbines and Met Masts will not result in loss of public water supply due to excavations of public road pavements; or loss of electricity/ communications service due to accidental damage during movement of large machinery, public road opening excavations or excavations associated with groundwork; or loss of electricity/ communications service due to relocation of telephone or electricity poles/lines. This is because the proposed changes only relates to the turbine structures and met mast structure and there is no requirement for additional road works, construction works or activities or service outages. There is no change to the authorised site entrances; no widening works at site entrances; no change to the size or type of machinery being used; no change to turbine component transportation requirements and no change to construction traffic, beyond that already authorised for the Whole Upperchurch Windfarm Project.

Therefore, the Proposed Larger Turbines and Met Masts will not result in any change in the impact of Upperchurch Windfarm, on Built Services. And also therefore, there will be no increase in cumulative effect of the Whole Upperchurch Windfarm Project itself or with Other Projects and Activities.

NTS 1.17 Non-Technical Summary Conclusion

Upperchurch Windfarm was granted planning permission in 2014 for twenty-two wind turbines. The windfarm is not yet constructed. This application is a proposal to amend the maximum tip height of the authorised turbines from upto 126.6 meters to tip height to upto 152 meters to tip height, through extending the hub height and the length of the blades of the turbines. It is also proposed to change the height of the two authorised met masts and change the mast design from a tubular tower to a lattice tower. The proposal is called the Proposed Larger Turbines and Met Masts.

Wind turbine technology has improved and turbines have increased in size since 2014. This proposal will facilitate the construction of the most technically advanced and productive turbines available on the Irish market at the moment.

The experts who evaluated the effects of this alteration to the authorised Upperchurch Windfarm turbines and met masts, conclude that there will be no material negative increase in the impact of Upperchurch Windfarm on any environmental topic as a result of constructing the Proposed Larger Turbines and Met Mast rather than the authorised turbines and masts. There will be a significantly positive effect to Climate Change Action due to the predicted almost doubling of production of clean, renewable electricity and also a positive effect on Population & Human Health, from the increase in annual Community Benefit Fund and Commercial Rates payments.

Upperchurch Windfarm is part of a whole Project which includes the other elements - UWF Related Works and UWF Grid Connection (authorised in February 2021); UWF Replacement Forestry (afforestation licence granted 2019) and UWF Other Activities (no planning required). The Proposed Larger Turbines and Met Masts do not require any changes to be made to these other elements and also it is evaluated in the EIA Report 2021 that the proposal will not cause increase in cumulative

effects from the Whole Upperchurch Windfarm Project itself or with Other Project and Activities in the surrounding area.

The potential for increase in clean electricity production and increased payments benefiting the local community and the County, without materially changing or increasing the significance of the impact on the other environmental topics are compelling arguments for allowing an increase in the size of the authorised turbines.

NTS 1.18 Further Information on the Development

The following documents have been submitted with this application and can be examined for a more detailed description of the proposal;

- **Drawing Pack** for detailed technical drawings of the proposal.
- **Environmental Impact Assessment Report** (**EIAR 2021)** for comprehensive descriptions, figures, appendices and analysis of the effects of changing the authorised development.
- **EIAR Landscape Illustrations Pack** (Comparative ZTVs and Photomontages)
- **Upperchurch Windfarm Environmental Management Plan 2021**
- **Whole Project Mitigations Measures, Monitoring Arrangements and Planning Conditions**
- **Appropriate Assessment Report 2021** for the assessment of the effects on European Sites (Natura 2000 sites such as Special Areas of Conservations (SACs) and Special Protection Areas (SPAs)).
- **Reference Documents to EIAR 2021 and AA 2021** for full environmental information on the other elements of the whole Upperchurch Windfarm project. The other elements are UWF Related Works; UWF Grid Connection; UWF Replacement Forestry and UWF Other Activities.

NTS Figure 1 Layout of Upperchurch Windfarm

Legend:

- Proposed Larger Turbine (same location as Authorised Turbine)
- Proposed Larger Met Mast (same location as Authorised Met Mast)
- Authorised Upperchurch Windfarm footprint

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T21
T22
Met Mast No.1
Met Mast No.2
To Nenagh
To Newport
To Thurles
UPPERCHURCH
Glastrigan
Stone Row
Garranakilka
Seskin
Knockatoora Commons
Mogland
Curraghnamoe
Toorfiba
Standing Stone
Knocknamena
Carew
Coumbeg
Coumnag
Chonic
Gortnada
Glenbeg
Grousehall
Reisk
Foilnaman
Gortatooda
Gleninchnaveigh
Cooga
Cappanaleigh
Pendye's Cross Rds
Knockmaroe
Cnoc na Aitha
Megalithic Tomb
Knockcurraghbola Commons
Shevry
Mound
Standing Stones
Knocknabansha
Cnoc na Bainsi
Knockcurraghbola Crowlands
Megalithic Tombs
Inch
Knockduff
Curraghduff
Knockalough Loop
Loughbrack
Graniera
Milestone
Cloch an Mhile
Curraghnatinny
Lugnaskagh
Inchiyara
Knockalough
Cnoc an Lough
Owenbeg
An Abhainn Bhea
Eglesey Road
R497
R503
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NTS Figure 2 The Whole Upperchurch Windfarm Project