UWF Grid Connection EIA Report (2019)

Volume C2: EIAR Main Report

Chapter 15: Material Assets - Roads

October 2019

Topic | Material Assets (Roads)

Contents

List of Figures

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

List of Appendices

Appendices referenced in this topic chapter can be found in **Volume C4 EIAR Appendices.**

Glossary of Terms

Term	Definition
Congested	A junction or link is considered to be congested when traffic flows are at 85% of the estimated capacity of the junction or link
Sensitive Aspect	Any sensitive receptor in the local environment which could be impacted by the project.
Project Design Measure	Measures for environmental protection, incorporated into the design of the project.
Traffic Growth	The normal expected growth in traffic over time
Trip	One movement, in or out of the study area by foot, cycle or vehicle
FWD Analysis	A load pulse is produced by dropping a known mass, and is transmitted to the road pavement through a loading plate. The load cell measures the load imparted to the pavement surface and the geophones measure the pavement deflection in response to the load.

List of Abbreviations

Abbreviation	Full Term
TII	Transport Infrastructure Ireland
PD	Ecopower Project Design Environmental Protection Measure developed by members of the EIAR Team
AMM	Ecopower Additional Mitigation Measure developed by members of the EIAR Team
FWD	Falling Weight Deflectometer
UGC	Underground Cables
UWF	Upperchurch Windfarm

Executive Summary of the Material Assets: Roads Chapter

Baseline Environment: Most of the UWF Grid Connection 110kV UGC involves cabling in lightly trafficked sections of the R503 Regional Road, with less works planned for local roads which are generally rural in nature and also lightly trafficked. The R503 runs generally in an E-W orientation and links Thurles town in the east with Newport town and Limerick city to the west and is identified as Strategic Roads in the North Tipperary County Development Plan 2010 (as amended).

The public roads affected are the Regional Road R503, along with the Local Roads "L" Roads – the L2166-10, L6013-0, L2156-0, L2157-0, L6009-0, L5337-1, L2264-50, L6188-0, with the exception of the L5337-1 at Tullow Newport (L5337-1 won't be affected - construction material haul route only). All of these roads are 2-way roads, with the trafficked pavement varying in width from 3.5 to 5m, with narrow verges, and are generally bounded by low level earthen embankments or hedgerows along either side, with road surface water drained to open drains, generally running along each of the roadsides.

There are no vehicle weight restrictions in place along any of the roads affected by the works. Road Boundaries consist of a mix of hedgerows and simple mounded embankments, which are aligned beyond drainage channels that occur in most roadside verges.

Road Users include local traffic and commuters on the R503 between Limerick and Thurles. Tourists may also be present on the walking/cycling routes that interact with these roads.

Survey Results for Sensitive Aspects in the Baseline Environment: Surveys of the existing road and traffic conditions were carried out including Passing Traffic Volume Data collection (ATC Tube Counts); Buried Structures Survey; Pavement video survey and Pavement Condition Index (vPCI) survey; and Peat Probe Surveys (R503 only). A Road Safety Audit and a Traffic & Transport Impact Assessment were also conducted.

Passing Traffic Volume Data surveys demonstrated that the roads in the study area are very lightly trafficked. Traffic counts (7-day classified 'ATC Tube Counts') were carried out in January 2019 at 5 locations and in May 2019 at 6 locations, to measures vehicles over a 24-hour period and the results show that traffic volumes on the roads are very low. Traffic speeds are generally maintained well within the posted speed limits.

Buried Structure surveys established that the 63 no. watercourse crossings along the public road comprise a mix of bridges (15) and plastic/concrete/masonry culverts (48). TLI Group engineers surveyed the structures and were satisfied that the road structures above the bridges (where trenching in the bridge deck is required) were in good condition and will be capable of supporting the 110kV UGC infrastructure and the increased traffic loading associated with the construction works. No works will be required to the bridge structures themselves. At two bridges (W8 and W9) the bridges are not considered to have sufficient road depth over the bridge arch/deck to accommodate the cable ducting and therefore the cabling will cross via Horizontally Drilling (HDD) under the existing bridge and watercourse. Also, the existing road level and parapet wall heights at Rockvale Bridge (W7), Tooreenbrien Bridge (W36) and Anglesey Bridge (W53) will need to be increased to accommodate the 110kV UGC. A Road Safety Audit was carried out, by Malachy Walsh & Partners, who considered that the project will not affect road safety along the route.

Pavement condition surveys show that the pavement condition on the R503 was rated as Good; with conditions on the local "L" roads found to be 'good' to 'fair' on most local roads. Surveys of the public roads along the route, particularly where the 110kV UGC route pass through mapped peat soils in the central part of the route on sections of the Regional Road R503, found that sections of the R503 road through mapped peat soils are substantially of 'excavate and fill' construction, though not all sections of road may be built on competent ground and would be considered to be of 'floating road' construction. A total of 20 peat probe sampling was also carried out to determine the depth of peat in these areas. In general the ground on both

sides of the regional road was firm ground. The design of the 110kV UGC cables trench includes the application of floating road trench design where competent ground is not encountered, this will avoid any effects to the structural integrity of any 'floating' sections of the Regional Road R503.

Road Works affecting the Public Roads including buried structures: The 110kV is almost wholly planned for the pubic road network, with trenching and cabling required in the R503 and on some Local Roads. The construction of the 110kV UGC will involve the excavation of a trench c.1.25m deep and 0.6m wide within public road pavements. In total there will be 29.2km of cables trench within the road pavements. The construction of the Joint Bays will require the excavation of the road pavement to install pre-cast concrete chambers for the 40 No. Joint Bays along the route of the 110kV UGC on the public road. Of the 48 No. culverts, no works will be required to 35 No. of these, with the 110kV UGC installed either under or over the culverts. At the remaining 13 No. culverts, the existing masonry box culvert may need to be replaced (12 No. of which are under the R503, and 1 No. under the L-2265-50). The 110kV UGC will then be installed under the existing/replaced culvert.

Works to road verges and boundaries will only occur at Mountphilips Substation site entrance. All works outside of the Mountphilips Substation site will take place within road pavements/built surfaces.

Road works affecting Road Users: It is expected that works on the public road will last approximately 8 to 9 months on the R503 and for periods of between 1 to 3 weeks at various points on the Local Roads. There will be 4 construction works crews working on the roads at the same time, with 1 crew dedicated to construction works on the local roads, and 3 crews working at separate locations along the Regional R503 Road. There will be approximately 80m – 100m of trenching completed in a single day. At the Joint Bay locations, initial construction works will take 2 days, cable pulling works will take 3 days and cable jointing works 5 days, per Joint Bay. 31 of the 40 Joint Bays are on the Regional R503 Road.

Works will result in one-lane closures on the Regional R503 Road and will result in some road closures and one-lane closures on the Local Roads. The Local Roads that will be closed for periods between 1 week and 1 month are; the two local roads north of Newport and one local road near the consented Upperchurch Windfarm substation. There are diversion options adding 5 minutes to the journey time, available around the Newport local road closures and a diversion adding 10 minutes to the journey time around the local road closure near the Upperchurch Windfarm substation. At the one-lane closure locations, traffic flow at these locations will be managed around the works, using a stop-go system and flagmen to minimise delays and disruption to road users.

A Traffic Management Plan (TMP) will implemented, the objective of which will be to control and minimise the traffic impacts of construction insofar as it may affect the road network, local residents and the travelling public on the public roads close to and adjacent to the UWF Grid Connection construction site, through measures to maximise road safety while keeping traffic flowing as freely as possible. As requested by the Roads Department of Tipperary County Council, during pre-planning consultations, the Promoter will fund the costs of Tipperary County Council engaging a chartered Civil Engineer to oversee quality control and compliance with drawings, specifications and road opening conditions for the duration of the works

Summary of the Likely Impact to Public Roads: **The impact on public road pavements is evaluated as Moderate**, due to the moderate magnitude of the works but works will be temporary; traffic on the roads is light and the road will be reinstated in accordance with the Department of Transport, Tourism & Sport Guidelines for Managing Openings in Public Roads (April 2017). **The impact on bridges and culverts is evaluated as Neutral** because the majority of buried structures require no works and also any works required will contribute to safer roads and improved infrastructure because any culverts replaced, will be replaced with higher specification culverts. **The impact to roadside boundaries is evaluated as Imperceptible** because boundary removal is limited to the widening of the existing field entrance for the Mountphilips Substation

site and the reinstatement of the road boundary behind sightlines at the widened entrance. **Cumulative impacts** with UWF Related Works, Upperchurch Windfarm and *potential* Castlewaller Windfarm (grid connection works on the local road in Castlewaller) are the same, ranging from **Neutral to Imperceptible to Moderate**.

Summary of the Likely Impacts to Road Users: The effect of delays to be expected by Road Users due to road works, is evaluated as Slight due to the lightly trafficked nature and extent of available capacity on all roads; the availability of acceptable diversions around road closures; the maintenance of local access to properties on the roads, including the roads subject to closures; the temporary duration and the application of traffic management measures and use of flagmen to minimise traffic delays. **The Cumulative Impact** with UWF Related Works, Upperchurch Windfarm and *potential* Castlewaller Windfarm (grid connection works on the local road in Castlewaller) are the same, ranging from **Imperceptible to Slight**.

Conclusion: The UWF Grid Connection will not cause significant adverse effects to Material Assets (Roads).

15 Environmental Factor: Material Assets (Roads)

15.1 Introduction to the Material Assets (Roads) Chapter

15.1.1 What are Material Assets (Roads)?

The Material Asset - Roads, relates to the local, Regional and National roads which are part of the public road network. In this chapter, Road Users relate to pedestrians, cyclists, and drivers of motor vehicles using the public road network.

15.1.2 Overview of Material Assets (Roads) in the Local Environment

The existing roads environment consists for the most part of lightly trafficked sections of the R503 Regional Road, along with local roads which are generally rural in nature and also lightly trafficked. All of these roads are 2-way roads, with the trafficked pavement varying in width from 3.5 to 5m, with narrow verges, and are generally bounded by low level earthen embankments or hedgerows along either side. The road pavements consist of traditional surface-dressed flexible pavement ('tar and chippings'), with road surface water drained to open drains, generally running along each of the roadsides.

Road Users are mainly people driving cars or vans to and from work/school. The R503 connects Thurles with Limerick and is also designated as a scenic route. The number of road users was low in general, with very low numbers of walkers or cyclists recorded during traffic counts.

The location of the UWF Grid Connection in relation to the local road network is illustrated on OSI Mapping on Figure GC 15.1: Location of the UWF Grid Connection.

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

15.1.3 Sensitive Aspects of the Material Assets (Roads) Environment <u>included</u> 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 **<u>are included in this topic chapter</u>** as they could be potentially impacted:

Sensitive Aspect No. 1	Public Roads	Section 15.2
Sensitive Aspect No. 2	Road Users	Section 15.3

<u>Each of the above listed Sensitive Aspects are evaluated individually in Sections 15.2 to 15.3 of this Chapter</u>.

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 15.2 to 15.3. The colour-codes have been applied to section headings, tables and on side-tabs on the edge of the pages.

15.1.4 Sensitive Aspects excluded from further evaluation

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

Public Roads & Road Users on national and regional roads along delivery routes for concrete and aggregate deliveries, other materials deliveries, personnel and turbine component transportation on national and regional roads and local roads, as far as the R503 at Newport from the west, and at Ballycahill from the east, and the UWF Other Activities Haul Route Activity Locations: N69, N18, M7, R498, and the R503 from R498 junction as far as the consented Upperchurch Windfarm Site Entrance No.1.	Evaluated as excluded, due to Neutral impacts: It is considered that National and Regional Road pavements or buried structures are not likely to be affected by the delivery of the construction materials or the larger turbine components, due to the high capacity and good condition of these roads, the commonality of HGVs on these roads, and the absence of any requirement to carry out works to the road surface or to road structures in order to deliver turbine components or construction or operational materials or personnel.
Public Roads & Road Users along the route of any diversions temporarily put in place due to road closures on local roads.	Evaluated as excluded, due to Neutral impacts: It is considered that impacts to local roads or local road users due to any diversions will be Neutral, due to the brief or very short temporary duration of any diversion put in place along with the ability of these local roads to accommodate the additional traffic volumes and the lightly trafficked nature of the roads in this upland area.

15.1.5 Overview of the Subject Development

The UWF Grid Connection is the subject development, being the subject of a current application to An Bord Pleanála. The main parts of the UWF Grid Connection are identified in Table 15-1 below.

Table 15-1: Subject Development – UWF Grid Connection

Project ID	The Subject Development	Composition of the Subject Development
Element 1	The Subject Development 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 EIAR Main Report).

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

15.1.5.1 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 8930m^2 to 10290m^2) and the footprint of the control building is increased from 205m^2 to 375m^2. ***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.

15.1.6 The Authors of the Material Assets (Roads) Chapter

The Material Assets chapter has been written by David Tarrant, Ruairí Geary and Daithí Barrett, all with project experience relating to the proposed type of works, with TLI Group.

David Tarrant is a Chartered Engineer and has over 12 years' experience in the Irish construction sector is currently a lead civil design engineer with TLI Group. David has worked on numerous HV Cable designs within the road network including national roads, TII Infrastructure crossings and also in designing new proposed roadways. Daithí Barrett is a Lead Environmental Scientist within TLI Group and has over 6 years' experience dealing specifically with environmental issues relating to the utility sector. Ruairi Geary is a Chartered Engineer and is a design team leader within TLI Group. Ruairí has over 14 years' experience in a wide range of Electrical/Mechanical/Civil engineering projects, specialising in the area of distribution and transmission network design, and in particular working on the ESB and Eirgrid Networks.

TLI Group is a utility infrastructure consultancy and construction company, operating extensively within the utilities sector both in Ireland and internationally. Designing and building overhead power lines and underground cables with associated structures are the company's core expertise.

15.1.7 Sources of Baseline Information

The information sources outlined in Table 15-2 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 15-2: Sources of Baseline Information for Material Assets (Roads)

Type	Source
Consultation	Feedback was received from • Transport Infrastructure Ireland • Roads Department, Tipperary County Council • Members of the public during the Public Consultation and Information Day See Chapter 3: The Scoping Consultations, Chapter 3 Appendices for further details.
Guidelines	• The TII Traffic and Transport Assessment Guidelines (2014) • The TII Design Manual for Roads and Bridges (2013, as amended), • The Department for Transport Traffic Signs Manual (2010), • The TII Specification for the Reinstatement of Openings in National Roads (2013)
Desktop	• North Tipperary County Development Plan 2010 (as varied in 2016). • POWSCAR 2016, CSO Database • RSA Collision Statistics Database • EPA Mapping Database • Review of planning/ environmental information documents for the Other Elements of the Whole UWF Project as contained in Volume F of the planning application • Compilation of Appendix 15.1: Traffic and Transportation Assessment Report • Review of Pavement Management Systems' Appendix 15.2: Pavement Condition Survey • Review of Road Safety Audit by Malachy Walsh & Partners. Appendix 15.4: Stage 1 Road Safety Audit and Review
Fieldwork	• Passing Traffic Volume Data collection and assessment (ATC Tube Counts) • Buried Structures Survey (part of Appendix 5.2: Inventory and Survey of Watercourse Crossings) • A pavement video survey and pavement condition index (vPCI) survey for the whole road network involved in the development, by Pavement Management Services (PMS). Appendix 15.2: Pavement Condition Survey • Site Visits & Observation of road pavement and boundary conditions. Appendix 15.3: Site Photographs of UWF Grid Connection Roads, Bridges & Culverts. • Stage 1 Road Safety Audit and Review, by Malachy Walsh & Partners – see Appendix 15.4 • Peat Probe Survey on the R503. Appendix 15.5: Peat Probe Survey and illustrated on Figure GC 15.2. • Inventory and Survey of Watercourse Crossings. Appendix 15.6.

15.1.8 Methodology used to Describe the Baseline Environment and to Evaluate Impacts

The methodology used to describe the baseline environment and evaluate impacts was based on TII's Traffic and Transportation Assessment Guidelines (2014), and on the IMPERIA methodology, described in Section 15.1.8.2 below.

15.1.8.1 Transport Infrastructure Ireland - Traffic and Transportation Assessment Guidelines

15.1.8.1.1 TII Threshold Analysis

The TII guidelines recommend that a threshold assessment & analysis is undertaken. The threshold levels are included in the 1st column of Table 15-3 below. Whether or not the UWF Grid Connection project meets the criteria is detailed in the 2nd column.

Table 15-3: TII Threshold Analysis

Traffic Management Guidelines Thresholds for Transport Assessments	**Criteria met? Yes/No?**
Traffic to and from the development exceeds 10% of the traffic flow on the adjoining road.	**Yes**, due to the extremely low existing traffic volumes on some of the local roads in the study area.
Traffic to and from the development exceeds 5% of the traffic flow on the adjoining road where congestion exists or the location is sensitive	No - There are no roads classed as 'congested' – all roads are between 1% and 2% of their estimated capacity (as per the TII Guidelines, a junction or link is considered to be congested when traffic flows are at 85% of the estimated capacity of the junction or link)
Residential development in excess of 200 dwellings.	No - Not applicable
Retail and leisure development in excess of 1,000m^2.	No - Not applicable
Office, education and hospital development in excess of 2,500m^2.	No - Not applicable
Industrial development in excess of 5,000m^2.	No - Not applicable
Distribution and warehousing in excess of 10,000m^2	No - Not applicable

As one of the criteria in Table 15-3 will be met, a detailed Traffic & Transportation Assessment has been undertaken and has been incorporated into Section 15.2 and Section 15.3 of this chapter. The full Traffic and Transportation Assessment is included with the EIA Report as Appendix 15.1.

15.1.8.1.2 Methodology for Calculating Traffic Volumes

The construction traffic associated with the UWF Grid Connection and the Other Elements (UWF Related Works and Upperchurch Windfarm) has been quantified and the cumulative volumes have been calculated in order to evaluate the whole project impact on any roads which are affected by more than one element of the whole project.

The modelling of trip generation, assignment and distribution to the road network has been based on information in Chapter 5 of the EIAR Main Report.

In order to quantify the impact on traffic and transport, the construction traffic volumes and movements to and from the site compounds (the Temporary Compound at the Mountphilips Substation for UWF Grid Connection, and Site Compound No. 1 in Graniera for Upperchurch Windfarm and UWF Related Works) and the various site entrances and to and from quarries and the various construction works areas was calculated, and the daily and peak hour construction traffic movements associated with each site entrance or road works location was then calculated for the relevant local road. This was undertaken for a typical 24 Hour Annual Average Daily Traffic volume, and for the traditional weekday AM and PM peak hours.

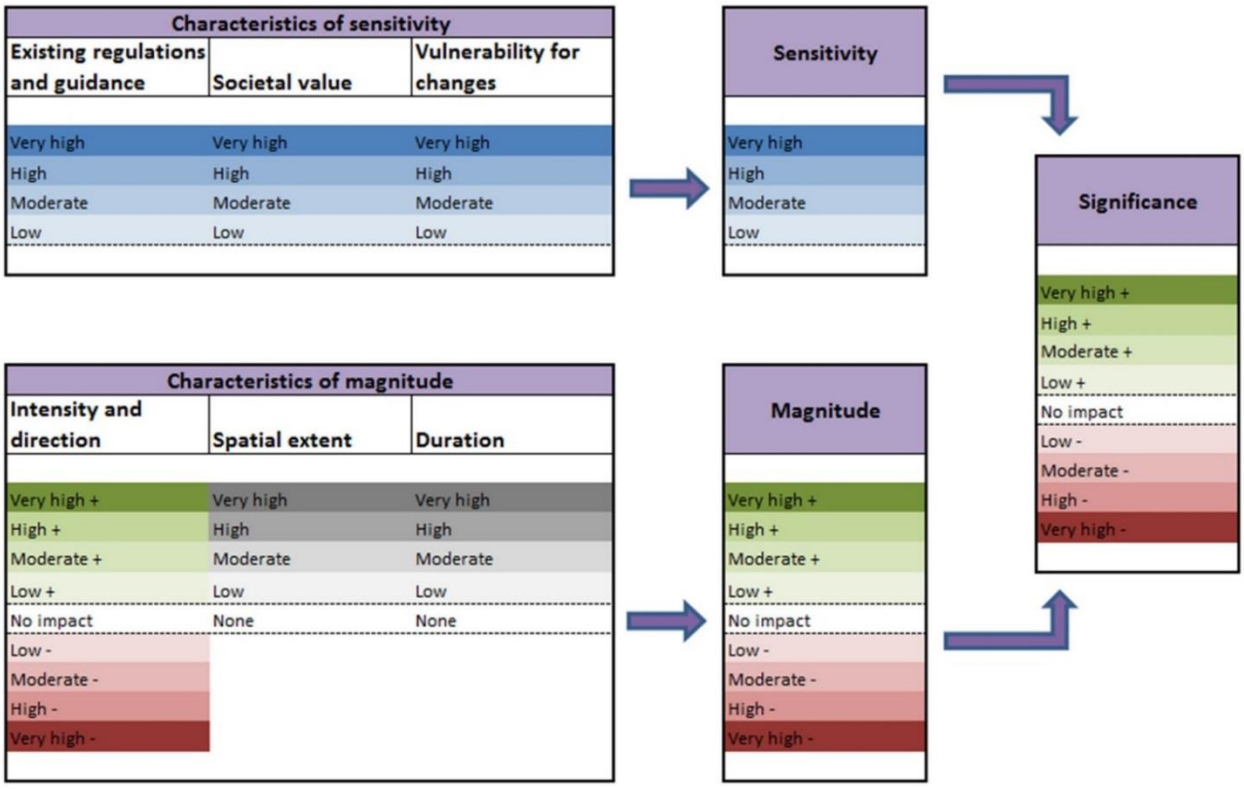
The Annual Average Daily Traffic volumes in PCUs without the works, for each of the affected roads has been measured through traffic counts, which were carried out on each affected road. Passing Traffic Volume Data collection and assessment (ATC Tube Counts) can be found in Appendix 15.1: Traffic and Transportation Assessment Report.

The transport impact of the additional construction traffic has been evaluated against the existing volumes and the future volumes, together with the quantified road link capacity based on the existing pavement width and conditions, using industry standard methods (TD76/99 Link Capacity Assessment) of link capacity assessment traffic volumes and link capacity details for each affected road. See Appendix 15.4: Stage 1 Road Safety Audit and Review.

15.1.8.2 Overview of the IMPERIA Methodology

The IMPERIA methodology is also used to evaluate the significance of impacts, together with the TII Guidance.

In the framework developed under the EC LIFE project - IMPERIA, the evaluation of impact significance uses a replicable, multi-criteria decision analysis, where the sensitivity of the receptor (i.e. the sensitivity of a Sensitive Aspect of the environment) and the magnitude of the change caused by a project are rated using sub-criteria or scales, and then the overall significance is evaluated using a matrix.



The criteria for determining the overall sensitivity of a receptor and magnitude of the change (impact) to the receptor, is provided in the tables below. The matrix for determining the significance of the impact to the receptor is provided after these tables.

15.1.8.2.1 Criteria for Evaluating the Sensitivity of a Receptor

Sensitivity of the receptor is a description of the characteristics of the receptor or aspect of the environment which will be affected by the development. It is a measure of 1) existing regulations and guidance, 2) societal value and 3) vulnerability for the change. The sensitivity of a receptor is estimated in its current state prior to any change implied by the project.

Existing regulations and guidance describes whether there are any such objects in the impact area, which have some level of protection by law or other regulations (e.g. prohibition against polluting groundwater and Natura areas), or whose conservation value is increased by programs or recommendations (e.g. landscapes designated as nationally valuable).

Societal value describes the value of the receptor to the society and depending on the type of impact may be related to economic values (e.g. water supply), social values (e.g. landscape or recreation) or environmental values (e.g. natural habitat). Societal value measures general appreciation from the point of view of the society. When relevant, the number of people impacted is taken into account.

Vulnerability for the change describes how liable the receptor is to be influenced or harmed by changes to its environment.

Sensitivity	Criteria Existing regulations/guidance	Criteria Societal value	Criteria Vulnerability to change
Low	Few or no recommendations which add to the conservation value of the impact area, and no regulations restricting use of the area (e.g. zoning plans).	The receptor is of small value or uniqueness. The number of people impacted is small.	Even a large external change would not have substantial impact on the status of the receptor. There are only few or none vulnerable receptors in the area.
Moderate	Regulation sets recommendations or reference values for an object in the impact area, or the project may impact an area conserved by a national or an international program.	The receptor is valuable and locally significant but not very unique. The number of people impacted is moderate.	At least moderate changes are needed to substantially change the status of the receptor. There are some vulnerable receptors in the area.
High	The impact area includes an object that is protected by national law or an EU directive (e.g. Natura 2000 areas).	The receptor is unique and valuable to society. It may be deemed nationally significant and valuable. The number of people impacted is large.	Even a small external change could substantially change the status of the receptor. There are many vulnerable receptors in the area.
Very High	The impact area includes an object that is protected by national law or an EU directive (e.g. Natura 2000 areas).	The receptor is highly unique, very valuable to society and possibly irreplaceable. It may be deemed internationally significant and valuable. The number of people affected is very large.	Even a very small external change could substantially change the status of the receptor. There are very many vulnerable receptors in the area.

The **overall sensitivity of a receptor** is assessed by the competent expert on the basis on his/her assessment of the components of sensitivity. A general guide for deriving the overall sensitivity is to pick the maximum of existing regulations and guidance and societal value and then adjust that value depending on the level of vulnerability.

Determining the Overall Sensitivity of a Receptor	
Low	The receptor has minor social value, low vulnerability for the change and no existing regulations and guidance. Even a receptor which has major or moderate social value may have low sensitivity if it's not liable to be influenced by the development.
Moderate	The receptor has moderate value to society, its vulnerability for the change is moderate, regulation may set reference values or recommendations, and it may be in a conservation program. Even a receptor which has major social value may have moderate sensitivity if it has low vulnerability, and vice versa.
High	Legislation strictly conserves the receptor, or it is very valuable to society, or very liable to be harmed by the development.
Very High	Legislation strictly conserves the receptor, or it is irreplaceable to society, or extremely liable to be harmed by the development. Even minor influence by the proposed development is likely to make the development unfeasible.

15.1.8.2.2 Criteria for Evaluating the Magnitude of an Impact

Magnitude of the impact describes the characteristics of the changes or effects that the planned project is likely to cause. Magnitude is a combination of 1) intensity and direction, 2) spatial extent, and 3) duration. Assessment of magnitude evaluates the likely changes affecting the receptor *without* taking into account the receptors sensitivity to those changes.

Intensity describes the physical dimension of a development. The direction of the change/effect is either positive (green) or negative (red).

Magnitude	Criteria – Intensity & Direction
Very High	The proposal has an extremely beneficial effect on nature or environmental load. A social change benefits substantially people's daily lives.
High	The proposal has a large beneficial effect on nature or environmental load. A social change clearly benefits people's daily lives.
Moderate	The proposal has a clearly observable positive effect on nature or environmental load. A social change has an observable effect on people's daily lives.
Low	An effect is **positive** and observable, but the change to environmental conditions or on people is small.
No impact	An effect so small that it has no practical implication. Any benefit or harm is negligible.
Low	An effect is **negative** and observable, but the change to environmental conditions or on people is small.
Moderate	The proposal has a clearly observable negative effect on nature or environmental load. A social change has an observable effect on people's daily lives and may impact daily routines.
High	The proposal has a large detrimental effect on nature or environmental load. A social change clearly hinders people's daily lives.
Very High	The proposal has an extremely harmful effect on nature or environmental load. A social change substantially hinders people's daily lives.

Spatial extent describes the geographical reach of, or the range within which, an effect is observable.

Duration describes the length of time during which an impact is observable and it also takes other related issues such as timing and periodicity into account. These are relevant for impacts which aren't observable all the time such as periodic impacts.

Magnitude	Criteria Spatial Extent	Criteria Duration
Low	Impact extends only to the immediate vicinity of a source. Typical range is < 1 km.	An impact whose duration is at most one year, for instance during construction and not operation. A moderate-term impact may fall into this category if it's not constant and occurs only at periods causing the least possible disturbance.
Moderate	Impact extends over one municipality. Typical range is 1-10 km.	An impact lasts from one to a number of years. A long-term impact may fall into this category if it's not constant and occurs only at periods causing the least possible disturbance.
High	Impact extends over one region. Typical range is 10-100 km.	An impact lasts several years. The impact area will recover after the project is decommissioned.
Very High	Impact extends over several regions and may cross national borders. Typical range is > 100 km.	An impact is permanent. The impact area won't recover even after the project is decommissioned.

Deriving the overall magnitude of the change from components of magnitude

Magnitude of the change is a comprehensive synthesis of its component factors. In a case, where intensity, spatial case and duration all get the same value, the magnitude would also be given this value. In other cases, intensity should be taken as a starting point, and the assessment should be adjusted based on spatial extent and duration to obtain an overall estimate. The aim is that the overall assessment should capture the characteristics of an effect. The table below describes some example descriptions of different categories for the magnitude of the change.

Determining the Overall Magnitude of the Change/Effect	
Very High	The proposal has beneficial effects of very high intensity and the extent and the duration of the effects are at least high.
High	The proposal has beneficial effects of high intensity and the extent and the duration of the effects are high.
Moderate	The proposal has clearly observable positive effects on nature or people's daily lives, and the extent and the duration of the effects are moderate.
Low	An effect is positive and observable, but the change to environmental conditions or on people is small.
No impact	No change is noticeable in practice. Any benefit or harm is negligible.
Low	An effect is negative and observable, but the change to environmental conditions or on people is small.
Moderate	The proposal has clearly observable negative effects on nature or people's daily lives, and the extent and the duration of the effects are moderate.
High	The proposal has harmful effects of high intensity and the extent and the duration of the effects are high.
Very High	The proposal has harmful effects of very high intensity and the extent and the duration of the effects are at least high.

15.1.8.3 Assessing the significance of an impact

The **assessment of the overall significance uses the matrix below,** where positive impacts are in green and negative in red. The matrix is based on the **magnitude of the change** affecting a receptor and on the **sensitivity of the receptor** to those changes.

The values obtained from the table are indicative because the most relevant dimensions for characterising an impact are dependent on the type of impact. Thus, some discretion from the expert is required, in particular in cases, where the one component is low and the other one high or very high.

Determining the Overall Significance of an Impact

Impact Significance		Magnitude of change								
		Very High	**High**	**Moderate**	**Low**	**No Change**	**Low**	**Moderate**	**High**	**Very High**
Receptor Sensitivity	**Low**	Significant*	Moderate*	Slight	Imperceptible	Neutral	Imperceptible	Slight	Moderate*	Significant*
	Moderate	Significant	Significant	Moderate	Slight	Neutral	Slight	Moderate	Significant	Significant
	High	Profound	Significant	Significant	Moderate*	Neutral	Moderate*	Significant	Significant	Profound
	Very High	Profound	Profound	Significant	Significant*	Neutral	Significant*	Significant	Profound	Profound

* Especially in these cases, significance might get a lower estimate, if sensitivity or magnitude is near the lower bound of the classification

Note on Terms used in 'Determining the Overall Significance of an Impact' Table: *The Significance rating ascribed in the Table above have been refined from the ARVI tool, to provide a more nuanced understanding of the significance and also to be compatible with the terms used throughout this EIA Report, which have been informed by the EPA Guidelines on Information to be contained in EIAR (2017) for description of effects.*

In the above Table - Low has been refined as Slight or Imperceptible depending on context; High has been renamed as Significant; Very High has been renamed as Profound; No Impact is understood to also mean Neutral effect, which is defined in the EPA Guidelines as 'no effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error'.

15.1.9 Certainty and Sufficiency of the Evaluation/Information

The assessment follows industry-standard procedures, guidelines and best practices for the Assessment of Traffic and Transportation impacts.

The information which informed the baseline descriptions and impact evaluations was collated from site visits and surveys of the local and regional road network and surveys of bridge and culvert crossing structures, carried out in January and June 2019, and through consultation with the Roads Department of Tipperary County Council.

In respect of Roads, no significant limitations or difficulties were encountered.

15.2 Sensitive Aspect No.1: Public Roads

This Section provides a description and evaluation of the Sensitive Aspect - Public Roads.

15.2.1 BASELINE CHARACTERISTICS of Public Roads

15.2.1.1 STUDY AREA for Public Roads

The study area for Public Roads in relation to the UWF Grid Connection is described in Table 15-4 and illustrated on Figure GC 15.2: UWF Grid Connection Study Area for Public Roads (Volume C3 EIAR Figures).

Table 15-4: UWF Grid Connection Study Area for Public Roads

Study Area for Public Roads	Justification for the Study Area Extents
Construction works areas on the public road network; route of concentrated UWF Grid Connection construction traffic; roadwork locations on local roads; at site access points and the R503 regional road between Newport and Ballycahill.	Public Roads at road works locations or along routes of concentrated construction traffic or at the site access point may be affected by road works and construction traffic movement associated with UWF Grid Connection. Roads remote from the area are not likely to be affected.

15.2.1.2 Baseline Context and Character of Public Roads in the UWF Grid Connection Study Area

The roads which could be potentially affected by the UWF Grid Connection works and associated haulage are the **Regional Road** R503, along with the **Local Roads** (designated as "L" Roads); L2166-10, L6013-0, L2156-0, L2157-0, L6009-0, L5337-1, L2264-50, L6188-0. With the exception of the L5337-1 at Tullow Newport, all of these roads will be subject to trenching and joint bay excavation works for the 110kV UGC.

The L6013-0 will not be used as a haulage route from the Mountphilips Substation Site (location of the temporary construction compound) to the L2156-0, L2157-0 and L6009-0 when installing the 110kV UGC along these roads. Rather traffic from the temporary construction compound at Mountphilips Substation site will use the L2166-10, through Newport town and then the L5337-1 at Tullow to access the L2156-0, L2157-0 and L6009-0 works, thus avoiding the L6013-0 entirely.

15.2.1.2.1 Road Pavements

The roads are 2-way roads, with the trafficked pavement varying in width from 3.5 to 5m. The road pavements generally consist of traditional surface-dressed flexible pavement ('tar and chippings'), with narrow verges and road surface water drained to open drains, generally running along each of the roadsides.

15.2.1.2.2 Pavement Condition

A Pavement Condition Survey was carried out to evaluate the type, severity and quantity of pavement distress for each 100 metre length of pavement along the route of the survey. These distresses include defects such as bleeding, ravelling, patching, rutting, depressions, alligator cracking, potholes, edge break-up and road disintegration. The Pavement Condition Index (PCI) rating, the structural index and the surface index based on distress type, are calculated for each 100 metres from the distress data collected. The data and detailed survey results are included in Appendix 15.2: Pavement Condition Survey and summarised below. Photographs of each road are included in Appendix 15.3: Site Photographs of UWF Grid Connection Roads, Bridges & Culverts. The survey found that, in general, the road condition is good to fair throughout the study area.

Table 15-5: PCI Rating System (index between 0 and 100).

PCI Range	Pavement Condition Rating
85 to 100	Very Good
65 to 85	Good
50 to 65	Fair
40 to 50	Poor
20 to 40	Very Poor
< 20	Fail

Table 15-6: Pavement Condition Ratings (roads listed from west to east)

Road No.	Pavement Condition Index	Rating	Length of UWF Grid Connection 110kV UGC (km)
L-2166-10	57/46	Fair / Poor	0.8 km
L-6013-0	62	Fair	1.2 km
L-2156-0	50	Fair	0.3 km
L-2157-0	57/36	Fair / Very Poor	0.8 km
L-6009-0	81	Good	1.7 km
R-503	81	Good	22.2 km
L-2264-50	71	Good	1.9 km
L-6188-0	73	Good	0.3 km

15.2.1.2.3 R503 Road Stability through areas of mapped peat soils

Sections of the 110kV UGC route pass through mapped peat soils (as per EPA Corine 2018 mapping) in the central part of the route on sections of the Regional Road R503. Peat probe sampling was carried out to determine the depth of peat in these areas (see Appendix 15.5: Peat Probe Survey). A total of 20 peat probe test samples were completed, with peat identified in 5 no. of these locations in Reardnogy More and Knocknabansha townlands. Peaty topsoil only (i.e. no deep peat) was recorded at the other 15 no. locations. At the 5 no. locations where peat depths were recorded, the peat depth ranged between 1m and 4m. At four of the five locations it was found that the high side of the road comprised of firm dry ground, and that the lower (southern) side of the road also comprised dry ground close to the road with wetter boggier ground further away from the road. Boggy ground was noted on both sides of the road at one location at Reardnogy Beg. The locations of the 20 no. peat probes are identified on Figure GC 15.2.

A visual survey of the R503 Regional Road was carried out by the topic authors in August 2019. During this survey, recent repair works to the road to correct differential (uneven) settlement of the road were identified. Overall, based on these surveys, it is expected that the sections of the R503 road through mapped peat soils are substantially of 'excavate and fill' construction, though not all sections of road may be built on competent ground and would be considered to be of 'floating road' construction.

The design of the 110kV UGC cables trench includes the application of floating road trench design where competent ground is not encountered – i.e. on sections where the road is not sitting on solid ground. This essentially involves installing geogrid material around the cable trench and lapped 1m over the existing road at both sides of the trench in order to secure the cable trench into the road build up. An additional geotextile layer is installed at the bottom of the trench, if the bottom of the trench is sitting on peat, this will provide additional stability for the installation of the cable trench. During reinstatement of these sections of 110kV UGC a minimum width of 2.6m of roadway will be reinstated to mitigate against differential (uneven) settlement through spreading loads and creating a more even distribution of pressures across the peat

surface[1]. It is considered that the application of floating road trench design and the minimum 2.6m reinstatement of the road above will improve the performance of these sections of road.

15.2.1.2.4 Buried structures (bridges and culverts)

There are 63 No. buried structures located on the route of the 110kV UGC, comprising a mix of bridges, plastic or concrete pipe culverts and small masonry stone culverts. The number of each type of structure for each road along the route of the 110kV UGC is detailed in Table 15-7 and illustrated on Figure GC 15.2: UWF Grid Connection Study Area for Public Roads. Photographs of these structures are included in Appendix 15.3: Site Photographs of UWF Grid Connection Roads, Bridges & Culverts and an inventory is included in Appendix 15.6: Inventory and Survey of Watercourse Crossings.

Table 15-7: Buried Structures in Public Roads (roads listed from west to east)

Road No.	No. of bridges	No. of culverts	Length of UWF Grid Connection 110kV UGC (km)
L-2166-10	0	1	0.8 km
L-6013-0	1	1	1.2 km
L2156-0	1	0	0.3 km
L2157-0	0	0	0.8 km
L6009-0	2	0	1.7 km
R-503	11	41	22.2 km
L-2264-50	0	3	1.9 km
L-6188-0	0	2	0.3 km

The buried structures listed above area were inspected by Chartered Engineers from TLI Group during site investigations in January and June 2019.

15.2.1.2.5 Road stability in the vicinity of old masonry culverts

13 no. culverts along the 110kV UGC route are old masonry culverts which potentially will require replacement during construction works. Some of these culverts have already partially collapsed. A visual inspection was carried out by the topic authors in August 2019 of the stability of the road above these culverts. The survey found no evidence of road instability at any of the culvert locations.

15.2.1.2.6 Structural Condition of Bridges

All bridges along the route of the 110kV UGC were visually assessed by David Tarrant, structural engineer with TLI Group, as part of bridge crossing design. At the 15 No. bridges, the visual condition of the structures is as expected for the construction type and age of structures. There were no visual cracks or depressions in the road surfaces above the bridges/culverts at the time of inspection. It is considered that the road structures above the bridges (where trenching in the bridge deck is required) were in good condition and will be capable of supporting the 110kV UGC infrastructure and the increased traffic loading associated with the construction works.

[1] Scottish National Heritage & Forestry Commission Scotland, *Floating Roads on Peat* (2010)

15.2.1.2.7 Cable Trench design for Bridge crossings

For over half of all bridge crossings, sufficient depth/cover is provided in the bridge deck to allow the installation of the ducting in standard trefoil formation. Where the bridge deck has insufficient dimensions/cover to accommodate the standard trefoil detail (<1250mm depth), a flat cable formation will be utilised. Ducts laid in flat formation will be laid in C25/30 concrete, ensuring protection for the ducts and providing localised strengthening of the bridge arch beneath the ducting.

15.2.1.2.8 Works at Bridges

No works will be required to the bridge structures themselves, however at Rockvale Bridge (W7), Tooreenbrien Bridge (W36) and Anglesey Bridge (W53), the road level will be raised to provide sufficient cover over the cables and this raising of the road will require that the height of the bridge parapet walls are increased to meet current Tii requirements/standards. These bridges are identified on Figure GC 15.2: UWF Grid Connection Study Area for Public Roads.

15.2.1.2.9 Directional Drilling under bridges

2 No. Bridges along the proposed route of the 110kV UGC (Watercourse crossing W8 and W9) are not considered to have sufficient road depth over the bridge arch/deck to accommodate the cable ducting and therefore are proposed to be crossed via a method of Horizontal Directional Drilling (HDD) under the existing bridge. At W8 and W9, where the bridge is drilled under, the bridge will remain unchanged as a result of the proposed works.

Relevant EIAR Figures:

Figure GC 15.2.1: Remedial Works to Bridges at W7, W36 and W53. Detailed drawings of all 15 No. bridges are included in the Drawings Pack Volume B of the Planning Application.

15.2.1.2.10 Culvert Crossing Design

The 48 No. culverts (under the public road) are comprised of both concrete/plastic pipes and masonry box culverts, **no works will be required to 35 No. of these culverts**, with the 110kV UGC installed either under or over these culverts.

At the remaining 13 No. culverts, the existing old masonry box culvert may need to be replaced (12 No. of which are under the R503, and 1 No. under the L-2265-50), and the 110kV UGC will be installed under the existing/replaced culvert. These culverts are identified on Figure GC 15.2: UWF Grid Connection Study Area for Public Roads.

Relevant EIAR Figures:

Figure GC 15.2.2: Cross Sections of 110kV UGC over and under existing culverts
Figure GC 15.2.3: Cross Sections of Replaced Culvert along the 110kV UGC

Detailed drawings of the culvert crossings are included in the Drawings Pack Volume B of the Planning Application.

15.2.1.2.11 Buried Structures along Construction material Haulage Routes

There is 1 No. additional buried structure (bridge) along the construction material haulage route on the L5337-1 at Tullow. The buried structure is currently in good condition and will be capable of supporting the increased traffic loading associated with the construction works. No works will be required to this structure, and it scoped out from further evaluation in this report.

15.2.1.2.12 Weight Restrictions

There are **no vehicle weight restrictions in place** along any of the roads affected by the works. This provides a useful guide to the acceptability of the roads and buried structures and their adequacy to facilitate the movement of HGV vehicle types, subject to the normal legally allowable axle loading on Irish Roads.

15.2.1.2.13 Road Boundaries

Road Boundaries consist of a mix of hedgerows and simple mounded embankments, which are aligned beyond drainage channels that occur in most roadside verges. The road boundary at Coole (where the site entrance for Mountphilips Substation will be located) consists of earthen banks and hedgerow with some immature trees alongside the road).

15.2.1.2.14 Traffic Volumes

Observation based on site visits, and a review of the traffic survey information, confirms that all of the roads within the study area, including the Regional Roads, are very lightly trafficked, and have on average 98.8% spare capacity during peak traffic periods. Traffic volumes are described in further detail in Section 15.3.1.2 of this Chapter, with data from the traffic count surveys included in Appendix 15.1: Traffic and Transportation Assessment Report.

15.2.1.3 Importance of Public Roads

According to the Department of Transport, Tourism and Sport[2], 'the regional and local roads programme is important from economic, social and political perspectives. These roads serve an important economic role in the Irish context and also have valuable social and community functions. These roads are often the sole means of access for local economic activity and play a very important role in Ireland due to

- the dispersed nature of the population and industrial development;
- the importance of tourism and agriculture as generators of wealth and employment; and
- the increasing attention being given to rural development and urban regeneration'.

The R503 runs generally in an E-W orientation and links Thurles town to the east with Newport town and Limerick City to the west and is identified as Strategic Roads in the North Tipperary County Development Plan 2010 (as amended).

The local roads generally serve as access to local residential traffic and are used for farming and rural operations and activities. The R503 is also designated scenic route in Tipperary North County Development Plan.

With the exception of Rockvale Bridge at W7, Tooreenbrien Bridge at W36 and Anglesey Bridge at W53, the buried structures, listed above, are not considered to be structurally important, and they serve solely as a route to carry storm water run-off and water in small watercourse under the road. The Anglesey Bridge at W53 is historically important, being listed under the National Inventory of Architectural Heritage. The potential for effects to the cultural heritage or architectural heritage of the Anglesey Bridge are evaluated in Chapter 16: Cultural Heritage, Section 16.3.4.1 and Appendix 16.2: Architectural Heritage Impact Assessment of Anglesey Bridge.

[2] http://www.dttas.ie/roads/english/regional-and-local-roads

15.2.1.4 Sensitivity of Public Roads

Road pavements and buried structures can be affected by road works involving the excavation of the pavement, works at bridges, and by increases in traffic, particularly HGV traffic. Road boundaries can be affected by new or widened accesses from the public road network onto the lands beyond.

Based on the IMPERIA methodology, outlined in Section 15.1.8, Public Roads (including road pavements, bridges and culverts) are evaluated as having **Moderate** Sensitivity due to their value to society which is locally and regionally significant but taking into account the low usage of the roads in the study area which have 99% available capacity. As described in Section 15.2.1.3 above, one bridge, Anglesey Bridge, is listed on the National Inventory of Architectural Heritage and is evaluated as having 'High' sensitivity.

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

The current condition of the public road pavements and the current good condition of the buried structures is likely to continue with very slow increases in annual traffic volumes, in the region of 1-2% per annum.

15.2.1.6 Receiving Environment (the Baseline + Trends)

The condition of road pavements and buried structures are assumed to be the same as the current condition by the start of the construction stage. Published annual national traffic growth rates of 1-2% per annum have been applied to the measured 2019 volumes on the affect roads for the years 2020/2021[3], to allow for worst case traffic volumes during a 2020/2021 construction stage.

[3] Whilst a 2020/2021 opening year has been selected for the works, in light of the anticipated slow change in the baseline conditions, it should be noted that any required change (of say 2-3 years) in the selection of opening year will have no implications whatsoever for the conclusions of the study due to the very lightly trafficked nature of the affected roads.

15.2.2 CUMULATIVE INFORMATION - Cumulative Projects & Baseline Characteristics

15.2.2.1 Cumulative Evaluation Study Area

15.2.2.1.1 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.

UWF Grid Connection Cumulative Evaluation Study Area for Public Roads	Justification for the Study Area Extents
Route of concentrated UWF Grid Connection construction traffic; roadwork locations on local roads; at site access points and the R503 regional road between Newport and Ballycahill.	Public Roads at road works locations or along routes of concentrated construction traffic or at the site access point may be affected by road works and construction traffic movement associated with both UWF Grid Connection *and* Other Elements of the Whole UWF Project or Other Projects. The study area has been extended out to Ballycahill in order to take account of traffic to UWF Related Works and Upperchurch Windfarm from the quarry in Holycross, which will join the R503 Regional Road at Ballycahill. Roads remote from the area are not likely to be affected. The local roads between the Holycross quarry and the junction with the R503 at Ballycahill are not likely to be affected due to the existing daily use of these roads by quarry traffic, in the context of the daily output capacity of the quarry.

The study area is illustrated on Figure CE 15.2: UWF Grid Connection Cumulative Evaluation Study Area for Public Roads.

15.2.2.1.2 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 15.2.2.2.1 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 15-8 and illustrated on Figure WP 15.2: Whole Project Study Area for Public Roads (Volume C3 EIAR Figures).

Table 15-8: Cumulative Evaluation Study Area for Public Roads

Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
Element 1: UWF Grid Connection	Route of concentrated UWF Grid Connection construction traffic; roadwork locations on local roads; at site access points and the R503 regional road between Newport and Ballycahill.	Public Roads along routes of concentrated construction traffic or at road works or site access points may be affected by construction traffic movements and road works.
Element 2: UWF Related Works		
Element 3:		

Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
UWF Replacement Forestry		Roads remote from the area are not likely to be affected.
Element 4: Upperchurch Windfarm (UWF)		
Element 5: UWF Other Activities		

15.2.2.2 Scoping for Other Projects or Activities & Potential for Impacts

The evaluation of cumulative impacts to Public Roads 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 Public Roads 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 the Cumulative Evaluations (Section A2.1.4.29).

The results of this scoping exercise are that: Castlewaller Windfarm (consented windfarm, potential grid connection and potential widened forestry entrance on the R503) have been scoped in for evaluation of cumulative effects to Public Roads.

The location of, and study area boundary associated with, the Other Elements which are included for cumulative evaluation is illustrated on Figure WP 15.2.

15.2.2.2.1 Potential for Other Elements or Other Projects to cause Impacts to Public Roads

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 Public Roads. The results of this evaluation are included in Table 15-9.

The location of, and study area boundary associated with, the Other Elements and Other Projects which are included for cumulative evaluation is illustrated on Figure WP 15.2. The baseline character of the areas around these projects is described in Section 15.2.2.3.

Table 15-9: Results of the Evaluation of the Other Elements and Other Projects & Activities

Other Elements of the Whole UWF Project	
Element 2: UWF Related Works	Included for the evaluation of cumulative effects
Element 3:UWF Replacement Forestry	Evaluated as excluded: No impacts due to: The road which could be potentially affected by the UWF Replacement Forestry is the **Local Road** L2264-34, from which access will be gained through an existing farm entrance to the afforestation lands. This road is a 2-way road made of traditional surface-dressed flexible pavement ('tar and chippings'), with narrow verges and road surface water drained to open drains, generally running along one/both of the roadside. The road is very lightly trafficked with 99.6% spare capacity, and is not subject to any vehicular weight restrictions. Road boundaries consist of a mix of hedgerows and simple mounded embankments, which are aligned beyond drainage channels that occur in many roadside verges.

	• No noticeable increase in traffic volumes on the public road network due to the extremely low traffic volumes associated with the UWF Replacement Forestry - the planting stage will generate 1-2 vehicles movements per day over a one-month period, and as a comparative example this level of traffic is substantially less than the daily level of traffic generated by a single residential dwelling. During the growth stage, traffic will be in the region of 2 to 4 vehicle movements per year. • No requirement for roadworks or works to roadside boundaries or buried structures. In relation to the entrance to the UWF Replacement Forestry from the public road; the existing farm entrance will be used. This entrance (labelled EW10 on the drawings and mapping included with the UWF Related Works application to Tipperary County Council) currently has sufficient sightlines and set back distances. No changes to the geometry of the existing entrance will be required to accommodate the new native woodland. The only change relates to a change of use from agricultural to agriculture and forestry, which will have no effect on Public Roads.
Element 4: Upperchurch Windfarm (UWF)	Included for the evaluation of cumulative effects
Element 5: UWF Other Activities	Evaluated as excluded: Neutral Impact/No Impact due to: • Notwithstanding the National and Regional Road network along the turbine component and materials haul routes are scoped out in Section 15.1.4, in relation to the Haul Route Activities, none of the Tii Guideline thresholds (see Table 15-3) are met, and therefore further analysis is not required - the traffic increases as a result of the Haul Route Activities (tree trimming, laying of matting, street furniture removal), will be in all cases considerably less than 1% of the current traffic volumes on these roads and as a result will be neutral, given that the normal day-to-day variation in traffic conditions can be as much as 10%. In addition, tree trimming is regularly carried out to roadside boundaries and is a commonplace occurrence on the public road network, and specifically in relation to the Clarina junction on the N69 outside Limerick, the turbine component delivery route across the side of the roundabout at Clarina Junction will be provided through the use of a 'geogrid' material, which will be used to facilitate the use of the roundabout without disturbing the soil or causing damage to the roundabout.. • Upperchurch Hen Harrier Scheme & Monitoring Activities & Overhead Line Activities: no works to the road network or road boundaries form part of these activities, and taking into consideration the extremely low volumes of traffic associated with these activities, and the brief duration of any public road use, no effects to Public Roads are likely to occur.
Castlewaller Windfarm (consented windfarm, potential grid connection, including potential site entrance works off the R503)	Yes, included for the evaluation of potential cumulative effects to Road Pavements. Excluded in relation to cumulative effects to bridges and culverts as the potential for cumulative impacts only relates to the 110kV UGC on the L6009-0 road, where 110kV UGC will be directionally drilled under the two watercourse crossings structures on this road – thereby avoiding direct impacts to these

Public Roads
Sensitive Aspect
Material Assets (Roads)
Topic

	bridges, and consequently there is no potential for cumulative impacts to these bridges. Excluded in relation to roadside boundaries, as the 110kV UGC works will be within road pavements with no works in verges or boundaries along the L6009-0 or R503 roads, therefore no interaction with any potential Castlewaller Windfarm grid connection or site entrance works.

15.2.2.3 Cumulative Information: Baseline Characteristics – Context & Character

15.2.2.3.1 Element 2: UWF Related Works

The roads which could be potentially affected by the UWF Related Works and associated haulage are the Regional Road R503 (between Newport and Ballycahill) along with the Local Roads (designated as "L" Roads); L6185-13, L2264-50, L6188-0, L61881-0, L2264-34, L4139-16, L4138-12 and L4139-0.

Buried Structures: There are 3 No. buried structures under affected roads; concrete culverts routing storm water under the L6188-0 at WW31 and under the L4139-0 at WW12 and a square masonry culvert routing a small stream under the L6185-13 road at WW32.

Road Boundaries**:** consist of a mix of hedgerows and simple mounded embankments, which are aligned beyond drainage channels that occur in many roadside verges.

Traffic Volumes: Observation based on site visits, and a review of the traffic survey information, confirms that all of the roads within the study area, including the Regional Roads, are very lightly trafficked, and have on average 99% spare capacity during peak traffic periods.

15.2.2.3.2 Element 3: UWF Replacement Forestry

Not applicable – Element evaluated as excluded. See Section 15.2.2.2.1

15.2.2.3.3 Element 4: Already Consented Upperchurch Windfarm

The regional and local roads associated with the UWF Related Works will also be used for access to the Upperchurch Windfarm.

Consideration of the Passage of Time: The makeup and number of road users of the public road network in the vicinity of Upperchurch Windfarm has not materially changed since the preparation of the 2013/2014 planning documents and assessments. It is considered therefore that the information in the 2013 EIS, is relevant to the cumulative evaluations in this EIAR for UWF Grid Connection.

15.2.2.3.4 Element 5: UWF Other Activities

Not applicable – Element evaluated as excluded. See Section 15.2.2.2.1

15.2.2.3.5 Other Projects or Activities

Castlewaller Windfarm: Although Castlewaller grid connection is not likely to be constructed during the same period as UWF Grid Connection (because the Castlewaller Windfarm has not yet been offered a grid connection from EirGrid) in the event that the 2 No. projects are built at the same time, there could be cumulative impacts to road surfaces/boundaries and any culverts present at the point of interaction on the L6009-0 (potential grid connection cabling) and the R503 (potential widening works at an existing forestry entrance at Fanit) and therefore this project is scoped in for consideration. The potential grid connection for Castlewaller, could overlap the 110kV UGC route on the L6009-0 road.

15.2.3 PROJECT DESIGN MEASURES for Public Roads

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 15-10 are relevant to the Environmental Factor, Material Assets (Roads), and in particular to the sensitive aspect **Public Roads**.

Table 15-10: UWF Grid Connection Project Design Measures relevant to Public Roads

PD ID	Project Design Environmental Protection Measure (PD)
PD04	All construction works will be carried out during daylight hours.
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.
PD13	As requested by the Roads Department of Tipperary County Council, during pre-planning consultations, the Promoter will fund the costs of Tipperary County Council engaging a chartered Civil Engineer to oversee quality control and compliance with drawings, specifications and road opening conditions for the duration of the works

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 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.

15.2.4 EVALUATION OF IMPACTS to Public Roads

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) - Public Roads.

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

Table 15-11: 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)*
Damage to road pavements (construction stage)	*Decrease in structure integrity of roads (construction stage)*
Damage to Bridges & Culverts (construction stage)	*Operational Stage Impacts*
Damage to road boundaries (construction stage)	*Decommissioning Stage Impacts*

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 15.2.4.1 to 15.2.4.3.**

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 15.2.4.

15.2.4.1 Impact Evaluation Table: Damage to Road Pavements

Impact Description	
Project Life Cycle Stage:	Construction stage

Impact Source: Excavations for cable trenches and joint bays, construction/delivery traffic
Cumulative Impact Source: Trenching works, site access, construction/delivery traffic
Impact Pathway: Roads

Impact Description: Road pavements comprise the hard surfacing of the road, along with the supporting subgrade underneath. The roadside verge and drainage influences the quality of road edges and road condition. Road pavements can be damaged by excavations of the surface and also by large volumes of additional traffic. The use, widening, or opening of site access points can also lead to deterioration of the road edge.

The methodology employed to evaluate the effect on road pavements is based on the Transport Infrastructure Ireland's Traffic and Transportation Assessment Guidelines, using the methodology as outlined in Section 15.1.8. See Appendix 15.1: Traffic and Transportation Assessment Report, and also Appendix 15.2: Pavement Condition Survey, and Appendix 15.5: Peat Probe Survey, which informed this evaluation.

Impact Quality: Negative

Evaluation of the Subject Development Impact – Damage to Road Pavements

Element 1: UWF Grid Connection – direct/indirect impact

Impact Magnitude: The impact to public road pavements relates to the widening of the existing field entrance at Coole for the Mountphilips Substation, and the construction of the 110kV Underground Cables (UGC) along 29.2km of the public road network between the Mountphilips Substation site entrance at Coole and the private paved road in Knockcurraghbola Commons (in the vicinity of the Consented UWF Substation).
The 110kV UGC is routed along the L2166-10 (0.8km), L6013-0 (1.2km), L2156-0 (0.3km), L2157-0 (0.8km), L6009-0 (1.7km), R503 (22.2km), L2264-50 (1.9km), L6188-0 (0.3km).

Verge Works: Works to road verges will only occur at Mountphilips Substation site entrance at Coole townland where the existing field entrance will be permanently widened – with 6m of verge removed and overlaid with hardcore.

Excavation of road surfaces for cable trenches: The construction of the 110kV UGC will involve the excavation of a trench c.1.3m deep and 0.6m wide within public road pavements. In total there will be 29.2km of cable trench within the road pavements. The construction works will proceed in a linear manner with on average 100m of cable trench completed each day. At the end of each day, the completed sections of cables trench will be reinstated with a temporary surface for road safety and trench integrity purposes. See Figure GC 15.2.2: Cross Sections of 110kV UGC over and under existing culverts. A floating road design will be used at any locations where competent ground is not encountered during trench excavations. This is expected to be limited to short lengths of the R503 in Reardnogy More and Knocknabansha townlands. A detailed drawing of the cable trench is included in the drawings pack in Volume B: Planning Drawings with the planning application.

Excavation of road surfaces for Joint Bays: The construction of the 110kV UGC will require the excavation of an area, c. 2.5m wide and 6m long and 2.3m deep, to install pre-cast concrete chambers for the 40 No. Joint Bays under the public road pavements. All Joint Bays will include comprise a joint bay chamber and 2 ancillary chambers (Earth Link Chamber & Communications Chamber). Following excavations, the precast joint bay, link box and communications chambers will be placed in-situ and the surrounding road pavement reinstated. The joint bay chambers will be temporarily filled with sand, fitted with precast concrete covers, and the road surface above temporarily reinstated. The joint bay will be temporarily reopened to pull through the cables, being temporarily reinstated once more, until the cable jointing is carried out. Following jointing the joint bay chamber will be temporarily reinstated, ready for final permanent reinstatement following commissioning. The

Public Roads

Sensitive Aspect

road surface over joint bay chambers will be fully reinstated with no access chambers. The Earth Link Chamber and Communications Chamber will have surface access chambers and a man-hole type cover at road surface level. See Figure 15.2.4: Views of 110kV UGC Joint Bays.

Reinstatement of Road Surfaces: Full permanent reinstatement will take place at the end of construction works, or otherwise in accordance with the conditions of the Road Opening Licence. All sections of roads subject to trenching works in the road pavement will be permanently reinstated with surface dressing, to the specification of the Road Opening Licence(s) and in accordance with Department of Transport, Tourism & Sport Guidelines for Managing Openings in Public Roads (April 2017); and will be subject to the Traffic Management Plan. This road reinstatement will ameliorate any impacts to road pavements, and therefore it is considered that no permanent impacts to road pavements are likely to occur.

Additional Construction Traffic: All of the roads within the UWF Grid Connection Study Area are in good condition (see Appendix 15.2: Pavement Condition Survey) with an average excess of c.98% of the capacity of each road remaining available during construction works (see Appendix 15.1: Traffic and Transportation Assessment Report). Therefore, the deterioration of the road edges or reduction in the integrity of road pavements, due to the additional construction traffic, is not expected to occur. Nonetheless, the project Promoter is committed to carrying out Pavement Condition Surveys both before and after the construction period, and any pavements which are inadvertently damaged by construction traffic will be repaired to the satisfaction of Tipperary County Council.

Overall the magnitude of the impact to road pavements is **Moderate** due to the moderate intensity (observable effect on people's daily lives and may impact daily routines), high spatial extent (more than 10km), and low duration (impacts will be less than 1 year in any road with permanent reinstatement) as per the IMPERIA methodology, see Section 15.1.8.2.2.

Significance of the Impact: Moderate

Rationale for Impact Evaluation:

- the Moderate Sensitivity and the Moderate Magnitude, as per IMPERIA methodology outlined in Section 15.1.8.1.3
- the temporary duration of the works, with temporary reinstatement, and permanent reinstatement at the completion of works
- The lightly trafficked nature and extent of available capacity on all roads (in excess of 98% on average)
- As requested by the Roads Department of Tipperary County Council, during pre-planning consultations, the Promoter will fund the costs of Tipperary County Council engaging a chartered Civil Engineer to oversee quality control and compliance with drawings, specifications and road opening conditions for the duration of the works.
- The reinstatement of trenching locations within road pavements in accordance with the Department of Transport, Tourism & Sport Guidelines for Managing Openings in Public Roads (April 2017).

Material Assets (Roads)

Topic

Element 1: UWF Grid Connection – cumulative impact

Cumulative Impact Magnitude:

There is no potential for cumulative effects with Upperchurch Windfarm, as Upperchurch Windfarm will not involve any works to road pavement surfaces or verges.

There is potential for cumulative effects with UWF Related Works on the R503 at Knocknabansha, and along the local roads L2264-50 and L6188-0 at Knockmaroe and Knockcurraghbola Crownlands where excavations for the 110kV UGC will occur along with verge/boundary works for UWF Related Works Haul Route Works and a 5m section of the cable trenches in each of the local roads for the UWF Related Works Internal Windfarm Cabling. The magnitude of cumulative impacts will be reduced by the avoidance of road works for UWF Grid Connection being carried out at the same time as road works for UWF Related Works on the L2264-50 or L6188-0 local roads (Project Design Measure), with the 110kV UGC trench being reinstated with a temporary surface on a daily basis. All sections of roads subject to trenching works in the road pavement will be permanently reinstated with surface dressing, to the specification of the Road Opening Licence(s) and in accordance with Department of Transport, Tourism & Sport Guidelines for Managing Openings in Public Roads (April 2017); and

will be subject to the Traffic Management Plan. This road reinstatement will ameliorate any impacts to road pavements, and therefore it is considered that no permanent impacts to road pavements are likely to occur.

Cumulative impacts also related to combined construction traffic on the R503, the L2264-50 and L6188-0 roads associated with UWF Grid Connection and UWF Related Works and the Consented Upperchurch Windfarm. Pavement Condition Surveys (see Appendix 15.2: Pavement Condition Survey) undertaken on these roads show that the roads are in good condition, while Transport Modelling (see Appendix 15.1: Traffic and Transportation Assessment Report) of the combined worst case construction traffic demonstrates that, while the volume of traffic on the L6188-0 will double in volume, an average excess of c.95% of the capacity of each road will remaining available during construction works. Therefore, the deterioration of the road edges or reduction in the integrity of road pavements, due to the additional construction traffic, is not expected to occur. Nonetheless, the project Promoter is committed to carrying out Pavement Condition Surveys both before and after the construction period, and any pavements which are inadvertently damaged by construction traffic will be repaired to the satisfaction of Tipperary County Council.

While the spatial extent of roads affected cumulative is low, there are works for three projects ongoing on the L2264-50 and therefore it is considered that the magnitude of effects on the **L2264-50 is Moderate**, while the magnitude on the **L6188-0 in Knockcurraghbola Commons is Low.**

There is potential for cumulative impacts with the potential Castlewaller grid connection trenching works along the **L6009-0** at Castlewaller / Carrowkeale / Derryleigh townlands and at the R503 (Castlewaller Site Entrance) at Fanit townlands over a 1 month period. The cumulative impact magnitude is evaluated as **Low** for the public road as significant cumulative construction impacts are not expected as works will either take place at separate times, or should works be carried out at the same time, then works for both projects are likely to be carried out by one crew, with no significant cumulative damage to the road pavement with road reinstatement, subject to road opening licenses, and although a longer construction periods is possible on the local road L6009-0, this will not cause significant effects to residential amenity, as the works are still temporary and of short duration, during daylight hours. Works at the R503 entrance will not cause cumulative significant impacts to the public road due the very short duration of both 110kV UGC works and the entrance works.

Significance of the Cumulative Impact: **ranges from Moderate** (on L2264-50) **to Slight** (on L6188-0, L6009-0 and R503 site entrance)

Rationale for Impact Evaluation:

- the Moderate Sensitivity and the Low to Moderate Magnitude, as per IMPERIA methodology outlined in Section 15.1.8.2.2.
- The temporary duration of the works, with temporary reinstatement, and permanent reinstatement at the completion of works;
- The lightly trafficked nature and extent of available capacity (average in excess of 95%) on all roads
- The reinstatement of trenching locations within road pavements in accordance with the Department of Transport, Tourism & Sport Guidelines for Managing Openings in Public Roads (April 2017)
- The scheduling of works to avoid roadworks from both UWF Grid Connection and UWF Related Works occurring at the same time, on the L2264-50 and L6188-0.

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

Element 2: UWF Related Works

Impact Magnitude: Haul Route Works will involve the removal of a total of 1710m of verges on the R503, L4139-0, L4138-12, L2264-50, L6188-0, L6185-13 roads, hardcore will be laid and compacted on these verge areas, and following construction, soil will be laid over the hardcore during reinstatement of the verge.
Internal Windfarm Cables will involve a total of 45m of trench excavations in the road pavement on the L4139-0, L4139-16, L6188-0, L61881-0, L6185-13, L2264-34, L2264-50. Small sections of verge will be also being removed and overlaid with hardcore at the 9 No. temporary entrances for the Internal Windfarm Cabling and Haul Route Works. The additional construction traffic associated with the UWF Related Works will have a negligible effect on the network capacity and operation of the roads within the study area, as 99.6%, on average, of the capacity of each of the roads will remain available during the construction stage.

Public Roads

Sensitive Aspect

Significance of the Impact: Imperceptible

Rationale for Impact Evaluation:

- The temporary duration of the works,
- The lightly trafficked nature and extent of available capacity on all roads
- The reinstatement of trenching locations within road pavements in accordance with the Tii Guidelines for the Opening, Backfilling and Reinstatement of Openings in Public Roads
- The repair of any damage to road pavements along concentrated construction traffic haul routes.

Element 3: UWF Replacement Forestry – *N/A, evaluated as excluded, see Section 15.2.2.2.1*

Element 4: Consented Upperchurch Windfarm

Impact Magnitude: There are no works planned to the public road surfaces. Works involving the laying of hardcore on road verges will occur at the main Site Entrance on the R503 and to a lesser extent at the 11 no. smaller existing entrances off the local road network in the area.
Any damage to the network due to the passage of construction traffic will be repaired in accordance with Condition 23 of the Grant of Permission 2014.

Significance of the Impact: Neutral

Rationale for Impact Evaluation:

- Planning Conditions requiring all roads to be reinstated to the satisfaction of Tipperary County Council,
- FWD Testing that will ensure that the strength and stability of the roads is maintained and reinstated.

Element 5: UWF Other Activities – *N/A, evaluated as excluded, see Section 15.2.2.2.1*

Cumulative Information: Individual Evaluations of Other Projects or Activities

Other Project: Castlewaller Windfarm (potential grid connection and R503 site entrance works)

Magnitude: A *potential* (i.e. not permitted and not currently proposed) underground grid connection to Killonan, including a section along the L6009-0 at Castlewaller / Carrowkeale / Derryleigh townlands. Any works will be subject to a road opening license. Potential widening of an existing forestry entrance off the R503 for the Castlewaller project at Fanit townland. Works likely to take c.1 month period.
Magnitude is evaluated as Low on L6009-0, Very Low on R503

Significance of the Impact: Imperceptible

Rationale for Impact Evaluation:

- The Low Sensitivity and Low /Very Low Magnitude;
- The lightly trafficked nature and extent of available capacity on the L6009-0 and R503;
- The temporary duration and the reversibility of the impact with the completion of construction works;
- The application of traffic management measures and use of flagmen

Evaluation of Other Cumulative Impacts – Damage to Road Pavements

Whole UWF Project Effect

Cumulative Impact Magnitude: UWF Grid Connection will involve permanent laying of hardcore on 6m of road verge at Mountphilips Substation entrance, and trench excavations along 29.2km of road pavement and 40 No. joint bay excavations within the public road surfaces between the Mountphilips Substation entrance in Coole and the Consented UWF Substation in Knockcurraghbola Commons. In the Upperchurch Windfarm area, the UWF Related Works will involve trench excavations along 45m of road pavement and temporary laying of hardcore on 1,755m of road verge. Upperchurch Windfarm will involve the laying of hardcore on the verge area at the main Site Entrance on the R503 and to a lesser extent at the 11 no. existing smaller entrances off the local road network in the area.

Material Assets (Roads)

Topic

The road pavements affected by the UWF Grid Connection works along local roads and along the R503 Regional Road are for the most part located away from UWF Related Works or Upperchurch Windfarm traffic. There are only two local roads which will be subject to construction traffic relating to the three elements, – the L2264-50 and L6188-0. In addition, two local roads, L4138-12 and L4139-0, will experience a noticeable (albeit still very low) increase in traffic with works for both the UWF Related Works and Upperchurch Windfarm in Shevry.

While the spatial extent of roads affected cumulative is moderate, effects are spread over a large longitudinal area, avoiding Newport town, and overall the magnitude is considered to be **Low.**

Significance of the Cumulative Impact: Slight

Rationale for Cumulative Impact Evaluation:

- the Moderate Sensitivity and the Low Magnitude, as per IMPERIA methodology outlined in Section 15.1.8.2.2.
- The good condition but weak pavement strength of most of the local roads including the L2264-50, L6188-0, L4138-12 and the L4139-0 local roads, with the repair of any damage to these four roads with full width reinstatement on any damaged sections.
- The temporary duration of the works, with temporary reinstatement, and permanent reinstatement at the completion of works
- The lightly trafficked nature and extent of available capacity on all roads
- The reinstatement of trenching locations within road pavements in accordance with the Department of Transport, Tourism & Sport Guidelines for Managing Openings in Public Roads (April 2017)
- The repair of any damage to other road pavements along concentrated construction traffic haul routes for the UWF Grid Connection.

All Elements of the Whole UWF Project with Other Projects or Activities

Cumulative Impact Magnitude: Cumulative impacts with Other Projects only relates to UWF Grid Connection, as described above (UWF Grid Connection – cumulative impacts), and copied hereunder:

110kV UGC and Potential Castlewaller Windfarm grid connection :
There is potential for cumulative impacts with the potential Castlewaller grid connection trenching works along the **L6009-0** at Castlewaller / Carrowkeale / Derryleigh townlands and at the R503 (Castlewaller Site Entrance) at Fanit townlands over a 1 month period. The cumulative impact magnitude is evaluated as **Low** for the public road as significant cumulative construction impacts are not expected as works will either take place at separate times, or should works be carried out at the same time, then works for both projects are likely to be carried out by one crew, with no significant cumulative damage to the road pavement with road reinstatement, and although a longer construction periods is possible on the local road L6009-0, this will not cause significant effects to residential amenity, as the works are still temporary and of short duration, during daylight hours. Works at the R503 entrance will not cause cumulative significant impacts to the public road due the very short duration of both 110kV UGC works and the entrance works. The magnitude of cumulative impacts is evaluated as **Low** on this road due to the lightly trafficked nature of this road, the temporary duration of works with full road reinstatement following works.

Significance of the Cumulative Impact: Imperceptible

Rationale for Cumulative Impact Evaluation:

- The Low Sensitivity and Low Magnitude;
- The lightly trafficked nature and extent of available capacity on the L6009-0 and R503;
- The temporary duration and the reversibility of the impact with the completion of construction works;
- The application of traffic management measures and use of flagmen

Public Roads

Sensitive Aspect

15.2.4.2 Impact Evaluation Table: Damage to Bridges and Culverts

Impact Description	
Project Life Cycle Stage:	Construction stage

Impact Source: Trenching works
Cumulative Impact Source: road widening works (UWF Related Works)
Impact Pathway: Roads

Impact Description: Bridges and culverts within UWF Grid Connection construction works areas relate to bridges and culverts along the 110kV UGC route which provide crossing structures over watercourses. These structures are important from a transport and travel perspective and are important for road safety.

The 110kV UGC will be installed in the road surface over the bridges or by horizontal directional drilling under the bridge itself. Culverts will be crossing by installing ducts in concrete over or under the existing culvert. Impacts relate to excavation works at these crossing structures, and not to additional construction traffic, as the structures were found to be in good condition during surveys of the structures, and are considered capable of carrying any extra traffic or machinery associated with the works.

The potential for a reduction in the integrity of the structures due to trenching works (for UWF Grid Connection) or road widening works (for UWF Related Works), is examined in this impact table. The effect of raising the road level on the safety of bridges and parapet walls is also examined.

Impact Quality: positive

Evaluation of the Subject Development Impact – Damage to Bridges and Culverts

Element 1: UWF Grid Connection – direct/indirect impact

Impact Magnitude: There are 63 No. buried structures under the public roads along the route of the 110kV UGC – 15 No. bridges and 48 no. culverts. The potential for impacts only relates to the 110kV UGC cable trench as there will be no Joint Bays within 25m of any bridge or culvert structure.

To minimize the impact on the bridge structure, all ducting installed with the bridge deck will be encased in concrete, this will ensure distribution of the cable weight and provide a bond between sides of the trench excavation. In additional, the bridge arch/structural deck will not be affected by the proposed works. The ducting will be installed in the roadway build-up only. It is expected that 3 No. Bridges along the cable route will require the road level to be raised (W7, W36 and W53) to provide a minimum construction depth to the top of ducts, the adjacent parapet wall will be increased to meet minimum TII standards. This will make the bridge safer for both traffic and pedestrians. Raising the height of parapet walls will be a positive impact, contributing to road safety along the route. Detailed drawings of the 3 No. bridges where road and parapet level build-up is required are included in the drawings pack, included in Volume B Planning Drawings of the planning application.

At the 48 No. culverts along the route, the 110kV UGC cables trench will be constructed either under or over 35 No. of these culverts with no impact on the culvert. Impacts to culvert structures relate to 13 no. masonry box culverts which potentially will need to be replaced during works. It is considered that because any culverts replaced during construction works, will be replaced with higher specification culverts, that the impact to the public road network will be positive.

Overall, the impact magnitude will be Negligible due to the small number of bridges which require works to parapet walls, and the small number of culverts which potentially will be replaced, in the context of the large number of crossing structures along the road network within the study area and under the wider county roads.

Significance of the Impact: Neutral Impact

Material Assets (Roads)

Topic

Rationale for Impact Evaluation:

- The Moderate Sensitivity and Negligible Magnitude, as per IMPERIA methodology – see Section 15.1.8.2.2.
- The majority of crossings will require no works to buried structures,
- Impacts will be positive – contributing to safer roads and improved infrastructure.

Element 1: UWF Grid Connection – cumulative impact

Cumulative Impact Magnitude: The potential for cumulative impacts only relates to the 1 No. culvert (W64) along the L2264-50 which potentially will need to be replaced during 110kV UGC trenching works. However, no works will be carried out on or in close proximity to this structure for any of the Other Elements of the Whole UWF Project. In addition this culvert is structurally capable of carrying the additional construction traffic associated with the UWF Grid Connection, UWF Related Works and Upperchurch Windfarm along this road.

Significance of the Impact: No Cumulative Impact

Rationale for Impact Evaluation:

- Only 1 No. culvert, which may require replacement, within the area of UWF Related Works and Upperchurch Windfarm, and no works will be carried out on or in close proximity to this structure for any of 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

Impact Magnitude: There are 3 No. buried structures at UWF Related Works Haul Route Works locations - WW12 and WW31 (both culverts) and WW32 (small stone arch structure). WW32 does not require any works, therefore there no potential for effects to this structure. Both WW12 and WW31 will require a 1m extension of the culvert on one side, this work will be carried out with minimal interference to the existing structure in accordance with Tii Specification for Roadworks.

All three structures (WW12, WW31 and WW32, were inspected by Wind Prospect Ireland *(now Ionic Consulting)* in 2017 who found that the structures are in good condition and are not subject to vehicular weight restrictions, therefore it is considered that these structures will not be affected by the additional construction traffic associated with the UWF Related Works and the Upperchurch Windfarm.

The magnitude of impact will be negligible due to the very small number of culverts involved.

Significance of the Impact: Neutral Impact

Rationale for Impact Evaluation:

- The extension of the 2 No. culverts will not affect the existing structure.

Element 3: UWF Replacement Forestry – *N/A, evaluated as excluded, see Section 15.2.2.2.1*

Element 4: Consented Upperchurch Windfarm

Impact Magnitude: No works to crossing structures under public roads are associated with the Upperchurch Windfarm.

Significance of the Impact: No Potential for Impact

Rationale for Impact Evaluation:

- No works to crossing structures under public roads are associated with the Upperchurch Windfarm.

Element 5: UWF Other Activities – *N/A, evaluated as excluded, see Section 15.2.2.2.1*

Evaluation of Other Cumulative Impacts – Damage to Bridges and Culverts
Whole UWF Project Effect
Cumulative Impact Magnitude: The cumulative whole project effect relates to trenching works over or under 63 no. watercourse strucutres, increase in road level and height of parapet walls on 3 No. of bridges, and the replacement of up to 13 No. small masonry box culverts, mainly under the R503, along the 110kV UGC route, and the extension by 1m of 2 no. culverts on local roads for UWF Related Works (Haul Route Works).
Significance of the Cumulative Impact: **Neutral**
Rationale for Cumulative Impact Evaluation: • The Moderate Sensitivity and the negligible magnitude • The majority of crossings will require no works, • Impacts will be positive – contributing to safer roads and improved infrastructure.

Note: No cumulative evaluation of Other Projects or Activities is included in the table above, because no Other Projects or Activities were evaluated as having potential to cause cumulative effects to Public Roads with either the UWF Grid Connection or the Other Elements of the Whole UWF Project (see Section 15.2.2.2).

15.2.4.3 Impact Evaluation Table: Damage to Road Boundaries

Impact Description	
Project Life Cycle Stage:	Construction stage

Impact Source: Site access to Mountphilips Substation
Cumulative Impact Source: Trenching works, site access
Impact Pathway: Road Boundary

Impact Description: Road boundaries consist of existing hedges and roadside embankments and walls, and are important for road safety and contribute to the character of an area.

Part of the road boundary will be removed at site access points (for both UWF Grid Connection and UWF Related Works) and, in addition, works for UWF Related Works Internal Windfarm Cabling are through roadside boundaries and trenching works will be involve the removal of a 5m section of the boundary at each of these locations. At the Mountphilips Substation site entrance, the roadside boundary will be reinstated adjacent to its original alignment behind the site entrance sight lines.

Impact Quality: Negative

Evaluation of the Subject Development Impact – Damage to Road Boundaries

Element 1: UWF Grid Connection – direct/indirect impact

Impact Magnitude: the potential for impacts to roadside boundaries relates to the widening of the existing field entrance for the Mountphilips Substation site. No damage to roadside boundaries will occur at any location along the 110kV UGC on public roads outside of the Mountphilips Substation site. No works will be required (and therefore no potential to damage road boundaries) at the access point onto the private paved road in Knockcurraghbola Commons.

A new permanent site entrance will be provided through an existing farm entrance off the L2166-10, for the Mountphilips Substation and Temporary Compound. The existing farm entrance will be widened to 6m, with a visibility splay of 160m provided. The sightlines are based on the 85th percentile ambient traffic speed on the Local Road serving the access, as recorded during traffic count surveys. These sightlines will be provided through the partial removal of the roadside boundary and the pruning of any hedgerow or trees within the visibility splay. Any hedges or trees that are removed will be replaced with an equivalent length of hedge and/or number of trees which will be replanted behind the sight lines. Each entrance will be fenced with post and rail and an entrance gate will be installed set back 4.8m from the road edge. The Mountphilips Substation site entrance is illustrated on Figure GC 15.2.5: Plan View of Permanent Site Entrance at Coole (Mountphilips Substation Site Entrance).

Due to the very small extent of boundary removal, with reinstatement, impact magnitude is evaluated as Negligible.

Significance of the Impact: Imperceptible

Rationale for Impact Evaluation:

- The Moderate Sensitivity and Negligible Magnitude, as per IMPERIA methodology – see Section 15.1.8.2.2.
- Impacts to road boundaries is limited to the widening of 1 existing field entrance at Coole;
- The reinstatement of road boundaries behind sightlines at the widened entrance.

Element 1: UWF Grid Connection – cumulative impact

Cumulative Impact Magnitude: There is no potential for cumulative impacts with UWF Grid Connection, as the 110kV UGC will not require any temporary or permanent removal of roadside boundaries for the 110kV

Public Roads

Sensitive Aspect

UGC, with the only road boundary affected by UWF Grid connection at a substantial separation distance (c.22km) from the Other Elements.
Significance of the Impact: No Cumulative Impact
Rationale for Impact Evaluation: • UWF Grid Connection effects to road boundaries will only occur in Coole townland at the Mountphilips Substation site; • Separation distance (c.22km) to Other Elements.
Cumulative Information: Individual Evaluations of Other Elements of the Whole UWF Project
Element 2: UWF Related Works
Impact Magnitude: No works to road boundaries are required for Realigned Windfarm Roads, Telecoms Relay Pole or UWF Related Works Ancillary Works. 14 No. temporary entrances off the public road for the Internal Windfarm Cabling trenching works, 10 No. of which will be newly opened, and 4 No. will comprise widening of existing farm gateways. 5 No. temporary entrances off the public road will be opened or widened to accommodate the UWF Related Works Haul Route Works, 2 No. of which are through existing farm gates. The Haul Route Works will involve the temporary removal of 1035m and the permanent removal of 25m of road boundaries.
Significance of the Impact: Imperceptible
Rationale for Impact Evaluation: • The temporary loss of road boundaries at temporary site access points, • The reinstatement of all temporary entrances and opening of roadside boundaries to the satisfaction of Tipperary County Council • The reinstatement of all verges and roadside drainage following the completion of construction works in an area.
Element 3: UWF Replacement Forestry – *N/A, evaluated as excluded, see Section 15.2.2.2.1*
Element 4: Consented Upperchurch Windfarm
Impact Magnitude: The widening of 11 no. permanent site entrances through existing farm gates along the R503, L4139-0, L4138-12, L6188-0, L2264-50 and L6185-13 roads. As per the EIS 2013: All construction entrances have been designed having regard to the North Tipperary County Development Plan and the National Roads Authority Geometric Design of Major/Minor Priority Junctions and Vehicular Access to National Roads. Widening works at these locations will be managed under the Traffic Management Plan for the Upperchurch Windfarm set out in the RFI 2013.
Significance of the Impact: Not be Significant
Rationale for Impact Evaluation: As per the Grant of Permission 2014: it is considered that, subject to compliance with the conditions set out below, the development would not seriously injure the amenities of the area or of property in the vicinity, and would be acceptable in terms of traffic safety and convenience.
Element 5: UWF Other Activities – *N/A, evaluated as excluded, see Section 15.2.2.2.1*
Evaluation of Other Cumulative Impacts – Damage to Road Boundaries
Whole UWF Project Effect
Cumulative Impact Magnitude: The roadside boundaries affected by the UWF Grid Connection (1 of 1), UWF Related Works (18 of 19) and Upperchurch Windfarm (10 of 11) are for the most part on local roads. The 2 boundaries on Regional Roads

Material Assets (Roads)

Topic

related to Haul Route Works for UWF Related Works at HW7 (locally known as the Christmas tree yard) on the R503, and for the main entrance into Upperchurch Windfarm, also on the R503 at Shevry. The roadside boundary for UWF Grid Connection at the Mountphilips Substation entrance will be permanent, while for the Upperchurch Windfarm/UWF Related Works approximately half of the roadside boundary removal will be temporary and the boundaries will be reinstated along the original alignment following completion of construction works. The remaining entrances for Upperchurch Windfarm will be permanently widened, where the extent of widening is small at all but one of these entrances – where longer sections of public road boundary will be removed to provide sightlines at the main Upperchurch Windfarm site entrance (at UWF Site Entrance No.1 in Shevry).
Significance of the Cumulative Impact: Imperceptible
Rationale for Cumulative Impact Evaluation: • Temporary loss or permanent loss/change to road boundaries will have a negative and observable effect, particularly in the Upperchurch area, however the implications to the public road network will be small given the very low volumes of traffic on the local roads. • The opening of roadside boundaries, reinstatement of all temporary entrances, verges and roadside drainage for UWF Related Works to the satisfaction of Tipperary County Council; • The separation distance between the Upperchurch Windfarm/UWF Related Works area and the Mountphilips Substation for UWF Grid Connection.

Note: No cumulative evaluation of Other Projects or Activities is included in the table above, because no Other Projects or Activities were evaluated as having potential to cause cumulative effects to Public Roads with either the UWF Grid Connection or the Other Elements of the Whole UWF Project (see Section 15.2.2.2).

Public Roads

Sensitive Aspect

15.2.4.4 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 15-12 below.

Table 15-12: Description and Rationale for Excluded Impacts to Public Roads

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				
Excavations, installation of cables trench	1,2	Roads	Decrease in structure integrity of roads	Rationale for Excluding: No likely effect in relation to UWF Grid Connection due to the stable nature of roads within the construction works areas being predominantly of 'excavate and fill' construction and their location on firm ground. At the sections of road along the 110kV UGC on the R503 where it occurs through mapped peat areas will use a floating road cable trench detail and 2.6m reinstatement of the road surface following works, this will improve the strength of the road in these locations. In all other locations, the public road is located on competent ground. In relation to UWF Related Works, trenching or works in road pavements, verges or boundaries will be carried out in locations underlain by competent ground, with reinstatement of pavements/verges/boundaries to the satisfaction of Tipperary County Council. Therefore effects to the integrity of roads is not expected to occur.
Operational Stage				
Rationale for Excluding: Neutral effect: With regard to the UWF Grid Connection: The Mountphilips Substation, will be remotely monitored and secured, and will be inspected on a monthly basis. The 110kV UGC will be tested (via the manhole cover over link box chambers at the Joint Bay locations) every 1 to 2 years. In total, it is expected that access to the Mountphilips Substation/110kV UGC will occur over a total c.13 per year, most likely using vans, will be associated with the routine operation of the UWF Grid Connection. Any infrequent maintenance or unplanned repairs (if they occur at all) are expected to involve reopening Joint Bays requiring the use of larger machinery and plant for very short periods of time (1 to 2 weeks). Any road works will be subject to Road Opening Licence, and the Joint Bay area will be reinstated to the satisfaction of Tipperary County Council, and any impacts are expected to be Neutral. With regard to the UWF Related Works: The Telecoms Relay Pole and the ground above the Internal Windfarm Cables will have one inspection per year, the Realigned Windfarm Roads will be visually inspected on a monthly basis during windfarm site inspections. Each inspection will ordinarily be by way of a normal car or small works van. However, it may require the use of larger machinery and plant for brief durations (c.1 day) to maintain the Realigned Windfarm Roads periodically during the operational stage. As these traffic volumes associated with the operational stage are negligible, no damage to road pavements are likely to occur. No works to road pavements or buried structures will be required during the operation of the UWF Related Works. With the exception of Haul Route Works, no works to road boundaries will be required. At Haul Route Works locations, the roads boundaries may need to be adjusted temporarily at some stage in the future in order to accommodate the transport of turbine components to and from the windfarm. It is considered that this will occur very infrequently during the operational stage. It is intended that the hard-core surface, which was installed during the construction works, will be left in-situ under the reinstated verges and boundaries and can be uncovered in the event of requiring its reuse. The resulting duration of any works at Haul Route Works locations will be				

Material Assets (Roads)

Topic

Source(s) of Impacts	Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)
brief, reversible with reinstatement, and are typical of commonly occurring road works on Irish roads, therefore any impacts to road boundaries will be Neutral. With regard to the Upperchurch Windfarm: 1-2 small vehicle movements (van or four wheel drive) per day associated with the maintenance of the windfarm, and few if any larger vehicle movements. The only larger vehicles would be those associated with the windfarm are the replacement of turbine parts, which may be required infrequently during the operational stage. In any case the use of larger vehicles will involve very small numbers of larger vehicle movements, all of which will comply with axle loadings, and vehicle movements associated with large turbine components will take place outside of peak hours. Due to the very low traffic volumes associated with Upperchurch Windfarm, which are less than those associated with a residential dwelling and the absence of roadworks or works to roadside boundaries or buried structures, the effects to Public Roads will be Neutral.				
Decommissioning Stage				
Rationale for Excluding: No potential for effects/Neutral effects. The UWF Grid Connection will not be decommissioned, therefore there is no potential for effects. The traffic volumes associated with those parts of the UWF Related Works which will be decommissioned (Telecoms Relay Pole, cables from the Internal Windfarm Cables) will result in minimal traffic condition changes which will not be noticeable on the local roads. Haul Route Works: It is not known at this time whether the turbine components will be broken up and transported off-site in smaller parts for recycling, or if some or all of the turbine components will be transported offsite for reuse. Should turbine components be transported offsite, then the road verges/boundaries at Haul Route Works locations will be widened once more, similar to infrequent widening during the operational stage, to facilitate the transport of turbine components (if needed). These works will not have any effect on road pavements, and any boundaries removed will be reinstated immediately afterwards. Therefore, it is considered that the decommissioning works and activities associated with the UWF Related Works will have a neutral effect on Public Roads. In relation to the Upperchurch Windfarm, no works or damage to public road pavements or to public road boundaries are expected during any decommissioning activities, therefore there is no potential for impacts to Public Roads from this Element.				

15.2.5 Mitigation Measures for Impacts to Public Roads

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 Public Roads.

15.2.6 Evaluation of Residual Impacts to Public Roads

Residual Impacts are the final or intended effects that will occur after mitigation measures have been put into place. No additional mitigation measures were required, and thus the Residual Impact is the same as the Impact set out in Impact Evaluation Table sections for Public Roads above (Section 15.2.4)

– i.e. **no significant adverse impacts**.

15.2.7 UWF Grid 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.

15.2.8 Summary of Impacts to Public Roads

A summary of the Impact to Public Roads is presented in Table 15-13.

Table 15-13: Summary of the impacts to Public Roads

Impact to Public Roads:	**Damage to Road Pavements**	**Damage to Bridges and Culverts**	**Damage to Road Boundaries**
Evaluation Impact Table	*Section 15.2.4.1*	*Section 15.2.4.2*	*Section 15.2.4.3*
Project Life-Cycle Stage	Construction	Construction	Construction
UWF Grid Connection (direct/indirect impact)	**Moderate**	**Neutral**	**Imperceptible**
UWF Grid Connection (cumulative impact)	**Moderate** (L2264-50) to **Slight** (L6188-0, L6009-0 and R503 site entrance)	**No Cumulative Impact**	**No Cumulative Impact**
Element 2: UWF Related Works	Imperceptible	Neutral	Imperceptible
Element 3: UWF Replacement Forestry	No Impact - Evaluated as Excluded, see Section 15.2.2.2.1		
Element 4: Upperchurch Windfarm	Neutral	No potential for Impact	Not be Significant
Element 5: UWF Other Activities	Neutral Impact/No Impact - Evaluated as Excluded, see Section 15.2.2.2.1		
Cumulative Impact:			
All Elements of the Whole UWF Project	**Slight**	**Neutral**	**Imperceptible**
Other Projects & Activities: Castlewaller Windfarm (potential grid connection on the L6009-0 and potential site entrance works off the R503)	**Imperceptible**	**No potential for cumulative impact**	

Note: No cumulative information for Other Projects or Activities is included in the table above, because no Other Projects or Activities were evaluated as having potential to cause cumulative effects to Public Roads with either the UWF Grid Connection or the Other Elements of the Whole UWF Project (see Section 15.2.2.2).

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.

Public Roads

Sensitive Aspect

Material Assets (Roads)

Topic

15.3 Sensitive Aspect No.2: Road Users

This Section provides a description and evaluation of the Sensitive Aspect - Road Users.

15.3.1 BASELINE CHARACTERISTICS of Road Users

15.3.1.1 STUDY AREA for Road Users

The study area for Road Users in relation to the UWF Grid Connection is described in Table 15-14 and illustrated on Figure GC 15.3: UWF Grid Connection Study Area for Road Users (Volume C3 EIAR Figures).

Table 15-14: UWF Grid Connection Study Area for Road Users

Study Area for Road Users	Justification for the Study Area Extents
Construction works area boundary on the public road network; and the route of concentrated construction traffic on the R503 between Newport and Knockmaroe, and on the local roads north of Newport town to the Mountphilips Substation site entrance at the western end of the 110kV UGC route, and the local roads north of the R503 between the junction at Knockmaroe and the private paved road to the Consented UWF Substation location at the eastern end of the 110kV UGC route.	Road Users on public roads at road works locations or along routes of concentrated construction traffic or at the site access point may be affected by road works and construction traffic movement associated with UWF Grid Connection. Road Users, who have acceptable alternative routes are not likely to be affected.

15.3.1.2 Baseline Context and Character of Road Users in the UWF Grid Connection Study Area

Road Users relate to local road users, vehicular through traffic (road users commuting or passing through the area), tourists and pedestrians/cyclists. These road users use the roads for commuting to work or school, for agricultural/forestry access, for local and regional business or leisure purposes.

15.3.1.2.1 Composition of Road Users

In relation to commuting to work or school, data from the Central Statistics Office (POWSCAR 2016) indicates that the majority of road users in upland area, travel to work in a car, van or lorry, whereas a small minority of people use public transport (mainly buses), walk or cycle. Detailed POWSCAR data is included in Appendix 15.1: Traffic and Transportation Assessment Report. The POWSCAR 2016 Census, outlined in Table 15-15, shows a high usage of cars and a very low usage of bicycles and walking as modes of transport in the Electoral Districts (Kilcomenty, Kilnarath, Killoscully, Newport, Abington and Foilnaman) associated with the UWF Grid Connection. The CSO data shows that the majority of people drive or are driven to work or school/college.

Based on the CSO data, outlined in Table 15-15 below, it is assumed that road users along the regional road in the area (R503) mainly comprise people travelling to work or school/college, or travelling to shops and businesses along the R503, as this road is identified as a commuter route linking Thurles with Limerick.

It is also assumed that tourists use the R503 regional road to travel between Thurles and Limerick, and potentially, are present on the walking/cycling routes that exist in the study area.

The R503 is also designated scenic route in Tipperary North County Development Plan.

Table 15-15: Extract from CSO 2016 POWSCAR data

POWSCAR 2016 - Theme 11 Commuting	Kilcomenty	Killoscully	Kilnarath	Newport	Abington	Foilnaman
Commuting to Work						
On foot - Work	3	1	1	39	2	2
Bicycle - Work	0	0	0	7	0	0
Bus, minibus or coach - Work	2	2	0	11	4	0
Train, DART or LUAS - Work	0	1	0	1	1	1
Motorcycle or scooter - Work	0	0	1	2	0	1
Car driver - Work	232	158	113	868	158	88
Car passenger - Work	7	5	1	61	4	4
Van - Work	30	16	17	86	26	16
Other (incl. lorry) - Work	3	0	2	7	7	4
Work mainly at or from home - Work	22	19	12	42	26	21
Not stated - Work	5	8	6	30	6	4
Total – Commuting to Work	**304**	**210**	**153**	**1154**	**234**	**141**
Commuting to School or College						
On foot - School or college	15	0	2	189	14	5
Bicycle - School or college	0	0	1	3	0	0
Bus, minibus or coach - School or college	19	57	23	36	47	31
Train, DART or LUAS - School or college	1	0	0	0	0	0
Motorcycle or scooter - School or college	0	0	0	0	0	0
Car driver - School or college	14	7	5	39	9	2
Car passenger - School or college	150	53	41	473	61	39
Van - School or college	2	0	1	3	0	0
Other (incl. lorry) - School or college	0	0	0	0	0	0
Work mainly at or from home - School or college	4	0	0	0	0	0
Not stated - School or college	3	4	4	22	4	3
Total – Commuting to School or College	**208**	**121**	**77**	**765**	**135**	**80**
Total per Mode of Transport						
On foot - Total	18	1	3	228	16	7
Bicycle - Total	0	0	1	10	0	0
Bus, minibus or coach - Total	21	59	23	47	51	31
Train, DART or LUAS - Total	1	1	0	1	1	1
Motorcycle or scooter - Total	0	0	1	2	0	1
Car driver - Total	246	165	118	907	167	90
Car passenger - Total	157	58	42	534	65	43
Van - Total	32	16	18	89	26	16
Other (incl. lorry) - Total	3	0	2	7	7	4

POWSCAR 2016 - Theme 11 Commuting	Kilcomenty	Killoscully	Kilnarath	Newport	Abington	Foilnaman
Work mainly at or from home - Total	26	19	12	42	26	21
Not stated - Total	8	12	10	52	10	7
Total per ED	**512**	**331**	**230**	**1919**	**369**	**221**

15.3.1.2.2 Traffic Volumes

7-day classified 'ATC Tube Counts' surveys were carried out at on each of the affected roads in order to establish background traffic conditions, in terms of volume and ambient speed. All vehicles recorded during the traffic survey are expressed in terms of "Passenger Car Units" (PCUs), sometimes referred to as "Car Equivalents". This is the methodology which has been employed here (with for example specific industry standard conversion factors to convert HGVs, Skip Lorries, Cars/Trailers and Bin Lorries to PCUs). The conversion factors used are in accordance with industry-standard recommendations.

The existing traffic conditions of the affected roads, as recorded during the surveys, are presented in Table 15-16 and Table 15-17. The Electoral Districts in which each of the affected roads are located, are also identified in the Table, for ease of reference to the CSO data in Table 15-15 above. In summary, the surveys confirm that the roads in the area are generally very lightly trafficked, reflecting the rural nature of the study area.

Table 15-16: Summary of Traffic Volumes recorded during traffic count surveys

Traffic Count Locations	Road ID	Electoral District	24Hr 2-Way AADT (PCUs)	% HGVs	AM Peak Hr 2-Way Flow (PCUS)	PM Peak Hr 2-Way Flow (PCUS)
T1	L-2166-0	Kilcomenty	721	0.5%	94	66
T2	L6013-0	Kilcomenty	301	0.4%	35	27
T3	L2156-0	Kilnarath	1016	0.3%	97	108
T4	L2157-0	Kilnarath	967	0.7%	85	95
T5	L6009 at Castlewaller	Kilnarath	217	0.2%	31	21
T6	L6009 at Cooldrisla	Newport	407	0.7%	38	37
T7	R503 at Derryleigh	Newport	2046	0.9%	176	229
T8	R503 at Rear Cross	Abington	950	1.6%	80	110
T9	R503 at Knockmaroe	Foilnaman	709	1.9%	66	87
T10	L2264-50	Foilnaman	183	0.8%	19	23
T11	L6188-0	Foilnaman	76	0.6%	7	7

The traffic count data demonstrates that on average the vast majority (98.5%) of traffic on the roads within the UWF Grid Connection Study Area comprised cars or vans, with 1% comprises heavy vehicles (such as buses, articulated and rigid trucks), and 0.5% comprises bicycles or motorcycles.

The traffic count survey, in addition to observations during site visits and surveys, confirms that the roads within the UWF Grid Connection Study Area have low traffic volumes and are not congested roads.

Road Users

Sensitive Aspect

15.3.1.2.3 Traffic Speeds

The traffic data collected confirmed that the traffic speeds are generally maintained well within the posted speed limits (i.e. less than 80kph which is generally the speed limit on the local roads).

Table 15-17: Summary of 85th percentile speeds recorded during traffic count surveys

Road ID	85th percentile Traffic Design Speed Km/Hr
L-2166-10**	84
L6013-0	58.9
L2156-0	59.6
L2157-0	72.5
L6009 at Castlewaller	67.5
L6009 at Cooldrisla	52.4
R503 at Derryleigh	83.4
R503 at Rear Cross	69.5
R503 at Knockmaroe	61.7
L2264-50	70.4
L6188-0	54

*** The site entrance for the Mountphilips Substation is off the L2166-10 local road at Coole townland.*

15.3.1.2.4 Road Safety Record

A review of the Road Safety Authority (RSA) online collision database (http://rsa.ie/en/RSA/Road-Safety/RSA-Statistics/Collision-Statistics/Ireland-Road-Collisions/), which is available for the eleven year period during the years 2005 to 2015 inclusive, recorded no fatal collisions, 2 no. serious collisions and 3 no. minor collisions along the route of the 110kV UGC on the R503 between 2005-2015 inclusive. No collisions were recorded on the local roads within the study area during this period. The roads in the study area are considered to have a good record of road safety.

15.3.1.2.5 Public Transport

A rural transport bus service provides services between Upperchurch, Klicommon and Rear Cross to the larger towns in in Tipperary. Rear Cross is also along the Bus Éireann Limerick to Dundrum service route.

15.3.1.2.6 Tourist/Walking/Cycling Routes

The R503 is a designated scenic route in Tipperary North County Development Plan. The waymarked walking routes Slievefelim Way, is routed along the R503 for c.1.3km just outside Rear Cross village. There is also a waymarked cycle route, the Ormond Way Cycle, part of which is routed along the L2264-50 (locally called the Borrisoleigh Road) through Knockmaroe townland. These walks and cycle route are identified on Figure GC 15.3 UWF Grid Connection Study Area for Road Users.

Material Assets (Roads)

Topic

Both the CSO data and the traffic count surveys show a very low usage of the road network by cyclists.

15.3.1.3 Importance of Road Users

Road Users are of importance as members of local communities, farmers and forestry workers, other workers, commuters to and between urban areas and visitors. Road Users are required to adhere to the Rules of the Road and to use the roads in accordance with the Road Traffic Act (as amended).

15.3.1.4 Sensitivity of Road Users

Road Users could be sensitive to changes in road use conditions such as substantial increases in traffic volumes, particularly HGVs; presence of roadworks and traffic management measures, such as stop-go systems; and a reduction in road pavement quality which could either increase journey times or reduce road safety.

Cyclists or walkers are considered to be vulnerable road users, and could be intimidated by the presence of heavy goods vehicles, particularly on narrow roads. There are also two primary schools located along the route of the 110kV UGC on the R503 – Lackamore National School and Rear Cross National School, children being dropped off or collected at school opening/closing times are more vulnerable to increased traffic and road works in close proximity.

Based on the IMPERIA methodology, outlined in Section 15.1.8.2.1, Road Users are evaluated as having **Low** Sensitivity due to the low number of users on the roads, and due to the temporary and linear nature of the works there will not be substantial changes on the road network which could significant affect Road Users, and due to the low number of more vulnerable Road Users such as walkers and cyclists, or children attending local national schools in the area.

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

According to Transport Infrastructure Ireland[4], growth across the national road network was 3% in 2017.

Construction traffic volumes were assigned to the roads within the UWF Grid Connection Study Area. Traffic growth factors for 2020/2021 (start year for construction) were calculated from data obtained from Transport Infrastructure Ireland[5] which provides the recommended method of predicting future year traffic growth on public roads. A growth rate factor of 1.028 was applied to the current traffic volumes on the roads, and it is expected that there will be very slow increases in annual traffic volumes, in the region of 1-2% per annum.

In general, by the time of construction, the volume of traffic and make-up of road users is considered unlikely to change noticeably from baseline conditions.

15.3.1.6 Receiving Environment (the Baseline + Trends)

The evaluation of impacts to Road Users is based on the predicted traffic volumes for 2020/2021.

Whilst a 2020/2021 opening year has been selected for the works, in light of the anticipated slow change in the baseline conditions, it should be noted that any required change (of say 2 - 3 years) in the selection of opening year will have no implications whatsoever for the conclusions of the study due to the very lightly trafficked nature of the affected roads.

[4] Transport Infrastructure Ireland 'National Roads Network Indicators' (2017)
[5] PE-PAG-02017 Project Appraisal Guidelines for National Roads Unit 5.3 (Travel Demand Projections October 2016, Table 5.3.2: Link-Based Growth Rates: Annual Growth Factors)

Road Users

Sensitive Aspect

15.3.2 CUMULATIVE INFORMATION - Cumulative Projects & Baseline Characteristics

15.3.2.1 Cumulative Evaluation Study Area

15.3.2.1.1 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 Road Users	Justification for the Study Area Extents
Construction works area boundary on the public road network; and The route of concentrated construction traffic on the R503 between Newport and Knockmaroe, and on the local roads north of Newport town to the Mountphilips Substation site entrance at the western end of the 110kV UGC route, and the local roads north of the R503 between the junction at Knockmaroe and the private paved road to the Consented UWF Substation location at the eastern end of the 110kV UGC route.	Road Users on public roads at road works locations or along routes of concentrated construction traffic or at the site access point may be affected by road works and construction traffic movement associated with both UWF Grid Connection *and* Other Elements of the Whole UWF Project or Other Projects. Road Users, who have acceptable alternative routes are not likely to be affected

The study is illustrated on Figure CE 15.3: UWF Grid Connection Cumulative Evaluation Study Area for Road Users.

15.3.2.1.2 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.

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 15.3.2.2.1 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 15-18 and illustrated on Figure WP 15.3: Whole Project Study Area for Road Users (Volume C3 EIAR Figures).

Table 15-18: Cumulative Evaluation Study Area for Public Roads

Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
Element 1: UWF Grid Connection	Route of concentrated construction traffic or roadwork locations on regional roads and on local roads as far as the site access points	Road Users along routes of concentrated construction traffic or at road works or site access points may be affected by construction traffic movements and road works. Road Users, who have acceptable alternative routes are not likely to be affected
Element 2: UWF Related Works		
Element 3: UWF Replacement Forestry		
Element 4: Upperchurch Windfarm (UWF)		

Material Assets (Roads)

Topic

Cumulative Project	Cumulative Study Area Boundary	Justification for Study Area Extent
Element 5: UWF Other Activities		

15.3.2.2 Scoping for Other Projects or Activities & Potential for Impacts

The evaluation of cumulative impacts to Road Users 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 Road Users 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 the Cumulative Evaluations (Section A2.2 .4.30).

The results of this scoping exercise are that: Castlewaller Windfarm (potential grid connection and potential site entrance works off the R503) has been scoped in for evaluation of cumulative effects to Public Roads.

The location of, and study area boundary associated with, the Other Elements and Other Projects which are included for cumulative evaluation is illustrated on Figure WP 15.3.

15.3.2.2.1 Potential for Other Elements or Other Projects to cause Impacts to Road Users

An evaluation was carried out by the topic authors of the likelihood for the Other Elements of the Whole UWF Project or Other Projects to cause cumulative effects to the Sensitive Aspect Road Users. The results of this evaluation are included in Table 15-19.

The location of, and study area boundary associated with, the Other Elements and Other Projects which are included for cumulative evaluation is illustrated on Figure WP 15.3. The baseline character of the areas around these projects is described in Section 15.3.2.3.

Table 15-19: Results of the Evaluation of the Other Elements and Other Projects

Other Elements of the Whole UWF Project	
Element 2: UWF Related Works	Included for the evaluation of cumulative effects
Element 3: UWF Replacement Forestry	Evaluated as excluded: No impacts are likely to occur due to Access into the UWF Replacement Forestry lands will be through an existing farm entrance on the Local Road L2264-34. This road is a 2-way road which is very lightly trafficked with 99.6% spare capacity. There are adequate sightlines at this existing entrance. Part of the Ormond Way cycle route is along the L2264-34. No increase in journey times due to the absence of any road works and the extremely low volumes of traffic associated with the UWF Replacement Forestry - the planting stage will generate 1-2 vehicles movements per day over a one-month period, and as a comparative example this level of traffic is substantially less than the daily level of traffic generated by a single residential dwelling. During the growth stage, traffic will be in the region of 2 to 4 vehicle movements per year. No reduction in road safety due to the adequacy of sightlines at the existing access point.
Element 4: Upperchurch Windfarm (UWF)	Included for the evaluation of cumulative effects
Element 5: UWF Other Activities	Evaluated as excluded: Neutral Impacts or No Impacts due to: Notwithstanding the National and Regional Road network along the turbine component and

Road Users

Sensitive Aspect

	materials haul routes are scoped out in Section 15.1.4, in relation to the Haul Route Activities, none of the Tii Guideline thresholds (see Table 15-3) are met, and therefore further analysis is not required - the traffic increases as a result of the Haul Route Activities (tree trimming, laying of matting, street furniture removal), will be in all cases considerably less than 1% of the current traffic volumes on these roads and as a result will have no effect on Road Users, given that the normal day-to-day variation in traffic conditions can be as much as 10%. In addition, tree trimming is a commonplace occurrence on the public road network. Although street furniture, including safety signs, will be removed as part of the Haul Route Activities, these signs will be removed immediately prior to turbine component transportation, during off peak hours, and replaced immediately after the convoy passes by and it is considered that the brief removal of street furniture will not affect the safe use of the roads by Road Users. Upperchurch Hen Harrier Scheme & Monitoring Activities & Overhead Line Activities: no works to the road network or road boundaries form part of these activities, and taking into consideration the extremely low volumes of traffic associated with these activities, and the brief duration of any public road use, no effects to Road Users are likely to occur.
Castlewaller Windfarm (potential grid connection);	Yes, included for the evaluation of cumulative effects in relation to potential grid connection works on the L6009-0 local road. Although Castlewaller Windfarm is not likely to be constructed during the same period as UWF Grid Connection (because the Castlewaller Windfarm has not yet been offered a grid connection from EirGrid, and has to obtain planning consent for its grid connection), there is *some possibility* that this windfarm could be built during the same period as UWF Grid Connection. In the event that the 2 No. projects are built at the same time, there could be cumulative increased journey times for Road Users at the points of potential co-location of the underground grid connections in the L6009-0, and therefore this project is scoped in for consideration. Excluded from the evaluation of cumulative effects in relation to the consented windfarm and the potential site entrance works off the R503, The indicate site entrance works on the R503 are not expected to cause any impacts to road users and are not scoped in. Similarly the windfarm works are not located on the public road, with traffic levels not of a quantity to cause significant cumulative impacts to road users, therefore the windfarm is scoped out.

15.3.2.3 Cumulative Information: Baseline Characteristics – Context & Character

15.3.2.3.1 Element 2: UWF Related Works

Material Assets (Roads)

Topic

The roads which could be potentially affected by the UWF Related Works and associated haulage are the Regional Road R503 along with the Local Roads (designated as "L" Roads); L6185-13, L2264-50, L6188-0, L61881-0, L2264-34, L4139-16, L4138-12 and L4139-0.

Traffic count surveys: were carried out for a 24-hour period at 9. No locations. The traffic count survey, in addition to observations during site investigations, confirms that the roads in the study area have low traffic volumes and are not congested roads. The vast majority of traffic counted comprised cars or vans. Both the traffic count surveys and the CSO POWSCAR data show a very low usage of the road network by cyclists.

Road Safety: The traffic data collected confirmed that the traffic speeds are generally maintained well within the posted speed limits (i.e. less than 80kph which is generally the speed limit on the local roads). A review of the Road Safety Authority on-line collision statistics demonstrates that the local and regional roads in the study area do not have a significant history of accidents. See Appendix 15.1: Traffic and Transportation Assessment Report for more details on safety statistics.

The waymarked walking routes that exist in the UWF Related Works Study Area consist of the Eamon a Chnoic Loop and the Ormond Way walking route (currently being developed). There is also a waymarked cycle route, the Ormond Way Cycle, part of which is routed along the L2264-50 and L2264-34 (locally called the Borrisoleigh Road) through Knockmaroe and Foilnaman. These walks and cycle route are identified on Figure WP 15.3: Whole Project Study Area for Road Users. Part of the Ormond Way walking route (currently under development) is along the L4139-0; and all of the Ormond Way Cycle route is along public roads.

15.3.2.3.2 Element 3: UWF Replacement Forestry

Not applicable – Element evaluated as excluded. See Section 15.3.2.2.1

15.3.2.3.3 Element 4: Already Consented Upperchurch Windfarm

The baseline characteristics for Road Users described under UWF Related Works above, also applies to the road users which will be travelling on roads associated with Upperchurch Windfarm deliveries.

Consideration of the Passage of Time: Although road traffic increases at approximately 1 – 2% per annum, due to the very lightly nature of the roads and the extent of available capacity on all roads, it is considered that there is not a material change from traffic conditions at the time of the Upperchurch Windfarm 2013 EIS or 2014 assessment, and therefore the information in the 2013 EIS remains relevant to the cumulative evaluations in this EIAR for UWF Grid Connection

15.3.2.3.4 Element 5: UWF Other Activities

Not applicable – Element evaluated as excluded. See Section 15.3.2.2.1

15.3.2.3.5 Other Projects or Activities

Castlewaller Windfarm: Potential to cause increased journey times for Road Users on the L6009-0 (if the potential Castlewaller grid connection trenching works were to coincide with the UWF Grid Connection trenching works).

15.3.3 PROJECT DESIGN MEASURES for Road Users

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 15-20 are relevant to the Environmental Factor, Material Assets (Roads), and in particular to the sensitive aspect **Road Users**.

Table 15-20: UWF Grid Connection Project Design Measures relevant to Road Users

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).
PD06	Construction works will not be carried out within 150m of Rearcross National School or Lackamore National School, during school hours. In addition, the project Community Liaison Officer will keep each school informed of construction timetables and scheduling.
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.
PD10	Flag-men will be used at 110kV UGC works locations on the public roads subject to one lane closures. These flagmen will control the movement of traffic on the public road, so that road users can continue to use the public road network in a in a safe and efficient manner. The works will be carried out according to the Traffic Management Plan for UWF Grid Connection. The Traffic Management Plan forms part of the Environmental Management Plan.
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.
PD12	As requested by the Roads Department of Tipperary County Council, during pre-planning consultations, the works along the public road network will be scheduled to minimise impacts on schools and local businesses. The works will be scheduled so that they do not disrupt or interfere with Tipperary County Council's road works programme on the R503 through Newport town.
PD13	As requested by the Roads Department of Tipperary County Council, during pre-planning consultations, the Promoter will fund the costs of Tipperary County Council engaging a chartered Civil Engineer to oversee quality control and compliance with drawings, specifications and road opening conditions for the duration of the works

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 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.

15.3.4 EVALUATION OF IMPACTS to Road Users

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) - Road Users.

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

Table 15-21: 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)*
Increased Journey Times (construction stage)	*Increased Risk of Road Accidents (construction stage)*
	Interrupted or disrupted access to property (construction stage)
	Operational Effects
	Decommissioning Effects

The source-pathway-receptor links for the impact included are described in the Impact Evaluation Table in the next section, **Section 15.3.4.1.**

The source-pathway-receptor links and the rationale for impacts excluded are described in the section directly after the Impact Evaluation Table, in Section 15.3.4.2.

Road Users

Sensitive Aspect

15.3.4.1 Impact Evaluation Table: Increased Journey Times

Impact Description	
Project Life Cycle Stage:	Construction stage

Impact Source: Road works, construction traffic
Cumulative Impact Source: Road works, construction traffic
Impact Pathway: Roads

Impact Description: The presence of roadworks on local roads and the regional road R503, road closures and one-lane closures with stop-go systems, and increased traffic due to the use of the roads by construction delivery vehicles could result in delays and disruption to road users along roads in the study area.

Impact Quality: Negative

Evaluation of the Subject Development Impact – Increased Journey Times

Element 1: UWF Grid Connection – direct/indirect impact

Impact Magnitude:

Construction works for the UWF Grid Connection will involve the excavation of the road pavements for the cables trench and the Joint Bays.

The trenching works are conservatively expected to proceed at an average rate of 80m – 100m per day for the 110kV UGC:

- 0.7km on the L2166-10 which will be completed over a 2 week period,
- 1.2km on the L6013-0 which will be completed over a 3 week period;
- 0.4km on the L2156-0 which will be completed over a 1 week period,
- 0.8km on the L2157-0 which will be completed over a 2 week period,
- 1.8km on the L6009-0 which will be completed over a 1 month period,
- 22.4k on the R503 for which will be completed over a 8 to 9 month period,
- 1.9km on the L2264-50 which will be completed over a 1 month period; and
- 0.3km on the L6188-0 which will be completed over a 1 week period.

In addition road works will be required at Joint Bay locations, during their initial construction (2 days per Joint Bay), and during cable pulling (3 days per Joint Bay), and during cable jointing works (5 days per Joint Bay). There are a total of 40 no. Joint Bays along the public road network:

- 2 No. on the Local Road L6013-0;
- 1 No. on the L5183-0
- 1 No. on the L2166-1
- 2 No. on the L6009-0,
- 31 No. on the R503,
- 2 No. on the L2264-50; and
- 1 No. on the L6188-0.

4 No. construction works crews will carry out 110kV UGC works concurrently, with 1 No. crew dedicated to construction works on the local roads, and 3 No. crews working at separate locations along the R503 Regional Road.

Traffic counts were carried out in January 2019 at 5 locations and in May 2019 at 6 locations, to measures Passenger Car Units (PCUs) over a 24-hour period, the results show that traffic volumes on the roads are very low, while Traffic Modelling (See Appendix 15.1: Traffic and Transportation Assessment Report) demonstrates that over 98% of the capacity of the roads will remain available during the construction period.

- 721 PCUs on the L2166-10,
- 301 PCUs on the L6013-0,
- 1016 PCUs on the L2156-0,
- 967 PCUs on the L2157-0,

Material Assets (Roads)

Topic

- 217 PCUs on the L6009-0 at Castlewaller,
- 407 PCUs on the L6009-0 at Cooldrisla,
- 2046 PCUs on the R503 at Derryleigh,
- 950 PCUs on the R503 at Rear Cross,
- 709 PCUs on the R503 at Knockmaroe,
- 183 PCUs on the L2264-50 and
- 76 PCUs on the L6188-0.

Road Closures: Due to the narrow road widths of the L6013-0, L6009-0, L6188-0 local roads, these roads will be closed during construction works. Acceptable alternative routes are available for all of these roads, and diversions will be signposted during road closures. Local access will be maintained on these roads at all times.

Diversion times are as follows:

- L-6013-0: Diversion through Newport town, circa 5 minutes. As detailed above this diversion will be in place for a period of 3 weeks
- L-6009-0: Diversion through Newport town, circa 5 minutes. As detailed above this diversion will be in place for a period of 1 month.
- L-6188-0: Diversion through townland of Shevry and on through Milestone, circa 10 minutes. As detailed above this diversion will be in place for a period of 1 week.

One-Lane Closures: The remaining roads – R503, L2166-10, L2156-0, L2157-0 and L2264-50 will be subject to one lane closures, with traffic flow managed around the works using a stop-go system and flagmen to minimise delays and disruption to road users. Traffic management measures will be put in place on the approach to works, advance warning signage has been designed in accordance with the Traffic Signs Manual.

One-lane closures for the local roads are detailed above, a further breakdown of the 8 to 9 month works on the Regional road R503 are as follows:

- 3 crews preforming trenching, joint bay installation and temporary road reinstatement. This will require 3 No. one lane closures along the R503 for 23 No. weeks. Wait time will be circa 3 minutes at each location. The wait time is short due to the low volume of traffic on the R503.
- Cable pulling will take 2-3 no. days per joint bay. This will include removal of temporary road reinstatement, pulling of cables and reinstatement of the road over the joint bay. There will be 3 No. crews for 7 No. weeks.
- Cable jointing works will take 5 days per joint bay. This will include the removal of temporary road reinstatement, jointing of cables and the final reinstatement of the road over the joint bay. There will be 3 No. crews for 11 No. weeks.

The magnitude of impact is evaluated as Moderate, due to the moderate intensity (observable effect on people's daily lives and may impact daily routines), low to moderate spatial extent, and low duration (impacts will be less than 1 year), as per the IMPERIA methodology, see Section 15.1.8.2.2

Significance of the Impact: Slight

Rationale for Impact Evaluation:

- The lightly trafficked nature and extent of available capacity on all roads
- The availability of acceptable diversions around road closures on the L6013-0, L6009-0, L6188-0 local roads;
- The maintenance of local access to properties on the roads, including the roads subject to closures.
- The temporary duration (generally 1 to 3 weeks at any one point on local roads, and 8 to 9 months in total on the regional road)
- The reversibility of the impact with completion of roadworks;
- Application of traffic management measures and use of flagmen to minimise traffic delays.

Road Users

Sensitive Aspect

Element 1: UWF Grid Connection – cumulative impact

Cumulative Impact Magnitude: The potential for cumulative impacts with Other Elements relates to the L2264-50 and L6188-0 local roads and R503 Regional Road in the Upperchurch Windfarm/UWF Related Works area.

The potential for cumulative effects relates to additional construction related traffic on local roads within the UWF Grid Connection Cumulative Study Area for deliveries to Upperchurch Windfarm and UWF Related Works construction works areas, there will also be increased traffic on the regional road R503 for deliveries to the UWF Grid Connection, Upperchurch Windfarm and UWF Related Works sites.

There is no potential for in-combination travel delays due to road works for UWF Grid Connection and for UWF Related Works, as works for these two elements on the L2264-50 and L6188-0 local roads will not be carried out at the same time. Cumulative impacts relate to sequential impacts with works for UWF Grid Connection and UWF Related Works occurring over a total of 6 weeks on the L2264-50, and over a total of 2 weeks on the L6188-0.

The cumulative impact magnitude is evaluated as Low for road users along the L2264-50 local roads and R503 regional road, due to the very low number of Road Users in the context of the 98% available capacity on these roads, even when the cumulative traffic volumes are modelled (see Appendix 15.1: Traffic and Transportation Assessment Report).

The potential for cumulative impacts with the *potential* Castlewaller grid connection trenching works along the L6009-0 at Castlewaller / Carrowkeale / Derryleigh townlands over a 1 month period. The cumulative impact magnitude is evaluated as Low for road users as cumulative construction impacts are not expected as works will either take place at separate times, or should works be carried out at the same time, then works for both projects are likely to be carried out by one crew, and although a longer construction periods is possible on the local road L6009-0, this will not cause significant effects to journey times, as the works are still temporary and of short duration, with alternative routes available. Local access to properties will maintained during road works and road closures.

Significance of the Impact: Imperceptible

Rationale for Impact Evaluation:

- The Low Sensitivity and Low Magnitude;
- The lightly trafficked nature and extent of available capacity on the R503, L2264-50, L6188-0, and L6009-0;
- The temporary duration and the reversibility of the impact with the completion of construction works;
- The application of traffic management measures and use of flagmen
- Local access to properties maintained.

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

Element 2: UWF Related Works

Impact Magnitude: The Internal Windfarm Cabling requires 9 No. separate cable crossing of public roads, which will each be completed within one day.
Haul Route Works will take place at 13 No. locations and will be completed within 1 to 3 days at any location. Flagmen will be used at these locations to minimise delays and disruption to local road users. Traffic management measures will be put in place on the approach to works, advance warning signage has been designed in accordance with the Traffic Signs Manual.

Significance of the Impact: Imperceptible

Rationale for Impact Evaluation:

- The lightly trafficked nature and extent of available capacity on all roads
- Brief to temporary (up to 3 days) duration of road works, with most trenching completed within one day at road crossing locations.
- The temporary duration of increased traffic associated with the delivery of construction materials;

Material Assets (Roads)

Topic

- Application of traffic management measures and use of flagmen

Element 3: UWF Replacement Forestry – *N/A, evaluated as excluded, see Section 15.3.2.2.1*

Element 4: Consented Upperchurch Windfarm

Impact Magnitude: There are no works to the public road associated with the Upperchurch Windfarm.
As per Appendix 15.1: Traffic and Transportation Assessment Report the additional construction traffic associated with the Upperchurch Windfarm not have a significant adverse effect on the network capacity and operation of the roads within the study area, with 98%, on average, of the capacity of the affected roads remaining available during the construction stage. The cumulative impact magnitude is evaluated as Low to Moderate.

Significance of the Impact: Imperceptible to Slight

Rationale for Impact Evaluation:

- As per the ABP Inspectors Report for Upperchurch Windfarm: I would therefore agree that the development will impact on the road network and cause disruption to road users but the overall impact will be confined to the time span of the construction period. Impacts can I consider be addressed and mitigated by the implementation of the construction management plan.
- As per the Grant of Permission 2014: it is considered that, subject to compliance with the conditions set out below, the development would not seriously injure the amenities of the area or of property in the vicinity, and would be acceptable in terms of traffic safety and convenience

Element 5: UWF Other Activities – *N/A, evaluated as excluded, see Section 15.3.2.2.1*

Other Project: Potential Castlewaller Windfarm Grid Connection

A potential underground grid connection to Killonan, including a section along the L6009-0 at Castlewaller / Carrowkeale / Derryleigh townlands. Any works will be subject to a road opening license and Traffic Management Plan. Works likely to take c.1 month period. Magnitude is evaluated as Low on L6009-0.

Significance of the Impact: Imperceptible

Rationale for Impact Evaluation:

- The Low Sensitivity and Low Magnitude;
- The lightly trafficked nature and extent of available capacity on the L6009-0;
- The temporary duration and the reversibility of the impact with the completion of construction works;
- The application of traffic management measures and use of flagmen
- Local access to properties maintained.

Evaluation of Other Cumulative Impacts – Increased Journey Times

Whole UWF Project Effect

Cumulative Impact Magnitude: The Whole UWF Project works requires road works various local public roads and on the Regional Road R503 across the Whole Project Cumulative Evaluation Study Area. Two roads – L2264-50 and L6188-0, will be subject to road works to both UWF Grid Connection 110kV UGC trenching and UWF Related Works Internal Windfarm Cabling Trenching and Haul Route Works, over a total period of 6 weeks on the L2264-50 and 2 weeks on the L6188-0, otherwise roadworks for the UWF Grid Connection and UWF Related Works will be on separate public roads. No road works are required for Upperchurch Windfarm.

The construction works associated with the Whole UWF Project will also cause an increase in traffic volumes on roads due to the construction traffic delivering construction materials, four roads will be subject to construction material haulage traffic from more than one element – the L2264-50, L6188-0, L4138-12 and

Road Users

Sensitive Aspect

L4139-0. These roads are very lightly trafficked, with 98% of the estimated available capacity of all roads remaining available during the peak traffic construction periods. A number of roads will be subject to road closures, with acceptable alternative routes available for each road, and with local access to properties maintained during road works and road closures.

The R503 will be subject to one lane closures as a result of UWF Grid Connection works, over a period of 8 to 9 months.3 no. crews preforming trenching, joint bays and temporary road reinstatement.

Significance of the Cumulative Impact: ranging from Imperceptible to Slight:
Slight significance for Road Users on the roads associated with UWF Grid Connection works, and the L4138-12 and the L4139-0 roads subject to cumulative traffic, and **Imperceptible** for Road Users on other Public Roads.

Rationale for Cumulative Impact Evaluation:

- The lightly trafficked nature and extent of available capacity on all roads
- Temporary duration of UWF Grid Connection road works and road closures, with reversibility of impacts with the completion of construction;
- Brief to temporary (up to 3 days) duration of UWF Related Works road works, with most trenching completed within one day at road crossing locations, and trenching along the length of a public road not lasting more than 3 days at any location,
- For the most part, the separation of UWF Grid Connection works from Upperchurch Windfarm/UWF Related Works construction sites; Application of traffic management measures and use of flagmen

All Elements of the Whole UWF Project with Other Projects or Activities

Cumulative Impact Magnitude: Cumulative impacts with Other Projects only relates to UWF Grid Connection, as described above (UWF Grid Connection – cumulative impacts), and copied hereunder:

110kV UGC and Potential Castlewaller Windfarm grid connection :
The potential for cumulative impacts with the *potential* Castlewaller grid connection trenching works along the L6009-0 at Castlewaller / Carrowkeale / Derryleigh townlands over a 1 month period. The cumulative impact magnitude is evaluated as Low for road users as cumulative construction impacts are not expected as works will either take place at separate times, or should works be carried out at the same time, then works for both projects are likely to be carried out by one crew, and although a longer construction periods is possible on the local road L6009-0, this will not cause significant effects to journey times, as the works are still temporary and of short duration, with alternative routes available. Local access to properties will maintained during road works and road closures.

Significance of the Cumulative Impact: Imperceptible

Rationale for Cumulative Impact Evaluation:

- The Low Sensitivity and Low Magnitude;
- The lightly trafficked nature and extent of available capacity on the L6009-0, R503, L2264-50 and L6188-0;
- The temporary duration and the reversibility of the impact with the completion of construction works;
- The application of traffic management measures and use of flagmen
- Local access to properties maintained.

Material Assets (Roads)

Topic

15.3.4.2 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 15-22 below.

Table 15-22: Description and Rationale for Excluded Impacts to Road Users

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				
Traffic Management Road Works, Construction Traffic	1, 2, 4	Road	Increased Risk of Road Accidents	Rationale for Excluding: No likely effect due to the lightly trafficked nature of the roads, the brief to temporary duration of any road works, and the inclusion of road user protection measures in the project design (See Section 15.3.3); the application of advanced signage and traffic management measures, which have been designed in accordance with the Traffic Signs Manual, on the approach to any works or site access points; the provision of sightlines at permanent site entrances; and the application of speed restrictions on vehicles delivering construction materials along the local road network, these measures will ensure the continued safe passage of all road users.
Traffic Management Road Works	1, 2	Road	Interrupted or disrupted access to property	Rationale for Excluding: Neutral impact to road users: Roadworks for the 110kV UGC will take place along 29.2km of public road network, however best practice measures will be put in place to ensure that there is no loss of access to properties along the 110kV UGC route. A small number of roads will be closed for a short duration, however access will be provided at all times to 3rd party properties. In relation to UWF Related Works, road works will be carried out at 18 No. locations, there will be no road closures and access will be provided at all times to 3rd party properties. There are no road works associated with Element 4 Upperchurch Windfarm.
Operational Stage				
Rationale for Excluding: Neutral Impacts or No Impacts: With regard to the UWF Grid Connection: The Mountphilips Substation, will be remotely monitored and secured, and will be inspected on a monthly basis. Each of the cable joint bays along the 110kV UGC and the ground above the 110kV UGC will be inspected annually. In total, it is expected that access to the joint bays/substation will occur over a total c.13 days per year, most likely using vans, will be associated with the routine operation of the UWF Grid Connection. Any infrequent maintenance or repairs (if at all) are expected to be limited to Joint Bay locations and may require roadworks for very short periods of time (1 - 2 weeks). Impacts are expected to be Neutral given the very temporary duration and the implementation of traffic management measures during roadworks (if any). With regard to the UWF Related Works: The Telecoms Relay Pole and the ground above the Internal Windfarm Cables will have one inspection per year, the Realigned Windfarm Roads will be visually inspected on a monthly basis during windfarm site inspections. Each inspection will ordinarily be by way of a normal car or small works van. However, it may require the use of larger machinery and plant for brief durations (c.1 day) to maintain the Realigned Windfarm Roads periodically during the operational stage. At Haul Route Works locations, the roads boundaries may need to be adjusted temporarily at some stage in the future in order to accommodate				

Road Users

Sensitive Aspect

Source(s) of Impacts	Project Element	Pathway	Impacts (Consequences)	Rationale for Excluding (Scoping Out)

the transport of turbine components to and from the windfarm. It is considered that this will occur very infrequently during the operational stage. It is intended that the hard-core surface, which was installed during the construction works, will be left in-situ under the reinstated verges and boundaries and can be uncovered in the event of requiring its reuse. The resulting duration of any works at Haul Route Works locations will be brief, reversible with reinstatement and are typical of commonly occurring road works on Irish roads, therefore any impacts to Road Users, such as increased journey times, will be Neutral.

With regard to the Upperchurch Windfarm: 1-2 small vehicle movements (van or four-wheel drive) per day associated with the maintenance of the windfarm, and few if any larger vehicle movements. The only larger vehicles would be those associated with the windfarm are the replacement of turbine parts, which may be required infrequently during the operational stage. In any case the use of larger vehicles will involve very small numbers of larger vehicle movements, all of which will comply with axle loadings, and vehicle movements associated with large turbine components will take place outside of peak hours. Due to the very low traffic volumes associated with Upperchurch Windfarm, which are less than those associated with a residential dwelling and the absence of roadworks, the effects to Road Users will be Neutral.

Decommissioning Stage

Rationale for Excluding: Neutral Impacts/No Impacts.
The UWF Grid Connection will not be decommissioned, therefore there is no potential for effects.

The traffic volumes associated with those parts of the UWF Related Works which will be decommissioned (Telecoms Relay Pole, cables from the Internal Windfarm Cables) will result in minimal traffic condition changes which will not be noticeable on the local roads, and neutral effects to Road Users is expected. In relation to the Haul Route Works: It is not known at this time whether the turbine components will be broken up and transported off-site in smaller parts for recycling, or if some or all of the turbine components will be transported offsite for reuse. Should turbine components be transported offsite, then the road verges/boundaries at Haul Route Works locations will be widened once more, similar to infrequent widening during the operational stage, to facilitate the transport of turbine components (if needed). The duration of any works at Haul Route Works locations will be brief, reversible with reinstatement and are typical of commonly occurring road works on Irish roads, therefore any impacts to Road Users, such as increased journey times, will be Neutral.

In relation to the Upperchurch Windfarm, the traffic volumes associated with the decommissioning of the turbines will be low, and for the most part will consist of HGVs and vans transporting turbine parts off-site. Turbine component transportation off-site, if any, will be carried out during off-peak hours (typically during the early hours of the morning) when there are few, if any motorists on local and regional roads, it is considered that effects to Road Users, if any, will be neutral.

Material Assets (Roads)

Topic

15.3.5 Mitigation Measures for Impacts to Road Users

Mitigation measures were incorporated into the UWF Grid Connection project design, including the Project Design Measures, and it is this design that has been evaluated in this topic chapter. No additional mitigation measures are required as the topic authors conclude that **significant impacts are not likely to occur** to occur to Road Users.

15.3.6 Evaluation of Residual Impacts to Road Users

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 Road Users above (Section 15.3.4) – i.e. **no significant adverse impacts**.

15.3.7 Traffic Management Plan

A Traffic Management Plan forms part of the UWF Grid Connection Environmental Management Plan, which is included as Volume D.

The Traffic Management Plan (TMP) for the public roads will be a key construction contract document, the implementation of which will reduce possible impacts which may occur due to the presence of construction traffic and works on the public roads, in particular the Local Roads in the vicinity. It is a particular objective of this plan to control and minimise the traffic impacts of construction insofar as it may affect the local environment, local residents and the travelling public on the public roads close to and adjacent to the construction site, through measures to maximise the safety while keeping traffic flowing as freely as possible. The TMP will be updated from time to time to include any relevant planning conditions in addition to any new information on 3rd party road works or events, which would impact on the construction traffic route and timing. The appointed Contractor will be responsible for carrying out and managing the construction activities in accordance with the TMP.

Best Practice through the implementation of a Traffic Management Plan, will be employed to afford further protection to the Environment.

Road Users

Sensitive Aspect

15.3.8 Summary of Impacts to Road Users

A summary of the Impact to Road Users is presented in Table 15-23.

Table 15-23: Summary of the impacts to Road Users

Impact to Road Users:	**Increased Journey Times**
Evaluation Impact Table	*Section 15.3.4.1*
Project Life-Cycle Stage	Construction
UWF Grid Connection Direct/indirect impact	**Slight**
UWF Grid Connection Cumulative impact	**Imperceptible**
Element 2: UWF Related Works	Imperceptible
Element 3: UWF Replacement Forestry	No Potential for Impact - Evaluated as Excluded, see Section 15.3.2.2.1
Element 4: Upperchurch Windfarm	Imperceptible to Slight
Element 5: UWF Other Activities	No Potential for Impact - Evaluated as Excluded, see Section 15.3.2.2.1
Cumulative Impact:	
All Elements of the Whole UWF Project	**Ranges from Imperceptible to Slight**
Other Projects & Activities: Castlewaller Windfarm (potential grid connection on the L6009-0)	**Imperceptible**

Material Assets (Roads)

Topic

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.

15.4 Reference List

Bus Eireann, Limerick – Newport – Cappamore – Dundrum 332. https://www.buseireann.ie/timetables/332-1516878888.pdf.

Central Statistics Office

https://www.cso.ie/en/media/csoie/census/census2016/powscar/Place_of_Work,_School_or_College_-_Census_of_Anonymised_Records_(POWSCAR)_User_Guide_2016_v4.pdf

Department of Transport, Tourism and Sport. Regional and Local Roads. https://www.gov.ie/en/policy-information/0eb589-road-safety/?referrer=/roads/english/road-safety/

North Tipperary Leader Partnership, Rural Transport Programme. http://www.ntdc.ie/programmes/rural-development-programme-leader-2014-2020/

Road Safety Authority, Online Map of Collisons in Ireland. https://www.rsa.ie/en/RSA/Road-Safety/RSA-Statistics/

EPA Maps, Corine 2018, https://gis.epa.ie/EPAMaps/

Reference

Topic Material Assets (Roads)