

UWF Grid Connection EIA Report

Volume C2: EIAR Main Report

Chapter 8: Biodiversity

Inis



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Glossary of Terms

Term	Definition
Afforestation	The establishment of a forest or stand of trees (forestation) in an area where there was no previous tree cover
Anadromous	Fish that migrate up rivers from the sea to spawn
Appropriate Assessment	An assessment required by the EU Habitats Directive where a project (or plan) would be likely to have a significant effect on a European site, either alone or in combination with other plans or projects
Avoidance	Prevention of impacts occurring, having regard to predictions about potentially negative environmental effects (e.g. project decisions about site location or design).

Term	Definition
Baseline Environment	The conditions that would pertain in the absence of the proposed project at the time that the project would be constructed / operated / decommissioned. The definition of these baseline conditions should be informed by changes arising from other causes (e.g. other consented developments)
Bern Convention	Convention on the Conservation of European Wildlife and Natural Habitats in Bern in 1992 ensures that governments take into account the conservation needs of species during the formulation of planning and development policies
Biodiversity	The biological diversity of the earth's living resources. The total variability among organisms and ecosystems. In common usage, and within these Guidelines, biodiversity is used to describe the conservation of the natural environment, rather than describing the variation within it.
Catchment	A catchment area is a hydrological unit. Each drop of precipitation that falls into a catchment area eventually ends up in the same river. Catchment areas are separated from each other by watershed
Climate change	A change in global or regional climate patterns, in particular a change apparent from the mid to late 20th century onwards and attributed largely to the increased levels of atmospheric carbon dioxide produced by the use of fossil fuels.
Compensation	Measures taken to make up for the loss of, or permanent damage to, ecological features despite mitigation. Any replacement area should be similar in terms of biological features and ecological functions that have been lost or damaged, or with appropriate management have the ability to reproduce the ecological functions and conditions of those biological features.
Competent Authority	An organisation or individual who is responsible for determining an application for consent for a project. Competent authorities in relation to Appropriate Assessment in Ireland are set out in SI 477 of 2011.
Conceptual Site Model	Model used to facilitate the identification of source-pathway-receptor links between a project and the receiving environment
Connectivity	A measure of the functional availability of the habitats needed for a particular species to move through a given area. Examples include the flight lines used by bats to travel between roosts and foraging areas or the corridors of appropriate habitat needed by some slow colonising species if they are to spread.
Conservation objective	Objective for the conservation of biodiversity (e.g. specific objective within a management plan or broad objectives of policy).
Conservation status	The state of a species or habitat including for example, extent, abundance, distribution and their trends.
Couches	Overground nest like structure used by Otter for resting and/or breeding
Cumulative impact / effect	Additional changes caused by a proposed development in conjunction with other developments or the combined effect of a set of developments taken together.
Degradation	The condition or process of degrading or being degraded.
Designated Sites	General term for sites which have been designated for nature conservation and for which legal protection has been conferred onto the sites. In Ireland, these included Special Areas of Conservation and Special Protection Areas. In addition to Natural Heritage Areas designated under national legislation.
Displacement	The action of moving something from its place or position.
Distribution	The geographical presence of a feature. This can depend on factors such as climate and altitude.

Term	Definition
Disturbance	Disturbance is a temporary change in environmental conditions that causes a pronounced change in an ecosystem.
Ecosystem	A dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit
Effect	Outcome to an ecological feature from an impact. For example, the effects on a dormouse population from loss of a hedgerow. See also 'Impact'.
EIAR	Environmental Impact Assessment Report
Endangered	A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered (Section V of IUCN Red List Categories and Criteria (2012) Version 3.1 2nd edn.), and it is therefore considered to be facing a very high risk of extinction in the wild.
Enhancement	The genuine enhancement of the natural heritage interest of a site or area because the project includes improved management or new habitats or features, which are better than the prospective management, or the habitats or features present there now. There is, therefore, a net or new benefit to the natural heritage
Environmental Impact Assessment (EIA)	Assessment of projects carried out under the EIA Directive and Regulations.
Environmental Impact Assessment Report	A document describing the effects of a project on the environment prepared during EIA
European sites	Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) which comprise the Natura 2000 network which are designated under European legislation
Fauna	Fauna is all of the animal life of any particular region or time.
Favourable condition	Satisfactory condition of an ecological feature. In some cases, favourable condition is specifically defined (e.g. for some designated sites).
Flora	Flora is the plant life occurring in a particular region or time.
Flora Protection Order	The current list of plant species protected by Section 21 of the Wildlife Act, 1976 is set out in the Flora (Protection) Order, 2015, which supersedes orders made in 1980, 1987 and 1999.
Fragmentation	The breaking up of a habitat, ecosystem or land-use type into smaller parcels with a consequent impairment of ecological function.
Groundwater	Groundwater is the water found underground in the cracks and spaces in soil, sand and rock. It is stored in and moves slowly through geologic formations of soil, sand and rocks called aquifers.
Habitat	The place or type of site where an organism or population naturally occurs. Often used in the wider sense referring to major assemblages of plants and animals found together
Hinterland	Area of surrounding landscape
Holts	Created or existing underground shelter used by Otter for resting and/or breeding
Hydrological	Associated with or related to the scientific study of the properties, distribution, and effects of water on the earth's surface, in the soil and underlying rocks, and in the atmosphere.
Impact	Actions resulting in changes to an ecological feature. For example, the construction activities of a development removing a hedgerow. See also 'Effect'
Important ecological features	Ecological features requiring specific assessment within EclA. Ecological features can be important for a variety of reasons (e.g. quality and extent of designated sites or habitats, habitat / species rarity).

Term	Definition
Larvae	Plural form of larva; The active immature form of an insect, especially one that differs greatly from the adult and forms the stage between egg and pupa
Life-cycle stages	In this context, the stages of a project; i.e. Construction, Operational and Decommissioning
Mitigation/Mitigation Measures	Measures taken to avoid or reduce negative impacts. Measures may include: locating the development and its working areas and access routes away from areas of high ecological interest, fencing off sensitive areas during the construction period, or timing works to avoid sensitive periods. An example of a reduction measure is a reed bed silt trap that is designed to minimise the amount of polluted water running directly into an ecologically important watercourse. See also compensation (which is separate from mitigation).
Natura Impact Statement	Under the European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011), an EclA report including the scientific assessment of a plan or project in relation to relevant Natura 2000 sites and other information required to enable a competent authority to carry out an Appropriate Assessment
Natural Heritage Area	The basic designation for wildlife in Ireland is the Natural Heritage Area (NHA). This is an area considered important for the habitats present or which holds species of plants and animals whose habitat needs protection.
Non-native invasive species	Any non-native animal or plant that has the ability to spread causing damage to the environment, the economy, our health and the way we live. Equivalent of 'alien species' as used by the Convention on Biological Diversity
Non-Volant	Incapable of flight
Population	A collection of individuals (plants or animals), all of the same species and in a defined geographical area.
Precautionary Principle	The principle that the absence of complete information should not preclude precautionary action to mitigate the risk of significant harm to the environment.
Project Design Measure	Measures for environmental protection, incorporated into the design of the project.
Proposed Natural Heritage Area	Proposed NHAs (pNHAs) were published on a non-statutory basis in 1995 and have not since been statutorily proposed or designated. These sites are of significance for wildlife and habitats are subject to limited protection, in the form of agri-environmental farm planning schemes, NPWS approval for afforestation schemes on pNHA lands and recognition of the ecological value of pNHAs by Planning and Licencing Authorities
Qualifying Interest	Habitats listed on Annex I and Species listed on Annex II of the EU Habitats Directive for which Special Areas of Conservation have been designated.
Rarity	A measure of relative abundance
Receptors	Any ecological or other defined feature (e.g. human beings) that is sensitive to or has the potential to be affected by an impact.
Replacement	The creation of a habitat that is an acceptable substitute for the habitat which has been lost.
Restoration	The re-establishment of a damaged or degraded system or habitat to a close approximation of its pre-degraded condition.
Riparian	Relating to or situated on the banks of a river
Roost	Resting place for a bird or bat
SAC/cSAC	Site designated according to the habitats directive. Special area of conservation means a site of Community importance designated by the Member States through a statutory, administrative and/or contractual act where the necessary conservation

Term	Definition
	measures are applied for the maintenance or restoration, at a favourable conservation status, of the natural habitats and/or the populations of the species for which the site is designated
Scoping	The process of determining the content and extent of the matters which should be covered in the environmental information (the EIA Report) to be submitted to a Competent Authority for developments which are subject to EIA.
Screening	Determination of whether or not an EIA is necessary.
Sensitive Aspect	Any sensitive receptor in the local environment which could be impacted by the project.
Sett	Series of underground tunnels and chambers of varying complexity used by Badgers for resting and breeding
Significance	The importance of the outcome of the impact (or the consequence of change) for the receiving environment.
Slieve Felim to Silvermines Upland Area	Area of hilly or mountainous land, over 150m elevation and contiguous areas of related habitats that occur below this altitude, in the Slieve Felim to Silvermines Mountain area between Newport Town and Upperchurch village.
Source-Impact-Pathways	Method used to identify the source of any potential impacts, predicting any potential impacts and identifying the pathways by which the potential impacts can reach the sensitive receptor
SPA	Area classified under Article 4 of the birds directive (Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds).
Special Conservation Interest	Species listed on Annex I of the EU Birds Directive as well as wetland habitats for which Special Protection Areas have been designated for the conservation of birds.
Sustainable Development	Sustainable development is a pattern of resource use that aims to meet human needs while preserving the environment so that these needs can be met not only in the present, but also for future generations.
Taxa	Plural form of Taxon; a taxonomic group of any rank, such as a species, family, or class.
Tributary	A river or stream which flows into a larger river or lake
Turbary	Turf-cutting, the legal right to cut turf or peat for fuel on common ground or on another person's ground
Vulnerable	A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable (see Section V of IUCN Red List Categories and Criteria (2012) Version 3.1 2nd edn.), and it is therefore considered to be facing a high risk of extinction in the wild.
Zone(s) of Influence	The area(s) over which ecological features may be affected by the biophysical changes caused by the proposed project and associated activities.

List of Abbreviations

Abbreviation	Full Term
AA	Appropriate Assessment
ABP	An Bord Pleanála
BCI	Bat Conservation Ireland
BOCCI	Birds of Conservation Concern in Ireland
BPM	Ecopower Best Practice Measure developed by members of the EIAR Team
BWI	Birdwatch Ireland
CIEEM	Chartered Institute of Ecology and Environmental Management
CIRIA	Construction Industry Research and Information Association
DAHRGA	Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs
DoEHLG	Department of Environment, Heritage and Local Government
EcIA	Ecological Impact Assessment
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
FPO	Flora Protection Order
GSI	Geological Survey of Ireland
IEEM	Institute of Ecology and Environmental Management
IFI	Inland Fisheries Ireland
IFM	Institute of Fisheries Management
JNCC	Joint Nature Conservation Committee
NBDC	National Biodiversity Data Centre
NGO	Non-Governmental Organisation
NHA	Natural Heritage Area
NIS	Natura Impact Statement
NPWS	National Parks and Wildlife Service
NRA	National Roads Authority
OSI	Ordnance Survey of Ireland
PD	Ecopower Project Design Environmental Protection Measure developed by members of the EIAR Team
PEA	Preliminary Ecological Appraisal
pNHA	Proposed Natural Heritage Area
RFI	Request for Further Information
SAC/cSAC	Special Area of Conservation
SEA	Strategic Environmental Assessment
SNH	Scottish Natural Heritage
SPA	Special Protection Area
UGC	Underground Cable
UWF	Upperchurch Windfarm

Executive Summary of the Biodiversity Chapter

The effects of the development on biodiversity in the area is assessed with respect to terrestrial and aquatic ecosystems of the receiving environment and the terrestrial, aquatic and avian fauna present therein.

Baseline Environment: The proposed Mountphilips Substation is located on agricultural grassland, on lower lying land to the west of the Slievefelim to Silvermines upland area. Outside the Mountphilips Substation site, the proposed 110kV UGC will cross through the Slievefelim to Silvermines uplands entirely under paved roads – predominately the Regional Limerick to Thurles Road (R503), in order to connect said Mountphilips Substation to the Consented Upperchurch Windfarm Substation to the east of the uplands. Due to the location of the 110kV UGC wholly within paved roads, the immediate vicinity of the 110kV UGC is dominated by agricultural grassland and other habitats reflective of this e.g. roadside hedgerows, treelines and earth banks, with numerous dwellings, farm buildings and associated gardens, amenity grassland, hedges and lawns. The wider surrounding environment is representative of typical upland habitats, and includes lands under active management for agriculture and forestry.

Field Surveys: To establish the ecosystems and species present, various field surveys were carried out including; **Field Walking** of all the works locations; **Habitat Surveys** of all **terrestrial habitats** within a 50m buffer of work locations; **Aquatic Ecology/Fisheries Survey** of the watercourse characteristics of all UGC crossing locations; **Hen Harrier Surveys** to identify breeding behaviour, active nests, availability of nesting and foraging habitats within 2km of each identified nest location, habitat and prey item presence within 150m of the construction works boundary and winter roost presence within 3.6km. Satellite imagery was examined and ground-truthing was carried out. Up to date information from local Hen Harrier experts and the NPWS informed these surveys; **General Birds Surveys** at the Mountphilips Substation site and **Kingfisher Habitat Suitability Surveys** within 300m of twenty-six crossing locations (in tandem with **Otter Surveys**) in addition to dedicated breeding surveys; buildings were noted for potential suitability for **Breeding Barn Owls**; **Bat Surveys** were conducted. Buildings within 50m of the 110kV UGC, were appraised for their suitability for roosting bats. Mature trees with bat roost suitability within 50m of the UWF Grid Connection construction works area, were inspected from ground level and all of watercourse crossing structures (i.e. bridges and culverts) were inspected for bat activity/roosts. Bat Activity Surveys using auto-mated detectors were carried out at four locations near the Mountphilips Substation site and two locations near the consented Upperchurch Windfarm substation; **Non-Volant Mammals** present within 50m of the proposed works were surveyed; and **Amphibians and Reptiles** occurring within the study area were recorded during the course of all site walkovers for habitat, mammal and bird surveys.

Survey Results for Sensitive Aspects in the Baseline Environment: Birds, bats and other mammals, amphibians, reptiles and invertebrates are present within the receiving environment. The 110kV UGC passes through the boundary of the Slievefelim to Silvermines Mountains SPA for 8km, along the R503. The SPA is designated for the protection of Hen Harrier. The 110kV UGC overlaps the boundary of the Lower River Shannon at 6 No. locations on the public road, mainly along the Regional Road (R503). The SAC is designated for the protection of aquatic habitats, and salmonids and freshwater aquatic species. Other European Sites, including the Lower River Suir SAC and the Clare Glen SAC, along with nationally designated NHAs and pNHAs are also found within the surrounding area. The majority of the footprint of the UWF Grid Connection is located within the River Shannon surface water catchment, with the remainder located in the River Suir surface water catchment. There are three main watercourses along the route of the 110kV UGC, all of which are within the River Shannon catchment; the Newport River (crossed at Rockvale Bridge), the Clare (Annagh) River (crossed at Tooreenbrien Bridge) and the Bilboa River (crossed at Anglesey Bridge). At these crossing locations all three watercourses are evaluated as containing good salmonid habitat, with good/high biological water quality and good ecological status. Crossing works required for the 110kV UGC at these three locations

will be in the road pavement within the bridge structures. The majority of watercourse crossings for UWF Grid Connection are characterised as minor streams and land drains, which have been subject to previous anthropogenic modification (arterial drainage, drainage maintenance, channel modification, abstractions, diversions, etc.). Aspects of the topic Biodiversity, which were deemed to be Sensitive to the development are **European Sites; National Sites; Aquatic Habitats & Species; Terrestrial Habitats; Hen Harrier; General Bird Species; Bats; Non-Volant Mammals; Amphibians & Reptiles and Marsh Fritillary** (*Other elements of the Whole UWF Project only*).

Project Design Measures: The UWF Grid Connection development as evaluated in the EIA Report incorporates Project Design Measures or mitigation measures to avoid, prevent or reduce negative impacts on Biodiversity. There are fifty-six project design environmental protection measures developed to protect Biodiversity in the receiving environment and seven Best Practice Measures, developed specifically to protect surface water quality. Protection of the water quality and the existing drainage regime will be managed under a Surface Water Management Plan (SWMP), while a bespoke Invasive Species Management Plan has been developed to prevent the introduction and/or spread of invasive species. These Plans will be implemented through the Environmental Management Plan by the appointed Contractor during the construction stage of the UWF Grid Connection and will be supervised and audited by a full time Environmental Clerk of Works who will be independent of the Contractor.

Summary of the Likely Impact to European Sites

The findings of the effects of the UWF Grid Connection (either alone or in combination with other projects) on European Sites are fully considered and evaluated in the Appropriate Assessment Report (NIS) for the development. In line with EIA Directive Guidance, the findings of the NIS are summarised in the EIA Report (in this case the Biodiversity Chapter).

A total of 23 European or Natura Sites were identified for screening. The results of the screening was that UWF Grid Connection has potential, via impact pathways, to cause effects to the four European Sites - the Lower River Shannon SAC; Lower River Suir SAC; Clare Glen SAC; and the Slievefelim to Silvermines Mountain SPA which is designated specifically for the Hen Harrier bird.

- The Mountphilips Substation site and the majority of the 110kV UGC (29km of the total 30.5km) are located within the Mulkear River catchment of the **Lower River Shannon SAC** catchment area. The 110kV UGC is located within the boundary of the Lower River Shannon SAC at six points along public roadways.
- No part of the UWF Grid Connection overlaps the boundary of the **Lower River Suir SAC** – the 110kV construction works are located c.12km upstream of the River Suir SAC, where the last c.1.5km of the UGC route is located in the Clodiagh (Tipperary) local surface water body (sub-basin) which exists within the Suir_SC_030 sub-catchment.
- No part of the UWF Grid Connection overlaps the boundary of the **Clare Glen SAC**. Clare Glen SAC comprises a wooded area on both banks of the Clare River approximately c.2.2km downstream of the 110kV UGC (on the R503 Thurles to Limerick Regional Road) within the Annagh (Tipperary) local surface water body.
- The Mountphilips Substation is not located within the **Slievefelim to Silvermines Mountain SPA**; however, the 110kV UGC, which is 30.5km in length, passes through the boundary of the SPA for 8km in total entirely within the R503 Thurles to Limerick Regional Road.

European Site are considered to be of **International Importance**. The UWF Grid Connection was evaluated for cumulative effects with other elements of the Whole UWF Project; as part of a Whole UWF Project effect and with Other Projects and Activities (Milestone Windfarm, Newport Town Park, Rearcross Quarry,

Curraghduff Quarry, Castlewaller Windfarm, potential Bunkimalta Windfarm, and the Activities of Forestry, Agriculture, Turf-Cutting.

The Mitigation measures (Project Design Measures, Best Practice Measures, Surface Water Management Plan, Invasive Species Management Plan, Traffic Management Plan) prepared specifically for this project have been designed in line with Best Practice and constitute the Best Available techniques following scientific literature and field baseline verification. The Mitigation Measures are considered to be robust and proven measures which will avoid significant adverse effects to European Sites.

Summary Impacts to European Sites

In summary the findings of the NIS concludes that, 'following the examination and analysis presented, it can be concluded on a reasoned basis, that the proposed UWF Grid Connection development will not result in adverse effects on the Integrity of European Sites, in circumstances where no reasonable scientific doubt remains'.

Summary of the Likely Impact to National Sites

Bleanbeg Bog NHA, Grageen Fen and Bog NHA and Mauherslieve Bog NHA are within 15km of the UWF Grid Connection. It is evaluated that there is no potential for effects because the development will not overlap any NHA boundary; the separation distance between the development and the NHA sites; the 110kV UGC will be located within the carriageway of public roads, and therefore there is an absence of ecological connectivity; the development is located downslope of all 3 No. NHA sites, and therefore it is evaluated that there are no source pathway links for hydrological effects and no likelihood of indirect habitat effects to these NHAs.

Summary of the Likely Impact on Aquatic Habitats & Species

Aquatic habitat relates to the instream features supporting aquatic biodiversity (bed substrate, morphology, water quality, etc.). Watercourses are highly sensitive to change, containing sensitive aquatic ecological receptors including salmonids, lamprey species, and a diverse macroinvertebrate community. **The impact of the development is evaluated as Slight to Slight-moderate** for decrease in instream aquatic habitat quality; **Slight to Moderate** for riparian habitat degradation and **Slight** for Changes to flow regime, disturbance or displacement and spread of invasive species. The rationale for this evaluation is generally because instream works are only required at 3 No. locations which have all been in some way altered by the existing landuse (i.e. agriculture or public road infrastructure); these works will only be undertaken during the IFI specified period (July – September); will not be undertaken without isolation of flow within the watercourse, and the removal of fish; all the remaining watercourses will be crossed using the existing structures (bridges or culverts) and the majority of all the watercourses to be crossed have low / no fisheries value. The frequency of works is once for any culvert replacement that might be required; the duration of the impact is limited to the specific works period within or adjacent to the aquatic habitat; the brief to temporary duration and reversibility of any effects and the implementation of water quality Project Design protection measures and Best Practice Measures; and the implementation of the Invasive Species Management Plan and adherence to best practice Biosecurity Protocols (IFI, 2010). **The cumulative impact and the Whole UWF Project cumulative impact is evaluated as Imperceptible to Moderate and No Likely Impact.** The cumulative impact of the Whole UWF Project with other projects and activities in the area, will be **Slight and No Likely Impact.**

Summary the Likely Impact on Terrestrial Habitats

Within the construction works area, the Public Road and other built surfaces accounts for 82% of the habitat concerned. Within 50m of the construction works area the dominant habitats present are improved agricultural grassland (36%); improved built land (15%), wet grassland (13%), and a mosaic of built land and amenity grassland (10.5%) which together make up 75% of all habitats present. Conifer plantation and scrub and to a much lesser extent, very small amounts of other habitat and habitat mosaics make up the remaining habitats within 50m of the construction works area. There are no Flora Protection Order (FPO) species present. There are invasive plant species present at various locations. Habitats of international conservation importance are located at four of the locations where the UGC passes through the boundary of the Lower River Shannon SAC. Habitats of National Importance in the area include the Newport River; Clare River; Bilboa River and Upland/Eroding Streams habitats which are hydrologically connected to the Lower River Shannon SAC. Habitats of Local Importance in the area include woodland; hedgerows; tree lines; scrub and small areas of Oak-birch-holly woodland; Wet heath/Wet grassland habitat mosaic and Lowland blanket bog. Due to the location of 8km of the 110kV UGC within an SPA designated for Hen Harrier, a number of habitats along the route support the structure and function of the SPA. This primarily includes foraging habitats in the open landscape (grassland, heath and bog) habitats.

Terrestrial Habitats are sensitive to direct land take, pollution, and environmental changes resulting from modification, such as increased drainage. The diversity of habitats is particularly sensitive to encroachment from invasive species. **The impact of the development is evaluated as Imperceptible** for Reduction in Terrestrial Habitats; Hedgerow Severance and Loss of High Nature Value Trees at the Mountphilips Substation Site generally because the vast majority of the construction works areas (82%) are on paved roads; the low sensitivity of the habitats for which change will occur - at Mountphilips Substation site, almost all of the land use change is on improved agricultural grassland, which has been evaluated as having lower value; at the Substation Site entrance hedgerow severance to create sightlines, will be replaced immediately with new hedgerow and semi-mature trees behind the new sightlines to avoid fragmentation effects; the very low extent of permanent hedgerow severance, with net gain due to new hedgerow planting along the new access road and no noticeable adverse contrast with baseline conditions. There is **no cumulative impact. The Whole UWF Project impact is evaluated as Not Significant to Moderate (Positive)** because of the net gain of the tree replanting and the Upperchurch Hen Harrier Scheme.

Summary the Likely Impact on Hen Harrier

Hen Harrier Study Area Extents: The extent of the Study Areas have been derived from sources such as published literature on Hen Harrier, in addition to Best Practice Guidance available within the Irish and UK Guidance, in particular Scottish Natural Heritage (SNH).

- 1 **Within 2km from the UWF Grid Connection construction works area boundary in all directions,** for breeding sites (*confirmed nest site or centre point of observed evidence of breeding behaviour identified during the breeding season*); territories; availability of foraging (hunting) habitats and communal winter roost sites – **in accordance with SNH Guidelines.**
- 2 **Within 2km of identified nests,** in relation to the availability of suitable **breeding and foraging Habitat - foraging habitat loss** within 2km of a Hen Harrier nest may potentially have negative effects on breeding success.
- 3 **Within 150m of the construction works area boundary in all directions-** in relation to **disturbance displacement to foraging Hen Harrier during the breeding season,** and effective habitat loss as a result - **150m is the most suitable Minimum Approach Distance (MAD)** indicated for likely disturbance in respect of Hen Harrier.
- 4 Within **150m of the construction works area boundary in all directions for prey item availability** - professional Judgement, based on the most suitable **MAD recommended** for Hen Harrier.

- 5 Within **50m of the construction works area boundary** in all directions for **General Habitats** - Professional Judgement and as per **Best Practice**.

In Ireland, the Hen Harrier is confined largely to heather moorland and young forestry plantations, where they nest on the ground. Hen Harrier foraging habitat preferences during the breeding season, are generally biased towards moorland, grassland mosaics and pre-thicket forest habitats which support larger numbers of prey species, their preferred being small birds such as Meadow Pipits and Skylarks and small mammals such as Bank Voles and mice. Hen Harrier are considered as 'central-place' foragers with most foraging taking place during the breeding season within a 'core range' of 2km from nests. During the breeding season females hunt closer to nest locations (typically <1km) whereas males hunt further away. In a remote tracking study in the Irish context, the concentration of Hen Harrier hunting behaviour was more than 10 times higher within 1 km of the nest than it was between 2 and 5 km from the nest. During winter, Hen Harriers gather at communal or solitary roost sites. In Ireland the majority of these roost sites are located in reed beds, heather/bog and rank/rough grassland but also fen, bracken, gorse or saltmarsh.

Context of Hen Harrier in the Slieve Felim to Silvermines uplands: The Slievefelim to Silvermines Mountain SPA as a whole covers 20,917ha and has held between seven and ten pairs of nesting Hen Harrier, and is considered one of the strongholds for Hen Harrier in the country. The SPA has a high proportion (70%) of suitable habitat. Surveys, carried out between 2016 and 2019 for the current evaluation, found that Hen Harriers nested within this SPA – no nests were recorded outside of the SPA boundary. The Mountphilips Substation is not located within the SPA; however 8km in length of the 110kV UGC passes through the SPA, entirely located within the Regional Road (R503).

Nearest Hen Harrier Nesting Sites to the development: Nests within 2km of the proposed development have been identified for this application, over a study period spanning 2017-2019 inclusive. However, a precautionary approach has been taken for completeness to include the presentation of nest data out to 3km from the development – this reflects that in certain instances the central point of observed breeding activity is often variable within a breeding season or inter-annually. For the period between 2016 and 2019, **9 No. nests were recorded within 2km, with a further 3 No. nests within 3km, and 1 No. nest at 3.2km (13 No. nests in total)**, all of which were located on lands within the SPA boundary. **Four** of the seven active territories identified in 2019, **had successful nests (i.e. these were still active in July 2019)** having either recently fledged young or with large chick(s) still in the nest at that time). With regard to proximity to works and therefore exposure to source impact pathways for possibly significant effects, the closest identified nest to the proposed development in any year was 0.6km away (2016), with **the closest active nest in 2019 being 0.9km away**.

No nests were recorded within 2km of the Mountphilips Substation, with the nearest nest being 4.6km from Mountphilips (in 2016).

Hen Harrier Nesting Habitat within 2km of the development: All habitats within 2km of the proposed UWF Grid Connection development (whether within the SPA or outside the SPA) were evaluated for their suitability as nesting habitat for Hen Harrier, notwithstanding whether Hen Harrier territories have been recorded within this area. 34% of the land within 2km of the development was considered to provide suitable nesting habitat for Hen Harrier, with 66% classed as unsuitable. The latter percentage includes all the lands at Mountphilips – where there is no suitable nesting habitat.

However, while there is sufficient nesting habitat to support Hen Harrier within 2km of the 110kV UGC, at closer distances to the 110kV UGC the habitats are less attractive at least to nesting Hen Harriers - within 50m of the proposed works for example, only 11.2% of all habitats are identified as suitable nesting habitat. This undoubtedly reflects the location of the 110kV UGC on primarily public road and the presence of houses and community amenities.

Hen Harrier foraging habitat within the 2km core range of identified nests: The identification of suitable foraging habitat is required to determine the likelihood of disturbance to foraging Hen Harrier, during the breeding season. The area of land suitable for foraging Hen Harrier within 2km of all nests comprise 43% of the total lands within 2km of all identified Hen Harrier nests, which is greater than the 30% of suitable foraging habitat required for an area to be attractive to Hen Harrier. Linear features comprising 255km are also present, which may offer foraging opportunities.

Hen Harrier Winter Roosting Habitat in the Study area: Suitable roosting habitats are not widely available, with only very small fragmented patches of habitat located within 2km of proposed development. No communal roost was identified within 2km of UWF Grid Connection during 2016-2018 surveys. 1 No. roost exists at 2.1km from the development, with 2 No. roosts between 3km and 3.6km. Based on desktop review, and the results of scoping and consultation with local NPWS/Hen Harrier surveyors no other roosts have been identified, within the likely zone of effect of the proposed development.

Importance of Hen Harrier: Hen Harrier is listed on Annex I of the EU Birds Directive 2009/147/EC. The breeding population of Hen Harrier is Amber listed on the most recent Birds of Conservation Concern in Ireland 2014 – 2019.

Sensitivity of Hen Harrier:

Sensitivity to Habitat Loss:

Studies have shown that most foraging takes place within 2km of the nest site, and as per SNH Guidance this is considered the core foraging range for Hen Harrier during the breeding season. The magnitude of effects is distance (to nearest nest) dependant, as both frequency of occurrence and foraging intensity decreases with distance from the nest. Of particular importance and where pathways for likely significant effects are more likely are lands which provide high quality foraging habitat within 2km of nests and on which breeding Hen Harrier (male or female birds) may be dependent during key periods of the breeding cycle such as provisioning young. Loss of suitable habitat may affect breeding success/productivity for one whole cycle, or until vegetation is re-instated both when considered alone and in combination with other possible sources of loss.

Disturbance

Hen Harriers are known to be sensitive to disturbance at the nest. An expert review of disturbance presented by Ruddock and Whitfield (2007) suggests active disturbance events during the incubation (part of breeding) period for Hen Harrier are, in the view of the majority of experts, likely to occur at <10-500m from a nest.

Whilst Foraging

There have been no specific studies examining the flight initiation distance (FID) of non-breeding Hen Harriers to human disturbance. Data collected from various other sources for disturbance effects on Falconiformes (which includes the Hen Harrier species) would conservatively suggest that foraging Hen Harriers are unlikely to be impacted by disturbance events over 150m away. As a species that disperses widely during the winter from breeding sites, Hen Harrier are less restricted to specific foraging areas (i.e. birds are not territorial) during the non-breeding season.

Sensitivity of Roosting Hen Harrier

Windfarms and associated infrastructure have not been explicitly defined as a threat or pressure on roosts within the Irish context.

Positive Sensitivity towards habitat creation or sympathetic management

Hen Harriers are positively sensitive to the creation of or sympathetic management of foraging and nesting habitat within their traditional range. Multiple studies exist where Hen Harriers have continued to nest and

forage in close proximity to operational wind energy developments where inclusive habitat 'enhancement' was provided.

Likely Impacts to Hen Harrier

The impact is evaluated as **Not Significant for Permanent or Temporary Reduction or Loss of Suitable Foraging Habitat** due to land cover change, which will only apply at the Mountphilips Substation Site. The amount of suitable habitat loss at the Mountphilips Substation site relates to a very small area (0.05ha) of wet grassland which will permanently change to new access road. As the nearest nest is 4.6km from this suitable habitat, this habitat is considered to be sub-optimal based on distance from nest. The Not Significant significance represents a noticeable change in the character of the environment at Mountphilips, but without any significant consequences on the Annex I species Hen Harrier. The **cumulative impact is also evaluated as Not Significant. The impact of the Whole UWF Project will be Significant (Positive)** because the Upperchurch Hen Harrier Scheme will contribute to an overall net gain to Hen Harrier of an additional 31.8Ha of actively managed foraging habitat proximal to the SPA. The cumulative impact of the Whole UWF Project with other projects (including management plans) and activities in the area, will be **Neutral**.

The impacted is evaluated as **Not Significant for Disturbance/Displacement of foraging Hen Harrier during the breeding season** because works during the breeding season (March-August) will only take place at the Mountphilips Substation site. This means that no works will occur within 4.3km of any known nests during the breeding season and the large amount of suitable habitat (3,580ha) within the core foraging range (2km) of the Hen Harrier nests identified; the availability of suitable foraging habitat within the wider area, with 70% suitable habitat available within the SPA; in the context of existing background trends, disturbance is primarily related to visual intrusion, and Hen Harrier is likely to already be habituated to road-based and farming-based noise and visual intrusion; effects will be momentary-brief in duration; unlikely to affect any individual >150m from source, and; highly reversible once any individual moves beyond 150m. The **cumulative impact is also evaluated as Not Significant. The impact of the Whole UWF Project will be Not Significant.** The cumulative impact of the Whole UWF Project with other projects and activities in the area, will be **Not Significant to Slight**.

The impact is evaluated as **Not Significant for Disturbance/Displacement of foraging Hen Harrier outside of the breeding season** because birds will already be habituated to road-based noise and visual intrusion; effects will be momentary-brief in duration; unlikely to affect any individual >150m from source; and highly reversible once any individual moves beyond 150m, given the extent of suitable foraging habitats available. Disturbance to birds at their night-time roosts, has been excluded as no significant effects are reasonably foreseeable due to distance between UWF Grid Connection works and identified roost sites. The **cumulative impact is also evaluated as Not Significant**.

The Impact is evaluated as **Imperceptible for Reduction in Prey Item Species** because a potential reduction in prey item availability only relates to the Mountphilips Substation Site, where suitable foraging habitat comprising 0.05ha will be lost, which is evaluated as negligible in the context of the separation distance to the nearest hen harrier nest (greater than 4km). There will be no noticeable changes in the character of the environment from a prey availability perspective. The **cumulative impact is also evaluated as Imperceptible. The impact of the Whole UWF Project will be Moderate (Positive)** because of the positive effect on prey item species of the Upperchurch Windfarm Hen Harrier Scheme. The cumulative impact of the Whole UWF Project with other projects (including management plans) and activities in the area, will be **Neutral**.

Summary of Likely Impact on General Bird Species

The species recorded during the two breeding season surveys at the Mountphilips substation site and the April 2019 survey along the entire length of the proposed 110kV UGC route are all representative of common and widespread terrestrial breeding bird communities in Ireland, being typical of the mosaic of farmland, woodland and rural gardens found in the survey areas.

The Impact is evaluated as **Not Significant** (Meadow Pipit: Habitat Loss); **Imperceptible** (Golden Plover: Habitat Loss); **Not Significant** (Golden Plover – Disturbance/Displacement); **Imperceptible** (Kingfisher, Grey Wagtail and Dipper - Disturbance/Displacement); and **Slight Positive** (General Birds - Habitat Enhancement). This is because of the negligible loss of suitable nesting habitat and the extent of suitable foraging habitat to be affected (1.75Ha), evaluated as very low, in the context of the availability of suitable habitat in the surrounding area – for Meadow Pipit at the Mountphilips Substation Site); because no Golden Plover were recorded at the Mountphilips Substation during any ecological surveys between 2016 and 2019. Activities such as cable trenching will not contrast significantly from baseline activities such as road works or farming related works; because of the low and negligible Sensitivity and Magnitude respectively of disturbance effects; the implementation of Project Design Measures for Grey Wagtail and Dipper; the duration of any individual disturbance events will be brief and reversible once works finish, with birds expected to return; and because of the benefit to bird diversity of the planting of hedgerows, erection of nest boxes and reinstatement built into the design. The cumulative impact is evaluated in the range from **No Cumulative Impact to Imperceptible to Not Significant**. The impact of the Whole UWF Project will range from **Imperceptible to Slight to Not Significant to Slight (Positive)**.

Summary of Likely Impact on Bats

The key sensitivities of bats are the **destruction or disturbance of their roosting places**, and the **modification of their commuting routes and foraging habitats**.

Destruction or disturbance of bat roosts in trees due to removal of mature trees, trimming and pruning of mature trees and hedgerows at Mountphilips Substation Site. **The Impact is evaluated as Imperceptible** because only 1 tree of moderate suitability is within the zone of effect. A number of project design measures will ensure that no bats are roosting in the tree at the time of works. The other trees near the Mountphilips Substation, 1 tree has moderate suitability and the rest have low suitability for bats. **Destruction / disturbance of bat roosts in bridges** due to trenching works for the 110kV UGC, and works to parapet walls. The 110kV UGC will cross a number of bridges and culverts, all within the existing road foundations. **The Impact is evaluated as Imperceptible** because two bat roosts could be directly or indirectly affected, both of which are of Negligible Importance; and the application of project design measures include bridge surveys (and the exclusion of bats, if required) before works over a bridge commences. **Severance of commuting routes or feeding areas** due to site clearance works particularly along the route of the new access road to Mountphilips Substation. **The Impact is evaluated as Imperceptible** because only a small extent of hedgerow will be permanently lost, and; 700m of additional hedgerow planting will more than compensate for its loss. **Disturbance or Displacement due to Lighting** which will be required for security reasons at the temporary construction compound. **The Impact is evaluated as Imperceptible** because the use of cowling will prevent light spill onto bat roosts or key commuting routes / feeding areas, so there will be no change to their baseline condition and any lighting that is required would only be temporarily active, and would not be on throughout the night, so any localized effects on feeding or roosting bats would be of momentary duration. There will be **No Cumulative Impact with Other Elements of the Whole UWF Project** due to separation distance. The cumulative effect of the **Whole Windfarm Project will range from Imperceptible to Not Significant** because of the small extent of the combined works that will affect Bats.

Summary of likely Impact on Non-Volant Mammals

Baseline surveys recorded evidence of **Otter, Badger, Fox, Deer species, Rat and Squirrel species** within the study area, however limited evidence of breeding or resting sites is present, primarily due to the placement of the majority of work locations within the public road. No active breeding or resting sites for Badger (setts) or Otter (couches and/or holts) are present within the Study Area. At the Mountphilips Substation site evidence of Badger, Squirrel, Deer and Fox were recorded. No Badger setts were recorded at the Mountphilips Substation site. Along the 110kV UGC route outside of the Mountphilips Substation site, evidence of mammals is limited to 18 mammal pathways/mammal runs, which is typical evidence of roadside usage. A total of seven burrows were recorded within 50 metres of the 110kV UGC route. Three of these burrows were inactive or infrequently used. The species using these burrows could not be confirmed due to an absence of other confirmatory evidence i.e scat, hairs, or prints, however they are considered likely to be Rabbit or Rat. No protected sites in respect of Badger and other general mammals exist within the study area. All mammals are sensitive to the direct effects from disturbance/displacement from breeding and foraging ranges as a result of habitat loss, construction noise and visual intrusion.

Otter - Disturbance/Displacement due to construction noise and visual intrusion. **The Impact is evaluated as Slight** because there is recorded Otter evidence in close proximity to three identified crossings, in particular at one location where parapet works will take place over the Lower River Shannon SAC, however; no Holts or resting places occur in close proximity, and; works will take place during daylight hours, and from the surface of the bridge only, with; very slight contrast to existing baseline conditions is expected, given the majority of works take place in an existing road subject to heavy passage of traffic, to which Otter will be habituated; the brief-temporary duration of disturbance events and any corresponding effect, with effects expected to be reversible, and; project design measures to avoid/reduce effects also in place, including at all watercourse crossing locations. **Badger – Habitat Loss** where the potential for effects is limited to the Mountphilips Substation site. While no evidence of Badger activity was recorded during the 2019 survey, suitable foraging habitats, consisting of grassland, woodland and hedgerows were recorded within 50m of the substation, considering the widespread distribution of Badger in Ireland, and the presence of suitable foraging habitat within and in close proximity to the study area, Badger are considered likely to forage in the area. **The Impact is evaluated as Not Significant** because no setts were recorded within the study area. While badgers' cross roads to access feeding areas, they generally do not forage along roads, and are particularly unlikely to forage along a road as busy as the R503; the brief duration of the works and the absence of significant habitat loss associated with the area; the extent of land use change, within the context (less than 2%) of an average territory size of 80Ha, and; very slight contrast with baseline conditions. **Badger – Disturbance and Displacement**, the **Impact is evaluated as Imperceptible** because of the absence of badger setts within 50m of the works; temporary duration of the works; completion of works during daylight hours; the majority of the works will be confined to the existing public road, with all works for the 110kV UGC carried out from paved surfaces only, and; effects are unlikely to cause noticeable changes in the character of the environment. The cumulative impact is evaluated in the range from **No Cumulative Impact to Imperceptible**. **The Cumulative Impact of the Whole UWF Project will range from Slight to Not Significant** because of the absence of activity in the cumulative area and protection measures built into the design of the projects.

Summary of the Likely Impact on Amphibians & Reptiles

Taking into account the species distribution of amphibians and reptiles in Ireland, **suitable habitat exists within the study area for Smooth Newt, Common Frog, and Common Lizard**. Amphibians and reptiles are sensitive to direct mortality, habitat loss, habitat fragmentation and disturbance and to the emergence of previously unrecorded diseases. **No Impacts were included for further evaluation** because suitable habitat degradation is considered to be unlikely; the extent of reduction in foraging and breeding habitat is considered negligible, in the context of availability of habitats in the immediate surrounding area. Disturbance/Displacement effects are considered to be neutral because the spatial extent, limited frequency, and brief duration of the works will be negligible and identified suitable habitats do not overlap construction works areas or activity locations. There is **No Potential for Cumulative Impacts** because the impacts from any individual element will be Neutral.

Summary of the Likely Impact on Marsh Fritillary

No suitable habitat for Marsh Fritillary was recorded on or adjacent to the lands at Mountphilips Substation site. Outside of the Substation site, the 110kV UGC is located entirely in the paved surfaces of roads which are not suitable habitat for Marsh Fritillary butterfly. During 2017 surveys for Other Elements of the Whole UWF Project, three colonies of Marsh Fritillary were recorded, with two c. 1.2km north of the 110kV UGC route and one c.1.1km south east of the works at the Consented UWF Substation at Knockcurraghbola Commons. **The impact of Habitat Loss** through excavation works for UWF Grid Connection **is therefore evaluated as No Likely Impact**. **There is No Likely cumulative impact** because there was no Marsh Fritillary habitat identified within 50m of the overlap areas with the other elements of the Whole UWF Project. The cumulative effect of the **Whole UWF Project will be Slight**, and only relates to the UWF Related Works and Upperchurch Windfarm in Shevry, the **cumulative Impact of the Whole UWF Project with peat extraction activities at Cummer Bog** is evaluated as **Moderate** because of the small overall extent and degree of Habitat loss and the likely continuance of peat extraction at the nearest known colony within the study zone.

Summary of the Overall Impact on Biodiversity

Biodiversity is defined as the variability among living organisms from all sources, including, inter alia, terrestrial, marine, and other aquatic ecosystems, and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems.

Relevant ecosystems within the study area of the proposed development, including terrestrial and aquatic habitats, along with their respective individual receptors scoped in for appraisal have been subject to full consideration in this chapter and the resultant conclusion is that with the implementation of the mitigation and project design as outlined herein, no residual effects remain. No significant impacts on the interaction, variety or variability within species comprising terrestrial and aquatic ecosystems or European Sites comprising parts of their ecosystem functioning are anticipated.

8 Environmental Factor: Biodiversity

8.1 Introduction to the Biodiversity Chapter

8.1.1 What is Biodiversity?

Biodiversity is the variability among living organisms from all sources, including terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part. This includes diversity within and between species and ecosystems.

8.1.2 Overview of Biodiversity in the Local Environment

The proposed Mountphilips Substation is on agricultural grassland, located on lower lying land to the west of the Slievefelim to Silvermines upland area. Outside the Mountphilips Substation site, the proposed 110kV UGC will cross through the Slievefelim to Silvermines uplands entirely under paved roads – predominately the Regional Limerick to Thurles Road (R503), in order to connect said Mountphilips Substation to the Consented Upperchurch Windfarm Substation to the east of the uplands. Due to the location of the 110kV UGC wholly within paved roads, the immediate vicinity of the 110kV UGC is dominated by agricultural grassland and other habitats reflective of this e.g. roadside hedgerows, treelines and earth banks, with numerous dwellings, farm buildings and associated gardens, amenity grassland, hedges and lawns. The wider surrounding environment is representative of typical upland habitats, and includes lands under active management for agriculture and forestry. Birds, bats and other mammals, amphibians, reptiles and invertebrates are present within the upland area.

The majority of the footprint of the UWF Grid Connection is located within the River Shannon surface water catchment, with the remainder located in the River Suir surface water catchment. Within the River Shannon catchment, the Mountphilips Substation site and c.29km of the 110kV UGC exist within the Lower Shannon & Mulkear hydrometric area and include the Killeengarriff, Newport (Tipperary) and the Bilboa sub-catchments. Within the River Suir catchment, the remaining c.1.5km of the 110kV UGC route is located within the Suir sub catchment. Otter, fish and other aquatic species are present within these sub-catchments.

European Sites such as the Slievefelim to Silvermines Mountains SPA and the Lower River Shannon SAC are found in the surrounding area. The 110kV UGC passes through the boundary of the Slievefelim to Silvermines Mountains SPA for 8km, along the R503. The SPA is designated for the protection of Hen Harrier. The 110kV UGC overlaps the boundary of the Lower River Shannon at 6 No. locations on the public road, mainly along the Regional Road (R503). The SAC is designated for the protection of aquatic habitats, and salmonids and freshwater aquatic species. Other European Sites, including the Lower River Suir SAC and the Clare Glen SAC, along with nationally designated NHAs and pNHAs are also found within the surrounding area.

The location of the UWF Grid Connection is illustrated on OSI Mapping on [Figure GC 8.1: UWF Grid Connection Location Map](#).

Figures and mapping referenced in this topic chapter can be found in **Volume C3 EIAR Figures**.

8.1.3 Sensitive Aspects of the Biodiversity environment included for further evaluation

Any sensitive receptor in the local environment which could be impacted by the project is a Sensitive Aspect. The following Sensitive Aspects **are included in this topic chapter** as they could be potentially impacted:

Sensitive Aspect No. 1	European Sites	Section 8.2
Sensitive Aspect No. 2	National Sites	Section 8.3
Sensitive Aspect No. 3	Aquatic Habitats & Species	Section 8.4
Sensitive Aspect No.4	Terrestrial Habitats	Section 8.5
Sensitive Aspect No.5	Hen Harrier	Section 8.6
Sensitive Aspect No.6	General Bird Species	Section 8.7
Sensitive Aspect No.7	Bats	Section 8.8
Sensitive Aspect No.8	Non-Volant Mammals	Section 8.9
Sensitive Aspect No.9	Amphibians & Reptiles	Section 8.10
Sensitive Aspect No.10	Marsh Fritillary (<i>Other Elements of the Whole UWF Project only</i>)	Section 8.11

Each of the above listed Sensitive Aspects are evaluated individually in Sections 8.2 to 8.11 of this Chapter.

To help readers navigate to individual sensitive aspect sections, the colour codes for each Sensitive Aspect used above are also used in the Sensitive Aspect sections Section 8.2 to 8.11. The colour-codes have been applied to section headings, tables and on side-tabs on the edge of the pages.

8.1.4 Sensitive Aspects excluded from further evaluation

The following Sensitive Aspects **are excluded from this topic chapter**:

General Invertebrates other than Marsh Fritillary	Effects evaluated as Neutral ¹ due to the scale of the works and small number of machines/vehicles at any one location, in addition to the general low ecological value of habitats in the receiving environment in terms of Invertebrate diversity.
Natterjack toad (<i>Bufo (Epidalea) calamita</i>),	Effects evaluated as not likely, due to the location of the UWF Grid Connection and Other Elements of the UWF Whole Project beyond the geographical range of this species.
Slow worm (<i>Anguis fragilis</i>)	Effects evaluated as not likely, due to the location of the Elements of the UWF Grid Connection and Other Elements of the UWF Whole Project beyond the geographical range of this legless lizard species.

¹ “No effects or effects that are imperceptible, within the normal bounds of variation or within the margin of forecasting error”. See EPA, August 2017, and Table 8-9.

8.1.5 Overview of the Subject Development

The UWF Grid Connection is the subject development, being the subject of the current application to An Bord Pleanála. The main parts of the UWF Grid Connection are identified in Table 8-1 below.

Table 8-1: Subject Development – UWF Grid Connection

Project ID	The Subject Development	Composition of the Subject Development
Element 1	<u>The Subject Development</u> UWF Grid Connection (GC)	Mountphilips Substation Mountphilips – Upperchurch 110kV UGC Ancillary Works at Mountphilips Substation site

Note: The UWF Grid Connection is 'Element 1' of the Whole UWF Project.

A description of the location, size and design, life-cycle stages, use of natural resources, emissions and wastes, and the vulnerability to major accidents and natural disasters is provided in [Chapter 5: Description of the Development – UWF Grid Connection \(Volume C2 Main EIA Report of this EIA Report\)](#).

This EIA Report is also available on www.upperchurchwindfarmgridconnection.ie.

8.1.5.1 Changes to the development from the 2018 Application

This is the 2nd Application for UWF Grid Connection (2019 Application). The previous application (2018 Application) was refused by An Bord Pleanála in December 2018. There are changes in this 2019 UWF Grid Connection Application from the 2018 Application. These comprise;

- In this 2019 Application, the route of the 110kV UGC from Mountphilips Substation Site entrance to the Consented UWF Substation site is wholly under the public road (except for 700m under a private paved road at the Consented UWF Substation end) and is 30.5km in length. By comparison, the 2018 Application 110kV UGC route was through agricultural and forestry tracks and lands with some public road crossings and 27.5km in length.
- Mountphilips Substation is at the same location, but the footprint of the Substation Compound is increased by 15% (from 8930m² to 10290m²) and the footprint of the control building is increased from 205m² to 375m². **Note:** Details of the changes/no changes to the Mountphilips Substation Site as a result of the increased dimensions are listed in [Chapter 5: Description of the Development: Section 5.1.1.1](#).

8.1.6 The Authors of the Biodiversity Chapter

The Biodiversity chapter was prepared by Inis Environmental Consultancy team members who are scientific experts in various fields of ecology and biodiversity. The team members were;

Howard Williams BSc CEnv MCIEEM CBiol MRSB MIFM (Principal Ecologist and CEO Inis Environmental Consultancy) - Howard is a Chartered Environmentalist and a Chartered Biologist and has written and managed many Construction Environmental Management Plans, Article 6 Appropriate Assessments and Ecological Impact Assessments for over 50 wind farm projects. Howard is an expert in the field of avian ecology in addition to having considerable knowledge and experience producing management strategies/prescriptions for a range of protected species, both terrestrial and aquatic.

Christopher Cullen Dip. Eng. Dip. Ecol. ACIEEM (Senior Ecologist) – Chris is a specialist in Ornithological surveys and assessments, however, he also has experience in Project Management, Appropriate Assessment, Expert Witness testimony, Cumulative Impact Assessment, Habitat Mapping, Mitigation Development, EIA, Collision Risk Modelling, Biomonitoring and a broad range of survey methodologies;

Dr. Alex Copland BSc PhD - experienced conservation scientist, specialising in the conservation of wild birds and biodiversity in the wider countryside, particularly in agricultural, upland and peatland landscapes. He is proficient in data analysis and studied bird populations in Ireland for over 18 years. He has managed several large-scale, multi-disciplinary conservation projects, including research and conservation work for species of conservation concern. He has worked with NGOs at EU-level as well as EU institutions (European Commission and European Parliament);

Jennifer Pearson BA MSc ACIEEM – Ecologist. Jennifer has worked as an Environmental Clerk of Works on multiple wind farms in England and Wales in terrestrial environments, and has been involved in EIA and AA evaluations for large wind farms and grid connection infrastructure.

Donncha Ó Catháin BSc (Hons) MSc GCIEEM – Ecologist. Donncha has a broad range of expertise within the Ecology sector, including aquatic ecology, botany and habitat assessment, and expertise in undertaking Ecological Clerk of Works. He has experience of using a range of survey techniques; such as habitat surveys using Fossitt (2000) classification, breeding bird surveys, winter bird transects and vantage point surveys, in line with Best Practice;

Peter O Connor MSc. Qualifying member of CIEEM - Peter holds a Masters Degree in GIS and Remote Sensing. He has experience in using MaxEnt and LiDAR to map the habitat suitability and distribution of bird species;

Gyr Penn Bird Surveyor –Having previously worked for the RSPB as a species protection officer over many years Gyr is considered by his peers in Ireland to be a highly skilled hen harrier surveyor. He has Hen Harrier survey experience at all levels of wind farm development (pre, during and post-construction periods including clear-felling) within SPAs (Slieve Aughty Mountains SPA, Co. Galway and the Slievefelim to Silvermines Mountains SPA, Co. Tipperary). He has worked for Inis at a number of wind farms carrying out vantage point surveys for Hen Harriers within SPAs;

Timothy Gallagher - Ecologist/ Mammologist. Timothy is a Field Ecologist and has conducted numerous surveys using various standardised techniques and methods including vantage point watches, CBS transects, small mammal trapping surveys, ink-pad tunnel trapping surveys, remote camera trapping surveys and large-scale mammal transect surveys.

Daireann McDonnell, MSc, B.Sc. Daireann is a qualified and experienced Aquatic Ecologist with more than fifteen years of professional experience in the environmental sector. He has provided specialist input in the delivery of Ecological Impact Assessments and Appropriate Assessment reporting for plans and projects potentially affecting terrestrial, freshwater and marine resources. He has extensive experience in aquatic surveys for protected and sensitive species, including invertebrate identification / biological water quality

Nick Marchant, has twelve years of professional experience, including nine years as an ecological consultant, one year as a local authority biodiversity officer, and two years managing an NGO overseas. He has an MSc in Ecosystem Conservation and Landscape Management from NUI Galway and a BSc in Environmental Science from Queens University Belfast. He is a member of the Chartered Institute of Ecology and Environmental Management, and operates in accordance with their code of professional conduct.

8.1.7 Sources of Baseline Information

The information sources outlined in Table 8-2 were reviewed during desktop studies and confirmed during fieldwork in order to gather information on the baseline environment. The recommendations in the guidelines listed in the table, have been considered during the preparation of this chapter.

Table 8-2: Sources of Baseline Information for Biodiversity

Type	Source
Consultation	<p>Feedback was received from</p> <ul style="list-style-type: none"> • An Bord Pleanála pre-application consultation • Tipperary County Council pre-application consultation • National Parks and Wildlife Service • Inland Fisheries Ireland <p>See Chapter 3: The Scoping Consultations, and Appendices A3.1, A3.2.</p>
Policy & Legislation	<ul style="list-style-type: none"> • National Biodiversity Action Plan (2017 – 2021) • North Tipperary County Development Plan 2010 (as varied), adopted in December 2015, relevant provisions include HERT29 • Draft North Tipperary Local Biodiversity Action Plan 2007 • Mid-West Regional Planning Guidelines 2010-2022 • North Tipperary Heritage Plan 2013-2018 • Tipperary Renewable Energy Strategy 2016 • South Tipperary Biodiversity Action Plan 2010-2015 • EU Birds Directive (2009) Directive 2009/147/EC • EU Habitats Directive (1992) Council Directive 92/43/EEC • EC (Birds and Natural Habitats) Regulations 2011 (as amended) • Water Framework Directive (2000) Directive 2000/60/EC
Guidelines	<p><u>Ecological Evaluation</u></p> <ul style="list-style-type: none"> • National Roads Authority, (2008) Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes. • Guidelines for Ecological Impact Assessment in the UK and Ireland- (CIEEM, 2016 and 2018). • Environment Agency, (2014) UK Pollution Prevention Guidelines (PPG) • EPA (2017) Guidelines on the Information to be contained in EIA Reports, Draft. <p><u>Hen Harrier</u></p> <ul style="list-style-type: none"> • Arroyo <i>et al.</i> (2009) Hunting habitat selection by hen harriers on moorland: Implications for conservation management. • Arroyo <i>et al.</i> (2014) Ranging behaviour of Hen Harriers breeding in Special Protection Areas in Scotland. • Barton <i>et al.</i> (2006) The second national survey of breeding hen harriers in Ireland 2005 • Forrest <i>et al.</i> (2011) Flight activity and breeding success of hen harrier at Paul's Hill Wind Farm in Scotland. • Hen Harrier Project, (2019). HARRIER HEN PROGRAMME T&Cs 2nd Edition April 2019. Note 6, Pg. 22. • Irwin <i>et al.</i> (2012) Optimum scenarios for Hen Harrier conservation in Ireland. Report to the Dept. of Agriculture, Food & the Marine. • Madders, M. (2000) Habitat selection and foraging success of Hen Harriers Circus in west Scotland. • Madders, M. (2003) Hen Harrier foraging activity in relation to habitat and prey. • Moran & Wilson-Parr, (2014), Hen Harrier SPA Mapping Project undertaken by NPWS

Type	Source	Introduction, Authors, Sources, Methodology
	<ul style="list-style-type: none"> NPWS (2015) Hen Harrier Conservation and the Forestry Sector in Ireland Version 3.2 Hardey <i>et al.</i> (2014). Raptors: a field guide to survey and monitoring (3rd Edition) O'Donoghue, 2010 Irish Winter Hen Harrier Roost Survey (IWHHRS) Ruddock <i>et al.</i> (2007). A review of disturbance distances in selected bird species. Natural Research (Projects) Ltd to SNH Ruddock <i>et al.</i> (2012) Republic of Ireland National Hen Harrier Survey 2010. Irish Wildlife Manual, No. 59, NPWS Ruddock <i>et al.</i> (2016) 2015 National Survey of Breeding Hen Harrier in Ireland. Irish Wildlife Manuals, No. 93 NPWS and Scottish Natural Heritage (SNH). Scottish Natural Heritage (2017). Recommended bird survey methods to inform impact assessment of onshore wind Farms. Version 2. SNH, Battleby. <p><u>Other Birds</u></p> <ul style="list-style-type: none"> Birdwatch Ireland (2010) An assessment of the effects of Arterial Drainage Maintenance on Kingfisher and other riparian birds. Birdwatch Ireland (2012) Guidelines for Countryside Bird Survey Participants Colhoun <i>et al.</i> (2013) Birds of Conservation Concern in Ireland 2014-2019. Cummins <i>et al.</i> (2010) Assessment of the distribution and abundance of Kingfisher and other riparian birds on six SAC river systems in Ireland Birdwatch Ireland Crowe <i>et al.</i> (2014) Countryside Bird Survey Report 1998-2013, BirdWatch Ireland Lusby <i>et al.</i> (2011) Assessing the effectiveness of monitoring methods for Merlin in Ireland: the Pilot Merlin Survey 2010. Bibby <i>et al.</i> (2000). Bird Census Techniques, 2nd Edition. Academic Press, London. Cummins <i>et al.</i> (2010) The status of Red Grouse in Ireland and the effects of land use, habitat and habitat quality on their distribution. Irish Wildlife Manuals, No. 50. NPWS <p><u>Terrestrial Habitats</u></p> <ul style="list-style-type: none"> Fossitt, J (2000) A Guide to the Habitats of Ireland Smith <i>et al.</i> (2011) Best Practice Guidance for Habitat Survey and Mapping, Heritage Council Ireland Irish Statute Book (Various) European Communities (Natural Habitats) Regulations 1997 (S.I. 94/97) as amended NPWS (2013) Status of Protected EU Habitats and Species in Ireland. Overview Vol.1. <p><u>Bats</u></p> <ul style="list-style-type: none"> Collins (2016) Bat Conservation Trust: Bat surveys for professional ecologists: good practice guidelines Billington <i>et al.</i> (1997). The Conservation of Bats in Bridges Project. Natural England. Collins (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Ed.) National Road Authority (2006) Guidelines for the treatment of bats during the construction of National Road scheme. Lundy <i>et al.</i> (2011) Landscape conservation for Irish bats & species specific roosting characteristics, Bat Conservation Ireland. <p><u>Badgers</u></p> <ul style="list-style-type: none"> NRA, 2005 Guidelines for the Treatment of Badgers prior to the Construction of National Road Schemes Sleeman <i>et al.</i> (2009) How many Eurasian badgers are there in Ireland?, European Journal of Wildlife Research <p><u>Otters</u></p>	

Type	Source
	<ul style="list-style-type: none"> National Roads Authority (2006) Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes Highways Agency (1999) The Good Roads Guide: Nature Conservation Advice in Relation to Otters <i>Design Manual for roads and Bridges</i> (DMRB Vol 10 S. 4 Part 4 HA 81/99). <p><u>Aquatic Habitats & Species</u></p> <ul style="list-style-type: none"> National Roads Authority (2005) Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes. Inland Fisheries Ireland, (2016) Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites (Eastern Regional Fisheries Board, not dated). CIRIA (Construction Industry Research and Information Association) 2006: Guidance on 'Control of Water Pollution from Linear Construction Projects' CIRIA 2006: Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors). Fowles & Smith, (2006) Mapping the habitat quality of patch networks for the marsh fritillary Meehan, (2013) National Smooth Newt Survey 2013 Report, Irish Wildlife Trust, National Biodiversity Data Centre (2016) Data for records of Common Frog held by NBDC <p><u>Invasive Species</u></p> <ul style="list-style-type: none"> Kelly <i>et al.</i> (2013a) The economic cost of invasive and non-native species in Ireland and Northern Ireland, A report prepared for the N.I. Environment Agency and NPWS. Kelly, <i>et al.</i> (2013b) Risk analysis and prioritisation for invasive and non-native species in Ireland and Northern Ireland, A report prepared for the N.I. Environment Agency and NPWS. O'Flynn <i>et al.</i> (2014) Ireland's invasive and non-native species – trends in introductions, NBDC Series No. 2.
Desktop	<ul style="list-style-type: none"> NPWS website www.npws.ie National Biodiversity Data Centre website(NBDC) www.biodiversityireland.ie Tipperary County Council www.tipperarycoco.ie Transport Infrastructure Ireland (formerly NRA) www.tii.ie European Union www.europa.eu Water Framework Directive www.wfireland.ie Scottish National Heritage www.nature.scot The Heritage Council www.heritagecouncil.ie Construction Industry Research and Information Association www.ciria.org Irish Wildlife Trust www.iwt.ie Environmental Protection Agency website (EPA) www.epa.ie Inland Fisheries Ireland (IFI) www.fisheriesireland.ie Birdwatch Ireland (BWI) www.birdwatchireland.ie Bat Conservation Ireland (BCI) www.batconservationireland.org Butterfly Ireland www.butterflyconservation.ie <p><u>Previous Hen Harrier Surveys</u></p> <ul style="list-style-type: none"> Results of Hen Harrier surveys performed from March 2015 to April 2017 were used as a source of information. These surveys focused on suitable nesting habitat and historical nest locations within 2km of the UWF Related Works/Upperchurch Windfarm sites. Existing records of Hen Harrier usage of the area, dating back to 2003, were collated to establish suitable nesting or roosting habitat and further consultation undertaken in January 2019 with local Hen Harrier experts and NPWS.

Type	Source	Introduction, Authors, Sources, Methodology
	<ul style="list-style-type: none"> Satellite imagery was reviewed to identify areas of potentially suitable breeding habitat. <u>In co-ordination with and/or by review of the other EIA Report Chapters as follows:</u> Chapter 7: Land Chapter 10: Soils Chapter 11: Water Chapter 12: Air Chapter 15: Material Assets (Roads) Review of planning/ environmental information documents for the Other Elements of the Whole UWF Project as contained in Volume F of the planning application; Review of environmental information/planning documents for Milestone Windfarm, Rearcross Quarry, Newport Town Park, Castlewaller Windfarm (consented windfarm) Bunkimalta Windfarm (potential windfarm based on previously proposed windfarm). Planning Reference numbers included in Appendix 2.1. 	
Fieldwork	<p><u>Field Walking</u></p> <ul style="list-style-type: none"> The locations of UWF Grid Connection (Mountphilips Substation site and the route of the 110kV UGC) were visited, and watercourses surveyed, in January 2019 and May 2019. <p><u>Habitat Surveys</u></p> <ul style="list-style-type: none"> <u>All terrestrial habitats</u> within a 50m buffer of work locations were surveyed and classified, in January and May 2019, see also Appendix 8.3. <u>Aquatic Ecology/Fisheries</u>: A watercourse characteristics survey of the 68 No. crossing locations of the UWF Grid Connection was carried out on the 17th, 22nd, 23rd and 28th of January 2019 and May 2019. Some additional watercourse crossing locations were surveyed in June of 2019. Surveys of watercourse crossing locations located on haulage routes associated with the UWF Grid Connection were carried out on the 7th and 8th June, 2017, see also Appendix 8.2. <p><u>Species specific surveys</u></p> <ul style="list-style-type: none"> <u>Hen Harrier</u>: Hen Harrier surveys were carried out in April, June and July 2019. 10 No. vantage points were selected which focused on suitable nesting habitat and historical nest and roost locations (identified since 2003) within 2km of the UWF Grid Connection construction works boundary (whether within the SPA or outside the SPA). Surveys were carried out to identify breeding behaviour (in April 2019) and active nests (in June and July 2019). In order to determine the availability of nesting and foraging habitats for Hen Harriers within 2km of each identified nest location, satellite imagery was examined and ground-truthing was carried out in May 2019. Habitat and prey item presence surveys within 150m of the construction works areas were also carried out in May 2019. Winter Roost Surveys were undertaken for the 2018 EIAR in Sept 2016 to Feb 2017 and Sept 2017 to Feb 2018. Up to date details of roost sites and activities was subject of informal consultation with local Hen Harrier experts and the NPWS, see also Appendix 8.4 and Appendix 8.5. <u>General Birds</u>: A standardised bird transect survey was undertaken at the Mountphilips Substation site in the breeding seasons of 2016 and 2017 and non-breeding seasons of 2016/ 2017 and 2017/2018 and a similar transect methodology was also used to survey the proposed Mountphilips Substation and the whole length of proposed 110kV UGC route over seven days in April 2019 (breeding season 2019), see also Appendix 8.3. <u>Kingfisher</u>: Watercourse crossings were evaluated for any evidence of Kingfisher nest holes within 300m, both upstream and downstream, of 26 No. crossing locations (in tandem with Otter surveys in January and May 2019), see also Appendix 8.7. Kingfisher surveys extending to 500m 	<div>Biodiversity</div> <div>Topic</div>

Type	Source
	<p>upstream and downstream of W7 Newport River crossing point were undertaken in June 2019 as this location had potential to support suitable Kingfisher foraging and nesting habitats, and with potential for greater prey item availability, see also Appendix 8.7.</p> <ul style="list-style-type: none"> • <u>Barn Owls</u>: In February 2019, buildings were noted for potential suitability for Breeding Barn Owls. In August 2019, four buildings identified as having high suitability for Barn Owls were surveyed, see also Appendix 8.7. • <u>Bats</u>: Bat surveys were conducted in January 2019. Buildings within 50m of the 110kV UGC, were appraised for their suitability for roosting bats, (there are no buildings within 50m of Mountphilips Substation). Mature trees with bat roost suitability within 50m of the UWF Grid Connection construction works area, were inspected from ground level. The 110kV UGC will be installed over/under c. 65 watercourse crossing structures (i.e. bridges and culverts) and all of these were inspected and subjected to emergence or re-entry surveys in some instances, in May of 2019. Bat Activity Surveys using automated detectors were carried out at four locations near the Mountphilips Substation site and two locations near the consented Upperchurch Windfarm substation in the mid-summer and autumn seasons of 2016, see also Appendix 8.9. • <u>Non-Volant Mammals</u>: The surveys of non-volant mammals, to inform the first planning application (partially relied on herein) were undertaken in March, 2016, August 2016, September 2016 and April 2017. Updated surveys of non-volant mammals (including badger in particular) present within 50m of the proposed works (for the <i>currently proposed</i> 110kV UGC route) were completed in January and May 2019, see also Appendix 8.8. The revised footprint of the Mountphilips Substation site was also re-surveyed for signs of mammal evidence in July of 2019. • <u>Otter</u>: surveys of suitable watercourses were carried out in January and May 2019, where a total of 26 watercourses were surveyed, the watercourses were surveyed within 300m upstream and downstream of the crossing point of the 110kV UGC over/under the existing watercourse crossing structure and include the Newport River (W7), Clare River (W36) and Bilboa River (53) and 23 other watercourses (W5, W8, W9, W18, W21, W22, W23, W26, W28, W29, W30, W33, W35, W39, W41, W42, W46, W47, W48, W49, W50, W51 and W52). • <u>Amphibians and Reptiles</u> occurring within the study area were recorded during the course of all site walkovers for habitat, mammal and bird surveys in January 2019 and in May 2019. Surveys were undertaken in May 2019, along the section of route bypassing Newport town where suitable habitat for Smooth Newt and Common or Viviparous Lizard was noted, see also Appendix 8.8.

8.1.8 Methodology used to Describe the Baseline Environment and to Evaluating Effects

A combination of NRA guidance² and methodology developed by Steve Percival³ was used to evaluate the sensitivity of ecological receptors, the magnitude of impacts and the resultant significance of likely or potential effects to relevant aspects of Biodiversity as a result of the development of the UWF Grid Connection.

8.1.8.1 Determining the Importance of the Biodiversity resources (NRA 2009)

The importance of biodiversity resources within the study areas for UWF Grid Connection has been derived from NRA Guidance (2009), as outlined in the table below.

Table 8-3: NRA Evaluation Guidance (NRA 2009)

<u>Resource Evaluation</u>	<u>NRA Criteria</u>
International Importance	<p>'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation.</p> <p>Proposed Special Protection Area (SPA). Site that fulfils the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended). Features essential to maintaining the coherence of the Natura 2000 Network.</p> <p>Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive.</p> <p>Resident or regularly occurring populations (assessed to be important at the national level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or Species of animal and plants listed in Annex II and/or IV of the Habitats Directive.</p> <p>Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971). World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972).</p> <p>Biosphere Reserve (UNESCO Man & The Biosphere Programme). Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979).</p> <p>Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979).</p> <p>Biogenetic Reserve under the Council of Europe. European Diploma Site under the Council of Europe.</p> <p>Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).</p>
National Importance	<p>Site designated or proposed as a Natural Heritage Area (NHA).</p> <p>Statutory Nature Reserve.</p> <p>Refuge for Fauna and Flora protected under the Wildlife Acts.</p> <p>National Park.</p> <p>Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve;</p> <p>Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park.</p> <p>Resident or regularly occurring populations (assessed to be important at the national level) of the following: Species protected under the Wildlife Acts; and/or Species listed on the relevant</p>

² Guidelines for Assessment of Ecological Impacts of National Road Schemes, 2009

³ Predicting the effects of wind farms on birds in the UK: the development of an objective assessment method, 2007

<u>Resource Evaluation</u>	<u>NRA Criteria</u>
	Red Data list. Site containing 'viable areas' of the habitat types listed in Annex I of the Habitats Directive.
County Importance	<p>Area of Special Amenity.</p> <p>Area subject to a Tree Preservation Order.</p> <p>Area of High Amenity, or equivalent, designated under the County Development Plan.</p> <p>Resident or regularly occurring populations (assessed to be important at the County level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list.</p> <p>Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance.</p> <p>County important populations of species, viable areas of semi-natural habitats or natural heritage features identified in the National or Local BAP, if this has been prepared.</p> <p>Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county.</p> <p>Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.</p>
Local Importance (Higher Value)	<p>Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared;</p> <p>Resident or regularly occurring populations (assessed to be important at the Local level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list.</p> <p>Sites containing semi natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality;</p> <p>Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.</p>
Local Importance (Lower Value)	<p>Sites containing small areas of semi natural habitat that are of some local importance for wildlife;</p> <p>Sites or features containing non-native species that is of some importance in maintaining habitat links.</p>

8.1.8.2 Determining the Sensitivity of Biodiversity Receptors

Guidance from Percival 2007 and NRA 2009 has been used to evaluate the sensitive of bird species to the proposed development. This rating system has also been used as a general guide for other biodiversity receptors throughout this report.

Table 8-4: Bird Sensitivity Rating Equivalency (Percival 2007 and NRA 2009 Combined)

Sensitivity of Bird receptor	Percival criteria 2007	NRA Resource Evaluation	NRA Criteria	Combined Criteria
Very High	Species is cited interest of SPA. Species present in Internationally important numbers.	International Importance.	Resident or regularly occurring populations (assessed to be important at the national level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive	Species is cited interest of SPA. Species present in Internationally important numbers. Resident or regularly occurring populations (assessed to be important at the national level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive
High	Other non-cited species which contribute to integrity of SPA. Ecologically sensitive species (<300 breeding pairs in UK) and less common birds of prey. Species listed on Annex 1 of the EU bird's directive. Regularly occurring relevant migratory species which are rare or vulnerable	National Importance	Resident or regularly occurring populations (assessed to be important at the national level) of the following: Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list	Other non-cited species which contribute to integrity of SPA Ecologically sensitive species (<300 breeding pairs nationally) and less common birds of prey. Species listed on Annex 1 of the EU bird's directive. Regularly occurring relevant migratory species which are rare or vulnerable Resident or regularly occurring populations (assessed to be important at the national level) of the following: Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list (in this case BOCCI Red list).
Medium	Species present in regionally important numbers (>1% of regional population). Species occurring within SPA's but not crucial to the integrity of the site. Species listed as priority species in the UK BAP subject to special conservation measures	County Importance	Resident or regularly occurring populations (assessed to be important at the County level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; County important populations of species. Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.	Species present in regionally important numbers (>1% of regional population). Species occurring within SPA's but not crucial to the integrity of the site. Resident or regularly occurring populations (assessed to be important at the County level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; County important populations of species. Species that are rare or are undergoing a decline in quality or extent at a national level.

Sensitivity of Bird receptor	Percival criteria 2007	NRA Resource Evaluation	NRA Criteria	Combined Criteria
Low	Species covered above which are present very infrequently or in very low numbers. Any other species of conservation interest not covered above, e.g. species listed on the red or amber lists of the BoCCI.	Local Importance (High Value)	Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared; Resident or regularly occurring populations (assessed to be important at the Local level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list.	Locally important populations of priority species identified in the Local BAP, if this has been prepared; Resident or regularly occurring populations (assessed to be important at the Local level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list. Amber listed species.
Negligible	Species that remain common and widespread	Local Importance (Low Value)	n/a	Species that remain common and widespread Green Listed Species.

8.1.8.3 Determining Magnitude of Impacts to Biodiversity Receptors (Percival 2007)

A definition of terms used in respect of magnitude for bird species evaluations is outlined in the table below. This rating system has also been used as a general guide for magnitude quantification for other biodiversity receptors throughout this report.

Table 8-5: Determining Magnitude of Impacts (Percival 2007)

Magnitude	Description
Very High	Total loss or very major alteration to key elements/ features of the baseline conditions such that the post development character/ composition/ attributes will be fundamentally changed and may be lost from the site altogether. Guide: < 20% of population / habitat remains
High	Major loss or major alteration to key elements/ features of the baseline (pre-development) conditions such that post development character/ composition/ attributes will be fundamentally changed. Guide: 20-80% of population/ habitat lost
Medium	Loss or alteration to one or more key elements/features of the baseline conditions such that post development character/composition/attributes of baseline will be partially changed. Guide: 5-20% of population/ habitat lost
Low	Minor shift away from baseline conditions. Change arising from the loss/alteration will be discernible but underlying character/composition/attributes of baseline condition will be similar to pre-development circumstances/patterns. Guide: 1-5% of population/ habitat lost
Negligible	Very slight change from baseline condition. Change barely distinguishable, approximating to the “no change” situation. Guide: < 1% population/ habitat lost

8.1.8.4 Determining Risk of Effect to Biodiversity Receptors (Percival 2007)

The guideline probability rating definitions used to inform bird species evaluations in conjunction with the probability definitions as outlined in Table 8-7 are outlined in the Table 8-6 below. In some instances, consideration of a species sensitivity and or separation distance has merited an evaluation of less than LOW in respect of the probability of impacts, this is referenced in the text where applicable.

This rating system has also been used as a general guide for determining risk in relation to other biodiversity receptors throughout this report.

Table 8-6: Birds - Risk classifications or likelihood that an impact will occur (Percival 2007)

Probability	Description	Comments
High	Impact is likely to occur (>50% likelihood)	Species known to be vulnerable to specific impact
Medium	Impact may occur (5-50% likelihood)	Species may be affected by specific impact
Low	Impact is very unlikely (<5% likelihood)	Species known to be tolerant to specific impact

The EPA also define the probability of effects, in the Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA, August 2017), as outlined in the table below.

Table 8-7: Probability of Effects (EPA, August 2017)

Likely Effects	Unlikely Effects
The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.

8.1.8.5 Determining Significance of Effect to Birds (Percival 2007 & EPA 2017 combined)

The Percival significance matrix used for bird species evaluations is provided in the table below. This matrix has also been used as a guide for determining the significance of impacts in relation to other biodiversity receptors throughout this report. The Equivalent EPA significance ratings have been applied to the table by the authors.

Table 8-8: Determining the Significance of Impacts (Percival 2007 with equivalent EPA Significance Ratings)

Significance		Sensitivity			
		Very High	High	Medium	Low
Magnitude	Very High	Very high/ Very significant	Very high/ Very significant	High/ Significant effects	Medium/ Moderate effects
	High	Very high/ Very significant	Very high/ Very significant	Medium/ Moderate effects	Low/ Slight effects
	Medium	Very high/ Very significant	High/ Significant effects	Low/ Slight effects	Very low/ Not Significant
	Low	Medium/ Moderate effects	Low/Slight effects	Low/Slight effects	Very low/ Not Significant
	Negligible	Low/ Slight effects	Very low/ Not Significant	Very low/ Not Significant	Very low/ Not Significant

Inis Environmental Note: 'Very Low' significance (as per Percival 2007) is considered equivalent to the EPA definitions for 'Not Significant', or 'Imperceptible' or 'Neutral' depending on the context of the magnitude of the impact or the sensitivity of the receptor, determined by the authors based on their professional ecological judgement and experience. Similarly, the significance of impacts where the magnitude is Negligible is

determined by the authors based on the context of the impact and their professional ecological judgement and experience.

8.1.8.6 EPA EIAR Guidance Definitions of Effects

Table 8-9 to 8-11 outline the EPA evaluation criteria utilised in this appraisal of the Environmental Factor, Biodiversity. This criteria is included in the Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA, August 2017)

Table 8-9: Quality of Effects (EPA, August 2017)

<u>Quality of Effect</u>	<u>Description</u>
Positive Effect	A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or removing nuisances or improving amenities)
Neutral Effect	No effects or effects that are imperceptible, within the normal bounds of variation or within the margin of forecasting error.
Negative/Adverse Effect	A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).

Table 8-10: Duration of Effects (EPA, August 2017)

<u>Duration of Effect</u>	<u>Description</u>
Momentary Effects	Effects lasting from seconds to minutes
Brief Effects	Effects lasting less than a day
Temporary Effects	Effects lasting less than a year
Short-term Effects	Effects lasting one to seven years
Medium-term Effects	Effects lasting seven to fifteen years
Long-term Effects	Effects lasting fifteen to sixty years
Permanent Effects	Effects lasting over sixty years

Table 8-11: Significance of Effects (EPA, August 2017)

<u>Significance of Effect</u>	<u>Description</u>
Imperceptible	An effect capable of measurement but without significant consequences
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging trends
Significant	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment
Profound	An effect which obliterates sensitive characteristics

8.1.8.7 Desktop Review**8.1.8.7.1 Designated Sites and Protected Species**

A desktop review was conducted to inform scoping and identify features of ecological importance. The desktop review also included an appraisal of all sites designated for nature conservation under national and international legislation within a 15km radius of the UWF Grid Connection and the Whole UWF Project. Potential sites of conservation interest were identified by an examination of Ordnance Survey (OSI) mapping (1:50,000 scale), NPWS maps browser and detailed aerial photography (Bing maps).

Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Natural Heritage Areas (NHAs), Proposed Natural Heritage Areas (pNHAs) within 15km, and records of protected species in the vicinity of UWF Grid Connection and Whole UWF Project were identified. This information was obtained by accessing the website of the National Parks and Wildlife Service (NPWS) of the Department of the Environment, Heritage and Local Government.

A data request was also sent to NPWS GIS division on 01/08/19 for a full inventory of all protected and rare species recorded within pertinent 10km squares overlapping the UWF Grid Connection and Whole UWF Project. This data is presented in **Table 1 in Appendix 8.1: Species Records held by NPWS & NBDC, Volume C4: EIAR Appendices**.

The database of the National Biodiversity Data Centre was also consulted to assess the presence of rare plant and faunal species and records of protected species reported within the primary 10km squares in which the UWF Grid Connection and Whole UWF Project is located. This data is presented in **Tables 2 to 8 in Appendix 8.1: Species Records held by NPWS & NBDC**.

Due to the conditions of the data request with regard to the presentation of sensitive data as defined (<https://www.npws.ie/sites/default/files/general/npws-sensitive-species.pdf>), not all records are presented. In addition, the spatial resolution of each record is presented at 10 km scale in line with the condition that “data are provided on the understanding that users will not use the information to the detriment of individual species or habitats, biodiversity or the environment in general.”

8.1.8.7.2 Hen Harrier – Desktop Review

Existing records of Hen Harrier usage of the area, dating back to 2003, were collated to establish suitable nesting or roosting habitat and satellite imagery was additionally reviewed to identify areas of potentially suitable breeding habitat. NPWS Conservation Rangers and local bird experts with knowledge of existing and historical Hen Harrier nest record locations were consulted for current information.

By virtue of the prior appraisal of Upperchurch Windfarm and UWF Related Works, breeding occupancy and presence of winter roosts has already been established for those areas of habitat within and proximal to these other Elements of the Whole UWF Project.

8.1.8.7.3 Bats – Desktop review

National landscape suitability maps for Irish bat species (Lundy et al., 2010) were reviewed using the Map Viewer of the National Biodiversity Data Centre. See **Plate 1 in Appendix 8.5: Bat & Non-Volant Mammals Data**. Records of known bat roosts within 10km of the UWF Grid Connection were obtained from the Bat Conservation Ireland database at the outset of the project.

8.1.8.7.4 Aquatic Ecology – Desktop Review

A comprehensive desktop review was carried out to identify watercourses along the UWF Grid Connection location. Information on water quality of the relevant watercourses was obtained from the EPA website and Chapter 11 Water.

8.1.8.7.5 Review of Previous Fieldwork

Site investigations carried out between December 2015 and May 2018 for the 1st (2018) UWF Grid Connection planning application at the location of Mountphilips Substation and the western and eastern extents of the 110kV UGC, are relevant to this 2nd (2019) UWF Grid Connection (*in which generally only the route of the 110kV UGC between Mountphilips Substation and Upperchurch Windfarm Substation has changed, the location of Mountphilips Substation remains the same, although the 2019 substation compound is larger in size than that proposed in 2018*). Findings from this fieldwork were therefore used to inform the evaluations in this 2nd Application also.

8.1.8.8 Fieldwork Methodology - Hen Harrier

Following scoping and formal consultation with NPWS as described in Chapter 3 of the EIAR, it was established that, based on likely sensitivities, and source-pathways linkages in respect of disturbance and displacement, the primary objective of Hen Harrier surveys should be to identify all Hen Harrier breeding and winter roosting sites in suitable habitat within a 2km radius of proposed works (i.e. any likely source stimulus in terms of disturbance or displacement - with the distance of 2km being the radius stipulated by SNH guidance). This approach was formulated in consultations with NPWS and is supported in SNH guidance.

8.1.8.8.1 Vantage Points Surveys 2016, 2017, 2018 and 2019

Breeding Season – 2016 & 2017; 2019

The methodology selected was that published by SNH in respect of breeding raptor surveys (more specifically Hardey et al., 2013), which describes the survey techniques to establish breeding territory /nest site location and occupancy by Hen Harrier. This method corresponds to that utilized to date in National Surveys for the species in the republic (e.g. Ruddock et al., 2012, 2015) and also research into the species (Irwin et al., 2015 and Wilson et al., 2015). As no pathways exist for collision mortality from a proposed underground cable, then flight activity surveys purely to establish levels of flight activity and inform collision risk modelling as per a typical wind energy development were not scoped in.

For breeding season surveys to establish nesting attempts, 12 No. historical vantage points were ground-truthed (for visibility) and fixed. These vantage points were used during the 2016 (March to June inclusive) and 2017 (March to August inclusive) breeding seasons. Additional effort in the months of July and August was added to surveys in 2017 as some nesting attempts occurred later than the previous year. The 12 No. vantage points used, focused on suitable nesting habitat and historical nest locations in the UWF Grid Connection area. These surveys were carried out for the previous (2018) UWF Grid Connection application. Breeding Season Surveys for the subject application (2019 UWF Grid Connection), which were carried out in April 2019 and July 2019, utilised 10. No. Vantage Points (VPs) to determine the occupancy status of the nesting territories within 2km of the current 110kV UGC route and the current status of the cumulative study area around Upperchurch Windfarm and UWF Related Works areas. The grid references for 10. No. 2019 Vantage Point locations (in ITM co-ordinates) are listed in [Table 4 in Appendix 8.4: Hen Harrier Fieldwork and Survey Results](#).

Winter Roosts – 2016/17 and 2017/18

For winter roost surveys 7 No. of the 12 No. 2016/2017 vantage points were employed during the Sept 2016 to Feb 2017 and Sept 2017 to Feb 2018 periods. Winter surveys were stratified to coincide with dawn and dusk periods, as per Best Practice guidance (SNH, 2014 and guidance for the Irish Winter Hen Harrier Roost Survey (IWHHRS) from O'Donoghue, 2010), to establish the locations of communal roosts. Grid references of vantage points utilised as provided in [Table 3 in Appendix 8.4: Hen Harrier Fieldwork and Survey Results](#).

By virtue of the prior appraisal of Upperchurch Windfarm, breeding occupancy and presence of winter roosts has already been established for those areas of habitat within and proximal to the Upperchurch Windfarm, which includes the UWF Related Works, and elements of the UWF Other Activities.

Detailed Survey Results

The details of timing, duration and weather conditions for vantage point surveys undertaken from 2016 to 2019 are listed in [Tables 7 to 12 in Appendix 8.4: Hen Harrier Fieldwork and Survey Results](#).

Detailed results of the Hen Harrier Survey are presented in [Tables 16 to 27 in Appendix 8.4: Hen Harrier Fieldwork and Survey Results](#).

8.1.8.8.2 Hen Harrier Habitat Suitability Mapping May 2019

Habitats were initially identified using shapefiles provided from existing habitat information arising from the Hen Harrier SPA Mapping Project undertaken by NPWS (Moran & Wilson-Parr, 2015). However, these only relate to habitats within the SPA, so **an additional mapping exercise was undertaken to extend the coverage to include non-SPA habitat within 2km of each nest**. Habitats were initially identified from aerial photos. Where the identification of habitats from aerial photos could not be confirmed, a ground-truthing exercise was undertaken in May 2019, to check the habitats actually present. As well as identifying unknown habitats, the ground-truthing exercise also sampled a variety of the identified habitats to ensure the habitats identification process was accurate and robust.

All habitat parcels, including both polygon's for fields (or areas-based habitats) and lines for linear habitats (such as hedgerows and treelines) were digitised, allowing accurate measurement of area or length.

The identified habitats were classed as suitable or unsuitable for both nesting and foraging. Habitats identified as suitable for nesting by Hen Harriers were wet grassland, peatland habitats (including heath), scrub, dense bracken and both pre- and post-thicket forestry (as per Ruddock *et al.*, 2016). Habitats considered unsuitable for nesting included agricultural grasslands (including improved grasslands and rough grazing), clearfell, hedgerows and treelines (Ruddock *et al.*, 2016).

Detailed Survey Results

For habitat suitability classifications see [Tables 13 of Appendix 8.4: Hen Harrier Fieldwork and Survey Results](#) and for extent of suitable/unsuitable habitat see [Tables 14 of Appendix 8.4: Hen Harrier Fieldwork and Survey Results](#).

8.1.8.9 Fieldwork Methodology – General Birds

8.1.8.9.1 Breeding Bird Surveys

The whole length (c.30km) of the 110kV UGC route was surveyed in 40 transects in April 2019. Survey work was carried out over seven days in April 2019 (12, 17, 18, 20, 25, 27 and 28). The methodology followed the standardised line transect methodology for surveying birds (BWI, 2012). All birds were recorded onto standardised recording sheets in four distance categories from the proposed UGC route (0-25m; 25-100m; 100+m and in flight). A standardised bird transect survey was also undertaken at the Mountphilips Substation site in the breeding seasons of 2016 and 2017 and non-breeding seasons of 2016/ 2017 and 2017/2018. The 2019 transects included Mountphilips Substation site.

Transect data were recorded using standard Countryside Bird Survey (CBS) methodology (Birdwatch Ireland, 2012). The conservation status of each species recorded during the field surveys was assessed using the Birds of Conservation Concern in Ireland (BoCCI) list (Colhoun & Cummins, 2013) in addition to relevant national or international legal designations.

Available data on breeding birds within the EIS documentation for the Upperchurch Windfarm was reviewed within the context of overlap with the locations of UWF Related Works, UWF Replacement Forestry and UWF Other Activities. Due to the continuity and overlap of habitat types present throughout the respective elements, a sufficient representative sample of breeding birds is considered to have been achieved through both the results of the current study and previously conducted studies.

Detailed Survey Results

For General Birds Survey Results see [Table 4 to 8 \(Mountphilips Transect\)](#); [Table 1 \(110kV UGC route\)](#); [Table 12 \(Bird Sensitivity Ratings\)](#) in [Appendix 8.7: General Birds Fieldwork and Survey Results](#).

8.1.8.9.2 Kingfisher Surveys

With regard to Kingfisher, the suitability of watercourses 300m upstream and downstream of watercourse crossing locations was appraised in January and May 2019 (in tandem with Otter surveys). These surveyed watercourses include the Newport River (W7), Clare River (W26) and Bilboa River (W53) and 23 other watercourses (W5, W7, W8, W9, W18, W21, W22, W23, W26, W28, W29, W30, W33, W35, W39, W41, W42, W46, W47, W48, W49, W50, W51 and W52). These rivers were selected due to their possible potential to support suitable Kingfisher foraging and nesting habitats, and the potential for greater prey item availability. Watercourse crossings along the UWF Grid Connection route are generally unsuitable for nesting Kingfisher, which requires sandy or earth banks alongside the watercourse to establish their tunnel/burrow nests.

In addition, Kingfisher surveys extending to 500m upstream and downstream of W7 Newport River crossing point, following the Best Practice methodology presented in National Roads Authority (2008), was undertaken on 26 June 2019 (in tandem with the Otter surveys). Suitable watercourses were evaluated for any evidence of nest holes within 300m of the crossing locations. In each case banks were inspected for evidence of Kingfisher, and general suitability of banks in proximity to crossing locations for nesting Kingfisher. Target notes were made on suitable nesting banks, and any observed nest holes.

Detailed Survey Results

For Kingfisher Survey Results see [Table 2 in Appendix 8.7: General Birds Fieldwork and Survey Results](#).

8.1.8.9.3 Barn Owls

In February 2019, buildings were noted for potential suitability for Breeding Barn Owls. In July 2019, buildings identified as having high suitability for Barn Owls were surveyed. This involved checking for signs of building occupation (such as pellets, feathers, etc.). All Barn Owl surveys were carried out in accordance with *Barn Owl Surveying Standards for National Road Projects*, (TII, 2017).

Detailed Survey Results

For Barn Owl Survey Results see [Table 3 in Appendix 8.7: General Birds Fieldwork and Survey Results](#).

8.1.8.10 Fieldwork Methodology - Habitats

8.1.8.10.1 Habitat Surveys

All habitat surveys undertaken followed best practice guidance (Smith et al., 2011) and utilised the habitat classification presented in Fossitt (2000). All habitats within a 50-m buffer of work locations were surveyed and classified to level 3. All surveys were carried out in good weather.

Habitat surveys of the UWF Grid Connection were undertaken in January 2019 and May 2019. Whilst January is outside of the optimal survey season for flora, this survey was adequate for the biodiversity sensitivities occurring within the study area and also allowed for the identification of habitat classification to the appropriate resolution. Nomenclature for vascular plants follows Parnell and Curtis (2012).

Detailed Survey Results

For Habitats (non-linear and linear respectively) surveyed within 50m of the UWF Grid Connection works locations. [Section 8.3.2 for UWF Grid Connection and Section 8.3.3 for the Whole UWF Project Appendix 8.3: Terrestrial Habitats Survey Results & Impact Calculations](#).

8.1.8.11 Fieldwork Methodology – Aquatic Ecology/Fisheries

8.1.8.11.1 Classification of the Ecological Value of Watercourses

A watercourse characteristics survey of crossing locations along the UWF Grid Connection route (by INIS Ecologists and by the authors of the Water chapter (Hydro Environmental Services) was carried out visually on the 17th, 22nd, 23rd and 28th of January 2019 and May 2019, during which the following physical parameters and habitat quality indicators were recorded at each watercourse crossing point - Grid coordinates; Watercourse feature i.e. drain, stream or river; Crossing type e.g. existing culvert, new crossing; Channel width and depth (m); Substrate type - listing substrate fractions in order of dominance i.e. large rocks, cobble, gravel, sand, mud, etc; Target notes on fisheries habitat and character including: features such as extent of riffle and glide/bank stability; salmonid suitability i.e. spawning / juvenile rearing habitat; and lamprey suitability. Surveys of watercourse crossing locations on haulage routes associated with the UWF Grid Connection were carried out in June, 2017.

Following the above broad characterisations, and using Best Practice, INIS evaluated each watercourse crossing for UWF Grid Connection for fisheries and assigned a fisheries importance rating of Optimal, Sub-Optimal or Poor. These instances of marginal fisheries value (typically between Sub-Optimal and Poor) were classified as Sub-Optimal. Best Practice literature utilised was as follows: Barbour et al. (1991); Kelly & King (2001); Kennedy *et al.* (1986); Greenberg *et al.* (1998); Hatfield *et al.* (2000) and O'Grady *et al.* (1993). The full titles of these Guidelines are listed in the [Reference list at the end of this Chapter 8](#).

Detailed Survey Results

For number and classification of watercourse crossings see, [Section 8.2.2 in Appendix 8.2: Aquatic Habitats & Species Fieldwork & Survey Results](#).

8.1.8.12 Fieldwork Methodology - Bat Species

Survey aims

The aims of the bat surveys were to:

- Assess the bat roost suitability of bridges, buildings and mature trees that could be directly affected
- Identify potential indirect effects on bats, e.g. from disruption of commuting routes, or lighting

Survey of potential bat roosts in January 2019

A preliminary ecological appraisal was carried out for all buildings within 150m of the development works using the approach outlined in Section 4.3 of Bat Conservation Trusts Guidelines (Collins, 2016). All buildings were assigned a suitability category of negligible, low, moderate or high suitability, based on the age and condition of structural features used by roosting bats (e.g. roof tiles, attic spaces, soffit / fascia boards, walls).

Ground-level roost assessments were carried out for all trees with moderate or low bat suitability within 50m of the development works, using binoculars (Steiner SkyHawk 3.0 10x42). The aim of the ground-level inspection was to identify any potential roost features (cavities or crevices on trunks or limbs) and evidence of bats (e.g. droppings, fur-oil stains at access points). Coniferous trees within plantations were not inspected, because they are rarely large enough to have any features suitable for bats, and because it is standard forestry practice to remove any trees that have obvious signs of damage and disease; as a result, trees within plantations typically have negligible suitability for bats.

As the 110kV UGC will be installed over/under c. 65 watercourse crossing structures (i.e. bridges and culverts), all structures along the route were inspected. Presence / absence bat surveys and/or roost characterisation surveys were carried out at 11 watercourse crossing structures (deemed suitable) along the 110kV UGC route. Some watercourse crossing structures could be surveyed using a high-powered torch and/or an endoscope, allowing detailed inspections of all crevices. In other cases, presence / absence surveys and roost characterisation surveys were carried out at dusk and dawn using an Anabat Walkabout detector (Titley Scientific); this is a high-specification modern bat detector that is fit for purpose.

These surveys were conducted on the 17th, 22nd and 23rd January 2019 and in May 2019.

Mountphilips Substation and Upperchurch Windfarm Substation Bat Activity surveys

Bat Activity Surveys at Mountphilips Substation Site and Upperchurch Substation Site were undertaken using automated Anabat Express bat detectors (Titley Scientific). External microphones were mounted on canes at a height of approximately 1.5m in order to obtain 'clean' recordings that were not affected by surrounding vegetation. One detector was placed in each location for two nights in the mid-summer period (June – August 2016) and two nights in the autumn season (September / October 2016). Night length ranged from 7.15 hours in late June to 12.45 hours in early October, giving a total survey effort of approx. 35-40 hours at each sampling point. We consider that this survey effort was sufficient to provide a good representation of bat activity during their most active periods, and that it was proportionate to the potential effects as discussed in Section 2.2.5 of Collins (2016). Surveys were carried out during suitable weather conditions, i.e. minimum temperatures above 10°C, average winds of less than 4m/s and little or no rainfall. There was wet weather or high winds on some of the survey nights in September, so the survey was extended until two nights of suitable conditions were obtained. Results of this survey are still considered viable for the revised appraisal given little or no change to baseline habitat structure has occurred in the interim.

Calculation and comparison of bat activity indices

In order to standardise bat activity between the mid-summer and autumn survey periods, results are displayed as a 'Bat Activity Index', which is the total number of bat passes divided by the number of hours

per night (Hundt, 2012). This was calculated from sunset to sunrise, using publicly-available data from www.timeanddate.com.

At present there is not a standard system to categorise bat activity as low, moderate or high, because the results vary depending on the species involved and the location of the site. For the purposes of this report we use a bespoke system to discuss and compare levels of bat activity at the site, as outlined in the below Table. This approach uses standardised terms (e.g. occasional, frequent) to categorise bat activity indices within certain ranges; the average time interval between passes is also provided to give a more-intuitive interpretation of the terms.

Characterisation of Bat Activity Indices

Bat Activity Index	Average interval between calls	Terms of characterisation
<2	> 30 minutes	Negligible
2 - 12	5 – 30 minutes	Occasional
12 – 60	1 – 5 minutes	Frequent
>60	< 1 minute	Near-constant

Species identification and interpretation of data

Sonograms from Anabat Express detectors were obtained in the 'zero-crossing' format and viewed using AnalookW software (Corben 2014). Species were identified with reference to *British Bat Calls: A Guide to Species Identification* (Russ 2012) based primarily on frequency and call shape, but also with reference to call slope for *Myotis* spp. Social calls were classified as unidentified bats unless they closely matched the examples provided in Russ (2012).

It is acknowledged that *Myotis* spp. can have very similar calls, and that the classification of sonograms can be imprecise, so all *Myotis* records in this document should be considered as *conferre* records, i.e. *Myotis cf daubentonii*. There can also be overlaps in call frequency between *Pipistrellus* spp. - calls with a CF component at 50 kHz may be either soprano pipistrelle or common pipistrelle, while calls at 40 kHz may be either common pipistrelle or *Nathusius'* pipistrelles – but in most cases, it is possible to determine the species based on call characteristics and/or other calls immediately before or after the recording. If a bat pass could not be confidently identified to species level it was recorded as an unidentified bat, or identified only to genus level (e.g. *Myotis* spp.).

Valuation of ecological features and assessment of impacts

Impacts were assessed using the *Guidelines for Ecological Impact Assessment in the UK and Ireland* (CIEEM 2018) and *Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports* (EPA, 2017). Reference was also made to Wray *et al.*, (2010) with regards to the evaluation of roosts and commuting routes / foraging areas.

Detailed Survey Results

For [Bat Roost](#) Survey Results and [Bat Activity](#) Survey Results see [Section 8.8.3.1 in Appendix 8.8: Bat & Non-Volant Mammals Data](#)

8.1.8.13 Fieldwork Methodology - Non-Volant Mammals

Surveys for all legally protected non-volant mammal species were undertaken within a 50m buffer of the UWF Grid Connection, with the exception of otter (listed separately below). The surveys to inform the first 2018 planning application (partially relied on herein) was undertaken on 8th – 11th March, 2016. Results of this survey are still considered viable for the revised appraisal given little or no change to baseline habitat structure has occurred in the interim. Additional surveys were undertaken on 29th August 2016, 29th September 2016, 5th/6th April 2017. Updated surveys of the current, proposed, route of the 110kV UGC were completed in 17th, 22nd, 23rd January and 30th May 2019.

Otters

Otter surveys followed the NRA *Guidelines for Treatment of Otters During Construction of National Road Schemes* (NRA, 2008), which state that, although there are no seasonal constraints for otter surveys, any dense vegetation (especially in summer) can reduce success in the identification of otter holts or couches. Hence the confirmatory surveys were scheduled for winter 2019 in order to optimize detection of otters and also in May 2019.

Guidance on the extent of the study area for otters was taken from the *British Highways Agency's Nature Conservation Advice in Relation to Otters HA8199* (Highways Agency, 1999) which dictates a linear search of 300m upstream and downstream of each watercourse crossing is undertaken.

Badgers

According to the NRA *Guidelines for the Treatment of Badgers Prior to Construction of National Road Schemes* (NRA, 2005), survey of setts within 50m of the proposed works location is required. Badger surveys are significantly constrained by vegetative cover and season, and are best conducted from November to April (NRA, 2005). In accordance with NRA guidance, all areas were systematically searched for setts and all hedgerows and boundaries were checked comprehensively by Inis ecologists. Badger territorial activity is high from mid-January to March and surveys at this time are most efficient in identification of badger paths, latrines and feeding signs. Surveys for evidence of the presence of badgers within 50m of the proposed works (were completed in January and May 2019. The revised footprint of the Mountphilips Substation site was also re-surveyed for signs of mammal evidence in July of 2019.

Other Mammals

The following field signs of all mammals were recorded during non-volant mammal surveys within the study area:

- Well-used pathways;
- Prints/tracks;
- Scat/spraints/droppings;
- Signs of feeding (foraged pine cones, badger snuffle holes)
- Places of shelter and features or areas likely to be of particular value as foraging resources (NRA 2004).

Photographs and detailed notes were also recorded for each feature and mapped using ArcGIS 10.4.

For Non-Volant Mammals Survey Results see [Section 8.8.3.2 in Appendix 8.8: Bat & Non-Volant Mammals Data](#)

8.1.9 Certainty and Sufficiency of Information Provided

The biodiversity baseline information was collated from site investigations and field surveys, along with publically available online resources including Biodiversity Data Centre (NBDC), National Parks & Wildlife Service (NPSWS), Environmental Protection Agency (EPA), and Inland Fisheries Ireland (IFI), which are regularly updated. In all cases the most recent publications available are relied on. All documentation used is referenced at the end of the chapter. A clear documentary trail is provided throughout this chapter, and chapter appendix, Appendix 8.1 - Appendix 8.9, to the competency of data and methods used and the rationale for selection of same. All field survey work was carried out by qualified and experienced ecologists. Baseline information was also supplemented by the baseline information for Upperchurch Windfarm (EIS & RFI 2013), UWF Related Works (EIAR 2018, Revised EIAR 2019) and UWF Replacement Forestry (EIAR 2018).

For the avoidance of doubt, with respect to Hen Harrier, although studies conducted in 2016 and 2017 were in relation to a different 110kV UGC route for the previous 2018 UWF Grid Connection application (PL92.301959) and therefore different study extent, consultation with local experts and NPWS was undertaken in 2019 for the current appraisal to determine whether or not additional nests were known from any areas outside the prior study extent. Results of this consultation was used to scope possible territories requiring survey in 2019 (within 2km of the now proposed route of the 110kV UGC) in line with Best Practice (Hardey et al., 2014) and for which the results are herein presented.

The evaluation of the baseline environment and potential for impacts has been informed by and carried out using best practice guidance, namely *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal* (Chartered Institute of Ecology and Environmental Management, 2016 and 2018). The professional judgement of the ecologist has been used in the scoping of surveys, interpretation of data, and assessment of impacts; this approach is consistent with the CIEEM guidelines. Sensitivity and magnitude were evaluated using the NRA/Percival combined methodology outlined in Section 8.1.8. A clear documentary trail is provided throughout this chapter regarding the data and methods used in the evaluation. All documentation used is referenced at the end of this Biodiversity chapter.

In respect of Biodiversity no material limitations or difficulties were encountered, nevertheless some minor limitations are discussed below:

Restricted Access to Properties: It was not always possible to obtain permission to enter private property and/or to access the interior of buildings, such as for example two buildings initially evaluated as suitable for Barn Owl. One building which was unsafe to enter has been classified as used by Barn Owl on the basis of owner information on sightings, and the second building has retained its classification as highly suitable, following a precautionary approach, although the only access point was a broken chimney stack. No limitation therefore exists.

8.2 Sensitive Aspect No.1: European Sites

This Section provides a description and evaluation of the Sensitive Aspect - European Sites.

We note that findings of the effects of the UWF Grid Connection (either alone or in combination with other projects) on European Sites are fully considered and evaluated in the **Appropriate Assessment Report for UWF Grid Connection** (herein referred to as the NIS). This NIS is included in **Volume E: Appropriate Assessment Reporting for UWF Grid Connection** of the planning application for the UWF Grid Connection.

In line with EIA Directive Guidance, findings are summarised herein; however, and for the avoidance of doubt, we refer the NIS for detailed examination and analysis of likely significant effects in respect of European Sites.

European Sites

Sensitive Aspect

8.2.1 BASELINE CHARACTERISTICS of European Sites

8.2.1.1 STUDY AREA for European Sites

The study area for European Sites in relation to the UWF Grid Connection is described in Table 8.12 and illustrated on **Figure GC 8.2.1: UWF Grid Connection Cumulative Evaluation Study Area for European Sites** and **Figure GC 8.2.2 – GC 8.2.5: Location of UWF Grid Connection in relation to Lower River Shannon SAC, Lower River Suir SAC, Clare Glen SAC and Slievefelim to Silvermines Mountain SPA** (Volume C3 EIAR Figures).

Table 8-12: UWF Grid Connection Study Area for European Sites

Study Area for European Sites	Justification for the Study Area Extents
15km from UWF Grid Connection construction works areas, extended to 15km from the boundary of all of the Other Elements of the Whole UWF Project.	An evaluation distance of 15km is currently recommended in the case of projects (DoEHLG, 2009). The extension of the area is based on professional judgement and the precautionary principle.

8.2.1.2 Baseline Context and Character of European Sites in the UWF Related Works Study Area

European sites such as candidate Special Areas of Conservation (cSACs) and Special Protection Areas (SPAs) designated within the Natura 2000 network are herein considered.

To avoid duplication of the detailed evaluation of European Sites covered in the Appropriate Assessment Report, only the key findings of the Appropriate Assessment report are included herein.

8.2.1.2.1 Stage 1 Screening – Connected to or Necessary for the Management of a European Site?

UWF Grid Connection is not directly connected to or necessary for the management of any European Site

8.2.1.2.2 Stage 1 Screening Evaluation

A Screening for Appropriate Assessment was carried out which examined the potential effects of the UWF Grid Connection project, either alone or in combination with other projects or plans, upon a European site and considered whether it could be objectively concluded that these effects will not be significant.

A total of 23 European or Natura Sites were identified within the UWF Grid Connection Study Area. These European Sites comprise nineteen Special Areas of Conservation (SAC) and four Special Protection Area (SPA for birds). These European Sites and their respective distance to the UWF Grid Connection are outlined in Table 8.13, and identified on **Figure GC 8.2.1** and **Figure CE 8.2.1: Cumulative Evaluation Study Area for European Sites**. The Screening evaluation is included in **Volume E: Appropriate Assessment Reporting**.

Biodiversity

Topic

Table 8-13: European Sites within 15km of the proposed UWF Grid Connection project

	European Site	Distance from UWF Grid Connection
1	Slievefelim to Silvermines Mountain SPA (004165)	0m
2	Lower River Shannon SAC (002165)	0 m
3	Lower River Suir SAC (002137)	4.3 km
4	Anglesey Road SAC (002125)	2.9 km
5	Bolingbrook Hill SAC (002124)	8.5 km
6	Keeper Hill SAC (001197)	4.3 km
7	Silvermine Mountain SAC (000939)	9.4 km
8	Silvermine Mountain West SAC (002258)	7.7 km
9	Philipston Marsh SAC (001847)	12.0 km
10	Kilduff, Devilsbit Mountain SAC (000934)	16.8 km
11	Clare Glen SAC (000930)	1.6 km
12	Glenstal Wood SAC (001432)	2.6 km
13	Slieve Bernagh Bog SAC (002312)	11.5 km
14	Lough Derg, North-East Shore SAC (002241)	26.3 km
15	Glenomra Wood SAC (001013)	11.3 km
16	Tory Hill SAC (000439)	26 km
17	Ratty River Cave SAC (002316)	24.5 km
18	Askeaton Fen Complex SAC (002279)	31 km
19	Barrigone SAC (000432)	44 km
20	Curraghchase Woods SAC (000174)	33.4 km
21	Lough Derg (Shannon) SPA (004058)	10.2 km
22	River Shannon and River Fergus Estuaries SPA (004077)	16.9 km
23	Stack's to Mullaghareirk Mountains, West Limerick Hills & Mount Eagle SPA (004161)	50.9 km

8.2.1.2.3 Results of the Screening Evaluation

The results are that **there is no potential or no likelihood for UWF Grid Connection to cause any significant effects to the following 19 no. European Sites (16 SACs, 3 SPAs):**

- Anglesey Road SAC (002125),
- Bolingbrook Hill SAC (002124),
- Keeper Hill SAC (001197),
- Silvermine Mountain SAC (000939),
- Silvermine Mountain West SAC (002258),
- Philipston Marsh SAC (001847),
- Kilduff, Devilsbit Mountain SAC (000934),
- Glenstal Wood SAC (001432),
- Slieve Bernagh Bog SAC (002312),
- Lough Derg, North-East Shore SAC (002241),
- Glenomra Wood SAC (001013),
- Tory Hill SAC (000439),
- Ratty River Cave SAC (002316),
- Askeaton Fen Complex SAC (002279),

- Barrigone SAC (000432),
- Curraghchase Woods SAC (000174),
- Lough Derg (Shannon) SPA (004058),
- River Shannon and River Fergus Estuaries SPA (004077), and
- Stack's to Mullaghareirk Mountains, West Limerick Hills & Mount Eagle SPA (004161).

Therefore, these EU sites have been 'Screened Out' at Stage One of the Appropriate Assessment process.

The results of the screening were also that UWF Grid Connection has potential, via impact pathways, to cause significant effects to the following 4 European Sites (3 SACs, 1 SPA);

- **Lower River Shannon SAC**
- **Lower River Suir SAC, and**
- **Clare Glen SAC (000930),**
- **Slievefelim to Silvermines Mountain SPA**

These sites are described below.

8.2.1.2.4 Lower River Shannon SAC

The Lower River Shannon SAC encompasses the Shannon, Feale, Mulkear and Fergus estuaries, the freshwater lower reaches of the River Shannon (between Killaloe and Limerick), the freshwater stretches of much of the Feale and Mulkear catchments, and the marine area between Loop Head and Kerry Head.

This very large site stretches along the Shannon valley from Killaloe in Co. Clare to Loop Head/ Kerry Head. The site encompasses the Shannon, Feale, Mulkear and Fergus estuaries, the freshwater lower reaches of the River Shannon (between Killaloe and Limerick), the freshwater stretches of much of the Feale and Mulkear catchments and the marine area between Loop Head and Kerry Head. Rivers within the sub-catchment of the Feale include the Galey, Smearlagh, Oolagh, Allaughun, Owveg, Clydagh, Caher, Breanagh and Glenacarney. Rivers within the sub-catchment of the Mulkear include the Killeenagarrieff, Annagh, Newport, the Dead River, the Bilboa, Glashacloonaraveela, Gortnageragh and Cahernahallia.

This site contains the only known resident population of Bottle-nosed Dolphin in Ireland and all three Irish lamprey species. This site supports more wintering wildfowl and waders than any other site in the country and supports a large number of migratory birds.

Qualifying Interests: The following Lower River Shannon SAC Qualifying Interest habitats and species were screened in for evaluation at Stage 2 of the process:

- Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation [3260]
- Alluvial Forests (91E0)* (priority habitat)
- Atlantic Salmon [1106]
- Sea Lamprey [1095]
- Brook Lamprey [1096]
- River Lamprey [1099]
- Otter [1355]

Overlap with the SAC Boundary: The Mountphilips Substation site and the majority of the 110kV UGC (29km of the total 30.5km) are located within the Mulkear River catchment of the Lower River Shannon SAC catchment area, specifically within the Newport [Tipperary]_SC_010, Kileengarriff_SC_010, and Bilboa_SC_010 Sub-Catchments. See **Figure GC 8.2.2: Location of UWF Grid Connection and other projects/activities in relation to Lower River Shannon SAC.**

The UWF Grid Connection (110kV UGC) is located within the boundary of the Lower River Shannon SAC at six locations, over a total distance of 1025m, as follows;

- 190m along a section of the local public road L6013-0 to the north of Newport;
- 230m along a section of local public roads L2156-0 and L2157-0 on either side of, and over Rockvale Bridge. Rockvale Bridge crosses the Newport River, to the north of Newport town, at Watercourse Crossing W7;
- 100m, 80m and 390m sections along the Regional Limerick to Thurles Road R503 to the east of Rear Cross; and
- 35m along a section of the Regional Road R503 at Anglesey Bridge, near Kilcommon. Anglesey Bridge crosses over the Bilboa River, to the south of Kilcommon village, at Watercourse Crossing W53.

All works at the Rockvale Bridge and Anglesey Bridge will be carried out in the bridge structure. No instream works and no works on the lands below the bridges will be required.

All construction works on the public road, including where works overlap the SAC boundary, will be carried out in the public road pavement and no instream works, and no works in the verges or adjacent lands will occur.

8.2.1.2.5 Lower River Suir SAC

The Lower River Suir SAC consists of all of the freshwater stretches of the Suir immediately south of Thurles, and the tidal stretches as far as the confluence with the Barrow/Nore immediately east of Cheekpoint in Co. Waterford, and many of the tributaries including the Clodiagh, the Lingaun, Anner, Nier, Tar, Aherlow and Multeen. With respect to the Whole UWF Project, the Clodiagh⁴ River, Multeen River and Owenbeg River downstream of the development are within the Lower River Suir SAC.

Qualifying Interests: The following Lower River Suir SAC Qualifying Interest habitats and species were screened in for evaluation at Stage 2 of the process:

- Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation [3260]
- Alluvial Forests (91E0)* (priority habitat)
- Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]
- Yew Woodlands* Taxus baccata woods of the British Isles [91J0] (priority habitat)
- Old sessile oak woods with Ilex and Blechnum in the British Isles
- Freshwater Pearl Mussel [1029]
- White-clawed Crayfish [1092]
- Sea Lamprey [1095]
- Brook Lamprey [1096]
- River Lamprey [1099]
- Atlantic Salmon [1106]
- Otter [1355]

⁴It should be noted that **there are two Clodiagh Rivers within the catchment of the Lower River Suir SAC**; the Clodiagh River which rises in the eastern extent of the UWF Grid Connection and flows through the Upperchurch/Holycross area of County Tipperary, and c.60km to the southeast another Clodiagh River which rises in the Comeragh Mountains and flows through the Rathgormack/Clonea/Portlaw area of County Waterford. There is no interaction between the water catchment areas of these two rivers.

Overlap with the SAC Boundary: No part of the UWF Grid Connection overlaps the boundary of the Lower River Suir SAC. The UWF Grid Connection construction works are located c.12km upstream of the River Suir SAC, where the last c.1.5km of the UWF Grid Connection 110kV UGC route is located in the Clodiagh (Tipperary)_010 local surface water body (sub-basin) which exists within the Suir_SC_030 sub-catchment. See **Figure GC 8.2.3: Location of UWF Grid Connection and other projects/activities in relation to Lower River Suir SAC.**

8.2.1.2.6 Clare Glen SAC

This SAC lies on the Limerick - Tipperary border, in the western foothills of the Slievefelim Mountains, about 10 km north-west of Cappamore. The glen was formed by the action of the Clare River cutting into the Old Red Sandstone. The site comprises the wooded river valley. The woodland, although planted with many exotic trees, is mature and conforms to a type listed on Annex II of the E.U. Habitats Directive. The presence of a number of rare and scarce species including bryophytes and fungi adds further to its importance.

Qualifying Interests: The following Clare Glen SAC Qualifying Interest habitats and species were screened in for evaluation at Stage 2 of the process:

- Old Oak Woodlands [91A0]
- Killarney Fern (*Trichomanes speciosum*) [1421]

Overlap with the SAC Boundary: No part of the UWF Grid Connection overlaps the boundary of the Clare Glen SAC. Clare Glen SAC comprises a wooded area on both banks of the Clare River approximately c.2.2km downstream of the UWF Grid Connection (110kV UGC) within the Annagh (Tipperary)_030 local surface water body. See **Figure GC 8.2.4: Location of UWF Grid Connection and other projects/activities in relation to Clare Glen SAC.**

8.2.1.2.7 Slievefelim to Silvermines Mountain SPA

This SPA is an upland site located in Counties Tipperary and Limerick. It includes the peaks Keeper Hill, Slieve Felim, Knockstanna, Knockappul, Mother Mountain, Knockteige, Cooneen Hill and Silvermine Mountain. The site is underlain mainly by sandstones of Silurian age. Several important rivers rise within the site, including the Mulkear, Bilboa and Clare. The Slievefelim to Silvermines SPA is of ornithological importance because it provides nesting and foraging habitat for breeding Hen Harrier.

The Slievefelim to Silvermines Mountain SPA as a whole covers 20,917ha⁵, has held between seven (2010) and ten (2015) pairs of nesting Hen Harrier (Ruddock *et al.*, 2016), and is considered one of the strongholds for Hen Harrier in the country. The SPA has a high proportion (70%) of suitable habitat, totalling 14,552ha (extrapolated from data in Moran & Wilson-Parr, 2015). Within the SPA, nesting Hen Harriers have shown a preference to nest in the early stages of new and second-rotation conifer plantations, though some pairs may still nest in tall heather of unplanted bogs and heath⁶. Hen Harrier surveys, carried out between 2016 and 2019 for the UWF Grid Connection, found that Hen Harriers within the UWF Grid Connection Study Area all nested within this SPA – no nests were recorded outside of the SPA boundary.

Special Conservation Interest: The following Special Conservation Interest species was screened in for evaluation at Stage 2 of the process: Hen Harrier [A082]

Overlap with the SPA Boundary: The Mountphilips Substation is not located within the SPA; however, the 110kV UGC, which is 30.5km in length, passes through the boundary of the SPA for 8km in total. Where the 110kV UGC is routed outside of the Mountphilips Substation site (including through the SPA area), the 110kV

⁵ <https://www.npws.ie/sites/default/files/protected-sites/natura2000/NF004165.pdf>

⁶ <https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY004165.pdf>

UGC is entirely located within paved roads. The public road in question, through the boundary of the SPA, is the aforementioned Regional Road R503 which links Thurles to Limerick city.

See **Figure GC 8.2.5: Location of UWF Grid Connection in relation to Slievefelim to Silvermines Mountain SPA.**

8.2.1.3 Importance of European Sites

The EU Habitats Directive (92/43/EEC) on the Conservation of Natural Habitats and of Wild Fauna and Flora formed a basis for the designation of Special Areas of Conservation (SACs). Similarly, Special Protection Areas are legislated for under the Birds Directive (Council Directive 79/409/EEC on the Conservation of Wild Birds). Collectively SACs and SPAs are referred to as Natura 2000 sites, or 'European' sites. For the purposes of this report, they are considered to be of **International Importance**.

8.2.1.4 Sensitivity of European Sites

SAC designated sites are sensitive to hydrological changes to groundwater and surface water quality which may affect water dependant ecosystems, and habitat disturbance or loss. Within individual Designated Sites (both SAC's and SPA's), specific species may be sensitive to disturbance, displacement, habitat loss or a reduction in prey item species or accidental mortality, which could reduce their favourable conservation status. Designated sites are also sensitive to encroachment by invasive species.

8.2.1.5 Trends in the Baseline Environment (the 'Do-Nothing' scenario)

8.2.1.5.1 Special Protection Areas (SPAs)

Trends in respect of taxa designated under the EU Birds Directive (SPA's) are reported to the EU under Article 12⁷ of said directive. The most recently available trend information covers the period 2008-2012. Longer term trends in regard to wintering and breeding taxa across the SPA network are largely unknown⁸.

The 2014 Report covers 196 bird species, including species which live in Ireland all year round and others which migrate here for summer or winter. It provides a picture of both short-term and long-term trends for some species, and similarly a view of the breeding range trends in some species. However, there is an absence of long-term data for some species. The report was required to provide information on trends rather than a conclusive assessment of status, as is the case in the Article 17 report. In summary, 58% of species populations were stable or increasing in the short term, while 27% were decreasing. However, looking at long term data (where available) 36% were stable or increasing, while 28% were decreasing⁹.

8.2.1.5.2 Special Areas of Conservation (SACs)

Reporting on trends with regard to protected habitats and species under the EU Habitats Directive is provided to the EU under Article 17 of said directive. The most recently available trend information in respect of individual habitats and species was published in 2019¹⁰.

⁷ https://circabc.europa.eu/sd/a/a211d525-ff4d-44f5-a360-e82c6b4d3367/IE_A12NatSum_20141031.pdf

⁸ http://cdr.eionet.europa.eu/Converters/run_conversion?file=/ie/eu/art12/envuvesya/IE_birds_reports-14328-144944.xml&conv=343&source=remote#A082_B

⁹ Summarised from "Evaluation study to support the Fitness Check of the Birds and Habitats Directives" available online at <https://www.npws.ie/sites/default/files/publications/pdf/Fitness%20Check%2015%204%2015.pdf>.

¹⁰ https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2019_Vol1_Summary_Article17.pdf

Habitats

Under Article 11 of the Directive, each member state is obliged to undertake surveillance of the conservation status of the natural habitats and species in the Annexes and under Article 17, to report to the European Commission every six years on their status and on the implementation of the measures taken under the Directive. In April 2019, Ireland submitted the third assessment of conservation status for 59 habitats.

The Overall Status of habitats as depicted in the report is that 85% of habitats are in Unfavourable (i.e. Inadequate or Bad) status, with 46% of habitats demonstrating ongoing declining trends.

Many of the changes from previous assessments are due to improved knowledge e.g. marine habitats, changes of interpretation of the ecology of the habitat e.g. Rynchosporion depressions, or changes in the thresholds for Structure and Functions e.g. Juniper scrub. Therefore, the actual status (i.e. Favourable, Unfavourable/Inadequate or Unfavourable-Bad) of habitats has remained largely unchanged over time but with ongoing declining trends impacting almost half of all habitats. Although some habitats had insufficient Range and Area when the Directive came into force (e.g. active raised bog, hay meadows and many woodland habitats), it is the Structure and Functions of the habitats that is driving the Overall Status results in many cases, with inadequate conservation measures in place to improve the Future Prospects. Declining trends are particularly notable in marine, peatland, grassland and woodland habitats.

Pressures and threats are recorded in 54 of the 59 habitats assessed. The most frequent pressures recorded in habitats relate to the agriculture category. Over 70% of habitats are impacted by pressures relating to agricultural practices, and the pressure is ranked as High importance in more than 50% of habitats.

The next most frequent category of pressure to be recorded in habitats is “I Alien and problematic species” (listed as a pressure in 42% of habitats), closely followed by “F Development, construction and use of residential, commercial, industrial and recreational infrastructure and areas”, a pressure in 41% of habitats. However, alien and problematic species are high-importance pressures at just 12% of habitats, while infrastructure is recorded as a high-importance pressure in 22% of habitats.

Conservation measures are reported as being undertaken in 36 habitats. For 27 of these habitats, the main purpose of the conservation measures is to maintain the Range, Area or Structure and Functions of the habitat. For five habitats the main purpose of the measures is to restore the habitat, while for the remaining four the purpose of the measures is to increase the habitat area.

Species

Of the 68 Habitats Directive-listed species in Ireland, eight species have been described as vagrants. These include six cetacean species, Allis shad (*Alosa alosa*) and Brandt’s bat (*Myotis brandtii*). The latter two species have been assigned to this category since 2007 as there is no evidence of breeding populations of these species. The Nore pearl mussel (*Margaritifera durrovensis*) is no longer considered a separate species from the freshwater pearl mussel.

The Overall Status of the remaining 60 species (including three species groups) is that 57% of species are in Favourable status and 30% are in Unfavourable status (i.e. Inadequate or Bad), with 72% demonstrating stable or improving trends while 15% demonstrate ongoing declining trends.

Many species remain in Favourable status. Population increases and Range expansion have been observed for several bat species, marsh fritillary (*Euphydryas aurinia*), otter (*Lutra lutra*) and pine marten (*Martes martes*). Ongoing declines are reported for all whorl snails, freshwater pearl mussel, lesser horseshoe bat (*Rhinolophus hipposideros*) and maërl species. Knowledge has improved for many cetacean species and all data point to Favourable status for all species. A re-assessment of data for river lamprey (*Lampetra fluviatilis*) and leatherback turtle (*Dermochelys coriacea*) has resulted in an Unknown assessment for these species due to difficulties associated with identifying river lamprey juveniles and the paucity of records across a vast

marine area for the leatherback turtle.

Pressures are identified as impacting on 46 of the 57 taxa assessed. Threats are identified for 48 taxa.

Impacts from agricultural activities, and to a lesser extent forestry, are reported as having a negative effect on a wide range of species, including fish, molluscs, terrestrial mammals and vascular plants. This is because of the wide sphere of influence of some of these activities which, though implemented at relatively local levels, may influence a much wider area, particularly if they affect groundwater supplies or nearby watercourses. Examples include drainage, fertiliser application and clear-felling. The issue of alien species is a cross-cutting one, as it is for habitats, but it is recorded as a pressure for species much less frequently; however, the impact is predicted to increase over the next 12 years. In general, lower numbers of pressures and threats are reported for bat species than the other species groups, with no significant impacts noted for six of the nine bat species assessed.

Conclusion:

The conclusion is that most Irish habitats listed on the Habitats Directive are in Unfavourable status and almost half are demonstrating ongoing declines. The majority of species listed on the Habitats Directive are, however, in Favourable status in Ireland, and stable, although a small number are considered to be in Bad status and continue to require concerted efforts to protect and restore them.

8.2.1.6 Receiving Environment (the Baseline + Trends)

It is assumed in this report that the baseline environment in relation to designated sites, as identified above, will be the receiving environment at the time of construction – i.e. 2020/2021. due to the short separation period. Further trends in species and habitats as identified in reporting to Europe are likely overlap the operational phase, dependant on the occurrence of causal mechanisms such as identified pressures.

8.2.2 CUMULATIVE INFORMATION - Cumulative Projects & Baseline Characteristics

8.2.2.1 Cumulative Evaluation Study Areas

8.2.2.1.1 UWF Grid Connection Cumulative Evaluation Study Area

The UWF Grid Connection was evaluated for cumulative effects with other projects and the study area is set out in the table below. The study areas are illustrated on [Figure CE 8.2.2 – CE 8.2.5: Location of UWF Grid Connection and other projects/activities in relation to Lower River Shannon SAC, Lower River Suir SAC, Clare Glen SAC and Slievefelim to Silvermines Mountain SPA](#) (Volume C3 EIAR Figures).

UWF Grid Connection Cumulative Evaluation Study Area for European Sites	Justification for the Study Area Extents
<p>Lower River Shannon SAC: The EPA sub-catchments of the Newport [Tipperary]_SC_010, Kileengarrif_SC_010, and Bilboa_SC_010 within the regional Mulkear River catchment</p> <ul style="list-style-type: none"> • Newport[Tipperary]_SC_010, • Dead_SC_010, • Kileengarrif_SC_010, • Bilboa_SC_010, • Mulkear_SC_010, • Mulkear_SC_020, • Shannon[Lower]_SC_090 	<p>As per Chapter 11 Water - defined by regional topography and drainage towards the SAC.</p> <p>Note: The Mulkear River catchment is the Lower Shannon & Mulkear Catchment Hydrometric Area HA25D excluding Shannon [Lower] _SC_100 sub-catchment and Shannon [Lower] _SC_080 sub-catchment.</p> <p>The zone of cumulative impacts for SAC relates to the regional subcatchments, as any effects at a wider catchment level will be negligible due to dilution and dispersion.</p>
<p>Lower River Suir SAC: Suir_SC_030 sub-catchment within the Regional River Suir Hydrometric are HA16</p>	<p>As per Chapter 11 Water- defined by regional topography and drainage towards the SAC.</p> <p>The zone of cumulative impacts for SAC relates to the regional subcatchment, as any effects at a wider catchment level will be negligible due to dilution and dispersion.</p>
<p>Clare Glen SAC - Annagh (Tipperary)_030, Annagh(Tipperary)_020 and Annagh (Tipperary)_010 local surface water bodies</p>	<p>These local surface water bodies are all located upstream and hydrologically connected to the SAC, in the Killeengarriff_SC_010 subcatchment.</p>
<p>Slieve Felim to Silvermines Mountains SPA: SPA plus 2km around the boundary</p>	<p>Cumulative impacts should be assessed at the relevant biogeographical scale, so that the assessment of the impact of the development can be made alone and in combination with other developments- SNH 2018¹¹ Little information is available on the effects of grid infrastructure construction activities on breeding Hen Harriers, although effects from large scale development such as wind farms at distances of up to 1km from nests has been reported (Ruddock & Whitfield, 2007, Wilson <i>et al.</i> ,2015). An area of twice this has been conservatively selected in line with Best Practice, (SNH, 2017). This area is considered conservative in the context of the proposed UWF Grid Connection, which may not have the same magnitude of source impacts during construction and/or operation as other larger developments cited in the references above.</p>

¹¹ Scottish Natural Heritage. (2018). *Assessing Significance of Impacts from Onshore Wind Farms Outwith Designated Areas*. SNH, Battleby.

8.2.2.1.2 Whole Project Cumulative Evaluation Study Area

UWF Grid Connection is part of a whole project which comprises the following Other Elements; Element 2: UWF Related Works, Element 3: UWF Replacement Forestry, Element 4: Upperchurch Windfarm (UWF), and Element 5: UWF Other Activities. The Subject Development, UWF Grid Connection is Element 1. All five elements are collectively referred to as the Whole UWF Project in this EIA Report.

The Other Elements must be considered because UWF Grid Connection is part of a whole project. Therefore, the cumulative information and evaluations for the Other Elements of the Whole UWF Project are included in order to present the totality of the project.

A description of these Other Elements is included in this EIA Report at [Appendices 5.3, 5.4, 5.5 and 5.6](#), in [Volume C4 EIAR Appendices](#). Scoping of these Other Elements is presented in [Section 8.3.2.2.1](#) below.

The Whole Project Cumulative Evaluation Study Area comprises of the UWF Grid Connection Study Area along with the study areas for Other Elements which are described in Table 8-14 and illustrated on [Figure CE 8.2.1: UWF Grid Connection Cumulative Evaluation Study Area for European Sites \(Volume C3 EIAR Figures\)](#).

Table 8-14: Whole Project Cumulative Evaluation Study Area for European Sites

<u>Cumulative Project</u>	<u>Cumulative Study Area Boundary</u>	<u>Justification for Study Area Extent</u>
Element 1 : UWF Grid Connection	Lower River Shannon SAC: The EPA sub-catchments of the Newport [Tipperary]_SC_010, Kileengarrif_SC_010, and Bilboa_SC_010 within the regional Mulkear River catchment <ul style="list-style-type: none"> • Newport[Tipperary]_SC_010, • Dead_SC_010, • Kileengarrif_SC_010, • Bilboa_SC_010, • Mulkear_SC_010, • Mulkear_SC_020, Shannon[Lower]_SC_090	Same study area as UWF Grid Connection Cumulative Evaluation Study Area - Professional Judgement
Element 2: UWF Related Works		
Element 3: UWF Replacement Forestry		
Element 4: Upperchurch Windfarm (UWF)		
Element 5: UWF Other Activities		
	Lower River Suir SAC: Suir_SC_030 sub-catchment within the Regional River Suir Hydrometric are HA16 Clare Glen SAC Annagh (Tipperary)_030, Annagh (Tipperary)_020 and Annagh(Tipperary)_010 local surface water bodies Slieve Felim to Silvermines Mountains SPA: SPA plus 2km around the boundary	

8.2.2.2 Scoping of Other Projects or Activities & for Potential for Impacts

The evaluation of cumulative impacts to European Sites also considered Other Projects or Activities. A scoping exercise was carried out to determine which projects or activities, if any, have potential to cause cumulative effects to European Sites with either the UWF Grid Connection or the Other Elements of the Whole UWF Project and therefore should be brought forward for evaluation in this topic chapter. A brief overview of the Other Projects or Activities and the scoping exercise by the topic authors is included in **Appendix 2.1: Scoping of Other Projects or Activities for Cumulative Evaluations (Section A2.1.4.4)**.

The results of this scoping exercise are that: Milestone Windfarm, Rearcross Quarry, Newport Town Park proposed Curraghduff Quarry, Castlewaller Windfarm, potential Bunkimalta Windfarm and the Activities of Forestry, Agriculture, Turf-Cutting in the surrounding area have been scoped in for evaluation of cumulative effects to European Sites on the basis of potential interactions with the aquatic environment.

8.2.2.2.1 Potential for Impacts to European Sites

An evaluation was carried out by the topic authors of the likelihood for the Other Elements of the Whole UWF Project to cause cumulative effects to the Sensitive Aspect European Sites. The results of this evaluation are included in Table 8-15.

The location of the Other Elements in relation to European Sites is illustrated on **Figures CE 8.2**.

Table 8-15: Results of the Evaluation of the Other Elements of the Whole UWF Project

<u>Other Element of the Whole UWF Project</u>	
Element 2: UWF Related Works	<u>Included/Excluded</u> for the evaluation of cumulative effects in relation to: <ul style="list-style-type: none"> • Included: Lower River Shannon SAC • Included: Lower River Suir SAC • Excluded: Clare Glen SAC, not hydrologically connected • Included: Slievefelim to Silvermines Mountain SPA
Element 3: UWF Replacement Forestry	<u>Included/Excluded</u> for the evaluation of cumulative effects in relation to: <ul style="list-style-type: none"> • Included: Lower River Shannon SAC • Included: Lower River Suir SAC • Excluded: Clare Glen SAC, not hydrologically connected • Included: Slievefelim to Silvermines Mountain SPA
Element 4: Upperchurch Windfarm (UWF)	<u>Included/Excluded</u> for the evaluation of cumulative effects in relation to: <ul style="list-style-type: none"> • Included: Lower River Shannon SAC • Included: Lower River Suir SAC • Excluded: Clare Glen SAC, not hydrologically connected • Included: Slievefelim to Silvermines Mountain SPA
Element 5: UWF Other Activities	<u>Included/Excluded</u> for the evaluation of cumulative effects in relation to: <ul style="list-style-type: none"> • Included: Lower River Shannon SAC • Included: Lower River Suir SAC • Included: Clare Glen SAC • Included: Slievefelim to Silvermines Mountain SPA
<u>Other Projects or Activities</u>	
Rearcross Quarry (existing) Castlewaller Windfarm (consented windfarm & potential grid connection)	<u>Included/Excluded</u> for the evaluation of cumulative effects in relation to: <ul style="list-style-type: none"> • Included: Lower River Shannon SAC • Excluded: Lower River Suir SAC, not hydrologically connected • Included: Clare Glen SAC • Included: Slievefelim to Silvermines Mountain SPA

European Sites Sensitive Aspect	Bunkimalta Windfarm (potential windfarm & consented grid connection)	
	Newport Town Park (consented)	<u>Included/Excluded</u> for the evaluation of cumulative effects in relation to: <ul style="list-style-type: none"> • Included: Lower River Shannon SAC • Excluded: Lower River Suir SAC, not hydrologically connected • Included: Clare Glen SAC • Excluded: Slievefelim to Silvermines Mountain SPA, small scale development in Newport town
	Milestone Windfarm (existing) Proposed Quarry at Curraghduff	<u>Included/Excluded</u> for the evaluation of cumulative effects in relation to: <ul style="list-style-type: none"> • Excluded: Lower River Shannon SAC, already constructed windfarm, absence of hydrological pathways • Included: Lower River Suir SAC • Excluded: Clare Glen SAC, not hydrologically connected • Included: Slievefelim to Silvermines Mountain SPA
	Forestry Agriculture Turf-Cutting (in the surrounding area)	<u>Included/Excluded</u> for the evaluation of cumulative effects in relation to: <ul style="list-style-type: none"> • Included: Lower River Shannon SAC • Included: Lower River Suir SAC • Included: Clare Glen SAC • Included: Slievefelim to Silvermines Mountain SPA

8.2.2.3 Cumulative Information: Baseline Characteristics – Context & Character

The location of the Other Elements and Other Projects and Activities in relation to the Lower River Shannon SAC, Lower River Suir SAC, Clare Glen SAC and the Slieve Felim to Silvermines Mountain SPA is provided below, and illustrated on **Figure CE: 8.2**.

8.2.2.3.1 Element 2: UWF Related Works

The UWF Related Works are mainly located in the Clodiagh (Tipperary¹²) River sub-catchment of the River Suir which drains downstream to the Lower River Suir cSAC, to the south of Holycross village (no works occur within the SAC). Some of the footprint of the UWF Related Works also drains downstream to the Lower River Shannon cSAC. The UWF Related Works location HW7 is located within the Slieve Felim to Silvermines Mountains SPA- however no works are required at this location

8.2.2.3.2 Element 3: UWF Replacement Forestry

UWF Replacement Forestry is located entirely in the Clodiagh (Tipperary) River sub-catchment which drains downstream to the Lower River Suir cSAC. The UWF Replacement Forestry is located in its entirety outside the Slieve Felim to Silvermine Mountains SPA.

8.2.2.3.3 Element 4: Upperchurch Windfarm

The already consented Upperchurch Windfarm is located mainly in the Clodiagh (Tipperary) River sub-catchment which drains downstream to the Lower River Suir cSAC. Some of the footprint of the Upperchurch Windfarm drains downstream to the Lower River Shannon cSAC.

The Upperchurch Windfarm is located in its entirety outside the Slieve Felim to Silvermine Mountains SPA.

¹² We note that there are 2 River Clodiagh's within the River Suir catchment, the above sited Clodiagh (Tipperary) River but also the Clodiagh (Waterford) River (including the only designated Freshwater Pearl Mussel sub-catchment in the Suir catchment). There is no hydrological connection between the two Clodiagh Rivers.

Consideration of the Passage of Time: A comparison of EPA monitoring data for 2012 and 2017 demonstrates that water quality in the catchments into which the windfarm site drains, has remained stable. Hen harrier habitat has remained sub-optimal and surveys during 2015 to 2017 recorded low usage of the windfarm site by hen harriers. In relation to the SPA, surveys conducted at the Upperchurch Windfarm site, and in the area of the windfarm site for UWF Related works and UWF Grid Connection demonstrate that hen harrier usage of the site continues to be very low, and limited to foraging with no nests within 2km. Therefore it is considered that the descriptions in the 2013 and 2014 documents for Upperchurch Windfarm remain relevant to the cumulative evaluations in this EIAR for UWF Grid Connection.

8.2.2.3.4 Element 5: UWF Other Activities

The UWF Other Activities are partially located in the Clodiagh (Tipperary) River sub-catchment which drains downstream to the Lower River Suir cSAC, where Haul Route Activities HA21-23 and Upperchurch Hen Harrier Scheme exist in proximity to the Upperchurch Windfarm.

Further Haul Route Activity locations such as tree trimming, overlaying of matting on verges and temporary street furniture removal extend northwards and then west before termination at Foynes. This brings a number of HA locations into closer proximity the Lower River Shannon SAC. Overhead Line Activities will also occur within the River Shannon catchment. Monitoring Activities will occur upstream of the Clare Glen SAC and within the Slievefelim to Silvermines Mountain SPA. No works however are proposed in respect of these activities in proximity to European Sites.

8.2.2.3.5 Other Projects or Activities

Existing Milestone Windfarm: Milestone Windfarm is an existing 4-turbine windfarm located on lands adjacent to the consented Upperchurch Windfarm. This windfarm is located entirely outside of the Slieve Felim to Silvermines Mountain SPA, upstream of the Lower River Suir SAC.

Curraghduff Quarry: A proposed quarry exists at Curraghduff, circa. 3.7km to the southeast of the 110kV UGC at the Consented UWF Substation. This quarry is located entirely outside of the Slieve Felim to Silvermines Mountain SPA, upstream of the Lower River Suir SAC.

Potential Bunkimalta Windfarm (and consented grid connection): a potential windfarm located within the Slievefelim to Silvermines SPA, c.5km to the north of the UWF Grid Connection. The windfarm will also be located upstream of the Lower River Shannon SAC and Clare Glen SAC.

Consented Castlewaller Windfarm (and potential grid connection): a consented windfarm located within the Slievefelim to Silvermines SPA, immediately adjacent to the UWF Grid Connection. It is located upstream of the Lower River Shannon SAC. None of the windfarm is located upstream of Clare Glen SAC, however part of the potential grid connection route and addition site access is located upstream of this SAC.

Consented Newport Town Park: a consented park adjacent to the Newport River and therefore adjacent to the Lower River Shannon SAC.

Existing Rear Cross Quarry: an existing quarry located in Shanballyedmond, near Rear Cross village, to the south of the UWF Grid Connection. Located within the Slievefelim to Silvermines Mountain SPA and upstream of Lower River Shannon SAC/Clare Glen SAC.

Forestry/Agriculture/Turf-Cutting (in the surrounding area) occur within the Slievefelim to Silvermines SPA, and adjacent to, or in the case of Turf cutting, upstream of the Lower River Shannon cSAC/Lower River Suir cSAC/Clare Glen SAC.

8.2.3 PROJECT DESIGN MEASURES for European Sites

At the conception of the UWF Grid Connection, the design team evaluated the potential for significant impacts to the environment. Impacts will only take place where three components exist together; (1) the source of the impact (project), (2) the receptor of the impact (sensitive aspect) and (3) a pathway between the source and the sensitive aspect. The objective of mitigation measures is to avoid, prevent or reduce, one of the three components of an impact by choosing an alternative location, alternative design or an alternative process.

Potential or likely significant impacts were avoided, prevented or reduced by integrating mitigation measures into the fundamental design of the development – these are the Project Design Environmental Protection Measures, which are shortened to ‘Project Design Measures’ in this EIA Report.

The development as evaluated in the EIA Report incorporates the Project Design Measures.

The Project Design Measures outlined in Table 8-16 are relevant to the Environmental Factor, Biodiversity, and in particular to the sensitive aspect **European Sites**.

Please Note: The Project Design Measures will be implemented through the **Environmental Management Plan for UWF Grid Connection**, which includes a Surface Water Management Plan, Invasives Species Management Plan, Environmental Emergency Procedures and Best Practice Measures (See Volume D appended to this EIA Report)

Table 8-16: UWF Grid Connection Project Design Measures relevant to European Sites

PD ID	Project Design Environmental Protection Measure (PD) (Mitigation Measures)
Project Design Measures – Slievefelim to Silvermines Mountain SPA	
PD01	UWF Grid Connection construction works during the Hen Harrier breeding season (March to August inclusive) will only take place at the Mountphilips Substation Site; construction of the 110kV UGC between the Mountphilips Substation site and the Consented UWF Substation compound will be carried out during the months of September to February inclusive.
PD02	If works at Mountphilips Substation site are programmed to begin in the Hen Harrier breeding season (March to August) confirmatory Hen Harrier breeding surveys will be completed, before such works initiate, such that all pre breeding nuptial activity, nesting activity and active nests are recorded within 2km of the entire construction works area boundary. These surveys will be completed prior to the start-up of all construction activities. No works will take place within 2 km of any identified active Hen Harrier nest during the hen harrier breeding season.
PD03	Although no hen harrier roosts are currently known to occur within 1km of UWF Grid Connection, confirmatory surveys will be completed to record any roosting locations within 1km of UWF Grid Connection. Should a hen harrier roost occur within 1km of UWF Grid Connection works, then construction works within 1km of a roost will be limited to the period between ‘one hour after sunrise’ to ‘one hour before sunset’ during the Hen Harrier roosting season (October to February inclusive).
PD05	At the Mountphilips Substation site, construction traffic will be restricted to the construction works area and tracking across adjacent ground will not be permitted. A speed limit of 25km/hr for all traffic/machinery will be implemented at the Mountphilips Substation site. Outside of Mountphilips Substation site, all construction will be restricted to the paved road surfaces or built surfaces along the 110kV UGC. A speed limit of 50km/hr for all delivery and construction traffic will be implemented on Local Roads (‘L’ roads).
PD58	Hedgerow removal and clearance of any other breeding bird vegetation will take place outside of the bird breeding season i.e. not during the period of March to August inclusive. This includes hedgerow and scrub removal in addition to hedgerow trimming.

Project Design Measures – Lower River Shannon SAC	
PD46	All construction works will be monitored on a daily basis by the Environmental Clerk of Works and by members of the Environmental Clerk of Works team (for example Site Ecologist) as required, for compliance with the Environmental Commitments, which include the Project Design Measures, as per the UWF Grid Connection Environmental Management Plan (see Volume D).
PD05	At the Mountphilips Substation site, construction traffic will be restricted to the construction works area and tracking across adjacent ground will not be permitted. Outside of Mountphilips Substation site, all construction will be restricted to the paved road surfaces or built surfaces along the 110kV UGC.
PD17	At Mountphilips Substation, water for operational stage welfare facilities will be obtained from a Rain Water Harvesting system. Waste water will be collected in tanks and removed from site by an appropriately licensed operator, for treatment in a licensed water treatment plant. These two measures will avoid the need for a new well or mains water connection and will avoid the need to treat waste water on-site.
PD18	The new substation compound and the new permanent access road at the Mountphilips Substation site will have a permanent surface water drainage network in place which will include check dams. These check dams will allow the settlement of suspended solids in water runoff while also slowing down the rate of water run-off from these areas.
PD19	At Mountphilips Substation location, where dewatering of trenches or excavations is required, there will be no direct discharge of untreated water into any watercourse or drain. Rather all pumped water will be treated prior to discharge using an infiltration trench or settlement pond or suitable water treatment train such as a Siltbuster, as appropriate to the volume of water requiring treatment (if any) to ensure there is no exceedance of the criteria listed in Schedule 5 and Schedule 6 of the EC Environmental Objectives Surface Water Regulations 2009 (as amended) and will ensure that the water quality status in downstream waterbodies are maintained in accordance with the Surface Water Regulations 2009.
PD20	At Mountphilips Substation site, all excavated material will be removed for temporary or permanent storage at designated berms, which will be located more than 25m away from the watercourses on Mountphilips Substation site. All storage berms will be graded and sealed following emplacement. The berms will be covered if there is a risk of erosion. Temporary silt control methods such as silt fencing will be placed around all overburden storage areas. The existing vegetative buffer between the berms and the nearest watercourses will be maintained and no works will occur in the buffer zone.
PD21	At Mountphilips Substation site, permanent storage berms around the substation compound will be sown with grasses and flower species common to the surrounding vegetation. The permanent storage berms along the new access road will be planted with local provenance native fruiting hedge species, with grasses and native flower species sown along the sides of the berms. Revegetation works will take place at the soonest practicable opportunity after emplacement.
PD22	Outside of the Mountphilips Substation site, there will be no storage of overburden and all excavations from road trenches will be removed to licensed waste facilities in accordance with the UWF Grid Connection Waste Management Plan. Loads of excavated material will be covered during transportation to prevent spillages of excavated material.
PD23	All Joint Bays for the 110kV UGC will be located at least 50m from a Class 1 or Class 2 watercourse and at least 25m from Class 3 or Class 4 watercourses.
PD24	Outside of the Mountphilips Substation site, where dewatering of trenches or excavations is required for the 110kV UGC, there will be no direct discharge of treated water into any watercourse or drain. Rather all pumped water will be treated using a mobile water treatment train and then discharged via a silt bag to ensure there is no exceedance of the criteria listed in Schedule 5 and Schedule 6 of the EC Environmental Objectives Surface Water Regulations

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	PD25	Construction works along the 110kV UGC route will cease during heavy or prolonged rainfall events, and any open trenches or excavations will be covered. Use of weathering forecasting will be undertaken in advance of works.
	PD26	A phased approach will be undertaken in relation to excavations, excavation dewatering and any culvert replacement works, where these works occur within 50m of a watercourse. The phased approach will only permit one of main potential sediment producing activities (i.e. excavations, excavation dewatering or culvert replacement works), to be carried out within 50m of a watercourse, at any one time.
	PD27	At Mountphilips Substation site, works within 50m of watercourses, additional mitigation measures include double silt fencing, temporary drain blocking, placement of straw bale arrangements along preferential surface water flowpaths and, where necessary, the use of matting to prevent ground erosion and rutting.
	PD28	Along the 110kV UGC on the public road, where works will take place within 50m of a watercourse, additional mitigation measures will be implemented which include silt fencing and placement of sandbag arrangements along preferential surface water flowpaths on the road pavement. Following works on any particular section, any works debris will be removed from the road before the sandbags and silt fences are removed.
	PD29	Cable trenching works, joint bay chamber installation and culvert replacement works on the section of 110kV UGC between W13 and W20 (inclusive) and the culvert replacement works at W32 and W34 will only be completed during dry weather in the dryer months of the year – i.e. February to September included. This will minimise/avoid the requirement for any excavation dewatering as a result of waterlogged soils or surface water runoff. None of these 110kV UGC sections are within the Lower River Shannon SAC.
	PD30	Lines of silt fencing and sandbags will be erected along the edge of the road so that surface water runoff from adjacent construction works areas is captured and directed to the excavated trench, where it can be pumped and treated before being released, as per PD24.
	PD31	Works to bridge parapet walls at watercourse crossings W7, W36, W53 will be carried out during dry weather, and debris netting will be fixed to the outside of the walls in order to prevent any debris falling into the watercourse below.
	PD32	At Mountphilips Substation site, instream construction works at the watercourse crossings W1, W2 and W3 will be followed by site-specific reinstatement measures to ensure the equilibrated restoration of flow character and morphology within the affected reach to achieve baseline character and avoid any deterioration in morphology as required under the Water Framework Directive (WFD). Measures will include: bank stabilisation using boulder armour or willow/brush bank protection; reinstatement of bank slope and character, creation of compound channels where necessary; reinstatement of instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles; and planting along the riparian margins to stabilise banks, add flood protection and provide riparian buffer; and the use of deflector plates during the restoration of flow. Instream works at W1, W2 and W3 at the Mountphilips Substation site will be undertaken during dry weather within the IFI instream works window (July – September inclusive). As per PD41, instream works at W1, W2 and W3 will be supervised by a member of CIEEM and the Institute of Fisheries Management to ensure both the Project Design Measures and Best Practice are followed.
	PD33	All new permanent watercourse culverts at the Mountphilips Substation site and any replacement culverts along the public road for the 110kV UGC will be sized to cope with a minimum 100-year flood event.
Biodiversity	PD34	Only precast concrete culverts or structures will be used at the watercourse crossing locations at Mountphilips Substation site and for any culvert replacements along the 110kV UGC. Only precast concrete chambers will be used at Joint Bay locations. No batching of wet cement will take place on-site.
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PD35	Concrete pours will be required for the 110kV UGC cables trench. Only chutes will be washed out at the works locations into the cable trench, with the washout of the tank taking place at the concrete supplier depot. Concrete chute washouts within the SAC boundary will take place into designated bins for removal to the designated concrete wash settlement pond at the Mountphilips Substation site.
PD42	There will be no refuelling of vehicles or plant permitted within 100m of a watercourse. Spill response apparatus including spill-kits and hydrocarbon absorbent packs will be stored in the cabin of each vehicle and operators will be fully trained in the use of this equipment. The Environmental Emergency Response Procedure will be implemented immediately in the event of any spills. The Environmental Emergency Response Procedure is part of the UWF Grid Connection Environmental Management Plan.
PD43	The main fuel stocks for, and chemical wastes arising from, construction activities will be stored in a designated location, away from main traffic activity, within the temporary compound at the Mountphilips Substation site. All fuel will be stored in bunded, locked storage containers. The designated storage location will be greater than 100m from a watercourse. Spill response apparatus including spill-kits and hydrocarbon absorbent packs will be stored at the designated location in the temporary compound and all operators will be fully trained in the use of this equipment. The Environmental Emergency Response Procedure will be implemented immediately in the event of any spills. The Environmental Emergency Response Procedure is part of the UWF Grid Connection Environmental Management Plan.
PD44	Overnight parking of plant and machinery will only be permitted at the temporary compound at the Mountphilips Substation site and at a distance greater than 50m from watercourses.
PD45	The horizontal directional drilling works at W8 and W9 will be carried out by an experienced Drilling Contractor and supervised and managed by a competent and experienced Mud Engineer who understands the technicalities and challenges of drilling works. The Mud Engineer will advise the Construction Manager on the selection of competent drillers for the HDD works; monitor the watercourse bed during drilling works, and will supervise the drilling works including the drilling pressures and the implementation of any contingency measures. From a surface water quality protection perspective, the area around the launch/reception pit, bentonite batching, pumping and recycling plant will be bunded using appropriate terram geotextile and/or sandbags in order to contain any spillages. Drilling fluid returns will be contained within a sealed tank / sump to prevent migration from the works area. Spills of drilling fluid will be cleaned up immediately and stored in an adequately sized water tight skip before being taken off-site to a suitably licensed waste facility. In the event of a break-out occurring, the Environmental Emergency Response Procedure for Frac-Out will be implemented which includes the following contingency measures; In the event of break-out occurring in the river bed, the rig will immediately shut off the pumps and the drilling assembly will be pulled off to reduce annular pressures; In the event of break-out on the road an excavator will be available to dig a pit to contain fluid with vacuum trucks/pumps available to transfer drill fluid from the containment point back to the recycling point; and in either scenario, drilling fluid additives designed to plug the formation will be introduced to the circulation system and let set. Environmental Emergency Response Procedures are included in the UWF Grid Connection Environmental Management Plan (see Volume D).
PD47	Surface water quality monitoring of the main watercourses downstream of the works will be carried out to ensure that the downstream water quality status in the receiving water is maintained and that there is no exceedance of the criteria listed in Schedule 5 and Schedule 6 of the EC Environmental Objectives Surface Water Regulations 2009 (as amended) and will ensure that the water quality status in downstream waterbodies are maintained in accordance with the Surface Water Regulations 2009. Where non-compliance in water quality is measured or recorded, works will stop until the issue is resolved. The surface water monitoring locations and sampling programme are defined in the Surface Water Management Plan for UWF Grid Connection. The Surface Water Management Plan is part of the UWF Grid Connection Environmental Management Plan (see Volume D).

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European Sites	PD48	The new permanent cross structures at the Mountphilips Substation site and the replacement culvert at W14 along the R503 will be bottomless or clear spanning.
	PD49	In-stream works at Mountphilips Substation site and culvert replacement works at W14 along the R503 Regional Road will only be undertaken during the IFI specified period (July, August and September) and will be carried out to best practice (IFI, 2016).
	PD50	Culvert replacement works along the 110kV UGC will not be undertaken without isolation of flow within the watercourse. Isolation of flow will be achieved through the use of sandbags filled with clean, washed sand. Any fish within the isolated section will be removed prior to works commencing. This will require the engagement of licensed fisheries personnel to deplete the works area using electrofishing and, following collection of biometrics, transferred immediately downstream of the crossing point and placed back in the water. The water will then be isolated from the works by over pumping using a flume (pipe). Following works, the sandbags will be removed slowly to ensure the equilibrated restoration of flow character and morphology within the affected reach. Deflector plates will be used if required, to reduce the hydraulic power of the water (These measures will be overseen by an experienced aquatic ecologist). These measures will ensure that the baseline character is maintained and will ensure that a deterioration in morphology is avoided, as required under the Water Framework Directive.
	PD69	All covering of vegetative invasive knotweed infestations with high density polyethylene grass carpet terram will take place, at all identified locations prior to any works commencing on UWF Grid Connection or any other element of the Whole UWF Project. The covering of infestations will be completed on sections seven days in advance of works occurring on those sections. The infestations will be covered so that their full extent plus 1 metre is covered entirely and no vegetation is visible. The covering of these infestations will only be carried out under the direct supervision of an ecologist with prior experience of this type of work i.e. this work cannot be carried out by any general construction staff. No posts will be used to secure the coverings i.e. there will be no ground interference during any of these operations.
	PD36	The sections of 110kV UGC trenches that overlap the Lower River Shannon SAC will be lined with an impermeable geotextile material to prevent potential migration of cement from the trench base or sides into the SAC.
	PD37	In addition to PD22, there will be no storage of overburden within the Lower River Shannon SAC.
	PD38	110kV UGC works outside of Mountphilips Substation site will be carried out entirely on paved roads and where the 110kV UGC crosses watercourses, the works will be carried out over the existing bridges and over/under existing culverts. No in-streams works are proposed at any watercourse crossing points (including the Newport River and Bilboa River crossings) within the boundary of the Lower River Shannon SAC and therefore there will be no placement of cement or other materials within the river channels or on the river banks within the SAC.
	PD39	In addition to PD42, there will be no refuelling of vehicles or plant, no storage of fuels and no overnight parking permitted within 100m of the boundary of the Lower River Shannon SAC.
	PD40	In addition to PD29, all 110kV UGC works within the boundary of the Lower River Shannon SAC will only be completed during dry weather in the dryer months of the year – i.e. February to September included.
	PD41	The instream works at W1, W2 and W3 at Mountphilips Substation site, and the culvert replacement works at the 13 existing culverts on the public road, and all works (including concrete placement) within the boundary of the Lower River Shannon SAC, will be supervised by a member of CIEEM and the Institute of Fisheries Management to ensure both the Project Design Measures and Best Practice Measures are followed.
Biodiversity	Project Design Measures – Lower River Suir SAC/Clare Glen SAC	
	PD46	All construction works will be monitored on a daily basis by the Environmental Clerk of Works and by members of the Environmental Clerk of Works team (for example Site Ecologist) as required, for compliance with the Environmental Commitments, which include the Project Design Measures, as per the UWF Grid Connection Environmental Management Plan (see Volume D).
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PD22	Outside of the Mountphilips Substation site, there will be no storage of overburden and all excavations from road trenches will be removed to licensed waste facilities in accordance with the UWF Grid Connection Waste Management Plan. Loads of excavated material will be covered during transportation to prevent spillages of excavated material.
PD23	All Joint Bays for the 110kV UGC will be located at least 50m from a Class 1 or Class 2 watercourse and at least 25m from Class 3 or Class 4 watercourses.
PD24	Outside of the Mountphilips Substation site, where dewatering of trenches or excavations is required for the 110kV UGC, there will be no direct discharge of treated water into any watercourse or drain. Rather all pumped water will be treated using a mobile water treatment train and then discharged via a silt bag to ensure there is no exceedance of the criteria listed in Schedule 5 and Schedule 6 of the EC Environmental Objectives Surface Water Regulations 2009 (as amended) and will ensure that the water quality status in downstream waterbodies are maintained in accordance with the Surface Water Regulations 2009.
PD25	Construction works along the 110kV UGC route will cease during heavy or prolonged rainfall events, and any open trenches or excavations will be covered. Use of weathering forecasting will be undertaken in advance of works.
PD26	A phased approach will be undertaken in relation to excavations, excavation dewatering and any culvert replacement works, where these works occur within 50m of a watercourse. The phased approach will only permit one of main potential sediment producing activities (i.e. excavations, excavation dewatering or culvert replacement works), to be carried out within 50m of a watercourse, at any one time.
PD28	Along the 110kV UGC on the public road, where works will take place within 50m of a watercourse, additional mitigation measures will be implemented which include silt fencing and placement of sandbag arrangements along preferential surface water flowpaths on the road pavement. Following works on any particular section, any works debris will be removed from the road before the sandbags and silt fences are removed.
PD29 (does not apply to Lower River Suir SAC)	Cable trenching works, joint bay chamber installation and culvert replacement works on the section of 110kV UGC between W13 and W20 (inclusive) and the culvert replacement works at W32 and W34 will only be completed during dry weather in the dryer months of the year – i.e. February to September included. This will minimise/avoid the requirement for any excavation dewatering as a result of waterlogged soils or surface water runoff. None of these 110kV UGC sections are within the Lower River Shannon SAC.
PD30	Lines of silt fencing and sandbags will be erected along the edge of the road so that surface water runoff from adjacent construction works areas is captured and directed to the excavated trench, where it can be pumped and treated before being released, as per PD24.
PD31 (does not apply to Lower River Suir SAC)	Works to bridge parapet walls at watercourse crossings W7, W36, W53 will be carried out during dry weather, and debris netting will be fixed to the outside of the walls in order to prevent any debris falling into the watercourse below.
PD33	All new permanent watercourse culverts at the Mountphilips Substation site and any replacement culverts along the public road for the 110kV UGC will be sized to cope with a minimum 100-year flood event.
PD34	Only precast concrete culverts or structures will be used at the watercourse crossing locations at Mountphilips Substation site and for any culvert replacements along the 110kV UGC. Only precast concrete chambers will be used at Joint Bay locations. No batching of wet cement will take place on-site.
PD35	Concrete pours will be required for the 110kV UGC cables trench. Only chutes will be washed out at the works locations into the cable trench, with the washout of the tank taking place at the concrete supplier depot. Concrete chute washouts within the SAC boundary will take place into designated bins for removal to the designated concrete wash settlement pond at the Mountphilips Substation site.

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European Sites	PD42	There will be no refuelling of vehicles or plant permitted within 100m of a watercourse. Spill response apparatus including spill-kits and hydrocarbon absorbent packs will be stored in the cabin of each vehicle and operators will be fully trained in the use of this equipment. The Environmental Emergency Response Procedure will be implemented immediately in the event of any spills. The Environmental Emergency Response Procedure is part of the UWF Grid Connection Environmental Management Plan.
	PD43	The main fuel stocks for, and chemical wastes arising from, construction activities will be stored in a designated location, away from main traffic activity, within the temporary compound at the Mountphilips Substation site. All fuel will be stored in bunded, locked storage containers. The designated storage location will be greater than 100m from a watercourse. Spill response apparatus including spill-kits and hydrocarbon absorbent packs will be stored at the designated location in the temporary compound and all operators will be fully trained in the use of this equipment. The Environmental Emergency Response Procedure will be implemented immediately in the event of any spills. The Environmental Emergency Response Procedure is part of the UWF Grid Connection Environmental Management Plan.
	PD44	Overnight parking of plant and machinery will only be permitted at the temporary compound at the Mountphilips Substation site and at a distance greater than 50m from watercourses.
	PD47	Surface water quality monitoring of the main watercourses downstream of the works will be carried out to ensure that the downstream water quality status in the receiving water is maintained and that there is no exceedance of the criteria listed in Schedule 5 and Schedule 6 of the EC Environmental Objectives Surface Water Regulations 2009 (as amended) and will ensure that the water quality status in downstream waterbodies are maintained in accordance with the Surface Water Regulations 2009. Where non-compliance in water quality is measured or recorded, works will stop until the issue is resolved. The surface water monitoring locations and sampling programme are defined in the Surface Water Management Plan for UWF Grid Connection. The Surface Water Management Plan is part of the UWF Grid Connection Environmental Management Plan (see Volume D).
	PD48	The new permanent cross structures at the Mountphilips Substation site and the replacement culvert at W14 along the R503 will be bottomless or clear spanning.
	PD49	In-stream works at Mountphilips Substation site and culvert replacement works at W14 along the R503 Regional Road will only be undertaken during the IFI specified period (July, August and September) and will be carried out to best practice (IFI, 2016).
Biodiversity	PD50	Culvert replacement works along the 110kV UGC will not be undertaken without isolation of flow within the watercourse. Isolation of flow will be achieved through the use of sandbags filled with clean, washed sand. Any fish within the isolated section will be removed prior to works commencing. This will require the engagement of licensed fisheries personnel to deplete the works area using electrofishing and, following collection of biometrics, transferred immediately downstream of the crossing point and placed back in the water. The water will then be isolated from the works by over pumping using a flume (pipe). Following works, the sandbags will be removed slowly to ensure the equilibrated restoration of flow character and morphology within the affected reach. Deflector plates will be used if required, to reduce the hydraulic power of the water (These measures will be overseen by an experienced aquatic ecologist). These measures will ensure that the baseline character is maintained and will ensure that a deterioration in morphology is avoided, as required under the Water Framework Directive.
	PD69	All covering of vegetative invasive knotweed infestations with high density polyethylene grass carpet terram will take place, at all identified locations prior to any works commencing on UWF Grid Connection or any other element of the Whole UWF Project. The covering of infestations will be completed on sections seven days in advance of works occurring on those sections. The infestations will be covered so that their full extent plus 1 metre is covered entirely and no vegetation is visible. The covering of these infestations will only be carried out under the direct supervision of an ecologist with prior experience of this type of work i.e. this work cannot be

	carried out by any general construction staff. No posts will be used to secure the coverings i.e. there will be no ground interference during any of these operations.
PD37	In addition to PD22, there will be no storage of overburden within the Lower River Shannon SAC.
PD38	110kV UGC works outside of Mountphilips Substation site will be carried out entirely on paved roads and where the 110kV UGC crosses watercourses, the works will be carried out over the existing bridges and over/under existing culverts. No in-streams works are proposed at any watercourse crossing points (including the Newport River and Bilboa River crossings) within the boundary of the Lower River Shannon SAC and therefore there will be no placement of cement or other materials within the river channels or on the river banks within the SAC.

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8.2.4 EVALUATION OF IMPACTS to European Sites

To avoid duplication of the detailed evaluation of European Sites covered in the Appropriate Assessment Report, only the key findings of the Appropriate Assessment report are included herein.

As previously referenced, the likely effects of the UWF Grid Connection on European Sites, both alone and cumulative with Other Elements of the Whole UWF Project and Other Projects and Activities is evaluated in the [Appropriate Assessment Report for UWF Grid Connection](#) (herein referred to as the NIS).

Conceptual Site Models were used to facilitate the identification of source-pathway-receptor links, between the project and the sensitive Biodiversity receptor - European Sites and is presented in Section 2.7 of the Stage 1 Screening Evaluation (see Volume E). As a result of the Conceptual Site Model exercise, a number of effects were screened in for evaluation at Stage Two of the Appropriate Assessment reporting process, and these impacts, are listed below:

Table 8-17: Summary of Impact Pathways screened in for examination at Stage 2

European Site	Qualifying Interest/Special Conservation Interest screened in for evaluation at Stage 2	Impact examined at Stage 2
Lower River Shannon SAC	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation [3260] Alluvial Forests (91E0)* (priority habitat)	SAC Pathway 1, 2, 3
	Atlantic Salmon [1106] Sea Lamprey [1095] Brook Lamprey [1096] River Lamprey [1099] Otter [1355]	SAC Pathway 4, 5, 6, 7, 8
Lower River Suir SAC	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation [3260] Alluvial Forests (91E0)* (priority habitat) Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Yew Woodlands* Taxus baccata woods of the British Isles [91J0] (priority habitat) Old sessile oak woods with Ilex and Blechnum in the British Isles	SAC Pathway 2, 3
	Freshwater Pearl Mussel [1029] White-clawed Crayfish [1092] Sea Lamprey [1095] Brook Lamprey [1096] River Lamprey [1099] Atlantic Salmon [1106] Otter [1355]	SAC Pathway 5, 6, 7, 8
Clare Glen SAC	Old Oak Woodlands [91A0] Killarney Fern (Trichomanes speciosum) [1421]	SAC Pathway 2, 3
Slievefelim to Silvermines Mountain SPA	Hen Harrier [A082]	SPA Pathway 1, 2, 3

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As described in Section 3.4 of the NIS (Volume E), the SAC Pathways 1 to 8 are:

SAC Pathway 1: Direct effects to Qualifying Interest habitats of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within the SAC
SAC Pathway 2: Indirect Effects to Qualifying Interest habitats of an SAC Site (i.e. via reductions in water quality or spread of invasive species) within the SAC
SAC Pathway 3: Indirect Effects to Qualifying Interest habitats , of an SAC Site (i.e. via reductions in water quality or spread of invasive species) ex-situ the SAC
SAC Pathway 4: Direct effects to Qualifying Interest species of an SAC Site (i.e. mortality) within or ex-situ the SAC
SAC Pathway 5: Indirect effects to Qualifying Interest species of an SAC Site (i.e. disturbance /displacement) within the SAC
SAC Pathway 6: Indirect effects to Qualifying Interest species of an SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) within the SAC
SAC Pathway 7: Indirect effects to Qualifying Interest species of the SAC Site (i.e. disturbance /displacement) ex-situ to the SAC
SAC Pathway 8: Indirect effects to Qualifying Interest species of the SAC Site (i.e. habitat loss, fragmentation, degradation, loss/reduction in connectivity) ex-situ the SAC.

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In order to evaluate the effect of UWF Grid Connection on the integrity of the Lower River Shannon SAC, Lower River Suir SAC, and Clare Glen SAC (*pathway 2 and 3 only*), the impact pathways identified above are examined in detail, through a number of focused impact evaluations, as per:

SAC Pathway 1 SAC Pathway 2 SAC Pathway 3 SAC Pathway 6 SAC Pathway 8	<i>were examined through these impact evaluations:</i>	<ul style="list-style-type: none"> • Decrease in instream aquatic habitat quality • Changes to flow regime • Riparian habitat degradation • Spread of invasive aquatic species
SAC Pathway 4 SAC Pathway 5 SAC Pathway 7	<i>were examined through these impact evaluations:</i>	<ul style="list-style-type: none"> • Direct Mortality of Fish and Aquatic Species • Disturbance or displacement of fish and aquatic species • Direct Mortality of Otter • Disturbance/Displacement of Otter.

The detailed evaluations of the Impact Pathways to the Lower River Shannon SAC, Lower River Suir Sac, and Clare Glen SAC are provided in **Sections 3.6, 3.7 and 3.8 of the NIS (Appropriate Assessment Report for UWF Grid Connection (Volume E))**.

A **summary of the findings** of that detailed evaluation are presented **below at Sections 8.2.4.1 to 8.2.4.3**.

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As described in Section 3.4 of the NIS (Volume E), the SPA Pathways 1 to 3 are:

- SPA Pathway 1: Direct effects to Special Conservation Interest Species **within an SPA** (i.e. Disturbance, Mortality)
- SPA Pathway 2: Indirect effects to Special Conservation Interest Species **within an SPA** (i.e. Secondary effects on suitable habitat via habitat loss, degradation, fragmentation or reduction/loss of connectivity, or through a reduction in prey item species)
- SPA Pathway 3: Indirect effects to Special Conservation Interest Species **ex-situ** an SPA (i.e. Secondary effects on suitable habitat via habitat loss, degradation, fragmentation or loss/reduction in connectivity, reductions in prey item species, or through disturbance or mortality effects to Special Conservation Interest bird species outside their respective SPA).

In order to evaluate the effect of UWF Grid Connection on the integrity of the Slievefelim to Silvermines Mountain SPA, the impact pathways identified above are examined in detail, through a number of focused impact evaluations, as per:

SPA Pathway 1 SPA Pathway 2 SPA Pathway 3	<i>were examined through these impact evaluations:</i>	<ul style="list-style-type: none"> • Permanent or Temporary Reduction or Loss of Suitable Foraging Habitat • Disturbance/Displacement of foraging Hen Harrier, during the breeding season • Disturbance/Displacement of foraging Hen Harrier outside the breeding season • Reduction in Prey Item Species
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The detailed evaluations of the Impact Pathways to the Slievefelim to Silvermines Mountain SPA are provided in [Section 3.9 of the NIS \(Appropriate Assessment Report for UWF Grid Connection \(Volume E\)\)](#).

A **summary of the findings** of that detailed evaluation are presented **below at Section 8.2.4.4**.

8.2.4.1 Findings of the Appropriate Assessment Report in relation to Lower River Shannon SAC

As per Section 3.6.4 of the Appropriate Assessment Report for UWF Grid Connection:

This section (*Section 3.6*) of the NIS has provided further evaluation of the source-impact pathways identified at Stage 1 Screening as having the potential to result in likely significant effects on the River Shannon SAC and its respective Qualifying Interests screened in for further appraisal.

This has included potential effects on QI habitats and species from decreases in instream aquatic habitat quality, changes to flow regime, riparian habitat degradation, and the spread of invasive species. Potential effects on QI Species examined have included direct mortality of fisheries and other aquatic species, disturbance to or displacement of fisheries, along with mortality of and disturbance to or displacement of Otter. The Qualifying Interests screened in for evaluation at Stage 2 were:

- Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation [3260]
- Alluvial Forests (91E0)* (priority habitat)
- Atlantic Salmon [1106]
- Sea Lamprey [1095]
- Brook Lamprey [1096]
- River Lamprey [1099]
- Otter [1355]

The above Qualifying Interests both habitats and species have been subject to further examination in respect of their specific sensitivities & Conservation Objectives as to whether the identified pathways/effects can be considered likely to result in adverse effects on European Site Integrity via effects on Conservation Objectives; this has concluded that:

it was concluded that:

- No effects on QI Habitat Alluvial Woodland via reductions in habitat area, distribution or size, altered hydrological regime or structure and composition are expected.
- No effects on QI Species (Atlantic Salmon or Lamprey spp.) via reductions in Abundance or distribution, or supporting habitat (juvenile and/or spawning habitat) quality are expected.
- No effects on QI Habitat Floating River Vegetation via reductions in habitat area, distribution or size, altered hydrological regime, structure and composition, riparian habitat or connectivity are expected.
- No effects on QI Species Otter via reductions in Abundance or distribution, barrier effect, supporting habitat or supporting habitat quality (including prey item abundance) are expected.

Cognisance has been given at this stage to the various Mitigation Measures designed to specifically avoid adverse effects on European Site Integrity, and to in-combination effects with both other project elements of the Whole Upperchurch Windfarm Project in addition to other plans or activities, or consented projects within the defined temporal and spatial overlap for cumulative or in combination effects. Effects both within and without (i.e. ex-situ) the European Site under consideration have been considered.

The evaluation herein has found, that following the examination and analysis presented, **it can be concluded on a reasoned basis, that the proposed development will not result in adverse effects on the Integrity of the River Shannon SAC, in circumstances where no reasonable scientific doubt remains.**

8.2.4.2 Findings of the Appropriate Assessment Report in relation to Lower River Suir SAC

As per Section 3.7.4 of the Appropriate Assessment Report for UWF Grid Connection:

This section (*Section 3.7*) of the NIS has provided further evaluation of the source-impact pathways identified at Stage 1 Screening as having the potential to result in likely significant effects on the River Suir SAC and its respective Qualifying Interests screened in for further appraisal.

This has included potential effects on QI habitats and species from decreases in instream aquatic habitat quality, changes to flow regime, riparian habitat degradation, and the spread of invasive species. Potential effects on QI Species examined have included direct mortality of fisheries and other aquatic species, disturbance to or displacement of fisheries and other aquatic species, along with mortality of and disturbance to or displacement of Otter. The Qualifying Interests screened in for evaluation at Stage 2 were:

- Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation [3260]
- Alluvial Forests (91E0)* (priority habitat)
- Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]
- Yew Woodlands* Taxus baccata woods of the British Isles [91J0] (priority habitat)
- Old sessile oak woods with Ilex and Blechnum in the British Isles
- Freshwater Pearl Mussel [1029]
- White-clawed Crayfish [1092]
- Sea Lamprey [1095]
- Brook Lamprey [1096]
- River Lamprey [1099]
- Atlantic Salmon [1106]
- Otter [1355]

The above Qualifying Interests both habitats and species have been subject to further examination in respect of their specific sensitivities & Conservation Objectives as to whether the identified pathways/effects can be considered likely to result in adverse effects on European Site Integrity via effects on Conservation Objectives; this has concluded that:

- No effects on QI Habitat Floating River Vegetation via reductions in habitat area, occurrence, altered hydrological regime, structure and composition, riparian habitat, underlying water quality, typical species and fringing habitats are expected.
- No effects on QI Habitat Alluvial Forests via reductions in habitat area, occurrence, distribution or individual woodland size, structure, woodland indicators, vegetative composition, altered hydrological regime are expected.
- No effects on QI Habitat Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6340] via reductions in habitat area, occurrence and distribution, altered hydrological regime, altered structure and composition including increases in non-native species of >1%, changes to physical structure, increased grazing and /or disturbance.
- No effects on QI Habitat Taxus baccata woods of the British Isles [91J0] via reductions in habitat area, occurrence and distribution, individual woodland size, Altered structure and vegetative composition including increases in negative indicator species are expected.
- No effects on QI Species (Freshwater Pearl Mussel) via reductions in Population Size or distribution, Population Structure, extent or condition of supporting habitat (including water and substratum quality) quality, hydrological regime, host species or fringing habitat are expected.

- No effects on QI Species (White-clawed Crayfish) via reductions in baseline occurrence or population structure, increases in disease such as Crayfish Plague, increased negative indicator species (Alien Crayfish Species) & reductions in water or habitat quality are expected.
- No effects on QI Species (Lamprey spp.) via reductions in Abundance or distribution, or supporting habitat (juvenile and/or spawning habitat) quality are expected.
- No effects on QI Species (Atlantic Salmon) via reductions in Abundance or distribution (including adults, salmon fry and out migrating smolt), reduced accessibility, or supporting habitat (water) quality are expected.
- No effects on QI Species (Otter) via reductions in Abundance or distribution, extent of terrestrial, freshwater and marine habitat, barrier effect, supporting habitat or supporting habitat quality (including fish biomass) are expected.

Cognisance has been given at this stage to the various Mitigation Measures designed to specifically avoid adverse effects on European Site Integrity, and to in-combination effects with both other project elements of the Whole Upperchurch Windfarm Project in addition to other plans or activities, or consented projects within the defined temporal and spatial overlap for cumulative or in combination effects. Effects both within and without (i.e. ex-situ) the European Site under consideration have been considered.

The evaluation herein has found, that following the examination and analysis presented, **it can be concluded on a reasoned basis, that the proposed development will not result in adverse effects on the Integrity of the Lower River Suir SAC, in circumstances where no reasonable scientific doubt remains.**

8.2.4.3 Findings of the Appropriate Assessment Report in relation to Clare Glen SAC

As per Section 3.8.4 of the Appropriate Assessment Report for UWF Grid Connection:

This section (*Section 3.8*) of the NIS has provided further evaluation of the source-impact pathways identified at Stage 1 Screening as having the potential to result in likely significant effects on the River Suir SAC and its respective Qualifying Interests screened in for further appraisal. The Qualifying Interests screened in for evaluation at Stage 2 were:

- Old Oak Woodlands [91A0]
- Killarney Fern (*Trichomanes speciosum*) [1421]

The above Qualifying Interests both habitats and species have been subject to further examination in respect of their specific sensitivities & Conservation Objectives as to whether the identified pathways/effects can be considered likely to result in adverse effects on European Site Integrity via effects on Conservation Objectives; this has concluded that:

- No effects on QI Habitat Old Oak Woodlands [91A0] via reductions in habitat area, distribution or size, woodland structure, or vegetation composition are expected.
- No effects on QI Killarney Fern (*Trichomanes speciosum*) [1421] via reductions in or alterations to its habitat requirements (site hydrology, relative humidity, canopy cover, shading levels, etc.), or the introduction of Invasive Species, as defined in CO targets are expected.

Cognisance has been given at this stage to the various Mitigation Measures designed to specifically avoid adverse effects on European Site Integrity, and to in-combination effects with both other project elements of the Whole Upperchurch Windfarm Project in addition to other plans or activities, or consented projects within the defined temporal and spatial overlap for cumulative or in combination effects. Effects both within and without (i.e. ex-situ) the European Site under consideration have been considered.

The evaluation herein has found, that following the examination and analysis presented, **it can be concluded on a reasoned basis, that the proposed development will not result in adverse effects on the Integrity of Clare Glen SAC, in circumstances where no reasonable scientific doubt remains.**

8.2.4.4 Findings of the Appropriate Assessment Report in relation to Slievefelim to Silvermines Mountain SPA

As per Section 3.9.4 of the Appropriate Assessment Report for UWF Grid Connection:

This section (*Section 3.9*) of the NIS has provided further evaluation of the source-impact pathways identified at Stage 1 Screening as having the potential to result in likely significant effects on the Slievefelim to Silvermines Mountain SPA and its respective Special Conservation Interest screened in for further appraisal.

The Special Conservation Interest screened in for evaluation at Stage 2 were:

- Hen Harrier [A082]

The above Special Conservation Interest species has been subject to further examination in respect of its specific sensitivities & Conservation Objectives as to whether the identified pathways/effects can be considered likely to result in adverse effects on European Site Integrity via effects on Conservation Objectives; and it is concluded that:

- The favorable Conservation condition of the species, or the Integrity of the SPA, will not be adversely affected through any reduction in habitat, range, population status or viability, through permanent or temporary loss of habitat, disturbance or displacement during either the breeding or non-breeding seasons, and any reductions in prey item density.

Cognisance has been given at this stage to the various Mitigation Measures designed to specifically avoid adverse effects on European Site Integrity, and in-combination effects with both other project elements of the Whole Upperchurch Windfarm Project in addition to other plans or activities, or consented projects within the defined temporal and spatial overlap for cumulative or in combination effects. Effects both within and without (i.e. ex-situ) the European Site under consideration have been considered.

The evaluation herein has found, that following the examination and analysis presented, **it can be concluded on a reasoned basis, that the proposed development will not result in adverse effects on the Integrity of Slievefelim to Silvermines Mountains SPA, in circumstances where no reasonable scientific doubt remains.**

8.2.5 Mitigation Measures for Impacts to European Sites

The evaluations in Sections 3.6 to 3.9 of the NIS took into account the Mitigation Measures for the project.

Mitigation measures (Project Design Measures, Best Practice Measures, Surface Water Management Plan, Invasive Species Management Plan, and Traffic Management Plan) prepared specifically for this project have been designed in line with Best Practice and constitute the Best Available techniques following scientific literature and field baseline verification. The Mitigation Measures are considered to be robust and proven measures which will avoid significant adverse effects to European Sites.

8.2.6 Evaluation of Residual Impacts to European Sites

As described in Section 8.2.4, it is concluded on a reasoned basis, that UWF Grid Connection, alone or in combination, will not result in adverse effects on the Integrity of the European Sites under consideration, having regard to their respective conservation objectives, in circumstances where “no reasonable scientific doubt”.

8.2.7 Application of the Environmental Management Plan for European Sites

The Mitigation Measures will be implemented by the Project Manager and the main Contractor during the construction stage. Implementation of the measures, including the Management Plans, will be carried out under the **UWF Grid Connection Environmental Management Plan** which is appended to this EIA Report as **Volume D**.

The UWF Grid Connection Environmental Management Plan includes a supervisory structure which ensures accountability for all works elements, with requirements for a Project Manager and an independent (of the Contractor) Environmental Clerk of Works along with suitably qualified specialists (including Site Ecologist; Site Hydrologist, mud engineer and invasive species specialist) who will supervise the works and monitor the implementation of Mitigation Measures in order to ensure that sensitive works elements are carried out in a manner which delivers the planned outcomes within the parameters of the impact assessment, as specified.

On this basis, it can be confidently concluded that failures in the mitigation measures and their prescribed outcomes will be avoided.

Nonetheless, the EMP includes contingency measures for unforeseen events, such as oil/fuel spillages, frac-out or water pollution. The Environmental Clerk of Works will have a full time presence on-site during the construction stage, and environmental experts will supervise works at environmentally sensitive locations. This will ensure that any unforeseen significant adverse effects are identified in a timely manner and appropriate remedial action taken immediately. The Environmental Clerk of Works will have a ‘stop-works’ authority to temporarily stop works over part of the site to avoid either an infringement of the Environmental Commitments or an unforeseen adverse environmental event. Works will not be allowed to re-commence until the issue is resolved.

8.2.8 Summary of Impacts to European Sites

In summary it can be concluded that following the examination and analysis presented, it can be concluded on a reasoned basis, that the proposed UWF Grid Connection development will not result in adverse effects on the Integrity of European Sites, in circumstances where no reasonable scientific doubt remains.

Table 8-18: Summary of the impacts to European Sites

Impact to European Sites:	Lower River Shannon SAC	Lower River Suir SAC	Clare Glen SAC	Slieve Felim to Silvermines Mountains SPA
<i>Evaluation Impact Table (for Other Elements only)</i>	<i>Appropriate Assessment Report Section 3.6</i>	<i>Appropriate Assessment Report Section 3.7</i>	<i>Appropriate Assessment Report Section 3.7</i>	<i>Appropriate Assessment Report Section 3.9</i>
Project Life-Cycle Stage (for Other Elements only)	Construction Stage	Construction Stage	Construction Stage	Construction Stage, Operational Stage
<u>UWF Grid Connection</u>	No Adverse Effects on the Integrity of the SAC	No Adverse Effects on the Integrity of the SAC	No Adverse Effects on the Integrity of the SAC	No Adverse Effects on the Integrity of the SPA
<u>CUMULATIVE IMPACTS:</u>				
UWF Grid Connection in-combination with: Upperchurch Windfarm, UWF Related Works, UWF Replacement Forestry, UWF Other Activities, Milestone Windfarm, Newport Town Park, Rear Cross Quarry, Curraghduff Quarry, Castlewaller Windfarm, Bunkimalta Windfarm, Forestry, Agriculture and Turf-Cutting Activities	No Adverse Effects (in-combination) on the Integrity of the SAC	No Adverse Effects (in-combination) on the Integrity of the SAC	No Adverse Effects (in-combination) on the Integrity of the SAC	No Adverse Effects (in-combination) on the Integrity of the SPA

Sensitive Aspect	European Sites
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Topic	Biodiversity
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8.3 Sensitive Aspect No.2: National Sites

This Section provides a description and evaluation of the Sensitive Aspect - National Sites, which relates to Irish designated sites of ecological importance and comprises both Natural Heritage Areas (NHAs) and proposed NHAs (pNHA's). Chris Cullen was the main author of this Section.

8.3.1 UWF GRID CONNECTION – EVALUATED AS EXCLUDED

8.3.1.1 Baseline Characteristics of National Sites in relation to UWF Grid Connection Study Area

A total of 3 NHA's and 23 No. pNHAs are found within 15km of the UWF Grid Connection. The location and spatial extent of these NHA's and pNHA's is illustrated on **Figure GC 8.3: UWF Grid Connection Study Area for European Sites** (Volume C3 EIAR Figures).

The location of the NHAs in the UWF Grid Connection Study Area is described in Table 8-19, the features of interest for these sites are summarized in Table 8-20.

Table 8-19: List of NHA's within the UWF Grid Connection Study Area

Site name and code	Distance from nearest point of UWF Grid Connection
Bleanbeg Bog NHA (Site Code: 002450)	2.2 km north of UWF Grid Connection
Grageen Fen and Bog NHA (Site Code: 002186)	3.2 km southwest of UWF Grid Connection
Mauherslieve Bog NHA (Site Code: 002385)	2.8 m north of UWF Grid Connection

Table 8-20: Features of Interest of NHAs within the UWF Grid Connection Study Area

Site name and code	Feature of Interest
Bleanbeg Bog NHA (Site Code: 002450)	Bleanbeg Bog NHA consists primarily of upland blanket bog and is located approximately 7 km east of Newport in south Tipperary. The site is situated in the townlands of Bleanbeg, Glencroe, Fiddane and Castlewaller. It incorporates a broad plateau of upland blanket bog habitat that grades into heath, upland grassland on peaty soil, and cutover bog. The western boundary of the site is defined by the transition from intact blanket bog to cutover bog, while the northern, eastern and southern sides of the site are bounded by conifer plantation. Peatlands are the feature of interest for this site. Red data book species Red Grouse and Irish Hare have been recorded on site. A pair of Hen Harriers, also a Red Data Book species, nest within 1 km of the site and are known to forage over the site.
Grageen Fen and Bog NHA (Site Code: 002186)	Peatlands are the feature of interest for this site. The site is an example of an upland blanket bog and fen habitat.
Mauherslieve Bog NHA (Site Code: 002385)	Peatlands are the feature of interest for this site. Irish Hare have been recorded on site. Mauherslieve Bog NHA is a site of considerable conservation value featuring intact upland blanket bog. Blanket bog habitat is a globally scarce resource. It is largely confined to coastal regions at temperate latitudes with cool, wet, oceanic climates. North-west Europe contains some of the best-developed areas of blanket bog in the world.

The location of the 23 no. pNHA's in the UWF Gird Connection Study Area are identified on Figure GC 8.3.

Table 8-21: pNHA's located within 15km of UWF Grid Connection

National Sites	Sensitive Aspect	pNHA Site name and code	Distance from UWF Grid Connection
		Derrygareen Heath (Site Code: 000931)	0.1km northeast
		Clare Glen (Site Code: 000930)	1.5 km south
		Glenstal Wood (Site Code: 001432)	2.5 km south
		Bilboa And Gortnageragh River Valleys (Site Code: 001851)	2.9 km south
		Keeper Hill (Site Code: 001197)	4.3 km north
		Ballyvorheen Bog (Site Code: 001849)	5.8 km south
		Dromsallagh Bog (Site Code: 001850)	6.5 km south
		Nenagh River Gorge (Site Code: 001133)	6.6 km north
		Knockanavar Wood (Site Code: 000961)	7.1 km south
		Aughnaglanny Valley (Site Code: 000948)	7.7 km south
		Inchinsquillib and Dowlings Woods (Site Code: 000956)	8.0 km south
		Lough Derg (Site Code: 000011)	8.7 km northwest
		Castleconnell (Domestic Dwelling, Occupied) (Site Code: 000433)	8.8 km west
		Silvermine Mountains (Site Code: 000939)	9.4 km north
		Killavalla Wood (Site Code: 001178)	10.6 km north
		Glenomra Wood (Site Code: 001013)	11.2 km west
		Cloonlara House (Site Code: 000028)	11.3 km west
		Kilbeg Marsh (Site Code: 001848)	11.3 km south
		Philipston Marsh (Site Code: 001847)	12 km south
		Dundrum (Site Code: 002096)	13.5 km south
		Annacarty Wetlands (Site Code: 000639)	13.9 km south
		Ballyneill Marsh (Site Code: 001846)	13.9 km south
		Dundrum Sanctuary (Site Code: 000950)	14.7 km south

8.3.1.2 Evaluation of UWF Grid Connection

UWF Grid Connection was evaluated for its potential to cause impacts to National Sites. The designated National Heritage Area (NHA) sites are Bleanbeg Bog NHA, Grageen Fen and Bog NHA and Mauherslieve Bog NHA.

It is evaluated that there is no potential for effects to these 3 NHAs or their Features of Interest due to:

- UWF Grid Connection will not overlap any NHA boundary;
- the separation distance between UWF Grid Connection and the NHA sites,
- UWF Grid Connection will be located within the carriageway of public roads, and therefore there is an absence of ecological connectivity;
- UWF Grid Connection is located downslope of all 3 NHA sites, and therefore it is evaluated that there are no source pathway links for hydrological effects (as evaluated in Chapter 11: Water, Section 11.1.4) and no likelihood of indirect habitat effects to these NHAs.

It is evaluated that there is no potential for effects to 20 of the 23 pNHAs within 15km or to their Features of Interest due to:

- UWF Grid Connection will not overlap any pNHA boundary,
- the separation distance between UWF Grid Connection and the pNHA sites,
- UWF Grid Connection will be located within the carriageway of public roads, and therefore there is an absence of ecological connectivity.

Of the remaining three pNHA sites, Derrygareen Heath pNHA, which is located 100m north of the UWF Grid Connection, was further evaluated for potential effects by virtue of proximity. It is evaluated however that this pNHA will not be affected by the UWF Grid Connection as it is located upslope from the grid connection. The features of conservation interest for which the site is designated also preclude potential effects seeing as the site is designated for the presence of heathland, which is not sensitive to the construction stage impact pathways identified associated with the proposed project, including noise and vibration. The absence of overlap with this pNHA, and the presence of a 100m buffer of scrub between the proposed UWF Grid Connection and this site further precludes any impacts from construction related loss, disturbance, or emissions.

Clare Glen pNHA, and Bilboa and Gortynageragh River Valleys pNHA, which are located 1.5 km and 2.9 south of the UWF Grid Connection respectively, have downstream connectivity to the proposed grid route via watercourse crossings on the R503 public road. Notwithstanding this source impact pathway, no impacts on these pNHAs are expected due to the implementation of the UWF Grid Connection Project Design Environmental Protection Measures for the protection of downstream water quality.

8.3.1.3 Cumulative Evaluation for the Other Elements of the Whole UWF Project (grey background)

UWF Grid Connection is part of a whole project which comprises the following other elements – Element 2: UWF Related Works, Element 3: UWF Replacement Forestry, Element 4: Upperchurch Windfarm (UWF) and Element 5: UWF Other Activities. The Subject Development, UWF Grid Connection, is Element 1. All five elements are collectively referred to as the Whole UWF Project in this EIA Report.

UWF Grid Connection has no potential to cause impacts to National Sites (NHA or pNHA sites) by itself, and therefore cannot have a cumulative effect. However, the Other Elements must be considered because the UWF Grid Connection is part of a whole project. Therefore, the cumulative information and evaluations for the Other Elements of the Whole UWF Project are included in Section 8.3.2 to Section 8.3.4 and included in the summary table in Section 8.3.8 in order to show the totality of the project.

8.3.2 CUMULATIVE INFORMATION - Cumulative Projects & Baseline Characteristics

8.3.2.1 Cumulative Evaluation Study Areas

8.3.2.1.1 UWF Grid Connection Cumulative Evaluation Study Area

The UWF Grid Connection has been excluded as a source of impacts to National Sites, primarily due to separation distances between UWF Grid Connection and designated National Sites (NHAs), as well as the absence of impact pathways to proposed National Sites (pNHAs).

8.3.2.1.2 Whole Project Cumulative Evaluation Study Area

UWF Grid Connection is part of a whole project which comprises the following other elements – Element 2: UWF Related Works, Element 3: UWF Replacement Forestry, Element 4: Upperchurch Windfarm (UWF) and Element 5: UWF Other Activities. The Subject Development, UWF Grid Connection, is Element 1. All five elements are collectively referred to as the Whole UWF Project in this EIA Report.

UWF Grid Connection has no potential to cause impacts to National Sites by itself, and therefore cannot have a cumulative effect. However, the Other Elements must be considered because the UWF Grid Connection are part of a whole project. Therefore, the cumulative information and evaluations for the Other Elements of the Whole UWF Project are included in Section 8.3.2 to Section 8.3.4 and included in the summary table in Section 8.3.8 in order to show the totality of the project.

A description of these Other Elements is included in this EIA Report at [Appendices 5.3, 5.4, 5.5 and 5.6](#), in [Volume C4 EIAR Appendices](#). Scoping of these Other Elements is presented in [Section 8.3.2.2.1](#) below.

The Whole Project Cumulative Evaluation Study Area comprises of the UWF Grid Connection Study Area along with the study areas for Other Elements which are described in Table 8-22 and illustrated on [Figure WP 8.3: Whole Project Study Area for National Sites \(Volume C3 EIAR Figures\)](#).

Table 8-22: Whole Project Cumulative Evaluation Study Area for National Sites

<u>Cumulative Project</u>	<u>Cumulative Study Area Boundary</u>	<u>Justification for Study Area Extent</u>
Element 1 : UWF Grid Connection	15km from the boundary of construction works, afforestation lands, activity locations.	Professional Judgement
Element 2: UWF Related Works		
Element 3: UWF Replacement Forestry		
Element 4: Upperchurch Windfarm (UWF)		
Element 5: UWF Other Activities		

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8.3.2.2 Scoping of Other Projects or Activities & for Potential for Impacts

The evaluation of cumulative impacts to National Sites also considered Other Projects or Activities. A scoping exercise was carried out to determine which projects or activities, if any, have potential to cause cumulative effects to National Sites with either the UWF Grid Connection or the Other Elements of the Whole UWF Project and therefore should be brought forward for evaluation in this topic chapter. A brief overview of the Other Projects or Activities and the scoping exercise by the topic authors is included in [Appendix 2.1: Scoping of Other Projects or Activities for Cumulative Evaluations \(Section A2.1.4.5\)](#).

The results of this scoping exercise are that: it is evaluated that no Other Projects or Activities are likely to cause cumulative effects with either the UWF Grid Connection or the Other Elements of the Whole UWF Project, and therefore no Other Projects or Activities are scoped in for evaluation of cumulative effects to National Sites.

8.3.2.2.1 Potential for Impacts to National Sites

An evaluation was carried out by the topic authors of the likelihood for the Other Elements of the Whole UWF Project to cause cumulative effects to the Sensitive Aspect National Sites. The results of this evaluation are included in Table 8-24.

The location of the Other Elements in relation to National Sites (NHAs and pNHAs) is illustrated on [Figure WP 8.3](#).

The features of interest of the NHA sites within 15km of the Elements of the Whole UWF Project are described in Table 8-23.

Table 8-23: Features of Interest of National Heritage Sites within 15km of the Whole UWF Project

Site name and code	Feature of Interest
Bleanbeg Bog NHA (Site Code: 002450)	Bleanbeg Bog NHA consists primarily of upland blanket bog and is located approximately 7 km east of Newport in south Tipperary. The site is situated in the townlands of Bleanbeg, Glencroe, Fiddane and Castlewaller. It incorporates a broad plateau of upland blanket bog habitat that grades into heath, upland grassland on peaty soil, and cutover bog. The western boundary of the site is defined by the transition from intact blanket bog to cutover bog, while the northern, eastern and southern sides of the site are bounded by conifer plantation. Peatlands are the feature of interest for this site. The red data book species Red Grouse and Irish Hare have been recorded on site. A pair of Hen Harriers, also a Red Data Book species, nest within 1 km of the site and are known to forage over the site.
Grageen Fen and Bog NHA (Site Code: 002186)	Peatlands are the feature of interest for this site. The site is an example of an upland blanket bog and fen habitat.
Mauherslieve Bog NHA (Site Code: 002385)	Peatlands are the feature of interest for this site. Irish Hare have been recorded on site. Mauherslieve Bog NHA is a site of considerable conservation value featuring intact upland blanket bog. Blanket bog habitat is a globally scarce resource. It is largely confined to coastal regions at temperate latitudes with cool, wet, oceanic climates. North-west Europe contains some of the best-developed areas of blanket bog in the world.
Woodcock Hill Bog NHA (Site Code: 002402)	Peatlands are the feature of interest for this site. This site is an area of upland blanket bog and wet heath.
Moyreen Bog NHA (Site Code: 002361)	Peatlands are the feature of interest for this site. This site is a good example of lowland blanket bog. Red Grouse and Common Frog have been recorded on the site.
Carrigkerry Bogs NHA (Site Code: 002399)	Peatlands are the feature of interest for the site. Irish Hare and Red Grouse are plentiful. Also occurring are Snipe, Meadow Pipit and Fox Moth

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Site name and code	Feature of Interest
Scohaboy Bog NHA (Site Code: 000937)	Peatlands are the feature of interest for this site. The site is a large raised bog. The Irish Red Data Book species Bird Cherry (<i>Prunus padus</i>) has been recorded from the site (in the past).
Gortacullin Bog NHA (Site Code: 002401)	Peatlands are the feature of interest for the site. The site contains a mosaic of up-land bog and wet heath. Red Grouse has been recorded on the site.

Table 8-24: Results of the Evaluation of the Other Elements of the Whole UWF Project

Other Element of the Whole UWF Project	
Element 2: UWF Related Works	<p><u>Evaluated as excluded:</u> No potential for effects</p> <p>3 No. NHA sites and 17 No. pNHA sites are located within 15km of the UWF Related Works. The NHA sites include: Mauherslieve Bog NHA, Bleanbeg Bog NHA and Grageen Fen and Bog NHA. Mauherslieve Bog NHA is the closest NHA site, located 4.2km to the west of the UWF Related Works.</p> <p>It is evaluated that there is no potential for effects to these NHAs, or to the pNHAs within 15km or their Features of Interest due to:</p> <ul style="list-style-type: none"> • The UWF Related Works will not overlap any NHA or pNHA boundary, the nearest site is over 4km away – Mauherslieve Bog NHA 4.2km. All other NHAs or pNHAs are future from the project, including Bleanbeg Bog NHA and Grageen Fen and Bog NHA which are 12.1km and 12.3km from the project respectively. • There is no potential for impacts to the Features of Interest of the National Sites due to distance and absence of any ecological connectivity, or source pathway links for hydrological effects (as evaluated in Chapter 11: Water, Section 11.1.4).
Element 3: UWF Replacement Forestry	<p><u>Evaluated as excluded:</u> No potential for effects</p> <p>2 No. NHA sites and 9 No. pNHA sites are located within 15km of the UWF Replacement Forestry. The NHA sites include: Bleanbeg Bog NHA and Mauherslieve Bog NHA. Mauherslieve Bog NHA is the closest NHA site, located 6.1km to the west of the UWF Replacement Forestry.</p> <p>It is evaluated that there is no potential for effects to these NHAs, or to the pNHAs within 15km or their Features of Interest due to:</p> <ul style="list-style-type: none"> • The UWF Replacement Forestry will not overlap any NHA or pNHA boundary, Mauherslieve Bog NHA is the closest NHA site, located 6.1km to the west. • There is no potential for impacts to the Features of Interest of the National Sites due to distance and absence of any ecological connectivity, or source pathway links for hydrological effects (as evaluated in Chapter 11: Water, Section 11.1.4).
Element 4: Upperchurch Windfarm (UWF)	<p><u>Evaluated as excluded:</u> No potential for effects</p> <p>The Upperchurch Windfarm is within 15km of the Bleanbeg Bog NHA, Mauherslieve Bog NHA, Grageen Fen and Bog NHA and Gortacullin Bog NHA.</p> <p>It is evaluated that there is no potential for effects to these NHAs, or to the pNHAs within 15km or their Features of Interest due to:</p> <ul style="list-style-type: none"> • The Upperchurch Windfarm will not overlap any NHA or pNHA boundary, Mauherslieve Bog NHA is the closest NHA site, located over 4km to the west, • There is no potential for impacts to the Features of Interest of the National Sites due to distance and absence of any ecological connectivity, or source pathway links for hydrological effects (as evaluated in Chapter 11: Water, Section 11.1.4).

Element 5: UWF Other Activities	<p><u>Evaluated as excluded: No potential for effects/Neutral effects:</u></p> <p>8 No. NHA sites are and 60 No. pNHA sites are located within 15km of the UWF Other Activities. The NHA sites include: Bleanbeg Bog NHA, Grageen Fen and Bog NHA, Mauherslieve Bog NHA, Woodcock Hill Bog NHA, Moyreen Bog NHA, Carrigkerry Bogs NHA, Scohaboy Bog NHA and Gortacullin Bog NHA. Mauherslieve Bog NHA is the closest NHA site, located 4.8km to the northwest of the closest location of UWF Other Activities.</p> <p><u>UWF Other Activities</u> overlap a single pNHA (Inner Shannon Estuary – South Shore) where Haul Route Activities will involve street furniture removal and replacement on existing roadway roundabouts along the N69 (Dock Road, Limerick). Neutral effects are likely to this pNHA due the location of the activity within the public road corridor and the absence of drainage or excavation works.</p> <p>No potential for effects to any NHA or pNHA caused by other activities due the absence of construction excavations or drainage works and the separation distances to sites.</p>
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8.3.2.3 Cumulative Information: Baseline Characteristics

8.3.2.3.1 Element 2: UWF Related Works

Not applicable – This Element has been evaluated as excluded, see Section 8.3.2.2.1.

8.3.2.3.2 Element 3: UWF Replacement Forestry

Not applicable – This Element has been evaluated as excluded, see Section 8.3.2.2.1.

8.3.2.3.3 Element 4: Upperchurch Windfarm

Not applicable – This Element has been evaluated as excluded, see Section 8.3.2.2.1.

8.3.2.3.4 Element 5: UWF Other Activities

Not applicable – This Element has been evaluated as excluded, see Section 8.3.2.2.1.

8.3.2.3.5 Other Projects or Activities

Not applicable – No Other Projects or Activities were scoped in for evaluation of cumulative effects, see Section 8.3.2.1.

8.3.3 PROJECT DESIGN MEASURES for National Sites

At the conception of the UWF Grid Connection, the design team evaluated the potential for significant impacts to the environment. Impacts will only take place where three components exist together; (1) the source of the impact (project), (2) the receptor of the impact (sensitive aspect) and (3) a pathway between the source and the sensitive aspect. The objective of mitigation measures is to avoid, prevent or reduce, one of the three components of an impact by choosing an alternative location, alternative design or an alternative process.

Potential or likely significant impacts were avoided, prevented or reduced by integrating mitigation measures into the fundamental design of the development – these are the Project Design Environmental Protection Measures, which are shortened to ‘Project Design Measures’ in this EIA Report.

The development as evaluated in the EIA Report incorporates the Project Design Measures.

The Project Design Measures outlined in Table 8-25 are relevant to the Environmental Factor, Biodiversity, and in particular to the sensitive aspect **National Sites**.

Table 8-25: UWF Grid Connection Project Design Measures relevant to National Sites

PD ID	Project Design Environmental Protection Measure (PD)
PD17	At Mountphilips Substation, water for operational stage welfare facilities will be obtained from a Rain Water Harvesting system. Waste water will be collected in tanks and removed from site by an appropriately licensed operator, for treatment in a licensed water treatment plant. These two measures will avoid the need for a new well or mains water connection and will avoid the need to treat waste water on-site.
PD18	The new substation compound and the new permanent access road at the Mountphilips Substation site will have a permanent surface water drainage network in place which will include check dams. These check dams will allow the settlement of suspended solids in water runoff while also slowing down the rate of water run-off from these areas.
PD19	At Mountphilips Substation location, where dewatering of trenches or excavations is required, there will be no direct discharge of untreated water into any watercourse or drain. Rather all pumped water will be treated prior to discharge using an infiltration trench or settlement pond or suitable water treatment train such as a Siltbuster, as appropriate to the volume of water requiring treatment (if any) to ensure there is no exceedance of the criteria listed in Schedule 5 and Schedule 6 of the EC Environmental Objectives Surface Water Regulations 2009 (as amended) and will ensure that the water quality status in downstream waterbodies are maintained in accordance with the Surface Water Regulations 2009.
PD20	At Mountphilips Substation site, all excavated material will be removed for temporary or permanent storage at designated berms, which will be located more than 25m away from the watercourses on Mountphilips Substation site. All storage berms will be graded and sealed following emplacement. The berms will be covered if there is a risk of erosion. Temporary silt control methods such as silt fencing will be placed around all overburden storage areas. The existing vegetative buffer between the berms and the nearest watercourses will be maintained and no works will occur in the buffer zone.
PD21	At Mountphilips Substation site, permanent storage berms around the substation compound will be sown with grasses and flower species common to the surrounding vegetation. The permanent storage berms along the new access road will be planted with local provenance native fruiting hedge species, with grasses and native flower species sown along the sides of the berms. Revegetation works will take place at the soonest practicable opportunity after emplacement.
PD22	Outside of the Mountphilips Substation site, there will be no storage of overburden and all excavations from road trenches will be removed to licensed waste facilities in accordance with the UWF Grid Connection Waste Management Plan. Loads of excavated material will be covered during transportation to prevent spillages of excavated material.
PD23	All Joint Bays for the 110kV UGC will be located at least 50m from a Class 1 or Class 2 watercourse and at least 25m from Class 3 or Class 4 watercourses.

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PD24	Outside of the Mountphilips Substation site, where dewatering of trenches or excavations is required for the 110kV UGC, there will be no direct discharge of treated water into any watercourse or drain. Rather all pumped water will be treated using a mobile water treatment train and then discharged via a silt bag to ensure there is no exceedance of the criteria listed in Schedule 5 and Schedule 6 of the EC Environmental Objectives Surface Water Regulations 2009 (as amended) and will ensure that the water quality status in downstream waterbodies are maintained in accordance with the Surface Water Regulations 2009.
PD25	Construction works along the 110kV UGC route will cease during heavy or prolonged rainfall events, and any open trenches or excavations will be covered. Use of weathering forecasting will be undertaken in advance of works.
PD26	A phased approach will be undertaken in relation to excavations, excavation dewatering and any culvert replacement works, where these works occur within 50m of a watercourse. The phased approach will only permit one of main potential sediment producing activities (i.e. excavations, excavation dewatering or culvert replacement works), to be carried out within 50m of a watercourse, at any one time.
PD27	At Mountphilips Substation site, works within 50m of watercourses, additional mitigation measures include double silt fencing, temporary drain blocking, placement of straw bale arrangements along preferential surface water flowpaths and, where necessary, the use of matting to prevent ground erosion and rutting.
PD28	Along the 110kV UGC on the public road, where works will take place within 50m of a watercourse, additional mitigation measures will be implemented which include silt fencing and placement of sandbag arrangements along preferential surface water flowpaths on the road pavement. Following works on any particular section, any works debris will be removed from the road before the sandbags and silt fences are removed.
PD29	Cable trenching works, joint bay chamber installation and culvert replacement works on the section of 110kV UGC between W13 and W20 (inclusive) and the culvert replacement works at W32 and W34 will only be completed during dry weather in the dryer months of the year – i.e. February to September included. This will minimise/avoid the requirement for any excavation dewatering as a result of waterlogged soils or surface water runoff. None of these 110kV UGC sections are within the Lower River Shannon SAC.
PD30	Lines of silt fencing and sandbags will be erected along the edge of the road so that surface water runoff from adjacent construction works areas is captured and directed to the excavated trench, where it can be pumped and treated before being released, as per PD24.
PD31	Works to bridge parapet walls at watercourse crossings W7, W36, W53 will be carried out during dry weather, and debris netting will be fixed to the outside of the walls in order to prevent any debris falling into the watercourse below.
PD32	At Mountphilips Substation site, instream construction works at the watercourse crossings W1, W2 and W3 will be followed by site-specific reinstatement measures to ensure the equilibrated restoration of flow character and morphology within the affected reach to achieve baseline character and avoid any deterioration in morphology as required under the Water Framework Directive (WFD). Measures will include: bank stabilisation using boulder armour or willow/brush bank protection; reinstatement of bank slope and character, creation of compound channels where necessary; reinstatement of instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles; and planting along the riparian margins to stabilise banks, add flood protection and provide riparian buffer; and the use of deflector plates during the restoration of flow. Instream works at W1, W2 and W3 at the Mountphilips Substation site will be undertaken during dry weather within the IFI instream works window (July – September inclusive). As per PD41, instream works at W1, W2 and W3 will be supervised by a member of CIEEM and the Institute of Fisheries Management to ensure both the Project Design Measures and Best Practice are followed.
PD33	All new permanent watercourse culverts at the Mountphilips Substation site and any replacement culverts along the public road for the 110kV UGC will be sized to cope with a minimum 100-year flood event.
PD34	Only precast concrete culverts or structures will be used at the watercourse crossing locations at Mountphilips Substation site and for any culvert replacements along the 110kV UGC. Only precast concrete chambers will be used at Joint Bay locations. No batching of wet cement will take place on-site.

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National Sites	PD35	Concrete pours will be required for the 110kV UGC cables trench. Only chutes will be washed out at the works locations into the cable trench, with the washout of the tank taking place at the concrete supplier depot. Concrete chute washouts within the SAC boundary will take place into designated bins for removal to the designated concrete wash settlement pond at the Mountphilips Substation site.
	PD42	There will be no refuelling of vehicles or plant permitted within 100m of a watercourse. Spill response apparatus including spill-kits and hydrocarbon absorbent packs will be stored in the cabin of each vehicle and operators will be fully trained in the use of this equipment. The Environmental Emergency Response Procedure will be implemented immediately in the event of any spills. The Environmental Emergency Response Procedure is part of the UWF Grid Connection Environmental Management Plan.
	PD43	The main fuel stocks for, and chemical wastes arising from, construction activities will be stored in a designated location, away from main traffic activity, within the temporary compound at the Mountphilips Substation site. All fuel will be stored in bunded, locked storage containers. The designated storage location will be greater than 100m from a watercourse. Spill response apparatus including spill-kits and hydrocarbon absorbent packs will be stored at the designated location in the temporary compound and all operators will be fully trained in the use of this equipment. The Environmental Emergency Response Procedure will be implemented immediately in the event of any spills. The Environmental Emergency Response Procedure is part of the UWF Grid Connection Environmental Management Plan.
	PD44	Overnight parking of plant and machinery will only be permitted at the temporary compound at the Mountphilips Substation site and at a distance greater than 50m from watercourses.
	PD45	The horizontal directional drilling works at W8 and W9 will be carried out by an experienced Drilling Contractor and supervised and managed by a competent and experienced Mud Engineer who understands the technicalities and challenges of drilling works. The Mud Engineer will advise the Construction Manager on the selection of competent drillers for the HDD works; monitor the watercourse bed during drilling works, and will supervise the drilling works including the drilling pressures and the implementation of any contingency measures. From a surface water quality protection perspective, the area around the launch/reception pit, bentonite batching, pumping and recycling plant will be bunded using appropriate terram geotextile and/or sandbags in order to contain any spillages. Drilling fluid returns will be contained within a sealed tank / sump to prevent migration from the works area. Spills of drilling fluid will be cleaned up immediately and stored in an adequately sized water tight skip before being taken off-site to a suitably licensed waste facility. In the event of a break-out occurring, the Environmental Emergency Response Procedure for Frac-Out will be implemented which includes the following contingency measures; In the event of break-out occurring in the river bed, the rig will immediately shut off the pumps and the drilling assembly will be pulled off to reduce annular pressures; In the event of break-out on the road an excavator will be available to dig a pit to contain fluid with vacuum trucks/pumps available to transfer drill fluid from the containment point back to the recycling point; and in either scenario, drilling fluid additives designed to plug the formation will be introduced to the circulation system and let set. Environmental Emergency Response Procedures are included in the UWF Grid Connection Environmental Management Plan (see Volume D).
Biodiversity	PD46	All construction works will be monitored on a daily basis by the Environmental Clerk of Works and by members of the Environmental Clerk of Works team (for example Site Ecologist) as required, for compliance with the Environmental Commitments, which include the Project Design Measures, as per the UWF Grid Connection Environmental Management Plan (see Volume D).
	PD47	Surface water quality monitoring of the main watercourses downstream of the works will be carried out to ensure that the downstream water quality status in the receiving water is maintained and that there is no exceedance of the criteria listed in Schedule 5 and Schedule 6 of the EC Environmental Objectives Surface Water Regulations 2009 (as amended) and will ensure that the water quality status in downstream waterbodies are maintained in accordance with the Surface Water Regulations 2009. Where non-compliance in water quality is measured or recorded, works will stop until the issue is resolved. The surface water monitoring locations and sampling programme are defined in the Surface Water Management Plan for UWF Grid Connection. The Surface Water Management Plan is part of the UWF Grid Connection Environmental Management Plan (see Volume D).
	PD48	The new permanent cross structures at the Mountphilips Substation site and the replacement culvert at W14 along the R503 will be bottomless or clear spanning.

PD49	In-stream works at Mountphilips Substation site and culvert replacement works at W14 along the R503 Regional Road will only be undertaken during the IFI specified period (July, August and September) and will be carried out to best practice (IFI, 2016).
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8.3.4 EVALUATION OF IMPACTS to National Sites

As evaluated in Section 8.3.1, the UWF Grid Connection development has been excluded as a source of impacts to National Sites, primarily due to separation distances between UWF Grid Connection and National Sites.

8.3.5 Mitigation Measures for Impacts to National Sites

Mitigation measures are not relevant as, due to its location, there is **no potential for UWF Grid Connection to cause impacts** to National Sites.

8.3.6 Evaluation of Residual Impacts to National Sites

Residual Impacts are the final or intended effects that will occur after mitigation measures have been put into place. Mitigation measures are not relevant and thus the Residual Impact is the same as the Impact set out in the Evaluation of UWF Grid Connection (Section 8.3.1), i.e. **no potential for impacts**.

8.3.7 UWF Grd Connection Environmental Management Plan

The Project Design measures will be implemented by the Project Manager and the main Contractor during the construction stage, under the **Environmental Management Plan for the UWF Grid Connection (EMP)**. The EMP is appended to this EIA Report as **Volume D**.

The EMP will be an important contract document for the main construction contractor (Contractor) who will be contractually obliged to comply with the EMP. An Environmental Clerk of Works will be appointed, who will be independent of the construction Contractor, and it will be the responsibility of the Environmental Clerk of Works to monitor the compliance of the Contractor with the EMP through liaising with the Construction Site Manager and the Project Manager, monitoring construction works on a daily basis and by carrying out regular audits on EMP compliance. The Environmental Clerk of Works will be resourced to employ a team of environmental specialists including a Site Ecologist, Site Hydrologist and a Invasive Species Specialist.

8.3.8 Summary of Impacts to National Sites

No impacts to National Sites are concluded by the topic authors as likely to occur.

The greyed out boxes in the summary table below relate to the cumulative information for the Other Elements of the Whole UWF Project, which are included to show the totality of the project.

Table 8-26: Summary of the impacts to National Sites

Impact to Bleanbeg Bog NHA:	No Impact
<i>Evaluation Impact Table</i>	<i>Section 8.3.1 and 8.3.2</i>
Project Life-Cycle Stage	Construction/Operation
<u>UWF Grid Connection</u>	No Potential for Impacts - See Section 8.3.1
Element 2: UWF Related Works	No Potential for Impacts
Element 3: UWF Replacement Forestry	No Potential for Impacts
Element 4: Upperchurch Windfarm	No Potential for Impacts
Element 5: UWF Other Activities	No Potential for Impacts
<u>CUMULATIVE IMPACTS:</u>	
All Elements of the Whole UWF Project	No Potential for Cumulative Impacts

Note: No cumulative information for Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to National Sites with either the UWF Grid Connection or the Other Elements of the Whole UWF Project (see Section 8.3.2.2).

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8.4 Sensitive Aspect No.3: Aquatic Habitats & Species

This Section provides a description and evaluation of the Sensitive Aspect - Aquatic Habitats & Species.

Daireann McDonnell, Chris Cullen and Howard Williams were the main authors of this Section. Please see Sources of Information (Section 8.1.7) and Methodology (Section 8.1.8) for details of the desktop and fieldwork surveys which have informed the evaluation of Aquatic Habitats & Species.

8.4.1 BASELINE CHARACTERISTICS of Aquatic Habitats & Species

8.4.1.1 STUDY AREA for Aquatic Habitats & Species

The study area for Aquatic Habitats & Species in relation to the UWF Grid Connection is described in Table 8-35 and illustrated on [UWF Grid Connection Study Area for Aquatic Habitats & Species \(Overview and Maps 1 to 3\)](#) (Volume C3 EIAR Figures).

Table 8-27: UWF Grid Connection Study Area for Aquatic Habitats & Species

Study Area for Aquatic Habitats & Species	Justification for the Study Area Extents
Watercourses at Crossing Locations	As per Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Scheme, NRA, (2008), CIEEM 2018, EPA 2017, DHPLG 2018, SEPA (2008), Engineering in the Water Environment: Good Practice Guide Construction of River Crossings. WAT-SG-25. Scottish Environment Protection Agency, First edition, April 2008, Mumane, <i>et al.</i> (2006) CIRIA technical guidance C648: Control of water pollution from linear construction projects. CIRIA, 2006.

8.4.1.2 Baseline Context and Character of Aquatic Habitats & Species in the UWF Grid Connection Study Area

In respect of aquatic habitats and aquatic species, the existing environment comprises surface water bodies and their affected sub-catchment areas within the upper reaches of tributaries draining to the River Shannon and River Suir regional catchments.

68 no. watercourse crossings occur within the construction works area boundary associated with the UWF Grid Connection. The majority (63 no.) of which are located in the Lower Shannon & Mulkear River hydrometric area of the River Shannon catchment (crossings W1 to W63), with just 5 No. watercourses located in the River Suir catchment (crossings W64 to W68). Where the 110kV UGC leaves the Mountphilips Substation site, it is entirely located on public roads (W4 to W66) and private paved road (W67 to W68) along its route to the Consented UWF Substation. The watercourse crossings are located in the following EPA sub-catchments: Killeengarrif_SC_010, Newport [Tipperary]_SC_010, Bilboa_SC_010 and the Suir_SC_030.

There are three main watercourses along the route of the 110kV UGC, all of which are within the River Shannon catchment; the Newport River (W7 at the Rockvale Bridge), the Clare (Annagh) River (W36 at the Tooreenbrien Bridge) and the Bilboa River (W53 at the Anglesey Bridge). At these crossing locations all three watercourses are evaluated as containing good salmonid habitat, with good/high biological water quality and good ecological status. Crossing works required for the UWF Grid Connection at these three locations will be in the road pavement within the bridge structures, road level raising works and works to increase the height of parapet walls will all be undertaken from the road surface of the bridge.

The Newport River (W7), Clare River (W36) and Bilboa River (W53), which flow through the study area, were generally 4 to 6 metres wide. The smaller Tooreenbrien Lower which occurs at W33 and Foildarragh which occurs at W49 are c.1-2m wide, and the remaining Class 1 or Class 2 watercourses were generally shallow fast flowing streams which ranged between 0.5m and 1m wide.

All 68 no. watercourse crossing locations were subject to a site visit by an aquatic ecologist and surveyed to evaluate fisheries habitat suitability, riparian and instream habitat and potential for protected aquatic species. In summary the majority of watercourse crossings for UWF Grid Connection are characterised as minor streams and land drains, which have been subject to previous anthropogenic modification (arterial drainage, drainage maintenance, channel modification, abstractions, diversions, etc.). This has resulted in the reduction of ecological status and fisheries potential in the majority of cases throughout the catchments. A number of watercourse crossing points are heavily poached by cattle and in poor condition due to effluent run-off. A summary of the results of the field surveys for the UWF Grid Connection is included in Table 8-28. As per table below, instream works are required at 2 no. watercourses with Fisheries value at Mountphilips Substation site, with culvert replacement works likely to be required at 1 no. watercourse with Fisheries value.

Table 8-28: Summary of Watercourses within the UWF Grid Connection Study Area

<u>Class</u>	<u>Watercourse Description</u>	<u>Watercourse Crossing ID</u>	<u>Location</u>	<u>Total No. of Water-courses</u>	<u>Confirmed In-Stream Works</u>	<u>Potentially re-quiring culvert replacement works</u>
Class 1	Fisheries Value: EPA mapped blue line, major river or stream	W5, W7, W8, W9, W14, W18, W33, W36, W38, W39, W45, W49, W53	Public Roads along 110kV UGC	13	0	1 (W14)
Class 2	Fisheries Value: Headwater Stream Equivalent to EPA blue line but not mapped	W1, W3, W65	Agricultural lands at Mountphilips Substation site Public Roads along 110kV UGC	3	2 (W1, W3)	0
Class 3	Low Fisheries Value: Sub-optimal, heavily vegetated, low or no flow during dry periods	W2, W4, W6, W10, W11, W15, W17, W21, W22, W23, W24, W25, W26, W27, W28, W29, W31, W32, W37, W41, W42, W43, W44, W50, W51, W52, W56	Agricultural lands at Mountphilips Substation site (W2), Public Roads along 110kV UGC	27	1	3
Class 4	No Fisheries Value: Drain, no flow	W12, W13, W16, W19, W20, W30, W34, W35, W40, W46, W47, W8, W54, W55, W57, W58, W59, W60, W61, W62, W63, W64, W66, W67, W68	Public Roads and Private paved road along 110kV UGC	25	0	9
Total				68	3	13

Watercourse crossing locations, watercourse classifications and the boundary of various sub-catchments are identified on **Figure GC 8.4: UWF Grid Connection Study Area for Aquatic Habitats & Species (Overview and Maps 1 to 3)**. Further details on the site visits and the fisheries appraisals for each watercourse are included in **Appendix 8.2: Aquatic Habitats & Species Fieldwork & Survey Results** in **Volume C4 EIAR Appendices**.

Table 8-29: Summary of Watercourse Crossings for UWF Grid Connection (110kV UGC)

Regional Catchment	EPA sub-catchments ¹	EPA - Local Surface Water Bodies ²	Length of 110kV UGC (km)	No. Water-course crossings	No. Watercourses with Fisheries Value – i.e. Class 1 or Class 2	Watercourses with Fisheries Value which will be subject to new Instream Works	Watercourse s with Fisheries Value which will be subject to <i>potential</i> Culvert Replacement Works
Shannon	Killeengarrif_SC_010	Ballyard_010	1.3	4	2	2 (W1, W3)	0
	Newport[Tipperary]_SC_010	Newport_040	3.5	5	5	0	0
	Killeengarrif_SC_010	Annagh (Tipperary)_030	4	7	1	0	0
		Annagh (Tipperary)_020	8.4	23	5	0	1 (W14)
	Bilboa_SC_010	Bilboa_010	6.4	18	3	0	0
		Inch (Bilboa)_010	5.4	6	0	0	0
Suir	Suir_SC_030	Clodiagh (Tipperary)_010	1.5	5	1	0	0

¹ Catchments are listed from west to east along the UWF Grid Connection route from the Mountphilips Substation to the Consented UWF Substation

² Catchment areas as defined in <https://gis.epa.ie/EPAMaps/>

8.4.1.3 Importance of Aquatic Habitats & Species

As above, there are three principal rivers which will be crossed by the UWF Grid Connection located in the Lower Shannon & Mulkear hydrometric area of the River Shannon catchment. At the crossing locations, the Newport River (W7) and the Bilboa River (W53) are designated within the Lower River Shannon SAC. The Clare (Annagh) River crossing (W36) is located approximately 9.5 km upstream of the Lower River Shannon SAC designation on this watercourse. This European Site designation terminates at the downstream point of impassable falls, which creates a migratory barrier for Atlantic Salmon and Sea lamprey. Although these three rivers are not listed as Salmonid Waters under Schedule 1 of the S.I. No. 293/1988, all are designated within the Lower River Shannon SAC within the wider study area and support nationally important Atlantic salmon (within the passable reaches) and resident Brown trout populations. Furthermore, all three watercourse crossings on the Newport, Bilboa and Clare (Annagh) Rivers comprise internationally important aquatic instream habitat for additional water-dependant Annex II species, including Brook lamprey and Otter. The Bilboa River and the Newport River are part of the Lower River Shannon SAC and are therefore of International Importance. The Clare (Annagh) River at the crossing point is evaluated as being of National Importance, taking account of the salmonid fisheries value (resident Brown trout); in addition to its connectivity to the Lower River Shannon downstream; and with cognisance of the water-dependant habitats and species it supports.

Aquatic Habitats & Species

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In the Suir catchment, the Clodiagh (Tipperary) sub-catchment is identified as a Freshwater Pearl Mussel (FPM) sensitive catchment¹³, containing other **extant** populations of this Annex II listed species. The Clodiagh River population in north Tipperary is not designated as a qualifying interest within the Lower River Suir SAC; where the conservation objectives for the Lower River Suir SAC relate specifically to the Clodiagh (Portlaw) FPM population¹⁴, which is connected to the River Suir main channel in Co. Waterford. In the Clodiagh River (County Tipperary), extant Freshwater pearl mussel populations are located downstream of the watercourse crossings, within the SAC boundary and at a distance of approximately 17km from the subject development.

The upper reaches of the Suir catchment within the study area are characterised as land drains (W64, W66, W67 and W68) with one watercourse crossing (W65) identified as providing important juvenile habitat for Atlantic salmon, contiguous with the populations within the Lower River Suir SAC downstream; resident Brown trout populations are also supported within this watercourse. Therefore, the unnamed headwater stream of the Clodiagh River at W65 is evaluated as of 'Good' status with 'Good' biological water quality and as being of National Importance.

Minor watercourses within the UWF Grid Connection study area which were identified as having fisheries potential (Class 1 or Class 2) are evaluated as being of local importance (higher value).

Those watercourses and drains with sub-optimal or no fisheries value (Class 3 or Class 4) are evaluated as being of local importance (lower value), and subsequently scoped out from further evaluation in the impact assessment, in line with guidance (EPA, 2017).

Furthermore, as evaluated in Chapter 11 Water, a suite of water quality protection measures will be implemented during the construction of UWF Grid Connection and these measures will include all watercourses, regardless of their fisheries value. No effects greater than 'Imperceptible' are likely to any of the watercourses in proximity to the development.

8.4.1.4 Sensitivity of Aquatic Habitats & Species

Aquatic ecological receptors, including fisheries, are dependent on prevailing good to high water quality conditions; this includes the chemical water quality character, as well as sediment and nutrient loadings within the affected streams. Both aquatic macroinvertebrates (Freshwater pearl mussel, White-clawed crayfish and pollution sensitive lotic communities generally) and fish communities are sensitive to suspended solids loading (turbidity), as well as the associated effects of siltation within the river channel. Siltation and turbidity have negative implications for fish and invertebrates due to physical damage and reduced feeding/foraging, as well as negative impacts due to compaction of spawning gravels and mortality impacts for salmonid eggs (affecting recruitment) and invertebrate life stages within gravel substrates (interstitial spaces). Suspended solids may be mobilised downstream and affect reaches remote from the source of the suspended solids. Furthermore, fish populations and macroinvertebrate communities may be sensitive to vibration affecting the aquatic environment, arising during construction activities such as directional drilling works.

¹³ Sourced from online NPWS dataset, available at: <https://www.npws.ie/research-projects/animal-species/invertebrates/freshwater-pearl-mussel/freshwater-pearl-mussel-data>

¹⁴ NPWS (2017) Conservation Objectives: Lower River Suir SAC 002137. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.

8.4.1.5 Trends in the Baseline Environment (the 'Do-Nothing' scenario)

The UWF Grid Connection is located in the Killeengarrif_SC_010, Newport[Tipperary]_SC_010, and Bilboa_SC_010 sub-catchments which are part of the Lower Shannon & Mulkear hydrometric area of the River Shannon catchment, and the Clodiagh (Tipperary)_010 local waterbody catchment of the Suir_SC_010 sub-catchment of the River Suir catchment. Both the Newport River and Clodiagh River catchments were classified as 'catch and release' by IFI in 2019 (Salmon Angling Regulations: Management of the Wild Salmon Fishery 2019) for the conservation of Atlantic Salmon stocks, indicating the ongoing pressures on the salmon populations in these catchments. There is an ongoing and persistent decline in Atlantic Salmon stocks in Irish freshwaters overall, pertaining specifically to the European Sites which list this species as a qualifying interest (NPWS, 2013). Pressures and threats affecting the freshwater habitat of salmon correlate directly to those pressures affecting other aquatic ecological interests including lamprey species, aquatic invertebrates and other salmonids (siltation; channelization; drainage maintenance; invasive species and disease vectors; and direct/diffuse pollution from agriculture, forestry and direct discharges). It is noted that morphological pressures such as barriers to movement or channelisation may have varying adverse significance on different species; for example, affecting salmon differently to lamprey species. As per Chapter 11 – Water, the Water Framework Directive status of the surface water bodies at the study area is typically Good. The majority of the waterbodies are *Not at Risk* with the exception of the Inch (Bilboa)_010 and Clodiagh (Tipperary)_010 which are reported to be At Risk of not meeting the Water Framework Directive objectives, due to morphological and forestry related effects such as suspended sediment and eutrophication. It is noted that the status and risk characterisations have not been updated in the current RBMP (2018-2021), thus characterisation and water quality status are cited as indicative.

Aquatic Habitats & Species

Sensitive Aspect

8.4.1.6 Receiving Environment (the Baseline + Trends)

It is assumed in this report that the baseline environment in relation to Aquatic Habitats & Species, as identified above, will be the receiving environment at the time of construction, on the basis of the relative stability of the pertinent aquatic ecological receptors (identified in long-term trends) in the catchments under consideration herein.

Biodiversity

Topic

8.4.2 CUMULATIVE INFORMATION - Cumulative Projects & Baseline Characteristics

8.4.2.1 Cumulative Evaluation Study Areas

The UWF Grid Connection was evaluated for cumulative effects with other projects and the study area is set out in the table below.

UWF Grid Connection Cumulative Evaluation Study Area for Aquatic Habitats & Species	Justification for the Study Area Extents
Watercourses at Crossing Locations	As per Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Scheme, NRA, (2008), and CIEEM 2016

The study is illustrated on [Figure CE 8.4: UWF Grid Connection Cumulative Evaluation Study Area for Aquatic Habitats & Species \(Overview and Maps 1 to 3\)](#).

8.4.2.1.1 Whole Project Cumulative Evaluation Study Area

UWF Grid Connection is part of a whole project which comprises the following Other Elements; Element 2: UWF Related Works, Element 3: UWF Replacement Forestry, Element 4: Upperchurch Windfarm (UWF), and Element 5: UWF Other Activities. The Subject Development, UWF Grid Connection is Element 1. All five elements are collectively referred to as the Whole UWF Project in this EIA Report.

The Other Elements must be considered because UWF Grid Connection is part of a whole project. Therefore, the cumulative information and evaluations for the Other Elements of the Whole UWF Project are included in order to present the totality of the project.

A description of these Other Elements is included in this EIA Report at [Appendices 5.3, 5.4, 5.5 and 5.6](#), in [Volume C4 EIAR Appendices](#). Scoping of these Other Elements is presented in [Section 8.4.2.2.1](#) below.

The Whole Project Cumulative Evaluation Study Area comprises of the UWF Grid Connection Study Area along with the study areas for Other Elements and Other Projects or Activities which are described on Table 8-30 and illustrated on [Figure WP 8.4: Whole Project Study Area for Aquatic Habitats & Species \(Overview and Map 1\)](#) (Volume C3 EIAR Figures).

Table 8-30: Whole Project Cumulative Evaluation Study Area for Aquatic Habitats & Species

Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
Element 1: UWF Grid Connection	Watercourse Crossing Locations and sub-catchments	As per Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Scheme, NRA, (2008)
Element 2: UWF Related Works		
Element 3: UWF Replacement Forestry		
Element 4: Upperchurch Windfarm (UWF)		
Element 5: UWF Other Activities		Professional Judgement

8.4.2.2 Scoping of Other Elements, Other Projects or Activities & for Potential for Impacts

The evaluation of cumulative impacts to Aquatic Habitats & Species also considered Other Projects or Activities. A scoping exercise was carried out to determine which projects or activities, if any, have potential to cause cumulative effects to Aquatic Habitats & Species with either the UWF Grid Connection or the Other Elements of the Whole UWF Project and therefore should be brought forward for evaluation in this topic chapter. A brief overview of the Other Projects or Activities and the scoping exercise by the topic authors is included in [Appendix 2.1: Scoping of Other Projects or Activities for Cumulative Evaluations \(Section A2.1.4.6\)](#).

The results of this scoping exercise are that: consented Newport Town Park, consented Castlewaller Windfarm (and potential grid connection), and the potential Bunkimalta Windfarm (including the consented grid connection), have been scoped in for evaluation of cumulative effects to Aquatic Habitats & Species on the basis of potential interactions with the aquatic environment.

8.4.2.2.1 Potential for Impacts to Aquatic Habitats & Species

An evaluation was carried out by the topic authors of the likelihood for the Other Elements of the Whole UWF Project and for the Other Projects or Activities to cause cumulative effects to the Sensitive Aspect Aquatic Habitats & Species. The results of this evaluation are included in Table 8-31.

The location of, and study area boundary associated with, the Other Elements and Other Projects or Activities which are included for cumulative evaluation is illustrated on [Figure WP 8.4](#). The baseline character of the areas around these Elements is described in Section 8.4.2.3

Table 8-31: Results of the Evaluation of the Other Elements and Other Projects or Activities

Other Element of the Whole UWF Project	
Element 2: UWF Related Works	<u>Included</u> for the evaluation of cumulative effects
Element 3: UWF Replacement Forestry	<p><u>Evaluated as excluded:</u> No potential for effects: The UWF Replacement Forestry is located within the Clodiagh (Tipperary) River sub-catchment of the River Suir regional catchment. One Class 1 stream flows through the UWF Replacement Forestry lands. Environmental protection measures which form part of the design of the UWF Replacement Forestry include planting by hand, no use of pesticide or fertilizer, no refuelling or storage of fuels onsite, a 10m water setback area, and the planting and management of the site in accordance with best practice.</p> <ul style="list-style-type: none"> • Neutral habitat deterioration impacts arising from the UWF Replacement Forestry, as there is no requirement for instream works and no sources of significant sediment creation as planting will be carried out by hand. • Neutral disturbance or displacement effects, as there is no requirement for instream works, and due to the scale of the works with planting being carried out by hand without the use of machines, and low levels of maintenance associated with the growth stage. • There is no potential for habitat quality impacts, as the riparian strips/grassland adjacent to the existing watercourse will be maintained as part of the forestry layout as a water quality protection measure. • There is no potential for the planting works to spread invasive species, as there are no instream works required.

Aquatic Habitats & Species		<ul style="list-style-type: none"> • There is no potential for aquatic habitat degradation due to nitrogen deposition, as the new forestry will be a permanent native woodland, therefore no tree-felling/harvesting will be carried out. • There is no potential for acidification effects during the growth stage, as the UWF Replacement Forestry will be deciduous in nature. • There is no risk of pollution events as herbicide or fertilizers will not be used and the use of machinery will be minimal. • No potential for impacts to aquatic habitat quality arising from the spread of invasive species, as there are no instream works or activities adjacent to watercourses required. • There is no risk of aquatic habitat degradation (as a result of nitrogen deposition) as commercial tree felling will not be required – UWF Replacement Forestry will be a permanent native woodland.
	Sensitive Aspect	
	Element 4: Upperchurch Windfarm (UWF)	<u>Included</u> for the evaluation of cumulative effects
	Element 5: UWF Other Activities	<p><u>Evaluated as excluded:</u> no potential for effects: The UWF Other Activities are located in both the River Suir regional catchment and the River Shannon regional catchment. There are no watercourse crossing works required for the UWF Other Activities.</p> <ul style="list-style-type: none"> • There is no potential for aquatic habitat effects as there are no instream works or sediment creating activities adjacent to watercourses required as a result of UWF Other Activities (including Overhead Line Activities, Haul Route Activities, and the Upperchurch Hen harrier Scheme). • No potential for disturbance effects to aquatic receptors due to the small scale of activities and no instream activities in Class 1 or Class 2 watercourses. The Upperchurch Hen harrier Scheme will include <u>planting of 1.4km of woody scrub species along riparian corridors</u> and fencing of watercourse corridors to prevent access to the watercourses by livestock, which will enhance the quality of riparian habitats. • No potential for impacts to aquatic habitat quality arising from the spread of invasive species, as there are no instream works required as a result of UWF Other Activities, and the best practice biosecurity measures to prevent the spread of invasive species will be implemented for all activities; as set out in Chapter 5, Appendix 5.6 (Description of UWF Other Activities) • No potential for impacts to aquatic habitats due to tree felling, as no tree felling of conifer plantations is required.
	Other Projects or Activities	
Biodiversity Topic	Newport Town Park (consented)	<u>Yes, included</u> for the evaluation of cumulative effects relating to decreases in instream habitat quality and the spread of non-native invasive species.
	Castlewaller Windfarm (consented windfarm & potential grid connection)	<u>Excluded from evaluation</u> of cumulative effects in relation to the following impacts- changes in flow regime, disturbance/displacement of fish or aquatic species, and riparian habitat degradation, as any cumulative effects will be Neutral due to absence of spatial overlap on physical habitat precluding direct cumulative effects. Indirect cumulative effects will be negated due to physical and spatial isolation, i.e. separation distance.
	Bunkimalta Windfarm (potential windfarm & consented grid connection)	

8.4.2.3 Cumulative Information: Baseline Characteristics – Context & Character

In respect of aquatic habitats and aquatic species, the existing environment in relation to cumulative effects comprises surface water bodies (predominantly the upper reaches of tributaries) draining to the Killeengarriff_SC_010, Newport [Tipperary]_SC_010 and Bilboa_SC_010 subcatchments within the Lower River Shannon & Mulkear River hydrometric area of the River Shannon catchment and the Suir_SC_030 subcatchment in the River Suir catchment.

8.4.2.3.1 Element 2: UWF Related Works

UWF Related Works will involve 32 no. watercourse crossings. The majority of watercourse crossings are located off-road in agricultural and forestry lands. The majority of the footprint of the UWF Related Works is located within the River Suir regional catchment – mainly in the Clodiagh (Tipperary)_10 local water body in the Suir_SC_030 sub-catchment, with the remainder within the Owenbeg_010 local water body (also part of the Suir_SC_030) and the Multeen (East)_010 local surface water body which is within the Multeen(East)_SC_010 subcatchment. A small proportion of the footprint of the UWF Related Works is located in the Bilboa_SC_010 sub-catchment of the River Shannon.

UWF Related Works WW22 and UWF Grid Connection W65 are crossing points of the same watercourse.

Table 8-32: Summary of Watercourses within the UWF Related Works Study Area

<u>Class</u>	<u>Watercourse Description</u>	<u>Watercourse Crossing ID</u>	<u>Total No.</u>	<u>Total With In-Stream Works</u>
Class 1	EPA mapped blue line, major river or stream (fisheries value)	WW19	1	1
Class 2	Headwater Stream Equivalent to EPA blue line but not mapped (fisheries value)	WW2, WW4, WW7, WW22, WW28,	5	4
Class 3	Sub-optimal, heavily vegetated with low or no flow during dry periods (low fisheries value)	WW14, WW18,	2	2
Class 4	Drain (no fisheries value)	WW1, WW3, WW5, WW6, WW8, WW9, WW10, WW11, WW12, WW13, WW15, WW16, WW17, WW20, WW21, WW23, WW24, WW25, WW26, WW27, WW29, WW30, WW31, WW32	24	18
Total			32	25

Table 8-33: Summary of Regional and Local Hydrology at the UWF Related Works Areas

<u>Regional Catchment</u>	<u>EPA sub-catchment</u>	<u>EPA Local Surface Water Bodies</u>	<u>Internal Cable (km)</u>	<u>HW works</u>	<u>RWR works</u>	<u>No. WC Crossings</u>
Suir	Suir_SC_030	Clodiagh (Tipperary)_010	11.44	HW1 to HW6 – HW11 – HW13	RWR1- RWR2	26
	Suir_SC_030	Owenbeg_010	3.84	-	RW3	5
Suir	Multeen[East]_SC_010	Multeen (East)_010	0.88	-	-	0
Shannon	Bilboa_SC_010	Inch (Bilboa)_010	1.45	HW7 to HW10	-	1
		Bilboa_010	0.29	-	-	0

HW Works – Haul Route Works, RWR – Realigned Windfarm Roads

Aquatic Habitats & Species	Watercourse crossing locations, watercourse classifications and the boundary of various sub-catchments are identified on Figure WP 8.4: Whole Project Study Area for Aquatic Habitats & Species (Overview and Map 1) , (Volume C3 EIAR Figures).
Sensitive Aspect	<p>8.4.2.3.2 Element 3: UWF Replacement Forestry</p> <p>Not applicable – Element evaluated as excluded. See Section 8.4.2.2.1.</p>
	<p>8.4.2.3.3 Element 4: Upperchurch Windfarm</p> <p>The area of the <u>Upperchurch Windfarm</u> is predominantly situated in the River Suir regional catchment (Clodiagh (Tipperary) River and Multeen River sub-catchments).</p> <p>The remaining proportion of the footprint of the Upperchurch Windfarm is located in the Bilboa River sub-catchment of the River Shannon.</p> <p>As per the EIS 2013, the Upperchurch Windfarm involves 1 no. watercourse crossings, this watercourse is included in Table 8-32 as WW2 (Class 2).</p> <p><u>Consideration of the Passage of Time:</u> A comparison of EPA monitoring data for 2012 and 2017 demonstrates that water quality in the catchment into which the windfarm site drains, has remained stable. Therefore, it is considered that the descriptions in the 2013 and 2014 documents for Upperchurch Windfarm remain relevant to the cumulative evaluations in this 2019 EIAR.</p>
	<p>8.4.2.3.4 Element 5: UWF Other Activities</p> <p>Not applicable – Element evaluated as excluded. See Section 8.4.2.2.1.</p>
	<p>8.4.2.3.5 Other Projects or Activities:</p> <p>Newport Town Park (proposed): A recently consented public park on lands immediately adjacent to the Newport River within the urban area of Newport town. The new park will incorporate children's play area, play equipment, zip wire, outdoor gym equipment, pump track, multi-use games area, recreational walkways, seating, signage, interpretive panels, landscaping and car parking. In relation to aquatic habitats and species, the Newport Town part is located within the Newport (Tipperary)_SC_010 sub-catchment, downstream of the UWF Grid Connection development. The development will involve excavations and groundworks on lands immediately adjacent to the Newport River and overlaps the boundary of the Lower River Shannon SAC. However, there will be no instream works, nor works within 5m, of the Newport River. Sediment control, water quality protection, and invasive species control measures will be implemented, as conditioned by planning consent.</p> <p>Consented Castlewaller Windfarm (and potential grid connection): The consented 16-turbine windfarm is entirely located within the Newport (Tipperary)_SC_010 sub-catchment, all upstream of the UWF Grid Connection development. The construction of the Castlewaller Windfarm and potential grid connection will involve both instream works and works in close proximity to watercourses. The grid connection for Castlewaller Windfarm is neither currently consented nor proposed. For the purposes of this evaluation, the potential route of this grid connection is assumed to be predominantly on public roads, including the L6009-0, just east of Newport Town. The L6009-0 will also be used for the UWF Grid Connection 110kV UGC. A potential site entrance via an existing forestry entrance off the R503 (along the UWF Grid Connection route) is also evaluated herein. Both of these potential works (i.e. grid connection and site entrance works) occur in</p>
Biodiversity	
Topic	

the Kileengarrif_SC_010 and Newport (Tipperary)_SC_010 sub-catchments. Although Castlewaller Windfarm is not likely to be constructed during the same period as UWF Grid Connection, there is some possibility that this windfarm could be built during the same period as UWF Grid Connection, and therefore the Castlewaller Windfarm project is included in the cumulative evaluation on a precautionary basis.

Potential Bunkimalta Windfarm (and consented grid connection): Due to the recent annulment of the Bunkimalta Windfarm planning permission, it is not expected that the potential Bunkimalta Windfarm will be constructed at the same time as UWF Grid Connection, this potential project and its associated grid connection are nonetheless included in the cumulative evaluation on a precautionary basis. There are no current proposals for a windfarm in the Bunkimalta/Keeper Hill area, however for the purposes of this report a potential windfarm in a similar location and of a similar size as the previous 2013 application is evaluated herein. It is assumed that the windfarm will involve excavations, groundworks and instream works within the Kileengarrif_SC_010 and Newport (Tipperary)_SC_010 sub-catchments. There is an already consented grid connection for a windfarm in the Bunkimalta/Keeper Hill area, which is predominately within the public road corridor to Nenagh town. This grid connection involve works within the Kileengarrif_SC_010 and Newport (Tipperary)_SC_010 sub-catchments, though it is not located close to the UWF Grid Connection. The potential Bunkimalta Windfarm is located upstream of the UWF Grid Connection only.

8.4.3 PROJECT DESIGN MEASURES for Aquatic Habitats & Species

At the conception of the UWF Grid Connection, the design team evaluated the potential for significant impacts to the environment. Impacts will only take place where three components exist together; (1) the source of the impact (project), (2) the receptor of the impact (sensitive aspect) and (3) a pathway between the source and the sensitive aspect. The objective of mitigation measures is to avoid, prevent or reduce, one of the three components of an impact by choosing an alternative location, alternative design or an alternative process.

Potential or likely significant impacts were avoided, prevented or reduced by integrating mitigation measures into the fundamental design of the development – these are the Project Design Environmental Protection Measures, which are shortened to ‘Project Design Measures’ in this EIA Report.

The development as evaluated in the EIA Report incorporates the Project Design Measures.

The Project Design Measures outlined in Table 8-34 are relevant to the Environmental Factor, Biodiversity, and in particular to the sensitive aspect **Aquatic Habitats & Species**.

Table 8-34: UWF Grid Connection Project Design Measures relevant to Aquatic Habitats & Species

PD ID	Project Design Environmental Protection Measure (PD)
PD05	At the Mountphilips Substation site, construction traffic will be restricted to the construction works area and tracking across adjacent ground will not be permitted. A speed limit of 25km/hr for all traffic/machinery will be implemented at the Mountphilips Substation site. Outside of Mountphilips Substation site, all construction will be restricted to the paved road surfaces or built surfaces along the 110kV UGC. A speed limit of 50km/hr for all delivery and construction traffic will be implemented on Local Roads ('L' roads).
PD17	At Mountphilips Substation, water for operational stage welfare facilities will be obtained from a Rain Water Harvesting system. Waste water will be collected in tanks and removed from site by an appropriately licensed operator, for treatment in a licensed water treatment plant. These two measures will avoid the need for a new well or mains water connection and will avoid the need to treat waste water on-site.
PD18	The new substation compound and the new permanent access road at the Mountphilips Substation site will have a permanent surface water drainage network in place which will include check dams. These check dams will allow the settlement of suspended solids in water runoff while also slowing down the rate of water run-off from these areas.
PD19	At Mountphilips Substation location, where dewatering of trenches or excavations is required, there will be no direct discharge of untreated water into any watercourse or drain. Rather all pumped water will be treated prior to discharge using an infiltration trench or settlement pond or suitable water treatment train such as a Silbuster, as appropriate to the volume of water requiring treatment (if any) to ensure there is no exceedance of the criteria listed in Schedule 5 and Schedule 6 of the EC Environmental Objectives Surface Water Regulations 2009 (as amended) and will ensure that the water quality status in downstream waterbodies are maintained in accordance with the Surface Water Regulations 2009.
PD20	At Mountphilips Substation site, all excavated material will be removed for temporary or permanent storage at designated berms, which will be located more than 25m away from the watercourses on Mountphilips Substation site. All storage berms will be graded and sealed following emplacement. The berms will be covered if there is a risk of erosion. Temporary silt control methods such as silt fencing will be placed around all overburden storage areas. The existing vegetative buffer between the berms and the nearest watercourses will be maintained and no works will occur in the buffer zone.
PD21	At Mountphilips Substation site, the permanent storage berms will be along the new access road and around the substation compound will be planted with local provenance native fruiting hedge species, with grasses and native flower species common to the surrounding vegetation sown along the sides of the berms. Local provenance native wildflower seed of flowering plants like clovers, vetches and

	knapweed will be included. Revegetation works will take place at the soonest practicable opportunity after emplacement.
PD22	Outside of the Mountphilips Substation site, there will be no storage of overburden and all excavations from road trenches will be removed to licensed waste facilities in accordance with the UWF Grid Connection Waste Management Plan. Loads of excavated material will be covered during transportation to prevent spillages of excavated material.
PD23	All Joint Bays for the 110kV UGC will be located at least 50m from a Class 1 or Class 2 watercourse and at least 25m from Class 3 or Class 4 watercourses.
PD24	Outside of the Mountphilips Substation site, where dewatering of trenches or excavations is required for the 110kV UGC, there will be no direct discharge of treated water into any watercourse or drain. Rather all pumped water will be treated using a mobile water treatment train and then discharged via a silt bag to ensure there is no exceedance of the criteria listed in Schedule 5 and Schedule 6 of the EC Environmental Objectives Surface Water Regulations 2009 (as amended) and will ensure that the water quality status in downstream waterbodies are maintained in accordance with the Surface Water Regulations 2009.
PD25	Construction works along the 110kV UGC route will cease during heavy or prolonged rainfall events, and any open trenches or excavations will be covered. Use of weathering forecasting will be undertaken in advance of works.
PD26	A phased approach will be undertaken in relation to excavations, excavation dewatering and any culvert replacement works, where these works occur within 50m of a watercourse. The phased approach will only permit one of main potential sediment producing activities (i.e. excavations, excavation dewatering or culvert replacement works), to be carried out within 50m of a watercourse, at any one time.
PD27	At Mountphilips Substation site, works within 50m of watercourses, additional mitigation measures include double silt fencing, temporary drain blocking, placement of straw bale arrangements along preferential surface water flowpaths and, where necessary, the use of matting to prevent ground erosion and rutting.
PD28	Along the 110kV UGC on the public road, where works will take place within 50m of a watercourse, additional mitigation measures will be implemented which include silt fencing and placement of sandbag arrangements along preferential surface water flowpaths on the road pavement. Following works on any particular section, any works debris will be removed from the road before the sandbags and silt fences are removed.
PD29	Cable trenching works, joint bay chamber installation and culvert replacement works on the section of 110kV UGC between W13 and W20 (inclusive) and the culvert replacement works at W32 and W34 will only be completed during dry weather in the dryer months of the year – i.e. February to September included. This will minimise/avoid the requirement for any excavation dewatering as a result of waterlogged soils or surface water runoff. None of these 110kV UGC sections are within the Lower River Shannon SAC.
PD30	Lines of silt fencing and sandbags will be erected along the edge of the road so that surface water runoff from adjacent construction works areas is captured and directed to the excavated trench, where it can be pumped and treated before being released, as per PD24.
PD31	Works to bridge parapet walls at watercourse crossings W7, W36, W53 will be carried out during dry weather, and debris netting will be fixed to the outside of the walls in order to prevent any debris falling into the watercourse below.
PD32	At Mountphilips Substation site, instream construction works at the watercourse crossings W1, W2 and W3 will be followed by site-specific reinstatement measures to ensure the equilibrated restoration of flow character and morphology within the affected reach to achieve baseline character and avoid any deterioration in morphology as required under the Water Framework Directive (WFD). Measures will include: bank stabilisation using boulder armour or willow/brush bank protection; reinstatement of bank slope and character, creation of compound channels where necessary; reinstatement of instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles; and planting along the riparian margins to stabilise banks, add flood protection and provide riparian buffer; and the use of deflector plates during the restoration of flow. Instream works at W1, W2 and W3 at the Mountphilips Substation site will be undertaken during dry weather within the IFI instream works window (July – September inclusive). As per PD41, instream works at W1, W2

Aquatic Habitats & Species		and W3 will be supervised by a member of CIEEM and the Institute of Fisheries Management to ensure both the Project Design Measures and Best Practice are followed. Although intended for the purpose of the WFD, this measure will also indirectly contribute to downstream water quality protection in the SAC.
	PD33	All new permanent watercourse culverts at the Mountphilips Substation site and any replacement culverts along the public road for the 110kV UGC will be sized to cope with a minimum 100-year flood event.
	PD34	Only precast concrete culverts or structures will be used at the watercourse crossing locations at Mountphilips Substation site and for any culvert replacements along the 110kV UGC. Only precast concrete chambers will be used at Joint Bay locations. No batching of wet cement will take place on-site.
	PD35	Concrete pours will be required for the 110kV UGC cables trench. Only chutes will be washed out at the works locations into the cable trench, with the washout of the tank taking place at the concrete supplier depot. Concrete chute washouts within the SAC boundary will take place into designated bins for removal to the designated concrete wash settlement pond at the Mountphilips Substation site.
	PD42	There will be no refuelling of vehicles or plant permitted within 100m of a watercourse. Spill response apparatus including spill-kits and hydrocarbon absorbent packs will be stored in the cabin of each vehicle and operators will be fully trained in the use of this equipment. The Environmental Emergency Response Procedure will be implemented immediately in the event of any spills. The Environmental Emergency Response Procedure is part of the UWF Grid Connection Environmental Management Plan.
	PD43	The main fuel stocks for, and chemical wastes arising from, construction activities will be stored in a designated location, away from main traffic activity, within the temporary compound at the Mountphilips Substation site. All fuel will be stored in bunded, locked storage containers. The designated storage location will be greater than 100m from a watercourse. Spill response apparatus including spill-kits and hydrocarbon absorbent packs will be stored at the designated location in the temporary compound and all operators will be fully trained in the use of this equipment. The Environmental Emergency Response Procedure will be implemented immediately in the event of any spills. The Environmental Emergency Response Procedure is part of the UWF Grid Connection Environmental Management Plan.
Biodiversity	PD44	Overnight parking of plant and machinery will only be permitted at the temporary compound at the Mountphilips Substation site and at a distance greater than 50m from watercourses.
	PD45	The horizontal directional drilling works at W8 and W9 will be carried out by an experienced Drilling Contractor and supervised and managed by a competent and experienced Mud Engineer who understands the technicalities and challenges of drilling works. The Mud Engineer will advise the Construction Manager on the selection of competent drillers for the HDD works; monitor the watercourse bed during drilling works, and will supervise the drilling works including the drilling pressures and the implementation of any contingency measures. From a surface water quality protection perspective, the area around the launch/reception pit, bentonite batching, pumping and recycling plant will be bunded using appropriate terram geotextile and/or sandbags in order to contain any spillages. Drilling fluid returns will be contained within a sealed tank / sump to prevent migration from the works area. Spills of drilling fluid will be cleaned up immediately and stored in an adequately sized water tight skip before being taken off-site to a suitably licensed waste facility. In the event of a break-out occurring, the Environmental Emergency Response Procedure for Frac-Out will be implemented which includes the following contingency measures; In the event of break-out occurring in the river bed, the rig will immediately shut off the pumps and the drilling assembly will be pulled off to reduce annular pressures; In the event of break-out on the road an excavator will be available to dig a pit to contain fluid with vacuum trucks/pumps available to transfer drill fluid from the containment point back to the recycling point; and in either scenario, drilling fluid additives designed to plug the formation will be introduced to the circulation system and let set. Environmental Emergency Response Procedures are included in the UWF Grid Connection Environmental Management Plan (see Volume D).
	PD46	All construction works will be monitored on a daily basis by the Environmental Clerk of Works and by members of the Environmental Clerk of Works team (for example Site Ecologist) as required, for compliance with the Environmental Commitments, which include the Project Design Measures, as per the UWF Grid Connection Environmental Management Plan (see Volume D).

PD47	Surface water quality monitoring of the main watercourses downstream of the works will be carried out to ensure that the downstream water quality status in the receiving water is maintained and that there is no exceedance of the criteria listed in Schedule 5 and Schedule 6 of the EC Environmental Objectives Surface Water Regulations 2009 (as amended) and will ensure that the water quality status in downstream waterbodies are maintained in accordance with the Surface Water Regulations 2009. Where non-compliance in water quality is measured or recorded, works will stop until the issue is resolved. The surface water monitoring locations and sampling programme are defined in the Surface Water Management Plan for UWF Grid Connection. The Surface Water Management Plan is part of the UWF Grid Connection Environmental Management Plan (see Volume D).
PD48	The new permanent cross structures at the Mountphilips Substation site and the replacement culvert at W14 along the R503 will be bottomless or clear spanning.
PD49	In-stream works at Mountphilips Substation site and culvert replacement works at W14 along the R503 Regional Road will only be undertaken during the IFI specified period (July, August and September) and will be carried out to best practice (IFI, 2016).
PD50	<p>Culvert replacement works along the 110kV UGC will not be undertaken without isolation of flow within the watercourse. Isolation of flow will be achieved through the use of sandbags filled with clean, washed sand. Any fish within the isolated section will be removed prior to works commencing. This will require the engagement of licensed fisheries personnel to deplete the works area using electrofishing and, following collection of biometrics, transferred immediately downstream of the crossing point and placed back in the water. The water will then be isolated from the works by over pumping using a flume (pipe), with deflector plates used on the downstream side of the flume to reduce the hydraulic power of the water.</p> <p>Construction works at the crossing will be followed by site-specific reinstatement measures to ensure the equilibrated restoration of flow character and morphology within the affected reach to achieve baseline character and avoid any deterioration in morphology as required under the Water Framework Directive (WFD). Measures will include: bank stabilization measures, reinstatement of bank slope and character; and reinstatement of instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles; and the use of deflector plates during the restoration of flow. As per PD41, culvert replacement works will be supervised by a member of CIEEM and the Institute of Fisheries Management to ensure both the Project Design Measures and Best Practice are followed. These measures will ensure that the baseline character is maintained and will ensure that a deterioration in morphology is avoided, as required under the Water Framework Directive. This in turn will protect Aquatic Ecology.</p>
PD51	The sections of the 110kV UGC trench within the R503, in the central part of the 110kV UGC where the adjacent lands comprise predominantly peaty soils, will be lined with a geotextile membrane which will provide support to the cables trench and the road structure.
PD36	The sections of 110kV UGC trenches that overlap the Lower River Shannon SAC will be lined with an impermeable geotextile material to prevent potential migration of cement from the trench base or sides into the SAC.
PD37	In addition to PD22, there will be no storage of overburden within the Lower River Shannon SAC.
PD38	110kV UGC works outside of Mountphilips Substation site will be carried out entirely on paved roads and where the 110kV UGC crosses watercourses, the works will be carried out over the existing bridges and over/under existing culverts. No in-streams works are proposed at any watercourse crossing points (including the Newport River and Bilboa River crossings) within the boundary of the Lower River Shannon SAC and therefore there will be no placement of cement or other materials within the river channels or on the river banks within the SAC.
PD39	In addition to PD42, there will be no refuelling of vehicles or plant, no storage of fuels and no overnight parking permitted within 100m of the boundary of the Lower River Shannon SAC.
PD40	In addition to PD29, all 110kV UGC works within the boundary of the Lower River Shannon SAC will only be completed during dry weather in the dryer months of the year – i.e. February to September included.
PD41	The instream works at W1, W2 and W3 at Mountphilips Substation site, and the culvert replacement works at the 13 existing culverts on the public road, and all works (including concrete placement) within the boundary of the Lower River Shannon SAC, will be supervised by a member of CIEEM and

Aquatic Habitats & Species

Sensitive Aspect

Biodiversity

Topic

Aquatic Habitats & Species		the Institute of Fisheries Management to ensure both the Project Design Measures and Best Practice Measures are followed.
Sensitive Aspect	<p><u>Cumulative Information:</u> Potential or likely significant impacts caused by the Other Elements of the Whole UWF Project were avoided, prevented or reduced by incorporating Project Design Measures into the fundamental design of the UWF Related Works, UWF Replacement Forestry and into the consented design of the Upperchurch Windfarm. These Project Design Measures are included in the description of these Elements, and can be found in this EIA Report in Appendices 5.3, 5.4 and 5.5, in Volume C4: EIAR Appendices.</p>	

	Biodiversity
Topic	

8.4.4 EVALUATION OF IMPACTS to Aquatic Habitats & Species

In this Section, the likely direct and indirect effects of the UWF Grid Connection are identified and evaluated. Then the likely cumulative effects of the UWF Grid Connection together with the Other Elements of the Whole UWF Project and Other Projects or Activities are identified and evaluated.

A conceptual site model exercise was carried out to facilitate the identification of source-pathway-receptor links between the project (source) and the sensitive aspect (receptor) - Aquatic Habitats & Species.

As a result of the exercise, some impacts were included and some were excluded.

Table 8-35: List of all Impacts included and excluded from the Impact Evaluation Table sections

Impacts Included (Evaluated in the Impact Evaluation Table sections)	Impacts Excluded (Justification at the end of the Impact Evaluation Table sections)
Decrease in instream aquatic habitat quality, (construction stage)	<i>Aquatic Habitat Degradation (as a result of increased nitrification / nitrogen deposition) such as temporary oxygen shortages (construction stage)</i>
Changes to flow regime, (construction stage)	<i>Operational stage effects</i>
Disturbance or displacement of fish and aquatic species, (construction stage)	<i>Decommissioning stage effects</i>
Riparian habitat degradation, (construction stage)	
Spread of invasive aquatic species, (construction stage)	

The source-pathway-receptor links for included impacts are described in the Impact Evaluation Tables in the next sections. **The Impact Evaluation Tables are presented in the following sections 8.4.4.1 to 8.4.4.5.**

The source-pathway-receptor links and the rationale for excluded impacts are described in the section directly after the Impact Evaluation Table sections, in Section 8.4.4.6.

8.4.4.1 Impact Evaluation Table: Decrease in instream aquatic habitat quality

Impact Description:

Project Life Cycle Stage: Construction stage

Impact Source: instream works; culvert replacement works; parapet works; movement of soils and machinery; excavation works; use of hydrocarbons & cement-based compounds; reinstatement works

Cumulative Impact Source: Instream works; Movement of soils and machinery; Excavation works; Forestry felling; Hydrocarbons; Reinstatement; Earthworks and Groundwork

Impact Pathway: Soils; Surface water, water flowpaths

Impact Description: Aquatic habitat relates to the instream features supporting aquatic biodiversity (bed substrate, morphology, water quality, etc.). Watercourses are highly sensitive to change, containing sensitive aquatic ecological receptors including salmonids, lamprey species, and a diverse macroinvertebrate community.

Instream works at some watercourses will require direct excavation of the banks and bed of the watercourse, which can change the physical character of the watercourse and has the potential to degrade the quality of the baseline habitat which supports the structure, function and diversity of aquatic species.

Water quality effects due to sedimentation: Erosion and deposition are natural process in watercourses¹⁵, varying naturally throughout the year. However, additional sediment contributions entering the watercourse, such as from construction works in, adjacent to or upstream of individual watercourses, can have negative implications for fish and invertebrates due to physical damage and reduced feeding/foraging, as well as negative impacts due to compaction of spawning gravels by sediment causing mortality impacts for salmonid eggs (affecting recruitment) and interfering with invertebrate life stages within gravel substrates (interstitial spaces). These impacts may be mobilised downstream and affect river reaches at a distance from the physical works.

In addition, water quality effects due to contamination by fuels, oils or cementitious material has the potential to lead to direct toxicity events, or sub-lethal degradation of aquatic habitat quality.

Impact Quality: Negative

Evaluation the Subject Development Impact – Decrease in instream aquatic habitat quality

Element 1: UWF Grid Connection – direct/indirect impact

General Impact Magnitude:

Of the 68 No. watercourse crossings required for the UWF Grid Connection, 16 No. have been evaluated to have fisheries value. Of these 16 No. watercourses, 2 No. watercourses with fisheries value at Mountphilips Substation site (W1, W3) will be subject of instream works and 1 No. watercourse with fisheries value along the 110kV UGC with fisheries value (W14) will be subject to *potential* culvert replacement works. Each of these watercourses were classed as minor 1st order streams during watercourse surveys.

Overall, the magnitude of the effect on the physical instream habitat i.e. watercourse channel morphology, substrate, and water quality due to instream works at W1 and W3, and due to culvert replacement works at W14 has been evaluated as having a Negligible magnitude with regard to availability, diversity and quality of habitat supporting aquatic species. This in line with the impact magnitude evaluation presented for instream works in Chapter 11 Water (Negligible magnitude/Imperceptible significance impact taking account of instream works). The potential for decreases in aquatic habitat quality due to additional sedimentation or contamination by fuels, oils or cement is evaluated as having a Negligible magnitude, in line with the Negligible Impact magnitude and Imperceptible impact significance presented for instream works, sedimentation and contamination effects in Chapter 11 Water.

¹⁵ EPA Ireland; Managing the Impact of Fine Sediment on River Ecosystems,

The remaining 13 No watercourses with fisheries value will not require instream works or culvert replacement works. This includes the crossing of the Newport River at W7, the crossing of the Clare (Annagh) River at W36 and the crossing of the Bilboa River at W53 – the 110kV UGC will be installed within the existing bridge structures. The installation of the 110kV UGC at the other watercourses with fisheries value (W5, W8, W9, W18, W33, W38, W39, W45, W49, W65) will not involve instream works as the cables will be installed either under or over the existing structures. Therefore the potential for decreases in aquatic habitat quality at the remaining 13 No. watercourses only relates to sources of additional sedimentation or contamination by fuels, oils or cement. The potential for decreases in aquatic habitat quality due to additional sedimentation or contamination by fuels, oils or cement is evaluated as having a Negligible magnitude, in line with the Negligible Impact magnitude and Imperceptible impact significance presented for instream works, sedimentation and contamination effects in Chapter 11 Water.

Significance of the Impact: Slight to Moderate at watercourses with fisheries value requiring instream works or culvert replacement works, Slight Impacts at Sub-Catchment level

Rationale for Impact Evaluation:

- Application of comprehensive water quality protection measures for UWF Grid Connection through the EMP with supervision by supervised by a member of CIEEM and the Institute of Fisheries Management during all instream works and culvert replacement works (i.e. whether fisheries value or not);
- In-stream works at W1, W3 and culvert replacement works at W14 will only be undertaken during the IFI specified period (July – September) (Project Design Measure), which puts works outside of key sensitivity periods for the aquatic receptors. Flow conditions during this period are also likely to be lower, with lower relative contributions from surface water run-off;
- The in-stream works will not be undertaken without isolation of flow within the watercourse, and the removal of fish within the isolated section, prior to the in-stream works commencing (Project Design Measure).;
- Implementation of the Project Design Measures for Water Quality protection (PD17 to PD50) through the Surface Water Management Plan for UWF Grid Connection
- There will be no direct discharge of pumped water into the watercourse during the works (Project Design);
- The spatial extent of effects to the watercourse channel will occur within the footprint of any works at potential culvert replacement locations;
- The frequency of such an event is once for any culvert replacement works;
- The duration of the impact is limited to the specific works period within or adjacent to the aquatic habitat.
- Impacts to the watercourse channel are temporary and reversible. The duration of any reductions in the quality of downstream habitats due to siltation are considered with regard to fish species, protected Annex II aquatic invertebrates, and macroinvertebrate communities which support fish populations; such effects are evaluated to be temporary to short-term and not reversible; and
- It's likely only between 100 – 300m of the trench will be excavated in any day with only 1 – 3 watercourse crossings being completed in any one day (assumed 3 work crews). Therefore, taking account of the temporary nature of the works within the catchment, all effects will be brief to temporary in nature and reversible.

Element 1: UWF Grid Connection – cumulative impact

Cumulative Impact Magnitude:

The potential for cumulative effects relates to watercourses with fisheries value (i.e. Class 1 or Class 2). The potential for cumulative effects with the Other Elements of the Whole UWF Project relates to those watercourses with fisheries value which will be subject to instream works for both UWF Grid Connection and for Other Elements, with cognisance of works proposed within adjacent tributaries of the affected catchments, but which may not be occurring on the same individual watercourses.

Neither Upperchurch Windfarm, nor UWF Replacement Forestry, nor UWF Other Activities will require any instream works, and it is therefore evaluated that any cumulative impacts directly or indirectly affecting instream aquatic habitat quality (water quality contamination or sedimentation) will be negligible, with reference to interactions between these Elements and the UWF Grid Connection. This evaluation takes cognisance of the Surface Water Management measures in place for Upperchurch Windfarm.

Aquatic Habitats & Species	<p>UWF Related Works within the Shannon catchment will cause limited construction-related effects as UWF Related Works will not require any instream works in the Bilboa_SC_010 sub-catchment, and is not located in either the Killeengarrif_SC_010 or Newport_SC_010 sub-catchments, and cumulative impacts to instream aquatic habitat quality will be negligible. The potential for cumulative effects with UWF Related Works therefore relates to the Suir_SC_030 sub-catchment, where UWF Related Works also occurs and will require instream works.</p> <p>In the Suir_SC_030 sub-catchment, the UWF Grid Connection does not require any instream works, or culvert replacement works to existing culverts on watercourses with fisheries value; while the UWF Related Works will involve instream works on five watercourses (with fisheries value) within the Suir_SC_030 sub-catchment. One of the UWF Related Works (WW22) instream works will be within c.20m of UWF Grid Connection crossing W65 (which will not require any culvert replacement works as it is within the road pavement). The temporal extent of both works components is short-term and water quality contamination effects arising from the UWF Grid Connection works are restricted to the duration of the cable trench works only, in the road corridor, and will not overlap temporally with the UWF Related Works at this watercourse crossing point along this road segment (Project Design). In addition, the spatial extent of any potential physical cumulative effects will occur within the footprint of the UWF Related Works instream works, and also downstream within the zone of sediment transport. Therefore, the zone of cumulative effects extends from the watercourse crossing points to the lower end of any waterbody. Due to the limited spatial extent of works associated with the UWF Grid Connection, it is evaluated that the magnitude of any cumulative impacts with regard to interactions with the UWF Related Works to instream aquatic habitat quality will be negligible.</p> <p>There is potential for cumulative effects with the Bunkimalta Windfarm and Castlewaller Windfarm (and potential grid connection) (should they be constructed during the same period as UWF Grid Connection), the potential for cumulative effects relates to the <u>Newport SC_010 sub-catchment</u> and the <u>Killeengarrif SC_010 sub-catchment</u>. Due to the large size of both of these catchments, the limited extent of instream works associated with UWF Grid Connection, the large upstream distance of Bunkimalta Windfarm works, the temporary duration of these works, and the implementation of surface water management plans for both windfarms, the cumulative impact magnitude is evaluated as Negligible to Slight (in line with the cumulative magnitude evaluated in the Water chapter).</p>
Sensitive Aspect	<p>Significance of the Impact: Imperceptible to Moderate in the local context</p>
Biodiversity	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • In-stream works or culvert replacement works in watercourses with fisheries value for UWF Grid Connection will only occur in the <u>Killeengarrif SC_010 sub-catchment</u> and will only be undertaken during the IFI specified period (July – September) (Project Design Measure); • No instream works or culvert replacement works in watercourses with fisheries value are required for UWF Grid Connection on watercourses of fisheries value arising from the UWF Grid Connection in the Newport_SC_010, the Bilboa_SC_010 or the Suir_SC_030 sub-catchments. • Application of comprehensive water quality protection measures for UWF Grid Connection through the EMP with supervision by supervised by a member of CIEEM and the Institute of Fisheries Management during all in-stream works and culvert replacement works (i.e. whether fisheries value or not); • In-stream works in the <u>Suir SC_030 sub-catchment</u> only relate to UWF Related Works where works will occur on small headwater streams (5 No.) during the period July to September and the in-stream works will not be undertaken without isolation of flow within the watercourse prior to the in-stream works commencing; • The upstream separation distance to Bunkimalta Windfarm and the location of Castlewaller Windfarm turbines in the Newport SC_010 sub catchment where there are no instream or culvert replacement works required on any watercourse for the UWF Grid Connection, and the location of their respective grid connections predominately on roadways, with works spread over two catchments, in addition to the relatively large surface water catchment area of the <u>Newport SC_010</u> or <u>Killeengarrif SC_010 sub-catchments</u>, and the temporary duration of construction works; • There will be no direct discharge of pumped water into watercourses during the works (Project Design); • The spatial extent of effects to the watercourse channel is limited to the footprint of instream works or culvert replacement works, and; • The duration of the impact is limited to the specific works period within or adjacent to the aquatic habitat, and • Impacts to the watercourse channel are temporary and reversible with reinstatement.

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project**Element 2: UWF Related Works**

Impact Magnitude: Works at, or in close proximity to, watercourses have potential to cause decreases in instream habitat quality directly through instream works and indirectly through sediment laden/contaminated runoff into the watercourse.

There are 32 no. watercourse crossings required by the Internal Windfarm Cabling, Realigned Windfarm Roads and Haul Route Works. 31 no. of the total 32 no. crossings are located within the Suir SC 030 sub-catchment and 1 no. in the Bilboa SC 010 sub-catchment. Of these 31 no. crossings the Suir SC 030 sub-catchment, in-stream works will be required at 25 no. of these locations - 5 No. of which were evaluated as having fisheries value. The 1 no. watercourse crossing in the Bilboa_SC_010 will not require any instream works.

The spatial extent of such effects will occur within the footprint of the instream works (direct effects), and also downstream of construction works (indirect water quality effects) within the zone of sediment transport.

The effect on the physical instream habitat i.e. watercourse channel morphology, substrate, and flow character due to instream works has been evaluated as a Slight to Moderate adverse impact on availability, diversity and quality of habitat supporting aquatic species. This in line with the impact magnitude evaluation presented for instream works in Chapter 11 Water (taking account of instream works).

Significance of the Impact: Imperceptible to Moderate in the local context

Rationale for Impact Evaluation:

- In-stream works will only be undertaken during the IFI specified period (July – September) for the Class 1 and Class 2 watercourses ((UWF Related Works Project Design Measure));
- The Class 1 and Class 2 watercourses where in-stream works are required (5 No.) are largely small headwater streams and therefore are likely to have relatively low flows during July to September;
- The in-stream works will not be undertaken without isolation of flow within the watercourse prior to the in-stream works commencing. This will be completed by over pumping, flume (pipe) or channel diversion methods (UWF Related Works Project Design Measure);
- There will be no direct discharge of pumped water into the watercourse during the works (UWF Related Works Project Design Measure));
- The duration of the impact is limited to the specific works period within or adjacent to the aquatic habitat, and
- Impacts to the watercourse channel are temporary and reversible with reinstatement.
- The duration of any reductions in the quality of downstream habitats due to siltation are considered with regard to fish species, protected Annex II aquatic invertebrates, and macroinvertebrate communities which support fish populations; such effects are evaluated to be temporary to short-term and not reversible.

Element 3: UWF Replacement Forestry – N/A, evaluated as excluded, see Section 8.4.2.2.1.

Element 4: Upperchurch Windfarm

Impact Magnitude: There is 1 no. watercourse crossing within the Upperchurch Windfarm Site, evaluated as having fisheries value (Class 1, WW2). This watercourse will be crossed using a clear span bridge, which will avoid the requirement for instream works. Baseline conditions indicated that the aquatic species were present year-round, and works in close proximity to this watercourse were evaluated as being of high magnitude for aquatic species. However, it was identified that significant impacts were not probable/not likely post-mitigation. The 2013 EIS concludes that water quality effects will not be significant

Significance of the Impact: Imperceptible

Rationale for Impact Evaluation:

- A clear-span bridge will be used where a natural stream (Class 1 watercourse) will be crossed and therefore no in-stream works are required;
- All effects were evaluated as reversible and temporary in the short-term and impacts were associated with construction phase works.

Element 5: UWF Other Activities – N/A, evaluated as excluded, see Section 8.4.2.2.1.

Other Projects: Newport Town Park, Castlewaller Windfarm, Bunkimalta Windfarm

Newport Town Park, along with the consented Castlewaller Windfarm, and part of the potential Bunkimalta Windfarm (*assumed*) are located within the Newport (Tipperary)_SC_010. The potential route of the Castlewaller grid connection (*assumed*) and a small section of the consented Bunkimalta Windfarm will occur along the public road network through the Kileengarriff SC 010 subcatchment.

While Newport Town Park is located on lands immediately adjacent to the Newport River, no instream works, or works within 5m of the river will occur. Instream works and works (including earthworks) in close proximity to watercourses will be associated with the two windfarm developments. However sediment and erosion control measures are conditioned/assumed to form part of any future planning application. It is also assumed that any requirements for new or replacement watercrossing structures will be sized to adequately cope with flood events, and enable the free passage of fish.

Rationale for Impact Evaluation:

- Implementation of best practice during construction works and the development of these projects in accordance with planning conditions

Whole UWF Project Effect

Magnitude: The watercourse crossing works required for the UWF Grid Connection (68 No. total) are largely located within the River Shannon catchment (63 No.) while the watercourse crossings required for the Upperchurch Windfarm (1 No.) and UWF Related Works (32 No. total) are largely located in the Suir SC 030 sub-catchment. For the Whole UWF Project, a potential decrease in aquatic habitat quality due to instream/culvert replacement works is identified at a total of **8 No.** watercourses evaluated as having fisheries value – 3 no. for UWF Grid Connection, and 5 no. for UWF Related Works. The spatial extent of habitat quality effects arising from Whole UWF Project impacts, due to instream works or water quality contamination, will potentially occur within the footprint of the instream/culvert replacement works, taking account of Project Design measures and implementation of mitigation measures stipulated for individual Project Elements. These effects will be dispersed between two regional catchments and within several local sub-catchments. Impact range is located downstream of the lowest point in the waterbody where Whole UWF Project works are required, with reference to the zone of sediment transport. It is evaluated that the cumulative impact magnitude will be Imperceptible to Moderate.

Rationale for Impact Evaluation:

- The presence of sensitive salmonid fish habitat within the works area and protected Annex II (and Annex IV listed) species downstream.
- The low number of watercourses (8 No. in total) with fisheries value and subject to instream/culvert replacement works.
- the location of works in two separate regional catchments;
- the linear nature of the UWF Grid Connection 110kV UGC works over a large c.23km latitudinal distance;
- The spatial extent of effects to watercourse channels will occur within the footprint of the instream works,
- The once off frequency and brief to temporary duration of works within or adjacent to the aquatic habitat.
- Impacts at the works site are temporary and reversible; however, any reduction in habitat quality due to potential downstream siltation effects are considered to be short-term to temporary and not reversible.

All Elements of the Whole UWF Project with Other Projects or ActivitiesCumulative Impact Magnitude:

In relation to cumulative effects within the Killeengarriff_SC_010 sub-catchment; Approximately 13.7km of the 110kV UGC and the Mountphilips Substation site and 5 No. of the 16 No. consented Bunkimalta Windfarm turbines and 0.2km of the consented grid connection for Bunkimalta Windfarm, and 9.6km of the potential grid connection route for Castlewaller Windfarm are located within the Killeengarriff_SC_010. There are no other elements of the Whole UWF Project requiring instream works, or contributing to aquatic habitat deterioration (water quality contamination or deterioration) within this sub-catchment.

In relation to cumulative effects within the Newport (Tipperary)_SC_010 sub-catchment; Approximately 3.5km of the 110kV UGC, along with 11 No. of the 16 No. consented Bunkimalta Windfarm turbines and 6.4km of the potential consented Bunkimalta Windfarm grid connections, and all of the Castlewaller Windfarm and 4.8km of the potential Castlewaller Windfarm grid connection and all of the Newport Town Park are located within the Newport (Tipperary)_SC_010 sub-catchment. There are no other elements of the Whole UWF Project requiring instream works, or contributing to aquatic habitat deterioration (water quality contamination or deterioration) within this sub-catchment.

The remaining elements of the Whole UWF Project are located in the Bilboa River sub-catchment and in the Suir_SC_030 sub-catchment and are therefore spatially distant and hydrologically separated from any cumulative interactions due to instream works with Other Projects and Activities.

The magnitude of cumulative impact is Negligible to Low, taking account of the impact evaluations for the Whole UWF Project and those of the Other Projects and Activities identified in the wider study area, with cognisance of the aquatic sensitivities in the affected catchments.

Significance of the Cumulative Impact: SlightRationale for Cumulative Impact Evaluation:

- The presence of sensitive salmonid fish habitat within the works area and protected Annex II (and Annex IV listed) species downstream.
- The low number of watercourses (8 No. in total) with fisheries value and subject to instream/culvert replacement works.
- the location of works in two separate regional catchments;
- the linear nature of the UWF Grid Connection 110kV UGC works over a large c.23km latitudinal distance;
- The spatial extent of effects to watercourse channels will occur within the footprint of the instream works,
- The once off frequency and brief to temporary duration of works within or adjacent to the aquatic habitat.
- Impacts at the works site are temporary and reversible; however, any reduction in habitat quality due to potential downstream siltation effects are considered to be short-term to temporary and not reversible. the location of the grid connections for Bunkimalta Windfarm (consented) and Castlewaller Windfarm (potential) predominately on existing forestry/public roads within the catchment;
- The large surface water catchment area of the Killeengarriff_SC_10 sub-catchment (122km²) and Newport (Tipperary)_SC_010 sub-catchment(95km²);
- The relatively large upstream distance of the potential Bunkimalta Windfarm site (~10km) from the 110kV works;
- The absence of instream works required for the Newport Town Park;
- Sediment Control Plans expected to be in place at the potential Bunkimalta Windfarm and associated consented grid connection, consented Castlewaller Windfarm (and potential grid connection, as per best practice) and consented Newport Town Park project.
- the location of the grid connections for Bunkimalta Windfarm (consented) and Castlewaller Windfarm (potential) predominately on existing forestry/public roads within the catchment;

8.4.4.2 Impact Evaluation Table: Changes to Flow Regime

Impact Description

Project Life Cycle Stage: Construction stage

Impact Source: instream works; culvert replacement works; movement of soils and machinery; excavation works; new crossing structures

Cumulative Impact Source: Instream works; new crossing structures;

Impact Pathway: Surface water;

Impact Description: Watercourse morphology relates to the shape of a watercourse channel, its bed and banks and how erosion, transportation of water, sedimentation and the composition of riparian vegetation changes this shape over time. As per Section 11.2.4.3 of Chapter 11: Water, direct impacts are identified to channel morphology and geomorphology (bed and banks of watercourses) due to instream works. The potential for indirect effects which would lead to sediment deposition at a scale to alter channel morphology or the flow regime are considered unlikely; with reference to Project Design measures.

Aquatic species are likely to be present in fishery value watercourses at instream construction works locations at W1 and W3 (new crossing locations at Mountphilips Substation site) and at W14 along the 110kV UGC on the Regional Road (potential culvert replacement works). Any change in watercourse morphology which affects channel flow regimes can result in cross factor effects on aquatic ecological communities. Aquatic species are reliant on instream habitat heterogeneity (riffle/glide/pool structure); along with the availability of peak flow flushes (flood/spate); the provision of flows for upstream/downstream migration and the avoidance of barriers to passage; and avoidance of channel constriction during low flow.

Instream works are limited to the individual crossing points (W1 and W3) and include trenching works for underground cables, installation of temporary (W1) or permanent (W3) crossing structures and reinstatement works. Works for the UWF Grid Connection also involve the replacement of some existing culverts under public road pavements, with 1 no. culvert (W14) potentially requiring replacement at a watercourse with fisheries value. The creation of adverse flow conditions or habitat limitations due to changes to flow or morphology will be limited to the specific works period within or adjacent to the aquatic habitat.

As per project design, instream construction works at the watercourse crossings W1, W2 (no fisheries value) and W3 will be followed by site-specific reinstatement measures to ensure the equilibrated restoration of flow character and morphology within the affected reach to achieve baseline character and avoid any deterioration in morphology as required under the Water Framework Directive (WFD). Measures will include: bank stabilisation using boulder armour or willow/brush bank protection; reinstatement of bank slope and character, creation of compound channels where necessary; reinstatement of instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles; and planting along the riparian margins to stabilise banks, add flood protection and provide riparian buffer; and the use of deflector plates during the restoration of flow. Instream works at W1, W2 and W3 at the Mountphilips Substation site will be undertaken during dry weather within the IFI instream works window (July – September inclusive). As per PD41, instream works at W1, W2 and W3 will be supervised by a member of CIEEM and the Institute of Fisheries Management to ensure both the Project Design Measures and Best Practice are followed.

As per project design, culvert replacement works at W14 and the 12 no. other watercourse crossings (no fisheries value) will be subject to reinstatement works which will include site-specific bank stabilization measures, reinstatement of bank slope and character; and reinstatement of instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles. These measures will be supervised by a member of CIEEM and the Institute of Fisheries Management to ensure both the Project Design Measures and Best Practice are followed.

Project Design Measures also include the use of culverts at all new permanent watercourse crossings which will be a minimum of 900mm in diameter and will be bottomless or clear spanning at W1, W2, W3 and W14 watercourse crossings. In addition, in-stream works will only be undertaken during dry weather within the IFI instream works window (July – September inclusive), and will include for the equilibrated reinstatement of flow and the use of diffuser plates where required.

Impact Quality: Negative

Evaluation the Subject Development Impact – Changes to Flow Regime

Element 1: UWF Grid Connection – direct/indirect impact

Impact Magnitude:

Works at, or in close proximity to, watercourses have potential to indirectly affect aquatic species and habitats through changes to flow regimes which can be caused directly by morphological changes due to instream works.

16 No. of the 68 No. watercourses within the UWF Grid Connection site are evaluated as having fisheries value (i.e. Class 1 or Class 2). At Mountphilips Substation 3 no. watercourse crossings are proposed, two of these watercourses (W1 and W3) have fisheries value (both Class 2). Instream works at these two watercourses will involve the installation of one temporary crossing structure (W1) and one permanent crossing structure (W3).

The 65 No. watercourse crossings along the UWF Grid Connection 110kV UGC, outside of the Mountphilips Substation site, all exist along the public road network and along the private paved road near the Consented UWF Substation. 14 No. of the 65 No. watercourses have been evaluated to have fisheries value. Of these 14 No. watercourses, 1 No. will be subject to *potential* culvert replacement works (W14). At W14, changes to the flow regime will be brief (1 day) and for the duration of the immediate works, restricted to the location of the works area within the footprint of, or directly adjacent to the existing crossing point in the public road. Changes to the flow regime at these crossing locations will be avoided through the isolation of flow, over pumping of the water from upstream to downstream of works, the use of deflector plates, the equilibrated restoration of flow and the sensitive restoration of the bed and banks of these watercourse following works (Project Design). The magnitude of impact is negligible to low, taking account of Project Design.

The remaining 13 No. watercourses with fisheries value, including all required crossings of major rivers Newport, Clare and Bilboa Rivers, are all across existing crossing structures which do not require any instream works or culvert replacement works and cables will be installed either under or over the structure. Any changes to flow regime due to sedimentation will be of negligible magnitude with the implementation of Project Design Measures, such as the use of sandbags to avoid the runoff of sediment laden water from construction works areas, and the treatment of any water pumped from excavations prior to discharge.

Significance of the Impact: Slight

Rationale for Impact Evaluation:

- Instream works at W1 and W3, and culvert replacement works at W14 will only be undertaken during dry weather within the IFI specified period (July – September) watercourses with fisheries value, this will also be applied to W2 and the 12 no. watercourses with sub-optimal or no fisheries value, to protect downstream watercourses (Project Design Measure);
- The Class 1 and Class 2 watercourses at W1, W3 and W14 are characterized as small, first order streams, which have all been in some way altered by the existing landuse (i.e. agriculture or public road infrastructure);
- The limited extent of direct instream works potentially affecting flow, and the sensitive design of new/replaced crossing structures following from pre-planning consultation with IFI.
- The brief to temporary duration and reversibility of any effects.
- the implementation of comprehensive water quality Project Design protection measures which will minimize/avoid sediment laden runoff from entering watercourses;

Element 1: UWF Grid Connection – cumulative impact

The potential for cumulative effects relates to watercourses with fisheries value (i.e. Class 1 or Class 2). The potential for cumulative effects with the Other Elements of the Whole UWF Project relates to those watercourses with fisheries value which will be subject to instream works for both UWF Grid Connection and for Other Elements.

Neither Upperchurch Windfarm nor UWF Replacement Forestry nor UWF Other Activities will require any instream works, and UWF Grid Connection will not require any instream works/culvert replacement works on watercourses with fisheries value in the catchment areas of these Other Elements, therefore there is no potential

for effects via instream works. In relation to effects via sedimentation, as per Chapter 11 Water it has been evaluated that any sedimentation cause by UWF Replacement Forestry and UWF Other Activities will be negligible and consequently these project elements are not likely to contribute to any changes to flow regimes. In relation to Upperchurch Windfarm, due to the limited extent of Upperchurch Windfarm works in proximity to UWF Grid Connection works, the predominance of land drains (with no fisheries value) in the windfarm site and due to the implementation of the Sediment & Erosion Control Plan for the windfarm, it is evaluated that any cumulative impacts to flow regime (due to sedimentation) will be negligible.

UWF Related Works has limited extent and will not require instream works in the Bilboa SC 010 sub-catchment, and is not located in either the Newport SC 010 or Killeengarriff SC 010 sub-catchments, therefore cumulative impacts are not likely to occur in these sub-catchments. The potential for cumulative effects with UWF Related Works is limited to the Suir SC 030 sub-catchment, where construction works for both UWF Grid Connection and UWF Related Works will take place within the Clodiagh (Tipperary)_010 local surface water body. The UWF Grid Connection will not require any culvert replacement works on watercourses with fisheries value in the Suir_SC_030 sub-catchment, while UWF Related Works will involve instream works on five watercourses (with fisheries value) within the local surface water body. One watercourse (an unnamed tributary of the Clodiagh Upper) will be subject to instream works for UWF Related Works at WW22, c.20m upstream of the trenching works over an existing public road culvert (W65) for the 110kV UGC; however, there is no spatial or temporal overlap between these works. Furthermore, in the absence of instream works for the trench works for the proposed 110kV UGC works at W65 will not give rise to an alteration to the flow regime at this crossing point.

The spatial extent of any cumulative flow regime effects will occur within the footprint of the instream works or culvert replacement works, extending to immediately downstream where hydrological flow character may be altered locally due to bank or river bed modification or hydrological modification works; however, there is no cumulative overlap in physical or spatial extent with regard to the UWF Grid Connection with the UWF Related Works in this respect, and therefore cumulative changes to flow regime due to instream works are not expected. The cumulative magnitude is evaluated as Negligible.

Significance of the Impact: Imperceptible

Rationale for Impact Evaluation:

- The absence of instream works associated with both UWF Grid Connection and UWF Related Works in the same sub-catchment;
- The absence of instream works associated with Upperchurch Windfarm, UWF Replacement Forestry or UWF Other Activities;
- The majority of the watercourses have been in some way altered by the existing landuse (i.e. forestry or agriculture);
- The limited extent of direct instream works potentially affecting flow;
- The sensitive crossing designs to be implemented (Project Design);
- The brief to temporary duration and reversibility of any effects.

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project

Element 2: UWF Related Works

Impact Magnitude:

Works at, or in close proximity to, watercourses have potential to cause changes to flow regime through instream works and indirectly through sediment laden runoff into the watercourse.

There are 32 no. watercourse crossings required by the Internal Windfarm Cabling, Realigned Windfarm Roads and Haul Route Works. 31 no. of the total 32 no. crossings are located within the Suir_SC_030 sub-catchment and 1 no. in the Bilboa_SC_010 sub-catchment. Of these 31 no. crossings the Suir_SC_030 sub-catchment, instream works will be required at 25 no. of these locations - 5 No. of which were evaluated as having fisheries value. The 1 no. watercourse crossing in the Bilboa_SC_010 will not require any instream works.

The spatial extent of changes to flow regime effects will occur within the footprint of the instream works and also immediately downstream where hydrological flow character is altered due to bank or river bed modification.

The potential for indirect effects which would lead to sediment deposition at a scale to alter channel morphology or the flow regime are considered unlikely. Instream works in watercourses with fisheries value (5 No.) relate to 3 temporary crossings for Internal Windfarm Cabling trenching works and/or the installation of a temporary crossing structure, while the remaining 2 No. relate to the installation of permanent crossing structures. The spatial extent of any flow regime effects will occur within the footprint of the instream works, and also immediately downstream where hydrological flow character is altered due to bank or river bed modification. The magnitude of impact is negligible to slight.

Significance of the Impact: Slight

Rationale for Impact Evaluation:

- In-stream works will only be undertaken during the IFI specified period (July – September) for the Class 1 and Class 2 watercourses (Project Design Measure);
- The Class 1 and Class 2 watercourses where in-stream works are required are mostly small headwater streams;
- The majority of the watercourses have been in some way altered by the existing landuse (i.e. forestry or agriculture);
- The limited extent of direct instream works potentially affecting flow,
- The sensitive crossing designs developed following consultation with IFI.
- The brief to temporary duration and reversibility of any effects.

Element 3: UWF Replacement Forestry – N/A, evaluated as excluded, see Section 8.4.2.2.1.

Element 4: Upperchurch Windfarm

Impact Magnitude:

Construction works will take place in close proximity to 1 No. watercourses with fisheries value. No instream works are required at this location and this watercourse will be crossed using a clear span bridge, which will avoid the requirement for instream works and preclude direct modification to the flow regime. Changes to flow regime due to sedimentation from nearby construction works will be avoided by the implementation of the Sediment & Erosion Control Plan for the Upperchurch Windfarm during construction works.

Significance of the Impact: Slight

Rationale for Impact Evaluation:

- No instream works are required on the watercourse crossing within the Upperchurch Windfarm site
- Implementation of the Sediment & Erosion Control Plan

Element 5: UWF Other Activities – N/A, evaluated as excluded, see Section 8.4.2.2.1.

Evaluation of Other Cumulative Impacts – Changes to Flow Regime

Whole UWF Project Effect

Cumulative Impact Magnitude:

A potential decrease in aquatic habitat via changes to flow regime is identified at **8 No.** watercourse crossings where instream works or culvert replacement works are required within watercourses evaluated as having fisheries value – 3 no. for UWF Grid Connection and 5 no. for UWF Related Works.

The potential for indirect effects which would lead to sediment deposition at a scale to alter channel morphology or the flow regime are considered unlikely.

The spatial extent of such effects will occur within the footprint of the instream works, extending to immediately downstream where hydrological flow character may be altered due to bank or river bed modification, recognising that cumulative effects are widely dispersed between two regional catchments and within several sub-catchments.

Significance of the Cumulative Impact: Slight

Aquatic Habitats & Species	<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Instream works potentially affecting the flow regime are required at a limited number of locations; half of which require temporary works and half require permanent instream structures. • Implementation of Project Design Measures at all stream/culvert crossings, instream works and culvert replacement works locations to minimize effects • Implementation of the sensitive crossing designs developed following consultation with IFI. • the use of deflector plates, the equilibrated restoration of flow • Provision of reinstatement works at new permanent crossings/replaced existing culverts under supervision of a member of CIEEM and the Institute of Fisheries Management. .
Sensitive Aspect	<p>Note: There is no cumulative evaluation of <u>Other Projects or Activities</u> included in the table above, because all of the Other Projects or Activities were evaluated as excluded from this particular impact table (see Section 8.4.2.2.1).</p>
<div>Biodiversity</div> <div>Topic</div>	

8.4.4.3 Impact Evaluation Table: Disturbance or Displacement of Fish and Aquatic Species

Impact Description	
Project Life Cycle Stage:	Construction stage
<p><u>Impact Source:</u> instream works; culvert replacement works; operating machinery; excavation works; noise and human disturbance; drilling works; reinstatement works</p> <p><u>Cumulative Impact Source:</u> Instream works, operating machinery; excavation works; noise and human disturbance; reinstatement</p> <p><u>Impact Pathway:</u> direct contact; ground and air vibrations</p> <p><u>Impact Description:</u> Instream works and machinery operation within or in close proximity to any watercourse has the potential to directly disturb or displace salmonid fish and aquatic species within fish-bearing streams, or sensitive aquatic receptors such as white-clawed crayfish. Fish are likely to mobilise outside of their territories due to human disturbance, but will return once the disturbance effect diminishes (i.e. brief temporary effect). Aquatic invertebrates are less sensitive to disturbance and displacement arising from human activity and are scoped out from evaluation of disturbance/displacement effects. The extent of disturbance or displacement of aquatic ecological receptors, including fish, will be limited to the direct footprint of any instream works within watercourses which support anadromous Atlantic salmon and resident Brown trout populations – i.e. Class 1 or Class 2 watercourses. Disturbance or displacement effects will be brief to temporary in nature, lasting for the duration of works at or in close proximity to Class 1 or Class 2 watercourses.</p> <p><u>Impact Quality:</u> Negative</p>	
Evaluation the Subject Development Impact – Disturbance or Displacement of Fish and Aquatic Species	
Element 1: UWF Grid Connection – direct/indirect impact	
<p><u>Impact Magnitude:</u></p> <p>Of the 68 No. watercourse crossings required for the UWF Grid Connection, 16 No. have been evaluated to have fisheries value.</p> <p>Of these 16 No. watercourses, 2 No. watercourses at Mountphilips (W1, W3) will be subject of instream works and 1 No. watercourse along the 110kV UGC (W14) will be subject to culvert replacement works. Due to the location of works in the watercourse, the magnitude of disturbance effects at these locations is evaluated as Slight to Moderate in the local context.</p> <p>The remaining 13. No watercourses with fisheries value will <u>not</u> require either instream works or culvert replacement works. This includes the crossing of the Newport River at W7, the crossing of the Clare River at W36 and the crossing of the Bilboa River at W53 – where the 110kV UGC will be installed within the existing bridge structures. The installation of the 110kV UGC at the other watercourses with fisheries value (W5, W8, W9, W18, W33, W38, W39, W45, W49, W65) will not involve instream works or culvert replacement works as the cables will be installed either under or over the existing structures, therefore the magnitude of disturbance effects at these locations only relates to works in the public road pavements and is evaluated as Imperceptible to Slight. There may be occasional, very short duration disturbance to fish populations utilising habitat beneath the bridge; however, this will not result in displacement, loss of territory, or holding habitat.</p> <p>Disturbance may also occur at drilling locations (W8, W9) with the magnitude of disturbance impacts due to noise or vibration evaluated as Low. Similarly, due to the very short duration and nature of drilling works, these works will not result in displacement, loss of territory, or holding habitat. It should be noted that the drilling works at W8 and W9 are <u>not within the Lower River Shannon SAC boundary</u>.</p> <p>Proposed works including trench excavation, bridge works, culvert replacement, directional drilling, and resurfacing may give rise to disturbance to fish and aquatic biodiversity receptors present within Class 1 and</p>	

Class 2 watercourses over a period of c.1 – 2 days at each crossing location (and c. 2 to 5 days at drilling locations). The frequency of these disturbance effects is once only for cables trenches with or without new permanent culverts.

Significance of the Impact: Slight

Rationale for Impact Evaluation:

- In-stream works will only be undertaken during the IFI specified period (July – September) for the Class 1 and Class 2 watercourses to avoid sensitive salmonid instream migration and spawning periods (Project Design);
- The Class 1 and Class 2 watercourses W1, W3 and W14, where in-stream works are required, are small first order streams and therefore are likely to have relatively low flows during July to September;
- The in-stream works will not be undertaken without isolation of flow within the watercourse prior to the in-stream works commencing. All fish and Annex II listed species (White-clawed crayfish) will be translocated to suitable habitat in immediate proximity downstream, within the same watercourse. This will be completed under license and following standard protocols; (Project Design);
- The extent of disturbance or displacement of aquatic ecological receptors, including fish, will be limited to the direct footprint of instream works at W1 and W3 and any potential culvert replacement works at W14.
- The frequency of disturbance effects will be once for works at W1, W3 and W14,
- The duration of any disturbance impacts are considered with regard to fish species, protected Annex II aquatic invertebrates, and macroinvertebrate communities which support fish populations; such effects are evaluated to be temporary and reversible.

Element 1: UWF Grid Connection – cumulative impact

Cumulative Impact Magnitude:

The potential for cumulative effects relates to watercourses with fisheries value (i.e. Class 1 or Class 2).

The potential for cumulative effects with the Other Elements of the Whole UWF Project relates to those watercourses with fisheries value which will be subject to instream works or works in close proximity for both UWF Grid Connection and for Other Elements.

Neither UWF Replacement Forestry nor UWF Other Activities will require any instream works, and works in close proximity will be small in scale; it is therefore evaluated that the magnitude of any cumulative disturbance impacts will be negligible. Neither Upperchurch Windfarm nor UWF Related Works require instream works in the Bilboa SC 010 sub-catchment, and neither are located in the Newport SC 010 or Killeengarriff SC 010 sub-catchments. The potential for cumulative disturbance effects is limited to the Suir SC 030 sub-catchment, where both Upperchurch Windfarm and UWF Related Works will occur and will require instream works or works in close proximity to watercourses with fisheries value.

UWF Related Works will involve instream works on five watercourses (with fisheries value) in the Suir SC 030 sub-catchment, and Upperchurch Windfarm will involve works in close proximity (but no instream works) to one of these five watercourses (WW2) (during the construction of a clear span structure over this watercourse). The potential for UWF Grid Connection to cause disturbance/displacement effects in the Suir_SC_030 is limited to 1 No. watercourse (W65) with fisheries value, where works will only involve trenching works in the public road over an existing culvert, and no instream or culvert replacement works will be required at this location, neither will there be any temporal overlap between works at the UWF Grid Connection crossing locations and UWF Related Works instream works (Project Design), and furthermore UWF Grid Connection is not located close to WW2. This minimises the potential for cumulative disturbance or displacement effects caused by UWF Grid Connection. Therefore the magnitude of any cumulative effects will be Negligible.

Significance of the Impact: Imperceptible

Rationale for Impact Evaluation:

- The UWF Grid Connection will not require any culvert replacement works for watercourses of fisheries value in the Suir_SC_030 sub-catchment, and therefore any disturbance/displacement effects to fish in the Suir

catchment only relates to brief disturbance as a result of trenching works in the public road over 1 No. existing culvert;

- In-stream works or culvert replacement works for UWF Grid Connection will only be undertaken during dry weather within the IFI specified period (July – September) (Project Design Measure);
- In-stream works for UWF Related Works will only be undertaken during the IFI specified period (July – September) for the Class 1 and Class 2 watercourses to avoid sensitive salmonid instream migration and spawning periods (Project Design Measure);
- The in-stream works for either UWF Grid Connection or UWF Related Works will not be undertaken without isolation of flow within the watercourse prior to the in-stream works commencing (Project Design Measure). All fish and Annex II listed species (White-clawed crayfish) will be translocated to suitable habitat in immediate proximity downstream, within the same watercourse. This will be completed under license and following standard protocols;
- The frequency of disturbance effects will be once;

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project

Element 2: UWF Related Works

Impact Magnitude:

Of the 32 No. watercourse crossings within the UWF Related Works construction works area boundary, **6 No.** have been evaluated to have fisheries value. Of these 6 No. watercourses, 5 No. will be subject to instream works (the remaining 1 no. crossing WW2 will use a clear span structure (part of Upperchurch Windfarm works) with no requirement for instream works).

Any fish present are likely to be affected for between 1 – 2 days during instream works. The frequency of these disturbance effects is once for half of the locations (cables trenches with or without new permanent culverts) and twice for the remaining locations (temporary culverts; once for installation and once for removal).

Significance of the Impact: Slight

Rationale for Impact Evaluation:

- In-stream works will only be undertaken during the IFI specified period (July – September) for the Class 1 and Class 2 watercourses to avoid sensitive salmonid instream migration and spawning periods (Project Design Measure);
- The Class 1 and Class 2 watercourses where in-stream works are required are largely small headwater streams and therefore are likely to have relatively low flows during July to September (Project Design Measure);
- All fish will be translocated to suitable habitat in immediate proximity downstream, within the same watercourse prior to works (Project Design Measure);
- The in-stream works will not be undertaken without isolation of flow within the watercourse prior to the in-stream works commencing (Project Design Measure);
- The singular frequency of any disturbance events at half of the locations, and;
- The duration of any disturbance impacts are considered with regard to fish species, protected Annex II aquatic invertebrates, and macroinvertebrate communities which support fish populations; such effects are evaluated to be temporary and reversible.

Element 3: UWF Replacement Forestry – N/A, evaluated as excluded, see Section 8.4.2.2.1

Element 4: Upperchurch Windfarm

Impact Magnitude: None:

1 No. watercourse with fisheries value occurs within the footprint of the Upperchurch Windfarm site. This watercourse will be crossed using a clear span bridge, which will avoid the requirement for instream works. Disturbance effects are limited to the construction works for the new bridge along with the subsequent use of the new bridge throughout the construction period.

Significance of the Impact: Imperceptible

Aquatic Habitats & Species	<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> The Upperchurch Windfarm impacts were evaluated as being of high magnitude for aquatic species; however, it was identified that significant impacts were not probable/not likely post-mitigation. A clear-span bridge will be used at WW2 and therefore no in-stream works are required; disturbance will be limited to the immediate works area.
	<p>Element 5: UWF Other Activities – N/A, evaluated as excluded, see Section 8.4.2.2.1</p>
Sensitive Aspect	<p>Evaluation of Other Cumulative Impacts – Disturbance or Displacement of Fish and Aquatic Species</p>
	<p>Whole UWF Project Effect</p> <p><u>Cumulative Impact Magnitude:</u> Direct disturbance or displacement of aquatic ecological receptors, including fish, will be limited to the footprint of any instream works or culvert replacement works and directly upstream and downstream of all crossings, temporary and permanent instream works structures, bank-side works and construction works adjacent to watercourses and over existing crossing structures. The watercourse crossings are dispersed between two regional catchments and within several local sub-catchments. In total there are 8 No. instream works locations where instream works/culvert replacement works in fish-bearing streams are required – 3 no. for UWF Grid Connection and 5 no. for UWF Related Works, all of which will be sensitive to disturbance. However, at the local level in the context of individual receptors, temporary displacement will be limited to the affected stretch of watercourse, without cumulative population-level impacts at a watercourse or catchment level. Disturbance may also occur at 14 No. other watercourse crossing points due to works in close proximity – 13 no. for UWF Grid Connection and 1 no. for UWF Related Works/Upperchurch Windfarm.</p> <p>Significance of the Cumulative Impact: Slight</p> <p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> In-stream works will only be undertaken during the IFI specified period (July – September) for the Class 1 and Class 2 watercourses to avoid sensitive salmonid instream migration and spawning periods (Project Design Measure); The Class 1 and Class 2 watercourses where in-stream works are required are largely small headwater streams and therefore are likely to have relatively low flows during July to September (Project Design Measure); The in-stream works will not be undertaken without isolation of flow within the watercourse, and the translocation of fish, prior to the in-stream works commencing (Project Design Measure); The linear nature of the UWF Grid Connection 110kV UGC works over a large c.23km latitudinal distance; The low number of watercourses (8 No. in total) with fisheries value and subject to instream/culvert replacement works. The frequency of disturbance effects will be once for all 110kV UGC cables trenches at crossing locations with or without potential culvert replacement; The duration of any disturbance impacts are considered with regard to fish species, protected Annex II aquatic invertebrates, and macroinvertebrate communities which support fish populations; such effects are evaluated to be temporary and reversible.
Biodiversity	<p>Note: There is no cumulative evaluation of <u>Other Projects or Activities</u> included in the table above, because all of the Other Projects or Activities were evaluated as excluded from this particular impact table (see Section 8.4.2.2.1).</p>
Topic	

8.4.4.4 Impact Evaluation Table: Riparian habitat degradation

Impact Description	
Project Life Cycle Stage:	Construction stage
<p><u>Impact Source:</u> instream works, culvert replacement works; movement of soils and machinery; excavation works; reinstatement works</p> <p><u>Cumulative Impact Source:</u> Instream works; Movement of soils and machinery; Excavation works; Forestry felling; Reinstatement</p> <p><u>Impact Pathway:</u> Soils; Direct contact</p> <p><u>Impact Description:</u> The riparian corridor along a watercourse relates to the interface between the aquatic habitat, the bankside vegetation and terrestrial environment. An intact, semi-natural riparian zone has significant beneficial services in the protection of instream aquatic habitat quality, food/nutrient contributions, and temperature regulation. Existing riparian habitat quality within the study area is subject to afforestation and agricultural management, including clearance works, drainage maintenance and channelization works.</p> <p>The removal of, or damage to, riparian vegetation during instream works or excavation/ground clearance works in close proximity to any watercourse has the potential to impact on the quality of riparian habitats which in turn can affect watercourse morphology, shading, bank stability, and nutrient and sediment loading and result in indirect effects on aquatic species.</p> <p><u>Impact Quality:</u> Negative</p>	
Evaluation the Subject Development Impact – Riparian habitat degradation	
Element 1: UWF Grid Connection – direct/indirect impact	
<p><u>Impact Magnitude:</u></p> <p>Of the 68 No. watercourse crossings required for the UWF Grid Connection, 16 No. have been evaluated to have fisheries value. Of these 16 No. watercourses, 2 No. watercourses at Mountphilips (W1, W3) will be subject of instream works. Riparian habitat at the W1 and W3 crossing locations consists of vegetation clearance (as necessary: topsoil stripping, scrub removal) within the boundary of the temporary construction works area at the Mountphilips Substation site. As per Project Design, following works at W1 and W3, reinstatement works will be carried out which will include site-specific bank stabilisation measures using boulder armour or willow/brush bank protection; reinstatement of bank slope and character; creation of compound channels within the bank-width of the existing river corridor, where necessary and replanting of riparian buffer zones with suitable native species to manage flood flows and buffer run-off. The duration of any loss of well-structured riparian habitat impacts is evaluated with regard to the direct aquatic habitat services provided by the riparian zone (bank stabilization and erosion control, shading and temperature regulation), as well as the indirect inputs such as habitat for invertebrate food for fish and aquatic biota, reduction in light for aquatic flora, flood control and buffering effects in relation to run-off. The context of riparian habitat quality in the study area is considered, with regard to existing intensive agriculture affecting baseline conditions at the W1 and W3 crossing points; which has resulted in degraded cover due to bank side clearance works at the majority of crossing locations. Riparian habitat impacts will be reversible with reinstatement and will be temporary to short-term, limited to the construction phase and early operational stage until vegetation has re-established. The impact magnitude is Low.</p> <p>Culvert replacement works will be required at potential up to 13 no. existing watercourse crossings along the public road. Only 1 no. of these watercourse has fisheries value (W14), while 3 No. have sub-optimal fisheries value (Class 3), and at 9 no. have no fisheries value (Class 4). The replacement of the existing culvert is expected to have minimal effect on any adjacent riparian habitat degradation due to the works taking place from the road pavement above, and from either side of, the culvert, with works in the watercourse limited to the placement of sandbags and deflector plates, placement of the culvert and reinstatement works. Any reinstatement of the immediately adjacent culvert finishing works, will be of a negligible magnitude and are considered unlikely to result in any impact on adjacent riparian habitat.</p>	

Aquatic Habitats & Species	<p>At the remaining 13 No. watercourse crossings along the 110kV UGC route (which have fisheries value), including all required crossings of major rivers (Newport, Clare and Bilboa), the installation of the 110kV UGC will utilise existing crossing structures which do not require any instream works or culvert replacement works and the 110kV UGC will be installed within the existing bridge structures; or under or over the existing culverts, therefore there is no potential to damage or remove riparian habitat either side of the road corridor at these locations.</p> <p>At the remaining 39 watercourse crossings locations (all of which are along the 110kV UGC route on public roads), are at existing watercourse crossing locations which have low/none fisheries value, and the impact magnitude of riparian habitat degradation on aquatic ecological receptors is evaluated as negligible.</p>
	<p>Significance of the Impact: Slight to Moderate</p>
Sensitive Aspect	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> Riparian habitat impacts that may affect aquatic ecology and fisheries receptors are limited to 3 watercourse crossing locations within minor watercourses (W1, W3 and W14); The general context of the three watercourses with fisheries value affected (W1, W2, W14) comprises first order streams within managed agricultural lands within enclosed or fully tunneled riparian vegetation at the crossing points. ; Bank works will be required at watercourse crossing locations W1, W3, with minor clearance of riparian vegetation within the footprint of the potential culvert replacement at W14; Riparian habitat impacts are to be managed with project reinstatement measures (Project Design Measures) and is therefore reversible; Riparian habitat impacts will be limited to the construction phase, reversible, temporary and short-term and in line with baseline conditions and reversible with reinstatement. supervision of all instream works (i.e. W1, W2 (no fisheries value) and W3) and culvert replacement works (W14 and 12 no. other locations at watercourses with sub-optimal or no fisheries value) by a member of CIEEM and the Institute of Fisheries Management
	<p>Element 1: UWF Grid Connection – cumulative impact</p>
Biodiversity	<p><u>Cumulative Impact Magnitude:</u></p> <p>The potential for cumulative impacts relates to waterbodies within which instream works or culvert replacement work for UWF Grid Connection are expected to cause degradation of riparian habitat. For UWF Grid Connection, this only relates to W1, W3 and W14. No Other Element is located in close proximity to these watercourse crossings; therefore it is considered that there is no potential for cumulative impacts.</p>
	<p>Significance of the Impact: No Cumulative Impact</p>
	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> Riparian habitat impacts that may affect aquatic ecology and fisheries receptors are limited to discrete locations, with no overlap between UWF Grid Connection and the Other Elements, as instream works will take place in separate catchments.
	<p>Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project</p>
Topic	<p>Element 2: UWF Related Works</p>
	<p><u>Impact Magnitude:</u> Riparian habitat will be affected at 6 No. watercourse crossings identified as having fisheries value, out of a total of 32 watercourse crossings within the construction works area boundary associated with the UWF Related Works. The duration of any loss of well-structured riparian habitat impacts will be temporary to short-term, limited to the construction phase and early operational stage until vegetation has re-established.</p>
	<p><u>Significance of the Impact:</u> Slight to Moderate</p>
	<p><u>Rationale for Impact Evaluation:</u></p>

- Riparian habitat impacts that may affect aquatic ecology and fisheries receptors are limited to discrete locations at watercourse crossing locations within minor watercourses;
- The general context of the watercourses affected comprises managed agricultural lands and open uplands with poorly-developed riparian habitat, where well-developed riparian habitat occurs it comprises willow species which regenerate quickly;
- Riparian habitat impacts are to be managed with project reinstatement measures (Project Design Measures) and is therefore reversible;
- Riparian habitat impacts will be limited to the construction phase, reversible with reinstatement, temporary and short-term and in line with baseline conditions. Bank works are required at watercourse crossing locations; alternatives to riparian clearance are not available.

Element 3: UWF Replacement Forestry – *N/A, evaluated as excluded, see Section 8.4.2.2.1*

Element 4: Upperchurch Windfarm

Impact Magnitude:

As per the 2013 EIS, 1 No. watercourse with fisheries value will be crossed. The crossing method will utilise a clear span bridge design, which will avoid the requirement for instream works; however, works within the riparian zone will be required.

Significance of the Impact: Imperceptible

Rationale for Impact Evaluation:

- No requirement for instream works on fisheries value watercourses
- Limited scale of works within the riparian corridor at the 1 no. stream crossing
- All effects were evaluated as reversible and temporary in the short-term;
- Riparian habitats within the Upperchurch Windfarm which are directly affected by construction works were not identified as being of significant conservation value.

Element 5: UWF Other Activities – *N/A, evaluated as excluded, see Section 8.4.2.2.1*

Evaluation of Other Cumulative Impacts – Riparian habitat degradation

Whole UWF Project Effect

Cumulative Impact Magnitude:

Riparian habitat will be affected at **9 No.** watercourses with fisheries value which will be associated with bankside works, instream works or culvert replacement works – 3 no. for UWF Grid Connection and 6 no. for UWF Related Works (includes 1 no. for Upperchurch Windfarm). The cumulative impact magnitude of the whole project on the riparian and bankside habitats within the Shannon and Suir regional catchments is evaluated as Negligible to Low.

Significance of the Cumulative Impact: Slight to Moderate

Rationale for Cumulative Impact Evaluation:

- The instream works at W1 and W3, and culvert replacement works at W14 required for the 110kV UGC are all located within the River Shannon catchment, while the watercourse crossings required for the Upperchurch Windfarm and UWF Related Works are all located in the River Suir surface water catchment;
- The limited extent of instream works, within defined works areas will reduce the potential spatial area.
- The Class 1 and Class 2 watercourses where in-stream works are required are small, first order streams and therefore are likely to have relatively low flows during July to September which will enable easier access;
- Existing riparian habitat quality within the works areas, which comprise the baseline for evaluation of impact significance, is subject to afforestation and agricultural management, including clearance works, drainage maintenance and channelization works.
- Riparian habitat impacts will be limited to the construction phase, reversible, temporary and short-term and in line with baseline conditions. Bank works are required at stream crossing locations, limited to the direct footprint of the temporary works areas; alternatives to temporary riparian clearance are not available.

Aquatic Habitats & Species	<ul style="list-style-type: none"> • The duration of the impact are generally once-off, restricted to the period of works within or adjacent to the aquatic habitat; relate to individual watercourses and are thus not subject to sequential project effects. • Riparian habitat impacts are to be managed with project reinstatement measures (Project Design Measures) and is therefore reversible.
Sensitive Aspect	<p>Note: There is no cumulative evaluation of <u>Other Projects or Activities</u> included in the table above, because all of the Other Projects or Activities were evaluated as excluded from this particular impact table (see Section 8.4.2.2.1).</p>
Topic	Biodiversity

8.4.4.5 Impact Evaluation Table: Spread of Invasive Aquatic Species

Impact Description	
Project Life Cycle Stage:	Construction stage
<p><u>Impact Source:</u> instream works; culvert replacement works; excavation works, movement of soils and machinery</p> <p><u>Cumulative Impact Source:</u> Instream works; Excavation works, movement of soils and machinery</p> <p><u>Impact Pathway:</u> Surface water; Movement of soils and machinery</p> <p><u>Impact Description:</u> Invasive aquatic species include non-native, terrestrial invasive species such as Japanese knotweed or Himalayan balsam, invasive riparian vegetation (such as Japanese knotweed) and also fish and mobile invertebrate fauna (such as Asian clam, Signal crayfish, or non-native shrimp species).</p> <p>Aquatic invasive species may be introduced to unaffected catchments or spread within infected watercourses during the course of instream works or transported via excavated material by site machinery.</p> <p>Aquatic invasive species have the potential for significant ecosystem disturbance, disrupting the predator/prey balance or causing habitat disruption within aquatic systems. The spread of aquatic invasive species is not restricted in extent to the footprint of construction/instream works, but can be transported both upstream (mobile species and 3rd party transport) and downstream (hydrological transport) within a watercourse, potentially extending throughout the catchment.</p> <p>Non-native, invasive species potentially affecting the aquatic environment can also include terrestrial species which compromise bank integrity, riparian structural diversity and riparian invertebrate production contributing to habitat diversity and feeding inputs within the aquatic system. The incidence of a single, once-off introduction can have lasting, long-term ecosystem effects which can persist beyond any control measures for eradication. In this respect, spread of aquatic invasive species is evaluated as non-reversible; however the management of non-native, invasive species will be subject to a bespoke Invasive Species Management Plan which includes Best Practice biosecurity measures and supervision by an invasive species specialist, this will ensure that the spread of invasive species is avoided, and therefore it is considered that this impact is unlikely to occur.</p> <p><u>Impact Quality:</u> Negative</p>	
Evaluation the Subject Development Impact – Spread of Aquatic Invasive Species	
Element 1: UWF Grid Connection – direct/indirect impact	
<p><u>Impact Magnitude:</u></p> <p>There is the potential for introduction of non-native, invasive species at all 68 No. watercourse crossing points associated with the Mountphilips Substation site and 110kV UGC works due to the carrying out of works at or in close proximity to watercourses, and due to the movement of machinery over watercourses at existing road crossings; these include the transport, spread or introduction of terrestrial invasive species such as Japanese knotweed or Himalayan balsam, where these species occur widely within the study area. The potential for introduction of aquatic invasive species including mobile invertebrate fauna (such as Asian clam, Signal crayfish, or non-native shrimp species) or invasive riparian vegetation (such as Japanese knotweed), is limited to the instream works areas at W1, W2 and W3 at the Mountphilips Substation site, and at the 13 No. culvert replacement locations along the route of the 110kV UGC, where works may interact with the aquatic environment to facilitate introduction or spread of aquatic species.</p> <p>However the management of non-native, invasive species will be subject to a bespoke Invasive Species Management Plan for UWF Grid Connection which includes Best Practice biosecurity measures and supervision by an invasive species specialist, this will ensure that the spread of invasive species is avoided, and therefore it is considered that this impact is unlikely to occur.</p>	
<u>Significance of the Impact:</u> No Likely Impact	

Aquatic Habitats & Species Sensitive Aspect	<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> the implementation of the Invasive Species Management Plan and adherence to best practice Biosecurity Protocols (IFI, 2010) will ensure that there is no likelihood of this effect occurring.
	<p>Element 1: UWF Grid Connection – cumulative impact</p> <p>Cumulative Impact Magnitude: As evaluated above, there is potential for the spread of invasive species either along the riparian corridor, or within the aquatic environment, at the 68 No. watercourse crossing points associated with UWF Grid Connection due to the carrying out of works at or in close proximity to watercourses, and due to the movement of machinery over watercourses along the road verge, where existing infestations of negative species occur (e.g. Japanese knotweed, Himalayan balsam, etc.). The risk of the spread of invasive species is increased where additional works due to the Other Elements take place within a local catchment area, where these works (or traffic associated with these works) will occur within or in close proximity to watercourses. UWF Grid Connection works will occur in the same catchment as the UWF Related Works and the consented Upperchurch Windfarm in the <u>Bilboa SC 010</u> and the <u>Suir SC 030 sub-catchments</u>. The <u>Suir SC 030 sub-catchment</u> also has potential to be affected by works for UWF Replacement Forestry.</p> <p>In the <u>Bilboa SC 010</u>, works for UWF Grid Connection will take place at or in close proximity (20m) to 24 No. watercourses, with works at 1 No. watercourse within the Bilboa_SC_010 also required for UWF Related Works. No works in close proximity to watercourses are required for Upperchurch Windfarm. The cumulative impact magnitude for the Bilboa_SC_010 sub-catchment is evaluated as Medium.</p> <p>In the <u>Suir SC 030 sub-catchment</u>, works for UWF Grid Connection will take place at or in close proximity (20m) to 5 No. watercourses, with works at 26 No. watercourse within the sub-catchment also required for UWF Related Works and works close to 1 No. watercourse required for Upperchurch Windfarm. The cumulative impact magnitude for the Bilboa River catchment is evaluated as Low.</p> <p>In relation to Other Projects: it is expected that Best Practice biosecurity measures will be implemented for the potential Bunkimalta Windfarm (and consented grid connection) to prevent the spread of invasive species by those developments to ensure compliance with legislative requirements. While the consented Castlewaller Windfarm includes the implementation of Best Practice including a monitoring and evaluation Programme in respect of Japanese Knotweed to be implemented as part of its EMP, cumulative impact magnitude is evaluated as Low in the <u>Killeengarrif SC 010</u> and <u>Newport SC 010 sub-catchments</u>.</p> <p>However the management of non-native, invasive species at UWF Grid Connection works locations will be subject to a bespoke Invasive Species Management Plan for UWF Grid Connection which includes Best Practice biosecurity measures and supervision by an invasive species specialist, this will ensure that the spread of invasive species (by UWF Grid Connection) is avoided, and therefore it is considered that this cumulative impact is unlikely to occur.</p>
Biodiversity Topic	<p><u>Significance of the Impact: No Likely Cumulative Impact</u></p>
	<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> the implementation of the Invasive Species Management Plan for UWF Grid Connection and adherence to best practice Biosecurity Protocols (IFI, 2010) will ensure that there is no likelihood of this effect occurring. In addition, the construction of the other projects under consideration, will be obliged to meet its statutory requirements with regard to the introduction or spread of invasive species as set out in the European Communities (Birds and Natural Habitats) Regulations 2011, with specific reference to species listed in Annex III of those regulations.

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project**Element 2: UWF Related Works**Impact Magnitude:

There is the potential for introduction of non-native, invasive aquatic species at all 32 No. watercourse crossings associated with the UWF Related Works.

However the management of non-native, invasive species at UWF Related works locations will be subject to a bespoke Invasive Species Management Plan for UWF Related Works which includes Best Practice biosecurity measures and supervision, this will ensure that the spread of invasive species is avoided, and therefore it is considered that this cumulative impact is unlikely to occur.

Significance of the Impact: No Likely Impact

Rationale for Impact Evaluation:

- The spread of aquatic invasive species is not restricted in extent to the footprint of the works, but can be transported both upstream and downstream within a watercourse. There is the potential for catchment-wide impacts once an introduction has occurred. The incidence of a single, once-off introduction can have lasting, long-term ecosystem effects which can persist beyond any control measures for eradication.
- In this respect, the spread of aquatic invasive species is evaluated as non-reversible, however
- the implementation of the Invasive Species Management Plan, including best practice biosecurity protocols (IFI, 2010) will ensure that there is no likelihood of this effect occurring.

Element 3: UWF Replacement Forestry – N/A, evaluated as excluded, see Section 8.4.2.2.1

Element 4: Upperchurch WindfarmImpact Magnitude:

There is the potential for introduction of non-native, invasive aquatic species at the 1 No. watercourse crossing associated with the Upperchurch Windfarm works.

However the management of non-native, invasive species at Upperchurch Windfarm locations will be subject to Best Practice biosecurity measures and invasive species control, along with supervision by an invasive species specialist, as provided in the UWF Grid Connection Invasive Species Management Plan, this will ensure that the spread of invasive species is avoided, and therefore it is considered that this impact is unlikely to occur.

Significance of the Impact: No Likely Impact

Rationale for Impact Evaluation:

- Best practice biosecurity and invasive species control measures will be implemented during construction works to prevent the spread of invasive species, which will meet regulatory requirements.

Element 5: UWF Other Activities – N/A, evaluated as excluded, see Section 8.4.2.2.1

Cumulative Information: Individual Evaluations of Other Projects or Activities**Other Projects: Newport Town Park, Castlewaller Windfarm, Bunkimalta Windfarm**Impact Magnitude:

The potential for development works for Newport Town Park to spread invasive species is limited due to the absence of instream works or works within 5m of the river. In addition this project includes measures for control and management of non-native invasive species and thus will not interact cumulatively with the UWF Grid Connection proposal.

In relation to Castlewaller Windfarm, Japanese Knotweed and Rhododendron (terrestrial invasive species) were identified in studies to inform the original application. In the Ecological Management Plan submitted to the competent authority as part of the RFI response, and adherence to the eradication of Knotweed and Best Practice stipulated by Invasive Species Ireland is described, as part of measures to be taken prior to construction, during the construction stage and during the operation and maintenance stage. It is assumed that the grid

Aquatic Habitats & Species	Sensitive Aspect	connection element (which may be proposed at a future date), will include best practice control measures to prevent the spread of invasive species, to meet regulatory requirements. In relation to Bunkimalta Windfarm, no Aquatic invasive species were described. In relation to Bunkimalta, no Invasive species were identified in baseline studies to inform the 2013 EIS, however it is assumed that any future planning application for this windfarm will include upto date information on the occurrence of invasive species and will incorporate Best Practice control measures to avoid their spread.
		<u>Significance of the Impact:</u> Not Significant (residual)
		<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none">• The implementation of invasive species control measures as consented (Newport Town Park, Castlewaller Windfarm)• it is assumed that the Castlewaller grid connection and Bunkimalta Windfarm (both/either of which may be proposed at a future date), will include best practice control measures to prevent the spread of invasive species, to meet regulatory requirements.• The construction of both Castlewaller and Bunkimalta windfarms and their associated elements, will be obliged to meet the requirements set out in the Ecological Management Plan, in addition to its statutory requirements with regard to the introduction or spread of invasive species as set out in the birds and habitats regulations- with specific reference to species listed in Annex III of those regulations.
Evaluation of Other Cumulative Impacts – Spread of Aquatic Invasive Species		
Whole UWF Project Effect		
<u>Cumulative Impact Magnitude:</u> There is the potential for introduction of non-native, invasive aquatic species at 100 No. watercourse crossing works locations, spread over 2 regional catchments, associated with the Whole UWF Project – 68 no. for UWF Grid Connection and 32 no. for UWF Related Works (includes 1 no. for Upperchurch Windfarm). The impact magnitude is evaluated as Medium due to the presence of invasive species throughout the study area, established as the baseline condition and thus contributing to the risk of spread where infestations from one location to another. However the management of non-native, invasive species will be subject to a bespoke Invasive Species Management Plans for both UWF Grid Connection (which includes for Upperchurch Windfarm) and UWF Related Works which includes Best Practice biosecurity measures and supervision by an invasive species specialist, this will ensure that the spread of invasive species is avoided, and therefore it is considered that this impact is unlikely to occur.		
<u>Significance of the Cumulative Impact:</u> No Likely Impact		
<u>Rationale for Cumulative Impact Evaluation:</u> <ul style="list-style-type: none">• The spread of aquatic invasive species is not restricted in extent to the footprint of the works, but can be transported both upstream and downstream within a watercourse. There is the potential for catchment-wide impacts once an introduction has occurred. The incidence of a single, once-off introduction can have lasting, long-term ecosystem effects which can persist beyond any control measures for eradication.• In this respect, the spread of aquatic invasive species are evaluated as non-reversible, however• The implementation of the Invasive Species Management Plan for UWF Grid Connection and UWF Related Works, including best practice Biosecurity Protocols (IFI, 2010), and the implementation of best practice measures for Upperchurch Windfarm will ensure that there is no likelihood of this effect occurring.		
Biodiversity	Topic	All Elements of the Whole UWF Project with Other Projects or Activities
		<u>Cumulative Impact Magnitude:</u> There is the potential for introduction of non-native, invasive aquatic species at 100 No. watercourse crossing works locations, spread over 2 hydrometric areas, associated with the Whole UWF Project. The impact magnitude is evaluated as Medium due to the presence of invasive species throughout the study area,

established as the baseline condition and thus contributing to the risk of spread where infestations from one location to another.

With regard to Other Projects, it is considered that while both projects have potential to spread invasive species, that it is not likely to occur due to the expected implementation and adherence to Best Practice in the eradication and treatment of invasive species to ensure compliance with legislative requirements .

Significance of the Cumulative Impact: No Likely Impact

Rationale for Cumulative Impact Evaluation:

- The implementation of the Invasive Species Management Plan for UWF Grid Connection and Upperchurch Windfarm, and UWF Related Works, including best practice biosecurity protocols (IFI, 2010), and supervision by an invasive species specialist, will ensure that there is no likelihood of this effect occurring.
- In addition, the construction of the other projects under consideration, will be obliged to meet its statutory requirements with regard to the introduction or spread of invasive species as set out in the European Communities (Birds and Natural Habitats) Regulations 2011, with specific reference to species listed in Annex III of those regulations.

8.4.4.6 Description and Rationale for Excluded (scoped out) Impacts

The source-pathway-receptor links and the rationale for impacts excluded from the Impact Evaluation Table sections are described in Table 8-36 below.

Table 8-36: Description and Rationale for Excluded Impacts to Aquatic Habitats & Species

Key: 1: UWF Grid Connection; 2: UWF Related Works; 3: UWF Replacement Forestry; 4: Upperchurch Windfarm; 5: UWF Other Activities

Source(s) of Impacts	Project Element	Pathway(s)	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
Construction Stage				
Storage of Brash, tree felling, hedgerow trimming, vegetation clearance	2,4,5	Nitrogen Deposition	Aquatic Habitat Degradation (as a result of increased nutrification/nitrogen deposition) such as temporary oxygen shortages.	Rationale for Excluding: No potential for impact/Neutral Impact No felling for UWF Grid Connection, or UWF Replacement Forestry. In relation to UWF Related Works and the Consented Upperchurch Windfarm, the scale of forestry felling is insufficient to result in additive nitrogen deposition effects – any effects will be Neutral.
Operational Stage				
Rationale for Excluding: Access routes and permanent watercourse crossing structures will be in place. Operational Works will be minimal, with no works to watercourse crossing structures expected.				
Decommissioning Stage				
Rationale for Excluding: UWF Related Works, Upperchurch Windfarm: Access routes and permanent watercourse crossing structures will be in place. Works will be subject to best practice management measures. UWF Grid Connection will not be decommissioned.				

8.4.5 Mitigation Measures for Impacts to Aquatic Habitats & Species

Mitigation measures were incorporated into the project design including the Project Design Measures. No additional mitigation measures are required as the topic authors conclude that **significant impacts are not likely to occur to Aquatic Habitats & Species** as a consequence of the UWF Grid Connection.

8.4.6 Evaluation of Residual Impacts to Aquatic Habitats & Species

Residual Impacts are the final or intended effects that will occur after mitigation measures have been put into place. No additional mitigation measures are required and thus the Residual Impact is the same as the Impact set out in Impact Evaluation Table sections for Aquatic Habitats & Species above (Section 8.4.4) – i.e. **no significant adverse impacts**.

8.4.7 UWF Grd Connection Environmental Management Plan

The Project Design measures will be implemented by the Project Manager and the main Contractor during the construction stage, under the **Environmental Management Plan for the UWF Grid Connection (EMP)**. The EMP is appended to this EIA Report as **Volume D**.

The EMP will be an important contract document for the main construction contractor (Contractor) who will be contractually obliged to comply with the EMP. An Environmental Clerk of Works will be appointed, who will be independent of the construction Contractor, and it will be the responsibility of the Environmental Clerk of Works to monitor the compliance of the Contractor with the EMP through liaising with the Construction Site Manager and the Project Manager, monitoring construction works on a daily basis and by carrying out regular audits on EMP compliance. The Environmental Clerk of Works will be resourced to employ a team of environmental specialists including a Site Ecologist, Site Hydrologist and an Invasive Species Specialist.

8.4.7.1 Surface Water Management Plan

The UWF Grid Connection Environmental Management Plan will include a bespoke Surface Water Management Plan. Water quality and the existing drainage regime will be managed under the Surface Water Management Plan (SWMP) which will be implemented by the appointed Contractor during the construction stage of the UWF Grid Connection. This Surface Water Management Plan (SWMP) provides the water management framework for the appointed Contractors and Sub-contractors and it incorporates the mitigating principles described in this EIAR (particularly in Chapter 11 – Water) to ensure that construction works are carried out with minimal impact on the surface water environment and in accordance with the mitigation measures and project design commitments made in the EIAR.

8.4.7.2 Invasive Species Management Plan

The UWF Grid Connection Environmental Management Plan will include a bespoke Invasive Species Management Plan developed to prevent/avoid the introduction and/or spread of invasive species. The Invasive Species Management Plan includes Best Practice biosecurity measures and describes supervision by an Invasive Species Specialist during the construction phase.

8.4.7.3 Application of Best Practice for Aquatic Habitats & Species

The UWF Grid Connection Environmental Management Plan also includes Best Practice Measures (BPM), which although not part of the Project Design for the UWF Grid Connection, will be employed to afford further protection to the Environment.

The following Best Practice Measures have been developed, for the protection of **Aquatic Habitats & Species**, by the authors of this topic chapter, using industry best practice:

GC-BPM-01	Best Practice Measures for Protection of Surface Water Quality and Watercourse Morphology during instream works at Mountphilips Substation site
GC-BPM-02	Best Practice Measures for Protection of Surface Water Quality and Watercourse Morphology during replacement of existing culverts along the 110kV UGC outside Mountphilips Substation site
GC-BPM-03	Best Practice Design of New Permanent Watercourse Crossing Structures and Existing Culvert Replacements to Prevent Flood Risk
GC-BPM-04	Best Practice Surface Water Quality Protection Measures For Site Runoff During The Mountphilips Substation Site Construction Works
GC-BPM-05	Best Practice Measures to Protect Surface Water and Groundwater Quality during use of Cement Based Compounds
GC-BPM-06	Best Practice Measures To Protect Surface Water And Groundwater Quality During Storage And Handling Of Fuels, Oils And Chemicals
GC-BPM-07	Best Practice Measures to Protect Surface Water Quality During Storage of Overburden at the Mountphilips Substation Site

Aquatic Habitats & Species

Sensitive Aspect

Biodiversity

Topic

8.4.8 Summary of Impacts to Aquatic Habitats & Species

A summary of the Impact to Aquatic Habitats & Species is presented in Table 8-37.

Table 8-37: Summary of the impacts to Aquatic Habitats & Species

Impact to Aquatic Habitats & Species	Decrease in instream aquatic habitat quality	Changes to flow regime	Disturbance or displacement	Riparian habitat degradation	Spread of aquatic invasive species
Evaluation Impact Table	Section 8.4.4.1	Section 8.4.4.2	Section 8.4.4.3	Section 8.4.4.4	Section 8.4.4.5
Project Life-Cycle Stage	Construction	Construction	Construction	Construction	Construction
<u>UWF Grid Connection</u> <i>Direct/indirect impact</i>	Slight to Moderate at new or replacement culverts (3 No. locations) Slight at Sub-Catchment level	Slight	Slight	Slight to Moderate	No Likely Impact
<u>UWF Grid Connection</u> <i>Cumulative impacts</i>	Imperceptible to Moderate in the local context	Imperceptible	Imperceptible	No Cumulative Impact	No Likely Cumulative Impact
Element 2: UWF Related Works	Imperceptible to Moderate	Slight	Slight to Moderate	Slight to Moderate	No Likely Impact
Element 3: UWF Replacement Forestry	No Potential for Impacts - Evaluated as Excluded, see Section 8.4.2.2.1				
Element 4: Upperchurch Windfarm	Imperceptible	Slight	Imperceptible	Imperceptible	No Likely Impact
Element 5: UWF Other Activities	No Potential for Impacts - Evaluated as Excluded, see Section 8.4.2.2.1				
<u>Cumulative Impacts:</u>					
All Elements of the Whole UWF Project	Imperceptible to Moderate in the local context	Slight	Slight	Slight to Moderate	No Likely Impact
All Elements of the Whole UWF Project <i>cumulatively with</i> Other Projects or Activities Newport Town Park Castlewaller Windfarm Bunkimalta Windfarm	Slight	N/A - evaluated as excluded, See Section 8.4.2.2.1			No Likely Impact

Aquatic Habitats & Species
Sensitive Aspect

The greyed out boxes in the above summary table relate to the cumulative information for the Other Elements of the Whole UWF Project, which are included to show the totality of the project.

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8.5 Sensitive Aspect No.4: Terrestrial Habitats

This Section provides a description and evaluation of the Sensitive Aspect - Terrestrial Habitats.

Donncha O Cathain, Chris Cullen and Howard Williams were the main authors of this Section. Please see Sources of Information (Section 8.1.7) and Methodology (Section 8.1.8) for details of the desktop and fieldwork surveys which have informed the evaluation of Terrestrial Habitats.

Terrestrial Habitats

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8.5.1 BASELINE CHARACTERISTICS of Terrestrial Habitats

8.5.1.1 STUDY AREA for Terrestrial Habitats

The study area for Terrestrial Habitats in relation to the UWF Grid Connection is described in Table 8-38 and illustrated on **Figure GC 8.5: UWF Grid Connection Study Area for Terrestrial Habitats (Overview and Maps 1 to 4)** (Volume C3 EIAR Figures).

Table 8-38: UWF Grid Connection Study Area for Terrestrial Habitats

Study Area for Terrestrial Habitats	Justification for the Study Area Extents
Construction works area boundary plus 50m in all directions	Professional judgement and as per Best Practice (CIEEM, 2018)

8.5.1.2 Baseline Context and Character of Terrestrial Habitats in the UWF Related Works Study Area

Terrestrial Habitats within the UWF Grid Connection Study Area comprise a mosaic of agricultural grassland, commercial forestry plantations, broadleaved woodland, peatlands, hedgerows, wet grassland, private roads and public roads. Due to the location of UWF Grid Connection mainly along existing public roads within an agricultural setting, for the most part the landscape is dominated by agricultural grassland and other habitats reflective of this e.g. roadside hedgerows, treelines and earth banks, with numerous dwellings, farm buildings and associated gardens, amenity grassland, hedges and lawns.

Within the construction works area, the Public Road and other built surfaces (BL3) accounts for 24.2ha or 82% of the habitat.

Thirty-seven habitat types (including fifteen types of habitat mosaic) comprising 306.9Ha were recorded along the survey corridor (i.e. within 50m of the construction works areas). The dominant habitats present are buildings and artificial surfaces (BL3) (15%), agricultural grassland (GA1) (36%), wet grassland (GS4) (13%), and a mosaic of built land and amenity grassland (BL3/GA2) (10.5%) which together make up 75% of all habitats present. Conifer plantation (WD4) and Scrub (WS1) have the highest cover of the remaining habitats by area at 8.8%, and 3.5% of the total area respectively. The remaining 13.1% of habitats include mixed/broadleaf/conifer woodland (WD2) (1.9%), riparian woodland (WS5) (1.6%), amenity grassland (GA2) (1.5%) and WS1/GS4 (1%) and a mixture of 27 habitats or habitats mosaics each less than 1% of the overall total within the study area.

Habitats of Local Importance (Higher Value) include buildings and artificial surfaces (BL3) (based on possible importance of certain roadside buildings to bats/Barn Owl), scrub (WS1) (importance to local diversity), mixed broadleaf woodland (WD1) (based on importance to birds/mammals), mixed broadleaf/conifer woodland (WD2) (based on importance to birds and mammals), hedgerows (WL1) (level of maturity and value to birds and mammals), tree lines (WL2) (local importance to birds and mammals), and riparian woodland (WN5) (Importance to local diversity and hydrological function) and.

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Terrestrial Habitats	<p>Six linear habitat types comprising Tree lines (WL2), Hedgerows (WL1), Earthen banks (BL2), Drainage ditches (FW4), Depositing/lowland rivers (FW2), and Stone walls (BL1) were also recorded. The total length of linear hedgerow and treelines (or mosaics of both) present within the study area along the survey corridor comprises 39.2km.</p> <p>Terrestrial Habitats within 50m of UWF Grid Connection are illustrated on Figure GC 8.5.</p> <p>No <u>Flora Protection Order (FPO) species</u> are present within, or in close proximity to, construction works areas.</p> <p><u>Non-native invasive plant species</u> listed on the Third Schedule subject to restrictions under Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011) are herein described. Rhododendron (<i>Rhododendron ponticum</i>) is present at 25 locations. Japanese knotweed or Himalayan knotweed infestations were recorded at 17 locations during habitat assessments on the UWF Grid Connection. Giant hogweed (<i>Heracleum mantegazzianum</i>) was recorded at one location. Locations of non-native invasive plant species are illustrated in Figure GC 8.5.</p>
	<p>Cherry laurel (<i>Prunus laurocerasus</i>) was recorded at 12 locations, this species, while not listed on the Third Schedule subject to restrictions under Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011) is listed as a 'High impact' invasive species by O' Flynn <i>et al.</i> (2014). 'Medium impact' non-native invasive plant species (Kelly <i>et al.</i>, 2013, O' Flynn <i>et al.</i>, 2014) recorded included Sycamore (<i>Acer pseudoplanatus</i>), Pheasant berry (<i>Leycesteria formosa</i>), and Cotoneaster (<i>Cotoneaster spp.</i>). Other non-native plant species of lesser significance were also recorded, these included Box honeysuckle (<i>Lonicera nitida</i>), Snowberry (<i>Symphoricarpus albus</i>), Montbretia (<i>Crocsmia x crocosmiflora</i>) and Bamboo (Subfamily <i>Bambusoideae</i>).</p> <p>Further details on terrestrial habitats surveys are included in Appendix 8.3: Terrestrial Habitats Survey Results & Impact Calculations in Volume C4 EIAR Appendices.</p>
	<p>8.5.1.3 Importance of Terrestrial Habitats</p>
	<p>International importance: Habitats of international conservation importance occur at four locations where the UWF Grid Connection passes through the boundary of the Lower River Shannon SAC. These rivers and riparian habitats support habitats and species listed on Annex I and II, respectively, of the EU Habitats Directive 92/43/EEC which are listed as qualifying interests for the Lower River Shannon SAC.</p> <p>Habitats of National Importance include: Newport River, Clare River, Bilboa River, and Upland/Eroding Streams habitats which are hydrologically connected to the Lower River Shannon SAC, comprising high and good ecological status surface water habitats, and supporting nationally important fisheries and protected fauna.</p> <p>Habitats of Local Importance (Higher Value) occurring within the survey corridor for the proposed development include wet grassland (GS4), scrub (WS1), mixed broadleaf woodland (WD1), mixed broadleaf/conifer woodland (WD2), hedgerows (WL1), and tree lines (WL2). A small area of Oak-birch-holly woodland (WN1) at Scraggeen was found to correspond to the EU Habitats Directive 92/43/EEC habitat, 'Old sessile oak woods with Ilex and Blechnum, in the British Isles (91A0)', and is therefore evaluated as being of County Importance.</p>
Biodiversity Topic	<p>A small area of Wet heath/Wet grassland (HH3/GS4) habitat mosaic was found at Loughbrack Townland; wet heath corresponds to EU Habitats Directive 92/43/EEC Annex I habitat 'Northern Atlantic wet heaths with Erica tetralix (4010)', however as the area of habitat in question was very limited in extent and degraded through grazing and drainage it is considered to be of Local Importance (Higher Value). An area of Lowland blanket bog (PB3) was found at Reardnogy Beg, this habitat corresponds to EU Habitats Directive 92/43/EEC Annex I habitat to 'Blanket bogs (7150)'; however, this area of bog was found to be in poor condition due to evidence of peat harvesting and substantial colonization by invasive Rhododendron.</p>

With the exception of 0.05ha of Wet Grassland (GS4) at Mountphilips Substation site, none of the above described habitats are located within the works area and hence will not be directly impacted by the UWF Grid Connection. It is noted that the Mountphilips Substation site is predominantly (1.7ha) Improved Agricultural Grassland (GS1), which is of Local Importance (Lower Value).

Due to the location of sections of the UWF Grid Connection 110kV UGC within an SPA designated for Hen Harrier, a number of habitats along the route of the 110kV UGC support the structure and function of the SPA. This primarily includes foraging habitats in the open landscape (grassland, heath and bog) habitats. See Sensitive Aspect Hen Harrier Section 8.6.1 for further information.

8.5.1.4 Sensitivity of Terrestrial Habitats

Terrestrial Habitats are sensitive to direct land take, pollution, and environmental changes resulting from modification such as increased drainage. Groundwater dependant habitats such as bog and peatland habitats may be sensitive to changes in groundwater regimes or changes in ground water quality. The diversity of habitats is particularly sensitive to encroachment from invasive species which may out-compete local native species. Habitats are also sensitive to Human activities such as burning and recreational use.

8.5.1.5 Trends in the Baseline Environment (the 'Do-Nothing' scenario)

The present survey forms a baseline classification of habitats on or near the subject development. No previous habitat information at a suitable scale is available from which trends can be identified or changes evaluated.

Reporting on trends with regard to protected habitats and species under the EU Habitats Directive is provided to the EU under Article 17 of said directive. Overall trends for some Annex quality habitats present within the receiving environment such as Wet Heath are included therein and evaluated nationally (stable in the case of Wet Heath for example). Availability of trends in respect of locally important habitats is limited (Browne, 2007). We would note that the onsite Wet Heath was subject to cattle grazing at the time of the windfarm EIS (2013), and this is still the case. Likewise, in respect of Upland Blanket Bog, the windfarm EIS has previously identified degradation from peat extraction, land reclamation, conifer planting, grazing and drainage. The latter 2 pressures are still present and therefore represent an ongoing trend. This trend is expected to continue the degradation of these particular habitat types regardless of the proposed development.

As such, a scenario in which the Subject Development does not take place would result in a continuation of current trends relating to habitats within the study area.

8.5.1.6 Receiving Environment (the Baseline + Trends)

It is assumed in this report that the baseline environment in relation to Terrestrial Habitats, as identified above, will be the receiving environment at the time of construction and during the operational phase.

8.5.2 CUMULATIVE INFORMATION - Cumulative Projects & Baseline Characteristics

8.5.2.1 Cumulative Evaluation Study Areas

8.5.2.1.1 UWF Grid Connection Cumulative Evaluation Study Area

The UWF Grid Connection was evaluated for cumulative effects with other projects and the study area is set out in the table below.

UWF Grid Connection Cumulative Evaluation Study Area for Terrestrial Habitats	Justification for the Study Area Extents
UWF Grid Connection Construction works area boundary plus 50m in all directions	The study area is sufficient to identify those Other Elements (or Other Projects or Activities) which may cause cumulative effects to Terrestrial Habitats with UWF Grid Connection.

The study is illustrated on [Figure CE 8.5: UWF Grid Connection Cumulative Evaluation Study Area for Terrestrial Habitats \(Maps 1 to 4\)](#).

8.5.2.1.2 Whole Project Cumulative Evaluation Study Area

UWF Grid Connection is part of a whole project which comprises the following Other Elements; Element 2: UWF Related Works, Element 3: UWF Replacement Forestry, Element 4: Upperchurch Windfarm (UWF), and Element 5: UWF Other Activities. The Subject Development, UWF Grid Connection is Element 1. All five elements are collectively referred to as the Whole UWF Project in this EIA Report.

The Other Elements must be considered because UWF Grid Connection is part of a whole project. Therefore, the cumulative information and evaluations for the Other Elements of the Whole UWF Project are included in order to present the totality of the project.

A description of these Other Elements is included in this EIA Report at [Appendices 5.3, 5.4, 5.5 and 5.6](#), in [Volume C4 EIAR Appendices](#). Scoping of these Other Elements is presented in [Section 8.5.2.2.1](#) below.

The Whole Project Cumulative Evaluation Study Area comprises of the UWF Grid Connection Study Area along with the study areas for Other Elements which are described in Table 8-39 and illustrated on [Figure WP 8.5: Whole Project Study Area for Terrestrial Habitats \(Overview and Maps 1 to 4\)](#) (Volume C3 EIAR Figures).

Table 8-39: Whole Project Cumulative Evaluation Study Area for Terrestrial Habitats

Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
Element 1: UWF Grid Connection	Construction works area boundary/afforestation plus 50m in all directions	Professional judgement and as per Best Practice (CIEEM, 2018)
Element 2: UWF Related Works		
Element 3: UWF Replacement Forestry		
Element 4: Upperchurch Windfarm (UWF)		
Element 5: UWF Other Activities		

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8.5.2.2 Scoping of Other Elements, Other Projects or Activities & for Potential for Impacts

The evaluation of cumulative impacts to Terrestrial Habitats also considered Other Projects or Activities. A scoping exercise was carried out to determine which projects or activities, if any, have potential to cause cumulative effects to Terrestrial Habitats with either the UWF Grid Connection or the Other Elements of the Whole UWF Project and therefore should be brought forward for evaluation in this topic chapter. A brief overview of the Other Projects or Activities and the scoping exercise by the topic authors is included in [Appendix 2.1: Scoping of Other Projects or Activities for Cumulative Evaluations \(Section A2.1.4.7\)](#).

The results of this scoping exercise are that: it is evaluated that no Other Projects or Activities are likely to cause cumulative effects with either the UWF Grid Connection or the Other Elements of the Whole UWF Project, and therefore no Other Projects or Activities are scoped in for evaluation of cumulative effects to Terrestrial Habitats.

8.5.2.2.1 Potential for Impacts to Terrestrial Habitats

An evaluation was carried out by the topic authors of the likelihood for the Other Elements of the Whole UWF Project to cause cumulative effects to the Sensitive Aspect Terrestrial Habitats. The results of this evaluation are included in Table 8-40.

The location of, and study area boundary associated with, the Other Elements which are included for cumulative evaluation is illustrated on [Figure WP 8.5](#). The baseline character of the areas around these Elements is described in Section 8.5.2.3.

Table 8-40: Results of the Evaluation of the Other Elements of the Whole UWF Project

Other Element of the Whole UWF Project	
Element 2: UWF Related Works	<u>Included</u> for the evaluation of cumulative effects
Element 3: UWF Replacement Forestry	<p><u>Evaluated as excluded:</u> Neutral effect/No potential for effects due to: Seven habitat types comprising 11.6Ha were recorded within the UWF Replacement Forestry study area. The dominant habitats present are improved agricultural grassland (GA1), Wet Grassland (GS4) and conifer plantation (WD4) which together make up 10.4Ha or 89% of all habitats present within the UWF Replacement Forestry study area. Scrub (WS1) and built land and artificial surfaces (BL3) make up the majority of the remaining habitats (9%). Linear habitats are primarily composed of spoil and bare ground (ED2), tree lines (WL2), hedgerows (WL1) and earth banks (BL2). The total area of linear hedgerow and treelines (or mosaics of both), comprises 134m within the UWF Replacement Forestry site. No non-native invasive plant species were recorded. Terrestrial Habitats of Local Importance, Higher Value within the UWF Replacement Forestry site are wet grassland (GS4), broadleaf woodland (WD1) and Scrub (WS1). Linear hedgerow and tree lines (or mosaics of both) within the Replacement Forestry site are evaluated as of Local Importance, Higher Value.</p> <ul style="list-style-type: none"> • Neutral habitat loss due to the small extent of Wet Grassland (Local Importance (Higher Value) which will be planted with native woodland, which will have at least as high an importance rating, • No potential for hedgerow severance impacts as zero hedgerow is to be removed, • No potential for loss of High Nature Value trees, as no mature trees will be removed, • No potential for cross factor habitat degradation effects, as effects to Local Surface Water Bodies will not be greater than imperceptible, and no likely effects to Local Groundwater Bodies is expected.

Terrestrial Habitats		<ul style="list-style-type: none"> • No direct loss of Flora Protection Order species, as none were recorded at the site, • No fragmentation is expected from UWF Replacement Forestry with positive effects likely to accrue, • No likely spread of invasive species as none recorded within the afforestation site. Notwithstanding this point a comprehensive Invasive Species Management Plan has been developed and will be implemented by all personnel at the UWF Replacement Forestry site during its planting and growth stages.
	Element 4: Upperchurch Windfarm (UWF)	<u>Included</u> for the evaluation of cumulative effects
	Element 5: UWF Other Activities	<u>Included</u> for the evaluation of cumulative effects

8.5.2.3 Cumulative Information: Baseline Characteristics – Context & Character

8.5.2.3.1 Element 2: UWF Related Works

Terrestrial Habitats within the UWF Related Works Study Area comprise a mosaic of agricultural grassland, commercial forestry plantations, hedgerows, wet grassland, private roads and public roads.

Twenty-two habitat types (including six types of habitat mosaic) comprising 190.5Ha were recorded. The dominant habitats present are GA1: Improved agricultural grassland (113.38ha or 59.5%), followed by WD4: Conifer plantation (45.45ha or 22%), both of which are evaluated as Local Importance (Lower Value). The remaining habitats (18.5% in total) are mainly made up of: Wet Grassland (GS4), Scrub (WS1), built land and artificial surfaces (BL3), Wet Heath (HH3) and Upland Blanket Bog (PB2). Linear habitats are primarily composed of Buildings and Artificial Surfaces (BL3), earth banks (BL2), and Eroding/Upland Rivers (FW1).

Habitats identified as Key Ecological Receptors (evaluated as of Local Importance (Higher Value) or above) which occur within the UWF Related Works Study Area comprise:

- 693 meters of Upland/Eroding Rivers (FW1),
- 2.03ha of Upland Blanket Bog (PB2),
- 11.95ha of Wet Grassland (GS4),
- 1.77ha of Scrub and Immature Woodland (WS1/2),
- 2.32ha of Wet Heath (HH3),
- 1.58ha of Dry-humid Acid Grassland (GS3),
- 0.11ha of Dry Siliceous Heath (HH1),
- 0.1ha of Cutover Bog (PB4),
- 1,611 meters of Linear hedgerow (WL1) / treelines (WL2).

Respective areas of each habitat type (evaluated as of Local Importance (Higher Value) or above) are illustrated in **Figure WP 8.5: Whole Project Study Area for Terrestrial Habitats (Overview and Maps 1 to 4)** and presented in full in **Appendix 8.3: Terrestrial Habitats Survey Results & Impact Calculations (Section A8.3.2.3) in Volume C4 EIAR Appendices.**

No Flora Protection Order (FPO) species are present within the UWF Related Works construction area boundary.

Non-native invasive plant species listed on the Third Schedule subject to restrictions under Regulations 49 and 50 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477/2011) are herein described. A Japanese knotweed or Himalayan knotweed infestation was recorded at 1 location during habitat assessments for UWF Related Works. The infestation is located greater than 7 metres from the construction works area boundary.

8.5.2.3.2 Element 3: UWF Replacement Forestry

Not applicable – Element evaluated as excluded. See Section 8.5.2.2.1.

8.5.2.3.3 Element 4: Upperchurch Windfarm

The terrestrial habitats present in the Upperchurch Windfarm have been previously described in the 2013 EIS and 2013 RFI and include 13 distinct classifications and 3 types of habitat mosaic. Habitats are broadly similar to that described elsewhere with the addition of upland blanket bog (PB2), acid grassland (GS3) and neutral grassland (GS1) in addition to the aforementioned mosaics.

Total length of linear hedgerow/treeline/field boundary within the Upperchurch Windfarm study area is 25km, with grass dominated banks described as the dominant type of field boundary.

Within the 2013 EIS, a single (public roadside) record of Japanese Knotweed was recorded within the study area for the Upperchurch Windfarm.

Consideration of the Passage of Time: the 2013 planning documents were reviewed and habitats on the Consented Upperchurch Windfarm site were observed during surveys for UWF Related Works. With the exception of some maturation of trees, there have been no material changes in the makeup of terrestrial habitats on the windfarm site, and it is considered that the descriptions in the 2013 and 2014 documents for Upperchurch Windfarm remain relevant to the cumulative evaluations in this EIAR for UWF Grid Connection. Furthermore, the maturity of trees on the windfarm site has been taken into account in the relevant cumulative evaluations in this 2019 EIAR for UWF Grid Connection.

8.5.2.3.4 Element 5: UWF Other ActivitiesHaul Route Activity Locations

Fourteen habitat types comprising 36.4Ha were recorded. The dominant habitats present are improved agricultural grassland (GA1), Built Land and Artificial Surfaces (BL3), Mixed Broadleaf Woodland (WD1) and Dry Meadows and Grassy Verges (GS2) which together make up 30.2Ha or 83.2% of all habitats present. Scrub (WS1), Wet Grassland (GS4) and Amenity Grassland (GA2) make up the majority of the remaining habitats (11.3%). Linear habitats are primarily composed of spoil and bare ground (ED2), Dry Meadows and Grassy Verges (GS2), Hedgerows (WL1), Tree lines (WL2), Hedgerows (WL1) and Earth Banks (BL2).

The total area of linear hedgerow and treelines (or mosaics of both) present comprises 2,031m.

Japanese knotweed was recorded c.15m from the haul route location HA15 on the R503 east of Ballycahill. This was the only record of non-native invasive plant species associated with the UWF Other Activities survey corridor. The infestation is located at a distance greater than the root spread for this species (i.e. 7 metres) to the activity location.

Upperchurch Hen Harrier Scheme Area

A total of 128 Hectares of land has been put forward as alternative habitat for the Upperchurch Hen Harrier Scheme. The habitat types are a mixture of wet grassland (GS4) and improved grassland (GA1), with some smaller areas of willow scrub. We refer to the consented Upperchurch Windfarm Ecological Management Plan (2013) for further information in this regard (contained in **Volume F9: Reference Documents**).

Overhead Line Activities

A total of 18 habitats were recorded within a 50-metre buffer of the Overhead Line Activities. The majority of the study area was composed of improved agricultural grassland. See **Table 10 Appendix 8.3 Terrestrial Habitats Survey Results & Impact Calculations** for further detail.

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		Not applicable – <u>No</u> Other Projects or Activities were scoped in for evaluation of cumulative effects, see Section 8.5.2.1.
	Biodiversity	8.5.2.4 Cumulative Information Baseline Characteristics - Importance of Terrestrial Habitats
		8.5.2.4.1 UWF Related Works:
		<p>National Importance: Upland/Eroding Streams habitats present are evaluated as of National Importance based on connectivity to the Clodiagh (Tipperary) and Multeen River sub-catchments. In total 7 No. of the watercourses are classified as Upland/Eroding Streams within UWF Related Works study area.</p> <p>County Importance: 2.03ha of Upland Blanket Bog (PB2), which is of County Importance, is present within the study area.</p> <p><u>188.47ha of habitats of Local Importance (Higher Value)</u> are within the UWF Related Works Study Area. These habitats are evaluated as being of Local Importance (Higher value) based on their semi-natural status, and thus their potential to support a range of native species of plants and animals of high value in a local context. These habitats are comprised of:</p> <p>BL3: Buildings and artificial surfaces (based on importance to bats),</p> <ul style="list-style-type: none"> • GS4: Wet Grassland • HH3: Wet Heath • WS1/WS2 Scrub and Immature Woodland • GS3: Dry-humid Acid Grassland), • HH1 Dry Siliceous Heath (HH1), • PB4: Cutover Bog (PB4), • WL1: hedgerows (based on level of maturity and value to birds and mammals), • WL2: tree lines (local importance to birds and mammals).
		8.5.2.4.2 Upperchurch Windfarm
		Upland Blanket Bog (PB3) of County Importance is described in the Upperchurch Windfarm EIS. Sixteen habitat types are present which are of Local Importance, Higher Value. All remaining habitats are of lesser importance.
		8.5.2.4.3 UWF Other Activities
		<p><u>Haul Route Activity Locations</u></p> <p>Habitats of Local Importance, Higher Value present within the previously identified study area (including areas within 50m of the public road network) are Eroding/Upland Rivers (FW1), Mixed Broadleaf woodland (WD1), Hedgerows (WL2) and Scrub (WS1). Linear hedgerow and treelines (or mosaics of both) present are of Local Importance, Higher Value.</p> <p><u>Overhead Line Activities</u></p> <p>Habitats of Local Importance (Higher Value) present at or within 50m of pole/structure locations includes Wet Grassland (GS4), Oak-ash-hazel Woodland (WN2), Riparian woodland (WN5), Wet willow-alder-ash woodland (WN6), Mixed Broadleaf/Conifer Woodland (WD2), Broadleaved Woodland WD1/Wet Grassland (GS4) mosaic, Cutover Bog (PB4), Hedgerows (WL1), and Treelines (WL2). The Newport (Mulkear) River, present as Depositing/Lowland Rivers (FW2) between structures is evaluated as of International Importance, based on its status as a SAC.</p>

8.5.3 PROJECT DESIGN MEASURES for Terrestrial Habitats

At the conception of the UWF Grid Connection, the design team evaluated the potential for significant impacts to the environment. Impacts will only take place where three components exist together; (1) the source of the impact (project), (2) the receptor of the impact (sensitive aspect) and (3) a pathway between the source and the sensitive aspect. The objective of mitigation measures is to avoid, prevent or reduce, one of the three components of an impact by choosing an alternative location, alternative design or an alternative process.

Potential or likely significant impacts were avoided, prevented or reduced by integrating mitigation measures into the fundamental design of the development – these are the Project Design Environmental Protection Measures, which are shortened to ‘Project Design Measures’ in this EIA Report.

The development as evaluated in the EIA Report incorporates the Project Design Measures.

The Project Design Measures outlined in Table 8-41 are relevant to the Environmental Factor, Biodiversity, and in particular to the sensitive aspect **Terrestrial Habitats**.

Table 8-41: UWF Grid Connection Project Design Measures relevant to Terrestrial Habitats

PD ID	Project Design Environmental Protection Measure (PD)
PD05	At the Mountphilips Substation site, construction traffic will be restricted to the construction works area and tracking across adjacent ground will not be permitted. A speed limit of 25km/hr for all traffic/machinery will be implemented at the Mountphilips Substation site. Outside of Mountphilips Substation site, all construction will be restricted to the paved road surfaces or built surfaces along the 110kV UGC. A speed limit of 50km/hr for all delivery and construction traffic will be implemented on Local Roads ('L' roads).
PD32	At Mountphilips Substation site, instream construction works at the watercourse crossings W1, W2 and W3 will be followed by site-specific reinstatement measures to ensure the equilibrated restoration of flow character and morphology within the affected reach to achieve baseline character and avoid any deterioration in morphology as required under the Water Framework Directive (WFD). Measures will include: bank stabilisation using boulder armour or willow/brush bank protection; reinstatement of bank slope and character, creation of compound channels where necessary; reinstatement of instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles; and planting along the riparian margins to stabilise banks, add flood protection and provide riparian buffer; and the use of deflector plates during the restoration of flow. Instream works at W1, W2 and W3 at the Mountphilips Substation site will be undertaken during dry weather within the IFI instream works window (July – September inclusive). As per PD41, instream works at W1, W2 and W3 will be supervised by a member of CIEEM and the Institute of Fisheries Management to ensure both the Project Design Measures and Best Practice are followed.
PD43	The main fuel stocks for, and chemical wastes arising from, construction activities will be stored in a designated location, away from main traffic activity, within the temporary compound at the Mountphilips Substation site. All fuel will be stored in bunded, locked storage containers. The designated storage location will be greater than 100m from a watercourse. Spill response apparatus including spill-kits and hydrocarbon absorbent packs will be stored at the designated location in the temporary compound and all operators will be fully trained in the use of this equipment. The Environmental Emergency Response Procedure will be implemented immediately in the event of any spills. The Environmental Emergency Response Procedure is part of the UWF Grid Connection Environmental Management Plan.
PD57	All excavation works will take place in line with protective measures required to avoid damage to trees during the construction phase of road projects, as stipulated in the NRA document 'Guidelines for the Protection and Preservation of Trees, Hedgerows and Scrub prior to, during and post construction of National Road Schemes'. This will include consultation with a qualified arborist, where appropriate to ensure works within the Root Protection Area (RPA) avoid any significant damage to tree roots. Exposed tree roots will be protected where required and excavation methods will be appropriately undertaken so as to avoid damage to RPA's. All excavation works in the RPA will be overseen by the Project Ecologist.

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Cumulative Information: Potential or likely significant impacts caused by the Other Elements of the Whole UWF Project were avoided, prevented or reduced by incorporating Project Design Measures into the fundamental design of the UWF Related Works, and into the consented design of the Upperchurch Windfarm. These Project Design Measures are included in the description of these Elements, and can be found in this EIA Report in **Appendices 5.3 and 5.5**, in **Volume C4: EIAR Appendices**.

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8.5.4 EVALUATION OF IMPACTS to Terrestrial Habitats

In this Section, the likely direct and indirect effects of the UWF Grid Connection are identified and evaluated. Then the likely cumulative effects of the UWF Grid Connection together with the Other Elements of the Whole UWF Project and Other Projects or Activities are identified and evaluated.

A conceptual site model exercise was carried out to facilitate the identification of source-pathway-receptor links between the project (source) and the sensitive aspect (receptor) - Terrestrial Habitats.

As a result of the exercise, some impacts were included and some were excluded.

Table 8-42: List of all Impacts included and excluded from the Impact Evaluation Table sections

Impacts <u>Included</u> (Evaluated in the Impact Evaluation Table sections)	Impacts <u>Excluded</u> (Justification at the end of the Impact Evaluation Table sections)
Reduction in Terrestrial Habitats (construction stage)	Surface or Ground water dependant habitat degradation (construction stage)
Hedgerow Severance (construction stage)	Habitat degradation (construction stage)
Loss of High Nature Value Trees (construction stage)	Landscape level Habitat fragmentation (construction stage)
	Direct loss of Flora Protection Order species (construction stage)
	Introduction or spread of invasive species (construction stage)
	Introduction or spread of invasive species (operational stage)
	Introduction or spread of invasive species (decommissioning stage)

The source-pathway-receptor links for included impacts are described in the Impact Evaluation Tables in the next sections. **The Impact Evaluation Tables are presented in the following sections 8.5.4.1 to 8.5.4.3.**

The source-pathway-receptor links and the rationale for excluded impacts are described in the section directly after the Impact Evaluation Table sections, in Section 8.5.4.4.

8.5.4.1 Impact Evaluation Table: Reduction in Terrestrial Habitats

Impact Description

Project Life Cycle Stage: Construction stage

Impact Source: Excavation Works, new hardstanding areas, storage of materials

Cumulative Impact Source: Excavation works, ground clearance, new hardstanding areas, materials storage

Impact Pathway: Land Cover

Impact Description: Land take during the construction stage will cause a direct reduction in habitats present. Land take for the UWF Grid Connection development only relates to the Mountphilips Substation site, because all works outside of the Mountphilips Substation site will occur on paved roads. Land cover change for project infrastructure such as permanent roads, permanent berms and the Mountphilips Substation and the two new End Masts will reduce the respective area of some higher value habitats or habitats which are important from a Biodiversity perspective. In order to facilitate the replacement of existing culverts along the public road, where required, the removal of a minimal area of roadside vegetation may be necessary, this however will be a reversible and temporary land cover change of negligible extent.

As per Best Practice all habitats described and evaluated herein are those evaluated as of Local Importance (Higher Value) and above - we note that no habitats evaluated as of County, National, or International Importance are affected by permanent land cover change.

No permanent Land cover change will occur within the Slievefelim to Silvermines Mountain SPA or within the Lower River Shannon SAC. UWF Grid Connection will be installed within the public road pavement, with no additional permanent loss or reduction of habitat area within either the SPA or the SAC.

In relation to cumulative impacts, the majority of land cover change for UWF Related Works is temporary in nature with immediate re-instatement for works such as cable trenching and temporary berms, and the use of flagmen at entrances reduces land cover change. Permanent storage berms, located along realigned windfarm roads, will be re-instated immediately with native grasses. All re-instatement will be overseen by the Project Ecologist. Permanent land cover change is associated with the consented Upperchurch Windfarm (new access road, turbine hardstands, and the consented UWF substation), and with UWF Replacement Forestry.

Impact Quality: Negative

Evaluation of Subject Development Impact – Reduction in Terrestrial Habitats

Element 1: UWF Grid Connection – direct/indirect impact

Impact Magnitude:

Permanent habitat loss will comprise 1.75 ha, limited to 2 no. habitat types; Improved agricultural grassland GA1 (1.7 ha) and **Wet grassland GS4 (0.05 ha)**, which will occur at Mountphilips/Coole. These habitats are evaluated as Local Importance (Higher value), in the case of Wet grassland, and Local Importance (Lower Value) for Improved agricultural grassland. The magnitude of change represents 0.57% of the total habitat within the study area, and 0.85%, and 2.02% respectively of the habitats described. Temporary land-use change of non-linear features at Mountphilips/Coole is limited to 0.23ha of Improved agricultural grassland and 0.04Ha of Wet grassland.

It will be necessary to remove 160m of treeline which includes 17 immature trees and 1 mature tree at the Mountphilips Substation site entrance to widen the entrance and provide sightlines. An equivalent length of new hedgerow with 17 no. semi mature trees (native hedgerow species and at least 10 years old) will be planted behind the new sightlines at the site entrance.

In order to build the new permanent access road to the Mountphilips Substation site it will be necessary to remove 40m of hedgerow which includes 11 immature trees. A new hedgerow, c.700m in length, will be planted on the berms on either side of the new permanent access road between the Site Entrance and Mountphilips Substation and around the Mountphilips Substation compound; the sides of the berms will be seeded with native

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grass and wildflower species, for the benefit of biodiversity in the area. All new hedging will be locally sourced native fruiting hedgerow species.

Where the 110kV UGC occurs outside of the Mountphilips Substation site, the works will be confined to road pavements, and there will be no other permanent land-use change associated with the UWF Grid Connection; all other hedgerows and treelines will be retained along the route of the 110kV UGC outside of the Mountphilips Substation site.

Overall magnitude is evaluated as negligible.

Significance of the Impact: Imperceptible

Rationale for Impact Evaluation:

- The vast majority of the construction works areas (84%) are on paved roads; with the remaining 16% comprising the area of the construction works boundary on agricultural lands at Mountphilips Substation Site. Overall landuse change relates to 6% of the footprint of the total construction works (i.e. Mountphilips Substation site and 110kV UGC). The 6% only relates to land-use change at the Mountphilips Substation site;
- At Mountphilips Substation site, 1.7 ha land cover change is Improved agricultural grassland which has been evaluated as having local importance (lower value);
- The low sensitivity of the habitats for which land-use change will occur
- In the context of the extent of higher value habitat in the wider surrounding area (context), and;
- The extremely limited extent (0.1ha) of semi-natural habitat lost (wet grassland), with the majority of lost habitat consisting of lower value Improved agricultural grassland.
- Very slight change to overall biodiversity value from baseline conditions, notwithstanding;
- The permanent duration, and;
- Low reversibility with permanent land cover change likely

Element 1: UWF Grid Connection – cumulative impact

Cumulative Impact Magnitude: The potential for cumulative impacts relates to the part of the UWF Grid Connection Cumulative Study Area which overlaps the UWF Related Works/Upperchurch Windfarm area, at the eastern extent of the 110kV UGC. The 110kV UGC is entirely located within paved road surfaces in this area, which is a Local Importance (lower value) habitat. In addition the road surfaces will be reinstated following the completion of works for the 110kV UGC. No cumulative effects on terrestrial habitats will accrue.

The cumulative impact magnitude is evaluated as negligible.

Significance of the Impact: No Cumulative Impact

Rationale for Impact Evaluation:

- The local importance (lower value) of the habitat within the overlap area – i.e. paved roads;
- The temporary nature of works and reinstatement of the paved road surfaces.

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project

Element 2: UWF Related Works

Impact Magnitude:

No habitats evaluated as of County, National or International Importance will be lost.

Permanent habitat loss relates to 1 no. habitat type, Wet grassland GS4 (0.07Ha), evaluated as of Local Importance (higher value). The magnitude of change represents 0.6% of the total 11.95Ha of Wet Grassland habitat within the UWF Related Works study area. The impact magnitude is evaluated as negligible.

Significance of the Impact: Not Significant

Rationale for Impact Evaluation:

- The local importance (higher value) of the habitats lost;
- The low sensitivity of the habitats for which change will occur (context), and;

Terrestrial Habitats	<ul style="list-style-type: none"> The extent of Habitat Loss, with none of the individual habitat changes representing more than 5% of the respective habitat present, which is; Very slight change from baseline conditions, notwithstanding; The long term duration, and; Low reversibility with permanent land cover change likely. The local importance (higher value) of the habitats lost;
	Element 3: UWF Replacement Forestry – N/A, evaluated as excluded, see Section 8.5.2.2.1
	Element 4: Upperchurch Windfarm
	<u>Impact Magnitude:</u> According to the 2013 EIS and the An Bord Pleanála Inspectors Report In terms of the habitat loss arising from the construction of roads, foundations and hardstandings, this was determined as 9.65Ha, primarily in the Improved Agricultural Grassland (GA1 - 5.98Ha) and conifer plantations (WD4 - 1.18Ha). 7.81Ha of this habitat was identified as Higher Value, 77% of which is Improved Agricultural Grassland (GA1). The scale of land cover change is 1.4% of available habitat within the Study area boundary of 536Ha.
	<u>Significance of the Impact:</u> Not Significant
	<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> According to the An Bord Pleanála Inspectors Report “In relation to the details submitted, I consider that the potential impact on habitats on the site is not therefore significant. The impacts largely occur on areas with a long history of human intervention through farming and forestry cultivation. I also consider that subject to the mitigation measures as outlined that the proposed development is not likely to result in significant impacts and effects on any designated sites.”
	Element 5: UWF Other Activities
	<u>Impact Magnitude:</u> None
	<u>Significance of the Impact:</u> Neutral Impact
	<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> No permanent land cover change is proposed of Terrestrial Habitats evaluated as of Local Importance (Higher Value) or greater.
Sensitive Aspect	Evaluation of Other Cumulative Impacts – Reduction in Terrestrial Habitats
	Whole UWF Project Effect
	<u>Magnitude:</u> No habitats evaluated as of County, National or International Importance will be lost. Permanent habitat loss relates to 1 no. habitat type, Wet grassland GS4 (0.07Ha), evaluated as of Local Importance (higher value). Habitat loss of Local Importance (Higher Value) in respect of the UWF Grid Connection (0.05Ha), the UWF Related Works (0.07Ha) and Upperchurch Windfarm (7.81 Ha, of which 5.98ha relates to Improved Agricultural Grassland which is considered by the authors to be of Lower Value, in accordance with Fosset (2000)).
	Significance of the Whole Project Effect: Not Significant
	<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> The overall extent of Habitat Loss, and; Changes from baseline conditions are very slight-minor, notwithstanding; The long term to permanent duration, and; Low reversibility with permanent land cover change likely.
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Note: No cumulative evaluation of Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to Terrestrial Habitats with either the UWF Grid Connection or the Other Elements of the Whole UWF Project (see Section 8.5.2.1).

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Biodiversity
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8.5.4.2 Impact Evaluation Table: Hedgerow Severance

Impact Description

Project Life Cycle Stage: Construction stage

Impact Source: Excavation Works, entrance works, access road

Cumulative Impact Source: Excavation Works, Access roads, Ground Clearance.

Impact Pathway: Land cover

Impact Description: Construction stage works will cause both 160m of temporary and 40m of permanent severance of existing field boundaries at the Mountphilips Substation site, with temporary loss at the site entrance off the public road, and permanent loss at hedgerow intersections along the new permanent access road. Permanent severance if of sufficient magnitude may affect habitat connectivity.

The other elements of the Whole UWF Project will also cause temporary and permanent severance of field boundaries, this is primarily to facilitate the cabling as part of UWF Related Works (315m of temporary) and to facilitate entrances and access roads for Upperchurch Windfarm (980m of permanent). Any temporary hedgerow loss, such as at field boundary crossings and at entrances, will be immediately re-instated once works are complete with like for like vegetation and therefore Neutral effects are considered likely. Project Design Measures such as the use of flagmen at entrances (*for UWF Related Works*) has reduced the extent of field boundaries to be removed, even if only temporarily.

As per Best Practice all habitats described and evaluated herein are those evaluated as of Local Importance (Higher Value) and above - we note that no hedgerows or field boundaries were evaluated as of County, National, or International Importance. This is reflective of the landscape present with many field boundaries comprising earthen banks, or lower value hedgerows.

Hedgerow creation: The Upperchurch Hen Harrier Scheme (part of UWF Other Activities) is to incorporate significant planting of hedgerows (2.8km of new planting). New hedgerows will also be planted as part of the UWF Grid Connection (700m of new hedgerow at the Mountphilips Substation site), UWF Related Works (370m new planting) and Upperchurch Windfarm (360m new planting).

Impact Quality: Negative and positive

Evaluation of Subject Development Impact – Hedgerow Severance

Element 1: UWF Grid Connection – direct/indirect impact

Impact Magnitude:

It will be necessary to remove 160m of hedgerow which includes 17 immature trees and 1 mature tree at the substation site entrance to widen the entrance and provide sightlines. These will be reinstated by planting the equivalent amount of hedgerow and trees behind the new sightlines, so effective habitat loss will be temporary in extent and duration.

It will be necessary to remove 40m of hedgerow which includes 11 immature trees to build the new permanent access road. A new hedgerow, c.700m in length, will be planted on the berms on either side of the new permanent access road between the Site Entrance and Mountphilips Substation and around the Mountphilips Substation compound; the sides of the berms will be seeded with native grass and wildflower species, for the benefit of biodiversity in the area. All new hedging will be locally sourced native hedgerow species, and the replacement trees will be native hedgerow species and at least 10 years old. With reinstatement any effect on habitat connectivity is evaluated as of negligible magnitude. No hedgerow severance will occur outside of the Mountphilips Substation site.

The magnitude of impact is evaluated as being negligible, due to reinstatement of trees of at least 10 years in age.

Significance of the Impact: Imperceptible

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<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> Hedgerow severance to create sightlines will be replanted immediately behind the new sightlines at the entrance to avoid fragmentation effects, so effective habitat loss will be temporary in extent and duration; The very low extent of permanent severance (40m permanent loss), with; Net gain due to 700m of new hedgerow planting along the new permanent access road and around the sub-station compound at Mountphilips Substation site. No noticeable adverse contrast with baseline conditions is expected, when considered with proposed new planting; 	
Element 1: UWF Grid Connection – cumulative impact	
<p>Cumulative Impact Magnitude: There is no potential for cumulative impacts due to the separation distance (c.22km) between hedgerow severance/planting at Mountphilips and hedgerow severance/planting for the Other Elements of the Whole UWF Project.</p>	
Significance of the Impact: No cumulative impact	
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> Separation distance (c.22km) between hedgerow severance/planting at Mountphilips and hedgerow severance/planting for the Other Elements of the Whole UWF Project. 	
Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project	
Element 2: UWF Related Works	
<p>Impact Magnitude:</p> <p>Hedgerows and earthen banks occur at most field boundaries within the Internal Windfarm Cabling, Realigned Windfarm Roads and Haul Route Works locations. In total, 170m of hedgerow will be permanently removed to facilitate Haul Route Works (HR6 and HR13) and Realigned Windfarm Roads (RWR2). These hedgerows comprise primarily earthen banks (only 1 mature tree and 3 immature trees are to be removed). These hedgerows and trees will be replaced with an equivalent length of new native hedgerow along with an equivalent number of native trees immediately adjacent to the area. In addition new hedgerow will be planted on the berms surrounding the Telecom Relay Pole (c.17m).</p> <p>In total, 145m of hedgerow and 4 No. trees will be removed at Internal Windfarm Cabling and some Haul Route Works locations, these hedgerows and trees will be immediately reinstated after completion of construction works, so effective habitat loss will be temporary in extent.</p>	
Significance of the Impact: Not Significant	
<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> The low extent of severance, with most field boundaries comprising earthen banks, and; No individual severed sections evaluated as sufficient in magnitude to result in fragmentation effects, and; Very slight change from baseline conditions, and; Reinstatement ensuring some habitat loss is temporary in duration, notwithstanding; The long-term duration of some permanent change. 	
Element 3: UWF Replacement Forestry – N/A, evaluated as excluded, see Section 8.5.2.2.1.	
Element 4: Upperchurch Windfarm	
<p>Impact Magnitude:</p> <ul style="list-style-type: none"> As per the windfarm EIS, 980m of hedgerow will be removed. 	
Significance of the Impact: Not Significant	
<p>Rationale for Impact Evaluation:</p>	

Terrestrial Habitats	<ul style="list-style-type: none"> As per the Upperchurch Windfarm EIS (2013), the impact of hedgerow severance is evaluated to be not significant: “However the extent (<i>of irreversible hedgerow loss</i>) is relatively low particularly as there is an abundance of this habitat and many of the hedgerows dividing fields have very little cover within the region. Therefore, it is near certain that the impact on this habitat will not be significant.”
	Element 5: UWF Other Activities
	<p><u>Impact Magnitude:</u></p> <p>The Upperchurch Hen Harrier scheme activities will include improvement planting with suitable trees and shrub species along existing field boundary hedgerows, and planting of 2.8km of new hedgerows with native trees and shrubs. Ongoing farming practices will also be restricted to preclude further hedgerow removal. No hedgerow loss is associated with Overhead Line activities under consideration.</p>
	<p><u>Significance of the Impact:</u> Significant (positive)</p>
Sensitive Aspect	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> The extent of new hedgerow to be planted, and; The long-term duration equivalent to the lifetime of the project.
	Evaluation of Other Cumulative Impacts – Hedgerow Severance
	Whole UWF Project Effect
	<p><u>Magnitude:</u></p> <p>Permanent hedgerow loss will occur both at the western side of the Slievefelim to Silvermines Mountain uplands area at the Mountphilips Substation site (UWF Grid Connection), and on the eastern side of the upland area at the UWF Related Works and Upperchurch Windfarm sites.</p> <p>Total permanent hedgerow loss will be 1020m across the Whole UWF Project, the majority of which relates to Upperchurch Windfarm (980m), with the remaining 40m at Mountphilips Substation site.</p> <p>Temporary hedgerow/field boundary removal relates to 160m at the Mountphilips Substation site entrance with an additional temporary 315m within the UWF Related Works Study Area, much of which comprises earthen banks.</p> <p>In total 4.23km of new hedgerow will be planted within the Whole UWF Project study area, including 700m along new permanent access road to Mountphilips Substation (UWF Grid Connection) on the western side of the upland area, and c.370m for UWF Related Works, 360m for Upperchurch Windfarm, and 2800m for UWF Other Activities on the eastern side of the upland area.</p>
	<u>Significance of the Whole Project Effect: Not Significant</u>
	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> The extent of Habitat Loss overall, with limited removal of trees and; Individual severance locations will not result in any corridor fragmentation, and; Very slight to minor change from baseline conditions, additionally; Significant positive effects from Hedgerow enhancement and planting of 2.8km of new hedgerows in the Upperchurch area will occur as a result of the Upperchurch Hen Harrier Scheme, over the lifetime of the project, notwithstanding; The long-term duration, and; Low reversibility with land cover change likely
Biodiversity	
Topic	<p>Note: No cumulative evaluation of <u>Other Projects or Activities</u> is included in the table above, because <u>no</u> Other Projects or Activities are likely to cause cumulative effects to Terrestrial Habitats with either the UWF Grid Connection or the Other Elements of the Whole UWF Project (see Section 8.5.2.1).</p>

8.5.4.3 Impact Evaluation Table: Loss of High Nature Value Trees

Impact Description	
Project Life Cycle Stage:	Construction stage
<u>Impact Source:</u> Excavation Works, vegetation clearance for site entrance works and access road works	
<u>Cumulative Impact Source:</u> Excavation Works, vegetation clearance works	
<u>Impact Pathway:</u> Land cover	
<p><u>Impact Description:</u> Habitats including mature trees such as hedgerows, treelines, deciduous woodland and scrub are herein evaluated for loss of mature trees of biodiversity value or immature trees which have the potential to be of high value. Construction stage works will cause both temporary and permanent loss of existing field boundaries. Permanent loss of mature trees may affect connectivity / result in fragmentation and have secondary effects on other species which utilise mature trees for breeding or resting (such as birds or mammals). Protection of trees not removed but occurring within or adjacent to the construction works, and which may be affected by secondary or cross factor sources such as excavation operations will be given protection through adherence to a project design measure (based on industry best practice) for the protection and preservation of tree roots during the construction phase (PD57). Trees evaluated herein are of Local Importance (Higher Value) in accordance with their respective habitat classification.</p> <p>We note that the Upperchurch Hen Harrier Scheme is to incorporate significant planting of trees, in addition the UWF Replacement Forestry will comprise deciduous trees in its entirety.</p> <p><u>Impact Quality:</u> Negative and positive</p>	
Evaluation of Subject Development Impact – Loss of High Nature Value Trees	
Element 1: UWF Grid Connection – direct/indirect impact	
<p><u>Impact Magnitude:</u></p> <p>Tree loss is limited to the Mountphilips Substation site, where 1 no. mature trees of Ash (<i>Fraxinus excelsior</i>) and 28 immature trees comprising Ash (n=16), Sycamore (n=1), Oak (n=3) and Hazel (n=8) will be removed along the site entrance and access road to Mountphilips Substation location. A 230m section of road at Scrageen where a small area of Oak-birch-holly woodland was found to correspond to the EU Habitats Directive 92/43/EEC habitat, 'Old sessile oak woods with Ilex and Blechnum, in the British Isles (91A0)' runs adjacent to the route of the 110kV UGC at Scrageen, PD measures will protect tree roots at this and any other location where they may occur.</p> <p>Given only a single mature tree is to be lost and protective measures to avoid secondary effects the magnitude is evaluated as negligible.</p>	
Significance of the Impact: Imperceptible	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The low magnitude of Loss overall, which; • Will not result in any corridor fragmentation, and; • Application of project design measure for the protection and preservation of tree roots during the construction phase (PD57) • No discernable change from baseline conditions, notwithstanding; • The permanent duration, and; • Low reversibility with permanent loss likely. 	
Element 1: UWF Grid Connection – cumulative impact	
<p><u>Cumulative Impact Magnitude:</u> There is no potential for cumulative impacts due to the separation distances to the the high nature value trees at the locations for the Other Elements of the Whole UWF Project – i.e.</p>	

Terrestrial Habitats	c.22km from high nature value trees at Mountphilips Substation site, 16.2km from high nature value trees at Screggan along the 110kV UGC (at Screggan).
	Significance of the Impact: No cumulative impact
Sensitive Aspect	<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> Separation distance (between high nature value trees at Mountphilips Substations site and along the 110kV UGC, and the high nature value trees at the locations of the Other Elements of the Whole UWF Project.
	Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project
Biodiversity	Element 2: UWF Related Works
	<u>Impact Magnitude:</u> Tree loss is limited to 1 no. mature tree and 3 immature trees- primarily from hedgerow crossing locations.
	<u>Significance of the Impact:</u> Not Significant
	<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> The extent of Loss is low overall, and; Will not result in any corridor fragmentation, and; Very slight change from baseline conditions, notwithstanding; The long term duration, and; Low reversibility with permanent loss likely
	Element 3: UWF Replacement Forestry – N/A, evaluated as excluded, see Section 8.5.2.2.1
	Element 4: Upperchurch Windfarm
	<u>Impact Magnitude:</u> Tree loss is Medium and will be limited to 24 no. mature trees - primarily from hedgerow crossing locations and site entrances.
	<u>Significance of the Impact:</u> Not Significant
	<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> The low magnitude of loss, which; Will not result in any corridor fragmentation, and; Very slight change from baseline conditions, notwithstanding; The long-term duration, and; Low reversibility with permanent loss likely
	Element 5: UWF Other Activities
Topic	<u>Impact Magnitude:</u> Neutral Effect for Haul Route Activity locations or Monitoring Activity locations as no permanent removal of trees is proposed in respect of these works. The Upperchurch Hen Harrier scheme does include the planting of 2.2 Ha of tree and shrub species in scrub areas, improvement planting with suitable trees and shrub species along existing field boundary hedgerows, and planting of 2.8km of new hedgerows with native trees and shrubs. In addition, 1.4km of woody scrub species will be planted along riparian corridors. No trees will be removed to facilitate Overhead Line Activities as described.
	<u>Significance of the Impact:</u> Moderate (positive)
	<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> The extent of replanting of trees, and; A significant contrast with baseline conditions is predicted. The long-term duration, and; Low reversibility.

Evaluation of Other Cumulative Impacts – Loss of High Nature Value Trees**Whole UWF Project Effect****Magnitude:**

Tree loss is limited to 26 no. mature and 31 no. immature trees. The majority of tree loss relates to Upperchurch Windfarm, where 24 mature trees will be lost. The remaining tree loss will be 1 no. mature Ash tree and 28 no. immature trees on UWF Grid Connection (at Mountphilips Substation site), and 1 no. mature tree and 3 no. immature trees within the UWF Related Works. Project Design Measures for UWF Grid Connection and Best Practice Measures for UWF Related Works will avoid secondary effects through any potential damage to tree roots where they occur.

The Upperchurch Hen Harrier scheme includes the planting of 2.2 Ha of tree and shrub species in scrub areas, improvement planting with suitable trees and shrub species along existing field boundary hedgerows, and planting of 2.8km of new hedgerows with native trees and shrubs. In addition, 1.4km of woody scrub species will be planted along riparian corridors.

Significance of the Whole Project Effect: Moderate (positive)**Rationale for Impact Evaluation:**

- The extent of replanting of trees, and;
- The duration which is long term and over the lifetime of the project, and;
- A significant positive contrast with baseline conditions is predicted, with;
- Limited reversibility

Note: No cumulative evaluation of Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to Terrestrial Habitats with either the UWF Grid Connection or the Other Elements of the Whole UWF Project (see Section 8.5.2.1).

8.5.4.4 Description and Rationale for Excluded (scoped out) Impacts

The source-pathway-receptor links and the rationale for impacts excluded from the Impact Evaluation Table sections are described in Table 8-43 below.

Table 8-43: Description and Rationale for Excluded Impacts to Terrestrial Habitats

Key: 1: UWF Grid Connection; 2: UWF Related Works; 3: UWF Replacement Forestry; 4: Upperchurch Windfarm; 5: UWF Other Activities

Source(s) of Impacts	Project Element	Pathway(s)	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
Construction Stage				
Movement of soils and machinery	1,2,4,5	Ground-water	Surface or Ground water dependant habitat degradation	Rationale for Excluding; Imperceptible impacts to Local Groundwater Bodies or Local Surface Water Bodies, therefore no potential for significant adverse impacts to local water dependant habitats which may support terrestrial habitats are likely to occur as a consequence of the development of the individual Elements or the Whole UWF Project (refer Chapter 11 Water). Cross-factor effects by virtue of same are accordingly excluded from further evaluation.
Movement of soils and machinery	1,2,4,5	Surface Water	Habitat degradation	Rationale for Excluding; Imperceptible impacts to Local Surface Water Bodies or Water Dependant Habitats are likely to occur as a consequence of the development of the individual Elements or the Whole UWF Project (refer Chapter 11 Water and Sensitive Aspect Aquatic Ecology). Cross-factor effects by virtue of same are accordingly excluded from further evaluation.
Excavation works	1,2,4,5	Soils	Direct loss of Flora Protection Order species	Rationale for Excluding; No Flora Protection Order species were recorded within the Construction Works Boundaries.
Excavation works	1,2, 4,5	Landcover	Landscape level Habitat fragmentation	Rationale for Excluding: Neutral Landscape level effect is predicted. Permanent entrance to Mountphilips Substation will be re-instated; hedgerow crossings for UWF Related Works are narrowed to 5m to avoid/reduce fragmentation effects, Minimal trees are to be removed for UWF Related Works which generally correlates with Consented UWF Roads. Upperchurch Hen Harrier Scheme will increase connectedness through planting of hedgerows/trees. No habitat removal is required for Overhead Line Activities.
Movement of soils and machinery	1,2,4,5	Soils	Introduction or spread of invasive species	Rationale for Excluding: No likely impact Japanese knotweed or Himalayan knotweed infestations were recorded at 17 locations during habitat assessments on the UWF Grid Connection. Giant hogweed (<i>Heracleum mantegazzianum</i>) was recorded at one location. Infestations were recorded along the verges of the road corridor within which the UWF Grid Connection is located. The impact can be excluded however, as all construction works will occur on/in the road pavements, and due to the implementation of a comprehensive Invasive Species Management Plan for UWF Grid Connection which includes detailed biosecurity measures based on Best Practice, and in accordance with Best Available

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Source(s) of Impacts	Project Element	Pathway(s)	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
				<p>Techniques currently utilised for roadworks by Tipperary County Council and Transport Infrastructure Ireland. In addition an Invasive Species Specialist will monitor works adjacent to infestations, to ensure the Invasive Species Management Plan (ISMP) is fully adhered with. This will avoid both direct effects from the UWF Grid Connection alone, but also in combination effects with other project elements. The implementation of the final ISMP will be a contractual obligation on any appointed contractors. The Invasive Species Management Plan is included in Volume D: Environmental Management Plan for UWF Grid Connection.</p> <p>In relation to UWF Related Works, A knotweed infestation was recorded at 1 location during habitat assessments on the UWF Related Works. The infestation is located at a distance greater than 7 metres of the haul route realignment construction works area boundary. Effects can be excluded by virtue of Distance and an Invasive Species Management Plan which has been developed for the UWF Related Works Revised EIAR 2019 (See Volume F4, Tab5: Reference Documents).</p> <p>Upperchurch Windfarm: Within the 2013 EIS, a single (public roadside) record of Japanese Knotweed was recorded within the study area for the Upperchurch Windfarm. An ISMP has been developed for UWF Related Works – for which locations overlap the consented Upperchurch Windfarm. Best Practice biosecurity measures will be implemented during the construction of the Consented Windfarm (see Invasive Species Management Plan for UWF Grid Connection, Tab 4 of the EMP – Volume D). In addition the temporal implementation of PD measures and the ISMP for the UWF Grid Connection, prior to works commencing on any other project element, will avoid the introduction into the wind farm of any invasive species. Effects can be excluded.</p> <p>UWF Other Activities: Japanese knotweed was recorded c.15m from the haul route location HA15 on the R503 east of Ballycahill. This was the only record of non-native invasive plant species associated with the UWF Other Activities survey corridor. The infestation is located at a distance greater than 7 metres (c.15m) to the activity location. Effects can be excluded.</p>
Operational Stage				
Movement of soils and machinery	1,2,4,5	Soils	Introduction or spread of invasive species	<p>Rationale for Excluding: Operational maintenance for UWF Grid Connection, Upperchurch Windfarm and UWF Related Works are minimal and unlikely to result in the spread of invasive species. Notwithstanding this a comprehensive Invasive Species Management Plan has been developed for UWF Grid Connection (see Volume D) and will be implemented during operational</p>

Terrestrial Habitats

Sensitive Aspect

Biodiversity

Topic

Terrestrial Habitats	Source(s) of Impacts	Project Element	Pathway(s)	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
					maintenance to ensure that none of the identified Invasive Species infestations poses a risk to the environment, either alone or in-combination. In relation to UWF Related Works/Upperchurch Windfarm/UWF Other Activities: All pertinent locations of Invasive Species are currently >7metres from any operational works/activity areas and therefore impacts are not likely. Notwithstanding, Best Practice biosecurity measures will be implemented during the operational stage of the Consented Windfarm (see Invasive Species Mangement Plan for UWF Grid Connection, Tab 4 of the EMP – Volume D).
Sensitive Aspect	Decommissioning Stage				
	Movement of soils and machinery	1,2,4,5	Soils	Introduction or spread of invasive species	<p>Rationale for Excluding:</p> <p>UWF Grid Connection will not be decommissioned so no pathways exist for effect where the source magnitude is potentially highest.</p> <p>In relation to UWF Related Works/Upperchurch Windfarm/UWF Other Activities: All pertinent locations of Invasive Species are currently >7metres from any decommissioning works/activity areas and therefore impacts are not likely. Notwithstanding, Best Practice biosecurity measures will be implemented during the operational stage of the Consented Windfarm (see Invasive Species Mangement Plan for UWF Grid Connection, Tab 4 of the EMP – Volume D).</p>

8.5.5 Mitigation Measures for Impacts to Terrestrial Habitats

Mitigation measures were incorporated into the UWF Grid Connection project design including the Project Design Measures. No additional mitigation measures are required as the topic authors conclude that **significant impacts are not likely to occur** to Terrestrial Habitats as a consequence of the UWF Grid Connection.

8.5.6 Evaluation of Residual Impacts to Terrestrial Habitats

Residual Impacts are the final or intended effects that will occur after mitigation measures have been put into place. No additional mitigation measures are required and thus the Residual Impact is the same as the Impact set out in Impact Evaluation Table sections for Terrestrial Habitats above (Section 8.5.4) – i.e. **no significant adverse impacts**.

8.5.7 UWF Grd Connection Environmental Management Plan

The Project Design measures will be implemented by the Project Manager and the main Contractor during the construction stage, under the **Environmental Management Plan for the UWF Grid Connection (EMP)**. The EMP is appended to this EIA Report as **Volume D**.

The EMP will be an important contract document for the main construction contractor (Contractor) who will be contractually obliged to comply with the EMP. An Environmental Clerk of Works will be appointed, who will be independent of the construction Contractor, and it will be the responsibility of the Environmental Clerk of Works to monitor the compliance of the Contractor with the EMP through liaising with the Construction Site Manager and the Project Manager, monitoring construction works on a daily basis and by carrying out regular audits on EMP compliance. The Environmental Clerk of Works will be resourced to employ a team of environmental specialists including a Site Ecologist, Site Hydrologist and a Invasive Species Specialist.

8.5.7.1 Invasive Species Management Plan

The UWF Grid Connection Environmental Management Plan will include a bespoke Invasive Species Management Plan developed to prevent/avoid the introduction and/or spread of invasive species. The Invasive Species Management Plan includes Best Practice biosecurity measures and describes supervision by an Invasive Species Specialist during the construction phase.

8.5.8 Summary of Impacts to Terrestrial Habitats

A summary of the Impact to Terrestrial Habitats is presented in Table 8-44.

Table 8-44: Summary of the impacts to Terrestrial Habitats

Impact to Terrestrial Habitats:	Reduction in Terrestrial Habitats	Hedgerow Severance	Loss of High Nature Value Trees
<i>Evaluation Impact Table</i>	<i>Section 8.5.4.1</i>	<i>Section 8.5.4.2</i>	<i>Section 8.5.4.3</i>
Project Life-Cycle Stage	Construction	Construction	Construction
<u>UWF Grid Connection</u> <i>Direct/indirect impact</i>	Imperceptible	Imperceptible	Imperceptible
<u>UWF Grid Connection</u> <i>Cumulative impacts</i>	No Cumulative Impact	No Cumulative Impact	No Cumulative Impact
Element 2: UWF Related Works	Not Significant	Not Significant	Not Significant
Element 3: UWF Replacement Forestry	Neutral Impact/No Potential for Impact - Evaluated as Excluded, see Section 8.5.2.2.1.		
Element 4: Upperchurch Windfarm	Not Significant	Not Significant	Not Significant
Element 5: UWF Other Activities	Neutral	<u>Significant (positive)</u>	Moderate (positive)
<u>Cumulative Impact:</u>			
All Elements of the Whole UWF Project	Not Significant	Not Significant	Moderate (positive)

The greyed out boxes in the above summary table relate to the cumulative information for the Other Elements of the Whole UWF Project, which are included to show the totality of the project.

Note: No cumulative information for Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to Terrestrial Habitats with either the UWF Grid Connection or the Other Elements of the Whole UWF Project (see Section 8.5.2.1).

8.6 Sensitive Aspect No.5: Hen Harrier

This Section provides a description and evaluation of the Sensitive Aspect - Hen Harrier.

Dr. Alex Copland, Chris Cullen and Howard Williams were the main authors of this Section. Please see Sources of Information (Section 8.1.7) and Methodology (Section 8.1.8) for details of the desktop and fieldwork surveys which have informed the evaluation of Hen Harrier.

8.6.1 BASELINE CHARACTERISTICS of Hen Harrier

8.6.1.1 STUDY AREA for Hen Harrier

The study areas for Hen Harrier in relation to the UWF Grid Connection is described in Table 8-45 and illustrated on **Figure GC 8.6.1: UWF Grid Connection Study Area for Hen Harrier** (Volume C3 EIAR Figures).

Study areas have been derived from sources such as published literature on Hen Harrier, in addition to Best Practice Guidance available within the Irish and UK Guidance, in particular Scottish Natural Heritage (SNH).

Table 8-45: UWF Grid Connection Study Areas for Hen Harrier

Study Areas for Hen Harrier	Justification for the Study Area Extents
<ol style="list-style-type: none"> 1. Within 2km from the UWF Grid Connection construction works area boundary in all directions, for breeding sites (confirmed nest site or centre point of observed evidence of breeding behaviour identified during the breeding season), territories, availability of foraging (hunting) habitats and communal winter roost sites; 2. Within 2km of identified nests in relation to the availability of suitable breeding and foraging Habitat 3. Within 150m of the UWF Grid Connection construction works area boundary in all directions- in relation to disturbance displacement to foraging Hen Harrier during the breeding season, and effective habitat loss as a result. 4. Within 150m of the UWF Grid Connection construction works area boundary in all directions in relation to secondary effects via reductions in Prey Item availability. 5. Within 50m of the UWF Grid Connection construction works area boundary in all directions in relation to habitats proximal to the general settings of works. 	<ol style="list-style-type: none"> 1. The extent of the study area is defined in accordance with SNH Guidelines (2017¹⁶), the use of the centre point of observed evidence to determine nest site is based on the Hen Harrier Project (2019¹⁷). 2. Foraging habitat loss within 2km of a Hen Harrier nest may potentially have negative effects on breeding success (Arroyo <i>et al.</i>, 2014). Habitat composition at this scale has previously been interrogated in research in the Irish context to investigate nest site selection at a landscape scale (Wilson <i>et al.</i> 2010). 3. 150m is the Minimum Approach Distance (MAD) (Livesey <i>et al.</i>, 2016) indicated for likely disturbance in respect of Falconiformes (the family of birds with characteristics most similar to Hen Harrier). 4. Professional Judgement, based on the MAD recommended for Hen Harrier as outlined at 2. above. 5. Professional Judgement and as per Best Practice (CIEEM, 2016)

¹⁶ Scottish Natural Heritage (2017). *Recommended bird survey methods to inform impact assessment of onshore wind Farms. Version 2.* SNH, Battleby.

¹⁷ Hen Harrier Project, (2019). *HARRIER HEN PROGRAMME Terms and Conditions 2nd Edition April 2019.* Hen Harrier Project, Oranmore, Co. Galway. Note 6, Pg. 22.

Hen Harrier	8.6.1.2 Baseline Context and Character of Hen Harrier in the UWF Grid Connection Study Area
	8.6.1.2.1 Character
Sensitive Aspect	<p>The harriers (genus <i>Circus</i>) are all fairly large hawks with long, broad wings, long tails and legs and slim bodies (Watson 1977). The Hen Harrier <i>Circus cyaneus</i> is a medium sized, ground nesting bird which is specifically suited to foraging (hunting) at low height over open ground containing preferred prey species. Their long wings and hunting technique does not equip them for hunting in closed woodland. They were once widespread throughout Ireland but by the early 20th century their numbers had been substantially reduced (O'Flynn, 1983).</p> <p>In Ireland the Hen Harrier is confined largely to heather moorland and young forestry plantations, where they nest on the ground. They are found mainly in Counties Laois, Tipperary, Cork, Clare, Limerick, Galway, Monaghan, Cavan, Leitrim, Donegal and Kerry. The current national breeding population is estimated at 108 - 157 breeding pairs (Ruddock <i>et al.</i>, 2016). The most recent estimate of the national wintering population, from Irelands Article 12 submission to the EU, is 269-349 individuals. Wintering birds may comprise native breeding birds but also birds from overseas which visit Ireland during the winter months (Wernham <i>et al.</i>, 2002; Etheridge & Summers, 2006).</p> <p>Ireland holds the most westerly breeding population of Hen Harrier in Europe.</p> <p>It has been shown in Ireland (Wilson <i>et al.</i>, 2006) that breeding Hen Harriers avoid areas where less than 30% of the landscape comprises suitable habitats such as bog (used for foraging and nesting), rough pasture (used for foraging) or young forest (used for foraging and nesting).</p> <p>Studies have also shown that Hen Harrier demonstrate high nest fidelity (faithfulness) and use nest sites on a traditional basis (which may include different birds using sites on an annual or irregular basis over many years (e.g. Amar & Redpath, 2002, Hardey <i>et al.</i>, 2014).</p> <p>The mechanism for the selection of nesting sites by Hen Harrier is not perfectly understood and is thought to relate to micro-climatic and habitat variables (e.g. shelter, aspect, vegetation present at the actual nest location) as well as macro-habitat determinants (larger scale landscape related influences such as showing a preference for open moorland, heath, young conifer etc.) (Redpath <i>et al.</i>, 1998; Wilson <i>et al.</i>, 2009).</p> <p>Hen Harrier foraging habitat preferences during the breeding season are generally biased towards moorland, grassland mosaics and pre-thicket forest habitats which support larger numbers of prey species. Ruddock <i>et al.</i>, 2016, reported that Hen Harrier were more frequently recorded foraging over heather moorland (30%), second rotation forest (18.7%), rough grassland (12.4%) and thicket stage forest (12.4%). In a published study of 900 Hen Harrier pellets in Ireland covering winter and breeding seasons, Hen Harriers were found to have a diverse diet, which varies between areas and seasons and includes small mammals, birds, amphibians and reptiles - up to 78% of the diet of Hen Harriers in Ireland was shown to comprise passerine species of birds (Irwin <i>et al.</i>, 2012).</p>
Biodiversity Topic	<p>Hen Harrier are considered as 'central-place' foragers with most foraging taking place during the breeding season within a 'core range' of 2km from nests (SNH, 2018, Irwin <i>et al.</i>, 2012). During the breeding season females hunt closer to nest locations (typically <1km) whereas males hunt further away (Arroyo <i>et al.</i>, 2006). In a remote tracking study in the Irish context, the concentration of Hen Harrier hunting behaviour was more than 10 times higher within 1 km of the nest than it was between 2 and 5 km from the nest (Irwin <i>et al.</i> 2012).</p> <p>Hen Harrier wintering grounds are typically lowland sites below 100m. During winter, Hen Harriers gather at communal or solitary roost sites. In Ireland the majority of these roost sites are located in reed beds, heather/bog and rank/rough grassland but also fen, bracken, gorse or saltmarsh. Approximately 20% of known roosting sites in Ireland occur within close proximity to core nesting areas. In 2014, approximately 96 confirmed solitary and communal roosts were known in Ireland, and were estimated to support between</p>

219 – 313 individuals (B. O'Donoghue, pers comm cited in NPWS, 2015). Within continental Europe maximum numbers of up to 50 birds have been recorded at winter roosts, and in the Irish context, up to 10 birds has been documented (Watson, 1977). Winter hunting grounds cover a much wider range and greater variety of habitats than Summer (Watson, 1977).

8.6.1.2.2 Context

The UWF Grid Connection comprises the Mountphilips Substation site, which is located to the west of the Slieve Felim & Silvermine Mountains upland area, and the 110kV UGC which is routed from the Mountphilips Substation to the already consented Upperchurch Windfarm (UWF) Substation to the east of the upland area. The Mountphilips Substation is not located within the SPA; however, the 110kV UGC, which is 30.5km in length, passes through the boundary of the SPA for 8km in total. Where the 110kV UGC is routed outside of the Mountphilips Substation site (including through the SPA area), the 110kV UGC is entirely located within paved roads. The public road in question, through the boundary of the SPA, is the aforementioned Regional Road R503 which links Thurles to Limerick city.

The landcover of the surrounding upland area is predominately agricultural grassland and commercial forestry, with regional and local roads occurring throughout connecting the towns of Thurles, Nenagh, Cappawhite, Cappamore, Tipperary Town, Newport and Limerick city, in addition to several smaller villages such as Hollyford, Upperchurch, Kilcommon, Rear Cross, Murroe, Doon and Silvermines.

This upland area also includes the Slievefelim to Silvermines Mountain Special Protection Area (SPA), which is a European Site designated under the EU Birds Directive (2009/147/EC) of special conservation interest for Hen Harrier.

The Slievefelim to Silvermines Mountain SPA as a whole covers 20,917ha¹⁸, has held between seven (2010) and ten (2015) pairs of nesting Hen Harrier (Ruddock *et al.*, 2016), and is considered one of the strongholds for Hen Harrier in the country. The SPA has a high proportion (70%) of suitable habitat, totalling 14,552ha (extrapolated from data in Moran & Wilson-Parr, 2015). Within the SPA, nesting Hen Harriers have shown a preference to nest in the early stages of new and second-rotation conifer plantations, though some pairs may still nest in tall heather of unplanted bogs and heath¹⁹. Hen Harrier surveys, carried out between 2016 and 2019 for the UWF Grid Connection, found that Hen Harriers within the UWF Grid Connection Study Area all nested within this SPA – no nests were recorded outside of the SPA boundary.

In terms of the proposed development, the Mountphilips Substation is not located within the SPA; however, the 110kV UGC, which is 30.5km in length, passes through the boundary of the SPA for 8km in total. Where the 110kV UGC is routed outside of the Mountphilips Substation site (including through the SPA area), the 110kV UGC is entirely located within paved roads. The public road in question, through the boundary of the SPA, is the aforementioned Regional Road R503 which links Thurles to Limerick city. In relation to traffic volumes, while the R503 is not a congested road, there is some variation in traffic usage along the route dependant on proximity to local facilities such as schools, with traffic levels higher nearer to Newport. There are 317 houses and 17 community facilities within 100m of the route of the 110kV UGC.

¹⁸ <https://www.npws.ie/sites/default/files/protected-sites/natura2000/NF004165.pdf>

¹⁹ <https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY004165.pdf>

<div>Hen Harrier</div> <div>Sensitive Aspect</div>	8.6.1.2.3 SPA Connectivity
	<p>Guidance is available from Scottish Natural Heritage (SNH) to assist in establishing levels of connectivity to designated SPA's. Connectivity distances per species included are set out from a literature review that examined ranging behaviour. SNH specifically recommends that <i>"in most cases the core range should be used when determining whether there is connectivity between the proposal and the qualifying interests"</i>. A core foraging range of 2km from nests sites during breeding is presented for Hen Harrier in this Best Practice Guidance (SNH 2018).</p> <p>As the proposed development passes through the boundary of the SPA for over 8km, connectivity is assumed.</p>
<div>Biodiversity</div> <div>Topic</div>	8.6.1.2.4 Nearest Nesting Sites to UWF Grid Connection
	<p>In line with the justification as set out in Table 8-45, nests within 2km of the proposed development have been identified for the current appraisal over a study period spanning 2017-2019 inclusive. However, a precautionary approach has been taken to include the presentation of nest data out to 3km from the proposed development – this reflects that in certain instances the central point of observed breeding activity is often variable within a breeding season or inter-annually, and due to this potential for variation, it is considered that this more comprehensive, precautionary approach is required for completeness.</p> <p>Methods for the current study included a systematic review of desktop information, consultation with local experts and NPWS and fieldwork in line with Best Practice methods. The results of previous Hen Harrier surveys (2016, 2017 to inform the previous 2018 UWF Grid Connection planning application PL92.301959), and 2019 fieldwork to identify breeding behaviour (in April 2019) and active nests (in June and July 2019) within the study area are presented. For the purpose of this appraisal, all confirmed nests and /or centre points of observed breeding behaviour are considered as nesting attempts, in line with a precautionary approach²⁰ and established Best Practice in the evaluation of nesting attempts (see Section 8.1.8.8).</p> <p>For the avoidance of doubt, although studies conducted in 2016 and 2017 were in relation to a different 110kV UGC route for the previous 2018 UWF Grid Connection application (PL92.301959) and therefore different study extent, consultation with local experts and NPWS was undertaken in 2019 for the current appraisal to determine whether or not additional nests were known from any areas outside the prior study extent. Results of this consultation was used to scope possible territories requiring survey in 2019 (within 2km of the now proposed route of the 110kV UGC) in line with Best Practice (Hardey <i>et al.</i>, 2014) and for which the results are herein presented. Based on information on nest territories in 2016-2018 obtained through consultation, the 2019 study results which confirm the location of these previously identified territories, and the cautionary approach in assigning nest status to any observed breeding activity, data presented herein is considered complete and sufficient to inform the evaluation of likely significant effects.</p> <p>Hen Harrier nests and/or nesting attempts for the period 2016-2019 and within 3km of the proposed development are shown in Table 8-46. In general terms there are 7 traditional nesting territories within and up to 2km from the proposed development (A-G) - with a further 3 traditional territories within 3km (H-J); i.e. 10 traditional territories in total within 3km. Not all of these are occupied in any given year, however, with, for example, only 7 of the 10 territories confirmed as active during the 2019 breeding season.</p> <p>For the period 2016-2019, 9 nests were recorded within 2km, with a further 3 nests within 3km, and 1 nest at 3.2km from the development (13 nests in total), all of which were located on lands within the SPA boundary, (note that nest locations G1, G2 and G3 are considered to be the same occupied territory, as are locations H1 and H2, with slight inter-annual variation in the exact nest location within that territory). Four</p>

²⁰ Not all breeding activity observed potentially becomes a breeding attempt- however a precautionary principle is applied.

of the seven active territories identified in 2019 had successful nests (i.e. these were still active in July 2019 having either recently fledged young or with large chick(s) still in the nest at that time).

In line with Best Practice, the background mapping, townlands, geographical context, precise locations of nests are not provided, to protect Hen Harrier, however the approximate core ranges are identified on **Figures GC 8.6.2.1 to GC 8.6.2.10: Habitat Suitability within the Core Foraging Range of Hen Harrier Nests.**

Table 8-46: Identified Hen Harrier Nests within 3km of the proposed UWF Grid Connection, 2016-2019

Nest	Distance to UWF Grid Connection (km)	Most recent year when active
A	0.6	2016
B	1.0	2019
C	0.9	2019
D	1.5	2019
E	1.8	2019
F	2.0	2019
G1	1.8	2019
G2	2.0	
G3	1.9	
H1	2.6	2019
H2	3.2	
I	2.4	2016
J	2.6	2017

With regard to proximity to works and therefore exposure to source impact pathways for possibly significant effects, the closest identified nest in any year to the proposed UWF Grid Connection development was 0.6km away (breeding territory A in 2016), with the closest active nest (or centre-point of a territory) in 2019 0.9km from the nest (breeding territory C).

No nest occurs closer than 600m to the proposed development. No nests were recorded within 2km of the Mountphilips Substation site, with the nearest nest being 4.6km from Mountphilips (Nest A in 2016).

8.6.1.2.5 Nesting Habitat in the UWF Grid Connection Study Area

As noted earlier, Hen Harrier are essentially central place foragers, with most foraging taking place during the breeding season within 2km of nests. They are also faithful to traditional nesting sites or territories and regularly nest year after year in the same general location (Hardey *et al.*, 2014). The heretofore identified nests (A-J) are therefore reasonably considered to accurately reflect any short-term nesting or likely nesting territories which may overlap the proposed time period for construction.

Nevertheless, cognisance is being given in the current evaluation to the general availability of nesting habitat, within 2km of the proposed development, notwithstanding whether Hen Harrier territories have been recorded within this area. This is to provide contextual information on the general availability of nesting habitats and to allow for evaluation if required of the degree of displacement habitat available for nesting harrier within the study zone stipulated in Guidance.

All habitats within 2km of the proposed UWF Grid Connection development (whether within the SPA or outside the SPA) were evaluated for their suitability as nesting habitat for Hen Harrier. Habitats identified as suitable for nesting by Hen Harriers within 2km of the proposed UWF Grid Connection were wet grassland, peatland habitats (including heath), scrub, dense bracken and both pre- and post-thicket forestry (as per

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<div>Hen Harrier</div>	<p>Ruddock <i>et al.</i>, 2016). Habitats considered unsuitable for <u>nesting</u> included agricultural grasslands (including improved grasslands and rough grazing), clearfell, hedgerows and treelines (Ruddock <i>et al.</i>, 2016).</p> <p>Of the 8,343ha of lands present within 2km of the proposed UWF Grid Connection development, 3,580ha (43%) was considered to provide suitable nesting habitat for Hen Harrier, with 4,763ha (57%) classed as unsuitable. The latter percentage includes all the lands at Mountphilips – there is no suitable nesting habitat at this location.</p> <p>The availability of suitable habitats within 2km of the proposed UWF Grid Connection therefore exceeds the 30% threshold indicated by Wilson <i>et al.</i> (2006) for Hen Harriers to use the landscape.</p> <p>However, while there is sufficient nesting habitat (43%) to support Hen Harrier within 2km of the UWF Grid Connection, at closer distances to the proposed UWF Grid Connection the habitats are considered to be less attractive at least to nesting Hen Harriers - within 50m of the proposed UWF Grid Connection works for example, all habitats (a total of 340ha), only comprised 38ha (11%) as suitable nesting habitat for Hen Harrier. This undoubtedly reflects the location of the route of the 110kV UGC on primarily public road.</p>
	<p>In line with Best Practice, the background mapping, townlands, geographical context, precise locations of nests are not provided, to protect Hen Harrier, however all habitats within 2km of nests are identified on Figures GC 8.6.3: Habitat Suitability within 2km of UWF Grid Connection.</p>
<div>Sensitive Aspect</div>	<p>8.6.1.2.6 Foraging habitat within the 2km core range of identified nests</p> <p>The consideration of the availability of suitable <i>foraging</i> habitat is required to determine the likelihood of source impact pathways related to disturbance impacting on foraging Hen Harrier, during the breeding season and potentially resulting in reduced breeding success.</p> <p>Hen Harriers primarily forage within 2km of the nest, and therefore this core range of 2km around identified nests has been selected for further consideration.</p> <p>Within this radius of nests <i>breeding</i> Hen Harrier will be more susceptible to displacement related effects where sources of disturbance occur within 150m of suitable foraging habitat (based on the Minimum Approach Distance or MAD presented in Table 8-1). A subset therefore of all suitable habitats within 2km of an identified nest location, and which also occur within 150m of proposed works is examined further within Section 8.6.4 Evaluation of Impacts (see also Section 8.6.1.4 Sensitivity of Hen Harrier).</p> <p>Collectively, the total area of lands suitable for foraging Hen Harrier within 2km of all nests combined comprise 3580ha or 43% of the total lands within 2km of all identified Hen Harrier nests (8343ha). Linear features comprising 255km are also present which may offer foraging opportunities.</p> <p>On an ‘individual territory’ basis, none of the 10 regularly occupied territories currently (2019) have less than 33% foraging habitat available (range 33%-54%) within 2km of their individual nest locations (or identified central point of territory).</p>
	<p>As noted, at least 30% suitable habitat is required for an area to be attractive to Hen Harrier. Foraging habitat analysis demonstrate that there is foraging habitat greater than this threshold available within the core foraging range comprising a 2km radius of the nests identified, individually (33% - 54%), collectively (43%) and also on a per territory basis.</p> <p>In line with Best Practice, the background mapping, townlands, geographical context, precise locations of nests are not provided, to protect Hen Harrier, however all foraging habitat within 2km of nests are identified on Figures GC 8.6.2.1 to GC 8.6.2.10: Habitat Suitability within the Core Foraging Range of Hen Harrier Nests.</p>
<div>Biodiversity</div>	

8.6.1.2.7 Winter Roosting Habitat in the UWF Grid Connection Study area

In the winter months harriers often roost communally, typically in habitats such as reedbeds and heather less than 100m above sea level (ASL). However, small numbers of communal roosts exist at higher altitudes. Roosts are often traditionally used sites (Clarke & Watson, 1990), and selection of same may not be based on habitat suitability alone, with other factors such as land use change, levels of disturbance, etc. being critical determinants (Clarke & Watson, 1990).

In relation to roost sites, suitable roosting habitats (reed beds, heather/bog and rank/rough grassland but also fen, bracken, gorse) are not widely available, with very small fragmented patches of habitat are located within 2km of UWF Grid Connection. Specific roosts are described in Section 8.6.1.2.8 below - it is considered that these comprise the only roost locations likely to be used with sufficient frequency to be considered in terms of possible source impact pathways.

8.6.1.2.8 Winter Roosts in the UWF Grid Connection Study Area

No communal roost was identified within 2km of UWF Grid Connection during 2016-2018 surveys. 1 no. roosts exist at 2.1km from the UWF Grid Connection in Goulmore townland, with 2 further roosts between 3km and 3.6km from the UWF Grid Connection (110kV UGC). Based on desktop review, and the results of scoping and consultation with local NPWS/Hen Harrier surveyors no other roosts have been identified. There are therefore no known roosts within the likely zone of effect of the proposed development.

Based on studies conducted for the previous planning application (PL92 .301959) the roost population of the UWF Grid Connection study area was previously estimated as 0-5 birds (based on a maximum of 5 birds recorded concurrently across all roosts on any given day, from 2 winter seasons of effort). This has the potential to increase or decrease dependant on inter-annual variation, weather or other factors. The maximum count of 5 birds at any individual roost (comprising 4 adult males and one female) was only recorded on a single occasion, in January 2018.

Further details on Hen Harrier fieldwork & survey results are included in [Appendix 8.4: Hen Harrier Fieldwork & Survey Results](#).

Further details on Upperchurch Windfarm Hen Harrier surveys are included in [Appendix 8.5: Hen Harrier Surveys at Upperchurch Windfarm 2015 - 2017](#).

Further details on Milestone & Inchivara Wind Farm Hen Harrier surveys are included in [Appendix 8.6: Milestone & Inchivara Wind Farm Hen Harrier Survey 2015 2017](#).

8.6.1.3 Importance of Hen Harrier

Hen Harrier is listed on Annex I of the EU Birds Directive 2009/147/EC. In 2007, six Special Protection Areas (including the Slieve Felim to Silvermines Mountains SPA) were designated across the country with breeding populations of Hen Harrier as the sole Special Conservation Interest to ensure the conservation of the species. The breeding population of Hen Harrier is Amber listed on the most recent Birds of Conservation Concern in Ireland 2014 – 2019 (Colhoun and Cummins, 2013). The Slievefelim to Silvermines Mountain SPA is only designated for breeding hen harrier. Both breeding and wintering Hen Harrier present are evaluated as Internationally Important and assigned a sensitivity rating of **Very High** (in accordance with Section 8.1.8.1 Methodology) for the purpose of evaluation.

Hen Harrier

Sensitive Aspect

Biodiversity

Topic

Hen Harrier	8.6.1.4 Sensitivity of Hen Harrier	
	8.6.1.4.1 Sensitivity to Habitat Loss	
Sensitive Aspect	<p>Studies have shown that most foraging takes place within 2km of the nest site, and as per SNH Guidance this is considered the core foraging range for Hen Harrier during the breeding season. The magnitude of effects is distance (to nearest nest) dependant, as both frequency of occurrence and foraging intensity decreases with distance from the nest. Of particular importance and where pathways for likely significant effects are more likely are lands which provide high quality foraging habitat within 2km of nests and on which breeding Hen Harrier (male or female birds) may be dependent during key periods of the breeding cycle such as provisioning young. Loss of suitable habitat may affect breeding success/productivity for one whole cycle, or until vegetation is re-instated both when considered alone and in combination with other possible sources of loss.</p>	
	8.6.1.4.2 Sensitivity to disturbance	
Biodiversity	<p><i>At the nest</i></p> <p>Hen Harriers are known to be sensitive to disturbance at the nest (Masden, 2010, Pearce-Higgins <i>et al.</i>, 2012). The effects of significant disturbance to Hen Harrier may be nest desertion, reduced incubation periods (resulting in embryo mortality), or additional stress on adult birds due to their propensity to alarm at intruders. Some or all of these effects may result in longer term abandonment of (traditionally held) nesting areas, with resultant local and/or population level effects.</p> <p>Whilst raptors in general may accept short infrequent disturbance events proximal to nests, and may even be highly tolerant of certain sources of disturbance, sudden changes during critical periods such as the start of the breeding season may provoke a higher level of response (Petty, 1998) with consequent effects on breeding success and local reproductive rates.</p> <p>Ruddock and Whitfield, 2007, provides background citations from the grey literature on disturbance to Hen Harriers from construction and human activities (e.g. Brown and Amadon 1968, Newton 1979). In addition, the paper cites further references to buffer zone recommendations within the literature, such as Romin and Muck (1999), who recommended a 500m buffer for Northern Harrier, a species very similar to Hen Harrier, and formerly considered conspecific (i.e. the same species). The expert review of disturbance presented by Ruddock and Whitfield (2007) suggests active disturbance events during the incubation (part of breeding) period for Hen Harrier are, in the view of the majority of experts, likely to occur at <10-500m from a nest.</p> <p>Hen Harrier, whilst at the nest, are evaluated as potentially sensitive to disturbance from construction related activities (during the breeding season) at distances of 500m or less.</p>	
	<p><i>Whilst foraging</i></p> <p>There have been no specific studies examining the flight initiation distance (FID) of Hen Harriers to human disturbance. However, 150m is the Minimum Approach Distance (MAD) (Livesey <i>et al.</i>, 2016) indicated for likely disturbance in respect of Falconiformes (the family of birds with characteristics most similar to Hen Harrier).</p> <p>A study on FIDs on Northern Harrier <i>Circus cyaneus hudsonius</i> from aircraft suggested a mean FID of 70m (Booms <i>et al.</i>, 2010) implying that birds may react to disturbance of similar magnitude (90db) at a distance of 105m. In a wider review of FIDs, Livesey <i>et al.</i> (2016) indicated a mean FIDs for Falconiformes of 89.7m (with a Minimum Approach Distance (MAD) 134.5m) (for pedestrian-based disturbance) and 79.7m (MAD 119.5m) (for motorized vehicles). However, birds will be habituated to certain background activities and react less to artificial noise versus the presence of humans.</p>	
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Collectively, these data would conservatively suggest that the MAD indicated in Livesey *et al.*, 2016 is acceptable to assume for the current appraisal, and therefore it is concluded that foraging Hen Harrier are unlikely to be impacted by disturbance events over 150m away and within this distance only events of similar magnitude to the sources described (e.g. at 90dB) may have any effect. A 150m buffer of the proposed development is taken as the zone wherein effective habitat loss may take place following disturbance through noise or visual intrusion, should suitable foraging habitat be present within this radius of works which also overlaps the 2km core foraging range of any given nest location. Breeding Hen Harrier are evaluated as sensitive to disturbance within this distance (150m) from works – given the potential for secondary effects on breeding success.

Hen Harrier

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8.6.1.4.3 Sensitivity of Roosting Hen Harrier

As a species that disperses widely during the winter from breeding sites (Watson, 1977), Hen Harrier are less restricted to specific foraging areas (i.e. non-breeding birds are not territorial) during the non-breeding season. As a consequence, foraging Hen Harrier are evaluated as less sensitive to disturbance at this time, as any individual encountering sources of disturbance will not be tied to a defined territory, and would have ample displacement habitat available within which to forage in the event of a brief disturbance event.

In relation to disturbance in proximity to winter roosting sites; birds are known to forage extensively from regularly used roosting sites (at least up to 24km see Watson, 1977) (compared to a 2km core range for nesting sites) and, in comparison to during the breeding season show little fidelity²¹ both of which reduce sensitivity to disturbance related effects.

Windfarms and associated infrastructure have not been explicitly defined as a threat or pressure on roosts within the Irish context.

8.6.1.4.4 Positive Sensitivity towards habitat creation or sympathetic management

Hen Harriers are positively sensitive to the creation of or sympathetic management of foraging and nesting habitat within their traditional range (Forrest *et al.*, 2011). Multiple studies exist where Hen Harriers have continued to nest and forage in close proximity to operational wind energy developments where inclusive habitat 'enhancement' was provided (Forrest *et al.*, 2011; Robson, 2011 as cited in NPWS, (draft) 2017²²).

8.6.1.5 Trends in the Baseline Environment (the 'Do-Nothing' scenario)

Four national surveys have been undertaken to assess the conservation status of Hen Harrier in Ireland (Norriss *et al.*, 2002; Barton *et al.*, 2006; Ruddock *et al.*, 2012; Ruddock *et al.*, 2016). The most recent survey recorded 108 to 157 breeding pairs (Ruddock *et al.*, 2016). This was lower than the breeding population estimate for 2010 of 128 to 172 breeding pairs (Ruddock *et al.*, 2012), similar to the estimate of breeding pairs in 2005 of 132 to 153 (Barton *et al.*, 2006) and slightly higher than the results of the first national survey which estimated 102 to 129 breeding pairs (Norriss *et al.*, 2002).

The Slievefelim to Silvermines Mountains SPA was one of only two SPAs to record an increase in breeding territories between 2005 and 2015 (Ruddock *et al.*, 2016). It also had the greatest proportional increase in population, with an estimated population of five pairs in the SPA in 2005 rising to a total of ten pairs being

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²¹ NPWS.2015. Hen Harrier Conservation and the Forestry Sector in Ireland.

²² NPWS. 2017. *Hen Harrier Conservation and the Renewable Energy Sector in Ireland (Draft)*.

estimated in the SPA in 2015. Apart from the Slieve Bloom Mountains SPA, where the Hen Harrier population rose from five pairs in 2005 to 13 pairs in 2015, the remaining four SPAs designated for the conservation of Hen Harrier all showed reductions in the number of breeding territories recorded from 2005 to 2015 (Ruddock *et al.*, 2016).

Habitat use in the 2015 National Survey of Hen Harrier indicated that second rotation forestry was the most common nesting habitat selected followed by heather. Out of 108 confirmed nesting territories, 64 (59%) were in second rotation forestry with 28 nests (26%) of nests in heather. More scarcely used habitats included scrub (nine nests), first rotation forestry (six nests) and failed forest (one nest).

8.6.1.6 Receiving Environment (the Baseline + Trends)

At a national level, 5-year interval trends show that the Hen Harrier population appears to be in decline, however the population in Slievefelim to Silvermines Mountains SPA is at least stable or on the increase. Changes in the supporting habitat, such as the maturation of 2nd rotation forestry (selected for nesting) or land management changes to further nesting and foraging habitat, are unlikely to produce a declining trend by the time the subject development is under construction. It is assumed in this report that the baseline environment in relation to Hen Harrier, as identified above, will be the receiving environment at the time of construction. Longer term trends have been identified with respect to forestry, such as a declining trend in the amount of (nesting) habitat available within the SPA and are likely to overlap the operation phase. The following is cited directly from the document titled “Hen Harrier Conservation and the Forestry Sector in Ireland”, published by NPWS in 2015:

“Forests less than 15 years old constitute to varying degrees a potential foraging resource for Hen Harriers. In line with the forecasted reduction in the extent of the forest nesting resource, indicative future estimates of the extent of the potential forest foraging resource within the SPA network shows an acute declining trend over the next 10 years²³”. This negative trend is also applicable to the Slieve Felim to Silvermines Mountains SPA.

In relation to forest nesting habitat, it is projected for the period 2012 – 2025 that all SPAs will undergo an acute reduction in the extent of forest that is of use to the Hen Harrier as a nesting resource. The overall decline is estimated to be 42% for this period when only 11% of the entire forest estate in the SPA network will constitute a potential nesting resource for forest nesting Hen Harrier. The projected decline of this resource varies between the SPAs from approximately 24% (Stack’s to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA) to 82% in Slieve Beagh SPA. Accordingly, it will likely be after 2035 before the net estimated usable forest nesting habitat will exceed present levels. Within the Slieve Felim to Silvermines SPA the estimated extent of forest within the SPA that is potentially usable as Hen Harrier nesting habitat is expected to decline from 23% (in 2012) to 11% within the period 2012-2025 and thereafter increase up to 44% by the year 2045.

²³ NPWS.2015. Hen Harrier Conservation and the Forestry Sector in Ireland.

8.6.2 CUMULATIVE INFORMATION - Cumulative Projects & Baseline Characteristics

8.6.2.1 Cumulative Evaluation Study Areas

8.6.2.1.1 UWF Grid Connection Cumulative Evaluation Study Area

The UWF Grid Connection was evaluated for cumulative effects with other projects and the study area is set out in the table below.

UWF Grid Connection Cumulative Evaluation Study Area for Hen Harrier	Justification for the Study Area Extents
<p>2km from the UWF Grid Connection construction works area boundary in all directions</p> <p>4km from UWF Grid Connection construction works areas to identify Other Projects or Activities which could contribute to cumulative effects.</p>	<p>Cumulative impacts should be assessed at the relevant biogeographical scale, so that the assessment of the impact of the development can be made alone and in combination with other developments- SNH 2018²⁴</p> <p>Little information is available on the effects of grid infrastructure construction activities on breeding Hen Harriers, although effects from large scale development such as wind farms at distances of up to 1km from nests has been reported (Ruddock & Whitfield, 2007, Wilson <i>et al.</i>, 2015). An area of twice this has been conservatively selected in line with Best Practice, (SNH, 2017). This area is considered conservative in the context of the proposed UWF Grid Connection, which may not have the same magnitude of source impacts during construction and/or operation as other larger developments cited in the references above.</p> <p>The study area is doubled to identify those Other Elements (or Other Projects or Activities) which may cause cumulative effects.</p>

The study is illustrated on **Figure CE 8.6 UWF Grid Connection Cumulative Evaluation Study Area for Hen Harrier**.

8.6.2.1.2 Whole Project Cumulative Evaluation Study Area

UWF Grid Connection is part of a whole project which comprises the following Other Elements; Element 2: UWF Related Works, Element 3: UWF Replacement Forestry, Element 4: Upperchurch Windfarm (UWF), and Element 5: UWF Other Activities. The Subject Development, UWF Grid Connection is Element 1. All five elements are collectively referred to as the Whole UWF Project in this EIA Report.

The Other Elements must be considered because UWF Grid Connection is part of a whole project. Therefore, the cumulative information and evaluations for the Other Elements of the Whole UWF Project are included in order to present the totality of the project.

A description of these Other Elements is included in this EIA Report at **Appendices 5.3, 5.4, 5.5 and 5.6**, in **Volume C4 EIAR Appendices**. Scoping of these Other Elements is presented in **Section 8.6.2.2.1** below.

²⁴ Scottish Natural Heritage. (2018). *Assessing Significance of Impacts from Onshore Wind Farms Outwith Designated Areas*. SNH, Battleby.

The Whole Project Cumulative Evaluation Study Area comprises of the UWF Grid Connection Study Area along with the study areas for Other Elements and Other Projects or Activities which are described in Table 8-47 and illustrated on **Figure WP 8.6: Whole Project Study Area for Hen Harrier** (Volume C3 EIAR Figures).

Table 8-47: Cumulative Evaluation Study Area for Hen Harrier

Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
Element 1: UWF Grid Connection	2km from the construction works/afforestation area boundaries in all directions for whole project effect; 4km from construction works areas to identify Other Projects or Activities which could contribute to cumulative effects.	As per SNH (2017) guidance
Element 2: UWF Related Works		Research on the spatial ecology of Hen Harriers has shown that foraging females spend most of their time within 1km of the nest, while males hunt mostly within 2km of the nest (Arroyo <i>et al.</i> , 2009, Irwin <i>et al.</i> , 2012, Arroyo <i>et al.</i> , 2014).
Element 3: UWF Replacement Forestry		
Element 4: Upperchurch Windfarm (UWF)		The study area is doubled to identify those Other Elements (or Other Projects or Activities) which may cause cumulative effects.
Element 5: UWF Other Activities		

8.6.2.2 Scoping of Other Elements, Other Projects or Activities & for Potential for Impacts

The evaluation of cumulative impacts to Hen Harrier also considered Other Projects or Activities. A scoping exercise was carried out to determine which projects or activities, if any, have potential to cause cumulative effects with either the UWF Grid Connection or with any of the Other Elements of the Whole UWF Project and therefore should be brought forward for evaluation in this topic chapter. A brief overview of these Other Projects or Activities and the scoping exercise by the topic authors is included in **Appendix 2.1: Scoping of Other Projects or Activities for Cumulative Evaluations (Section A2.1.4.8)**.

Milestone Windfarm (existing), Rear Cross Quarry (existing), Castlewaller Windfarm (consented windfarm and potential grid connection), and Bunkimalta Windfarm (potential windfarm and consented grid connection, and the activities: Forestry, Agriculture and Turf-Cutting (in the surrounding areas) have been scoped in for evaluation of cumulative effects to Hen Harrier.

8.6.2.2.1 Potential for Impacts to Hen Harrier

An evaluation was carried out by the topic authors of the likelihood for the Other Elements of the Whole UWF Project and for the Other Projects or Activities to cause cumulative effects to the Sensitive Aspect Hen Harrier. The results of this evaluation are included in Table 8-48.

The location of, and study area boundary associated with, the Other Elements and Other Projects or Activities which are included for cumulative evaluation is illustrated on **Figure WP 8.6**. The baseline character of the areas around these Elements is described in Section 8.6.2.3.

Table 8-48: Results of the Evaluation of the Other Elements and Other Projects or Activities

Other Element of the Whole UWF Project	
Element 2: UWF Related Works	<u>Included</u> for the evaluation of cumulative effects
Element 3: UWF Replacement Forestry	<u>Included</u> for the evaluation of cumulative effects
Element 4:	<u>Included</u> for the evaluation of cumulative effects

Upperchurch Windfarm (UWF)		Hen Harrier
Element 5: UWF Other Activities	<u>Included</u> for the evaluation of cumulative effects <u>(with the exception of Haul Route Activities HA 1 to HA20, which are evaluated as excluded as these activities do not have potential to act as a source for impacts on Hen Harriers due to their negligible magnitude in terms of source disturbance and location on public roads and have been scoped out accordingly).</u>	
Other Project or Activity		
Milestone Windfarm (<i>existing</i>) Rearcross Quarry (<i>existing</i>) Castlewaller Windfarm (<i>consented windfarm & potential grid connection</i>) Bunkimalta Windfarm (<i>potential windfarm, consented grid connection</i>) Forestry (in the surrounding area) Agriculture (in the surrounding area) Turf-Cutting (in the surrounding area)	<u>Yes, included</u>	Sensitive Aspect

8.6.2.3 Cumulative Information: Baseline Characteristics – Context & Character

8.6.2.3.1 Element 2: UWF Related Works

The location of the 5 No. different parts of UWF Related Works are outside of the SPA, except for one overlap to the north of Haul Route Works HW7 (however HW7 does not require works or vegetation clearance within the SPA boundary). See [Figure WP 8.6](#).

Nesting Habitat within 2km of UWF Related Works

A desk-top assessment on habitat availability for nesting Hen Harriers within 2km of the UWF Related Works was undertaken from aerial photography interpretation. A ground-truthing exercise was then undertaken on these data to identify undetermined habitats and check a sample of the aerial photography interpretation.

A total of 5,455ha of lands were assessed within the 2km buffer of the UWF Related Works. Of this, 1,341 (24.6%) was considered to provide suitable nesting habitat for Hen Harrier, with 4,114ha (75.4%) classed as unsuitable.

Foraging Habitat

A similar exercise to the above was also undertaken to determine the extent of foraging habitat within 2km of the UWF Related Works. Habitats identified as suitable for foraging by Hen Harriers within 2km of UWF Related Works were all peatland habitats (including heath), freshwater marsh, wet grassland, mosaic grasslands (including those with rush cover and rough grazings), scrub, dense bracken, pre-thicket forestry (i.e. forests where there the canopy has not closed), clearfell, hedgerows and treelines. Habitats considered unsuitable for foraging included improved agricultural grasslands and dense (closed-canopy) woodland.

Out of the 5,455ha of lands that were evaluated, 2,050 (38%) was considered to provide suitable foraging habitat for Hen Harrier, with 3,405ha (62%) classed as unsuitable.

In addition, to look at the zone of potential disturbance to foraging Hen Harriers, all foraging habitats within 150m of the UWF Related Works (i.e. the Minimum Approach Distance for Hen Harriers) were also examined for their suitability for foraging Hen Harriers. Out of a total of 560ha, 152ha (27%) were classed as suitable foraging habitat for Hen Harrier with 408ha (73%) classed as unsuitable.

Roosting Habitat within 2km of UWF Related Works

In relation to roost sites, suitable roosting habitats (reed beds, heather/bog and rank/rough grassland but also fen, bracken, gorse) are not widely available, with very small fragmented patches of habitat located within 2km of UWF Related Works.

Nearest Nesting and Roost Sites

For the current appraisal a further review of desktop information and consultation with local experts, and NPWS has been undertaken. No Hen Harrier nest locations/breeding sites are recorded within 1km of the UWF Related Works element, or within 1km of the consented Upperchurch Windfarm boundary. None are present within a further radius of 2km (the closest nesting attempt in 2019 was 4.8km from the boundary of the UWF Related Works).

The nearest known *historical* nest location to the UWF Related Works is that within the townland of Knockalough, located ca. 2.5 km to the south; no confirmed nest has occurred here in recent years (i.e. 2016-2019) and the last confirmed nesting attempt was in 2014. This nest is not included in Table 8.49.

Previously a nest has been located at Curreeny, to the northwest of UWF Related Works, and at Glenough Windfarm, to the south of UWF Related Works. The Curreeny nesting territory has not been confirmed active since 2014, was not active in 2019 and is also not included in Table 8.49. The Glenough nesting territory (adjacent to the operating Glenough Windfarm) has been active in recent years up to and including 2019. Due to separation distance from the proposed UWF Grid Connection, this nest has not been included in Table 8.49.

For the avoidance of doubt, Table 8-49 below outlines the distance in kilometers from all identified nests (2016-2019) to UWF Related Works (construction works boundary). For completeness all nests identified in Section 8.6.1.2.4) are included. Distances are also provided to the Upperchurch Windfarm (UWF) 2013 Study area and the nearest Consented UWF Turbine.

Table 8-49. Historical and Recently Active Hen Harrier Nests 2016-2019*

Nest	Within SPA	Last Confirmed as active	Distance to UWF Related Works (CWB) (km)	Distance to Upperchurch Windfarm 2013 Study Area (km)	Distance to nearest Consented UWF Turbine Location (km)
A	Yes	2016	15.8	16.9	17.1
B	Yes	2019	14.0	15.2	15.5
C	Yes	2019	12.9	13.9	14.1
D	Yes	2019	11.8	13.0	13.3
E	Yes	2019	10.5	11.8	12.1
F	Yes	2019	9.3	10.7	11.0
G1	Yes	2019	6.6	7.5	7.5
G2	Yes		6.5	7.4	7.4
G3	Yes		6.3	7.2	7.2
H1	Yes	2019	4.5	5.3	5.3
H2	Yes		4.8	5.3	5.4
I	Yes	2016	13.6	14.5	14.7
J	Yes	2017	12.7	13.4	13.7

*Distances to the Upperchurch Windfarm 2013 study area and nearest Consented UWF Turbine locations are provided for completeness.

No Hen Harrier nests are present within 2km of the UWF Related Works boundary, either inside the SPA or outside the SPA.

For the period covered by the current evaluation (2016-2019 inclusive) the closest nest (H1) within the SPA to UWF Related Works is 4.5km to the west of the nearest point of construction works.

Winter Roosts within 2km of UWF Related Works

No communal roosts within 2km of UWF Related Works were identified during 2012 – 2017, or 2017/2018 surveys, or are known to exist in the area based on desktop review, and the results of scoping and consultation with local NPWS/Hen Harrier surveyors.

Connectivity to Designated Sites – Separation distance of UWF Related Works to the SPA

The location of the 5 No. different parts of UWF Related Works are outside of the SPA, except for one overlap to the north of Haul Route Works HW7 (however HW7 does not require works or vegetation clearance within the SPA boundary). Otherwise, the nearest boundary of the SPA is:

- 580m to the west of Internal Windfarm Cabling;
- 173m to the west of Realigned Windfarm roads;
- 157m west of Haul Route Works;
- and 805m west of Telecom Relay Pole.

Connectivity to Designated Sites – Scottish Natural Heritage Guidance

Considering the SNH recommendation that it is the core range (2km) which should be used when determining connectivity, given the limited amount of foraging habitat available for Hen Harrier within 2km of UWF Related Works and, importantly, no known precedent for traditional usage by Hen Harrier, it is considered that nesting pairs within the SPA do not currently rely on hunting habitat within the consented Upperchurch Windfarm or within the construction works area boundaries of the UWF Related Works²⁵.

In the period since the submission of the Appeal to An Bord Pleanála, surveys conducted in 2019 at the UWF Related Works site, in April and July, in line with Best Practice (SNH 2017) and overlapping periods of known peaks in Hen Harrier activity, recorded no flight activity by Hen Harrier within 500m of UWF Related Works. The new findings presented herein are not considered to conflict with evaluations previously presented in respect of UWF Related Works (PL92.303634).

8.6.2.3.2 Element 3: UWF Replacement Forestry

The UWF Replacement Forestry location comprises primarily improved agricultural grassland, which is of low attractiveness for foraging Hen Harrier. No breeding or winter roost habitat is present. The nearest nest to UWF Replacement Forestry is H1 at 6.8km distant.

The UWF Replacement Forestry is located outside of the SPA boundary. See [Figure WP 8.6](#).

8.6.2.3.3 Element 4: Upperchurch Windfarm

The consented Upperchurch Windfarm is the subject of a Hen Harrier Management Plan as part of the 2014 Grant of Permission. This Hen Harrier Management Plan is described in the 2013 RFI and sets out to enhance and promote habitat on lands close to the windfarm site to benefit foraging Hen Harrier. The Hen Harrier Management Plan is evaluated in this application as part of the UWF Other Activities and referred to as the 'Upperchurch Hen Harrier Scheme'.

The Upperchurch Windfarm is outside the Slievefelim to Silvermines Mountains SPA. With regard to the Upperchurch Windfarm, Hen Harrier were not recorded as breeding within the study area for the 2013 EIS and the habitat was evaluated as 'sub-optimal', see [Figure WP 8.6](#).

²⁵ See also the NPWS submission to Tipperary County Council on Related Works.

A desk-top assessment on habitat availability for nesting Hen Harriers within the 2013 Windfarm Study Area was undertaken from aerial photography interpretation in 2019. A total of 407ha of land were assessed. Of this, 127ha (31.2%) was considered to provide suitable nesting habitat for Hen Harrier.

In respect of foraging habitats, out of the total of 407ha of lands that were assessed (within the 2013 EIS study area), 95ha (23.3%) was considered to provide suitable foraging habitat for Hen Harrier. In addition to these habitats, a total of 10.6km of hedgerows and treelines were also identified which may offer foraging opportunities to Hen Harrier. The relatively low percentage of suitable foraging habitat is considered a limiting factor to this area attracting Hen Harrier and considered in line with the previous evaluation (2013) of the site as 'sub-optimal'.

Foraging at low frequency during the summer months has been described in the 2013 EIS. Similarly, habitats may be utilised for foraging during the winter months, however no suitable winter roost habitat is present.

Surveys in the interim period since consent, for both Upperchurch Windfarm (Ecopower Developments, 2015 & 2016) and the nearby consented Milestone windfarm (BES, 2015 & 2017) have also taken place.

The results of the Upperchurch Windfarm surveys (Ecopower Developments, 2015 & 2016) is that Hen Harrier observations have continued to remain low during the breeding season (April-July as cited in SNH Guidance) with only 6 observations, in total comprising 467 seconds, recorded during this period. Of this, only one bird was within the Consented Upperchurch Windfarm boundary – in March 2015 where a bird was recorded for 15 seconds.

Pre-construction surveys aimed at establishing any breeding activity at the nearby Milestone Windfarm (BES, 2015 & 2017) provide further insight into Hen Harrier usage of the area. Within 2015, these surveys took place in April, May and June of 2015; and in April and May of 2017. The methods followed were based on the methodology used in the Irish Hen Harrier Survey 2015 (Ruddock *et al.*, 2016) to detect breeding territories (see 'Survey and recording guidelines for contributors' within the cited document) (see [Appendix 8.6: Milestone & Inchivara Wind Farm Hen Harrier Survey 2015 2017](#)). Results of pre-construction surveys at Milestone Windfarm yielded three observations of Hen Harriers across two yearly periods of the breeding season when expected activity would be high if Hen Harriers were breeding onsite (at Milestone) or locally.

Surveys were conducted in 2019 in April and July, by Inis Environmental Consultants, in line with Best Practice (SNH, 2017) utilising 10 vantage points, and overlapping periods of known peaks in Hen Harrier activity. With 3 observations, in total comprising 200 seconds, recorded during this period. Of these observations, two bouts of flight activity by Hen Harrier, in total comprising 44 seconds out of 120 hours of breeding season surveys, were within 500m of Consented UWF Turbine locations or within the 2013 wind farm study area (see [Appendix 8.4: Hen Harrier Fieldwork & Survey Results](#)).

The nearest known historical nest location to the consented Upperchurch Windfarm is that within the townland of Knockalough, located ca. 2.4 km to the south– no confirmed nest has occurred here in recent years (i.e. 2015-2018) however and the last confirmed nesting attempt was in 2014.

Previously a nest has been located at Curreeny, ca. 2.7km to the northwest of the consented Upperchurch Windfarm, and at Glenough Windfarm, ca.4km to the south of the consented Upperchurch Windfarm. The Curreeny nesting territory has not been confirmed active since 2014 (Inis Environmental Consultants, unpublished data) and was also inactive in 2019.

The Glenough nesting territory (adjacent to the operating Glenough Windfarm) has been active in recent years up to and including 2019. Upperchurch windfarm is outside the core range (2km) for this nest in respect of foraging.

Nests identified for the current study and their respective distance from Upperchurch Windfarm are presented in Table 8-49 (see above).

Consideration of the Passage of Time: The makeup of suitable habitat for Hen Harrier in the Upperchurch Windfarm site has not materially changed since 2012/2013, and the frequency of use by Hen Harrier, recorded during the 2012/2013 surveys, is supported by the results of the Upperchurch and Milestone surveys described in respect of recent years – in addition to survey results from 2019. By reason of distance from likely centres of activity for Hen Harrier (nearest confirmed nests), usage of the Upperchurch Windfarm site has continued to remain low and does not demonstrate any dependency by birds, breeding within the SPA, upon lands outside the SPA where the consented Upperchurch Windfarm is to be located. Therefore, it is considered that the descriptions in the 2013 and 2014 documents for Upperchurch Windfarm remain relevant to the cumulative evaluations in this 2019 EIAR for UWF Grid Connection and are supported by findings from surveys conducted in the interim and in April and July of 2019.

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8.6.2.3.4 Element 5: UWF Other Activities

The Upperchurch Hen Harrier Scheme is located outside the SPA in Knockcurraghbola Commons, Coumnageeha, Foilnahan, Knockmaroe and Grousehall townlands on agricultural lands between the Slievefelim to Silvermines SPA and the Upperchurch Windfarm, see [Figure WP 8.6](#).

Haul Route Activities are also located outside the SPA. By their nature these locations are located on existing public roadways and roadside verges and do not comprise or include foraging or breeding habitat for Hen Harrier. Similarly, habitats are not suitable for foraging during the winter months, and no suitable winter roost habitat is present. Those locations in closest proximity to the already consented Upperchurch Windfarm (HA21-23) whilst unsuitable in themselves do occur adjacent to lands as part of the Consented Upperchurch Windfarm where foraging at low frequency has been recorded. Similarly Monitoring Activities during the construction of the Whole UWF Project will take place on lands which may be utilized for foraging albeit at low frequency.

Suitable foraging habitat for Hen Harrier is present at locations of wet grassland along the route of the overhead line relating to Overhead Line Activities; in addition suitable foraging habitat is present at Shower Bog adjacent to the overhead line.

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8.6.2.3.5 Other Projects or Activities

Milestone Windfarm is located outside the Slievefelim to Silvermines Mountain SPA, to the east of the 110kV UGC route in Knockcurraghbola Commons and Knockcurraghbola Crownlands, and is almost immediately south west of Upperchurch Windfarm/UWF Related Works construction works. Milestone Windfarm comprises 4 no. built and operational turbines and associated infrastructure. The implementation of a Hen Harrier Management Plan was conditioned as part of planning consent.

Rearcross Quarry: An operational quarry exists near Rear Cross in Shanballyedmond townland ca.1km to the south of the route of the 110kV UGC along the Regional Road R503. Rearcross Quarry is located within the Slievefelim to Silvermines Mountain SPA, and measures to protect hen harrier form part of the planning conditions and licences for this quarry.

Note: the supply of aggregate to the UWF Grid Connection and Other Elements of the Whole UWF Project will be supplied as part of the consented capacity of the Rearcross Quarry, and no expansion of the quarry is required in relation to this supply.

Castlewaller Windfarm is located within the Slievefelim to Silvermines Mountain SPA, with consented turbines located c.1.2km to the north of the UWF Grid Connection where the 110kV UGC is routed along the R503. This consented windfarm is located within areas containing suitable foraging and nesting Hen Harrier habitat and in close proximity to known historical and more recent nesting attempts. As per planning

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conditions, Castlewaller Windfarm will be subject to significant management plans in respect of Hen Harrier. The grid connection for Castlewaller Windfarm is neither currently consented nor proposed, however a potential route (as per ABP correspondence) was identified along the local roads in Castlewaller townland (same road (L6009-0) as UWF Grid Connection), then crossing the R503 and heading south predominantly along public roads to Killonan Station, the potential grid connection also includes site access along an existing forestry road from an existing forestry entrance off the R503. It is assumed that hen harrier protective measures will for part of any future planning application for the grid connection / site access works.

Potential Bunkimalta Windfarm is also located within the Slievefelim to Silvermines Mountain SPA. Although it is not expected that UWF Grid Connection will be constructed during the same time as any future-proposed Bunkimalta Windfarm, a precautionary approach has been adopted in this EIAR, and a potential windfarm in the same geographical location as the previously proposed Bunkimalta Windfarm, is evaluate herein. Therefore, it is assumed, for the purposes of this report that the potential Bunkiamalta Windfarm will be located within the SPA, c.4.6km to the north of the UWF Grid Connection 110kV UGC route, and that this potential windfarm will be located within areas containing suitable foraging and nesting Hen Harrier habitat and in close proximity to known historical and more recent nesting attempts. Due to its location within an SPA, it is assumed that the Bunkimalta Windfarm will only proceed where the windfarm can be developed without causing adverse effects to the Hen Harrier and will be subject to significant management plans in respect of Hen Harrier. In relation to the grid connection, this part of the windfarm is already consented and is routed to the north towards Nenagh town, predominantly along forestry roads and public roads. Consented works also include site entrance works at forestry entrances.

Forestry in the surrounding area is widespread throughout the study area and occurs outside and inside the boundary of the SPA. Approximately half of the SPA is afforested, including both first and second rotation plantations and clear fell areas and forestry is consequently listed as one of the most important activities with high effect on the SPA (High negative rank). General forestry activities in commercial conifer plantations in the surrounding area, includes management of growing forests, along with planting, thinning and harvesting activities.

Agriculture in the surrounding area is widespread throughout the study area and predominately comprises hill farming with more intensive grassland farming occurring at lower altitudes. Hill farming constitutes roughly one half of the land use within the SPA and is mainly based on the usage of rough grassland. Grazing is a medium ranked activity both in terms of negative and positive impacts on the SPA.

Turf-Cutting or Peat Extraction, both mechanically and by hand occurs, with cut-over bog evident at a number of locations within the study area, including at Bleanbeg Bog, Cummermore, Gortmahonoge and at Cummer (Mulloghney). Turf-Cutting is also a medium ranked negative pressure on the SPA.

8.6.3 PROJECT DESIGN MEASURES for Hen Harrier

At the conception of the UWF Grid Connection, the design team evaluated the potential for significant impacts to the environment. Impacts will only take place where three components exist together; (1) the source of the impact (project), (2) the receptor of the impact (sensitive aspect) and (3) a pathway between the source and the sensitive aspect. The objective of mitigation measures is to avoid, prevent or reduce, one of the three components of an impact by choosing an alternative location, alternative design or an alternative process. Potential or likely significant impacts were avoided, prevented or reduced by integrating mitigation measures into the fundamental design of the development – these are the Project Design Environmental Protection Measures, which are shortened to ‘Project Design Measures’ in this EIA Report.

The development as evaluated in the EIA Report incorporates the Project Design Measures.

The Project Design Measures outlined in Table 8-50 are relevant to the Environmental Factor, Biodiversity, and in particular to the sensitive aspect **Hen Harrier**.

Table 8-50: UWF Grid Connection Project Design Measures relevant to Hen Harrier

PD ID	Project Design Environmental Protection Measure (PD)
PD01	UWF Grid Connection construction works during the Hen Harrier breeding season (March to August inclusive) will only take place at the Mountphilips Substation Site; construction of the 110kV UGC between the Mountphilips Substation site and the Consented UWF Substation compound will be carried out during the months of September to February inclusive.
PD02	If works at Mountphilips Substation site are programmed to begin in the Hen Harrier breeding season (March to August) confirmatory Hen Harrier breeding surveys will be completed, before such works initiate, such that all pre breeding nuptial activity, nesting activity and active nests are recorded within 2km of the entire construction works area boundary. These surveys will be completed prior to the start-up of all construction activities. No works will take place within 2 km of any identified active Hen Harrier nest during the hen harrier breeding season.
PD03	Although no hen harrier roosts are currently known to occur within 1km of UWF Grid Connection, confirmatory surveys will be completed to record any roosting locations within 1km of UWF Grid Connection. Should a hen harrier roost occur within 1km of UWF Grid Connection works, then construction works within 1km of a roost will be limited to the period between ‘one hour after sunrise’ to ‘one hour before sunset’ during the Hen Harrier roosting season (October to February inclusive).
PD58	Hedgerow removal and clearance of any other breeding bird vegetation will take place outside of the bird breeding season i.e. not during the period of March to August inclusive. This includes hedgerow and scrub removal in addition to hedgerow trimming.
PD05	At the Mountphilips Substation site, construction traffic will be restricted to the construction works area and tracking across adjacent ground will not be permitted. A speed limit of 25km/hr for all traffic/machinery will be implemented at the Mountphilips Substation site. Outside of Mountphilips Substation site, all construction will be restricted to the paved road surfaces or built surfaces along the 110kV UGC. A speed limit of 50km/hr for all delivery and construction traffic will be implemented on Local Roads (‘L’ roads).
PD07	110kV UGC construction works along the local roads L2264-50 and L6188-0, will not take place at the same time as the UWF Related Works Haul Route Works on these roads. The 110kV UGC construction works will also be scheduled so that the works do not occur on the same days as concrete deliveries for Consented UWF Turbines along these local roads.
PD11	Construction works for the 110kV UGC in Knocknabansha, Knockmaroe, Knockcurraghbola Crownlands and Knockcurraghbola Commons townlands, which are within 350m of local residences, will not take place at the same time as either the UWF Related Works or Upperchurch Windfarm where those works also occur within 350m.

Cumulative Information: Potential or likely significant impacts caused by the Other Elements of the Whole UWF Project were avoided, prevented or reduced by incorporating Project Design Measures into the fundamental design of the UWF Related Works, UWF Replacement Forestry and into the consented design

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of the Upperchurch Windfarm. These Project Design Measures are included in the description of these Elements and can be found in this EIA Report in [Appendices 5.3, 5.4 and 5.5 in Volume C4: EIAR Appendices](#).

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8.6.4 EVALUATION OF IMPACTS to Hen Harrier

In this Section, the likely direct and indirect effects of the UWF Grid Connection are identified and evaluated. Then the likely cumulative effects of the UWF Grid Connection together with the Other Elements of the Whole UWF Project and Other Projects or Activities are identified and evaluated.

A conceptual site model exercise was carried out to facilitate the identification of source-pathway-receptor links between the project (source) and the sensitive aspect (receptor) - Hen Harrier.

As a result of the exercise, some impacts were included and some were excluded.

Table 8-51: List of all Impacts included and excluded from the Impact Evaluation Table sections

Impacts Included (Evaluated in the Impact Evaluation Table sections)	Impacts Excluded (Justification at the end of the Impact Evaluation Table sections)
Permanent or Temporary Reduction or Loss of Suitable Foraging Habitat (construction/operational stages)	<i>Reduction in or Loss of Suitable Nesting Habitat or Winter Roosting Habitat (construction stage)</i>
Disturbance/Displacement of foraging Hen Harrier, <u>during</u> the breeding season (construction stage))	<i>Mortality of Hen Harrier in or at Nest Sites or Roost Sites, (construction stage)</i>
Disturbance/Displacement of foraging Hen Harrier outside the breeding season (construction stage)	<i>Disturbance/Displacement of Nesting or Roosting Hen Harrier (construction stage)</i>
Reduction in Prey Item Species (construction/operational stage)	<i>Additive mortality (operational stage)</i>
	<i>Disturbance/displacement to nesting or roosting Hen Harrier (operational stage)</i>
	<i>Disturbance/displacement to foraging Hen Harrier (breeding and non-breeding) (operational stage)</i>
	<i>Disturbance/displacement (decommissioning stage)</i>

The source-pathway-receptor links for the impact included are described in the Impact Evaluation Tables in the **following Sections 8.6.4.1 to 8.6.4.4**.

The source-pathway-receptor links and the rationale for impacts excluded are described in the section directly after the Impact Evaluation Tables in Section 8.6.4.5.

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8.6.4.1 Impact Evaluation Table: Permanent or Temporary Reduction or Loss of Suitable Foraging Habitat

Impact Description

Project Life Cycle Stage: Construction/Operational stage

Impact Source: Land cover change, vegetation clearance; earthworks

Cumulative Impact Source: Land cover change, forestry felling, removal of hedgerows, Land cover change from Agricultural Practices such as drainage, Direct habitat loss through peat extraction of intact bog, and habitat loss through forest maturation.

Impact Pathway: Land cover

Impact Description: Hen Harrier is a very high sensitivity receptor of International Importance. Permanent Land take or land use/cover change of positively selected foraging habitats (i.e. suitable and within the established core range for connectivity to a nest) during the construction stage may cause secondary effects for this Annex I species and SPA special conservation interest. Studies have shown that most foraging takes place within 2km of the nest site, and as per SNH Guidance this is considered the core foraging range for Hen Harrier. The magnitude of effects is distance (to nearest nest) dependant, as the area within a certain radius of the nest increases as the square of this distance, for example hunting concentration becomes 10 times less between 2km and 5km from the nest compared to within 2km of the nest (Irwin *et al.*, 2012).

Although home range size may vary between locations and across individuals, it is clear from studies that Harrier females during the breeding season hunt closer to nests than males (e.g. Arroyo *et al.*, 2006²⁶); home ranges of females are centred on nest sites and on average may be half the area of that of males. In a Scottish study (Arroyo *et al.* 2014²⁷) female harriers mostly hunted within 1km of nests.

Male birds have larger home ranges (Arroyo *et al.* 2006, 2014), but studies also suggest that male harriers mostly hunt within 2km of the nest (Arroyo *et al.*, 2014), but can hunt further away (out to 10km (SNH, 2016)). In a study of Northern Harrier, Martin 1987, found that 85% of all male activity occurred within 3km of the nest. Furthermore, studies have shown that the amount of time spent foraging by Hen Harrier (expressed in min/km²) decreases with distance from the nest (Madders (2003)).

Of particular importance and where pathways for likely significant effects are more likely are lands which provide high quality foraging habitat within 2km of nests and on which breeding Hen Harrier (male or female birds) may be dependent during key periods of the breeding cycle such as provisioning young. Loss of suitable habitat may affect breeding success/productivity for one whole cycle, or until vegetation is re-instated both when considered alone and in combination with other possible sources of loss. Loss of high dependency foraging habitat, where it occurs in close proximity to nesting locations, at key periods of the breeding cycle may result in reduced productivity and/or nest success, in particular where it occurs within 2km of a nest location and where limited alternative habitat is available. The degree of existing foraging habitat within the core foraging range is relevant in determining the dependency/reliance on any suitable habitat outside of this range, and consequently on the significance of any loss.

The creation of, or sympathetic management of, foraging and nesting habitat within the traditional range of breeding hen harrier positively affect nest success (Forrest *et al.*, 2011).

Impact Quality: Negative, positive and neutral (varies per project)

²⁶ Arroyo, B., Leckie, F., Redpath, S. (2006) Habitat Use and Range Management on Priority Areas for Hen Harriers: Final Report. Report to Scottish Natural Heritage. First draft- March 2006.

²⁷ Arroyo, B., Leckie, F., Amar, A., McCluskie, A. & Redpath, S. (2014) Ranging behaviour of Hen Harriers breeding in Special Protection Areas in Scotland. Bird Study 61: 48-55.

Evaluation of the Subject Development Impact– Permanent or Temporary Reduction or Loss of Suitable Foraging Habitat

Element 1: UWF Grid Connection – direct/indirect impact

Impact Magnitude:

There will be no temporary loss of suitable foraging habitat as a result of the construction of UWF Grid Connection.

Permanent land cover change will only occur at the Mountphilips Substation site in Coole and Mountphilips townlands. All works for UWF Grid Connection outside of the Mountphilips Substation site (i.e. the 110kV UGC) will take place on paved roadways where there is no potential for any temporary or permanent, suitable habitat loss.

The amount of suitable habitat loss at the Mountphilips Substation site relates to a very small area (0.05ha or $\frac{1}{7}$ th of an acre) of wet grassland (GS4) which will permanently change to new access road. This area of suitable habitat is located in the 2nd field between the site entrance and the substation compound. As the nearest nest (Nest Site A) is 4.6km from this suitable habitat at the Mountphilips Substation site, this habitat is considered to be sub-optimal based on distance from nest, within the context of the species preference for nest site fidelity and the available habitat within the core foraging range.

Foraging habitat surveys have shown that c. 33% of lands within 2km of Nest A comprise suitable foraging habitat (420ha at minimum plus 77km of linear features), supporting the assertion that there will be no reliance by nesting birds on the suitable habitat at the Mountphilips Substation site, based on habitat availability closer to the Nest A location. Therefore, the magnitude of foraging habitat loss is evaluated as Negligible.

In addition it is considered that whilst male harriers can occur and forage at distances greater than 3km from a nest, given the project design measures as part of the project, that the probability of foraging birds occurring at this isolated location (in the context of the nearby SPA and available habitat therein), and at frequencies sufficiently high to result in significant consequences on breeding, is very low.

As part of the design of the Mountphilips Substation site, 700m of new hedgerow, comprising a mix of native tree species, will be planted along each side of the new permanent access road during the construction stage, and will provide permanent suitable foraging habitat in the form of new linear features at the Mountphilips Substation site. However, due to the separation distance from the nearest nest, the magnitude of this positive impact will also be Negligible.

Significance of the Impact: Not Significant

Rationale for Impact Evaluation:

- Very High sensitivity rating for Hen Harrier, and Negligible magnitude of foraging habitat loss;
- Long term (permanent) duration, and low reversibility;
- Very low probability of foraging birds occurring with sufficient frequency to result in significant consequences on nesting birds or breeding success, and;
- the separation distance of >4.5km from landcover change to nearest known nest (Nest Site A) within the study period;
- Studies have shown that most foraging occurs within 2km of a nest and reduces thereafter with distance;
- The very small extent of suitable habitat which will be lost – 0.05ha;
- The scale and availability of suitable foraging habitat within 2km of Nest Site A, and the distance to Mountphilips;
- The magnitude of effect, on the sensitive aspect Hen Harrier, following Percival *et al.* is evaluated as 'Negligible' (0-1% of habitat lost), equivalent to a non-distinguishable change away from baseline conditions, and;
- The provision of 700m of new hedgerow along the new access road, will provide new permanent linear habitat in the longer term for hen harrier.

Hen Harrier	Element 1: UWF Grid Connection – cumulative impact
	<p>Cumulative Impact Magnitude:</p> <p>The loss of foraging habitat only relates to the Mountphilips Substation, which has been evaluated as being of Negligible magnitude and sub-optimal due to the separation distance (4.6km) from the nearest hen harrier nest (Nest Site A). Habitat surveys at Nest Site A also demonstrate that there is sufficient foraging habitat (at least 33%) within 2km of this nest, and therefore it is evaluated that there would be no reliance on the suitable habitat at Mountphilips. In addition it is considered that whilst male harriers may occur and forage at distances greater than 3km from a nest, given the project design measures as part of the project, that the probability of foraging birds occurring at this isolated location (in the context of the nearby SPA and available habitat therein), and at frequencies sufficiently high to result in significant consequences on breeding, is very low.</p> <p>Due to the above, it is evaluated that there is no potential for the Mountphilips Substation site to cumulatively affect Nest Site A in combination with consented Castlewaller Windfarm, potential Bunkimalta Windfarm, Forestry Activities (in the surrounding area), Turf Cutting or Agricultural Activities. In addition, the hen harrier management plans for the windfarm sites will result in Neutral impacts from these projects. Impacts from agriculture and forestry in areas surrounding Mountphilips itself are evaluated as negligible.</p> <p>It is also considered that the potential for synergistic effects on other nesting territories such as for example if birds from the nearest nest (in this case nest A) were forced to rely on lands elsewhere, resulting in intraspecific competition are avoided due to separation distance, and thus effects on other nests identified are similarly excluded.</p> <p>In respect of the potential Castlewaller Windfarm grid connection, part of the potential underground cable route is located within 2km of the identified Nest A and Nest C. Any land cover change of natural habitats associated with this potential development within 2km of a Hen Harrier is not likely to result in the selection (by Hen Harrier) of lands at Mountphilips for compensatory foraging due to distance, and in combination effects are excluded on this basis.</p> <p>Due to the separation distance between the Mountphilips Substation site and the Other Elements of the Whole UWF Project, Existing Rear Cross Quarry or Existing Milestone Windfarm, it is considered that no cumulative effects will occur.</p> <p>There is no potential for cumulative impacts of the 110kV UGC where it is routed through the UWF Related Works/Upperchurch Windfarm area because the route of UWF Grid Connection 110kV UGC is entirely on paved roads (with no foraging habitat loss) within the overlap zone and therefore the UWF Grid Connection 110kV UGC will not cause any loss of habitat and cannot contribute to cumulative impacts. Cumulative impacts with forestry or agriculture, similarly cannot occur with the 110kV UGC works as there is no foraging habitat loss associated with 110kV UGC in the first instance.</p> <p>No secondary habitat loss will occur in respect of existing Rear Cross quarrying operations which will provide materials for the development, as aggregate for the UWF Grid Connection and the Other Elements will be supplied within the consented capacity of the quarry.</p>
Sensitive Aspect	Significance of the Impact: Not Significant
	<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> • Very High sensitivity rating for Hen Harrier, and Negligible magnitude of foraging habitat loss; • Very low probability of foraging birds occurring with sufficient frequency to result in significant consequences on nesting birds or breeding success, and; • the separation distance of >4.5km from landcover change to nearest known nest (Nest Site A) within the study period, and; • the loss of suitable foraging habitat at Mountphilips is of too small a scale and too far from the nearest nest (or any other nest) to cause cumulative impacts with other projects or activities in the area. • Studies have shown that most foraging occurs within 2km of a nest and reduces thereafter with distance;
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<ul style="list-style-type: none"> No loss of foraging habitat associated with UWF Grid Connection (110kV UGC) where the cumulative evaluation study area overlaps the construction works areas for UWF Related Works and Upperchurch Windfarm. 	<div>Hen Harrier</div> <div>Sensitive Aspect</div>
<p>Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project</p>	
<p>Element 2: UWF Related Works</p>	<div>Hen Harrier</div> <div>Sensitive Aspect</div>
<p><u>Impact Magnitude:</u></p> <p>Total permanent land take of suitable foraging habitat is confined to improved agricultural grassland (0.12Ha); Wet Grassland (0.07Ha), upland blanket bog/Conifer mosaic (0.01Ha), Mature or closed canopy conifer plantation (0.28Ha) and scrub (0.004Ha) and totals 0.48Ha. None of this 0.48ha of suitable foraging habitat is within 2km (i.e. the core range) of an identified nest- in fact the nearest is Nest Site H1 at 4.5km to the west. Foraging habitat surveys of the 2km core foraging habitat area around Nest Site H1 demonstrate that there is at minimum 51% suitable foraging habitat within 2km of the nest (644Ha of suitable foraging habitat and ca.24km of linear features), and it is evaluated that there will be no reliance by foraging Hen Harrier on suitable habitat therefore at the UWF Related Works site. There is a Very low probability therefore of foraging birds occurring with sufficient frequency to result in significant consequences on nesting birds or breeding success, and;</p> <p>Temporary habitat loss relates to up to 4.6km of internal cabling located in agricultural lands and 2.1km located in forestry lands, in addition to c.1500m of temporary access roads at 4 no. differing locations; all of which will occur outside the Hen Harrier breeding season as Project Design. All these lands will be available for foraging within one growing season once vegetation has re-established. All temporarily removed sections of field boundary will be re-instated following the completion of works in any area, with at least 3 year old native species. In addition, a net gain of ca.370m of new hedgerow will be planted at the UWF Related Works site. This will comprise locally sourced native species.</p> <p>Note: Within the UWF Related Works site, HW7 is the only location where the <u>site</u> boundary overlaps the Hen Harrier SPA. No construction works and no land cover change will take place within the SPA boundary, in line with the precautionary principle, to avoid effects on habitats possibly suitable for Hen Harrier. All other UWF Related Works locations and lands are located outside the SPA.</p> <p>Overall the magnitude of foraging loss as a result of the development of UWF Related Works is evaluated as Negligible.</p>	
<p><u>Significance of the Impact:</u> Not Significant</p>	<div>Hen Harrier</div> <div>Sensitive Aspect</div>
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> The very high sensitivity rating of the species (context), and negligible magnitude; The small extent of permanent habitat loss, evaluated as a very slight change from baseline condition, and; The long-term duration of permanent habitat loss, however; The reversibility of temporary habitat loss is expected within the temporary-short term period, also; The nearest active Hen Harrier nests are at least 4.5km from works, and foraging habitat surveys demonstrate that at this distance there will be no reliance by nesting Hen Harrier on the foraging habitat at UWF Related Works; The reversibility of the impact with the reinstatement of lands at temporary works locations. Based on distance to nest H1 , Very low probability of foraging birds occurring with sufficient frequency to result in significant consequences on nesting birds or breeding success; 	
<p>Element 3: UWF Replacement Forestry</p>	<div>Biodiversity</div> <div>Topic</div>
<p><u>Impact Magnitude:</u></p> <p>Available foraging habitat for Hen Harrier currently within the land folio boundary comprises improved agricultural grassland (3.54Ha); Wet Grassland (0.44Ha) and Scrub (0.01Ha); in total 3.99Ha. This entire area will undergo landuse change to UWF Replacement Forestry (deciduous forestry) to be managed specifically for the</p>	

Hen Harrier	<p>use of Hen Harrier, including the incorporation of 'tried and tested' management measures which will facilitate Hen Harrier foraging and usage such as the provision of ride lines and clearings within the new woodland.</p> <p>Although the nearest nest site to UWF Replacement Forestry is 6.8km to the west (Nest Site H1), which has >50% suitable habitat available for foraging within 2km of the nest (636Ha plus ca.23km of linear features), the location of the UWF Replacement Forestry adjacent to Upperchurch Hen Harrier Scheme areas, will increase the availability of suitable foraging habitat for Hen Harrier outside but proximal to the SPA, and therefore the magnitude of this positive impact is evaluated as Medium.</p>
	<p><u>Significance of the Impact:</u> Very Significant (positive)</p>
Sensitive Aspect	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The very high sensitivity rating of the species, and the demonstrated sensitivity of Hen Harriers to positive management (context), and; • The small extent of lands to be managed for Hen Harrier, and; • The permanent duration, and; • The Non-reversibility with the new woodland being a permanent woodland, which will not be harvested.
	<p>Element 4: Upperchurch Windfarm</p>
	<p><u>Impact Magnitude:</u> As per the 2013 RFI the magnitude of foraging habitat loss was calculated as 95Ha (actual loss plus effective loss through displacement effects). For completeness, given that the estimate of total displacement was based on 2017 as the construction year, an upwardly revised total estimate of 100.22 Ha has been extrapolated from data provided in the Upperchurch Windfarm RFI (Table 2 of the UWF Ecological Management Plan). This figure corresponds with 2020/2021 as the construction year – however it is still less than the 128Ha of lands to be provided/managed as additional favourable foraging areas under the conditioned Upperchurch Hen Harrier Scheme (evaluated other 'UWF Other Activities').</p>
	<p><u>Significance of the Impact:</u> Neutral Residual Impact</p>
	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The effective loss of 100.22Ha of habitat constitutes an effect of medium magnitude (5-20% of available habitat lost); • The implementation of the Upperchurch Hen Harrier Scheme, as conditioned; • Very High sensitivity of the species, and; • Long term duration.
	<p>Element 5: UWF Other Activities</p>
Biodiversity	<p><u>Impact Magnitude:</u> Neither Haul Route Activities nor Monitoring Activities nor Overhead Line Activities will not result in any loss of foraging habitat.</p> <p>In total 128ha of habitat will be managed to increase the area of Hen Harrier foraging habitat, measures set down in the Upperchurch Hen Harrier Scheme to achieve this include:</p> <p>Rush management to control coverage and increase suitability for foraging habitat, promoting prey item species;</p> <p>2,085m increase in hedgerow, resulting in increased edge habitat for foraging and prey items;</p> <p>3ha enclosures of native scrub and trees, increased cover for prey item species;</p> <p>Lines of electric fence with plastic fliers so that they are more visible to the Hen Harrier, to avoid mortality;</p> <p>Enhancement of the riparian corridor (to maintain corridor value for foraging Hen Harrier): 1220m of woody scrub species; and Erect fencing to make stockproof and exclude access to river by livestock.</p>
	<p>The following restrictions will apply to landowners within the Upperchurch Hen harrier Habitat scheme (to maintain habitat suitability): Limited spreading of fertiliser (every 4-5 years); Limited spreading of lime (every 4-5 years); No burning; No excavation of drains or reclaiming heath or bog.</p> <p>In addition to the management described, workshops are proposed with landowners to advise landowners on the importance and implementation of the above measures.</p>
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In total 128Ha of agricultural lands will be managed for the benefit of Hen Harrier, outside the turbine 250m buffer and the footprint of the development; as per the Upperchurch Windfarm EMP. The net gain to Hen Harrier is 128Ha-100.22Ha which is 27.8Ha. The magnitude of this gain is evaluated as High as it constitutes a major alteration to the baseline features present.

Significance of the Impact: **Very significant (positive)**

Rationale for Impact Evaluation:

- The demonstrated sensitivity of Hen Harriers to positive management (context), and;
- The extent of lands to be managed for Hen Harrier, and;
- The long term duration, and;
- Low reversibility.

Cumulative Information: Individual Evaluations of Other Projects or Activities

Other Project: Existing Milestone Windfarm

Impact Magnitude: Effective Habitat Loss of Hen Harrier habitat occurs where suitable habitat is present within 250m of each existing turbine (n=4) location. However, an area of lands at Knockcurraghbola Commons will be managed as part of a Hen Harrier Management Area for the lifetime of the windfarm for the benefit of Hen Harrier- comprising 10.8ha. This includes rush management, nutrient management, weed control, and the maintenance of edge habitat.

Significance of the Impact: Neutral residual effect

Rationale for Impact Evaluation:

- The impact is evaluated as neutral given the effective habitat loss is mitigated by lands proposed to be managed for the benefit of Hen Harrier, over the lifetime of the wind farm.

Other Project: Rear Cross Quarry

Impact Magnitude:

The already existing quarrying operation at Shanballyedmond, near Rear Cross covers approximately 10 ha and is located within the Slievefelim to Silvermines Mountains SPA. No additional habitat loss (beyond that consented) is predicted in respect of existing quarrying operations. As confirmed with the quarry owner, all aggregate will be supplied within the current consented capacity of the quarry.

Significance of the Impact: **Neutral**

Rationale for Impact Evaluation:

- the effective habitat loss is exactly equivalent to the area to be managed for the benefit of Hen Harrier, over the lifetime of the quarry.
- Although within the SPA, there are no known expansion plans and the volumes of aggregate required for the Whole UWF Project will be supplied within the current consented capacity of the quarry.

Other Project: Castlewaller Windfarm (consented windfarm, potential grid connection)

Although Castlewaller Windfarm is not expected to be constructed during the same period as the UWF Grid Connection, it is nonetheless included for evaluation of cumulative effects on a precautionary basis.

Impact Magnitude: Effective Habitat Loss of Hen Harrier habitat will occur within 250m of each turbine location, where harriers use second rotation aged 3-9 years-estimated at 47.9Ha.²⁸ However, as conditioned under the windfarms planning permission, 47.9Ha of clear felled woodland will be managed for the lifetime of the windfarm for the benefit of Hen Harrier. The potential grid connection is routed along forestry/windfarm roads and public roads where it occurs within the SPA. It is assumed that any future proposal for the grid connection will include protection measures for Hen Harrier which will ensure significant impacts to Hen Harrier are avoided.

²⁸ Castlewaller Woodland Partnership (2007). Response to RFI from North Tipperary County Council prepared by Fehily Timoney and Company

Hen Harrier	<p>Significance of the Impact: Neutral residual effect</p> <p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> The impact is evaluated as neutral given the effective habitat loss is exactly equivalent to the area of clear felled woodland to be managed for the benefit of Hen Harrier, over the lifetime of the wind farm. The assumption that hen harrier protection measures will be implemented as part of any future proposed grid connection, in the context of the route of the potential grid connection predominately along forestry and public roads. <p>Other Project: Potential Bunkimalta Windfarm potential windfarm, consented grid connection) <i>Although Bunkimalta Windfarm is not expected to be constructed during the same period as the UWF Grid Connection, it is nonetheless included for evaluation of cumulative effects on a precautionary basis</i></p>
	<p>Impact Magnitude: The consented grid connection is routed along forestry roads and public roads where it occurs within the SPA. It is assumed that any future proposed Bunkimalta Windfarm will include site design and mitigation measures to ensure that effects to Hen Harrier will not be significant (in the context of its location within a Hen Harrier SPA), this is likely to include measures in relation to land-use change, in particular the permanent exclusion of Hen Harrier from suitable habitat.</p>
Sensitive Aspect	<p>Significance of the Impact: Neutral residual effect</p> <p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> Requirement on projects within a designated site to prove that no significant adverse effects will occur. <p>Activity: Forestry Activities in the Surrounding Area</p> <p>Impact Magnitude: Hen Harrier in Ireland makes extensive use of both first and second rotation pre-thicket forest habitat during the breeding period. However, by its successional nature forests inevitably matures and become less suitable (Avery & Leslie, 1990; Madders, 2000; 2003; O'Donoghue, 2004).</p> <p>The following is cited directly from the document titled "Hen Harrier Conservation and the Forestry Sector in Ireland", published by NPWS in 2015: "Forests less than 15 years old constitute to varying degrees a potential foraging resource for Hen Harriers. In line with the forecasted reduction in the extent of the forest nesting resource, indicative future estimates of the extent of the potential national <i>forest foraging</i> resource within the SPA network shows an acute declining trend over the next 10 years²⁹"(emphasis added). This negative trend is also applicable to the Slieve Felim to Silvermines Mountains SPA, where the extent of useable forest is predicted to drop from 23% in 2012 to 11% in 2025.</p> <p>It is likely that some sites within the 'wider countryside' areas supporting breeding Hen Harrier that have been afforested will also experience forestry related changes both due to the maturation of existing forest habitat and the conversion of currently useful habitat (e.g. scrub, low intensity managed farmland) to a less stable state.</p>
	<p>Significance of the Impact: Significant (negative)</p> <p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> precautionary basis <p>Activity: Agricultural Activities in the Surrounding Area</p> <p>Impact Magnitude: Trends specific to the receiving environment are generally unavailable however agricultural activities have the potential to adversely affect the availability of Hen Harrier foraging habitat, through a number of pathways specifically agricultural practices which result in habitat loss, habitat fragmentation and habitat degradation due to intensification or abandonment. Grazing is a means of maintaining open habitats for Hen Harrier and changes to grazing regimes can alter the availability of suitable habitat. An EIP (European Innovation Partnership) Locally Led Scheme called the Hen Harrier Project is in place across 6 SPA's in Ireland including the Slievefelim to</p>
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²⁹ NPWS.2015. Hen Harrier Conservation and the Forestry Sector in Ireland.

Silvermine Mountains SPA which facilitates the reward of farmers whose land holding is within or adjacent to the SPA for maintaining suitable Hen Harrier habitat.
<u>Significance of the Impact:</u> Significant (negative)
<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> Precautionary Basis - In the absence of available information on trends
Other Project: Turf-cutting
<u>Impact Magnitude:</u> Turf extraction appears to form part of the current baseline environment at various locations such as Bleanbeg Bog, Cummermore, Gortmahonoge and at Cummer (Mulloghney). Some of these habitats where they overlap the SPA are further protected through the provision of NHA's such as at Bleanbeg Bog, Mauherslieve Bog, and Grageen Fen and Bog, wherein further turf cutting of intact areas is unlawful, or SAC's such as Keeper Hill SAC, Bolingbrook Hill SAC, Silvermine Mountains SAC or Silvermines Mountains West SAC wherein Conservation Objectives to protect Qualifying Interest bog habitats are set out. Peat extraction by hand or through mechanical means is ranked as a medium level pressure in respect of Hen Harrier within the SPA ³⁰ .
<u>Significance of the Impact:</u> Neutral
<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> Restrictions on further turf cutting in intact areas/protected areas, and; The limited extent of lands subject to turbary (rights to cut turf) within the Hen Harrier SPA overall (4%), with little of this occurring within the Cumulative Evaluation Study Area; The reversibility of any effect, (in the context of Hen Harrier) with birds expected to continue to utilize re-vegetating cutover bog for foraging.
Evaluation of Other Cumulative Impacts – Permanent or Temporary Reduction or Loss of Suitable Foraging Habitat
Whole UWF Project Effect
<u>Magnitude:</u> Both positive and negative quality effects occur with regard to Hen Harrier foraging habitat loss across the Whole UWF Project. Negative effects which stem from the UWF Grid Connection refer to permanent landcover change of 0.05Ha of suitable foraging habitat (GS4) at the Mountphilips Substation site; and 0.07ha of permanent landcover change of suitable habitat at the UWF Related Works site. The affected habitat at both sites is considered sub-optimal due to the separation distance to the nearest Hen Harrier nest (4.6km and 4.5km respectively). Foraging habitat surveys at nearest nests demonstrate that there is sufficient foraging habitat available to Hen Harrier within the core 2km foraging range of each (34% at Nest A and 51% at Nest H1), and it is considered that there is no reliance on lands at either the Mountphilips Substation site or UWF Related Works sites. Overall the magnitude of negative habitat loss is considered to be Negligible. The provision of 700m of new hedgerow at the Mountphilips Substation site for UWF Grid Connection and 370m of new linear habitat at the UWF Related Works site will provide new linear foraging habitat for Hen Harrier, albeit outside of the core foraging range from the nearest nests. The negative effects of Upperchurch Windfarm, which is evaluated herein within the context of effective displacement based on a revised construction date of 2020/2021 (as per the Upperchurch Windfarm RFI 2013); is effectively mitigated by the activities consented under the Upperchurch Hen Harrier Scheme (UWF Other Activities), which as intended results in a net gain through design to Hen Harrier both in area and quality of habitat. The provision and management of UWF Replacement Forestry (4ha) specifically for Hen Harrier, outside but proximal to the SPA and adjacent to the Upperchurch Hen Harrier Scheme also contributes to an overall net gain to Hen Harrier of an additional 31.8Ha of actively managed foraging habitat (net gain to Hen Harrier due to Hen Harrier Scheme is 128Ha-100.22Ha which is 27.8Ha, and the additional 4ha due to the UWF Replacement Forestry, giving a total net gain of 31.8Ha).

³⁰ <https://www.npws.ie/sites/default/files/protected-sites/natura2000/NF004165.pdf>

Hen Harrier	Significance of the Whole Project Effect: Significant (positive)
	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Very High sensitivity rating for Hen Harrier; • The demonstrated sensitivity of Hen Harriers to positive management (context), and; • The extent of lands to be managed for Hen Harrier overall (128Ha+4Ha=132ha), and; • The long term to permanent duration, given that UWF Replacement Forestry will be a permanent woodland and will not be harvested, and; • The negligible magnitude of habitat loss from the UWF Grid Connection Mountphilips Substation site which is located outside of the core foraging range of the nearest nest (4.6km) and also the absence of any habitat loss effects from the UWF Grid Connection 110kV route; • The negligible magnitude of habitat loss from the UWF Related Works site which is located outside of the core foraging range of the nearest nest (4.5km); • The reversibility of negative effects with reinstatement of lands, provision of new hedgerow, planting of a new permanent woodland and the application of the Upperchurch Hen Harrier Scheme and other measures as described.
Sensitive Aspect	
	All Elements of the Whole UWF Project with Other Projects or Activities
	<p>The magnitude of foraging habitat loss resulting from the Whole UWF Project, consented Castlewaller Wind Farm, potential Bunkimalta Windfarm, existing Milestone Windfarm, Agriculture and turf cutting in the vicinity are evaluated as largely neutral. Forestry activities in the surrounding area are generally a negative trend in the background environment currently with declines in available foraging habitat in the short-medium term (next 10 years & expected to increase subsequently and evaluated as significant in that regard. Effects from Hen Harrier management plans in respect of consented Castlewaller, potential Bunkimalta and existing Milestone Windfarms will neutralise the effects of these windfarms and it is assumed that the potential Castlewaller grid connection will not result in land cover change likely to result in adverse affects on breeding Hen Harrier territories which it potentially overlaps. There will be a net gain from the Whole UWF Project which is at minimum 31.8Ha. Overall the magnitude is Low.</p>
	Significance of the Cumulative Impact: Neutral
	<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Very High sensitivity rating for Hen Harrier; • The net gain in terms of lands managed specifically for the use of Hen Harrier, and; • Extent of lands to be managed in total, notwithstanding, • The medium-term duration of negative trend in respect of reductions in forestry based foraging habitat. • Separation distances to identified nests, with all locations of habitat loss or reduction located outside the core foraging range of hen harrier (i.e. >2km).
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8.6.4.2 Impact Evaluation Table: Disturbance/Displacement of foraging Hen Harrier during the breeding season

Impact Description

Project Life Cycle Stage: Construction stage

Impact Source: noise and visual intrusion; operating machinery; presence of construction personnel (at Mountphlips Substation site only)

Cumulative Impact Source: noise and visual intrusion; operating machinery; presence of construction personnel associated with Upperchurch Windfarm and UWF Replacement Forestry and UWF Other Activities, and associated with farming and forestry management activities, turf-cutting, quarrying works and potentially other windfarm construction sites.

Impact Pathway: Air, Visibility

Impact Description:

Breeding Hen Harriers are known to be sensitive to disturbance at or near the nest (Ruddock & Whitfield, 2007). Although estimates of disturbance distances between source and nest differ, a review by Ruddock & Whitfield (2007) suggests a conservative distance of effect of 1,000m, up to which, birds at the nest could be disturbed during wind farm construction activities.

Disturbance to foraging birds away from the immediate vicinity of nests may also occur (Masden, 2010; Pearce-Higgins *et al.*, 2012). This can impair foraging success during critical periods of the breeding season such as when provisioning young or result in increased energy expenditure and subsequent reductions in fitness. This may be dependent on whether or not sequential effects occur, levels of habituation to background disturbance or whether sufficient displacement habitat is available once a bird experiences a disturbance event. The degree or frequency of baseline foraging is an influencing factor, as is distance to nests as this is a likely determinant of dependency.

A minimum approach distance (MAD) as a function of flight initiation distance (FID) is used to determine the likelihood of any effect on an individual. There have been no specific studies examining the FID of foraging Hen Harriers to human disturbance. However, a study on FIDs on Northern Harrier *Circus cyaneus* from aircraft suggested a mean FID of 70m (Booms *et al.*, 2010) implying that birds may react to disturbance of similar magnitude (90db) at a distance of 105m. In a wider review of FIDs, Livesey *et al.* (2016) indicated a mean FIDs for Falconiformes of 89.7m (MAD 134.5m) (for pedestrian-based disturbance) and 79.7m (MAD 119.5m) (for motorised vehicles). Collectively, these data would suggest that foraging Hen Harriers are unlikely to be impacted by disturbance events over 150m away. Hen Harrier will also be habituated to certain background activities such as traffic and machinery on roads and on farmlands and would be expected to react less to artificial noise than to the presence of humans.

Therefore, a 150m buffer of the proposed development is taken as the zone wherein effective habitat loss may take place following disturbance through noise or visual intrusion as a result of construction works and/or the presence of construction personnel. At distances further than 150m from construction works areas, noise or visual intrusion are unlikely to result in any noticeable effect on foraging Hen Harriers.

The magnitude of the disturbance/displacement effect is related to the likelihood of Hen Harrier being present within the 150m zone of potential impact, and therefore the availability of suitable foraging habitat and the distance of sources of disturbance/displacement to any given nest location is relevant.

The core foraging range for Hen Harrier is considered to be 2km from nests (Arroyo *et al.*, 2014; SNH, 2017). Although home range size may vary between locations and across individuals, it is clear from studies that Harrier

Hen Harrier

Sensitive Aspect

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Hen Harrier	<p>females during the breeding season hunt closer to nests than males (e.g. Arroyo et al., 2006³¹); home ranges of females are centred on nest sites and on average may be half the area of that of males. In a Scottish study (Arroyo et al. 2014³²) female harriers mostly hunted within 1km of nests.</p>
	<p>Male birds have larger home ranges (Arroyo <i>et al.</i> 2006, 2014), but studies also suggest that male harriers mostly hunt within 2km of the nest (Arroyo et al.,2014), but can hunt further away (out to 10km (SNH,2016)). In a study of Northern Harrier, Martin 1987, found that 85% of all male activity occurred within 3km of the nest. Furthermore, studies have shown that the amount of time spent foraging by Hen Harrier (expressed in min/km²) decreases with distance from the nest (Madders (2003)). In this context it is considered that whilst male harriers may occur and forage at distances greater than 4km from a nest, the likelihood of any dependence on (and by inference high frequency of occurrence at) locations where disturbance sources may occur during the breeding season, greater than 4km from a nest, such as present for example at Mountphilips Substation site, is extremely low.</p>
Sensitive Aspect	<p>In relation to cumulative (sequential) effects, multiple sources of noise and visual intrusion occurring within the same spatial and/or temporal timeframe may combine should Hen Harriers encounter multiple sources of disturbance displacement in succession.</p>
	<p>To avoid any impacts to breeding hen harrier, UWF Grid Connection construction works during the Hen Harrier breeding season (March to August inclusive) will only take place at the Mountphilips Substation Site; construction of the 110kV UGC between the Mountphilips Substation site and the Consented UWF Substation compound will be carried out during the months of September to February inclusive (PD01). Additionally, if works at Mountphilips Substation site are programmed to begin in the Hen Harrier breeding season (March to August) confirmatory Hen Harrier breeding surveys will be completed, before such works initiate, such that all pre breeding nuptial activity, nesting activity and active nests are recorded within 2km of the entire construction works area boundary. These surveys will be completed prior to the start-up of all construction activities. No works will take place within 2 km of any identified active Hen Harrier nest during the hen harrier breeding season (PD02). These two project design measures will ensure that disturbance/displacement of foraging Hen Harrier is avoided.</p>
	<p><u>Impact Quality:</u> Negative</p>
	<p>Evaluation of the Subject Development Impact – Disturbance/Displacement of foraging Hen Harrier during the breeding season</p>
	<p>Element 1: UWF Grid Connection – direct/indirect impact</p>
	<p><u>Impact Magnitude:</u> During the breeding season, no works will be carried out within the SPA, and UWF Grid Connection works will be limited to the Mountphilips Substation site. No works will be carried out on the 110kV UGC outside of the Mountphilips Substation site during the breeding season. . This means that all works during the breeding season, which will be limited to the Mountphilips Substation site, will take place at distances greater than 4.3km from any traditional nest sites which were recorded during the 2016, 2017 and 2019 breeding surveys.</p>
Biodiversity	<p>Habitat surveys of lands within 2km of the known nest sites (2km is considered to be the core foraging area) demonstrate that there is ample suitable foraging habitat, which amounts to 3,580ha (or 42.9%) of the total land area (8,343ha) within the core foraging area around the 10 nests recorded in the upland area over the 2016 to 2019 period. In addition, according to Moran & Wilson-Parr (2015), there is 70% suitable habitat within the SPA as a whole. We therefore evaluate that there is no likelihood of Hen Harrier depending on the habitats within</p>
Topic	<p>³¹ Arroyo, B., Leckie, F., Redpath, S. (2006) Habitat Use and Range Management on Priority Areas for Hen Harriers: Final Report. Report to Scottish Natural Heritage. First draft- March 2006.</p> <p>³² Arroyo, B., Leckie, F., Amar, A., McCluskie, A. & Redpath, S. (2014) Ranging behaviour of Hen Harriers breeding in Special Protection Areas in Scotland. Bird Study 61: 48-55.</p>

150m of the construction works areas at Mountphilips Substation site, due to separation distance and the overall extent of habitat availability.

Taking into account that the nearest nest is 4.3km from the only part of the UWF Grid Connection which could be built during the breeding season – i.e. works at Mountphilips Substation site; with studies suggesting that most foraging occurs within 2km of a nest and reduces thereafter with distance; it is evaluated that the magnitude of any disturbance or displacement effects on foraging Hen Harrier during the breeding season will be negligible both within and outside the SPA, and with the application of project design measures (in particular PD02 in relation to Mountphilips Substation site) that significant impacts are unlikely to occur.

Significance of the Impact: Not Significant

Rationale for Impact Evaluation:

- Very High sensitivity rating for Hen Harrier and Negligible (approximating to 'no change') magnitude
- Works during the breeding season (March-August) will only take place at the Mountphilips Substation site. This means that no works will occur within 4.3km of any known nests, all of which are considered to be traditional nests, being used repeatedly ;
- no likelihood of reliance on any suitable foraging habitats either at the Mountphilips Substation site due to separation distance from nests, and the large amount of suitable habitat (3,580ha) within the core foraging range (2km) of the Hen Harrier nests identified
- Very low probability of foraging birds occurring with sufficient frequency to result in significant consequences on nesting birds or breeding success, and;
- the availability of suitable foraging habitat within the wider area, with 70% suitable habitat available within the SPA;
- in the context of existing background trends and disturbance is primarily related to visual intrusion, and Hen Harrier is likely to already be habituated to road-based and farming-based noise and visual intrusion;
- Effects will be momentary-Brief in duration;
- unlikely to affect any individual >150m from source, and;
- Highly reversible once any individual moves beyond 150m.

Element 1: UWF Grid Connection – cumulative impact

Cumulative Impact Magnitude:

There is no potential for cumulative impacts with UWF Related Works (constructed outside the breeding season), UWF Replacement forestry (planted by hand), or with the UWF Other Activities Upperchurch Hen Harrier Scheme (similar to farming activities and outside temporal overlap).

Due to the separation distance from breeding season works, at the Mountphilips Substation Site, from Upperchurch Windfarm and UWF Other Activities and from other projects such as potential Bunkimalta and consented Castlewaller Windfarms (and potential grid connection), existing Milestone Windfarm and from existing Rear Cross Quarry, there is a very low probability of cumulative disturbance effects. Forestry or agricultural activities in the area, close to works at the Mountphilips Substation site, are on-going background activities, and any cumulative impact will not be noticeable.

There is no potential for cumulative impacts with the consented Upperchurch Windfarm, UWF Other Activities, existing Milestone Windfarm, potential Bunkimalta Windfarm, existing Rear Cross Quarry, potential Castlewaller Windfarm (and potential grid connection) or turf cutting activities as the UWF Grid Connection 110kV UGC works will not be carried out during the breeding season. Cumulative impacts with works at Mountphilips Substation site are unlikely to occur with the application of project design measure PD02.

Overall, the Magnitude of cumulative disturbance/displacement is therefore evaluated as being negligible.

Significance of the Impact: Not Significant

Rationale for Impact Evaluation:

- Very High sensitivity rating for Hen Harrier and Negligible (approximating to 'no change') magnitude;

Hen Harrier	<ul style="list-style-type: none"> • Fact that most foraging takes place within 2km of the nest site, and no nests are within 4.3km of works which could take place during the breeding season (i.e. at the Mountphilips Substation site); • Separation distance between Mountphilips substation site and Other Elements and Other Projects, and therefore; • Very low probability of foraging birds occurring with sufficient frequency to result in significant consequences on nesting birds or breeding success, and; • Noise/Vibration/Intrusion unlikely to affect any individual >150m from source; • Birds likely to be habituated to various background activities such as once-off housing, farming practices, , forestry practices and; • The duration of effects, (momentary-brief) and; • High reversibility once the bird moves beyond 150m. • Construction works for 110kV UGC outside of the Mountphilips Substation site will be not be carried out during the hen harrier breeding season March to August inclusive;
Sensitive Aspect	Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project
	Element 2: UWF Related Works
	<p><u>Impact Magnitude:</u> None, the UWF Related Works will be constructed outside of the Hen Harrier breeding season March to August inclusive (this includes hedgerow and scrub removal in addition to hedgerow trimming), therefore there is no potential for disturbance/displacement effects during the breeding season.</p>
	<p><u>Significance of the Impact:</u> No Impact</p>
	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Construction works for the UWF Related Works will be not be carried out during the Hen Harrier breeding season March to August inclusive;
	Element 3: UWF Replacement Forestry
	<p><u>Impact Magnitude:</u></p> <p>All planting will be done by hand. Magnitude is negligible and unlikely to occur given the separation distance to the nearest nest (6.8km)</p>
	<p><u>Significance of the Impact:</u> Neutral to Not Significant</p>
	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • No contrast in activities from background levels, and; • Momentary – brief duration, with; • High reversibility once any individual moves beyond 150m. • Very low probability of foraging birds occurring with sufficient frequency to result in significant consequences on nesting birds or breeding success, and;
	Element 4: Upperchurch Windfarm
Biodiversity	<p><u>Impact Magnitude:</u> Out of 504 ha within the footprint and 150m of the consented Upperchurch Windfarm, only 135 ha (26.8%) is suitable for Hen Harriers to forage. This falls below the 30% threshold indicated as offering and attractive landscape to Hen Harriers (Wilson <i>et al.</i>, 2006). The nearest nest location to the consented Upperchurch Windfarm is 5.3km. There is evidence to show that breeding Hen Harriers rarely (<2% of the time) forage more than 4km from the nest (Arroyo <i>et al.</i>, 2012). Data from field surveys also indicate very low levels of Hen Harrier use within the footprint of the consented Upperchurch Windfarm (in 2019, 120 hours of breeding season VP observations yielded a total of 200 seconds of observed Hen Harrier activity, (of which 44 seconds were within 500m of a consented UWF turbine location). Given the distance from these observations to identified nests, these are unlikely to be actively breeding birds, and the magnitude of this impact is considered to be negligible and unlikely to occur given the separation distance to the nearest nest (5.3km).</p>
	<p><u>Significance of the Impact:</u> Not Significant</p>
Topic	

Rationale for Impact Evaluation:

- Very High sensitivity rating for Hen Harrier and Negligible magnitude;
- The low proportion (<30%) of suitable habitat for foraging Hen Harriers in the footprint and 150m buffer of the consented Upperchurch Windfarm; coupled with
- The distance of separation between the consented Upperchurch Windfarm the nearest Hen Harrier nest at 5.3km,; resulting in
- Very low probability of foraging birds occurring with sufficient frequency to result in significant consequences on nesting birds or breeding success, and;
- The irregularity and low number of Hen Harrier observations during the vantage point surveys indicating that the consented Upperchurch Windfarm is used infrequently by breeding Hen Harriers.

Element 5: UWF Other Activities

Impact Magnitude: The Upperchurch Hen Harrier Scheme will involve activities with similar sources of noise/intrusion as farming practices; Haul Route Activities trimming will be similar to existing noise/intrusion from regular maintenance of roadside hedgerows, and works on the Killonan Line will compare with existing maintenance in terms of the scale and magnitude of any noise/intrusion. The magnitude of impact is evaluated as Negligible.

Significance of the Impact: Not Significant

Rationale for Impact Evaluation:

- No contrast from background levels of noise of intrusion is expected, and;
- Birds will already be habituated to road-based noise and visual intrusion;
- Effect duration will be brief to momentary for most activities, and;
- Highly reversible once any individual moves beyond 150m

Cumulative Information: Individual Evaluations of Other Projects or Activities**Other Project: Existing Milestone Windfarm**

Impact Magnitude: Milestone windfarm has already been constructed. Magnitude of effects is limited to operational disturbance only which is expected to be of a scale in the order of up to 250m from turbines. Habitats on site are of low value for Hen Harriers (BES, 2017). Lands are being provided and managed to provide foraging opportunities for Hen Harrier. There is overlap between the identified Hen Harrier Management Plan land parcels and the 150m zone of possible disturbance to foraging birds around UGC works, should they occur. Flight activity is low at Milestone windfarm (study area comprising a 500m radius of construction works) however and observations are not attributed to locally nesting birds (BES, 2017, 2015).

Significance of the Impact: Not Significant

Rationale for Impact Evaluation:

- The implementation of a HHMP to mitigate for any disturbance effects such as displacement from foraging areas;
- Thus avoiding significant consequences on breeding birds;
- Low levels of recorded activity, which are not attributed to locally nesting birds.
- The presence of low value habitats for Hen Harrier at Milestone Windfarm in the first instance, as reported.
- Distance from Milestone to identified nests, notwithstanding some overlap in Hen Harrier Management Plan lands with 150m zone of possible disturbance to foraging Hen Harriers.

Other Project: Rear Cross Quarry

Impact Magnitude: Evaluated as negligible, effectively part of the background baseline environment. The already existing quarrying operation at Shanballyedmond, near Rear Cross covers approximately 10 ha and is located

Hen Harrier	Sensitive Aspect	within the Slievefelim to Silvermines Mountains SPA. No potential for secondary impacts as the quarry will be able to supply all aggregate to the Whole UWF Project within the current consented capacity of the quarry.
		<u>Significance of the Impact:</u> Slight
		<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> No contrast in activities from background levels, and; Momentary – brief duration, with; High reversibility once any individual moves beyond 150m. And no increase expected.
		Other Project: Castlewaller Windfarm (<i>consented windfarm, potential grid connection</i>) <i>Although Castlewaller Windfarm is not expected to be constructed during the same period as the UWF Grid Connection, it is nonetheless included for evaluation of cumulative effects on a precautionary basis.</i>
Biodiversity	Topic	<u>Impact Magnitude:</u> Noise and visual intrusion during the construction period may interact with foraging individuals from 2-3 no. nests within 2km. Magnitude of Effects on Hen Harrier have already been evaluated as Negligible. Any grid connection route, which may be proposed at a future date, will be required to show no significant effects to Hen Harrier.
		<u>Significance of the Impact:</u> Slight
		<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> Primarily on the design of the windfarm allowing for the maintenance of foraging corridors and separation distance to nearest nests, and; The extent of displacement habitat available for any disturbed birds.
		Other Project: Potential Bunkimalta Windfarm (<i>potential windfarm, consented grid connection</i>) <i>Although Bunkimalta Windfarm is not expected to be constructed during the same period as the UWF Grid Connection, it is nonetheless included for evaluation of cumulative effects on a precautionary basis</i>
		<u>Impact Magnitude:</u> The consented grid connection is routed along forestry roads and public roads where it occurs within the SPA. It is assumed that any future proposed Bunkimalta Windfarm will include site design and mitigation measures to ensure that effects to Hen Harrier will not be significant (in the context of its location within a Hen Harrier SPA), this is likely to include measures in relation to disturbance and displacement, particularly from suitable habitat.
		<u>Significance of the Impact:</u> Neutral residual effect
		<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> requirement on projects within a designated site to prove that no significant adverse effects will occur
		Activity: Forestry
		<u>Impact Magnitude:</u> Disturbance from forestry operations is part of background trends, limited information is available on magnitude of this however forestry extraction is subject to Forest Service procedure for felling within the Hen Harrier breeding season, this includes full Appropriate Assessment to protect Hen Harriers within SPA's and a requirement to consider an EIA on lands outside of Natura 2000 sites (depending upon the nature of the forestry operations). It is assumed this process will be undertaken for all commercial forestry resulting in no likelihood of significant effects or adverse effects on site integrity. The magnitude of disturbance/displacement from forestry activities is evaluated as negligible.
		<u>Significance of the Impact:</u> Not Significant
		<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> No contrast in activities from background levels, and; Brief-Temporary duration, with; High reversibility once any individual moves beyond 150m. Forestry activities are subject to Appropriate Assessment of their effects on Hen Harrier.

Activity: Agriculture
Impact Magnitude: Evaluated as negligible, effectively same as background.
Significance of the Impact: Not Significant
Rationale for Impact Evaluation: <ul style="list-style-type: none"> No contrast in activities from background levels, and; Brief-Temporary duration, with; High reversibility once any individual moves beyond 150m.
Other Project: Turf-cutting
Impact Magnitude: Evaluated as negligible, effectively same as background.
Significance of the Impact: Neutral
Rationale for Impact Evaluation: <ul style="list-style-type: none"> No contrast in activities from background levels, and; Momentary – brief duration, with; High reversibility once any individual moves beyond 150m.
Evaluation of Other Cumulative Impacts – Disturbance/Displacement of foraging Hen Harrier during the breeding season
Whole UWF Project Effect
Cumulative Impact Magnitude: <p>The spatial extent of the Whole UWF Project effect during the breeding season relates to the Mountphilips Substation site to the west of the upland area, and the Upperchurch Windfarm site on the eastern side of the upland area. UWF Other Activities may also take place at both of these locations, in addition to other locations in the wider area (all of which will be outside, and at a distance from, the SPA). Works during the breeding season may also include planting works for UWF Replacement Forestry.</p> <p>No works for either the 110kV UGC (outside of the Mountphilips Substation site) or for the UWF Related Works will occur during the breeding season.</p> <p>Overall the magnitude is evaluated as negligible.</p>
Significance of the Cumulative Impact: Not Significant
Rationale for Cumulative Impact Evaluation: <ul style="list-style-type: none"> Very High Sensitivity rating for Hen Harrier and negligible magnitude of impact; Fact that most foraging takes place within 2km of the nest site, no nests are within 4.3km of works during the breeding season; Very low probability of foraging birds occurring with sufficient frequency at Mountphilips Substation site to result in significant consequences on nesting birds or breeding success, and; Separation distance between works at Mountphilips Substation site and works in the Upperchurch Windfarm area; Noise/Vibration/Intrusion unlikely to affect any individual >150m from source; Birds likely to be habituated to various background activities such as once-off housing, farming practices, road maintenance, forestry practices and; The duration of effects, (momentary-brief) and; High reversibility once the bird moves beyond 150m. Construction works for the 110kV UGC (outside of Mountphilips Substation site) and for UWF Related Works will be not be carried out during the hen harrier breeding season March to August inclusive, avoiding any potential for sequential effects with Other Elements or Other Projects; The distance to the nearest confirmed nest locations.

Hen Harrier	All Elements of the Whole UWF Project with Other Projects or Activities
	<p><u>Cumulative Impact Magnitude:</u></p> <p>There is potential for disturbance to breeding foraging hen harriers resulting from the Whole UWF Project, and existing Milestone Windfarm, existing Rearcross Quarry and agricultural, forestry and turf cutting activities in the surrounding area, along with (potentially) Castlewaller Windfarm, and Bunkimalta Windfarm.</p> <p>Magnitude of effects from the Whole UWF Project is evaluated above as Negligible. When the Other Projects and Activities are collectively taken into account, the magnitude of effect will be negligible.</p>
Sensitive Aspect	Significance of the Cumulative Impact: Not Significant to Slight (negative)
	<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Very High sensitivity rating for Hen Harrier, and Negligible magnitude; • Construction works for UWF Grid Connection during the breeding season limited to Mountphilips Substation site which puts works during the breeding season further than 4km from nest sites, avoiding any disturbance effects; • Construction works for the 110kV UGC (outside of Mountphilips Substation site) and for UWF Related Works will be not be carried out during the Hen Harrier breeding season March to August inclusive, avoiding any potential for sequential effects; • The distance to the nearest confirmed nest locations in respect of the UWF Grid Connection (Mountphilips Substation site – 4.3km), Consented Upperchurch Windfarm (5.3km from nearest turbine base), and UWF Replacement Forestry (6.8km from the afforestation lands); • Fact that most foraging takes place within 2km of the nest site, with only 2% occurring at distances >4km • Noise/Vibration/Intrusion unlikely to affect any individual >150m from source; • Birds likely to be habituated to various background activities such as traffic, farming practices, road maintenance, quarrying, forestry practices; • The duration of effects, (momentary-brief); • High reversibility once the individual bird moves beyond 150m; and • The separation distance from UWF Grid Connection works at Mountphilips Substation site and Consented Upperchurch Windfarm from Castlewaller Windfarm site or Bunkimalta Windfarm site (both greater than 4km) precludes sequential effects.

8.6.4.3 Impact Evaluation Table: Disturbance/Displacement of foraging Hen Harrier outside of the breeding season

Impact Description: Disturbance/Displacement of foraging Hen Harrier outside of the breeding season

Project Life Cycle Stage:	Construction stage
<p><u>Impact Source:</u> noise and visual intrusion; operating machinery; presence of construction personnel</p> <p><u>Cumulative Impact Source:</u> noise and visual intrusion; operating machinery; presence of construction personnel associated with Upperchurch Windfarm, UWF Related Works, UWF Replacement Forestry and UWF Other Activities; and associated with farming and forestry management activities, turf-cutting, quarrying works and <i>potentially</i> other windfarm construction sites.</p> <p><u>Impact Pathway:</u> Air, Visibility</p> <p><u>Impact Description:</u></p> <p>Between the period September to February inclusive, Hen Harriers are considered to be in their non-breeding season (Watson, 1977). During the non-breeding season, Hen Harriers may move substantial distances from their breeding areas, including immigration into Ireland from the UK (Wernham <i>et al.</i>, 2002; Etheridge & Summers, 2006), as well as movements within Ireland (Irwin <i>et al.</i>, 2011). This reduces reliance on habitats proximal to breeding areas, with Hen Harriers making substantial movements during the non-breeding season, which indicates that Harriers are less likely to be sensitive to disturbance during the non-breeding season compared to during the nesting season (when Hen Harriers are typically limited to foraging with 2km of nesting locations (Arroyo <i>et al.</i>, 2014) with studies suggesting that most foraging occurs within 2km of a nest and reduces thereafter with distance). In addition, the effects of disturbance in the non-breeding season are at an individual level rather than affecting chicks/nest success.</p> <p>A minimum approach distance (MAD) as a function of flight initiation distance (FID) is used to determine the likelihood of any effect on an individual. There have been no specific studies examining the FID of foraging Hen Harriers to human disturbance. However, a study on FIDs on Northern Harrier <i>Circus cyaneus</i> from aircraft suggested a mean FID of 70m (Booms <i>et al.</i>, 2010) implying that birds may react to disturbance of similar magnitude (90db) at a distance of 105m. In a wider review of FIDs, Livesey <i>et al.</i> (2016) indicated a mean FIDs for Falconiformes of 89.7m (MAD 134.5m) (for pedestrian-based disturbance) and 79.7m (MAD 119.5m) (for motorised vehicles). Collectively, these data would suggest that foraging Hen Harriers are unlikely to be impacted by disturbance events over 150m away. Hen Harrier will also be habituated to certain background activities such as traffic and machinery on roads and on farmlands and would be expected to react less to artificial noise than to the presence of humans.</p> <p>Therefore, construction works and the presence of construction personnel are unlikely to result in any noticeable effect on foraging Hen Harriers more than 150m away from the point of disturbance. A 150m buffer of the proposed development is taken as the zone wherein effective habitat loss may take place following disturbance through noise or visual intrusion, should suitable foraging habitat be present within this radius of works. Due to the linear nature of the 110kV UGC, disturbance and effective habitat loss through displacement would be brief to temporary in nature, whereas any disturbance/displacement from works at the Mountphilips Substation site will be temporary in nature.</p> <p>UWF Grid Connection works during the non-breeding season relates to all works areas for UWF Grid Connection, i.e. the Mountphilips Substation site <u>and</u> the 110kV UGC works, which are predominantly on public roads between the Mountphilips Substation site and the Consented UWF Substation compound. 110kV UGC works on the public road network include works on the Regional Road R503, which is located within the boundary of the SPA. To reiterate, as per Project Design, no works will take place outside of the Mountphilips Substation site during the Hen Harrier breeding season, this means that any works within the SPA boundary will only be carried out during the non-breeding season.</p> <p>In relation to cumulative effects, multiple sources of noise and visual intrusion will occur in and on both sides of the upland area, during the same period of time.</p>	

Hen Harrier

Sensitive Aspect

Biodiversity

Topic

Hen Harrier	<p>While the 110kV UGC works in the Knockmaroe, Knockcurraghbola Commons and Knockcurraghbola townlands area will be carried out during the same period as UWF Related Works and Upperchurch Windfarm construction works. The magnitude of impact is reduced through the application of project design (which was developed for the protection of residential amenity, but also will reduce the magnitude of cumulative or sequential effects to hen harrier):</p> <p>PD07 - 110kV UGC construction works along the local roads L2264-50 and L6188-0, will not take place at the same time as the UWF Related Works Haul Route Works on these roads. The 110kV UGC construction works will also be scheduled so that the works do not occur on the same days as concrete deliveries for Consented UWF Turbines along these local roads; and</p> <p>PD11 - Construction works for the 110kV UGC in Knocknabansha, Knockmaroe, Knockcurraghbola Crownlands and Knockcurraghbola Commons townlands, which are within 350m of local residences, will not take place at the same time as either the UWF Related Works or Upperchurch Windfarm where those works also occur within 350m.</p> <p><u>Impact Quality:</u> Negative</p>
	<p>Evaluation of the Subject Development Impact – Disturbance/Displacement of foraging Hen Harrier outside of the breeding season</p>
Sensitive Aspect	<p>Element 1: UWF Grid Connection – direct/indirect impact</p> <p><u>Impact Magnitude:</u></p> <p>Winter hunting grounds cover a much wider range and greater variety of habitats than Summer (Watson, 1977). Based on studies conducted for the previous planning application (PL92 .301959) the winter population of the UWF Grid Connection study area is estimated as 0-5 birds (based on a maximum of 5 birds recorded concurrently (for the 2018 application) across all roosts on any given day, from 2 winter seasons of effort). This has the potential to increase or decrease dependant on inter-annual variation, weather or other factors. Likely noise levels from construction are evaluated as negligible in the context of existing background trends and disturbance is primarily related to visual intrusion.</p> <p>Habitat surveys of lands within 150m of the UWF Grid Connection works (150m is considered to be the distance from construction works where disturbance/displacement could occur) indicate that there is potentially 345ha (36%) of foraging habitats where Hen Harriers could be disturbed, which overlap proposed works during the winter period (this would only represent a maximum disturbance should all works be taking place concurrently). Furthermore, this area forms a very small proportion of the available suitable foraging habitat in the wider landscape. For example, a similar calculation on habitat availability for foraging Hen Harriers within 2km of the UWF Grid Connection works indicates that there are some 4,842 ha (39%) of suitable habitats and, according to Moran & Wilson-Parr (2015), there is 70% suitable habitat (ca. 14,642Ha) within the wider SPA as a whole. On this basis there is no likelihood /probability of Hen Harrier exclusively depending on the habitats within 150m of the UWF Grid Connection works during the winter months, thus reducing any likelihood of significant effects.</p> <p>Overall, the Magnitude of cumulative disturbance/displacement is therefore evaluated as being negligible.</p>
	<p><u>Significance of the Impact: Not Significant</u></p>
Biodiversity	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Very High sensitivity rating for Hen Harrier and Negligible magnitude; • Birds will already be habituated to road-based noise and visual intrusion; • Effects will be momentary-brief in duration; • unlikely to affect any individual >150m from source; and • Highly reversible once any individual moves beyond 150m, given the extent of suitable foraging habitats available ; • Demonstrated low numbers of Hen Harriers wintering in the vicinity. • Very low probability of foraging birds occurring with sufficient frequency to result in significant consequences on nesting birds or breeding success subsequently.

Element 1: UWF Grid Connection – cumulative impact**Cumulative Impact Magnitude:**

Due to the separation of the UWF Grid Connection works along the R503 from potential Bunkimalta Windfarm (greater than 4km), it is unlikely that any cumulative disturbance effects will occur. In respect of consented Castlewaller Windfarm and existing Milestone Windfarm (including some of the Milestone Windfarm Hen Harrier management plan lands) and existing Rear Cross Quarry, all occur in close proximity to works proposed during the winter months resulting in the potential for sequential effects due to the nomadic nature of wintering Hen Harriers. In relation to Castlewaller Windfarm potential grid connection works, there is potential for sequential or combined works on the local road along the 110kV UGC on the L6009-0 and R503 roads (where the 110kV UGC is currently proposed and where part of the Castlewaller grid connection route (L6009-0) and a new access point from the R503 for the Castlewaller grid connection works was also indicated during SID pre-application discussions with An Bord Pleanála during 2019).

The magnitude of cumulative effects is evaluated as negligible in relation to existing Milestone Windfarm, potential Bunkimalta Windfarm and existing Rear Cross Quarry, and negligible in relation to consented Castlewaller Windfarm and its potential grid connection.

There is also potential for cumulative impacts via disturbance with Other Elements such as Upperchurch Windfarm, UWF Related works, UWF Replacement Forestry and with the UWF Other Activities Upperchurch Hen Harrier Scheme at the eastern end of the 110kV UGC route within the UWF Grid Connection Cumulative Evaluation Study Area through the accumulation of single disturbance events on foraging birds moving through the landscape. The magnitude of cumulative impacts relates to the potential for concurrent activity encountered sequentially by foraging birds as they move through the areas where works are being undertaken.

The potential for sequential cumulative effects on wintering Hen Harriers is largely mitigated by the scale and availability of suitable displacement habitat, the low numbers overall wintering in the vicinity, and the brief to momentary nature of any individual disturbance event, which is unlikely to result in any significant stress on a foraging Hen Harrier, as typically wintering birds are habituated to moving through the wider Irish landscape and encountering sources of intrusion/disturbance.

The potential for cumulative impacts with nearby forestry, agricultural or turf-cutting activities is primarily related to traffic movements associated with these on the R503, and is evaluated as low.

Overall the magnitude of cumulative disturbance is evaluated as negligible.

Significance of the Impact: Not Significant**Rationale for Impact Evaluation:**

- Very High sensitivity rating for Hen Harrier and Negligible Magnitude;
- Noise/Vibration/Intrusion unlikely to affect any individual >150m from source;
- Birds likely to be habituated to various background activities such as once-off housing, farming practices, road maintenance, forestry practices and;
- The duration of effects, (momentary-brief) and;
- High reversibility once the bird moves beyond 150m.
- availability of foraging habitats within the wider area (4,842ha (39%) within 2km of the UWF Grid Connection works and 70% suitable habitat within the SPA as a whole).
- Habituation by wintering harriers to foraging widely through the landscape.

Very low probability of foraging birds occurring with sufficient frequency to result in significant consequences on nesting birds or breeding success subsequently.

Hen Harrier	Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project	
	Element 2: UWF Related Works	
	<u>Impact Magnitude:</u> Likely noise levels from construction are evaluated as negligible in the context of existing background trends and disturbance is primarily related to visual intrusion.	
	UWF Related Works will be constructed during the September to February period; disturbance/displacement impacts to foraging Hen Harrier could therefore occur during this time.	
Sensitive Aspect	Habitat surveys of lands within 150m of the UWF Related Works (150m is considered to be the distance from the disturbance/displacement where impacts on foraging Hen Harrier could occur) indicate that there is potentially 152ha (27%) of foraging habitats where Hen Harriers could be disturbed. However, this forms a very small proportion of the available suitable foraging habitat in the wider landscape. A similar calculation on habitat availability within 2km of the UWF Related Works indicates that there are some 2,050 ha (38%) of suitable habitats within 2km and, according to Moran & Wilson-Parr (2015), there is 70% suitable habitat within the SPA as a whole. We therefore evaluate that there is no likelihood/probability of wintering Hen Harrier depending on the habitats within 150m of the UWF Related Works due to the overall extent of habitat availability.	
	<u>Significance of the Impact:</u> Not Significant	
	<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> • Very High sensitivity rating for Hen Harrier and Negligible magnitude; • Noise/Vibration/Intrusion unlikely to affect any individual >150m from source; • Birds likely to be habituated to various background activities such as once-off housing, farming practices, road maintenance, forestry practices and; • The duration of effects, (momentary-brief) and; • High reversibility once the bird moves beyond 150m. • availability of foraging habitats within the wider area (2,050ha (38%) within 2km of the UWF Related Works and 70% suitable habitat within the SPA as a whole). 	
	Element 3: UWF Replacement Forestry	
Biodiversity	<u>Impact Magnitude:</u>	
	All planting will be done by hand. Magnitude is negligible.	
	<u>Significance of the Impact:</u> Not Significant	
	<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> • No contrast in activities from background levels, and; • Momentary – brief duration, with; • High reversibility once any individual moves beyond 150m. • Very low probability of foraging birds occurring with sufficient frequency to result in significant consequences on nesting birds or breeding success subsequently, and; 	
Topic	Element 4: Upperchurch Windfarm	
	<u>Impact Magnitude:</u> <p>Out of 504 ha within the footprint and 150m of the consented Upperchurch Windfarm, only 135 ha (27%) is suitable for Hen Harriers to forage. Data from field surveys also indicate very low levels of Hen Harrier use within the footprint of the consented Upperchurch Windfarm (in 2 years of additionally commissioned Hen Harrier surveys carried out from March 2015 to April 2017, a representative sample of 379 hours of winter season (Oct-March inclusive) VP observations yielded a total of 600 seconds of observed Hen Harrier activity, (of which 240 seconds were within 150m of works locations (Ecopower Developments 2015, 2016 and 2017). Due to the low proportion of suitable habitat at the windfarm site, the low numbers of Hen Harrier recorded during the winter season, and the availability of suitable habitat in the wider landscape (36% within 2km, 70% within the SPA), it is considered that the magnitude of disturbance/displacement will be negligible.</p>	

<u>Significance of the Impact:</u> Not Significant
<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none">• Very High sensitivity of the species and Negligible Magnitude,• Low levels of recorded Hen Harrier activity during the winter;• The low proportion (<30%) of suitable habitat for foraging Hen Harriers in the footprint and 150m buffer of the consented Upperchurch Windfarm; coupled with• Noise/Vibration/Intrusion unlikely to affect any individual >150m from source;• Birds likely to be habituated to various background activities such as once-off housing, farming practices, road maintenance, forestry practices and;• The duration of effects, (momentary-brief) and;• High reversibility once the bird moves beyond 150m.• Availability of foraging habitats for Hen Harrier within the wider area (1,846ha (36%) within 2km of the Consented Upperchurch Windfarm and 70% suitable habitat within the SPA as a whole).• Very low probability of foraging birds occurring with sufficient frequency to result in significant consequences on nesting birds or breeding success subsequently, and;
Element 5: UWF Other Activities
<u>Impact Magnitude:</u> <p>The Upperchurch Hen Harrier Scheme will involve activities with similar sources of noise/intrusion as farming practices; Haul Route Activities trimming will be similar to existing noise/intrusion from regular maintenance of roadside boundaries and works on the Killonan Line will compare with existing maintenance in terms of the scale and magnitude of any noise/intrusion. The magnitude of impact is evaluated as Negligible.</p>
<u>Significance of the Impact:</u> Not Significant
<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none">• No contrast from background levels of noise of intrusion is expected, and;• Wintering Hen Harriers will already be habituated to road-based noise and visual intrusion;• Overhead Line Activities will compare to existing maintenance activities;• Effect duration will be brief to momentary for most activities, and;• Highly reversible once any individual moves beyond 150m.
<u>Cumulative Information: Individual Evaluations of Other Projects or Activities</u>
<u>Other Project: Milestone Windfarm</u>
<u>Impact Magnitude:</u> Milestone windfarm has already been constructed. Magnitude of effects is limited to operational disturbance only which is expected to be of a scale in the order of up to 250m from turbines. Habitats on site are of low value for Hen Harriers (BES, 2017). Lands are being provided and managed to provide foraging opportunities for Hen Harrier. There is overlap between the identified Milestone Windfarm Hen Harrier Management Plan (HHMP) land parcels and the 150m zone of possible disturbance to foraging birds around 110kV UGC works, should they occur.
<u>Significance of the Impact:</u> Not Significant
<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none">• Wintering Hen Harriers will already be habituated to ambient noise and visual intrusion;• Effect duration will be brief to momentary for most events, and;• Highly reversible once any individual moves beyond 150m.• The implementation of a HHMP to mitigate for any operational disturbance effects such as displacement from foraging areas;• The presence of low value habitats for Hen Harrier at Milestone Windfarm in the first instance, as reported.• Very low probability of foraging birds occurring with sufficient frequency to result in significant consequences on nesting birds or breeding success subsequently.

Hen Harrier	Other Project: Rear Cross Quarry
	<u>Impact Magnitude:</u> Evaluated as negligible, effectively same as background. No potential for secondary impacts as there the quarry will be able to supply all aggregate to the Whole UWF Project within the current consented capacity of the quarry.
	<u>Significance of the Impact:</u> Neutral
	<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> No contrast in activities from background levels, and; High reversibility once any individual moves beyond 150m. And no increase expected.
Sensitive Aspect	Other Project: Castlewaller Windfarm (<i>consented windfarm, potential grid connection</i>) <i>Although Castlewaller Windfarm is not expected to be constructed during the same period as the UWF Grid Connection, it is nonetheless included for evaluation of cumulative effects on a precautionary basis.</i>
	<u>Impact Magnitude:</u> Noise and visual intrusion during the construction period may interact with foraging individuals should it overlap the winter period. Magnitude of effects on Hen Harrier have already been evaluated as Negligible. Any grid connection route, which may be proposed at a future date, will be required to show no significant effects to Hen Harrier included through disturbance related pathways.
	<u>Significance of the Impact:</u> Not Significant
	<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> The potential for interaction during the winter months, notwithstanding; Wintering Hen Harriers will already be habituated to ambient noise and visual intrusion; Effect duration will be brief to momentary for most activities, and; Highly reversible once any individual moves beyond 150m. The extent of displacement habitat available for any disturbed birds. Very low probability of foraging birds occurring with sufficient frequency to result in significant consequences on nesting birds or breeding success subsequently.
Biodiversity	Other Project: Potential Bunkimalta Windfarm (<i>potential windfarm, consented grid connection</i>) <i>Although Bunkimalta Windfarm is not expected to be constructed during the same period as the UWF Grid Connection, it is nonetheless included for evaluation of cumulative effects on a precautionary basis</i>
	<u>Impact Magnitude:</u> The consented grid connection is routed along forestry roads and public roads where it occurs within the SPA. It is assumed that any future proposed Bunkimalta Windfarm will include site design and mitigation measures to ensure that effects to Hen Harrier will not be significant (in the context of its location within a Hen Harrier SPA), this is likely to include measures in relation to disturbance and displacement, particularly from suitable habitat.
	<u>Significance of the Impact:</u> Neutral residual effect
	<u>Rationale for Impact Evaluation:</u> Requirement on projects within a designated site to prove that no significant adverse effects will occur.
Topic	Activity: Forestry
	Disturbance from forestry operations is part of background trends. Limited information is available on magnitude of this, however forestry extraction is subject to Forest Service procedure for felling within the Hen Harrier breeding season. This includes full Appropriate Assessment to protect Hen Harriers within SPA's, which should take account of wintering Hen Harrier. It is assumed this process will be undertaken for all commercial forestry resulting in no likelihood of significant effects or adverse effects on site integrity. The magnitude of disturbance/displacement from forestry activities on wintering Hen Harrier is evaluated as negligible.
	<u>Significance of the Impact:</u> Neutral to Not Significant

Rationale for Impact Evaluation: <ul style="list-style-type: none"> • Precautionary basis • Very low probability of foraging birds occurring with sufficient frequency to result in significant consequences on nesting birds or breeding success subsequently. 	
Activity: Agriculture	
Impact Magnitude: Evaluated as negligible, effectively same as background.	
Significance of the Impact: Not Significant	
Rationale for Impact Evaluation: <ul style="list-style-type: none"> • No contrast in activities from background levels, and; • Brief-Temporary duration, with; • High reversibility once any individual moves beyond 150m. 	
Other Project: Turf-cutting	
Impact Magnitude: Evaluated as negligible, effectively same as background – no turf cutting is likely during the winter months.	
Significance of the Impact: Neutral	
Rationale for Impact Evaluation: <ul style="list-style-type: none"> • Restrictions on further turf cutting in intact areas/protected areas, and; • The limited extent of lands subject to turbarry (rights to cut turf) within the Hen Harrier SPA overall (4%), with little of this occurring within the Cumulative Evaluation Study Areas or likely to occur in winter; • The reversibility of any effect, (in the context of Hen Harrier) with birds expected to continue to utilize re-vegetating cutover bog for foraging. 	
Evaluation of Other Cumulative Impacts – Disturbance/Displacement of foraging Hen Harrier outside of the breeding season	
Whole UWF Project Effect	
Magnitude: Habitat surveys of lands within 150m of the construction works (150m is considered to be the distance from construction works where disturbance/displacement could occur) indicate that there is potentially 345ha of foraging habitats where Hen Harriers could be disturbed within 150m of UWF Grid Connection works; and 480ha of foraging habitats where Hen Harriers could be disturbed within 150m of UWF Related Works/Upperchurch Windfarm works, during the winter period (this would only represent a maximum disturbance should all works be taking place concurrently). These works will be spread over a wide linear area from the Mountphilips Substation site on the western side of the upland area, along public roads through the upland area, and on lands on the eastern side of the upland area. Furthermore, the lands within 150m of construction works form a very small proportion of the available suitable foraging habitat in the wider landscape. The Mountphilips Substation site contains only a small area of suitable foraging habitat with the site generally under improved grassland. No disturbance effects are anticipated for construction at the Upperchurch Windfarm/UWF Related Works area during the winter months due to low numbers of Harriers recorded within the greater area. Overall, the Magnitude of cumulative disturbance/displacement is therefore evaluated as being negligible. In respect of UWF Replacement Forestry, all planting will be done by hand. UWF Other Activities will be small in scale and similar to background farming activities. The Magnitude of both of these activities will be negligible.	
Significance of the Cumulative Impact: Not Significant	
Rationale for Impact Evaluation: <ul style="list-style-type: none"> • Very High sensitivity rating for Hen Harrier and Negligible magnitude; • Birds will already be habituated to road-based noise and visual intrusion; • Effects will be momentary-brief in duration; • unlikely to affect any individual >150m from source; and 	

Hen Harrier	<ul style="list-style-type: none"> Highly reversible once any individual moves beyond 150m, given the extent of suitable foraging habitats available; and Demonstrated low numbers of Hen Harriers wintering in the vicinity. Very low probability of foraging birds occurring with sufficient frequency to result in significant consequences on nesting birds or breeding success subsequently.
Sensitive Aspect	All Elements of the Whole UWF Project with Other Projects or Activities
	<p>Cumulative Impact Magnitude:</p> <p>The magnitude of foraging habitat loss resulting from the Whole UWF Project, existing Milestone Windfarm, existing Rearcross Quarry, Agriculture and Turf Cutting in the vicinity, along with <i>potentially</i> Castlewaller Windfarm and Bunkimalta Windfarm, are evaluated as being negligible.</p> <p>Forestry activities in the surrounding area is generally a negative trend in the background environment currently with declines in available foraging habitat in the short-medium term (next 10 years & expected to increase subsequently) and evaluated of Medium magnitude in that regard. No turf cutting is likely to take place during winter months and agriculture is likely to be the same as existing baseline. There is some potential for birds to encounter sources of noise or visual intrusion sequentially as they move through the landscape.</p> <p>Overall magnitude is evaluated as negligible.</p>
	Significance of the Cumulative Impact: Not Significant
	<ul style="list-style-type: none"> Rationale for Cumulative Evaluation: Very High sensitivity rating for Hen Harrier, and Negligible magnitude ; The potential for sequential events, however; Wintering Harriers are likely to be habituated to various background activities such as once-off housing, farming practices, road maintenance, forestry practices and; Very low probability of foraging birds occurring with sufficient frequency to result in significant consequences on nesting birds or breeding success subsequently, and; Effects will be momentary-brief in duration; unlikely to affect any individual >150m from source; and Highly reversible once any individual moves beyond 150m, given the extent of suitable foraging habitats available; Demonstrated low numbers of Hen Harriers wintering in the vicinity.

8.6.4.4 Impact Evaluation Table: Reduction in Prey Item Species

Impact Description

Project Life Cycle Stage: Construction stage/Operational Stage

Impact Source: Land cover change, vegetation clearance, noise and visual intrusion; operating machinery; presence of construction personnel

Cumulative Impact Source: Excavations, Land Cover Change, Forestry Felling, removal of Hedgerows, land cover change from agricultural practices such as drainage, peat extraction

Impact Pathway: Mortality/Displacement

Impact Description: Hen Harrier preferred prey species are typically described as those of open ground, such as Meadow Pipit (*Anthus pratensis*) and Skylark (*Alauda arvensis*). Hen Harriers breeding numbers are typically correlated with the abundance of small mammals in the UK (Redpath *et al.*, 2002a; 2002b; Thirgood *et al.*, 2003), however this relationship does not appear to exist in Ireland perhaps due to the absence of short-tailed vole (*Microtus agrestis*) (see O'Donoghue, 2010). Preferred prey species in Ireland have been described as Meadow Pipit, Wood Mouse (*Apodemus sylvaticus*) and other small passerines during the breeding season with Meadow Pipit, Brown Rat (*Rattus norvegicus*) and wintering thrushes predominating in winter (O'Donoghue, 2010).

In a published study of 900 Hen Harrier pellets in Ireland covering winter and breeding seasons, Hen Harriers were found to have a diverse diet, which varies between areas and seasons and includes small mammals, birds, amphibians and reptiles - up to 78% of the diet of Hen Harriers in Ireland was shown to comprise passerine species of birds (Irwin *et al.*, 2012). Winter diet at coastal roosts found various bird species forming 77.2% of diet (by percentage frequency); birds were predominantly passerines (Smiddy & Cullen, 2017).

Reductions in the availability of Prey Items (passerine songbirds, small mammals, reptiles and amphibians) may disadvantage foraging Hen Harriers, in particular during the breeding season when provisioning young. These reductions will typically be related to construction stage disturbance displacement (although this is likely to be temporary in duration and reversible) and any operational habitat loss (as habitat loss or loss in quality of existing habitat may have a direct effect on the composition and numerical abundance of the prey that inhabit it) and therefore consideration is given to both.

Intensity of agricultural management is known to negatively affect densities of songbirds with small mammal abundance in grassland related to the height and diversity of vegetation present. The effects of Habitat Loss (permanent or Temporary Reduction or Loss of Suitable Habitat and the effects thereof on Hen Harrier are considered separately in this EIAR- (see Impact Evaluation Table 8.6.4.1).

Impact Quality: neutral, negative and positive

Evaluation of the Subject Development Impact – Reduction in Prey Item Species

Element 1: UWF Grid Connection – direct/indirect impact

Impact Magnitude:

General mammal species such as Brown Rat, Shrews, Mice, Bank Vole, Hare and Rabbit have been scoped out from consideration due to the limited extent of permanent land cover change of natural habitats, the general low densities likely to be present (resulting in an importance evaluation of Local Importance, Lower Value) and the high likelihood of no observable changes to existing trends as a result of the proposed UWF Grid Connection development (see Section 8.9). Residual impacts on Amphibians and Reptiles have been evaluated as Neutral (see Section 8.10). As per Section 8.7 of this report, residual impacts on General Birds range from Imperceptible or Neutral to Slight (Positive). Effects on Meadow Pipit from the UWF Grid Connection were evaluated as 'not significant' due to the limited extent of land cover change, only at Mountphilips Substation site. This land cover change has also been evaluated as to its effect on Hen Harrier through loss of foraging habitat and found to be negligible in magnitude. A potential reduction in prey item availability only relates to the Mountphilips Substation Site, where suitable foraging habitat comprising 0.05ha will be lost – evaluated as negligible. Numbers of prey items likely to occur within this area are considered less than negligible in the context of prey availability,

Hen Harrier

Sensitive Aspect

Biodiversity

Topic

Hen Harrier	Sensitive Aspect	<p>for example a typical Meadow Pipit average home range size of 2.18ha has been described, inferring at most a single pair of pipits could be lost permanently.</p> <p>Overall magnitude is evaluated as Negligible, i.e. barely distinguishable and approximating to a 'no change' situation.</p> <p>Significance of the Impact: Imperceptible</p> <p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> The very high sensitivity of the species and negligible magnitude, however; No noticeable changes in the character of the environment from a prey availability perspective are predicted. Distance from the only source (Mountphilips Substation site) of a reduction in Prey Items to the nearest hen harrier nest (greater than 4km).
		<p>Element 2: UWF Grid Connection – cumulative impact</p> <p><u>Cumulative Impact Magnitude:</u></p> <p>A potential reduction in prey item availability only relates to the Mountphilips Substation Site, where suitable foraging habitat comprising 0.05 ha will be lost – evaluated as negligible. Any reduction in prey items likely to occur within this area are considered less than negligible. Based on separation distance to the nearest nest (Nest A), and the available of suitable habitat described, there is no potential source of cumulative effects. Due to the above, it is evaluated that there is no potential for any reduction in prey item availability at the Mountphilips Substation site to cumulatively affect Prey Availability in combination with consented Castlewaller Windfarm and potential grid connection or potential Bunkimalta Windfarm and consented grid connection, Forestry or Turf Cutting Activities in the area. In addition, the hen harrier management plans for the windfarm sites will result in Neutral impacts from these projects. Synergistic effects on any other nests can also be excluded. In relation to Agriculture, no changes in the baseline agricultural practices in the immediate landholdings around the Mountphilips Substation site are planned or likely to occur in the short term i.e. any additional sources which may exacerbate prey item reduction effects in particular during the construction stage are negligible.</p> <p>Due to the separation distance from any possible reduction in prey items (i.e. at Mountphilips Substation site) to the Other Elements of the Whole UWF Project, Rear Cross Quarry or Milestone Windfarm it is considered that no cumulative effects will occur.</p> <p>Overall magnitude is evaluated as Negligible, i.e. barely distinguishable and approximating to a 'no change' situation.</p> <p>Significance of the Impact: Imperceptible</p> <p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> The very high sensitivity of the species and negligible magnitude, however; No noticeable changes in the character of the environment from a prey availability perspective are predicted. Distance from the only source (Mountphilips Substation site) of a reduction in Prey Items to the nearest nest. Distance from the only source of a reduction in Prey items to Other Elements of the Whole UWF Project Distance from the only source of a reduction in Prey Items to the other Projects and Activities described.
Biodiversity	Topic	<p>Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project</p> <p>Element 2: UWF Related Works</p> <p><u>Impact Magnitude:</u></p> <p>General mammal species such as Brown Rat, Shrews, Mice, Bank Vole, Hare and Rabbit have been scoped out from consideration due to the limited extent of permanent land cover change of natural habitats, the general low densities likely to be present (resulting in an importance evaluation of Local Importance, Lower Value) and the high likelihood of no observable changes to existing trends as a result of the UWF Related Works. Residual impacts on Amphibians and Reptiles have been evaluated as Neutral. The impact magnitude of habitat loss on Meadow Pipit (as a receptor) was evaluated as negligible. The likelihood of significant effects on other passerine</p>

species were excluded. The nearest Hen Harrier nest to UWF Related Works (H1) is 4.5km, on this basis foraging habitat loss for Hen Harrier was evaluated as negligible.

Overall any reduction in prey items for Hen Harrier is evaluated as negligible.

Significance of the Impact: Not Significant

Rationale for Impact Evaluation:

- The very high sensitivity of the species, and Negligible magnitude however;
- Some noticeable changes in the character of the environment from a prey availability perspective to Hen Harrier may be possible;
- The extent of suitable habitat for Meadow Pipit to be affected represents a minor shift away from baseline conditions, and;
- Effects are ameliorated by virtue of distance to the nearest nest, resulting in an evaluation of no reliance on foraging habitats at the site and in turn prey items which may be present at the UWF Related Works Site.

Element 3: UWF Replacement Forestry

Impact Magnitude:

While the UWF Replacement Forestry will be of benefit to Hen harrier in the long term, during its planting it has potential to disturb or displace prey items with land cover change during operation also requiring consideration.

General mammal species such as Brown Rat, Shrews, Mice, Bank Vole, Hare and Rabbit have been scoped out from consideration due to the limited extent of planting works, the general (low) densities likely to be present (resulting in an importance evaluation of Local Importance, Lower Value) and the high likelihood of no observable changes to existing trends as a result of the proposed development. No measurable impacts were predicted on Amphibians and Reptiles and therefore no likely significant effects are reasonably foreseeable. The impact magnitude of habitat loss on Meadow Pipit was evaluated as slight based on the change of 3.98Ha of suitable habitat to forestry- inferring up to 2 pairs of Meadow Pipit may be affected. However, the magnitude of displacement of Meadow pipit during the planting stage/early growth stage of the new woodland is reduced through the planting by hand of the new trees, no requirement to clear grass from the site, and the very short duration of works. It is considered that the lands will remain available to Meadow Pipit for a number of years while the new trees start to establish – however in the long term some habitat for ground nesting birds will be lost, to be replaced with habitat for other passerine species, which will also be potentially available to Hen Harrier as prey items. The likelihood of significant negative quality effects on other passerine species were excluded. The nearest Hen Harrier nest to UWF Replacement Forestry (H1) is 6.8km, on the basis of the proposed management of the afforested lands for Hen Harrier, the effects of land cover change on Hen Harrier foraging habitat were evaluated as Very Significant (positive).

Overall any reduction in the availability of prey items for Hen Harrier is evaluated as Low (Positive).

Significance of the Impact: Moderate (Positive)

Rationale for Impact Evaluation:

- The very high sensitivity of the species, and negligible magnitude;
- Some disturbance/displacement of Meadow Pipit during planting and long term due to land cover change is likely, however;
- Planting works will be carried out by hand, and will not involve the clearance of grass from the lands. The lands will become available to prey items immediately after planting works are complete until the new trees start to establish.
- Effects are reduced by the relatively small extent and duration of works, the replacement of open habitats with habitats to be managed for Hen Harrier and by virtue of distance to the nearest Hen Harrier nest;
- Management measures will also provide foraging opportunities for Hen Harrier, of permanent duration

Element 4: Upperchurch Windfarm

Impact Magnitude: The 2013 EIS recorded various prey items as present or likely to be present including Field Mice, Pygmy Shrew, Rabbit, Irish Hare, Common Lizard, Common Frog in addition to passerine bird

Hen Harrier	<p>species including Meadow pipit, Skylark and thrushes. During construction effects on fauna including through noise and anthropogenic effects were evaluated as of low magnitude, temporary in duration and limited to the construction phase with the overall impact not significant. Any reduction in prey item availability to Hen Harrier is evaluated as negligible in the context of distance from nearest nests - H1 is 5.3km.</p> <p>In terms of operational effects, the magnitude of foraging habitat loss was estimated as 95Ha (now revised to 100.22Ha to reflect a construction year of 2020/2021). 128ha of lands are to be provided and managed as favourable foraging areas including habitats specifically targeted at providing prey for Hen Harrier such as passerine birds and small mammals. A reduction in the intensity of management and the reversion of some fields back to wet grassland will improve the availability of small mammals and birds for Hen Harrier.</p>
	<p><u>Significance of the Impact:</u> Neutral</p>
Sensitive Aspect	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Very High sensitivity of the species, and Negligible magnitude; • Effects are ameliorated by virtue of distance to the nearest nest, resulting in an evaluation of no reliance on foraging habitats at the windfarm site and in turn prey items present at the windfarm site • The implementation of the Upperchurch Hen Harrier Scheme, as conditioned; • Long term duration.
	<p>Element 5: UWF Other Activities</p>
	<p><u>Impact Magnitude:</u></p> <p>Due to their scale and nature, the magnitude of any disturbance effect to prey items (and resultant reduction in numbers available to hen harrier) as a result of Haul Route Activities, Monitoring Activities, or Overhead Line Activities will be negligible.</p> <p>Activities for the Upperchurch Hen Harrier Scheme will take place in agricultural lands, where prey item species may occur. However, these activities will be similar to background farming activities. Overall the magnitude of reduction in prey item availability will be negligible. In total the UHHS will provide 128ha of habitat which will be managed to increase the area of Hen Harrier foraging habitat, measures set down in the Upperchurch Hen Harrier Scheme to achieve this include:</p> <p>Rush management to control coverage and increase suitability for foraging habitat, promoting prey item species;</p> <p>2,085m increase in hedgerow, resulting in increased edge habitat for foraging and prey items;</p> <p>3ha enclosures of native scrub and trees, increased cover for prey item species</p>
	<p><u>Significance of the Impact:</u> Very Significant (positive)</p>
	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Very High sensitivity of the species, and; • The implementation of the Upperchurch Hen Harrier Scheme, as conditioned;
	<p><u>Cumulative Information: Individual Evaluations of Other Projects or Activities</u></p>
Biodiversity	<p>Other Project: Existing Milestone Windfarm</p>
	<p><u>Impact Magnitude:</u> Effective Habitat Loss of Hen Harrier habitat occurs where suitable habitat is present within 250m of each existing turbine (n=4) location. However, an area of lands at Knockcurraghbola Commons will be managed as part of a Hen Harrier Management Area for the lifetime of the windfarm for the benefit of Hen Harrier- comprising 10.8ha. This includes rush management, nutrient management, weed control, and the maintenance of edge habitat- all of which should benefit prey items such as small mammals and ground nesting passerine species of birds for Hen Harrier.</p>
	<p><u>Significance of the Impact:</u> Neutral Residual Effect</p>
Topic	<p><u>Rationale for Impact Evaluation:</u></p>

- The impact is evaluated as neutral given the effective habitat loss of Hen Harrier foraging habitat is mitigated by lands proposed to be managed for the benefit of Hen Harrier, over the lifetime of the wind farm, including the management of habitat for Prey Items.

Other Project: Rear Cross Quarry

Impact Magnitude:

The already existing quarrying operation at Shanballyedmond, near Rear Cross covers approximately 10 ha and is located within the Slievefelim to Silvermines Mountains SPA. No additional habitat loss (beyond that consented) is predicted in respect of existing quarrying operations thus no reduction in the availability of prey items will be associated with the use of this quarry (including for the supply of aggregate for the Whole UWF Project). The consented operation also includes lands under management for Hen Harrier.

Significance of the Impact: Neutral

Rationale for Impact Evaluation:

- the effective habitat loss is exactly equivalent to the area to be managed for the benefit of Hen Harrier, over the lifetime of the quarry.
- Although within the SPA, there no known expansion plans and the volumes of aggregate required for the Whole UWF Project will be supplied within the current consented capacity of the quarry.

Other Project: Castlewaller Windfarm (consented windfarm, potential grid connection)

Although Castlewaller Windfarm is not expected to be constructed during the same period as the UWF Grid Connection, it is nonetheless included for evaluation of cumulative effects on a precautionary basis.

Impact Magnitude:

Residual effects on general flora and fauna, including small mammals and amphibians and reptiles were evaluated as insignificant. A very low significance rating was applied to effects of a wind farm at the site to Red Grouse, Golden Plover and 'all other avian species'. Effective Habitat Loss of Hen Harrier habitat will occur within 250m of each turbine location, where harriers use second rotation aged 3-9 years-estimated at 47.9Ha. However, as conditioned under the windfarms planning permission, 47.9Ha of clear-felled forestry will be managed, including the creation of suitable foraging habitat for Hen Harrier, for the lifetime of the windfarm. The potential grid connection for Castlewaller Windfarm is primarily routed along paved surfaces or existing forestry roads and tracks. Any impact magnitude where it overlaps the Hen Harrier SPA will have to be such so that adverse effects on the integrity of the European Site are avoided.

Significance of the Impact: Neutral residual effect

Rationale for Impact Evaluation:

- The impact is evaluated as neutral given the effective habitat loss is exactly equivalent to the area to be managed and improved for the benefit of Hen Harrier, over the lifetime of the wind farm.

Other Project: Potential Bunkimalta Windfarm potential windfarm, consented grid connection)

Although Bunkimalta Windfarm is not expected to be constructed during the same period as the UWF Grid Connection, it is nonetheless included for evaluation of cumulative effects on a precautionary basis

Impact Magnitude:

The consented grid connection is routed along forestry roads and public roads where it occurs within the SPA. It is assumed that any future proposed Bunkimalta Windfarm will include site design and mitigation measures to ensure that effects to Hen Harrier will not be significant (in the context of its location within a Hen Harrier SPA), this is likely to include measures in relation to disturbance and displacement, particularly from suitable habitat.

Significance of the Impact: Neutral Residual Effect

Rationale for Impact Evaluation:

- Requirement on projects within a designated site to prove that no significant adverse effects will occur.

Hen Harrier	Sensitive Aspect	Activity: Forestry in the surrounding area
		<u>Impact Magnitude:</u> Hen Harrier in Ireland makes extensive use of both first and second rotation pre-thicket forest habitat during the breeding period. However, by its successional nature forests inevitably matures and become less suitable (Avery & Leslie, 1990; Madders, 2000; 2003; O'Donoghue, 2004). Prey animals recorded in young forests included bank vole, greater white-toothed shrew and several passerine species of bird (McCarthy <i>et al.</i> , 2019). However, prey abundance in young forestry may be less than in open moorland, the more traditional habitat utilised by Hen Harrier in many places. Nonetheless, a negative trend in the extent of potential forest foraging resource is expected for the Slieve Felim to Silvermines Mountains SPA, where the extent of useable forest is predicted to drop from 23% in 2012 to 11% in 2025.
		<u>Significance of the Impact:</u> Significant (negative)
		<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none">Precautionary basis
		Activity: Agriculture
		<u>Impact Magnitude:</u> Agricultural activities have the potential to adversely affect the availability of Hen Harrier prey items through land improvement, increases in stocking levels and various management techniques. Pathways which are specifically agriculturally based activities may result in habitat loss, habitat fragmentation and habitat degradation due to intensification or abandonment. Grazing is a means of maintaining open habitats for Hen Harrier and changes to grazing regimes can alter the availability of suitable habitat, by affecting prey item densities. An EIP (European Innovation Partnership) Locally Led Scheme called the Hen Harrier Project is in place across 6 SPA's in Ireland including the Slievefelim to Silvermine Mountains SPA which facilitates the reward of farmers whose land holding is within or adjacent to the SPA for maintaining suitable Hen Harrier habitat. No changes to the current (baseline) management of the grasslands immediately around the Mountphilips Substation site are planned to occur (EDL landowner consultation).
		<u>Significance of the Impact:</u> Significant (negative)
		<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none">Precautionary Basis
		Other Project: Turf-cutting
		<u>Impact Magnitude:</u> Peat extraction by hand or through mechanical means is ranked as a medium level pressure in respect of Hen Harrier within the SPA. The removal of peat reduces the availability of habitat for ground nesting birds such as Meadow Pipit and Skylark, which are prey items for Hen Harrier. Within the Whole Project Cumulative Evaluation Study Area, turf extraction appears to form part of the current baseline environment at various locations such as Bleanbeg Bog, Cummermore, Gortmahonoge and at Cummer (Mulloghney). Some of these habitats where they overlap the SPA are further protected through the provision of NHA's such as at Bleanbeg Bog, Mauherslieve Bog, and Grageen Fen and Bog, wherein further turf cutting of intact areas is unlawful, or SAC's such as Keeper Hill SAC, Bolingbrook Hill SAC, Silvermine Mountains SAC or Silvermines Mountains West SAC wherein Conservation Objectives to protect Qualifying Interest bog habitats are set out.
		<u>Significance of the Impact:</u> Neutral
		<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none">Restrictions on further turf cutting (and hence prey item habitat) in intact areas/protected areas, and;The limited extent of lands subject to turbary (rights to cut turf) within the Hen Harrier SPA overall (4%), with little of this occurring within the CE Study Area;The reversibility of any effect, (in the context of Hen Harrier) with birds expected to continue to utilize re-vegetating cutover bog for foraging.
Biodiversity		
Topic		

Evaluation of Other Cumulative Impacts – Reduction in Prey Item Species

Whole UWF Project Effect

Magnitude:

The potential for reductions in the abundance in Hen Harrier prey item species will occur across the Whole UWF Project area as a result of habitat loss (both temporary and permanent) and disturbance/displacement from construction works and construction stage activities. Overall, general mammal species such as Brown Rat, Shrews, Mice, Bank Vole, Hare and Rabbit and amphibians and reptiles are likely to be present in low densities and observable changes to existing trends as a result of the construction of the Whole UWF Project are not expected. Due to the abundance of suitable habitat for passerines in the immediate wider area, general passerine species and Meadow pipit will not be significantly affected. Given the very small extent of suitable foraging habitat for Hen Harrier at the Mountphilips Substation Site, and the lack of reliance on habitats at the Upperchurch Windfarm/UWF Related Works site and the separation of both locations from the nearest hen harrier nest (greater than 4km), the likely continued use of the UWF Replacement Forestry lands in early growth stage of the new woodland along with the low numbers of potential prey items lost due to operational landcover change, with additional species likely to be promoted through management, and the nature of the UWF Other Activities, the magnitude of the whole project impact is evaluated as no greater than the UWF Grid Connection alone, i.e. Negligible.

Significance of the Whole Project Effect: Moderate (Positive)

Rationale for Impact Evaluation:

- The extent of lands to be managed for Hen Harrier prey items;
- The very high sensitivity of the species and negligible magnitude, however;
- No noticeable changes in the character of the environment from a prey availability perspective are predicted.
- Distance from the only source (Mountphilips Substation site) of a reduction in Prey Items to the nearest hen harrier nest (greater than 4km);
- The reversibility of the effect on temporary land cover change areas following the completion of construction and reinstatement works, and the completion of activities; and
- UWF Replacement Forestry lands will remain available to prey item species following planting works until the new trees start to establish.

All Elements of the Whole UWF Project with Other Projects or Activities

Both positive and negative quality effects occur with regard to Hen Harrier foraging habitat loss across the Whole UWF Project. The magnitude of any reduction in prey availability resulting from the Whole UWF Project, consented Castlewaller Wind Farm (including its potential grid connection), potential Bunkimalta Windfarm (including its consented grid connection), and turf cutting in the vicinity are evaluated as cumulative negligible due to the abundance of suitable habitat for prey item species in the immediate and wider upland area. Existing Milestone Windfarm is evaluated as neutral with the current management of lands for the benefit of hen harrier. Agricultural practices in the vicinity of works generally provide open habitats for hen harrier. Forestry activities in the surrounding area is generally a negative trend in the background environment currently with declines in available foraging habitat in the short-medium term (next 10 years & expected to increase subsequently and evaluated as significant in that regard. Overall the cumulative magnitude of the Whole UWF Project (during its construction) together with the Other Projects and Activities is evaluated as Negligible.

Significance of the Cumulative Impact: Neutral

Rationale for Cumulative Impact Evaluation:

- The very high sensitivity of the species and negligible magnitude;
 - The availability of suitable habitat in the upland area;
 - The net gain in terms of lands managed specifically for the use of Hen Harrier, and;
 - Extent of lands to be managed in total, notwithstanding;
- The medium-term duration of negative trend in respect of reductions in forestry based foraging habitat;

Hen Harrier	Distance to Nests from the various lands which will undergo management.
Sensitive Aspect	
Biodiversity	
Topic	

8.6.4.5 Description and Rationale for Excluded (scoped out) Impacts

The source-pathway-receptor links and the rationale for impacts excluded from the Impact Evaluation Table sections are described in Table 8-52 below.

Table 8-52: Description and Rationale for Excluded Impacts to Hen Harrier

Key: 1: UWF Grid Connection; 2: UWF Related Works; 3: UWF Replacement Forestry; 4: Upperchurch Windfarm; 5: UWF Other Activities

Source(s) of Impacts	Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
Construction Stage/Planting Stage				
Land cover change	1,2,3,4	Land cover	Reduction in or Loss of Suitable Nesting Habitat or Winter Roosting Habitat	Evaluated as Excluded: No potential for effect: Habitat surveys for the Whole UWF Project show that there is no suitable nesting habitat (i.e. <u>suitable</u> bog, pre-thicket forestry) or winter roosting habitat (i.e. suitable bog, scrub, or reedbeds) overlapping the construction works area for UWF Grid Connection, UWF Related Works, UWF Replacement Forestry or Upperchurch Windfarm.
Forestry Felling, tree felling, vegetation clearance, movement of machinery	1,2,3,4	Contact	Mortality of Hen Harrier in or at Nest Sites or Roost Sites	<p>Evaluated as Excluded:</p> <p>No likely effect on nests sites, as breeding nest sites are located outside the construction works areas at distances greater than 0.6km from UWF Grid Connection, 4.5km from UWF Related Works, 5.3km from Upperchurch Windfarm, 6.8km from UWF Replacement Forestry.</p> <p>No likely effect on winter roosts sites as roosts are located outside the construction works areas at distances greater than 2km from UWF Grid Connection, 4.5km from UWF Related Works, 5.6km from Upperchurch Windfarm, 6km from UWF Replacement Forestry.</p> <p>Design measures are included as part of Project Design (for UWF Grid Connection, UWF Related Works and UWF Replacement Forestry) and as part of planning conditions for Upperchurch Windfarm which will avoid works during the breeding season in close proximity to nest sites. Project Design for UWF Grid Connection and UWF Related Works will also prevent mortality of roosting Hen Harrier outside of the breeding season.</p>

Hen Harrier

Sensitive Aspect

Biodiversity

Topic

Hen Harrier		Source(s) of Impacts	Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
Sensitive Aspect		Noise and human activity	1,2,3,4	Visibility	Disturbance/Displacement of Nesting or Roosting Hen Harrier	<p>Evaluated as Excluded:</p> <p>No likely effect on nests sites, as breeding nest sites are located outside the construction works areas at distances greater than 0.6km from UWF Grid Connection, 4.5km from UWF Related Works, 5.3km from Upperchurch Windfarm, 6.8km from UWF Replacement Forestry.</p> <p>No likely effect on winter roosts which are located outside the construction works areas at distances greater than 2km from UWF Grid Connection, 4.5km from UWF Related Works, 5.6km from Upperchurch Windfarm, 6.8km from UWF Replacement Forestry.</p> <p>Design measures are included as part of Project Design (for UWF Grid Connection, UWF Related Works and UWF Replacement Forestry) and as part of planning conditions for Upperchurch Windfarm which will avoid works during the breeding season in close proximity to nest sites, which will therefore avoid disturbance or displacement effects to nesting Hen Harrier.</p> <p>Project Design for UWF Grid Connection and UWF Related Works will also prevent disturbance or displacement of roosting Hen Harrier outside of the breeding season, with works limited to the period between one hour after sunrise to one hour before sunset during the months of October to February inclusive within 1km of a roost, as part of Project Design.</p>
Operational Stage/ Growth Stage						
Biodiversity		New above ground structures, new access roads	1,2,3,4	collision, physical contact	Additive mortality	<p>Evaluated as Excluded: No likely impact:</p> <p>UWF Grid Connection: no likely impact with the new structures at Mountphilips Substation due to the immobility of these structures, all other parts are either underground or at ground level (i.e. new roads).</p> <p>UWF Related Works: no likely impact with the Telecom Relay Pole, due to the immobility of this structure and no precedent in the literature for this structure as a collision risk (akin to telegraph pole).</p> <p>UWF Replacement Forestry: no potential for effects due to the absence of moving structures.</p> <p>Upperchurch Windfarm: As per the 2014 ABP Inspectors Report no significant residual impact to Hen Harrier is expected to occur. There would be no potential for cumulative impacts with Other Elements, as the Other Elements are not likely to cause additive mortality of Hen Harrier.</p> <p>There is no risk of additive mortality due increased accessibility, as there will be no increase in accessibility - all new roads will have gates which will be locked on landholder boundaries and at site entrances.</p>
		Noise and human activity	1,2,3,4,5	Air and Visibility	Disturbance/displacement	<p>Evaluated as Excluded: Neutral effect</p> <p>Distance to established nests and winter roosts and low frequency of occurrence during the winter months reduces</p>
Topic						

Source(s) of Impacts	Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
			to nesting or roosting Hen Harrier	likelihood of effect to winter foraging birds. Disturbance, if any, will be brief to momentary in duration, combined with low frequency of operational maintenance and high reversibility once any commuting (i.e. a hen harrier moving towards or from a nest or night roost location) bird moves beyond 150m from source of disturbance means that effects, if any, will be Neutral.
Noise and human activity	1,2,3,4,5	Air and Visibility	Disturbance/displacement to foraging Hen Harrier (breeding and non-breeding)	<p>Evaluated as Excluded: No potential for impacts/Neutral effects;</p> <p>UWF Grid Connection: - Operational activities mainly relate to the Mountphilips Substation compound area at the Mountphilips Substation site. The compound is >4km from the nearest known nest. Hen Harriers are central place foragers, with much of foraging occurring within 2km of the nest.</p> <p>Therefore, it is considered that based on distance, disturbance or displacement effects during either breeding or non-breeding due to activities at the Mountphilips Substation site are not likely to occur.</p> <p>Along the 110kV UGC, operational activities will involve annual testing and inspection, with these activities being carried out entirely from road pavements. No disturbance/displacement expected beyond 150m from activity locations, no nests were recorded closer than 600m from the 110kV UGC during 2016 to 2019 surveys. In addition, annual inspection and any planned maintenance along the 110kV UGC will be scheduled to occur outside of the breeding season, which will avoid disturbance of breeding Hen Harrier. Any unscheduled repair work, which may need to take place during the breeding season, will occur very infrequently, if at all. Due to the likely separation distance from nests, and the infrequent, reversible, and temporary duration of works, and location of any works within existing roads, it is considered that disturbance/displacement effects to hen harriers will be Neutral during unplanned repairs, should they occur at all. Effects outside breeding season are anticipated to be less, as birds will be ranging widely through the countryside and densities are low.</p> <p>UWF Related Works – operational activities will involve inspection and some maintenance of Realigned Windfarm Roads and of the Telecom Relay Pole, with annual visual walkover inspections of the ground above Internal Windfarm Cabling, all of which will be of very brief duration. Some of the Haul Route Works locations may also be required to be used during any turbine blade replacements. Habitat surveys of lands within 150m of the UWF Related Works (150m is considered to be the distance from the disturbance/displacement where impacts on foraging Hen Harrier could occur) indicate that there is potentially 152ha (27%) of suitable foraging habitats where Hen Harriers could be disturbed. However, this forms a very small proportion of</p>

Hen Harrier

Sensitive Aspect

Biodiversity

Topic

Topic	Biodiversity	Sensitive Aspect	Hen Harrier	Source(s) of Impacts	Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
								<p>the available suitable foraging habitat in the wider landscape. A similar calculation on habitat availability within 2km of the UWF Related Works indicates that there are some 2,050 ha (38%) of suitable habitats within 2km and, according to Moran & Wilson-Parr (2015), there is 70% suitable habitat within the SPA as a whole. We therefore evaluate that there is no likelihood of wintering or breeding Hen Harrier depending on the habitats within 150m of the UWF Related Works during the operational phase due to the overall extent of habitat availability.</p> <p>UWF Replacement Forestry: Evaluated as Excluded: All works will be done by hand and equivalent to typical farming activities, therefore the magnitude of any noise or visual intrusion will be Negligible and any disturbance or displacement effects are likely to be Neutral.</p> <p>Upperchurch Windfarm: As per the 2014 ABP Inspectors Report, with the implementation of the Upperchurch Hen Harrier Scheme, no significant residual impact to Hen Harrier is expected to occur.</p> <p>UWF Other Activities: Evaluated as Excluded: Element 4: HA1-HA20. These are excluded from further evaluation as works involve street furniture removal or activities on public roads with no significant source of noise or intrusion.</p>
				Electrical parts	1,2,4	Air	Exposure to EMF	Evaluated as Excluded: No likely effects, as literature (http://www.eirgridgroup.com/site-files/library/EirGrid/EirGrid-Evidence-Based-Environmental-Study-5-Birds.pdf) supports no precedent for this as a viable impact.
				Decommissioning Stage				
				Noise and human activity	5 (HA1-HA20)	Visibility	Disturbance /displacement	<p>Evaluated as Excluded: No impact/ Neutral Impact</p> <p>UWF Grid Connection – no decommissioning related impacts – as the UWF Grid Connection will not be decommissioned</p> <p>UWF Replacement Forestry – no felling related impacts – UWF Replacement Forestry will be a permanent wood and will not be felled.</p> <p>Upperchurch Windfarm and UWF Related Works- Neutral impact: decommissioning works will take place from hardcore areas, small number of machines required and brief duration of works (2 to 3 days) at each turbine location. No likely effect on nests sites, as breeding nest sites are located outside the footprints of the Upperchurch Windfarm/UWF Related Works at distances greater than 4.5km from UWF Related Work and 5.3km from Upperchurch Windfarm</p> <p>UWF Other Activities: Haul Route Activities: Neutral effect as works involve street furniture removal or activities on public roads with limited sources of noise or intrusion. No requirement for activities associated with the remaining UWF Other Activities.</p>

8.6.5 Mitigation Measures for Impacts to Hen Harrier

Mitigation measures were incorporated into the UWF Grid Connection project design including the Project Design Measures. No additional mitigation measures are required as the topic authors conclude that **significant impacts are not likely to occur to Hen Harrier** as a consequence of the UWF Grid Connection.

8.6.6 Evaluation of Residual Impacts to Hen Harrier

Residual Impacts are the final or intended effects that will occur after mitigation measures have been put into place. No additional mitigation measures are required and thus the Residual Impact is the same as the Impact set out in Impact Evaluation Table for Hen Harrier above (Section 8.6.4) – i.e. **no significant adverse impacts**.

8.6.7 UWF Grd Connection Environmental Management Plan

The Project Design measures will be implemented by the Project Manager and the main Contractor during the construction stage, under the **Environmental Management Plan for the UWF Grid Connection (EMP)**. The EMP is appended to this EIA Report as **Volume D**.

The EMP will be an important contract document for the main construction contractor (Contractor) who will be contractually obliged to comply with the EMP. An Environmental Clerk of Works will be appointed, who will be independent of the construction Contractor, and it will be the responsibility of the Environmental Clerk of Works to monitor the compliance of the Contractor with the EMP through liaising with the Construction Site Manager and the Project Manager, monitoring construction works on a daily basis and by carrying out regular audits on EMP compliance. The Environmental Clerk of Works will be resourced to employ a team of environmental specialists including a Site Ecologist, Site Hydrologist and a Invasive Species Specialist.

All surveys for breeding or roosting Hen Harrier, and monitoring of temporal restrictions of works in relation to nesting or roosting Hen Harrier will be undertaken by a suitably qualified Ornithologist(s) (and member of CIEEM) with experience in the survey and management of Hen Harrier.

Hen Harrier

Sensitive Aspect

Biodiversity

Topic

8.6.8 Summary of Impacts to Hen Harrier

A summary of the Impact to Hen Harrier is presented in Table 8-53.

Table 8-53: Summary of the impacts to Hen Harrier

Hen Harrier	Impact to Hen Harrier:	Permanent or Temporary Reduction in or Loss of Suitable Foraging Habitat	Disturbance/displacement of foraging Hen Harrier during the breeding season	Disturbance/Displacement of foraging Hen Harrier outside of the breeding season	Reduction in Prey Item Species
	<i>Evaluation Impact Table</i>	<i>Section 8.6.4.1</i>	<i>Section 8.6.4.2</i>	<i>Section 8.6.4.3</i>	<i>Section 8.6.4.4</i>
Sensitive Aspect	Project Life-Cycle Stage	Construction/Operation	Construction	Construction	Construction/Operational
	UWF Grid Connection <i>Direct/indirect impact</i>	Not Significant	Not Significant	Not Significant	Imperceptible
	UWF Grid Connection <i>Cumulative impacts</i>	Not Significant	Not Significant	Not Significant	Imperceptible
	Element 2: UWF Related Works	Not Significant	No Impact	Not Significant	Not Significant
	Element 3: UWF Replacement Forestry	Very Significant (positive)	Neutral to Not Significant	Not Significant	Moderate (positive)
	Element 4: Upperchurch Windfarm	Neutral residual effect	Not Significant	Not Significant	Neutral
	Element 5: UWF Other Activities	Very significant (positive)	Not Significant	Not Significant	Very Significant (positive)
	Cumulative Impact:				
	All Elements of the Whole UWF Project	Significant (positive)	Not Significant	Not Significant	Moderate (positive)
	All Elements of the Whole UWF Project <i>cumulatively with</i> Other Projects or Activities: Bunkimalta Windfarm Castlewaller Windfarm Forestry, Agriculture, Turf-Cutting in the area Quarrying	Neutral	Not Significant to Slight (negative)	Not Significant	Neutral

The greyed out boxes in the above summary table relate to the cumulative information for the Other Elements of the Whole UWF Project, which are included to show the totality of the project.

8.7 Sensitive Aspect No.6: General Bird Species

This Section provides a description and evaluation of the Sensitive Aspect - General Bird Species.

Dr. Alex Copland, Chris Cullen and Howard Williams were the main authors of this Section. Please see Sources of Information (Section 8.1.7) and Methodology (Section 8.1.8) for details of the desktop and fieldwork surveys which have informed the evaluation of General Birds.

8.7.1 BASELINE CHARACTERISTICS of General Bird Species

8.7.1.1 STUDY AREA for General Bird Species

The study area for General Bird Species in relation to the UWF Grid Connection is described in Table 8-54 and illustrated on **Figure GC 8.7: UWF Grid Connection Study Area for General Bird Species (Overview and Maps 1 to 4)** (Volume C3 EIA Figures).

Table 8-54: UWF Grid Connection Study Area for General Bird Species

Study Area for General Bird Species	Justification for the Study Area Extents
100m area around and incorporating the construction works areas- species numbers and density	Professional judgement and as per Best Practice (BWI, 2012; CIEEM, 2016; NRA, 2008; Lusby <i>et al.</i> , 2010; SNH 2014; TII, 2017; EPA, 2006)
50m area around and incorporating the construction works areas -habitat suitability evaluations	
50m area around and incorporating the construction works areas -Barn Owl Building Suitability	
300m area around and incorporating the construction works areas- Kingfisher	
Watercourse Crossing Locations -Grey Wagtail and Dipper	

8.7.1.2 Baseline Context and Character of General Bird Species in the UWF Grid Connection Study Area

The receiving environment in the UWF Grid Connection Study Area supports a wide variety of general bird species of open countryside and farmland, in addition to more specialist upland species. Some migratory species are only present during the summer or winter months within which they disperse widely over suitable habitat, whilst other sedentary species are present throughout the year.

General Breeding Birds

A standardised bird transect survey was undertaken at the Mountphilips Substation site in the breeding season of 2016 and 2017 and a similar transect methodology was also used to survey whole length of the proposed 110kV UGC route in April 2019 (including again the lands at Mountphilips – covered under Transect T40).

The three breeding season surveys at the Mountphilips substation site recorded a total of 37 species, including one species, Meadow pipit that is Red-listed as a Bird of Conservation Concern in Ireland (BoCCI; Colhoun & Cummins, 2013). A further nine Amber-listed BoCCI species were recorded (Barn Swallow,

Goldcrest, Greenfinch, Linnet, Mistle Thrush, Robin, Starling, Skylark and Stonechat). Although breeding status was not confirmed during this survey effort it is likely that all these species could potentially breed within the vicinity of the Mountphilips substation due to the presence of suitable habitats.

In the April 2019 survey along the entire length of the proposed 110kV UGC route, a total of 50 bird species were recorded and although breeding for all species was not confirmed, it is likely that 49 species could possibly be breeding in the vicinity of the route (the exception being a casual record of Lesser Black-backed Gull during surveys – a species which breeds on coasts or large inland waterbodies in Ireland, and were likely to have been recorded on passage through the survey area). During the April 2019 transect survey along the proposed 110kV UGC route, two bird species that are Red-listed as Birds of High Conservation Concern in Ireland (Colhoun & Cummins, 2013) were recorded: Grey Wagtail and Meadow Pipit. In addition, 16 Amber-listed Birds of Conservation Concern in Ireland (Colhoun & Cummins, 2013) were also recorded (Dunnock, Goldcrest, Greenfinch, House Sparrow, Linnet, Mistle Thrush, Robin, Skylark, Stonechat, Barn Swallow, Sparrowhawk, Sand Martin, House Martin, Kestrel, Lesser Black-backed Gull and Starling).

The species recorded during the surveys at Mountphilips Substation site and along the route of the 110kV UGC are all representative of common and widespread terrestrial breeding bird communities in Ireland, being typical of the mosaic of farmland, woodland and rural gardens found in the survey areas.

The full list of species is included [see Section 8.7.2.1 - 110kV UGC and Section 8.7.2.4 – Mountphilips Substation Site in Appendix 8.7: General Birds Fieldwork & Survey Results.](#)

No species on Annex I of the EU Birds Directive were recorded during any of these surveys.

During Hen Harrier vantage point surveys during the non-breeding season 2017/2018 two bird species that are Red-listed as Birds of High Conservation Concern in Ireland (Colhoun & Cummins, 2013) were recorded: Golden Plover and Meadow Pipit. In addition, 3 Amber-listed Birds of Conservation Concern in Ireland (Colhoun & Cummins, 2013) were also recorded (Snipe, Sparrowhawk, and Kestrel).

General Wintering Birds

A repeat of the breeding bird survey at the Mountphilips substation was undertaken in the winters (November-February) of 2016-17 and 2017-18. For these surveys, a total of 25 species were recorded in the vicinity of the Mountphilips substation during transect surveys in the winter of 2016-17 and 2017-18. As with summer, Meadow Pipit was the only BoCCI Red-listed species recorded, along with five BoCCI Amber-listed species (Snipe, Goldcrest, Starling, Robin and House Sparrow).

Based on the range of terrestrial habitats mapped and based on observations made during these surveys of the Mountphilips Substation site and the 110kV UGC route, the general wintering bird community is typical of common and widespread bird communities found in the wider countryside in Ireland.

Meadow Pipit

Terrestrial habitat surveys indicate that Meadow Pipit habitat is widespread along the proposed 110kV UGC route. A total of 98 Meadow Pipits were recorded along the 110kV UGC route in April 2019 and breeding in the fields adjacent to the survey transect is therefore likely. A maximum of two birds were recorded in the vicinity of the Mountphilips Substation site in the 2017 breeding season. Meadow Pipit have been evaluated as of County Importance and assigned a sensitivity rating of Medium for evaluation.

This species is generally site-faithful, although there is some post-breeding dispersal in winter months, particularly from upland areas to lowland habitats.

Golden Plover breed in heather moors, blanket bogs and acidic grasslands and disperse widely over the winter months. Wintering Golden Plover use wide open expanses of pasture and tilled land. No suitable

breeding habitat for Golden Plover was recorded within the survey area, during the survey undertaken in January 2019. However, suitable winter habitat for Golden Plover, consisting of pasture in large open fields was recorded. This species was not observed during ecological surveys in January 2019 or the transect survey in April 2019. Golden Plover have been assigned a sensitivity rating of High for evaluation.

Kingfisher

Kingfisher are on Annex I of the EU Birds Directive and Amber-listed in Ireland as a species of Conservation Concern (Colhoun & Cummins, 2013). With regard to the proposed UWF Grid Connection suitable watercourses were surveyed 300m upstream and downstream of suitable watercourses at crossing locations. These surveyed watercourses include the Newport River (W7), Clare River (W36) and Bilboa River (53) and 23 other watercourses (W5, W8, W9, W18, W21, W22, W23, W26, W28, W29, W30, W33, W35, W39, W41, W42, W46, W47, W48, W49, W50, W51 and W52). Habitats at watercourse crossings are generally unsuitable for nesting Kingfisher, which requires sandy or earth banks alongside the watercourse to establish their tunnel/burrow nests.

For the Newport River, the survey area extended to 500m upstream and downstream of the crossing point W7 (NRA, 2008). A Kingfisher nest was found c.540m upstream in a sandy bank. However, suitable Kingfisher habitat was only present from c.400m upstream and further upstream past the nest location. The watercourse downstream from this (i.e. from 400m upstream of the crossing point to 500m downstream) was typically shallow and fast-flowing with many in-stream boulders and riffles or small waterfalls. These riverine habitats are not utilised by Kingfisher for foraging, which prefer slow-flowing waterways for feeding; (Snow & Perrins, 1998). It is therefore likely that Kingfisher foraging from the nest is from c.400m upstream from the crossing point (W7) and further upstream from this. An Earth bank with Kingfisher nesting potential; but no nest hole present; was noted 430m upstream, a Kingfisher was sighted at 450m upstream and a nest hole was recorded in the riverbank at 540m upstream.

Dipper

Dippers are a widespread resident along rocky streams and rivers and are slightly smaller than a blackbird. Dippers breed along fast flowing streams and rivers with plenty of exposed rocks. In Ireland, the majority of breeding pairs are found in uplands. A single Dipper was also observed during the transect survey in April 2019. Dipper nests were recorded at three water crossing locations; one nest at watercourse crossing W18, two nests at watercourse crossing W28 and one nest at watercourse crossing W41. One other water crossing (W23) was identified as suitable for Dipper; however, no evidence of Dipper was recorded at this location.

Grey Wagtail

During ecological surveys undertaken of the 110kV UGC route in January 2019, observations of evidence of Grey Wagtail at water crossings were recorded and a probable Grey Wagtail nest was recorded at watercourse crossing W36. A total of 11 Grey Wagtail were recorded during the April 2019 transect along the proposed 110kV UGC, and there are suitable habitats for breeding Grey Wagtail at or close by to watercourse crossing locations.

Barn Owl

There are no buildings within the survey area at the Mountphilips Substation site.

All buildings within the survey area along the route of the 110kV UGC were evaluated for suitability for Barn Owl during the ecological surveys undertaken in January 2019. The assessment followed criteria according to TII (2017).

Four buildings were assessed as having high suitability for Barn Owl. These were all surveyed in August 2019 for occupancy. No signs of occupancy were detected for any of these buildings. One building was too

General Bird Species	dangerous to enter due to the state of repair. The owner stated that he had occasionally observed Barn Owls during the winter but did not believe that they were breeding at that location.
	No suitable breeding habitat for <u>Red Grouse</u> was recorded during the ecological surveys of the proposed UWF Grid Connection in January 2019. In the winter if snow is on the ground the species has a widespread distribution occupying wind swept ridges and lower ground, however no suitable habitat with sufficient habitat cover was recorded within the survey areas and no birds were recorded during any of the ecological surveys in the area..
Sensitive Aspect	<u>Eurasian Curlew</u> (Curlew) nest on the ground in a range of habitats in Ireland, from rough pasture, meadows and heather. Huge changes in the upland areas, such as the destruction of peat bogs, afforestation, intensive management of farmland and the abandonment of some lands, leading to encroachment by scrub, gorse and dense rushes, have all affected Curlew breeding habitats. In Ireland, the Curlew is not a common breeder, however it is found in most parts of the country. No suitable habitat for wintering Curlew were recorded during the ecological survey of the proposed 110kV UGC route in January 2019 and no Curlew were observed during any of the other the ecological surveys, including the transect survey along the proposed 110kV UGC route in April 2019. No suitable breeding habitat for Curlew was recorded within the study area during these surveys. In general, grazing regimes and other land management practices within 50m of the road corridor and at the Mountphilips Substation site preclude breeding by this species.
	No suitable breeding habitat for <u>Merlin</u> or <u>Peregrine</u> were recorded within the study area during the ecological surveys undertaken in January 2019 (the proximity to the road qualifies the habitats as unsuitable for breeding for Merlin; whilst for Peregrine there are no suitable nesting habitats (large buildings, cliff faces or quarries)). During the winter both species have a widespread distribution, and Merlin may occasionally perch in roadside trees during the winter months. However, the locations of works do not comprise foraging habitat for these species.
	Further details on General Bird fieldwork and survey results are included in Appendix 8.7: General Birds Fieldwork & Survey Results .

8.7.1.3 Importance of General Bird Species

All wild bird species are protected by legislation under the Wildlife Act, 1976 and the Wildlife (Amendment) Act, 2000. Merlin, Peregrine Falcon, Golden Plover and Kingfisher are listed on Annex I of the EU Birds Directive 2009/147/EC. Eurasian Curlew is now classified on the IUCN Red List as 'near threatened'.

Notwithstanding the protection afforded to some bird species at EU level, the importance of each species in relation to the UWF Grid Connection area takes account of international classifications and the occurrence of the species at the site within the context of resident or regularly occurring local populations, county populations or those at a national or international level – see Table 8-3 for criteria.

Although not listed on either Annex I or II of the EU Birds Directive, due to its importance as a prey item for Hen Harrier in the context of the nearby Slievefelim to Silvermines Mountain SPA, Meadow Pipit have been evaluated as of County Importance and assigned a sensitivity rating of **Medium** for evaluation.

Although listed on Annex I of the EU Birds Directive, due to an unfavourable conservation status in the EU, Golden Plover is provisionally listed as secure at pan-European level. Nevertheless, wintering Golden Plover in Ireland are evaluated as Nationally Important and assigned a sensitivity rating of **High**.

Although listed on Annex II of the EU Birds Directive, due to a decline in population across Europe including Ireland, Red Grouse are evaluated as of County Importance and assigned a sensitivity rating of **Medium**.

Listed on the IUCN (global) Red List of Conservation Concern, as well as the Red List of the Birds of Conservation Concern in Ireland, Eurasian Curlew is evaluated as of National Importance and assigned a sensitivity rating of **High**.

Kingfishers are on Annex I of the EU Birds Directive and are Amber listed in Ireland, due to having an unfavourable conservation status in Europe from historical declines. However, Kingfisher populations are not of global concern, thus a sensitivity rating of **Low** is applied.

Dipper are Green-listed in Ireland, and due to their widespread population in Ireland are assigned a sensitivity rating of **Negligible**.

Grey Wagtail are Red-listed in Ireland due to short-term population declines. With a recovering Irish population, and a secure European and global population, a sensitivity rating of **Low** is applied.

Barn Owl, are Red-listed in Ireland due to short- and long-term population declines. Barn Owl are assigned a sensitivity rating of **High**.

Although listed on Annex I of the EU Birds Directive, due to population declines across Europe (including Ireland), Merlin in the density recorded are evaluated as of Local Importance (low value) and assigned a sensitivity rating of **Negligible**.

Although listed on Annex I of the EU Birds Directive, due to historical population declines Peregrine populations are on the increase in Ireland. Given the density recorded here they are evaluated as of Local Importance (low value) and assigned a sensitivity rating of **Negligible**.

8.7.1.4 Sensitivity of General Bird Species

General breeding birds are sensitive to habitat loss and disturbance/displacement from noise and/or visual intrusion. Wintering birds are similarly sensitive.

Meadow Pipit are sensitive to changes in land cover or land use which results in a decrease of suitable nesting habitat (improved agricultural grassland, wet grassland or grassland mosaics, and upland blanket bog), these changes can affect breeding numbers, foraging success, and increased exposure to predation through displacement to less viable feeding areas, and local population level declines.

Golden Plover are sensitive to changes in land cover or land use of suitable foraging or roosting habitats such as improved agricultural grassland, wet grassland or grassland mosaics, and upland blanket bog, where land cover/use change may cause reductions in foraging success, increased exposure to predation through displacement to less viable feeding areas, and also reduction in survival rates of wintering birds. Wintering Golden Plover are also sensitive to disturbance or displacement effects due to noise, visual intrusion, and anthropogenic sources.

Red Grouse are sensitive to habitat loss and fragmentation from afforestation and agricultural land-use change, including over-grazing. Recreational disturbance may also be an issue in some upland areas, as can unsustainable or illegal hunting. Poor management of heather, including illegal burning and wildfires, and ground predators can negatively impact nesting birds during spring and summer months.

Breeding waders such as Eurasian Curlew are sensitive to habitat loss or fragmentation through afforestation, habitat loss from peat extraction, ground based predation, destruction from agricultural machinery and abiotic variables such as flooding.

Kingfishers are known be particularly sensitive to disturbance at their nests, although can tolerate disturbance in the vicinity (e.g. on the bank or within the watercourse) provided that the actual nest is not interfered with. Water quality issues, such as nutrification from agricultural run-off or point-source pollution, may also impact on prey availability and water clarity (Kingfishers hunt by observing prey within the water).

Dipper and other species such as Grey Wagtail which associate with freshwater are sensitive to secondary water quality degradation, including nutrification from agricultural run-off or point source pollution and acidification of the water (which is linked to commercial forestry harvesting operations). These may alter prey assemblages which in turn can impact upon breeding success. Such riverine birds may also be impacted by severe weather events, such as localised flooding (which can wash away nests) or very cold snaps during the winter (which limits prey availability).

Barn Owl are well studied in Ireland and face a number of threats. Loss of nesting sites and prey-rich foraging habitats is likely to be one of the main issues, as well as the ingestion of second-generation rodenticides that such prey may have consumed. These can build up within the tissues of the Barn Owl to lethal levels. Barn Owls are also susceptible to road mortality, particularly from hunting along embankments and verges of motorways and other major roads.

Merlin are sensitive to habitat loss, particularly the intensification of agriculture in upland areas which may impact on prey-rich foraging habitats. The impact of upland afforestation are less clear, as Merlin have adapted to nest in such forested landscapes, although it seems likely that such landscapes reduce the density and availability of prey. Merlin are also sensitive to disturbance during the breeding season.

Peregrine remain sensitive to persecution at breeding sites, with several cases of illegal killing reported annually. They are also susceptible to secondary poisoning through the food chain (although this appears to be less of an issue now since the ban (and reduction in use) of certain chemicals).

Bird species are sensitive to suitable landscaping/reinstatement from which positive effects may accrue.

8.7.1.5 Trends in the Baseline Environment (the 'Do-Nothing' scenario)

In trend analyses on General Breeding Birds undertaken on 53 species within the most recent Countryside Bird Survey report (Crowe *et al.*, 2014) some 20 species showed increasing trends over the 16-year period since 1998, while 17 species remained relatively stable.

The most recently published Atlas (Balmer *et al.*, 2013) has shown that the species with the largest winter range are still the Hooded Crow, Wren, Robin and Blackbird. In Ireland the Atlas found that 74% of species had increased their winter range.

The abundance and diversity of the bird species within the baseline environment is evaluated as following the general trend of species populations throughout Ireland as described in published literature such as cited above. Given this, a scenario in which the subject development does not take place would result in a continuation of current trends relating to general bird species within the study area.

8.7.1.6 Receiving Environment (the Baseline + Trends)

It is assumed in this report that the baseline environment in relation to general bird species, as identified above, will be the receiving environment at the time of construction as no noticeable change is expected to occur within the relatively short time period prior to commencement of construction. Identified longer terms trends, such as declines in breeding Curlew is likely to overlap the operational phase, as are trends in respect of general breeding birds and wintering birds, identified in publications such as the 2013 Atlas.

8.7.2 CUMULATIVE INFORMATION - Cumulative Projects & Baseline Characteristics**8.7.2.1 Cumulative Evaluation Study Areas****8.7.2.1.1 UWF Grid Connection Cumulative Evaluation Study Area**

The UWF Grid Connection was evaluated for cumulative effects with other projects and the study area is set out in the table below.

UWF Grid Connection Cumulative Evaluation Study Area for General Bird Species	Justification for the Study Area Extents
1km from UWF Grid Connection construction works areas	General birds, due to their naturally smaller home ranges are unlikely to be cumulatively affected by Other Elements or Other Projects or Activities outside this distance

The study is illustrated on **Figure CE 8.7: UWF Grid Connection Cumulative Evaluation Study Area for General Bird Species**.

8.7.2.1.2 Whole Project Cumulative Evaluation Study Area

UWF Grid Connection is part of a whole project which comprises the following Other Elements; Element 2: UWF Related Works, Element 3: UWF Replacement Forestry, Element 4: Upperchurch Windfarm (UWF), and Element 5: UWF Other Activities. The Subject Development, UWF Grid Connection is Element 1. All five elements are collectively referred to as the Whole UWF Project in this EIA Report.

The Other Elements must be considered because UWF Grid Connection is part of a whole project. Therefore, the cumulative information and evaluations for the Other Elements of the Whole UWF Project are included in order to present the totality of the project.

A description of these Other Elements is included in this EIA Report at **Appendices 5.3, 5.4, 5.5 and 5.6**, in **Volume C4 EIAR Appendices**. Scoping of these Other Elements is presented in **Section 8.7.2.2.1** below.

The Whole Project Cumulative Evaluation Study Area comprises of the UWF Grid Connection Study Area along with the study areas for Other Elements which are described in Table 8-55 and illustrated on **Figure WP 8.7: Whole Project Study Area for General Bird Species (Overview and Map 1)** (Volume C3 EIAR Figures).

Table 8-55: Whole Project Cumulative Evaluation Study Area for General Bird Species

Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
Element 1: UWF Grid Connection	50m area around and incorporating the construction works areas, afforestation lands, activity locations	Professional judgement and as per Best Practice (CIEEM, 2016, NRA, 2008, Lusby et al., 2010, SNH 2014).
Element 2: UWF Related Works		
Element 3: UWF Replacement Forestry	1km from construction works areas and activity locations in relation to cumulative effects with Other Projects or Activities	General birds, due to their naturally smaller home ranges are unlikely to be cumulatively affected outside this distance
Element 4: Upperchurch Windfarm (UWF)		
Element 5: UWF Other Activities		

General Bird Species

Sensitive Aspect

Biodiversity

Topic

8.7.2.2 Scoping of Other Elements, Other Projects or Activities & for Potential for Impacts

The evaluation of cumulative impacts to General Bird Species also considered Other Projects or Activities. A scoping exercise was carried out to determine which projects or activities, if any, have potential to cause cumulative effects to General Bird Species with either the UWF Grid Connection or the Other Elements of the Whole UWF Project and therefore should be brought forward for evaluation in this topic chapter. A brief overview of the Other Projects or Activities and the scoping exercise by the topic authors is included in [Appendix 2.1: Scoping of Other Projects or Activities for Cumulative Evaluations \(Section A2.1.4.9\)](#).

The results of this scoping exercise are that: it is evaluated that no Other Projects or Activities are likely to cause cumulative effects with either the UWF Grid Connection or the Other Elements of the Whole UWF Project, and therefore no Other Projects or Activities are scoped in for evaluation of cumulative effect to General Bird Species.

8.7.2.2.1 Potential for Impacts to General Bird Species

An evaluation was carried out by the topic authors of the likelihood for the Other Elements of the Whole UWF Project to cause cumulative effects to the Sensitive Aspect General Bird Species. The results of this evaluation are included in Table 8-56.

The location of, and study area boundary associated with, the Other Elements which are included for cumulative evaluation is illustrated on [Figure WP 8.7](#). The baseline character of the areas around these Elements is described in Section 8.7.2.3.

Table 8-56: Results of the Evaluation of the Other Elements of the Whole UWF Project

<u>Other Element of the Whole UWF Project</u>	
Element 2: UWF Related Works	<u>Included</u> for the evaluation of cumulative effects
Element 3: UWF Replacement Forestry	<u>Included</u> for the evaluation of cumulative effects
Element 4: Upperchurch Windfarm (UWF)	<u>Included</u> for the evaluation of cumulative effects
Element 5: UWF Other Activities	<u>Included</u> for the evaluation of cumulative effects

8.7.2.3 Cumulative Information: Baseline Characteristics – Context & Character**8.7.2.3.1 Element 2: UWF Related Works**

All the species recorded within 50m of the UWF Related Works construction works areas are typical of the habitats present.

General Breeding Birds

Given the overlap between Upperchurch Windfarm and UWF Related Works locations we refer to the species described within the EIS for Upperchurch Windfarm. As per the EIS 2013, surveys of breeding birds to inform the baseline evaluation of Upperchurch Windfarm recorded 37 species in total across 'summer transects' and vantage point surveys. All the species recorded are typical of the habitats present. Species recorded include Skylark, Kestrel, Peregrine Falcon (Annex I), Stonechat and Crossbill. Additional species recorded on Upperchurch Windfarm included Raven, Sand Martin, Crossbill and Reed Bunting. Of these it is considered that Peregrine and Sand Martin do not nest within the study area as there is no suitable nesting habitat

present. Many of the remaining species are typically representative of the land use present and have strong associations with the type of activities in the area (e.g. hill farming) in respect of the quality of habitat present. Studies as part of the current evaluation of UWF Related Works, such as habitat surveys for UWF Replacement Forestry (conducted in April 2017), also recorded species such as Blackbird, Goldcrest, Great Tit, Wren and Robin, in addition to Meadow Pipit, Reed Bunting and Skylark. In general, the distribution of general bird species is considered unchanged with respect to the passage of time since the 2013 EIS.

All of the above species breed and forage in the receiving environment within suitable habitat. In general, the receiving environment would be quiet with many species unlikely to undergo significant disturbance other than from day to day farming activities, and occasionally forestry operations.

General Wintering Birds

Studies for the 2013 EIS on Upperchurch Windfarm (which overlaps the locations of UWF Related Works) recorded a typical assemblage of wintering species (n=34). Of these five Amber-listed (Skylark, Hen Harrier, Kestrel, Starling and Linnet) and 29 Green-listed species were present. In the interest of clarity, we note that the BoCCI status presented herein is the more current Cummins and Colhoun (2013) evaluation, published subsequent to the Upperchurch Windfarm EIS.

Meadow Pipit

This is a very widespread species in Ireland, found in bogs, uplands and areas of scrub and pasture, with an estimated population of 500,000 to 1,000,000 pairs. Birds are ground nesting and typically feed on invertebrates such as crane flies, mayflies and spiders. This species nests on the ground in open countryside in heaths, moors, bogs and coastal marshes. This species is generally site-faithful, although there is some post-breeding dispersal in winter months, particularly from upland areas to lowland habitats. There is c.123Ha of suitable habitat, comprising grassland, grassland mosaics, dry heath, upland blanket bog and cutaway bog, for Meadow Pipit within the UWF Related Works Study Area. It is considered that the habitat at UWF Related Works is sub-optimal/optimal, and it is noted that suitable habitat occurs throughout the wider area. Meadow Pipit were recorded on the UWF Related Works sites during bird surveys for Upperchurch Windfarm and during site surveys for UWF Related Works.

Golden Plover

Golden Plover breed in heather moors, blanket bogs & acidic grasslands. Golden Plover form flocks in winter, foraging and roosting in large open pasture and tilled fields. Golden Plover were not recorded from the locations of the UWF Related Works during any site visits and none were observed during studies to inform Upperchurch Windfarm 2013 EIS. There is c.120ha of available suitable Golden Plover habitat within the study area which mainly comprises improved agricultural grassland and grassland mosaics, and small areas of upland blanket bog and cutaway bog. The habitat is only suitable for wintering birds.

Red Grouse

The Red Grouse is a sub-species of Willow Grouse. It is resident in the west and north of Britain and in Ireland. In Ireland, it is a widespread but sparsely-occurring breeding bird. It is found on mountains, moorland and lowland blanket bogs and raised bogs, where it is associated with heather which it requires for food, shelter and nesting. Optimal habitat for Red Grouse is not found within the locations of the UWF Related Works. No Red Grouse were recorded in studies to inform Upperchurch Windfarm. Although Upland Blanket Bog is present within the 50m habitat survey buffer it is sub-optimal for the species, and no evidence was recorded during e.g. habitat walkovers and surveys.

Merlin, Peregrine Falcon

Merlin was not observed during studies to inform Upperchurch Windfarm 2013 EIS. None were recorded during site visits to inform the current evaluation.

General Bird Species	<p>Peregrine Falcon was recorded on a single occasion (June 2011) during studies to inform Upperchurch Windfarm 2013 EIS.</p> <p>Hen Harrier is specifically evaluated in Section 8.6 of this report.</p> <p>Eurasian Curlew</p> <p>Curlew was not recorded from the locations of the UWF Related Works during any site visits and none were observed during studies to inform the (overlapping) Upperchurch Windfarm EIS. Areas of wet grassland and open moorland are present in the wider area, but may be sub-optimal for Curlew due to land use management, and fragmentation.</p>
	<p>Kingfisher</p> <p>Kingfishers breed in tunnels dug in vertical banks along watercourses. They are a largely sedentary species and rarely move from established territories. However, some may move to lakes and coasts during extended spells of cold weather outside of the breeding season. They are widespread in Ireland and found on streams, rivers and canals. Kingfisher was not recorded during studies to inform Upperchurch Windfarm EIS. None were recorded in surveys to inform the current appraisal, including watercourse evaluations. The watercourses (habitats) which are present on the UWF Related Works site predominately comprise drains which are not suitable for breeding Kingfisher.</p>
Sensitive Aspect	<p>8.7.2.3.2 Element 3: UWF Replacement Forestry</p>
Biodiversity	<p>General Birds</p> <p>Species recorded on site (during habitat surveys) included Wren, Robin, Meadow Pipit, House Martin, Blackbird, Stonechat, Hooded Crow, Chaffinch, Rook, Magpie and Woodpigeon.</p> <p>General Wintering Birds</p> <p>Resident species recorded during current studies will also be present during the winter months.</p> <p>Meadow Pipit</p> <p>Meadow Pipits are present and were recorded at the UWF Replacement Forestry site.</p> <p>Golden Plover</p> <p>Golden Plover were not recorded from the locations of the UWF Replacement Forestry during any site visits and none were observed during studies to inform the adjacent Upperchurch Windfarm 2013 EIS.</p> <p>Red Grouse</p> <p>Habitat for Red Grouse is not found within the locations of UWF Replacement Forestry.</p> <p>Merlin</p> <p>Merlin was not recorded from the locations of the UWF Replacement Forestry during any site visits and none were observed during studies to inform the adjacent Upperchurch Windfarm 2013 EIS. No breeding habitat is present.</p>
	<p>Eurasian Curlew</p> <p>Curlew was not recorded from the locations of the UWF Replacement Forestry during any site visits and none were observed during studies to inform the adjacent Upperchurch Windfarm EIS. No breeding habitat is present for this species.</p>
Topic	

Kingfisher

Kingfisher was not recorded during any site visits to inform the 2018 evaluation for UWF Replacement Forestry. Kingfisher was not recorded during studies to inform the adjacent Upperchurch Windfarm EIS. The watercourse which is present within the landholding is not suitable for nesting Kingfisher.

8.7.2.3.3 Element 4: Upperchurch Windfarm

All the species recorded during 2012 surveys for the Upperchurch Windfarm EIS are typical of the habitats present.

General Breeding Birds

As per the EIS 2013, surveys of breeding birds to inform the baseline evaluation of Upperchurch Windfarm recorded 37 species in total across 'summer transects' and vantage point surveys. All the species recorded are typical of the habitats present. Species recorded include Skylark, Kestrel, Peregrine Falcon, Stonechat and Crossbill. Additional species recorded on Upperchurch Windfarm, to that recorded at UWF Grid Connection locations, were Raven, Sand Martin, Crossbill and Reed Bunting. Of these it is considered that Peregrine and Sand Martin do not nest on site as there is no suitable nesting habitat present at Upperchurch Windfarm.

General Wintering Birds

Studies on Upperchurch Windfarm (2013) recorded a typical assemblage of wintering species (n=34). Of these five Amber-listed (Skylark, Hen Harrier, Kestrel, Starling, and Linnet) and 29 Green-listed species were present. In the interest of clarity we note that the BOCCI status presented herein is the more current Cummins and Colhoun (2013) evaluation, published subsequent to the Upperchurch Windfarm EIS.

Meadow Pipit

Meadow Pipit is present in suitable habitat.

Golden Plover

Golden Plover were not observed during studies on Upperchurch Windfarm or during any surveys carried out at UWF Replacement Forestry.

Red Grouse

No Red Grouse were recorded in studies on Upperchurch Windfarm.

Merlin

Merlin was not observed during studies on Upperchurch Windfarm.

Eurasian Curlew

No Curlew was observed during studies to inform the Upperchurch Windfarm EIS.

Kingfisher

Kingfisher was not recorded during studies to inform the Upperchurch Windfarm EIS.

Consideration of the Passage of Time: The makeup of suitable habitat for general bird species on the Upperchurch Windfarm site has not materially changed since 2012/2013, and the species recorded during the 2012/2013 surveys were generally also recorded during site surveys for UWF Related Works. Therefore, it is considered that the descriptions in the 2013 and 2014 documents for Upperchurch Windfarm remain relevant to the cumulative evaluations in this 2019 EIAR for UWF Grid Connection.

General Bird Species	8.7.2.3.4 Element 5: UWF Other Activities
	<p>General bird species of Hedgerows are present. Resident Bird species described in respect of breeding are likely to be present during the winter months also. <u>Meadow Pipit</u> may be present in suitable fields adjacent to activity locations however habitats such as roadside verges do not comprise breeding habitat. <u>Golden Plover</u> were not recorded from the locations of UWF Other Activities during any site visits. The locations do not comprise suitable habitat for this species. Habitat for <u>Red Grouse</u> is not found at the locations of UWF Other Activities. <u>Merlin</u> may occasionally perch in roadside trees during the winter months, however the locations of activities do not comprise breeding or foraging habitat for this species.</p> <p>Bird species present during a site walkover (January 2018) of Overhead Line Activities locations were recorded. In total, twenty three species were recorded, including six Amber-listed species (Goldcrest, Stonechat, Starling, Common Snipe, Robin and House Sparrow), the remaining species were green listed. See Appendix 8.7: General Birds Fieldwork & Survey Results, Section A8.7.2.5.</p>
Sensitive Aspect	8.7.2.3.5 Other Projects or Activities
	Not applicable –No Other Projects or Activities were scoped in for evaluation of cumulative effects, see Section 8.7.2.1

8.7.3 PROJECT DESIGN MEASURES for General Bird Species

At the conception of the UWF Grid Connection, the design team evaluated the potential for significant impacts to the environment. Impacts will only take place where three components exist together; (1) the source of the impact (project), (2) the receptor of the impact (sensitive aspect) and (3) a pathway between the source and the sensitive aspect. The objective of mitigation measures is to avoid, prevent or reduce, one of the three components of an impact by choosing an alternative location, alternative design or an alternative process.

Potential or likely significant impacts were avoided, prevented or reduced by integrating mitigation measures into the fundamental design of the development – these are the Project Design Environmental Protection Measures, which are shortened to ‘Project Design Measures’ in this EIA Report.

The development as evaluated in the EIA Report incorporates the Project Design Measures.

The Project Design Measures outlined in Table 8-57 are relevant to the Environmental Factor, Biodiversity, and in particular to the sensitive aspect **General Bird Species**.

Table 8-57: UWF Grid Connection Project Design Measures relevant to General Bird Species

PD ID	Project Design Environmental Protection Measure (PD)
PD05	At the Mountphilips Substation site, construction traffic will be restricted to the construction works area and tracking across adjacent ground will not be permitted. A speed limit of 25km/hr for all traffic/machinery will be implemented at the Mountphilips Substation site. Outside of Mountphilips Substation site, all construction will be restricted to the paved road surfaces or built surfaces along the 110kV UGC. A speed limit of 50km/hr for all delivery and construction traffic will be implemented on Local Roads ('L' roads).
PD58	Hedgerow removal and clearance of any other breeding bird vegetation will take place outside of the bird breeding season i.e. not during the period of March to August inclusive. This includes hedgerow and scrub removal in addition to hedgerow trimming.
PD59	Works will not take place at any bridge during the Dipper breeding season (Feb-June inclusive) without a confirmatory survey to determine Dipper presence or absence. If Dippers are present, where possible works will not proceed until breeding has completed. All works at these and other bridges will be overseen by a project ecologist to ensure the requirements of the Wildlife Acts are being met. During culvert replacement works at W13, a Dipper nest box will be fitted to the new crossing structure. Additional nest boxes (c.10) will be provided for Dipper at suitable bridges to provide a net gain for this species.
PD60	Where works will be carried out at parapet walls, no works will take place between the period April-August without confirmatory survey as to the presence or absence of breeding Grey Wagtail. If breeding Grey Wagtail is present, then works will be overseen by a suitably qualified ecologist to ensure no effects occur to Grey Wagtail present in adherence to the requirements of the Wildlife Act. Works at all bridges will be overseen by the project Ecologist. Nest boxes (c.10) will be provided for Grey Wagtail at suitable bridges to provide a net gain for this species.
PD62	All bridges/structures where works are proposed will be subject to confirmatory surveys for General breeding birds prior to works commencing. All works will be supervised by the project Ecologist.

Cumulative Information: Potential or likely significant impacts caused by the Other Elements of the Whole UWF Project were avoided, prevented or reduced by incorporating Project Design Measures into the fundamental design of the UWF Related Works and UWF Other Activities and into the consented design of the Upperchurch Windfarm. These Project Design Measures are included in the description of these Elements, and can be found in this EIA Report in **Appendices 5.3, 5.5 and 5.6**, in **Volume C4: EIAR Appendices**.

General Bird Species

Sensitive Aspect

Biodiversity

Topic

8.7.4 EVALUATION OF IMPACTS to General Bird Species

In this Section, the likely direct and indirect effects of the UWF Grid Connection are identified and evaluated. Then the likely cumulative effects of the UWF Grid Connection together with the Other Elements of the Whole UWF Project are identified and evaluated.

A conceptual site model exercise was carried out to facilitate the identification of source-pathway-receptor links between the project (source) and the sensitive aspect (receptor) - General Bird Species.

As a result of the exercise, some impacts were included and some were excluded.

Table 8-58: List of all Impacts included and excluded from the Impact Evaluation Table sections

Impacts Included (Evaluated in the Impact Evaluation Table sections)	Impacts Excluded (Justification at the end of the Impact Evaluation Table sections)
Meadow Pipit: Habitat Loss (construction stage)	<i>Disturbance / Displacement: Meadow Pipit (construction stage)</i>
Golden Plover: Habitat Loss (construction stage)	<i>Habitat Loss – Merlin, Red Grouse, Eurasian Curlew, (construction stage)</i>
Golden Plover: Disturbance/Displacement (construction stage)	<i>Habitat Loss – Kingfisher, Grey Wagtail, Dipper (construction stage)</i>
Grey Wagtail, Kingfisher, Dipper: Disturbance / Displacement (construction stage)	<i>Disturbance / Displacement: General Birds, (construction stage)</i>
General Birds: Habitat Enhancement (operational stage)	<i>Disturbance / Displacement: Merlin (construction Stage)</i>
	<i>Disturbance / Displacement: Red Grouse, (Construction stage)</i>
	<i>Disturbance / Displacement: Eurasian Curlew, (construction stage)</i>
	<i>Disturbance / Displacement: Peregrine, (construction stage)</i>
	<i>Disturbance / Displacement: Barn Owl, (construction stage)</i>
	<i>Physical injury or destruction of nests/chicks, (construction stage)</i>
	<i>Disturbance / Displacement, (operational stage)</i>
	<i>Disturbance / Displacement, (decommissioning stage)</i>

The source-pathway-receptor links for included impacts are described in the Impact Evaluation Tables in the next sections. **The Impact Evaluation Tables are presented in the following sections 8.7.4.1 to 8.7.4.5.**

The source-pathway-receptor links and the rationale for excluded impacts are described in the section directly after the Impact Evaluation Table sections, in Section 8.7.4.6.

8.7.4.1 Impact Evaluation Table: Meadow Pipit – Habitat Loss

Impact Description

Project Life Cycle Stage: Construction stage

Impact Source: Construction Works; Excavation; Movement of Soils and Machinery

Cumulative Impact Source: Construction Works; Excavation; Movement of Soils and Machinery, Afforestation

Impact Pathway: Land Cover

Impact Description: The Meadow Pipit is a Red-listed species due to sharp breeding declines thought to be a result of the unusually severe winters of 2009/10 and 2010/11. Based on this it is assigned a medium sensitivity rating. However, numbers of Meadow Pipit have been increasing since 2012 (Crowe *et al.*, 2017)³³. Land cover change of suitable nesting habitat (improved agricultural grassland, wet grassland or grassland mosaics, and upland blanket bog), where construction works areas overlap may cause reductions in breeding numbers, foraging success, increased exposure to predation through displacement to less viable feeding areas, and local population level declines.

Meadow Pipit will benefit from enhancement measures for Hen Harrier as part of the Upperchurch Hen Harrier Scheme (UWF Other Activities), wherein the management prescription has been specifically designed to benefit species such as Meadow Pipit, which are an important prey item for Hen Harrier.

Meadow Pipit territory size varies depending upon habitat availability, structure and prey availability. A large-scale study in Welsh mountain grassland (Seel & Walton, 1979) which studied a similar landscape to that found around the proposed UWF Grid Connection (i.e. marginal, upland agricultural grassland) estimated an average annual density of 48 pairs per km², with the average home range size of 2.18ha. This equates to an estimated foraging distance around a nest of just under 100m (assuming the nest is located within an area of uniformly suitable habitat for foraging).

Impact Quality: Negative and positive

Evaluation of the Subject Development Impact – Meadow Pipit: Habitat Loss

Element 1: UWF Grid Connection – direct/indirect impact

Impact Magnitude:

Suitable breeding habitat occurs at the Mountphilips Substation site. In total permanent loss of suitable breeding habitat will comprise 1.75Ha in total, the vast majority 1.7ha of which is improved agricultural grassland (GA1), with the remaining 0.05ha comprising wet grassland (GS4). Temporary land-use change during construction will comprise 0.2ha of improved agricultural grassland (GA1) in the area of the new End Masts. Given the very small extent of suitable habitat, the magnitude of habitat loss at the Mountphilips Substation site is considered Negligible.

No suitable habitat loss will occur along the 110kV UGC route, outside of the Mountphilips Substation site, due to its location entirely on paved surfaces.

Significance of the Impact: Not Significant

Rationale for Impact Evaluation:

- The medium sensitivity of the species, based on conservation status, and;
- negligible loss of suitable nesting habitat;

³³ Citation: Crowe, O., Coombes, R.H., Tierney, T.D., Walsh, A.J. & O'Halloran, J. 2017. *Countryside Bird Survey Report 1998-2016*. BirdWatch Ireland, Wicklow

General Bird Species	<ul style="list-style-type: none"> The extent of suitable foraging habitat to be affected (1.75Ha), evaluated as very low, in the context of the availability of suitable habitat in the surrounding area.
	Element 1: UWF Grid Connection – cumulative impact
	Cumulative Impact Magnitude: No cumulative effect will occur to Meadow Pipit habitat in combination with the Other Elements of the Whole UWF Project due to the separation distance of c.22km between the suitable habitat which will be affected by land cover change for UWF Grid Connection (which occurs at the Mountphilips Substation area) and the land cover change associated with the Other Elements of the Whole UWF Project.
	Significance of the Impact: No cumulative impact
Sensitive Aspect	<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> Separation distance of c.22km between land cover change associated with UWF Grid Connection and the land cover change associated with any of the Other Elements.
	Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project
	Element 2: UWF Related Works
	<u>Impact Magnitude:</u> Construction Works will include land take of 0.2Ha of suitable breeding habitat for Meadow Pipit in the form of grassland and grassland mosaic. The scale of habitat loss is 0.15% of available habitat within the Study area boundary (123Ha – where suitable habitats for Meadow Pipit include grassland, grassland mosaics, dry heath, upland blanket bog and cutaway bog).
	<u>Significance of the Impact:</u> Not Significant
	<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> The medium sensitivity of the species, based on conservation status, and; The extent of suitable habitat to be affected (0.2Ha), evaluated as negligible (<1% of available habitat lost); The long-term duration (15-60 years).
	Element 3: UWF Replacement Forestry
	<u>Impact Magnitude:</u> Construction Works will include permanent land cover change of 3.98Ha of suitable breeding habitat (improved agricultural grassland (3.54ha) and wet grassland (0.44ha)) for Meadow Pipit. The scale of habitat loss represents 37% of available habitats (10.68Ha) within the UWF Replacement Forestry study area but is offset by the retention of suitable Meadow Pipit habitat within woodland rides to be established for foraging Hen Harrier.
Biodiversity	<u>Significance of the Impact:</u> Slight
	<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> The medium sensitivity of the species, based on conservation status, and; The majority of land cover change is from improved agricultural grassland, which is sub-optimal for Meadow Pipit, and; Offset by the retention of rides (i.e. Meadow Pipit habitat) within the deciduous woodland to be planted, notwithstanding; The extent of habitat subject to change, evaluated as high (20-80% of habitat lost), which; Comprises a major alteration to the baseline conditions; The permanent duration, and; Low reversibility with land cover change likely
Topic	

Element 4: Upperchurch Windfarm	
<u>Impact Magnitude:</u>	Construction Works will include land cover change of 7.81Ha of suitable breeding habitat for Meadow Pipit in the form of grassland, grassland mosaic, and bog habitat. The scale of land cover change is 2.39% of available habitat within the Study area boundary (128Ha).
<u>Significance of the Impact:</u>	Slight
<u>Rationale for Impact Evaluation:</u>	<ul style="list-style-type: none"> The medium sensitivity of the species, based on conservation status, and; The extent of habitat to be lost, is low (i.e. 1-5% of available habitat), which; Comprises a minor shift away from baseline conditions, notwithstanding; The long-term duration (15-60 years), and; Low reversibility with permanent land cover change likely
Element 5: UWF Other Activities	
<u>Impact Magnitude:</u>	The sensitive management of 128Ha of lands for Hen Harrier as part of the Upperchurch Hen Harrier Scheme will also increase the suitable habitat present for Meadow Pipit. No habitat loss of suitable breeding habitat is associated with other locations such as Haul route activities and Overhead Line Activities.
<u>Significance of the Impact:</u>	Moderate (positive)
<u>Rationale for Impact Evaluation:</u>	<ul style="list-style-type: none"> The medium sensitivity of the species, based on conservation status, and; The extent of lands to be sympathetically managed, evaluated as high (i.e. 20-80% of the 128Ha included in the Upperchurch Hen Harrier Scheme of habitat present), which; Comprises a major alteration to baseline features, and The long term duration, over the lifetime of the project, and; Low reversibility.
Evaluation of Other Cumulative Impacts – Meadow Pipit: Habitat Loss	
Whole UWF Project Effect	
<u>Magnitude:</u>	<p>Instances of land cover change in respect of suitable breeding habitat will occur from works associated with the UWF Grid Connection (1.75Ha), UWF Related Works (0.2Ha), UWF Replacement Forestry (3.98Ha) and the Upperchurch Windfarm (7.81Ha). Overall habitat loss is 13.74ha, which is considered Negligible in the context of the size of the Whole UWF Project.</p> <p>No cumulative habitat loss effects will occur to Meadow Pipit as a result of UWF Grid Connection in combination with the other elements of the Whole UWF Project, as any land cover change associated within the UWF Grid Connection are outside the zone of effect for the other elements of the Whole UWF Project.</p> <p>No land cover change will occur within the Slieve Felim to Silvermines Mountain SPA (where either UWF Grid Connection or UWF Related Works overlaps the SPA). Outside the SPA, the sensitive management of 128Ha of lands for Hen Harrier as part of the Upperchurch Hen Harrier Scheme will also increase the suitable habitat present for Meadow Pipit.</p>
<u>Significance of the Whole Project Effect:</u>	
<u>Rationale for Impact Evaluation:</u>	<ul style="list-style-type: none"> The medium sensitivity of the species, based on conservation status, and; The Negligible magnitude of habitat loss overall (13.74Ha), comprises of a small extent of available habitat within 1km of the various works.

Topic	Biodiversity	Sensitive Aspect	General Bird Species	<ul style="list-style-type: none">• A very slight shift away from baseline conditions, which;• Is ameliorated by the management of lands (128ha) as part of the Upperchurch Hen Harrier Scheme, over;• A long-term to permanent duration, and with;• The sensitive management of 128Ha of lands for Hen Harrier as part of the Upperchurch Hen Harrier Scheme will also increase the suitable habitat present for Meadow Pipit.• Low reversibility
				<p>Note: No cumulative evaluation of <u>Other Projects or Activities</u> is included in the table above, because <u>no</u> Other Projects or Activities are likely to cause cumulative effects to General Bird Species with either the UWF Grid Connection or the Other Elements of the Whole UWF Project (see Section 8.7.2.1).</p>

8.7.4.2 Impact Evaluation Table: Golden Plover - Habitat Loss

Impact Description	
Project Life Cycle Stage:	Construction stage
<p><u>Impact Source:</u> Construction Works; Excavation; Movement of Soils and Machinery</p> <p><u>Cumulative Impact Source:</u> Construction Works; Excavation; Movement of Soils and Machinery, afforestation</p> <p><u>Impact Pathway:</u> Land Take</p> <p><u>Impact Description:</u> As an Annex I species Golden Plover is a High Sensitivity receptor. Land cover change of suitable foraging or roosting habitat such as improved agricultural grassland, wet grassland or grassland mosaics, and upland blanket bog, where construction works areas overlap may cause reductions in foraging success, increased exposure to predation through displacement to less viable feeding areas, and also reduction in survival rates of wintering birds.</p> <p>No breeding Golden Plover will be affected as all works for the Elements of the Whole UWF Project are outside the Irish breeding range. In addition numbers of birds recorded, and therefore potentially affected, are low within the context of the Irish wintering population.</p> <p><u>Impact Quality:</u> Negative</p>	
Evaluation of the Subject Development Impact – Golden Plover: Habitat Loss	
Element 1: UWF Grid Connection – direct/indirect impact	
<p><u>Impact Magnitude:</u> Permanent land-use change of suitable wintering habitat at the Mountphilips Substation site will comprise 1.75Ha in total, of which 1.7ha is improved agricultural grassland (GA1), with the remaining 0.05ha comprising wet grassland (GS4). Temporary land-use change (in the area of the new End Masts) during construction will comprise 0.2ha of improved agricultural grassland (GA1). However, the habitats present at this location are not suitable for Golden Plover due to the enclosed nature of the improved grassland fields, and therefore no effective habitat loss is expected to occur at the Mountphilips Substation site.</p> <p>No habitat loss will occur along the 110kV UGC route where it occurs outside of the Mountphilips Substation site (i.e. on the public road and private paved road section of the 110kV UGC).</p> <p>The magnitude of habitat loss effects to Golden Plover is therefore evaluated as Negligible.</p>	
Significance of the Impact: Imperceptible	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> as per Section 8.7.1.2, the high sensitivity rating of the species, based on conservation status, and the Negligible magnitude of the impact; No suitable habitat loss, notwithstanding; The permanent duration, and; Low reversibility 	
Element 1: UWF Grid Connection – cumulative impact	
<p><u>Cumulative Impact Magnitude:</u> No cumulative effect will occur to habitats in combination with the UWF Grid Connection due to the permanent land cover change associated with the UWF Grid Connection will be confined to the Mountphilips Substation area c.22km linear separation distance from any of the Other Elements</p>	
Significance of the Impact: No cumulative effect	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> The separation distance between land cover change locations for UWF Grid Connection (Mountphilips Substation site) and the Other Elements. 	

General Bird Species	Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project	
	Element 2: UWF Related Works	
	<p><u>Impact Magnitude:</u> Permanent land cover change will comprise 0.2Ha of suitable foraging or roosting habitat for wintering Golden Plover as improved agricultural grassland (0.12ha) and wet grassland (0.07ha). The scale of habitat loss represents 0.16% of available suitable Golden Plover habitat (120Ha – comprising improved agricultural grassland, grassland mosaics, upland blanket bog and cutaway bog) within the study area boundary. Golden Plover were not recorded from the locations of the UWF Related Works, during any site visits and none were observed during studies to inform Upperchurch Windfarm 2013 EIS.</p>	
	<u>Significance of the Impact:</u> Imperceptible	
Sensitive Aspect	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The extent of habitat loss (0.2Ha), is negligible(i.e. <1% of available habitat) and represents a very slight change from baseline conditions; • The availability of suitable foraging and roosting habitat (at minimum 119.8Ha) in the greater area, notwithstanding; • The long term duration, and; • Low reversibility with permanent land cover change likely. 	
	Element 3: UWF Replacement Forestry	
	<p><u>Impact Magnitude:</u> Permanent land cover change of 3.98Ha of suitable foraging or roosting grassland habitat to deciduous woodland will occur. This represents 37% of the available habitats within the UWF Replacement Forestry study area (10.7Ha). Golden Plover were not recorded during any site visits and none were observed in the area during studies to inform Upperchurch Windfarm 2013 EIS.</p>	
	<u>Significance of the Impact:</u> Slight	
Biodiversity	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The extent of suitable habitat to be affected (3.98Ha or 37% of that available within the study area); • The permanent duration, and; • Low reversibility with land cover change likely 	
	Element 4: Upperchurch Windfarm	
	<p><u>Impact Magnitude:</u> Construction Works will include land cover change of 7.81Ha of suitable breeding habitat for Golden Plover in the form of grassland, grassland mosaic, and bog habitat. The scale of land cover change is 1.4% of available habitat within the Study area boundary (536Ha).</p>	
	<u>Significance of the Impact:</u> Neutral impact	
Topic	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • No Golden Plover were recorded during winter bird studies of the Upperchurch Windfarm 	
	Element 5: UWF Other Activities	
	<u>Impact Magnitude:</u> Negligible	
	<u>Significance of the Impact:</u> Neutral impact	
	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • No suitable habitat is present for roosting or foraging Golden Plover, and • Golden Plover are not known to utilize roadside verges/roundabouts for foraging or roosting, and; • Golden Plover were not recorded within the locations for the Upperchurch Hen Harrier Scheme; • Monitoring does not include land take or land cover changes 	

Evaluation of Other Cumulative Impacts – Golden Plover: Habitat Loss**Whole UWF Project Effect****Magnitude:**

Instances of land cover change in respect of suitable foraging or roosting habitat will occur from works on either side of the Slievefelim to Silvermines Mountain upland area, with habitat loss associated with UWF Grid Connection (1.75ha), UWF Related Works (0.2Ha), Upperchurch Windfarm (7.81Ha) and UWF Replacement Forestry (3.98Ha). Overall suitable habitat loss is 13.74ha, which is considered to be Negligible in the context of the area of available habitat.

Significance of the Whole Project Effect: Imperceptible**Rationale for Impact Evaluation:**

- The high sensitivity rating of the species and Negligible magnitude of habitat loss, counterbalanced with;
- No birds recorded
- The extent of habitat loss overall in the context of the availability of habitat within the study area, and not withstanding;
- The permanent duration, and;
- Low reversibility

Note: No cumulative evaluation of Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to General Bird Species with either the UWF Grid Connection or the Other Elements of the Whole UWF Project (see Section 8.7.2.1).

8.7.4.3 Impact Evaluation Table: Golden Plover - Disturbance/Displacement

Impact Description

Project Life Cycle Stage: Construction stage

Impact Source: During Construction Noise and Visual and Intrusion

Cumulative Impact Source: During Construction Noise and Visual and Intrusion

Impact Pathway: Air

Impact Description: As an Annex I species Golden Plover is a High Sensitivity receptor. Disturbance to/displacement of wintering Golden Plover due to noise, visual intrusion or anthropogenic sources may occur during the period October to March when the highest proportion of birds (wintering) could be potentially present within the receiving environment.

As works will only be conducted during daylight hours as part of Project Design, disturbance to birds foraging at night (when most foraging takes place) is avoided. Displacement during daylight hours, if of sufficient duration and from high value foraging areas may result in effective habitat loss with consequent effects on feeding success, winter survival and breeding capacity; dependant on numbers of birds affected and availability of alternative habitat. No breeding Golden Plover will be directly affected as all works are outside the Irish breeding range.

Sources of disturbance are likely; however the degree of avoidance/response may also vary from individual to individual and as flock size varies may be limited in spatial extent. The duration of disturbance events are assumed to be brief given the linear nature of most of the works – however as birds may range over wide areas there is the potential for sequential effects i.e. from multiple concurrent sources. In this instance birds displaced from one location may experience a second disturbance stimulus from e.g. another work crew.

Impact Quality: Negative

Evaluation of the Subject Development Impact – Golden Plover: Disturbance/Displacement

Element 1: UWF Grid Connection – direct/indirect impact

Impact Magnitude:

No Golden Plover were recorded during any of the ecological surveys on the proposed 110kV UGC route in 2019. While some suitable habitat exists in close proximity to the public road along the 110kV UGC route, traffic is already causing disturbance on roads and use of suitable adjacent lands is unlikely. Furthermore the duration of works along the public road are assumed to be brief given the linear nature of the works.

Due to the enclosed nature of the improved grassland fields at the Mountphilips Substation site, it is considered that Golden Plover are not likely to occur in close proximity to construction works at the Mountphilips Substation site, and therefore disturbance will not occur here.

The Magnitude of disturbance effects is therefore considered negligible, if it occurs at all.

Significance of the Impact: Not Significant

Rationale for Impact Evaluation:

- No Golden Plover were recorded at the Mountphilips Substation during any ecological surveys between 2016 and 2019.
- Activities such as cable trenching will not contrast significantly from baseline activities such as road works or farming related works, and;
- The duration of any individual disturbance events will be brief, and;
- Reversible once works finish, with birds expected to return, and;

General Bird Species

Sensitive Aspect

Biodiversity

Topic

- Any response is not expected to be permanent, based on studies of the species with regard to large construction sites (wind farm sites, as per Pearce-Higgins et al., 2012) and therefore unlikely to alter long term wintering trends;

Element 1: UWF Grid Connection – cumulative impact

Cumulative Impact Magnitude: UWF Grid Connection works have the potential to cause additive disturbance effects at the eastern extent of the project where UWF Grid Connection works occur within 1km of the UWF Related Works, UWF Replacement Forestry and Upperchurch Windfarm, all three having suitable Golden Plover habitat. The potential for cumulative impacts relates to the increased disturbance as a result of multiple crews of people and machinery carrying out various works and activities. However, the cumulative magnitude of impact is considered to be negligible due to the absence of Golden Plover recorded on any of the UWF Related Works, UWF Replacement Forestry and Consented Upperchurch Windfarm sites, and the extent of available habitat in the wider surrounding area and the carrying out of works during daylight hours. Furthermore the transient nature and duration of works for the UWF Grid Connection along the public road and private paved road further reduce the potential for cumulative effects.

Significance of the Impact: Not Significant

Rationale for Impact Evaluation:

- No Golden Plover were recorded during ecological field surveys for the proposed UWF Grid Connection
- No Golden Plover were recorded in baseline studies for the Upperchurch Windfarm, which overlaps the works locations for UWF Related Works, or observed during site surveys for UWF Related Works or UWF Replacement Forestry therefore;
- Due to the absence of birds recorded in the area, there is a Very Low probability of disturbance notwithstanding suitable habitat is present.

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project

Element 2: UWF Related Works

Impact Magnitude:

120ha of suitable habitat for wintering Golden Plover occurs within the study area for UWF Related Works. However no birds have been recorded utilising these locations in studies described herein. The magnitude of any disturbance is therefore negligible.

Significance of the Impact: Not Significant

Rationale for Impact Evaluation:

- No birds were recorded in baseline studies for the Upperchurch Windfarm, which overlaps the works locations for UWF Related Works, or observed during site surveys for UWF Related Works therefore;
- The probability of disturbance is significantly reduced (to an evaluation as low), notwithstanding suitable habitat is present.
- Activities such as cable trenching will not contrast significantly from baseline activities such as road works or farming related works, and;
- The duration of any individual disturbance events (if any) will be brief, and;
- Reversible once works finish, with birds expected to return, and;
- Any response is not expected to be permanent, based on studies of the species with regard to the construction of wind farms (Pearce-Higgins et al 2012) and therefore unlikely to alter long term wintering trends.

Element 3: UWF Replacement Forestry

Impact Magnitude: Although suitable habitat occurs (Improved Agricultural Grassland and Wet Grassland), no Golden Plover were recorded at the site. The magnitude of planting works will be negligible.

Significance of the Impact: Neutral Impact

General Bird Species	Sensitive Aspect	Rationale for Impact Evaluation:
		<ul style="list-style-type: none"> All planting will be done by hand and will not contrast to baseline agricultural activities.
		Element 4: Upperchurch Windfarm
		Impact Magnitude: Although suitable habitat occurs, including 5.98ha of Improved Agricultural Grassland, no Golden Plover were recorded at the site during either surveys for the 2013 EIS/RFI or during surveys for UWF Related Works
		Significance of the Impact: Neutral Impact
		Rationale for Impact Evaluation:
		<ul style="list-style-type: none"> No Golden Plover were recorded in studies to inform the EIS for the <u>Upperchurch Windfarm</u>
		Element 5: UWF Other Activities
		Impact Magnitude: None
		Impact Evaluation: Neutral impact
Biodiversity	Topic	Rationale for Impact Evaluation:
		<ul style="list-style-type: none"> The Haul Route Activity locations do not include suitable habitat to attract Golden Plover, and; Activities will not contrast from baseline activities already present, such as farming related works and road maintenance. Overhead Line Activities will be similar to existing maintenance which is undertaken; will occur during daylight hours and will not result in any contrast from the existing environment.
		Evaluation of Other Cumulative Impacts – Golden Plover: Disturbance/Displacement
		Whole UWF Project Effect
		Magnitude: Instances of disturbance has potential to occur on suitable foraging/roosting winter habitat from construction works and the presence of work crews on either side of and traversing the Slievefelim to Silvermines Mountain upland area. The magnitude of cumulative whole project will be negligible, as no Golden Plover were recorded within study areas for any Element.
		Significance of the Whole Project Effect: Not Significant
		Rationale for Impact Evaluation:
		<ul style="list-style-type: none"> No birds recorded, and; Activities such as cable trenching, road works, will cause very slight changes from baseline activities such as farming related works, even if multiple instances occur simultaneously, and; The duration of individual disturbance events (including sequential) will be brief, limited to daylight hours and; Reversible once works finish, with birds expected to return, and; Any response is not expected to be permanent, based on studies of the species with regard to the construction of wind farms (Pearce-Higgins et al., 2012) and therefore unlikely to alter long term wintering trends.
		Note: No cumulative evaluation of <u>Other Projects or Activities</u> is included in the table above, because <u>no</u> Other Projects or Activities are likely to cause cumulative effects to General Bird Species with either the UWF Grid Connection or the Other Elements of the Whole UWF Project (see Section 8.7.2.1).

8.7.4.4 Impact Evaluation Table: Kingfisher, Grey Wagtail and Dipper - Disturbance/Displacement

Impact Description	
Project Life Cycle Stage:	Construction stage
Impact Source: During Construction Noise and Visual and Intrusion	
Cumulative Impact Source: During Construction Noise and Visual and Intrusion	
Impact Pathway: Air, Visibility	
<p><u>Impact Description:</u> Kingfishers and Grey Wagtail have both been assigned a Sensitivity rating of Low, while Dipper is assigned a Sensitivity rating of Negligible.</p> <p>There is suitable habitat for Kingfisher along the larger watercourses in the vicinity of the proposed 110kV UGC, as evidenced by the record of a Kingfisher nest 540m upstream of crossing point W7. Once territories have been established, Kingfishers are not considered to move substantial distances, although they may be forced to move to coastal areas due to severe (cold) weather (Morgan & Glue, 1977). There is a suggestion that disturbance close to nesting sites may impact Kingfishers (such as from fishermen), but the impact within foraging areas (e.g. water spots) is low (Machar, 2008). Although exact data on this is sparse, Livesey <i>et al.</i> (2016) indicates a Minimum Approach Distance for Coraciiformes (the order to which Kingfisher belong) of 25.2m.</p> <p>There are suitable habitats for breeding Grey Wagtail at water crossing locations. Although nesting within cavities within built structures next to watercourses appear to be a favoured location (Smiddy & O'Halloran, 1998) this species will nest at habitats that may be away from watercourses and/or crossing points (Tyler, 1972). Grey Wagtails disperse in winter months to lower-lying and coastal areas (Smiddy & O'Halloran, 1998). Although fidelity to nesting sites between years is not confirmed, a pair may have multiple broods within close proximity during a single nesting season.</p> <p>Dippers always build their nests with the opening over running water, therefore bridges are a particularly favoured habitat, although other man-made structures next to watercourses (including buildings or walls) as well as natural nest sites (such as rock-faces, tree roots or banks that overhang watercourses) are also used (Shaw, 1978). Adult Dippers show a very high degree of site fidelity to their breeding location from season to season (O'Halloran <i>et al.</i>, 2000). Juveniles will disperse away from the natal site, although they typically remain within the same river system (if not the same watercourse) when establishing territories (O'Halloran <i>et al.</i>, 2000; Tyler & Ormerod, 1994).</p> <p>Project design measures include pre-construction surveys for breeding birds at the proposed river crossing structures where works are to be carried out. These will be undertaken by a competent ecologist to ensure that any works that proceed are in full compliance with the requirements of the Wildlife Acts. In addition, supplementary nesting sites for Grey Wagtail and Dipper will be provisioned on relevant structures (or their immediate vicinity) where identified as appropriate.</p> <p><u>Impact Quality:</u> Negative</p>	
Evaluation of the Subject Development Impact – Kingfisher, Grey Wagtail and Dipper: Disturbance/Displacement	
Element 1: UWF Grid Connection – direct/indirect impact	
<p><u>Impact Magnitude:</u></p> <p>Kingfisher: A Kingfisher nest was found c.540m upstream in a sandy bank on the Newport River. However, suitable Kingfisher habitat was only present from c.400m upstream and further upstream past the nest location. The watercourse downstream from this (i.e. from 400m upstream of the crossing point W7 to 500m downstream) was typically shallow and fast-flowing with many in-stream boulders and riffles or small waterfalls. These riverine habitats are not utilised by Kingfisher for foraging, which prefer slow-flowing waterways for</p>	

General Bird Species	feeding; Snow & Perrins, 1998). It is therefore likely that Kingfisher foraging from the nest is from c.400m upstream from the crossing point (W7) and further upstream from this. Given the distance separating the suitable breeding habitat and the proposed works, coupled with low sensitivity to disturbance, no likely effects are reasonably foreseeable.
	Grey Wagtail: a probable Grey Wagtail nest was recorded at watercourse crossing W36 and a total of 11 Grey Wagtail were recorded during the April 2019 transect along the proposed 110kV UGC. Given this species use of a variety of riparian and non-riparian habitats for nesting, any effects of the proposed works on Grey Wagtail are therefore considered to be negligible.
Sensitive Aspect	Dipper: Dipper nests were recorded at three water crossing locations; one nest at water crossing W18, two nests at watercourse crossing W28 and one nest at watercourse crossing W41. One other water crossing (W23) was identified as suitable for Dipper; however, no evidence of Dipper was recorded at this location. There is therefore the potential for three pairs of Dippers to be affected at the indicated crossing points. However, the stated Project Design measures will ensure that suitable nesting sites are retained and increased through the provision of targeted nesting box provisioning. The magnitude of disturbance effects is therefore considered to be negligible.
	Significance of the Impact: Imperceptible
	<u>Rationale for Impact Evaluation:</u>
	<ul style="list-style-type: none"> • Low and Negligible Sensitivity and Magnitude of disturbance effects; • implementation of Project Design Measures for Grey Wagtail and Dipper and Kingfisher; • Activities such as cable trenching will not contrast significantly from baseline activities such as road works or farming related works, and; • The duration of any individual disturbance events will be brief, and; • Reversible once works finish.
	Element 1: UWF Grid Connection – cumulative impact
	<u>Cumulative Impact Magnitude:</u>
	Significance of the Impact: Imperceptible
	<u>Rationale for Impact Evaluation:</u>
	<ul style="list-style-type: none"> • Low and Negligible Sensitivity and Negligible Magnitude of disturbance effects; • Separation distance between nests identified along the 110kV UGC route and the Other Elements. • Due to the separation distance from proposed works to suitable habitat, there is a Very Low probability of disturbance notwithstanding suitable habitat is present.
	Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project
	Element 2: UWF Related Works
	<u>Impact Magnitude:</u>
	No Kingfisher nests were identified within the zone of effect at watercourse crossing locations associated with UWF Related Works, therefore impacts are not expected to occur. No Dipper or Grey Wagtail were recorded during fieldwork within 50m buffer for the Related Works, although targeted surveys for these species was not undertaken in this area. The Magnitude of disturbance effects is therefore considered to be Negligible.
	<u>Significance of the Impact: Neutral</u>
	<u>Rationale for Impact Evaluation:</u>
Topic	<ul style="list-style-type: none"> • Low and Negligible Sensitivity and Negligible Magnitude of disturbance effects; • Activities such as cable trenching and haul route works will not contrast significantly from baseline activities such as road works, and;

<ul style="list-style-type: none"> • The duration of any individual disturbance events will be brief, and; • Reversible once works finish. • No birds were recorded or observed during site surveys for UWF Related Works therefore; • The probability of disturbance is Very Low, notwithstanding suitable habitat is present for Dipper, Kingfisher and Grey Wagtail.
Element 3: UWF Replacement Forestry
Impact Magnitude: None – No watercourse crossing works associated with this element, with works carried out by hand and the implementation of a buffer zone along the stream onsite, therefore no potential to cause disturbance effects to Kingfisher, Grey Wagtail or Dipper.
Significance of the Impact: Neutral Impact
Rationale for Impact Evaluation: <ul style="list-style-type: none"> • All planting will be done by hand and will not contrast to baseline agricultural activities. • no works in close proximity to the watercourse
Element 4: Upperchurch Windfarm
Impact Magnitude: Only one watercourse with potentially suitable habitat within the windfarm site, no instream works associated with this watercourse – with works limited to the construction of a clear span bridge at this watercourse. No Kingfisher, Grey Wagtail or Dipper observed or recorded during baseline studies.
Significance of the Impact: Neutral Impact
Rationale for Impact Evaluation: <ul style="list-style-type: none"> • Low and Negligible Sensitivity and Negligible Magnitude of disturbance effects; • The duration of any individual disturbance events will be temporary, and; • Reversible once works finish. • No birds were recorded or observed during site surveys for Upperchurch Windfarm or UWF Related Works therefore; • The probability of disturbance is Very Low, notwithstanding suitable habitat is present for Dipper, Kingfisher and Grey Wagtail.
Element 5: UWF Other Activities
Impact Magnitude: No watercourse crossing works required for this element, with any activities in close proximity small in scale, and mostly carried out by hand with minimal use of machinery. Therefore the magnitude of any disturbance is evaluated as Negligible.
Impact Evaluation: Neutral impact
Rationale for Impact Evaluation: <ul style="list-style-type: none"> • Low and Negligible Sensitivity and Negligible Magnitude of disturbance effects; • No watercourse works required; • Activities will not contrast from baseline activities already present, such as farming related works and road maintenance. • Overhead Line Activities will be similar to existing maintenance which is undertaken; will occur during daylight hours and will not result in any contrast from the existing environment.

General Bird Species	Evaluation of Other Cumulative Impacts – Kingfisher, Grey Wagtail and Dipper: Disturbance/Displacement
	Whole UWF Project Effect
Sensitive Aspect	<p><u>Magnitude:</u></p> <p>Instances of disturbance has potential to occur from construction works and the presence of work crews at watercourse crossing points on either side of and traversing the Slievefelim to Silvermines Mountain upland area. Both birds and nests were recorded within the UWF Grid Connection study area only, and it is considered unlikely that material populations of these birds are present at the UWF Related Works/Upperchurch Windfarm area. The magnitude of cumulative whole project is therefore considered to be negligible.</p>
	<p><u>Significance of the Whole Project Effect: Imperceptible</u></p> <p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Low and Negligible Sensitivity and Negligible Magnitude of disturbance effects; • Works such as cable trenching, road works in the context of baseline activities such as public road use and farming related works, and; • Temporary duration, which will be; • Reversible once works finish.

Note: No cumulative evaluation of Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to General Bird Species with either the UWF Grid Connection or the Other Elements of the Whole UWF Project (see Section 8.7.2.1).

8.7.4.5 Impact Evaluation Table: General Birds - Habitat Enhancement

Impact Description	
Project Life Cycle Stage:	Operational Stage
<p><u>Impact Source:</u> Reinstatement of vegetation and Replanting of trees/hedgerow at construction works areas</p> <p><u>Cumulative Impact Source:</u> Reinstatement, Replanting, enhancement planting, maintenance of rush swards, Planting of Deciduous Trees</p> <p><u>Impact Pathway:</u> Land cover Change</p> <p><u>Impact Description:</u> With respect to linear features such as treelines and hedgerow, it will be necessary to remove 160m of treeline which includes 17 immature trees and 1 mature tree at the Mountphilips Substation site entrance to widen the entrance and provide sightlines. These will be reinstated by planting the equivalent amount of hedgerow and/or trees behind the new sightlines. It will be necessary to remove 40m of hedgerow which includes 11 immature trees to build the new permanent access road. New hedgerow, c.700m in length, will be planted on the berms on either side of the new permanent access road between the Site Entrance and Mountphilips Substation and around Mountphilips Substation; the sides of the berms will be seeded with native grass and wildflower species, for the benefit of biodiversity in the area. All new hedging will be locally sourced native fruiting hedgerow species, and the replacement trees will be native hedgerow species and at least 10 years old.</p> <p>The planting of equivalent deciduous forestry for lower ecological value conifer plantation, as UWF Replacement Forestry, in addition the use of locally sourced native hedgerow and tree species in all landscaping and reinstatement will constitute a land cover change to higher value habitat for general birds.</p> <p>In addition the management measures as part of the Upperchurch Hen Harrier Scheme such as the maintenance of rush swards, enhancement and planting of hedgerows and riparian habitat, and promotion of semi-natural habitat will increase habitat quality for ground nesting birds such as Meadow Pipit and Skylark, and general birds of open countryside – this will have secondary positive effects not only on Hen Harrier but additionally other raptor species which may be present such as Kestrel.</p> <p>It is likely that the above will result in a net gain to overall bird diversity - with the duration being permanent in the case of the UWF Grid Connection and UWF Replacement Forestry, and at least long term in the case of the UWF Related Works, Upperchurch Hen Harrier Scheme and Upperchurch Windfarm.</p> <p><u>Impact Quality:</u> Positive</p>	
Evaluation of the Subject Development Impact – General Birds: Habitat Enhancement	
Element 1: UWF Grid Connection – direct/indirect impact	
<p><u>Impact Magnitude:</u></p> <p>At Mountphilips Substation site, the hedgerow/trees at the site entrance will be removed, and a new hedgerow with semi-mature trees will be planted behind the new sightlines.</p> <p>Habitat enhancement will comprise of 700m of new native species hedgerow will be planted alongside the new permanent access road between Mountphilips Substation Site Entrance and the new Mountphilips Substation, and the establishment of native grass and wildflower species along the sides of the berms along the new permanent access road and on the berms around Mountphilips Substation.</p>	
<u>Significance of the Impact: Slight (positive)</u>	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The benefit to bird diversity, and; • The positive minor contrast with emerging trends in respect of land management and existing land cover, and; • The permanent duration, and; 	

General Bird Species	<ul style="list-style-type: none"> The low reversibility with these enhancement features being part of the design of the operational UWF Grid Connection.
	Element 1: UWF Grid Connection – cumulative impact
	<p><u>Cumulative Impact Magnitude:</u> No cumulative effect will occur due to habitat enhancement in combination with the Other Elements due to the separation distance (c.22km) between the habitat enhancement at Mountphilips and the habitat enhancement associated with UWF Replacement Forestry, UWF Related Works, Upperchurch Windfarm and the Upperchurch Hen Harrier Scheme (UWF Other Activities). At this distance there will be no overlap in breeding territories, or local populations.</p>
	<p><u>Significance of the Cumulative Impact:</u> No Cumulative Impact</p>
Sensitive Aspect	<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> The benefit to bird diversity, and; The contrast with emerging trends in respect of land management and land cover, and; The duration which is long term to permanent, and; The low reversibility.
	Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project
	Element 2: UWF Related Works
	<p><u>Impact Magnitude:</u> Equivalent lengths of native hedgerow and native trees will be replanted in lieu of hedgerow removal. In addition, c.370m of new hedgerow will be planted alongside the Realigned Windfarm Road RWR2.</p>
Biodiversity	<p><u>Significance of the Impact:</u> Imperceptible (positive)</p>
	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> The benefit to bird diversity, and; The contrast with emerging trends in respect of land management and land cover, and; The duration which is long term to permanent, and; The low reversibility.
	Element 3: UWF Replacement Forestry
	<p><u>Impact Magnitude:</u> In total, 4Ha of mixed species, native woodland will be created, at the UWF Replacement Forestry lands (6ha in area) which will comprise tall trees and understorey shrubs, along with wide ride lines, and a mix of tall grasses and scrub land cover maintained during the growth stage. The existing riparian habitat will be enhanced through the planting of Hazel, Alder and Willow species, and protected through the placement of fencing.</p>
Topic	<p><u>Significance of the Impact:</u> Slight (positive)</p>
	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> The benefit to bird diversity, and; The contrast with emerging trends in respect of land management, and; The permanent duration, and; The low reversibility with proposed enhancement already incorporated into project design.
	Element 4: Upperchurch Windfarm
	<p><u>Impact Magnitude:</u> The planting of 360m of new hedgerow using native species, and the enhancement of existing hedgerows with native species will constitute a land cover change to a higher value habitat for general birds.</p>

Significance of the Impact: Imperceptible (positive)
<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> The benefit to bird diversity, and; The low reversibility with proposed enhancement already incorporated into project design.
Element 5: UWF Other Activities
<u>Impact Magnitude:</u> The Upperchurch Hen Harrier scheme will result in 2.2Ha of trees, 1.4km of riparian habitat and 2.8km of new hedgerow being enhanced or created during initial activities. In total 128Ha of agricultural lands will be managed. The measures to be incorporated such as planting of scrub along riparian corridors, management of rush coverage, reductions in stocking levels, limiting of drainage, fertilizing, burning or hedgerow removal will constitute a land cover change to a higher value habitat for general birds.
Significance of the Impact: Significant (positive)
<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> The benefit to bird diversity, and; The contrast with emerging trends in respect of land management, and; The duration proposed for management, and; The low reversibility with proposed enhancement already consented
Evaluation of Other Cumulative Impacts – General Birds: Habitat Enhancement
Whole UWF Project Effect
<u>Magnitude:</u> Instances of enhancement, and management of habitat specifically for the benefit of birds will occur as part of the UWF Grid Connection, UWF Related Works, UWF Replacement Forestry (by design), and Upperchurch Windfarm. Cumulative positive effects may accrue due to the proximity of the UWF Replacement Forestry to the Upperchurch Hen Harrier Scheme.
Significance of the Whole Project Effect: Slight (positive)
<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> The benefit to bird diversity, and; The minor positive contrast with emerging trends in respect of land management and land cover, and; The duration which is long term to permanent, and; The low reversibility.

Note: No cumulative evaluation of Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to General Bird Species with either the UWF Grid Connection or the Other Elements of the Whole UWF Project (see Section 8.7.2.1).

8.7.4.6 Description and Rationale for Excluded (scoped out) Impacts

The source-pathway-receptor links and the rationale for impacts excluded from the Impact Evaluation Table sections are described in Table 8-59 below.

Table 8-59: Description and Rationale for Excluded Impacts to General Bird Species

Key: 1: UWF Grid Connection; 2: UWF Related Works; 3: UWF Replacement Forestry; 4: Upperchurch Windfarm; 5: UWF Other Activities

Source(s) of Impacts	Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
Construction Stage / Planting Stage				
Noise and human activity	1,2,3,4,5	Air and Visibility	Disturbance/ displacement of Meadow Pipit	<u>Meadow Pipit</u> : Evaluated as Excluded - Meadow Pipit are not considered to be particularly susceptible to impacts from wind farms (SNH, 2014) – including construction stage disturbance. Studies on the impacts of wind farms during both construction (Pearce-Higgins <i>et al.</i> 2012 ³⁴) and operation (Pearce-Higgins <i>et al.</i> 2009 ³⁵) have found little evidence of significant disturbance effects on this species. Therefore, it is considered that neither UWF Grid Connection nor the Whole UWF Project are likely to cause significant impacts to this species.
Land take	1,2,3,4,5	Land cover	Habitat Loss (Merlin, Peregrine, Red Grouse, Eurasian Curlew)	Merlin: Evaluated as Excluded - No Habitat Loss from Elements (1, 2, 3, 4, 5) including Overhead Line Activities as part of 'UWF Other Activities'
	1,2,3,4,5			Red Grouse: Evaluated as Excluded - No Habitat Loss from Elements (1, 2, 3, 4, 5) including Overhead Line Activities as part of 'UWF Other Activities'
	1,2,3,4,5			Peregrine: Evaluated as Excluded - No Habitat Loss from Elements (1, 2, 3, 4, 5)
	1,2,3,4,5			Eurasian Curlew: Evaluated as Excluded - No evidence of Curlew within the study areas for Elements 1, 2, 3, 4, 5 was noted. Furthermore, it is considered that no currently suitable breeding habitat will be subject to land cover change as a result of the Whole UWF Project. Furthermore, there will be no loss of suitable habitat in relation to element 1. No habitat loss from Other Elements including Overhead Line Activities as part of 'UWF Other Activities'.
	1		Habitat Loss (Kingfisher, Grey Wagtail, Dipper)	Evaluated as Excluded – Kingfisher, Grey Wagtail and Dipper were only recorded within the UWF Grid Connection Study Area. Instream works are limited to the Mountphilips Substation site where no suitable habitat occurs. Along the 110kV UGC route, culvert replacement works will not affect the bank or bed of the watercourse either upstream or downstream of the crossing point, with works limited to the replacement of the existing structure, with all works carried out from

³⁴ Greater Impacts of wind farms on bird populations during construction than subsequent operation: results of a multi-site and multi-species analysis. Pearce-Higgins, J.W., Stephen, L., Douse, A., Langston, R.H.W. s.l. : Journal of Applied Ecology, 2012, Vol. 49, pp. 386-394

³⁵ The distribution of breeding birds around upland wind farms. Pearce-Higgins, J.W., Leigh, S., Langston, R.H.W., Bainbridge, Ian.P., Bullman, R. s.l. : Journal of Applied Ecology, 2009, Vol. 46, pp. 1323-1331.)

Source(s) of Impacts	Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)	General Bird Species
				<p>the road pavement above, therefore any impacts will be Neutral.</p> <p>In relation to UWF Related Works, Kingfisher, Grey Wagtail or Dipper were not identified in any surveys. Watercourse crossing works will occur at 32 locations. However any effects will be Neutral given the absence of records of these species, the temporary duration of works, and the reinstatement of the watercourse in accordance with project design and best practice measures.</p> <p>No instream works associated with Upperchurch Windfarm or UWF Replacement Forestry or UWF Other Activities, therefore no potential for habitat loss from these Elements.</p>	
	1,2,3,4,5	Visibility	Disturbance/ Displacement (General Birds, Red Grouse, Merlin, Eurasian Curlew, Peregrine, Barn Owl)	<u>General Birds</u> : Most passerine (perching) species and general lowland farmland birds are not considered to be particularly susceptible to impacts from wind farms (SNH, 2014) – including construction stage disturbance. Studies on the impacts of wind farms during both construction (Pearce-Higgins <i>et al.</i> 2012) and operation (Pearce-Higgins <i>et al.</i> 2009) have found little evidence of significant disturbance effects on passerine species.	
	1,2,3,4,5			<u>Red Grouse</u> : Evaluated as Excluded - No habitat loss from Whole UWF Project Elements 1, 2, 3, 4, 5 including Overhead Line Activities as part of 'UWF Other Activities'.	
	1,2,3,4,5			<u>Merlin</u> : Evaluated as Excluded - Low numbers of wintering birds will not be measurably affected by the scale of visual intrusion or disturbance. This includes Overhead Line Activities as part of 'UWF Other Activities'.	
	1,2,3,4,5			<u>Eurasian Curlew</u> : No Eurasian Curlew recorded within the study areas for Elements 1, 2, 3, 4, 5.	
	1,2,3,4,5			<u>Peregrine</u> : Evaluated as Excluded - Low numbers of wintering birds will not be measurably affected by the scale of visual intrusion or disturbance. This includes Overhead Line Activities as part of 'UWF Other Activities'.	
	1			<u>Barn Owl</u> are excluded as no birds were recorded within 50m of works, and works will take place during daylight hours only. Also evaluated as Excluded from cumulative effects as these species were not identified during UWF Related Works/Upperchurch Windfarm surveys, only recorded in relation to element 1.	
Move-ment of machinery and soils,	1,2,4,5	Direct Contact	Physical injury/destruction of nests or chicks – General Birds, Dipper, Grey Wagtail, Barn Owl	Evaluated as Excluded – General Birds; In relation to UWF Grid Connection, including vegetation clearance and tree felling at Mountphilips Substation site will occur outside the bird nesting season; Effects on ground nesting birds including Meadow Pipit from works such as cable trenching (UWF Related Works only) will be overseen by Project Ecologist and therefore effects will be Neutral.	Biodiversity
Hedge-row trimming	1, 2, 4				

General Bird Species

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General Bird Species	Source(s) of Impacts	Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
	, tree felling				Dipper, Grey Wagtail and Barn Owl; Evaluated as Excluded- In relation to UWF Grid Connection , Neutral effects due to limited extent of works, separation distance to potential breeding sites, supervision of project ecologist and project design measures. In relation to UWF Related Works, no likely effects as these species were not identified during UWF Related Works surveys, (only recorded in relation to element 1). No instream works associated with Elements 3, 4, 5. Therefore no potential to cause physical injury or destruction of nests or chicks. No works in buildings (where Barn Owl could nest) associated with any of the Elements.
	Forestry felling	2, 4			
Sensitive Aspect	Operational Stage / Growth Stage				
	Maintenance Noise/ Visual intrusion	1,2,3,4,5	Air and Visibility	Disturbance/ displacement – (Meadow Pipit, Golden Plover, Eurasian Curlew, Red Grouse, Merlin, Peregrine, Kingfisher, Dipper Grey Wagtail, Barn Owl	Meadow Pipit: Evaluated as Excluded; Neutral disturbance/displacement effects are expected due to maintenance activities because all maintenance works will be carried out from hardcore surfaces (Elements 1, 2, 3, 4), from public road (Elements 1,5), or on foot (Elements 2,3,5).
Golden Plover: Evaluated as Excluded - Neutral disturbance/displacement effects are expected due to maintenance activities because all maintenance works will be carried out from hardcore surfaces (Elements 1, 2, 3, 4), from public road (Elements 1,5), or on foot (Elements 2,3,5).					
Eurasian Curlew: Evaluated as Excluded; Neutral effects predicted due to lack of birds in area.					
Red Grouse: Evaluated as Excluded; Neutral effects predicted due to lack of birds in area.					
Merlin: Evaluated as Excluded; Neutral effects predicted due to lack of birds in area.					
Peregrine: Evaluated as Excluded; Neutral effects predicted due to lack of birds in area.					
Kingfisher, Dipper, Grey Wagtail and Barn Owl; Evaluated as Excluded as operational maintenance is unlikely to result in any works contrasting to baseline conditions.					
Biodiversity	Decommissioning Stage				
	Noise and human activity	2,4,5	Air, Visibility	Disturbance/Dis placement Mortality of ground nesting birds – Meadow Pipit	Meadow Pipit: Evaluated as Excluded as there are no decommissioning activities associated with either the UWF Grid Connection or UWF Replacement Forestry, and very minor decommissioning activities associated with the UWF Related Works, Upperchurch Windfarm or UWF Other Activities. In relation to Upperchurch Windfarm (Element 4), Activities will only take place at existing hard stand locations within Upperchurch Windfarm, will be temporary in duration, reversible, and occur primarily in habitats of low value for Meadow Pipit. Studies on the
Topic					

Source(s) of Impacts	Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)	General Bird Species
				impacts of wind farms during both construction (Pearce-Higgins <i>et al.</i> 2012) and operation (Pearce-Higgins <i>et al.</i> 2009) have found little evidence of significant disturbance effects on passerine species. This is also applicable to decommissioning.	
			Disturbance/ Displacement (Golden Plover, Eurasian Curlew, Red Grouse, Merlin)	Golden Plover: Evaluated as Excluded - as there are no decommissioning activities associated with either the UWF Grid Connection or UWF Replacement Forestry, and very minor decommissioning activities associated with the UWF Related Works or UWF Other Activities. No Golden Plover were recorded in studies for Upperchurch Windfarm (Element 4), and decommissioning activities will be relatively small in scale and occur from hardstand areas.	
				Eurasian Curlew: Evaluated as Excluded; Neutral effects predicted due to lack of birds in area.	
				Red Grouse: Evaluated as Excluded; Neutral effects predicted due to lack of birds in area.	
				Merlin: Evaluated as Excluded - as there are no decommissioning activities associated with either the UWF Grid Connection or UWF Replacement Forestry, and no significant decommissioning activities associated with the UWF Related Works or UWF Other Activities. Decommissioning (4) is not likely to affect Merlin due to low numbers of wintering Merlin in the area.	

General Bird Species	<p>8.7.5 Mitigation Measures for Impacts to General Bird Species</p> <p>Mitigation measures were incorporated into the UWF Grid Connection project design including the Project Design Measures. No <u>additional</u> mitigation measures are required as the topic authors conclude that significant impacts are not likely to occur to occur to General Bird Species as a consequence of the UWF Grid Connection.</p>
	<p>8.7.6 Evaluation of Residual Impacts to General Bird Species</p> <p>Residual Impacts are the final or intended effects that will occur after mitigation measures have been put into place. No additional mitigation measures are required and thus the Residual Impact is the same as the Impact set out in Impact Evaluation Table sections for General Bird Species above (Section 8.7.4) – i.e. no significant adverse impacts.</p>
Sensitive Aspect	<p>8.7.7 UWF Grd Connection Environmental Management Plan</p> <p>The Project Design measures will be implemented by the Project Manager and the main Contractor during the construction stage, under the Environmental Management Plan for the UWF Grid Connection (EMP). The EMP is appended to this EIA Report as Volume D.</p> <p>The EMP will be an important contract document for the main construction contractor (Contractor) who will be contractually obliged to comply with the EMP. An Environmental Clerk of Works will be appointed, who will be independent of the construction Contractor, and it will be the responsibility of the Environmental Clerk of Works to monitor the compliance of the Contractor with the EMP through liaising with the Construction Site Manager and the Project Manager, monitoring construction works on a daily basis and by carrying out regular audits on EMP compliance. The Environmental Clerk of Works will be resourced to employ a team of environmental specialists including a Site Ecologist, Site Hydrologist and a Invasive Species Specialist.</p>

Biodiversity

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8.7.8 Summary of Impacts to General Bird Species

A summary of the Impact to General Bird Species is presented in Table 8-60.

Table 8-60: Summary of the impacts to General Bird Species

Impact to General Bird Species:	Meadow Pipit: Habitat Loss	Golden Plover: Habitat Loss	Golden Plover: Disturbance /Displacement	Kingfisher, Grey Wagtail & Dipper: Disturbance /Displacement	General Birds: Habitat Enhancement
<i>Evaluation Impact Table</i>	<i>Section 8.7.4.1</i>	<i>Section 8.7.4.2</i>	<i>Section 8.7.4.3</i>	<i>Section 8.7.4.4</i>	<i>Section 8.7.4.5</i>
Project Life-Cycle Stage	Construction	Construction	Construction	Construction	Construction
<u>UWF Grid Connection</u> <i>Direct/indirect impact</i>	Not Significant	Imperceptible	Not Significant	Imperceptible	Slight (positive)
<u>UWF Grid Connection</u> <i>Cumulative impacts</i>	No Cumulative Impact	No Cumulative Impact	Not Significant	Imperceptible	No Cumulative Impact
Element 2: UWF Related Works	Not Significant	Imperceptible	Not Significant	Neutral	Imperceptible (positive)
Element 3: UWF Replacement Forestry	Slight	Slight	Neutral	Neutral	Slight (positive)
Element 4: Upperchurch Windfarm	Slight	Neutral	Neutral	Neutral	Imperceptible (positive)
Element 5: UWF Other Activities	Moderate (positive)	Neutral	Neutral	Neutral	Significant positive
<u>Cumulative Impact:</u>					
All Elements of the Whole UWF Project	Slight	Imperceptible	Not Significant	Imperceptible	Slight (positive)

General Bird Species

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The greyed out boxes in the above summary table relate to the cumulative information for the Other Elements of the Whole UWF Project, which are included to show the totality of the project.

Note: No cumulative information for Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to General Bird Species with either the UWF Grid Connection or the Other Elements of the Whole UWF Project (see Section 8.7.2.1).

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8.8 Sensitive Aspect No.7: Bats

This Section provides a description and evaluation of the Sensitive Aspect - Bats.

Nick Marchant, Jennifer Pearson, Chris Cullen and Howard Williams were the main authors of this Section. Please see Sources of Information (Section 8.1.7) and Methodology (Section 8.1.8) for details of the desktop and fieldwork surveys which have informed the evaluation of Bats.

8.8.1 BASELINE CHARACTERISTICS of Bats

8.8.1.1 STUDY AREA for Bats

The study area for Bats in relation to the UWF Grid Connection is described in Table 8-61 and illustrated on **UWF Grid Connection Study Area for Bats (Overview and Maps 1 to 2)** (Volume C3 EIAR Figures).

Table 8-61: UWF Grid Connection Study Area for Bats

Study Area for Bats	Justification for the Study Area Extents
<ul style="list-style-type: none"> Buildings within 150m of the construction works area boundary Mature trees within 50m of the construction works area boundary; Linear vegetation features (e.g. hedgerows) of high suitability for foraging bats within the construction works area boundary; Bridges within the construction works area boundary and along material haulage routes on the local road network between the concrete/stone suppliers and the works locations. 	<p>Professional Judgement and as per Best Practice:</p> <p>Bat Surveys for Professional Ecologists: Good Practice Guidelines, Collins, (2016),</p> <p>The Conservation of Bats in Bridges Project – A Report on the survey and conservation of bat roosts in bridges in Cumbria, Billington and Norman (1997),</p> <p>Kelleher, C. & Marnell, F. (2006) Bat Mitigation Guidelines for Ireland. Irish Wildlife Manuals, No. 25. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland,</p>

8.8.1.2 Baseline Context and Character of Bats in the UWF Grid Connection Study Area

The UWF Grid Connection will provide a new substation and connection to the existing overhead lines at Mountphilips and new underground cabling between this new Mountphilips Substation and the consented UWF substation at Knockcurraghbola Commons. Most development will be within public roads (primarily the R503), with a short section crossing agricultural land at the western end (Mountphilips) of the route. The landscape surrounding the UWF Grid Connection is predominantly improved agricultural landscapes and forestry, with hedgerows / treelines along roadsides, in addition to low-density houses and farm buildings.

Desktop Survey of Landscape Suitability

Bats are common and widespread throughout Ireland, and occupy a wide variety of habitats. In a regional context, the following is noted in the (Draft) North Tipperary Biodiversity Plan 2007: *“Many bat species forage in woodland and over water, and the combination of both habitats within North Tipperary makes the area valuable for bat species. Built structures, such as bridges, that occur close to water are of particular value as roosts. Six of Ireland’s bat species are known to occur in North Tipperary: common pipistrelle Pipistrellus pipistrellus, soprano pipistrelle Pipistrellus pygmaeus, Leisler’s bat Nyctalus leisleri, Natterer’s bat Myotis nattereri (records from www.batconservationireland.org), Brown long-eared bat Plecotus auritus and Daubenton’s bat Myotis daubentonii (pers comm. S. Jones, S. Geraghty³⁶)”*. In addition, the author has

³⁶ As cited in the ‘draft North Tipperary Biodiversity Plan 2007’

Bats	<p>recorded Nathusius' pipistrelle <i>Pipistrellus nathusii</i> and whiskered bat <i>Myotis mystacinus</i> in the north Tipperary. Ireland's only other regularly-occurring bat species – the lesser horseshoe bat <i>Rhinolophus hipposideros</i> – can occasionally be found on the Limerick – Tipperary border, but in general the county is just outside the range of this species.</p> <p>Online national landscape suitability maps for Irish bat species (Lundy <i>et al.</i>, 2010) were reviewed using the Map Viewer of the National Biodiversity Data Centre. The suitability index for the 'all bats combined' layer varies across the length of the UWF Grid Connection. Areas of high suitability are found in the environs of Mountphilips at the western end of the UWF Grid Connection, moderate suitability and low suitability in the centre, and moderate suitability at the eastern end. Overall, the landscape suitability follows a consistent west to east pattern of decreasing habitat suitability for all species, with higher suitability in the agricultural pastures near Mountphilips, and lower suitability in the upland areas near Upperchurch Windfarm.</p>
Sensitive Aspect	<p>When considered at the level of individual bat species, the UWF Grid Connection Study Area has high suitability for common pipistrelles and natterer's bat; moderate suitability for soprano pipistrelles, Leisler's bat, whiskered bat, Daubenton's bat, and brown long-eared bats, and negligible suitability for Nathusius' pipistrelles and lesser horseshoe bats.</p> <p>A desktop review of known bat roosts identified no bat roosts in the UWF Grid Connection Study Area.</p> <p>Further information on context such as known roosts identified from desktop review is included in Appendix 8.8: Bat & Non-Volant Mammals Data in Volume C4 EIAR Appendices.</p> <p><u>Buildings with Suitability for Bats</u></p> <p>Preliminary ecological appraisals were carried out for 69 buildings within 50m of the 110kV UGC route (there are no buildings within 50m of Mountphilips Substation). 38 No. of these buildings were of high or moderate roost suitability, and were considered for potential indirect effects (there is no potential for direct effects to roosts within buildings due to the location of 110kV UGC entirely within road pavements – i.e. no works or damage to buildings will occur). To facilitate the cumulative evaluation, it is presumed as worst-case scenario that bats are present at these locations.</p> <p><u>Trees with Suitability for Bats</u></p> <p>Crevices and cavities in mature trees can provide roosting opportunities for bats, with some species (e.g. Leisler's bat) thought to favour roosting sites in trees. Recent research has demonstrated that the use of roosts in trees can be highly transitory, with frequent roost switching between nights and across the season, although some large cavities can be used as maternity or hibernation roosts for longer periods of time. Almost all records to date have been from broadleaf trees (particularly oaks), with only a very small number from specimen conifers, and none from conifer plantations³⁷.</p> <p>Mature trees within 50m of the UWF Grid Connection construction works area were inspected from ground level. At the Mountphilips Substation site 4 no. trees were considered to have low suitability for bats (e.g. small crevices that could be used by individual roosting bats), while 2 no. was considered to have moderate suitability (e.g. multiple or larger crevices that could support multiple roosting bats). Along the 110kV UGC on the public road network 4 no. trees were considered to have low suitability for bats. These trees are classified as having 'potential' for bats, following current BCT Best Practice guidelines (2016), as no presence/absence surveys have been undertaken. In addition, to facilitate the cumulative evaluation, it is presumed as worst-case scenario that bats are present at these locations. All other mature trees within 50m of the construction area boundaries were inspected and evaluated as having negligible roost suitability.</p>
Topic	<p><u>Bridges with Suitability for Bats</u></p>

³⁷ Andrews H & Gardener M 2016. Bat Tree Habitat Key – Database Report 2016. AEcol, Bridgwater

As the 110kV UGC will be installed over/under ca. 65 watercourse crossing structures (i.e. bridges and culverts), all structures along the route were inspected. It is noted that the development will cross 3 other watercourses at Mountphilips Substation site (giving a total of 68 watercourse crossings), but there are no existing structures (bridges or culverts) at these locations. Within the study area, 11 no. watercourse crossing structures (8 bridges and 3 culverts) had moderate suitability for roosting bats, 7 no. watercourse crossing structures (5 bridges and 2 culverts) had low suitability, and 47 had negligible suitability. However, it should be noted that these numbers only refer to the potential suitability of these structures for bats. Bridges with moderate suitability were surveyed by endoscope (with regard to Section 5.3 of the Bat Conservation Trust guidelines 2016) or bat detector survey to determine whether or not bats were using suitable structures. Bat roosts were recorded in two structures: bridges W33 and W44. Both were of a single soprano pipistrelle bat, and thus were considered to be day roosts / satellite roosts, which would be of negligible ecological value. Endoscope surveys were carried out for bridges with low suitability for bats, but no roosting bats were found.

Bridges along material haulage routes from the source quarries (for stone/concrete) and the main entrance for Mountphilips Substation site were surveyed, and were scoped out, because no bridge strengthening / modifications are required at these bridges. It was evaluated that there was no risk to bats at these bridge locations, due to the absence of any bridge works and in the context of the use of the bridge on a daily basis by HGV traffic.

Bat Activity surveys

Bat activity surveys, carried out in the mid-summer period (June-August 2016) and the autumn period (September-October 2016), using automated detectors were carried out at four locations near the Mountphilips Substation site and two locations near the consented UWF Substation. Activity levels (from six sampling locations) were relatively high, with an average of one bat pass every 2 - 3 minutes throughout the survey period (a Bat Activity Index of 23.4). The most frequently-recorded species were common pipistrelles, followed by soprano pipistrelles, *Myotis* spp. and Leisler's bat, in order of abundance. Lesser-horseshoe bats were not recorded. One of the sampling sites was considered to be of County Importance as a feeding areas / commuting route, four to be of Local Important, and one of Negligible Importance. The survey Sampling Locations are identified on Figure GC 8.8.1.

Table 8-62: Bat Activity Sampling Results

<u>Sampling Location</u>	<u>Habitat</u>	<u>Month</u>	<u>Characterisation of activity</u>	<u>Importance Evaluation</u>
SD1	Mature treeline	Jun	Frequent CP, occasional SP	Local
		Sept	Frequent CP, occasional SP & MY	
SD2	Hedgerow	Aug	Frequent CP	Local
		Sept	Occasional CP	
SD3	Hedgerow	Jun	Negligible	Local
		Sept	Frequent SP, occasional CP	
SD4	Hedgerow	Jun	Frequent CP, occasional SP	Local
		Sept	Occasional CP	
SD26**	Farmyard	Jun	Near-constant CP	County
		Sept	Occasional CP	
SD27**	Edge of conifer plantation	Jun	Occasional CP	Negligible
		Sept	Negligible	

** It should be noted that sampling locations SD26 and SD27 are also within the zone of influence of the UWF Related Works, and are discussed in relation to same within Section 8.8.2.3.1 of this report.

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Maps showing the preliminary ecological appraisals of in respect of bats buildings, trees and bridges are provided in [Figure GC 8.8](#). Further bat survey details and data are included in [8.8: Bat & Non-Volant Mammals Data](#) in [Volume C4 EIAR Appendices \(Section A8.8.3\)](#).

8.8.1.3 Importance of Bats

All bat species, and their breeding / resting places, are legally protected in Ireland under the Wildlife Act 1976 (as amended in 2000). The Wildlife Act is the principal national legislation providing for the protection of wildlife and the control of activities which may adversely affect wildlife. For the purpose of the current evaluation, importance levels are as described under Context (above) in respect of both roosts and locations of activity.

All bats are listed on Annex IV of the EU Habitats Directive 92/43/EEC, which was transposed into national law through the European Communities (Natural Habitats) Regulations 1997 (S.I. 94/97) as amended in 1998 (S.I. No. 233/1998), 2005 (S.I. No. 378/2005) and 2011 (SI No. 477/2011). This legislation protects bats both inside and outside of the Natura 2000 site network. Furthermore, lesser horseshoe bat is listed on Annex II of the EU Habitats Directive 92/43/EEC which requires Special Areas of Conservation (SACs) to be designated within the Natura 2000 site network to ensure the maintenance of their conservation status.

The Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention, 1982) ensures that governments take into account the conservation needs of species during the formulation of planning and development policies. It also seeks the protection of endangered species and in relation to bats, it stipulates that all bat species and their habitats are conserved.

8.8.1.4 Sensitivity of Bats

The key sensitivities of bats are the destruction or disturbance of their roosting places, and the modification of their commuting routes and foraging habitats (NPWS 2013, Collins et al., 2016).

During the day, bats roost in man-made structures (typically houses, farm buildings and bridges), mature trees, and caves. They can suffer direct effects due to the destruction or modification of their roosts (e.g. the demolition of a house or felling of a tree), or indirect effects due to disturbance of the area surrounding a roost (e.g. illumination of exit / entry points, or removal of surrounding vegetation). They are most sensitive to effects during their maternity and hibernation periods, which are from May to August and November to March, respectively.

After sunset, bats 'commute' from their roosts to a suitable feeding area, and spend most of the night foraging for insect prey. They typically favour linear habitat features (e.g. hedgerows and forest edges) for commuting and foraging, and usually avoid brightly-lit areas (Lundy et al., 2011). They may travel several kilometres from their roost, and may use different feeding areas on different nights.

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8.8.1.5 Trends in the Baseline Environment (the 'Do-Nothing' scenario)

Under Article 17 of the EC Habitats Directive (European Commission Directive 92/43/EEC), the Irish government is obliged to assess and report on the conservation status of all habitats and species listed in Annexes I, II, IV and V of the directive, including bats. In the latest submission (NPWS 2019), all Irish bat species are considered to be of favourable conservation status. Most bat species are listed as 'least concern' on the all-Ireland red list of mammals (Marnell et al., 2009), including the Nathusius' pipistrelle. Leisler's bat is listed as 'near-threatened' because Ireland supports an internationally-important population, but the overall population status of this species is known to be stable or increasing.

The abundance of Irish bats is monitored by Bat Conservation Ireland (Roche et al., 2012) using annual public surveys such as the 'Car-Based Monitoring Scheme', the 'All-Ireland Daubenton's Bat Waterways Survey', and roost monitoring assessments for brown long-eared bats and lesser horseshoe bats. In combination, these projects monitor all Irish species except Natterer's bat and whiskered bat. **To date the populations of all monitored species appear to be stable or increasing.**

If the development does not proceed, the site is expected to remain in the baseline condition and to be used by bat species on an occasional to regular basis. Based on the national trends of these species, the abundance of bats in the surrounding landscape is expected to remain stable, or to increase at a slow rate.

8.8.1.6 Receiving Environment (the Baseline + Trends)

As the conservation status of all Irish bat species is considered to be stable, it is expected that the baseline levels of bat activity will not change significantly by the time of construction of the project.

8.8.2 CUMULATIVE INFORMATION - Cumulative Projects & Baseline Characteristics

8.8.2.1 Cumulative Evaluation Study Areas

8.8.2.1.1 UWF Grid Connection Cumulative Evaluation Study Area

The UWF Grid Connection was evaluated for cumulative effects with other projects and the study area is set out in the table below.

UWF Grid Connection Cumulative Evaluation Study Area for Bats	Justification for the Study Area Extents
300m of the UWF Grid Connection construction works area boundary	The increased distance facilitates the identification of other Elements or Other Projects or Activities which will be carried out within 150m of an identified potential bat roost in a building or tree or potential feeding area (in any directions) / commuting route affected by UWF Grid Connection. Beyond 150m from roosts, it is considered that cumulative effects to bats will be negligible.

The study is illustrated on **Figure CE 8.8: UWF Grid Connection Cumulative Evaluation Study Area for Bats (Overview and Maps 1 to 2)**.

8.8.2.1.2 Whole Project Cumulative Evaluation Study Area

UWF Grid Connection is part of a whole project which comprises the following Other Elements; Element 2: UWF Related Works, Element 3: UWF Replacement Forestry, Element 4: Upperchurch Windfarm (UWF), and Element 5: UWF Other Activities. The Subject Development, UWF Grid Connection is Element 1. All five elements are collectively referred to as the Whole UWF Project in this EIA Report.

The Other Elements must be considered because UWF Grid Connection is part of a whole project. Therefore, the cumulative information and evaluations for the Other Elements of the Whole UWF Project are included in order to present the totality of the project.

A description of these Other Elements is included in this EIA Report at **Appendices 5.3, 5.4, 5.5 and 5.6**, in **Volume C4 EIAR Appendices**. Scoping of these Other Elements is presented in **Section 8.8.2.2.1** below.

The Whole Project Cumulative Evaluation Study Area comprises of the UWF Grid Connection Study Area along with the study areas for Other Elements which are described in Table 8-63 and illustrated on **Figure WP 8.8: Whole Project Study Area for Bats (Overview and Maps 1 to 2)** (Volume C3 EIAR Figures).

Table 8-63: Whole Project Cumulative Evaluation Study Area for Bats

Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
Element 1: UWF Grid Connection	<ul style="list-style-type: none"> Buildings within 150m of Element construction works areas or activity locations Mature trees within 50m of Element construction works areas or activity locations; Hedgerow severance locations Bridges within construction works locations or along concrete/aggregate haulage routes for Elements of the Whole UWF Project. 	Professional Judgement and as per Best Practice:
Element 2: UWF Related Works		Bat Surveys for Professional Ecologists: Good Practice Guidelines, Collins, (2016), and
Element 3: UWF Replacement Forestry		
Element 4: Upperchurch Windfarm (UWF)		The Conservation of Bats in Bridges Project – A Report on the survey and conservation of bat roosts in bridges in Cumbria, Billington and Norman (1997).
Element 5: UWF Other Activities		

8.8.2.2 Scoping of Other Elements, Other Projects or Activities & for Potential for Impacts

The evaluation of cumulative impacts to Bats also considered Other Projects or Activities. A scoping exercise was carried out to determine which projects or activities, if any, have potential to cause cumulative effects to Bats with either the UWF Grid Connection or the Other Elements of the Whole UWF Project and therefore should be brought forward for evaluation in this topic chapter. A brief overview of the Other Projects or Activities and the scoping exercise by the topic authors is included in **Appendix 2.1: Scoping of Other Projects or Activities for Cumulative Evaluations (Section A2.1.4.10)**.

The results of this scoping exercise are that: it is evaluated that no Other Projects or Activities are likely to cause cumulative effects with either the UWF Grid Connection or the Other Elements of the Whole UWF Project, and therefore no Other Projects or Activities are scoped in for evaluation of cumulative effect to Bats.

8.8.2.2.1 Potential for Impacts to Bats

An evaluation was carried out by the topic authors of the likelihood for the Other Elements of the Whole UWF Project to cause cumulative effects to the Sensitive Aspect Bats. The results of this evaluation are included in Table 8-64.

The location of, and study area boundary associated with, the Other Elements which are included for cumulative evaluation is illustrated on **Figure WP 8.8**. The baseline character of the areas around these Elements is described in Section 8.8.2.3.

Table 8-64: Results of the Evaluation of the Other Elements of the Whole UWF Project

<u>Other Element of the Whole UWF Project</u>	
Element 2: UWF Related Works	<u>Included</u> for the evaluation of cumulative effects
Element 3: UWF Replacement Forestry	<p><u>Evaluated as excluded</u>: No potential for effects due to no sources of impacts – During surveys, no bat roosts were recorded at the UWF Replacement Forestry lands, one low suitability feature was recorded within 150m of the existing entrance to the afforestation lands,</p> <ul style="list-style-type: none"> • There is no potential for destruction or disturbance of bat roosts in trees, as there is no requirement to fell or prune trees for the UWF Replacement Forestry, no requirement to upgrade bridge structures, and no requirement for renovations, alterations or use of buildings during either the planting or growth stages, therefore there is no source of impact; • No potential for severance of commuting routes or feeding area, as there is no requirement to remove any hedgerows or other linear features for the UWF Replacement Forestry. Woodland edge habitat will be created for foraging bats, as the UWF Replacement Forestry matures; • No potential for disturbance effects due to lighting, as lighting will not be required for the UWF Replacement Forestry, • No potential for disturbance or displacement effects due to noise or vibration as no significant sources of noise and no sources of vibration will be present onsite during planting or management activities • No potential for mortality of bats due to collision due to the absence of moving structures, • No potential for effects due to harvesting, as the UWF Replacement Forestry will be a permanent woodland and will not be harvested.
Element 4: Upperchurch Windfarm (UWF)	<u>Included</u> for the evaluation of cumulative effects

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Element 5: UWF Other Activities	<u>Included</u> for the evaluation of cumulative effects
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8.8.2.3 Cumulative Information: Baseline Characteristics – Context & Character

8.8.2.3.1 Element 2: UWF Related Works

Online national landscape suitability maps for Irish bat species (Lundy *et al.*, 2010) were reviewed and indicate that the suitability index for the 'all bats combined' layer is moderate within the environs of UWF Related Works. When considered at the level of individual bat species, the UWF Related Works Study Area has high suitability for common pipistrelles; moderate suitability for soprano pipistrelles, Leisler's bat, Whiskered Bat and Natterer's bat, low suitability for Daubenton's and brown long-eared bats, and negligible suitability for Nathusius' pipistrelles and lesser horseshoe bats.

Field Survey Results – UWF Related Works Study Area:

In addition to desktop studies, field surveys were used to gather further information on bats in the UWF Related Works area, and comprised surveys of buildings, bridges, trees, and hedgerows and other linear features. Preliminary ecological appraisals were carried out for buildings, bridges and trees in order to determine their suitability for Bats. The methodology for determining the suitability of a building/bridge/tree for Bats is described in Section 8.1.8 of the Introductory section of Chapter 8.

Roosts in Buildings: Preliminary ecological appraisals were carried out in 2016 and 2017 of all buildings (35 no.) within the study area. All buildings were assigned a suitability category of negligible, low, moderate or high suitability, based on the age and condition of structural features used by roosting bats (e.g. roof tiles, attic spaces, soffit / fascia boards, walls). The aim of the assessments was to identify any buildings of high or moderate roost suitability that were at risk of direct or indirect effects, in order to identify priorities for further survey.

28 no. buildings were considered to have negligible or low suitability for bat roosts. 7 no. buildings were considered to have moderate or high suitability, and presence / absence surveys and/or roost characterisation surveys were carried out at these buildings in July/August 2017 to cover the maternity period.

Four bat roosts were identified, all of which were located in dwelling houses and farm buildings. None of the roosts were located within the construction area boundaries. Two roosts are of County Importance, with the closest located 5m from the UWF Related Works construction works area. One roost is of Local importance, located 130m from the construction works area, and another is of Negligible importance.

Table 8-65: Identified Bat Roosts in the UWF Related Works study area

<u>Code</u>	<u>Type</u>	<u>Evidence of bats</u>	<u>Valuation</u>	<u>Proximity to UWF Related Works construction works area boundary</u>
BR14	Dwelling house	Day roost / satellite roost: 1 common pipistrelle	Negligible	15m
BR15	Dwelling house and traditional farm buildings	Maternity roost: 50 - 60 common pipistrelles Maternity roost: 5 soprano pipistrelles.	Local	130m
BR16	Dwelling house and traditional farm buildings	Maternity roost: 4 - 5 natterers bats. Transitional / mating roosts: 5 - 10 natterers bats, 20 common pipistrelles, 3 brown long-eared bats. Summer non-breeding / day roost: 2 common pipistrelles, 1 Leisler's bat. Hibernation roost: natterer's bats, common pipistrelles, Leisler's bat.	County	10m

<u>Code</u>	<u>Type</u>	<u>Evidence of bats</u>	<u>Valuation</u>	<u>Proximity to UWF Related Works construction works area boundary</u>
BR17	Dwelling house	Maternity roost: 2 – 3 natterers bats	County	5m

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Roosts in Bridges

7 no. bridges / culverts were identified within the construction works area boundary, with none along the material haulage routes on the local road network between the Upperchurch Windfarm main site entrance off the regional road in Shevry and the UWF Related Works locations.

All bridges / watercourse crossing structures were evaluated as having negligible suitability for bats, so no additional bat surveys (e.g. preliminary roost appraisal or presence / absence surveys) were required.

Bridges along material haulage routes from the source quarries (for stone/concrete) and the main entrance for Upperchurch Windfarm were surveyed, and were scoped out, because no bridge strengthening / modifications are required at these bridges. It was evaluated that there was no risk to bats at these bridge locations, due to the absence of any bridge works and in the context of the use of the bridge on a daily basis by HGV traffic.

Roosts in Mature Trees

All trees within 50m of the construction works area were evaluated as having negligible suitability for bats, so no additional bat surveys (e.g. preliminary roost appraisal or presence / absence surveys) were required.

Activity

Bat activity surveys were carried out using automated bat detectors at two sampling locations within the study area, covering both the summer and autumn periods. This method was selected in preference to transect surveys, because automated detectors sample activity throughout the night (transect surveys typically only cover the post-emergence period), and because they allow comparative analyses between multiple sites that are sampled concurrently.

Activity levels were relatively high, with an average of one bat pass every three minutes throughout the survey period (a Bat Activity Index of 20.8). The only species recorded in significant numbers was the common pipistrelle; all other species had negligible activity. Lesser-horseshoe bats were not recorded. One habitat feature was considered to be of County Importance as a commuting route / feeding area.

Table 8-66: Bat Activity Sampling Results in the UWF Related Works study area

<u>Site</u>	<u>Habitat</u>	<u>Month</u>	<u>Characterisation of activity</u>	<u>Ecological value</u>
SD26	Farmyard	Jun	Near-constant CP	County
		Sept	Occasional CP	
SD27	Edge of conifer plantation	Jun	Occasional CP	Negligible
		Sept	Negligible	

8.8.2.3.2 Element 3: UWF Replacement Forestry

Not applicable –Element evaluated as excluded. See Section 8.8.2.2.1

8.8.2.3.3 Element 4: Upperchurch Windfarm

Preliminary ecological appraisals were carried out for 7 buildings within the study area, and presence / absence surveys and/or roost characterisation surveys were carried out in 2016 and 2017 for features of high or moderate roost suitability that were considered to be at risk of direct or indirect effects.

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One bat roost of County Importance is located within farm buildings at Site Compound No.2, which is associated with the Upperchurch Windfarm, and therefore overlaps the construction works area directly. A further day roost/satellite roost of negligible importance is also present 15m from the construction works area within another part of the Upperchurch Windfarm.

Table 8-67: Identified Bat Roosts in the Upperchurch Windfarm study area

<u>Code</u>	<u>Type</u>	<u>Evidence of bats</u>	<u>Valuation</u>	<u>Proximity to Upperchurch Windfarm</u>
BR14	Dwelling house	Day roost / satellite roost: 1 common pipistrelle	Negligible	15m
BR16	Dwelling house and traditional farm buildings	Maternity roost: 4 - 5 natterers' bats. Transitional / mating roosts: 5 - 10 natterers bats, 20 common pipistrelles, 3 brown long-eared bats. Summer non-breeding / day roost: 2 common pipistrelles, 1 Leisler's bat. Hibernation roost: natterer's bats, common pipistrelles, Leisler's bat.	County	0m

Activity

Activity surveys for the Upperchurch Windfarm were carried out by Malachy Walsh & Partners in 2012 and 2013, and the results were presented in the wind farm EIS. Some excerpts from the bat report are provided below:

"The results of bats surveys indicate that up to seven species of bat are utilising habitats within the study area or are commuting through the site to more suitable habitat in the greater area.

Throughout the site common pipistrelles and soprano pipistrelles were recorded on the edge of woodland, along access tracks, hedgerows, treelines, over areas of scrub, semi-natural grassland and improved agricultural grassland. Common pipistrelle was the most common species recorded during surveys in 2012 and 2013."

Consideration of the Passage of Time: the composition of suitable roosting and foraging habitat for bat species on the Upperchurch Windfarm site, has not materially changed since 2012/2013, and surveys for UWF Related Works confirmed continued usage of suitable habitats by bat species, of which pipistrelles remained the most abundant species. Therefore, it is considered that the descriptions in the 2013 and 2014 documents for Upperchurch Windfarm remain relevant to the cumulative evaluations in this 2019 EIAR for UWF Grid Connection.

8.8.2.3.4 Element 5: UWF Other Activities

Due to the absence of possible sources of hedgerow severance in respect of UWF Other Activities (only minimal trimming of outer branches is planned) activity surveys to inform an appraisal of likely effects were not required

Roosts: No bat roosts were present. Trees at hedgerow trimming locations as part of Haul Route Activities are not suitable for roosting bats. No trimming is required for Overhead Line Activities.

8.8.2.3.5 Other Projects or Activities

Not applicable – No Other Projects or Activities were scoped in for evaluation of cumulative effects, see Section 8.8.2.1.

8.8.3 PROJECT DESIGN MEASURES for Bats

At the conception of the UWF Grid Connection, the design team evaluated the potential for significant impacts to the environment. Impacts will only take place where three components exist together; (1) the source of the impact (project), (2) the receptor of the impact (sensitive aspect) and (3) a pathway between the source and the sensitive aspect. The objective of mitigation measures is to avoid, prevent or reduce, one of the three components of an impact by choosing an alternative location, alternative design or an alternative process.

Potential or likely significant impacts were avoided, prevented or reduced by integrating mitigation measures into the fundamental design of the development – these are the Project Design Environmental Protection Measures, which are shortened to ‘Project Design Measures’ in this EIA Report.

The development as evaluated in the EIA Report incorporates the Project Design Measures.

The Project Design Measures outlined in Table 8-68 are relevant to the Environmental Factor, Biodiversity, and in particular to the sensitive aspect **Bats**.

Table 8-68: UWF Grid Connection Project Design Measures relevant to Bats

PD ID	Project Design Environmental Protection Measure (PD)
PD57	All excavation works will take place in line with protective measures required to avoid damage to trees during the construction phase of road projects, as stipulated in the NRA document ‘Guidelines for the Protection and Preservation of Trees, Hedgerows and Scrub prior to, during and post construction of National Road Schemes’. This will include consultation with a qualified arborist, where appropriate to ensure works within the Root Protection Area (RPA) avoid any significant damage to tree roots. Exposed tree roots will be protected where required and excavation methods will be appropriately undertaken so as to avoid damage to RPA’s. All excavation works in the RPA will be overseen by the Project Ecologist.
PD64	Tree felling only pertains to the Mountphilips Substation site. Confirmatory surveys will be carried out at all trees that will require felling or other major modifications (e.g. removal of rotten branches) in order to confirm the findings of the 2016 / 2017 surveys regarding the suitability of the trees for roosting bats. These trees will be subject to a ground-level visual inspection by the Project Ecologist (or a bat specialist acting on their behalf) prior to site clearance works.
PD65	While it is not expected that any trees with moderate or high suitability for roosting bats will be felled, the following measures will be implemented where a tree with moderate or high bat suitability is to be felled: a presence/absence bat surveys will be carried out; Felling of trees with bat roost suitability will be undertaken in the period late-August to late-October/early-November. Trees with low suitability for bats will be felled carefully and slowly in order to avoid impact-related injuries to any bats that may be roosting inside them. Sections of the tree with potential roost features for bats (e.g. crevices, damaged branches) will be cut in sections, lowered carefully to the ground and left undisturbed for 48 hours before removal; and Where the felling of trees with bat suitability is carried out, robust, weather-proof bat-boxes, for example Schwegler type 1FF and 2F models, will be placed in each of the affected sections to compensate for the loss of potential tree roosts. The number of bat boxes will match the number of trees with bat suitability to be felled. Bat boxes will be placed on an exposed section of tree trunk at a minimum height of 4-5m, providing a clear space in front of the box for bats to enter and exit. Boxes will be placed in locations that will receive at least 6-7 hours of sunlight during summer months, and will be placed on the southern side of the tree. The Project Ecologist will supervise the installation of bat boxes in order to ensure that they are sited appropriately.
PD66	All bridges of moderate suitability for bats will be subject to a confirmatory survey prior to the commencement of construction works. Bridges of negligible or low suitability do not need to be surveyed, but this will be reviewed by the Environmental Clerk of Works and Project Ecologist. If a bat roost is found, the Project Ecologist will review the proposed works at that bridge, and determine whether there could be a risk of impacts on the roost. If there is a risk of impact on a bat roost in a bridge, the Project Ecologist will develop a case-specific mitigation strategy and apply to the NPWS for a derogation licence. Bats will be excluded from the bridge for the duration of construction works

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	(typically only a few days), and replacement roosting opportunities (i.e. wall-mounted bat ‘tubes’ or boxes) will be provided at a suitable location nearby. When construction work is complete, bats will be able to return to their former roosting site.
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Cumulative Information: Potential or likely significant impacts caused by the Other Elements of the Whole UWF Project were avoided, prevented or reduced by incorporating Project Design Measures into the fundamental design of the UWF Related Works and UWF Other Activities and into the consented design of the Upperchurch Windfarm. These Project Design Measures are included in the description of these Elements, and can be found in this EIA Report in [Appendices 5.3, 5.5 and 5.6](#), in [Volume C4: EIAR Appendices](#).

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8.8.4 EVALUATION OF IMPACTS to Bats

In this Section, the likely direct and indirect effects of the UWF Grid Connection are identified and evaluated. Then the likely cumulative effects of the UWF Grid Connection together with the Other Elements of the Whole UWF Project and Other Projects or Activities are identified and evaluated.

A conceptual site model exercise was carried out to facilitate the identification of source-pathway-receptor links between the project (source) and the sensitive aspect (receptor) - Bats.

As a result of the exercise, some impacts were included and some were excluded.

Table 8-69: List of all Impacts included and excluded from the Impact Evaluation Table sections

Impacts Included (Evaluated in the Impact Evaluation Table sections)	Impacts Excluded (Justification at the end of the Impact Evaluation Table sections)
Destruction or disturbance of bat roosts in trees, (construction stage)	Mortality through roost destruction of roosts in forestry or hedgerows, (construction stage)
Destruction or disturbance of bat roosts in bridges, (construction stage)	Destruction/Disturbance of Bat Roosts in Buildings, (construction stage)
Severance of commuting routes or feeding areas, (construction stage)	Disturbance or Displacement of Bat Roosts due to Noise and Vibration, (construction stage)
Disturbance or Displacement due to lighting, (construction stage)	Inadvertent mortality through roost destruction due to hedgerow trimming activities (operational stage)
	Avoidance due to increased EMF (operational stage)
	Disturbance or Displacement due to lighting (operational stage)
	Disturbance or Displacement due to Noise and Vibration (operational stage)
	Mortality of bats due to collision or barotrauma (operational stage)
	Inadvertent mortality through roost destruction, (decommissioning stage)
	Disturbance or Displacement due to lighting, (decommissioning stage)
	Indirect Disturbance from Noise and Vibration, (decommissioning stage)

The source-pathway-receptor links for included impacts are described in the Impact Evaluation Tables in the next sections. **The Impact Evaluation Tables are presented in the following sections 8.8.4.1 to 8.8.4.4.**

The source-pathway-receptor links and the rationale for excluded impacts are described in the section directly after the Impact Evaluation Table sections, Section 8.8.4.5.

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8.8.4.1 Impact Evaluation Table: Destruction or disturbance of bat roosts in trees

Impact Description

Project Life Cycle Stage: Construction stage

Impact Source: Removal of mature trees, trimming and pruning of mature trees and hedgerows

Cumulative Impact Source: Tree felling, Trimming and pruning of mature trees and hedgerows

Impact Pathway: Landcover

Impact Description: Crevices and cavities in mature trees can provide roosting opportunities for bats, and some species (e.g. Leisler's bat) are thought to favour roosting sites in trees. Recent research has demonstrated that the use of roosts in trees can be highly transitory, with frequent roost switching between nights and across the season, although some large cavities can be used as maternity or hibernation roosts for longer periods of time. Almost all records to date have been from broadleaf trees (particularly oaks), with only a very small number from specimen conifers, and none from conifer plantations³⁸.

Any damage or disturbance to trees with crevices or cavities can have direct or indirect impacts on any bats that may be roosting within them. Felling can cause death or injury to bats, or the associated disturbance can cause them to emerge during daylight, thus exposing them to diurnal predators. Similarly, construction work within the root zone of trees can damage the tree, potentially causing the tree to fall at a later date. The spatial extent of impacts is limited to the tree in question (including its root zone and overhanging branches).

Impact Quality: Negative

Evaluation of Subject Development Impact – Destruction or disturbance of bat roosts in trees

Element 1: UWF Grid Connection – direct/indirect impact

Impact Magnitude:

In total, at the Mountphilips Substation site, 2 no. trees of moderate suitability and 4 trees of low suitability were recorded - 1 of moderate suitability, and 2 of low suitability occur at the permanent site entrance for Mountphilips Substation on the L2166-10 road; 1 tree with low bat suitability located within 50m of the Mountphilips Substation compound construction works area boundary; 1 tree of low bat suitability occurs north of the new end masts; and 1 tree of moderate bat suitability south of the new end masts.

Outside of the Mountphliips Substation site, 4 other trees (all low bat suitability) are recorded along the 110kV UGC route along the R503.

Only 1 tree with moderate suitability will require felling, this tree is located at the Mountphilips Substation site entrance. 2 low suitability trees will also be felled at this location. All of these trees were visually inspected between 2016 - 2019, and no evidence of roosting bats was observed, so it is considered that there is a low likelihood (e.g. <5%) that bats would be roosting within them at the time of construction. A number of project design measures have been incorporated into the development (PDs 57, 64 and 65), which include pre-construction surveys of trees, sensitive felling procedures, and the provision of alternative roosting opportunities.

No trees will be felled along the 110kV UGC route (i.e. outside of the Mountphilips Substation site), because works for the 110kV UGC will only occur within the paved surfaces of roads. Project Design measures will ensure that the roots of any of these trees are protected during construction works and that any damage to the roots of these trees is minimised.

³⁸ Andrews H & Gardener M 2016. Bat Tree Habitat Key – Database Report 2016. AEcol, Bridgwater

There is no potential for sequential effects to bats, as the extent of any instance of roost disturbance/destruction is limited to those Bats which may be present in individual trees. cut

Significance of the Impact: Imperceptible

Rationale for Impact Evaluation:

- Only 1 tree of moderate suitability is within the zone of effect, located at the Mountphilips Substation site entrance. A number of project design measures are outlined in Section 8.8.3, which will ensure that no bats are roosting in the tree at the time of works, thus preventing an impact.
- The other 2 trees at the Mountphilips Substation site entrance have low suitability for bats, and the likelihood that bats would occupy any of these trees at the time of felling is considered to be low (<5%). The project design measures listed in Section 8.8.3 will also apply for these trees.

Element 1: UWF Grid Connection – cumulative impact

Cumulative Impact Magnitude: There is no potential for cumulative effects with the Other Elements of the Whole UWF Project due to separation distance - all trees with suitability for bats, which could be affected by the UWF Grid Connection, are located at the proposed Mountphilips Substation site in western portion of study area,, and none were recorded at the eastern end of the 110kV UGC route in the Knockmaroe/Knockcurraghbola area. Therefore, there is a separation distance of c.22km between the Mountphilips Substation site and the UWF Related Works and Upperchurch Windfarm sites.

Significance of the Impact: No cumulative impact

Rationale for Impact Evaluation:

- Separation distance between trees within the UWF Grid Connection zone of impact and the zone of impact of the Other Elements.

Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project

Element 2: UWF Related Works

Impact Magnitude:

There are no trees which have suitability for roosting bats within 50m of UWF Related Works, and therefore bat roosts within 50m of the works are not expected to exist. Therefore, there is no potential for cumulative impacts.

Significance of the Impact: Neutral Impact

Rationale for Impact Evaluation:

- No trees with bat roost suitability within 50m of UWF Related Works construction works areas;
- No change in baseline conditions

Element 3: UWF Replacement Forestry – N/A, evaluated as excluded, see Section 8.8.2.2.1

Element 4: Upperchurch Windfarm

Impact Magnitude:

No potential tree roosts were identified in the EIS for the Upperchurch Windfarm and it was noted that the conifer plantations within the site offer “very poor roosting habitat”. In the RFI reporting it was noted that “large mature treelines in the greater area offer potential roosting sites for bats particularly along the roads in Shevry and Gleninchaveigh”. However, only a small number of trees will be felled along these roads, and none were considered to have suitability for bats. Therefore, this element of the project will not have any direct impact on potential tree roosts.

Significance of the Impact: Neutral Impact

Bats	<p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> None of the trees within the footprint of the development are suitable for roosting bats, so there will be no change to the baseline conditions
	<p>Element 5: UWF Other Activities</p> <p>Impact Magnitude: There is no requirement to fell trees. Trimming of hedgerows and low-hanging branches of trees will be required along some roads as part of UWF Other Activities. Haul Route Activity locations are on public roads and already subject to the standard maintenance regime for public roads, and it is expected that all such hedgerows / trees would have been trimmed in the past. Therefore, there is a negligible risk that bats could roost in any of these branches.</p> <p>No tree or hedgerow trimming is required for Overhead Line Activities.</p> <p>Significant planting of new trees will occur as part of the Upperchurch Hen Harrier Scheme (totalling 2.8km).</p>
Sensitive Aspect	<p>Significance of the Impact: Neutral Impact</p> <p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> None of the trees within the footprint of the development are suitable for roosting bats, so there will be no change to the baseline conditions Trimming associated with Haul Route Activity locations will not contrast with any baseline activities, and; Tree planting in respect of the Upperchurch Hen Harrier Scheme will increase availability of trees for Bats.
	<p>Evaluation of Other Cumulative Impacts – Destruction or disturbance of bat roosts in trees</p>
Biodiversity	<p>Whole UWF Project Effect</p> <p>Cumulative Impact Magnitude:</p> <p>There is no potential for cumulative whole project effects to Bats, because the impacts of the UWF Grid Connection will be imperceptible. The Other Elements of the Whole UWF Project do not include trees suitable for roosting bats, and trimming activities on public roads as part of UWF Other Activities will have Neutral effect on bat roosts, in addition the separation distance between the trees at the Mountphilips Substation site and the Other Elements reduces any potential for cumulative impacts between UWF Grid Connection and the Other Elements. There is no potential for cumulative sequential effects; as the extent of any instance of roost disturbance/destruction is limited to those Bats which may be present in individual trees.</p>
	<p>Significance of the Cumulative Impact: Imperceptible</p>
	<p>Rationale for Cumulative Impact Evaluation:</p> <ul style="list-style-type: none"> The UWF Grid Connection will have an imperceptible impact, the Other Elements will be Neutral The separation distance of the works at Mountphilips to the Other Elements
	<p>Note: No cumulative evaluation of <u>Other Projects or Activities</u> is included in the table above, because <u>no</u> Other Projects or Activities are likely to cause cumulative effects to Bats with either the UWF Grid Connection or the Other Elements of the Whole UWF Project (see Section 8.8.2.1).</p>

8.8.4.2 Impact Evaluation Table: Destruction / disturbance of bat roosts in bridges

Impact Description	
Project Life Cycle Stage:	Construction Stage/early Operational Stage
Impact Source: Trenching works for the 110kV UGC, and works to parapet walls	
Cumulative Impact Source: None	
Impact Pathway: physical disturbance / vibration	
Impact Description: Bats can roost in crevices and cavities underneath bridges, particularly in features of traditional stone construction. Modern bridges and culverts rarely have any crevices or cavities, and thus are usually unsuitable for roosting bats.	
Impact Quality: Negative	
Evaluation of Subject Development Impact – Destruction / disturbance of bat roosts in bridges	
Element 1: UWF Grid Connection – direct/indirect impact	
Impact Magnitude:	
<p>The UWF Grid Connection 110kV UGC will cross a number of bridges and culverts, all within the existing road foundations. Roosts of single soprano pipistrelle bats were recorded in 2019 in two of the bridges (W33 and W44), and nine other structures (at W7, W18, W23, W28, W36, W41, W43, W49 and W53) were considered to have moderate suitability for bats.</p> <p>At two locations (W8 and W9) the cable will be installed underneath the bed of the bridge by horizontal directional drilling. There is no potential for impacts on Bats at these two bridges, because directional drilling will avoid the need for any construction work (e.g. trenching) at the bridge.</p> <p>At the locations in which the cable trench for 110kV UGC will be installed within the existing road pavement over the bridge, there is a risk that bats could be affected. Direct impacts may occur if Bats occupied any crevices or cavities underneath the bridge that were uncovered (from above) during trenching works. Indirect impacts could occur if vibration from construction works caused bats to abandon their roost.</p> <p>For the two known roosts (W33 and W44), the 110kV UGC will be installed within the road pavement over the bridges. Both locations are day roosts / satellite roosts of single soprano pipistrelles (a very common species in Ireland), which are considered to be of Negligible Importance. Nonetheless, all bats receive legal protection under the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended) and the Wildlife Act 1976 (as amended). Nine other bridges were considered to have moderate suitability for bats, but no bats were found to be roosting in these structures (W7, W18, W23, W28, W36, W41, W43, W49 and W53) in 2019. A project design measure has been incorporated into the development (PD66), which includes pre-construction surveys of bridges, exclusion procedures and the provision of alternative roosting opportunities under derogation from NPWS.</p> <p>In relation to bridges under material haulage routes, no works are required to upgrade the integrity of any water crossing structures along haulage routes for UWF Grid Connection. These bridges are already used by large vehicles on a regular basis, so the passage of construction vehicles would not represent a change from the baseline condition.</p>	
Significance of the Impact: Imperceptible	
Rationale for Impact Evaluation:	
<ul style="list-style-type: none"> Two bat roosts could be directly or indirectly affected, both of which are of Negligible Importance; The destruction or disturbance of a bat roost would constitute a legal offence, thus any exclusion procedures will be carried out under derogation from NPWS. 	

Bats	<ul style="list-style-type: none"> The application of project design measures listed in Section 8.8.3, which include bridge surveys (and the exclusion of bats, if required) before works over a bridge commences.
	Element 1: UWF Grid Connection – cumulative impact
	<p>Cumulative Impact Magnitude: There is no potential for cumulative impacts to any of the bridges/culverts along the 110kV UGC with any Other Element, as no works are required by any Other Element to any of these structures, and the 2 culverts which will be widened as part of UWF Related Works (Haul Route Works) have negligible bat suitability</p>
	<p>Significance of the Impact: No Cumulative Impact</p> <p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> separation distance between trenching works over bridges for UWF Grid Connection and no work required to any bridge or crossing with bat suitability for any Other Element
Sensitive Aspect	Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project
	Element 2: UWF Related Works
	<p>Impact Magnitude:</p> <p>The 2 no. culverts which require extension for Haul Route Works have negligible suitability for roosting bats. No works are required to upgrade the integrity of structures along haulage routes for UWF Related Works. These bridges are already used by large vehicles on a regular basis, so the passage of construction vehicles would not represent a change from the baseline condition.</p> <p>In relation to material haulage routes, there is no potential for cumulative effects to the bridges and culverts under the Regional Road R503 and along the local road network from Knockmaroe to the Consented UWF Substation locations. No works are required to any of these bridges to facilitate the delivery of materials/components, and these bridges are already used by large vehicles on a regular basis, so the passage of construction vehicles would not represent a change from the baseline condition.</p>
	<p>Significance of the Impact: No Likely Impact</p> <p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> negligible suitability of 2 culverts for roosting bats, in the context of works to these culverts relating to a short extension (concrete pipe) to the existing concrete pipe the daily use of bridges under haulage routes by HGVs, with no works required.
Biodiversity	Element 3: UWF Replacement Forestry– N/A, evaluated as excluded, see Section 8.8.2.2.1
	Element 4: Upperchurch Windfarm
	<p>Impact Magnitude:</p> <p>There are no bridges within the Consented Upperchurch Windfarm site, and no works are required to upgrade the integrity of structures along haulage routes for the windfarm. These bridges are already used by large vehicles on a regular basis, so the passage of construction vehicles would not represent a change from the baseline condition.</p>
	<p>Significance of the Impact: No likely Impact</p> <p>Rationale for Impact Evaluation:</p> <ul style="list-style-type: none"> No bridges within the windfarm site the regular use of bridges under haulage routes by HGVs, with no works required.
Topic	Element 5: UWF Other Activities
	<p>Impact Magnitude:</p>

No magnitude: No bridge upgrade works are proposed for this element	Bats
Significance of the Impact: No likely Impact	
Rationale for Impact Evaluation: • no works to bridges associated with UWF Other Activities	
Evaluation of Other Cumulative Impacts – Destruction / disturbance of bat roosts in bridges	
Whole UWF Project Effect	
Cumulative Impact Magnitude: The only element of the Whole UWF Project that could potentially have impacts on bat roosts in bridges is the UWF Grid Connection (where the 110kV UGC will be constructed over 11 no. existing watercourse crossing structures which have moderate suitability for roosting bats). Duration of works will be 1 to 2 days at these locations, in the context that the roosts were evaluated as having Negligible importance. Project Design measures, which are part of the UWF Grid Connection development, will include pre-construction surveys of all bridges of moderate suitability, and the exclusion of bats before work.	Sensitive Aspect
Significance of the Cumulative Impact: Imperceptible	
Rationale for Cumulative Impact Evaluation: • Two bat roosts of Negligible Importance could be directly or indirectly affected by the UWF Grid Connection • No other element will have an impact on bat roosts in bridges	

Note: No cumulative evaluation of Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to Bats with either the UWF Grid Connection or the Other Elements of the Whole UWF Project (see Section 8.8.2.1).

8.8.4.3 Impact Evaluation Table: Severance of commuting routes or feeding areas

Impact Description

Project Life Cycle Stage: Construction Stage/early Operational Stage

Impact Source: Site clearance

Cumulative Impact Source: Site clearance

Impact Pathway: Land cover

Impact Description: Bats forage and commute along hedgerows, treelines and other linear habitat features. Both temporary and permanent clearance of short sections of habitats such as Hedgerows will be required to facilitate some construction works, particularly along the route of the new permanent access road to Mountphilips Substation. The removal of this habitat would not kill or injure any bats, but it may disrupt their behaviour, reducing the value of regular feeding areas and forcing bats to use alternate commuting routes. In many cases bats will be able to adapt to an altered route, as many bat species (e.g. pipistrelles) readily cross gaps of 5 - 10m. However, the disruption of key feeding areas or commuting routes may have a significant effect. For example, alteration of the key commuting routes to and from bat roosts can potentially cause bats to permanently abandon the roost.

Re-instated hedgerows will be planted at the Mountphilips Substation site entrance with semi-mature (locally sourced, native) trees, thus reducing the time required for re-establishment to original vegetation height. Therefore, the effects of vegetation removal would only persist in the short term (approx. 1 – 7 years), and after this period, the hedgerows would return to the baseline condition. It is also noted that UWF Grid Connection and Other Elements of the Whole UWF Project will include substantial Hedgerow planting, resulting in a net increase in the coverage of this habitat within the study area.

Impact Quality: Negative and Positive

Evaluation of Subject Development Impact – Severance of commuting routes or feeding areas

Element 1: UWF Grid Connection – direct/indirect impact

Impact Magnitude:

10 to 15m sections (40m in total) of hedgerow will be permanently removed at 3 locations along the new permanent access road to Mountphilips Substation. These hedgerows are evaluated as of local importance to bats. 700m of hedgerow will be planted along each side of the new access road.

In addition, approximately 160m of roadside boundary (comprising of 17 immature trees, 1 mature tree and earthen banks) will be permanently removed at the main site entrance to Mountphilips Substation to provide sufficient sightlines for the safety of road users on the public road, although the roadside boundary will be replaced with an equivalent length of new hedgerow and equivalent number of semi-mature trees behind the new sightlines.

No hedgerow removal is required for the 110kV UGC which is routed entirely along paved roads (predominantly public roads with one short length of private paved road).

No hedgerow removal is required near the consented UWF Substation. One of the sampling points at this location has bat activity of County Importance, but this will not be affected by the UWF Grid Connection.

Significance of the Impact: Imperceptible

Rationale for Impact Evaluation:

- Only a small extent of hedgerow (40m) will be permanently lost, and;
- 700m of additional hedgerow planting will more than compensate for its loss.

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Bats	Element 1: UWF Grid Connection – cumulative impact	
	<u>Cumulative Impact Magnitude:</u> No cumulative impact: There is no potential for cumulative effects with the Other Elements of the Whole UWF Project because all hedgerow severance and new hedgerow planting for the UWF Grid Connection will occur at the Mountphilips Substation area, which is c.22km linear separation distance from any of the Other Elements	
	Significance of the Impact: No cumulative effect	
	<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> Separation distance between hedgerows subject to temporary or permanent removal. 	
	Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project	
	Element 2: UWF Related Works	
	<u>Impact Magnitude:</u> 10m sections of field boundary will be permanently removed at two locations along Realigned Windfarm Road RWR2. However, these areas are un-vegetated, so they are not considered to be of importance for commuting or foraging bats. 145m of linear vegetation features (primarily hedgerows) will be removed temporarily (c.1 week to 1 month) at 15 locations along works locations for the Internal Windfarm Cabling and for Haul Route Works (HW7 and HW10). Temporary bat crossing structures will be installed at severed hedgerows or field boundary proximal to areas of either high Bat activity or roost locations, in order to avoid severance effects during works. When complete, all temporarily removed hedgerows or field boundaries will be reinstated.	
	<u>Significance of the Impact:</u> Imperceptible	
	<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> Only a small extent of hedgerow will be permanently lost. 370m of additional hedgerow planting alongside RWR2; and All temporarily-removed field boundaries will be reinstated to at least their former (or better) condition in the medium term, as outlined in Chapter 5 Description of the Development; The severance of most commuting routes / feeding areas will be medium term in duration, reversible and offset by the planting of new hedgerows; There will be a lag time in the re-establishment of the vegetation, but the continuity of linear features near bat roosts will be maintained using specially-designed bat crossing structures; This will ensure that bats can continue to use these features during the re-establishment period. 	
	Element 3: UWF Replacement Forestry– N/A, evaluated as excluded, see Section 8.8.2.2.1	
Biodiversity	Element 4: Upperchurch Windfarm	
	<u>Impact Magnitude:</u> There will be a loss of potential foraging habitat within the site. However, this loss of habitat is not considered to be significant given the availability of extensive foraging habitat outside the site. In the Ecological Management Plan for the development it is noted that “approximately 360m of new hedgerow will be planted to mitigate this loss of habitat.”	
	<u>Significance of the Impact:</u> Not significant	
	<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> The extent of permanent loss is mitigated by the planting of the same extent of replacement habitat; and Relatively little bat activity was recorded along hedgerow habitats. 	
	Element 5: UWF Other Activities	
Topic	<u>Impact Magnitude:</u>	

Bats	Sensitive Aspect	This element of the project will not involve the severance of any hedgerows or similar features. As part of Upperchurch Hen Harrier Scheme management up to 2.8km of hedgerow is to be planted, constituting a significant offset of Upperchurch Windfarm hedgerow removal in terms of the effects of severance
		Significance of the Impact: Imperceptible (positive)
		Rationale for Impact Evaluation: <ul style="list-style-type: none">• No hedgerows or other similar features will be severed, so there will be no change to the baseline conditions,• 2.8 km of new hedgerow planting will improve bat foraging habitat in the short to medium term.
		Evaluation of Other Cumulative Impacts – Severance of commuting routes or feeding areas
Biodiversity	Topic	Whole UWF Project Effect
		Cumulative Impact Magnitude: <p>Only some short sections of field boundary will be permanently affected: 3 sections of hedgerow of 10 to 15m length (totalling 40m) at Mountphilips Substation (UWF Grid Connection), and the hedgerow / field boundaries at UWF Related Works locations. Bat crossing structures will be installed at UWF Related Works locations proximal to identified bat roosts or areas of high foraging activity, which will ensure that linear connectivity is maintained during this period. When construction is completed, all of these hedgerows or field boundaries will be reinstated to at least their former (or better) condition using semi-mature plants. The provision of these structures will avoid sequential effects on foraging bats in instances where hedgerow severance locations occur within the zone of effect of multiple project elements. At the Upperchurch Windfarm site an additional 360m of hedgerow will be removed in Shevry.</p> <p>In addition, several elements of the Project will involve hedgerow planting, as follows: the Upperchurch Hen Harrier Scheme will incorporate 2.8 km of new hedgerows, and additional hedgerows will be planted as part of the UWF Grid Connection (700m of new hedgerow), UWF Related Works (370m of new hedgerow) and Upperchurch Windfarm (360m as mitigation for loss of suitable hedgerows).</p>
		Significance of the Cumulative Impact: Not Significant
		Rationale for Cumulative Impact Evaluation: <p>Only a small extent of hedgerow will be permanently lost. Additional hedgerow planting will more than mitigate for its loss;</p> <p>All temporarily-removed field boundaries will be reinstated to at least their former (or better) condition in the medium term;</p> <p>The severance of most commuting routes / feeding areas will be short term in duration, reversible and offset by the planting of semi-mature trees and shrubs on a like-for-like basis; and</p> <p>The continuity of important bat commuting routes will be maintained using specially-designed bat crossing structures.</p>

8.8.4.4 Impact Evaluation Table: Disturbance or Displacement due to Lighting

Impact Description	
Project Life Cycle Stage:	Construction stage
<u>Impact Source:</u> Artificial lighting	
<u>Cumulative Impact Source:</u> Artificial lighting	
<u>Impact Pathway:</u> Visibility	
<p><u>Impact Description:</u> Bats are nocturnal animals, and typically avoid any source of natural or artificial light. Lighting in the vicinity of bat roosts can cause roost abandonment, reduction in numbers of individuals, and reductions in juvenile growth rates. In addition, lighting near hedgerows and other semi-natural habitats can form barriers to the movement of commuting bats, and displace bats from feeding areas.</p> <p>Construction work will take place during daylight hours as part of Project Design, so it will not be necessary to use artificial lighting at construction works areas. However, lighting will be required for security reasons at the temporary construction compound at the Mountphilips Substation site. Security lighting will be used at the temporary compound at Mountphilips Substation site. All lighting will be cowed in order to prevent light spill and no lighting will be left turned on overnight. Lighting will be controlled by motion and time sensors to minimise the amount of time the lights are operational. (Project Design Measure).</p> <p><u>Impact Quality:</u> Negative</p>	
Evaluation of the Subject Development Impact – Disturbance or Displacement due to Lighting	
Element 1: UWF Grid Connection – direct/indirect impact	
<p><u>Impact Magnitude:</u></p> <p>1 No. Temporary compound at the Mountphilips Substation will be used over a 12 – 18 month period, and will be fitted with lights. The spatial extent of any disturbance or displacement effects will be small, due to the use of cowl: it would be directed towards the key areas required for security, and may illuminate an area of 10 - 20m from the light source. Lights will not be directed towards any bat roosts or key commuting routes / feeding areas. As lighting will be fitted with motion and time sensors, all lighting will be of momentary duration, typically only for approx. one minute for each time that the sensor is triggered.</p>	
Significance of the Impact: Imperceptible	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> The use of cowling will prevent light spill onto bat roosts or key commuting routes / feeding areas, so there will be no change to their baseline condition. Any lighting that is required would only be temporarily active, and would not be operational throughout the night, so any localized effects on feeding or roosting bats would be of momentary duration. 	
Element 1: UWF Grid Connection – cumulative impact	
<p><u>Cumulative Impact Magnitude:</u> No potential for cumulative effects, due to the separation distance (c.23km) between the temporary compound at the Mountphilips Substation and the temporary compound (for UWF Related Works and Upperchurch Windfarm) in Shevry. The works for the 110kV UGC will be carried out during daylight hours with no requirement for lighting, therefore there is no potential for cumulative effects from 110kV UGC works.</p>	
Significance of the Impact: No cumulative effect	
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> Lighting for the UWF Grid Connection will be of very limited spatial and temporal extent – limited to the Mountphilips Substation compound area. 	

Bats	Sensitive Aspect	<ul style="list-style-type: none">Separation distance between sources of light for UWF Grid Connection (Mountphilips Substation) and the sources for the Other Elements (Site Compound No. 1 at Upperchurch Windfarm).
		Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project
		Element 2: UWF Related Works
		<u>Impact Magnitude:</u> No additional compounds required for the UWF Related Works. UWF Related Works will be constructed as part of the Upperchurch Windfarm project and the already consented Site Compound No.1 in Shevry will be used by construction personnel working on the UWF Related Works. Upperchurch Windfarm Site Compound No.2 (known bat roost) will not be used by UWF Related Works personnel or to store any material, equipment or tools associated with UWF Related Works.
		<u>Significance of the Impact:</u> Imperceptible
		<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none">No additional lighting requirements for UWF Related WorksConstruction works will be carried out during daylight hours (Project Design Measure);The use of cowling on Upperchurch Windfarm Site Compound No.1 to prevent light spill onto bat roosts or key commuting routes / feeding areas, so there will be no change to their baseline condition.No requirement for additional lighting on construction works areas.
		Element 3: UWF Replacement Forestry – N/A, evaluated as excluded, see Section 8.8.2.2.1.
		Element 4: Upperchurch Windfarm
		<u>Impact Magnitude:</u> All lighting within compounds will be cowled towards the centre of the compound.
<u>Significance of the Impact:</u> Imperceptible		
<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none">The use of cowling will prevent light spillage so there will be no change to their baseline condition.Any lighting that is required would only be temporarily active, and would not be operational throughout the night, so any localized effects on feeding or roosting bats would be of momentary duration.		
Element 5: UWF Other Activities		
<u>Impact Magnitude:</u> No artificial lighting is proposed for this element of the project.		
<u>Significance of the Impact:</u> Neutral impact		
<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none">No artificial lighting will be required, so there will be no change to the baseline conditions		
Biodiversity	Topic	Evaluation of Other Cumulative Impacts – Disturbance or Displacement due to Lighting
		Whole UWF Project Effect
		Lighting will be used at Mountphilips Substation compound, and at the Upperchurch Windfarm Site Compound No.1 (in Shevry) during construction of the Whole UWF Project. As noted above, measures on lighting have been incorporated into the Project design in order to minimise the effects on bats. This will include the fitting of cowls to all lights in order to minimise light spill, and the use of motion and time sensors to minimise the amount of time the lights are operational. Lights will not be left on overnight. In addition, lighting will be required for 12 – 18 months in any location, and the spatial extent is expected to be of no more than 20m from the light source. These measures, along with the separation distance between compounds (c.23km) will also prevent any sequential effects on roosting or foraging bats from multiple aspects of the Whole UWF Project.

Although there are some bat roosts and commuting routes / feeding areas in the vicinity of the UWF Related Works, consented Upperchurch Windfarm and the UWF Grid Connection, the proposed project design measures ensure construction activities are carried out during daylight hours which will prevent the illumination of these areas.

Significance of the Cumulative Impact: Imperceptible

Rationale for Cumulative Impact Evaluation:

- The use of cowlings will prevent light spill onto bat roosts or key commuting routes / feeding areas, so there will be no change to their baseline condition. Any lighting that is required would only be temporarily active, and would not be operational throughout the night, so any localized effects on feeding or roosting bats would be of momentary duration.
- Construction works will be carried out during daylight hours.

Note: No cumulative evaluation of Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to Bats with either the UWF Grid Connection or the Other Elements of the Whole UWF Project (see Section 8.8.2.1).

8.8.4.5 Description and Rationale for Excluded (scoped out) Impacts

The source-pathway-receptor links and the rationale for impacts excluded from the Impact Evaluation Table sections are described in Table 8-70 below.

Table 8-70: Description and Rationale for Excluded Impacts to Bats

Key: 1: UWF Grid Connection; 2: UWF Related Works; 3: UWF Replacement Forestry; 4: Upperchurch Windfarm; 5: UWF Other Activities

Source(s) of Impacts	Project Element	Pathway(s))	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
Construction Stage				
Forestry Felling	2, 4, 5	Landcover	Mortality through roost destruction	<p>Evaluated as Excluded: No potential/no likely impact</p> <p>No forestry felling is required for UWF Grid Connection.</p> <p>In relation to UWF Related Works and Upperchurch Windfarm: No likely effect, as homogenous conifer plantations have extremely limited potential or suitability for roosting bats.</p> <p>In relation to UWF Other Activities: No likely effect due to the absence of possible sources of hedgerow severance in respect of UWF Other Activities, no bat roosts were present and the trees at hedgerow trimming locations as part of Haul Route Activities are not suitable for roosting bats. No trimming is required for Overhead Line Activities.</p>
Hedgerow Trimming	1,2, 4,5	Landcover	Inadvertent mortality through roost destruction	<p>Evaluated as Excluded: No likely impact, as any trimming will only the removal of outer edges of branches which are unsuitable for Bats</p>
Land cover Change	1,2, 4,5	Renovatio n/alteratio n of Buildings	Destruction/Dist urbance of Bat Roosts in Buildings	<p>Evaluated as Excluded: No potential/no likely impact:</p> <p>The UWF Grid Connection will not involve any demolition or alterations of any buildings.</p> <p>Upperchurch Windfarm: an unoccupied dwelling house and associated outbuildings (Roost #16) will be used as a site office for the Upperchurch Windfarm. The use of the site office for welfare facilities will be very similar to its original use as a dwelling house. There will be no renovations of the exterior or interior of the building. No permanent or fixed lighting will be installed around the exterior of the property, and shutters or blinds will be used to prevent light spill from windows on the northern side which faces towards identified roosts. The outbuildings will not be used for storage. Given the above, there is a low probability that the change of use would have direct or indirect impacts on any bat roosts, and the magnitude and spatial extent of impacts is considered to be negligible, because: (i) there will be no destruction or disturbance of any of the bat roosts in these structures; and (ii) there will be no new artificial lighting near any roost exit / entry</p>

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Source(s) of Impacts	Project Element	Pathway(s)	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
				points; therefore, there will be Neutral effects on the bat roost. A derogation licence will not be required. UWF Related Works will not use this unoccupied house, and therefore has no potential to cause effects to roosting bats. UWF Grid Connection will not use this Site Office during construction or operation.
Noise and Vibration	1,2,4,5	Air	Disturbance or Displacement of Bat Roosts due to Noise and Vibration	Evaluated as Excluded: Neutral Effect: Bats are not known to be particularly sensitive to noise and / or vibration; this pathway for impacts is not discussed in any British or Irish guidelines. As there will be no construction works at night, there is no risk of noise or vibration impacts on foraging or commuting bats. Although there are some bat roosts within 10m, construction works will be in close proximity to these roosts for no more than a half a day at any location. It is predicted that construction-related vibration will be approx. 0.5 to 1 mm/s within a zone of influence of approx. 5m. This would be barely perceptible to any human residents of properties, and therefore is also considered barely perceptible to any bats occupying a roost. Therefore, the magnitude of impacts reaching any bat roosts will be imperceptible.
Operational Stage				
Hedgerow Trimming	2, 5	Landcover	Inadvertent mortality through roost destruction	Evaluated as Excluded: No likely impact, as any trimming will only the removal of outer edges of branches which are unsuitable for Bats
EMF	1,2, 4	Air	Avoidance due to increased EMF	Evaluated as Excluded: No likely effects, as literature supports no precedent for this as a viable impact.
Artificial Lighting	1, 4	Visibility	Disturbance or Displacement due to lighting	Evaluated as Excluded: Neutral impact, as the only locations with operational lighting (substations, wind turbines) will incorporate bat-sensitive lighting (cowled, motion sensor and timer controlled) as part of the project design.
Noise and Vibration	1,2, 4,5	Air	Disturbance or Displacement due to noise/ vibration	Evaluated as Excluded: Neutral impact, as there will be no significant noise or vibration during the operational phase.
Above ground structures	1,2,4	Physical contact	Mortality of bats due to collision or barotrauma	Evaluated as Excluded: No likely effect and no potential for cumulative impacts with Upperchurch Windfarm. As per the 2014 ABP Inspectors Report, it was assessed that no significant impact to bats were likely to occur. There would be no potential for cumulative impacts with other project elements, as follows:

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Sensitive Aspect	Bats	Source(s) of Impacts	Project Element	Pathway(s)]	Impacts (Consequences)	Rationale for Excluding (Scoping Out)	
						UWF Grid Connection: no likely impact with the Mountphilips Substation, all other parts are either underground or at ground level (i.e. new roads), UWF Related Works: no likely impact with the Telecom Relay Pole, due to the immobility of this structure.	
		Decommissioning Stage					
		Hedgerow Trimming	1,2, 4,5	Landcover	Inadvertent mortality through roost destruction	No potential for effects as the UWF Grid Connection will not be decommissioned. In relation to the UWF Related Works or Upperchurch Windfarm trimming activities, if they occur, will only involve the removal of outer edges of branches which are unsuitable for bats. UWF Other Activities, if they occur, will only involve the removal of outer edges of branches which are unsuitable for bats	
		Artificial Lighting	1,2, 4	Air	Disturbance or Displacement due to lighting	No potential for effects, the UWF Grid Connection will not be decommissioned. In relation to the UWF Related Works or Upperchurch Windfarm, no potential for effects as there will be no requirement for lighting during decommissioning works	
		Noise and Vibration	1,2, 4	Air	Indirect Disturbance from Noise and Vibration	No potential for effects, the UWF Grid Connection will not be decommissioned. In relation to the UWF Related Works or Upperchurch Windfarm, no likely effects due to the small scale of decommissioning works or activities, with all work taking place from roads and turbine hardstands, so no potential to generate significant noise or vibration.	

8.8.5 Mitigation Measures for Impacts to Bats

Mitigation measures were incorporated into the UWF Grid Connection project design including the Project Design Measures. No additional mitigation measures are required as the topic authors conclude that **significant impacts are not likely to occur to Bats** as a consequence of the UWF Grid Connection.

8.8.6 Evaluation of Residual Impacts to Bats

Residual Impacts are the final or intended effects that will occur after mitigation measures have been put into place. No additional mitigation measures are required and thus the Residual Impact is the same as the Impact set out in Impact Evaluation Table sections for Bats above (Section 8.8.4) – i.e. **no significant adverse impacts**.

8.8.7 UWF Grd Connection Environmental Management Plan

The Project Design measures will be implemented by the Project Manager and the main Contractor during the construction stage, under the **Environmental Management Plan for the UWF Grid Connection (EMP)**. The EMP is appended to this EIA Report as **Volume D**.

The EMP will be an important contract document for the main construction contractor (Contractor) who will be contractually obliged to comply with the EMP. An Environmental Clerk of Works will be appointed, who will be independent of the construction Contractor, and it will be the responsibility of the Environmental Clerk of Works to monitor the compliance of the Contractor with the EMP through liaising with the Construction Site Manager and the Project Manager, monitoring construction works on a daily basis and by carrying out regular audits on EMP compliance. The Environmental Clerk of Works will be resourced to employ a team of environmental specialists including a Site Ecologist, Site Hydrologist and a Invasive Species Specialist.

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8.8.8 Summary of Impacts to Bats

A summary of the Impact to Bats is presented in Table 8-71.

Table 8-71: Summary of the impacts to Bats

Impact to Bats:	Destruction or disturbance of bat roosts in trees	Destruction or disturbance of bat roosts in bridges	Severance of commuting routes or feeding areas	Disturbance or Displacement due to Lighting
<i>Evaluation Impact Table</i>	<i>Section 8.8.4.1</i>	<i>Section 8.8.4.2</i>	<i>Section 8.8.4.3</i>	<i>Section 8.8.4.4</i>
Project Life-Cycle Stage	Construction	Construction	Construction /Early Operation	Construction
<u>UWF Grid Connection</u> <i>Direct/indirect impact</i>	Imperceptible	Imperceptible	Imperceptible	Imperceptible
<u>UWF Grid Connection</u> <i>Cumulative impacts</i>	No Cumulative Impact	No Cumulative Impact	No Cumulative Impact	No Cumulative Impact
Element 2: UWF Related Works	Neutral	No Likely Impact	Imperceptible	Imperceptible
Element 3: UWF Replacement Forestry	No Potential for Impact Evaluated as Excluded – see Section 8.8.2.2.1			
Element 4: Upperchurch Windfarm	Neutral	No Likely Impact	Not Significant	Imperceptible
Element 5: UWF Other Activities	Neutral	No Likely Impact	Imperceptible (positive)	Neutral
<u>Cumulative Impact:</u>				
All Elements of the Whole UWF Project	Imperceptible	Imperceptible	Not Significant	Imperceptible

The greyed out boxes in the above summary table relate to the cumulative information for the Other Elements of the Whole UWF Project, which are included to present the totality of the project.

Note: No cumulative information for Other Projects or Activities is included in the table above, as no Other Projects or Activities are likely to cause cumulative effects to Bats with either the UWF Grid Connection or the Other Elements of the Whole UWF Project (see Section 8.8.2.1).

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8.9 Sensitive Aspect No.8: Non-Volant Mammals

This Section provides a description and evaluation of the Sensitive Aspect - Non-Volant Mammals.

Donncha O Cathain, Jennifer Pearson, Chris Cullen and Howard Williams were the main authors of this Section. Please see Sources of Information (Section 8.1.7) and Methodology (Section 8.1.8) for details of the desktop and fieldwork surveys which have informed the evaluation of Aquatic Habitats & Species.

8.9.1 BASELINE CHARACTERISTICS of Non-Volant Mammals

8.9.1.1 STUDY AREA for Non-Volant Mammals

The study area for Non-Volant Mammals in relation to the UWF Grid Connection is described in Table 8-72 and illustrated on [Figure GC 8.9: UWF Grid Connection Study Area for Non-Volant Mammals \(Overview and Maps 1 to 2\)](#) (Volume C3 EIAR Figures).

Table 8-72: UWF Grid Connection Study Area for Non-Volant Mammals

Study Area for Non-Volant Mammals	Justification for the Study Area Extents
<p>Otter: All watercourse crossing locations were surveyed for suitability, and where suitable habitat occurred (26 No.) these watercourses were surveyed 300m in both direction</p> <p>Badger and Other Mammals: construction works area plus 50m in all directions</p>	<p>Professional Judgement and as pertinent:</p> <p>Otters: Best Practice guidelines published by the Highways Agency (1999)</p> <p>Badgers: Best Practice guidelines published by the NRA (2005)</p> <p>Other mammal species professional judgement and as per Best Practice (CIEEM, 2016).</p>

8.9.1.2 Baseline Context and Character of Non-Volant Mammals in the UWF Grid Connection Study Area

The principal habitats within the context of Non-Volant (non-flying) Mammals include open grassland and bogs which provides foraging habitat, and coniferous and deciduous forestry, mixed woodland, hedgerows, and scrub, which provide shelter and provide locations for breeding and resting.

Baseline surveys of the UWF Grid Connection recorded evidence of Otter (*Lutra lutra*), Badger (*Meles meles*), Fox (*Vulpes vulpes*), Pine Martin (*Martes martes*), Deer species, Rat (*Rattus Norvegicus*) and Squirrel species within the study area, however limited evidence of breeding or resting sites is present, primarily due to the placement of the majority of work locations within the public road. No active breeding or resting sites for Badger (setts) or Otter (Couches and/or holts) are present within the UWF Grid Connection Study Area. Opportunities for breeding Pine Marten may occur in some of the buildings which occur within the UWF Grid Connection study area.

At the Mountphilips Substation site evidence of Badger, Squirrel, Deer and Fox were recorded. Recorded Badger evidence consisted of prints and latrines (scat). No setts were recorded at the Mountphilips Substation site.

Along the 110kV UGC route outside of the Mountphilips Substation site, evidence of mammals is limited to 18 mammal pathways/mammal runs, which is typical evidence of roadside usage. The small number of records is attributed to the generally busy nature of the roads on which the route of the 110kV UGC is located. A total of seven burrows were recorded within 50 metres of the 110kV UGC route. Three of these burrows were inactive or infrequently used. The species using these burrows could not be confirmed due to an absence of other confirmatory evidence i.e scat, hairs, or prints, however they are considered likely to be

Rabbit or Rat. No protected sites in respect of Badger and other general mammals exist within the study area. The Lower River Shannon SAC (site code 002165), which intersects the development at certain watercourse crossing locations, is designated for Otter.

8.9.1.2.1 Individual Species & Survey Results

Otter

The territories of otters can stretch for several kilometres; the total length of the home range depends on the availability of food. The smallest territories are thought to occur at coastal sites, where territories may be as small as 2km. The longest territories occur in upland streams where an individual may have to range more than 20km to find sufficient food. Territorial marking typically occurs by means of sprainting or anal secretions. These marks are left mostly at features such as bridge footings, boulders, grass tussocks and stream confluences. Within their territories an individual otter may utilise a number of resting sites; these can be hidden refuges above ground (couches), or under-ground chambers (holts). Holts tend to be natural crevices, associated with the roots of trees growing along river and lake banks. These natural recesses provide the otter with a holt that has multiple entrances from which the otter can escape if disturbed. Couches occur frequently in dense vegetation and may be associated with frequently used runs and slides into the water. The rearing of cubs occurs within 'natal holts', which are not marked by spraint. Although capable of breeding at any time of the year, a peak in breeding occurs during the summer and early autumn.

Otters that live in rivers and lakes tend to be completely nocturnal, described as being crepuscular – activity peaks at dusk and dawn. Otters are principally piscivorous (fish eating), relying predominantly on salmonids (salmon and trout), but also eel and small fish species such as stickleback. However, otters are not limited to fish and feed opportunistically on a range of prey when available: frogs are frequently eaten by otters, and the remains of invertebrates (crayfish), birds and small mammals have also been found in spraints.

A survey of suitable watercourses was carried out in January and May 2019. A total of 26 watercourses were surveyed for Otter, 300m upstream and downstream, which include the Newport River (W7), Clare River (W36) and Bilboa River (W53) and 23 other watercourses (W5, W8, W9, W18, W21, W22, W23, W26, W28, W29, W30, W33, W35, W39, W41, W42, W46, W47, W48, W49, W50, W51 and W52). There were four records of Otter at 3 locations within the UWF Grid Connection study area, consisting of slides (locations where Otters tend to slide down steep banks), and spraints (droppings). One of the four records was recorded along the River Bilboa within the Lower River Shannon SAC, and consisted of an Otter slide, recorded approximately 60 metres downstream of watercourse crossing W53. An Otter spraint was recorded along the Tooreenbrien Lower River, approximately 45 metres downstream of watercourse crossing W33, with an Otter print recorded underneath the bridge structure. The fourth record relates to an Otter slide which was recorded along the Annagh (Clare) River, approximately 135 metres upstream of watercourse Crossing W36.

No active breeding or resting sites (Holts or Couches) were identified within 300m of any watercourse crossing.

Previous studies undertaken in January 2017 have recorded Otter evidence within the hinterland of the study area. Otter evidence (Otter path) has previously been recorded on the Munnia stream, east of the Mountphilips Substation compound, this location is >300m from the proposed Mountphilips Substation. An Otter slide was also recorded on the Newport River, approximately 980 metres upstream of the UWF Grid Connection 110kV UGC route. Although occupied territories were not recorded at the downstream locations of these records during the 2019 surveys, considering the territories of Otter can be several kilometres long these records are included (VWT, 2019).

No Otters were observed during current surveys, although this is typical in respect of a species where most activity takes place at night. The location of Otter records within the study area are presented on **Figure GC 8.9: UWF Grid Connection Study Area for Non-Volant Mammals (Overview and Maps 1 to 2)**.

Badger

Badgers are found throughout Ireland in areas of suitable habitat: large swathes of the Irish countryside provide ideal conditions for badgers, with their mosaic of pasture grasslands, hedgerows, and areas of scrub and woodland. Badger densities are lower in upland and mountainous areas, areas of bog, and marginal pasturelands along the Atlantic fringe. Several setts will be present within a badger group's territory but the focus of the badger group is known as the 'main' sett. The main sett is situated roughly central within the group territory and is usually occupied throughout the year and used as the principal breeding sett. Annex setts or outlier setts are smaller and may only be used intermittently or seasonally. An active main sett is characterised by considerable signs of activity, such as copious bedding, nearby latrine (defecation) sites, and well-used paths. Studies in several Irish counties have shown that territory size can vary from as little as 15ha to almost 300ha, with a mean of about 80ha. A review of data available on the National Biodiversity data centre website indicates that Badger setts have been recorded previously within 1km of the proposed development.

Records of six Badger latrines and one print were recorded within the study area (construction works area plus 50m) of the Mountphilips Substation site during surveys undertaken in April 2017, however no confirmed active setts were identified. A Badger print was recorded within the study area along the 110kV UGC works boundary at Knockcurraghbola Commons in 2017 – however no evidence of an active sett was recorded.

Outside of Mountphilips, surveys undertaken in January and May 2019 of the 110kV UGC route found no Badger setts within 50m of the route, nor at the location of the previous 2017 print recorded at Knockcurraghbola Commons. No other evidence in the form of scat, prints and latrines were noted during the survey. No animals were observed, however this is typical in respect of a nocturnal species.

The distribution of recorded Badger evidence is identified on **Figure GC 8.9: UWF Grid Connection Study Area for Non-Volant Mammals (Overview and Maps 1 to 2)**.

Other Mammals:

Fallow Deer are generally found mainly in mature deciduous or mixed woodlands close to open grassland. Red Squirrel is mainly found in coniferous or mixed woodland. Pine Marten generally occur in coniferous or mixed forestry and scrub. Red Fox is found in a wide range of habitats, while Irish Hare is generally found in bog, moor, heath and marsh in addition to mixed farmland, pastoral farmland and more marginal habitats. Hedgehog are associated with edge habitat and pasture, with coniferous woodland, marsh and arable land being least favourable. However, in rural Ireland, hedgehogs select arable land prior to hibernation to build up fat reserves. Irish stoat occur in habitat with suitable cover, in natural areas such as woodland as well as urban areas.

Evidence of Red Fox was noted at two locations at Mountphilips, consisting of a print and scat. Two small mammal burrows were recorded adjacent to watercourses along the 110kV UGC route; these were identified as likely to be Rat burrows, as no Otter slides from the burrow were present. Two locations of Deer tracks/droppings were recorded within the 50m study area of the Mountphilips Substation site during surveys undertaken in April 2017. These are likely to be from Fallow Deer.

Evidence of Deer Species was noted at two locations, one at Mountphilips Substation and another at Upperchurch Substation, both consisting of tracks and droppings.

Evidence of Pine Martin was noted at the Consented UWF Substation.

Non Volant Mammals	<p>Evidence of Red Squirrel was noted at Mountphilips Substation site, consisting of evidence of feeding.</p> <p>While no confirmed evidence of Fallow Deer, Irish Hare, Pine Marten and Red Squirrel was recorded along the 110kV UGC, they are likely to be present throughout the receiving environment due to the presence of suitable habitat within the study area, including grassland, heath and bog, and coniferous and broadleaved woodland.</p> <p>The location of recorded evidence of Non Volant Mammal records are identified on Figure GC 8.9: UWF Grid Connection Study Area for Non-Volant Mammals (Overview and Maps 1 to 2).</p> <p>The invasive Greater White-toothed Shrew is known to occur in the wider area and is considered as present within suitable habitat (grassland and woodland). A Greater White-toothed Shrew corpse was found at the Mountphilips Substation location. The invasive American Mink is also considered as present in suitable habitats (slow moving waterbodies such as rivers, lakes, ponds or streams and their adjacent habitat).</p> <p>Further details on Non-Volant Mammals fieldwork and survey results are included in Appendix 8.8: Bat & Non-Volant Mammals Data.</p>
	Sensitive Aspect
8.9.1.3 Importance of Non-Volant Mammals	
<p>All native mammals are protected by legislation under the Wildlife Act, 1976 and the Wildlife (Amendment) Act, 2000.</p> <p>Otter, Badger, Pine Marten, Red Squirrel, Irish Hare, Hedgehog and all deer species are afforded protection under the Wildlife Act (as amended). Otter, Pine Marten and Irish hare are also protected under the EU Habitats Directive 92/43/EEC. Otter is further protected under the Convention on Trading in Endangered Species. <u>Otter</u> is also listed as a qualifying interest of the Lower River Shannon SAC and, hence, is evaluated as of International Importance, which is equivalent to a Very High sensitivity rating.</p> <p>The following mammals are afforded protection under the Bern Convention (Convention on the Conservation of European Wildlife and Natural Habitats): Otter, Pine Marten, Irish Hare, Badger, Red Squirrel, Hedgehog and Irish Stoat.</p> <p>Local populations of Irish Hare and Badger are evaluated as of Local Importance (Higher Value), which is equivalent to Low sensitivity, as it is considered unlikely that based on recorded evidence, those populations which occur in close proximity to the proposed development comprise 1% or more of the County population.</p> <p>Local populations of Pine Marten, Red Squirrel, Hedgehog, and Irish Stoat are evaluated as Local Importance (Higher Value), which is equivalent to Low sensitivity, due to their protection under the Wildlife Act.</p> <p>Red Fox is not protected under the Wildlife Act and is therefore evaluated as Local Importance (lower Value) and does not require further evaluation. Fallow Deer is listed as a High Impact Invasive Species under the European Communities (Birds and Natural Habitats) Regulations 2011 in Republic of Ireland. Local populations of Fallow Deer are evaluated as Local Importance (lower value), which is equivalent to Negligible sensitivity, due to their non-native status and do not require further evaluation.</p> <p>The Greater White-toothed Shrew is an Amber-listed invasive species rated as ‘medium risk’ however their impact on conservation goals remains uncertain due to lack of data (Kelly et al., 2017). As an invasive species no importance evaluation is assigned to this species. As a high impact invasive species American Mink is similarly not assigned an importance evaluation.</p>	
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8.9.1.4 Sensitivity of Non-Volant Mammals

The conservation status of each of the protected species recorded or assumed to be present in the study area was obtained from the International Union for Conservation of Nature (IUCN) red list, the Habitat Directive Article 17 Reporting, and the NPWS 2009 Red List for Mammals. According to the IUCN Red List: all mammals recorded/assumed to be present are listed as 'Least Concern', with the exception of Otter which is listed as 'Near Threatened'. According to Habitats Directive Article 17 Reporting: Otter, Pine Marten and Irish Hare are all listed as having 'Favourable' conservation status. According to the Irish (NPWS 2009) Red List: Otter and Red Squirrel are classified as 'Near Threatened', while the remaining mammal species are 'Least Concern'.

All mammals are sensitive to the direct effects from disturbance/displacement from breeding and foraging ranges as a result of noise and visual intrusion. Some species show variable or flexible responses such as Otter where research from English Nature (Chanin, 2013) suggests indicate that Otters will rest under roads, in industrial buildings, close to quarries, and at other sites close to high levels of human activity.

Mammals are also sensitive to habitat loss and additive mortality from inadvertent contact with operating machinery or vehicles.

Otter: The National Parks & Wildlife Service's Threat Response Plan for the Otter (NPWS, 2009), a review of and response to the pressures and threats to Otters in Ireland, categorized three principal risks implicated in Otter declines across Europe: i) habitat destruction and degradation; ii) water pollution; and, iii) accidental death and/or persecution. Biodiversity Ireland identifies roads, motorways, professional passive fishing, pollution to surface waters, along with the removal of riparian habitats and a decline in eel numbers as the main threats to Otter.

Badger: Setts are sensitive to land take/machinery operations within 30-50m of sett location due to the potential for inadvertent disturbance and/or mortality with distances increasing to 150m if activities such as piling or blasting are proposed (none in this instance). Habitat loss greater than 25% of any social group's territory size is deemed as significant. Disturbance to foraging individuals when foraging from construction noise and visual intrusion especially during periods of night time working. Habitat loss or the construction of significant barriers may also dissect territories. The Department of Agriculture, Food and the Marine has previously conducted vaccination trials of Badgers in certain counties in Ireland and carries out culling in areas where severe cattle TB outbreaks occur. Badgers may also be killed or injured by road traffic as they attempt to access foraging areas- a review of roadkill records on the Biology.ie website³⁹ found no submitted records of badger mortality on roads which overlap the proposed development.

Pine Marten: Biodiversity Ireland identifies the main threat to Pine marten as forest and plantation management and use, roads and motorways, and predator control/incidental poisoning, along with habitat loss and fragmentation are the most serious threats.

Irish Hare: Biodiversity Ireland identifies the main threat to Irish hare as the modification of cultivation practices and intensive mowing or intensification of farming are identified as high-level threats to Irish hare. Other threats include invasive species, roads and motorways, urbanised areas/human habitation, and hunting, along with habitat loss and fragmentation leading to isolation and inbreeding. Climate change is also identified as a threat, affecting competitive relationships between Irish Hare and Brown Hare species.

8.9.1.5 Trends in the Baseline Environment (the 'Do-Nothing' scenario)

Available trends on general Irish mammals are limited however the most recent 'red list' (Marnell et al., 2009) has judged most of Ireland's terrestrial mammal species to be of 'least concern'. Otter and Red Squirrel are

³⁹ Biology.ie, Road Kill Survey, National Biodiversity Data Centre, Ireland, accessed 24 July 2019, <<https://maps.biodiversityireland.ie/Dataset/44>>

considered near threatened.

Article 17 reporting suggests there appears to have been a genuine improvement in the status of Otter in Ireland with future prospects evaluated as ‘favourable’ (NPWS, 2019). The Badger population is currently stable in Ireland, estimated in Northern Ireland as 33,500 (Reid et al., 2008) and in the Republic of Ireland as 84,000 (Sleeman et al., 2009). The Pine Marten population is thought to be increasing, and is estimated at 3-10,000 mature individuals (O’Mahony et al., 2007). Future prospects are evaluated as ‘favourable’ (NPWS, 2019).

Trends in respect of Greater White Toothed Shrew suggest the species is expanding its range by an average of 5.5 km/year (McDevitt et al., 2014). American Mink distribution in Ireland is also expected to continue to increase (Roy et al., 2009).

A scenario in which this proposed project does not take place would result in a continuation of current trends relating to Non-Volant Mammal species within the study area. Populations of mammals would be expected to remain as described above, i.e. favourable in the case of Otter, in line with prospects nationally, stable in the case of Badger etc.

8.9.1.6 Receiving Environment (the Baseline + Trends)

It is assumed in this report that the baseline environment in relation to Non-Volant Mammal species, as described herein, will be the receiving environment at the time of construction with ongoing trends as identified expected to be reflected during the operational phase.

8.9.2 CUMULATIVE INFORMATION - Cumulative Projects & Baseline Characteristics

8.9.2.1 Cumulative Evaluation Study Area

8.9.2.1.1 UWF Grid Connection Cumulative Evaluation Study Area

The UWF Grid Connection was evaluated for cumulative effects with other projects and the study area is set out in the table below.

UWF Grid Connection Cumulative Evaluation Study Area for Non Volant Mammals	Justification for the Study Area Extents
<p>Otter: Watercourse crossing locations plus 600m in either direction</p> <p>Badger and Others: 100m around and incorporating UWF Grid Connection construction works area.</p>	<p>The study area is doubled to identify those Other Elements (or Other Projects or Activities) which may cause cumulative effects to Non-Volant Mammals with UWF Grid Connection.</p>

The study is illustrated on [UWF Grid Connection Cumulative Evaluation Study Area for Non-Volant Mammals \(Overview and Maps 1 to 2\)](#).

8.9.2.1.2 Whole Project Cumulative Evaluation Study Area

UWF Grid Connection is part of a whole project which comprises the following Other Elements; Element 2: UWF Related Works, Element 3: UWF Replacement Forestry, Element 4: Upperchurch Windfarm (UWF), and Element 5: UWF Other Activities. The Subject Development, UWF Grid Connection is Element 1. All five elements are collectively referred to as the Whole UWF Project in this EIA Report.

The Other Elements must be considered because UWF Grid Connection is part of a whole project. Therefore, the cumulative information and evaluations for the Other Elements of the Whole UWF Project are included in order to present the totality of the project.

A description of these Other Elements is included in this EIA Report at [Appendices 5.3, 5.4, 5.5 and 5.6](#), in [Volume C4 EIAR Appendices](#). Scoping of these Other Elements is presented in [Section 8.9.2.2.1](#) below.

The Whole Project Cumulative Evaluation Study Area comprises of the UWF Grid Connection Study Area along with the study areas for Other Elements which are described in Table 8-73 and illustrated on [Figure WP 8.9: Whole Project Study Area for Non-Volant Mammals \(Overview and Maps 1 to 2\)](#) (Volume C3 EIAR Figures).

Table 8-73: Whole Project Cumulative Evaluation Study Area for Non-Volant Mammals

Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
Element 1: UWF Grid Connection	<p>Otter: Watercourse crossing locations plus 300m in either direction</p> <p>Badger and Other: construction works area, afforestation lands, activity locations plus 50m in all directions</p>	<p>Professional Judgement and as pertinent:</p> <p>Otters: Best Practice guidelines published by the Highways Agency (1999)</p> <p>Badgers: Best Practice guidelines published by the NRA (2005)</p> <p>Other mammal species professional judgement and as per Best Practice (CIEEM, 2016).</p>
Element 2: UWF Related Works		
Element 3: UWF Replacement Forestry		
Element 4: Upperchurch Windfarm (UWF)		
Element 5: UWF Other Activities		

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8.9.2.2 Overview of Other Elements, Other Projects or Activities

The evaluation of cumulative impacts to Non-Volant Mammals also considered Other Projects or Activities. A scoping exercise was carried out to determine which projects or activities, if any, have potential to cause cumulative effects to Non-Volant Mammals with either the UWF Grid Connection or the Other Elements of the Whole UWF Project and therefore should be brought forward for evaluation in this topic chapter. A brief overview of the Other Projects or Activities and the scoping exercise by the topic authors is included in [Appendix 2.1: Scoping of Other Projects or Activities for Cumulative Evaluations \(Section A2.1.4.11\)](#).

The results of this scoping exercise are that: it is evaluated that no Other Projects or Activities are likely to cause cumulative effects with either the UWF Grid Connection or the Other Elements of the Whole UWF Project, and therefore no Other Projects or Activities are scoped in for evaluation of cumulative effects to Non-Volant Mammals.

8.9.2.2.1 Potential for Impacts to Non-Volant Mammals

An evaluation was carried out by the topic authors of the likelihood for the Other Elements of the Whole UWF Project to cause cumulative effects to the Sensitive Aspect Non-Volant Mammals. The results of this evaluation are included in Table 8-74.

The location of, and study area boundary associated with, the Other Elements which are included for cumulative evaluation is illustrated on [Figure WP 8.9](#). The baseline character of the areas around these Elements is described in Section 8.9.2.2.3.

Table 8-74: Results of the Evaluation of the Other Elements of the Whole UWF Project

<u>Other Element of the Whole UWF Project</u>	
Element 2: UWF Related Works	<u>Included</u> for the evaluation of cumulative effects
Element 3: UWF Replacement Forestry	<u>Included</u> for the evaluation of cumulative effects
Element 4: Upperchurch Windfarm (UWF)	<u>Included</u> for the evaluation of cumulative effects
Element 5: UWF Other Activities	<u>Included</u> for the evaluation of cumulative effects

8.9.2.3 Cumulative Information: Baseline Characteristics – Context & Character

8.9.2.3.1 Element 2: UWF Related Works

Survey Results

Otter: No Otter evidence was recorded within the UWF Related Works study area.

Badger: No Badger setts were recorded during studies for UWF Related Works.

Other species: Fallow Deer (found mainly in mature deciduous or mixed woodlands close to open grassland), Red Fox (found in a wide range of habitats) and Irish Hare (found in bog, moor, heath and marsh in addition to mixed farmland, pastoral farmland and more marginal habitats) are present. Pine Marten was not recorded during UWF Related Works surveys but is assumed to occur in suitable habitat where it occurs.

The locations of mammal evidence recorded during surveys are identified on [Figure WP 8.9: Whole Project Study Area for Non-Volant Mammals \(Overview and Maps 1 to 2\)](#).

8.9.2.3.2 Element 3: UWF Replacement Forestry

Survey Results

Otter: No Otter evidence was recorded within the UWF Replacement Forestry study area.

Badger: No Badger setts were recorded within the UWF Replacement Forestry study area. A single print was recorded at ITM 594687 661526 within the study area, along a muddy farm track.

Other Species: Fallow Deer and Red Fox were recorded at UWF Replacement Forestry. Pine Marten was not recorded. Irish Hare was not recorded but assumed to be present.

The locations of mammal evidence recorded during surveys are identified on [Figure WP 8.9: Whole Project Study Area for Non-Volant Mammals \(Overview and Maps 1 to 2\)](#).

8.9.2.3.3 Element 4: Upperchurch Windfarm

Survey Results

Otter: As per the 2013 EIS, no Otter was recorded during surveys at the Upperchurch Windfarm site

Badger: As per the 2013 RFI, within the Upperchurch Windfarm a disused single entrance sett has been described approximately 250m southwest of T7 and a single disused entrance badger sett was recorded along a field boundary 150m west of T4. Evidence of Badger foraging was recorded in prior surveys for the 2013 RFI.

Other Species: Evidence of Fallow Deer was recorded previously within the Upperchurch Windfarm (as per the 2013 RFI). Irish Hare does occur and was observed during RFI studies. Red Fox and Pygmy shrew were recorded as present. There were no records of pine marten (*Martes martes*), hedgehog (*Erinaceus europaeus*) and Irish stoat (*Mustela erminea subsp. Hibernica*) during surveying, though the habitats within the windfarm site offer potential habitat for the species.

The locations of mammal evidence recorded during surveys are identified on Figure WP 8.9.

Consideration of the Passage of Time: The makeup of suitable habitat for badger, otter and other mammals on the Upperchurch Windfarm site has not materially changed since 2012/2013, and surveys for UWF Related Works confirmed a low usage of the windfarm area by these species. Therefore it is considered that the descriptions in the 2013 and 2014 documents for Upperchurch Windfarm remain relevant to the cumulative evaluations in this 2019 EIAR for UWF Grid Connection.

8.9.2.3.4 Element 5: UWF Other Activities

Haul Route Activity Locations:

No mammal evidence was recorded. This is as expected given that the locations of activities generally occur in immediate proximity to or overlap public roads.

Overhead Line Activity Locations:

Incidental records of mammal signs and individuals were made during surveys (January 2018) within the Overhead Line Activities study area, findings of note are summarised below, and identified on Figure WP 8.9.

An old Otter Holt was recorded within the bank of a drainage ditch in the townland of Killonan. An otter pathway located 80 metres west of Angle Mast AM3 was recorded between the Groody River and an adjoining stream, also in the townland of Killonan.

No active Badger setts were recorded within close proximity to the poles. An old badger sett was recorded within the hedgerow 180 metres north east of Angle Mast AM78, in the Mountphilips townland.

Additional mammals noted included Fox, Fallow Deer, and Rabbit. Mammal pathways were recorded frequently within hedgerows and through treelines. These could be used by a number of mammal species.

8.9.2.3.5 Other Projects or Activities:

Not applicable – No Other Projects or Activities were scoped in for evaluation of cumulative effects, see Section 8.9.2.1.

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8.9.3 PROJECT DESIGN MEASURES for Non-Volant Mammals

At the conception of the UWF Grid Connection, the design team evaluated the potential for significant impacts to the environment. Impacts will only take place where three components exist together; (1) the source of the impact (project), (2) the receptor of the impact (sensitive aspect) and (3) a pathway between the source and the sensitive aspect. The objective of mitigation measures is to avoid, prevent or reduce, one of the three components of an impact by choosing an alternative location, alternative design or an alternative process.

Potential or likely significant impacts were avoided, prevented or reduced by integrating mitigation measures into the fundamental design of the development – these are the Project Design Environmental Protection Measures, which are shortened to ‘Project Design Measures’ in this EIA Report.

The development as evaluated in the EIA Report incorporates the Project Design Measures.

The Project Design Measures outlined in Table 8-75 are relevant to the Environmental Factor, Biodiversity, and in particular to the sensitive aspect **Non-Volant Mammals**.

Table 8-75: UWF Grid Connection Project Design Measures relevant to Non-Volant Mammals

PD ID	Project Design Environmental Protection Measure (PD)
PD04	All construction works will be carried out during daylight hours.
PD05	At the Mountphilips Substation site, construction traffic will be restricted to the construction works area and tracking across adjacent ground will not be permitted. A speed limit of 25km/hr for all traffic/machinery will be implemented at the Mountphilips Substation site. Outside of Mountphilips Substation site, all construction will be restricted to the paved road surfaces or built surfaces along the 110kV UGC. A speed limit of 50km/hr for all delivery and construction traffic will be implemented on Local Roads (‘L’ roads).
PD52	Confirmatory surveys for active Otter holts and breeding activity will be carried out 150m upstream and downstream of watercourse crossing locations including those watercourses evaluated as unsuitable for Otter in the current appraisal.
PD53	All construction works within 150m of an active otter holt, will be carried out during daylight hours and outside of 2 hours after sunrise or before sunset during summer and outside of 1 hours after sunrise or before sunset during winter.
PD54	If an active holt (particularly holts at which breeding females or cubs are present) is located within 150 meters of the watercourse crossing points, no works will be undertaken while breeding females or cubs are present in the holt and NPWS will be notified immediately
PD55	No wheeled or tracked vehicles (of any kind) will be used within 20m of active, but non-breeding otter Holts, and light work, such as digging by hand will not take place within 15m of such holts, except under license.
PD56	The prohibited area associated with otter holts, should they be located in confirmatory surveys, will, where appropriate, be protected from any inadvertent disturbance from any works or personnel occurring nearby such as at a bridge and declared as ‘Ecology Restriction Zone’ with no mention of otters to any onsite staff. Appropriate awareness of the purpose of the excluded area will be conveyed through toolbox talks with site staff and sufficient signage will be placed on each possible access point. All contractors or operators on site will be made fully aware of the procedures pertaining to Ecology Restriction Zones and subject to audits and non-conformance records in the event of non-compliance, to be included in reports submitted to Local Authorities and relevant Statutory Consultees.
PD67	No badger setts were recorded within 50m of the UWF Grid Connection during pre-planning surveys. Confirmatory surveys will be carried out within 50 m of either side of the construction works area boundary to determine if any new setts have been established in the intervening period following initial pre-planning surveys and the commencement of construction activity. These confirmatory badger surveys will be undertaken no more than 12 months in advance of proposed construction activities, during the period November and April when vegetation cover is reduced. Should a badger

sett be confirmed, the following measures will be implemented: NWPS will be notified immediately of any new active setts which are located within 50 meters of the footprint of the development; If sett exclusion is required, this will be undertaken by an experienced ecologist under the necessary license and following best practice guidance (NRA, 2005); No construction works will be carried within 50m of an active badger sett during the main breeding season (December 1st to June 30th); and Construction activity in the environs of an active badger sett outside of the breeding period will follow NRA (2005) guidelines, i.e. no heavy machinery will be used within 30m of badger setts (unless carried out under license); lighter machinery (generally wheeled vehicles) will not be used within 20m of a sett entrance; light work, such as digging by hand will not take place within 10m of sett entrances.

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Cumulative Information: Potential or likely significant impacts caused by the Other Elements of the Whole UWF Project were avoided, prevented or reduced by incorporating Project Design Measures into the fundamental design of the UWF Related Works, UWF Replacement Forestry and UWF Other Activities and into the consented design of the Upperchurch Windfarm. These Project Design Measures are included in the description of these Elements, and can be found in this EIA Report in [Appendices 5.3, 5.4, 5.5 and 5.6](#), in [Volume C4: EIAR Appendices](#).

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8.9.4 EVALUATION OF IMPACTS to Non-Volant Mammals

In this Section, the likely direct and indirect effects of the UWF Grid Connection are identified and evaluated. Then the likely cumulative effects of the UWF Grid Connection together with the Other Elements of the Whole UWF Project are identified and evaluated.

A conceptual site model exercise was carried out to facilitate the identification of source-pathway-receptor links between the project (source) and the sensitive aspect (receptor) - Non-Volant Mammals.

As a result of the exercise, some impacts were included and some were excluded.

Table 8-76: List of all Impacts included and excluded from the Impact Evaluation Table sections

Impacts Included (Evaluated in the Impact Evaluation Table sections)	Impacts Excluded (Justification at the end of the Impact Evaluation Table sections)
Otter: Disturbance/Displacement (construction stage)	Otter – Loss of Habitat, (construction stage)
Badger: Habitat Loss (construction stage)	Secondary Mortality of Otter, (construction stage)
Badger: Disturbance/Displacement (construction stage)	Otter – Habitat Degradation, (construction stage)
	Badger - Secondary Mortality, (construction stage)
	Badger – Secondary Mortality, (construction stage)
	Badger – Temporary Loss of Habitat, (construction stage)
	Irish Hare, Pine Marten, Red Squirrel, Hedgehog, Irish stoat, and Fallow Deer - Secondary Mortality, (construction stage)
	Irish Hare, Pine Marten, Red Squirrel, Hedgehog, Irish stoat, and Fallow Deer: Habitat Loss, (construction stage)
	Irish Hare, Pine Marten, Red Squirrel, Hedgehog, Irish Stoat and Fallow Deer: Disturbance/Displacement, (construction stage)
	General Non-Volant Mammals: Introduction or spread of invasive species- White Toothed Shrew, (construction stage)
	General Non-Volant Mammals: Introduction or spread of invasive species- White Toothed Shrew, (operational stage)
	General Non-Volant Mammals: Disturbance/Displacement, (operational stage)
	General Non-Volant Mammals: Introduction or spread of invasive species- White Toothed Shrew, (decommissioning stage)
	General Non-Volant Mammals: Disturbance/Displacement (decommissioning stage)

The source-pathway-receptor links for included impacts are described in the Impact Evaluation Tables in the next sections. **The Impact Evaluation Tables are presented in the following sections 8.9.4.1 to 8.9.4.3.**

The source-pathway-receptor links and the rationale for excluded impacts are described in the section directly after the Impact Evaluation Table sections, in Section 8.9.4.4.

8.9.4.1 Impact Evaluation Table: Otter - Disturbance/Displacement

Impact Description

Project Life Cycle Stage: Construction stage

Impact Source: noise and human disturbance; visual intrusion

Cumulative Impact Source: Noise and Visual Intrusion

Impact Pathway: Air and visibility

Impact Description: Otter are rated as a very high sensitivity receptor (based on International importance ratings) and do not tolerate disturbance at or near holts (breeding dens) that are in active use (breeding may occur at any time of the year, but most likely during the Summer/early Autumn period). When Otters are not breeding, records suggest that Otters are less sensitive to human disturbance (Chanin, 2013). As no active holts were located within 300m (upstream or downstream) of works locations in proximity to suitable Otter habitat (i.e. at watercourse crossing locations) then effects are reduced to disturbance/displacement of foraging or resting animals, primarily within aquatic habitats but also within adjacent riparian corridors. This could include the disturbance of animals at resting places (couches). It is also noted that watercourses are present which form part of or are hydrologically connected to European Sites (SAC's) which include Otter as a Qualifying Interest.

These effects are reduced by an adherence to completing works during daylight hours only as part of Project Design.

Impact Quality: Negative

Evaluation of the Subject Development Impact – Otter: Disturbance/Displacement

Element 1: UWF Grid Connection – direct/indirect impact

Impact Magnitude:

Out of the 68 watercourse crossings along the UWF Grid Connection route, 26 watercourses were identified from surveys of all watercourse crossing locations, as having potential to support Otter and were therefore surveyed 300m upstream and downstream of the crossing for the presence of Otter. Out of these 26 watercourses surveyed, evidence of Otter was found at three watercourse crossings locations or their environs (W33, W36 and W53). No active breeding or resting sites (Holts or Couches) were identified, however.

The evidence of Otter found at three watercourse crossings locations (W33, W36 and W53) relates to a total of four records of Otter within the UWF Grid Connection study area, consisting of slides and spraints. One of the four records was recorded along the River Bilboa within the Lower River Shannon SAC, and consisted of an Otter slide, recorded approximately 60 metres downstream of watercourse crossing W53. Two records were recorded along the Tooreenbrien Lower River, consisting of an Otter spraint approximately 45 metres downstream of watercourse crossing W33 with an Otter print recorded underneath the W33 bridge structure. The fourth Otter record relates to an Otter slide which was recorded along the Annagh (Clare) River, approximately 135 metres upstream of watercourse Crossing W36. No Otters were observed, although this is typical in respect of a species where most activity takes place at night.

110kV UGC works over, and in close proximity to W33, W36 and W53 will involve the excavation of cable trenches and installation of ducting, and reinstatement of the trench. No instream works or culvert replacement works will be required at any of these crossings with the 110kV UGC installed in the road over the existing bridge structures, and although the parapet walls will need to be raised/built higher at W36 and W53, these works are not expected to be longer than 2 weeks in duration with all works to parapet walls taking place from the road surface over the bridges.

Considering the temporary duration of works at watercourse crossings and the scale of the proposed works, along with measures in place during works (Volume D, Tab 10, GC-OCM-17: Raising road level and parapet walls at Rockvale Bridge (W6), Tooreenbrien Bridge (W36) and Anglesey Bridge (W53)) the magnitude of impact in

Non Volant Mammals	relation to disturbance of Otter is expected to be negligible. When the absence of holts within 300m is taken into account, it is considered that disturbance/displacement impacts to breeding Otter are unlikely to occur.
	Significance of the Impact: Slight
Sensitive Aspect	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • The very high sensitivity <u>rating</u> of the species, and Negligible magnitude of impact; • Recorded Otter evidence in close proximity to 3 identified crossings, in particular W53 where parapet works will take place over the Lower River Shannon SAC, however; • No Holts or resting places occur in close proximity, and; • Works will take place during daylight hours, and from the surface of the bridge only, with; • In the context of works at larger watercourses will take place in an existing public road subject to the passage of traffic, to which Otter will be habituated; • The brief-temporary duration of disturbance events and any corresponding effect, with • Effects expected to be reversible, and; • Project design measures to avoid/reduce effects also in place, including at all watercourse crossing locations.
	Element 1: UWF Grid Connection – cumulative impact
	<p><u>Cumulative Impact Magnitude:</u> There is potential for cumulative effect where the UWF Grid Connection comes in close proximity to the UWF Related Works and Upperchurch Windfarm construction works areas. Six of the seven watercourse crossings (W62-W68) within the zone of overlap with UWF Related Works and Upperchurch Windfarm and which are associated with the UWF Grid Connection are Class 4 drains which have marginal habitat value to Otter, with limited prey availability (no fisheries potential). No evidence of Otter at the remaining watercourse crossing (W65-Class 2 indicating high fisheries potential) was recorded in studies to date. This crossing is also outside the Lower River Shannon SAC (designated for Otter) catchment. Therefore, the magnitude of cumulative impacts in relation to disturbance of Otter is expected to be negligible. When the absence of holts within 300m is taken into account, it is considered that disturbance/displacement impacts to breeding Otter are unlikely to occur.</p>
	Significance of the Impact: Imperceptible
	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • 6 of the 7 watercourses within the zone of cumulative impacts are drains, with the remaining 1 watercourse with potential to provide habitat, but no evidence of Otter recorded; • Works will take place during daylight hours only, and; • Be of brief-temporary duration, with; • Unlikely to occur with the application of project design measures for the protection of Otter.
Biodiversity	Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project
	Element 2: UWF Related Works
	<p><u>Impact Magnitude:</u> 32 No. watercourse crossings in total are required for UWF Related Works with instream works required at 25 No. of these crossings. Due to 75% of these watercourses being drains or marginal watercourses, and the absence of otter holts within 300m of the crossing points, impact magnitude is expected to be Negligible</p>
	<u>Significance of the Impact:</u> Neutral impact
Topic	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Application of project design measures for the protection of Otter, • No active holts were identified overlapping the construction area boundaries or within 300m, and; • Works will take place during daylight hours only, and;

<ul style="list-style-type: none"> • Be of brief-temporary duration.
Element 3: UWF Replacement Forestry
<u>Impact Magnitude</u> : No active holts or resting places were recorded in baseline studies and all planting will be done by hand. Therefore impact magnitude is expected to be Negligible.
<u>Significance of the Impact</u> : Neutral impact
<u>Rationale for Impact Evaluation</u> : <ul style="list-style-type: none"> • No active holts or resting places were recorded in baseline studies, and; • All planting will be done by hand, and; • Undertaken during daylight hours, and • Of temporary duration; • Any effect will be reversible, given the low magnitude of source disturbance.
Element 4: Upperchurch Windfarm
<u>Impact Magnitude</u> : No Otter were recorded during windfarm surveys; therefore the impact magnitude of any disturbance is expected to be Negligible.
<u>Significance of the Impact</u> : Neutral impact
<u>Rationale for Impact Evaluation</u> : <ul style="list-style-type: none"> • No active holts or resting places were recorded in baseline studies for the windfarm; • watercourses in the windfarm area generally comprise drains which have marginal habitat value to otter and; • works will be of temporary duration.
Element 5: UWF Other Activities
<u>Impact Magnitude</u> : No otter holts or resting places were recorded at Haul Route Activity locations, and the locations of Overhead Line activities and the nature of the activities themselves will not differ from the existing baseline maintenance regime, no upgrades to watercourse crossings will be required, and activities will all be of brief duration and only during daylight hours. Therefore, the impact magnitude is expected to be Negligible
<u>Significance of the Impact</u> : Neutral impact
<u>Rationale for Impact Evaluation</u> : <ul style="list-style-type: none"> • No otter holts or resting places were recorded at Haul Route Activity locations, and; • Locations of Overhead Line activities and the nature of the activities themselves will not differ from the existing baseline maintenance regime, no upgrades to watercourse crossings will be required, and activities will all be of brief duration and only during daylight hours; • The offsetting effects of long-term management activities for the Upperchurch Hen Harrier Scheme which will promote and enhance existing Otter habitat – including the enhancement of riparian corridors. • The low reversibility of the above described management.
Evaluation of Other Cumulative Impacts – Otter: Disturbance/Displacement
Whole UWF Project Effect
<u>Magnitude</u> : Construction works involving the use of machinery and excavation work at watercourse crossing points (both existing and new crossing points) will occur across a c.23km wide area within the River Shannon and River Suir catchments. There is potential to cause disturbance or displacement of otter at larger watercourse crossing points. These larger watercourses occur along the UWF Grid Connection, whereas the watercourses on the UWF Related Works and Upperchurch Windfarm sites are mainly drains and larger drains/watercourses with marginal habitat value to otter. Sequential effects could occur where Otters foraging or transiting along watercourses

experience multiple sources of instruction/disturbance in quick succession such as encountering multiple work crews undertaking construction activities.

In relation to in-combination effects of the whole project, there is no potential for cumulative additive effects to Otters from both the UWF Related Works and the Upperchurch Windfarm due to the absence of Otter recorded at the watercourses within these sites. There is no potential for cumulative effects of the UWF Replacement Forestry with the Other Elements due to the Neutral effect of UWF Replacement Forestry. The magnitude of the in-combination effect of the whole project, where considered in its entirety is in the order of UWF Grid Connection – i.e. Negligible. In total 3 no. watercrossing points (W33, W36 and W53) along the public road had signs of Otter use within 300m, the nearest of these crossing points (W53) is separated from UWF Related Works by ca.3km (to the nearest outlying works location (UWF Related Works HW7)- with most locations ca.4km or more) and Upperchurch Windfarm by ca.4km, therefore there is no likelihood of additive cumulative effects to individual Otters from both the UWF Grid Connection works and UWF Related Works or Upperchurch Windfarm works.

Significance of the Whole Project Effect: Slight

Rationale for Impact Evaluation:

- Notwithstanding the separation distances between the 3-no. watercourse crossing locations along the UWF Grid Connection and the watercourse crossing locations associated with the UWF Related Works and Other Elements;
- The absence of Otter records at the UWF Related Works, UWF Replacement Forestry and Upperchurch Windfarm study areas;
- Works will take place during daylight hours, and will be brief-temporary in duration;
- The very high sensitivity of the species, and Negligible cumulative magnitude;
- in the context of crossing locations as part of UWF Grid Connection comprising trenching works or road/parapet raising works within existing bridges where the works overlap the Lower River Shannon SAC, which has Otter as a Qualifying Interest, with;
- Recorded evidence of Otter in close proximity, and
- Potential (albeit unlikely) for sequential effects

Note: No cumulative evaluation of Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to Non-Volant Mammals with either the UWF Grid Connection or the Other Elements of the Whole UWF Project (see Section 8.9.2.1).

8.9.4.2 Impact Evaluation Table: Badger - Habitat Loss

Impact Description

Project Life Cycle Stage: Construction stage

Impact Source: construction of new access roads and compounds.

Cumulative Impact Source: Excavations, construction of new access roads, compounds and hardstanding areas, afforestation

Impact Pathway: Land cover

Impact Description: Badger is evaluated as a Low Sensitivity receptor. Construction works can cause a permanent and temporary loss of some suitable foraging or breeding habitat in the form of grassland, woodland and/or hedgerows under the footprint of permanent structures such as access roads, compounds, and hardstanding areas, in addition temporary loss could occur as a result of groundworks and temporary access roads. Permanent structures may also dissect territories.

Loss of suitable foraging habitat, may affect body condition, survival rate and/or breeding capacity dependant on the percentage of loss within a groups territory (>25% is considered as significant) and the availability of other food resources. Badger studies indicate that the average territory size is ca. 80Ha (NRA, 2005).

Permanent land-use change of non-linear habitat features at the Mountphilips site will comprise 1.75Ha in total, the vast majority of which (1.7ha) is improved agricultural grassland (GA1), with the remaining 0.05ha comprising wet grassland (GS4). Temporary land-use change during construction will comprise 0.2ha of improved agricultural grassland (GA1). With respect to linear features such as treelines and hedgerow, it will be necessary to remove 160m of treeline at the substation site entrance to widen the entrance and provide sightlines. These will be reinstated by planting the equivalent amount of hedgerow and trees behind the new sightlines. It will be necessary to remove 40m of hedgerow to build the new access road. A new hedgerow, c.700m in length, will be planted on the berms on either side of the new permanent access road between the Site Entrance and Mountphilips Substation and around the substation compound; the sides of the berms will be seeded with native grass and wildflower species, for the benefit of biodiversity in the area. All new hedging will be locally sourced native hedgerow species, and the replacement trees will be native hedgerow species and at least 10 years old.

Badgers will benefit positively from varying degrees of hedgerow enhancement, the creation of new hedgerows and also the management of lands as part of the Upperchurch Hen Harrier Scheme (UWF Other Activities).

Impact Quality: Negative, Neutral

Evaluation of the Subject Development Impact – Badger: Habitat Loss

Element 1: UWF Grid Connection – direct/indirect impact

Impact Magnitude:

The potential for effects is limited to the Mountphilips Substation site as no land cover change is proposed along the 110kV UGC route outside of the Mountphilips Substation site.

No setts were recorded within 50m of the Mountphilips Substation site. Evidence of badger only relates to four Badger latrines and one print were recorded within the 50m buffer of the Mountphilips Substation site works boundary during surveys undertaken in April 2017. No active badger setts or other signs of Badger activity in the form of scat, prints and latrines were recorded during the baseline surveys in 2017 or 2019.

While no evidence of Badger activity was recorded, suitable foraging habitats, consisting of grassland, woodland and hedgerows were recorded within 50m of Mountphilips Substation site, and along the 110kV UGC (although no habitat loss associated with 110kV UGC), considering the widespread distribution of Badger in Ireland, and the presence of suitable foraging habitat within and in close proximity to the UWF Grid Connection study area, Badger are considered likely to forage in the area surveyed

Non Volant Mammals	<p>Seeing as the installation of the 110kV UGC will be confined to paved roads, and as hedgerows and/or treelines at the Mountphilips Substation site will be reinstated, the impact magnitude on Badger resulting from the loss of habitat is expected to be limited only to the Mountphilips Substation where land cover change will relate to the new permanent road, roadside berms and the Mountphilips Substation compound, comprising 1.75Ha in total, and considered to be low. Potential territory dissection is similarly limited to the Mountphilips Substation site, as all works outside of the Mountphilips Substation site will only take place in existing paved surfaces. At the Mountphilips Substation site, the new permanent access road could cause territory dissection, however the provision of gates on opposite sites of the new permanent access road in each of the three fields between the site entrance and the substation compound will limit any dissection effect to low magnitude.</p>
	<p>Significance of the Impact: Not Significant</p>
Sensitive Aspect	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • Low sensitivity and the low magnitude of foraging habitat landcover change; • No setts were recorded within the study area for UWF Grid Connection. • While badgers' cross roads to access feeding areas, they generally do not forage along roads, and are particularly unlikely to forage along a road as busy as the R503. • the brief duration of the works and the absence of significant habitat loss associated with the UWF Grid Connection • The extent of land cover change, within the context (less than 2%) of an average territory size of 80Ha, and; • Very slight contrast with baseline conditions is expected, notwithstanding • The permanent duration of land cover change at the Mountphilips Substation site, and; • Low reversibility
	<p>Element 1: UWF Grid Connection – cumulative impact</p>
	<p><u>Cumulative Impact Magnitude:</u> No cumulative habitat loss or habitat enhancement impacts are likely to occur due to the separation distance (c.22km) between the habitat loss/habitat enhancement for Mountphilips Substation and the habitat loss/habitat enhancement which is expected to occur at the sites of the Other Elements of the Whole UWF Project.</p>
	<p>Significance of the Impact: No cumulative impact</p>
	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> • C.22km separation distance between habitats affected by the UWF Grid Connection and the habitats affected by the Other Elements of the Whole UWF Project.
	<p>Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project</p>
Biodiversity	<p>Element 2: UWF Related Works</p>
	<p><u>Impact Magnitude:</u> The extent of suitable foraging habitat permanent loss relates to 0.5Ha of Spoil and Bare Ground, recolonising bare ground, improved agricultural grassland, wet grassland, Conifer plantation and Scrub, which will be permanently lost. In addition, 170m of hedgerow will also be lost, comprising primarily earthen banks.</p> <p>Temporary loss of foraging habitat from works such as internal windfarm cabling (4.6km in agricultural lands and 2.1km in forestry), Haul Route Works (widening of roadside verges for 1710m in total; temporary removal and reinstatement of 1035m of hedgerow and earthen banks which form roadside boundaries; permanent removal of 25m of roadside boundary and the construction of 290m temporary access roads on private lands), temporary Site Entrances (n=14), Temporary Access roads (up to 5.3km) and the storage of temporarily excavated material is also likely to occur during the construction stage and until vegetation has been re-established on reinstated lands.</p>
Topic	<p>No active Badger setts nor signs of foraging activity were recorded at the UWF Related Works study area in 2017. Habitats within 50m of UWF Related Works comprise a total of 171ha of land. Over 66% of this is improved agricultural grassland and 25% is closed canopy conifer plantation. Remaining habitats comprise various grassland or grassland and heath mosaics, in addition to scrub and remnant peatlands. The majority of the</p>

surrounding farmed area is permanent grassland, with livestock farming, dairying and beef cattle rearing ongoing.

It is considered that due to the small extent of permanent habitat loss, and full reinstatement of temporary land cover change, in the context of the low usage of the site by Badgers, that the magnitude of impact will be negligible

Significance of the Impact: Not Significant

Rationale for Impact Evaluation:

- Small extent of permanent habitat loss (0.5ha)
- No active Badger setts were recorded in baseline studies of the UWF Related Works locations (2017) or Upperchurch Windfarm locations (2012);
- No material contrast with baseline conditions is expected;
- In relation to Haul Route Works and UWF Grid Connection works, badgers are not likely to forage extensively or rely on roadside habitats;
- Temporary loss of habitats is reversible with the reinstatement of lands.

Element 3: UWF Replacement Forestry

Impact Magnitude:

4Ha of suitable foraging habitat for Badger in the form of improved agricultural grassland and wet grassland will undergo a permanent land cover change to a mixed species, native woodland, which will comprise tall trees and understory shrubs, along with wide ride lines, and a mix of tall grasses and scrub land cover maintained during the growth stage. The existing riparian habitat will be enhanced through the planting of Hazel, alder and willow species, and protected through the placement of fencing. The area to be created represents 5% of an average territory size (80Ha). The UWF Replacement Forestry will result in a permanent land cover change, to habitat also suitable for Badger resulting in a slight positive change to higher quality breeding and foraging habitat.

Significance of the Impact: **Slight (Positive)**

Rationale for Impact Evaluation:

- No setts were identified within the study area for UWF Replacement Forestry, but prints indicating a foraging range were noted, and;
- The extent of habitat change which is;
- A positive contrast with baseline conditions;
- With permanent duration, and;
- Low reversibility.

Element 4: Upperchurch Windfarm

Impact Magnitude:

As per the 2013 EIS: The total habitat loss for Upperchurch Windfarm is 9.65Ha, of which conifer plantations (WD4) is 1.18Ha. The remaining 8.47Ha area is suitable foraging habitat for Badger in the form of Improved agricultural grassland GA1, Wet Grassland GS4, Mosaic of Improved Grassland & Wet Grassland GA1/GS4, Mosaic Wet Heath & Upland Blanket Bog HH3/PB3, Acid Grassland GS3 and Mosaic Acid Grassland & Upland Blanket Bog GS3/PB3. The scale of land cover change is 1.6% of available habitat within the study area boundary of 536Ha.

Significance of the Impact: Not Significant

Rationale for Impact Evaluation:

- As per ABP Inspector's Report "Arising from my assessment above and based on the information available therefore I Conclude that the development will not give rise to Significant adverse effects on the environment and that ongoing impacts are limited in terms of scale and significance and can be remediated."

Non Volant Mammals	Element 5: UWF Other Activities	
	<u>Impact Magnitude:</u> No permanent land take of Badger foraging or breeding habitat.	
	<u>Significance of the Impact:</u> Neutral impact	
	<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> • Badgers are not likely to forage extensively or rely on roadside habitats, and; • No permanent land cover change will occur, and; • The brief duration of any temporary effects, with; • Very slight contrast with baseline conditions expected, and; • The reversibility of temporary habitat loss with reinstatement of roadside verges following delivery and; • Positive effects will accrue from land management as part of the Upperchurch Hen Harrier Scheme, and; • Overhead Line Activities will not require land take of suitable Badger habitat nor contrast with the existing environment. 	
Sensitive Aspect	Evaluation of Other Cumulative Impacts – Badger: Habitat Loss	
	Whole UWF Project Effect	
	<u>Magnitude:</u> Instances of foraging and or breeding habitat loss will occur across the UWF Grid Connection, UWF Related Works and Upperchurch Windfarm; total habitat loss across the Whole UWF Project areas will be c.10.72ha. The extent of habitat loss, within the context of an average territory size is less than 2% for all Elements of the Whole UWF Project. All habitat loss associated with UWF Grid Connection is confined to the Mountphilips Substation site which is too far removed, c.23km, to additively combine with the rest of the Whole UWF Project. The UWF Replacement Forestry will result in a permanent land cover change, to habitat also suitable for Badger resulting in a slight positive change to higher quality breeding and foraging habitat. Management activities as part of the Upperchurch Hen Harrier scheme, whilst targeted at Hen Harrier will also benefit and possibly attract Badgers to the area.	
	Significance of the Whole Project Effect: Not Significant	
Biodiversity	<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none"> • The extent of total land cover change, and; • Instances of foraging and breeding habitat loss will occur across the UWF Related Works, UWF Replacement Forestry and Upperchurch Windfarm. However, due to a negligible loss of habitat associated with the UWF Grid Connection, this element is not expected to have any noticeable cumulative impact with the other project elements due to separation distance. • The absence of badger setts, and therefore the absence of identified territories; • very slight contrast with baseline conditions is expected, and; • The long-term duration of permanent land cover change, with; • Low reversibility, is; • Offset by management activities as described 	
	Note: No cumulative evaluation of <u>Other Projects or Activities</u> is included in the table above, because <u>no</u> Other Projects or Activities are likely to cause cumulative effects to Non-Volant Mammals with either the UWF Grid Connection or the Other Elements of the Whole UWF Project (see Section 8.9.2.1).	
Topic		

8.9.4.3 Impact Evaluation Table: Badger - Disturbance/Displacement

Impact Description

Project Life Cycle Stage: Construction stage

Impact Source: Construction Noise and Visual Intrusion

Cumulative Impact Source: Noise and Visual Intrusion

Impact Pathway: Air and visibility

Impact Description: Badgers are low sensitivity receptors. Disturbance to or Displacement of Badgers may occur where construction works are in close proximity to occupied Badger Setts. Serious disturbance may cause an avoidance response and result in the mortality of cubs, which are typically underground during the months of January through to February prior to emergence in April. Outside of proximity to setts, disturbance may occur to foraging animals should works occur during nocturnal periods. Sequential effects could occur should foraging animals experience multiple source of noise/visual intrusion whilst e.g. foraging.

Works will be undertaken during daylight hours only as part of Project Design, which substantially reduces the potential for disturbance effects. No construction works will take place within 50m of an active badger sett in the main breeding season (December to June inclusive), as part of Project Design, should one be located during confirmatory surveys.

Impact Quality: Negative

Evaluation of the Subject Development Impact – Badger: Disturbance/Displacement

Element 1: UWF Grid Connection – direct/indirect impact

Impact Magnitude:

No active badger setts or other signs of Badger activity were recorded during the baseline survey of the UWF Grid Connection in 2019 and therefore the only evidence is that previously recorded within 50m of the Mountphilips Substation site (comprising four Badger latrines and one print) and a single paw print at Knockcurraghbola Commons.

Groundworks only relate to the Mountphilips Substation site, with works for the 110kV UGC, outside of the Mountphilips Substation site, located entirely along paved road surfaces. Therefore, effects are limited to the Mountphilips Substation site, and construction activities therein, as roadside habitat along the 110kV UGC (between the Mountphilips Substation site and the consented UWF Substation) is not expected to be used extensively or relied upon as foraging habitat by badger. The construction of the 110kV UGC will consist of brief effects confined to the existing public road, during daylight hours, and the magnitude of impact to badgers are therefore expected to be Negligible.

At the Mountphilips Substation site, suitable habitat, consisting of grassland and hedgerow, occurs with badger evidence previously recorded. Construction works will involve the widening of the existing entrance from the public road, the removal of hedgerow, the construction of a new permanent access road and substation compound, along with temporary works at the new End Mast locations, complete with boundary fencing. Construction works will be carried out during daylight hours (as per Project Design), therefore any disturbance/displacement effects are evaluated as Negligible as Badger as nocturnal.

Significance of the Impact: Imperceptible

Rationale for Impact Evaluation:

- The low sensitivity and the Negligible Magnitude
- The absence of badger setts within 50m of the UWF Grid Connection;
- Temporary duration of the works;
- Completion of works during daylight hours;

Non Volant Mammals	<ul style="list-style-type: none"> The majority of the works will be confined to the existing public road, with all works for the 110kV UGC carried out from paved surfaces only, and; Effects are unlikely to cause noticeable changes in the character of the environment.
	Element 2: UWF Grid Connection – cumulative impact
	<p><u>Cumulative Impact Magnitude:</u> No cumulative disturbance/displacement impacts are likely to occur due to the separation distance (c.22km) between any disturbance/displacement which may occur from works at Mountphilips Substation and any disturbance/displacement which may occur from works at the sites of the Other Elements of the Whole UWF Project. Potential for sequential effects during construction of the 110kV UGC will be avoided due to works taking place during daylight hours only and the limited evidence of Badger outside of Mountphilips.</p>
	<p>Significance of the Impact: No Cumulative Impact</p> <p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> C.22km separation distance between the sources of impact associated with the UWF Grid Connection and associated with the Other Elements of the Whole UWF Project.
Sensitive Aspect	Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project
	Element 2: UWF Related Works
	<p><u>Impact Magnitude:</u> No active Badger setts were identified in baseline studies of UWF Related Works, therefore it is considered unlikely that badgers will be disturbed by noise and visual intrusion during construction works.</p>
	<p><u>Significance of the Impact:</u> Neutral Impact</p> <p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> No active Badger setts were identified in baseline studies of UWF Related Works.
Biodiversity	Element 3: UWF Replacement Forestry
	<p><u>Impact Magnitude:</u> No impact</p>
	<p><u>Significance of the Impact:</u> Neutral Impact</p> <p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> No setts were identified within the study area, and All planting will be done by hand, undertaken during daylight hours, and; Of temporary duration; No contrast to baseline conditions is expected.
	Element 4: Upperchurch Windfarm
Topic	<p><u>Impact Magnitude:</u></p> <p>'Some noise and anthropogenic disturbance during the construction phase of the development'.</p>
	<p><u>Significance of the Impact:</u> Not significant</p>
	<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> No active setts were identified; Duration temporary. Impact from disturbance is expected to be mostly reversible post construction. As per the UWF EIS 2013 - it is probable that a negative impact to badger will not be significant.

Element 5: UWF Other Activities
<p><u>Impact Magnitude:</u> Impact magnitude is negligible as there will be no sources of disturbance/intrusion of sufficient magnitude to affect foraging Badger. No setts were located in close proximity to locations of activities.</p>
<p><u>Significance of the Impact:</u> Neutral impact</p>
<p><u>Rationale for Impact Evaluation:</u></p> <ul style="list-style-type: none"> No Badger setts were identified at Haul Route activity locations or within 50m of same. Overhead Line Activities at any one location will be brief-momentary in duration, conducted during daylight hours only, with no excavations and the use only of light vehicles. Activities pertaining to the Upperchurch Hen Harrier Scheme management prescriptions will be similar to existing agricultural activities.
Evaluation of Other Cumulative Impacts – Badger: Disturbance/Displacement
Whole UWF Project Effect
<p><u>Magnitude:</u> Construction works will occur across a c.23km wide area, which includes suitable foraging and breeding habitat for badger. However no active badger setts were identified within the UWF Grid Connection, UWF Related Works, UWF Replacement Forestry or Upperchurch Windfarm study areas.</p> <p>UWF Related Works, UWF Replacement Forestry and UWF Other Activities are expected to have Neutral Effects, while the effects of the consented Upperchurch Windfarm and the proposed UWF Grid Connection will not be significant.</p> <p>UWF Grid Connection, UWF Related Works and Upperchurch Windfarm will be undertaken during daylight hours only as part of Project Design, which substantially reduces the potential for disturbance effects.</p>
<u>Significance of the Whole Project Effect: Not Significant</u>
<p><u>Rationale for Cumulative Impact Evaluation:</u></p> <ul style="list-style-type: none"> The absence of active badger setts and badger records in the study areas; Project design measures to avoid/reduce effects on Badger, with Works completed during daylight hours only.

Note: No cumulative evaluation of Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to Non-Volant Mammals with either the UWF Grid Connection or the Other Elements of the Whole UWF Project (see Section 8.9.2.1).

8.9.4.4 Description and Rationale for Excluded (scoped out) Impacts

The source-pathway-receptor links and the rationale for impacts excluded from the Impact Evaluation Table sections are described in Table 8-77 below.

Table 8-77: Description and Rationale for Excluded Impacts to Non-Volant Mammals

Key: 1: UWF Grid Connection; 2: UWF Related Works; 3: UWF Replacement Forestry; 4: Upperchurch Windfarm; 5: UWF Other Activities

Source(s) of Impacts	Project Element	Pathway(s)	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
Construction Stage /Planting Stage				
Land take	1,2, 4,	Land cover	Otter: Loss of habitat	Evaluated as Excluded: There will be no permanent loss of aquatic habitat. Any loss of riparian habitat will be negligible (Elements 1, 2, 4), resulting in no contrast to baseline conditions and Neutral effects on Otter. No loss of aquatic habitat in relation to Elements 3, 5.
Operating Machinery, Construction Traffic	1,2,3,4,5	Direct Contact	Otter: Secondary Mortality	Evaluated as Excluded: Neutral effects. No holts or resting places are located within the works areas associated with Elements 1,2,3,4). Sources of mortality are therefore restricted to accidental collision with vehicles on roads, which is avoided through works only occurring in daylight hours.
Operating Machinery, construction/ trenching works near and at watercourses	1,2,3,4,5	Water pollution	Otter; Habitat degradation	Evaluated as Excluded: Due to the protection of water quality through project design measures, sources of significant habitat degradation and effects on secondary prey species are avoided.
Land take	1,2,3,4,5	Land cover	Badger: Temporary loss of habitat	Evaluated as Excluded: Some temporary loss will occur during construction works for UWF Grid Connection at Mountphilips Substation site, and for UWF Related Works and Upperchurch Windfarm; and as reinstatement will occur immediately following the completion of construction works in an area – effects will be Neutral
Operating Machinery	1,2,3,4,5	Direct Contact	Badger: Secondary Mortality	Evaluated as Excluded: Neutral effects, No setts are located within the construction works areas for UWF Grid Connection, UWF Related Works or Upperchurch Windfarm. Sources of mortality are therefore restricted to accidental collision with vehicles on roads, with effects avoided through an adherence to only working during daylight hours. Any increases in traffic are not considered likely to result in increased traffic led mortality, given existing habituation, low levels of mortality recorded on roads within the area.
Operating Machinery	1,2,3, 4,5	Direct Contact	Irish Hare, Pine Marten, Squirrel, Hedgehog, Red Irish	Evaluated as Excluded: Works will only be conducted during daylight hours. Potential Secondary mortality is limited to vehicular collision

Non Volant Mammals

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Source(s) of Impacts	Project Element	Pathway(s)	Impacts (Consequences)	Rationale for Excluding (Scoping Out)	Non Volant Mammals
			Stout and Fallow Deer - Secondary Mortality	on roads, and as such effects are considered unlikely.	
Land Take	1,2,3,4,5	Land Cover	Irish Hare, Pine Marten, Red Squirrel, Hedgehog, Irish Stout and Fallow Deer - Habitat Loss	<p>Evaluated as Excluded: Neutral Impacts</p> <p>In relation to UWF Grid Connection, permanent habitat loss is limited to that at Mountphilips Substation site and is considered negligible in the context of available habitat for these species overall. The loss of foraging habitat associated with UWF Replacement Forestry is offset by the provision of further breeding and foraging habitat through planting of deciduous woodland, and the enhancement measures proposed as part of the Upperchurch Hen Harrier Scheme (UWF Other Activities). Land take associated with UWF Related Works (Permanent land cover change of 0.28Ha (<1%) of available suitable foraging or breeding Pine Marten, Red Squirrel and Fallow Deer habitat (48Ha)) is negligible in the context of existing habitats. With respect to Upperchurch Windfarm no Pine Marten were recorded in studies to inform the EIS and the scale of habitat loss in respect of other species considered here is evaluated as negligible.</p> <p>No significant contrast to baseline conditions with positive gains is expected.</p>	Sensitive Aspect
Noise and Visual Intrusion	1,2,3,4,5	Air and Visibility	Irish Hare, Pine Marten, Red Squirrel, Hedgehog, Irish Stout and Fallow Deer - Disturbance /Displacement	<p>Evaluated as Excluded: Neutral Impacts</p> <p>Instances of disturbance may occur across all elements, cumulative impacts may occur where various Elements are located in close proximity to each other. However, the scale/magnitude of any disturbance response is evaluated as negligible. The spatial extent of any disturbance/displacement will be limited to the immediate vicinity of the construction area boundaries. Sequential effects are unlikely given the alternative habitat available. Habituation by these species to the existing use of the roads along the route of the UWF Grid Connection 110kV UGC precludes the potential for significant disturbance effects.</p>	
Delivery of Materials	1,2,3,4,5	Landscaping	General Non-Volant Mammals: Introduction or spread of invasive species- White Toothed Shrew	Evaluated as Excluded: The Irish population of this invasive species is considered as Established/ Widespread and expanding. Range estimated at 7,600km ² in 2013, with a rate of expansion of 0.5-14.1km/yr depending on landscape characteristics (McDevitt <i>et al.</i> , 2014 ⁴⁰). It is considered that the low number of deliveries of organic materials such	Biodiversity

⁴⁰ McDevitt, A.D., Montgomery, W.I., Tosh, D.G., Lusby, J., Reid, N., White, T.A., McDevitt, C.D., O'Halloran, J., Searle, J.B. and Yearsley, J.M., (2014). Invading and expanding: range dynamics and ecological consequences of the greater white-toothed shrew (*Crocivura russula*) invasion in Ireland. PLoS One. 2014 Jun 23; 9(6):e100403. doi: 10.1371/journal.pone.0100403. eCollection 2014

Non Volant Mammals	Source(s) of Impacts	Project Element	Pathway(s)	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
					as hedging (a likely source of transportation or introduction) will have Neutral additive effects, within the context of background trends (a species already established and increasing rapidly).
Sensitive Aspect	Operational Stage / Growth Stage				
	Delivery of Materials	1,2,3,4,5	Landscaping	General Non-Volant Mammals: Introduction or spread of invasive species- White Toothed Shrew	Evaluated as Excluded: No significant deliveries of organic materials are required for any Element of the Whole UWF Project.
	Noise and human activity Operating Machinery	1,2,3,4,5	Air and Visibility	General Non-Volant Mammals: Disturbance/Displacement	Evaluated as Excluded: Levels of operational maintenance will have Neutral disturbance effects to mammals.
	Decommissioning Stage				
	Delivery of Materials	1,2,3,4,5	Landscaping	General Non-Volant Mammals: Introduction or spread of invasive species- White Toothed Shrew	Evaluated as Excluded: In relation to Element 1, 3, no potential for effects as no decommissioning will take place. In relation to Element 2,4,5 – no significant deliveries of organic materials are required. Nonetheless, the spread of invasive species will be avoided through the implementation of Best Practice biosecurity measures as per the Invasive Species Management Plan (Volume D)
	Noise and Human Activity	1,2,3,4,5	Air and Visibility	General Non-Volant Mammals: Disturbance/Displacement	Evaluated as Excluded: In relation to Element 1, 3, no potential for effects as no decommissioning will take place. In relation to Element 2,4,5 – Daylight hours of works, habituation, and limited frequency of disturbance reduces disturbance/displacement to 'Neutral'

8.9.5 Mitigation Measures for Impacts to Non-Volant Mammals

Mitigation measures were incorporated into the UWF Grid Connection project design including the Project Design Measures. No additional mitigation measures are required as the topic authors conclude that **significant impacts are not likely to occur** to occur to Non-Volant Mammals as a consequence of the UWF Grid Connection.

8.9.6 Evaluation of Residual Impacts to Non-Volant Mammals

Residual Impacts are the final or intended effects that will occur after mitigation measures have been put into place. No additional mitigation measures are required and thus the Residual Impacts are the same as the Impacts set out in Impact Evaluation Table sections for Non-Volant Mammals above (Section 8.9.4) – i.e. **no significant adverse impacts**.

8.9.7 UWF Grd Connection Environmental Management Plan

The Project Design measures will be implemented by the Project Manager and the main Contractor during the construction stage, under the **Environmental Management Plan for the UWF Grid Connection (EMP)**. The EMP is appended to this EIA Report as **Volume D**.

The EMP will be an important contract document for the main construction contractor (Contractor) who will be contractually obliged to comply with the EMP. An Environmental Clerk of Works will be appointed, who will be independent of the construction Contractor, and it will be the responsibility of the Environmental Clerk of Works to monitor the compliance of the Contractor with the EMP through liaising with the Construction Site Manager and the Project Manager, monitoring construction works on a daily basis and by carrying out regular audits on EMP compliance. The Environmental Clerk of Works will be resourced to employ a team of environmental specialists including a Site Ecologist, Site Hydrologist and a Invasive Species Specialist.

8.9.7.1 Surface Water Management Plan

The UWF Grid Connection Environmental Management Plan will include a bespoke Surface Water Management Plan. Water quality and the existing drainage regime will be managed under the Surface Water Management Plan (SWMP) which will be implemented by the appointed Contractor during the construction stage of the UWF Grid Connection. This Surface Water Management Plan (SWMP) provides the water management framework for the appointed Contractors and Sub-contractors and it incorporates the mitigating principles described in this EIAR (particularly in Chapter 11 – Water) to ensure that construction works are carried out with minimal impact on the surface water environment and in accordance with the mitigation measures and project design commitments made in the EIAR.

8.9.7.2 Invasive Species Management Plan

The UWF Grid Connection Environmental Management Plan will include a bespoke Invasive Species Management Plan developed to prevent/avoid the introduction and/or spread of invasive species. The Invasive Species Management Plan includes Best Practice biosecurity measures and describes supervision by an Invasive Species Specialist during the construction phase.

8.9.8 Summary of Impacts to Non-Volant Mammals

A summary of the Impact to Non-Volant Mammals is presented in Table 8-78.

Table 8-78: Summary of the impacts to Non-Volant Mammals

Impact to Non-Volant Mammals:	Otter: Disturbance /Displacement	Badger: Habitat Loss	Badger: Disturbance /Displacement
<i>Evaluation Impact Table</i>	<i>Section 8.9.4.1</i>	<i>Section 8.9.4.2</i>	<i>Section 8.9.4.3</i>
Project Life-Cycle Stage	Construction	Construction	Construction
UWF Grid Connection <i>Direct/indirect impact</i>	Slight	Not Significant	Imperceptible
UWF Grid Connection <i>Cumulative impacts</i>	Imperceptible	No Cumulative	No Cumulative
Element 2: UWF Related Works	Neutral	Not Significant	Neutral
Element 3: UWF Replacement Forestry	Neutral	Slight (positive)	Neutral
Element 4: Upperchurch Windfarm	Neutral	Not Significant	Not Significant
Element 5: UWF Other Activities	Neutral	Neutral	Neutral effect
All Elements of the Whole UWF Project	Slight	Not Significant	Not Significant

The greyed out boxes in the above summary table relate to the cumulative information for the Other Elements of the Whole UWF Project, which are included to show the totality of the project.

Note: No cumulative information for Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to Non-Volant Mammals with either the UWF Grid Connection or the Other Elements of the Whole UWF Project (see Section 8.9.2.1).

Non Volant Mammals

Sensitive Aspect

Biodiversity

Topic

8.10 Sensitive Aspect No.9: Amphibians & Reptiles

This Section provides a description and evaluation of the Sensitive Aspect - Amphibians & Reptiles.

Donncha O Cathain, Jennifer Pearson, Chris Cullen and Howard Williams were the main authors of this Section. Please see Sources of Information (Section 8.1.7) and Methodology (Section 8.1.8) for details of the desktop and fieldwork surveys which have informed the evaluation of Aquatic Habitats & Species.

8.10.1 BASELINE CHARACTERISTICS of Amphibians & Reptiles

8.10.1.1 STUDY AREA for Amphibians & Reptiles

The study area for Amphibians & Reptiles in relation to the UWF Grid Connection is described in Table 8-79 and illustrated on **Figure GC 8.10: UWF Grid Connection Study Area for Amphibians & Reptiles** (Volume C3 EIAR Figures).

Table 8-79: UWF Grid Connection Study Area for Amphibians & Reptiles

Study Area for Amphibians & Reptiles	Justification for the Study Area Extents
Construction works area plus 50m in all directions	Professional Judgement and as per Best Practice (CIEEM, 2016).

8.10.1.2 Baseline Context and Character of Amphibians & Reptiles in the UWF Grid Connection Study Area

Taking into account the species distribution of amphibians and reptiles in Ireland, suitable habitat exists within the study area for Smooth Newt, Common Frog, and Common Lizard.

Smooth Newt (*Lissotriton vulgaris*) is the only species of tailed amphibian found in Ireland. While commonly encountered near water bodies, adult newts are actually terrestrial, only returning to water bodies to breed. They tend to prefer habitats that offer protection from desiccation, such as long grass, woodland and scrubland. Newts will over-winter in refugia such as woodpiles and rotting logs, which offer them some protection from the elements (HSI). Smooth Newt has been recorded from Co. Tipperary in suitable habitat (Meehan 2013). In general, it is perceived that information gaps exist in terms of the distribution of these species in North Tipperary (Browne 2007).

Common frog (*Rana temporaria*) is one of only three amphibians found in Ireland. It is a widespread and abundant species occurring in a broad range of habitats throughout the country. Adults congregate to spawn in ponds and ditches in the spring. Eggs develop into tadpoles as water temperature rises and following metamorphosis young froglets emerge onto land in early summer. These young animals are particularly vulnerable to predation. They spend 2-3 years on land, feeding on terrestrial invertebrates, before returning to freshwater to breed. A life expectancy of 3-4 years would be typical. Extrapolated data primarily from the 2011 National Frog Survey (Reid *et al.*, 2013), used to inform Ireland's Article 17 under the EU Habitats Directive indicates the distribution of this species within three 10km squares overlapping with the UWF Grid Connection. These records consisted of two observations of Common Frog with the 10km grid square R75 and two observations of Common Frog with R85 and one observation of Common Frog in R86. According to Biodiversity Ireland's public records, there are three recent records (2019) of Common Frog; two records are located north of the R503 west of Lackamore and one record is located north of the R503 within the Mauherslieve region. The closest record occurs 245 metres north of the R503.

Common or Viviparous Lizard (*Zootoca vivipera*) is Ireland's only native terrestrial reptile. The species is widely distributed on the Irish mainland and at least some of the islands. It often frequents damp habitats, as the humidity has a beneficial effect on growth rate and activity. Ideal habitats for the species are south-facing, damp tussocky grassland, scrub covered hillsides, dunes or banks, woodland tracks and it also resides in peat bogs, dry grasslands and heathlands (HSI).

Survey Results:

Smooth Newt: Due to their wide distribution across Ireland, there is the possibility that Smooth Newt occurs within suitable habitat, typically found in slow-moving water such as natural ponds, ditches and wetlands. Man-made habitats such as garden ponds and quarry ponds are not significant components of the newt's habitat (Meehan 2013). No Smooth Newts were recorded during surveys undertaken in January 2019. However, this was outside the optimum survey period for this species thus suitable habitat for this species was noted. Foraging Smooth Newt can exploit a wide range of habitats but show a preference for wet grassland, woodland and scrub; thus, where these habitats occur along the 110kV UGC route, there is suitable foraging habitat for this species. Breeding Smooth Newt show preference for fish free ponds and ditches with abundant emergent vegetation.

No Smooth Newts were recorded during surveys undertaken in May 2019 along the section of route bypassing Newport town, suitable habitat for this species was noted.

Common frog: Due to their wide distribution across Ireland, there is the possibility that Common Frog occurs within suitable habitat (typically garden ponds, natural pools, drainage ditches and quarry ponds). No Common Frogs were recorded during surveys undertaken in January 2019. However this was outside the optimum survey period for this species thus suitable habitat for this species was noted. No Common Frogs were recorded during surveys undertaken in May 2019 along the section of route bypassing Newport town, suitable habitat for this species was noted. Suitable habitat occurs at a number of locations throughout the UWF Grid Connection route, including roadside and field drains which could potentially support breeding frogs. Common frogs exploit a wide range of habitats and can breed in puddles, drains and slow-flowing sections of watercourses. Frogs forage in a range of wet habitats including wet grassland and marsh; therefore, the locations where these habitats occur along the grid route are likely to support frogs.

Common or Viviparous Lizard: Due to their wide distribution across Ireland, there is the possibility that Viviparous Lizard occur within suitable habitat (woodland, marshes, heath, moors, bogs, acid grassland). No Viviparous Lizards were recorded during surveys undertaken in January 2019. However, this was outside the optimum survey period for this species thus suitable habitat for this species was noted. Suitable habitat is present along the route provided by woodlands and bogs, and lizards are expected to occur. No Viviparous Lizards were recorded during surveys undertaken in May 2019 along the section of route bypassing Newport town, suitable habitat for this species was noted.

Further details on Amphibians, Reptiles & Marsh Fritillary fieldwork and survey results are included in [Appendix 8.9: Amphibians, Reptiles & Marsh Fritillary Field Work & Survey Results](#).

8.10.1.3 Importance of Amphibians & Reptiles

All amphibian and reptile species are protected under the Wildlife Act (1976, amended 2000).

The Common Frog is also listed on the Annex V of the Habitats Directive on the Conservation of Natural Habitats of Wild Fauna and Flora (92/43/EEC), meaning that the removal of this species from the wild is restricted by European law.

All amphibians and reptiles present are evaluated as of Local Importance (Higher Value).

8.10.1.4 Sensitivity of Amphibians & Reptiles

Amphibians and reptiles are sensitive to direct mortality, including at the larval stage (frogs and newts), habitat loss, habitat fragmentation and disturbance through visual intrusion, noise and vibration. Amphibian declines have also been linked to the emergence of previously unrecorded diseases.

Populations of amphibians and reptiles are evaluated as **Low Sensitivity** receptors.

8.10.1.5 Trends in the Baseline Environment (the 'Do-Nothing' scenario)

The Common Frog was assessed as having a 'Favourable' conservation status within the National Frog survey of Ireland 2010/11 (Reid *et al.*, 2013). Its conservation status is classified as least concern in a European context (Kuzmin *et al.*, 2009). No estimate of population trend is available as the 2010/11 survey provided the first baseline for the country.

The Smooth Newt has a conservation status of least concern in a European context (Arntzen *et al.*, 2009). There is no population estimate available for Ireland and therefore, there is no evidence to illustrate the current population status.

The Viviparous Lizard has a conservation status of least concern in a European context, (Agasyen *et al.*, 2010). There is no population estimate to-date for Viviparous Lizards in Ireland and hence, there is no evidence to illustrate the current population status.

8.10.1.6 Receiving Environment (the Baseline + Trends)

It is assumed in this report that the baseline environment in relation to amphibians and reptiles, as identified above, will be the receiving environment at the time of construction and on into the operational phase.

8.10.2 CUMULATIVE INFORMATION - Cumulative Projects & Baseline Characteristics

8.10.2.1 Overview of Other Elements, Other Projects or Activities

8.10.2.1.1 UWF Grid Connection Cumulative Evaluation Study Area

The UWF Grid Connection was evaluated for cumulative effects with other projects and the study area is set out in the table below.

UWF Grid Connection Cumulative Evaluation Study Area for Amphibians & Reptiles	Justification for the Study Area Extents
100m area around UWF Grid Connection construction works areas	The study area is doubled to identify those Other Elements (or Other Projects or Activities) which may cause cumulative effects to amphibians and reptiles with UWF Grid Connection.

The study area is illustrated on [Figure CE 8.10: UWF Grid Connection Cumulative Evaluation Study Area for Amphibians & Reptiles](#).

8.10.2.1.2 Whole Project Cumulative Evaluation Study Area

UWF Grid Connection is part of a whole project which comprises the following Other Elements; Element 2: UWF Related Works, Element 3: UWF Replacement Forestry, Element 4: Upperchurch Windfarm (UWF), and Element 5: UWF Other Activities. The Subject Development, UWF Grid Connection is Element 1. All five elements are collectively referred to as the Whole UWF Project in this EIA Report.

The Other Elements must be considered because UWF Grid Connection is part of a whole project. Therefore, the cumulative information and evaluations for the Other Elements of the Whole UWF Project are included in order to present the totality of the project.

A description of these Other Elements is included in this EIA Report at [Appendices 5.3, 5.4, 5.5 and 5.6](#), in [Volume C4 EIAR Appendices](#). Scoping of these Other Elements is presented in [Section 8.10.2.2.1](#) below.

The Whole Project Cumulative Evaluation Study Area comprises of the UWF Grid Connection Study Area along with the study areas for Other Elements which are described in Table 8-80 and illustrated on [Figure WP 8.10: Whole Project Study Area for Amphibians & Reptiles](#) (Volume C3 EIAR Figures).

Table 8-80: Whole Project Cumulative Evaluation Study Area for Amphibians & Reptiles

Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
Element 1: UWF Grid Connection	50m area around and incorporating the construction works areas, afforestation lands and activity locations	Professional Judgement and as per Best Practice (CIEEM, 2016).
Element 2: UWF Related Works		
Element 3: UWF Replacement Forestry		
Element 4: Upperchurch Windfarm (UWF)		
Element 5: UWF Other Activities		

Amphibians & Reptiles

Sensitive Aspect

Biodiversity

Topic

8.10.2.2 Scoping of Other Elements, Other Projects or Activities & for Potential for Impacts

The evaluation of cumulative impacts to amphibians & reptiles also considered Other Projects or Activities. A scoping exercise was carried out to determine which projects or activities, if any, have potential to cause cumulative effects to amphibians & reptiles with either the UWF Grid Connection or the Other Elements of the Whole UWF Project and therefore should be brought forward for evaluation in this topic chapter. A brief overview of the Other Projects or Activities and the scoping exercise by the topic authors is included in [Appendix 2.1: Scoping of Other Projects or Activities for Cumulative Evaluations \(Section A2.1.4.12\)](#).

The results of this scoping exercise are that: it is evaluated that no Other Projects or Activities are likely to cause cumulative effects with either the UWF Grid Connection or the Other Elements of the Whole UWF Project, and therefore no Other Projects or Activities are scoped in for evaluation of cumulative effects to Amphibians & Reptiles.

8.10.2.2.1 Potential for Impacts to Amphibians & Reptiles

An evaluation was carried out by the topic authors of the likelihood for the Other Elements of the Whole UWF Project to cause cumulative effects to the Sensitive Aspect amphibians & reptiles. The results of this evaluation are included in Table 8-81.

The location of, and study area boundary associated with, the Other Elements which are included for cumulative evaluation is illustrated on [Figure WP 8.10](#). The baseline characteristics of the areas around these Elements is described in Section 8.10.2.3.

Table 8-81: Results of the Evaluation of the Other Elements of the Whole UWF Project

Other Elements of the Whole UWF Project	
Element 2: UWF Related Works	<u>Included</u> for the evaluation of cumulative effects
Element 3: UWF Replacement Forestry	<u>Included</u> for the evaluation of cumulative effects
Element 4: Upperchurch Windfarm (UWF)	<u>Included</u> for the evaluation of cumulative effects
Element 5: UWF Other Activities	<u>Evaluated as excluded</u> : No likely effects due to: The nature and small scale of the proposed works, with no compaction or habitat degradation likely to occur, and no permanent land-use change associated with UWF Other Activities, therefore noticeable effects on amphibians or reptiles not likely to occur. No evidence of amphibian or reptile species was recorded from habitat or other surveys of the UWF Other Activities locations.

8.10.2.3 Cumulative Information: Baseline Characteristics – Context & Character

8.10.2.3.1 Element 2: UWF Related Works

Common Frog: Extrapolated data primarily from the 2011 National Frog Survey (Reid *et al.*, 2013), does not indicate any distribution of this species within either 10km square overlapping the UWF Related Works (R95 and R96). Frogs were previously recorded in Knockmaroe, Grousehall and Foilnaman (Upperchurch Windfarm EIS 2013).

Common Lizard was recorded in suitable habitat (acid grassland) within the UWF Related Works study area boundary.

Smooth Newt: No Smooth Newt was noted, but is considered as likely to occur in suitable habitat.

Amphibians & Reptiles	Sensitive Aspect	8.10.2.3.2 Element 3: UWF Replacement Forestry
		<p>Extrapolated data primarily from the 2011 National Frog Survey (Reid <i>et al.</i>, 2013), does not indicate any distribution of this species within the 10km square which overlaps the UWF Replacement Forestry (R96).</p> <p>No amphibians or reptiles were recorded from site visits to the UWF Replacement Forestry lands, however as Common Lizard was recorded in suitable habitat (acid grassland) within the adjacent UWF Related Works study area, it is considered that this species is likely to occur on the UWF Replacement Forestry lands also.</p>
		8.10.2.3.3 Element 4: Upperchurch Windfarm
		<p>Upperchurch Windfarm: As per the 2013 EIS, Common Frog is described from a number of locations within the Upperchurch Windfarm. Common Lizard was also recorded in suitable habitat in acid grassland within the Upperchurch Windfarm site. This species has not been previously recorded in the study area (NBDC, 2016). The location of these survey records are identified on Figure WP 8.10: Whole Project Study Area for Amphibians & Reptiles.</p> <p><u>Consideration of the Passage of Time:</u> The makeup of suitable habitat for Amphibians & Reptiles on the Upperchurch Windfarm site has not materially changed since 2012/2013, and surveys for UWF Related Works confirmed a low usage of the windfarm area by these species. Therefore it is considered that the descriptions in the 2013 and 2014 documents for Upperchurch Windfarm remain relevant to the cumulative evaluations in this 2019 EIAR for UWF Grid Connection.</p>
		8.10.2.3.4 Element 5: UWF Other Activities
Biodiversity	Topic	Not applicable – Element evaluated as excluded. See Section 8.10.2.2.1.
		8.10.2.3.5 Other Projects or Activities
Biodiversity	Topic	Not applicable – <u>No</u> Other Projects or Activities were scoped in for evaluation of cumulative effects, see Section 8.10.2.1.

8.10.3 PROJECT DESIGN MEASURES for Amphibians & Reptiles

At the conception of the UWF Grid Connection, the design team evaluated the potential for significant impacts to the environment. Impacts will only take place where three components exist together; (1) the source of the impact (project), (2) the receptor of the impact (sensitive aspect) and (3) a pathway between the source and the sensitive aspect. The objective of mitigation measures is to avoid, prevent or reduce, one of the three components of an impact by choosing an alternative location, alternative design or an alternative process.

Potential or likely significant impacts were avoided, prevented or reduced by integrating mitigation measures into the fundamental design of the development – these are the Project Design Environmental Protection Measures, which are shortened to ‘Project Design Measures’ in this EIA Report.

The development as evaluated in the EIA Report incorporates the Project Design Measures.

The Project Design Measures outlined in Table 8-82 are relevant to the Environmental Factor, Biodiversity, and in particular to the sensitive aspect **Amphibians & Reptiles**.

Table 8-82: UWF Grid Connection Project Design Measures relevant to Amphibians & Reptiles

PD ID	Project Design Environmental Protection Measure (PD)
PD04	All construction works will be carried out during daylight hours.
PD05	At the Mountphilips Substation site, construction traffic will be restricted to the construction works area and tracking across adjacent ground will not be permitted. A speed limit of 25km/hr for all traffic/machinery will be implemented at the Mountphilips Substation site. Outside of Mountphilips Substation site, all construction will be restricted to the paved road surfaces or built surfaces along the 110kV UGC. A speed limit of 50km/hr for all delivery and construction traffic will be implemented on Local Roads (‘L’ roads).
PD68	As amphibians and reptiles will use brash piles for refuge and hibernation, all logs/brash created from hedgerow/tree removal at the Mountphilips Substation site will be removed off site immediately to prevent disturbance to amphibians/reptiles which may use brash piles if left in situ.

Cumulative Information: Potential or likely significant impacts caused by the Other Elements of the Whole UWF Project were avoided, prevented or reduced by incorporating Project Design Measures into the fundamental design of the UWF Related Works, UWF Replacement Forestry and into the consented design of the Upperchurch Windfarm. These Project Design Measures are included in the description of these Elements, and can be found in this EIA Report in [Appendices 5.3, 5.4 and 5.5](#), in [Volume C4: EIAR Appendices](#).

8.10.4 EVALUATION OF IMPACTS to Amphibians & Reptiles

In this Section, the likely direct and indirect effects of the UWF Grid Connection are identified and evaluated. Then the likely cumulative effects of the UWF Grid Connection together with the Other Elements of the Whole UWF Project are identified and evaluated.

A conceptual site model exercise was carried out to facilitate the identification of source-pathway-receptor links between the project (source) and the sensitive aspect (receptor) - Amphibians & Reptiles.

As a result of the exercise, **no impacts were included for evaluation**.

Table 8-83: List of all Impacts included and excluded from the Impact Evaluation Table sections

<u>Impacts Included</u> (Evaluated in the Impact Evaluation Table sections)	<u>Impacts Excluded</u> (Justification at the end of the Impact Evaluation Table sections)
No impacts included for evaluation	<i>Habitat degradation (compaction, change in drainage), (construction stage)</i>
	<i>Reduction in foraging and breeding habitat, (construction stage)</i>
	<i>Disturbance/Displacement, (construction stage)</i>
	<i>Physical injury/destruction of individual amphibians and reptiles, (construction stage)</i>
	<i>Operational Stage/Growth Stage</i>
	<i>Decommissioning Stage</i>

The source-pathway-receptor links and the rationale for excluded impacts are described in **Section 8.10.4.1**.

8.10.4.1 Description and Rationale for Excluded (scoped out) Impacts

The source-pathway-receptor links and the rationale for impacts excluded from the Impact Evaluation Table sections are described in Table 8-84 below.

Table 8-84: Description and Rationale for Excluded Impacts to Amphibians & Reptiles

Key: 1: UWF Grid Connection; 2: UWF Related Works; 3: UWF Replacement Forestry; 4: Upperchurch Windfarm; 5: UWF Other Activities

Source(s) of Impacts	Project Element	Pathway(s)	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
Construction Stage /Planting Stage				
Permanent Land cover Change	2, 4	Soils/ Surface Water	Habitat degradation (compaction, change in drainage)	Evaluated as Excluded: No compaction or habitat degradation likely as a result of Element 1 or 3. Construction Works associated with Element 2 and 4 may result in some secondary effects on habitat composition for amphibians and reptiles, however the spatial extent of this will be Negligible and any habitat degradation effects to local populations are likely to be Neutral.
Permanent Land cover Change	1,2,3,4	Landcover	Reduction in foraging and breeding habitat	<p>Evaluated as Excluded:</p> <p>In relation to Element 1,2, 4 - It is likely that the Construction Works will include some land-use change of suitable foraging or breeding habitat.</p> <p>In relation to Element 1, permanent land-use change of non-linear habitat features at the Mountphilips site will comprise 1.75Ha in total, of which 1.7ha (97%) is improved agricultural grassland (GA1), with the remaining 0.05ha or 3% comprising wet grassland (GS4), wet grassland is considered suitable foraging habitat for amphibians and reptiles. The extent of any reduction is considered negligible in the context of availability of habitats in the immediate surrounding area.</p> <p>Amphibians and Reptiles use woodland habitats, therefore hedgerows and treelines could be considered suitable habitat. In relation to Element 1; with respect to linear features such as treelines and hedgerow, it will be necessary to remove 160m of treeline which includes 17 immature trees and 1 mature tree at the Mountphilips Substation site entrance to widen the entrance and provide sightlines. These will be reinstated by planting the equivalent amount of hedgerow and/or trees behind the new sightlines. It will be necessary to remove 40m of hedgerow which includes 11 immature trees to build the new access road. A new hedgerow, c.700m in length, will be planted on the berms on either side of the new permanent access road between the Site Entrance and Mountphilips Substation and around the Mountphilips Substation compound, and a mix of native grasses and wildflowers will be sown on the sides of the berms, for the benefit of biodiversity in the area. All new hedging will be locally sourced native hedgerow species, and the replacement trees will be native hedgerow species and at least 10 years old. Considering the reinstatement/replacement of lost hedgerow/treelines at the Mountphilips Substation site and in the context of</p>

Topic	Biodiversity	Sensitive Aspect	Amphibians & Reptiles	Source(s) of Impacts	Project Element	Pathway(s)	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
								<p>available habitat and low occurrence of species as described herein, any effects will be Neutral.</p> <p>The extent of permanent land-use change as a result of Elements 2,3 and 4 is evaluated as negligible in the context of available habitat and low occurrence of species as described herein. The spatial extent of any loss will be limited to works within the construction boundary comprising permanent features, and therefore effects on amphibians or reptiles will be Neutral.</p> <p>Temporary land-use change at the Mountphilips Substation site (relates to temporary access road to End Masts, temporary crane hardstand area at End Masts and temporary construction compound) during construction will comprise 0.2ha of improved agricultural grassland (GA1), this habitat is considered unsuitable for amphibians and reptiles. In relation to Element 2, 4 - any other habitat loss is temporary. It is evaluated that the context of available habitat and low occurrence of species, effects will be Neutral.</p>
				Noise and human activity	1,2,3,4	Visibility	Disturbance/Displacement	Evaluated as Excluded: Construction works and activities may result in some cross-factor effects from disturbance stimuli (visual and vibration related), however the spatial extent, limited frequency, and brief duration will be Negligible and effects to local populations are likely to be Neutral.
				Operating Machinery	1,2,3,4- ++++	Direct Contact	Physical injury/mortality of individuals	Evaluated as Excluded: no likely impacts as use of machinery will be during daylight hours, survey ahead of vegetation clearance and removal of brash. No machinery use associated with UWF Replacement Forestry.
				Operational Stage / Growth Stage				
				Evaluated as Excluded: Operational Stage works or activities will cause Negligible source magnitude or duration of effects, and any effects on amphibians and reptiles are expected to be Neutral.				
				Decommissioning Stage				
				Evaluated as Excluded: Populations of amphibians and reptiles are evaluated as Low Sensitivity receptors. Decommissioning Works may result in some cross-factor effects from disturbance stimuli (visual and vibration related), however the spatial extent, limited frequency, and brief duration will be Negligible and any disturbance or displacement effects to local populations are likely to be Neutral.				

8.10.5 Mitigation Measures for Impacts to Amphibians & Reptiles

Mitigation measures were incorporated into the UWF Grid Connection project design including the Project Design Measures. No additional mitigation measures are required as the topic authors conclude that **significant impacts are not likely to occur** to occur to amphibians & reptiles as a consequence of the UWF Grid Connection.

8.10.6 Evaluation of Residual Impacts to Amphibians & Reptiles

Residual Impacts are the final or intended effects that will occur after mitigation measures have been put into place. No additional mitigation measures are required and thus the Residual Impact is the same as the Impact set out in the Description and Rationale for Excluded Impacts to amphibians & reptiles in Section 8.10.4.1, i.e. **Neutral impact**.

8.10.7 UWF Grd Connection Environmental Management Plan

The Project Design measures will be implemented by the Project Manager and the main Contractor during the construction stage, under the **Environmental Management Plan for the UWF Grid Connection (EMP)**. The EMP is appended to this EIA Report as **Volume D**.

The EMP will be an important contract document for the main construction contractor (Contractor) who will be contractually obliged to comply with the EMP. An Environmental Clerk of Works will be appointed, who will be independent of the construction Contractor, and it will be the responsibility of the Environmental Clerk of Works to monitor the compliance of the Contractor with the EMP through liaising with the Construction Site Manager and the Project Manager, monitoring construction works on a daily basis and by carrying out regular audits on EMP compliance. The Environmental Clerk of Works will be resourced to employ a team of environmental specialists including a Site Ecologist, Site Hydrologist and a Invasive Species Specialist.

8.10.8 Summary of Impacts to Amphibians & Reptiles

No impacts to Amphibians & Reptiles are concluded by the topic authors as likely to occur.

Table 8-85: Summary of the impacts to Amphibians & Reptiles

Impact to Amphibians & Reptiles	No Impact
<i>Evaluation</i>	<i>Section 8.10.4.1</i>
Project Life-Cycle Stage	All
<u>UWF Grid Connection</u>	Neutral Impacts / No Likely Impacts
Element 2: UWF Related Works	Neutral impacts / No likely impacts
Element 3: UWF Replacement Forestry	Neutral impacts /No likely impacts
Element 4: Upperchurch Windfarm	Neutral impacts / No likely impacts
Element 5: UWF Other Activities	No Likely Impacts - Evaluated as excluded, See Section 8.10.2.2.1
<u>Cumulative Impact:</u>	
All Elements of the Whole UWF Project	No Potential for Cumulative Impacts (as Neutral impacts from any individual Element)

The greyed out boxes in the above summary table relate to the cumulative information for the Other Elements of the Whole UWF Project, which are included to show the totality of the project.

Note: No cumulative information for Other Projects or Activities is included in the table above, because no Other Projects or Activities are likely to cause cumulative effects to Amphibians & Reptiles with either the UWF Grid Connection or the Other Elements of the Whole UWF Project (see Section 8.10.2.1).

8.11 Sensitive Aspect No.10: Marsh Fritillary

This Section provides a description and evaluation of the Sensitive Aspect –the Marsh Fritillary butterfly.

Chris Cullen, Donncha O Cathain, Jennifer Pearson, and Howard Williams were the main authors of this Section. Please see Sources of Information (Section 8.1.7) and Methodology (Section 8.1.8) for details of the desktop and fieldwork surveys which have informed the evaluation of Aquatic Habitats & Species.

8.11.1 Baseline Characteristics of Marsh Fritillary

8.11.1.1 STUDY AREA for Marsh Fritillary

The study area for Aquatic Habitats & Species in relation to the UWF Grid Connection is described in Table 8-86 and illustrated on **Figure GC 8.11: UWF Grid Connection Study Area for Marsh Fritillary** (Volume C3 EIAR Figures).

Table 8-86: UWF Grid Connection Study Area for Aquatic Habitats & Species

Study Area for Aquatic Habitats & Species	Justification for the Study Area Extents
50m area around and incorporating the construction works areas	Professional Judgement and as per Best Practice (CIEEM, 2016).

8.11.1.2 Baseline Context and Character of Marsh Fritillary in the UWF Grid Connection Study Area

Marsh Fritillary (*Euphras aurinia*) has a wide distribution across Ireland, but the distribution is patchy and it is still considered overlooked in some parts of its range. Colonies can be found in a variety of habitats including calcareous grassland, degraded bogs, wet heath, transition mires and fens up to 300m (Reagan *et al.*, 2010). It is the only protected butterfly species in Ireland. The population often fluctuates within its range dependant on weather, food supply and interaction with parasites. Larvae overwinter in a small web close to the ground and emerge in early spring. At a local level, populations can fluctuate highly and are subject to extremely low levels or periodic extinctions. The identification and protection of breeding sites is listed as a regional issue of concern in the Tipperary County Development Plan with inadvertent loss of previously unknown colonies an identified threat.

Previous records exist from 2 locations proximal to the Whole UWF Project, Cummer Bog near Kilcommon (<1km) and Dromsallagh, near Cappawhite (~10km). The evidence all indicates that the Marsh Fritillary is relatively sedentary, rarely dispersing beyond 750m, although colonisation may rarely take place over longer distances of 5–20 km (Warren 1994). The distance of 2km has been previously considered as a standardised 'functional landscape' i.e. the area within which most dispersal, new colonisation and regular exchange of genetic material will occur (Fowles & Smith 2006).

The Marsh Fritillary populations previously recorded in Bealaclave and Bournadomeeny (as part of the studies for the 2018 application) are 1.2km and 1.3km to the north of the current proposed 110kV UGC route.

Survey Results: No suitable habitat for Marsh Fritillary was recorded on or adjacent (50m) to the UWF Grid Connection lands at Mountphilips Substation site. Where the 110kV UGC element of the UWF Grid Connection occurs outside of the Mountphilips Substation site, the 110kV UGC is located entirely in the paved surfaces of roads, predominately in local roads, regional road (R503) and a short section in private paved road, which are not suitable habitat for Marsh Fritillary butterfly. Field surveys during 2019 found that habitats within 50m of construction works areas along the 110kV UGC are generally of low ecological value to terrestrial invertebrates, including Marsh Fritillary, and no suitable habitat was recorded within 50m of the works.

During 2017 surveys, three colonies of Marsh Fritillary were recorded – one colony each in Baurnadomeeny and Bealaclave townlands, both c. 1.2km north of the 110kV UGC route, with a third colony identified at Shevry which is located 1.1km south east of the UWF Grid Connection works at the Consented UWF Substation at Knockcurraghbola Commons.

The proposed UWF Grid Connection 110kV UGC route on the R503 also passes to the north of Cummer Bog complex, where previous records of Marsh Fritillary have been documented at the southern extremity, c. 800m from the R503. Numbers at this colony are cited as <10 in Nash *et al.* 2012.

The locations of these four Marsh Fritillary colonies are identified on [Figure GC 8.11: UWF Grid Connection Study Area for Marsh Fritillary](#).

8.11.1.3 Importance of Marsh Fritillary

Marsh Fritillary is the only butterfly species resident in Ireland that is listed in Annex II of the EU Habitats Directive 92/43/EEC. The population/habitat extent recorded from the current study is evaluated as of County Importance.

8.11.1.4 Sensitivity of Marsh Fritillary

Marsh Fritillary is sensitive to habitat loss, directly through land take or indirectly through compaction from vehicular movement. Individuals are considered as sensitive to vibrations on a precautionary basis. At the webbing stage larvae are sensitive to habitat disturbance and direct mortality from contact with machinery. Marsh fritillary habitat is sensitive to land cover change from drainage regime modification, the application of nutrients, higher intensities of grazing, the introduction of invasive species and alteration of physical structure. At a landscape level habitat fragmentation may affect population function at a larger scale (Asher *et al.*, 2001).

8.11.1.5 Trends in the Baseline Environment (the 'Do-Nothing' scenario)

The species was assessed as having an 'Inadequate' conservation status with an overall declining conservation trend in the most recent Article 17 report (NPWS, 2019) as required under the EU Habitats Directive 92/43/EEC. Within the Article 17 report, the range was assessed as 'favourable', the population was assessed as 'inadequate' with a qualifier of declining, habitat was assessed as 'favourable' and future prospects as 'inadequate' with a qualifier of declining. The species is classified as vulnerable due to a population decline of ≥ 30 percent (A2c) in the Irish Red List for Butterflies (Reagan *et al.*, 2010). Its conservation status is classified as least concern in a European context (Van Swaay *et al.*, 2010). Overall the trend in conservation status has changed since the last Article 17 report in 2013 with the trend classified as 'improving'.

Given the trends presented above, a scenario in which this project does not take place would result in a continuation of current trends relating to Marsh Fritillary, within the study area, in line with the decline cited above in respect of future prospects.

8.11.1.6 Receiving Environment (the Baseline + Trends)

It is assumed in this report that the baseline environment in relation to invertebrates, particularly Marsh Fritillary, as identified above, will be the receiving environment at the time of construction given the short time period likely to elapse in the interim.

8.11.2 CUMULATIVE INFORMATION - Cumulative Projects & Baseline Characteristics

8.11.2.1 Cumulative Evaluation Study Areas

The UWF Grid Connection was evaluated for cumulative effects with other projects and the study area is set out in the table below.

UWF Grid Connection Cumulative Evaluation Study Area for Marsh Fritillary	Justification for the Study Area Extents
2km from UWF Grid Connection for cumulative effects with Other Projects and Activities	The distance of 2km has been previously considered as a standardised 'functional landscape' i.e. the area within which most dispersal, new colonisation and regular exchange of genetic material will occur (Fowles & Smith 2006).

The study is illustrated on [Figure CE 8.11 UWF Grid Connection Cumulative Evaluation Study Area for Marsh Fritillary](#).

8.11.2.1.1 Whole Project Cumulative Evaluation Study Area

UWF Grid Connection is part of a whole project which comprises the following other elements – Element 2: UWF Related Works, Element 3: UWF Replacement Forestry, Element 4: Upperchurch Windfarm (UWF) and Element 5: UWF Other Activities. The Subject Development, UWF Grid Connection, is Element 1. All five elements are collectively referred to as the Whole UWF Project in this EIA Report.

The Other Elements must be considered because UWF Grid Connection is part of a whole project. Therefore, the cumulative information and evaluations for the Other Elements of the Whole UWF Project are included in order to present the totality of the project.

A description of these Other Elements is included in this EIA Report at [Appendices 5.3, 5.4, 5.5 and 5.6](#), in [Volume C4 EIAR Appendices](#). Scoping of these Other Elements is presented in [Section 8.11.2.2.1](#) below.

The Whole Project Cumulative Evaluation Study Area comprises of the UWF Grid Connection Study Area along with the study areas for Other Elements which are described in Table 8-87 and illustrated on [Figure WP 8.11: Whole Project Study Area for Marsh Fritillary \(Volume C3 EIAR Figures\)](#).

Table 8-87: Cumulative Evaluation Study Area for Marsh Fritillary

Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
Element 1: UWF Grid Connection	50m area around and incorporating the construction works areas, afforestation lands, activity locations 2km from Whole UWF Project for cumulative effects with Other Projects and Activities	Professional Judgement and as per Best Practice (CIEEM, 2016).
Element 2: UWF Related Works		The distance of 2km has been previously considered as a standardised 'functional landscape' i.e. the area within which most dispersal, new colonisation and regular exchange of genetic material will occur (Fowles & Smith 2006).
Element 3: UWF Replacement Forestry		
Element 4: Upperchurch Windfarm (UWF)		
Element 5:		

Invertebrates

Sensitive Aspect

Biodiversity

Topic

Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
UWF Other Activities		

8.11.2.2 Scoping of Other Elements, Other Projects or Activities & for Potential for Impacts

The evaluation of cumulative impacts to Marsh Fritillary also considered Other Projects or Activities. A scoping exercise was carried out to determine which projects or activities, if any, have potential to cause cumulative effects to Marsh Fritillary with either the UWF Grid Connection or the Other Elements of the Whole UWF Project and therefore should be brought forward for evaluation in this topic chapter. A brief overview of the Other Projects or Activities and the scoping exercise by the topic authors is included in [Appendix 2.1: Scoping of Other Projects or Activities for Cumulative Evaluations \(Section A2.1.4.13\)](#).

The results of this scoping exercise are that: Forestry, Agriculture and Turf-Cutting activities have been scoped in for evaluation of cumulative effects to Marsh Fritillary relating to the Other Elements.

8.11.2.2.1 Potential for Impacts to Marsh Fritillary

An evaluation was carried out by the topic authors of the likelihood for the Other Elements of the Whole UWF Project and for the Other Projects or Activities to cause cumulative effects to the Sensitive Aspect Marsh Fritillary. The results of this evaluation are included in Table 8-88.

The location of the Other Elements and Other Projects or Activities which are included for cumulative evaluation is illustrated on [Figure WP 8.11](#).

Table 8-88: Results of the Evaluation of the Other Elements and Other Projects or Activities

Other Element of the Whole UWF Project	
Element 2: UWF Related Works	<u>Included</u> for the evaluation of cumulative effects
Element 3: UWF Replacement Forestry	<p><u>Evaluated as excluded</u>: No potential for effects due to: No suitable habitat for Marsh Fritillary was recorded on or adjacent (50m) to the UWF Replacement Forestry lands.</p> <ul style="list-style-type: none"> No potential for habitat loss or habitat degradation effects as there is no suitable habitat for Marsh Fritillary in or adjacent (50m) to the afforestation lands, No potential for mortality of in-flight adults or in-situ larvae, as no suitable habitat or Marsh Fritillary populations were recorded within or adjacent (50m) to the afforestation lands, No potential for disturbance or displacement effects during planting or management activities, as no suitable habitat or Marsh Fritillary populations were recorded within or adjacent (50m) to the afforestation lands and no heavy machinery is required.
Element 4: Upperchurch Windfarm (UWF)	<u>Included</u> for the evaluation of cumulative effects
Element 5: UWF Other Activities	<p><u>Evaluated as excluded</u>: No potential for effects due to: No suitable habitat for Marsh Fritillary overlaps Haul Route Activity locations or the Upperchurch Hen Harrier Scheme. Marsh Fritillary was recorded proximal to Overhead Line Activities on Shower Bog in 2001. The exact location is unknown however no suitable habitat exists at structure locations in close proximity along the Overhead Line route.</p>

Other Project or Activity	
Activities: Forestry/Agriculture/Turf-Cutting	Yes, included for the evaluation of cumulative effects (Forestry is included as afforestation is a source of habitat loss in the surrounding area).

8.11.2.3 Cumulative Information: Baseline Characteristics – Context & Character	
8.11.2.3.1 Element 2: UWF Related Works	
<p>Suitable habitat for Marsh Fritillary overlaps UWF Related Works construction works areas at Shevry, where cabling as part of UWF Related Works are to be placed under roads consented as part of the Upperchurch Windfarm.</p> <p>Habitat for Marsh Fritillary to the extent of 0.54Ha is present at Shevry, of which 0.062Ha (11.5%) overlaps the construction works area. Evidence of breeding in the form of larval webbing was recorded at 4 locations within this habitat in September 2017 - all outside the works area boundary. A parasitic Braconid wasp of the genus <i>Cotesia</i> was also recorded. This species can be an influencing factor in local level population fluctuations and may be a limiting factor in records of the species from this location. This colony size is classified as (Small i.e. the predicted peak population is <100 adults) and is located 10.7km east of Baurnadomeeny and 12.1km east of Bealaclave (where populations of Marsh Fritillary were recorded during 2017 surveys).</p> <p>The location and extent of Marsh Fritillary habitat and species is illustrated on Figure WP 8.11: Whole Project Study Area for Marsh Fritillary.</p>	
8.11.2.3.2 Element 3: UWF Replacement Forestry	
Not applicable –evaluated as excluded. See Section 8.11.2.2.1.	
8.11.2.3.3 Element 4: Upperchurch Windfarm	
<p>Habitat for Marsh Fritillary at Upperchurch is the same habitat identified in relation to the UWF Related Works above– i.e. 0.54Ha is present at Shevry, of which 0.062Ha (11.5%) overlaps the construction works area for both the Upperchurch Windfarm and the UWF Related Works (the Internal Windfarm Cabling will be constructed within the new windfarm road at this location).</p> <p><u>Consideration of the Passage of Time:</u> The makeup of suitable habitat for Marsh Fritillary on the Upperchurch Windfarm site has not materially changed since 2012/2013, and surveys for UWF Related Works confirmed a low usage of the windfarm area by these species. Therefore it is considered that the descriptions in the 2013 and 2014 documents for Upperchurch Windfarm remain relevant to the cumulative evaluations in this 2019 EIAR for UWF Grid Connection.</p>	
8.11.2.3.4 Element 5: UWF Other Activities	
Not applicable – Element evaluated as excluded – see Section 8.11.2.2.1.	
8.11.2.3.5 Other Projects or Activities	
<p>During 2017 surveys, three colonies of Marsh Fritillary were recorded (all on agricultural grassland) – one colony each in Baurnadomeeny and Bealaclave townlands, both c. 1.2km north of the 110kV UGC route, with a third colony identified at Shevry which is located 1.1km south east of the UWF Grid Connection works on the UWF Related Works/Upperchurch Windfarm sites (as described above). There is a large separation distance between the colony at Shevry and those at Baurnadomeeny (10.7km) and Bealaclave (12.1km).</p>	

Invertebrates	Sensitive Aspect	Biodiversity	Topic
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Invertebrates	<p>In addition to the three colonies identified above, other colonies may occur in wet grassland (agriculture) but are unlikely to be present in forestry lands.</p> <p>A fourth colony is recorded at Cummer Bog, where previous records of Marsh Fritillary have been documented at the southern extremity, c. 800m from the R503. Numbers at this colony are cited as <10 in Nash <i>et al.</i> 2012. Cummer Bog is subject to on-going peat extraction (turf cutting). The distance between the Cummer Bog colony and the Shevry colony is greater than 5km.</p>	
	Sensitive Aspect	
Biodiversity		
	Topic	

8.11.3 PROJECT DESIGN MEASURES for Marsh Fritillary

At the conception of the UWF Grid Connection, the design team evaluated the potential for significant impacts to the environment. Impacts will only take place where three components exist together; (1) the source of the impact (project), (2) the receptor of the impact (sensitive aspect) and (3) a pathway between the source and the sensitive aspect. The objective of mitigation measures is to avoid, prevent or reduce, one of the three components of an impact by choosing an alternative location, alternative design or an alternative process.

Potential or likely significant impacts were avoided, prevented or reduced by integrating mitigation measures into the fundamental design of the development – these are the Project Design Environmental Protection Measures, which are shortened to ‘Project Design Measures’ in this EIA Report.

The development as evaluated in the EIA Report incorporates the Project Design Measures.

No Project Design Measures are relevant to the sensitive aspect, **Marsh Fritillary butterfly**.

Cumulative Information: Potential or likely significant impacts caused by the Other Elements of the Whole UWF Project were avoided, prevented or reduced by incorporating Project Design Measures into the fundamental design of the UWF Related Works. These Project Design Measures are included in the description of these Elements, and can be found in this EIA Report in **Appendices 5.4** in **Volume C4: EIAR Appendices**.

8.11.4 EVALUATION OF IMPACTS to Marsh Fritillary

In this Section, the likely direct and indirect effects of the UWF Grid Connection are identified and evaluated. Then the likely cumulative effects of the UWF Grid Connection together with the Other Elements of the Whole UWF Project and Other Projects or Activities are identified and evaluated.

A conceptual site model exercise was carried out to facilitate the identification of source-pathway-receptor links between the project (source) and the sensitive aspect (receptor) – Marsh Fritillary butterfly.

As a result of the exercise, some impacts were included and some were excluded.

Table 8-89: List of all Impacts included and excluded from the Impact Evaluation Table sections

Impacts <u>Included</u> (Evaluated in the Impact Evaluation Table sections)	Impacts <u>Excluded</u> (Justification at the end of the Impact Evaluation Table sections)
Habitat Loss (construction stage)	<i>Habitat Degradation (Introduction of invasive alien species which may out-compete food plants such as DBS), (construction stage)</i>
	<i>Habitat degradation (drainage alteration) - Marsh Fritillary, (construction stage)</i>
	<i>Habitat degradation (Compaction) - Marsh Fritillary, (construction stage)</i>
	<i>Mortality to in-flight MF Adults through contact with machinery, (construction stage)</i>
	<i>Potential disturbance/displacement from Vibration, (construction stage)</i>
	<i>Mortality of in situ Larvae, (construction stage)</i>
	<i>Potential disturbance/displacement of Marsh Fritillary individuals breeding in suitable habitat proximal to the Whole UWF Project during maintenance, (construction stage)</i>
	<i>Decommissioning Stage</i>

The source-pathway-receptor links for included impacts are described in the Impact Evaluation Table, which is presented in the following **Section 8.11.4.1**.

The source-pathway-receptor links and the rationale for excluded impacts are described in the section directly after the Impact Evaluation Tables, in Section 8.11.4.2.

8.11.4.1 Impact Evaluation Table: Habitat Loss

Impact Description for the Other Elements of the Whole UWF Project

Project Life Cycle Stage: Construction stage

Cumulative Impact Source: Excavation Works

Impact Pathway: Land Cover

Impact Description: Marsh Fritillary is a medium sensitivity receptor of County Importance. Permanent land cover change or loss of Marsh Fritillary habitat such as Devils-Bit scabious rich swards may result in the loss of habitat 'patches' reducing the size of individual colonies or reducing meta-population connectivity; which can cause secondary, population level declines.

Management prescriptions to be implemented as part of the Upperchurch Hen Harrier scheme, such as a limitation on the excavation of drains, will allow improved grassland to revert back to wet grassland/semi-natural grassland habitats and possibly further Marsh Fritillary habitat, meta-population interconnectivity.

Impact Quality: Negative.

Evaluation of the Subject Development Impact – Habitat Loss

Element 1: UWF Grid Connection – direct/indirect impact

Impact Magnitude:

There is no potential for any loss of suitable habitat due to the construction of the UWF Grid Connection as no suitable habitat for Marsh Fritillary was recorded on or adjacent (50m) to the UWF Grid Connection lands at Mountphilips Substation site or along the 110kV UGC route, during habitat surveys in January and May 2019;

The risk of indirect habitat degradation caused by the inadvertent spread of invasive species by quarry vehicles delivering stone to various UWF Grid Connection works locations, is avoided with the implementation of Project Design measures in line with the bespoke Invasive Species Management Plan for UWF Grid Connection. Measures will include confirmatory surveys and the covering of infestations with terram at all identified locations prior to any works commencing, along with the supervision of works by an invasive species specialist.

Significance of the Impact: No Likely Impact

Rationale for Impact Evaluation:

- No suitable habitat for Marsh Fritillary was recorded on or adjacent (50m) to the UWF Grid Connection lands at Mountphilips Substation site and the 110kV UGC route, during habitat surveys in January and May 2019;
- The 110kV UGC outside of the Mountphilips site is predominately on the paved surface of public roads, therefore there is no suitable habitat for Marsh Fritillary within 110kV UGC Construction Works Areas.
- Implementation of a bespoke Invasive Species Management Plan for UWF Grid Connection.

Element 1: UWF Grid Connection – cumulative impact

Cumulative Impact Magnitude: There is no potential for cumulative habitat loss as the UWF Grid Connection will not cause any habitat loss in itself. The risk of indirect habitat degradation caused by the inadvertent spread of invasive species by quarry vehicles delivering stone to various UWF Grid Connection works locations and also to UWF Related Works and Upperchurch Windfarm works locations (particularly in Shevry which contains a small population of Marsh Fritillary butterfly) is avoided through the implementation of a bespoke Invasive Species Management Plan will avoid source impacts from the UWF Grid Connection. Measures will include confirmatory surveys and the covering of infestations with terram at all identified locations prior to any works commencing, along with the supervision of works by an invasive species specialist.

Significance of the Impact: No Likely Impact

Rationale for Impact Evaluation:

Invertebrates	Sensitive Aspect	<ul style="list-style-type: none">• No Marsh Fritillary habitat identified within 50m of UWF Grid Connection works during habitat surveys in January and May 2019;• Implementation of a bespoke Invasive Species Management Plan for UWF Grid Connection.
		Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project
		Element 2: UWF Related Works
		<u>Impact Magnitude:</u> Habitat for Marsh Fritillary to the extent of 0.54Ha is present at Shevry, of which 0.062Ha (11.5%) overlaps the construction works area. Evidence of breeding in the form of larval webbing was recorded at 4 locations within this habitat in September 2017 - all outside the works area boundary. Permanent land cover change of 0.062Ha or 11.5% of suitable habitat present will occur during the construction stage along a section of Internal Windfarm Cabling in Shevry.
		<u>Significance of the Impact:</u> Slight
		<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none">• The magnitude of the habitat loss: evaluated as medium (5-20% of habitat present), and;• The absence of webs within the habitats to be removed and low overall number present, and;• The contrast to the baseline environment represents a partial change to baseline attributes, and;• The long-term nature of the loss, and;• The low reversibility of the identified effect.• Implementation of a bespoke Invasive Species Management Plan for UWF Related Works.
		Element 3: UWF Replacement Forestry – N/A, evaluated as excluded, see Section 8.11.2.2.1.
		Element 4: Upperchurch Windfarm
		<u>Impact Magnitude:</u> Permanent land cover change of 0.062Ha (620m ²) or 11.5% of suitable habitat present at the location will occur during the construction stage.
	<u>Significance of the Impact:</u> Slight	
	<u>Rationale for Impact Evaluation:</u> <ul style="list-style-type: none">• The magnitude of the habitat loss: evaluated as medium (5-20% of habitat present), and;• The absence of webs within the habitats to be removed and low overall number present, and;• The contrast to the baseline environment represents a partial change to baseline attributes, and;• The long-term nature of the loss, and;• The low reversibility of the identified effect	
	Element 5: UWF Other Activities – N/A, evaluated as excluded, see Section 8.11.2.2.1. <i>(Although it should be noted that the management prescriptions to be implemented as part of the Upperchurch Hen Harrier scheme, such as a limitation on the excavation of drains, will allow improved grassland to revert back to wet grassland/semi-natural grassland habitats and possibly further Marsh Fritillary habitat, meta-population interconnectivity).</i>	
Biodiversity		Cumulative Information: Individual Evaluations of Other Projects or Activities
		Other Project: Forestry /Agriculture/Turf-cutting in the surrounding area
	Topic	<u>Impact Magnitude:</u> Afforestation can result in direct habitat loss for Marsh Fritillary of suitable habitat. Afforestation within the geographical study zone is considered unlikely to result in significant habitat loss; as much of the suitable habitat is within the Slieve Felim to Silvermines SPA and afforestation will be limited.

Agriculture: Two small populations have been previously recorded (Inis, 2017) in Agricultural lands at Bealaclave and Baurnadomeeny. Agricultural activities such as reclamation (land cover change) can cause habitat loss, however agricultural activities are considered unlikely to result in any contrast to baseline activities.

Whilst turf-cutting can directly remove suitable habitat. A corollary of this is that suitable habitat for Marsh Fritillary often exists on the margins of cutover bog due to the grassland structure brought about from peat extraction. One colony has been recorded (Nash *et al*, 2012) at Cumber Bog. Cumber bog is subject to peat extraction and therefore Marsh Fritillary habitat loss is considered. The probability of Habitat Loss is evaluated as High on a precautionary basis. In the absence of predictive estimates on extraction the magnitude of habitat loss is evaluated as High (20-80% pf population or habitat change).

Significance of the Impact: Moderate

Rationale for Impact Evaluation:

- The likely continuance of Peat Extraction in Cumber Bog

Evaluation of Other Cumulative Impacts – Habitat Loss

Whole UWF Project Effect

Cumulative Impact Magnitude:

No populations of Marsh Fritillary or suitable supporting habitat was identified within 50m of the 110kV UCG route (UWF Grid Connection). Therefore, there is no potential for likely cumulative direct habitat loss effects to Marsh Fritillary associated with the UWF Related Works/Upperchurch Windfarm colonies and the UWF Grid Connection.

Suitable habitat for this sensitive receptor of County Importance is present within the Whole Project Cumulative Evaluation Study Area at a location in Shevry where UWF Related Works and Upperchurch Windfarm are both located. 0.062ha will be lost within the UWF Related Works and Upperchurch Windfarm elements. As the works areas overlap at this location, there is no potential for cumulative effects between the UWF Related Works and the Upperchurch Windfarm (the effect will only occur once).

Significance of the Cumulative Impact: Slight

Rationale for Cumulative Impact Evaluation:

- The overall extent and degree of Habitat loss in respect of a County Important receptor, and;
- The long-term nature of the loss, which is offset by;
- The absence of webs in the habitats to be lost.

All Elements of the Whole UWF Project with Other Projects or Activities

Cumulative Impact Magnitude:

In total 0.062Ha of suitable habitat for this sensitive receptor of County Importance is present within the Whole UWF Project Study Area – specifically at UWF Related Works/Upperchurch Windfarm works area.

Habitat loss from peat extraction at Cumber Bog is evaluated as high on a precautionary basis however, as the distance from the Cumber Bog colony is greater than 5km to the UWF Related Work/Upperchurch Windfarm colonies, no cumulative impact is expected.

Significance of the Cumulative Impact: Moderate

Rationale for Cumulative Impact Evaluation:

- The overall extent and degree of Habitat loss from the Whole UWF Project and Turf Cutting activities;
- County Important of Marsh Fritillary;
- The separation distance between colonies at Shevry and Cumber Bog, means cumulative impacts are unlikely
- The long-term nature of the loss, and;
- The likely continuance of peat extraction at the nearest known colony within the study zone.

8.11.4.2 Description and Rationale for Excluded (scoped out) Impacts

The source-pathway-receptor links and the rationale for impacts excluded from the Impact Evaluation Table sections are described in Table 8-90 below.

Table 8-90: Description and Rationale for Excluded Impacts to Marsh Fritillary

Key: 1: UWF Grid Connection; 2: UWF Related Works; 3: UWF Replacement Forestry; 4: Upperchurch Windfarm; 5: UWF Other Activities

Source(s) Impacts	Project Element	Pathway(s)	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
Construction Stage				
Movement of soils and machinery	2,4	Soils	Habitat Degradation (Introduction of invasive alien species which may out-compete food plants such as Devils Bit Scabious.)	<p>Evaluated as Excluded: Marsh Fritillary is a medium sensitivity receptor of County Importance. Should invasive species be spread to areas containing Marsh Fritillary, these species could potentially out-compete the Devils-Bit scabious plants, degrading the habitat available to Marsh Fritillary.</p> <p>In relation to UWF Grid Connection: There are a number of invasive plant species in the verges and on adjacent lands to the public road pavements on the 110kV UGC route. There is no Marsh Fritillary habitat within any UWF Grid Connection construction works areas. In relation to UWF Related Works and Upperchurch Windfarm: no invasive species of Flora are present within construction works areas that overlap Marsh Fritillary habitat within the UWF Related Works/Upperchurch Windfarm construction works areas at Shevry.</p> <p>The risk of indirect habitat degradation caused by the inadvertent spread of invasive species by quarry vehicles delivering stone to either UWF Grid Connection locations, is minimised with the implementation of Project Design measures and the implementation of the bespoke Invasive Species Management Plan for UWF Grid Connection and the bespoke Invasive Species Management Plan for UWF Related Works. The implementation of the two ISMPs will prevent these elements acting as a source of effects (either alone or in combination) along this pathway. These measures will be implemented prior to any works commencing on the projects. It is therefore evaluated that there is extremely low probability of invasive flora being transferred to habitat patches present e.g. at Shevry, and therefore effects are unlikely to occur.</p>
Landuse Change	1,2,4	Surface Water	Habitat degradation (drainage alteration)	<p>No potential for effects/Neutral effects:</p> <p>In respect of the UWF Grid Connection 110kV UGC, no potential for effects to Marsh Fritillary are expected due to the absence of populations and suitable supporting habitat within 50m of the 110kV UGC route.</p> <p>In respect of UWF Related Works/Upperchurch Windfarm habitat patches/colony: Neutral</p>

Invertebrates

Sensitive Aspect

Biodiversity

Topic

Source(s) Impacts	Project Element	Pathway(s)	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
				impacts due to the implementation of surface water management at Shevry for Upperchurch Windfarm will maintain surface water flows to down-gradient areas of habitat.
Movement of Soils and Machinery	2,4	Soils	Habitat degradation (Compaction)	Evaluated as Excluded; In relation to Elements 2&4 - Vehicular movement will be limited to temporary and permanent roads within the construction area boundaries, the effect of which is appraised under Habitat Loss.
Excavation Works	1,2,4	Ground and Air Vibrations	Potential disturbance/displacement from Vibration	In relation to Elements 2, 4 - Low levels of ground and air vibrations are expected to be detectable within the immediate vicinity (1-5m) of tracking machines. A maximum estimate is (0.5 to 1mm/s). There is a low probability of this affecting in situ Marsh Fritillary. Zero webs were located within the 5m buffer zone of vehicular usage (at Shevry). Neutral effects are considered likely.
Excavation Works	1,2,4	Excavations	Mortality of In-Situ larvae	No Impact: Project Design Measures, Reference Documents Volume F2 Chapter 5 PD43 , which involve relocating any Marsh Fritillary larvae will avoid mortality of in-situ larvae at UWF Related Works/Upperchurch Windfarm construction works area in Shevry. In respect of the UWF Grid Connection 110kV UGC, no effects to Marsh Fritillary are expected due to the absence of populations and suitable supporting habitat within 50m of the UGC route.
Operational Stage				
Operating Machinery	1,2,4	Direct Contact	Mortality to in-flight Marsh Fritillary Adults through contact with machinery	Evaluated as Excluded; In respect of the UWF Grid Connection 110kV UGC, no effects to Marsh Fritillary are expected due to the absence of populations and suitable supporting habitat within 50m of the 110kV UGC route, and due to the small scale of operational works being carried out by 1-2 people using small vehicles, with operational activities being carried out from hard surfaces In relation to Elements 2&4 - It is considered as extremely unlikely that the short duration of the works period close to any Marsh Fritillary colony will result in this secondary effect. No contrast to baseline conditions (e.g. the presence of operating farm machinery) is expected. Neutral effects are considered likely.
Machinery Movement	2,4	Ground and Air Vibrations	Potential disturbance/displacement of Marsh Fritillary individuals breeding in suitable habitat proximal to	Evaluated as Excluded: Maintenance, comprising 1-2 people travelling in light vehicles along new/existing roads or walking over lands over cable routes (4) will have Neutral effect.

Invertebrates	Source(s) Impacts	Project Element	Pathway(s)	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
				maintenance activities	
Sensitive Aspect	Decommissioning Stage				
	Evaluated as Excluded: In relation to 2, 4 -Neutral effects on Marsh Fritillary are considered likely due to the scale of works required, with works taking place from hardstanding areas, and the windfarm access roads expected to remain in place. No decommissioning works in relation to project 1 or 3.				

8.11.5 Mitigation Measures for Impacts to Marsh Fritillary

Mitigation measures were incorporated into the UWF Grid Connection project design. No additional mitigation measures are required as the topic authors conclude that **significant impacts are not likely to occur to Marsh Fritillary** as a consequence of the UWF Grid Connection.

8.11.6 Evaluation of Residual Impacts to Marsh Fritillary

Residual Impacts are the final or intended effects that will occur after mitigation measures have been put into place. No additional mitigation measures are required and thus the Residual Impact is the same as the Impact set out in Impact Evaluation Table sections for Marsh Fritillary above (Section 8.11.4.1) – i.e. **no significant adverse impacts**.

8.11.7 UWF Grd Connection Environmental Management Plan

The Project Design measures will be implemented by the Project Manager and the main Contractor during the construction stage, under the **Environmental Management Plan for the UWF Grid Connection (EMP)**. The EMP is appended to this EIA Report as **Volume D**.

The EMP will be an important contract document for the main construction contractor (Contractor) who will be contractually obliged to comply with the EMP. An Environmental Clerk of Works will be appointed, who will be independent of the construction Contractor, and it will be the responsibility of the Environmental Clerk of Works to monitor the compliance of the Contractor with the EMP through liaising with the Construction Site Manager and the Project Manager, monitoring construction works on a daily basis and by carrying out regular audits on EMP compliance. The Environmental Clerk of Works will be resourced to employ a team of environmental specialists including a Site Ecologist, Site Hydrologist and a Invasive Species Specialist.

8.11.7.1 Invasive Species Management Plan

The UWF Grid Connection Environmental Management Plan will include a bespoke Invasive Species Management Plan developed to prevent/avoid the introduction and/or spread of invasive species. The Invasive Species Management Plan includes Best Practice biosecurity measures and describes supervision by an Invasive Species Specialist during the construction phase.

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Topic

8.11.8 Summary of Impacts to Marsh Fritillary

No impacts to Marsh Fritillary are concluded by the topic authors as likely to occur as a consequence of the development of UWF Grid Connection.

Table 8-91: Summary of the impacts to Marsh Fritillary

Impact to Marsh Fritillary:	Habitat Loss
<i>Evaluation Impact Table</i>	<i>Section 8.11.4.1</i>
Project Life-Cycle Stage	Construction
<u>UWF Grid Connection</u> <i>Direct/indirect impact</i>	No Likely Impact
<u>UWF Grid Connection</u> <i>Cumulative impacts</i>	No Likely Impact
Element 2: UWF Related Works	Slight
Element 3: UWF Replacement Forestry	No Potential for Impacts - Evaluated as Excluded, see Section 8.11.2.2.1
Element 4: Upperchurch Windfarm	Slight
Element 5: UWF Other Activities	No Potential for Impacts - Evaluated as Excluded, see Section 8.11.2.2.1
<u>Cumulative Impact:</u>	
All Elements of the Whole UWF Project	Slight
All Elements of the Whole UWF Project <i>cumulatively with</i> Other Projects or Activities Forestry and Agriculture activities in the surrounding area, Turf-Cutting	Moderate

The greyed out boxes in the above summary table relate to the cumulative information for the Other Elements of the Whole UWF Project, which are included to show the totality of the project.

Invertebrates

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8.12 Reference List

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