

REFERENCE DOCUMENTS for PROPOSED LARGER TURBINES AND MET MASTS AT UPPERCHURCH WINDFARM for EIAR 2021 and AA 2021

REFERENCE DOCUMENT 32 of 36

This document contains the following:

UWF Replacement Forestry

- **2018 Natura Impact Statement for Whole UWF Project Elements 1 to 5 – Volume D2 (Volume 2 of 6)**
 - Appendix A4: Project Information: Description of UWF Grid Connection
 - Appendix A5: Project Information: Description of UWF Related Works
 - Appendix A6: Project Information: Description of UWF Replacement Forestry
 - Appendix A7: Project Information: Compiled Description of the consented Upperchurch Windfarm
 - Appendix A8: Description of UWF Other Activities

VOLUME D: APPROPRIATE ASSESSMENT REPORTING

Whole Upperchurch Windfarm Project

Natura Impact Statement for Whole UWF Project Elements 1 to 5

May 2018

Volume D2 (Volume 2 of 6)

Appendix A4: Project Information: Description of UWF Grid Connection

Appendix A5: Project Information: Description of UWF Related Works

Appendix A6: Project Information: Description of UWF Replacement Forestry

Appendix A7: Project Information: Compiled Description of the consented Upperchurch Windfarm

Appendix A8: Description of UWF Other Activities



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Whole Upperchurch Windfarm Project

Natura Impact Statement for Whole UWF Project Elements 1 to 5

March 2018

Appendix A4: Project Information **Description of UWF Grid Connection**



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UWF Grid Connection

Volume C2: EIAR Main Report

Chapter 5

Description of Development (UWF Grid Connection)



Contents

5	Description of Development - UWF Grid Connection	1
5.1	Introduction to Chapter 5	1
5.2	Characteristics of the UWF Grid Connection	2
5.2.1	Purpose of UWF Grid Connection.....	2
5.2.2	Location and overview description of UWF Grid Connection	2
5.2.3	Characteristics of UWF Grid Connection	4
5.2.3.1	Mountphilips Substation.....	4
5.2.3.2	Mountphilips – Upperchurch 110kV UGC.....	5
5.2.3.3	UWF Grid Connection Access Roads.....	7
5.2.3.4	UWF Grid Connection Ancillary Works	9
5.2.4	Environmental Protection Measures designed into the UWF Grid Connection.....	17
5.2.4.1	Environmental Management Plan	21
5.3	Life Cycle Stages of the UWF Grid Connection	22
5.3.1	Construction Stage - UWF Grid Connection	22
5.3.1.1	Overview of the Construction Process	22
5.3.1.2	Duration & Timing.....	22
5.3.1.3	Construction Personnel	24
5.3.1.4	Construction Stage Activities	24
5.3.1.5	Use of Machinery and Equipment	25
5.3.1.6	Use of Hydrocarbons	26
5.3.1.7	Other Facilities - Fuel Storage & Tool Storage	26
5.3.1.8	Imported Construction Materials	26
5.3.1.9	Traffic Management	28
5.3.1.10	Environmental Management Plan	28
5.3.2	Operational Stage - UWF Grid Connection	29
5.3.2.1	Overview of the Operational Stage	29
5.3.2.2	Duration and Timing of Operational Stage	29
5.3.2.3	Operational Personnel	29
5.3.2.4	Operational Activities	30
5.3.2.5	Use of Machinery and Equipment	31
5.3.2.6	Use of Hydrocarbons	31
5.3.2.7	Welfare Facilities	32
5.3.2.8	Other Facilities - Fuel Storage & Tool Storage	32
5.3.3	Changes to UWF Grid Connection	33
5.4	Use of Natural Resources, Emissions & Wastes.....	34

5.4.1	Use of Natural Resources.....	34
5.4.1.1	Use of Resources: Land.....	34
5.4.1.2	Use of Resources: Biodiversity.....	35
5.4.1.3	Use of Resources: Water	37
5.4.1.4	Use of Resources: Soils	38
5.4.2	Emissions	39
5.4.2.1	Dust.....	39
5.4.2.2	Vehicle Exhausts	39
5.4.2.3	Noise	39
5.4.2.4	Vibration	39
5.4.2.5	Light	39
5.4.2.6	Electromagnetic Radiation.....	39
5.4.3	Waste	40
5.4.3.1	Waste Water	40
5.4.3.2	General Waste	40
5.4.3.3	Chemical waste	40
5.4.3.4	Arisings.....	40
5.4.3.5	Waste Management Plan	40
5.5	Vulnerability of the Project to Major Accidents and Natural Disasters.....	41
5.5.1	Vulnerability to Major Accidents	41
5.5.2	Vulnerability to Natural Disasters.....	41
5.5.2.1	Land-slippage	41
5.5.2.2	Flooding	42
5.5.2.3	Consequences of Natural Disasters Occurring	42
5.5.2.4	Overall Risk	42
5.5.2.5	Mitigation Measures.....	43
5.6	Cumulative Descriptions	44
5.6.1	Description of the Other Elements of the Whole UWF Project.....	44
5.6.1.1	Element 2: UWF Related Works	45
5.6.1.2	Element 3: UWF Replacement Forestry.....	47
5.6.1.3	Element 4: Upperchurch Windfarm.....	49
5.6.1.4	Element 5: UWF Other Activities	51
5.6.1.5	Cumulative Locational Context of all the Elements.....	53
5.6.2	Secondary Projects	54
5.6.3	Description of Other Projects and Activities.....	55
5.6.3.1	Existing Killonan to Nenagh 110kV Overhead Line	56

5.6.3.2	Existing Shannonbridge – Killonan 220kV Overhead Line	56
5.6.3.3	Consented Bunkimalta Windfarm	56
5.6.3.4	Consented Castlewaller Windfarm	56
5.6.3.5	Existing Milestone Windfarm.....	57
5.6.3.6	Operational Windfarms in the Republic of Ireland.....	57
5.6.3.7	Existing Communication Structures.....	57
5.6.3.8	Consented Project – Newport Distributor Road, Newport.....	57
5.6.3.9	Consented Project – Industrial Warehouse Units at Thurles	57
5.6.3.10	Consented Project - Thurles Regional Water Treatment Works	58
5.6.3.11	Consented Gortnahalla Turbine.....	58
5.6.3.12	Killuragh Digester Plant.....	58
5.6.3.13	Housing Development in Doon and Annacotty	58
5.6.3.14	Agricultural Developments	58
5.6.3.15	Activities – Forestry, Agriculture.....	58
5.6.3.16	Activity – Turf-Cutting.....	58

LIST OF FIGURES – Contained in Volume C3: EIAR Figures

Figure No.	Figure Title
GC 5.1	Location of the UWF Grid Connection on OSI Discovery Mapping
GC 5.2	Layout of the UWF Grid Connection on Aerial Photography Mapping (Overview & Maps 1 to 15)
GC 5.3	UWF Grid Connection Construction Works Area Boundary (Overview & Maps 1 to 15)
GC 5.4	Plan of the Mountphilips Substation Compound
GC 5.5	Elevation of the Mountphilips Substation Compound
GC 5.6	Plan and Elevation of the Control Building at Mountphilips Substation
GC 5.7	Plan and Elevation of the End Masts at Mountphilips Substation
GC 5.8	Cross Section Views of Mountphilips - Upperchurch 110kV Underground Cables Trench
GC 5.9	Views of 110kV UGC Joint Bays
GC 5.10	Cross Sections of 110kV UGC in Public Road Pavements or Verges
GC 5.11	Cross Sections of 110kV UGC in Existing Farm Roads (Upgraded)
GC 5.12	Cross Sections of 110kV UGC in Existing Forestry Roads (Upgraded)
GC 5.13	Cross Sections of 110kV UGC in Existing Forestry Road through Bleanbeg Bog NHA
GC 5.14	Cross Sections of New Permanent Access Roads outside Slievefelim to Silvermines SPA
GC 5.15	Cross Sections of New Permanent <u>Concealed</u> Access Roads inside Slievefelim to Silvermines SPA
GC 5.16	Cross Sections of New Permanent <u>Concealed Floating</u> Access Road through Castlewaller (inside the SPA)
GC 5.16.1	Plan and cross section views of the New Permanent Concealed Floating Access Road and existing drains through Castlewaller (Section Number S39)
GC 5.17	Cross Sections of Temporary Access Road Types (3 types)
GC 5.18	Plan View of Temporary Compound C1 (Mountphilips)
GC 5.19	Plan Views of Temporary Compounds C2 (Bealaclave) & C3 (Knockcurraghbola Commons)
GC 5.20	Plan View of Permanent Site Entrance E1 at Coole (Mountphilips Substation & Temporary Compound C1)
GC 5.21	Plan View of Permanent Site Entrance E15 at Bealaclave (Temporary Compound C2)
GC 5.22	Plan View of Permanent Site Entrance E34 at Knockcurraghbola Commons (Consented Substation and Temporary Compound C3)
GC 5.23	Plan View of Typical Temporary Site Entrance
GC 5.24	Watercourse Crossing Type A1 & A2 – Existing Crossing Structure
GC 5.25	Watercourse Crossing Type B1 – Replaced Crossing Structure
GC 5.26	Watercourse Crossing Type C1 – New Permanent Structure
GC 5.27	Watercourse Crossing Type C2 - New Temporary Structure & Watercourse Crossing Type C4 - New Permanent Structure
GC 5.28	Watercourse Crossing Type C3 – 110kV UGC Trenching and Ducting only

Figure No.	Figure Title
GC 5.29	Watercourse Crossing Type D – Directional Drilling at the Newport (Mulkear) River (W10)
GC 5.30	Watercourse Crossing Type D - Directional Drilling at the Clare River (W36)
GC 5.31	Watercourse Crossing Type D - Directional Drilling at the Bilboa River (W57)
GC 5.32	Watercourse Crossing Type E – Temporary Portable Bailey Bridge
GC 5.33	Cross Sections of Hedgerow Removal and Reinstatement
GC 5.34	Cross Sections of Bat Crossing Structure
GC 5.35	Haul Routes for Aggregate and Concrete Deliveries (Overview Map & Map 1)
GC 5.36	Haul Route for Other Construction Materials & Equipment
GC 5.37	Advance Warning Signage for Road Works & Site Entrances
GC 5.38	Operational Stage Access to Mountphilips Substation and 110kV UGC (Overview & Maps 1 to 5)
GC 5.39	Operational Stage Land Use Change (Overview & Maps 1 to 5)

Note: The numbering system for Figures follows the sequence ‘Chapter Number- Figure Number’.

LIST OF APPENDICES – Contained in Volume C4: EIAR Appendices

Appendix No.	Appendix Title
Appendix 5-1	Outline Construction Methodologies for UWF Grid Connection
Appendix 5-2	Classification and Crossing Method for UWF Grid Connection Watercourses
Appendix 5-3	Description of Development (UWF Related Works)
Appendix 5-4	Description of Development (UWF Replacement Forestry)
Appendix 5-5	Complied Description of Upperchurch Windfarm
Appendix 5-6	Description of the UWF Other Activities
Appendix 5-7	A Guide to Risk Assessment in Major Emergency Management Jan 2010
Appendix 5-8	Vegetation Reinstatement Methodology along Concealed Access Roads

Note: The numbering system for Appendices follows the sequence ‘Chapter Number-Appendix Number’.

LIST OF COLOUR PLATES – Contained in this Chapter 5

Plate No.	Plate Title
Plate 5-1	Example of similar 110kV substation with End Masts connecting to overhead 110kV line
Plate 5-2	Examples of underground cable trenches
Plate 5-3	Example of trenching along a public road

Glossary of Terms

<u>Term</u>	<u>Definition</u>
EIA Directive	European Union Directive 2011/92/EU (as amended by Directive 2014/52/EU)
Environmental Factors	The factors in the environment required to be identified, described and assessed during the EIA process. These are specified in Article 3 (1) of the EIA Directive as Population and Human Health; Biodiversity; Land; Soils; Water; Air; Climate; Material Assets; Cultural Heritage and Landscape.
Competent Authority	The body legally delegated to decide on the Planning Application
Competent Expert	Experts who are qualified and competent in their field of expertise
Consented Windfarm	Upperchurch Windfarm – 22 wind turbines, substation, windfarm roads and ancillary works, consented in August 2014 under Planning Reference: Tipperary County Council 13/51/0003, ABP PL 22.243040
Element	One of the 5 No. elements listed in the row above
Project Design Environmental Protection Measures	Measures for environmental protection, incorporated into the design of the project.
Sensitive Aspect	Any sensitive receptor in the local environment which could be impacted by the project.
Whole UWF Project	Project made up of 5 No. elements – UWF Grid Connection; UWF Related Works, UWF Replacement Forestry, Upperchurch Windfarm (UWF) and UWF Other Activities.

List of Abbreviations

<u>Abbreviation</u>	<u>Full Term</u>
ABP	An Bord Pleanála
EDL	Ecopower Developments Limited
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
PD	Ecopower <u>Project Design</u> Environmental Protection Measure developed by members of the EIAR Team
RFI	Response to Further Information
SAC	Special Area of Conservation
SPA	Special Protection Area (for wild birds)
OCM	Outline Construction Methodologies
OHL	Overhead Line
UWF	Upperchurch Windfarm
UGC	Underground Cables

5 Description of Development - UWF Grid Connection

5.1 Introduction to Chapter 5

UWF Grid Connection is described in this chapter, in the following order:

Section 5.2	<ul style="list-style-type: none"> • A Description of the Location and Characteristics of the subject development (UWF Grid Connection) • The Project Design Environmental Protection Measures incorporated into the design to avoid, prevent or reduce likely significant adverse effects on the environment.
<p><u>The Development as described in Section 5.2</u></p> <p>At the conception of the UWF Grid Connection, the design team evaluated the potential or likely significant effects of the subject development, on the receiving environment. Any potential or likely significant effects were avoided <u>by integrating mitigation measures into the fundamental design of the UWF Grid Connection</u>. Various measures, particularly options for mitigation by avoidance and mitigation by prevention, were considered; these included alternative locations, alternative designs and alternative processes. Once the chosen location, design and process was decided the proposal was examined for opportunities to incorporate further mitigation measures (generally mitigation by reduction) in the final iteration of the development to be evaluated in the EIA Report. <u>The development, as described in Section 5.2, is the final iteration of the UWF Grid Connection</u>. It is this final iteration that is examined in Chapters 6 to 17, for effects on the prescribed environmental factors, by the topic competent experts.</p>	
Section 5.3	The durations and timing, main activities, personnel and material requirements for both the construction and operation stages. Any changes to the UWF Grid Connection, such as decommissioning.
Section 5.4	The use of natural resources, emissions and production of wastes for each stage.
Section 5.5	The vulnerability of the UWF Grid Connection to major accidents and natural disasters.
Section 5.6	<p>Cumulative Descriptions:</p> <p>For the purposes of cumulative assessment of the whole Upperchurch windfarm (UWF) project, a description of the other elements of the Whole UWF Project namely; UWF Related Works; UWF Forestry Replanting; the already consented Upperchurch Windfarm (UWF) and UWF Other Activities, is provided.</p> <p>For the purposes of a cumulative assessment with Other Existing or Consented Projects or Activities, a description of Other Existing or Consented Projects or Activities that were scoped in by the EIAR Team is also provided.</p>

5.2 Characteristics of the UWF Grid Connection

The UWF Grid Connection proposal comprises of the following parts:

- Mountphilips Substation
- Mountphilips – Upperchurch 110kV Underground Cable (110kV UGC)
- UWF Grid Connection Access Roads and
- UWF Grid Connection Ancillary Works.

5.2.1 Purpose of UWF Grid Connection

The purpose of UWF Grid Connection is to connect the Consented UWF Substation at Upperchurch Windfarm (UWF) to the substation at Mountphilips. Mountphilips substation will be connected to the existing, adjacent Killonan - Nenagh 110kV overhead line and thereby export electricity, from Upperchurch Windfarm when constructed and operational, to the national grid.

5.2.2 Location and overview description of UWF Grid Connection

Mountphilips Substation: The new substation is proposed for a location adjacent to the existing Killonan - Nenagh 110kV overhead line in agricultural grassland in Mountphilips townland, 2km north of Newport, 4km south of Birdhill, 17km north east of Limerick City and 23km west of the Upperchurch Windfarm. The new 110kV electrical substation will comprise 2 No. End Masts located at the Killonan – Nenagh 110kV overhead line; a compound, 230 meters east of the overhead line, measuring circa. 95 meters x 94 meters which will contain a control building; 110kV busbars; circuit breakers; line disconnects; current and voltage measuring equipment; cable chairs; surge arresters; lightening protection monopoles and other electrical apparatus. The 2 No. End Masts will be connected to the electrical equipment in the compound via underground cable.

Mountphilips - Upperchurch 110kV UGC: The 110kV UGC will connect the Mountphilips Substation to the Upperchurch Windfarm through the Consented UWF Substation, through the installation of underground cables. The route of the underground cables, which is 27.5km in length, will follow a generally west/east course through a mix of agricultural grassland (11.9km), commercial forestry plantations (1.9km), private forestry and farm roads (c.12km) and public roads (c.1.7km) through the townlands of Mountphilips, Coole, Freagh, Oakhampton, Newross, Castlewaller, Killeen, Knockacullin, Bealaclave, Baurnadomeeny, Goulmore, Laghile, Churchquarter, Knocknabansha, Knockmaroe, Knockcurraghbola Crownlands and Knockcurraghbola Commons. The 110kV UGC will be installed underground in trenches, which will be laid with ducts through which the electrical cables and communications cables will be pulled. The cable lengths will be pulled through and joined together at Joint Bay locations, in joint bay chambers. The ducts will be surrounded by concrete and the trench backfilled with excavated material or aggregate depending on the location. The only surface expression of the 110kV UGC will be the man-hole type covers over the Joint Bays and the over-ground identification marker posts and marker plates.

UWF Grid Connection Access Roads: To provide access to Mountphilips Substation and the Joint Bay locations along the 110kV UGC, New Permanent Access Roads will be constructed. Permanent access will also include upgraded existing farm and forestry roads.

UWF Grid Connection Ancillary Works will support the construction of UWF Grid Connection and will include the construction of Temporary Access Roads along the 110kV UGC construction works areas;

Permanent Site Entrances (including the provision of sightlines) at Mountphilips, Bealaclave and Knockcurraghbola Commons; Temporary Site Entrances at public road crossings along the 110kV UGC; installation of temporary and permanent watercourse crossing structures; construction and use of 3 No. Temporary Compounds, installation of drainage systems at Mountphilips Substation, around Temporary Compounds and along new UWF Grid Connection Access Roads; forestry felling; temporary and permanent hedgerow/tree removal; permanent hedgerow replanting; fencing; relocation of existing overhead electricity and telephone services and; storage of excavated materials at various locations within the construction works area boundary.

Relevant Volume C3 EIAR Figures:

Figure GC 5.1: Location of the UWF Grid Connection on OSI Discovery Mapping

Figure GC 5.2: Layout of the UWF Grid Connection on Aerial Photography Mapping (Overview & Maps 1 to 15)

Figure GC 5.3: UWF Grid Connection Construction Works Area Boundary (Overview & Maps 1 to 15)

Construction Works Area Boundary: All construction works e.g. machinery movement; excavations; excavated materials storage, will take place within the construction works area boundary as delineated on **Figure GC 5.3**. This construction works area is approximately 12m in width, except when traversing Bleanbeg Bog NHA or the River Shannon SAC when the area is reduced to encompass the forestry or farm track (as applicable) only.

UWF Grid Connection is abbreviated throughout this chapter as GC. All the Figures Numbers are prefaced by GC per e.g. Figure GC 5.1

5.2.3 Characteristics of UWF Grid Connection

5.2.3.1 Mountphilips Substation

The Mountphilips Substation will be constructed close to the existing Killonan - Nenagh 110kV overhead line. The design is based on similar high voltage looped-in 110kV substations, and will comprise:

- Substation Compound measuring c.8930m² in area, and will contain a control building; 110kV busbars; circuit breakers; line disconnects; current and voltage measuring equipment; cable chairs; surge arresters; lightning protection monopoles (c.18m in height) and other electrical apparatus, underground cabling and access roads. Secure perimeter fencing comprising 2.7m high palisade security fencing, which will surround the Substation Compound and will include 4.8m wide entrance gates. A permanent surface water drainage network will be installed around the compound. The Mountphilips to Upperchurch 110kV UGC will connect to the electrical equipment in the compound from the north side of the compound.
- Control Building, measuring c.205m² in area, located inside the Substation Compound, and will contain circuit breakers, electrical metering equipment and other electrical equipment, communications and control equipment, and welfare facilities comprising a self-contained toilet and an integrated rainwater harvesting system.
- 2 No. End Masts and associated underground 110kV cables will be used to facilitate the connection of the Mountphilips Substation onto the existing Killonan – Nenagh 110kV overhead line (OHL). These End Masts will be constructed beneath the existing Killonan – Nenagh 110kV OHL and are identified as End Mast No.1 and End Mast No.2. The End Masts will be lattice towers and will each be c.16m in height. 110kV cables will connect to the Killonan side of the overhead line at End Mast No.1, be affixed to the mast and then through underground ducting to the Mountphilips compound, through the electrical equipment and control building and then back onto the overhead line via a second set of underground ducting to End Mast No.2, routed up and affixed to End Mast No.2 and onto the Nenagh side of the overhead line. The cables from End Mast No. 1 and End Mast No.2 will connect to the electrical equipment in the compound from the south side of the compound.



Plate 5-1: Example of similar 110kV substation with End Masts connecting to overhead 110kV line

Relevant Volume C3 EIAR Figures:

Figure GC 5.2: Layout of the UWF Grid Connection on Aerial Photography Mapping (Map 1)

Figure GC 5.4: Plan of the Mountphilips Substation Compound

Figure GC 5.5: Elevation of the Mountphilips Substation Compound

Figure GC 5.6: Plan and Elevation of the Control Building at Mountphilips Substation

Figure GC 5.7: Plan and Elevation of the End Masts at Mountphilips Substation

Relevant Appendix 5.1 Outline Construction Methodologies for UWF Grid Connection:

[GC-OCM-03: Mountphilips Substation Compound](#)

[GC-OCM-04: New End Masts at Mountphilips Compound](#)

5.2.3.2 Mountphilips – Upperchurch 110kV UGC

Underground 110kV cabling works, referred to herein as the ‘Mountphilips to Upperchurch 110kV UGC’ or the ‘110kV UGC’, will connect the Mountphilips Substation to the Consented UWF Substation. The design of the Mountphilips – Upperchurch 110kV UGC complies with ESB Networks specifications and technical and operational requirements.

The 110kV UGC will comprise:

- Up to 27.5km each of 3 No. underground 110kV electrical cables and 2 No. underground communication cables; and copper cable (where required), each to be contained within ducting and laid in a trench (**Cable Trench**), 1.25m deep and 0.6m wide, along with semi-dry lean-mix concrete, red cable protection strip, yellow warning tape, protective plates (if required) and backfill material, as illustrated on [Figure GC 5.8](#)
- 38 No. Joint Bays, comprising joint bay chambers, communication chambers and link box chambers, to be located underground. All Joint Bays will be located at least 25m from a Class 1 or Class 2 watercourse. A typical joint bay is illustrated on [GC Figure 5.9](#).
- Marker posts and marker plates as necessary,
- The connecting of the underground cables to the Mountphilips Substation, at one end, and the Consented UWF Substation at the other end of the 110kV UGC.



Plate 5-2: Examples of underground cable trenches

5.2.3.2.1 Road Works for UWF Grid Connection

Road works will be required along the 110kV UGC where the route crosses or is aligned along the public road network. There will be no joint bays along the public road corridor, and road works will be limited to the Cables Trench. In total there are 13 No. locations (labelled R1 to R13) where trenching will occur within the road corridor, as described in Table 5-1.

Table 5-1: Road Works associated with UWF Grid Connection

No.	Road No.	Location	Extent of trenching	Duration of Road Works	Traffic Management
R1	L2166-0	Coole / Freagh	7.5m	1 day	Road Crossing
R2	L2156-11	Oakhampton	170m	3 days	One lane closure
R3	L2157-5	Newross	5m	1 day	Road Crossing
R4	L6011-10	Castlewaller	4.5m	1 day	Road Crossing
R5	L95032-8	Killeen	65m	1 day	Road Crossing (end of cul-de-sac)
R6	L21141-0	Knockacullin	3.2m	1 day	Road Crossing
R7	L2114-0	Beaclave	1270m	c.20 days	One lane closure
R8	L6085-0	Baurnadomeeny	130m	4 days	Road Closure
R9	L6086-5	Laghile	2.5m	1 day	Road Crossing
R10	L2266-0	Kilcommon	10m	1 day	Road Crossing
R11	L6182-0	Kilcommon	4.2m	1 day	Road Crossing
R12	R497	Knocknabansha / Knockmaroe	8.3m	1 day	Road Crossing
R13	L2264-50	Knockmaroe/ Knockcurraghbola Commons	7m	1 day	Road Crossing

Road Closure: It is expected that the L6085-0 in Baurnadomeeny will be closed for c.4 days to accommodate the trenching works. The closure will not be continuous throughout a given day, but will be timed by arrangement with the local residents (8 No.). In any case, works will take place during school holidays, and there is an alternative traffic route available during the closures.

One lane closures: The works on the public roads L2156-11 at Oakhampton and the L2114-0 at Beaclave, can be accommodated with one-lane closures. Traffic flow will be maintained using a stop/go system with flagmen.

Road Crossings: The remaining roadworks for the UWF Grid Connection relate to locations where the 110kV UGC crosses the road. Traffic flow will be maintained by placing a steel plate over the trench to allow traffic to pass over, while the works are on-going and flagmen will control a stop/go system.

All road closures will be subject to Road Closure application to Tipperary County Council. All road works will be subject to a Road Opening License application to Tipperary County Council and will be carried out in accordance with the Tii Guidelines on the Opening, Backfilling and Reinstatement of Openings in Public Roads.



Plate 5-3: Example of trenching along a public road

Relevant Volume C3 EIAR Figures:

Figure GC 5.2: Layout of the UWF Grid Connection on Aerial Photography Mapping (Overview & Maps 1 to 15)

Figure GC 5.8: Cross Sections of Mountphilips - Upperchurch 110kV Underground Cables Trench

Figure GC 5.9: Views of 110kV UGC Joint Bays

Figure GC 5.10: Cross Sections of 110kV UGC in Public Road Pavements or Verges

Relevant Appendix 5.1 Outline Construction Methodologies for UWF Grid Connection:

GC-OCM-05: 110kV Trenching and Ducting

GC-OCM-06: 110kV Joint Bays and Associated Chambers

GC-OCM-07: 110kV Cable Pulling

GC-OCM-08: 110kV Cable Jointing

5.2.3.3 UWF Grid Connection Access Roads

UWF Grid Connection Access Roads will consist of 8.1km of existing private roads, which will require upgrading, along with 4.4km of newly constructed permanent access roads.

5.2.3.3.1 Existing Access Roads

Existing private roads, comprising 5.6km of forestry roads and 2.5km of farm roads, occur at a number of locations between the Mountphilips Substation and the Consented UWF Substation. These existing private roads will be upgraded by overlaying crushed stone over the road. Where private roads will provide access to Joint Bays, the road will be widened to 3.5m. Any existing drains alongside widened roads will be realigned alongside the newly widened road edge. In general, the existing farm roads will be widened, whereas the existing forestry roads are already at least 3.5m wide.

5.2.3.3.2 New Permanent Access Roads

Permanent access roads are required by ESB Networks to gain access to Joint Bay locations.

In total 4.4km of new permanent access roads will be constructed, to provide access to the Mountphilips Substation and to the Joint Bays along the 110kV UGC. These new roads will be constructed of crushed stone over a layer of geotextile material and will incorporate permanent roadside drains including check dams and settlement ponds, where required, to slow down flow and settle suspended solids in water runoff.

Outside the SPA: 2.7km of these roads will be located outside of the boundary of the Natura 2000 site, the Slievefelim to Silvermines SPA, generally in agricultural fields. The new road will be bounded with new earthen berms which will be planted with a mix of grasses and native hedgerow species.

Inside the SPA: The remaining 1.7km of new permanent access roads will be located inside the boundary of the Slievefelim to Silvermines SPA. These new roads will generally comprise excavated stone roads, with a section of floating road across peat in Section 39 in Castlewaller and Killeen townlands. (*Note: Sections are identified on Figure GC 5.3*).

All the new roads (within the SPA) will be concealed beneath vegetation directly after construction - to be called Concealed Access Roads. This will be achieved by laying a rigid geocell paving material over the stone road, filled with peat/soil and planted with heather and grasses. The vegetation mix will reflect the land cover which existed prior to construction (in the case of grassland) and a heather and grass mix (in the case of forestry). The geocells will be planted to a density of 40 native Heather: Grass Nurse per m², at a ratio of 75:25, which will provide an excellent level of expected survival and cover.

Already matured heather and grass nurse plants will be used. The mature vegetation will be created off-site, by nursery production of heather and grasses (Native Irish or Scottish) and planting-out of the young plantlets into the rigid geocell and then allowing time for the plant roots to establish themselves, within the geocell. These planted rigid cell sections, can then be transported to the Concealed Access Road locations and used to cover the newly created roads directly after construction, creating an instant mature vegetation cover. At the roadside margins, where there will be no vehicular traffic, mature heather and grass plants can be planted directly into the ground, as a support structure will not be required for vehicles and plants. Vehicular traffic and access to the Concealed Access Roads will be restricted for 18 months, by fencing and locked gates

These 'vegetated roads' are referred to Concealed Access Roads or 'concealed roads' or 'concealed geocell roadways' in this EIA Report.

The vegetated surface of these Concealed Access Roads will be put in place according to the methodology by Dr. Mary O'Connor. Dr. O'Connor's methodology is included as **Appendix 5.8: Vegetation Reinstatement Methodology along Concealed Access Roads**.

Relevant Volume C3 EIAR Figures:

Figure GC 5.2: Layout of the UWF Grid Connection on Aerial Photography Mapping (Maps 1 to 15 – except Map 4)

Figure GC 5.11: Cross Sections of 110kV UGC in Existing Farm Roads (Upgraded)

Figure GC 5.12: Cross Sections of 110kV UGC in Existing Forestry Roads (Upgraded)

Figure GC 5.13: Cross Sections of 110kV UGC in the Existing Forestry Road through Bleanbeg Bog NHA

Figure GC 5.14: Cross Sections of New Permanent Access Roads outside Slievefelim to Silvermines SPA

Figure GC 5.15: Cross Sections of New Permanent Concealed Access Roads inside Slievefelim to Silvermines SPA

Figure GC 5.16: Cross Sections of New Permanent Concealed Floating Access Road through Castlewaller (inside the SPA)

Figure GC 5.16.1: Plan and cross section views of the New Permanent Concealed Floating Access Road and existing drains through Castlewaller (Section Number S39)

Relevant Appendix 5.1 Outline Construction Methodologies for UWF Grid Connection:

GC-OCM-09: Widening or Resurfacing Existing Private Roads

GC-OCM-10: New Permanent Access Roads

Appendix 5.8: Vegetation Reinstatement Methodology along Concealed Access Roads

5.2.3.4 UWF Grid Connection Ancillary Works**5.2.3.4.1 Temporary Access Roads**

During the construction stage, up to 9.3km of temporary access roads will be constructed within the Construction Works Area Boundary, to facilitate the movement of machinery and vehicles along the Cable Trench. Three methods will be employed to provide temporary access roads, where needed: 1. Excavate and Fill, 2. Floating road and 3. Matting. In general, the method of temporary road construction employed at any particular location will depend on the prevailing soil and weather conditions at the time of construction, and will be determined by the Contractor in conjunction with the Environmental Clerk of Works. These three methods for temporary access road construction are illustrated on [Figure GC 5.17](#).

Relevant Volume C3 EIAR Figures:

[Figure GC 5.17: Cross Sections of Temporary Access Road Types \(3 types\)](#)

Relevant Appendix 5.1 Outline Construction Methodologies for UWF Grid Connection:

[GC-OCM-11: Temporary Access Roads](#)

5.2.3.4.2 Temporary Compounds

3 No. temporary compounds will be set up during the construction stage to support the construction of the Grid Connection. These compounds will be provided at the Mountphilips Substation location (Temporary Compound C1), approximately halfway along the Mountphilips – Upperchurch 110kV UGC at Bealacave (Temporary Compound C2) and, adjacent to the Consented UWF Substation location (Temporary Compound C3).

Temporary Compound C1 will be approximately 1090m² in area and Temporary Compounds C2 and C3 will each be approximately 860m² in area. These compounds will accommodate parking, site offices, and canteen and welfare facilities along with designated storage areas for materials, wastes, oils and fuels.

Relevant Volume C3 EIAR Figures:

[Figure GC 5.2: Layout of the UWF Grid Connection on Aerial Photography Mapping \(Map 1, 8 & 15\)](#)

[Figure GC 5.18: Plan View of Temporary Compound C1 \(Mountphilips\)](#)

[Figure GC 5.19: Plan Views of Temporary Compounds C2 \(Bealacave\) & C3 \(Knockcurraghbola Commons\)](#)

Relevant Appendix 5.1 Outline Construction Methodologies for UWF Grid Connection:

[GC-OCM-13: Temporary Compounds](#)

5.2.3.4.3 Permanent Site Entrances

Three separate permanent site entrances will be provided through existing farm entrances. These entrances will provide access to the Mountphilips Substation and to the Temporary Compounds, as per

- A permanently widened entrance (Site Entrance E1) will be provided off the L2166-0, for the Mountphilips Substation and Temporary Compound C1, and
- As requested by Tipperary County Council Roads Department, a permanently widened entrance (Site Entrance E15), off the L2114-0, for Temporary Compound No.2 in Bealacave
- As requested by Tipperary County Council Roads Department, a permanently widened entrance (Site Entrance E34), off the L6188-0, for Temporary Compound No.3 in Knockcurraghbola Commons.

For the construction stage, the three existing farm entrances will be widened to 10m, with a visibility splay of 160m provided at Site Entrances E1 and E15 and 90m at Site Entrance E34. 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.

Following the completion of construction works, the operational stage sightlines, at all three entrances, will satisfy the sightline requirements as set out in Table 10.1 of the North Tipperary County Development Plan 2010 (as amended), being reduced at Site Entrance E1 and Site Entrance E15 to 90m sightlines, and reduced to 70m at Site Entrance E34.

Relevant Volume C3 EIAR Figures:

Figure GC 5.20: Plan View of Permanent Site Entrance E1 at Coole (Mountphilips Substation & Temporary Compound C1)

Figure GC 5.21: Plan View of Permanent Site Entrance E15 at Bealaclave (Temporary Compound C2)

Figure GC 5.22: Plan View of Permanent Site Entrance E34 at Knockcurraghbola Commons (Consented UWF Substation and Temporary Compound C3)

Relevant Appendix 5.1 Outline Construction Methodologies for UWF Grid Connection:

GC-OCM-12: Temporary and Permanent Site Entrances

5.2.3.4.4 Temporary Site Entrances

To facilitate the installation of the Cable Trench and the delivery of materials to construction works areas from the public road network, a total of 25 No. temporary site entrances will be required. 20 No. of these will be through existing farm or forestry entrances, and the remaining 5 No. will comprise a new entrances through the roadside boundary.

Existing agricultural field entrances will be widened to 5m. Similarly, the 5 No. new entrances will involve the removal of 5m of the roadside boundary to gain access to construction works areas on the adjacent agricultural lands. No works are required at forestry entrances.

Flag-men will be used to control traffic at temporary entrances.

Relevant Volume C3 EIAR Figures:

Figure GC 5.2: Layout of the UWF Grid Connection on Aerial Photography Mapping (Maps 1,2,3,6,7,8,9,11,12,13 & 14)

Figure GC 5.23: Plan View of Typical Temporary Site Entrances

Relevant Appendix 5.1 Outline Construction Methodologies for UWF Grid Connection:

GC-OCM-12: Temporary and Permanent Site Entrances

5.2.3.4.5 Watercourse Crossing

The construction of the UWF Grid Connection will involve crossing a total of 90 No. watercourses, which range in size from rivers to drains as outlined on Table 5-2.

Table 5-2: Watercourse Classifications at Crossing Points

Class	Watercourse Description	Number
1	EPA mapped blue line, major river or stream (fisheries value)	20
2	Headwater Stream Equivalent to EPA blue line but not mapped (fisheries value)	14
3	Sub-optimal, heavily vegetated with low or no flow during dry periods (low fisheries value)	10
4	Drain (no fisheries value)	46

The construction of the UWF Grid Connection will involve:

- Crossing of 49 No. existing structures (Watercourse Crossing Type A1 and A2)
- Replacement of 3 No. existing crossing structures, (Watercourse Crossing Type B1)
- Construction of 12 No. new permanent crossing structures, (Watercourse Crossing Type C1)
- Construction of 15 No. temporary crossing structures (Watercourse Crossing Type C2)
- Trenching and ducting for the 110kV UGC only (no traffic crossing) across 7 No. streams. (Watercourse Crossing Type C3)
- Construction of 1 No. new permanent crossing structures (no cable, traffic crossing only), (Watercourse Crossing Type C4)
- Installation of the 110kV UGC (no traffic crossing) using drilling techniques at 3 No. rivers - the Newport (Mulkear), Clare and Bilboa rivers (Watercourse Crossing Type D)
- Instream works at Class 1 and Class 2 watercourses, will only be carried out during the months of July, August and September. In order to progress construction works across watercourses outside of that period, portable bailey bridges will be used to facilitate the passage of traffic across the watercourse without the need for any instream works. (Watercourse Crossing Type E).

All permanent watercourse culverts will be sized to cope with a minimum 100-year flood event. All pipe culverts will be at least 900mm in diameter regardless of the anticipated flood flow. 900mm culverts will be embedded into the bed of the watercourse to a depth of 300mm, while 1200mm culverts will be embedded to a depth of 500mm.

New and replaced permanent crossing structures will be construction in accordance with the Office of Public Works (OPW) guidelines Construction, Replacement or Alteration of Bridges and Culverts (2013), and as agreed with OPW (telephone consultation, February 2018) will be subject to a Section 50 application to OPW following the grant of planning permission.

The treatment of each watercourse crossing along the UWF Grid Connection is specified in **Volume C4: EIAR Appendices: Appendix 5-2: Classification and Crossing Method for UWF Grid Connection Watercourses.**

Relevant Volume C3 EIAR Figures:

Figure GC 5.2: Layout of the UWF Grid Connection on Aerial Photography Mapping (Maps 1 to 15)

Figure GC 5.24: Watercourse Crossing Type A1 & A2 – Existing Crossing Structure

Figure GC 5.25: Watercourse Crossing Type B1 – Replaced Crossing Structure

Figure GC 5.26: Watercourse Crossing Type C1 – New Permanent Structure

Figure GC 5.27: Watercourse Crossing Type C2 - New Temporary Structure & Watercourse Crossing Type C4 - New Permanent Structure

Figure GC 5.28: Watercourse Crossing Type C3 – 110kV UGC Trenching and Ducting only

Figure GC 5.29: Watercourse Crossing Type D – Directional Drilling at the Newport (Mulkear) River (W10)

Figure GC 5.30: Watercourse Crossing Type D - Directional Drilling at the Clare River (W36)

Figure GC 5.31: Watercourse Crossing Type D - Directional Drilling at the Bilboa River (W57)

Figure GC 5.32: Watercourse Crossing Type E –Portable Temporary Bailey Bridge

Relevant Appendix 5.1 Outline Construction Methodologies for UWF Grid Connection:

GC-OCM-14: Horizontal Directional Drilling

GC-OCM-15: Instream Works Preparation and Reinstatement

GC-OCM-16: Instream Works

GC-OCM-17: Temporary Bailey Bridge

5.2.3.4.6 Drainage Systems

New Hardstanding/hard surface areas: An integrated drainage system will be installed around the Substation Compound, the hardstanding area at the End Mast locations, the Temporary Compounds and along new permanent roads. This integrated drainage system will keep 'clean' water upslope of the works separate from 'dirty' water runoff from construction works areas, while maintaining the existing drainage regime through the regular piping and release of clean water from the upslope side the works area to the downslope side. The integrated drainage system will include the installation of check dams, settlement ponds, clean water cross drains and outfall weirs. These parts of the drainage system will effectively avoid any contribution to flooding risk, minimise erosion, maintain drainage regimes, and minimise the amount of sediment entering downslope watercourses, through the attenuation (slow-down) of water flow rates and the settlement of suspended solids (sediment).

Temporary roads will be constructed upslope of the cables trench so that any surface water runoff will flow into the trench. Where dewatering of trenches or excavations is required, there will be no direct discharge of treated water into any watercourse or drain. Rather, all pumped water will be treated prior to discharge using an infiltration trench, settlement pond or suitable water treatment train such as a Siltbuster, or controlled release across existing vegetation, as appropriate.

Existing roadside drainage which occurs close to road works associated with the Cables Trench, or at Permanent Entrances or Temporary Entrances, will be piped to maintain flow. A concealed drain will be installed at all permanent entrances to prevent water runoff from construction areas, flowing onto the public road. These drains will be directed into an infiltration trench.

The drainage system will be left in place for the operations phase. Settlement ponds will be removed following construction. The drainage system at temporary works locations will be removed.

Relevant Volume C3 EIAR Figures: The drainage system is identified on:

Figure GC 5.2: Layout of the UWF Grid Connection on Aerial Photography Mapping (Maps 1, 8 & 15)

Figure GC 5.4: Plan of the Mountphilips Substation Compound

Figure GC 5.7: Plan and Elevation of the End Masts at Mountphilips Substation

Figure GC 5.11: Cross Sections of 110kV UGC in Existing Farm Roads (Upgraded)

Figure GC 5.12: Cross Sections of 110kV UGC in Existing Forestry Roads (Upgraded)

Figure GC 5.13: Cross Sections of 110kV UGC in the Existing Forestry Road through Bleanbeg Bog NHA

Figure GC 5.14: Cross Sections of New Permanent Access Roads outside Slievefelim to Silvermines SPA

Figure GC 5.15: Cross Sections of New Permanent Concealed Access Roads inside Slievefelim to Silvermines SPA

Figure GC 5.16: Cross Sections of New Permanent Concealed Floating Access Road through Castlewaller (inside the SPA)

Figure GC 5.16.1: Plan and cross section views of the New Permanent Concealed Floating Access Road and existing drains through Castlewaller (Section Number S39)

Figure GC 5.18: Plan View of Temporary Compound C1 (Mountphilips)

Figure GC 5.19: Plan Views of Temporary Compounds C2 (Bealaclave) & C3 (Knockcurraghbola Commons)

5.2.3.4.7 Forestry Felling

Small areas of coniferous forestry at various locations along the 110kV UGC will be permanently felled to facilitate the construction and operation of the 110kV UGC. In total, 1.3 hectares of forestry will be felled, this felling will be carried out under a felling license from the Forest Service, and an equivalent area of forestry will be replanted, under the conditions of this license, in Co. Tipperary – this replanting will be part of the UWF Replacement Forestry element of the whole UWF project. Further information on the UWF Replacement Forestry element is provided in [Section 5.6](#) of this chapter.

Relevant Volume C3 EIAR Figures: Forestry felling locations are identified on:

Figure GC 5.2: Layout of the UWF Grid Connection on Aerial Photography Mapping (Map 3, 5, 6, 9, 10, 11, 12 & 13)

Relevant Appendix 5.1 Outline Construction Methodologies for UWF Grid Connection:

GC-OCM-18: Forestry Felling

5.2.3.4.8 Fencing

Fencing will be erected at a number of locations during the construction and operation of the 110kV UGC per;

- Permanent timber post and rail fencing with gates will be erected along the new permanent access road to the Mountphilips Substation, at the 3 No. permanently widened site entrances and along either side of the 110kV UGC where the route passes through forestry or forestry firebreaks/clearlines;
- Temporary post and wire, or battery powered electric fencing will be used to delineate construction works areas and to prevent livestock from entering works areas and will also be used to protect reinstated lands until vegetation has re-established;
- Temporary timber post and rail fencing with gates will be erected at the temporarily widened site entrances;
- Temporary goal posts to mark the location of overhead electricity and telephone lines along construction works areas;
- Temporary bat crossing structures at selected hedgerow crossing locations along the 110kV UGC;
- Existing fencing which is required to be removed from the works areas or from widened existing site entrances will be replaced, in the original alignment and position, following construction works.

5.2.3.4.9 Relocation of local overhead services

In order to facilitate the safe construction of the UWF Grid Connection, 2 No. existing overhead lines will be altered, (in conjunction with the infrastructure owner), as follows:

- In Section 60 at Baurnadomeeny, 1 No. existing telephone pole will be moved 10m closer to the field boundary; *(Note: Sections are identified on Figure GC 5.3).*
- In Section 74 at Laghile, 2 No. existing electricity poles will be replaced with taller poles in order to raise up a 110m length of existing overhead 38kV electricity line. This is to provide greater clearance to construction machinery. *(Note: Sections are identified on Figure GC 5.3).*

Relevant Volume C3 EIAR Figures:

Figure GC 5.2: Layout of the UWF Grid Connection on Aerial Photography Mapping (Maps 8 & 12)

Relevant Appendix 5.1 Outline Construction Methodologies for UWF Grid Connection:

GC-OCM-19: Relocation of Overhead Lines

5.2.3.4.10 Provision of electricity supply to Mountphilips Substation

Mountphilips Substation will require a low voltage electricity supply, in order to energise and run electrical plant and general services at the compound. This supply will be taken from an overhead electrical line which passes through the 1st field, 105m from the substation access point (E1) off the public road. The line is a 10kV overhead line carried on a standard wooden pole. The pole will be fitted with a transformer in order to transform the electricity to low voltage (230kV), which is suitable for use in the substation. The electricity thus transformed will be cabled underground to the substation, 420m to the west, in a duct which will be laid alongside the 110kV UGC ducting.

5.2.3.4.11 Storage of Excavated Materials

In total, approximately 14,050 m³ of soils will need to be permanently excavated and relocated. This will mainly arise from the 110kV UGC trenching/joint bays, Mountphilips Substation ground works and Grid Connection Access Roads; comprising topsoil (9,615m³), peat (1,265 m³), subsoil, (2,390m³), rock (120m³), and spoil from public road excavations (660m³).

In addition, up to 11,140m³ of soils will be excavated from the construction works area boundary, including from the cable trench and from the footprint of any excavated temporary stone roads.

This excavated material will be managed as follows:

- The 660m³ of spoil from the public road excavations will be removed to a licensed waste facility.
- 8,370m³ of the excavated material will be permanently stored along the 110kV UGC works area as linear berms and remainder (5,020m³) will be reinstated within the works area.

Relevant Volume C3 EIAR Figures: Storage locations are identified on:

Figure GC 5.2: Layout of the UWF Grid Connection on Aerial Photography Mapping (Maps 1 to 15)

Relevant Appendix 5. Outline Construction Methodologies for UWF Grid Connection:

GC-OCM-20: Formation of Overburden Storage Berms.

5.2.3.4.12 Reinstatement of Construction Works Areas

Following the completion of construction works in an area, with the exception of new permanent infrastructure such as New Permanent Access Roads or permanently felled forestry areas, the lands under the construction works areas will be reinstated to their former condition and returned to the landowner for use as before.

Reinstatement of construction works areas: the temporarily stored excavated soils will be used to backfill and landscape the works areas. These areas will then be sown with native, Irish sourced, certified seeds, seedlings or plants to reflect the habitats that were present before the work.

Landholding boundaries including any existing gates will be reinstated on their original alignment and locks will be fitted to new gates which will be erected along New Permanent Access Roads, where the new road crosses multiple landholdings. A gate fitted with a lock will also be erected at both ends of the floating road section in Castlewaller/Killeen townlands. Gates will also be erected at field boundaries along the New Permanent Access Roads.

Reinstatement of hedgerow: will involve the replanting of the removed section of hedgerow like for like with established (at least 3 year old) native hedgerow plants in their original locations, immediately following the completion of the works in the area.

Along **sensitive bat corridors**, the bat crossing structures which will be installed during construction works will remain in place post-construction until the hedgerow has sufficiently regrown to provide viable habitat for bats. These bat crossing structures will be monitored by a suitably qualified bat specialist and maintained on a yearly basis until they are removed.

Relevant Volume C3 EIAR Figures:

Figure GC 5.33: Cross Sections of Hedgerow Removal and Reinstatement

Figure GC 5.34: Cross Sections of Bat Crossing Structure

Relevant Appendix 5.1 Outline Construction Methodologies for UWF Grid Connection:

GC-OCM-21: Reinstatement of Lands

5.2.3.4.13 Reinstatement of Public Roads

Trenches within road pavements will be reinstated in accordance with the Tii Guidelines on the Opening, Backfilling and Reinstatement of Openings in Public Roads. Where the cables trench crosses perpendicular to the road, full width surface overlay to a distance of 5m beyond either side of the trench will be carried out. Where the cables are aligned along the length of the road, full-width surface overlay will be carried out on any sections of road where the Surface Curvature Index (SCI), measured during FWD testing, is greater than 250.

Along **construction materials haulage routes**, confirmatory condition surveys involving pre-construction and post-construction inspections, high definition video surveys and FWD surveys will be undertaken along the routes of concentrated construction traffic between the R503 and the site access points on the local road network, and on the local road network from the junction of the R497 with the L2266-11 road. Whilst it is not expected to occur, any damage to structures or road pavements will be repaired to at least as good a condition as pre-works, and on damaged sections of roads where the Surface Curvature Index (SCI), measured during FWD testing, is greater than 250, full-width surface overlay will be carried out.

Reinstatement of **roadside boundaries**: All road boundaries at temporary site access points will be reinstated along the existing alignment.

5.2.4 Environmental Protection Measures designed into the UWF Grid Connection

The design of UWF Grid Connection includes the Project Design Environmental Protection Measures listed on Table 5-3, which were devised to avoid, prevent or reduce likely or potentially significant effects on the environment.

Relevant individual Project Design Environmental Protection Measures from the list below are duplicated in the **Environmental Factor topic chapters**, and the list is duplicated in full as a set of Environmental Commitments in **Volume D: UWF Grid Connection Environmental Management Plan** with the planning application.

The interaction of Project Design Environmental Protection Measures across the various Environmental Factors is provided in matrix format in **Chapter 18: Interaction of the Foregoing**.

Table 5-3: Environmental Protection Measures as part of the UWF Grid Connection design

PD ID	Project Design (PD) Environmental Protection Measure
PD01	All construction works will be carried out during daylight hours.
PD02	Flag-men will be used at temporary site entrances rather than creating sightlines by the removal of roadside boundaries. These flagmen will control the movement of traffic on the public road, so that road users can continue to use the local road network in a safe and efficient manner.
PD03	Construction works in Knockmaroe 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.
PD04	Confirmatory consultations with Irish Water, Eir and ESB and confirmatory ground surveys at service locations will be carried out ahead of works; 'Goal Posts' will be used to identify and highlight the height of nearby overhead lines; and a foreman will look out for underground pipes during excavations near services.
PD05	Land reinstatement will not be carried out during very wet weather or when the soil is waterlogged.
PD06	If any compaction has occurred along the construction works area, these areas will be ploughed with a sub-soiler to loosen the subsoil layer
PD07	Construction traffic will be restricted to the construction works area and tracking across adjacent ground will not be permitted
PD08	All initial groundworks will be monitored by an archaeologist under license from the National Monuments Service, to archaeologically record and preserve, either in situ or by record, any structures, features or objects of archaeological significance which may be encountered during the works.
PD09	New permanent access roads will have a permanent surface water drainage network in place which will include check dams. These check dams will settle suspended solids in water runoff while also slowing down the rate of water run-off from these areas.
PD10	Only precast concrete culverts or structures will be used at watercourse crossing locations. No batching of wet cement will take place on-site.
PD11	Instream construction works will be followed by site-specific reinstatement measures to ensure the restoration of flow character and morphology within the affected reach. Measures will include: bank stabilisation using boulder armour or willow/brush bank protection; reinstatement of bank slope and character, creation of compound channels where necessary; reinstatement of instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles; and planting along the riparian margin to stabilise banks, add flood protection and provide riparian buffer.
PD12	A phased approach will be undertaken in relation to watercourse crossing works, earthworks, forestry felling and excavation dewatering, where these works occur within 50m of a Class 1 or Class 2 watercourse. The phased approach will only permit one of main potential sediment producing activities, listed above, to be carried out within 50m of a Class 1 or Class 2 watercourse, at any one time.

PD ID	Project Design (PD) Environmental Protection Measure
PD13	All excavated material will be removed for temporary or permanent storage at a suitable location more than 50m away from all other Class 1 and Class 2 watercourses.
PD14	Temporary silt control methods such as silt fencing or containment berms will be placed around all overburden storage areas.
PD15	Permanent overburden storage berms will be graded and seeded immediately after emplacement.
PD16	For works within 50m of a Class 1 or Class 2 watercourse, additional mitigation measures include double silt fencing, temporary drain blocking, placement of straw bale arrangements along preferential surface water flowpaths and, where necessary, the use of matting to prevent ground erosion and rutting.
PD17	Where dewatering of trenches or excavations is required, there will be no direct discharge of treated water into any watercourse or drain. Rather all pumped water will be treated prior to discharge using an infiltration trench or settlement pond or suitable water treatment train such as a Siltbuster, as appropriate.
PD18	There will be no refuelling of vehicles or plant permitted within 100m of a watercourse
PD19	The main fuel stocks for, and chemical wastes arising from, construction activities will be stored in a designated location, away from main traffic activity, within the temporary compound. All fuel will be stored in bunded, locked storage containers.
PD20	Overnight parking of plant and machinery will only be permitted at locations which are greater than 50m from watercourses and where there is an existing hard-core surface in place.
PD21	No refuelling of plant or equipment will be permitted within 100m of identified wells
PD22	In-stream works at Class 1 and Class 2 watercourses will only be undertaken during the IFI specified period (July, August and September) and will be carried out to best practice (IFI, 2016).
PD23	In-stream works will not be undertaken without isolation of flow within the watercourse, any fish within the isolated section will be removed using electrofishing and, following collection of biometrics, transferred immediately downstream of the crossing point and placed back in the water. The water will then be isolated from the works by over pumping, flume (pipe) or channel diversion methods.
PD24	All new permanent watercourse culverts will be sized to cope with a minimum 100-year flood event. All pipe culverts will be a minimum of 900mm in diameter regardless of the anticipated flood flow.
PD25	All new permanent culverts in Class 1 and Class 2 type watercourses will be bottomless or clear spanning.
PD26	If works are programmed to begin in the Hen Harrier breeding season (March to August) confirmatory hen harrier breeding surveys will be completed, before such works initiate, such that all pre breeding nuptial activity, nesting activity and active nests are recorded within 2km of the construction works area boundary. These surveys will be completed prior to the start-up of all construction activities, until construction is complete and for 3 years thereafter. No construction works will take place within 500m of an active hen harrier breeding attempt or active nesting activity, during the breeding season (March to August).
PD27	During the hen harrier roosting season (October to February inclusive), construction works within 1000m of a roost will be limited to the period between one hour after sunrise to one hour before sunset.
PD28	Hedgerow removal and clearance of any other breeding bird vegetation will take place outside of the bird breeding season <i>i.e.</i> not during the period of March to August inclusive where possible. This includes hedgerow and scrub removal in addition to hedgerow trimming.
PD29	Confirmatory surveys for active Otter holts and activity (particularly holts at which breeding females or cubs are present) will be carried out 150m upstream and downstream of watercourse crossing locations.
PD30	All construction works within 150m of an active otter holt, will be carried out during daylight hours and outside of 2 hours after sunrise or before sunset during summer/outside of 1 hours after sunrise or before sunset during winter.
PD31	If an active holt (particularly holts at which breeding females or cubs are present) is located within 150 meters of the watercourse crossing points, no works will be undertaken <u>while cubs are present in the holt</u> and NPWS will be notified immediately

PD ID	Project Design (PD) Environmental Protection Measure
PD32	No wheeled or tracked vehicles (of any kind) will be used within 20m of active, but non-breeding otter Holts, and light work, such as digging by hand or scrub clearance will not take place within 15m of such holts, except under license.
PD33	The prohibited working area associated with otter holts will, where appropriate, be fenced with temporary fencing prior to any possibly invasive works and declared as 'out of bounds'. Fencing will be in accordance with Clause 303 of the NRA's Specification for Roadworks (National Roads Authority). Appropriate awareness of the purpose of the enclosure will be conveyed through toolbox talks with site staff and sufficient signage will be placed on each exclusion fence. All contractors or operators on site will be made fully aware of the procedures pertaining to each affected holt (NRA, 2006) and subject to audits and non-conformance records in the event of non-compliance, to be included in reports submitted to Local Authorities and relevant Statutory Consultees.
PD34	Confirmatory surveys will be carried out within 50 m of either side of the construction works area boundary of identified badger setts to determine the current status of known badger setts (i.e. active or inactive) and to determine if any new setts have been established in the intervening period following initial pre-planning surveys and the commencement of construction activity. These confirmatory badger surveys will be undertaken no more than 12 months in advance of proposed construction activities, during the period November and April when vegetation cover is reduced. NWPS will be notified immediately if the sett previously identified is confirmed as active or if a further active sett is located within 50 meters of the footprint of the development. If sett exclusion is required, this will be undertaken by an experienced ecologist under the necessary license and following best practice guidance (NRA, 2005).
PD35	No construction works will be carried within 50m of an active sett during the main breeding season (December 1 st to June 30 th).
PD36	Construction activity in the environs of a known active badger sett outside of the breeding period will follow NRA (2005) guidelines, i.e. no heavy machinery will be used within 30m of badger setts (unless carried out under license); lighter machinery (generally wheeled vehicles) will not be used within 20m of a sett entrance; light work, such as digging by hand or scrub clearance will not take place within 10m of sett entrances.
PD37	All construction works will be carried out during daylight hours. Security lighting will be used at compounds. <u>All lighting</u> will be cowled in order to prevent light spill and no lighting will be left turned on overnight. Lighting will be controlled by motion and time sensors to minimise the amount of time the lights are operational.
PD38	Confirmatory surveys will be carried out at all trees with bat suitability that will require felling or other major modifications (e.g. removal of rotten branches). These trees will be subject to a ground-level visual inspection by the Project Ecologist (or a bat specialist acting on their behalf) prior to site clearance works in order to confirm the findings of the 2016 / 2017 surveys. (Note: 17 trees with low suitability were identified within the UWF Grid Connection construction works area boundary during 2016/2017 surveys).
PD39	Where a tree with moderate or high bat suitability is to be felled, a presence/absence bat surveys will be carried out. (Note. It is not expected that any trees with moderate or high suitability will be felled).
PD40	Felling of trees with bat roost suitability will be undertaken in the period late-August to late-October/early-November. Trees with low suitability for bats will be felled carefully and slowly in order to avoid impact-related injuries to any bats that may be roosting inside them. Sections of the tree with potential roost features for bats (e.g. crevices, damaged branches) will be cut in sections, lowered carefully to the ground and left undisturbed for 48 hours before removal.
PD41	Where the felling of trees with bat suitability is carried out, robust, weather-proof bat-boxes, for example Schwegler type 1FF and 2F models, will be placed in each of the affected sections to compensate for the loss of potential tree roosts. The number of bat boxes will match the number of trees with bat suitability to be felled.
PD42	Installation of bat crossing structures at severed hedgerows, proximate to areas of high bat activity or roost locations. And following the completion of construction works, the replanting of these severed hedgerows with semi-mature shrubs/trees (like for like) and limits on temporary lighting near

PD ID	Project Design (PD) Environmental Protection Measure
	hedgerows.
PD43	Pre-construction survey of the distribution of Devil's-bit Scabious (larval food plant of Marsh Fritillary) during the last available April prior to the commencement of construction works. This requires that any areas of Devil's-bit Scabious that are located within the construction works area boundary, will be trimmed/cut to ground level in the last available late April / early May period prior to the commencement of construction.
PD44	All deliveries of construction materials that pass Kilcommon National School will be scheduled to take place outside of school drop-off/pick-up times - 9am to 9.30 am and 3pm to 3.30.
PD45	At Mountphilips Substation, water for welfare facilities will be obtained from a Rain Water Harvesting system. Waste water will be collected in tanks and removed from site by an appropriately licensed operator, for treatment in a licensed water treatment plant. These two measures will avoid the need for a new well or mains water connection and will avoid the need to treat waste water on-site.
PD46	Mountphilips Substation will have a permanent surface water drainage network in place which will include check dams. These check dams will settle suspended solids in water runoff while also slowing down the rate of water run-off from these areas.
PD47	All Joint Bays will be located at least 25m from a Class 1 or Class 2 watercourse, with 35 no. of the total 38 no. located greater than 50m from a Class 1 or Class 2 watercourse.
PD48	Only precast concrete chambers will be used at joint bays locations. No batching of wet cement will take place on-site.
PD49	<u>Lower River Shannon SAC:</u> The route of the 110kV UGC is located along an existing farm track within the SAC boundary. Construction works will be confined to the existing track within the SAC boundary.
PD50	<u>Lower River Shannon SAC:</u> There will be no storage of overburden within the Lower River Shannon SAC
PD51	<u>Lower River Shannon SAC:</u> All excavated material will be removed for temporary or permanent storage at a suitable location more than 100m away from the Newport (Mulkear) River, Clare River and Bilboa River.
PD52	<u>Lower River Shannon SAC:</u> No in-streams works are proposed at the Newport (Mulkear) River and Bilboa River crossings (which are located within the SAC) and therefore there will be no placement of cement within the river channels. The 110kV UGC will be installed by horizontal directional drilling technique.
PD53	<u>Lower River Shannon SAC:</u> All runoff from the construction works areas associated with the horizontal directional drilling works at the Newport (Mulkear) River and Bilboa River (which are located within the Lower River Shannon SAC) and at the Clare River (which is located upstream of the SAC), will be directed into a suitable water treatment train such as a Siltbuster and treated for sediment. This will also mean that in the unlikely event of an oil/fuel spill or leak, any contaminated water can be contained and removed off-site.
PD54	<u>Lower River Shannon SAC:</u> At the Newport (Mulkear) and Bilboa River crossings, drilling activities will be carried out at least 15m from the Lower River Shannon SAC boundary. Double silt fencing will be set up between the drilling rig and the SAC boundary – the 1st silt fence close to the rig and the 2nd silt fence close to the SAC boundary. No works or activities will be conducted on the SAC side of these fences. For the Clare River (which is not in an SAC) drilling activities will be carried out at least 15m away from the river bank. Double silt fencing will be set up as before and no works or activities will be conducted on the river side of these fences.
PD55	<u>Lower River Shannon SAC:</u> Drilling fluid returns will be contained within a sealed tank / sump, and pumped onto a skip for removal off-site to an appropriately licenced facility.
PD56	<u>Lower River Shannon SAC:</u> The drilling works at the Newport (Mulkear) River and Bilboa River will <u>not</u> be carried out during the months of May, June or July.
PD57	<u>Lower River Shannon SAC:</u> There will be no refuelling of vehicles or plant, no storage of fuels and no overnight parking permitted within the boundary of the Lower River Shannon SAC.
PD58	<u>Lower River Shannon SAC:</u> There will be no storage of fuels within 100m of the Newport (Mulkear) River, Clare River or Bilboa River.

PD ID	Project Design (PD) Environmental Protection Measure
PD59	<u>Bleanbeg Bog NHA</u> : The route within Bleanbeg Bog NHA is along an existing forestry track. There will be no excavation of blanket bog
PD60	<u>Bleanbeg Bog NHA</u> : There will be no storage of overburden within the Bleanbeg Bog NHA boundary.
PD61	<u>Bleanbeg Bog NHA</u> : There will be no refuelling of vehicles or plant, no storage of fuels and no overnight parking permitted within the boundary of the Bleanbeg Bog NHA.
PD62	<u>Slievefelim to Silvermine Mountain SPA</u> : All new permanent access roads within the SPA will be 'concealed access roads' which will be created immediately following construction works by covering the hardcore surface of the new road with a vegetated layer using the following method - firstly a geotextile material is laid on the road, covered in a layer of load bearing root-zone mix of peat and stone and then covered in turn by interlocking rigid geocells. The geocells and roadside berms (where present) will be planted with a mix of mature native Irish or Scottish heathers and grasses, with the mix depending on location. Where heather is being planted a depth of at least 150mm of peat will be provided. These 'concealed access roads' will provide a load bearing surface for occasional maintenance vehicles. Within the SPA, the establishment of the Concealed Access Roads will be overseen by a competent peatland ecologist and a hen harrier expert.
PD63	<u>Slievefelim to Silvermine Mountain SPA</u> : All temporary storage berm locations will be re-instated to the biodiversity value of the underlying habitat. Permanent berms will be immediately re-seeded with native heather and upland grass species. Harvester crossing points will be covered with topsoil and reseeded immediately as will any other temporary land-use change locations. Within the SPA, this reinstatement will be overseen by a competent peatland ecologist and a hen harrier expert, outside the SPA this reinstatement will be overseen by the Project Ecologist.
PD64	<u>Slievefelim to Silvermine Mountain SPA</u> : Annual visual inspections of the lands over the 110kV UGC and the testing/inspection/planned maintenance at Joint Bays, will be scheduled outside of the hen harrier breeding season, on those parts of the 110kV UGC which occurs within the boundary of the Slievefelim to Silvermines SPA.
PD65	No construction works will take place within 800m of an active curlew nest, or active nesting attempt, within the breeding season (March to August).

5.2.4.1 Environmental Management Plan

An Environmental Management Plan (EMP) is included with Volume D of the planning application. The purpose of the EMP is to communicate environmental control measures that apply to the development of the UWF Grid Connection to those with responsibility for carrying out works on site so that any likely significant adverse effects of the development on the receiving environment can be prevented.

The Environmental Management Plan includes the list of Project Design Environmental Project Measures (listed above), along with the Best Practice Methods that are included at the end of topic Chapters 6 to 17. Management plans for Traffic, Waste, Surface Water Quality and Invasive Species are also included in the EMP.

See: [Volume D: UWF Grid Connection Environmental Management Plan](#)

Note: The environmental protection measures for UWF Other Activities which relate to UWF Grid Connection will be included in the UWF Grid Connection Environmental Management Plan.

5.3 Life Cycle Stages of the UWF Grid Connection

5.3.1 Construction Stage - UWF Grid Connection

5.3.1.1 Overview of the Construction Process

The construction process for the UWF Grid Connection, is a relatively straightforward civil build. A number of separate dedicated 'crews' will work from each compound, each working on a different part of the UWF Grid Connection. The workers will arrive and depart daily to and from the relevant construction compounds, parking spaces will be provided at the site compounds. The various crews will then be transported to the specific works location by means of 'crew-cab' 4x4 vehicles or similar. Bulk deliveries of materials will be delivered to the site compounds and stored there until needed. Materials needed at works locations will be transported by way rigid body vehicle or tractor and trailer. Aggregate and concrete will be delivered directly to works locations.

5.3.1.2 Duration & Timing

The duration and timing of the construction of the UWF Grid Connection is outlined in Table 5-4.

Table 5-4: Duration and Timing of the Construction Phase of UWF Grid Connection

Construction Activities	Duration of the Construction Stage	Timing of Construction Activities
Pre-Construction - detailed design, confirmatory surveys, felling, hedgerow/tree removal or pruning etc.	3-6 months	Immediately prior to the commencement of the main construction period, or where seasonal timing is relevant to pre-confirmatory surveys or habitat works – during the appropriate season prior to works in the relevant sections of UWF Grid Connection
Main Civil and Electrical Construction Activities - Construction of Mountphilips Substation, 110kV UGC, UWF Grid Connection Access Roads, UWF Grid Connection Ancillary Works	6 – 8 months	Projected Start Date: 2018/2019
Cable Jointing Activities	3 months	It is expected that the period associated with Cable Jointing will overlap with the period associated with the Main Construction Activities.
Electrical commissioning activities	3 months	Commissioning will take place after the Main Construction and Cable Jointing works are complete.

The duration of works provided are approximate and may be shorter or longer, depending on the final number of crews used, weather conditions etc. A formal programme of works will be prepared by the appointed Contractor prior to the commencement of construction activities.

5.3.1.2.1 Construction Hours of Work

Normal construction times will be 07.00 to 19.00hrs Monday to Friday and 08.00 – 16.30hrs on Saturdays. These normal hours of work will be further restricted at particular locations as outlined in Scheduling of Works.

5.3.1.2.2 Scheduling of Works

To protect residential amenity, surface water quality and biodiversity, the following timing or scheduling of works will be implemented during the Construction Stage:

- Construction works will be carried out during daylight hours.
- Construction works in Knockmaroe and Knockcurraghbola Commons townlands, which are within 350m of any local residences, will not take place at the same time as other elements of the Whole UWF Project.
- All deliveries of construction materials that pass Kilcommon National School will be scheduled to take place outside of school drop-off/pick-up times - 9am to 9.30 am and 3pm to 3.30pm
- To reduce the potential for localised in-combination effects on surface water quality from the main potential sediment sources during construction works (i.e. Watercourse Crossing Works, Earthworks, Tree Felling and Excavation Dewatering), a phased approach will be undertaken during the construction works for these activities, where works within 50m of a Class 1 or Class 2 watercourse are required. The phased approach will only permit one of main potential sediment producing activities to be carried out at any one time within the local catchment to a watercourse (refer to Chapter 11: Water).
- Hedgerow removal and clearance of any other breeding bird vegetation will take place outside of the bird breeding season *i.e.* not during the period of March to August inclusive where possible. This includes hedgerow and scrub removal in addition to hedgerow trimming.
- In-stream works will only be undertaken during the IFI specified period (July – September) for the Class 1 and Class 2 watercourses.
- Drilling activities at the Newport (Mulkear) River and Bilboa River will not be carried out during the months of May to July inclusive.
- No construction works will take place within 500m of an active hen harrier nest, or active nesting activity, during the breeding season (March to August). Additionally, during the roosting season, (October to February), construction works will only be carried out during the period between one hour after sunrise and one hour before sunset in areas within 1000m of an active winter roost.
- No construction works will take place within 800m of an active curlew nest, or active nesting attempt, within the breeding season (March to August).
- No construction works will be carried within 50m of an active main badger sett during the main breeding season (December 1st to June 30th).
- Felling of trees with bat roost suitability will be undertaken in the period late-August to late-October/early-November.
- If an active otter holt (holts at which breeding females or cubs are present) is located within 150 meters of the watercourse crossing points, no works will be undertaken while cubs are present in the holt.
- All construction works within 150m of an active otter holt, will be carried out during daylight hours and outside of 2 hours after sunrise or before sunset during summer/outside of 1 hours after sunrise or before sunset during winter.

5.3.1.3 Construction Personnel

It is expected that approximately 100 No. persons will be involved in the pre-construction, main construction, cable jointing and commissioning works, broken down as follows:

- c.15 No. persons will be involved in pre-construction activities both on and off-site,
- The construction of the Mountphilips Substation will require c.20 construction workers,
- The construction of the Mountphilips – Upperchurch 110kV UGC will require c.35 construction workers during the construction of the 110kV UGC, organised in 6 No. crews,
- Security and canteen services will require c.12 personnel,
- Cable pulling will involve c.4 personnel organised in 2 No. cable pulling crews,
- Jointing works will involve c. 6 No. personnel in total, organised in 3 jointing crews and
- 8 No. electrical commissioner's personnel, for commissioning and energisation.

5.3.1.3.1 Welfare Facilities

Temporary Compounds will each contain site offices, a canteen and a self-contained toilet block.

Welfare Facilities at active construction works areas will consist of solar powered, single, self-contained portable toilets.

Toilet Servicing: All toilets will be serviced on a weekly (Toilet blocks at the Temporary Compounds) or bi-weekly (portable toilets at construction works areas) basis. A record of servicing will be kept by a licensed waste removal operator, such as Arlo Group. Servicing shall include internal cleansing, emptying and recharging with water and toilet additive and replenishing of all consumables.

5.3.1.4 Construction Stage Activities

Construction stage activities will involve the following main works:

- Pre-Construction Activities
- Construction Works Area Preparation
- Mountphilips Substation Compound
- New End Masts at Mountphilips Substation
- 110kV Trenching and Ducting
- 110kV Joint Bays and Associated Chambers
- 110kV Cable Pulling
- 110kV Cable Jointing
- Widening or Resurfacing Existing Private Roads
- New Permanent Access Roads
- Temporary Access Roads
- Temporary and permanent site entrances
- Temporary Compounds
- Horizontal Directional Drilling
- Instream Works Preparation and Reinstatement
- Instream Works
- Temporary Bailey Bridge
- Forestry Felling
- Relocation of Overhead Lines
- Overburden Storage Berms
- Reinstatement of Land

Individual Outline Construction Methodologies (OCMs) for all of the above listed main works and activities of UWF Grid Connection can be found at [Appendix 5-1: Outline Construction Methodologies for UWF Grid Connection](#). In the OCMs, a brief description of the work involved; the duration of this work; personnel, machinery, equipment and tools requirements; construction materials; details of the standard methodology for the construction activities and any variations to those methods are also outlined. These OCMs are specific to each distinct body of work or activity. The final Method Statements for the construction works will be developed by the appointed Contractor and will be based on these OCMs, prior to construction.

The OCMs are also provided in [Volume D: UWF Grid Connection Environmental Management Plan \(EMP\)](#) which comprises the main EMP statement; environmental commitments, environmental control measures and management plans; and Best Practice Measures. The purpose of the EMP is to communicate environmental control measures that apply to the development to those with responsibility for carrying out works on site. An Environmental Clerk of Works will be appointed and it will be their responsibility to ensure that the EMP is implemented through liaising with the Construction Site Manager and the Project Manager and by carrying out weekly audits on EMP compliance.

5.3.1.5 Use of Machinery and Equipment

The main machinery, equipment and tools which will be required during the construction stage are listed in Table 5-5. A full list of machinery, equipment and tools which will be used during the construction of the UWF Grid Connection is listed on the Outline Construction Methodologies in [Appendix 5.1](#).

Table 5-5: Construction machinery, equipment and tools

Construction Machinery	Construction Equipment and Tools
1 No. 90/200 tonne crane	1 No. Cement Mixer
6 No. 12ton excavators	1 No. Masonry cutting tool
7 No. 6ton excavators	7 No. De-Watering pumps
7 No. dump trucks	7 No. water pumps and associated pipes
6 No. Vibrating roller	7 No. Diesel generator
1 No. 14tn roller	Hand tools
3 No. trucks for waste removal	Sand bags
6 No. large vans	Silt traps and silt fences
1 No. Tarring vehicle	Oil absorbent booms
2 No. Cable Pulling machine	5 No. siltbuster units and skips
1 No. drilling rig – horizontal directional drilling	Wooden stakes and wooden fencing lats
Jointing Containers	Boundary tape and wire
	10 Battery powered electric fencers

5.3.1.6 Use of Hydrocarbons

Hydrocarbons will be used on-site during construction activities and will be limited to the diesel or petrol fuel and mechanical oils used by the site vehicles and machinery, delivery vehicles and any mobile generators used.

Grease may also be used to line the cable ducts to aid in cable pulling during the construction stage.

5.3.1.7 Other Facilities - Fuel Storage & Tool Storage

All fuels required for construction activities will be stored in a designated location, away from main traffic activity, within the Temporary Compounds. All fuel will be stored in bunded, locked storage containers. Overnight parking of plant and machinery will only be permitted at designated sites along the route where there is a hardcore surface in place.

Tools and smaller pieces of equipment will be stored in locked containers, at the Temporary Compounds, during the construction stage.

5.3.1.8 Imported Construction Materials

The construction materials, which will be brought onto the Grid Connection site, are listed in Table 5-6 along details of the quantity and source of the materials.

Table 5-6: Quantities, type and source of construction materials

Materials	Quantity ¹	Source of Materials
Semi-dry Lean Mix Concrete	9,490m ³ / 1050 No. loads	Roadstone Killough, Co Tipperary Roadstone Bunratty, Co Clare
Aggregate (crushed stone) ²	5,470m ³ / 455 No. loads	Shanballyedmond, Rear Cross
Hard core for temporary surface (public road sections)	700 m ³ / 59 No. loads	Clare
Surface dressing (public road sections)	1300 m ³ / 108 No. loads	Clare
Geotextile/Geocell material	10 No. loads	Nenagh
Control Building doors	1 load	Tullow, Co Carlow
Lattice towers (End Masts)	4 No. loads	Cork
Electrical cabling and plant	5 No. loads	EU
Switchgear	5 No. loads	EU
Reinforcing Steel	5 No. loads	Various Irish Suppliers
Communication cabling and equipment	2 No. loads	EU

¹ Based on use of stone on all temporary access roads

Materials	Quantity1	Source of Materials
General building materials	10 No. loads	Various Irish Suppliers
Joint bay chamber and cover	10 No. loads	Offaly
Communication chamber and cover	5 No. loads	Offaly
Link Box Chambers and cover	5 No. loads	Offaly
Earth Sheet Link Boxes and connections	5 No. loads	UK
Duct jointing collars and draw ropes	5 No. Loads	Cork
Profiles for ducting and chambers	5 No. Loads	Cork
HDPE Ducting	20 No. loads	Cork
HDPE Comms Ducting	14 No. loads	Cork
110kV electrical cable	26 No. loads	Cork
Fibre Optic communication cables	5 No. loads	Cork
Red cable protection strip	1 No. loads	Cork
Yellow warning tape	1 No. loads	Cork
Steel protection plate	1 No. loads (if required)	Birr, Co Offaly
Marker posts and plates	1 No. load	Dundrum, Co Dublin
Hedging and tree species	1 No. load	Established nurseries in Ireland or Scotland
Fencing materials, posts, rails, wire	1 No. load	Arrabawn Co-Op, Reiska

5.3.1.8.1 Material and Delivery Traffic Haulage Route

The delivery of construction materials will be managed in the following manner:

Aggregate and Concrete

HGV loads of aggregate, concrete and public road dressing will be delivered directly to construction works areas. These HGVs will travel to the works areas using both the regional and local road networks, using the haul routes specified in [Figure GC 5.35](#).

Other Construction Material

Other materials, such as ducting, geotextile and other construction materials, will be sourced from various suppliers and will be transported to the Temporary Compounds via the national and regional road network as identified on [Figure GC 5.36](#).

This material will be stored at the Temporary Compounds until required at works areas. Each day a smaller truck will be used to deliver the daily volume of ducting, cable protection strip, warning tape, duct jointing collars etc. to each active works area, using the haul routes specified in [Figure GC 5.35](#).

Relevant Volume C3 EIAR Figures:

[Figure GC 5.35: Haul Routes for Aggregate and Concrete Deliveries \(Overview Map & Map 1\)](#)

[Figure GC 5.36: Haul Route for Other Construction Materials & Equipment.](#)

5.3.1.9 Traffic Management**5.3.1.9.1 Road Licences**

All road closures will be subject to Road Closure application to Tipperary County Council.

All road works will be subject to a Road Opening License application to Tipperary County Council and will be carried out in accordance with the Tii Guidelines on the Opening, Backfilling and Reinstatement of Openings in Public Roads.

5.3.1.9.2 Flagmen

Flagmen will be employed at temporary site entrances and road work locations to control the movement of traffic on the public road, so that road users can continue to use the local road network in a safe and efficient manner.

5.3.1.9.3 Advance warning signage

Advance warning signage will be erected on both approaches to temporary site entrance locations and road works locations. The placement of this signage has been designed based on the recorded 85th percentile traffic speeds, or the posted limit, whichever is the higher.

5.3.1.9.4 Reinstatement of road boundaries

Following the completion of construction works, all road boundaries at temporary site access points or at temporary road widening locations will be reinstated along the existing alignment.

5.3.1.9.5 Engagement with Local Residents regarding Traffic

Contact will be maintained with local residents on the day to day timing of the works. A Community Liaison Officer (CLO) will be appointed as the point of contact between the developer, the local community and the wider public. The CLO will keep very active contact with local residents on the traffic arrangements around the works day to day.

5.3.1.9.6 Traffic Management Plan

A Traffic Management Plan is included in **Volume D: UWF Grid Connection Environmental Management Plan**.

Relevant Volume C3 EIAR Figures:

Figure GC 5.37: Advance Warning Signage for Road Works & Site Entrances.

5.3.1.10 Environmental Management Plan

An Environmental Management Plan (EMP) is included with Volume D of the planning application. The purpose of the EMP is to communicate environmental control measures that apply to the development of the UWF Grid Connection to those with responsibility for carrying out works on site so that any likely significant adverse effects of the development on the receiving environment can be prevented.

The Environmental Management Plan includes the list of Project Design Environmental Project Measures (listed above), along with the Best Practice Methods that are included at the end of topic Chapters 6 to 17.

Management plans for Traffic, Waste, Surface Water Quality and Invasive Species are also included in the EMP, which accompanies the planning application as **Volume D: UWF Grid Connection Environmental Management Plan**.

5.3.2 Operational Stage - UWF Grid Connection

5.3.2.1 Overview of the Operational Stage

Once commissioned and energised, the Grid Connection will be taken in charge by ESB Networks and the Mountphilips Substation and the Mountphilips – Upperchurch 110kV UGC will become part of the national electricity network. The new asset will be managed and operated by ESB Networks.

5.3.2.2 Duration and Timing of Operational Stage

Table 5-7: Duration and Timing of the Operation Phase of UWF Grid Connection

Description	Duration
Operation of the UWF Grid Connection	The UWF Grid Connection will be operated on a permanent basis by ESB Networks.
Mountphilips Substation: <ul style="list-style-type: none"> ● Routine Monthly Inspections (c.2hrs) ● Annual Maintenance ● Daily Remote Monitoring, 	c. 2hrs for monthly inspections c.2 days for annual maintenance - equates to a total of c.5 days per year associated with on-site inspections and maintenance.
110kV UGC: <ul style="list-style-type: none"> ● Annual Inspection and testing at Joint Bay link boxes ● Visual inspection of the lands over the 110kV UGC 	Up to 8 days per year associated with on-site inspections and testing carried out by a 2 man crew.
110kV UGC: <ul style="list-style-type: none"> ● Planned Maintenance of the 110kV UGC - Infrequent, <u>if at all</u>, during the lifetime of the Grid Connection 	c.8 – 10 days per cable pulling activity: 2 days for cable pulling, 1 week for cable jointing 1 day for testing
110kV UGC: <ul style="list-style-type: none"> ● Unplanned Repair of the 110kV UGC – <u>not likely or expected</u> that there will be any requirements for unplanned repairs to the 110kV UGC. 	In the unlikely event that repairs are required, they will be of a similar duration as the Planned Maintenance, above.

The duration of works in the operational stage provided above are approximate and may be shorter or longer, depending on the work involved, number of crews/personnel, weather conditions etc.

The timing of operational activities for the UWF Grid Connection will be scheduled by ESB Networks on an on-going basis and are not subject to timing restrictions, with the exception of Scheduling of Works in relation to Hen Harrier within the Slievefelim to Silvermines Mountains SPA, per:

Scheduling of Works in relation to Hen Harrier: Inspection, testing and planned maintenance on the parts of the 110kV UGC within the SPA will only be carried out during the months September through to February – i.e. outside the Hen Harrier breeding season which is March to August.

5.3.2.3 Operational Personnel

It is expected that scheduled inspection and maintenance activities will be carried out by ESB Networks personnel (2 men crews) over a total of 13 days per year.

Very infrequent planned maintenance or unplanned repairs may be required, if at all, during the lifetime of the Grid Connection, it is expected that one crew with c.6 ESB Networks personnel would be required for 1 week – 2 weeks duration, depending on the nature of the repairs work.

5.3.2.4 Operational Activities**5.3.2.4.1 Mountphilips Substation**

Daily monitoring: The Mountphilips Substation will not be permanently manned, as the equipment will be operated by remote computer link which will be connected to the EirGrid National Control Centre.

Monthly Inspection: will mainly involve the testing of the electrical equipment and apparatus and testing of the electrical, communications and control systems along with visual inspections of the Substation Compound and Control Building. The security and condition of the surrounding palisade fence and entrance gates will also be inspected during these monthly visits.

Monitoring of the communication cables will be carried out remotely.

Annual Maintenance: will involve testing of equipment, apparatus and systems, and may also involve the replacement of electrical parts within the Substation Compound or Control Building. All parts and tools will be brought into the Mountphilips Substation as required. Mobile generators and hoists may also be required for some maintenance activities.

5.3.2.4.2 Mountphilips - Upperchurch 110kV UGC**Annual Inspection:**

The electric cables will be inspected annually by ESB Networks. The annual inspection which will include checks, inspections and testing via the link boxes which will have been installed in a link box chamber at Joint Bays. The man-hole type cover over the link box chamber, which is at ground surface level, will be removed by hand to provide access to the link box within. Checks and testing of the electric cables will be carried out using hand held tools. The entire length of the 110kV UGC will also be visually inspected, by walk/drive over of the route.

The annual inspections will be carried out by a 2 man crew, who will use a four-wheel drive vehicle to access the Joint Bays from the Regional and Local Road networks and from the existing forestry and farm road network and from the new lengths of permanent access roads. Sections of 110kV UGC, between Joint Bays, across grassland fields, forestry fire breaks and concealed geocell roads will be visually inspected on-foot.

Planned Maintenance

Access for planned maintenance, if required, will be from the public and private road network identified on **Figure GC 5.38 (Overview and Maps 1 to 5)**.

The minimum lifecycle of the electrical cables and electric plant is 80 - 100 years in accordance with ESB Networks Specifications. As the cables will be factory tested to a high standard, sourced from ESNB approved suppliers and buried in a concrete enclosed trench in accordance with ESNB specifications, it is not expected that the cables will require replacement during their operational life. However, if any particular cable is found not to be performing to its specification, it will be scheduled for replacement.

Replacement of cables will involve the use of an excavator to remove the groundcover and concrete covers from the top of the joint bay chambers at each end of the cable to be replaced. The sand inside the chambers is then removed and the cable joints opened. The cable can then be pulled out of its duct using a cable winch set up at one of the joint bays, and a new cable is then be pulled into the duct and jointed at both ends. The sand will then be backfilled into the chambers and the covers replaced. Testing and commissioning in a similar manner to the construction phase will then be carried out.

Unplanned Repairs

It is not likely or expected that there will be any requirements for unplanned repairs to UWF Grid Connection during its operation. However, in the unlikely event that repairs are required, the associated activities will be similar to the planned maintenance activities described above.

Relevant Volume C3 EIAR Figures:

Figure GC 5.38: Operational Stage Access to Mountphilips Substation and 110kV UGC (Overview & Maps 1 to 5)

5.3.2.5 Use of Machinery and Equipment

The main machinery, equipment and tools which will be used during the operation of the Grid Connection are listed in Table 5-8.

Table 5-8: Use of Machinery and Equipment during the Operation of the Grid Connection

Machinery	Equipment	Materials
Mountphilips Substation		
Mobile Generator, and associated fuel	Hand tools	Replacement electrical or communication parts,
Mobile lifts – e.g. hoists, cherry pickers etc.	Testing equipment	Small volumes of sulphur hexafluoride (SF6) compressed gas
Van – equipped with any necessary hand tools and testing equipment	Equipment or apparatus for Mountphilips Substation	Small volumes of grease/oils
Mountphilips – Upperchurch 110kV UGC		
Four wheel drive vehicles – equipped with an necessary hand tools and testing equipment	Joining Containers for very infrequent Planned Maintenance or Unplanned Repairs	Replacement 110kV or communication cables and ancillary equipment
Excavator for very infrequent Planned Maintenance or Unplanned Repairs		
Cable pulling winch and spool trailer and tractor for very infrequent Planned Maintenance or Unplanned Repairs		

5.3.2.6 Use of Hydrocarbons

A small volume of hydrocarbons will be used on the UWF Grid Connection site during operational activities and is limited to the diesel or petrol fuel used by the site vehicles and machinery and any mobile generators used.

Small volumes of oil and grease will be used during maintenance of electrical equipment the Mountphilips Substation.

5.3.2.7 Welfare Facilities

There will be no requirement for office facilities at the operational Mountphilips Substation. Self-contained toilet facilities, serviced by a rain water harvesting system will be installed at the Control Building. This toilet will include waste water storage tanks, as illustrated on [Figure GC 5.6: Plan and Elevation of the Control Building at Mountphilips Substation](#).

5.3.2.8 Other Facilities - Fuel Storage & Tool Storage

Fuel Storage: There will be no requirement for fuel storage facilities during operations.

Tool Storage: There will be no requirement for tool storage facilities, all tools will be brought onto site as required.

5.3.3 Changes to UWF Grid Connection

Decommissioning: The UWF Grid Connection will remain permanently in place as part of the national electricity network and thus decommissioning is not envisaged.

5.4 Use of Natural Resources, Emissions & Wastes

5.4.1 Use of Natural Resources

The resources which will be imported onto the UWF Grid Connection site or which will be obtained from within the site during the development of the UWF Grid Connection are described below.

5.4.1.1 Use of Resources: Land

In order to safely accommodate the construction works and construction traffic, the land requirement for the construction of the UWF Grid Connection is greater than for the operation of the UWF Grid Connection.

5.4.1.1.1 Requirements for Land

Construction Land Requirement: In total construction works areas will be located on 39.1 hectares of land, as follows; 6.0ha of farm roads, 12.9ha of agricultural land, 16.0ha of forestry road, 1.0ha of forestry firebreak, 1.3ha of forestry and 1.9ha of public road.

The construction stage land requirements is the Construction Works Area boundary as delineated in RED on **Figure GC 5.3**.

Operational Land Requirement: Once the Development is constructed, the requirement for lands will reduce considerably, and mainly comprises the footprint of the Mountphilips Substation, and the footprint of any access roads located outside of the wayleave areas which will provide access to the Joint Bays.

In total 15.7Ha are required during operation of the project, as follows; 2.4ha of farm roads, 5.2ha of agricultural land, 6.4ha of forestry road, 0.4ha of forestry firebreak, 0.5ha of forestry and 0.8ha of public road. These lands are identified on **Figure GC 5.39**.

Relevant Volume C3 EIAR Figures:

Figure GC 5.3: UWF Grid Connection Construction Works Area Boundary (Overview & Maps 1 to 15).

Figure GC 5.39: Operational Stage Land Use Change (Overview & Maps 1 to 5).

5.4.1.1.2 Land use Restrictions

Restrictions on the use of land by landowners is limited to the Construction Stage, during which the use of the lands by the landowner will be restricted to varying degrees depending on the location and type of works taking place, as per:

- The use of agricultural lands, firebreaks and felled forestry in the construction works area (**Figure GC 5.3**) will be restricted during construction works on these areas, with restrictions continuing until vegetation has re-established following construction works; and
- The use of farm or forestry roads can continue during the construction works with some restrictions in place, forestry traffic if it occurs will use alternative routes along the forestry road network where available.
- Access will be maintained to lands at all times during construction, by arrangement with the individual landowners.

Following construction, the majority of the lands will be returned to their former use.

5.4.1.1.3 Land use Change

As a result of the construction of the UWF Grid Connection, 4.2ha of land will permanently change use as outlined below and illustrated on **Figure GC 5.39**;

- At the Mountphilips Substation site, 1.5ha of land will change ownership to ESB Networks, and this land will also change use from agricultural land to utility/hard-core surface/ access road,
- For New Permanent Access Roads, 1.4ha of land will change use from grassland to hard core access road (1.1Ha) and Concealed Access Road (0.3Ha).
- For New Permanent Access Roads, 0.5ha of land will change use from forestry to Concealed Access Roads. In addition 0.8Ha of forestry will change use to an unplanted area and 0.1Ha grassland will change use to road margin.
- 0.5Ha of New Permanent Berms will be reinstated with heathers and grasses from forestry road margin (0.4Ha) and grassland (0.1ha).
- Along the 110kV UGC, 11.1ha of lands will be subject to a 4m wide wayleave with ESB Networks. With the exception of building structures or planting forestry on the wayleave, use of these lands can continue as normal.

Relevant Volume C3 EIAR Figures:

Figure GC 5.39: Operational Stage Land Use Change (Overview & Maps 1 to 5)

5.4.1.2 Use of Resources: Biodiversity

5.4.1.2.1 Field Boundaries – Earthen Banks/Hedgerow/Trees

Hedgerows and earthen banks occur at most field boundaries within the UWF Grid Connection works areas. The removal of field boundaries and the pruning or removal of hedgerows and trees is limited to the construction stage.

Pruning: In total, 820m of hedgerows, which include trees of varying maturity, located close to works areas will be pruned to facilitate passage of machinery along works areas. All pruning will be conducted outside of the bird breeding season.

Permanent Removal: In total, 45m of hedgerow and 30 No. of trees of varying maturity will be permanently removed to facilitate a permanently widened entrance off the public road and a new permanent access road. These hedgerows and trees will be replaced with an equivalent length of new native hedgerow along with an equivalent number of native trees immediately adjacent to the area. All tree felling and hedgerow removal will be conducted outside of the bird breeding season.

Temporary Removal: During construction a total of 585m of field boundaries which include earthen banks, hedgerow and trees of varying maturity, will be required to be removed along the 110kV UGC construction works area boundary to accommodate the construction of UWF Grid Connection.

Bat Crossing Structures: On a number of hedgerows, a specially designed bat crossing structure will be erected at new entrances. These structures will be timber frames with vegetation attached, which will provide a continuation of flight-line for bats during the works.

Reinstatement of Hedgerows: Following the completion of construction works in an area, **the temporarily removed** section of field boundary will be reinstated to their original condition, with the formation of earthen banks and the replanting like for like with established (at least 3 year old) native hedgerow plants

in their original locations. Reinstatement will be carried out immediately following the completion of the works in the area.

Where hedgerow is removed to create **permanent sightlines**, new hedgerow will be planted as near as possible to their original location behind the sightlines.

Along **sensitive bat corridors**, the bat crossing structures installed during construction works will remain in place post-construction until the hedgerow has sufficiently regrown to provide viable habitat for bats. These bat crossing structures will be monitored by a suitably qualified bat specialist and maintained on a yearly basis until they are removed.

New Hedgerow created: c.700m of new hedgerow will be planted with locally sourced native species alongside the New Permanent Access Road between Site Entrance No.1 and the new Mountphilips Substation.

5.4.1.2.2 **Forestry**

Forestry felling is limited to the construction stage. In total 1.3ha of coniferous forestry will be permanently felled³, under a felling license from the Forest Service. This forestry felling will be carried out outside of the bird breeding season.

5.4.1.2.3 **Invasive Species**

Packaging will be checked for the presence of white toothed shrew and prior to arrival on site, contractor's vehicles and equipment will be thoroughly cleaned and then dried. High-pressure steam cleaning, with water hotter than 65 degrees Celsius, in addition to the removal of all vegetative material, will be required for all vehicles and equipment involved in construction works.

An Invasive Species Management Plan will be implemented to prevent the spread of knotweed species, this Plan is included in **Volume D: UWF Grid Connection Environmental Management Plan**.

Relevant Volume C3 EIAR Figures:

The location and treatment of hedgerows/trees is shown on:

Figure GC 5.2: Layout of the UWF Grid Connection on Aerial Photography Mapping (Maps 1-3, 6-9, 12-15)

Figure GC 5.20: Plan View of Permanent Site Entrance E1 at Coole (Mountphilips Substation & Temporary Compound C1)

Figure GC 5.21: Plan View of Permanent Site Entrance E15 at Bealaclave (Temporary Compound C2)

Figure GC 5.33: Cross Sections of Hedgerow Removal and Reinstatement

Figure GC 5.34: Cross Sections of Bat Crossing Structure

³ A condition of the felling license will require that an equivalent area of forestry be replanted in another location. The New Native Woodland at Foilnahan, (UWF Replacement Forestry element of the Whole UWF Project) will fulfil this obligation.

5.4.1.3 Use of Resources: Water

5.4.1.3.1 Drilling Activities

Some water will also be required to cool the cutting head and aid in the removal of cut material from the bore hole during the drilling activities at the three rivers along the Mountphilips – Upperchurch 110kV UGC. This water will be sourced from a local municipal supply and brought onto UWF Grid Connection site as required. Water used in the bore hole will be collected and removed for treatment in a licenced water treatment plant as requested during consultations with Inland Fisheries Ireland (IFI).

5.4.1.3.2 Potable Water

During construction, there will be no requirement for an on-site well or mains water connection at the Mountphilips Substation. Bottled drinking water will be stored in the canteen at each of the three Temporary Compounds, and will be carried in small volumes by each crew or other personnel working at locations away from Temporary Compounds.

During operation, the demand for potable water will be very low, and, as the substation will only be occupied occasionally, bottled drinking water will be brought into the Mountphilips Substation, as needed.

5.4.1.3.3 Non-potable water

During construction, non-potable water for hand washing or toilet flushing will be imported to the Temporary Compounds from a local municipal supply and stored in water holding tanks at the toilet blocks at the Temporary Compounds. Non-potable water will also be stored in small water holding tanks in the single portable toilets, which will be located at works areas.

During operation, non-potable water for hand washing or toilet flushing will be supplied from a rainwater harvesting system which will be integrated into the Control Building at Mountphilips Substation during its construction (this **mitigation measure is part of the design of the UWF Grid Connection** and will avoid impacts to groundwater). The rainwater harvesting system will provide all of the water requirements for welfare facilities at the Mountphilips Substation during its operation.

5.4.1.4 Use of Resources: Soils**5.4.1.4.1 Excavated Soils**

During the construction of the UWF Grid Connection, natural materials, such as topsoil, subsoil and rock, will arise from excavation works during the construction of the UWF Grid Connection. Approximately 9,615m³ of topsoil, 1265m³ of peat, 2,390m³ of subsoil and 120m³ of rock will be permanently excavated and relocated from the works areas. In addition, up to 11,140m³ of soils will be excavated from the construction works area boundary, including from the cable trench and from the footprint of any excavated temporary stone roads.

5.4.1.4.2 Permanent Storage

Some of the excavated material will be permanent stored, as follows:

- 8,370m³ of the excavated material will be permanently stored along the 110kV UGC works area as linear berms and remainder (5,020m³) will be reinstated within the works area.

5.4.1.4.3 Temporary Storage

The remaining material excavated from UWF Grid Connection construction works areas will be temporarily stored, within the construction works area identified in red on **Figure GC 5.3**. Topsoil, subsoil and rock will be stored separately, with as much surface vegetation left intact on the topsoil layer as possible. Suitable excavated competent material will be used to backfill the Cables Trench and following the completion of works in any area; the temporarily stored topsoil and subsoil will be used to backfill, reinstate and landscape the works areas.

5.4.1.4.4 Public Road Arising's and Contaminated Material

Approximately, 660m³ of spoil will also arise during excavations in public roads. The excess material arising from lengths of 110kV UGC excavated in the public road or contaminated material arising during the construction of UWF Grid Connection will be collected by Arlo Group and transported to their approved licensed facilities at Thurles, County Tipperary,

5.4.1.4.5 Imported Rock

Up to 5,470m³ of graded crushed stone will be imported onto the UWF Grid Connection work areas from the local Rear Cross Quarry.

5.4.1.4.6 Operational Stage - Soil

No excavations of soils will be required during the routine operation of the UWF Grid Connection.

Planned maintenance or unplanned repairs, if any occur, on the 110kV UGC, is likely to involve the re-opening of the underground chambers, at Joint Bays. This work which will result in very small volumes of crushed stone and sand being temporarily removed from the area directly over the joint bay covers, stored adjacent to the Joint Bay, and re-used to reinstate the top of the Joint Bay following the completion of the repairs.

Very small volumes of peat compost may be required during the establishment phase (first 18 months) of the Concealed Access Roads to apply a top dressing to the geocells if required.

5.4.2 Emissions

The main potential for emissions arises during the Construction Stage.

5.4.2.1 Dust

Dust may arise during the construction stage, due to the transportation of aggregate to site, movement of delivery vehicles both on and off the site; the movement of excavated material within the site, and from stored excavated materials at the works areas, particularly during dry and windy weather. During operation, the presence of excavations on-site, and therefore dust emissions, will be negligible – excavations, will generally only occur at Joint Bays during planned maintenance/unplanned repairs, which are expected to occur only very infrequently (if at all) during operation, and will involve the excavation of crushed stone and sand rather than soils.

5.4.2.2 Vehicle Exhausts

During the construction stage, all of the machinery used will be run on hydrocarbons and will emit nitrogen dioxide and other greenhouse gas emissions. During the operational stage, the presence of vehicles on site, and therefore nitrogen dioxide and other greenhouse gas emissions, will be negligible with a van or four wheel drive vehicle being used c.12 days per year, split roughly half and half between the Mountphilips Substation and the 110kV UGC.

5.4.2.3 Noise

During the construction stage, heavy machinery and vehicles which will be used at works areas will emit noise during their operation, noise will also be emitted from certain construction activities such as drilling, excavation or rock breaking or by mobile generators which may be used at work areas. During the operational stage, the presence of vehicles on site, and therefore noise emissions, will be negligible with a van or four wheel drive vehicle being used c.13 days per year, split roughly half and half between the Mountphilips Substation and the 110kV UGC.

5.4.2.4 Vibration

Construction works, including excavations and the use of heavy machinery will cause low levels of ground vibration. **No blasting or piling** will occur at the UWF Grid Connection construction works areas. No vibration emissions are expected during the operation of the UWF Grid Connection.

5.4.2.5 Light

Lighting will be used at the Temporary Compounds during construction and at the Mountphilips Substation Compound to illuminate the Substation Compound, the Control Building and access points during its operation. This lighting will use a cowled design along with motion-sensor and timer controlled lights which will not remain turned-on overnight. The 110kV UGC does not require any lighting.

5.4.2.6 Electromagnetic Radiation

Low frequency electrical and magnetic fields (EMF) will be present anywhere electricity is generated, distributed or used and therefore these electromagnetic fields are a common occurrence in everyday life. The operational Mountphilips Substation and the underground 110kV cables will each be a source of very low frequency (50Hz) electromagnetic fields. No electromagnetic fields will occur during the construction stage.

5.4.3 Waste

The greatest potential for waste occurs during the Main Construction stage of the project.

5.4.3.1 Waste Water

During the construction stage, self-contained toilets, with integrated waste water storage tanks, will be provided for construction workers, at the Temporary Compounds. Single self-contained, solar-powered toilets (portaloos) will also be provided at each of active works areas. The waste water storage tanks associated with the above toilet facilities will be emptied on a regular basis.

During the operational stage, toilet facilities will be installed in the Mountphilips Substation Control Building. The waste water storage tanks associated with the toilet facility at Mountphilips will be emptied on a regular basis.

5.4.3.2 General Waste

During the construction stage, materials such as pallets, packaging, and excess construction and building materials will be generated in small quantities at construction works areas. All individual waste streams will be identified at source, separated into recyclable and landfill waste and stored in a designated area at the Temporary Compounds.

During operation, general waste will arise in small quantities during maintenance activities at the operational Mountphilips Substation, including empty containers, packaging, materials and rags etc. This waste will be stored in a suitable container in a designated area with the secure Substation Compound.

5.4.3.3 Chemical waste

During construction, very small quantities of chemical waste will be generated, this waste is limited to solid waste oil, such as oily rags. All chemical wastes will be stored in secure, bunded and covered storage containers, in a designated secure part of the Temporary Compounds.

During operation, small volumes of chemical wastes, including oil and grease, may arise during the operational stage. These wastes will be taken off-site by the maintenance personnel and disposed of in an appropriately licensed facility.

5.4.3.4 Arisings

During the construction stage, arisings from any excavations within the structure of the public road will consist of old chip, tar, subsoils and rock material. Arisings also include any contaminated soils from off-road construction works areas. No arisings are expected during the Operational Stage.

5.4.3.5 Waste Management Plan

Any wastes which result from the operation of the UWF Grid Connection will be managed under the Waste Management Plan. The Plan includes a hierarchy of controls in relation to waste; Prevent, Reduce, Reuse, Recover and Responsibility and the controls and procedures which will be undertaken as part of the management of waste are specified. A strict chain of custody system will be set up as part of the Waste Management Plan to enable all wastes to be controlled in the appropriate manner.

The **Waste Management Plan** is included in **Volume D: UWF Grid Connection Environmental Management Plan**.

5.5 Vulnerability of the Project to Major Accidents and Natural Disasters

Major accidents or natural disasters which have the potential to affect the UWF Grid Connection are described hereunder. The vulnerability (exposure and resilience) of the UWF Grid Connection to major accidents and disasters and the risk of these accidents or disasters is classified according to the *Guide to Risk Assessment in Major Emergency Management* (DoEHLG, 2010). This Guide is included as [Appendix 5.7 Volume C4: EIA Appendices](#).

5.5.1 Vulnerability to Major Accidents

It is clear from the EIA Directive that ‘major accident’ mainly applies to notified Seveso establishments which operate under the Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015, where Dangerous Substances are identified in Schedule 1.

The UWF Grid Connection is **not vulnerable to Major Accidents**, due to the minimal volumes of the Dangerous Substances which will be used, limited to small volumes of diesel fuel used by vehicles during the construction and operation of the UWF Grid Connection, and very small volumes of grease and sulphur hexafluoride (SF₆) gas used at the Mountphilips Substation during its operation. Furthermore there are no Seveso sites in proximity to the UWF Grid Connection site, the closest being Grassland Agro in Limerick.

5.5.2 Vulnerability to Natural Disasters

Natural disasters which could potentially affect the UWF Grid Connection include land slippage and flooding. The likelihood of these natural disasters occurring is discussed below, with likelihood of the natural disaster occurring rated according to the DoEHLG 2010 Guidelines. The risk classification tables are included in [Appendix 5.7: A Guide to Risk Assessment in Major Emergency Management Jan 2010](#).

5.5.2.1 Land-slippage

A Peat Stability Assessment was carried out by Dr Paul Jennings of Applied Ground Engineering Consultants (AGEC), chartered geotechnical engineer with over 30 years’ experience in design and construction of sub-surface structures with particular expertise in forensic investigations of landslides. Dr Jennings concludes that the location of the UWF Grid Connection (110kV UGC) has a low and acceptable risk of potential peat failure, and has an acceptable margin of safety and is suitable for the development of the 110kV UGC.

The Peat Stability Assessment can be found in [Appendix 10.3: Peat Stability Assessment](#), of [Volume C4 EIA Report Appendices](#).

It is considered that the UWF Grid Connection is not vulnerable to natural disasters such as land slippage, due to the absence of peat and inherent stability of the subsoils on most of the site and the acceptable margin of safety along the part of the 110kV UGC in deeper peat. Therefore it is considered that the likelihood of land slippage disaster occurring along the UWF Grid Connection is **Very Unlikely**.

5.5.2.2 Flooding

In recent years, high rainfall events and subsequent flooding have become more frequent in Ireland. Where complete the Catchment Flood Risk Assessment and Management (CFRAM)⁴ OPW Flood Risk Assessment Maps are now the primary reference for flood risk planning in Ireland and supersede the Preliminary Flood Risk Assessment Maps (PFRA) maps. CFRAM mapping is not currently available for the area of the UWF Grid Connection and therefore the PFRA maps have been consulted.

A Stage II Flood Risk Assessment was completed for the subject development by Hydro Environmental Services, a specialist hydrological and hydrogeological consultancy, who concluded that there is a low risk of impact on the UWF Grid Connection as a result of potential flooding because based on the PFRA mapping all of the above-ground permanent infrastructure (i.e. Mountphilips Substation, new permanent access roads and Joint Bays are located in mapped Flood Zone C – where the probability of flooding is low (less than 0.1% or 1 in 1,000).

Also, there will be no potential of increased local flood risk as a result of the UWF Grid Connection as most of the subject development is located underground (i.e. 110kV cable). The footprint of the above-ground permanent infrastructure is minimal and distributed over several catchments and all new permanent watercourse crossing culverts will be suitably designed to accommodate flood flows

The Flood Risk Assessment can be found in [Appendix 11.3: Flood Risk Assessment](#), of [Volume C4 EIA Report Appendices](#).

Due to the fact that the UWF Grid Connection 110kV cable is not vulnerable to flooding due to the underground nature of the cable within a trench and the fact that permanent access roads to joint bay locations and the Mountphilips Substation are located in Flood Zone C (Low Risk), it is considered that the likelihood of flooding disaster occurring along the UWF Grid Connection is **Unlikely**.

5.5.2.3 Consequences of Natural Disasters Occurring

The consequence of the impact if the event occurs is described here.

Due to the low number of personnel working on-site at any one location, the consequence of any flooding or land slippage events, if they did occur, is considered to be **Limited**.

Due to the low number of people living or working locally, the consequence of any flooding or land slippage events, if they did occur, is also considered to be **Limited**.

The consequences to water quality due to land slippage or flooding could be **Serious** due to the widespread effects and extended duration of sedimentation effects in downstream watercourses.

5.5.2.4 Overall Risk

When the likelihood and the consequence of a potential land slippage or flooding event occurring is applied to the risk matrix from the DoEHLG 2010 guidelines, a broad indication of the critical nature of each risk can be determined.

⁴ CFRAM is Catchment Flood Risk Assessment and Management. The national CFRAM programme commenced in Ireland in 2011, and is managed by the OPW. The CFRAM Programme is central to the medium to long-term strategy for the reduction and management of flood risk in Ireland.

In relation to on-site personnel and other people in the locality, a land slippage or flooding event would be classed a 'normal emergency' - based on a likelihood rating of Very Unlikely and Extremely Unlikely and a consequence rating of Limited.

In relation to downstream water quality, due to the higher level of effect (Serious) on water quality a land slippage or flooding event could be a major emergency. According to the DoEHLG 2010 guidelines, both flooding and landslip events would be at the lower extreme of 'major emergency'.

5.5.2.5 Mitigation Measures

In relation to flooding, construction works for the underground cables will be carried out during dry periods in locations within mapped fluvial or pluvial flooding zones. Instream works on Class 1 and Class 2 watercourses will also be carried out during dry periods in the months of July, August and September, and all new permanent crossing structures will be sized to cope with a minimum 100 year flood event.

In relation to land slippage, the 110kV UGC in the area of deeper peat in the Castlewaller/Killeen area has been designed in conjunction with AGECC, who have also stipulated the construction methodologies and control measures which will be implemented in this area. In addition, contingency measures have been developed by AGECC, to ensure that the effects of landslipping, in the very unlikely event that it occurs, are minimised and that an emergency response can be implemented quickly and effectively. This contingency plan is included in [Volume D: UWF Grid Connection Environmental Management Plan](#).

Should a disaster occur, unconnected to the project but in the locality – the above mitigation measures already designed into the project will ensure that the project will not make the consequences of the event worst. In addition the presence of the project will not increase the likelihood of such an event occurring.

5.6 Cumulative Descriptions

Table 5-9: Subject Development: UWF Grid Connection - Element 1 of the Whole UWF Project

	The Subject Development	Composition of the Subject Development	Planning Status and Competent Authority for the Subject Development
1	The Subject Development UWF Grid Connection (GC)	Mountphilips Substation Mountphilips – Upperchurch 110kV UGC Grid Connection Access Roads Grid Connection Ancillary Works	Current planning application to An Bord Pleanála

An **overview of Element 1, UWF Grid Connection**, the subject development, is provided in [Section 5.2.2](#) above. A **full description** of the subject development is provided in the [successive Sections 5.2 to 5.5](#).

5.6.1 Description of the Other Elements of the Whole UWF Project

In order that a cumulative evaluation can be carried out for the UWF Grid Connection, an overview description is provided hereunder of all the other elements of the whole UWF project.

Table 5-10: Element 2 to 5 of the Whole UWF Project

	Element of the whole UWF project	Composition of each Element	Relevant Appendix Location for description of each element
2	UWF Related Works (RW)	Internal Windfarm Cabling Realigned Windfarm Roads Haul Route Works Telecom Relay Pole RW Ancillary Works	Appendix 5.3
3	UWF Replacement Forestry (RF)	Replacement Forestry at Foilnaman	Appendix 5.4
4	Upperchurch Windfarm (UWF)	Consented UWF Turbines Consented UWF Substation Consented UWF Roads UWF Ancillary Works	Appendix 5.5
5	UWF Other Activities (OA)	Haul Route Activities Upperchurch Hen Harrier Scheme Monitoring Activities Overhead Line Activities	Appendix 5.6

Relevant Volume C3 EIAR Figures:

[Figure CE 1.1: Location of UWF Grid Connection and the Other Elements of the Whole UWF Project on OSI Mapping.](#)

An EIA Report has also been prepared to accompany concurrent planning applications to the relevant Competent Authorities, for the UWF Related Works and UWF Replacement Forestry.

This information on the other elements of the whole UWF project can be found in the following locations;

- **Full EIA Report** or EIS (as appropriate) for **Elements 2, 3, and 4** in [Volume F: Reference Documents for Other Elements of the Whole UWF Project](#).
- **Description of each element 2, 3, 4, and 5** (presented in a format similar to this chapter and with smaller scale reference mapping and figures) in [Appendices 5.3 to Appendix 5.6](#), see [Volume C4: EIAR Appendices](#).
- **Overview description of each elements 2, 3, 4, and 5** of each other element in this Section hereunder.

5.6.1.1 Element 2: UWF Related Works

An application for planning permission for UWF Related Works has been submitted to Tipperary County Council. This application is accompanied by an EIA Report.

The full **EIA Report including mapping and figures for UWF Related Works** is included in **Volume F: Reference Documents for Other Elements of the Whole UWF Project**.

An extract from Volume F of the **detailed description** of the UWF Related Works (presented in a format similar to 5.2 to 5.5 above) along with a **copy of the accompanying figures** is included in **Appendix 5.3: Description of Development (UWF Related Works)**.

A summary overview of UWF Related Works is provided hereunder.

5.6.1.1.1 Location and Characteristics of UWF Related Works

The UWF Related works comprises of the following:

Internal Windfarm Cabling of c. 17.9km in length, to connect the Consented UWF Turbines to the Consented UWF Substation, through the installation of underground cables within ducts in trenches 1.25m deep and 0.6 wide. The majority (11.1km) of the Internal Windfarm Cabling will be installed under Consented Windfarm Roads or Realigned Windfarm Roads. The remainder of the Internal Windfarm Cabling will be installed in agricultural lands (4.6km), forestry lands (2.1km and forestry felling of 0.1ha), and crossing under 9 No. public roads (40 meters). The cabling will traverse the townlands of Graniera, Shevry, Knockcurraghbola Commons, Knockmaroe, Grousehall, Cummer, Foilnaman, Gleninchaveigh, Coumnageeha, Coumbeg, Knocknamena Commons, Glenbeg and Seskin.

The Internal Windfarm Cabling consists of electrical cables and communication cables and the copper conductor cables which are installed inside High Density Polyethylene (HDPE) ducting in underground trenches. The trench will be excavated, ducting and warning tapes installed and trench backfilled and reinstated. When the ducting installation is finished and the trench reinstated, the electrical, communication and copper conductor cables will then be pulled through the ducting. The only surface expression of the Internal Windfarm Cabling will be the over-ground identification marker posts and marker plates which will be installed at regular intervals above the cables trench

Realigned Windfarm Roads to realign the consented UWF Windfarm Roads at three locations;

The consented windfarm road to Turbine No.5 in Shevry is 560m in length, and will replace this road in its entirety with a new road 230m in length through forestry. This will require forestry felling of 0.2ha.

The consented windfarm road between Turbine No.19, Turbine No. 20 and Turbine No. 21, is 840m in length. It will replace 370m of this road with a new road also 370m in length. 220m of this road will be located on grassland field, with the remaining 150m in length located on existing farm road. The existing farm road section will be upgraded during construction works.

A short length (30m) of new access road is between the consented windfarm roads in Knockmaroe to the new Telecom Relay Pole.

Haul Route Works are along public road verges, roadside boundaries and grassland fields in order to widen parts of the L4139-0, L4138-12, L2264-50, L6188-0, L6185-13 by between 0.5m and 1.5m and to widen an entrance off the R503 by 30m. These works will facilitate the delivery of turbine components to the Upperchurch Windfarm site and will take place in the following townlands: Shevry, Knockcurraghbola

Commons, Knocknabansha, Knockmaroe and Grousehall. Works include the removal of soils and laying of crushed stone and hard-core in roadside verges for 1710m in total; temporary removal and reinstatement of 1035m of hedgerow and earthen banks which form roadside boundaries; permanent removal of 25m of roadside boundary and the construction of 290m temporary access roads on private lands.

The **Telecom Relay Pole** will relay communication signals around the Consented UWF Turbines in order to avoid interference from the operating Upperchurch Windfarm. The Telecom Relay Pole will comprise a wooden pole, up to 18m in height, with relay equipment attached to the top of the pole. A small compound, 5m X 5m in size, will enclose the relay pole, along with a ground based outdoor cabinet 2m high, 1.2m long and 1m wide and ancillary equipment. The compound will be securely fenced with 2.4m high palisade fencing; a native hedgerow will be planted on the berm created from the excavations. A communications and low voltage (LV) electricity supply will be cabled to the compound, from the existing supply at the Foilnahan mast, by 300m in length of cabling.

RW Ancillary Works will facilitate the construction of the UWF Related Works and will include a change of use for and existing agricultural entrance to agricultural and forestry entrance in permanent use, and 14 No. temporary site entrances; 5300m of temporary access roads; temporary and permanent watercourse crossings, involving 24 No. small field drains and 8 no. streams; drainage systems around permanent features and temporary drainage around works areas; 0.3 hectares of forestry to be felled; temporary and permanent hedgerow/tree removal; temporary and permanent fencing, temporary goal posts and bat crossing structures; relocation of 5 No. existing telephone poles; 11,830m³ of material will be excavated and temporarily stored for subsequent reinstatement or permanently placed in berms; reinstatement of roadside boundaries and public road surfaces.

5.6.1.1.2 UWF Related Works: Construction & Operation

UWF Related Works Construction Phase: All elements of the whole UWF project will be constructed at the same time and is expected to commence 2018/2019 and will take approx. 12 months. 5 of the c.100 persons working directly on the Upperchurch Windfarm site will work on UWF Related Works. A specialist communication engineering crew, made up of c. 2 personnel, will be involved in the erection and set up of the Telecom Relay Pole. The UWF Related Works, 23 No. loads of concrete and 292 No. loads of aggregate will be transported to the site by HGV, from local suppliers. A further 2 No. loads of road surfacing material and 43 No. loads of specific building materials will also be imported to the site, from various suppliers in the Region.

UWF Related Works Operational Phase: UWF has been granted permission to operate for 25 years from the date of commissioning. UWF Related Works will operate for the same period as the windfarm. The personnel employed in O&M for the windfarm will also maintain the UWF Related Works.

UWF Related Works use of Natural Resources: 20.9 hectares of land within the full UWF Related Works construction site which is reduced to just 25m² around the Telecom Relay Pole compound, during the operational phase; 4750m³ of topsoil, 6670m³ of subsoil and 360m³ of rock will arise from excavation works; small amounts of potable and non-potable water will be imported onto the site as required; 170m of hedgerow and 4 No. trees will be removed and the equivalent amount replanted following construction.

UWF Related Works Emissions: Insignificant dust, construction machinery exhaust, noise, vibration and light will be emitted during the **Construction Stage**. During the **Operational Stage** there will be negligible dust, vehicle exhaust, noise, vibration and light emitted. The operational electrical plant will be a source of electromagnetic fields but these will not be at levels to cause significant effects.

UWF Related Works Waste UWF Related Works personnel will use the welfare facilities and waste facilities provided at the Windfarm Site Compound No. 1 and No. 2. At these facilities, waste water will be contained in self-contained units and emptied by a licenced facility or, in the case of the Site Offices, will be treated in the existing septic tank. General and chemical waste will be segregated and stored in allocated tanks, bins, skips or areas at Site Compound No.1 and collected by an appropriately licensed waste contractor. There will be minimal general and chemical waste during the **Operational Stage**. This waste will be stored in a designated and secure area at the windfarm site offices and collected by an appropriately licenced operator. Welfare facilities for the O&M crew will be provided at the windfarm site offices. Any wastes which result from the construction, operation and decommissioning of UWF Related Works will be managed under the Waste Management Plan for the operating UWF.

5.6.1.2 Element 3: UWF Replacement Forestry

An **application for an afforestation license** for UWF Replacement Forestry has been submitted to the Minister for Agriculture, Food and the Marine. This application is accompanied by an EIA Report.

The full **EIA Report including mapping and figures for UWF Replacement Forestry** is included with the planning application in **Volume F: Reference Documents for Other Elements of the Whole UWF Project**.

An extract from Volume F of the **detailed description** of the UWF Replacement Forestry (presented in a format similar to 5.2 to 5.5 above) along with **a copy of the accompanying figures** is included in **Appendix 5.4: Description of Development (UWF Replacement Forestry)**.

A summary overview of UWF Replacement Forestry is provided hereunder.

5.6.1.2.1 Location and Characteristics of UWF Replacement Forestry

UWF Replacement Forestry relates to the planting with forestry, of 6ha of agricultural lands the purpose of which is to fulfil the replanting obligation which will arise from the felling of forestry for the development of the whole UWF project.

Located at Foilnahan townland, near Upperchurch, County Tipperary, 6 hectares (6ha) of agricultural grassland at will be planted with native woodland species, set in clusters of well-matched native species. There will be varied spacing created between the clusters according to Forest Service recommendations. A mixture of tall trees and understory shrubs will be planted, and the design includes wide ride-lines between deeper areas of core woodland. The ride-lines will create open spaces with tree-lined boundaries, which is much favoured by birds of prey during the day (e.g. hen harrier) and bats at night as hunting ground. A mixture of land cover – tall grasses, short grasses and scrub will be maintained under the planting and in the ride lines. Tree guards will be used to protect the saplings and young trees from rabbit damage. A livestock-proof fence will be erected around the perimeter of the planting.

The lands to be afforested are currently in two agricultural landholdings. A small watercourse, with an existing culvert crossing, runs through the centre. The existing riparian habitat along this watercourse will be enhanced through planting with hazel, alder and willow species and the entire afforestation land will be protected from livestock by the perimeter fencing.

There is a change of use required for an existing agricultural entrance to agricultural and forestry entrance which will remain in permanent use. This change of use is part of UWF Related Works – RW Ancillary Works.

The UWF Replacement Forestry will be designed and planted in accordance with the *Forest Service (2006) Information Note No. 5: Establishment, Design and Stocking Densities of New Native Woodland* and *Felling and Reforestation Policy published by the Forest Service (May 2017)*.

5.6.1.2.2 UWF Replanted Forestry: Planting and Growth Stage

UWF Replanted Forestry Planting Stage: Tree planting will be carried out by 4 No. forestry professionals. Tree saplings, wooden fence posts and fencing wire and gates will be imported to the site by 4WD vehicle.

UWF Growth Stage: Once planted, the trees will go through numerous stages of growth from sapling, through to maturity, old age and eventual decay with natural regeneration occurring through the lifecycle of the native wood. Other than thinning activities and grass/scrub management, natural maturation, old age and regeneration, no other changes to the native woodland are expected. Felling is not envisaged.

Use of Natural Resources: 6ha of agricultural land will be planted with mixed species to create a native woodland, comprising tall trees and understory shrubs, along with wide ride-lines, and a mix of tall grasses, short grasses and scrub land cover maintained during the growth stage. This will enhance biodiversity in the area. New trees and shrubs will be set back from the watercourse which runs through the UWF Replacement Forestry site. The existing riparian habitat will be enhanced through the planting with hazel, alder and willow species and the lands will be protected from livestock by the perimeter fence. Planting will be carried out by hand using spades. Small localised patches of disturbed soil will occur at the sapling tree trunks.

Emissions – Planting and Growth Stage: Negligible.

Waste - Planting and Growth Stage - such as packaging, and excess planting materials will be generated in very small quantities and this waste will be removed at source and disposed of in an appropriate licensed facility

5.6.1.3 Element 4: Upperchurch Windfarm

An overview description of already consented Upperchurch Windfarm (UWF) is provided hereunder.

An application for planning permission for Upperchurch Windfarm (Consented UWF) was made to Tipperary County Council in January 2013. The windfarm was permitted by Tipperary County Council in January 2014 and the permission was upheld by An Bord Pleanála in August 2014. The application was accompanied by an EIA Report (known as EIS at the time) and Natura Impact Statement. The full planning documents for consented UWF can be found in **Volume F: Reference Documents for Other Elements of the Whole UWF Project**.

5.6.1.3.1 Overview of the Location and Characteristics of Upperchurch Windfarm

UWF will comprise 22 wind turbines with an overall height up to 126.6 metres, 2 meteorological masts with an overall height of up to 80 metres, turbine foundation and crane hardstanding areas, access roads and an electrical substation.

The Upperchurch Windfarm site is located in the townlands of Graniera, Shevry, Knockcurraghbola Commons, Knockmaroe, Grousehall, Cumber, Foilnahan, Gleninchaveigh, Coumnamee, Coumbeg, Knocknamena Commons, Glenbeg and Seskin. This is an area 2km west of Upperchurch village and 18km to the west of Thurles, County Tipperary.

The 22 wind turbines, associated crane hardstandings and ancillary works will be constructed on a series of small hills ranging in elevation from 280m to 401m OD, set out generally over four areas. The substation will be constructed in Knockcurraghbola Commons and the turbines will be connected by underground cables to the substation. There will be two meteorological masts erected, one in Grousehall and a second in Knocknamena townlands. Ancillary Works will include borrow pits in Shevry, Knocknamena, Knockmaroe and Grousehall; 1 No. site entrance from the R503 Regional Road at Graniera and; 10 No. site entrances from local public roads, through and around the site, which will provide access to the windfarm.

A document, with a **detailed description of the Upperchurch Windfarm**, has been compiled from the original 2013 Upperchurch Windfarm EIS, from the Reply to Further Information, the additional information submitted during the planning process and mitigation measures and planning conditions attaching to the Grant of Permission, to reflect a description of the development as it is now permitted. This compilation document has been prepared in the same format as the current application Chapter 5, for ease of cross referencing. The compilation document can be found in **Appendix 5.4: Compiled Description of Upperchurch Windfarm**.

The full planning documents for consented UWF can be found in **Volume F: Reference Documents**.

Upperchurch Windfarm (UWF) is comprised of the following parts:

- **Consented UWF Turbines** - 22 No. wind turbines of the three-bladed, tubular tower model, light grey in colour and an overall height to blade tip upto 126.6m. The turbines will be constructed on concrete bases with an adjacent hard-core hardstand area. There is no requirement for fencing of turbine areas. The turbines will be connected by underground cables to the Consented UWF Substation.
- **Consented UWF Substation** - 110kV substation compound which includes a control building, main transformer and other electrical equipment enclosed in a compound by a palisade fence. The substation will measure 64m x 41m.
- **Consented UWF Windfarm Roads** - 11.6km of windfarm access roads will comprise 8km of newly built 5m wide roads and 3.6km of existing farm roads which will require upgrading and widening (by an average of 2m).

- **Consented Ancillary Works** – The main items of ancillary works will include, 2 No. meteorological masts up to 80m in height; 11 No. site entrances; 1 No. stream crossing; site drainage system; 2 No. construction site compounds; 6 No. borrow pits from which most of the aggregate required will be won; forestry felling, hedgerow removal and reinstatement; excavation, storage and reinstatement of soils.

5.6.1.3.2 Upperchurch Windfarm: Construction & Operation

UWF Construction Phase: All elements of the whole UWF project will be constructed at the same time.

Construction of UWF is expected to commence 2018/2019 and will take approx. 12 months. Approximately 277 persons will be engaged in the civil, electrical, project management, legal and financial services, material supply and component deliveries for the windfarm. Approximately 950 No. loads of concrete; 15 No. loads of reinforcing steel and 5 No. loads of general building materials and 212 No. loads of electrical plant and equipment (abnormal size loads) will be imported to the site by HGV. The abnormal turbine loads will be transported from Foynes Port.

UWF Operational Phase: UWF has been granted permission to operate for 25 years from the date of commissioning of the wind turbines, whereupon there will then be an option to apply for continuance of use or decommission the plant and restore the site. There will be 8 permanent jobs created in operation and maintenance activities, legal, electricity sales and asset management during the operational phase.

UWF use of Natural Resources: 56.3 hectares of land within the construction works site will reduced to 6.4 ha during the operational phase; Approx. 108,000m³ of excavated soils; 43,000m³ of aggregate mostly won on-site and otherwise imported from local quarry at Shanballyedmond, Rear Cross; small amounts of potable and non-potable water, sourced at an existing well at the windfarm site offices in Site Compound No. 2; felling of 4.4 hectares of conifers; 960m of hedgerow removed.

UWF Emissions: Dust, construction machinery exhaust, noise, vibration and light will be emitted during the construction stage. There is no house within 200m of the construction works. During the **Operational Stage** there will be negligible dust, vehicle exhaust, vibration and light emitted. The turbines will emit noise during operation. Permitted noise emissions are prescribed by planning condition. The operational electrical plant will be a source of very low frequency (50Hz) electromagnetic fields but these will not be at levels to cause significant effects at the turbine locations, and no effects will occur at local residences.

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

5.6.1.4 Element 5: UWF Other Activities

Although UWF Other Activities do not require planning permission, they do form part of the whole UWF project and therefore are included in the cumulative evaluation. A **description of these activities**, along with **mapping and figures** is included in **Appendix 5.6: Description of the UWF Other Activities**.

An overview of UWF Other Activities is provided hereunder.

5.6.1.4.1 Location and Activities of UWF Other Activities

The **Haul Route Activities** will facilitate the transportation of turbine components to the Upperchurch Windfarm site and are located at various points on the national and regional road network along the UWF turbine component haul route between Foynes Port in County Limerick and junction of the R503 and R497 Regional Roads in Knockmaroe townland, County Limerick. Activities comprise the laying of matting over verges at up to 5 No. locations, removal and replacement of street furniture (mainly signposts) at 13 No. locations and the trimming of up to 960m of hedgerow/trees at up to 15 No. locations.

The **Upperchurch Hen Harrier Scheme** will enhance and protect habitat for hen harrier in the vicinity of Upperchurch Windfarm, in order to fulfil planning condition No.18, attaching to the windfarm. The Upperchurch Hen Harrier Scheme is located in Knockcurraghbola Commons, Coumnaageeha, Foilnaman, Knockmaroe and Grousehall townlands on 128ha of agricultural lands between the Slievefelim to Silvermines SPA and the Upperchurch Windfarm. Activities associated with the Scheme includes once off activities such as planting of hedgerows and trees; enhancement of riparian corridors and scrub/wood areas; and the fencing off of watercourses and newly planted trees and shrubs. The Scheme also includes long-term farm management practices such as management of rush coverage, livestock grazing and the control of the use of lime, fertilizers and burning of gorse, amongst others. Nine local landowners are signed-up to the Scheme. Implementation involves a mix of initial once-off activities which will both create new habitat and protect and enhance existing habitat; and on-going farming practices which will result in the long term maintenance of hen harrier habitat.

Monitoring Activities will monitor the Whole UWF Project for compliance with the environmental protection measures and mitigation measures detailed in the UWF 2013 EIS and 2013 RFI (including the Construction Environmental Management Plan for Upperchurch Windfarm and the Ecological Management Plan for Upperchurch Windfarm); Planning Conditions attaching to the already consented UWF; and measures in the 2018 UWF Grid Connection EIA Report, the 2018 UWF Related Works EIA Report and the 2018 UWF Replacement Forestry EIA Report and associated UWF Grid Connection Environmental Management Plan and UWF Related Works Environmental Management Plans. Monitoring will also involve the supervision and recording of key construction activities, and monitoring of progress of land reinstatement.

Overhead Line Activities include re-sagging activities and fibre wrapping activities. The purpose of the re-sagging activities is to correct the tension of the existing overhead line, following the installation of the UWF Grid Connection End Masts, so that the lines are held within predefined tension parameters. The purpose of fibre wrapping is to provide a communication link to the newly installed Mountphilips Substation. The tension will be corrected on 2 no. Sections - i) between ESNB Angle Mast Structure No. 79 (c.200m south of Mountphilips substation) to New Mountphilips End Mast No. 1 and ii) between New Mountphilips End Mast No. 2 and ESNB Angle Mast Structure No. 90 (2.3 km north of Mountphilips substation). Wrapping the overhead line with fibre optic cable from Killonan ESNB substation (just east of Limerick City) to Mountphilips substation. The Overhead Line Activities will be carried out according to industry standard method statements, including standard health & safety and environmental management systems.

5.6.1.4.2 UWF Other Activities: Construction & Operation

Timing: The **Haul Route Activities** will occur prior to commencement of turbine component haulage and reinstatement will occur immediately after the passage of all components. The initial once-off activities associated with the **Upperchurch Hen Harrier Scheme** such as permanent planting and fencing of newly planted areas and watercourses will be carried out during the same period as the construction of UWF and UWF Related Works. There will be pre-construction **Monitoring Activities** before UWF and UWF Related Works commence. **Overhead Line Activities** will take place at the same time as the construction of Mountphilips substation.

UWF Other Activities Construction Phase: Approximately 50 persons will be engaged in UWF Other Activities including haul route activities, landowners involved in the hen harrier scheme, environmental experts engaged in the monitoring schemes and ESB Crews involved in overhead line activities. There will be very little materials delivered to the activity sites, these will include deliveries of geotextile matting, trees and shrubs, fencing materials and specialist ESB equipment.

UWF Other Activities Operational Phase: The same **Haul Route Activities** as for the construction phase, will be required in the occasional event of a large component delivery to UWF, if required, during the operational phase. The farming practices required under the **Upperchurch Hen Harrier Scheme** will continue throughout the lifetime of UWF. **Monitoring** of the success of Upperchurch Hen Harrier Scheme will be carried out during the operational lifetime of UWF. Monitoring will also include operational planning conditions and Ecological Management Plan compliance.

Use of Natural Resources: No land use changes required. No water or welfare facilities required. No mechanical excavations required; all planting will be carried out by hand. For haul route activities, up to 960m of roadside boundary hedges/treelines will be trimmed, outside of the general bird breeding season. For the Hen Harrier Scheme, 2.2ha of trees, 1.4km of riparian habitat and 2.8km of new hedgerow will be enhanced or created during initial activities. In total 128 hectares of agricultural lands will be management for the benefit of hen harrier.

There will be negligible **Emissions** from vehicles transporting personnel and any general **Waste** arising on-site will be removed by the crew themselves during the **construction** and **operational phase** of these Other Activities.

5.6.1.5 Cumulative Locational Context of all the Elements

The majority of the whole UWF project is located in County Tipperary with some minor activities along the Upperchurch Windfarm turbine component haul route and on the Killonan to Nenagh 110kV overhead line, in County Limerick (these activities are part of Element 5: UWF Other Activities).

The UWF Grid Connection is adjacent to and overlaps with Other Elements of the Whole UWF Project where:

- It is adjacent to the UWF Related Works and the Upperchurch Windfarm in Knockmaroe, Knockcurraghbola Commons and Knockcurraghbola Crownlands,
- It overlaps with Upperchurch Windfarm at the Consented UWF Substation, and

Relevant Volume C3 EIAR Figures:

Figure CE 1.2: UWF Grid Connection and the Other Elements of the Whole UWF Project in the vicinity of Upperchurch Windfarm.

Figure CE 1.3: UWF Grid Connection and the Other Elements of the Whole UWF Project in Knockmaroe, Knockcurraghbola Commons and Knockcurraghbola Crownlands.

5.6.2 Secondary Projects

The addition of Mountphilips Substation will add a new high voltage electrical substation in the Newport area. This may facilitate new connections to the Mountphilips substation in the future. There are no new connections planned at present.

5.6.3 Description of Other Projects and Activities

A cumulative evaluation of the effects of the subject development together with the Other Elements of the Whole UWF Project and Other Projects or Activities is presented in the Environmental Factor topic chapters.

Other Projects or Activities in the area were scoped using geographical and time-frame boundaries and conceptual site model exercises, see [Appendix 2.3: Scoping of Other Projects or Activities](#). The results of this scoping exercise is presented in Table 5-11, where Other Projects or Activities which have been scoped in for cumulative evaluation are listed in the left hand column of the matrix table, and the relevant Environmental Factor topic is identified in grey shading in the matrix.

Table 5-11: List of Other Projects or Activities included in the Environmental Factor Cumulative Evaluation

Other Project or Activity (These projects are identified on Figure CE 2.1: Other Projects or Activities Scoped In for Cumulative Evaluation in the Environmental Factor topic chapters)	Population	Human Health	Biodiversity	Land	Soils	Water	Air	Climate	Built Services	Roads & Traffic	Cultural Heritage	Landscape
Existing Killonan to Nenagh 110kV Overhead Line									-			
Existing Shannonbridge – Killonan 220kV Overhead Line												
Consented Bunkimalta Windfarm												
Consented Castlewaller Windfarm												
Existing Milestone Windfarm (includes permitted turbine at Inchivara) currently under construction												
Operational Windfarms in the Republic of Ireland												
Existing Communication Structures - Foilnahan Mast - Cummermore Communications Pole												
Consented Project – Newport Distributor Road, Newport												
Consented Project - Industrial warehouse Units at Thurles												
Existing/consented Project - Thurles Regional Water Treatment Works												
Consented Gortnahalla Turbine												
Killuragh Digester Plant												
Housing Development in Doon and Annacotty												
Agricultural Developments - Milk Milking Parlour in Cappamore, Milking Parlour in Lisnagry, Slatted Sheds and Stores in Pallasgreen, Slatted Shed in Gortussa.												
Activity – Forestry												
Activity – Agriculture												
Activity –Turf-cutting												

A brief overview of each of the above listed projects is provided below. The location of each project in relation to the elements of the Whole UWF Project is identified on **Figure CE 2.1: Other Projects or Activities Scoped In for Cumulative Evaluation in the Environmental Factor topic chapters.**

5.6.3.1 Existing Killonan to Nenagh 110kV Overhead Line

A high voltage (110kV) overhead line which runs between Killonan Station and Nenagh ESB substation (County Tipperary). The existing line is located to the west of the UWF Grid Connection and does not pass over the route of the 110kV UGC. The new Mountphilips Substation will be connected to this line via two new End Masts in farmland, west of the substation compound.

5.6.3.2 Existing Shannonbridge – Killonan 220kV Overhead Line

A high voltage (220kV) overhead line which runs between Shannonbridge ESB substation in County Offaly and Killonan ESB substation in County Limerick. A section of the line passes close to the UWF Grid Connection 110kV UGC in the townlands of Coole and Mountphilips.

5.6.3.3 Consented Bunkimalta Windfarm

The Bunkimalta Windfarm is a consented 16-turbine windfarm, located on Coillte lands, c.2.5km to the north of the UWF Grid Connection at Bunkimalta, Bauraglanna, Lackabrack, Knockfune and Foilduff at, Keeper Hill, Co. Tipperary.

Bunkimalta Windfarm will comprise 16 wind turbines, each having a rated electrical output of approximately 2,500 - 3,000 kilowatts, access tracks, a fenced Electrical Transformer Station comprising a single-storey Control Building and Substation, an effluent treatment system, three anemometer masts, repository areas, borrow pits and all associated site works, above and below ground. Each wind turbine will comprise a tower up to a maximum of 100 metres high, with a diameter of about 4 metres at the base. Three blades, up to a maximum of 50 metres in length, will be attached.

The Bunkimalta Windfarm will connect to the National Grid via an already consented underground grid connection to the existing Nenagh Substation, on the outskirts of Nenagh town.

The Bunkimalta Windfarm could be constructed during the same period as the UWF Grid Connection and the Whole UWF Project. Bunkimalta Windfarm, when built, will be operational during the operational stage of the Whole UWF Project.

An Environmental Impact Statement and Natura Impact Statement accompanied the planning application 13510035.

5.6.3.4 Consented Castlewaller Windfarm

The Castlewaller Windfarm is a 16-turbine windfarm, comprising 16 wind turbine generators (each with a maximum hub height of 100m, maximum rotor diameter of 90m, and with a total tip height of 145m), one permanent meteorological mast, 2 borrow pits, a sub-station including a control building, new internal access roads, upgrading of existing internal access roads, expansion of drainage system, turbine hardstands, wastewater holding tank, underground cables and ancillary works which is located along part of the 110kV UGC route in Castlewaller townland.

An Environmental Impact Statement and Natura Impact Statement accompanied the planning application 11/51/0251 for Castlewaller Windfarm.

Castlewaller Windfarm has not as yet secured a grid connection offer to connect to the National Grid from either Eirgrid or E.S.B Networks and therefore is not likely to be in construction at the same time as the construction of the Whole UWF Project.

5.6.3.5 Existing Milestone Windfarm

Milestone Windfarm is a consented 6-turbine windfarm located adjacent to the southwest of the consented Upperchurch Windfarm with 5 No. turbines consented under planning ref: 12510385 at Knockcurraghbola Commons, Knockcurraghbola Crownlands, Graniera and Shevry and 1 No. turbine consented under planning ref: 1410 at Inchivara and Knockduff. When constructed, Milestone Windfarm will comprise of wind turbines each with a maximum tip height of 126m, along with new access tracks, and electrical substation, a borrow pit and associated works. The grid connection associated with the Milestone Windfarm is towards the south at ESBN Cautteen Station, to be cabled along the public road network. An Environmental Impact Statement accompanied the planning applications for Milestone Windfarm – Ref: 12510385 & 1410.

Milestone Windfarm is currently under construction with construction works expected to be completed before the commencement of the construction of the subject development or any of the other elements of the Whole UWF Project. Therefore there will be no overlap of construction periods.

Part of the landholding associated with the Milestone Windfarm occurs within one of the landholdings associated with the 110kV UGC element of the UWF Grid Connection, in Knockcurraghbola Commons townland.

5.6.3.6 Operational Windfarms in the Republic of Ireland

The Republic of Ireland has a generating capacity of 2,909.66 MW based on 233 windfarms.

5.6.3.7 Existing Communication Structures

Foilnaman Mast: An existing communications mast comprising a 30m steel lattice mast structure at Knockmaroe townland, in the vicinity of the UWF Related Works/Upperchurch Windfarm site.

Cummernore Communications Pole: An existing communications structure comprising a 20m support pole, c.2km to the southwest of the Upperchurch Windfarm, and within 4km of the UWF Related Works (Telecom Relay Pole). This existing pole carries radio aerials and a communications dish, together with associated equipment, cabling, gantry pole, GPS timing antenna, cabinet and fencing. Planning Ref: 14600313

5.6.3.8 Consented Project – Newport Distributor Road, Newport

Consented public road development at Newport, County Tipperary, comprising the demolition of two habitable dwellings and the provision of a distributor road between the R503 and local county road (Murroe Road) and associated site works including footpaths, lighting, cycle tracks and drainage, at Tullow, Newport County Tipperary. The road development is within the Newport River catchment and also located upstream of the Lower River Shannon SAC. Planning Ref: 07511157.

5.6.3.9 Consented Project – Industrial Warehouse Units at Thurles

The construction of 1 No. Light Industrial/Warehousing building (gross floor area 2360.6sq.m.) at Bawntameena, Nenagh Road, Thurles, along with a roundabout and access Road from Nenagh Road (R498) complete with necessary improvement works and road markings, a car park and loading areas and ancillary

works; in addition the construction of a foul water pumping station and all associated works. Planning ref: 16600037.

5.6.3.10 Consented Project - Thurles Regional Water Treatment Works

The construction of a water treatment plant at Bohernacrusha, Killeenyarda, Holycross and outfall to the River Suir. The water treatment plant will consist of a water treatment and administration building, sludge dewatering building, ESB sub-station, generator & oil tank enclosure, raw water balancing tank, clear water tanks, sludge balancing tank, sludge thickening and sludge holding tank, washwater tank, sludge skip and emergency sludge storage area, chemical storage tanks, washwater storage tank and all associated site development and site excavation works above and below ground. Planning Ref: 16600877.

5.6.3.11 Consented Gortnahalla Turbine

Single wind generator with a maximum output set at 500kw, hub height 65m at Gortnahalla, near Upperchurch, Co Tipperary. Planning Ref: 12510368.

5.6.3.12 Killuragh Digester Plant

Development of a digester plant, associated ABP building and associated site works to process farm slurry and other organic material to provide renewable energy and fertilizer, in Killuragh, Pallasgreen, Co Limerick. Planning Ref: 111066.

5.6.3.13 Housing Development in Doon and Annacotty

Two housing developments: Construction of 25 no. houses consisting of 5 no. 4 bed detached dwellings, 20 no. 3 bed semi-detached dwellings, a bored well, entrance and roads together with associated site works and services at Bottle Hill, Doon, Co Limerick, Planning Ref: 16530; and Construction of 48 dwellings at Annacotty & construction of 240 dwellings in three areas/lots at Walkers Road, Annacotty, Co Limerick, Planning Ref: 137026 and 137094.

5.6.3.14 Agricultural Developments

Agricultural developments include a milk Milking Parlour in Cappamore, Co Limerick (Planning Ref: 15255), a Milking Parlour in Lisnagry, Co Limerick (Planning Ref: 15194), Slatted Sheds and Stores in Pallasgreen, Co Limerick (Planning Ref: 17133), and a Slatted Shed in Gortussa, Dundrum Co Tipperary (Planning Ref: 14600343).

5.6.3.15 Activities – Forestry, Agriculture

Agriculture and forestry are the predominant land uses in the area of the Whole UWF Project.

5.6.3.16 Activity – Turf-Cutting

Turbary (rights to cut turf) exists at Bleanbeg Bog immediately to the north of the UWF Grid Connection (110kV UGC) in the Castlewaller area.

The above projects and activities are included in the cumulative evaluations in the Environmental Topic chapters – Chapters 6 to 17. The relevant Environmental Factor topic is identified on Table 5-11.

Description of Development (UWF Grid Connection)

Figures and Mapping




Title: **Figure GC 5.1**

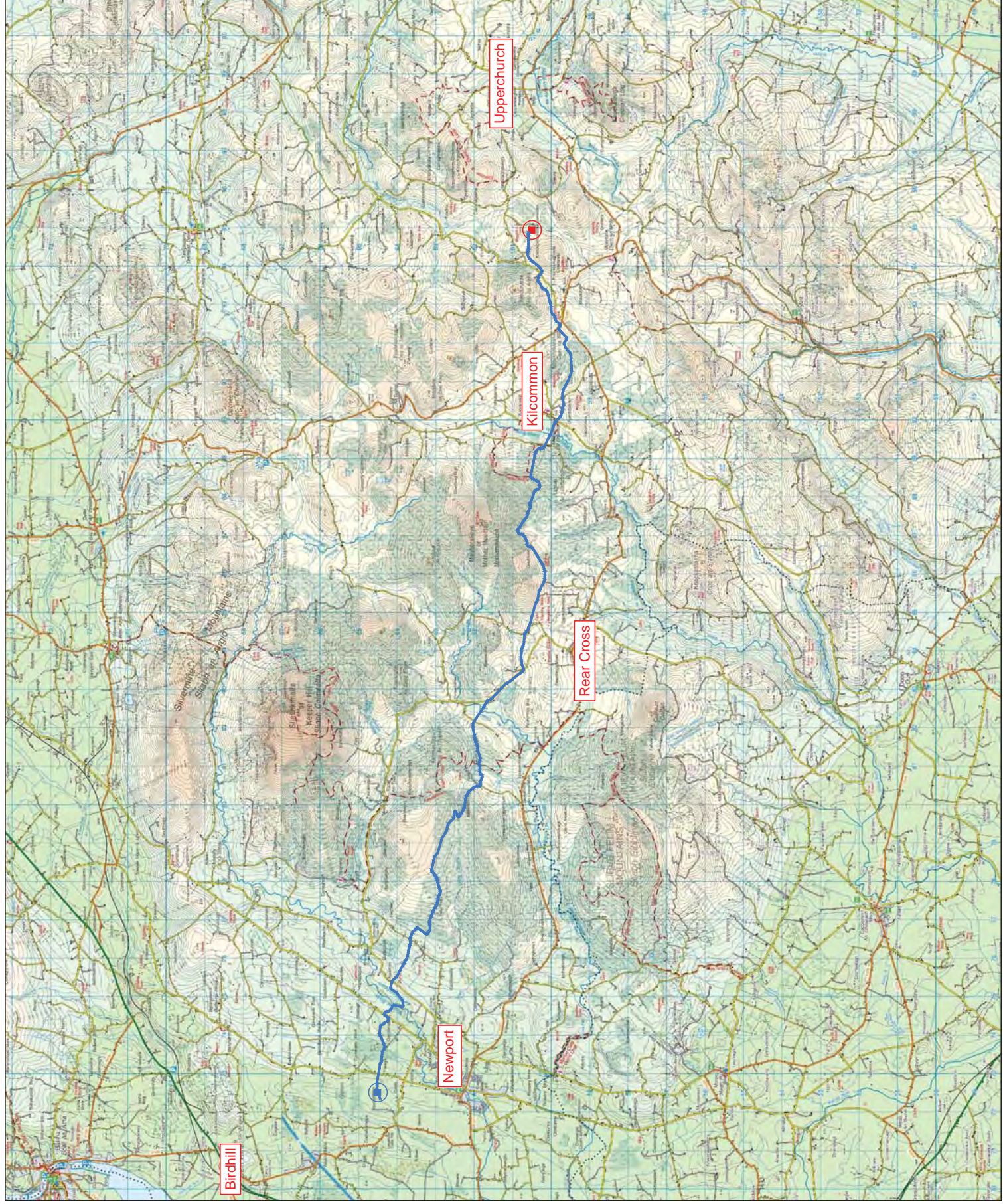
Location of the UWF Grid Connection on OSI Discovery Mapping

Map Number:

Overview Map on OSI Discovery Mapping

Legend:


-  **UWF Grid Connection**
 **Mountphilips Substation**
 **Consented UWF Substation**



Project:

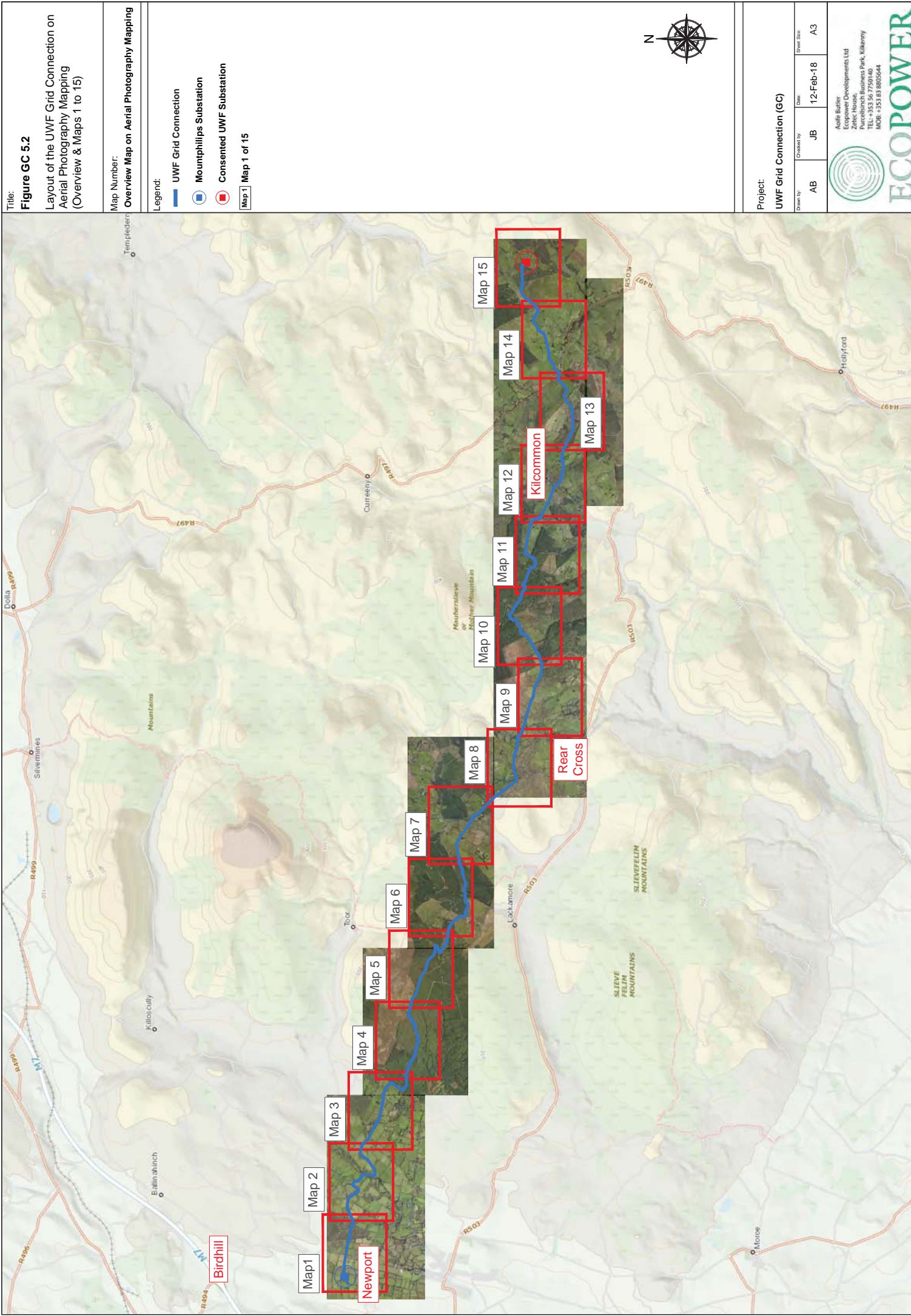
UWF Grid Connection (GC)

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Title: **Figure GC 5.2**
Layout of the UWF Grid Connection on
Aerial Photography Mapping
(Overview & Maps 1 to 15)

Map Number:
Map 1 of 15


- Legend:**
- | | | | | | |
|--|--|--|------------------------|--|---------------------------------------|
| | Existing Nenagh to Killonan 110kV OHL | | Temporary Access Roads | | Temporary hedgetree removal & pruning |
| | End Masts | | Existing Access Roads | | Permanent hedgetree removal |
| | End Masts temporary crane handstands | | Dirty water drain | | Diverted Stream |
| | Underground Cable from Nenagh to Killonan 110kV OHL into Mountphilips Substation | | Settlement Pond | | Grid Connection Road Crossings |
| | 110kV Substation Compound | | Clean water drain | | Grid Connection Water Crossings |
| | 110kV Substation Control Building | | Drainage Berm | | New Permanent Road ID |
| | Temporary Construction Compound C1 | | Permanent Berm | | Existing Access Road ID |
| | Mountphilips - Upperchurch 110kV UGC | | | | Temporary Site Entrance |
| | Joint Bay Locations | | | | (unless indicated permanent on map) |
| | New Permanent Access Roads | | | | Watercourse |
| | Temporary Access Roads | | | | Public Road |
| | Existing Access Roads | | | | Public Road Number |
| | Dirty water drain | | | | Townlands |
| | Settlement Pond | | | | |
| | Clean water drain | | | | |
| | Drainage Berm | | | | |
| | Permanent Berm | | | | |
| | Temporary hedgetree removal & pruning | | | | |
| | Permanent hedgetree removal | | | | |
| | Diverted Stream | | | | |
| | Grid Connection Road Crossings | | | | |
| | Grid Connection Water Crossings | | | | |
| | New Permanent Road ID | | | | |
| | Existing Access Road ID | | | | |
| | Temporary Site Entrance | | | | |
| | (unless indicated permanent on map) | | | | |
| | Watercourse | | | | |
| | Public Road | | | | |
| | Public Road Number | | | | |
| | Townlands | | | | |

Project:

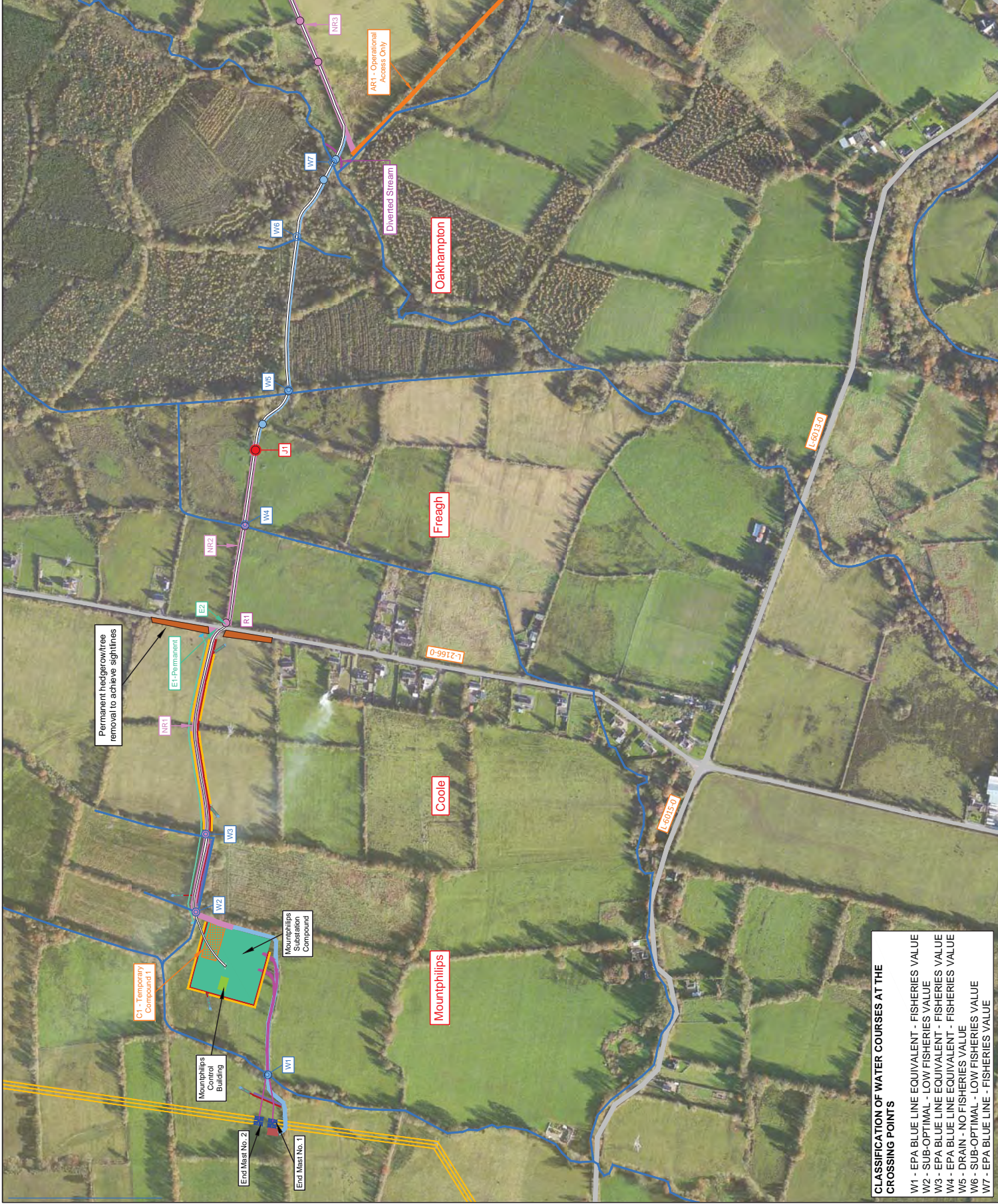
UWF Grid Connection (GC)

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CLASSIFICATION OF WATER COURSES AT THE CROSSING POINTS

- W1 - EPA BLUE LINE EQUIVALENT - FISHERIES VALUE
W2 - SUB-OPTIMAL - LOW FISHERIES VALUE
W3 - EPA BLUE LINE EQUIVALENT - FISHERIES VALUE
W4 - EPA BLUE LINE EQUIVALENT - FISHERIES VALUE
W5 - DRAIN - NO FISHERIES VALUE
W6 - SUB-OPTIMAL - LOW FISHERIES VALUE
W7 - EPA BLUE LINE - FISHERIES VALUE

CLASSIFICATION OF WATER COURSES AT THE CROSSING POINTS

- W8 - EPA BLUE LINE - FISHERIES VALUE
- W9 - DRAIN - NO FISHERIES VALUE
- W10 - EPA BLUE LINE - FISHERIES VALUE
- W66 - EPA BLUE LINE - FISHERIES VALUE

W8 - EPA BLUE LINE - FISHERIES VALUE
W9 - DRAIN - NO FISHERIES VALUE
W10 - EPA BLUE LINE - FISHERIES VALUE
W66 - EPA BLUE LINE - FISHERIES VALUE

Title: **Figure GC 5.2**
Layout of the UWF Grid Connection on
Aerial Photography Mapping
(Overview & Maps 1 to 15)

Map Number:
Map 3 of 15

Legend:

- Mountphilips - Upperchurch 110kV UGC
- New Permanent Access Roads

Temporary Access Roads

Existing Access Roads

Concealed Access Road (new permanent road)

Permanent Perm

Ferramenta de apoio

- Temporary hedge/tree removal & pruning

- Permanent hedge/tree removal

Joint Bay Locations

R12 Grid Connection Road Crossings

Grid Connection Water Crossings

New Permanent Road ID

Forestry Felling



Bat Crossing Locations

 Temporary Storage Area

Temporary Site Entrance

(unless indicated permanent on map)

Water Protection Measures

Watercourse

Public Road

Public Road Number

Townlands

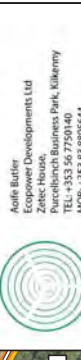



Project:

UWF Grid Connection (GC)

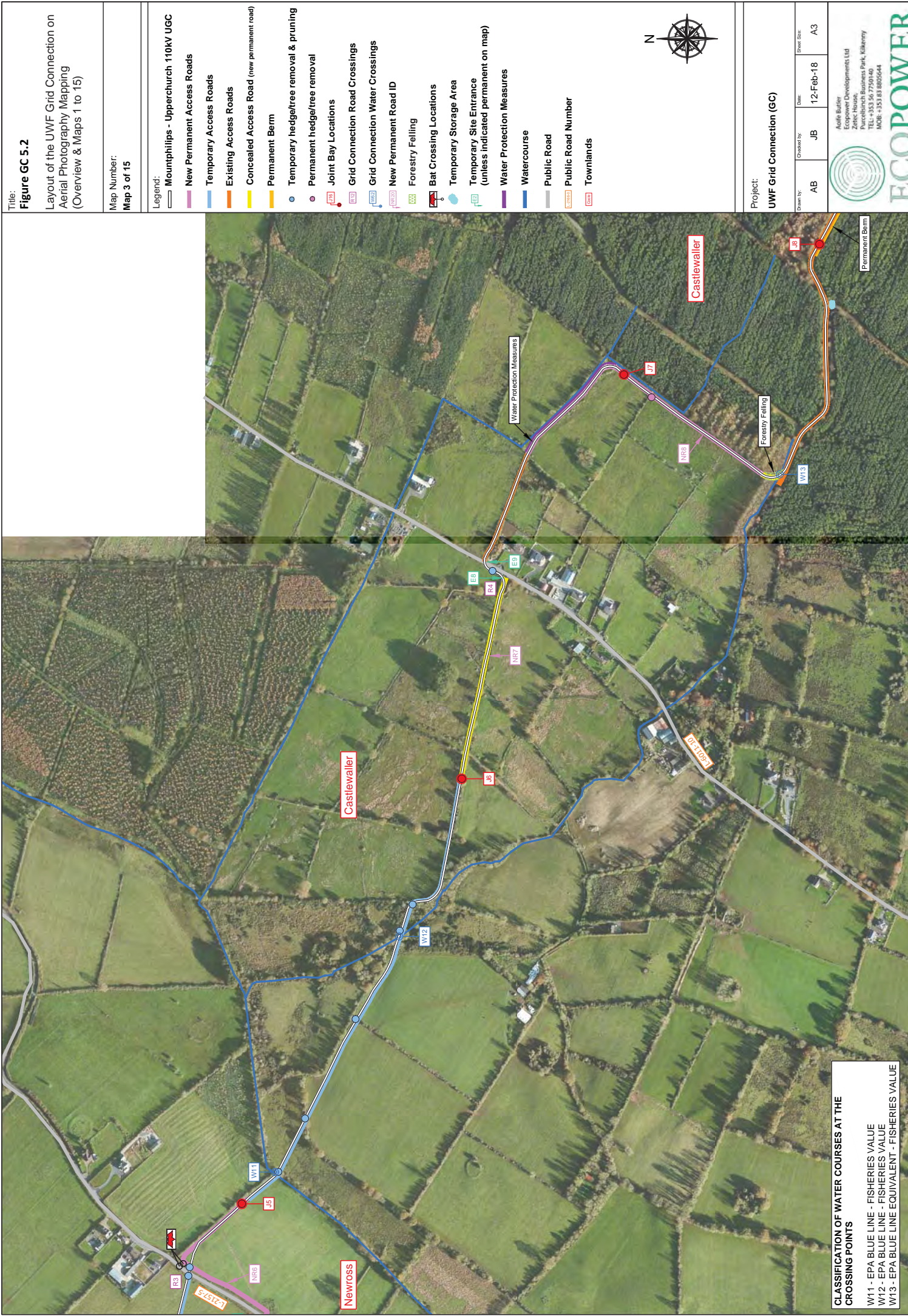
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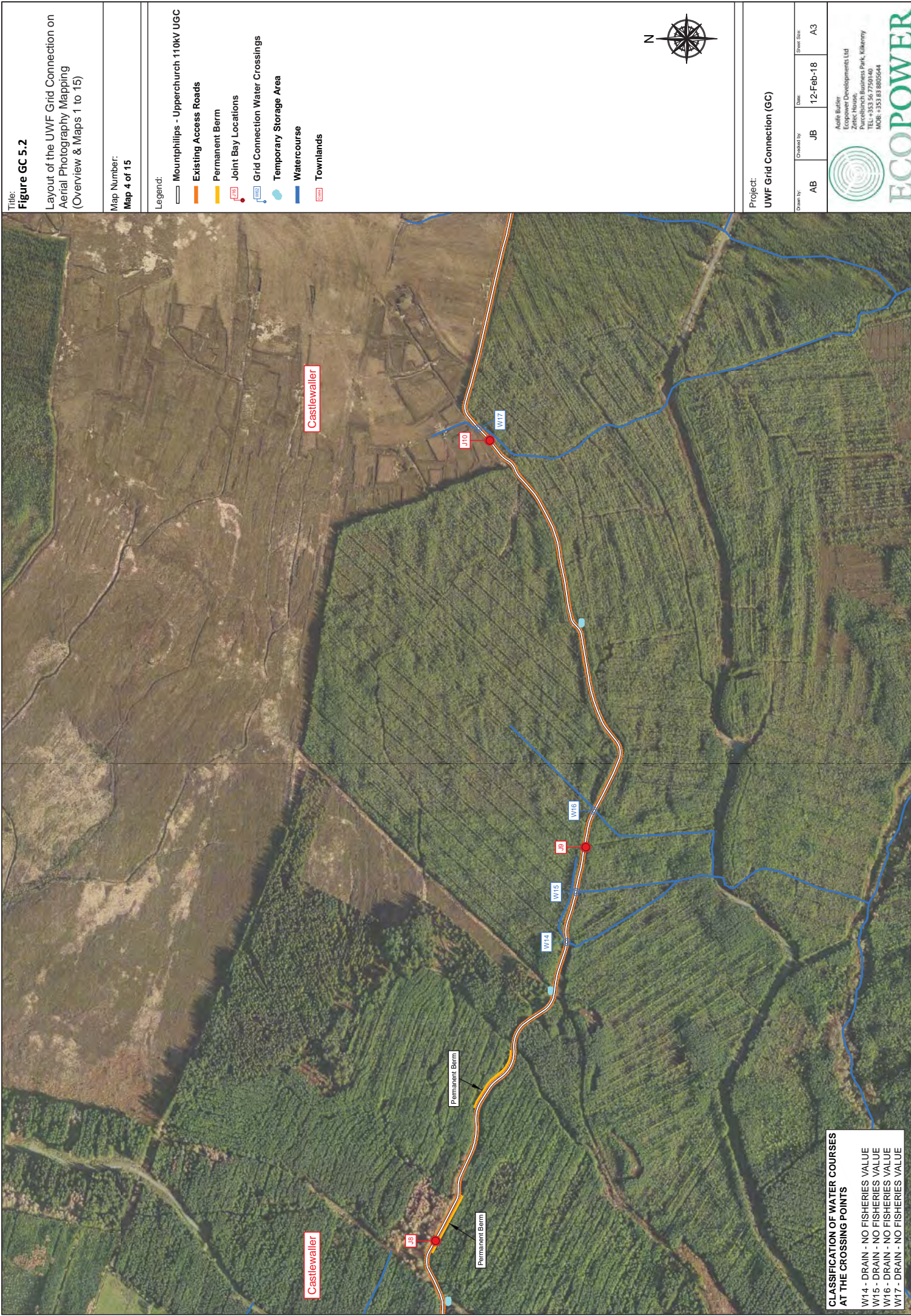
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CLASSIFICATION OF WATER COURSES AT THE CROSSING POINTS

Knockacappul

Killeen

W28 - DRAIN - NO FISHERIES VALUE
W29 - DRAIN - NO FISHERIES VALUE
W30 - DRAIN - NO FISHERIES VALUE
W31 - DRAIN - NO FISHERIES VALUE
W32 - EPA BLUE LINE - FISHERIES VALUE
W33 - DRAIN - NO FISHERIES VALUE
W34 - DRAIN - NO FISHERIES VALUE
W70 - EPA BLUE LINE EQUIVALENT - FISHERIES VALUE
W71 - DRAIN - NO FISHERIES VALUE
W72 - EPA BLUE LINE EQUIVALENT - FISHERIES VALUE
W73 - EPA BLUE LINE EQUIVALENT - FISHERIES VALUE
W74 - EPA BLUE LINE - FISHERIES VALUE
W75 - EPA BLUE LINE EQUIVALENT - FISHERIES VALUE
W76 - EPA BLUE LINE - FISHERIES VALUE
W77 - DRAIN - NO FISHERIES VALUE
W78 - DRAIN - NO FISHERIES VALUE
W79 - DRAIN - NO FISHERIES VALUE
W80 - DRAIN - NO FISHERIES VALUE
W81 - DRAIN - NO FISHERIES VALUE
W82 - DRAIN - NO FISHERIES VALUE
W83 - SUB-OPTIMAL - LOW FISHERIES VALUE
W84 - EPA BLUE LINE - FISHERIES VALUE
W85 - SUB-OPTIMAL - LOW FISHERIES VALUE
W86 - SUB-OPTIMAL - LOW FISHERIES VALUE
W87 - SUB-OPTIMAL - LOW FISHERIES VALUE

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UWF Grid Connection (GC)

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Knockacullin




















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Title: **Figure GC 5.2**
Layout of the UWF Grid Connection on
Aerial Photography Mapping
(Overview & Maps 1 to 15)

Map Number:
Map 9 of 15

Legend:

- | | |
|---|--|
|  | Mounphilips - Upperchurch 110kV UGC |
|  | New Permanent Access Roads |
|  | Temporary Access Roads |
|  | Existing Access Roads |
|  | Concealed Access Road <small>(new permanent road)</small> |
|  | Temporary hedge/tree removal & pruning |
|  | Permanent hedge/tree removal |
|  | Joint Bay Locations |
|  | Grid Connection Road Crossings |
|  | Grid Connection Water Crossings |
|  | New Permanent Road ID |
|  | Existing Access Road ID |
|  | Forestry Felling |
|  | Temporary Site Entrance
(unless indicated permanent on map) |
|  | Temporary Storage Area |
|  | Watercourse |
|  | Public Road |
|  | Public Road Number |
|  | Townlands |



Project:

UWF Grid Connection (GC)

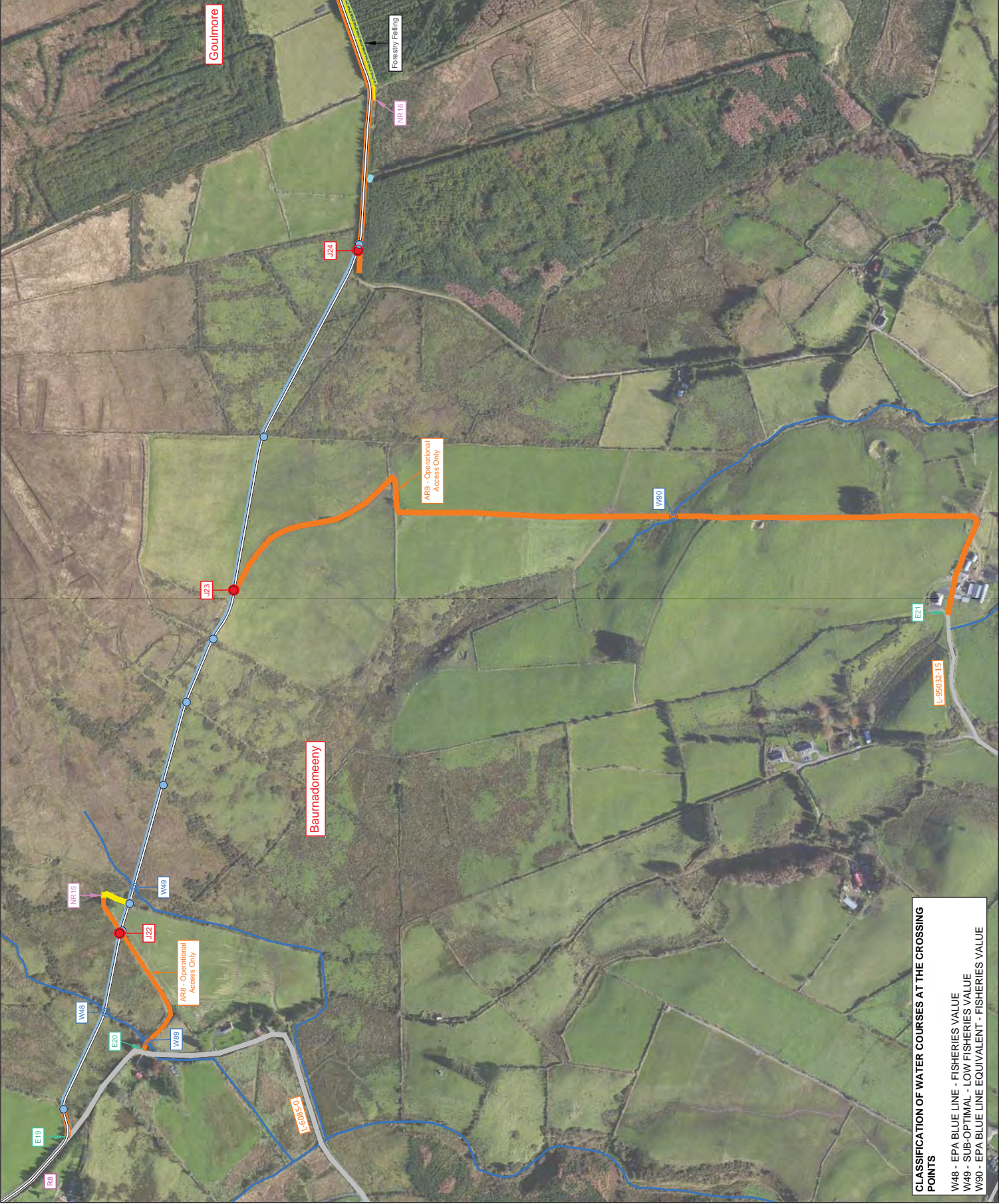
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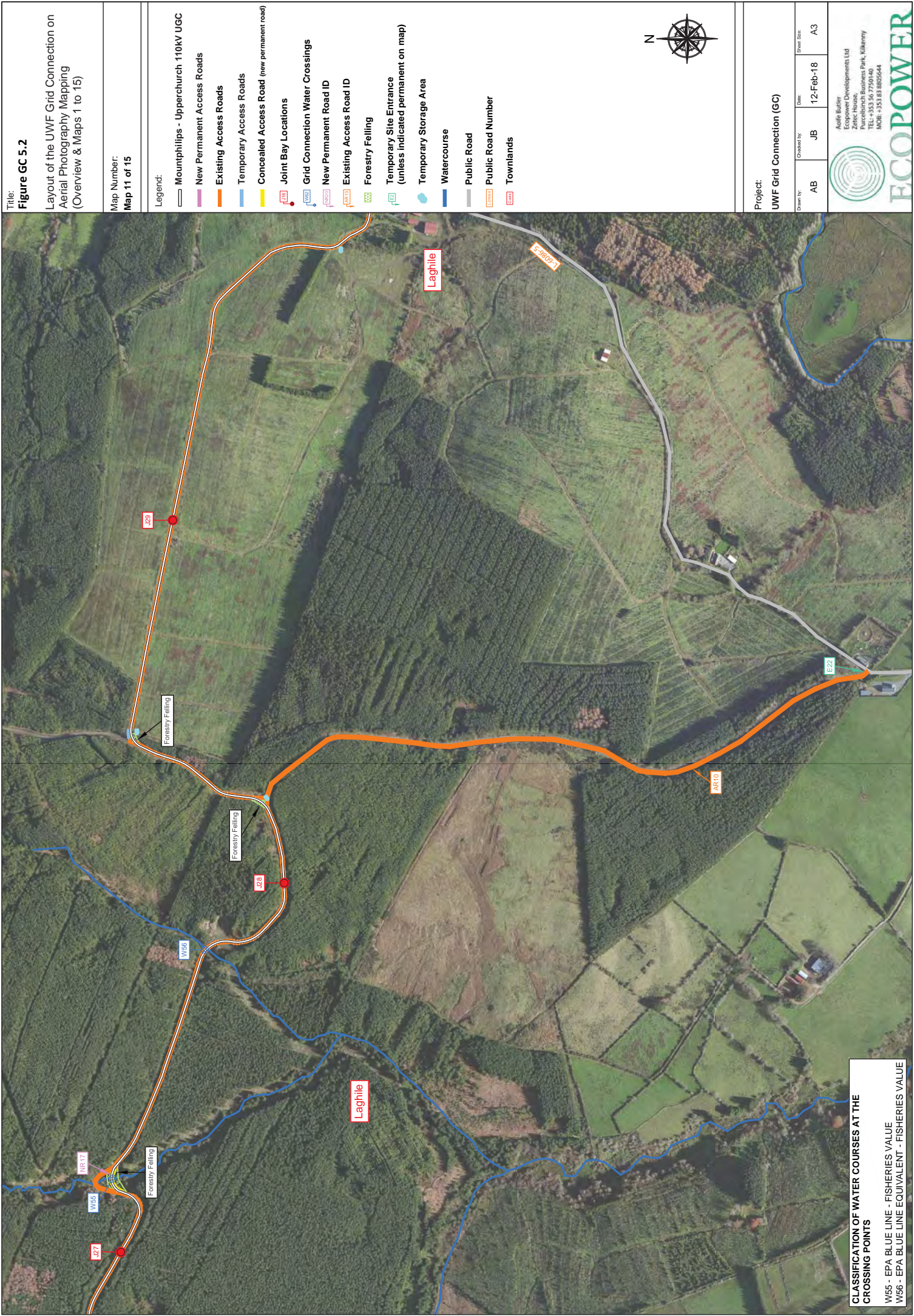


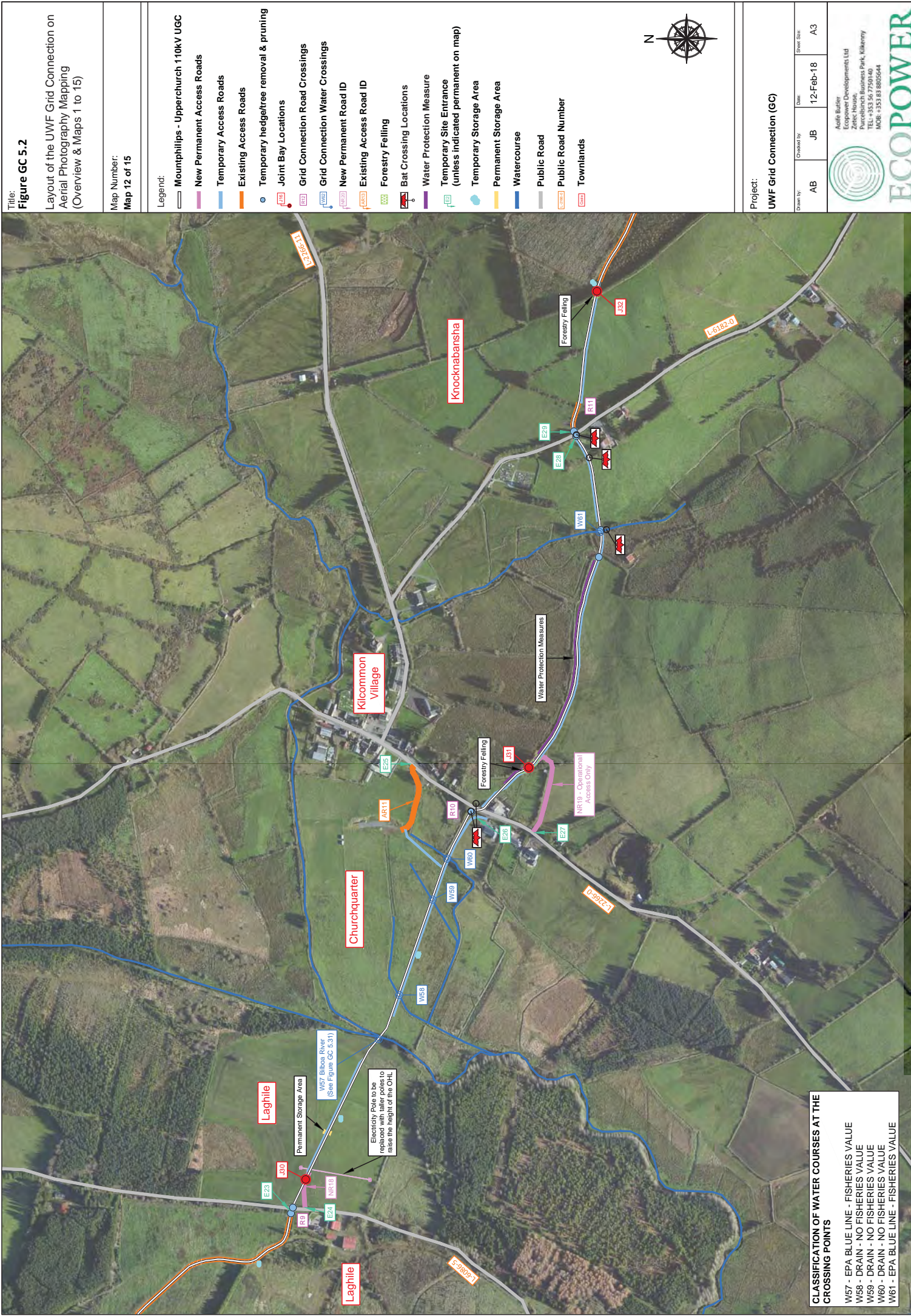
MOB: +353 83 8805644

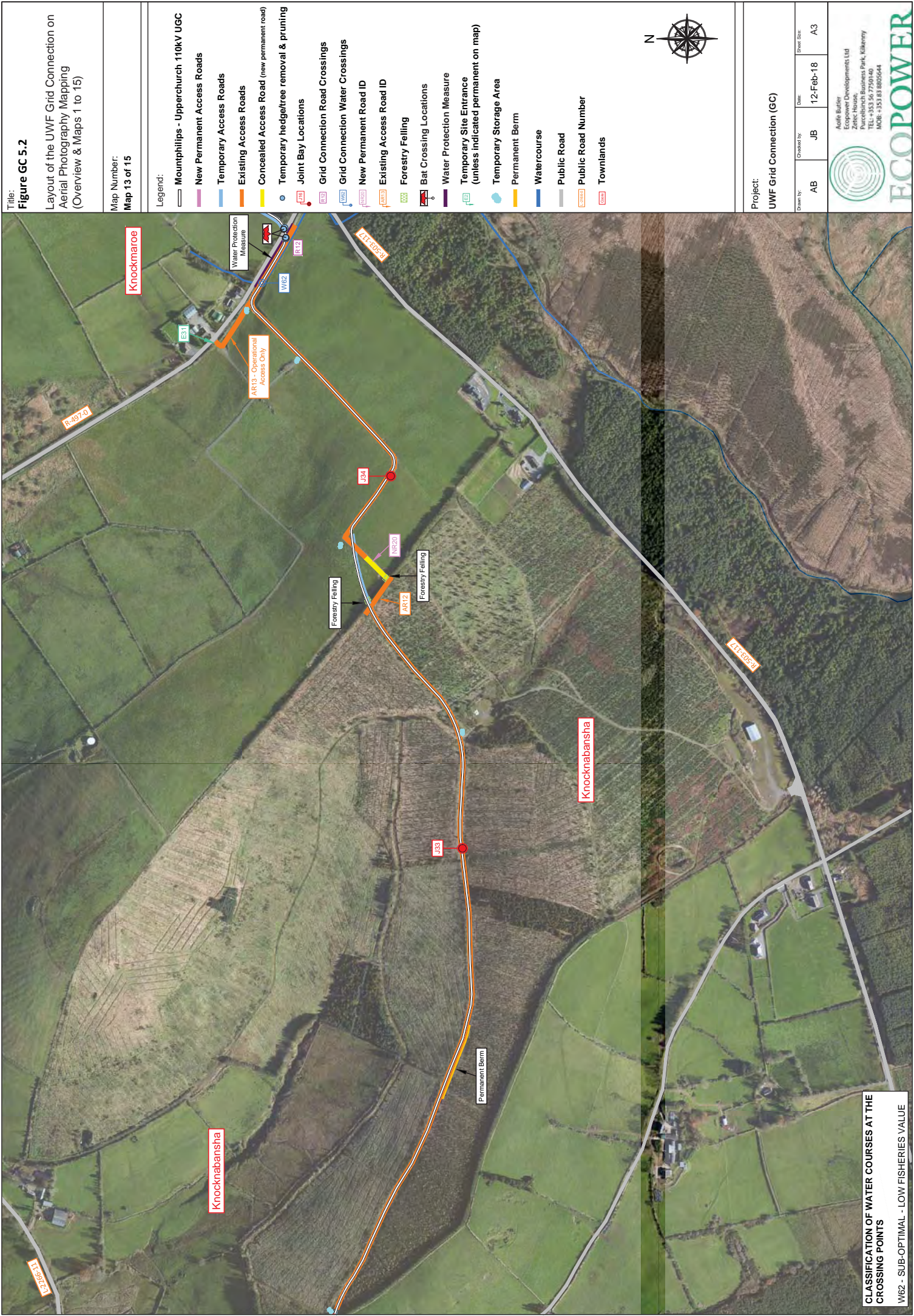


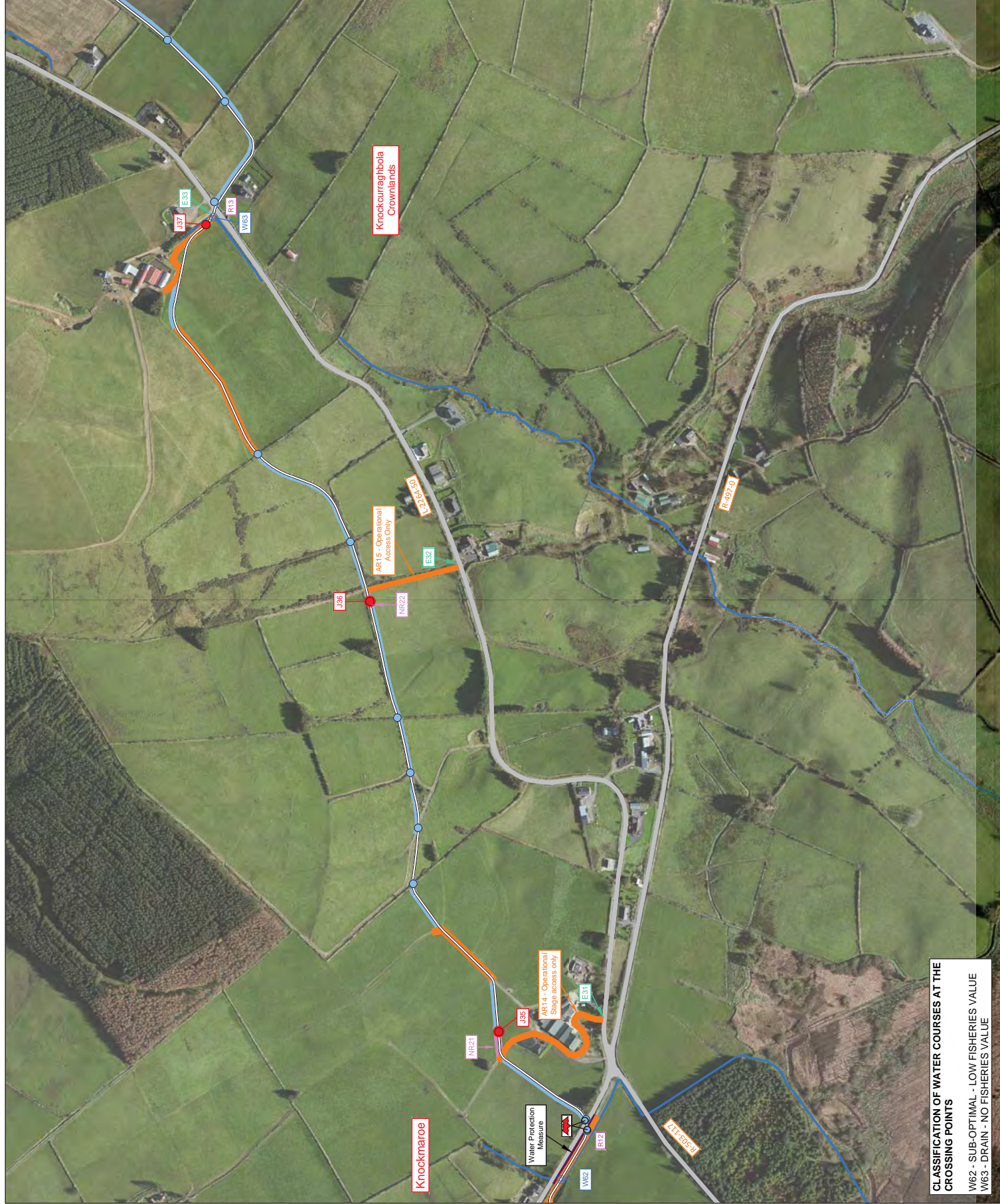
CLASSIFICATION OF WATER COURSES AT THE CROSSING POINTS

W48 - EPA BLUE LINE - FISHERIES VALUE
W49 - SUB-OPTIMAL - LOW FISHERIES VALUE
W90 - EPA BLUE LINE EQUIVALENT - FISHERIES VALUE









CLASSIFICATION OF WATER COURSES AT THE CROSSING POINTS

- W63 - DRAIN - NO FISHERIES VALUE
- W64 - DRAIN - NO FISHERIES VALUE
- W65 - DRAIN - NO FISHERIES VALUE

W63 - DRAIN - NO FISHERIES VALUE
W64 - DRAIN - NO FISHERIES VALUE
W65 - DRAIN - NO FISHERIES VALUE

Title: **Figure GC 5.3**
UWF Grid Connection Construction
Works Area Boundary
(Overview & Maps 1 to 15)

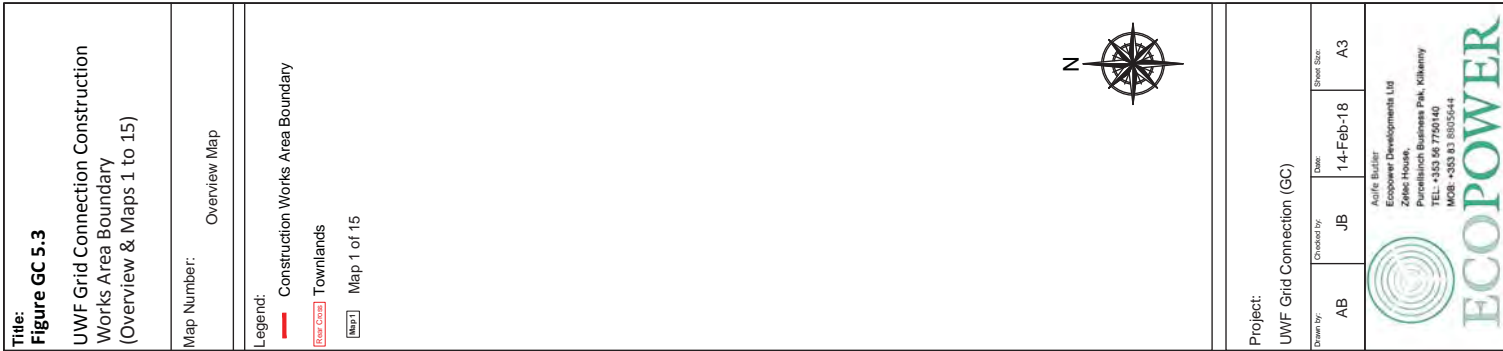
Map Number: Overview Map

Legend:

— Construction Works Area Boundary


Rear Cross Townlands

Map 1 of 15

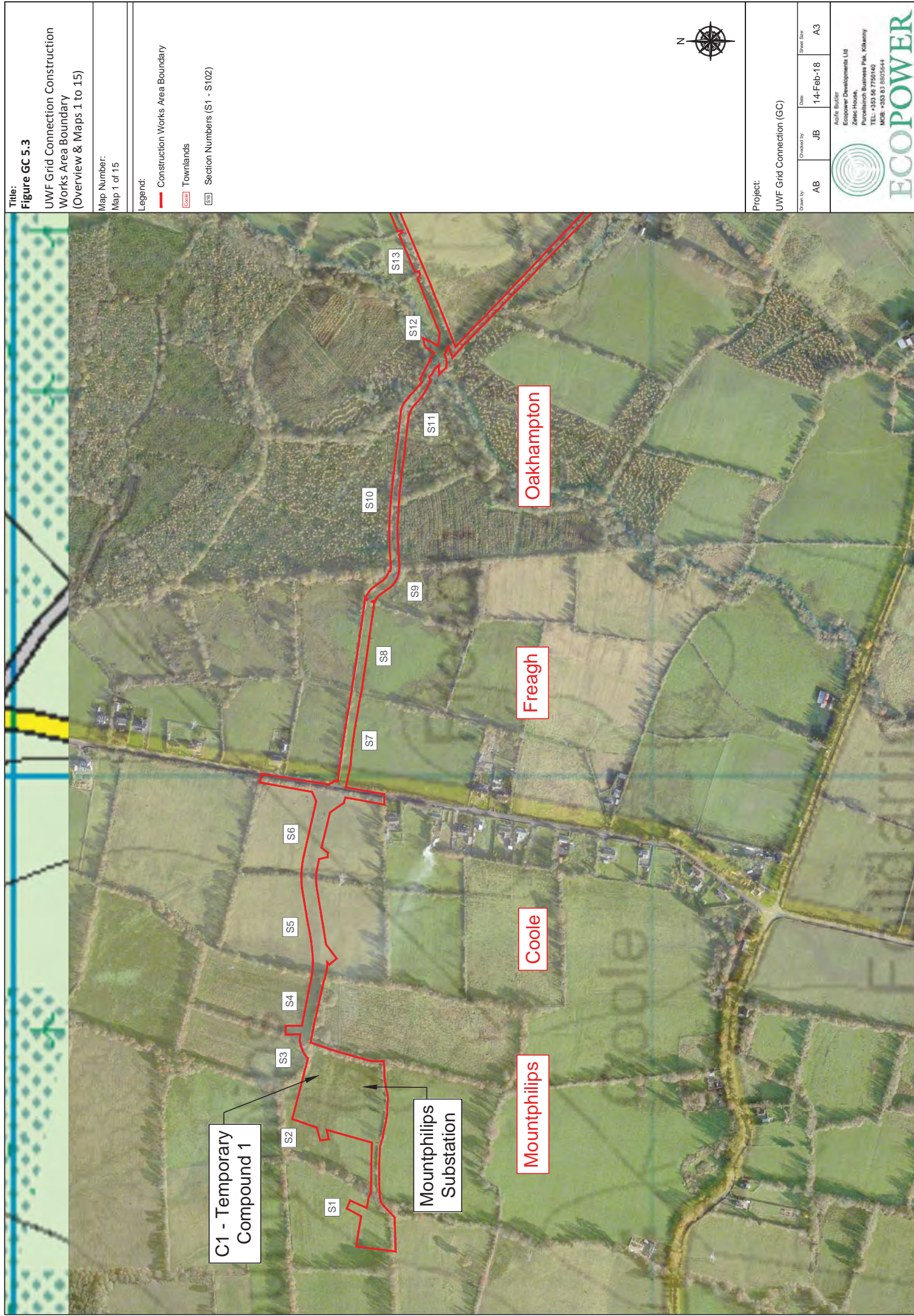


Project:
UWF Grid Connection (GC)

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Title:
Figure GC 5.3
UWF Grid Connection Construction
Works Area Boundary
(Overview & Maps 1 to 15)

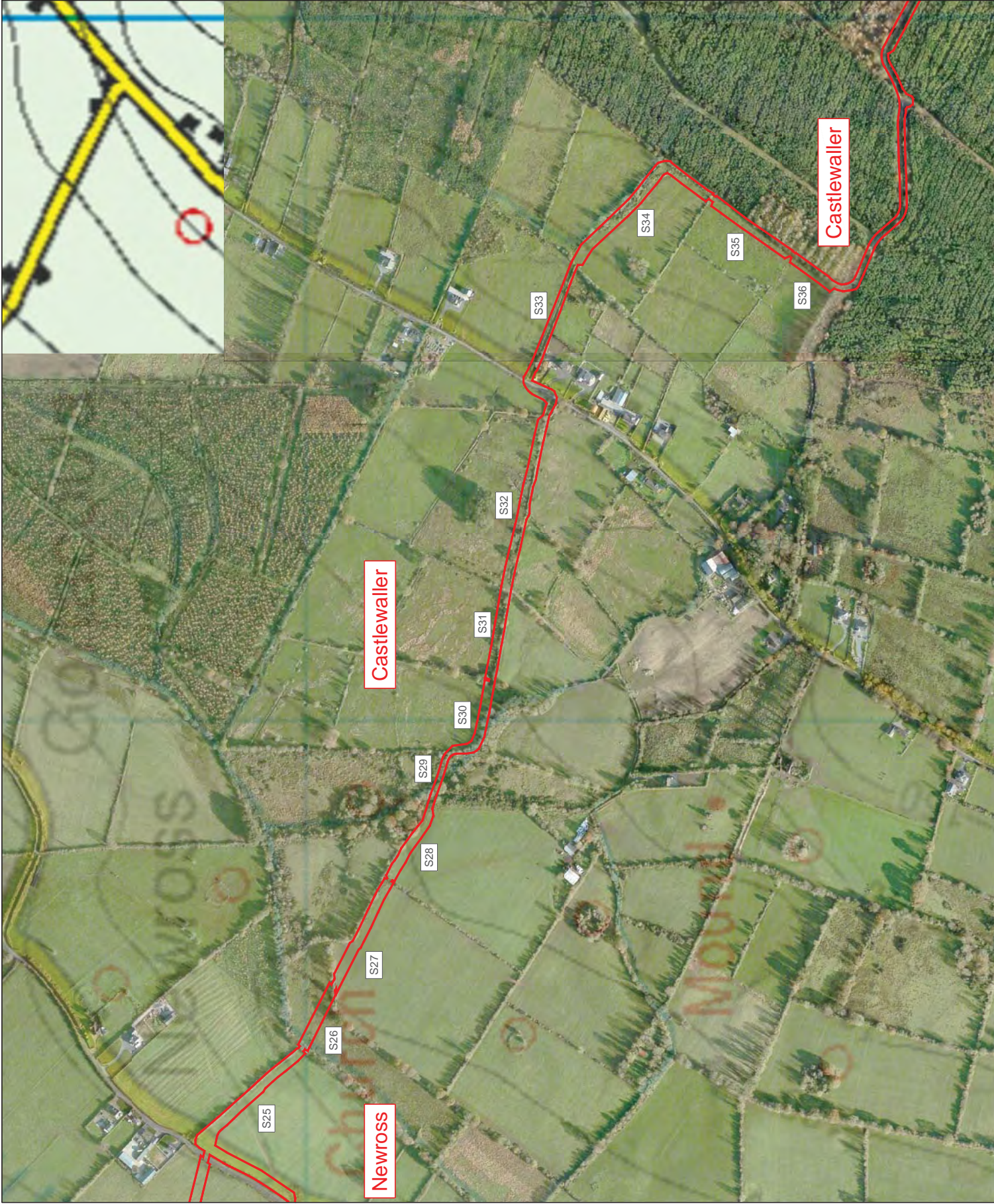
Map Number:
Map 3 of 15

Legend:
— Construction Works Area Boundary
Townlands
Section Numbers (S1 - S102)



Project:
UWF Grid Connection (GC)

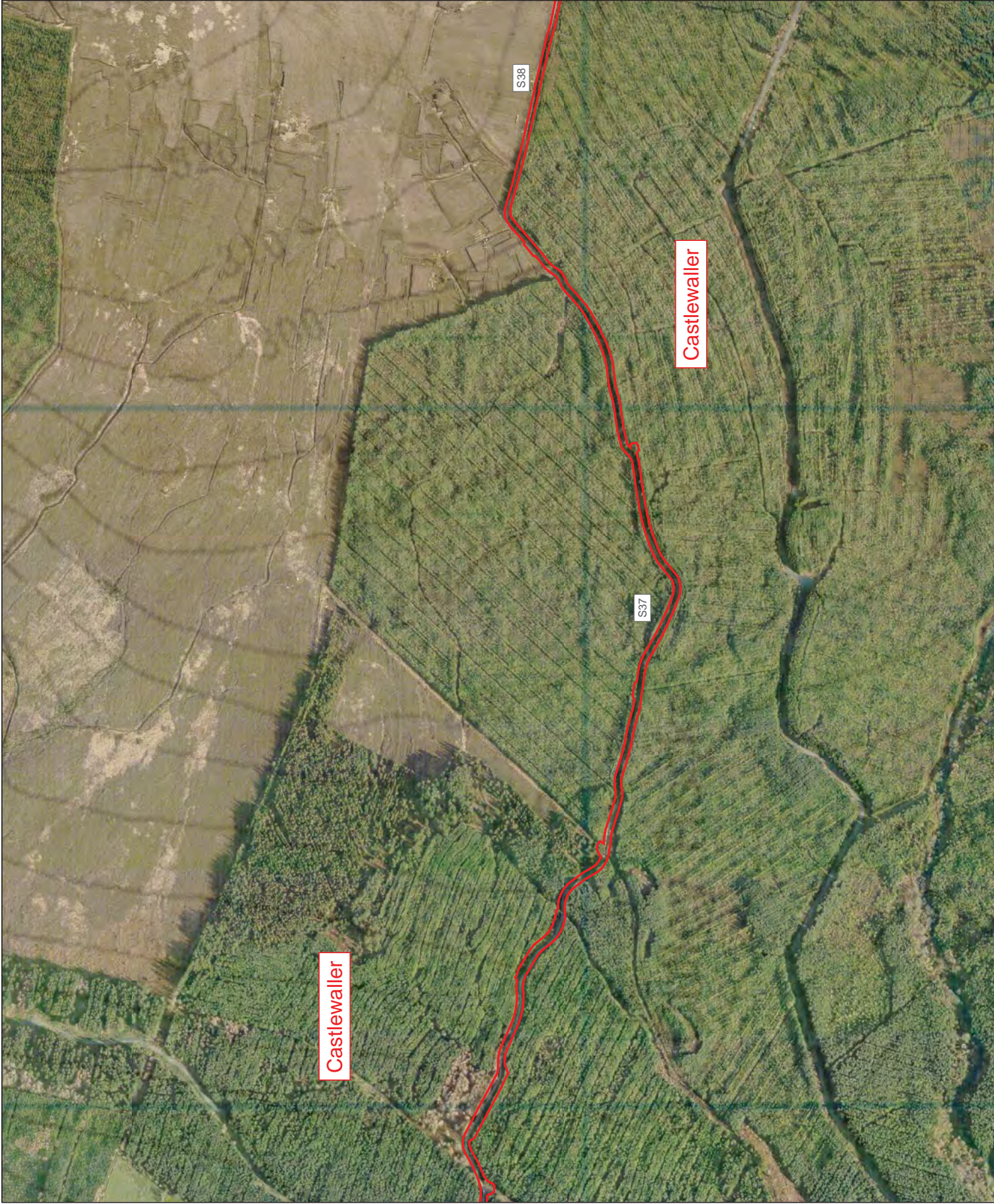
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Title:
Figure GC 5.3
UWF Grid Connection Construction
Works Area Boundary
(Overview & Maps 1 to 15)

Map Number:
Map 4 of 15

- Legend:
- Construction Works Area Boundary
 - Townlands
 - Section Numbers (S1 - S102)



Project:
UWF Grid Connection (GC)

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Title:
Figure GC 5.3
UWF Grid Connection Construction
Works Area Boundary
(Overview & Maps 1 to 15)

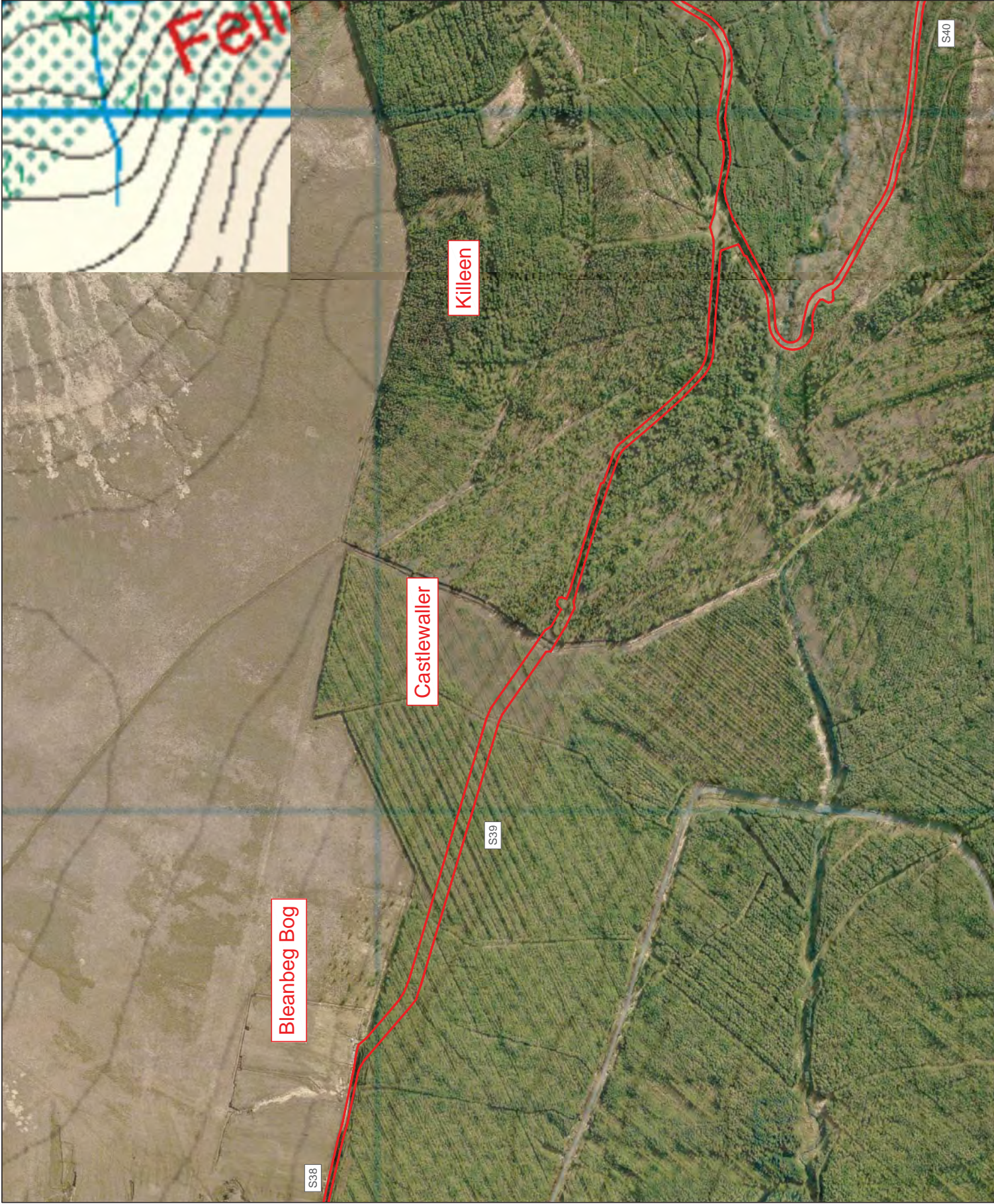
Map Number:
Map 5 of 15

Legend:
— Construction Works Area Boundary
S10 Townlands
S10 Section Numbers (S1 - S102)



Project:
UWF Grid Connection (GC)

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This aerial map illustrates the proposed Killeen Urban Extension, outlined by a red boundary. The extension is situated in a rural landscape characterized by green fields, hedgerows, and patches of trees. The map includes several labels for specific locations: Knockacappul to the north, Knockacullin to the northeast, and Killeen to the south and west. A series of numbered points, ranging from S40 to S47, are marked along the boundary line, likely indicating specific sites or landmarks. The map also shows some existing buildings and infrastructure, such as a road and a small cluster of houses near the bottom right corner.

The map displays the proposed Killeen Woodland Park, outlined in red. The park is situated in the Killeen area, bounded by Knockacappul to the north and Knockacullin to the east. The map shows a mix of green fields, wooded areas, and some buildings. A legend in the bottom right corner indicates that the red line represents the 'Proposed Killeen Woodland Park Boundary'. The map also shows the N10 road and several small water bodies. The text 'Killeen Woodland Park' is written in a large, stylized font across the center of the map.

The map displays the proposed Killeen Urban Extension, bounded by a red line. The extension area includes a large green field in the center-left, a wooded area in the center-right, and a small cluster of buildings in the bottom-right. The surrounding area is a mix of green fields and trees. Key locations labeled include Knockacappul, Knockacullin, and Killeen. A series of numbered points (S40 to S47) are marked along the boundary.

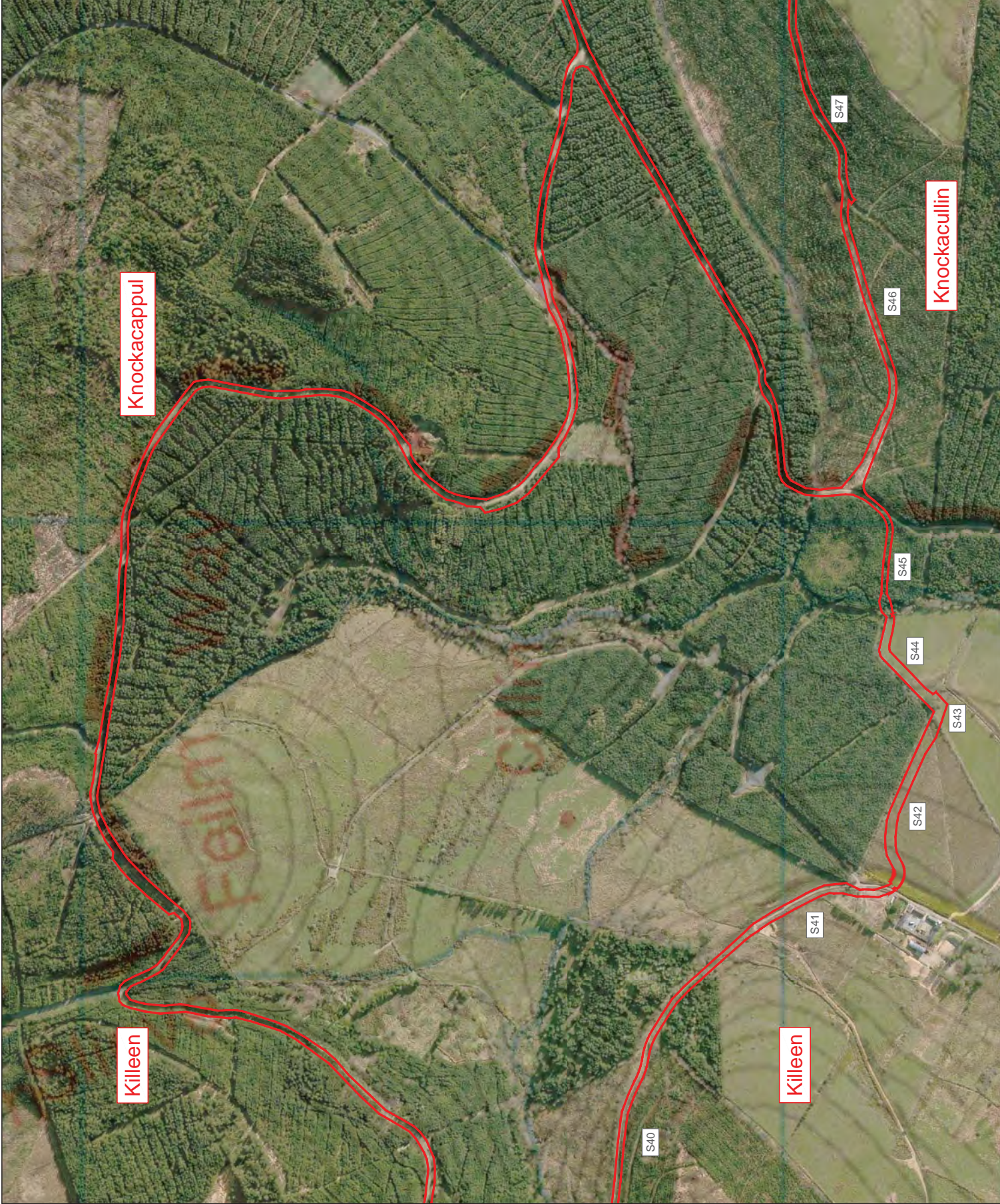
The map displays the proposed Killeen Urban Extension, bounded by a red line. The extension area includes a large green field in the center-left, a wooded area in the center-right, and a small cluster of buildings in the bottom-right. The surrounding area is a mix of green fields and trees. Key locations labeled include Knockacappul, Knockacullin, and Killeen. A series of numbered points (S40 to S47) are marked along the boundary.

This aerial map illustrates the proposed Killeen Urban Extension, outlined by a red boundary. The extension is situated in a rural landscape characterized by green fields, hedgerows, and patches of trees. The map includes several labels for specific locations: Knockacappul to the north, Knockacullin to the northeast, and Killeen to the south and west. A series of numbered points, ranging from S40 to S47, are marked along the boundary line, likely indicating specific sites or landmarks. The map also shows some existing buildings and infrastructure, such as roads and fences, within the surrounding area.

The map displays the proposed Killeen Woodland Park area, outlined in red. The park is situated in the Killeen area of County Wick, Ireland. The map includes labels for surrounding locations: Knockacappul to the north, Knockacullin to the east, and Killeen to the south. The park boundary is marked by a red line, and the area within is labeled 'Killeen Woodland Park'. The map also shows the N10 road and several small water bodies. A legend in the bottom right corner identifies the red line as the 'Proposed Killeen Woodland Park Boundary'.

The map displays the proposed Killeen Urban Extension, bounded by a red line. The extension area includes a large green field in the center-left, a wooded area in the center-right, and a small cluster of buildings in the bottom-right. The surrounding area is a mix of green fields and trees. The map is labeled with 'Knockacappul' at the top, 'Knockacullin' at the bottom, and 'Killeen' on the right. A series of numbered points (S40 to S47) are marked along the boundary, indicating specific locations or features. The map is oriented with North at the top.

The map displays the proposed Killeen Urban Extension, bounded by a red line. The extension area includes a large green field in the center-left, a wooded area in the center-right, and a small cluster of buildings in the bottom-right. The surrounding area is a mix of green fields and trees. The map is labeled with 'Knockacappul' at the top, 'Knockacullin' at the bottom, and 'Killeen' on the right. A series of numbered points (S40 to S47) are marked along the boundary, indicating specific locations or features. The map is oriented with North at the top.



The map displays the proposed Killeen Woodland Park, outlined in red. The park is situated in a rural area with a mix of forested land and open fields. The surrounding areas are labeled 'Knockacappul' to the north, 'Knockacullin' to the east, and 'Killeen' to the south. The map also shows the N10 road and several small water bodies. A legend in the bottom right corner identifies the red line as the 'Proposed Killeen Woodland Park Boundary'.

The map displays the proposed Killeen Urban Extension, bounded by a red line. The extension area includes a large green field in the center-left, a wooded area in the center-right, and a small cluster of buildings in the bottom-right. The surrounding area is a mix of green fields and trees. The map is labeled with 'Knockacappul' in the top-left, 'Knockacullin' in the top-right, and 'Killeen' in the bottom-left. A series of numbered points (S40 to S47) are marked along the boundary, indicating specific locations or features. The map is oriented with North at the top.

The map displays the proposed Killeen Urban Extension, bounded by a red line. The extension area includes a large green field in the center-left, a wooded area in the center-right, and a small cluster of buildings in the bottom-right. The surrounding area is a mix of green fields and trees. The map is labeled with 'Knockacappul' in the top-left, 'Knockacullin' in the top-right, and 'Killeen' in the bottom-left. A series of numbered points (S40 to S47) are marked along the boundary, indicating specific locations or features. The map is oriented with North at the top.

This aerial map illustrates the proposed Killeen Urban Extension, outlined by a red boundary. The extension is situated in a rural landscape characterized by green fields, hedgerows, and patches of trees. The map includes several labels for specific locations: Knockacappul to the north, Knockacullin to the northeast, and Killeen to the south and west. A series of numbered points, ranging from S40 to S47, are marked along the boundary line, likely indicating specific sites or landmarks. The map also shows some existing buildings and infrastructure, such as a road and a small cluster of houses near the bottom right corner.

The map displays the proposed Killeen Woodland Park, outlined in red. The park is situated in the Killeen area, bounded by Knockacappul to the north and Knockacullin to the east. The map includes labels for the park and surrounding areas, as well as a legend indicating the proposed boundary. The map also shows various roads, including the N10, and several small water bodies.

The map displays the proposed Killeen Urban Extension, bounded by a red line. The extension area includes a large green field in the center-left, a wooded area in the center-right, and a small cluster of buildings in the bottom-right. The surrounding area is a mix of green fields and trees. Key locations labeled include Knockacappul, Knockacullin, and Killeen. A series of numbered points (S40 to S47) are marked along the boundary.

The map displays the proposed Killeen Urban Extension, bounded by a red line. The extension area includes a large green field in the center-left, a wooded area in the center-right, and a small cluster of buildings in the bottom-right. The surrounding area is a mix of green fields and trees. Key locations labeled include Knockacappul, Knockacullin, and Killeen. A series of numbered points (S40 to S47) are marked along the boundary.

This aerial map illustrates the proposed Killeen Urban Extension, outlined by a red boundary. The extension is situated in a rural landscape characterized by green fields, hedgerows, and patches of trees. The map includes several labels for specific locations: Knockacappul to the north, Knockacullin to the northeast, and Killeen to the south and west. A series of numbered points, ranging from S40 to S47, are marked along the boundary line, likely indicating specific sites or landmarks. The map also shows some existing buildings and infrastructure, such as roads and fences, providing context for the proposed development.

This aerial map illustrates the proposed Killeen Urban Extension, outlined by a red boundary. The extension area is situated between Knockacappul to the north and Knockacullin to the east. The map shows a mix of green fields, trees, and some buildings. A series of numbered points (S40 to S47) are marked along the boundary, likely indicating specific locations or features. The map also shows the surrounding landscape, including roads and other land parcels.

The map displays the proposed Killeen Urban Extension, bounded by a red line. The extension area includes several fields and a river. Key locations labeled are Knockacappul, Knockacullin, and Killeen. The map also shows various roads, fields, and a river. A scale bar indicates distances up to 100m.

The map displays the proposed Killeen Urban Extension, bounded by a red line. The extension area includes several fields and a river. Key locations labeled are Knockacappul, Knockacullin, and Killeen. The map also shows various roads, fields, and a river. A scale bar indicates distances up to 100m.

Title:
Figure GC 5.3
UWF Grid Connection Construction
Works Area Boundary
(Overview & Maps 1 to 15)

Map Number:
Map 7 of 15

Legend:

— Construction Works Area Boundary

Townlands

Section Numbers (S1 - S102)



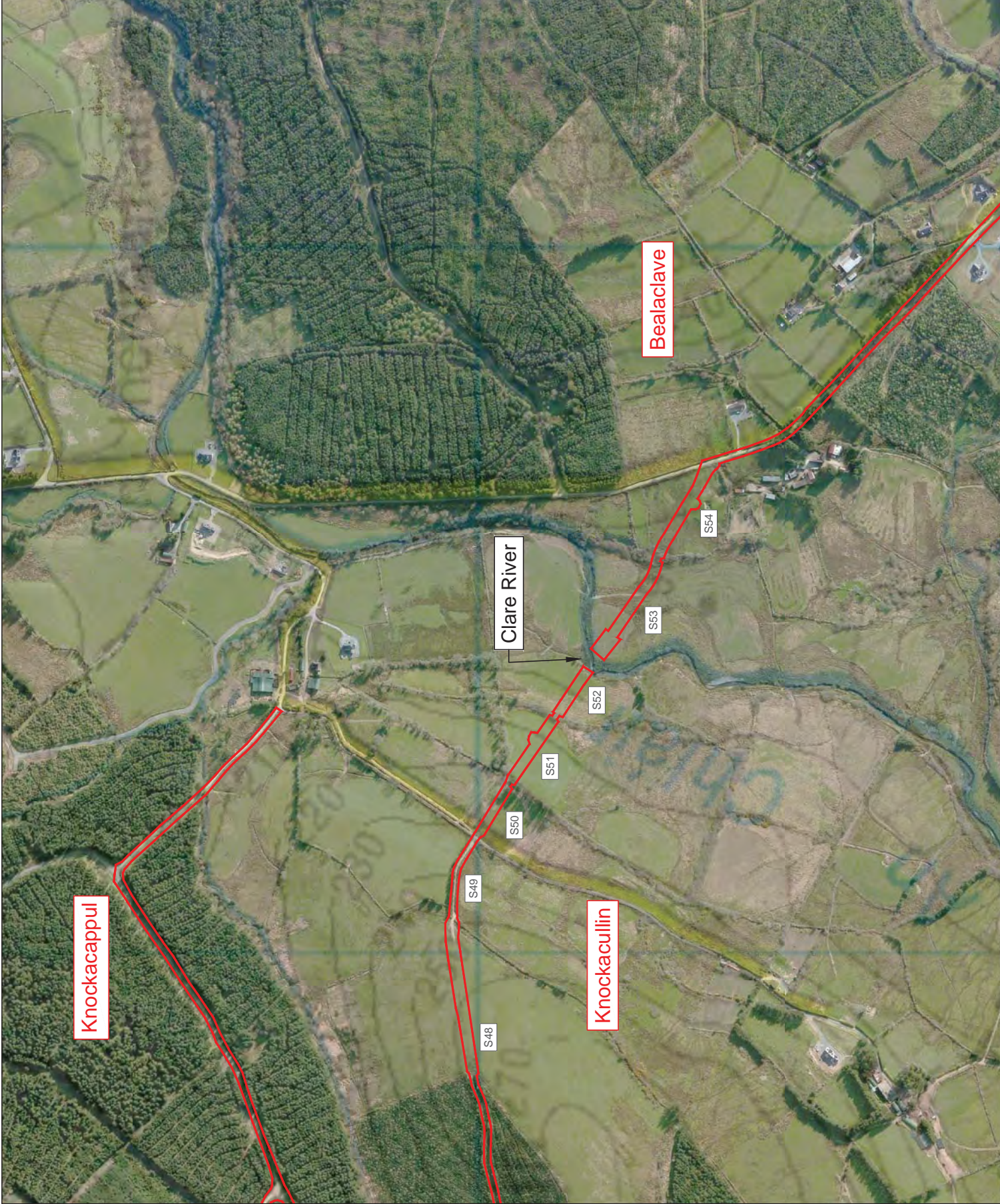
Project:	UWF Grid Connection (GC)
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UWF Grid Connection (GC)			
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AB	JB	14-Feb-18	A3

Drawn by: AB	Checked by: JB	Date: 14-Feb-18	Sheet Size: A3
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MOB: +353 83 8805644

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Title:
Figure GC 5.3
UWF Grid Connection Construction
Works Area Boundary
(Overview & Maps 1 to 15)

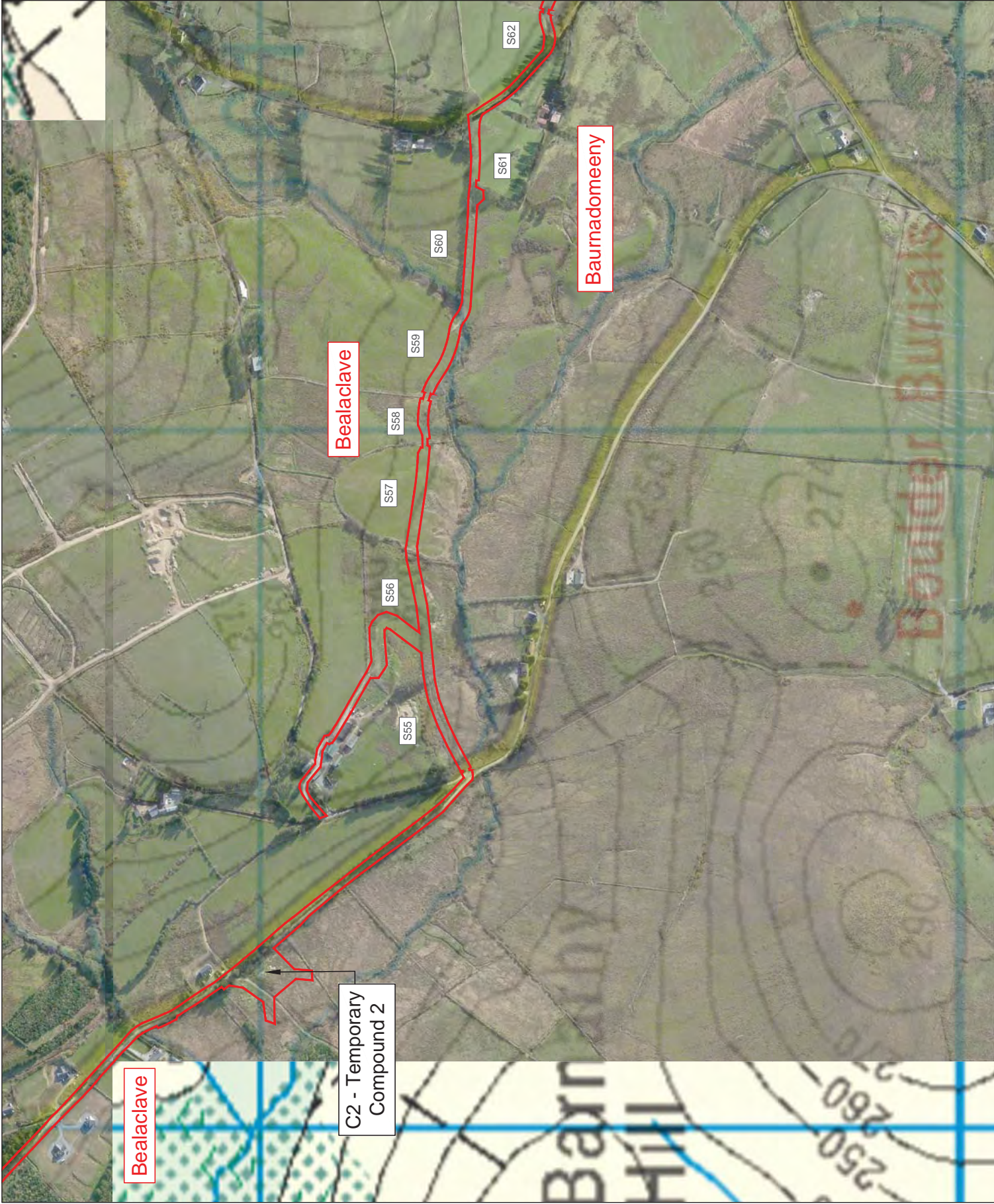
Map Number:
Map 8 of 15

Legend:
— Construction Works Area Boundary
Townlands
Section Numbers (S1 - S102)



Project:
UWF Grid Connection (GC)

Drawn by: AB	Created by: JB	Date: 14-Feb-18	Sheet Size: A3
<div><div><div>Aspire Builder</div><div>Ecopower Developments Ltd</div><div>Zeelee House,</div><div>Purcellstown Business Park, Kilkenny</div><div>TEL: +353 86 7760140</div><div>MOB: +353 83 8805644</div></div><div>ECOPOWER</div></div>			



Title:
Figure GC 5.3
UWF Grid Connection Construction
Works Area Boundary
(Overview & Maps 1 to 15)

Map Number:
Map 9 of 15

Legend:
— Construction Works Area Boundary
S63 S64 S65 S66 S67 S68 S69 S70 Townlands
S1 S2 S3 S4 S5 S6 S7 S8 S9 S10 S11 S12 S13 S14 S15 S16 S17 S18 S19 S20 S21 S22 S23 S24 S25 S26 S27 S28 S29 S30 S31 S32 S33 S34 S35 S36 S37 S38 S39 S40 S41 S42 S43 S44 S45 S46 S47 S48 S49 S50 S51 S52 S53 S54 S55 S56 S57 S58 S59 S60 S61 S62 S63 S64 S65 S66 S67 S68 S69 S70 Section Numbers (S1 - S102)



Project:
UWF Grid Connection (GC)

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TEL: +353 86 7760140
MOB: +353 83 8805644

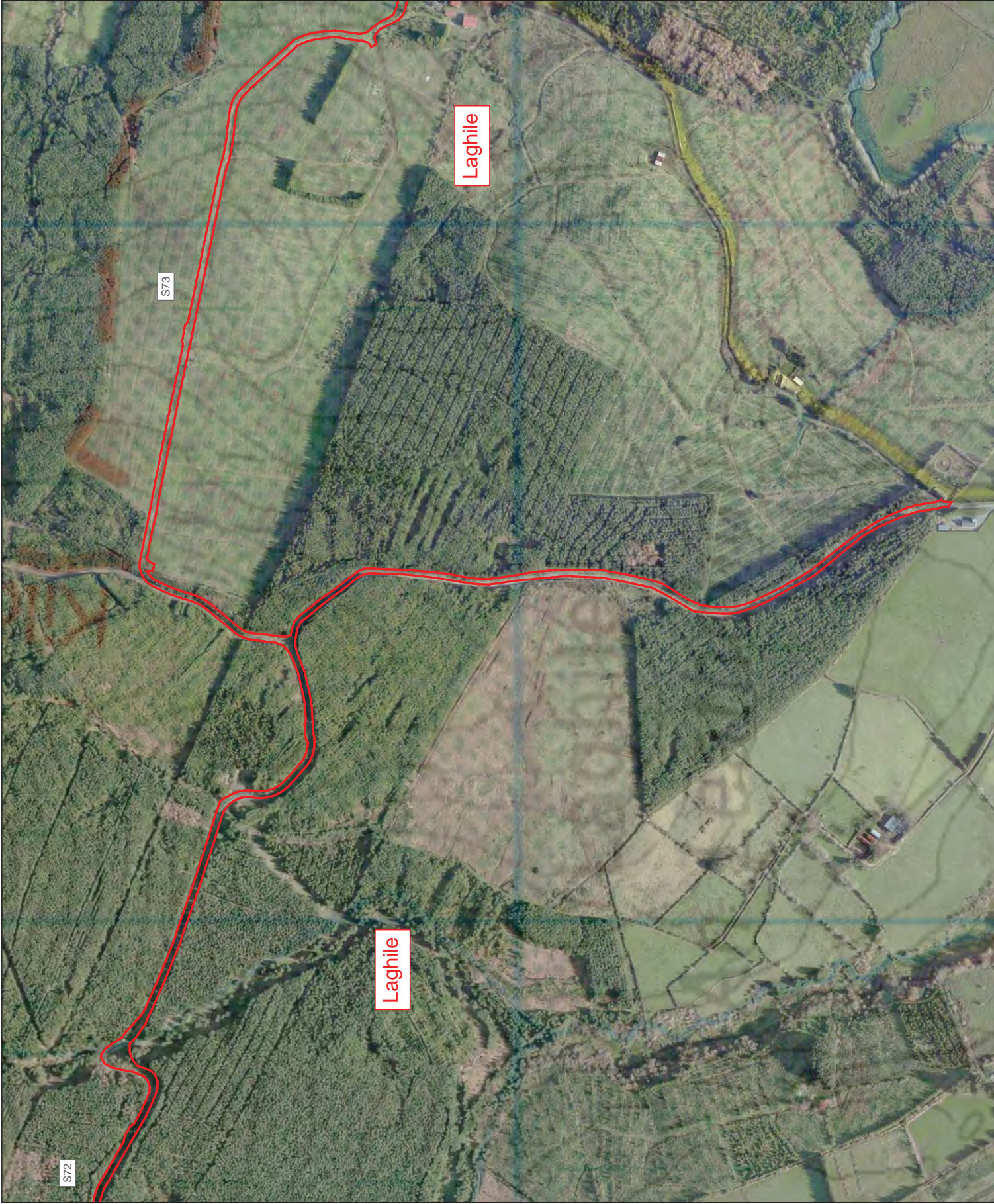
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Title:
Figure GC 5.3
UWF Grid Connection Construction
Works Area Boundary
(Overview & Maps 1 to 15)

Map Number:
Map 11 of 15

- Legend:
- Construction Works Area Boundary
 - Townlands
 - Section Numbers (S1 - S102)

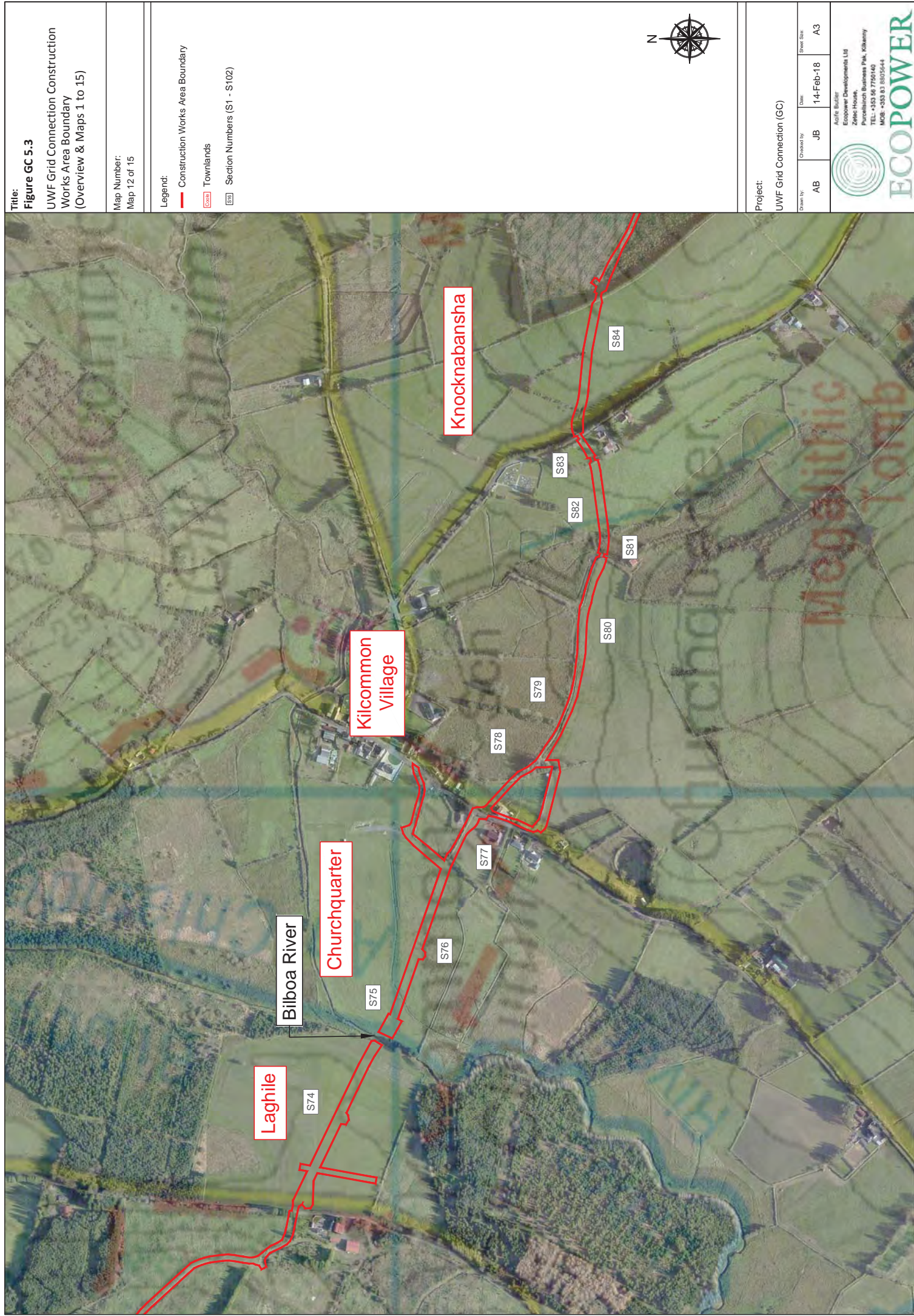


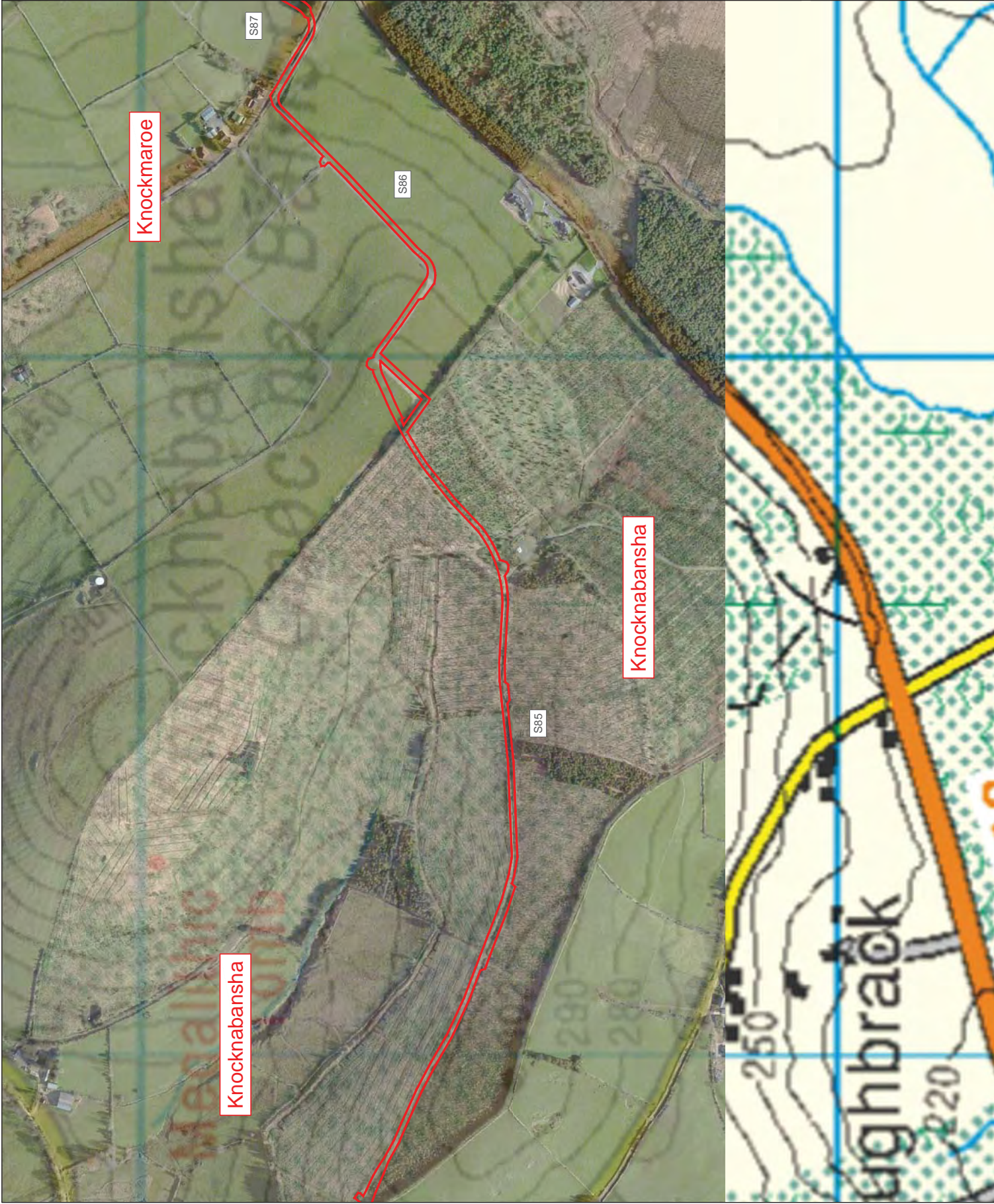
Project:
UWF Grid Connection (GC)

Drawn by:	Created by:	Date:	Sheet Size:
AB	JB	14-Feb-18	A3

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An aerial photograph of a rural landscape in County Wick, Ireland, showing a network of roads and fields. A red line highlights a specific route. The route starts at the bottom left, near a cluster of buildings, and proceeds generally northwards. It follows a series of roads labeled S87, S88, S89, S90, S91, S92, S93, S94, S95, S96, S97, and S98. The area is characterized by green fields, some with trees, and a few small settlements. A large, dark, irregularly shaped area in the upper left is labeled 'Knockcurraghbola Crownlands'. The name 'Knockmaroe' is written in a large, stylized font across the middle of the map. The overall scene is a typical rural landscape with a mix of agricultural land and small-scale development.

ECOPOWER
MOB: 353 83 850 5644

Title:
Figure GC 5.5

Elevation of the Mountphilips Substation Compound

Map Number:

N/A

Note :
Drawings not to scale. For illustration purposes only

	Description
CC	Cable Chair
SA	Surge Arrester
DUDE	Line / Earth Disconnect
DT/DBM1	Trailer / Earth Disconnect
VT	Voltage Transformer
CT	Current Transformer
CB	Circuit Breaker
DA	Bushbar Disconnect
PI	Post Insulator
LM	Lighting Mast

1. Layout and Arrangements of Substation Building and Electrical Equipment is shown indicatively and for illustration purposes only.
2. Dimensions shown are as per current Egrid Specifications at the time of submission. Dimensions and Specifications may vary at time of construction to reflect any revisions to Egrid or ESB Specifications.
3. Final Specifications of Buildings and Electrical Equipment is to be as per Egrid and ESB Specifications.
4. The Elevation of the Compound will be depicted by localized Topography such that CulFill Earthworks associated with the construction of the Compound are balanced.

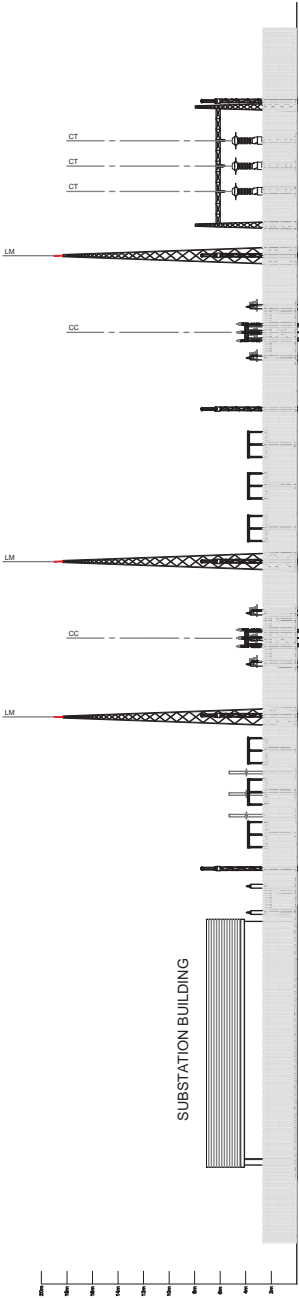
Designed in conjunction with



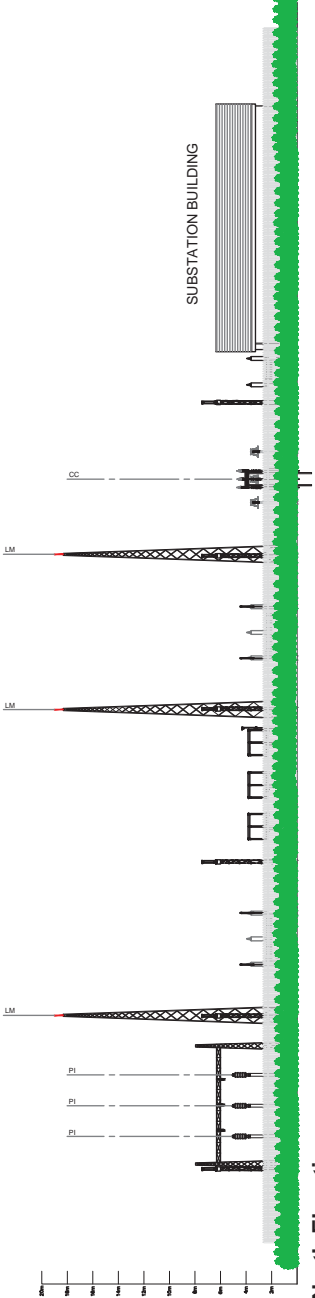
Project:
UWF Grid Connection (GC)

Drawn by:	Created by:	Date:	Sheet Size:
CB	JB	12-Feb-18	A3

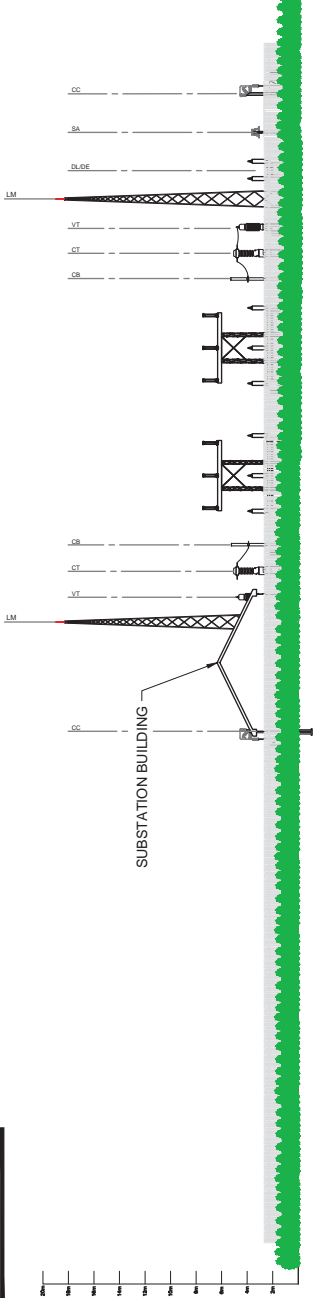
ECOPOWER
Energy Solutions
Zinc House, Pengkajeneh 833, Bussan Park
Landed - 086-7789140 (Ext 240)
Mobile - +93 999 5411419



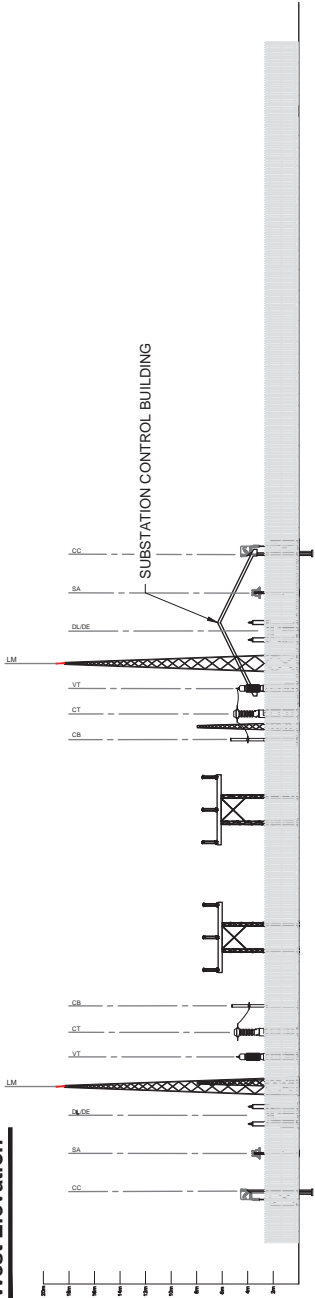
South Elevation



North Elevation



West Elevation



East Elevation

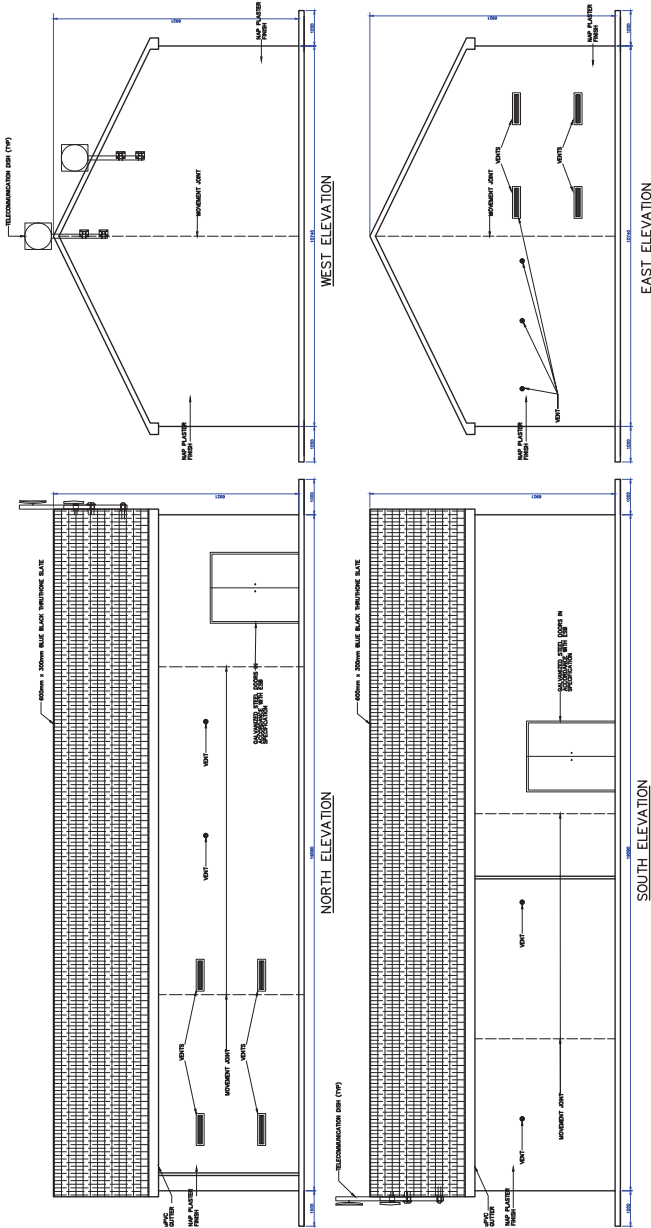
Title:
Figure GC 5.6

Plan and Elevation of the Control Building at
Mountphilips Substation

Map Number:

N/A

Note :
Drawings not to scale. For illustration purposes
only



1. Layout and Arrangements of Substation Building and Electrical Equipment is shown indicatively and for illustration purposes only.
2. Dimensions shown are as per current Eirgrid Specifications at the time of submission. Dimensions and Specifications may vary at time of construction to reflect any revisions to Eirgrid or ESB Specifications.
3. Final Specifications of Buildings and Electrical Equipment is to be as per Eirgrid and ESB Specifications.
4. The Elevation of the Compound will be depicted by localized Topography such that Curtil Fearnworks associated with the construction of the Compound are balanced.

Designed in conjunction with



Project:
UWF Grid Connection (GC)

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ECOPOWER GROUP
Zinc House, Penrhyndeolwyn Industrial Estate, Penrhyndeolwyn, Carmarthenshire, SA31 3YU
Llanelli - 01552 770000 (Ext 240)
Mobile - 07792 541119

Title:
Figure GC 5.7

Plan and Elevation of the End Masts at
Mountphilips Substation

Map Number:

N/A

Note :
Drawings not to scale. For illustration purposes
only
Dimensions in millimeters

1. Layout and Arrangements of Substation Building and Electrical Equipment is shown indicatively and for illustration purposes only.
2. Dimensions shown are as per current Engrid Specifications at the time of submission. Dimensions and Specifications may vary at time of construction to reflect any revisions to Engrid or ESB Specifications.
3. Final Specifications of Buildings and Electrical Equipment is to be as per Engrid and ESB Specifications.
4. The Elevation of the Compound will be depicted by localized Topography such that Cut/Fill Earthworks associated with the construction of the Compound are balanced.

Designed in conjunction with



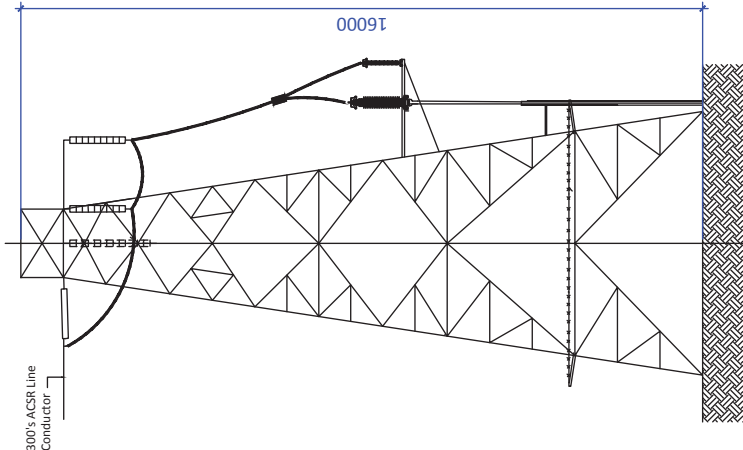
Project:
UWF Grid Connection (GC)

Drawn by:	Created by:	Date:	Sheet Size:
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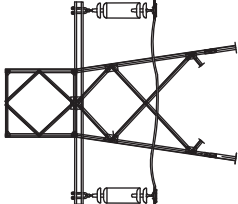


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Zetse House, Pengkalakemp 823, Bannan Park
Dandenong, Victoria 3175
Australia - +61 (0)3 9799 5411 (Ext 246)
Mobile - +61 (0)3 9799 5411 (Ext 246)

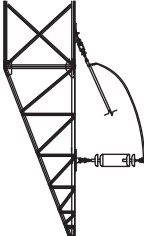




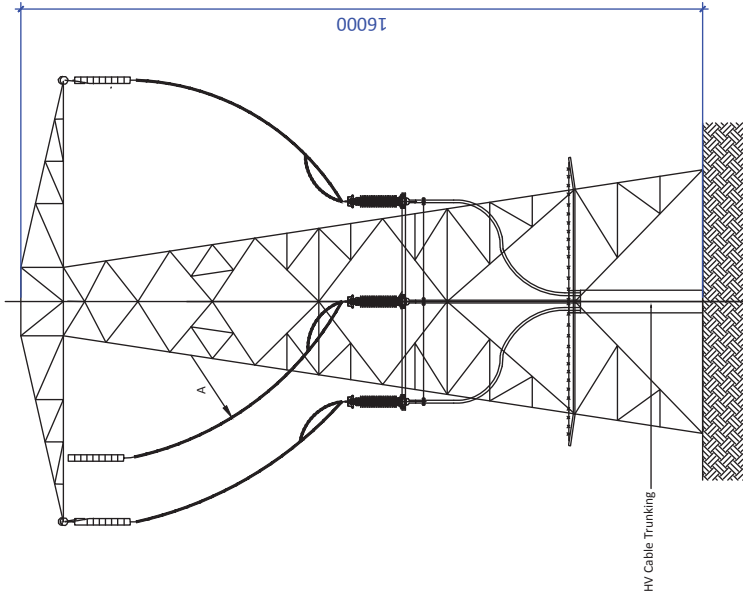
SIDE ELEVATION



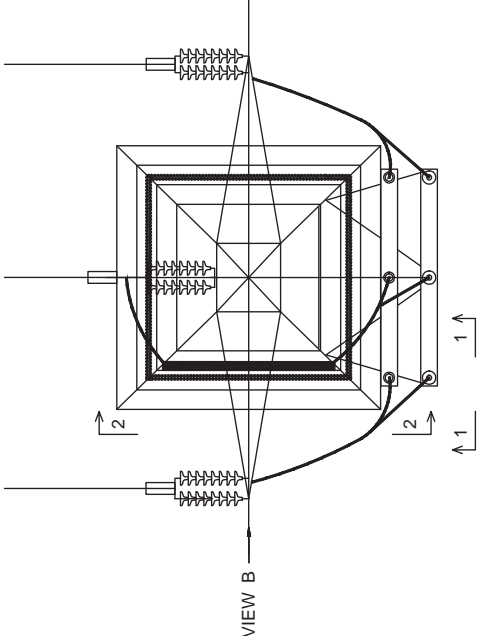
SECTION 2-2



SECTION 1-1



FRONT ELEVATION
(Rear Platform Removed for Clarity)



PLAN VIEW

<p>Title: Figure GC 5.8</p> <p>Cross Sections of MountPhillips - Upperchurch 110kV Underground Cables Trench</p>	<p>Map Number: N/A</p>
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Map Number: N/A

Note :
Drawings not to scale. For illustration purposes only

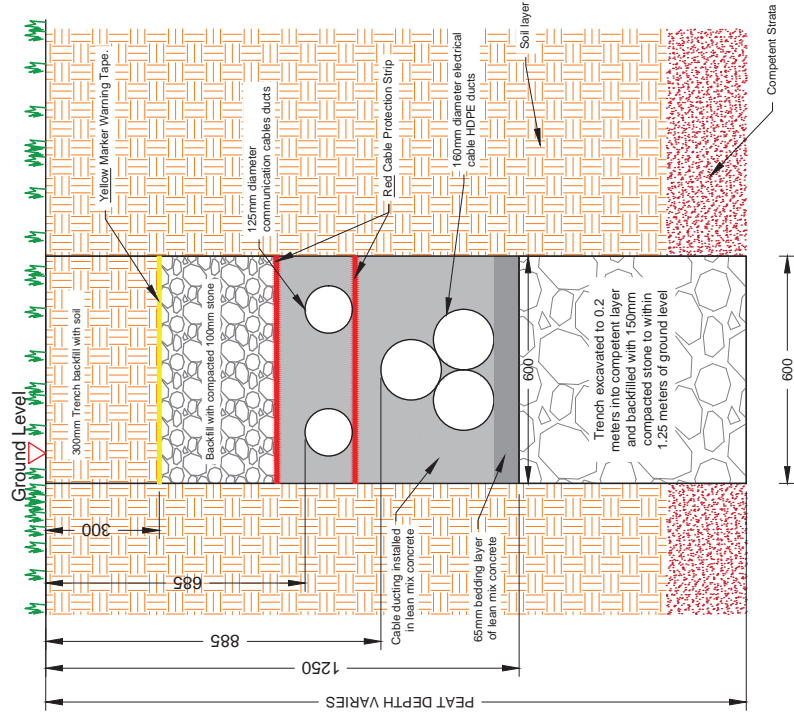


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CB	JB	12-Feb-18	A3

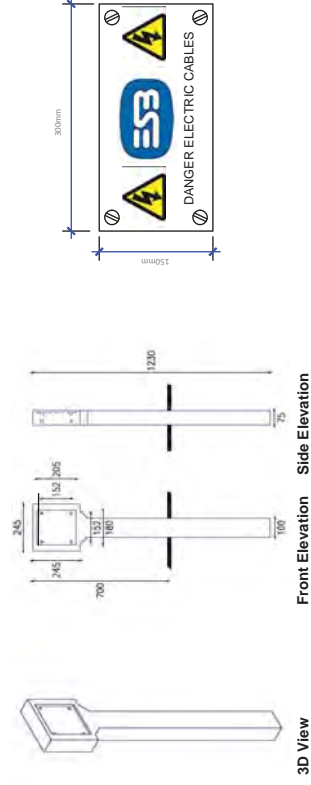
 **ECOPOWER**

Green Box
Empire Limited
Zong House, Portlambert, 12A Business Park
Droghda Road, Killybegs - R92 W500

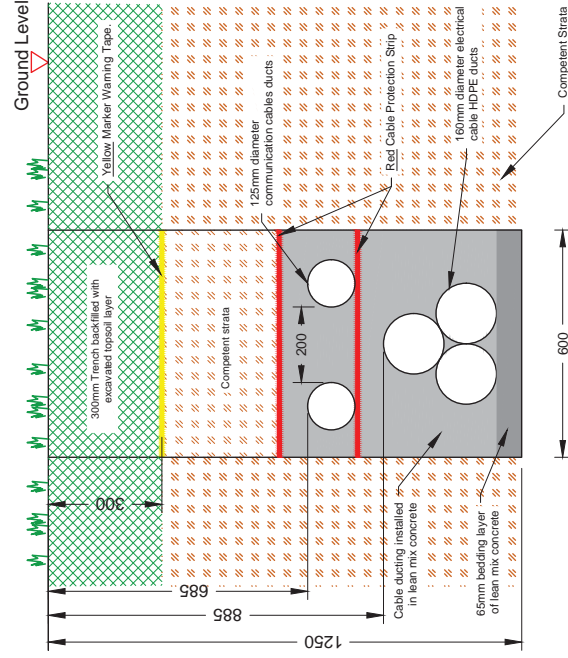
Locations - also 2700 on (see 264)
Machyn - 153 199 464 11428



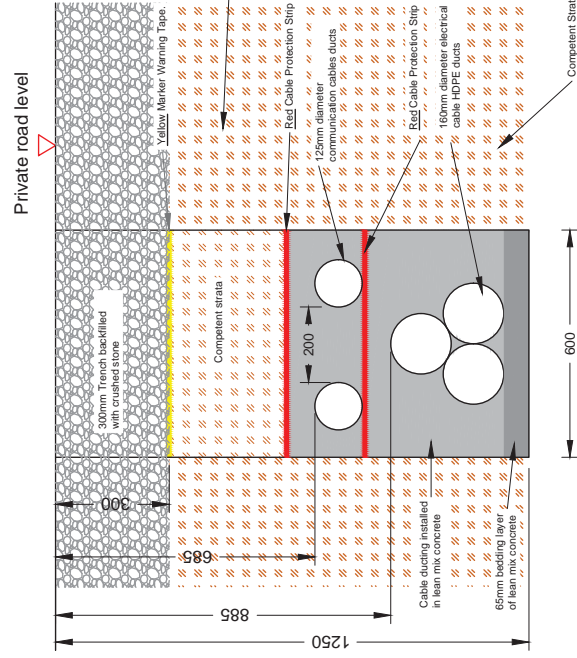
110kV CABLES TRENCH -TYPICAL CROSS SECTION THROUGH PEATLAND - SECTION NUMBER S39



TYPICAL MARKER POST AND MARKER PLATE DIMENSIONS



110kV CABLES TRENCH - TYPICAL SECTION THROUGH AGRICULTURAL LANDS



110kV CABLES TRENCH - TYPICAL SECTION THROUGH EXISTING PRIVATE ROADS

Title:
Figure GC 5.9

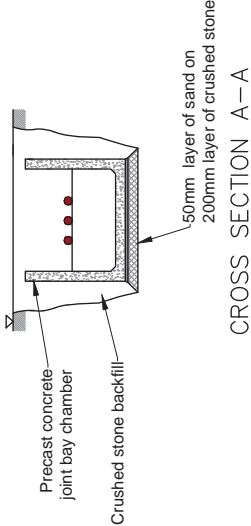
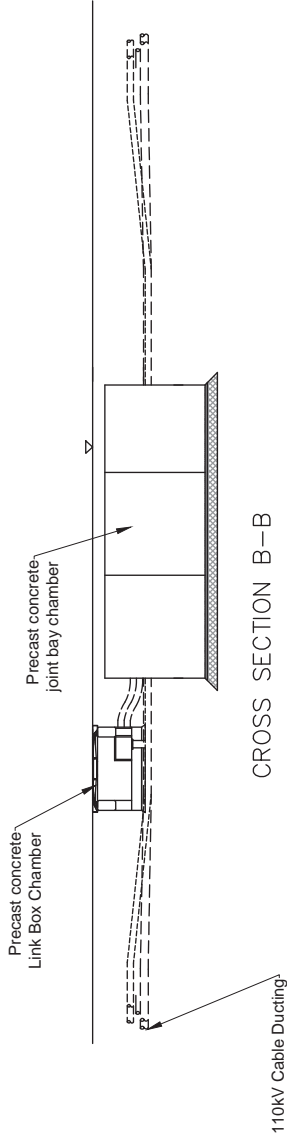
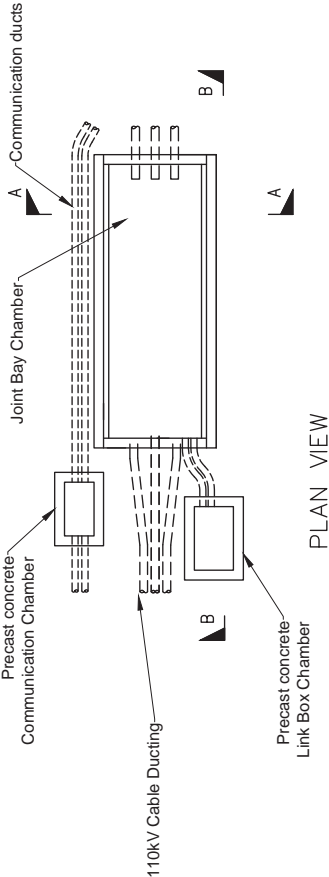
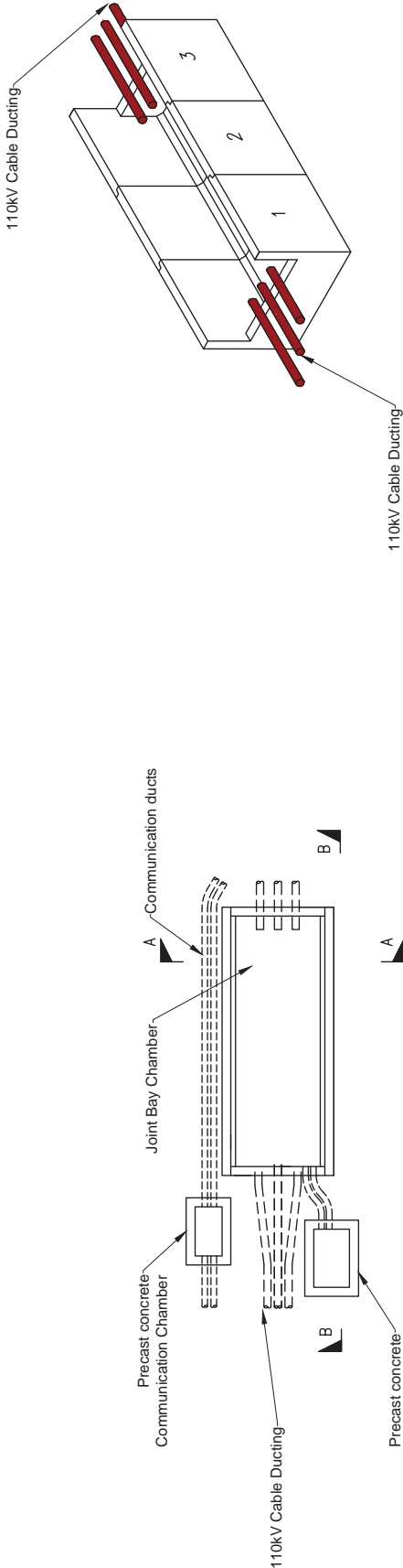
Views of 110kV UGC Joint Bays

Map Number:

N/A

Note :

Drawings not to scale. For illustration purposes only
Specifications may vary at time of construction to
reflect any revisions to Eirgrid or ESB Specifications

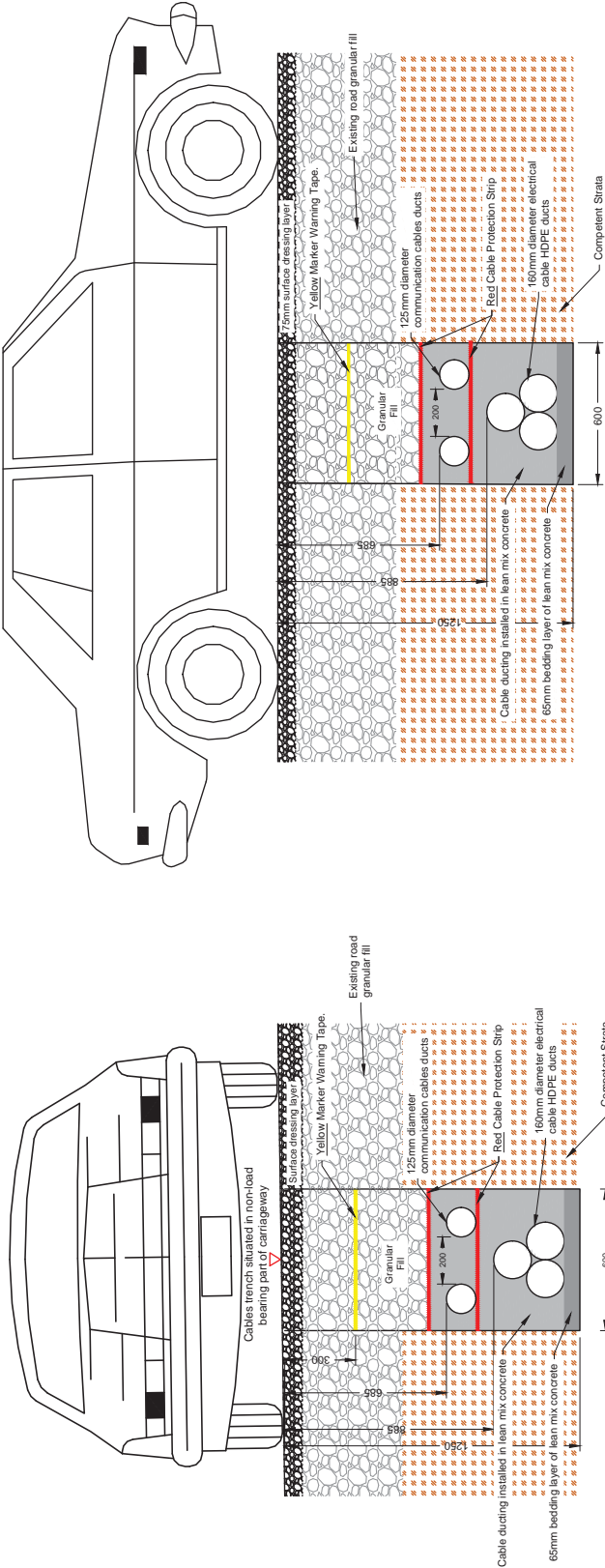


Designed in conjunction with



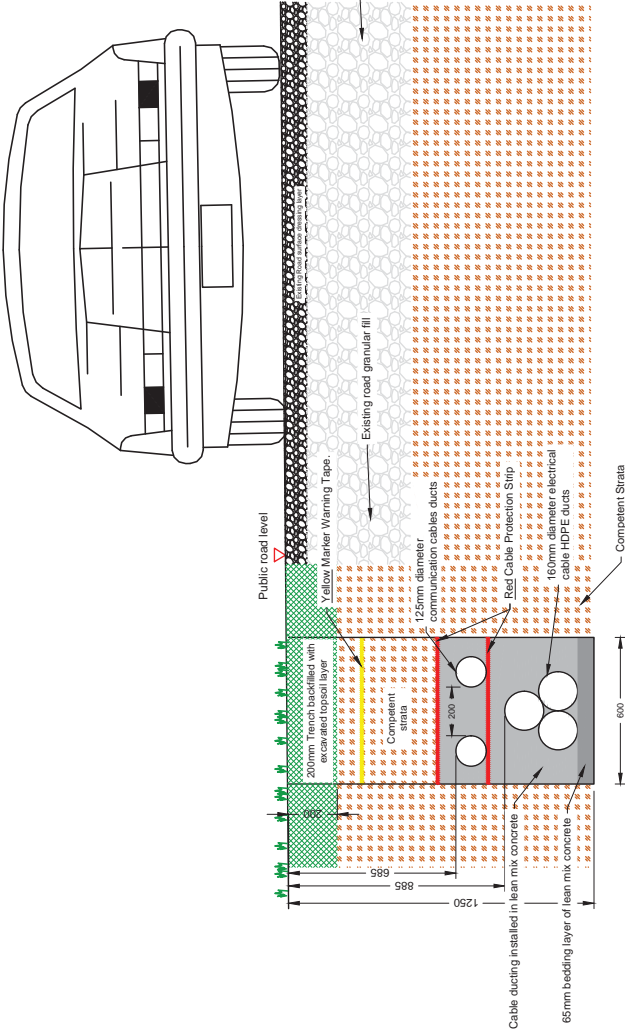
Project:
UWF Grid Connection (GC)

Drawn by:	Created by:	Date:	Sheet Size:
CB	JB	12-Feb-18	A3



TYPICAL SECTION OF 110kV CABLES TRENCH ALONG PUBLIC ROADS

TYPICAL SECTION OF 110kV CABLES TRENCH CROSSING PUBLIC ROADS



TYPICAL SECTION OF 110kV CABLES TRENCH SITUATED IN VERGE OF PUBLIC ROAD

Title: **Figure GC 5.11**

Cross Sections of 110kV UGC in Existing Farm Roads (Upgraded)

Map Number:

Note :
 Drawings not to scale. For illustration purposes only
 Specifications may vary at time of construction to reflect any revisions to Eirgrid or ESB Specifications

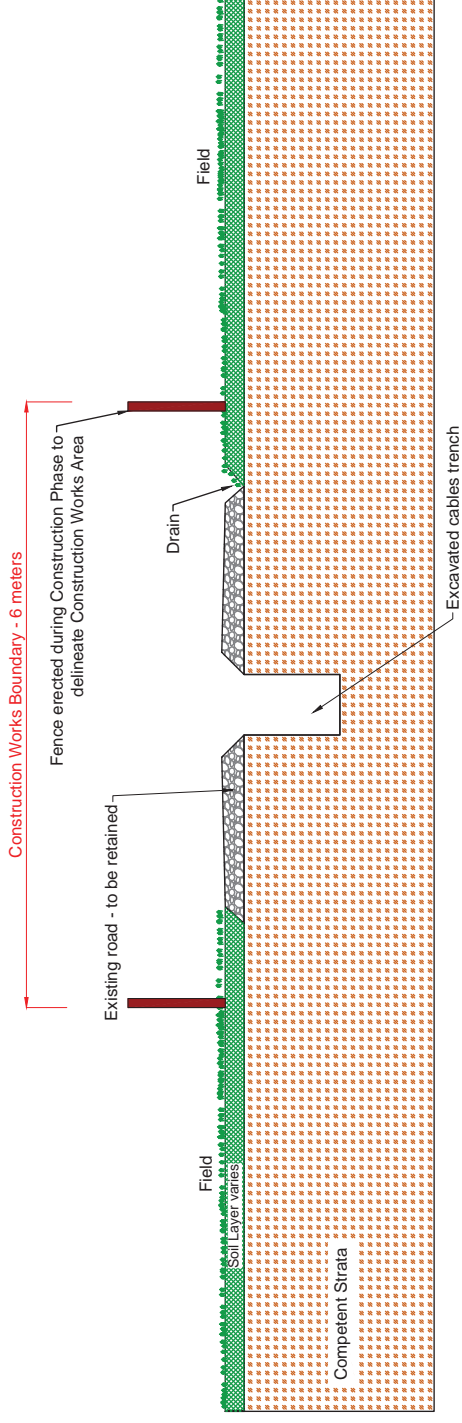
Project: UWF Grid Connection (GC)

Drawn by:	Checked by:	Date:	Sheet Size:
CB	JB	12-Feb-18	A3

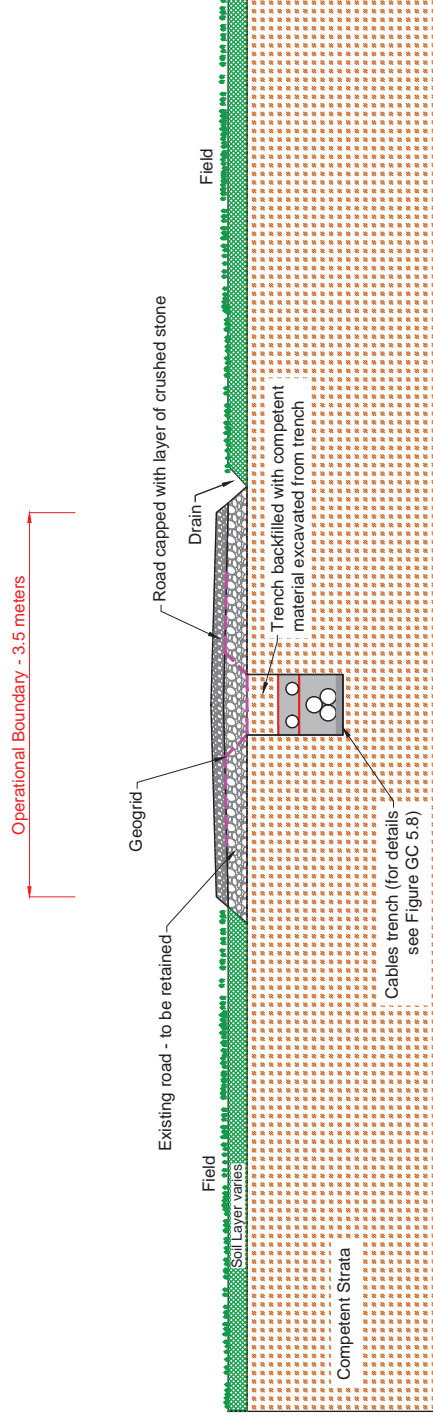


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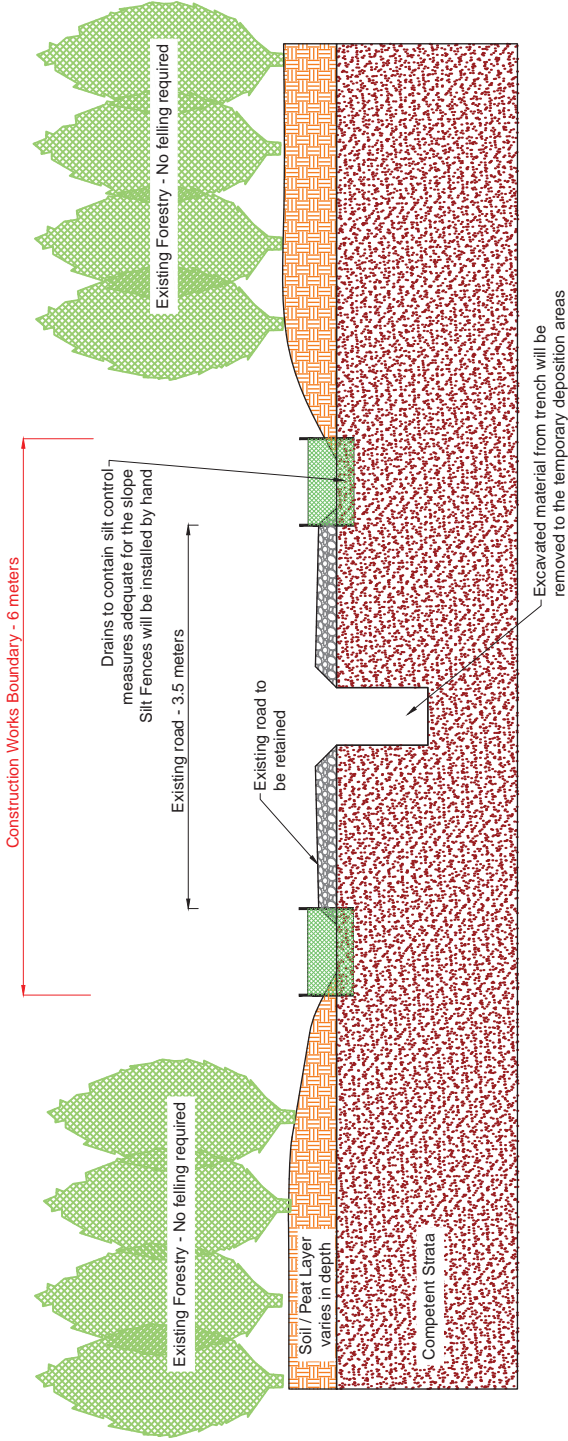
Cross Section of Upgraded Existing Farm Roads and Cables Trench - Construction Phase



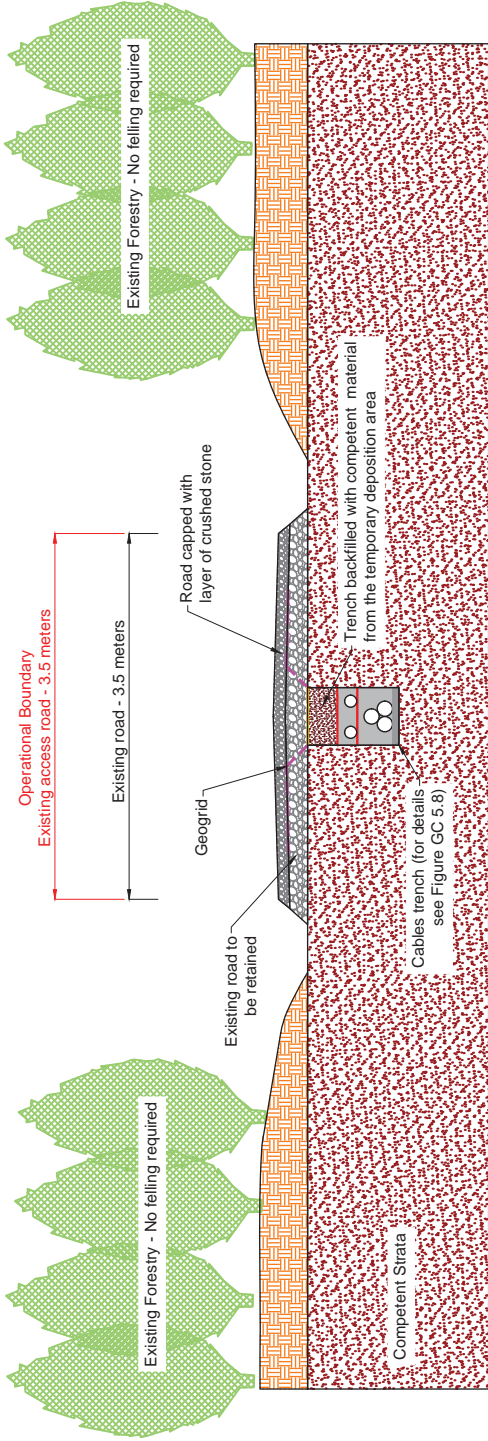
Cross Section of Upgraded Existing Farm Roads and Cables Trench - Operational Phase

Title: Figure GC 5.12	
Cross Section of 110kV UGC in Existing Forestry Roads (Upgraded)	
Map Number:	N/A
Note : Drawings not to scale. For illustration purposes only Specifications may vary at time of construction to reflect any revisions to Eirgrid or ESB Specifications	

Project: UWF Grid Connection (GC)			
Drawn by:	Created by:	Date:	Sheet Size:
CB	JB	12-Feb-18	A3



Cross Section of Upgraded Existing Forestry Roads and Cables Trench - Construction Phase



Cross Section of Upgraded Existing Forestry Roads and Cables Trench - Operational Phase

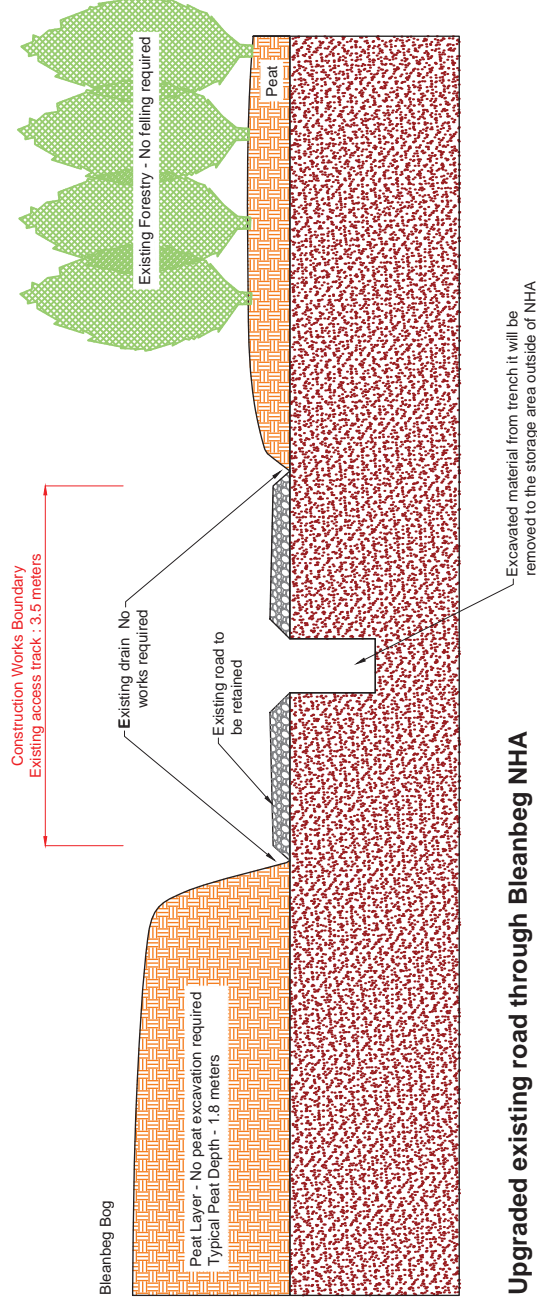
Title: **Figure GC 5.13**

Cross Section of 110kV UGC in Existing Forestry Road through Bleanbeg Bog NHA

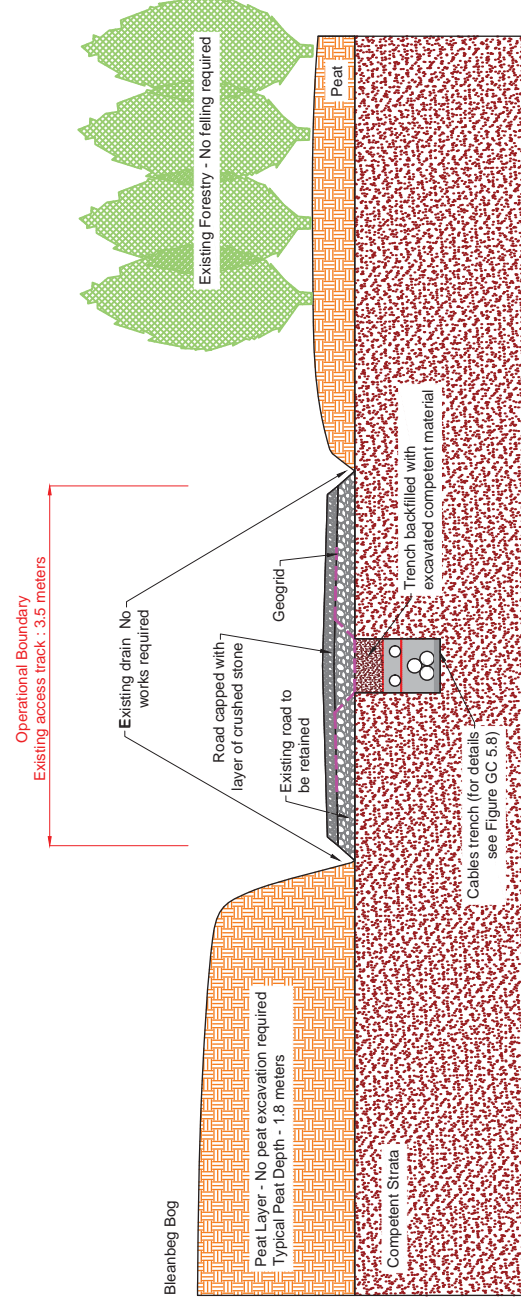
Map Number: N/A

Note :
Drawings not to scale. For illustration purposes only

Specifications may vary at time of construction to reflect any revisions to Eirgrid or ESB Specifications



Upgraded existing road through Bleanbeg NHA - Construction Phase



Upgraded existing road through Bleanbeg NHA - Operational Phase

Designed in conjunction with



and

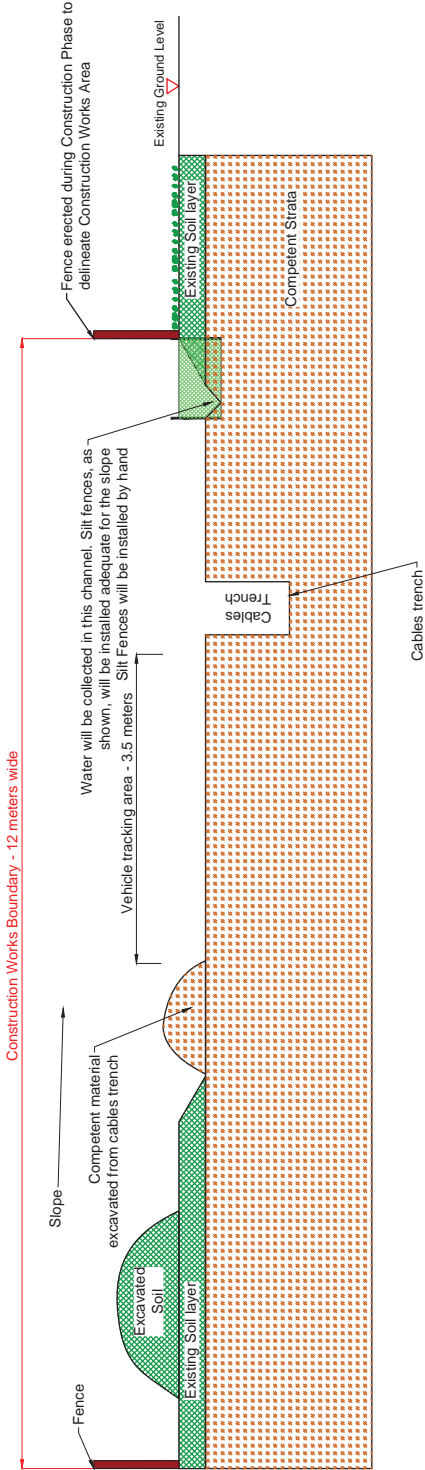
[illegible]

Title: Figure GC 5.14	
Cross Section of New Permanent Access Roads outside Silvermines SPA	
Map Number: N/A	
Note : Drawings not to scale. For illustration purposes only Specifications may vary at time of construction to reflect any revisions to Eirgrid or ESB Specifications	

Project:
UWF Grid Connection (GC)

Drawn by: CB	Created by JB	Date 12-Feb-18	Sheet Size A3
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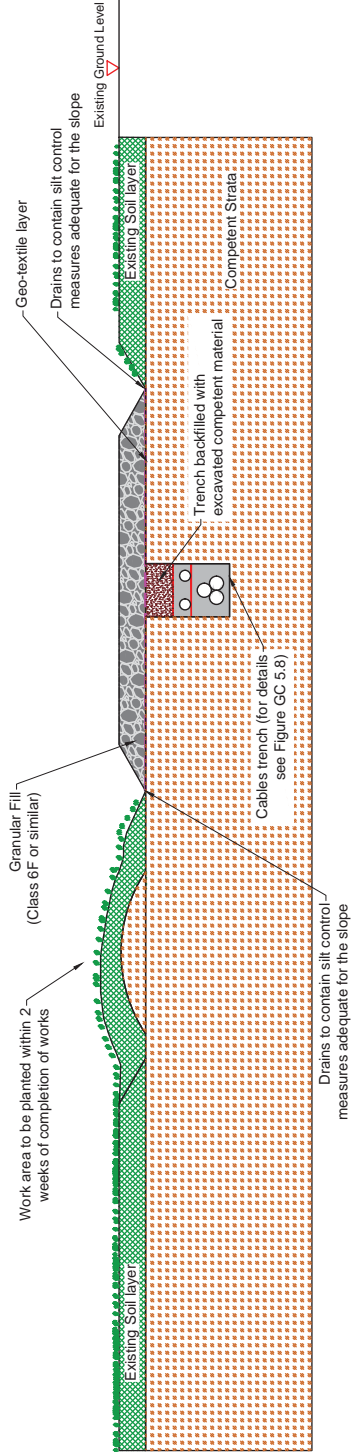
New Permanent Access Roads through Agricultural Lands outside of SPA - Construction Phase



Operational Boundary - 5.5 meters

Road width - 3.5 meters

Slope



New Permanent Access Roads through Agricultural Lands outside of SPA- Operational Phase

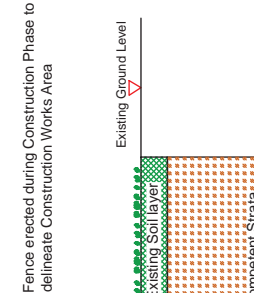
Figure GC 5.15

N/A

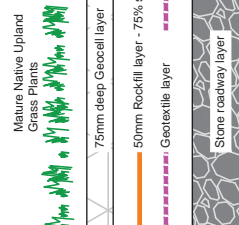
Specifications may vary at time of construction to reflect any revisions to Eirgrid or ESB Specifications

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New Permanent Access Roads through Agricultural Lands inside of SPA - Construction Phase



New Permanent Access Roads through Agricultural Lands inside of SPA - Operational Phase

mis

Project: UWF Grid Connection (GC)

Title:
Figure GC 5.16

Cross Sections of New Permanent
Concealed Floating Access Roads through
Castlewaller (inside the SPA)

Map Number:
N/A

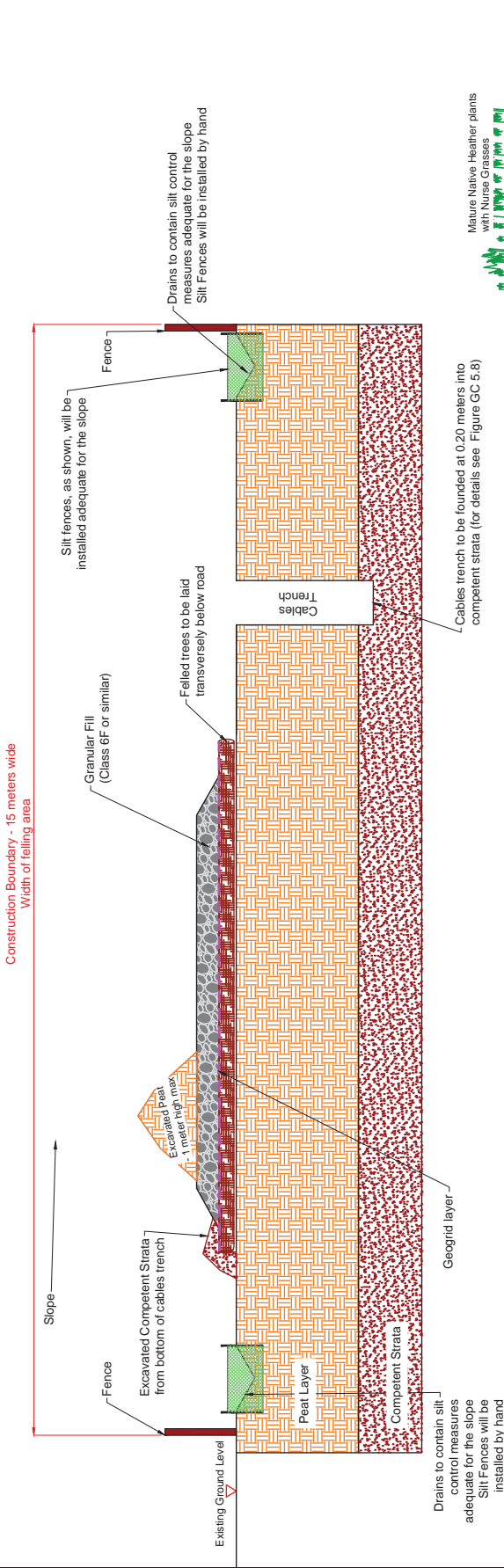
Note :
Drawings not to scale. For illustration purposes only
Specifications may vary at time of construction to
reflect any revisions to Elgrid or ESB Specifications



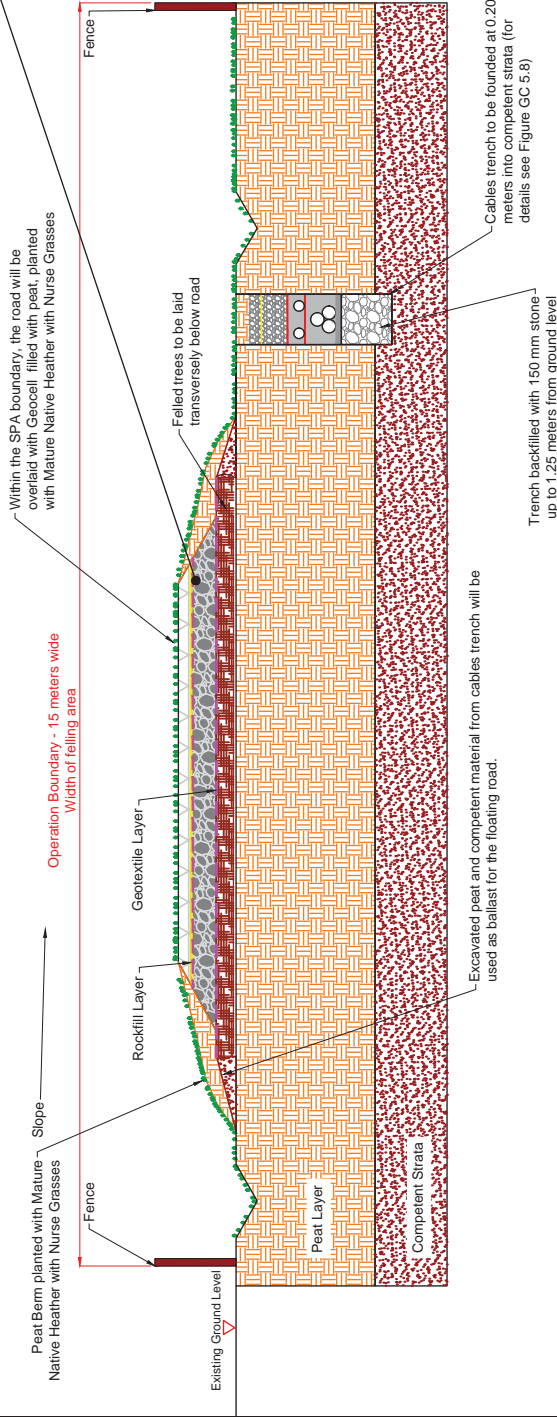
Project:
UWF Grid Connection (GC)

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Geotechnical Engineering Limited
Zinc House, Pengelleshall Road, Blounton Park
Dunfermline, Fife, Scotland, KY11 1YH
London: +44 (0)20 7706 4400 (UK 24h)
Mobile: +44 (0)7 799 541149



New permanent concealed floating access road through Castlewaller - Construction Phase

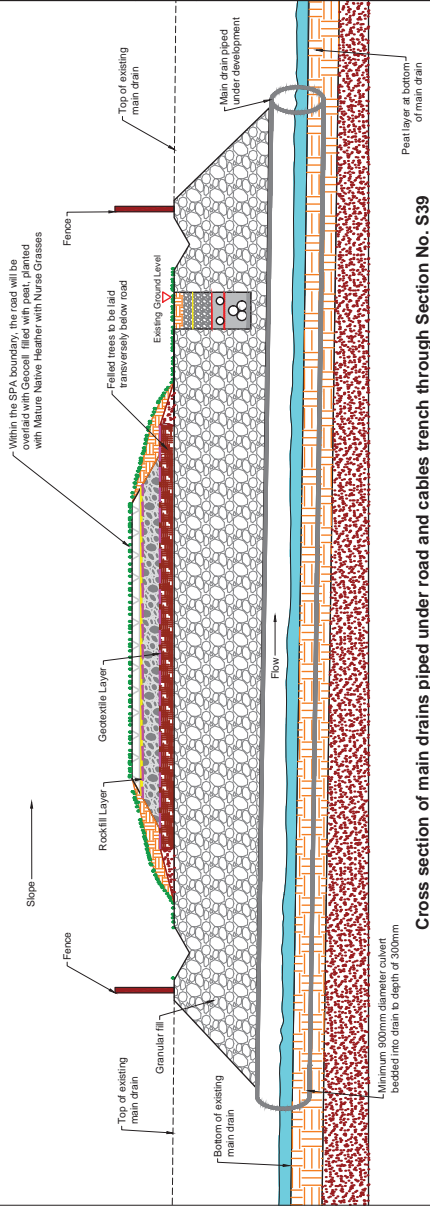


New permanent concealed floating access road through Castlewaller - Operational Phase

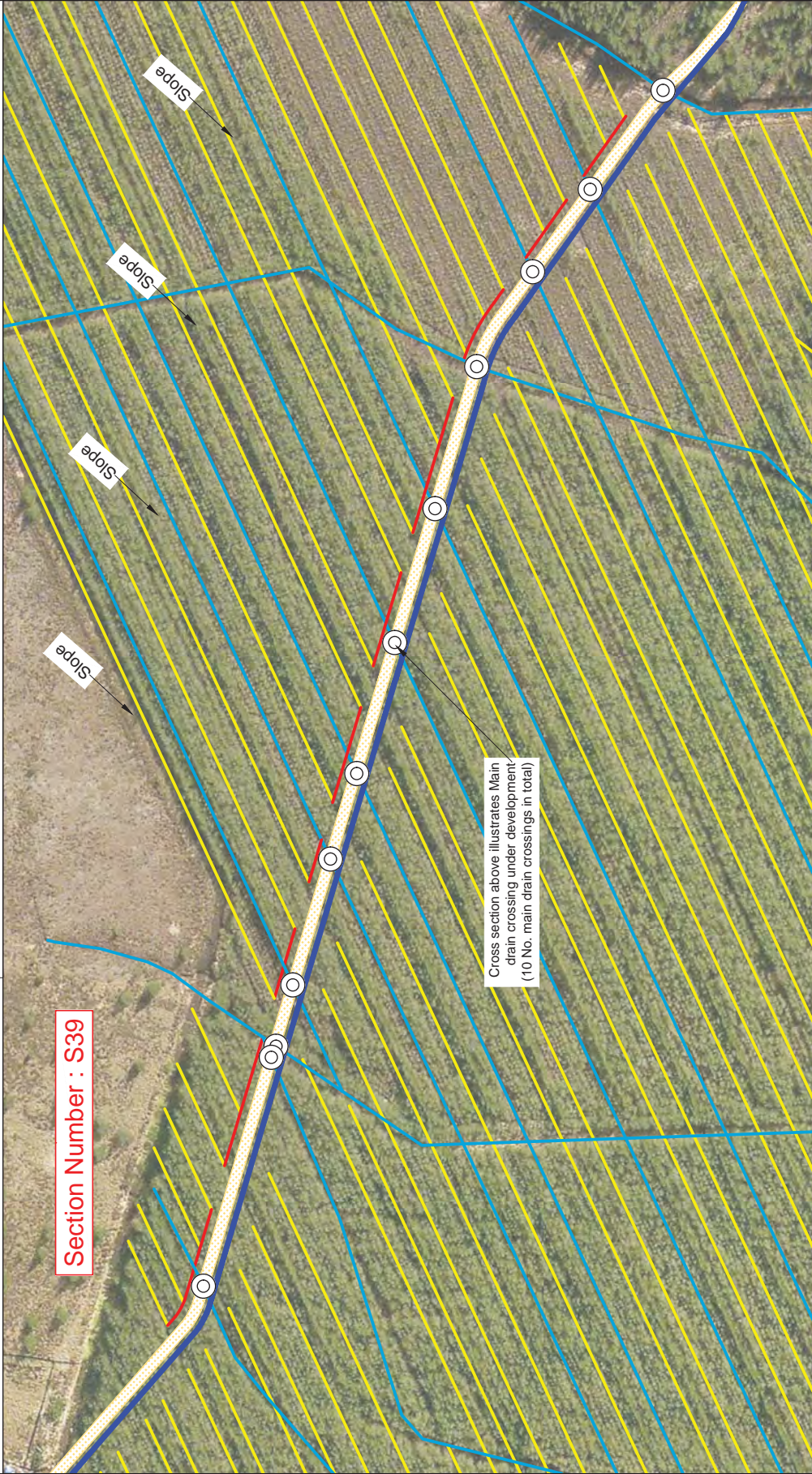
Description of the works:

Minor drains will be connected to the culverted main drains upslope of the works by excavating **interceptor drains** parallel to the works so water flows from the **minor drains** into the **main drains** then under the floating road and grid connection works area. This will prevent any ponding of water upslope of the works and avoid water coming into contact with any sediment from the works.

Section Number : S39



Cross section of main drains piped under road and cables trench through Section No. S39



Title:

Figure GC 5.16.1

Plan and cross section views of the New Permanent Concealed Floating Access Road and existing drains through Castlewaller (Section Number S39)

Map Number:

N/A

- UGC Grid Connection
- Existing Minor drains
- Existing Main drain
- Interceptor drain
- New Permanent Concealed Access Road

Main drains piped under development, 12 in total

See Cross Section above for details

Notes:

Drawings not to scale. For illustration purposes only

Specifications may vary at time of construction to reflect any revisions to Eirgrid or ESB Specifications

Project:

UWF Grid Connection (GC)

Drawn by:

CB

Created by:

JB

Date:

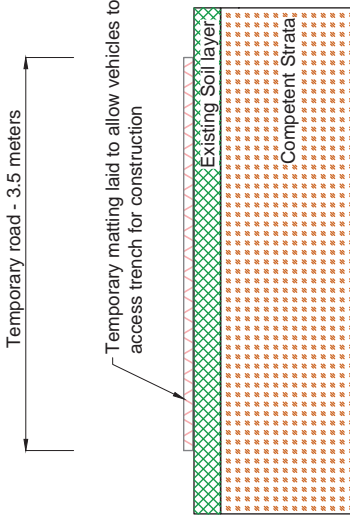
12-Feb-18

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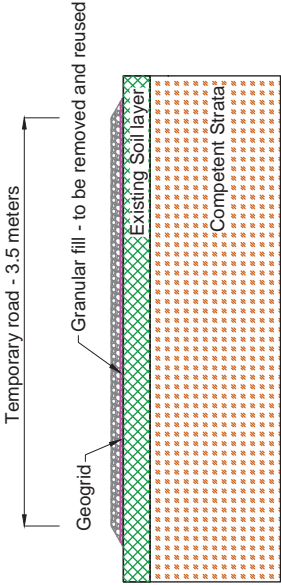
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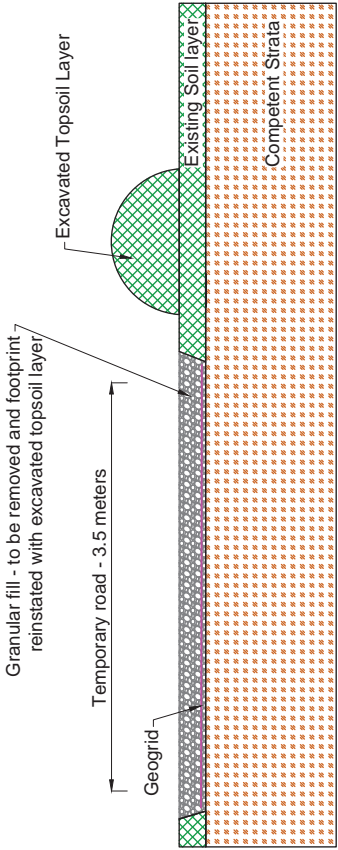
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Cross Section of temporary access road - Matting



Cross Section of temporary access road - Floating road



Cross Section of temporary access road - Excavate and fill

Temporary Compound C1 - Mountphilips Substation Compound

Title:
Figure GC 5.18
Plan View of Temporary Compound C1
(Mountphilips)

Map Number:
N/A

Notes:
Drainage can be seen on Figure GC 5.4 - Plan
of the Mountphilips Substation Compound

Drawings not to scale. For illustration purposes
only

Project:
UWF Grid Connection (GC)

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Company Name
EcoPower Limited
Zebra House, Pengkalan BSA Business Park
Dutrie Road, Kluang - 81010 Kluang
Johor - 076-7789440 (ext 240)
Mobile - +601 898754134/9

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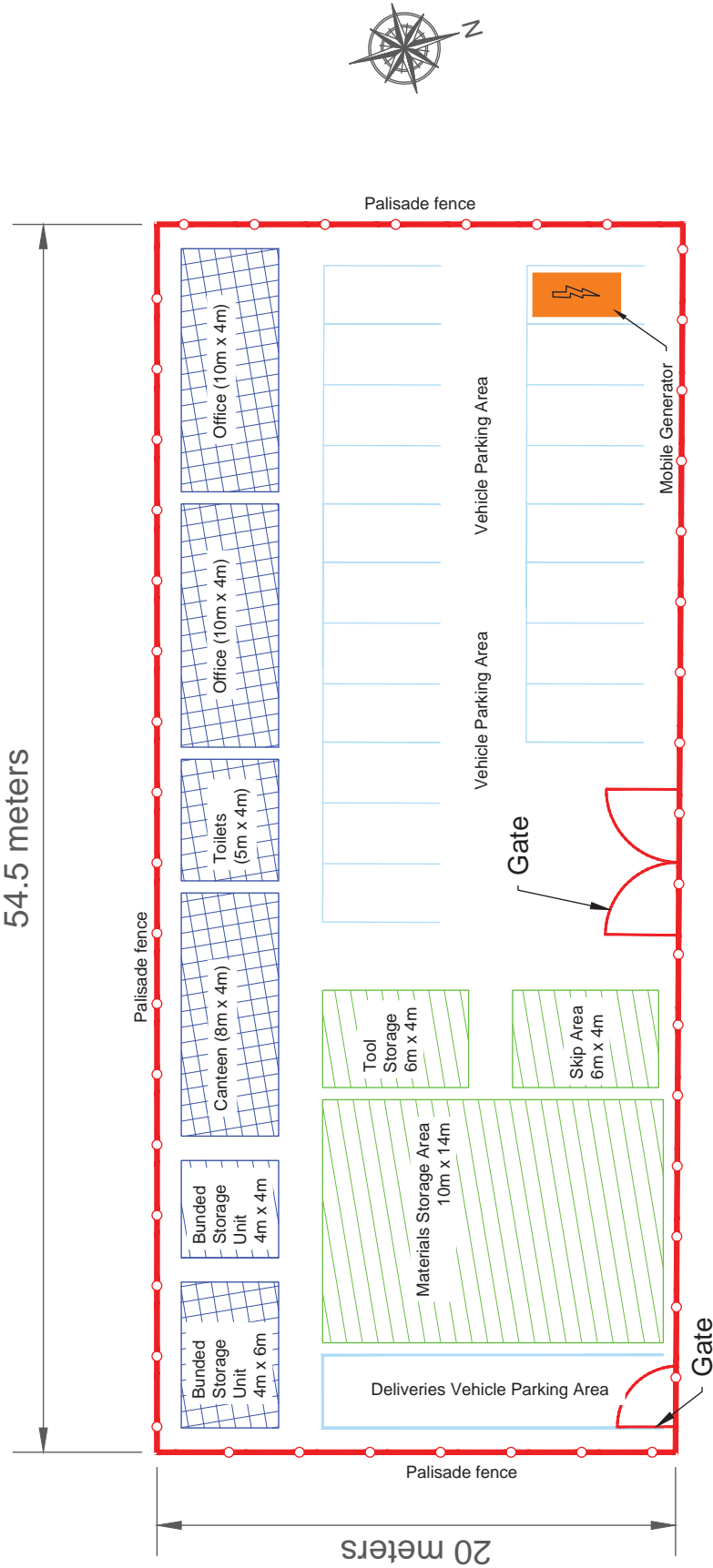


Figure GC 5.22

N/A

Fence to be moved back outside of visual splay



A3



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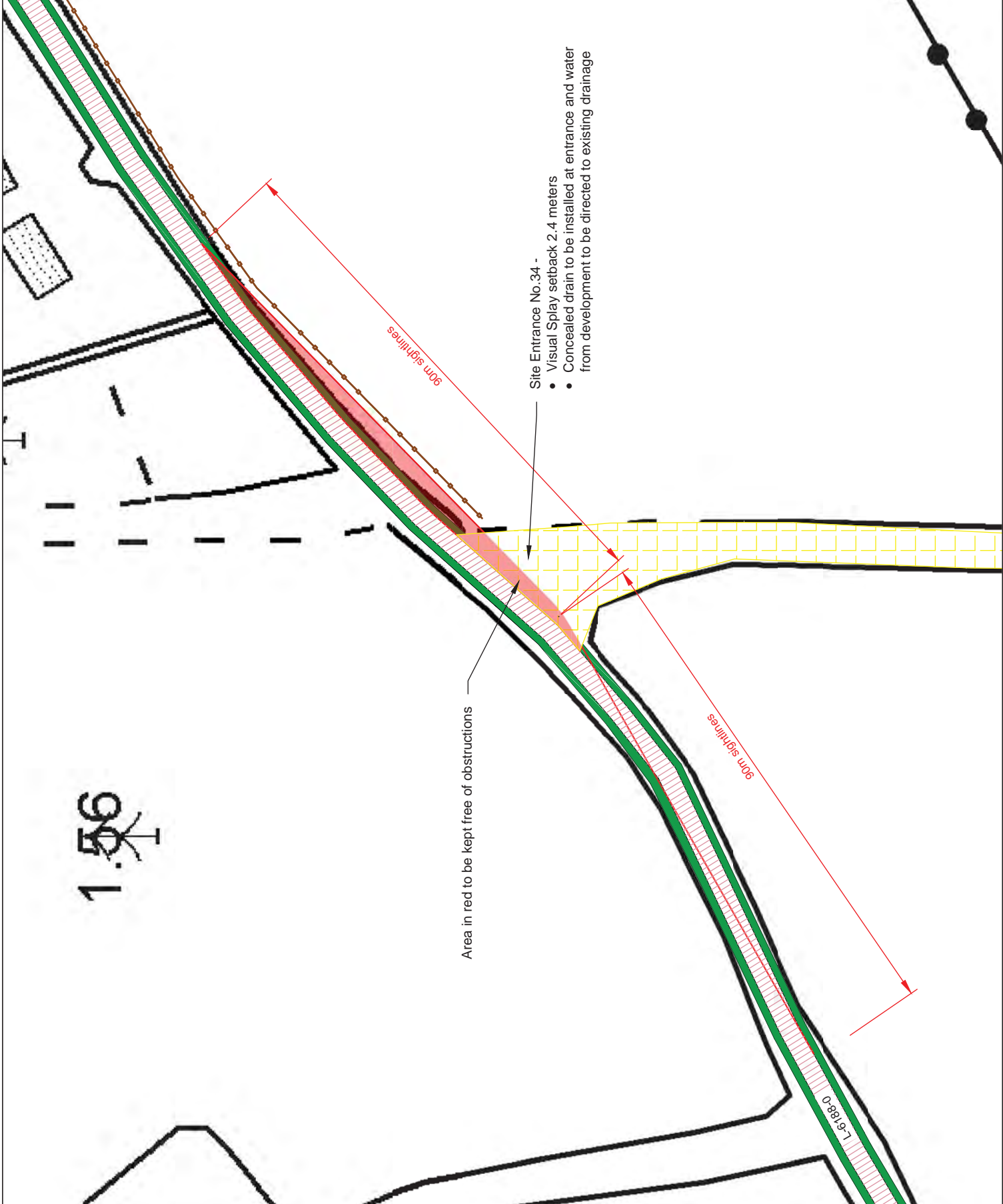
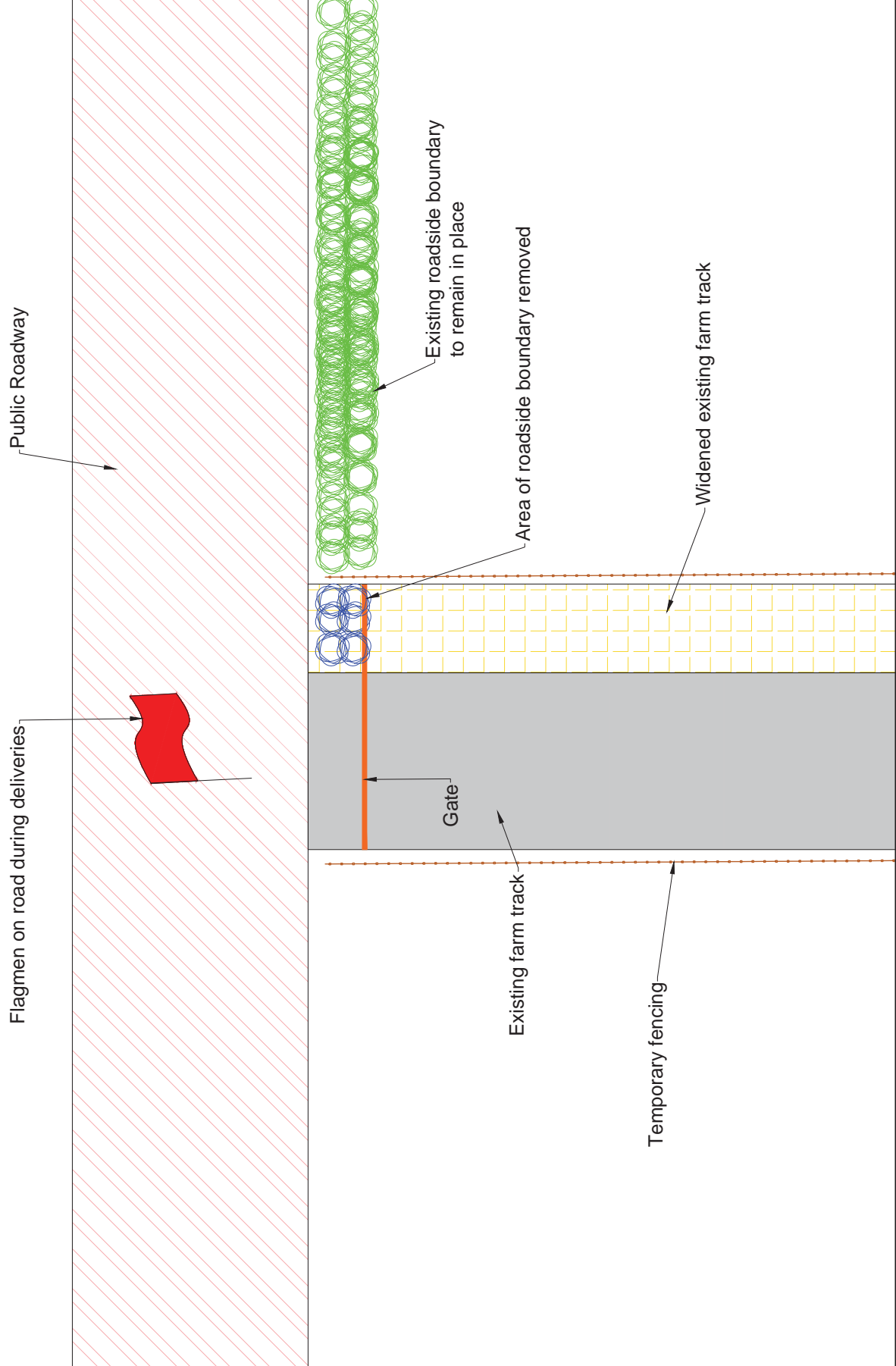
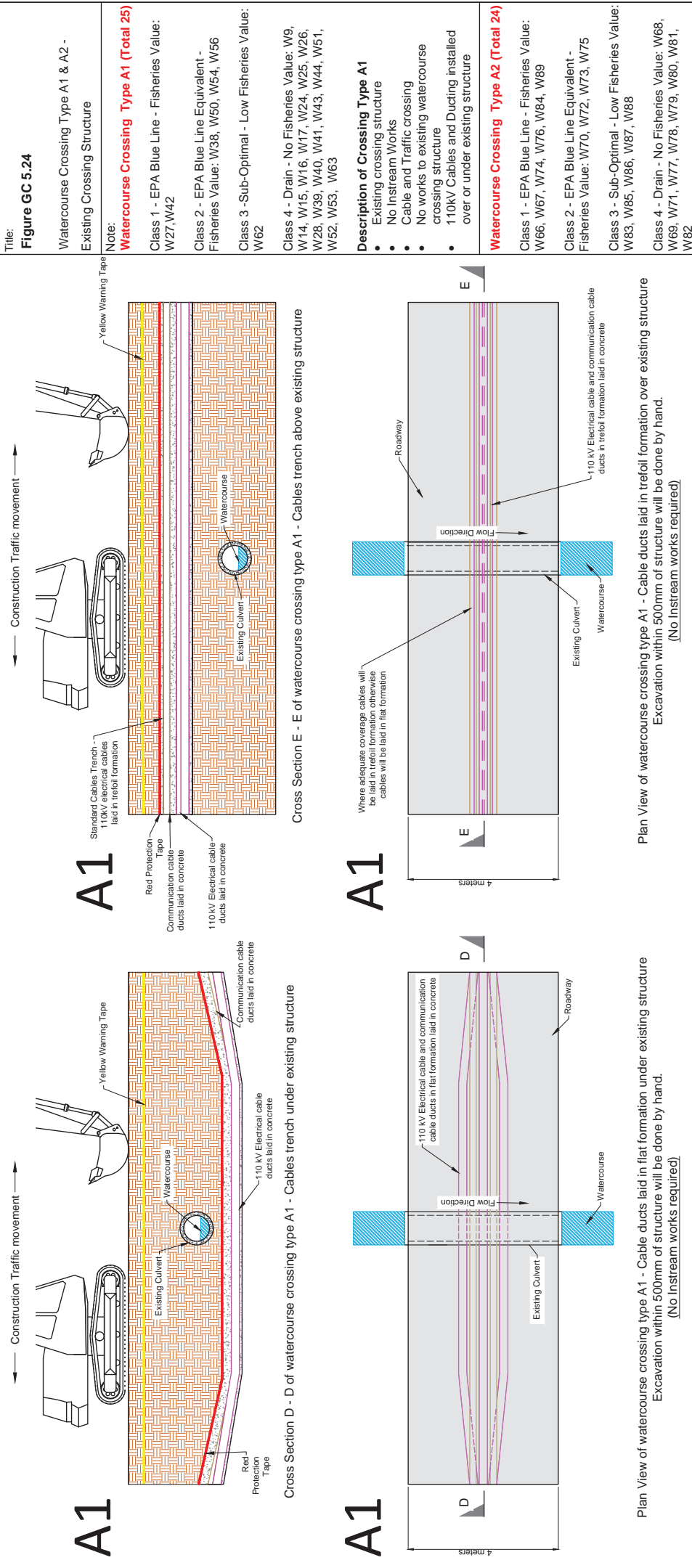


Figure GC 5.23

Map Number:


Note :
Drawings not to scale. For illustration purposes only

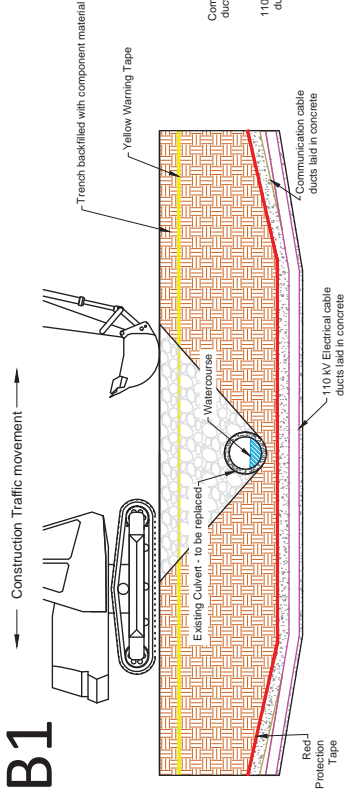




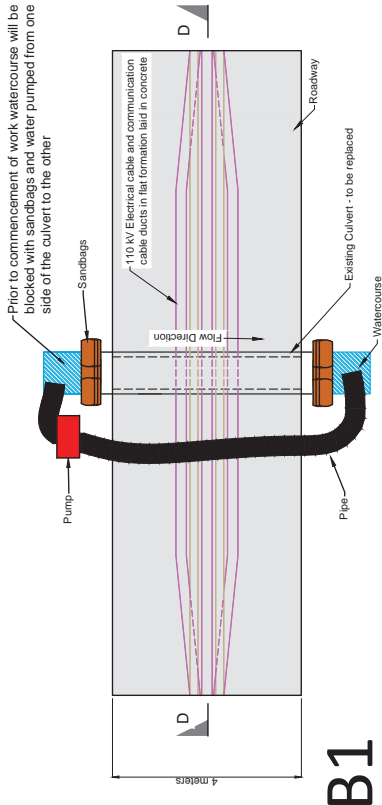
Cross Section of watercourse crossing type A2 - Traffic Movement only over structure (No instream works required)

Note :
Specifications may vary at time of construction to reflect any revisions to Eirgrid or ESB Specifications

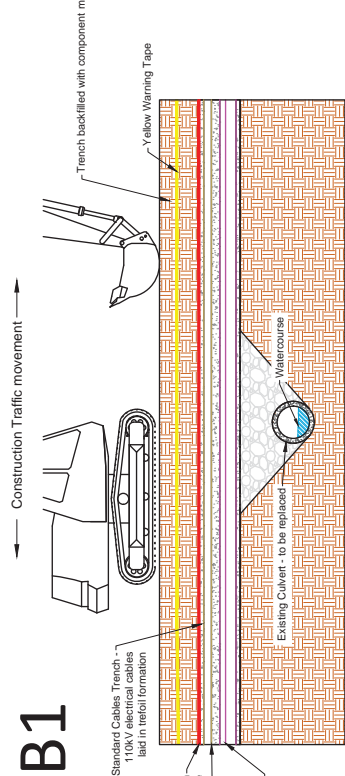
<p>Title: Figure GC 5.25</p> <p>Watercourse Crossing Type B1 - Replaced Crossing Structure</p>	<p>Note:</p> <p>Watercourse Crossing Type B1 (Total 3)</p> <p>Class 1 - EPA Blue Line - Fisheries Value: W8, W47</p> <p>Class 3 - Sub-Optimal - Low Fisheries Value: W35</p> <p>Description of Crossing Type B1</p> <ul style="list-style-type: none"> Existing crossing structure Instream Works Cable and Traffic crossing Replacement of existing watercourse crossing structure 110kV Cables and Ducting installed over or under replaced existing crossing structure 	<p>Project: UWF Grid Connection (GC)</p>	<p>Drawn by: CB</p> <p>Created by: JB</p> <p>Date: 12-Feb-18</p> <p>Sheet Size: A3</p>	<p>  EcoPower Environmental Services 10000 Highway 101, Suite 101 Langley, BC V4L 4C6 Canada Phone: (604) 779-1111 Fax: (604) 779-1112 Email: info@ecopower.ca </p>
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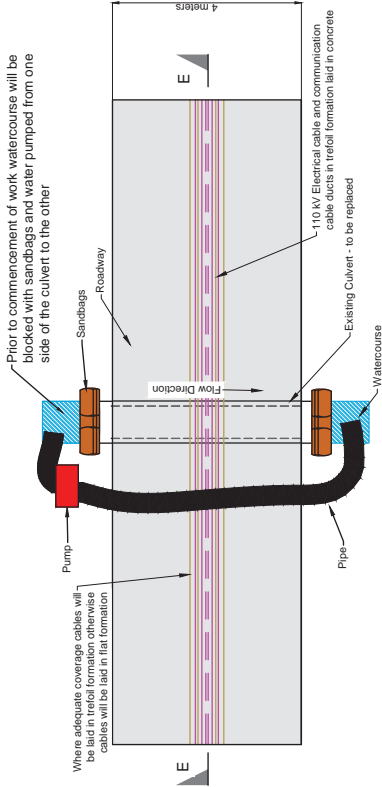
Cross Section D - D of watercourse crossing type B1 - Cables trench under replaced structure



Plan View of watercourse crossing type B1 - Cable ducts laid in flat formation under replaced structure



Cross Section E - E of watercourse crossing type B1 - Cables trench over replaced structure



Plan View of watercourse crossing type B1 - Cable ducts laid in trefoil formation over replaced structure

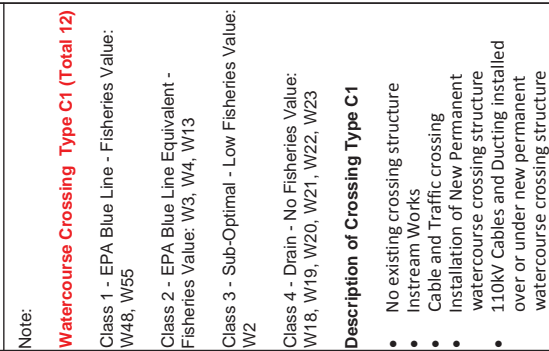
Note:

The damming and over-pumping method will typically be carried out at watercourses where a permanent crossing structure is being installed or where an existing culvert is being replaced.

All permanent watercourse culverts will be sized to cope with a minimum 100-year flood event. All pipe culverts will be at least 900mm in diameter regardless of the anticipated flood flow. 900mm culverts will be set into the river bed to a depth of 300mm and 1200mm culverts will be set in 500mm.

Note :
Specifications may vary at time of construction to reflect any revisions to Eirgrid or ESB Specifications

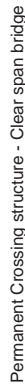
Title: **Figure GC 5.26**
Watercourse Crossing Type C1 - New
Permanent Structure



Designed in conjunction with

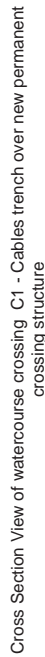
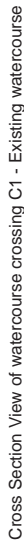
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CB	JB	12-Feb-18	A3


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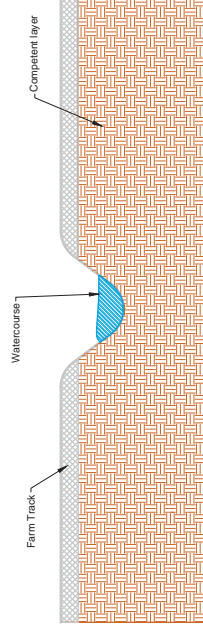
Note: The damming and over-pumping method will typically be carried out at watercourses where a permanent crossing structure is being installed or where an existing culvert is being replaced.

All permanent watercourse culverts will be sized to cope with a minimum 100-year flood event. All pipe culverts will be at least 900mm in diameter regardless of the anticipated flood flow. 900mm culverts will be set into the river bed to a depth of 300mm and 1200mm culverts will be set in 500mm.

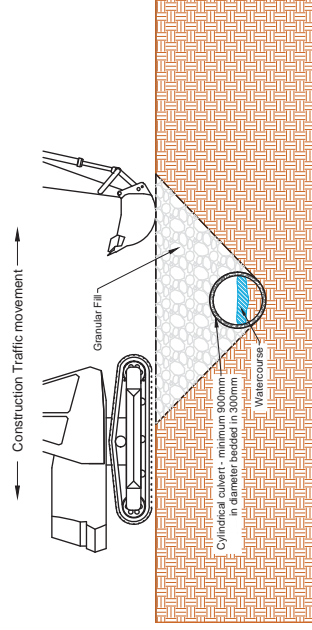


 **Cambridge**
University
Cambridge

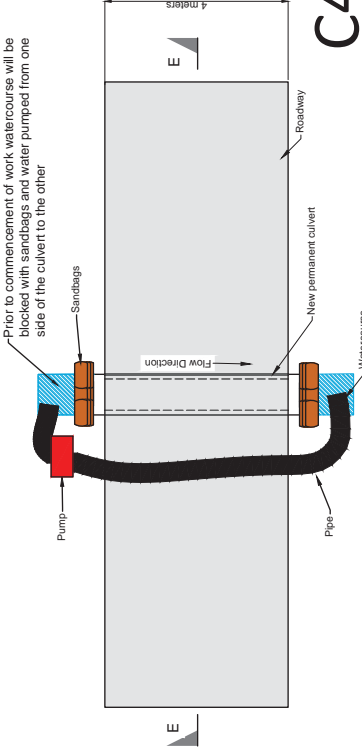
4



Cross Section View E - E of watercourse crossing W90 - Existing watercourse



Cross Section View E - E of watercourse crossing types C4 -
Traffic over new permanent crossing structure





Plan of watercourse crossing types C4 - Traffic over new permanent crossing structure

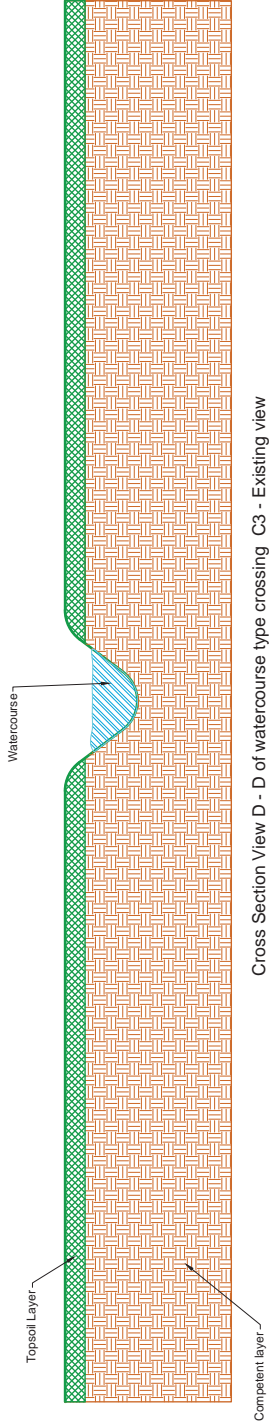
Note on CA:

Note on 34: The damming and over-pumping method will typically be carried out at watercourses where a permanent crossing structure is being installed or where an existing culvert is being replaced.

All permanent watercourse culverts will be sized to cope with a minimum 100-year flood event. All pipe culverts will be at least 900mm in diameter regardless of the anticipated flood flow. 900mm culverts will be set into the river bed to a depth of 300mm and 1200mm culverts will be set in 500mm

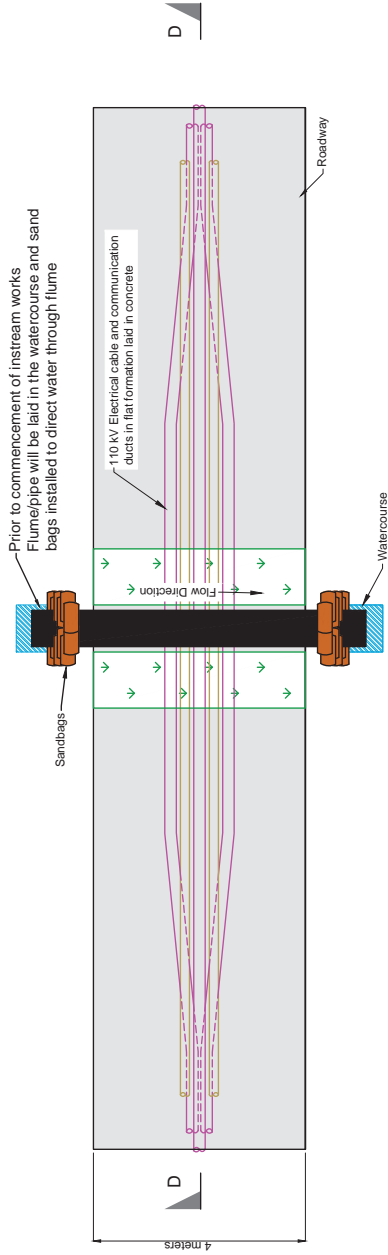
Title: Figure GC 5.27 Watercourse Crossing Type C2 - New Temporary Structure & Watercourse Crossing Type C4 - New Permanent Structure Watercourse Crossing Type C2 (Total 15) Class 1 - EPA Blue Line - Fisheries Value: W11 Class 2 - EPA Blue Line Equivalent - Fisheries Value: W1, W46 Class 3 - Sub-Optimal - Low Fisheries Value: W6, W49 Class 4 - Drain - No Fisheries Value: W5, W29, W30, W31, W33, W34, W37, W45, W58, W59 Description of Crossing Type C2 <ul style="list-style-type: none"> • No existing crossing structure • Instream Works • Cable and Traffic crossing • Installation of New Temporary watercourse crossing structure • 110KV Cables and Ducting installed under structure Watercourse Crossing Type C4 (Total 1) Class 2 - EPA Blue Line Equivalent - Fisheries Value: W90 Description of Crossing Type C4 <ul style="list-style-type: none"> • No existing crossing structure • Instream Works • Traffic crossing only • Installation of New Permanent watercourse crossing structure • No Cables or Ducting installed 			
Note : Specifications may vary at time of construction to reflect any revisions to Eirgrid or ESB Specifications			
<div style="display: flex; align-items: center; justify-content: space-between;"> <div style="text-align: center;">  </div> <div style="text-align: center;"> <p>Designed in conjunction with</p>  </div> </div>			
Project: UWF Grid Connection (GC)			
Drawn by:	CB	Checked by:	Date:
			12-Feb-18
			A3

C3



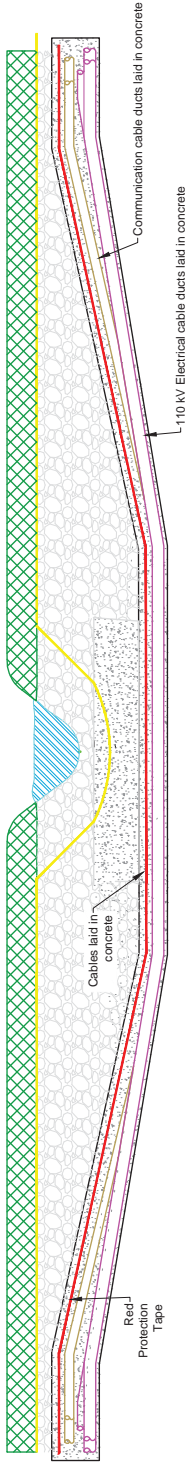
Cross Section View D - D of watercourse type crossing C3 - Existing view

C3



Plan View of watercourse crossing type C3 - Cables trench under watercourse

C3



Cross Section D - D of watercourse crossing type C3 - Cables trench under watercourse

Note:

The damming and over-pumping method will also be used at cable-only crossings where flows are very low at the time of the proposed crossing works.

The flume/pipe watercourse crossing method will also be used or at cable-only crossings where flows are too large to be managed by the dam and over pump method at the time of the proposed crossing works.

Title:

Figure GC 5.28

Watercourse Crossing Type C3 - 110kV
UGC Trenching and Ducting only

Note:

Watercourse Crossing Type C3 (Total 6)

Class 1 - EPA Blue Line - Fisheries Value:
W12, W32, W61

Class 2 - EPA Blue Line Equivalent -
Fisheries Value:
None

Class 3 - Sub-Optimal - Low Fisheries Value:
None

Class 4 - Drain - No Fisheries Value: W60,
W64, W65

Description of Crossing Type C3

- No existing crossing structure
- Instream Works
- Cable crossing only
- No watercourse crossing structure required
- 110kV Cables and Ducting installed under watercourse

Note :

Specifications may vary at time of construction to reflect any revisions to Eirgrid or ESB Specifications



Designed in conjunction with

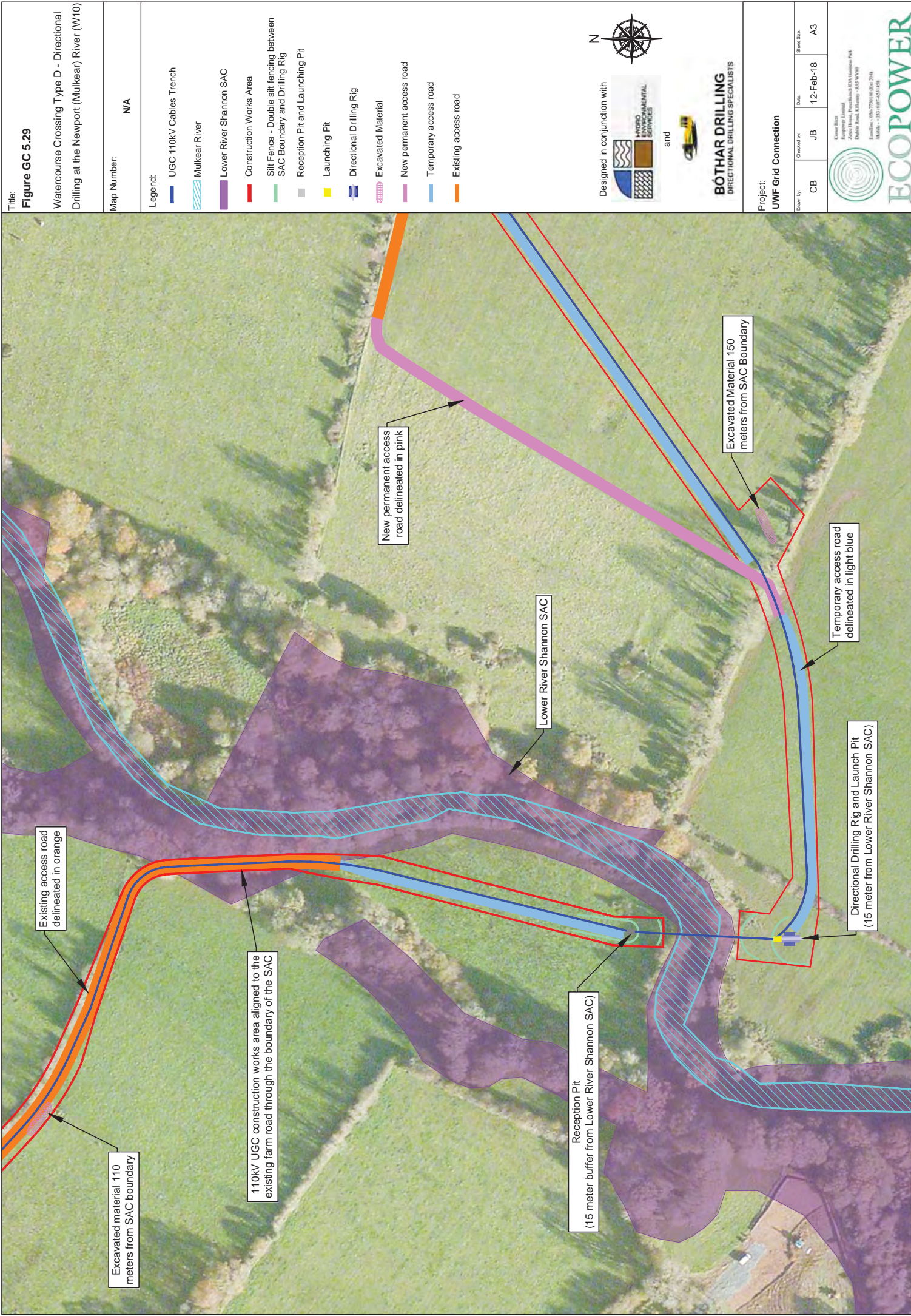
Project:

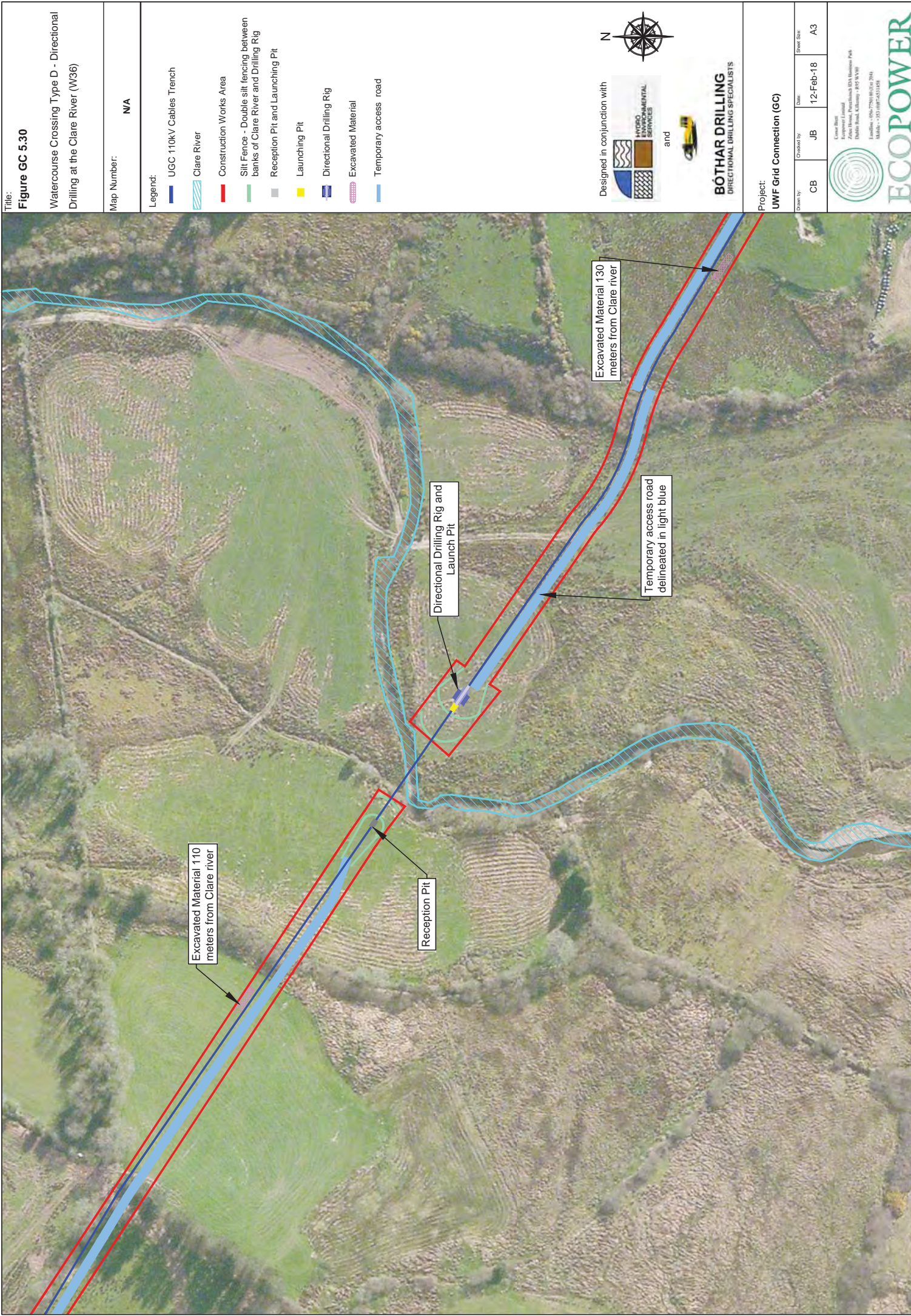
UWF Grid Connection (GC)

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Zoores House, Pengelly Road, Ballyvaughan, Co. Clare
Lisdoonbeg, Co. Kerry
Dublin Road, Kildare
Mullingar, Co. Wick





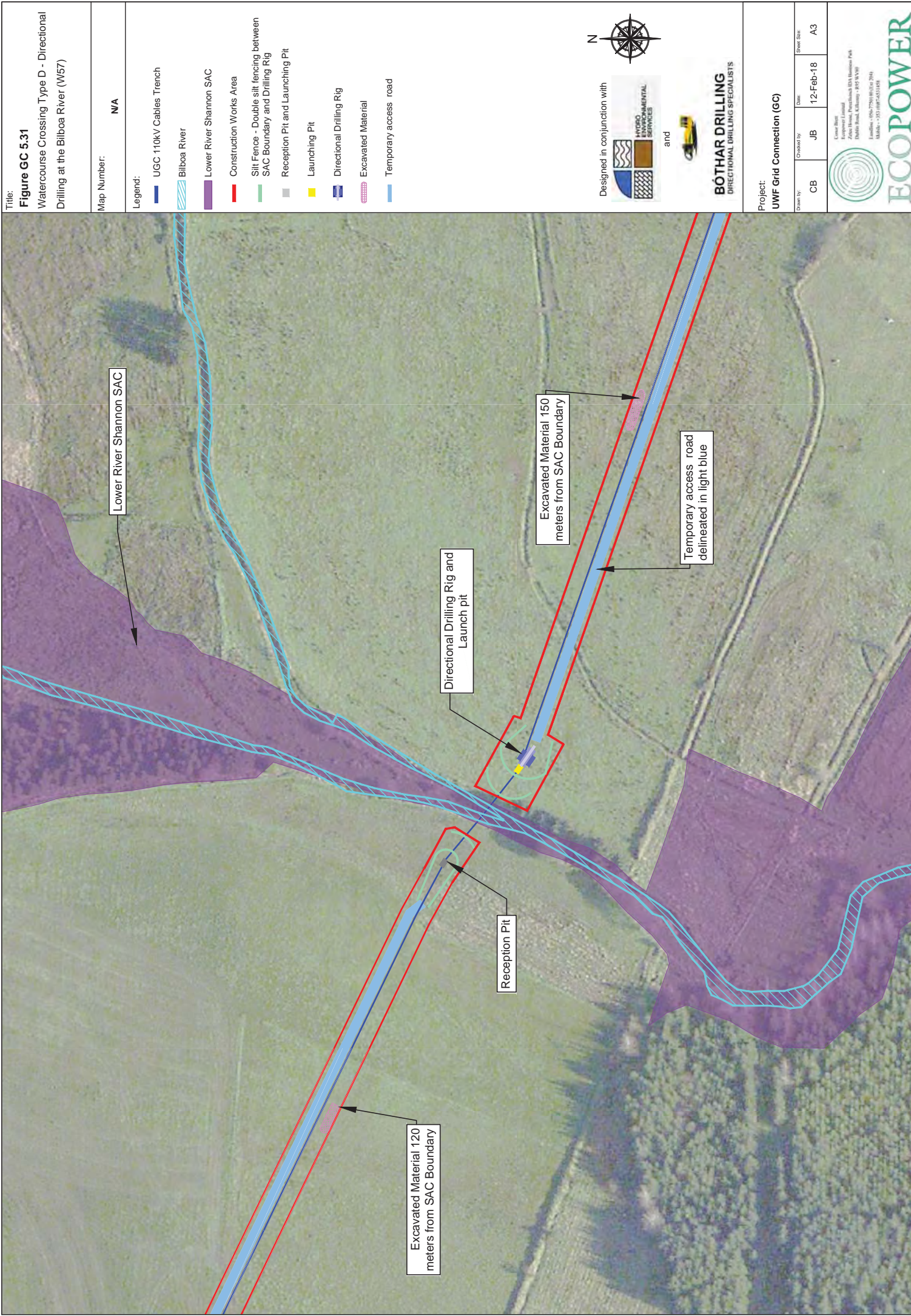


Figure GC 5.32

Note:

Used at C type water crossings at EPA Blue Line & EPA Blue Line Equivalent streams

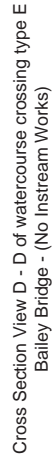
- No existing crossing structure
- No instream Works
- Traffic crossing only
- No Cables or Ducting installed

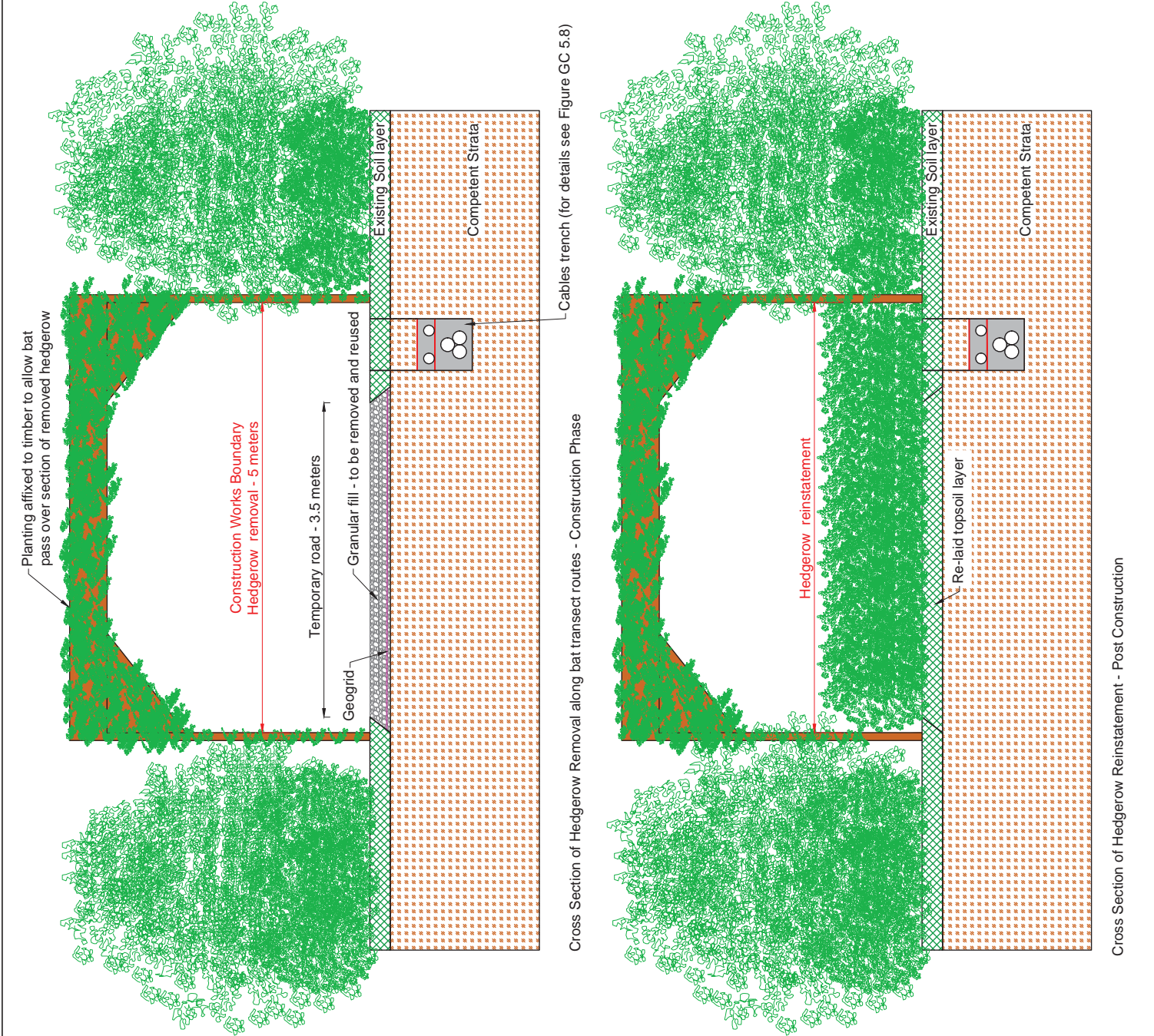
UWF Grid Connection (GC)



Cinema Royal
Empire Limited
Zoo's House, Poynton Road, HSA Business Park
Dobbin Road, Killybeggs - R05 WY90
Landline - 056-7790140 (Ext 204)
Mobile - +353 0977 6531258

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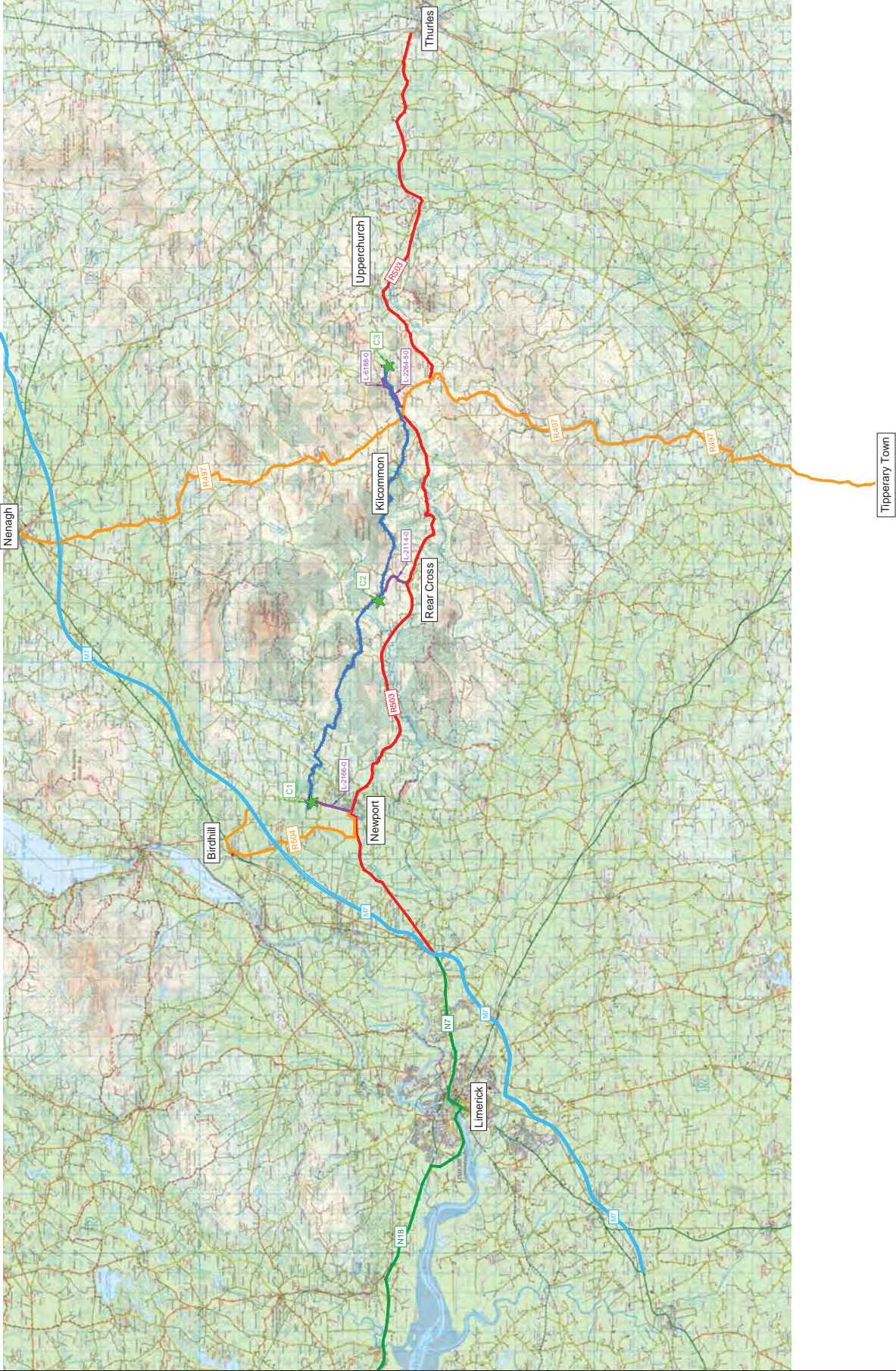




Title:
Figure GC 5.36
Haul Route for Other Construction
Materials & Equipment

Map Number:
Map 1 of 1

- Legend:
- UWF Grid Connection
 - Haul Route from Adjacent Town or City along a Regional Road to the R503
 - Regional Road R503
 - Temporary Compound
 - Temporary Compound Numbers
 - Haul Route to Temporary Compounds from the R503 along local roads
 - Local Road Numbers



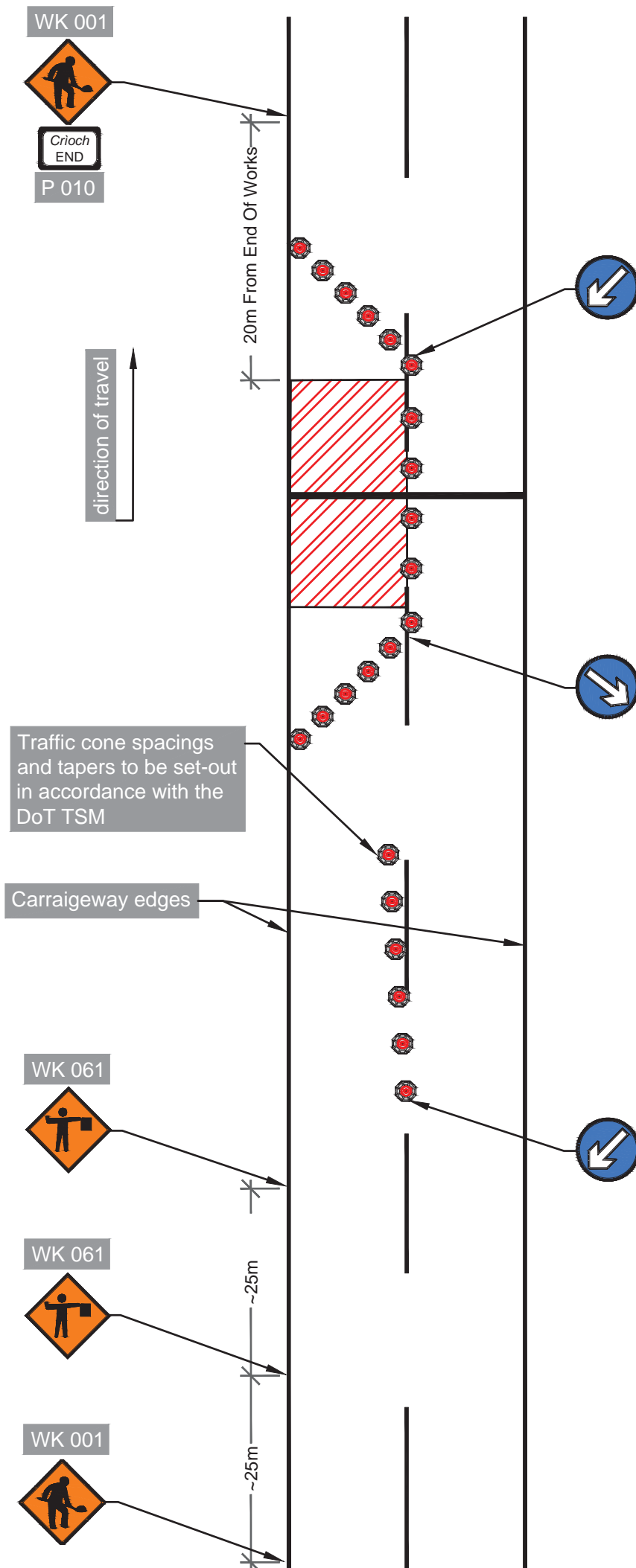


Figure GC 5.37

Advance Warning Signage for Road Works & Site Entrances

Designed in conjunction with



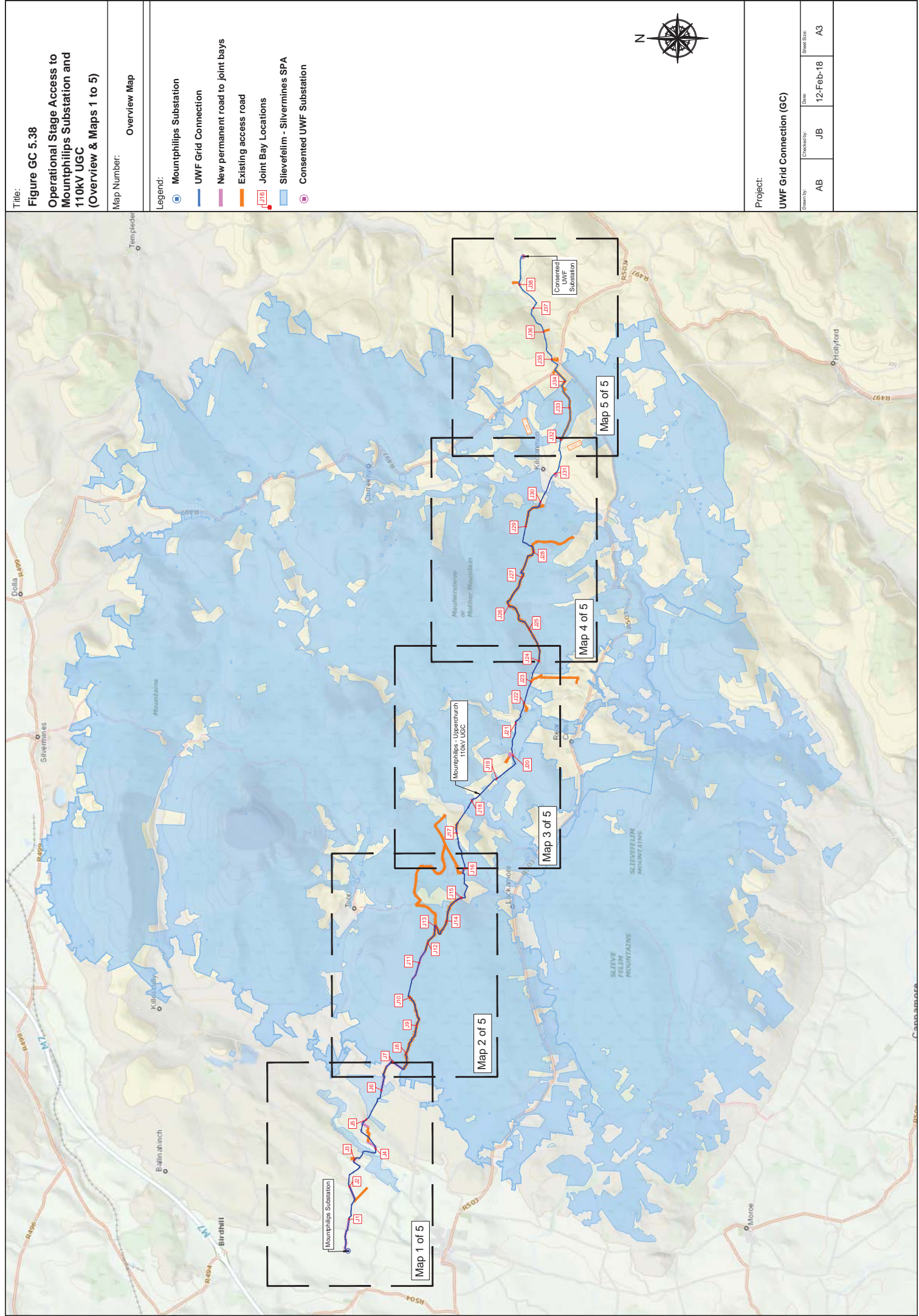
Note: This drawing is not to scale

Department of Transport Traffic Signs Manual (DoT TSM)

Project:
UWF Grid Connection (GC)

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AB	JB	12-Feb-18	A3





Title:
Figure GC 5.38
Operational Stage Access to
Mounthillips Substation and 110kV
UGC (Overview & Maps 1 to 5)

Map Number: **Map 3 of 5**

Legend:

-
- UWF Grid Connection
 - New permanent access road to joint bays
 - Existing private access road
 - Joint Bay Locations
 - Conseled Permanent access road
 - Public Road
 - Public Road Number
 - Slievefelim - Silvermines SPA



Project:

UWF Grid Connection (GC)

Drawn by: AB	Checked by: JB	Date: 12-Feb-18	Sheet Size: A3
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Aosle Butler
Ecopower Developments Ltd
Zetec House,
Purcellinch Business Park, Killynery
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MOB: +353 83 8805644

EcoPOWER



Operational Stage Access to Mountphilips Substation and 110KV UGC (Overview & Maps 1 to 5)

Map 4 of 5

Connection

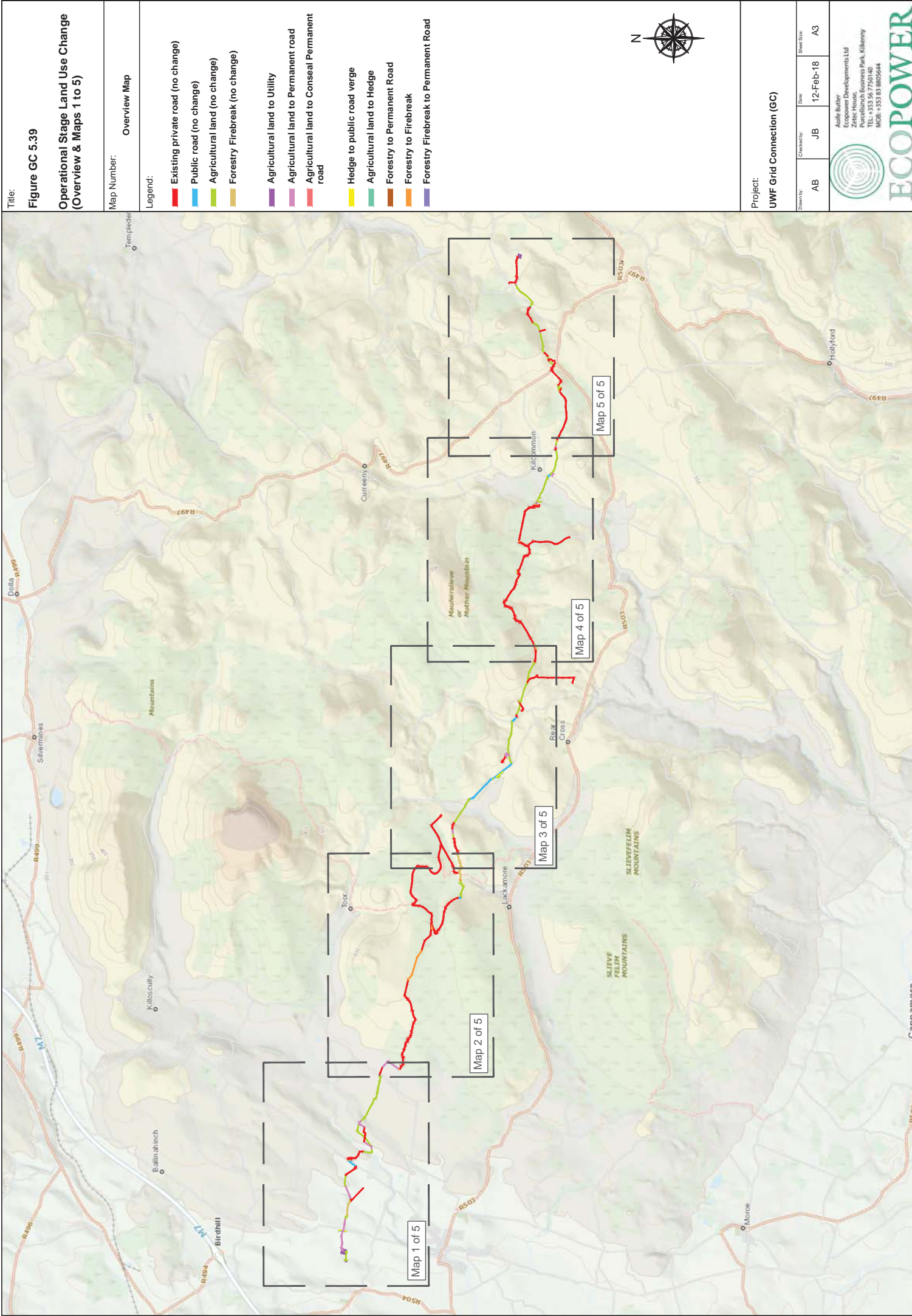
-

UWF Grid Connection (GC)

Sheet Size:	Date:
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ECOPOWER



Operational Stage Land Use Change (Overview & Maps 1 to 5)

Map Number:

Legend:

- | Color | Land Use / Feature |
|-------------|-------------------------------------|
| Blue | UWF Grid Connection |
| Red | Existing private road (no change) |
| Light Blue | Public road (no change) |
| Green | Agricultural land (no change) |
| Yellow | Forestry Firebreak (no change) |
| Purple | Agricultural land to Utility |
| Pink | Agricultural land to Permanent road |
| Orange | Hedge to public road verge |
| Teal | Agricultural land to Hedge |
| Brown | Felled Forestry to Permanent Road |
| Dark Blue | Townlands |
| Light Green | Public Road Number |

CR New Permanent - Concealed Access Road



Project:

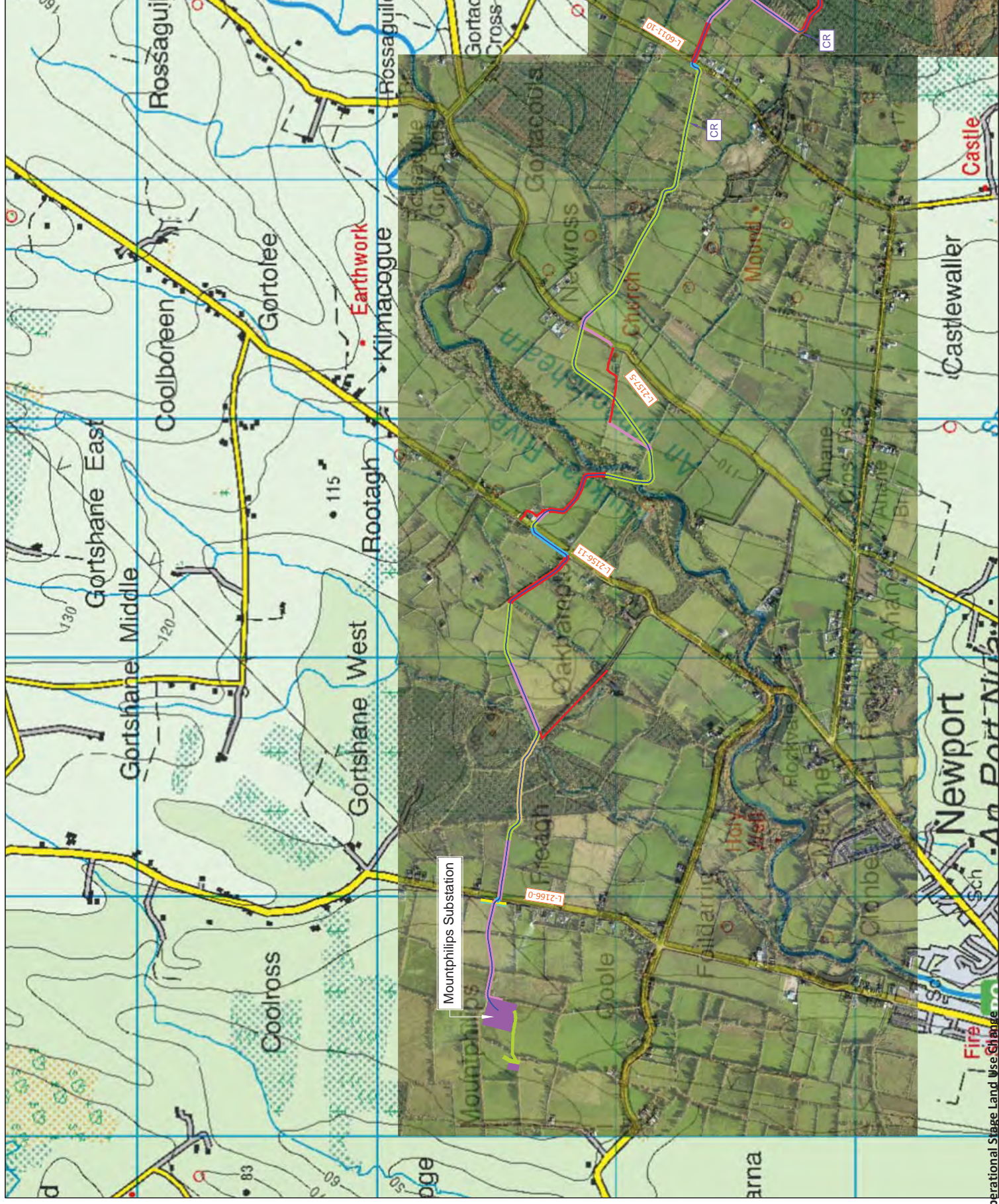
UWF Grid Connection (GC)

324

5	
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edged by:

Defer:	
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This figure is a composite image showing an aerial photograph of a mountainous region in Ireland, overlaid with a topographic map. The map features contour lines, place names, and a red boundary line. Key features include:

- Place Names:** Glencroe, Gortnaskehly, Fiddane, Bleanbegag, Knocknamoheragh, Feilim Way, Cillín, Killeen, Tooreenbrien-Upper, and Curley Rocks.
- Topographic Features:** Contour lines indicating elevation, with peaks labeled 329, 346, 363, and 370.
- Boundary Line:** A red line traces a path through the landscape, with labels 'CR' and 'L-95032-8'.
- Map Elements:** A grid of blue lines, a yellow line, and a purple line are also visible.

This aerial map of the Bann Valley area in Northern Ireland shows the Bann River and surrounding hills. The map includes contour lines, place names, and a red line tracing a path. Key features include:

- Place Names:** An Tuair, Bleanbeg, Knocknamoheragh, Fellin Way, Fellin Stream, Cilleen, Killeen, Tooreenbrien-Upper, and Fiddane.
- Contour Lines:** Elevation markers such as 329, 340, 360, 380, 400, 420, 440, 460, 480, 500, 520, 540, 560, 580, 600, 620, 640, 660, 680, 700, 720, 740, 760, 780, 800, 820, 840, 860, 880, 900, 920, 940, 960, 980, 1000, 1020, 1040, 1060, 1080, 1100, 1120, 1140, 1160, 1180, 1200, 1220, 1240, 1260, 1280, 1300, 1320, 1340, 1360, 1380, 1400, 1420, 1440, 1460, 1480, 1500, 1520, 1540, 1560, 1580, 1600, 1620, 1640, 1660, 1680, 1700, 1720, 1740, 1760, 1780, 1800, 1820, 1840, 1860, 1880, 1900, 1920, 1940, 1960, 1980, 2000, 2020, 2040, 2060, 2080, 2100, 2120, 2140, 2160, 2180, 2200, 2220, 2240, 2260, 2280, 2300, 2320, 2340, 2360, 2380, 2400, 2420, 2440, 2460, 2480, 2500, 2520, 2540, 2560, 2580, 2600, 2620, 2640, 2660, 2680, 2700, 2720, 2740, 2760, 2780, 2800, 2820, 2840, 2860, 2880, 2900, 2920, 2940, 2960, 2980, 3000, 3020, 3040, 3060, 3080, 3100, 3120, 3140, 3160, 3180, 3200, 3220, 3240, 3260, 3280, 3300, 3320, 3340, 3360, 3380, 3400, 3420, 3440, 3460, 3480, 3500, 3520, 3540, 3560, 3580, 3600, 3620, 3640, 3660, 3680, 3700, 3720, 3740, 3760, 3780, 3800, 3820, 3840, 3860, 3880, 3900, 3920, 3940, 3960, 3980, 4000, 4020, 4040, 4060, 4080, 4100, 4120, 4140, 4160, 4180, 4200, 4220, 4240, 4260, 4280, 4300, 4320, 4340, 4360, 4380, 4400, 4420, 4440, 4460, 4480, 4500, 4520, 4540, 4560, 4580, 4600, 4620, 4640, 4660, 4680, 4700, 4720, 4740, 4760, 4780, 4800, 4820, 4840, 4860, 4880, 4900, 4920, 4940, 4960, 4980, 5000, 5020, 5040, 5060, 5080, 5100, 5120, 5140, 5160, 5180, 5200, 5220, 5240, 5260, 5280, 5300, 5320, 5340, 5360, 5380, 5400, 5420, 5440, 5460, 5480, 5500, 5520, 5540, 5560, 5580, 5600, 5620, 5640, 5660, 5680, 5700, 5720, 5740, 5760, 5780, 5800, 5820, 5840, 5860, 5880, 5900, 5920, 5940, 5960, 5980, 6000, 6020, 6040, 6060, 6080, 6100, 6120, 6140, 6160, 6180, 6200, 6220, 6240, 6260, 6280, 6300, 6320, 6340, 6360, 6380, 6400, 6420, 6440, 6460, 6480, 6500, 6520, 6540, 6560, 6580, 6600, 6620, 6640, 6660, 6680, 6700, 6720, 6740, 6760, 6780, 6800, 6820, 6840, 6860, 6880, 6900, 6920, 6940, 6960, 6980, 7000, 7020, 7040, 7060, 7080, 7100, 7120, 7140, 7160, 7180, 7200, 7220, 7240, 7260, 7280, 7300, 7320, 7340, 7360, 7380, 7400, 7420, 7440, 7460, 7480, 7500, 7520, 7540, 7560, 7580, 7600, 7620, 7640, 7660, 7680, 7700, 7720, 7740, 7760, 7780, 7800, 7820, 7840, 7860, 7880, 7900, 7920, 7940, 7960, 7980, 8000, 8020, 8040, 8060, 8080, 8100, 8120, 8140, 8160, 8180, 8200, 8220, 8240, 8260, 8280, 8300, 8320, 8340, 8360, 8380, 8400, 8420, 8440, 8460, 8480, 8500, 8520, 8540, 8560, 8580, 8600, 8620, 8640, 8660, 8680, 8700, 8720, 8740, 8760, 8780, 8800, 8820, 8840, 8860, 8880, 8900, 8920, 8940, 8960, 8980, 9000, 9020, 9040, 9060, 9080, 9100, 9120, 9140, 9160, 9180, 9200, 9220, 9240, 9260, 9280, 9300, 9320, 9340, 9360, 9380, 9400, 9420, 9440, 9460, 9480, 9500, 9520, 9540, 9560, 9580, 9600, 9620, 9640, 9660, 9680, 9700, 9720, 9740, 9760, 9780, 9800, 9820, 9840, 9860, 9880, 9900, 9920, 9940, 9960, 9980, 10000.
- Scale:** A scale bar at the bottom left indicates distances up to 1000 meters.
- CR Labels:** Several 'CR' labels are placed along the red line, indicating specific points of interest.

This is an aerial map of the Killiney area in Dublin, Ireland. The map shows the Killiney River flowing through the landscape, with several tributaries and streams. Key features include:

- Topography:** Contour lines are visible, indicating elevations such as 320, 340, 360, and 380 meters.
- Place Names:** 'Killiney' is prominently displayed in the center. Other names include 'Fellin Way', 'Fellin Stream', 'Killiney Park', and 'Killiney Wood'. 'Fellin Stream' is also labeled in red.
- Infrastructure:** A road labeled 'CR' (County Road) runs through the area. A yellow line, possibly a railway or a specific boundary, is visible on the right side.
- Map Details:** The map includes a grid and various labels such as 'L-95032-8' and 'L-1109-1'. The terrain is a mix of green fields and brownish areas, possibly indicating different land uses or vegetation.

[illegible][illegible][illegible][illegible][illegible][illegible]

The image is an aerial photograph of a rural area in County Wick, Ireland, overlaid with a topographic map. The map shows the River Slaney flowing through the landscape. Key features include the Feilim Way, a road that runs along the river, and the Tooreenbrien area. The map also shows various topographical features, including hills and valleys. A red boundary line is drawn across the map, and a yellow line and a green line are also visible. A small inset map in the bottom right corner shows the location of the area within the county.

The map displays a topographic section of the Taareenbrien-Upper part. Key features include:

- Contour Lines:** Elevation contours are marked at 363, 340, 320, and 240 meters.
- Peak:** A prominent peak is labeled with an elevation of 363 meters.
- Road:** A road is indicated by a red line and labeled 'OR'.
- Grid System:** A blue grid is overlaid on the map, with coordinates ranging from 100 to 240 on the horizontal axis and 320 to 360 on the vertical axis.
- Scale:** A scale bar at the bottom indicates a distance of 100 meters.
- Topography:** The terrain is characterized by steep slopes and a central valley.

Topographic map of the area around Tranebryen-Øpperøpet. The map shows contour lines with elevations of 320, 340, and 363. A road is marked with a yellow line and a red line. A river is shown in blue. The map is oriented with North at the top. The text 'Tranebryen-Øpperøpet' is written vertically along the right side of the map. A small red label 'L-9037-8' is visible in the bottom right corner.

Topographic map of the area around Tranebryen-Øpperbøl. The map shows contour lines with elevations of 328, 330, 340, and 363. A river is depicted in blue, flowing from the top left towards the bottom right. A road is shown in yellow, running horizontally across the middle of the map. The area is labeled 'Tranebryen-Øpperbøl' in black text. A scale bar at the bottom indicates distances of 0, 100, and 200 meters. A north arrow is located in the bottom right corner.

Topographic map of the Toarsenbreen-Upperppet area. The map shows contour lines with elevations of 320, 340, and 360. A yellow line and a red line are drawn across the map. The text 'Toarsenbreen-Upperppet' is written vertically on the right side.

A detailed topographic map of the Traralgon area in Victoria, Australia. The map features contour lines indicating elevation, with labels for 320, 340, and 360 meters. A prominent yellow line represents the Traralgon-Corrumbidgee railway line, running diagonally across the map. A blue line indicates a road or path. The map also shows various geographical features, including a river or stream (blue line) and a large area of green stippling, likely representing a forest or park. The text 'Traralgon-Corrumbidgee' is visible on the left side of the map.

A detailed topographic map of the area around the village of Krasnoyarsk. The map shows contour lines with elevations of 220, 240, 260, and 280 meters. A river flows through the area, and a road is marked with a yellow line. The village of Krasnoyarsk is located near the center of the map. The map is oriented with North at the top.

This map segment shows the area around the 'L' marker. It features a road, a stream, and contour lines. The 'L' marker is located near the intersection of the road and the stream. The map includes a scale bar and a north arrow.

The map is a composite of three panels showing a proposed walking route through a hilly landscape. The route is marked with a red line and a yellow line. Key features include a river, a road, a bridge, and a village. The map includes contour lines and labels for various locations.

- Top Panel:** Shows a section of the route near a river and a road. The route is marked with a red line and a yellow line. The river is labeled "River". The road is labeled "L2140". The route is marked with a red line and a yellow line. The map includes contour lines and labels for various locations.
- Middle Panel:** Shows the route passing through a valley with a road and a bridge. The route is marked with a red line and a yellow line. The road is labeled "L2140". The bridge is labeled "CR". The map includes contour lines and labels for various locations.
- Bottom Panel:** Shows the route ascending a hill towards a village. The route is marked with a red line and a yellow line. The hill is labeled "Barrath Hill". The village is labeled "Reardnogy Beg". The map includes contour lines and labels for various locations.

This aerial map shows the Reardnogy area in County Wick, Ireland. The River Avonbeg flows through the landscape, with Reardnogy Beg and Reardnogy More visible. The map includes contour lines, a grid, and labels for 'CR' (County Road) and 'L' (Local Road). Key landmarks include Reardnogy Hill, Reardnogy Beg, and Reardnogy More. The map also shows the River Avonbeg and the River Avonbeg. The map is oriented with North at the top.

This aerial map shows the Reardnogy area in County Wick, Ireland. The River Abtrais flows through the landscape, with Reardnogy Beg and Reardnogy More identified. Key landmarks include the Standing Stone, Megalithic Tomb, and Boulder Burials. The map features contour lines, a grid, and a red line indicating a specific route or boundary. The area is characterized by rolling hills and fields, with some buildings and infrastructure visible.

This aerial map of the Reardnogy area in County Wick, Ireland, shows the River Abtraing flowing through the landscape. Key features include the Reardnogy Beg, a small lake, and the Standing Stone. The map also shows the Reardnogy Beg, a small lake, and the Standing Stone. The map includes contour lines, a grid, and a scale bar.

This aerial map shows the Reardnogy area in County Wick, Ireland. The River Abtraig flows through the landscape, with Reardnogy Beg and Reardnogy More being significant features. The map includes contour lines indicating elevation, a road network, and various landmarks such as the Standing Stone, Megalithic Tomb, and Boulder Burials. A red line indicates the proposed route for the Reardnogy Beg Water Scheme, which is shown flowing from the river towards the town of Reardnogy.

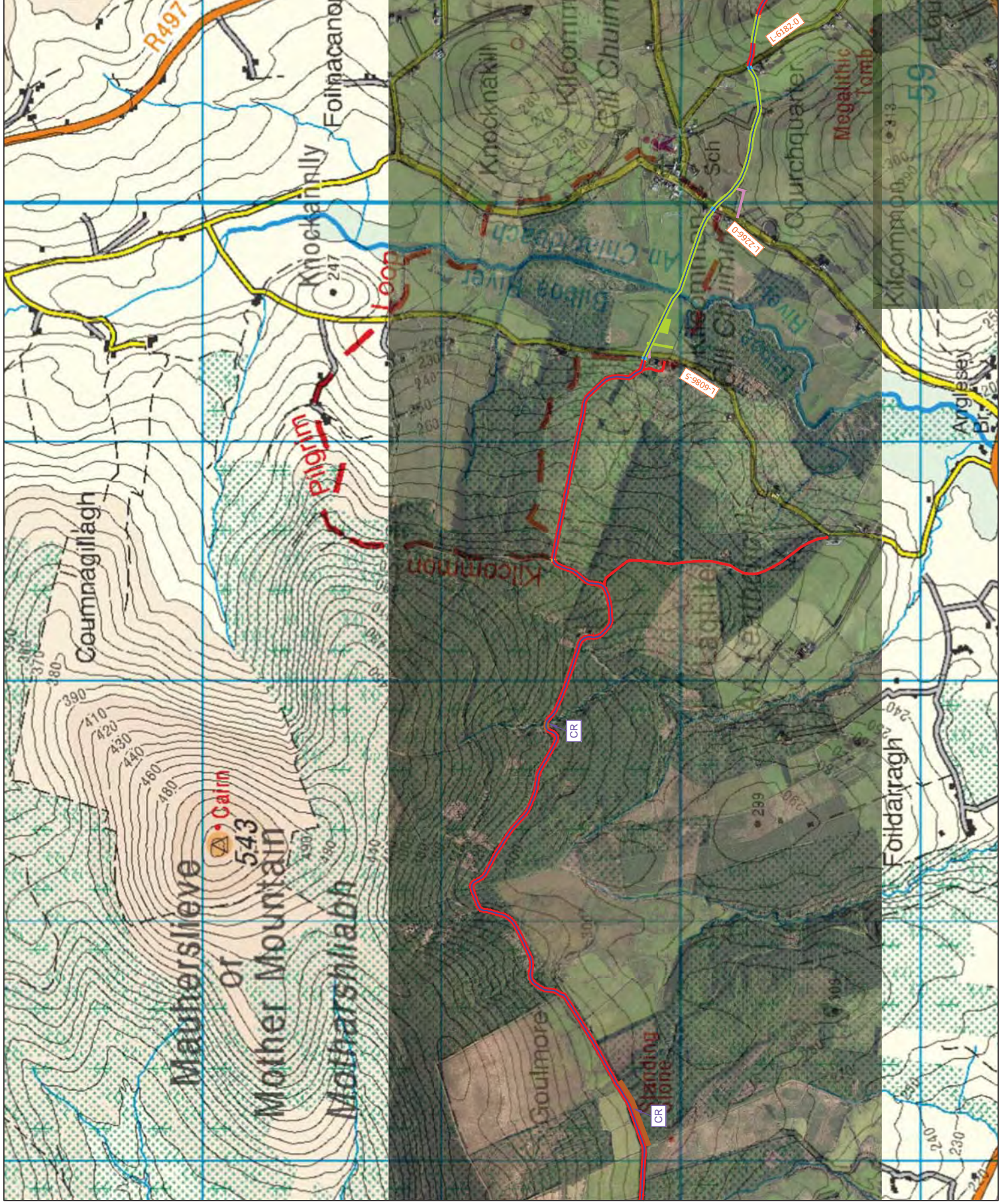
[illegible]

The image is a composite of a topographic map (left) and an aerial photograph (right) of the same geographical area. The topographic map on the left shows contour lines with elevations ranging from 200 to 266 meters. Key features labeled include 'Reardnogy Beg', 'Reardnogy More', 'Barnahy Hill', 'Footbridge', 'Ford', and 'Toogreenbrien Br'. A red line traces a path through the landscape. The aerial photograph on the right provides a real-world view of the terrain, showing fields, roads, and a river. Labels on the aerial photo include 'Standing Stone', 'Megalithic Tomb', 'Boulder Burials', 'Reardnogy More', 'Baunadomeen', 'Rear Cross', and 'Anglesey'. A red line also traces a path in the aerial view, corresponding to the one on the map. A small inset map in the bottom right corner shows the location of the study area within a larger regional context.

This aerial map shows the Baunadomeeny area in County Wick, Ireland. The River Slieve flows through the landscape. Key features include the 'Standing Stone', 'Megallithic Tomb', and 'Boulder Burials' marked with red dots. The map also shows 'Reardnogy More', 'Sch' (school), 'Rear Cross', and 'Anglesey'. A red line highlights a path or boundary. A scale bar indicates 0 to 100 meters.

The image displays a geographical area with an aerial photograph and a corresponding topographic map. The aerial view shows a road network with a red line indicating a specific route. The topographic map below shows contour lines and the same route highlighted in orange and red.










This aerial photograph shows the study area, including the River Anglessey and the village of Ruarcross. A red rectangle highlights the area shown in the topographic map below.



Title:
Figure GC 5.39
Operational Stage Land Use Change
(Overview & Maps 1 to 5)

Map Number: **Map 5 of 5**

UWF Grid Connection


-  Existing private road (no change)
 Public road (no change)
 Agricultural land (no change)
 Forestry to Firebreak
 Agricultural land to Permanent road
 Agricultural land to Utility
 Townlands
 Public Road Number
 New Permanent - Concealed Access Road



UWF Grid Connection (GC)

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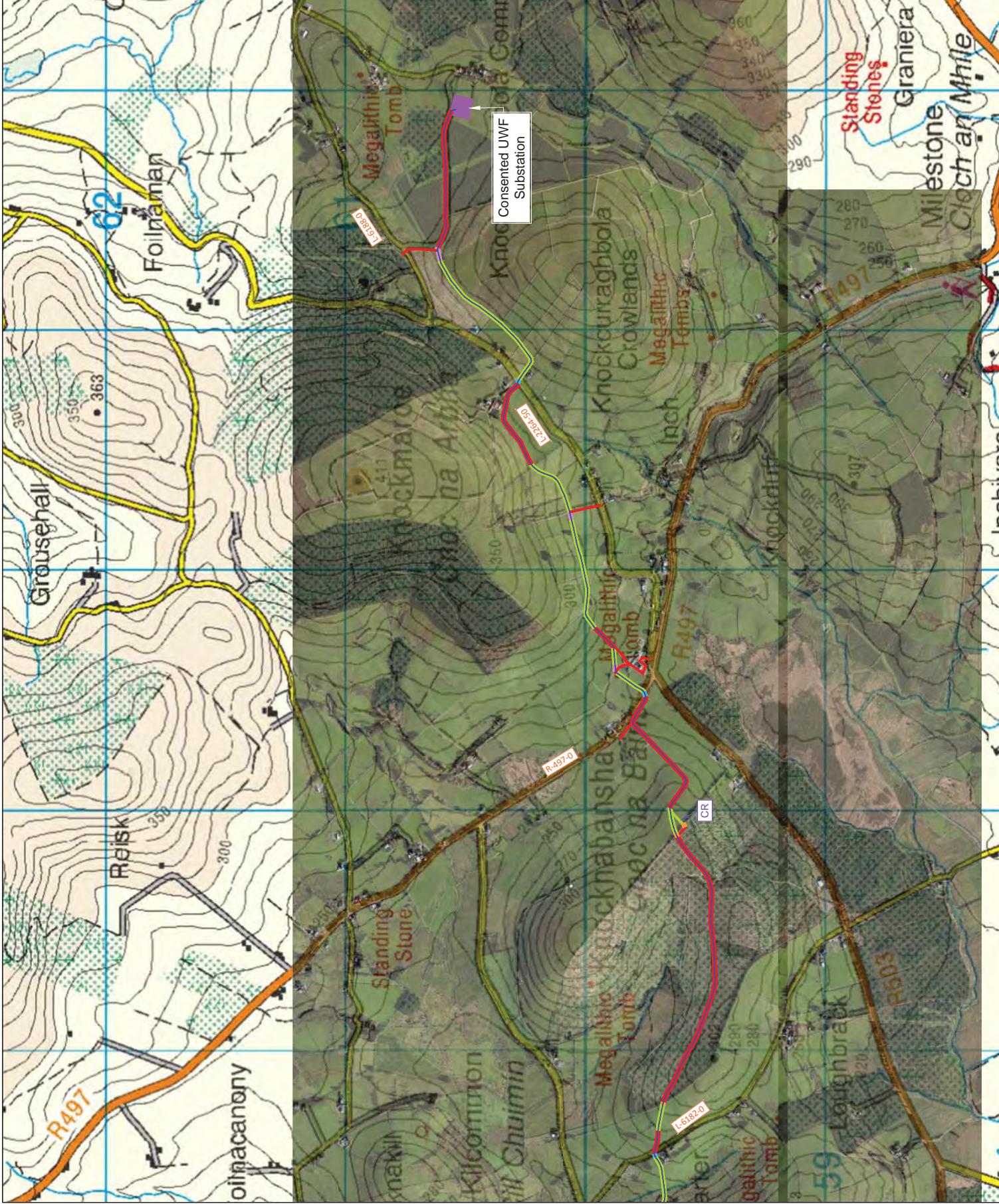
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Whole Upperchurch Windfarm Project

Natura Impact Statement for Whole UWF Project Elements 1 to 5

March 2018

Appendix A5: Project Information

Description of UWF Related Works



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UWF Related Works

Volume C2: EIAR Main Report

Chapter 5

Description of Development (UWF Related Works)



May 2018

Chapter	Description of Development – UWF Related Works
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Contents

5.	Description of the UWF Related Works Development	1
5.1.	Introduction to Chapter 5	1
5.2.	Characteristics of UWF Related Works	2
5.2.1.	Purpose of UWF Related Works.....	2
5.2.2.	Location and overview description of UWF Related Works	2
5.2.3.	Characteristics of UWF Related Works	4
5.2.3.1.	Realigned Windfarm Roads.....	4
5.2.3.2.	Internal Windfarm Cabling.....	5
5.2.3.3.	Haul Route Works	6
5.2.3.4.	Telecom Relay Pole	7
5.2.3.5.	RW Ancillary Works.....	8
5.2.4.	Environmental Protection Measures designed into the UWF Related Works	15
5.2.4.1.	Environmental Management Plan	18
5.3.	Life Cycle Stages of UWF Related Works.....	19
5.3.1.	Construction Stage - UWF Related Works	19
5.3.1.1.	Overview of the Construction Process.....	19
5.3.1.2.	Duration & Timing.....	19
5.3.1.3.	Construction Personnel.....	21
5.3.1.4.	Construction Stage Activities	21
5.3.1.5.	Use of Machinery and Equipment	22
5.3.1.6.	Use of Hydrocarbons.....	23
5.3.1.7.	Other Facilities - Fuel Storage & Tool Storage	23
5.3.1.8.	Imported Construction Materials	23
5.3.1.9.	Traffic Management at Temporary Entrances and Road Work Locations.....	24
5.3.1.10.	EMP for the UWF Related Works.....	25
5.3.2.	Operational Stage – UWF Related Works	26
5.3.2.1.	Duration and Timing of Operational Stage	26
5.3.2.2.	Operational Personnel	26
5.3.2.3.	Operational Activities.....	27
5.3.2.4.	Use of Machinery and Equipment	28
5.3.2.5.	Use of Hydrocarbons.....	28
5.3.2.6.	Welfare Facilities.....	28
5.3.2.7.	Other Facilities - Fuel Storage & Tool Storage	28

5.3.3.	Changes to UWF Related Works	29
5.3.3.1.	Decommissioning.....	29
5.4.	Use of Natural Resources, Emissions & Wastes	30
5.4.1.	Use of Natural Resources.....	30
5.4.1.1.	Use of Resources: Land	30
5.4.1.2.	Use of Resources: Biodiversity.....	31
5.4.1.3.	Use of Resources: Water.....	32
5.4.1.4.	Use of Resources: Soils	33
5.4.2.	Emissions.....	34
5.4.2.1.	Dust	34
5.4.2.2.	Vehicle Exhausts.....	34
5.4.2.3.	Noise	34
5.4.2.4.	Vibration	34
5.4.2.5.	Light.....	34
5.4.2.6.	Electromagnetic Radiation.....	34
5.4.3.	Waste	35
5.4.3.1.	Waste Water	35
5.4.3.2.	General Waste	35
5.4.3.3.	Chemical Waste	35
5.4.3.4.	Arisings.....	36
5.4.3.5.	Waste Management Plan.....	36
5.5.	Vulnerability of the Project to Major Accidents and Natural Disasters	37
5.5.1.	Vulnerability to Major Accidents	37
5.5.2.	Vulnerability to Natural Disasters (Land slippage, Flooding).....	37
5.5.2.1.	Land-slippage	37
5.5.2.2.	Flooding.....	37
5.5.2.3.	Consequences of Natural Disasters Occurring.....	38
5.5.2.4.	Overall Risk.....	38
5.5.2.5.	Mitigation Measures.....	38
5.6.	Cumulative Descriptions	40
5.6.1.	Description of the Other Elements of the Whole UWF Project	40
5.6.1.1.	Element 1: UWF Grid Connection	41
5.6.1.2.	Element 3: UWF Replacement Forestry.....	44
5.6.1.3.	Element 4: Upperchurch Windfarm.....	46
5.6.1.4.	Element 5: UWF Other Activities	48
5.6.1.5.	Cumulative Locational Context of all the Elements	50

Chapter 5: **Description of the UWF Related Works Development**

5.6.2.	Secondary Projects.....	51
5.6.3.	Description of Other Projects and Activities.....	52
5.6.3.1.	Existing Killonan to Nenagh 110kV Overhead Line	53
5.6.3.2.	Existing Shannonbridge – Killonan 220kV Overhead Line	53
5.6.3.3.	Consented Bunkimalta Windfarm.....	53
5.6.3.4.	Consented Castlewaller Windfarm	53
5.6.3.5.	Existing Milestone Windfarm.....	54
5.6.3.6.	Operational Windfarms in the Republic of Ireland.....	54
5.6.3.7.	Existing Communication Structures.....	54
5.6.3.8.	Consented Project – Newport Distributor Road, Newport.....	54
5.6.3.9.	Consented Project – Industrial Warehouse Units at Thurles.....	54
5.6.3.10.	Consented Project - Thurles Regional Water Treatment Works	55
5.6.3.11.	Consented Gortnahalla Turbine.....	55
5.6.3.12.	Killuragh Digester Plant.....	55
5.6.3.13.	Housing Development in Doon and Annacotty	55
5.6.3.14.	Agricultural Developments	55
5.6.3.15.	Activities – Forestry, Agriculture.....	55
5.6.3.16.	Activity – Turf-Cutting.....	55

LIST OF FIGURES – Contained in EIAR Volume C3

Figure No.	Figure Title
Figure RW 5.1	Location of UWF Related Works on OSI Discovery Mapping
Figure RW 5.2	Layout of UWF Related Works on Aerial Photography Mapping
Figure RW 5.3	UWF Related Works Construction Works Area Boundary
Figure RW 5.4	Layout of Internal Windfarm Cabling on Aerial Photography Mapping
Figure RW 5.5	Cross Section of Internal Windfarm Cables Trench
Figure RW 5.6	Cross Section of Internal Windfarm Cabling in Public Road Pavement
Figure RW 5.7	Layout of Realigned Windfarm Roads on Aerial Photography Mapping
Figure RW 5.8	Cross Section of Realigned Windfarm Road
Figure RW 5.9	Layout of Haul Route Works on Aerial Photography Mapping
Figure RW 5.10	Location and Layouts of Haul Route Works (Overview and Maps 1 to 3)
Figure RW 5.11	Location of the Telecom Relay Pole on Aerial Photography Mapping
Figure RW 5.12	Plan and Elevation of Telecom Relay Pole and Compound
Figure RW 5.13	Location of “Change of Use at Existing Entrance” (including sightlines)
Figure RW 5.14	Plan View of Typical Temporary Site Entrance
Figure RW 5.15	Cross Section of Temporary Access Roads
Figure RW 5.16	Watercourse Crossing Type A1 & A2 – UWF Related Works at Existing Crossing Structure
Figure RW 5.17	Watercourse Crossing Type B1 & B2–UWF Related Works at Replaced and /or Widened Crossing Structure
Figure RW 5.18	Watercourse Crossing Type C1–New Permanent Structure
Figure RW 5.19	Watercourse Crossing Type C2 – New Temporary Structure & Watercourse Crossing Type C4 – New Permanent Structure
Figure RW 5.20	Watercourse Crossing Type C3 – Internal Windfarm Cable trench and ducting only
Figure RW 5.21	Watercourse Crossing Type E – Plan and Cross Section Views of Bailey Bridge
Figure RW 5.22	Watercourse Crossing Type F - New permanent clear-span bridge
Figure RW 5.23	Haul Routes for Delivery of Aggregate, Concrete and Other Materials to UWF Site Compound No. 1
Figure RW 5.24	Haul Routes from UWF Site Compound No.1 to Construction Works Areas
Figure RW 5.25	Advance Warning Signage for Half Lane Closures
Figure RW 5.26	Operational Stage Land Use Change
Figure RW 5.27	Cross Section of Hedgerow Removal and Reinstatement

Note: The numbering system for Figures follows the sequence ‘Figure Number-Appendix Number’.

LIST OF APPENDICES – Contained in Volume C4: EIAR Appendices

Appendix No.	Appendix Title
Appendix 5.1	Outline Construction Methodologies for UWF Related Works
Appendix 5.2	Classification and Crossing Method for UWF Related Works Watercourses
Appendix 5.3	Description of Development (UWF Grid Connection)
Appendix 5.4	Description of Development (UWF Replacement Forestry)
Appendix 5.5	Complied Description of Upperchurch Windfarm
Appendix 5.6	Description of the UWF Other Activities
Appendix 5.7	A Guide to Risk Assessment in Major Emergency Management Jan 2010

Note: The numbering system for Appendices follows the sequence 'Chapter Number-Appendix Number'.

Glossary of Terms

<u>Term</u>	<u>Definition</u>
EIA Directive	European Union Directive 2011/92/EU (as amended by Directive 2014/52/EU)
Environmental Factors	The factors in the environment required to be identified, described and assessed during the EIA process. These are specified in Article 3 (1) of the EIA Directive as Population and Human Health; Biodiversity; Land; Soils; Water; Air; Climate; Material Assets; Cultural Heritage and Landscape.
Competent Authority	The body legally delegated to decide on the Planning Application
Competent Expert	Experts who are qualified and competent in their field of expertise
Consented Windfarm	Upperchurch Windfarm – 22 wind turbines, substation, windfarm roads and ancillary works, consented in August 2014 under Planning Reference: Tipperary County Council 13/51/0003, ABP PL 22.243040
Element	One of the 5 No. elements listed in the row above
Project Design Environmental Protection Measures	Measures for environmental protection, incorporated into the design of the project.
Sensitive Aspect	Any sensitive receptor in the local environment which could be impacted by the project.
Whole UWF Project	Project made up of 5 No. elements – UWF Grid Connection; UWF Related Works, UWF Replacement Forestry, Upperchurch Windfarm (UWF) and UWF Other Activities.

List of Abbreviations

<u>Abbreviation</u>	<u>Full Term</u>
ABP	An Bord Pleanála
EDL	Ecopower Developments Limited
EIA	Environmental Impact Assessment

<u>Abbreviation</u>	<u>Full Term</u>
EIAR	Environmental Impact Assessment Report
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
PD	Ecopower <u>Project Design</u> Environmental Protection Measure developed by members of the EIAR Team
RFI	Response to Further Information
SAC	Special Area of Conservation
SPA	Special Protection Area (for wild birds)
OCM	Outline Construction Methodologies
UWF	Upperchurch Windfarm
UGC	Underground Cables

5. Description of the UWF Related Works Development

5.1. Introduction to Chapter 5

UWF Related Works are described in this chapter, in the following order:

Section 5.2	<ul style="list-style-type: none"> • A Description of the Location and Characteristics of the subject development (the UWF Related Works). • The Project Design Environmental Protection Measures incorporated into the design to avoid, prevent or reduce likely significant adverse effects on the environment.
<p><u>The Development as described in Section 5.2</u></p> <p>At the conception of the UWF Related Works, the design team evaluated the potential or likely significant effects of the development, on the receiving environment. Any potential or likely significant effects were avoided, in most cases, <u>by integrating environmental protection measures into the fundamental design of the UWF Related Works</u>. Various measures, particularly options for mitigation by avoidance and mitigation by prevention, were considered; these included alternative locations, alternative designs and alternative processes. Once the chosen location, design and process was decided the proposal was examined for opportunities to incorporate further mitigation measures (generally mitigation by reduction) in the final iteration of the development to be evaluated in the EIA Report. <u>The development, as described in Section 5.2, is the final iteration of the UWF Related Works</u>. It is this final iteration that is examined in Chapters 6 to 17, for effects on the prescribed environmental factors, by the topic competent experts.</p>	
Section 5.3	The durations and timing, main activities, personnel and material requirements for both the construction and operation stages. Any changes to the UWF Related Works, such as decommissioning.
Section 5.4	The use of natural resources, emissions and production of wastes for each stage.
Section 5.5	The vulnerability of the UWF Related Works to major accidents and natural disasters.
Section 5.6	<p>Cumulative Descriptions:</p> <p>For the purposes of cumulative assessment of the whole Upperchurch windfarm (UWF) project, a description of the other elements of the Whole UWF Project namely; UWF Grid Connection; UWF Forestry Replanting; the already consented Upperchurch Windfarm (UWF) and UWF Other Activities, is provided.</p> <p>For the purposes of a cumulative assessment with Other Existing or Consented Projects or Activities, a description of Other Existing or Consented Projects or Activities that were scoped in by the EIAR Team is also provided.</p>

5.2. Characteristics of UWF Related Works

The UWF Related Works proposal comprises of the following parts:

- Internal Windfarm Cabling
- Realigned Windfarm Roads
- Haul Route Roads
- Telecom Relay Pole
- RW Ancillary Works

5.2.1. Purpose of UWF Related Works

Internal Windfarm Cabling: to connect the Consented UWF Turbines to the Consented UWF Substation.

Realigned Windfarm Roads: to realign two lengths of Consented UWF Roads and to provide access to a new telecom relay pole.

Haul Route Works: to facilitate the haulage of turbine components to the Upperchurch Windfarm site.

Telecom Relay Pole: to be erected in order to carry telecoms relay equipment, which will mitigate communication links impacts from operational Consented UWF Turbines on the communication signals between Foilnaman Mast and Laghtseefin Mast. The Telecom Relay Pole will fulfil Condition No. 18 of the planning conditions associated with the Upperchurch Windfarm.

RW Ancillary Works: will facilitate the construction of the UWF Related Works.

Note: the Consented UWF Turbines, Consented UWF Roads and the Consented UWF Substation refer to components of Upperchurch Windfarm (UWF). UWF has already received planning consent, but is not yet constructed.

5.2.2. Location and overview description of UWF Related Works

The **Internal Windfarm Cabling** will connect the Consented UWF Turbines to the Consented UWF Substation, through the installation of underground cables in agricultural; forestry lands; and across public roads; in the townlands of Graniera, Shevry, Knockcurraghbola Commons, Knockmaroe, Grousehall, Cummer, Foilnaman, Gleninchaveigh, Coumnageeha, Coumbeg, Knocknamena Commons, Glenbeg and Seskin. Approximately 62% of the Internal Windfarm Cabling is located under Consented UWF Roads or Realigned Windfarm Roads, the remaining Cabling is located in the vicinity of the windfarm site.

The Internal Windfarm Cabling consists of electrical cables, communication cables and the copper conductor cables which are installed inside High Density Polyethylene (HDPE) ducting in underground trenches. Cable Protection and Warning Tapes will also be laid in the trench. The trench will be excavated, ducting and warning tapes installed and the trench backfilled and reinstated. When the ducting installation is finished and the trench reinstated, the electrical, communication and copper conductor cables will then be pulled through the ducting. The only surface expression of the Internal Windfarm Cabling will be the over-ground identification marker posts and marker plates which will be installed at regular intervals above the cables trench.

The **Realigned Windfarm Roads** (labelled RWR on the mapping) are two sections of the already consented windfarm roads which require realignment and one length of new road to link a telecoms mast to the windfarm road. These changes are proposed for windfarm roads in agricultural and forestry lands in the townlands of Shevry, Knockmaroe, and Grousehall, which are all within the Upperchurch Windfarm site.

The **Haul Route Works** (labelled HW on the mapping), are proposed for public road verges, roadside boundaries and grassland fields located adjacent to the L4139-0, L4138-12, L2264-50, L6188-0, L6185-13 and R503 roads in the following townlands: Shevry, Knockcurraghbola Commons, Knocknabansha, Knockmaroe and Grousehall. Works include the removal of soils and laying of crushed stone and hard-core in roadside verges; temporary removal or part-removal of roadside boundaries; opening of temporary entrances and the construction of temporary access roads on private lands.

The **Telecom Relay Pole** is an 18m wooden pole proposed for a location in Knockmaroe townland, close to the existing Foilnaman Mast. Laghtseefin Mast is 9.5km directly south. The Relay Pole will be contained within a small compound, and a low voltage power and communications supply will be provided from the existing Foilnaman Mast. A short length of access road, Realigned Windfarm Road No. RWR3, will provide access to the Telecom Relay Pole from the Consented UWF Road network.

RW Ancillary Works will facilitate the construction of the UWF Related Works and will include temporary access roads; temporary and permanent watercourse crossings (labelled WW on the mapping); temporary site entrances (labelled EW on the mapping); change of use from 'agriculture' to 'forestry and agriculture' at the UWF Replacement Forestry entrance at Foilnaman (labelled EW10 on the mapping); along with forestry felling; temporary and permanent hedgerow/tree removal; permanent hedgerow replanting; fencing; relocation of existing telephone poles and temporary storage of excavated materials; at various locations within construction works area boundaries.

Relevant Volume C3 EIAR Figures:

Figure RW 5.1: Location of UWF Related Works on OSI Discovery Mapping

Figure RW 5.2: Layout of UWF Related Works on Aerial Photography Mapping which comprises all the UWF Related Works in one large format map in order to provide a comprehensive overview.

Figure RW 5.3: UWF Related Works Construction Works Area Boundary.

Construction Works Area Boundary: All construction works e.g. machinery movement; excavations; excavated materials storage, will take place within the construction works area boundary as delineated on **Figure RW 5.3**. This construction works area is predominately 12m in width. On Figures RW 5.3, consecutive Sections along the Internal Windfarm Cabling routes, (numbered from SW1 to SW84) are identified. These section numbers are used throughout the EIA Report and Appendices to refer to a particular geographical area of the Internal Windfarm Cabling routes.

UWF Related Works is abbreviated throughout this chapter as RW. All the Figures Numbers are prefaced by RW per e.g. Figure RW 5.1

5.2.3. Characteristics of UWF Related Works

5.2.3.1. Realigned Windfarm Roads

The Upperchurch Windfarm Roads require realigning at three locations; RWR1, RWR2 and RWR3 as follows

- **RWR1:** The consented windfarm road to Turbine No.5 in Shevry is 560m in length, and it will replace this road in its entirety by the Realigned Windfarm Road RWR1, which will be 230m in length through forestry and will require forestry felling of 0.2ha, but will avoid the felling of 0.4Ha along the original consented route to Turbine No.5.
- **RWR2:** The consented windfarm road between Turbine No.19, Turbine No. 20 and Turbine No. 21, is 840m long in total. It will replace 370m of this road by Realigned Windfarm Road RWR2, which will also be 370m in length. 220m of RWR2 is located on grassland field, with the remaining length located on existing farm road. The existing farm road section will be upgraded during construction works.
- **RWR3:** A short length (30m) of new access road will be between the Upperchurch Windfarm Roads in Knockmaroe to the new Telecom Relay Pole.

Relevant Volume C3 EIAR Figures:

Figure RW 5.7: Layout of Realigned Windfarm Roads on Aerial Photography Mapping

Figure RW 5.8: Cross Section of Realigned Windfarm Road

Relevant Appendix 5.1 UWF Related Works Outline Construction Methodology:

RW.OCM-04: Realigned Windfarm Roads

5.2.3.2. Internal Windfarm Cabling

Internal Windfarm Cabling will comprise c.17.9km of trenching, laid with ducts which will house 33kV electrical cables and communications cables. The cables trench will be 1.25m deep and 0.6 m wide. Closer to the windfarm substation in Knockcurraghbola Commons (in Section SW84, SW29, SW30 and SW31 where the electrical circuits from different directions are merging), a 400m length of the trench will be double width at 1.2m, to accommodate the double set of cabling. Cable Protection and Warning Tapes will also be laid in the trench as warning of the presence of electrical cables. Above ground identification marker posts and plates will be positioned to mark the location of the underground cables. The design of Internal Windfarm Cabling is typical of medium voltage windfarm cabling systems.

The majority (11.1km) of the Internal Windfarm Cabling will be installed under Consented UWF Roads or Realigned Windfarm Roads. The remainder of the Internal Windfarm Cabling will be installed in agricultural lands (4.6km), forestry lands (2.1km), and crossing under 9 No. public roads (40 meters) (labelled RW1 to RW9 on the mapping).

5.2.3.2.1. Public Road Works for Internal Windfarm Cabling

Road works will be required along the route of the **Internal Windfarm Cabling** where it crosses the public road on the L4139-0, L4139-16, L6188-0, L61881-0, L2264-50, L6185-13 and the L2264-34 local roads. In total there are 9 No. crossing points where the cables trench will be excavated across the road. **Traffic flow** will be maintained by placing a steel plate over the trench to allow traffic to pass over, while the works are on-going and flagmen will control a stop/go system.

Lane closures: A lane closure will be required on the L-2264-50 (Borrisoleigh Road). Flagmen will control a stop/go system for these lane closures.

Relevant Volume C3 EIAR Figures:

Figure RW 5.4: Layout of Internal Windfarm Cabling on Aerial Photography Mapping

Figure RW 5.5: Cross Section of Internal Windfarm Cables Trench

Figure RW 5.6: Cross Section of Internal Windfarm Cabling in Public Road Pavement

Relevant Appendix 5.1 UWF Related Works Outline Construction Methodology:

RW.OCM-08: Internal Windfarm Cabling

5.2.3.3. Haul Route Works

Haul Route Works will be carried out at thirteen locations in the vicinity of Upperchurch Windfarm. A description of the Haul Route Works at each location is included in the table below.

The **Haul Route Works** will take place on the L4139-0, L4138-12, L6188-0, L2264-50 and the L6185-13 local roads, and mainly comprise works within the public road corridor and consist of widening of the public road into the verge and in some cases, the removal of the roadside boundary and the widening of the road into the boundary or across the boundary into private lands. Soil in the verge will be removed and temporarily stored nearby and hardcore will be laid and compacted on these verges to provide access onto construction works areas on lands adjacent to the road. Any existing drainage channels at these entrances will be piped under the hardcore layer. This hardcore will prevent any damage to the edges of road pavements. This widening of the public road network will facilitate the delivery of the turbine components for the Upperchurch Windfarm. The verges and boundaries will be reinstated following the completion of component deliveries.

Table 5-1: Description of Haul Route Works

Haul Route Works ID	Description of the Haul Route Works
HW1	Widening of the L4139-0 by 0.5m into both verges for a length of c.120m. Temporary removal of 130m of roadside boundary.
HW2	Widening of the L4139-0 by 1.5m on the eastern side, for a length of c.280m, by moving the roadside drain and roadside boundary (earthen bank) onto agricultural grassland. Temporary removal of 150m of roadside boundary. As a result the existing concrete culvert at watercourse WW12 will be widened by 1m, with minimal interference to the existing structure.
HW3	Widening of bend along the L4139-0 by 1.5m on western side and 3.5m on eastern side in agricultural grasslands for a length of c.70m. Temporary removal of 100m of roadside boundary.
HW4	Widening of the L4139-0 by 1.5m on the eastern side, for a length of c.270m, by moving the roadside drain and earthen bank onto agricultural grassland. Temporary removal of 130m of roadside boundary.
HW5	Construction of 170m of new temporary site access road on agricultural lands between the L4139-0 and the L4138-12. Temporary removal of 40m of roadside boundary.
HW6	Widening of the L4138-12 by 0.5m into both verges for a length of c.170m. Temporary removal of 45m of roadside boundary.
HW7	Widening of Coillte entrance on the R503 by 30m, construction of 40m of new temporary site access road on forestry lands and the use of an existing hardcored yard for turning manoeuvres. Temporary removal of 70m of roadside boundary. Clearance of scrub and use of matting where required.
HW8	Widening of the L2264-50 on the eastern side by 13m for the initial 40m and then by 1.5m for the next 190m, by moving the roadside boundary (earthen bank) onto agricultural grassland. Temporary removal of 180m of roadside boundary.
HW9	Widening of the L2264-50 by 1.5m on the northern side, for a length of c.40m, by moving the roadside boundary (earthen bank) onto agricultural grassland. Temporary removal of 10m of roadside boundary.
HW10	Widening of the L2264-50 by 0.5m on the northern side, for a length of c.40m, by widening into the roadside verge.

HW11	80m of new temporary site access road on agricultural lands between the L2264-50 and the L6188-0. Temporary removal of 20m of roadside boundary.
HW12	Widening of the L6188-0 by 0.5m into both verges for a length of c.280m. Temporary removal of 160m of roadside boundary. As a result the existing concrete culvert at watercourse WW31 will be widened by 1m, with minimal interference to the existing structure.
HW13	Widening of the L6185-13 by 1.5m on the southern side, for a length of c.210m, by widening into the roadside verge. Permanent removal of 25m of roadside boundary. The public road pavement over watercourse crossing WW32 will be widened, by 1m, into the roadside verge with minimal interference to the existing structure.

In summary, the above Haul Route Works include widening of roadside verges for 1710m in total; temporary removal and reinstatement of 1035m of hedgerow and earthen banks which form roadside boundaries; permanent removal of 25m of roadside boundary and the construction of 290m temporary access roads on private lands.

All road works will be subject to a Road Opening License ---application to Tipperary County Council and will be carried out in accordance with the Tii Guidelines on the Opening, Backfilling and Reinstatement of Openings in Public Roads. The extensions to the existing structures at HW2 and HW12 will be carried out in accordance with the OPW guidelines Construction, Replacement or Alteration of Bridges and Culverts (2013). The detailed design will be agreed with the Tipperary County Council District Engineer prior to these extension works.

Following the delivery of turbine components to Upperchurch Windfarm, the Haul Route Works areas will be reinstated and roadside boundaries will be put back along their original alignment.

Relevant Volume C3 EIAR Figures:

Figure RW 5.9: Layout of Haul Route Works on Aerial Photography Mapping

Figure RW 5.10: Location and Layouts of Haul Route Works (Overview and Maps 1 to 3)

Relevant Appendix 5.1 UWF Related Works Outline Construction Methodology:

RW.OCM-06: Haul Route Works

5.2.3.4. Telecom Relay Pole

The Telecom Relay Pole will comprise a wooden pole, up to 18m in height, with relay equipment attached to the top of the pole. A small compound, 5m X 5m in size, will enclose the relay pole, along with a ground based outdoor cabinet 2m high, 1.2m long and 1m wide and ancillary equipment. The compound will be fenced with 2.4m high palisade fencing; a native hedgerow will be planted on the berm created from the excavations. A communications and low voltage (LV) electricity supply will be cabled 300m to the compound, from the existing supply at the Foilnaman mast. The connection will be by underground cables which will be laid under Realigned Windfarm Road RWR3 and Upperchurch Windfarm Road.

Relevant Volume C3 EIAR Figures:

Figure RW 5.11: Location of the Telecom Relay Pole on Aerial Photography Mapping

Figure RW 5.12: Plan and Elevation of Telecom Relay Pole and Compound

Relevant Appendix 5.1 UWF Related Works Outline Construction Methodology:

RW.OCM-07: Telecom Relay Pole

5.2.3.5. RW Ancillary Works**5.2.3.5.1. Site Entrances**

There is a change of use required for an existing entrance and 14 No. temporary site entrances required, for UWF Related Works. In addition, 11 No. site entrances that are already consented for UWF will be used for the UWF Related Works developments.

5.2.3.5.2. Change of Use of Existing Agricultural Entrance to Agricultural and Forestry Entrance

Replacement forestry is required for any felled forestry that occurs during the construction works for the whole UWF project. This forestry, the UWF Replacement Forestry, will be planted on lands in Foilnahan. An existing agricultural entrance leading off the L-2264-34 at Foilnahan, will be used to access these UWF Replacement Forestry lands. The existing permanent entrance is a farm entrance only. This will change use to an agricultural and forestry entrance and as before, remain in permanent use. No widening of the entrance is required as the existing sightlines comply with North Tipperary County Development Plan 2010 (as amended) Table 10.1: Sightline Requirements. This entrance is identified on the mapping as EW10.

Relevant Volume C3 EIAR Figures:

Figure RW 5.13: Location of “Change of Use at Existing Entrance” (including sightlines)

5.2.3.5.3. Temporary Site Entrances

To facilitate the installation of the Internal Windfarm Cabling and the construction of the Haul Route Works for the delivery of turbine components, a total of 14 No. temporary site entrances will be required. These entrances are identified on the mapping as EW. The EW ID number; whether the entrance is existing or new; the type of boundary to be opened and UWF element to which the entrance relates; are listed in Table 5-2.

Table 5-2: Temporary Site Entrances for UWF Related Works

Entrance ID	Existing Entrance	Type	Relevant part of the UWF Related Works
EW1	No	Earthen bank (removed)	Haul Route Works – HW5
EW2	Yes	Gate and concrete block wall (widened)	Haul Route Works – HW5
EW3	No	Hedgerow (removed)	Internal Windfarm Cable
EW4	No	Hedgerow (removed)	Internal Windfarm Cable
EW5	No	Post and Wire Fence (removed)	Internal Windfarm Cable
EW6	No	Earthen bank (removed)	Internal Windfarm Cable
EW7	No	Post and Wire Fence (removed)	Internal Windfarm Cable
EW8	No	Earthen bank (removed)	Internal Windfarm Cable
EW9	Yes	Farm & House Entrance (no widening)	Internal Windfarm Cable
EW11	No	Hedgerow (removed)	Internal Windfarm Cable
EW12	Yes	Field Entrance (no widening)	Internal Windfarm Cable
EW13	Yes	Yard Entrance - needs to be widened by hedgerow removal	Haul Route Works - HW7
EW14	No	Hedgerow (removed)	Haul Route Works - HW11

Entrance ID	Existing Entrance	Type	Relevant part of the UWF Related Works
EW15	No	Post and Wire Fence (removed)	Haul Route Works - HW11

The above table does not include EW10, as this is a permanent entrance for the UWF Replacement Forestry.

In summary, 4 No. of the temporary site entrances will be through existing farm or forestry entrances. The remaining 10 No. will be created by the removal of the roadside boundary, whether fence, earthen bank or hedgerow. Where widening is required, these entrances will be widened to 5m. All these entrances will be opened during the construction stage and closed after construction is complete. In the event of larger components such as blade or tower replacement at Upperchurch Windfarm during the operational phase, these entrances will need to be reopened to facilitate the delivery of the components, and will be closed again directly after the deliveries.

Relevant Volume C3 EIAR Figures:

Figure RW 5.2: Layout of UWF Related Works on Aerial Photography Mapping

Figure RW 5.4: Layout of Internal Windfarm Cabling on Aerial Photography Mapping

Figure RW 5.9: Layout of Haul Route Works on Aerial Photography Mapping

Figure RW 5.14: Plan View of Typical Temporary Site Entrance

Relevant Appendix 5.1 UWF Related Works Outline Construction Methodology:

RW.OCM-03: Temporary Site Entrances

5.2.3.5.4. Temporary Access Roads

During the construction stage, up to 5.3km of temporary access roads will be constructed within the construction works area boundary, to facilitate the movement of machinery and vehicles along the Internal Windfarm Cabling areas. Three methods will be employed to provide temporary access roads, where needed: matting, excavate and fill, or floating road. In general, the method of temporary road construction employed at any particular location will depend on the prevailing soil and weather conditions at the time of construction, and will be determined by the Contractor in conjunction with the Environmental Clerk of Works. The layout and temporary access road cross sections are illustrated on:

Relevant Volume C3 EIAR Figures:

Figure RW 5.4: Layout of Internal Windfarm Cabling on Aerial Photography Mapping

Figure RW 5.15: Cross Section of Temporary Access Roads

Relevant Appendix 5.1 UWF Related Works Outline Construction Methodology:

RW.OCM-05: Temporary Access Roads

5.2.3.5.5. Watercourse Crossings

The construction of the UWF Related Works will involve crossing a total of 32 No. watercourses, which range in size from streams to small field drains, as outlined on Table 5-3.

Table 5-3: Watercourse Classifications at Crossing Points

Class	Watercourse Description	Number
1	EPA mapped blue line, major river or stream (fisheries value)	1
2	Headwater Stream Equivalent to EPA blue line but not mapped (fisheries value)	5
3	Sub-optimal, heavily vegetated with low or no flow during dry periods (low fisheries value)	2
4	Drain (no fisheries value)	24

The construction of the UWF Related Works will involves:

- Crossing of 6 No. existing structures (Watercourse Crossing Type A1 and A2),
- Replacement of 1 No. existing crossing structures, (Type B1),
- Widening of 2 No. existing crossing structures at Watercourse Crossings WW12 and WW31, (Type B2)
- Construction of 5 No. new permanent crossing structures (cable and traffic), (Type C1),
- Construction of 5 No. new temporary crossing structures (cable and traffic), (Type C2) ,
- Trenching and ducting of 9 No. crossings (cable only, no traffic), (Type C3),
- Construction of 3 No. new permanent crossing structures (no cable, traffic only), (Type C4),
- Construction of 1 No. new permanent clear-span bridge (no in-stream works, cable and traffic), (Type F)
- In order to progress construction works across watercourses subject to fisheries timing restriction, temporary bailey bridges will be used to facilitate the passage of traffic across the watercourse.

All permanent watercourse culverts will be sized to cope with a minimum 100-year flood event. All pipe culverts will be at least 900mm in diameter regardless of the anticipated flood flow. 900mm culverts will be embedded into the bed of the watercourse to a depth of 300mm, while 1200mm culverts will be embedded to a depth of 500mm.

New and replaced permanent crossing structures will be construction in accordance with the Office of Public Works (OPW) guidelines Construction, Replacement or Alteration of Bridges and Culverts (2013), and as agreed with OPW (telephone consultation, February 2018) will be subject to a Section 50 application to OPW following the grant of planning permission. Details of the proposed works at WW12 and WW31 (culvert widening at Haul Route Works locations) will be agreed in advance with the District Engineer. No works to the road pavement will be required for the culvert extensions.

The treatment of each watercourse crossing along the UWF Grid Connection is specified in **Volume C4: EIAR Appendices: Appendix 5-2: Classification and Crossing Method for UWF Grid Connection Watercourses.**

Relevant Volume C3 EIAR Figures:

Figure RW 5.2: Layout of the UWF Related Works on Aerial Photography Mapping

Figure RW 5.16: Watercourse Crossing Type A1 & A2 – UWF Related Works at Existing Crossing Structure

Figure RW 5.17: Watercourse Crossing Type B1 & B2–UWF Related Works at Replaced and /or Widened Crossing Structure

Figure RW 5.18: Watercourse Crossing Type C1–New Permanent Structure

Figure RW 5.19: Watercourse Crossing Type C2 – New Temporary Structure & Watercourse Crossing Type C4 – New Permanent Structure

Figure RW 5.20: Watercourse Crossing Type C3 – Internal Windfarm Cable trench and ducting only

Figure RW 5.21: Watercourse Crossing Type E – Plan and Cross Section Views of Bailey Bridge

Figure RW 5.22: Watercourse Crossing Type F - New permanent clear-span bridge

Relevant Appendix 5.1 UWF Related Works Outline Construction Methodology:

RW.OCM-09: Instream Works Preparation and Reinstatement

RW.OCM-10: Instream Works

RW.OCM-11: Bailey Bridge

5.2.3.5.6. Drainage Systems

New hard surface areas: An integrated drainage system will be installed along the newly Realigned Windfarm Roads and at the Telecom Relay Pole. This integrated drainage system will keep ‘clean’ water upslope of the works separate from ‘dirty’ water runoff from construction works areas, while maintaining the existing drainage regime through the regular piping and release of clean water from the upslope side the works area to the downslope side. The integrated drainage system will include the installation of check dams, settlement ponds, clean water cross drains and outfall weirs. These parts of the drainage system will effectively avoid any contribution to flooding risk, minimise erosion, maintain drainage regimes, and minimise the amount of sediment entering downslope watercourses, through the attenuation (slow-down) of water flow rates and the settlement of suspended solid (sediment).

Temporary roads will be constructed upslope of the cables trench so that any surface water runoff will flow into the trench. Where dewatering of trenches or excavations is required, there will be no direct discharge of treated water into any watercourse or drain. Rather, all pumped water will be treated prior to discharge using an infiltration trench, settlement pond, suitable water treatment train such as a Siltbuster or controlled release across existing vegetation, as appropriate.

Existing roadside drainage which occurs close to works associated with the Internal Windfarm Cables trench; Haul Route Works and at Permanent and Temporary Entrances will be piped to maintain flow.

Following construction, the drainage system around permanent features, will be left in place for the operations phase except for settlement ponds, which will be removed. The drainage system at all temporary works locations will be removed.

5.2.3.5.7. Forestry Felling

Small areas of coniferous forestry at various locations along the Internal Windfarm Cabling and the Realigned Windfarm Roads will be permanently felled to facilitate construction and operation in these areas. In total, 0.3 hectares of forestry will be felled, 0.2Ha in Shevry along RWR1 and 0.1Ha in Knockcurraghbola Commons along the Internal Windfarm Cable route. This felling will be carried out under a felling license from the Forest Service, and an equivalent area of forestry will be replanted in Foilnaman townland (UWF Replacement Forestry) under the conditions of this license.

Relevant Volume C3 EIAR Figures:

Figure RW 5.4: Layout of Internal Windfarm Cabling on Aerial Photography Mapping

Figure RW 5.7 : Layout of Realigned Windfarm Roads on Aerial Photography Mapping

Relevant Appendix 5.1 UWF Related Works Outline Construction Methodology:

RW.OCM-13: Forestry Felling

5.2.3.5.8. Fencing

Fencing will be erected at a number of locations during the construction of the UWF Related Works and will include:

- Temporary post and wire fencing which will be used to delineate construction works areas;
- Temporary battery powered electric fencing on the outside of construction works area boundaries, to prevent livestock from entering works areas. Electric fencing will also be used to protect reinstated lands until the grass is established;
- Temporary goal posts to mark the location of overhead electricity and telephone lines along construction works areas;
- Temporary timber post and rail fencing with gates which will be erected at the temporarily widened site entrances and at Haul Route Works locations, where required.
- Temporary bat crossing structures at selected hedgerow crossing locations along UWF Related Works areas.

Existing fencing and boundaries which are required to be removed from the works areas or from widened existing entrances or Haul Route Works locations will be reinstated, in the original alignment and position, following construction works.

5.2.3.5.9. Relocation of local overhead services
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A number of existing telephone poles will be moved, in conjunction with the infrastructure owner, as follows:

- At HW3, 1 No. existing telephone pole will be moved behind the widened haul route area;
- At HW4, 1 No. existing telephone pole will be moved behind the widened haul route area;
- At HW6, 1 No. existing telephone pole will be moved behind the widened haul route area.
- At HW9, 1 No. existing telephone pole will be moved behind the widened haul route area.
- At HW13, 1 No. existing telephone pole will be moved behind the widened haul route area.

These telephone poles are identified with blue dot on Figure RW 5.10.

Relevant Volume C3 EIAR Figures:

Figure RW 5.10: Location and Layout of Haul Route Works (Maps 1 and 2 of 3)

Relevant Appendix 5.1 UWF Related Works Outline Construction Methodology:

RW.OCM-06: Haul Route Works

5.2.3.5.10. Storage of Excavated Materials

In total 11,830m³ of material will be excavated from the UWF Related Works areas. This will include topsoil, subsoils and to a lesser extent bedrock, along with spoil from public road sections.

This excavated material will be managed as follows:

- 930m³ will be permanently stored in berms on both sides of the Realigned Windfarm Roads and around the Telecom Relay Pole Compound;
- 10,850m³ will be temporarily placed alongside the Internal Windfarm Cables and Haul Route Works construction works areas, in separate soils layers, and will be used for infilling the trenches and reinstatement of the works areas. No excavated materials will be stored within 50m of a Class 1 or Class 2 Watercourse;
- 50m³ will consist of spoil from public road sections and will be removed to the licensed landfill at Thurles.

Relevant Appendix 5.1 UWF Related Works Outline Construction Methodology:

RW.OCM-14: Overburden Storage Berms

5.2.3.5.11. Reinstatement of Construction Works Areas

Following the completion of construction works in an area, with the exception of new permanent infrastructure such as Realigned Windfarm Roads or Telecom Relay Pole hardstand, the lands under the construction works areas will be reinstated to their former condition and returned to the landowner for use as before.

Reinstatement of construction works areas: the temporarily stored excavated soils will be used to backfill and landscape the works areas. These areas will then be sown with native, Irish sourced, certified seeds, seedlings or plants to reflect the habitats that were present before the work.

Landholding boundaries including any existing, hedgerows, banks or gates will be reinstated on their original alignment.

Haul Route Works locations: will be reinstated, in the original alignment and boundary position, following construction works.

Reinstatement of hedgerow: will involve the replanting of hedgerow with established (at least 3 years old) native hedgerow plants in their original locations, following the completion of the works in the area.

Along **sensitive bat corridors**, the bat crossing structures which will be installed during construction works will remain in place post-construction until the hedgerow has sufficiently regrown to provide viable habitat for bats. These bat crossing structures will be monitored by a suitably qualified bat specialist and maintained on a yearly basis, until they are no longer required.

Relevant Appendix 5.1 UWF Related Works Outline Construction Methodology:

RW.OCM-15: Reinstatement of Land

5.2.3.5.12. Reinstatement of Public Roads

Trenches within road pavements will be reinstated in accordance with the Tii Guidelines on the Opening, Backfilling and Reinstatement of Openings in Public Roads. Where the cables trench crosses perpendicular to the road, full width surface overlay to a distance of 5m beyond either side of the trench will be carried out.

Along **construction materials haulage routes**, confirmatory condition surveys involving pre-construction and post-construction inspections, high definition video surveys and falling weight deflectometer (FWD) surveys will be undertaken along the routes of concentrated construction traffic between the R503 and the site access points. Whilst it is not expected to occur, any damage to structures or road pavements will be repaired to at least as good a condition as pre-works, and on damaged sections of roads where the Surface Curvature Index (SCI), measured during FWD testing, is greater than 250, full-width surface overlay will be carried out.

Reinstatement of **roadside boundaries**: All road boundaries at temporary site access points will be reinstated along the existing alignment.

5.2.4. Environmental Protection Measures designed into the UWF Related Works

The design of the UWF Related Works includes the Project Design Environmental Protection Measures listed on Table 5-4, which were devised to avoid, prevent or reduce likely or potentially significant effects on the environment.

Relevant individual Project Design Environmental Protection Measures from the list below are duplicated in the **Environmental Factor topic chapters**, and the list is duplicated in full as a set of Environmental Commitments in **Volume D: Environmental Management Plan** with the planning application.

The interaction of Project Design Environmental Protection Measures across the various Environmental Factors is provided in matrix format in **Chapter 18: Interaction of the Foregoing**.

Table 5-4: Environmental Protection Measures as part of the UWF Related Works design

PD ID	Project Design Environmental Protection Measure	Description of Development – UWF Related Works Chapter
PD01	All construction works will be carried out during daylight hours.	
PD02	Flag-men will be used at temporary site entrances rather than creating sightlines by the removal of roadside boundaries. These flagmen will control the movement of traffic on the public road, so that road users can continue to use the local road network in a safe and efficient manner.	
PD03	Construction works in Knockmaroe and Knockcurraghbola Commons townlands, which are within 350m of local residences, will not take place at the same time as either the UWF Grid Connection or Upperchurch Windfarm.	
PD04	Confirmatory consultations with Irish Water, Eir and ESB and confirmatory ground surveys at service locations will be carried out ahead of works; ‘Goal Posts’ will be used to identify and highlight the height of nearby overhead lines; and a foreman will look out for underground pipes during excavations near services.	
PD05	Land reinstatement will not be carried out during very wet weather or when the soil is waterlogged.	
PD06	If any compaction has occurred along the construction works area, these areas will be ploughed with a sub-soiler to loosen the subsoil layer	
PD07	Construction traffic will be restricted to the construction works area and tracking across adjacent ground will not be permitted	
PD08	All initial groundworks will be monitored by an archaeologist under license from the National Monuments Service, to archaeologically record and preserve, either in situ or by record, any structures, features or objects of archaeological significance which may be encountered during the works.	
PD09	New permanent access roads will have a permanent surface water drainage network in place which will include check dams. These check dams will settle suspended solids in water runoff while also slowing down the rate of water run-off from these areas.	
PD10	Only precast concrete culverts or structures will be used at watercourse crossing locations. No batching of wet cement will take place on-site.	
PD11	Instream construction works will be followed by site-specific reinstatement measures to ensure the restoration of flow character and morphology within the affected reach. Measures will include: bank stabilisation using boulder armour or willow/brush bank protection; reinstatement of bank slope and character, creation of compound channels where necessary; reinstatement of instream flow features such as boulder substrates, pool / riffle sequences, or spawning cobbles; and planting along the riparian margin to stabilise banks, add flood protection and provide riparian buffer.	
PD12	A phased approach will be undertaken in relation to watercourse crossing works, earthworks, forestry felling and excavation dewatering, where these works occur within 50m of a Class 1 or Class 2 watercourse. The phased approach will only permit one of main potential sediment producing activities, listed above, to be carried out within 50m of a Class 1 or Class 2 watercourse, at any one time.	

PD ID	Project Design Environmental Protection Measure
PD13	All excavated material will be removed for temporary or permanent storage at a suitable location more than 50m away from all other Class 1 and Class 2 watercourses.
PD14	Temporary silt control methods such as silt fencing or containment berms will be placed around all overburden storage areas.
PD15	Permanent overburden storage berms will be graded and seeded immediately after emplacement.
PD16	For works within 50m of a Class 1 or Class 2 watercourse, additional mitigation measures include double silt fencing, temporary drain blocking, placement of straw bale arrangements along preferential surface water flowpaths and, where necessary, the use of matting to prevent ground erosion and rutting.
PD17	Where dewatering of trenches or excavations is required, there will be no direct discharge of treated water into any watercourse or drain. Rather all pumped water will be treated prior to discharge using an infiltration trench or settlement pond or suitable water treatment train such as a Silbuster, as appropriate.
PD18	There will be no refuelling of vehicles or plant permitted within 100m of a watercourse
PD19	The main fuel stocks for, and chemical wastes arising from, construction activities will be stored in a designated location, away from main traffic activity, within the temporary compound. All fuel will be stored in banded, locked storage containers.
PD20	Overnight parking of plant and machinery will only be permitted at locations which are greater than 50m from watercourses and where there is an existing hard-core surface in place.
PD21	No refuelling of plant or equipment will be permitted within 100m of identified wells
PD22	In-stream works at Class 1 and Class 2 watercourses will only be undertaken during the IFI specified period (July, August and September) and will be carried out to best practice (IFI, 2016).
PD23	In-stream works will not be undertaken without isolation of flow within the watercourse, any fish within the isolated section will be removed using electrofishing and, following collection of biometrics, transferred immediately downstream of the crossing point and placed back in the water. The water will then be isolated from the works by over pumping, flume (pipe) or channel diversion methods.
PD24	All new permanent watercourse culverts will be sized to cope with a minimum 100-year flood event. All pipe culverts will be a minimum of 900mm in diameter regardless of the anticipated flood flow.
PD25	All new permanent culverts on Class 1 and Class 2 type watercourses will be bottomless or clear spanning.
PD26	If works are programmed to begin in the Hen Harrier breeding season (March to August) confirmatory hen harrier breeding surveys will be completed, before such works initiate, such that all pre breeding nuptial activity, nesting activity and active nests are recorded within 2km of the construction works area boundary. These surveys will be completed prior to the start-up of all construction activities, until construction is complete and for 3 years thereafter. No construction works will take place within 500m of an active hen harrier breeding attempt or active nesting activity, during the breeding season (March to August).
PD27	During the hen harrier roosting season (October to February inclusive), construction works within 1000m of a roost will be limited to the period between one hour after sunrise to one hour before sunset.
PD28	Hedgerow removal and clearance of any other breeding bird vegetation will take place outside of the bird breeding season <i>i.e.</i> not during the period of March to August inclusive where possible. This includes hedgerow and scrub removal in addition to hedgerow trimming.
PD29	Confirmatory surveys for active Otter holts and activity (particularly holts at which breeding females or cubs are present) will be carried out 150m upstream and downstream of watercourse crossing locations.
PD30	All construction works within 150m of an active otter holt, will be carried out during daylight hours and outside of 2 hours after sunrise or before sunset during summer/outside of 1 hours after sunrise or before sunset during winter.
PD31	If an active holt (particularly holts at which breeding females or cubs are present) is located within 150 meters of the watercourse crossing points, no works will be undertaken <u>while cubs are present in the holt</u> and NPWS will be notified immediately

PD ID	Project Design Environmental Protection Measure
PD32	No wheeled or tracked vehicles (of any kind) will be used within 20m of active, but non-breeding otter Holts, and light work, such as digging by hand or scrub clearance will not take place within 15m of such holts, except under license.
PD33	The prohibited working area associated with otter holts will, where appropriate, be fenced with temporary fencing prior to any possibly invasive works and declared as 'out of bounds'. Fencing will be in accordance with Clause 303 of the NRA's Specification for Roadworks (National Roads Authority). Appropriate awareness of the purpose of the enclosure will be conveyed through toolbox talks with site staff and sufficient signage will be placed on each exclusion fence. All contractors or operators on site will be made fully aware of the procedures pertaining to each affected holt (NRA, 2006) and subject to audits and non-conformance records in the event of non-compliance, to be included in reports submitted to Local Authorities and relevant Statutory Consultees.
PD34	Confirmatory surveys will be carried out within 50 m of either side of the construction works area boundary of identified badger setts to determine the current status of known badger setts (i.e. active or inactive) and to determine if any new setts have been established in the intervening period following initial pre-planning surveys and the commencement of construction activity. These confirmatory badger surveys will be undertaken no more than 10-12 months in advance of proposed construction activities, during the period November and April when vegetation cover is reduced. NWPS will be notified immediately if the sett previously identified is confirmed as active or if a further active sett is located within 50 meters of the footprint of the development. If sett exclusion is required, this will be undertaken by an experienced ecologist under the necessary license and following best practice guidance (NRA, 2005).
PD35	No construction works will be carried within 50m of an active sett during the main breeding season (December 1 st to June 30 th).
PD36	Construction activity in the environs of a known active badger sett outside of the breeding period will follow NRA (2005) guidelines, i.e. no heavy machinery will be used within 30m of badger setts (unless carried out under license); lighter machinery (generally wheeled vehicles) will not be used within 20m of a sett entrance; light work, such as digging by hand or scrub clearance will not take place within 10m of sett entrances.
PD37	All construction works will be carried out during daylight hours. Security lighting will be used at compounds. <u>All lighting</u> will be cowled in order to prevent light spill and no lighting will be left turned on overnight. Lighting will be controlled by motion and time sensors to minimise the amount of time the lights are operational.
PD38	Confirmatory surveys will be carried out at all trees with bat suitability that will require felling or other major modifications (e.g. removal of rotten branches). These trees will be subject to a ground-level visual inspection by the Project Ecologist (or a bat specialist acting on their behalf) prior to site clearance works in order to confirm the findings of the 2016 / 2017 surveys.
PD39	Where a tree with moderate or high bat suitability is to be felled, a presence/absence bat surveys will be carried out. (Note. It is not expected that any trees with moderate or high suitability will be felled).
PD40	Felling of trees with bat roost suitability will be undertaken in the period late-August to late-October/early-November. Trees with low suitability for bats will be felled carefully and slowly in order to avoid impact-related injuries to any bats that may be roosting inside them. Sections of the tree with potential roost features for bats (e.g. crevices, damaged branches) will be cut in sections, lowered carefully to the ground and left undisturbed for 48 hours before removal.
PD41	Where the felling of trees with bat suitability is carried out, robust, weather-proof bat-boxes, for example Schwegler type 1FF and 2F models, will be placed in each of the affected sections to compensate for the loss of potential tree roosts. The number of bat boxes will match the number of trees with bat suitability to be felled.
PD42	Installation of bat crossing structures at severed hedgerows, proximate to areas of high bat activity or roost locations. And following the completion of construction works, the replanting of these severed hedgerows with semi-mature shrubs/trees (like for like) and limits on temporary lighting near hedgerows.
PD43	Pre-construction survey of the distribution of Devil's-bit Scabious (larval food plant of Marsh Fritillary) during the last available April prior to the commencement of construction works. This requires that any

PD ID	Project Design Environmental Protection Measure
	areas of Devil's-bit Scabious that are located within the construction works area boundary, will be trimmed/cut to ground level in the last available late April / early May period prior to the commencement of construction.

5.2.4.1. Environmental Management Plan

An Environmental Management Plan (EMP) is included with Volume D of the planning application. The purpose of the EMP is to communicate environmental control measures that apply to the development of the UWF Related Works to those with responsibility for carrying out works on site so that any likely significant adverse effects of the development on the receiving environment can be prevented.

The Environmental Management Plan includes the list of Project Design Environmental Project Measures (listed above), along with the Best Practice Methods that are included at the end of topic Chapters 6 to 17. Management plans for Traffic, Waste, Surface Water Quality and Invasive Species are also included in the EMP.

The environmental protection measures for UWF Other Activities which relate to UWF Related Works will be monitored through the UWF Related Works Environmental Management Plan.

See: [Volume D: Environmental Management Plan for UWF Related Works](#)

5.3. Life Cycle Stages of UWF Related Works

5.3.1. Construction Stage - UWF Related Works

5.3.1.1. Overview of the Construction Process

The construction process for the UWF Related Works, is a relatively straightforward civil build. A number of separate dedicated 'crews' will work from the consented compound associated with the Upperchurch Windfarm (Site Compound No.1), each working on a different part of the UWF Related Works. The workers will arrive and depart daily to and from the relevant construction compounds, parking spaces will be provided at the site compound. The various crews will then be transported to the specific works location by means of 'crew-cab' 4x4 vehicles or similar. Bulk deliveries of materials will be delivered to the site compound and stored there until needed. Materials required at works locations will be transported by way rigid body vehicle or tractor and trailer. Aggregate and concrete will be delivered directly to works locations.

5.3.1.2. Duration & Timing

The duration and timing of the construction of UWF Related Works is outlined in Table 5-5.

Table 5-5: Duration and timing of the construction of the UWF Related Works

Construction Activities	Duration of the Construction Stage	Timing of Construction Activities
Pre-Construction - Detailed design, confirmatory surveys, felling, hedgerow/tree removal or pruning etc.	3 - 6 months	Immediately prior to the commencement of the main construction period
Main Construction Activities - Construction of Internal Windfarm Cabling, Realigned Windfarm Roads, Haul Route Works, Telecom Relay Pole and RW Ancillary Works	6 – 8 months	Projected Start Date: 2018/2019 The UWF Related Works will take place during the same period as the construction of the Upperchurch Windfarm and Grid Connection (exceptions listed in Scheduling of Works below)

The duration of works provided are approximate and may be shorter or longer, depending on the final number of crews used, weather conditions etc. A formal programme of works will be prepared by the appointed Contractor prior to the commencement of construction activities.

5.3.1.2.1. Construction Hours of Work

Normal construction times will be 07.00 to 19.00hrs Monday to Friday and 08.00 – 16.30hrs on Saturdays. These normal hours of work will be further restricted at particular locations as outlined in Scheduling of Works.

5.3.1.2.2. Scheduling of Works

To protect residential amenity, surface water quality and biodiversity, the following timing or scheduling of works will be implemented during the Construction Stage:

- Construction works will be carried out during daylight hours.
- Construction works in Knockmaroe and Knockcurraghbola Commons townlands, which are within 350m of any local residences, will not take place at the same time as other elements of the Whole UWF Project.
- To reduce the potential for localised in-combination effects on surface water quality from the main potential sediment sources during construction works (i.e. Watercourse Crossing Works, Earthworks, Tree Felling and Excavation Dewatering), a phased approach will be undertaken during the construction works for these activities, where works within 50m of a Class 1 or Class 2 watercourse are required. The phased approach will only permit one of main potential sediment producing activities to be carried out at any one time within the local catchment to a watercourse (refer to Chapter 11: Water).
- In-stream works will only be undertaken during the IFI specified period (July – September) for the Class 1 and Class 2 watercourses.
- No construction works will take place within 500m of an active hen harrier nest, or active nesting activity, during the breeding season (March to August). Additionally, during the roosting season, (October to February), construction works will only be carried out during the period between one hour after sunrise and one hour before sunset in areas within 1000m of an active winter roost.
- No construction works will be carried within 50m of an active badger sett during the main breeding season (December 1st to June 30th).
- Felling of trees (if any) with bat roost suitability will be undertaken in the period late-August to late-October/early-November.
- If an active otter holt (holts at which breeding females or cubs are present) is located within 150 meters of the watercourse crossing points, no works will be undertaken while cubs are present in the holt.
- All construction works within 150m of an active otter holt, will be carried out during daylight hours and outside of 2 hours after sunrise or before sunset during summer/outside of 1 hours after sunrise or before sunset during winter.

5.3.1.3. Construction Personnel

The civil and electrical construction personnel involved in the construction of the Upperchurch Windfarm will also be involved in the construction of the Internal Windfarm Cabling, Realigned Windfarm Roads, Haul Route Works and the construction of the Telecom Relay Pole compound and the installation of underground communication and electricity cables between the existing Foilnahan Mast and the Relay Pole compound, no extra personnel will be required for these works and c.5 personnel from the Upperchurch Windfarm construction crew will be involved in the UWF Related Works. A specialist communication engineering crew, made up of c. 3 personnel, will be involved in the erection and set up of the Telecom Relay Pole.

5.3.1.3.1. Welfare Facilities

Upperchurch Windfarm Site Compound No.1 will contain site offices, welfare, canteen and parking facilities, storage locations for oils and fuels, materials and wastes.

Welfare Facilities at active construction works areas will consist of solar powered, single, self-contained portable toilets.

Toilet Servicing: All toilets will be serviced on a weekly (Toilet blocks at Upperchurch Windfarm Site Compound No.1) or bi-weekly (portable toilets at construction works areas) basis. A record of servicing will be kept by the licensed waste removal operator. Servicing shall include internal cleansing, emptying and recharging with water and toilet additive and replenishing of all consumables.

5.3.1.4. Construction Stage Activities

Construction stage activities will involve the following works:

- Pre-Construction Activities
- Construction Works Area Preparation
- Temporary Site Entrances
- Realigned Windfarm Roads
- Temporary Access Roads
- Haul Route Works
- Telecom Relay Pole
- Internal Windfarm Cabling
- Instream Works Preparation and Reinstatement
- Instream Works
- Bailey Bridge
- Relocation of Overhead Lines
- Felling of Forestry
- Overburden Storage Berms
- Reinstatement of Land

Individual Outline Construction Methodologies (OCMs) for all of the above listed main works and activities of UWF Grid Connection can be found at **Appendix 5-1: Outline Construction Methodologies for UWF Related Works**. In the OCMs, a brief description of the work involved; the duration of this work; personnel, machinery, equipment and tools requirements; construction materials; details of the standard methodology for the construction activities and any variations to those methods are also outlined. These

OCMs are specific to each distinct body of work or activity. The final Method Statements for the construction works will be developed by the appointed Contractor and will be based on these OCMs, prior to construction.

The OCMs are also provided in **Volume D: Environmental Management Plan (EMP)** which comprises the main EMP statement; environmental commitments, environmental control measures and management plans; and Best Practice Measures. The purpose of the EMP is to communicate environmental control measures that apply to the development to those with responsibility for carrying out works on site. An Environmental Clerk of Works will be appointed and it will be their responsibility to ensure that the EMP is implemented through liaising with the Construction Site Manager and the Project Manager and by carrying out weekly audits on EMP compliance.

5.3.1.5. Use of Machinery and Equipment

The main machinery, equipment and tools which will be required during the construction stage are listed in Table 5-6. A full list of machinery, equipment and tools which will be used during the construction of the UWF Related Works is listed on the Outline Construction Methodologies in **Appendix 5.1**.

Table 5-6: Construction machinery, equipment and tools

Construction Machinery	Construction Equipment and Tools
1 No. 12ton excavator	Hand tools
1 No. 6ton excavator	Cable Jointing tools
2 No. dump trucks	1 No. dewatering pumps
1 No. Vibrating roller	1 No. water pumps and associated pipes
1 No. roller	1 No. Diesel generator
1 No. van	Sand bags
1 No. Cable Pulling winch	Silt traps and silt fences
Pole planter and auger drill	Oil absorbent booms
	Siltbuster units and skips
	Wooden stakes and wooden fencing lats
	Boundary tape and wire
	Battery powered electric fencers
	geotextile matting /plastic mats

5.3.1.6. Use of Hydrocarbons

Hydrocarbons will be used on UWF Related Works areas during construction activities and is limited to the diesel or petrol fuel and oils used by the site vehicles and machinery, delivery vehicles and any mobile generators used. Grease may be coated on the cables to aid in cable pulling during the construction stage.

5.3.1.7. Other Facilities - Fuel Storage & Tool Storage

All fuels required for construction activities will be stored in a designated location, away from main traffic flows, within Upperchurch Windfarm Site Compound No.1. All fuel will be stored in bunded, locked storage containers.

Tools and smaller pieces of equipment will be stored in locked containers, at Upperchurch Windfarm Site Compound No.1, during the construction stage.

5.3.1.8. Imported Construction Materials

The construction materials, which will be brought onto the UWF Related Works areas, are listed in Table 5-7 along with details of the quantity and source of the materials.

Table 5-7: Quantities, type and source of construction materials

Note: The quantities shown below are worst case volumes and will be lower than those stated.

Materials	Quantity	Source of Materials
Semi-dry Lean Mix Concrete	180m ³ / 23 No. loads	Roadstone Killough, Co Tipperary Roadstone Bunratty, Co Clare
Aggregate (crushed stone) <i>Based on use of stone on all temporary access roads. Any stone used for the temporary access roads will be reused in the windfarm roads and hardstands.</i>	4620m ³ / 285 No. loads	Shanballyedmond, Rear Cross
Hard core for temporary public road surface	50m ³ / 7 No. loads	Clare
Surface dressing asphalt (public road sections)	12m ³ / 2 No. loads	Clare
Geotextile	4 No. loads	Cork
Duct jointing collars	1 No. load	Cork
125mm outer diameter HDPE Duct	12 No. loads	Cork
50mm outer diameter HDPE Comms Duct	4 No. loads	Cork
33KV electrical cable	12 No. loads	Cork
Fibre Optic communication cables	3 No. loads	Cork
Red cable protection strip	1 No. load	Cork
Relay Pole and Telecommunication Equipment	1 No. load	Cork
Yellow warning tape	1 No. load	Cork
Marker posts and plates	1 No. load	Dundrum, Co Dublin
Hedging	1 No. load	Dundrum, Co Tipperary
Fencing materials, posts, rails, wire	1 No. load	Arrabawn Co-Op, Reiska
Precast concrete and HDPE culverts Plastic matting and bog mats	1 No. load	Thurles

5.3.1.8.1. Material and Delivery Traffic Management

Aggregate and Concrete

HGV loads of aggregate, concrete and public road dressing will be delivered directly to construction works areas. These HGVs will travel to the works areas using both the regional and local road networks, as specified on **Figure RW 5.23**. These haul routes have been agreed with the Area Roads Engineer.

Other Construction Material

Other materials, such as ducting, geotextile and other construction materials, will be sourced from various suppliers and will be transported to the Upperchurch Windfarm Site Compound No.1 via the national and regional road network, as identified on **Figure RW 5.24**.

This material will be stored at Upperchurch Windfarm Site Compound No.1 until required at works areas. Each day a smaller truck will be used to deliver the daily volume of ducting, matting, cable protection strip, warning tape, duct jointing collars etc. to each active works area.

Relevant Volume C3 EIAR Figures:

Figure RW 5.23: Haul Routes for Delivery of Aggregate, Concrete and Other Materials to UWF Site Compound No. 1

Figure RW 5.24: Haul Routes from UWF Site Compound No.1 to Construction Works Areas.

5.3.1.9. Traffic Management at Temporary Entrances and Road Work Locations

5.3.1.9.1. Road Licences

All road works will be subject to a Road Opening License application to Tipperary County Council and will be carried out in accordance with the Tii Guidelines on the Opening, Backfilling and Reinstatement of Openings in Public Roads.

5.3.1.9.2. Flagmen

Flagmen will be employed at temporary site entrances and road work locations to control the movement of traffic on the public road, so that road users can continue to use the local road network in a safe and efficient manner.

5.3.1.9.3. Advance warning signage

Advance warning signage will be erected on both approaches to temporary site entrance locations and road works locations. The placement of this signage has been designed based on the recorded 85th percentile traffic speeds, or the posted limit, whichever is the higher.

5.3.1.9.4. Reinstatement of road boundaries

Following the completion of construction works, all road boundaries at temporary site access points or at temporary road widening locations will be reinstated along the existing alignment.

5.3.1.9.5. Engagement with Local Residents regarding Traffic

Contact will be maintained with the landowners on the day to day timing of the works. A Community Liaison Officer (CLO) will be appointed as the point of contact between the developer, the local community

and the wider public. The CLO will keep very active contact with local residents on the traffic arrangements around the works day to day.

5.3.1.9.6. Traffic Management Plan

A Traffic Management Plan is included in [Volume D: Environmental Management Plan](#).

Relevant Volume C3 EIAR Figures:

[Figure RW 5.25: Advance Warning Signage for Half Lane Closures](#)

5.3.1.10. EMP for the UWF Related Works

An Environmental Management Plan (EMP) for the UWF Related Works is included with Volume D of the planning application. The purpose of the EMP is to communicate environmental control measures that apply to the development of the UWF Related Works to those with responsibility for carrying out works on site so that any likely significant adverse effects of the development on the receiving environment can be prevented.

The Environmental Management Plan includes the list of Project Design Environmental Project Measures (listed above), along with the Best Practice Methods that are included at the end of topic Chapters 6 to 17.

Management plans for Traffic, Waste, Surface Water Quality and Invasive Species are also included in the EMP, which accompanies the planning application as [Volume D: Environmental Management Plan for the UWF Related Works](#).

5.3.2. Operational Stage – UWF Related Works

Once constructed and commissioned, as required, the UWF Related Works will be operated and maintained as part of the Upperchurch Windfarm.

5.3.2.1. Duration and Timing of Operational Stage**Table 5-8: Duration and timing of Operation Phase of the UWF Related Works**

Description	Duration
Operation of the UWF Related Works	The duration of the operational period for the UWF Related Works will correspond with the operational period of the Upperchurch Windfarm which is granted for <i>25 years from the date of commissioning of the wind turbines</i> under Condition 4 of the grant of planning permission for Upperchurch Windfarm, unless a planning period for a further period is granted.
Internal Windfarm Cables	1 day per year to carry out a visual inspection
Realigned Windfarm Roads	30mins per month 1 day per 5 years
Haul Route Works	During any subsequent, although infrequent, turbine component delivery: 2 days to re-use Haul Route Works Areas 1 week to reinstate roadside boundaries and lands
Telecom Relay Pole	1 day per year
RW Ancillary Works	No works

5.3.2.2. Operational Personnel

The personnel involved in the operation and maintenance of the Upperchurch Windfarm will also be involved in the operation and maintenance of the UWF Related Works. In addition, 2-3 No. specialised telecommunications personnel will be involved in an annual inspection and maintenance of the Telecom Relay Pole.

5.3.2.3. Operational Activities**5.3.2.3.1. Internal Windfarm Cabling**

Operational activities will include both annual visual inspections of the cable routes, using a four wheel drive vehicle along Upperchurch Windfarm Roads and Realigned Windfarm Roads, or by walking over cross-country sections. The cables will have a design life of 80 to 100 years. It is not expected that the cables will require replacement during their operation.

5.3.2.3.2. Realigned Windfarm Roads

Operational activities will include both monthly visual inspection of the Realigned Windfarm Roads, using a four wheel drive vehicle and annual maintenance of roads and the associated drainage network, using both hand tools and mini-diggers as required.

5.3.2.3.3. Haul Route Works

Annual visual inspection of Haul Route Works areas at H1 to H13. Occasional hedge trimming may be required, to accommodate the delivery of abnormal loads during major maintenance works at the Upperchurch Windfarm. To facilitate the occasional delivery of larger components, some roadside boundaries at Haul Route Works locations will be temporarily reopened (having been reinstated following construction) or temporarily removed. Geotextile material will laid over the concealed hard-core access roads in private lands where required. Once the components have been delivered, the roadside boundaries on these temporarily widened areas will be reinstated in their original alignment and ground cover on private lands will be reinstated.

5.3.2.3.4. Telecom Relay Pole

The support structure itself requires little maintenance during its operational lifetime; operational activities would consist of annual inspection and maintenance of the communications equipment mounted on the structure, outdoor cabinet, and compound area.

5.3.2.3.5. UWF Ancillary Works

No operational activities associated with these works are expected to take place during the operational stage.

5.3.2.4. Use of Machinery and Equipment**Table 5-9: Use of Machinery and Equipment during the Operation of the UWF Related Works**

Machinery	Equipment	Materials
4x4 vehicle for routine inspection,	Tools for occasional maintenance works	Aggregate for Realigned Windfarm Road maintenance, if required
	Hand tools & testing equipment	Replacement communication equipment for the Telecom Relay Pole, if required
small excavator and roller for occasional maintenance and haul route works	fencing equipment	Replacement fencing for Haul Route Works locations, if required.

5.3.2.5. Use of Hydrocarbons

A small volume of hydrocarbons will be used on-site during operational activities and is limited to the diesel or petrol fuel used by the site vehicles and occasional machinery used.

5.3.2.6. Welfare Facilities

The Upperchurch Windfarm site office (identified as Site Compound No.2), containing site offices, welfare, and canteen and parking facilities will be available to any personnel working on UWF Related Works.

5.3.2.7. Other Facilities - Fuel Storage & Tool Storage

There will be no requirement for fuel storage for the UWF Related Works. There will also be no requirement for tool storage facilities -all tools will be brought onto site as required.

5.3.3. Changes to UWF Related Works

5.3.3.1. Decommissioning

The UWF Related Works will cease to function following the decommissioning of the Upperchurch Windfarm. The following decommissioning works are relevant to the UWF Related Works:

Internal Windfarm Cables: The cables will be pulled from the ducts and will be re-used or recycled off-site in a licensed recycling facility.

Realigned Windfarm Roads will be left in situ, for use by the landowner. No works required.

Haul Route Works will be left in situ. No works required.

Telecom Relay Pole: The Relay Pole will be decommissioned following the decommissioning of the Upperchurch Windfarm. The communication links between Foilnahan Mast and Laghtseefin Mast will be restored, and then the antennae removed from the Relay Pole, the Pole, fence and the outdoor equipment will be decommissioned and removed. The footprint of the compound will be reinstated with the soils which formed the berms around the compound during construction.

5.4. Use of Natural Resources, Emissions & Wastes

5.4.1. Use of Natural Resources

The resources which will be imported onto the UWF Related Works areas or which will be obtained from within the works areas during the development of the UWF Related Works are described below.

5.4.1.1. Use of Resources: Land

5.4.1.1.1. Requirements for Land

Construction Stage Requirement: In order to safely accommodate the construction works and construction traffic, the land requirement for the construction of the UWF Related Works is greater than for the operation of the UWF Related Works. In total UWF Related Works will take place on 20.9 hectares of land within construction works areas, as follows; 0.3ha of farm roads, 6.9ha of agricultural land, 0.2ha of forestry road, 0.7ha of forestry firebreak, 0.4ha of forestry, 1.4ha of public road and 11.1ha of Upperchurch Windfarm Roads. These lands are outlined in red on [Figure RW 5.3](#)

Operational Stage Requirement: Following construction, with the exception of the 25m² Telecom Relay Pole compound, all of the lands will be returned to the landowner for their own use. The Realigned Windfarm Roads will be used by both the landowner and Upperchurch Windfarm.

5.4.1.1.2. Landuse Restrictions

Restrictions on the use of land by landowners is limited to the Construction Stage, during which the use of the lands by the landowner will be restricted to varying degrees depending on the location and type of works taking place, as per:

- The use of agricultural lands, firebreaks and felled forestry in the construction works area will be restricted during construction works on these areas, with restrictions continuing until vegetation has re-established following construction works; and
- The use of farm or forestry roads can continue during the construction works with some restrictions in place, forestry traffic if it occurs will use alternative routes along the forestry road network where available.
- Access will be maintained to lands at all times during construction, by arrangement with the individual landowners.
- Following construction, the majority of the lands will be returned to their former use.

5.4.1.1.3. Landuse Change

The construction of the UWF Related Works will result in the change of use of 25m² (0.0025Ha) of agricultural land to utility for the Telecom Relay Pole. In addition, 0.13ha of agricultural land will change use to Permanent Road, 0.09ha of forestry plantation will change use to Permanent Roads and 0.21ha will change use to Unplanted Forestry Firebreak.

During decommissioning, the Telecom Relay Pole will be removed, and 25m² of associated lands will be reinstated and returned to use as agricultural lands.

Relevant Volume C3 EIAR Figures:

Figure RW 5.3: UWF Related Works Construction Works Area Boundary.

Figure RW 5.26: Operational Stage Land Use Change

5.4.1.2. Use of Resources: Biodiversity

5.4.1.2.1. Field Boundaries – Earthen Banks/Hedgerow/Trees

Hedgerows and earthen banks occur at most field boundaries within the Internal Windfarm Cabling, Realigned Windfarm Roads and Haul Route Works locations. Some hedgerows also contain trees of varying maturity. The removal of field boundaries and the pruning or removal of hedgerows and trees is predominately limited to the construction stage. Field boundaries at Haul Route Works locations may also require temporary pruning or removal during the operational and decommissioning stage to facilitate the transport of turbine components.

Pruning: In total 540m of hedgerow will be pruned, 330m at Haul Route Works locations to facilitate delivery of turbine components and 210m close to works locations to facilitate the passage of machinery along works areas. All pruning will be conducted outside of the bird breeding season.

Permanent Removal: In total, 170m of hedgerow will be permanently removed to facilitate Haul Route Works (HR6 and HR13) and Realigned Windfarm Roads (RWR2). These hedgerows and trees will be replaced with an equivalent length of new native hedgerow along with an equivalent number of native trees immediately adjacent to the area.

Temporary Removal: In total, 145m of hedgerow and 4 No. trees will be temporarily removed at Internal Windfarm Cabling and some Haul Route Works locations.

Bat Crossing Structures: Bat crossing structures will be install at 2 no. locations. 1 no. at a 10m wide section of field boundary along Realigned Windfarm Road RWR2 and another at a 10m wide sections of roadside boundary (concrete wall) Haul Route Works HW5, a bat crossing structure in the form of 'goal posts' will be erected following the removal of a 10m section of each boundary. Vegetation and netting will be attached to these goal posts to provide a continuation of flight-line for bats during the construction works.

Reinstatement of Hedgerows: Following the completion of construction works in an area, **the temporarily removed** section of field boundary will be reinstated, with the formation of earthen banks and the replanting like for like with established (at least 3 year old) native hedgerow plant. Reinstatement will be carried out immediately following the completion of the works in the area.

Along **sensitive bat corridors**, the bat crossing structures installed during construction works will remain in place post-construction until the field boundary has been reinstated.

New Hedgerow created: c.370m of new hedgerow will be planted with locally sourced native species alongside the Realigned Windfarm Road RWR2.

Relevant Volume C3 EIAR Figures:

Figure RW 5.2 : Layout of the UWF Related Works on Aerial Photography Mapping

Figure RW 5.27: Cross Section of Hedgerow Removal and Reinstatement

5.4.1.2.2. Forestry Felling

Forestry felling is limited to the construction stage. In total 0.3ha of coniferous forestry will be permanently felled¹, under a felling license from the Forest Service. Forestry felling will be carried out outside of the bird breeding season.

5.4.1.2.3. Invasive Species

Packaging will be checked for the presence of white toothed shrew and prior to arrival on site, contractor's vehicles and equipment will be thoroughly cleaned and then dried. High-pressure steam cleaning, with water hotter than 65 degrees Celsius, in addition to the removal of all vegetative material, will be required for all vehicles and equipment involved in construction works.

An Invasive Species Management Plan will be implemented to prevent the spread of knotweed species, this Plan is included in **Volume D: Environmental Management Plan**.

5.4.1.3. Use of Resources: Water**5.4.1.3.1. Potable & Non-Potable Water**

During construction, All water requirements for welfare facilities and drinking purposes will be supplied at Upperchurch Windfarm Site Compound No.1 during the Construction Stage, no additional water will be required for the UWF Related Works.

During operation, All water requirements for welfare facilities and drinking purposes will be supplied at the Upperchurch Windfarm Site Office during the Operational Stage, no additional water will be required for the UWF Related Works.

¹ A condition of the felling license will require that an equivalent area of forestry be replanted in another location. The New native woodland at Foilnaman, (UWF Replacement Forestry element of the whole UWF project) will fulfil this obligation.

5.4.1.4. Use of Resources: Soils**5.4.1.4.1. Excavated Soils**

During the construction of the UWF Related Works, natural materials such as topsoil, subsoil and rock will arise from excavation works during the construction of the UWF Related Works. Approximately 4750m³ topsoil, 6670m³ subsoil and 360m³ rock, will arise from excavation works. All of this excavated material will be used to backfill cables trenches, used to reinstate land along construction works areas. In addition, c.50m³ of spoil will also arise during excavations in public roads

5.4.1.4.2. Permanent Storage

Some of the excavated material (930m³) will be permanent stored in berms alongside Realigned Windfarm Roads and around the Telecom Relay Pole compound.

5.4.1.4.3. Temporary Storage

The remaining material excavated from UWF Related Works construction works areas will be temporarily stored, within the construction works area. Topsoil, subsoil and rock will be stored separately, with as much surface vegetation left intact on the topsoil layer as possible. Suitable excavated competent material will be used to backfill the Cables Trench and following the completion of works in any area; the temporarily stored soil will be used to reinstate and landscape the works areas.

5.4.1.4.4. Public Road Arising's and Contaminated Material

The excess material arising from short lengths of Internal Windfarm Cabling excavated in the public road at the 9 no. road crossing locations, or contaminated material arising during the construction of UWF Related Works will be collected by Arlo Group and transported to their approved licensed facilities at Thurles, County Tipperary,

5.4.1.4.5. Imported Rock

Approximately 4,600m³ of graded crushed stone will be imported onto UWF Related Works areas from the local Rear Cross Quarry. This stone will be mainly used for the Realigned Windfarm Roads, telecom relay pole compound and temporary access roads for installing the internal windfarm cabling.

This calculation is based on a circumstances where there is not plastic/bog mats used for the temporary roads but all of the temporary roads are built with crushed stone. The volume of crushed stone will reduce substantially by the use of matting and the promoter intends to utilise matting as much as possible.

Also the amount of stone required for the realigned roads will offset a similar amount of rock that will not be required for the section of originally consented roadway because it will not be built so therefore there will be no overall increase in the volume of stone required for the windfarm roadways.

5.4.1.4.6. Operational Stage - Soil

No excavations of soils will be required during the routine operation of the UWF Related Works.

Small amounts of aggregate/hard core may be required from time to time, during occasional maintenance activities, to recap the Realigned Windfarm Roads.

5.4.2. Emissions**5.4.2.1. Dust**

During the construction stage, dust may arise, due to the transportation of aggregate to UWF Related Works areas, the movement of excavated material within the works areas and from stored excavated materials at the works areas, particularly during dry and windy weather. Dust will not cause any significant adverse effects to Air Quality. During the operational stage, the works areas will be re-vegetated therefore dust emissions will not occur. Dust emission would be limited to that emanating from occasional maintenance of the Realigned Windfarm Roads.

5.4.2.2. Vehicle Exhausts

During the construction stage, operating machinery used during the construction stage will be run on hydrocarbons and will emit nitrogen dioxide and other greenhouse gas emissions during their operation. Exhaust emissions will not be at levels to cause significant adverse effects. During the operational stage, a van or four wheel drive vehicle will be used for c.12 half days per year for monthly visual inspections, larger machinery may be required for 2 – 3 days every five years or so for road maintenance on the Realigned Windfarm Roads or occasionally for re-use of Haul Route Works areas. This minimal use of vehicles will result in negligible amounts of nitrogen dioxide and other greenhouse gas emissions during operation.

5.4.2.3. Noise

During the construction stage, heavy machinery and vehicles which will be used at works areas during the construction stage will emit noise during their operation, noise will also be emitted from certain construction activities such as excavation or rock breaking or by mobile generators which may be used at work areas. Noise emissions will not be at levels to cause significant adverse effects. During the operational stage, the presence of vehicles, and therefore noise emissions, during operation is considered negligible with a van or four wheel drive vehicle being used c.2 days per year during monthly visual inspections, larger machinery may be required for 2 – 3 days every five years for road maintenance on the Realigned Windfarm Roads or occasionally for c.7 days longer during any re-use of Haul Route Works areas.

5.4.2.4. Vibration

Construction works, including excavations and the use of heavy machinery will cause low levels of ground vibration. No blasting or piling will occur at the UWF Related Works construction works areas. Vibration emissions will not be at levels to cause significant adverse effects. No vibration emissions are expected during the operation of the UWF Related Works.

5.4.2.5. Light

Lighting will be used at Upperchurch Windfarm Site Compound No.1 during construction. This lighting will use a cowled design along with motion-sensor and timer controlled lights which will not remain turned-on overnight. No lighting will be required at construction works areas associated with the UWF Related Works and all construction works will be carried out during daylight hours.

5.4.2.6. Electromagnetic Radiation

Low frequency electrical and magnetic fields (EMF) will be present anywhere electricity is generated, distributed or used and therefore these fields are a common occurrence in everyday life. The operational

Internal Windfarm Cables will be a source of very low frequency (50Hz) electromagnetic fields. Electromagnetic fields will not be at levels to cause significant effects. No emissions of electromagnetic fields will occur during the construction stage.

5.4.3. Waste

The greatest potential for waste occurs during the Construction Phase.

5.4.3.1. Waste Water

The UWF Related Works will be constructed by the personnel involved in the construction of the Upperchurch Windfarm. Self-contained toilets, with integrated waste water storage tanks, will be provided for construction workers at Upperchurch Windfarm Site Compound No.1. Waste water will be collected by licensed collector - by Arlo Group or other appropriately licensed operator, and transported to an approved water treatment plant in Thurles, County Tipperary or other appropriately licensed facility.

The personnel involved in the operation and maintenance of UWF Related Works will also be involved in the operation and maintenance of Upperchurch Windfarm, and will have access to the Upperchurch Windfarm site office facilities, including toilets serviced by an existing septic tank. Waste water will be collected by licensed collector - by Arlo Group or other appropriately licensed operator, and transported to an approved water treatment plant in Thurles, County Tipperary or other appropriately licensed facility.

5.4.3.2. General Waste

During the construction stage, general waste materials such as pallets, packaging, and excess construction and building materials will be generated in small quantities at construction works areas. All individual waste streams will be identified at source, and stored at a designated area at Upperchurch Windfarm Site Compound No.1 with other General Waste arising from the Upperchurch Windfarm construction works. General waste will be collected by licensed collector - Arlo Group or other appropriately licensed operator and transported to their approved licensed facilities at Thurles, County Tipperary or other appropriately licensed facility. No general waste is expected during the operation of the UWF Related Works

5.4.3.3. Chemical Waste

Any chemical waste which may be generated during the construction of the UWF Related Works will be limited to solid waste-oil such as oily rags or any oil contaminated material. Should any chemical waste arise, it will be stored in a secure, bunded container in a designated area at Upperchurch Windfarm Site Compound No.1 with other Chemical Waste arising from the Upperchurch Windfarm construction works. All chemical waste will be removed by Arlo Group or other appropriately licensed operator and transported to either Enva Ireland Limited approved licensed facilities at Shannon, Cork, Portlaoise or Dublin or to the Rilta Environmental Ltd. approved licensed facility in Dublin.

No chemical waste or contaminated material is expected during the operation of the UWF Related Works. However, should any chemical waste occur, it will be stored in a secure bunded container at the Upperchurch Windfarm site office with any other chemical waste arising from the Upperchurch Windfarm operational activities. All chemical waste will be removed from the Upperchurch Windfarm site office by Arlo Group or other appropriately licensed operator and transported to either Enva Ireland Limited approved licensed facilities at Shannon, Cork, Portlaoise or Dublin or to the Rilta Environmental Ltd. approved licensed facility in Dublin.

5.4.3.4. Arisings

During the construction stage, arisings from any excavations within the structure of the public road will consist of old chip, tar, subsoils and rock material. Arisings also include any contaminated soils from off-road construction works areas. All of this material will be collected by operator Arlo Group or other appropriately licensed operator and transported to their approved licensed facilities at Thurles, County Tipperary or other appropriately licensed facility. No arisings from the public road network are expected during operation.

5.4.3.5. Waste Management Plan

Any wastes which result from the operation of the UWF Related Works will be managed under the Waste Management Plan. The Plan includes a hierarchy of controls in relation to waste; Prevent, Reduce, Reuse, Recover and Responsibility and the controls and procedures which will be undertaken as part of the management of waste are specified. A strict chain of custody system will be set up as part of the Waste Management Plan to enable all wastes to be controlled in the appropriate manner.

The **Waste Management Plan** is included in **Volume D: EMP for UWF Related Works**.

5.5. Vulnerability of the Project to Major Accidents and Natural Disasters

Major accidents or natural disasters which have the potential to affect the UWF Related Works are described hereunder. The vulnerability (exposure and resilience) of the UWF Related Works to major accidents and disasters and the risk of these accidents or disasters is classified according to the *Guide to Risk Assessment in Major Emergency Management* (DoEHLG, 2010). This Guide is included as [Appendix 5.7 Volume C4: EIAR Appendices](#).

5.5.1. Vulnerability to Major Accidents

It is clear from the EIA Directive that ‘major accident’ mainly applies to notified Seveso establishments which operate under the Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015, where Dangerous Substances are identified in Schedule 1.

The UWF Related Works is **not vulnerable to Major Accidents**, due to the minimal volumes of the Dangerous Substances which will be used, limited to small volumes of diesel fuel used by vehicles during the construction and operation of the UWF Related Works. Furthermore there are no Seveso sites in proximity to the UWF Related Works site, the closest being Grassland Agro in Limerick and MSD (pharmaceutical) in Kilsheelan, near Clonmel, Co Tipperary.

5.5.2. Vulnerability to Natural Disasters (Land slippage, Flooding)

Natural disasters which could potentially affect the UWF Related Works include **land slippage and flooding**. The likelihood of these natural disasters occurring is discussed below, with likelihood of the natural disaster occurring rated according to the DoEHLG 2010 Guidelines. The risk classification tables are included in [Appendix 5.7: A Guide to Risk Assessment in Major Emergency Management Jan 2010](#).

5.5.2.1. Land-slippage

It is considered that the UWF Related Works is not vulnerable to natural disasters such as land slippage, due to the absence of peat or very shallow peats at the works locations. Therefore it is considered that the likelihood of land slippage disaster occurring along the UWF Related Works is **Extremely Unlikely**.

5.5.2.2. Flooding

In recent years, high rainfall events and subsequent flooding have become more frequent in Ireland. Where complete the Catchment Flood Risk Assessment and Management (CFRAM)² OPW Flood Risk Assessment Maps are now the primary reference for flood risk planning in Ireland and supersede the Preliminary Flood Risk Assessment Maps (PFRA) maps. CFRAM mapping is not currently available for the area of the Upperchurch Windfarm site and therefore the PFRA maps have been examined.

² CFRAM is Catchment Flood Risk Assessment and Management. The national CFRAM programme commenced in Ireland in 2011, and is managed by the OPW. The CFRAM Programme is central to the medium to long-term strategy for the reduction and management of flood risk in Ireland.

A Stage II Flood Risk Assessment was completed for the subject development by Hydro Environmental Services, a specialist hydrological and hydrogeological consultancy, who concluded that there is a low risk of impact on the UWF Related Works as a result of potential flooding because based on the PFRA mapping all of the works areas and infrastructure are located in mapped Flood Zone C (Low Risk) – where the probability of flooding is low (less than 0.1% or 1 in 1,000). The elevated nature of the UWF Related Works areas means no significant pluvial or fluvial flooding would be expected.

Also, there will be no potential of increased local flood risk as a result of the UWF Related Works as most of the subject development is located underground (i.e. windfarm cabling). The footprint of the above-ground permanent infrastructure (i.e. realigned windfarm access roads, relay pole base etc) is minimal and distributed over several catchments and all new permanent watercourse crossing culverts will be suitably designed to accommodate flood flows.

Therefore it is considered that the likelihood of flooding disaster affecting the UWF Related Works areas is **Unlikely**.

The Flood Risk Assessment can be found in **Appendix 11.3: Flood Risk Assessment**, of **Volume C4 EIA Report Appendices**.

5.5.2.3. Consequences of Natural Disasters Occurring

The consequence of the impact if the event occurs is described here.

Due to the low number of personnel working on-site at any one location, the consequence of any flooding or land slippage events, if they did occur, is considered to be **Limited**.

Due to the low number of people living or working locally, the consequence of any flooding or land slippage events, if they did occur, is also considered to be **Limited**.

The consequences to water quality due to land slippage or flooding could be **Serious** due to the widespread effects and extended duration of sedimentation effects in downstream watercourses.

5.5.2.4. Overall Risk

When the likelihood and the consequence of a potential land slippage or flooding event occurring is applied to the risk matrix from the DoEHLG 2010 guidelines, a broad indication of the critical nature of each risk can be determined.

In relation to on-site personnel and other people in the locality, a land slippage or flooding event would be classed a 'normal emergency' - based on a likelihood rating of Extremely Unlikely and a consequence rating of Limited.

In relation to downstream water quality, due to the higher level of effect (Serious) on water quality a land slippage or flooding event could be a major emergency. According to the DoEHLG 2010 guidelines, both flooding and landslip events would be at the lowest extreme of 'major emergency'.

5.5.2.5. Mitigation Measures

No measures are required for land slippage risk. In relation to flooding, instream works on Class 1 and Class 2 watercourses will also be carried out during dry periods in the months of July, August and September, and all new permanent crossing structures will be sized to cope with a minimum 100 year flood event.

Chapter 5: *Description of Development - UWF Related Works*

Should a disaster occur, unconnected to the project but in the locality – the above mitigation measures already designed into the project will ensure that the project will not make the consequences of the event worst. In addition the presence of the project will not increase the likelihood of such an event occurring.

5.6. Cumulative Descriptions

Table 5-10: Subject Development: UWF Related Works - Element 2 of the Whole UWF Project

Element No.	The Subject Development	Composition of the Subject Development	Relevant Appendix Location for description of each element
2	<u>The Subject Development</u> UWF Related Works (RW)	Internal Windfarm Cabling Realigned Windfarm Roads Haul Route Works Telecom Relay Pole RW Ancillary Works	Current planning application to Tipperary County Council

An **overview of Element 2, UWF Related Works**, the subject development, is provided in **Section 5.2.2 above**. A **full description** of the subject development is provided in the **successive Sections 5.2 to 5.5**.

5.6.1. Description of the Other Elements of the Whole UWF Project

In order that a cumulative evaluation can be carried out for the UWF Related Works, an overview description is provided hereunder of all the other elements of the whole UWF project.

Table 5-11: Element 1 and Element 3 to 5 of the Whole UWF Project

	Element of the whole UWF project	Composition of each Element	Relevant Appendix Location for description of each element
1	UWF Grid Connection (GC)	Mountphilips Substation Mountphilips – Upperchurch 110kV UGC Grid Connection Access Roads Grid Connection Ancillary Works	Appendix 5.3
3	UWF Replacement Forestry (RF)	Replacement Forestry at Foilnahan	Appendix 5.4
4	Upperchurch Windfarm (UWF)	Consented UWF Turbines Consented UWF Substation Consented UWF Roads UWF Ancillary Works	Appendix 5.5
5	UWF Other Activities (OA)	Haul Route Activities Upperchurch Hen Harrier Scheme Monitoring Activities Overhead Line Activities	Appendix 5.6

Relevant Volume C3 EIAR Figures:

Figure CE 1.1: Location of UWF Related Works and the Other Elements of the Whole UWF Project on OSI Mapping.

An EIA Report has also been prepared to accompany concurrent planning applications to the relevant Competent Authorities, for the UWF Related Works and UWF Replacement Forestry.

This information on the other elements of the whole UWF project can be found in the following locations;

- **Full EIA Report** or EIS (as appropriate) for **Elements 1, 3, and 4** in **Volume F: Reference Documents for Other Elements of the Whole UWF Project**.
- **Description of each element 1, 3, 4 and 5** (presented in a format similar to this chapter and with smaller scale reference mapping and figures) in **Appendix 5.3 to Appendix 5.6**, see **Volume C4: EIAR Appendices**.
- **Overview description of each elements 1, 3, 4, and 5** of each other element in this Section hereunder.

5.6.1.1. Element 1: UWF Grid Connection

An application for planning permission for UWF Grid Connection has been submitted directly to An Bord Pleanála under Section 182A (9) of the Planning and Development (Strategic Infrastructure) Act (2006). The application is accompanied by an EIA Report.

The full **EIA Report including mapping and figures for UWF Grid Connection** is included in **Volume F: Reference Documents for Other Elements of the Whole UWF Project**.

An extract from Volume F of the **detailed description** of the UWF Grid Connection (presented in a format similar to 5.2 to 5.5 above) along with a **copy of the accompanying figures** is included in **Appendix 5.3: Description of Development (UWF Grid Connection)**.

A summary overview of UWF Grid Connection is provided hereunder.

5.6.1.1.1. Location and Characteristics of UWF Grid Connection

The UWF Grid Connection will comprise of the following:

Mountphilips Substation: A new substation is proposed for a location adjacent to the existing Killonan - Nenagh 110kV overhead line in agricultural grassland in Mountphilips townland, 2km north of Newport, 4km south of Birdhill, 17km north east of Limerick City and 23km west of the Upperchurch Windfarm. The new 110kV electrical substation will comprise 2 No. End Masts located at the Killonan – Nenagh 110kV overhead line; a compound, 230 meters east of the overhead line, measuring 95 meters x 94 meters which will contain a control building; 110kV busbars; circuit breakers; line disconnects; current and voltage measuring equipment; cable chairs; surge arresters; lightening protection monopoles and other electrical apparatus. The 2 No. End Masts will be connected to the electrical equipment in the compound via underground cable.

Mountphilips - Upperchurch 110kV UGC: The 110kV UGC will connect the Mountphilips Substation to the Upperchurch Windfarm through the Consented UWF Substation, through the installation of underground cables. The route of the underground cables, which is 27.5km in length, will follow a generally west/east course through a mix of agricultural grassland (11.9km), commercial forestry plantations (1.9km), private forestry and farm roads (c.12km) and public roads (c.1.7km) through the townlands of Mountphilips, Coole, Freagh, Oakhampton, Newross, Castlewaller, Killeen, Knockacullin, Bealaclave, Bournadomeeny, Goulmore, Laghile, Churchquarter, Knocknabansha, Knockmaroe, Knockcurraghbola Crownlands and Knockcurraghbola Commons. The 110kV UGC will be installed underground in trenches, which will be laid with ducts through which the electrical cables and communications cables will be pulled. The cable lengths will be pulled through and joined together at Joint Bay locations, in joint bay chambers. The ducts will be surrounded by concrete and the trench backfilled with excavated material or aggregate depending on the location. The only surface expression of the 110kV UGC will be the man-hole type covers over the Joint Bays and the over-ground identification marker posts and marker plates.

UWF Grid Connection Access Roads: To provide access to Mountphilips Substation and the Joint Bay locations along the 110kV UGC, New Permanent Access Roads will be constructed. Permanent access will also include upgraded existing farm and forestry roads.

UWF Grid Connection Ancillary Works will support the construction of UWF Grid Connection and will include the construction of Temporary Access Roads along the 110kV UGC construction works areas; Permanent Site Entrances (including the provision of sightlines) at Mountphilips, Bealaclave and Knockcurraghbola Commons; Temporary Site Entrances at public road crossings along the 110kV UGC; installation of temporary and permanent watercourse crossing structures; construction and use of 3 No. Temporary Compounds, installation of drainage systems at Mountphilips Substation, around Temporary Compounds and along new UWF Grid Connection Access Roads; forestry felling; temporary and permanent hedgerow/tree removal; permanent hedgerow replanting; fencing; relocation of existing overhead electricity and telephone services and; storage of excavated materials at various locations within the construction works area boundary.

5.6.1.1.2. UWF Grid Connection: Construction & Operation

UWF Grid Connection Construction Phase: All elements of the whole UWF project will be constructed at the same time. Construction of UWF is expected to commence in 2018/2019 and will take approx. 12 months. Approximately 100 persons will be engaged in the pre-construction, main construction, cable jointing and commissioning works for the UWF Grid Connection. 1050 No. loads of concrete; 455 No. loads of aggregate; 59 No. loads of hard core; and 108 No. loads of surface dressing (public road sections) will be imported from Roadstone Killough, Co Tipperary and Bunratty, Co Clare and Shanballyedmond, Rear Cross. 22 No. loads of general building materials including geotextile, and 126 No. loads of electrical plant and equipment including lattice towers, control building doors and switching gear, will be imported to the site from various suppliers throughout Ireland and the EU.

UWF Grid Connection Operational Phase: Once commissioned and energised, the Grid Connection will be taken in charge by ESB Networks and the Mountphilips Substation and the Mountphilips – Upperchurch 110kV UGC will become part of the national electricity network. The new asset will be managed and operated by ESB Networks. Scheduled inspection and maintenance activities will be carried out by ESB Networks personnel (2 men crews) over a total of 13 days per year. Very infrequent planned maintenance or unplanned repairs may be required, if at all, during the lifetime of the UWF Grid Connection, it is expected that one crew with c.6 ESB Networks personnel would be required for 1 week – 2 weeks duration, depending on the nature of the repairs work. The Grid Connection will remain permanently in place as part of the national electricity network and thus decommissioning is not envisaged.

UWF Grid Connection use of Natural Resources: Construction Phase – There will be 39.1 hectares of **land** required for the construction works site. 1.3ha of **coniferous forestry** will be permanently felled. 45m of **hedgerow** and 30 No. of **trees** of varying maturity will be permanently removed to facilitate either a permanently widened entrance off the public road or a new permanent access road. These hedgerows and trees will be replaced immediately adjacent to the area. On a number of hedgerows, a specially designed bat crossing structure will be erected at new entrances. These structures will be timber frames with vegetation attached, which will provide a continuation of flight-line for bats during the works. 820m of hedgerows, which include trees of varying maturity, located close to works areas will be pruned to facilitate passage of machinery along works areas. c.700m of new hedgerow will be planted with locally sourced native species. **Water** required for welfare facilities will be brought onto site. Approximately 9,615m³ of **topsoil**, 1,265m³ of **peat**, 2,390m³ of **subsoil** and 120m³ of **rock** will be permanently excavated from the works areas. 660m³ of spoil will also arise during excavations in public roads. 8,370m³ of the excavated material will be permanently stored along the 110kV UGC works area as linear berms and remainder (5,020m³) will be reinstated within the works area. In addition, up to 11,140m³ of soils will be temporarily excavated from the construction works area boundary, including from the cable trench and from the

footprint of any excavated temporary stone roads and will be temporarily stored, within the construction works area, to backfill, reinstate and landscape the works areas.

UWF Grid Connection use of Natural Resources: Operation Phase – The Land required will reduce considerably to just 4.2ha of land permanently changing use - mainly comprising the footprint of the Mountphilips Substation and the footprint of any new access roads which will provide access to the Joint Bays. No further **forestry felling, hedgerow or tree pruning or removal** will be required during the operational stage. Non-potable **water** requirements will be provided at the Mountphilips Substation via a rain water harvesting system, and drinking water will be brought onto site as needed. **No excavations of soils** will be required during the routine operation of the UWF Grid Connection. Planned maintenance or unplanned repairs, if any occur are likely to involve the re-opening of the underground chambers, at Joint Bays. This work which will result in very small volumes of crushed stone and sand being temporarily removed from the area directly over the joint bay covers, stored adjacent to the Joint Bay, and re-used to reinstate the top of the Joint Bay following the completion of the repairs.

UWF Grid Connection Emissions: Dust, construction machinery exhaust, noise, vibration and light will be emitted during the construction stage, negligible levels are associated with the operation and maintenance activities. During operation, Mountphilips Substation will emit **noise** however this is unlikely to be audible above the existing background noise levels at nearest residence, which is 385m distant. The operational sub-station and 110kV underground cable will be a source of very low frequency (50Hz) **electromagnetic fields**.

UWF Grid Connection Waste: Waste water from construction stage welfare facilities will be contained in self-contained units and emptied by a licenced facility. General and chemical waste will be segregated and stored in allocated tanks, bins, skips or areas at the Temporary Compounds, C1, C2 and C3. Waste will be collected by an appropriately licensed waste contractor. Any wastes which result from the construction of the UWF Grid Connection will be managed under a specific **Waste Management Plan**. During operation, there will be minimal general and chemical waste during the Operational Stage, with any waste taken offsite by ESNB personnel.

5.6.1.2. Element 3: UWF Replacement Forestry

An **application for an afforestation license** for UWF Replacement Forestry has been submitted to the Minister for Agriculture, Food and the Marine. This application is accompanied by an EIA Report.

The full **EIA Report including mapping and figures for UWF Replacement Forestry** is included with the planning application in **Volume F: Reference Documents for Other Elements of the Whole UWF Project**.

An extract from Volume F of the **detailed description** of the UWF Replacement Forestry (presented in a format similar to 5.2 to 5.5 above) along with **a copy of the accompanying figures** is included in **Appendix 5.4: Description of Development (UWF Replacement Forestry)**.

A summary overview of UWF Replacement Forestry is provided hereunder.

5.6.1.2.1. Location and Characteristics of UWF Replacement Forestry

UWF Replacement Forestry relates to the planting with forestry, of 6ha of agricultural lands the purpose of which is to fulfil the replanting obligation which will arise from the felling of forestry for the development of the whole UWF project.

Located at Foilnaman townland, near Upperchurch, County Tipperary, 6 hectares (6ha) of agricultural grassland at will be planted with native woodland species, set in clusters of well-matched native species. There will be varied spacing created between the clusters according to Forest Service recommendations. A mixture of tall trees and understory shrubs will be planted, and the design includes wide ride-lines between deeper areas of core woodland. The ride-lines will create open spaces with tree-lined boundaries, which is much favoured by birds of prey during the day (e.g. hen harrier) and bats at night as hunting ground. A mixture of land cover – tall grasses, short grasses and scrub will be maintained under the planting and in the ride lines. Tree guards will be used to protect the saplings and young trees from rabbit damage. A livestock-proof fence will be erected around the perimeter of the planting.

The lands to be afforested are currently in two agricultural landholdings. A small watercourse, with an existing culvert crossing, runs through the centre. The existing riparian habitat along this watercourse will be enhanced through planting with hazel, alder and willow species and the entire afforestation land will be protected from livestock by the perimeter fencing.

There is a change of use required for an existing agricultural entrance to agricultural and forestry entrance which will remain in permanent use. This change of use is part of UWF Related Works – RW Ancillary Works.

The UWF Replacement Forestry will be designed and planted in accordance with the *Forest Service (2006) Information Note No. 5: Establishment, Design and Stocking Densities of New Native Woodland* and *Felling and Reforestation Policy published by the Forest Service (May 2017)*.

5.6.1.2.2. UWF Replacement Forestry: Planting and Growth Stage

UWF Replacement Forestry Planting Stage: Tree planting will be carried out by 4 No. forestry professionals. Tree saplings, wooden fence posts and fencing wire and gates will be imported to the site by 4WD vehicle.

UWF Growth Stage: Once planted, the trees will go through numerous stages of growth from sapling, through to maturity, old age and eventual decay with natural regeneration occurring through the lifecycle of the native wood. Other than thinning activities and grass/scrub management, natural maturation, old age and regeneration, no other changes to the native woodland are expected. Felling is not envisaged.

Use of Natural Resources: 6ha of agricultural land will be planted with mixed species to create a native woodland, comprising tall trees and understory shrubs, along with wide ride-lines, and a mix of tall grasses, short grasses and scrub land cover maintained during the growth stage. This will enhance biodiversity in the area. New trees and shrubs will be set back from the watercourse which runs through the UWF Replacement Forestry site. The existing riparian habitat will be enhanced through the planting with hazel, alder and willow species and the lands will be protected from livestock by the perimeter fence. Planting will be carried out by hand using spades. Small localised patches of disturbed soil will occur at the sapling tree trunks.

Emissions – Planting and Growth Stage: Negligible.

Waste - Planting and Growth Stage - such as packaging, and excess planting materials will be generated in very small quantities and this waste will be removed at source and disposed of in an appropriate licensed facility.

5.6.1.3. Element 4: Upperchurch Windfarm

An overview description of already consented Upperchurch Windfarm (UWF) is provided hereunder.

An application for planning permission for Upperchurch Windfarm (Consented UWF) was made to Tipperary County Council in January 2013. The windfarm was permitted by Tipperary County Council in January 2014 and the permission was upheld by An Bord Pleanála in August 2014. The application was accompanied by an EIA Report (known as EIS at the time) and Natura Impact Statement. The full planning documents for consented UWF can be found in **Volume F: Reference Documents for Other Elements of the Whole UWF Project**.

5.6.1.3.1. Overview of the Location and Characteristics of Upperchurch Windfarm

UWF will comprise 22 wind turbines with an overall height up to 126.6 metres, 2 meteorological masts with an overall height of up to 80 metres, turbine foundation and crane hardstanding areas, access roads and an electrical substation.

The Upperchurch Windfarm site is located in the townlands of Graniera, Shevry, Knockcurraghbola Commons, Knockmaroe, Grousehall, Cummer, Foilnahan, Gleninchaveigh, Coumnageeha, Coumbeg, Knocknamena Commons, Glenbeg and Seskin. This is an area 2km west of Upperchurch village and 18km to the west of Thurles, County Tipperary.

The 22 wind turbines, associated crane hardstandings and ancillary works will be constructed on a series of small hills ranging in elevation from 280m to 401m OD, set out generally over four areas. The substation will be constructed in Knockcurraghbola Commons and the turbines will be connected by underground cables to the substation. There will be two meteorological masts erected, one in Grousehall and a second in Knocknamena townlands. Ancillary Works will include borrow pits in Shevry, Knocknamena, Knockmaroe and Grousehall; 1 No. site entrance from the R503 Regional Road at Graniera and; 10 No. site entrances from local public roads, through and around the site, which will provide access to the windfarm.

A document, with a **detailed description of the Upperchurch Windfarm**, has been compiled from the original 2013 Upperchurch Windfarm EIS, from the Reply to Further Information, the additional information submitted during the planning process and mitigation measures and planning conditions attaching to the Grant of Permission, to reflect a description of the development as it is now permitted. This compilation document has been prepared in the same format as the current application Chapter 5, for ease of cross referencing. The compilation document can be found in **Appendix 5.4: Compiled Description of Upperchurch Windfarm**.

The full planning documents for Upperchurch Windfarm can be found in **Volume F: Reference Documents for Other Elements of the Whole UWF Project**.

Upperchurch Windfarm (UWF) is comprised of the following parts:

- **Consented UWF Turbines** - 22 No. wind turbines of the three-bladed, tubular tower model, light grey in colour and an overall height to blade tip upto 126.6m. The turbines will be constructed on concrete bases with an adjacent hard-core hardstand area. There is no requirement for fencing of turbine areas. The turbines will be connected by underground cables to the Consented UWF Substation.
- **Consented UWF Substation** - 110kV substation compound which includes a control building, main transformer and other electrical equipment enclosed in a compound by a palisade fence. The substation will measure 64m x 41m.

- **Consented UWF Windfarm Roads** - 11.6km of windfarm access roads will comprise 8km of newly built 5m wide roads and 3.6km of existing farm roads which will require upgrading and widening (by an average of 2m).
- **Consented Ancillary Works** - The main items of ancillary works will include, 2 No. meteorological masts up to 80m in height; 11 No. site entrances; 1 No. stream crossing; site drainage system; 2 No. construction site compounds; 6 No. borrow pits from which most of the aggregate required will be won; forestry felling, hedgerow removal and reinstatement; excavation, storage and reinstatement of soils.

5.6.1.3.2. Upperchurch Windfarm: Construction & Operation

UWF Construction Phase: All elements of the whole UWF project will be constructed at the same time.

Construction of UWF is expected to commence 2018/2019 and will take approx. 12 months. Approximately 277 persons will be engaged in the civil, electrical, project management, legal and financial services, material supply and component deliveries for the windfarm. Approximately 950 No. loads of concrete; 15 No. loads of reinforcing steel and 5 No. loads of general building materials and 212 No. loads of electrical plant and equipment (abnormal size loads) will be imported to the site by HGV. The abnormal turbine loads will be transported from Foynes Port.

UWF Operational Phase: UWF has been granted permission to operate for 25 years from the date of commissioning of the wind turbines, whereupon there will then be an option to apply for continuance of use or decommission the plant and restore the site. There will be 8 permanent jobs created in operation and maintenance activities, legal, electricity sales and asset management during the operational phase.

UWF use of Natural Resources: 56.3 hectares of land within the construction works site will reduced to 6.4 ha during the operational phase; Approx. 108,000m³ of excavated soils; 43,000m³ of aggregate mostly won on-site and otherwise imported from local quarry at Shanballyedmond, Rear Cross; small amounts of potable and non-potable water, sourced at an existing well at the windfarm site offices in Site Compound No. 2; felling of 4.4 hectares of conifers; 960m of hedgerow removed.

UWF Emissions: Dust, construction machinery exhaust, noise, vibration and light will be emitted during the construction stage. There is no house within 200m of the construction works. During the **Operational Stage** there will be negligible dust, vehicle exhaust, vibration and light emitted. The turbines will emit noise during operation. Permitted noise emissions are prescribed by planning condition. The operational electrical plant will be a source of very low frequency (50Hz) electromagnetic fields but these will not be at levels to cause significant effects at the turbine locations, and no effects will occur at local residences.

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

5.6.1.4. Element 5: UWF Other Activities

Although UWF Other Activities do not require planning permission, they do form part of the whole UWF project and therefore are included in the cumulative evaluation. A description of these activities, along with **mapping and figures** is included in **Appendix 5.6: Description of the UWF Other Activities**.

An overview of UWF Other Activities is provided hereunder.

5.6.1.4.1. Location and Activities of UWF Other Activities

The **Haul Route Activities** will facilitate the transportation of turbine components to the Upperchurch Windfarm site and are located at various points on the national and regional road network along the UWF turbine component haul route between Foynes Port in County Limerick and junction of the R503 and R497 Regional Roads in Knockmaroe townland, County Limerick. Activities comprise the laying of matting over verges at up to 5 No. locations, removal and replacement of street furniture (mainly signposts) at 13 No. locations and the trimming of up to 960m of hedgerow/trees at up to 15 No. locations.

The **Upperchurch Hen Harrier Scheme** will enhance and protect habitat for hen harrier in the vicinity of Upperchurch Windfarm, in order to fulfil planning condition No.18, attaching to the windfarm. The Upperchurch Hen Harrier Scheme is located in Knockcurraghbola Commons, Coumnageeha, Foilnaman, Knockmaroe and Grousehall townlands on 128ha of agricultural lands between the Slievefelim to Silvermines SPA and the Upperchurch Windfarm. Activities associated with the Scheme includes once off activities such as planting of hedgerows and trees; enhancement of riparian corridors and scrub/wood areas; and the fencing off of watercourses and newly planted trees and shrubs. The Scheme also includes long-term farm management practices such as management of rush coverage, livestock grazing and the control of the use of lime, fertilizers and burning of gorse, amongst others. Nine local landowners are signed-up to the Scheme. Implementation involves a mix of initial once-off activities which will both create new habitat and protect and enhance existing habitat; and on-going farming practices which will result in the long term maintenance of hen harrier habitat.

Monitoring Activities will monitor the Whole UWF Project for compliance with the environmental protection measures and mitigation measures detailed in the UWF 2013 EIS and 2013 RFI (including the Construction Environmental Management Plan for Upperchurch Windfarm and the Ecological Management Plan for Upperchurch Windfarm); Planning Conditions attaching to the already consented UWF; and measures in the 2018 UWF Grid Connection EIA Report, the 2018 UWF Related Works EIA Report and the 2018 UWF Replacement Forestry EIA Report and associated UWF Grid Connection Environmental Management Plan and UWF Related Works Environmental Management Plans. Monitoring will also involve the supervision and recording of key construction activities, and monitoring of progress of land reinstatement.

Overhead Line Activities include re-sagging activities and fibre wrapping activities. The purpose of the re-sagging activities is to correct the tension of the existing overhead line, following the installation of the UWF Grid Connection End Masts, so that the lines are held within predefined tension parameters. The purpose of fibre wrapping is to provide a communication link to the newly installed Mountphilips Substation. The tension will be corrected on 2 no. Sections - i) between ESNB Angle Mast Structure No. 79 (c.200m south of Mountphilips substation) to New Mountphilips End Mast No. 1 and ii) between New Mountphilips End Mast No. 2 and ESNB Angle Mast Structure No. 90 (2.3 km north of Mountphilips substation). Wrapping the overhead line with fibre optic cable from Killonan ESNB substation (just east of Limerick City) to Mountphilips substation. The Overhead Line Activities will be carried out according to

industry standard method statements, including standard health & safety and environmental management systems.

5.6.1.4.2. UWF Other Activities: Construction & Operation

Timing: The **Haul Route Activities** will occur prior to commencement of turbine component haulage and reinstatement will occur immediately after the passage of all components. The initial once-off activities associated with the **Upperchurch Hen Harrier Scheme** such as permanent planting and fencing of newly planted areas and watercourses will be carried out during the same period as the construction of UWF and UWF Related Works. There will be pre-construction **Monitoring Activities** before UWF and UWF Related Works commence. **Overhead Line Activities** will take place at the same time as the construction of Mountphilips substation.

UWF Other Activities Construction Phase: Approximately 50 persons will be engaged in UWF Other Activities including haul route activities, landowners involved in the hen harrier scheme, environmental experts engaged in the monitoring schemes and ESB Crews involved in overhead line activities. There will be very little materials delivered to the activity sites, these will include deliveries of geotextile matting, trees and shrubs, fencing materials and specialist ESB equipment.

UWF Other Activities Operational Phase: The same **Haul Route Activities** as for the construction phase, will be required in the occasional event of a large component delivery to UWF, if required, during the operational phase. The farming practices required under the **Upperchurch Hen Harrier Scheme** will continue throughout the lifetime of UWF. **Monitoring** of the success of Upperchurch Hen Harrier Scheme will be carried out during the operational lifetime of UWF. Monitoring will also include operational planning conditions and Ecological Management Plan compliance.

Use of Natural Resources: No land use changes required. No water or welfare facilities required. No mechanical excavations required; all planting will be carried out by hand. For haul route activities, up to 960m of roadside boundary hedges/treelines will be trimmed, outside of the general bird breeding season. For the Hen Harrier Scheme, 2.2ha of trees, 1.4km of riparian habitat and 2.8km of new hedgerow will be enhanced or created during initial activities. In total 128 hectares of agricultural lands will be management for the benefit of hen harrier.

There will be negligible **Emissions** from vehicles transporting personnel and any general **Waste** arising on-site will be removed by the crew themselves during the **construction** and **operational phase** of these Other Activities.

5.6.1.5. Cumulative Locational Context of all the Elements

The majority of the whole UWF project is located in County Tipperary with some minor activities along the Upperchurch Windfarm turbine component haul route and on the Killonan to Nenagh 110kV overhead line, in County Limerick (these activities are part of Element 5: UWF Other Activities).

The UWF Related Works is predominately located adjacent to and overlaps with Other Elements of the Whole UWF Project, in particular the consented Upperchurch Windfarm per:

- The majority of the Internal Windfarm Cabling overlaps the Consented UWF Roads,
- The Realigned Windfarm Roads will provide alternative access to Consented UWF Turbines,
- The Haul Route Works and Telecom Relay Pole are located in the immediate vicinity of various parts of the Upperchurch Windfarm
- The UWF Related Works overlap and are adjacent to the UWF Grid Connection and the Upperchurch Windfarm in Knockmaroe, Knockcurraghbola Commons and Knockcurraghbola Crownlands,
- Haul Route Works are located adjacent to Haul Route Activities (UWF Other Activities) in the Knocknabansha/Knockcurraghbola Commons area.

Relevant Volume C3 EIAR Figures:

Figure CE 1.2: UWF Related Works and the Other Elements of the Whole UWF Project in the Upperchurch Windfarm area.

Figure CE 1.3: UWF Related Works and the Other Elements of the Whole UWF Project in Knockmaroe, Knockcurraghbola Commons and Knockcurraghbola Crownlands.

5.6.2. 4Secondary Projects

The development of the UWF Related Works is not expected to result in any secondary or consequential development.

In relation to the Other Elements of the Whole UWF Project, the addition of Mountphilips Substation (UWF Grid Connection) will add a new high voltage electrical substation in the Newport area. This may facilitate new connections to the Mountphilips substation in the future. There are no new connections planned at present.

5.6.3. Description of Other Projects and Activities

A cumulative evaluation of the effects of the subject development together with the Other Elements of the Whole UWF Project and Other Projects or Activities is presented in the Environmental Factor topic chapters.

Other Projects or Activities in the area were scoped using geographical and time-frame boundaries and conceptual site model exercises, see [Appendix 2.3: Scoping of Other Projects or Activities](#). The results of this scoping exercise is presented in Table 5-12, where Other Projects or Activities which have been scoped in for cumulative evaluation are listed in the left hand column of the matrix table, and the relevant Environmental Factor topic is identified in grey shading in the matrix.

Table 5-12: List of Other Projects or Activities included in the Environmental Factor Cumulative Evaluation

Project (These projects are identified on Figure CE 2.1: Other Projects or Activities Scoped In for Cumulative Evaluation in the Environmental Factor topic chapters)	Population	Human Health	Biodiversity	Land	Soils	Water	Air	Climate	Built Services	Roads & Traffic	Cultural Heritage	Landscape
Existing Killonan to Nenagh 110kV Overhead Line									-			
Existing Shannonbridge – Killonan 220kV Overhead Line												
Consented Bunkimalta Windfarm												
Consented Castlewaller Windfarm												
Existing Milestone Windfarm (includes permitted turbine at Inchivara) currently under construction												
Operational Windfarms in the Republic of Ireland												
Existing Communication Structures - Foilnahan Mast - Cummermore Communications Pole												
Consented Project – Newport Distributor Road, Newport												
Consented Project - Industrial warehouse Units at Thurles												
Existing/consented Project - Thurles Regional Water Treatment Works												
Consented Gortnahalla Turbine												
Killuragh Digester Plant												
Housing Development in Doon and Annacotty												
Agricultural Developments - Milk Milking Parlour in Cappamore, Milking Parlour in Lisnagry, Slatted Sheds and Stores in Pallasgreen, Slatted Shed in Gortussa.												
Activity – Forestry												
Activity – Agriculture												
Activity –Turf-cutting												

A brief overview of each of the above listed projects is provided below. The location of each project in relation to the elements of the Whole UWF Project is identified on [Figure CE 2.1: Other Projects or Activities Scoped In for Cumulative Evaluation in the Environmental Factor topic chapters](#).

5.6.3.1. Existing Killonan to Nenagh 110kV Overhead Line

A high voltage (110kV) overhead line which runs between Killonan Station and Nenagh ESB substation (County Tipperary). The existing line is located to the west of the UWF Grid Connection and does not pass over the route of the 110kV UGC. The new Mountphilips Substation will be connected to this line via two new End Masts in farmland, west of the substation compound.

5.6.3.2. Existing Shannonbridge – Killonan 220kV Overhead Line

A high voltage (220kV) overhead line which runs between Shannonbridge ESB substation in County Offaly and Killonan ESB substation in County Limerick. A section of the line passes close to the UWF Grid Connection 110kV UGC in the townlands of Coole and Mountphilips.

5.6.3.3. Consented Bunkimalta Windfarm

The Bunkimalta Windfarm is a consented 16-turbine windfarm, located on Coillte lands, c.2.5km to the north of the UWF Grid Connection at Bunkimalta, Bauraglanna, Lackabrack, Knockfune and Foilduff at, Keeper Hill, Co. Tipperary.

Bunkimalta Windfarm will comprise 16 wind turbines, each having a rated electrical output of approximately 2,500 - 3,000 kilowatts, access tracks, a fenced Electrical Transformer Station comprising a single-storey Control Building and Substation, an effluent treatment system, three anemometer masts, repository areas, borrow pits and all associated site works, above and below ground. Each wind turbine will comprise a tower up to a maximum of 100 metres high, with a diameter of about 4 metres at the base. Three blades, up to a maximum of 50 metres in length, will be attached.

The Bunkimalta Windfarm will connect to the National Grid via an already consented underground grid connection to the existing Nenagh Substation, on the outskirts of Nenagh town.

The Bunkimalta Windfarm could be constructed during the same period as the UWF Grid Connection and the Whole UWF Project. Bunkimalta Windfarm, when built, will be operational during the operational stage of the Whole UWF Project.

An Environmental Impact Statement and Natura Impact Statement accompanied the planning application 13510035.

5.6.3.4. Consented Castlewaller Windfarm

The Castlewaller Windfarm is a 16-turbine windfarm, comprising 16 wind turbine generators (each with a maximum hub height of 100m, maximum rotor diameter of 90m, and with a total tip height of 145m), one permanent meteorological mast, 2 borrow pits, a sub-station including a control building, new internal access roads, upgrading of existing internal access roads, expansion of drainage system, turbine hardstands, wastewater holding tank, underground cables and ancillary works which is located along part of the 110kV UGC route in Castlewaller townland.

An Environmental Impact Statement and Natura Impact Statement accompanied the planning application 11/51/0251 for Castlewaller Windfarm.

Castlewaller Windfarm has not as yet secured a grid connection offer to connect to the National Grid from either Eirgrid or E.S.B Networks and therefore is not likely to be in construction at the same time as the construction of the Whole UWF Project.

5.6.3.5. Existing Milestone Windfarm

Milestone Windfarm is a consented 6-turbine windfarm located adjacent to the southwest of the consented Upperchurch Windfarm with 5 No. turbines consented under planning ref: 12510385 at Knockcurraghbola Commons, Knockcurraghbola Crownlands, Graniera, Shevry and 1 No. turbine consented under planning ref: 1410 at Inchivara and Knockduff. When constructed, Milestone Windfarm will comprise of wind turbines each with a maximum tip height of 126m, along with new access tracks, and electrical substation, a borrow pit and associated works. The grid connection associated with the Milestone Windfarm is towards the south at ESNB Cauteen Station, to be cabled along the public road network. An Environmental Impact Statement accompanied the planning applications for Milestone Windfarm – Ref: 12510385 & 1410.

Milestone Windfarm is currently under construction with construction works expected to be completed before the commencement of the construction of the subject development or any of the other elements of the Whole UWF Project. Therefore there will be no overlap of construction periods.

Part of the landholding associated with the Milestone Windfarm occurs within one of the landholdings associated with the 110kV UGC element of the UWF Grid Connection, in Knockcurraghbola Commons townland.

5.6.3.6. Operational Windfarms in the Republic of Ireland

The Republic of Ireland has a generating capacity of 2,909.66 MW based on 233 windfarms.

5.6.3.7. Existing Communication Structures

Foilnaman Mast: An existing communications mast comprising a 30m steel lattice mast structure at Knockmaroe townland, in the vicinity of the UWF Related Works/Upperchurch Windfarm site.

Cummermore Communications Pole: An existing communications structure comprising a 20m support pole, c.2km to the southwest of the Upperchurch Windfarm, and within 4km of the UWF Related Works (Telecom Relay Pole). This existing pole carries radio aerials and a communications dish, together with associated equipment, cabling, gantry pole, GPS timing antenna, cabinet and fencing. Planning Ref: 14600313

5.6.3.8. Consented Project – Newport Distributor Road, Newport

Consented public road development at Newport, County Tipperary, comprising the demolition of two habitable dwellings and the provision of a distributor road between the R503 and local county road (Murroe Road) and associated site works including footpaths, lighting, cycle tracks and drainage, at Tullow, Newport County Tipperary. The road development is within the Newport River catchment and also located upstream of the Lower River Shannon SAC. Planning Ref: 07511157.

5.6.3.9. Consented Project – Industrial Warehouse Units at Thurles

The construction of 1 No. Light Industrial/Warehousing building (gross floor area 2360.6sq.m.) at Bawntameena, Nenagh Road, Thurles, along with a roundabout and access Road from Nenagh Road (R498) complete with necessary improvement works and road markings, a car park and loading areas and ancillary

works; in addition the construction of a foul water pumping station and all associated works. Planning ref: 16600037.

5.6.3.10. Consented Project - Thurles Regional Water Treatment Works

The construction of a water treatment plant at Bohernacrusha, Killeenyarda, Holycross and outfall to the River Suir. The water treatment plant will consist of a water treatment and administration building, sludge dewatering building, ESB sub-station, generator & oil tank enclosure, raw water balancing tank, clear water tanks, sludge balancing tank, sludge thickening and sludge holding tank, washwater tank, sludge skip and emergency sludge storage area, chemical storage tanks, washwater storage tank and all associated site development and site excavation works above and below ground. Planning Ref: 16600877.

5.6.3.11. Consented Gortnahalla Turbine

Single wind generator with a maximum output set at 500kw, hub height 65m at Gortnahalla, near Upperchurch, Co Tipperary. Planning Ref: 12510368.

5.6.3.12. Killuragh Digester Plant

Development of a digester plant, associated ABP building and associated site works to process farm slurry and other organic material to provide renewable energy and fertilizer, in Killuragh, Pallasgreen, Co Limerick. Planning Ref: 111066.

5.6.3.13. Housing Development in Doon and Annacotty

Two housing developments: Construction of 25 no. houses consisting of 5 no. 4 bed detached dwellings, 20 no. 3 bed semi-detached dwellings, a bored well, entrance and roads together with associated site works and services at Bottle Hill, Doon, Co Limerick, Planning Ref: 16530; and Construction of 48 dwellings at Annacotty & construction of 240 dwellings in three areas/lots at Walkers Road, Annacotty, Co Limerick, Planning Ref: 137026 and 137094.

5.6.3.14. Agricultural Developments

Agricultural developments include a milk Milking Parlour in Cappamore, Co Limerick (Planning Ref: 15255), a Milking Parlour in Lisnagry, Co Limerick (Planning Ref: 15194), Slatted Sheds and Stores in Pallasgreen, Co Limerick (Planning Ref: 17133), and a Slatted Shed in Gortussa, Dundrum Co Tipperary (Planning Ref: 14600343).

5.6.3.15. Activities – Forestry, Agriculture

Agriculture and forestry are the predominant land uses in the area of the Whole UWF Project.

5.6.3.16. Activity – Turf-Cutting

Turbary (rights to cut turf) exists at Bleanbeg Bog immediately to the north of the UWF Grid Connection (110kV UGC) in the Castlewaller area.

The above projects and activities are included in the cumulative evaluations in the Environmental Topic chapters – Chapters 6 to 17. The relevant Environmental Factor topic is identified on Table 5-12.

Description of Development (UWF Related Works)

Figures and Mapping

Title: Figure RW 5.1
Location of UWF Related Works
on OSI Discovery Mapping

Map Number:
Map 1 of 1

Legend:

- Haul Route Works
- Haul Route Works Numbers (HW1 - HW13)
- Realigned Windfarm Road
- Realigned Windfarm Road Numbers (RWR1 - RWR3)
- Internal Windfarm Cabling
- Telecom Relay Pole
- Upperchurch Windfarm (UWF)
- Regional Road Number

Haul Route Works Numbers
(HW1 - HW13)

Realigned Windfarm Road Numbers (RWR1 - RWR3)

Telecom Relay Pole


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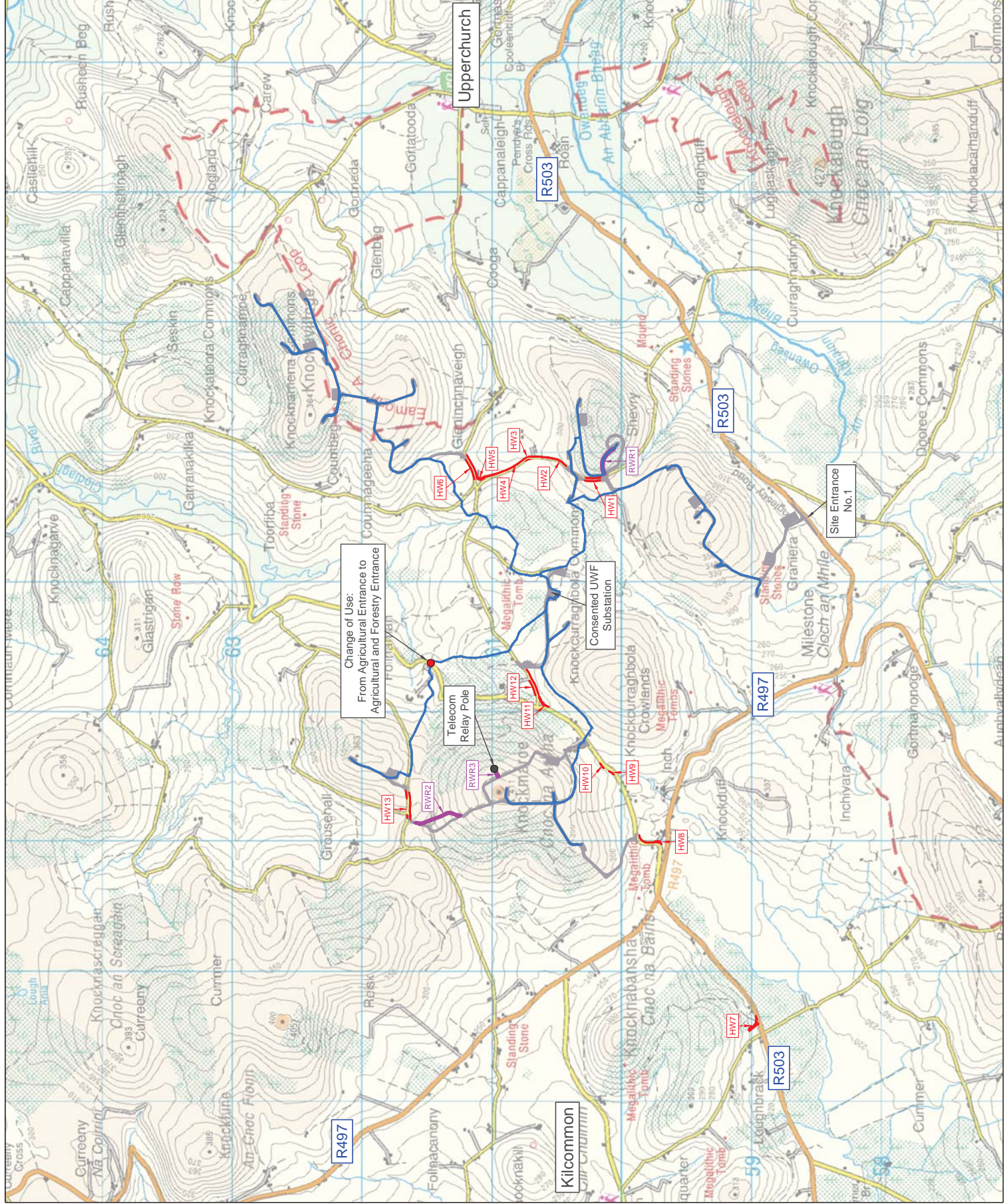
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MOB: +353 83 8805644













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Title:
Figure RW 5.4
Layout of Internal Windfarm Cabling
on Aerial Photography Mapping

Map Number:
Map 1 of 1

Legend:

- | | |
|---|--|
|  | Internal Windfarm Cabling |
|  | Temporary Access Roads |
|  | Water Crossings |
|  | Site Entrance Numbers |
|  | Road Crossing Numbers |
|  | Forestry Felling |
|  | Temporary hedge/tree removal & pruning |
|  | Watercourse |
|  | Public Road |
|  | Public Road Number |
|  | Townlands |
|  | Upperchurch Windfarm (UWF) |

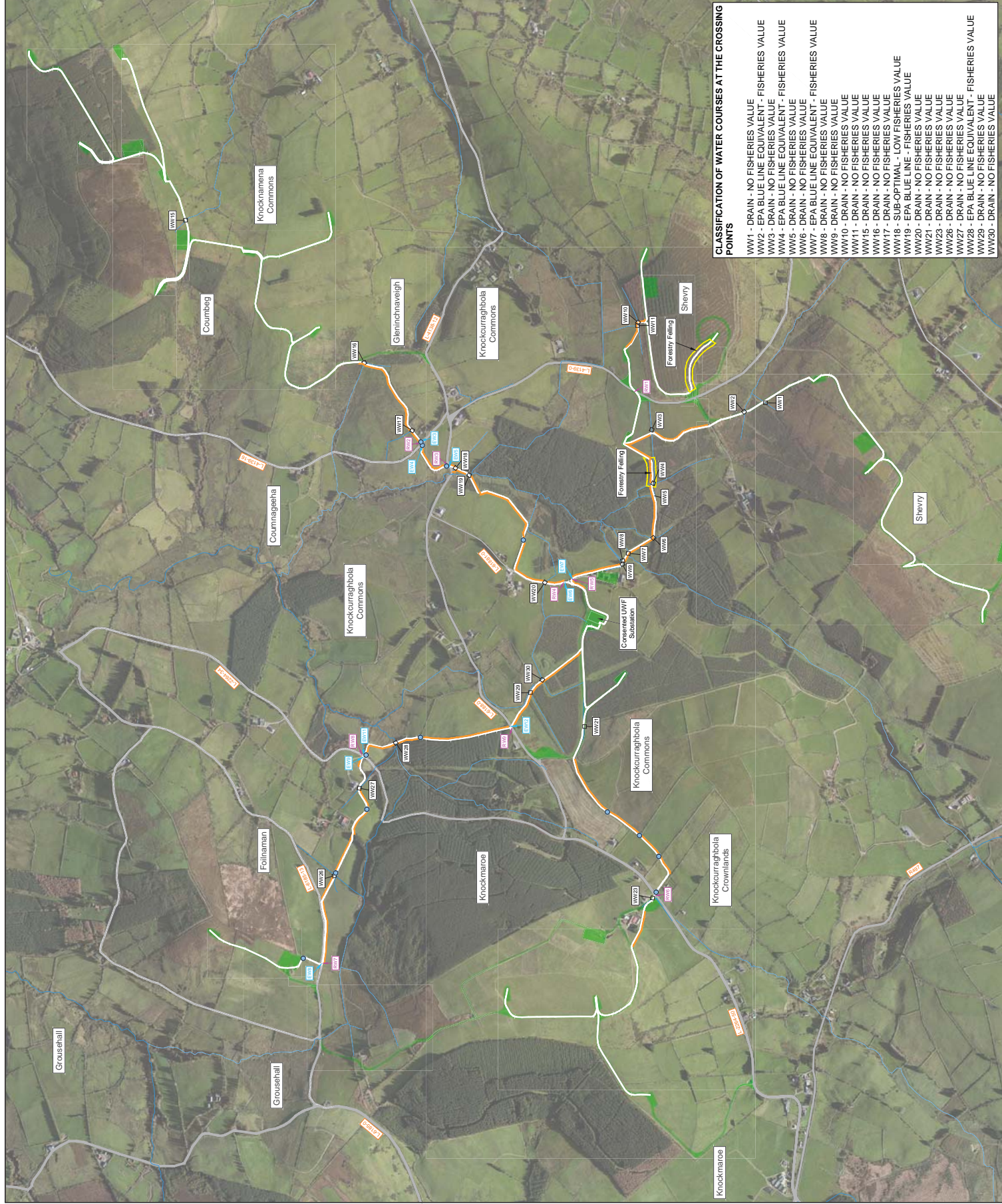




Project:
UWF Related Works (RW)

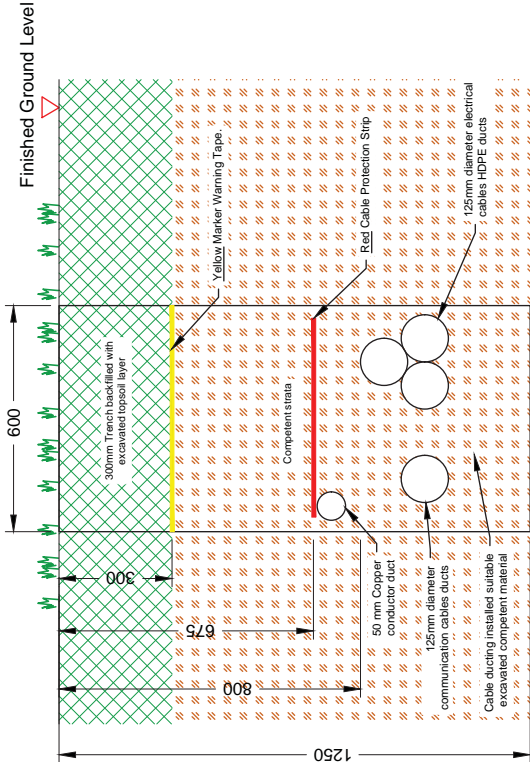
Drawn by: AB	Checked by: JB	Date: 19-Feb-18	Sheet Size: A3
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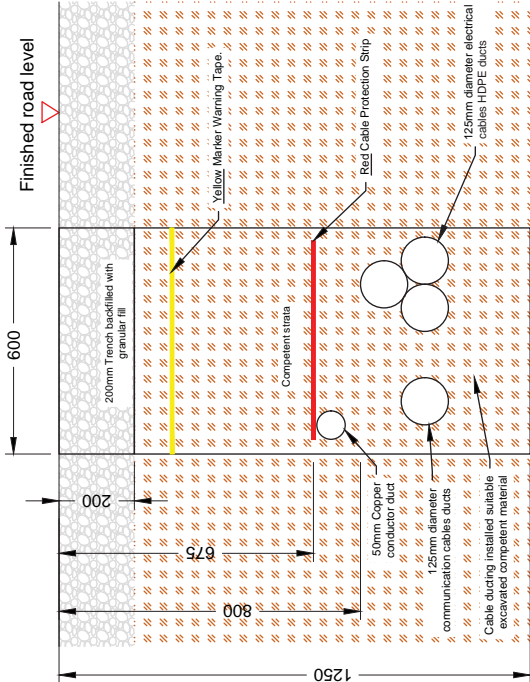
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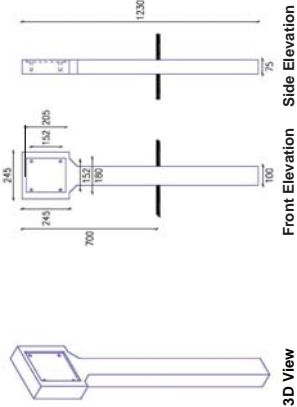
Title: Figure RW 5.5		Cross Sections of Internal Windfarm Cables Trench	
Map Number:	N/A		
Note : Drawings not to scale. For illustration purposes only			
Designed in conjunction with			
Project: UWF Related Works (RW)			
Drawn by:	CB	Created by:	JB
Date:	11-Feb-18	Sheet Size:	A3
			



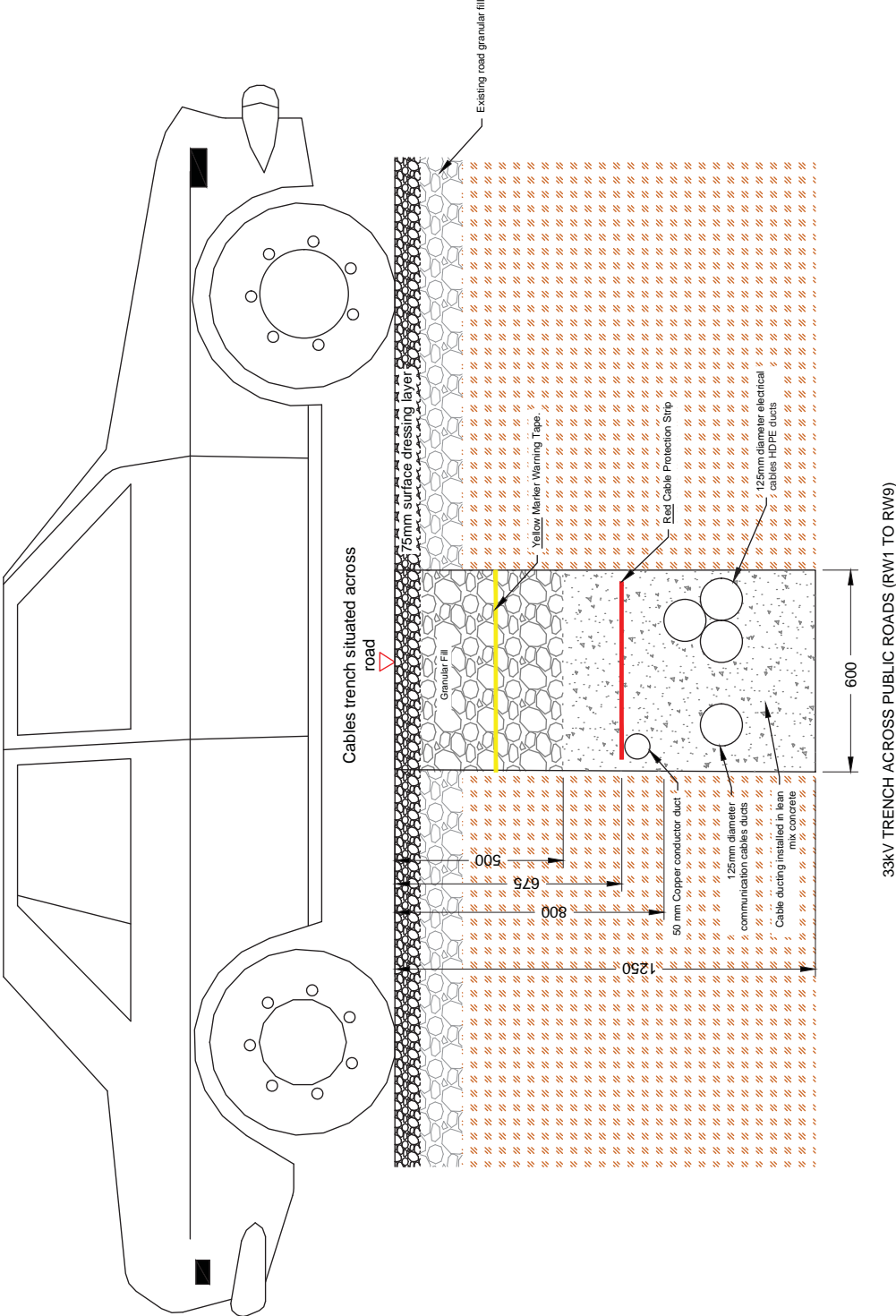
33kV CABLES TRENCH - TYPICAL SECTION THROUGH AGRICULTURAL LANDS AND FORESTRY LANDS



33kV CABLES TRENCH - TYPICAL SECTION THROUGH REALIGNED WINDFARM ROADS OR CONCENTED UWF WINDFARM ROADS



TYPICAL MARKER POST AND MARKER PLATE DIMENSIONS



33kV TRENCH ACROSS PUBLIC ROADS (RW1 TO RW9)

Title:
Figure RW 5.7
Layout of Realigned Windfarm Roads
on Aerial Photography Mapping

Layout of Realigned Windfarm Roads on Aerial Photography Mapping

Map Number:
Map 1 of 1


Legend:

Realigned Windfarm Road

— Realigned Windfarm Road

**Realigned Windfarm Road Numbers
(RWR1 - RWR3)**

Water Crossings

 Bat Crossing Locations

Forestry Felling

- Permanent hedge/tree removal & pruning

Watercourse

Public Road

Public Road Number

Sherry Townlands

Upperchurch Windfarm (UWF)



Project:

UWF Related Works (RW)

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CLASSIFICATION OF WATER COURSES AT THE CROSSING POINTS

WW24 - DRAIN - NO FISHERIES VALUE

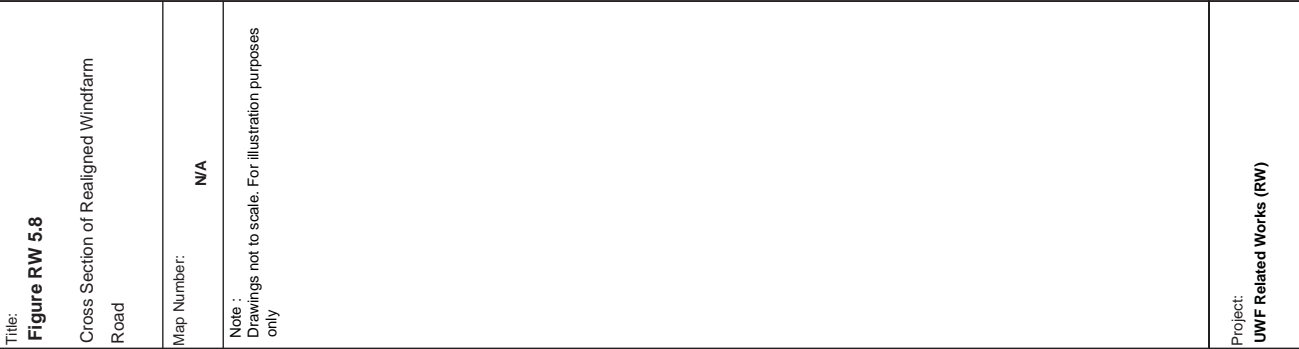
WW24 - DRAIN - NO FISHERIES VALUE
WW25 - DRAIN - NO FISHERIES VALUE

Title:
Figure RW 5.8

Cross Section of Realigned Windfarm Road

Map Number:
N/A

Note :
Drawings not to scale. For illustration purposes only



Cross section of Realigned Windfarm Road

CLASSIFICATION OF WATER COURSES AT THE CROSSING POINTS

WW12 - DRAIN - NO FISHERIES VALUE
WW13 - DRAIN - NO FISHERIES VALUE
WW14 - SUB-OPTIMAL - LOW FISHERIES VALUE
WW22 - EPA BLUE LINE EQUIVALENT - FISHERIES VALUE
WW31 - DRAIN - NO FISHERIES VALUE
WW32 - DRAIN - NO FISHERIES VALUE



Title:
Figure RW 5.9

Layout of Haul Route Works on Aerial Photography Mapping

Map Number:
Map 1 of 1

Legend:

- Haul Route Works
- Haul Route Works Numbers (HW1 - HW13)
- Water Crossings
- Bat Crossing Locations
- Site Entrances
- Temporary hedge/tree removal & pruning
- Permanent hedge/tree removal
- Watercourse
- Public Road
- Public Road Number
- Townlands
- Upperchurch Windfarm (UWF)

N

Project:
UWF Related Works (RW)

Drawn by: AB

Created by: JB

Date: 19-Feb-18

Sheet Size: A3

Ecopower
Aerial Butler
Ecopower Developments Ltd
Zooic House,
Purcellstown Business Park, Kilkenny
TEL: +353 56 7750140
MOB: +353 83 860544

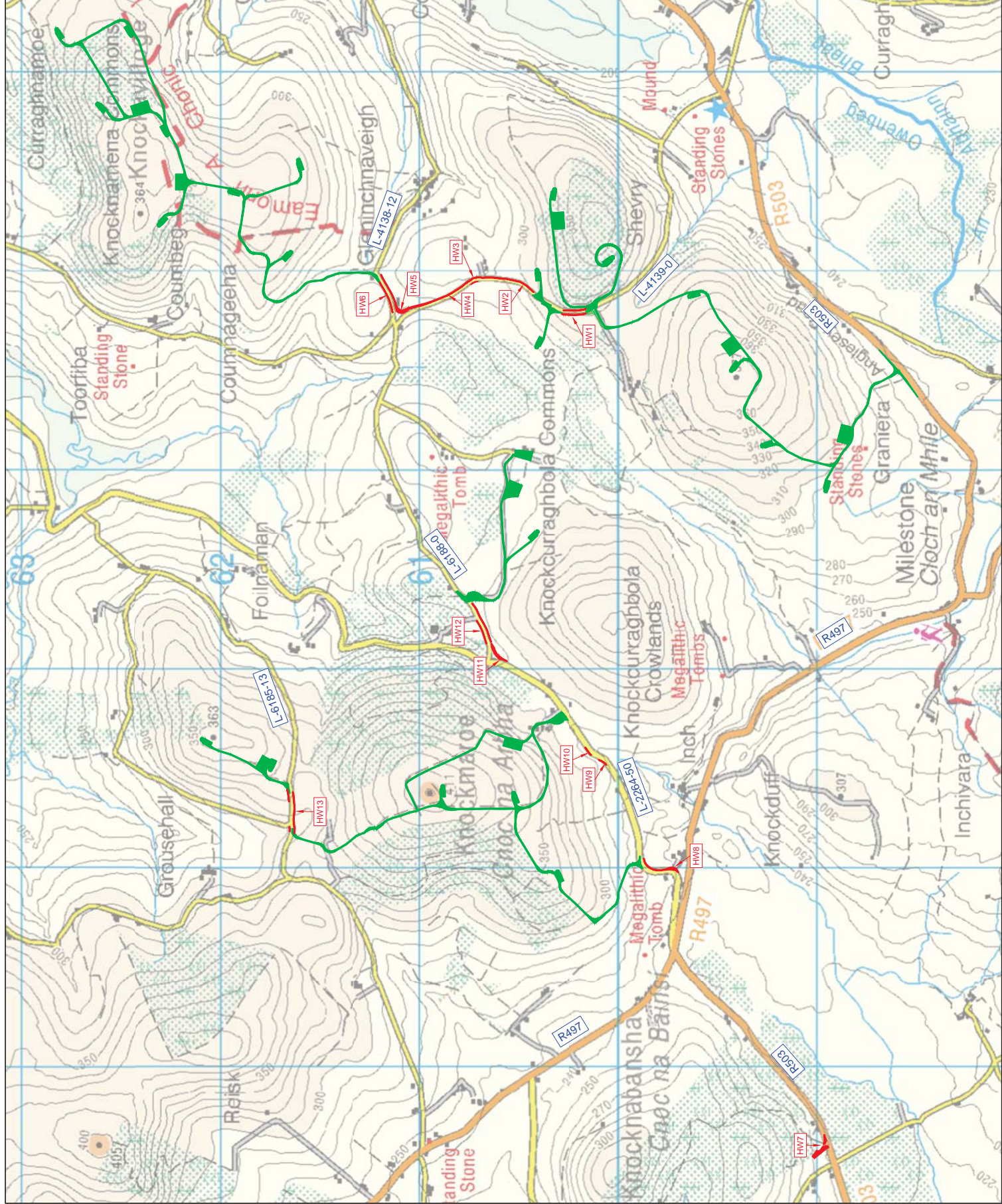
A vertical strip of a topographic map. It features brown contour lines indicating elevation, a blue line representing a river or stream, and a yellow line representing a road. There are also some green areas with a stippled pattern, possibly representing vegetation or a specific land use. The map is oriented vertically.

A topographic map of the Tooriba area. The map shows contour lines with elevations of 400 and 500. A river is depicted in blue, flowing through the landscape. A road is shown in yellow. The name 'Tooriba' is written vertically in blue. There are also some green dotted areas on the map.

[illegible]

A hand-drawn map of the North Atlantic Ocean. The map shows the Gulf Stream flowing from the southwest towards the northeast, and the Labrador Current flowing from the north towards the southwest. The map includes latitude and longitude lines, and a compass rose. The Gulf Stream is labeled 'Gulf Stream' and the Labrador Current is labeled 'Labrador Current'.

1358513



A detailed map of the Inchiquin area. The map shows a river flowing through a valley, with a road crossing it. The area is labeled 'Inchiquin' and 'Cloch an Mhile'. The map includes contour lines and a scale bar.



Title:
Figure RW 5.10
Location and Layouts of Haul Route
Works (Overview and Maps 1 to 3)

Map Number:
Map 1 of 3

- Legend:**
- Move Telephone Pole
 - ▭ Road Widening
 - ▭ Public Road
 - ▭ Temporary Removal of Roadside Boundary
 - ▭ L-4139-0 Public Road Number
 - ▭ Upperchurch Windfarm



Project:
UWF Related Works (RW)

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Date: 19-Feb-18
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MOR: +353 83 8605644
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Title:
Figure RW 5.10

Location and Layouts of Haul Route Works (Overview and Maps 1 to 3)

Map Number:
Map 2 of 3

Legend:

- Move Telephone Pole
- Road Widening
- Public Road
- Temporary Removal of Roadside Boundary
- L-4139-0 Public Road Number
- Upperchurch Windfarm



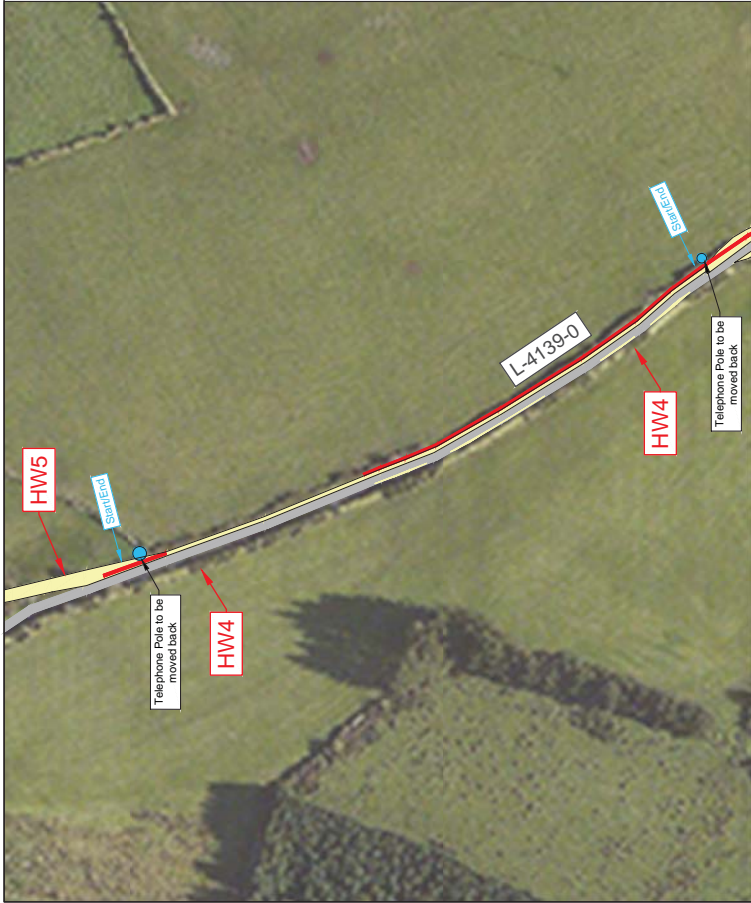
Project:
UWF Related Works (RW)

Drawn by:	AB	Checked by:	JB	Date:	19-Feb-18	Sheet Size:	A3
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 MOB: +353 83 8805644

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Title:
Figure RW 5.11


Location of the Telecom Relay Pole on
Aerial Photography Mapping


Map Number:
Map 1 of 1


Legend:


 Telecom Relay Pole and Compound

 Realigned Windfarm Road (RWR3)

 Public Road

 Public Road Number

 Townland

 Upperchurch Windfarm (UWF)

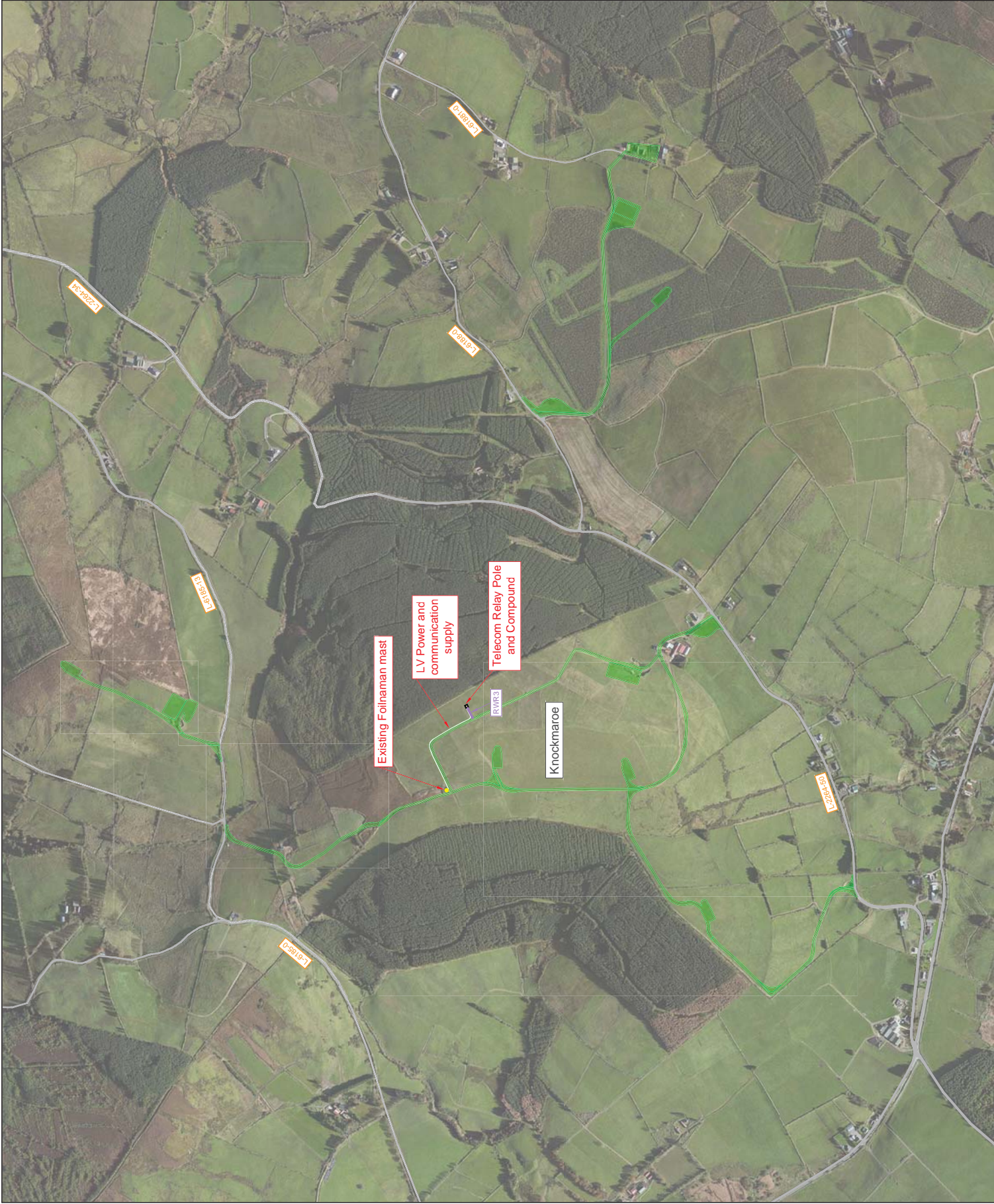


Project: UWF Related Works (RW)			
Drawn by: AB	Created by: JB	Date: 19-Feb-18	Sheet Size: A3



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Purcellinch Business Park, Kilkenny
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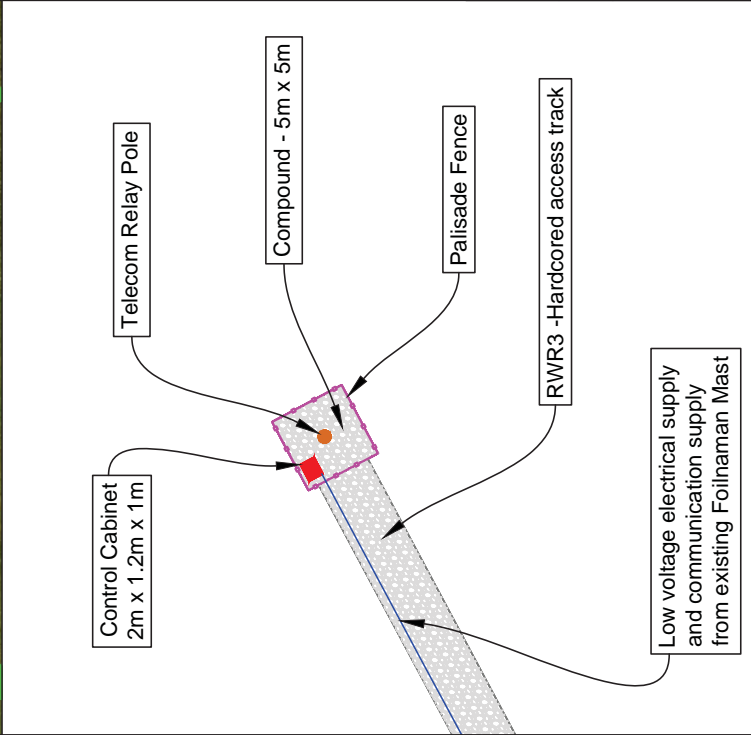
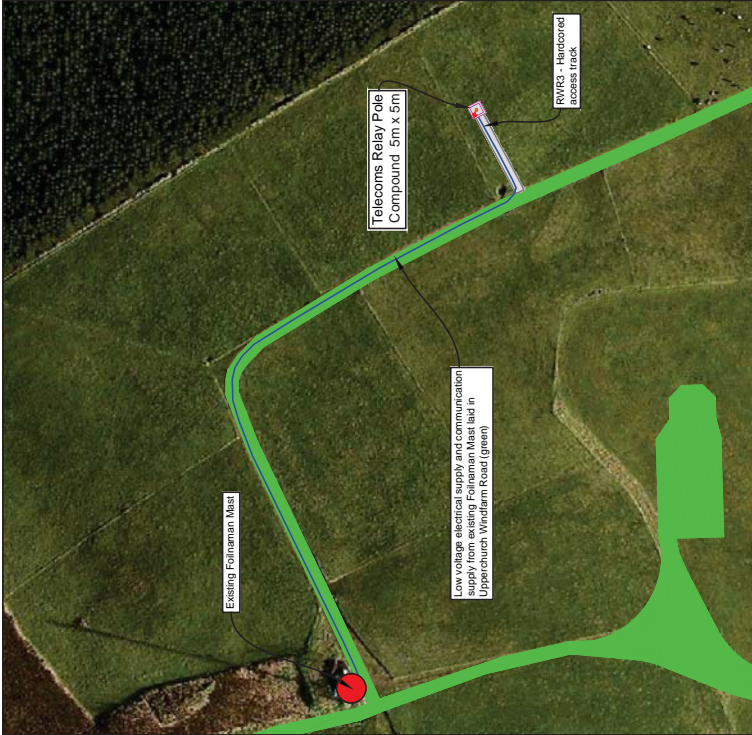


Title:
Figure RW 5.12

Plan and Elevation of Telecom Relay Pole and Compound

Map Number: **N/A**

Note :
Drawings not to scale. For illustration purposes only

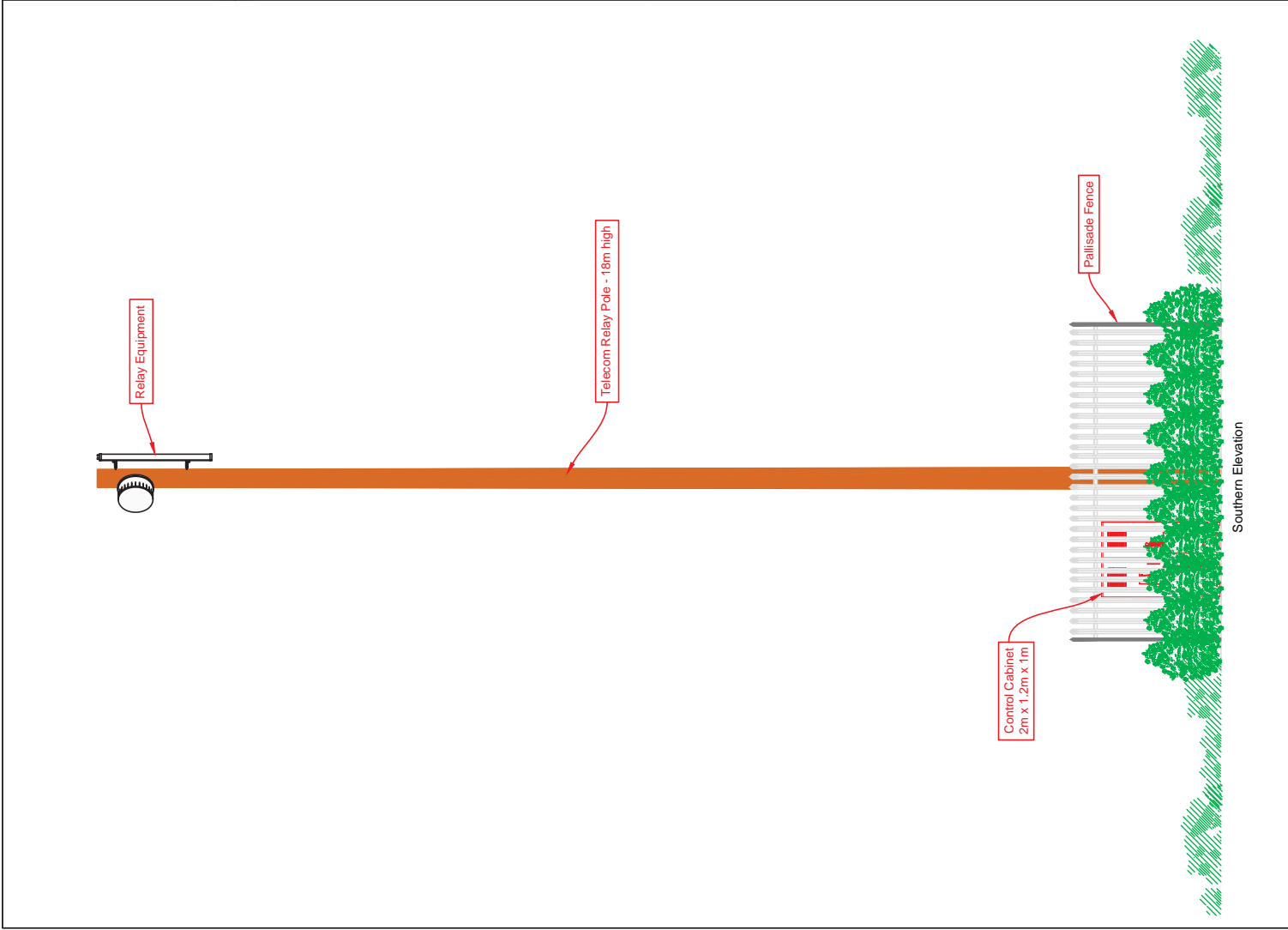


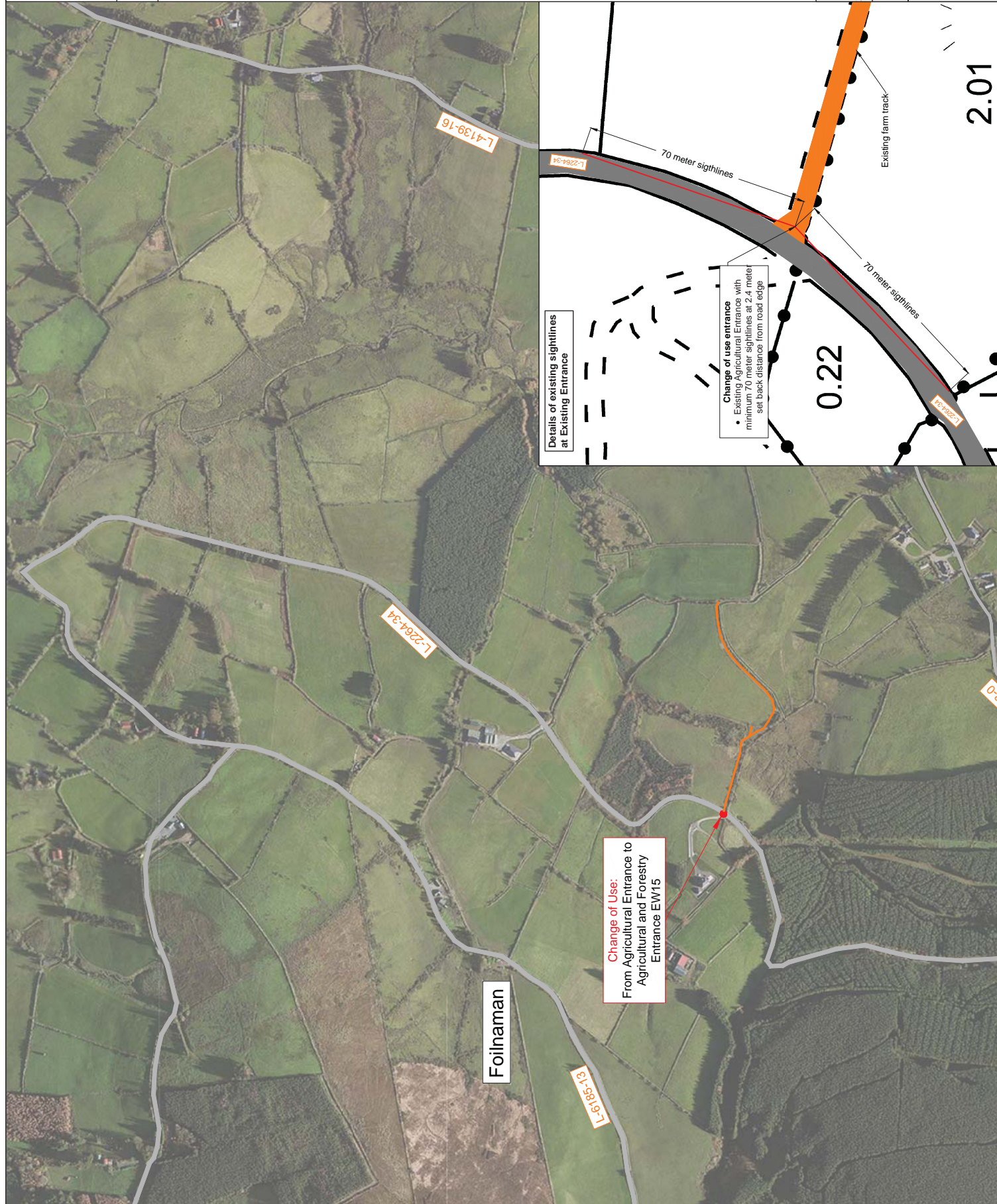
Designed in conjunction with



Project:
UWF Related Works (RW)

Drawn by: CB Created by: JB Date: 11-Feb-18 Sheet Size: A3





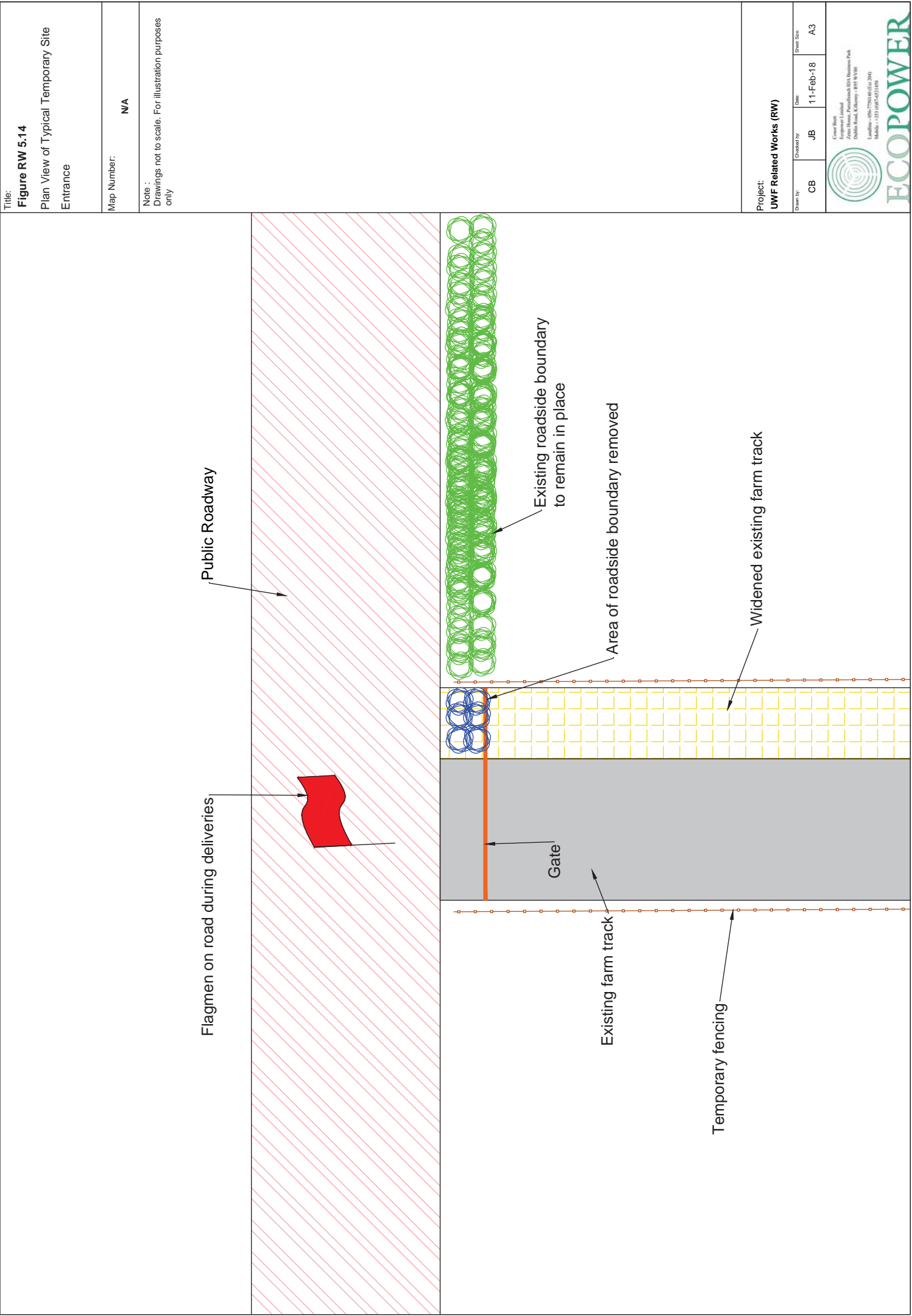


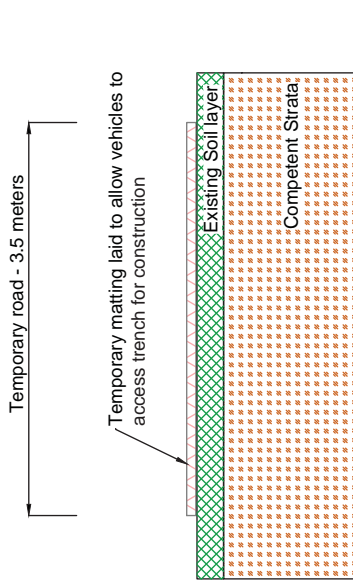
Figure RW 5.15

Map Number:

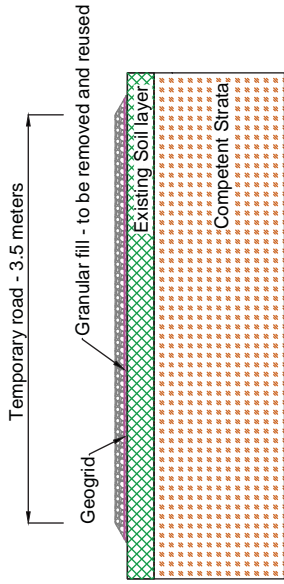
Note :
Drawings not to scale. For illustration purposes only

Drawn by:	Checked by:	Date:	Sheet Size:
CB	JB	11-Feb-18	A3

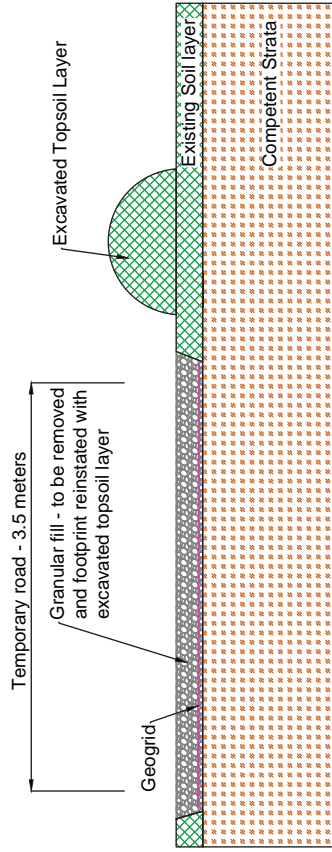
Cross section of temporary access road - Excavate and fill



Cross Section of temporary access road - Matting



Cross Section of temporary access road - Floating road



Cross Section of temporary access road - Excavate and fill

Title:
Figure RW 5.16

Watercourse Crossing Type A1 & A2 -
UWF Related Works at Existing Crossing
Structure

Note :
Drawings not to scale. For illustration
purposes only

Watercourse Crossing Type A1 (Total 5)
Class 4 - Drain - No Fisheries Value: WW6,
WW11, WW23, WW29, WW30

- Description of Crossing Type A1**
- Existing crossing structure
 - No Instream Works
 - Cable and Traffic crossing
 - No works to existing watercourse crossing structure
 - 33kV Cables and Ducting installed over or under existing structure

Watercourse Crossing Type A2 (Total 1)
Class 4 - Drain - No Fisheries Value: WW32

- Description of Crossing Type A2**
- Existing crossing structure
 - No Instream Works
 - Traffic crossing only
 - No works to existing watercourse crossing structure
 - No Cables or Ducting installed



Designed in conjunction with

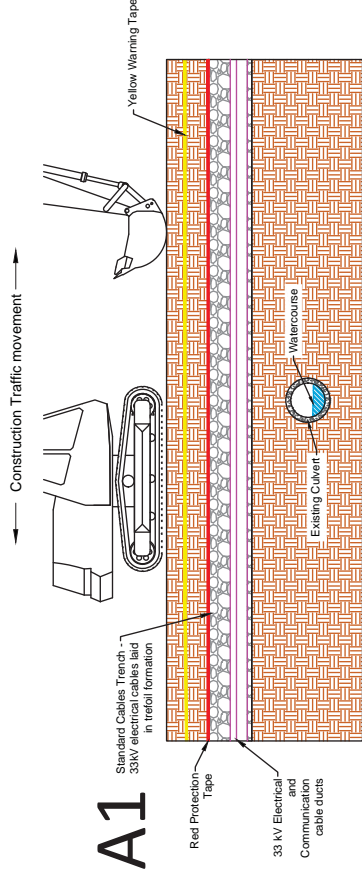
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UWF Related Works (RW)

Drawn by:	Created by:	Date:	Sheet Size:
CB	JB	11-Feb-18	A3

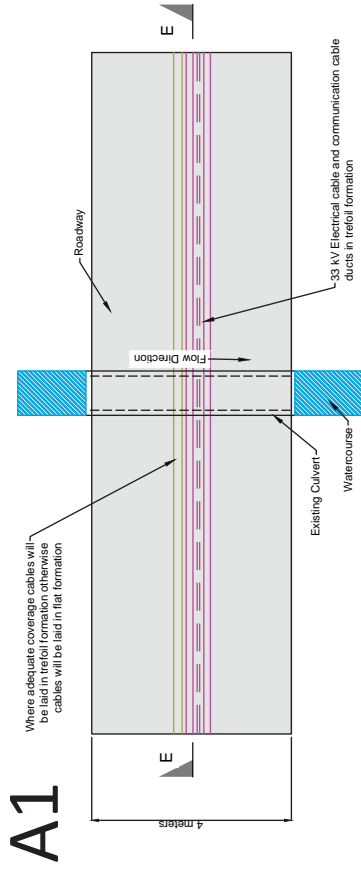


Company Name: ECOPOWER
Address: 1000, Pines Road, Balaclava, VIC 3103
Phone: 03 9497 1111
Email: info@ecopower.com.au
Website: www.ecopower.com.au

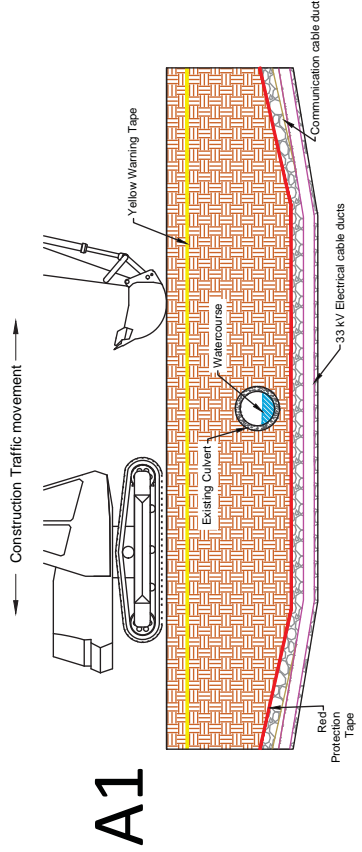
ECOPOWER



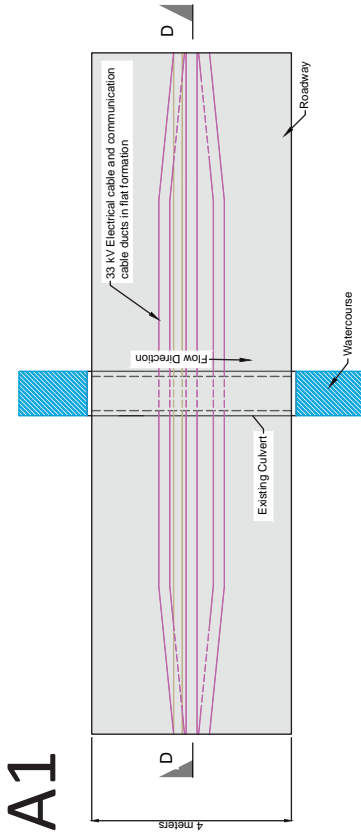
Cross Section E - E of watercourse crossing type A1 - Cables trench above existing structure



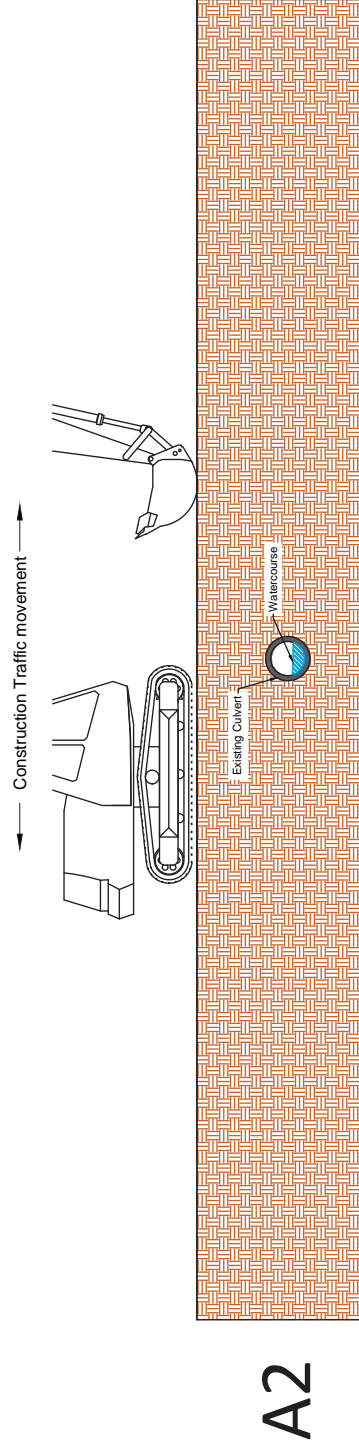
Plan View of watercourse crossing type A1 - Cable ducts laid in trefoil formation over existing structure
Excavation within 500mm of structure will be done by hand.
(No instream works required)



Cross Section D - D of watercourse crossing type A1 - Cables trench under existing structure

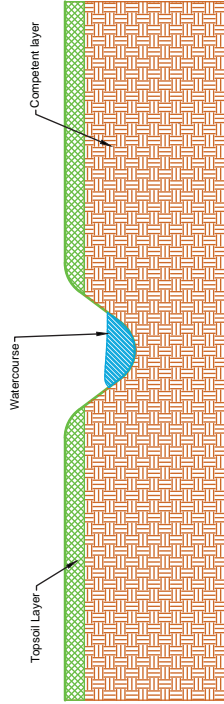


Plan View of watercourse crossing type A1 - Cable ducts laid in flat formation under existing structure
Excavation within 500mm of structure will be done by hand.
(No instream works required)

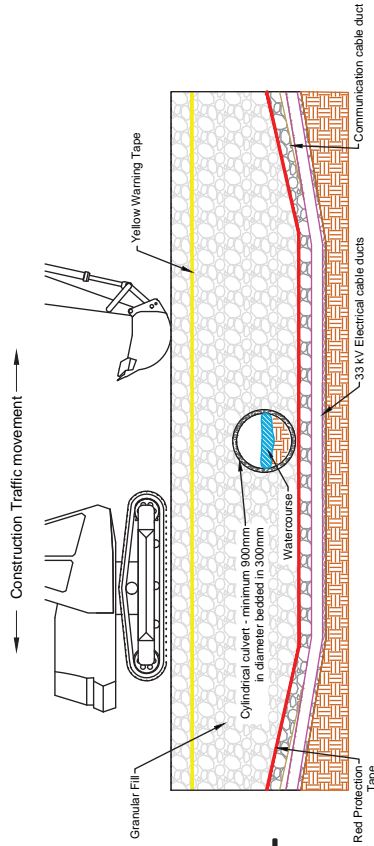


Cross Section of watercourse crossing type A2 - Traffic Movement only over structure (No instream works required)

C1

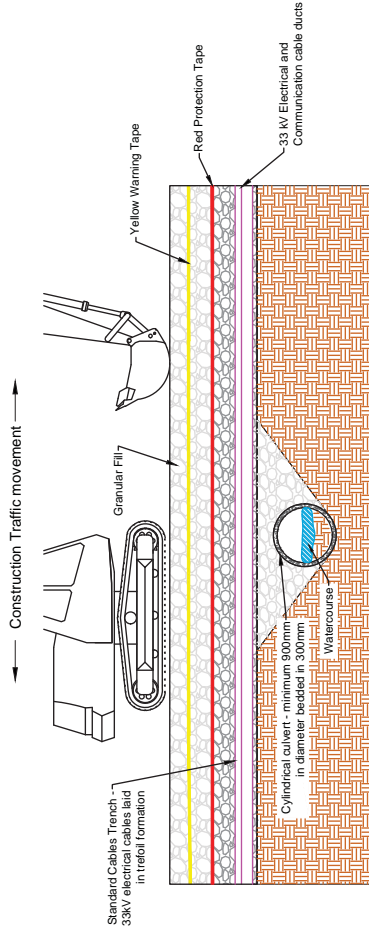


Cross Section View D - D of watercourse crossing C1 - Existing watercourse



Cross Section View of watercourse crossing types C1 - Cables trench under new permanent crossing structure



C1

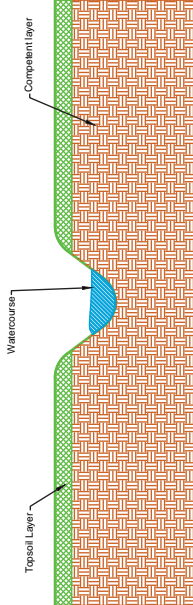
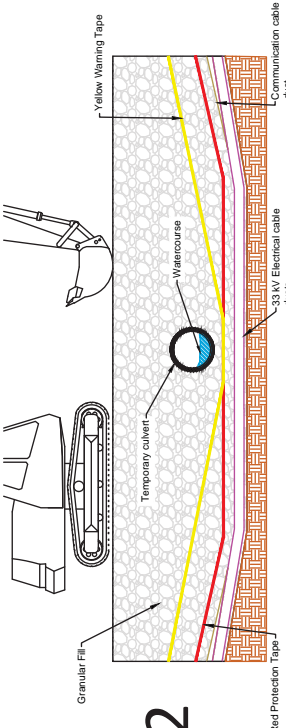
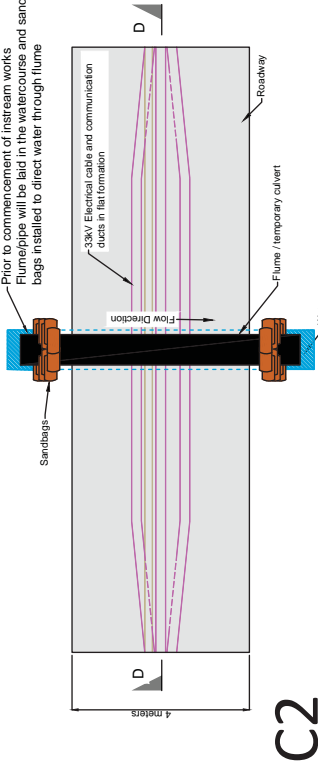
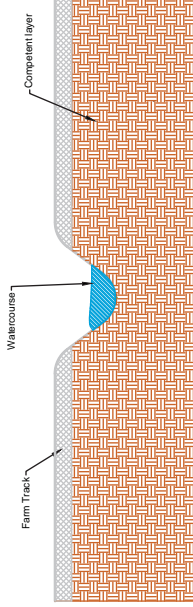
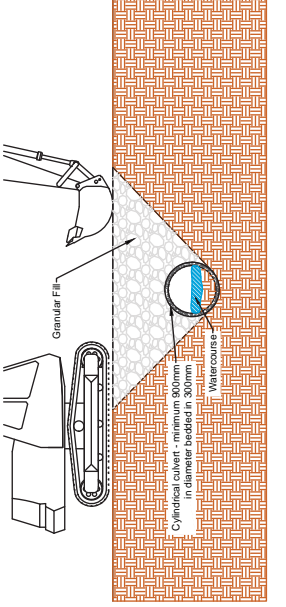
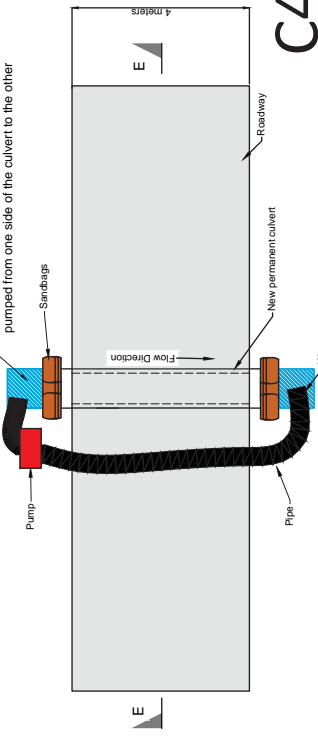








Cross Section View of watercourse crossing C1 - Cables trench over new permanent crossing structure

(Watercourse dammed and over-pumped)

C1

Title: Figure RW 5.18		Watercourse Crossing Type C1 - New Permanent Structure	
Note : Drawings not to scale. For illustration purposes only		Watercourse Crossing Type C1 (Total 5) Class 2 - EPA Blue Line Equivalent - Fisheries Value: WW4 Class 4 - Drain - No Fisheries Value: WW1, WW15, WW24, WW25	
Description of Crossing Type C1 <ul style="list-style-type: none">No existing crossing structureInstream WorksCable and Traffic crossingInstallation of New Permanent watercourse crossing structure33kV Cables and Ducting installed over or under new permanent watercourse crossing structure		Designed in conjunction with 	
Project: UWF Related Works (RW)		Drawn by: CB	Created by: JB
		Date: 11-Feb-18	Sheet Size: A3
		Client Name: Ecopower Limited Address: 100, Penrith Road, Penrith NSW 2150 Phone: 02 9500 1000 Fax: 02 9500 1001 Email: info@ecopower.com.au	

<div><div>C2</div><div></div><div><p>Cross Section View D - D of watercourse crossing C2 - Existing watercourse</p></div><div></div><div><p>Cross Section View D - D of watercourse crossing types C2 - Cables trench under new temporary crossing structure</p></div><div></div><div><p>Plan View of watercourse crossing C2 - Cables trench under new temporary crossing structure (Watercourse dammed and flume installed during instream works)</p></div><div><p>Note: The flume/pipe watercourse crossing method will typically be used where a temporary watercourse crossing structure is proposed.</p></div></div>	<div><div>C4</div><div></div><div><p>Cross Section View D - D of watercourse crossing W60 - Existing watercourse</p></div><div></div><div><p>Cross Section View E - E of watercourse crossing types C4 - Traffic over new permanent crossing structure (Watercourse dammed and over pumped during instream works)</p></div><div></div><div><p>Plan of watercourse crossing types C4 - Traffic over new permanent crossing structure (Watercourse dammed and over pumped during instream works)</p></div><div><p>Note: The damming and over-pumping method will typically be carried out at watercourses where a permanent crossing structure is being installed or where an existing culvert is being replaced. All permanent watercourse culverts will be sized to cope with a minimum 100-year flood event. All pipe culverts will be at least 900mm in diameter regardless of the anticipated flood flow. 900mm culverts will be set into the river bed to a depth of 300mm and 1200mm culverts will be set in 500mm</p></div></div> <tr><td><div><p>Title: Figure RW 5.19 Watercourse Crossing Type C2 - New Temporary Structure & Watercourse Crossing Type C4 - New Permanent Structure</p><p>Note : Drawings not to scale. For illustration purposes only</p><p>Watercourse Crossing Type C2 (Total 5)</p><p>Class 2 - EPA Blue Line Equivalent - Fisheries Value: WW7</p><p>Class 4 - Drain - No Fisheries Value: WW5, WW8, WW16, WW27</p><p>Description of Crossing Type C2</p><ul style="list-style-type: none">• No existing crossing structure• Instream Works• Cable and Traffic crossing• Installation of New Temporary watercourse crossing structure• 33kV Cables and Ducting installed under new temporary watercourse crossing structure<p>Watercourse Crossing Type C4 (Total 3)</p><p>Class 2 - EPA Blue Line Equivalent - Fisheries Value: WW22</p><p>Class 3 - Sub-Optimal - Low Fisheries Value: WW14</p><p>Class 4 - Drain - No Fisheries Value: WW13</p><p>Description of Crossing Type C4</p><ul style="list-style-type: none">• No existing crossing structure• Instream Works• Traffic crossing only• Installation of New Permanent watercourse crossing structure• No Cables or Ducting installed<p>Designed in conjunction with</p></div><div><p>Project: UWF Related Works (RW)</p><table><tr><td>Drawn by:</td><td>CB</td><td>Created by:</td><td>JB</td><td>Date:</td><td>11-Feb-18</td><td>Sheet Size:</td><td>A3</td></tr></table><div><p>ECOPOWER</p></div></div></td></tr>	<div><p>Title: Figure RW 5.19 Watercourse Crossing Type C2 - New Temporary Structure & Watercourse Crossing Type C4 - New Permanent Structure</p><p>Note : Drawings not to scale. For illustration purposes only</p><p>Watercourse Crossing Type C2 (Total 5)</p><p>Class 2 - EPA Blue Line Equivalent - Fisheries Value: WW7</p><p>Class 4 - Drain - No Fisheries Value: WW5, WW8, WW16, WW27</p><p>Description of Crossing Type C2</p><ul style="list-style-type: none">• No existing crossing structure• Instream Works• Cable and Traffic crossing• Installation of New Temporary watercourse crossing structure• 33kV Cables and Ducting installed under new temporary watercourse crossing structure<p>Watercourse Crossing Type C4 (Total 3)</p><p>Class 2 - EPA Blue Line Equivalent - Fisheries Value: WW22</p><p>Class 3 - Sub-Optimal - Low Fisheries Value: WW14</p><p>Class 4 - Drain - No Fisheries Value: WW13</p><p>Description of Crossing Type C4</p><ul style="list-style-type: none">• No existing crossing structure• Instream Works• Traffic crossing only• Installation of New Permanent watercourse crossing structure• No Cables or Ducting installed<p>Designed in conjunction with</p></div> <div><p>Project: UWF Related Works (RW)</p><table><tr><td>Drawn by:</td><td>CB</td><td>Created by:</td><td>JB</td><td>Date:</td><td>11-Feb-18</td><td>Sheet Size:</td><td>A3</td></tr></table><div><p>ECOPOWER</p></div></div>	Drawn by:	CB	Created by:	JB	Date:	11-Feb-18	Sheet Size:	A3
<div><p>Title: Figure RW 5.19 Watercourse Crossing Type C2 - New Temporary Structure & Watercourse Crossing Type C4 - New Permanent Structure</p><p>Note : Drawings not to scale. For illustration purposes only</p><p>Watercourse Crossing Type C2 (Total 5)</p><p>Class 2 - EPA Blue Line Equivalent - Fisheries Value: WW7</p><p>Class 4 - Drain - No Fisheries Value: WW5, WW8, WW16, WW27</p><p>Description of Crossing Type C2</p><ul style="list-style-type: none">• No existing crossing structure• Instream Works• Cable and Traffic crossing• Installation of New Temporary watercourse crossing structure• 33kV Cables and Ducting installed under new temporary watercourse crossing structure<p>Watercourse Crossing Type C4 (Total 3)</p><p>Class 2 - EPA Blue Line Equivalent - Fisheries Value: WW22</p><p>Class 3 - Sub-Optimal - Low Fisheries Value: WW14</p><p>Class 4 - Drain - No Fisheries Value: WW13</p><p>Description of Crossing Type C4</p><ul style="list-style-type: none">• No existing crossing structure• Instream Works• Traffic crossing only• Installation of New Permanent watercourse crossing structure• No Cables or Ducting installed<p>Designed in conjunction with</p></div> <div><p>Project: UWF Related Works (RW)</p><table><tr><td>Drawn by:</td><td>CB</td><td>Created by:</td><td>JB</td><td>Date:</td><td>11-Feb-18</td><td>Sheet Size:</td><td>A3</td></tr></table><div><p>ECOPOWER</p></div></div>	Drawn by:	CB	Created by:	JB	Date:	11-Feb-18	Sheet Size:	A3		
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Title:	Figure RW 5.21
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Watercourse Crossing Type E - Plan and
Cross Section Views of Bailey Bridge

Note :
Drawings not to scale. For illustration
purposes only

Watercourse Crossing Type E

Used at C type water crossings where required

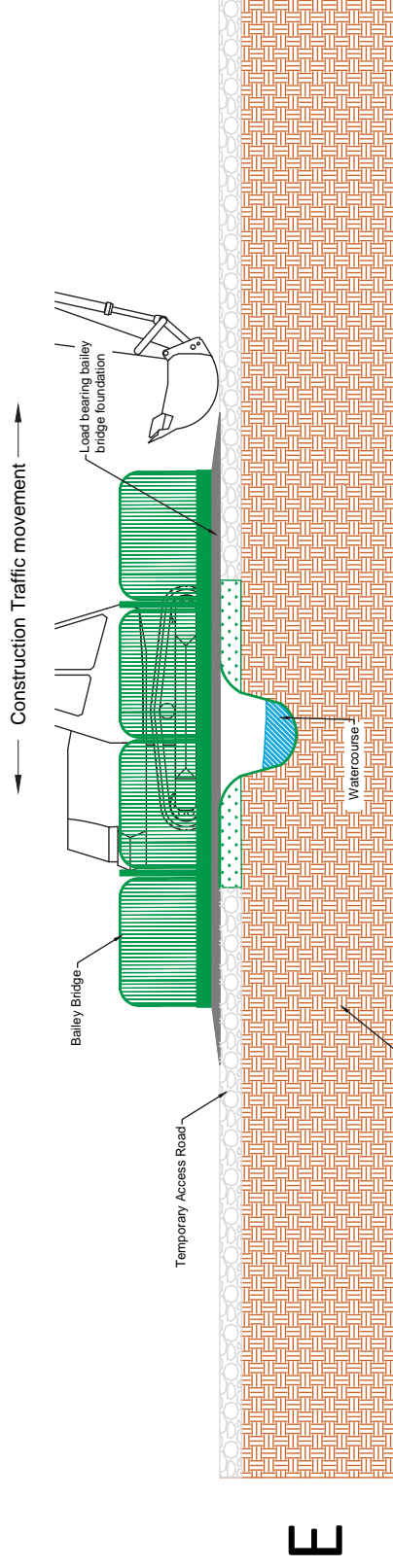
Description of Crossing Type E

- No existing crossing structure
- No instream Works
- Traffic crossing only
- No Cables or Ducting installed

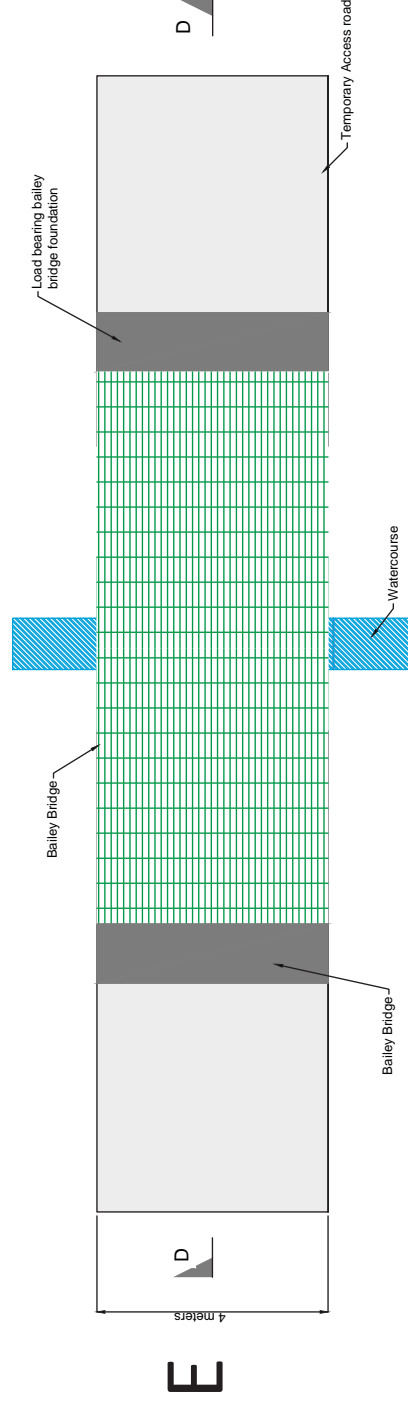
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**Green Trust
Environmental
Zoo**
Zoo House, Portland Rd, BSA Business Park
Dobbs Road, Keweenaw - P05 WY700
Landline: +66-7520446 (1st 204)
Mobile: +33-1092-663168



Cross Section View D - D of watercourse crossing type E
Bailey Bridge - (No Instream Works)

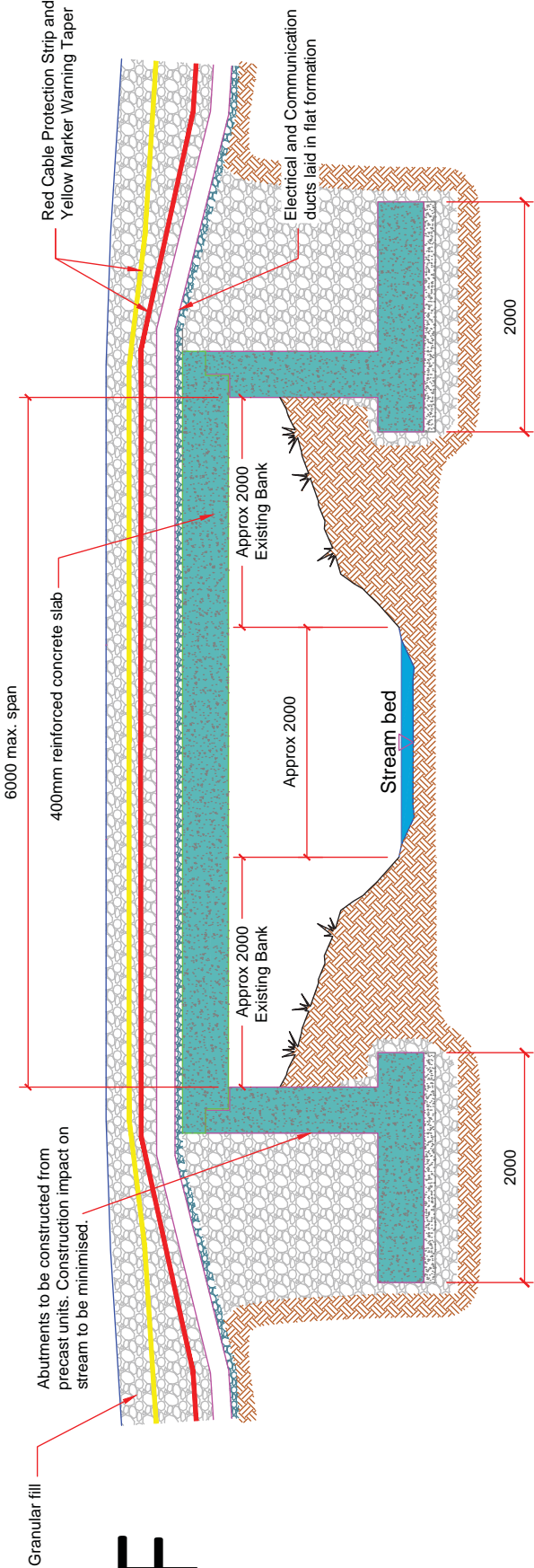


Plan View of watercourse crossing type E
Bailey Bridge - (No Instream Works)

Title: Figure RW 5.22			
Watercourse Crossing Type F - New permanent clear-span bridge			
Map Number:	N/A		
Note : Drawings not to scale. For illustration purposes only			
Watercourse Crossing Type F (Total 1)			
Class 2 - EPA Blue Line Equivalent - Fisheries Value: WW2			
Description of Crossing Type F			
<ul style="list-style-type: none">No existing crossing structureNo Instream WorksInternal Windfarm Cabling installed over watercourse using the consented UWF Clear span bridgeCable and Traffic crossing			
Project: UWF Related Works (RW)			
Drawn by: CB	Checked by: JB	Date: 11-Feb-18	Sheet Size: A3
<div><div><div>EcoPower Environmental Engineering Limited 27-29, Hume, Penrith NSW 2150 Australia Phone: +61-2-7594-8400 (Ext 240) Mobile: +61-2-9595-5433 (Ext 240)</div></div><div>ECOPOWER</div></div>			

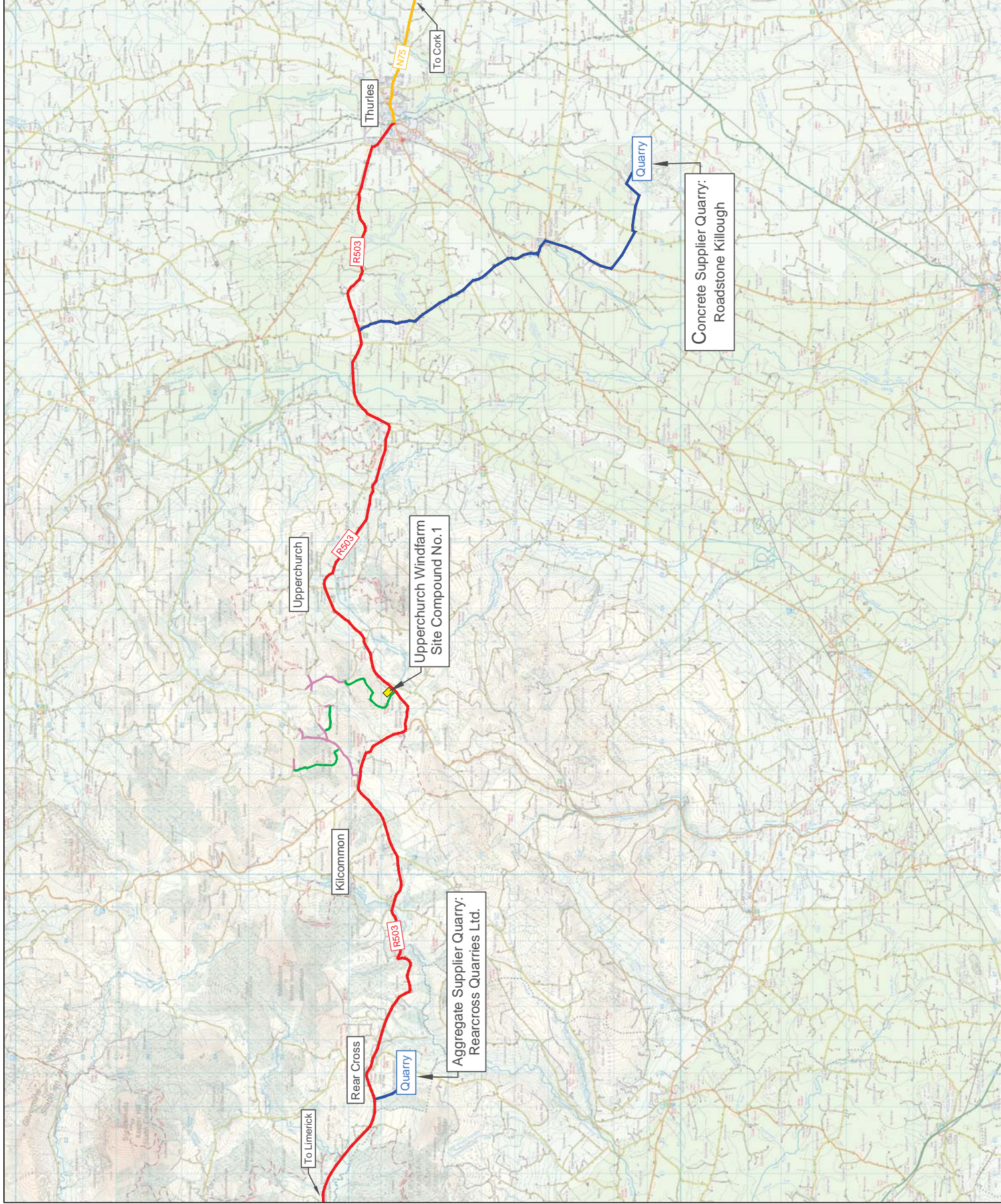
Note:
Slab to be designed to withstand all vehicular traffic loading.

Permanent Crossing structure - Clear span bridge



[illegible][illegible][illegible][illegible][illegible]

- [illegible]

[illegible][illegible][illegible][illegible][illegible]

The map displays a topographic view of the region between Thurles and Limerick. A prominent red line traces the proposed road alignment, starting at Thurles in the north, passing through Upperchurch and Kilcommon, and ending near Limerick in the south. Specific road sections are identified by labels: 'N75' near Thurles, and 'R503' along the main stretch between Upperchurch and Rear Cross. At Upperchurch, a blue-shaded area is designated as the 'Concrete Supplier Quarry: Roadstone Killough'. Further south, near Rear Cross, another blue-shaded area is marked as the 'Aggregate Supplier Quarry: Rearcross Quarries Ltd.'. Directional arrows indicate travel paths: 'To Cork' pointing north from Thurles, and 'To Limerick' pointing south from the southern end of the route. The surrounding terrain is depicted with contour lines and various geographical features.

[illegible][illegible][illegible]

Title:
Figure RW 5.24
Haul Routes from UWF Site Compound
No.1 to Construction Works Areas

Map Number:
Map 1 of 1

- | UWF Related Works | Construction Works Area |
|---|--|
|  | Haul Route along local roads R503 or the Upperchurch Site Compound No.1 to Related Works Areas |
|  | Consented UWF Roads |
|  | Upperchurch Windfarm Site Compound No.1 |
|  | Regional Road |
|  | Public Road Number |



Project: JWF Related Works (RW)

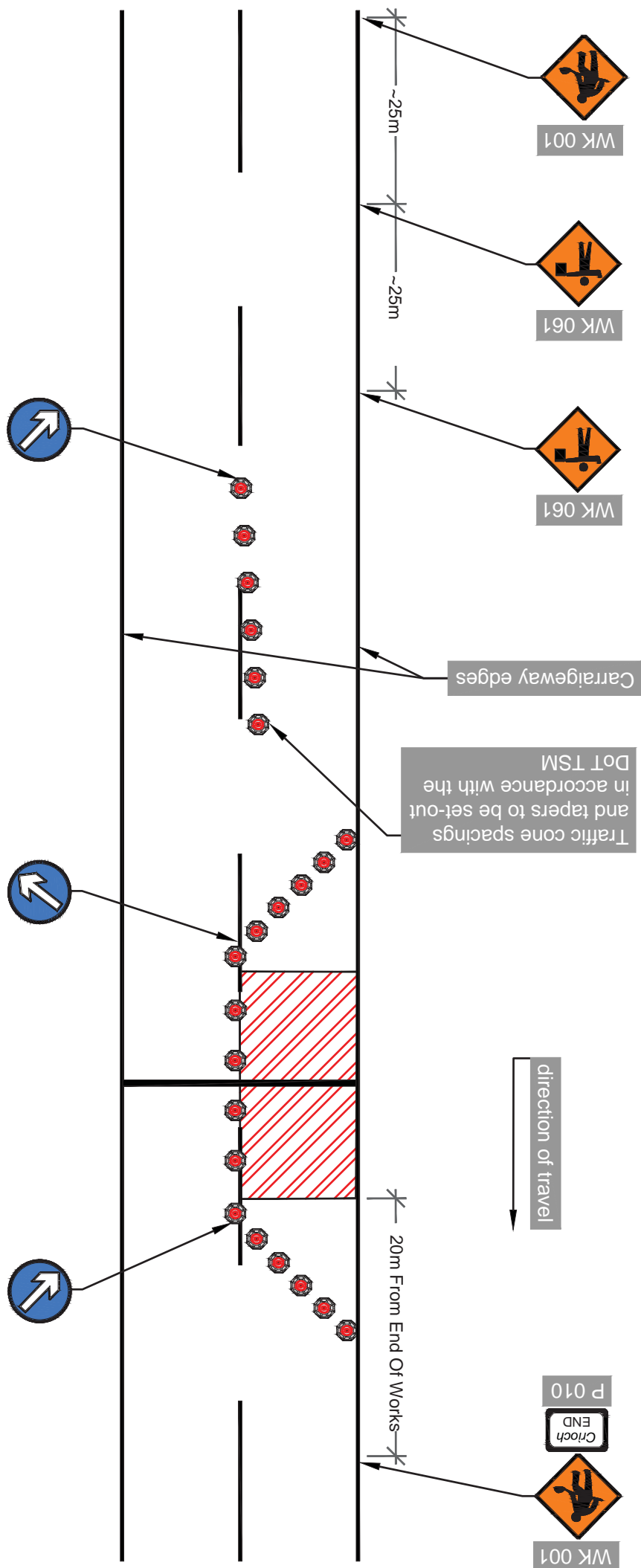
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ECOPOWER



- Legend:
- Agricultural Lands to New Permanent Road
 - Forestry to Permanent Road
 - Forestry to Forestry Firebreak



Title:
Figure RW 5.27

**Cross Section of Hedgerow Removal
and Reinstatement**

Map Number:
N/A

Note :
Drawings not to scale. For illustration
purposes only

Designed in conjunction with

Inís

Project:
UWF Related Works (RW)

Drawn by: CB Created by: JB Date: 11-Feb-18 Sheet Size: A3

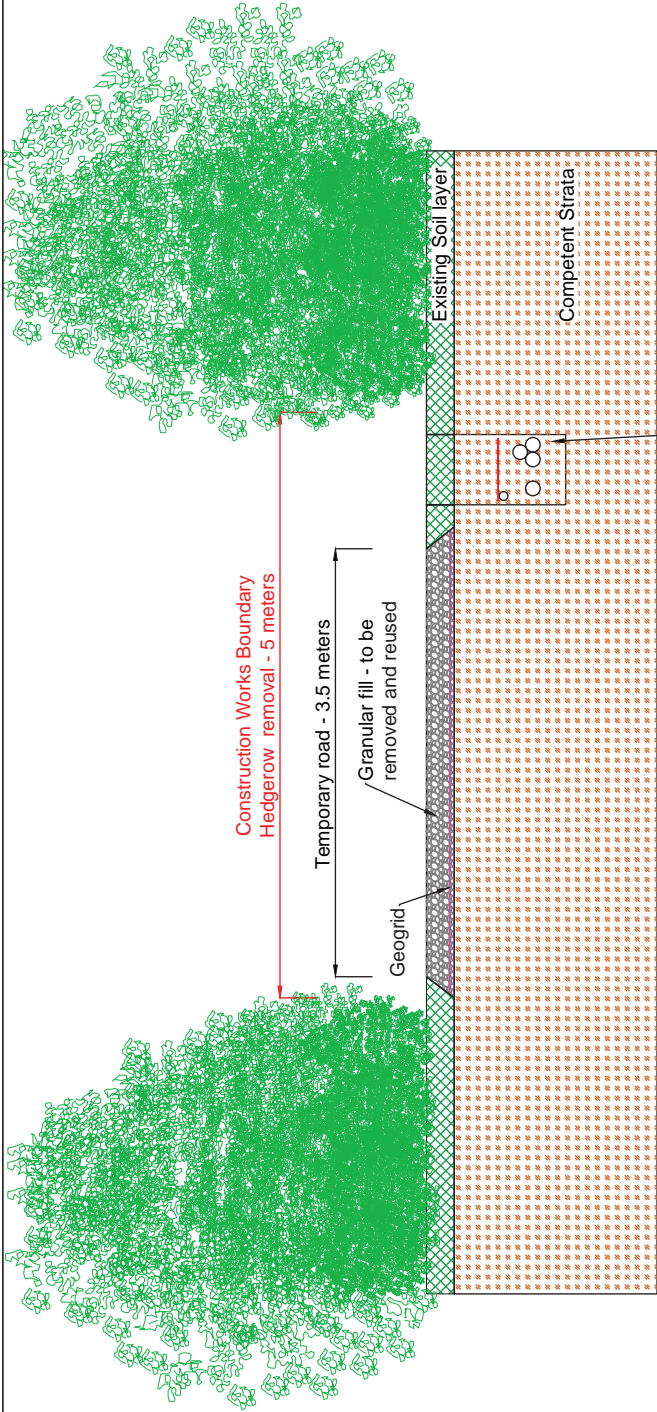


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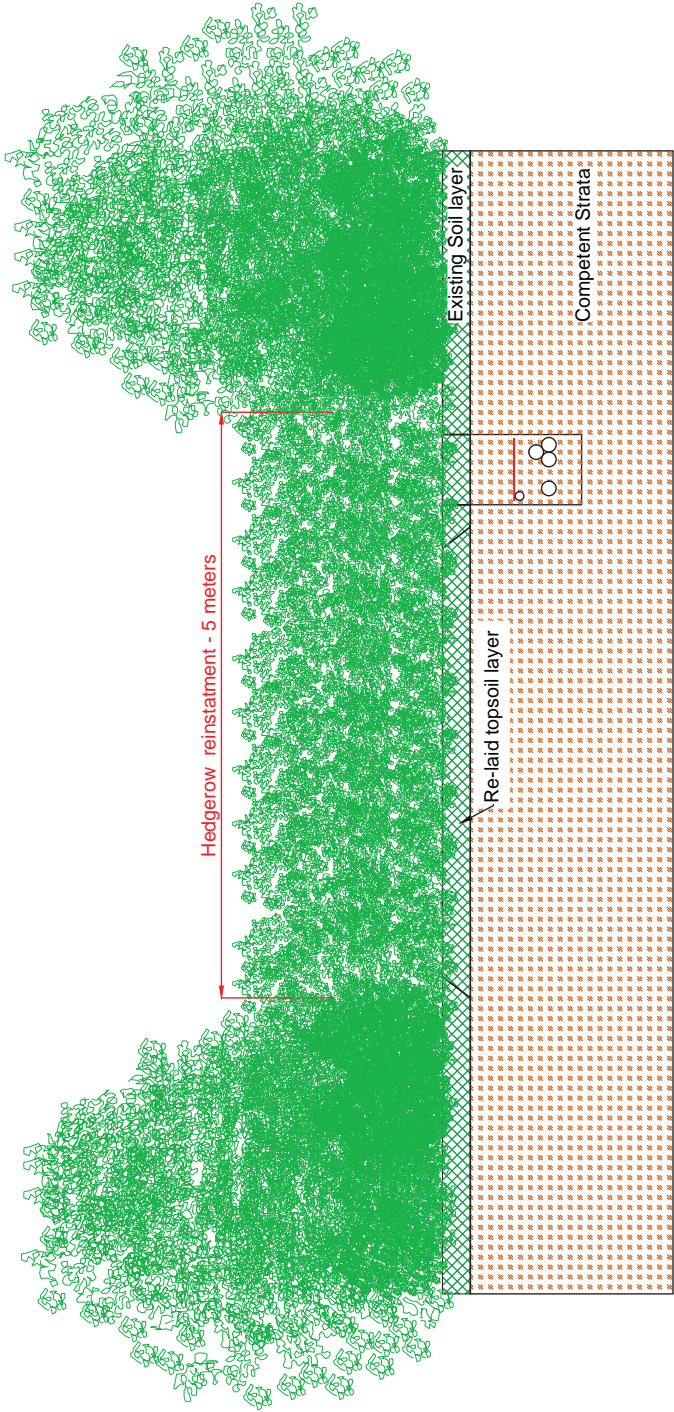
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Cross Section of Hedgerow Removal and temporary access road - Construction Phase



Cross Section of Hedgerow Reinstatement and temporary access road - Post Construction

Whole Upperchurch Windfarm Project

Natura Impact Statement for Whole UWF Project Elements 1 to 5

March 2018

Appendix A6: Project Information **Description of UWF Replacement Forestry**



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UWF Replacement Forestry

Volume C2: EIAR Main Report

Chapter 5

Description of Development (UWF Replacement Forestry)



May 2018

Contents

5.	Description of the UWF Replacement Forestry	1
5.1.	Introduction to Chapter 5	1
5.2.	Characteristics of UWF Replacement Forestry	2
5.2.1.	Purpose of UWF Replacement Forestry.....	2
5.2.2.	Location and Overview Description of UWF Replacement Forestry	2
5.2.3.	Characteristics of UWF Replacement Forestry	3
5.2.3.1.	Planting Densities.....	3
5.2.3.2.	Native Woodland Type	3
5.2.3.3.	Species Mix, Composition and Layout	3
5.2.3.4.	Water Setback.....	4
5.2.3.5.	Fencing	4
5.2.3.6.	Permanent Entrance	4
5.2.4.	Environmental Protection Measures designed into the UWF Replacement Forestry.....	5
5.2.4.1.	Best Practice Measures.....	6
5.2.4.2.	Invasive Species Management Plan.....	6
5.2.4.3.	Monitoring	6
5.3.	Life Cycle Stages of UWF Replacement Forestry	7
5.3.1.	Planting Stage - UWF Replacement Forestry	7
5.3.1.1.	Duration & Timing.....	7
5.3.1.1.1.	Hours of Work.....	7
5.3.1.2.	Planting Personnel	7
5.3.1.3.	Welfare Facilities.....	7
5.3.1.4.	Planting Stage Activities.....	7
5.3.1.5.	Use of Machinery and Equipment	8
5.3.1.6.	Use of Hydrocarbons.....	8
5.3.1.7.	Other Facilities - Fuel Storage & Tool Storage	8
5.3.1.8.	Imported Planting Materials	8
5.3.1.9.	Water Quality Management	8
5.3.2.	Growth Stage – UWF Replacement Forestry	9
5.3.2.1.	Duration and Timing of Growth Stage	9
5.3.2.2.	Growth Stage - Personnel	9
5.3.2.3.	Operational Activities.....	9
5.3.2.4.	Use of Machinery and Equipment	9
5.3.2.5.	Use of Hydrocarbons.....	10

5.3.2.6.	Welfare Facilities.....	10
5.3.2.7.	Other Facilities - Fuel Storage & Tool Storage	10
5.3.3.	Changes to the Project.....	10
5.4.	Use of Natural Resources, Emissions & Waste	11
5.4.1.	Use of Natural Resources.....	11
5.4.1.1.	Use of Resources: Land	11
5.4.1.2.	Use of Resources: Biodiversity.....	11
5.4.1.2.1.	Invasive Species Management.....	11
5.4.1.3.	Use of Resources: Water.....	11
5.4.1.4.	Use of Resources: Soils	12
5.4.2.	Emissions.....	13
5.4.3.	Waste	13
5.5.	Vulnerability of the Project to Major Accidents and Risks to Human Health.....	14
5.5.1.	Vulnerability to Major Accidents	14
5.5.2.	Vulnerability to Natural Disasters	14
5.5.2.1.	Land Slippage	14
5.5.2.2.	Flooding.....	14
5.5.3.	Overall Risk.....	15
5.6.	Cumulative Descriptions	16
5.6.1.	Description of the Other Elements of the Whole UWF Project.....	16
5.6.1.1.	Element 1: UWF Grid Connection	17
5.6.1.2.	Element 2: UWF Related Works.....	20
5.6.1.3.	Element 4: Upperchurch Windfarm.....	23
5.6.1.4.	Element 5: UWF Other Activities	25
5.6.2.	Cumulative Locational Context of all the Elements	27
5.6.3.	Secondary Projects.....	28
5.6.4.	Description of Other Projects and Activities.....	29
5.6.4.1	Existing Killonan to Nenagh 110kV Overhead Line	30
5.6.4.2	Existing Shannonbridge – Killonan 220kV Overhead Line	30
5.6.4.3	Consented Bunkimalta Windfarm.....	30
5.6.4.4	Consented Castlewaller Windfarm	30
5.6.4.5	Existing Milestone Windfarm.....	30
5.6.4.6	Operational Windfarms in the Republic of Ireland.....	31
5.6.4.7	Existing Communication Structures.....	31
5.6.4.8	Consented Project – Newport Distributor Road, Newport.....	31
5.6.4.9	Consented Project – Industrial Warehouse Units at Thurles.....	31

5.6.4.10	Consented Project - Thurles Regional Water Treatment Works	31
5.6.4.11	Consented Gortnahalla Turbine.....	32
5.6.4.12	Killuragh Digester Plant.....	32
5.6.4.13	Housing Development in Doon and Annacotty	32
5.6.4.14	Agricultural Developments	32
5.6.4.15	Activities – Forestry, Agriculture.....	32
5.6.4.16	Activity – Turf-Cutting.....	32

LIST OF FIGURES

Figure No.	Figure Title
Figure RF 5.1	Location of UWF Replacement Forestry on OSI Discovery Mapping
Figure RF 5.2	Planting Layout on Aerial Photography Mapping
Figure RF 5.3	Entrance for Replacement Forestry Lands

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

LIST OF APPENDICES

Appendix No.	Appendix Title
Appendix 5.1	UWF Replacement Forestry Best Practice Measures
Appendix 5.2	Invasive Species Management Plan
Appendix 5.3	Description of Development (UWF Grid Connection)
Appendix 5.4	Description of Development (UWF Related Works)
Appendix 5.5	Complied Description of Upperchurch Windfarm
Appendix 5.6	Description of the UWF Other Activities
Appendix 5.7	A Guide to Risk Assessment in Major Emergency Management Jan 2010.

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

Glossary of Terms

<u>Term</u>	<u>Definition</u>
EIA Directive	European Union Directive 2011/92/EU (as amended by Directive 2014/52/EU)
Environmental Factors	The factors in the environment required to be identified, described and assessed during the EIA process. These are specified in Article 3 (1) of the EIA Directive as Population and Human Health; Biodiversity; Land; Soils; Water; Air; Climate; Material Assets; Cultural Heritage and Landscape.
Competent Authority	The body legally delegated to decide on the Licence/Planning Application
Competent Expert	Experts who are qualified and competent in their field of expertise
Consented Windfarm	Upperchurch Windfarm – 22 wind turbines, substation, windfarm roads and ancillary works, consented in August 2014 under Planning Reference: Tipperary County Council 13/51/0003, ABP PL 22.243040
Element	One of the 5 No. elements listed in the row above
Project Design Environmental Protection Measures	Measures for environmental protection, incorporated into the design of the project.
Sensitive Aspect	Any sensitive receptor in the local environment which could be impacted by the project.
Whole UWF Project	Project made up of 5 No. elements – UWF Grid Connection; UWF Related Works, UWF Replacement Forestry, Upperchurch Windfarm (UWF) and UWF Other Activities.

List of Abbreviations

<u>Abbreviation</u>	<u>Full Term</u>
ABP	An Bord Pleanála
EDL	Ecopower Developments Limited
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
PD	Ecopower <u>Project Design</u> Environmental Protection Measure developed by members of the EIAR Team
RFI	Response to Further Information
SAC	Special Area of Conservation
SPA	Special Protection Area (for wild birds)
OCM	Outline Construction Methodologies
UWF	Upperchurch Windfarm
UGC	Underground Cables

5. Description of the UWF Replacement Forestry

5.1. Introduction to Chapter 5

UWF Replacement Forestry is described in this chapter, in the following order:

Section 5.2	<ul style="list-style-type: none"> • A Description of the Location and Characteristics of the subject development (UWF Replacement Forestry). • The Project Design Environmental Protection Measures incorporated into the design to avoid, prevent or reduce likely significant adverse effects on the environment.
<p><u>The Development as described in Section 5.2</u></p> <p>At the conception of the Project, the design team evaluated the potential or likely significant effects of the subject development, on the receiving environment. Any potential or likely significant effects were avoided <u>by integrating mitigation measures into the fundamental design of the UWF Replacement Forestry</u>. Various measures, particularly options for mitigation by avoidance and mitigation by prevention, were considered; these included alternative locations, alternative designs and alternative processes. Once the chosen location, design and process was decided the proposal was examined for opportunities to incorporate further mitigation measures (generally mitigation by reduction) in the final iteration of the development to be evaluated in the EIA Report. <u>The development, as described in Section 5.2, is the final iteration of the UWF Replacement Forestry</u>. It is this final iteration that is examined in Chapters 6 to 17, for effects on the prescribed environmental factors, by the topic competent experts.</p>	
Section 5.3	<p>The durations and timing, main activities, personnel and material requirements for both the planting and growth stages.</p> <p>Any changes to the UWF Replacement Forestry such as felling and harvesting.</p>
Section 5.4	The use of natural resources, emissions and production of wastes for each stage.
Section 5.5	The vulnerability of the UWF Replacement Forestry to major accidents and events and risks to human health.
Section 5.6	<p>Cumulative Descriptions:</p> <p>For the purposes of cumulative assessment of the whole Upperchurch windfarm (UWF) project, a description of the other elements of the Whole UWF Project namely; UWF Grid Connection; UWF Related Works; the already consented Upperchurch Windfarm (UWF) and UWF Other Activities, is provided.</p> <p>For the purposes of a cumulative assessment with Other Existing or Consented Projects or Activities, a description of Other Existing or Consented Projects or Activities that were scoped in by the EIAR Team is also provided.</p>

5.2. Characteristics of UWF Replacement Forestry

UWF Replacement Forestry relates to the planting with forestry, of 6ha of agricultural lands. The replacement forestry will comprise native tree and shrub species planted in clusters, with unplanted wide ride lines provided, for the benefit of biodiversity.

5.2.1. Purpose of UWF Replacement Forestry

The UWF Replacement Forestry at Foilnaman will fulfil the replanting obligation which will arise from the felling of forestry for the development of the whole Upperchurch Windfarm project.

5.2.2. Location and Overview Description of UWF Replacement Forestry

The UWF Replacement Forestry lands are located in two adjoining parcels of agricultural lands in Foilnaman townland, near the village of Upperchurch in County. Tipperary. See Plate 5-1 below.

Relevant Volume C3 EIAR Figures

Figure RF 5.1: Location of UWF Replacement Forestry on OSI Discovery Mapping

Note: UWF Replacement Forestry is abbreviated throughout this chapter as RF. All the Figures Numbers are prefaced by RF per e.g. Figure RF 5.1

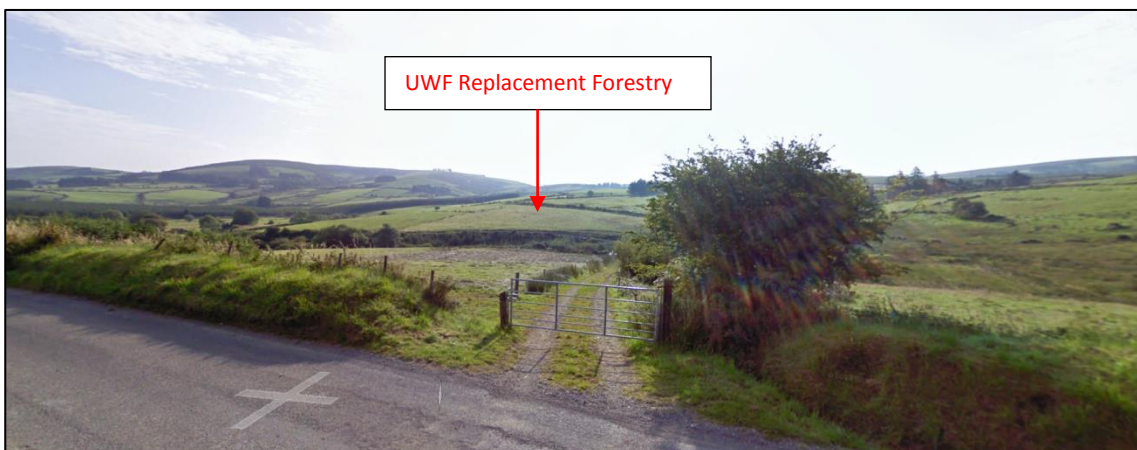


Plate 5-1: View of the UWF Replacement Forestry site from the entrance off the public road (EW10)

5.2.3. Characteristics of UWF Replacement Forestry

Six hectares (6ha) of agricultural grassland at Foilnaman townland will be planted with native woodland species, set in clusters of well-matched native species, and will be managed as permanent forest cover.

5.2.3.1. Planting Densities

The UWF Replacement Forestry site will be planted with 20,000 saplings which equates to 3,300 stems per hectare¹.

5.2.3.2. Native Woodland Type

The UWF Replacement Forestry is located in improved agricultural grassland on the eastern hills of the Slievefelim to Silvermine Mountain upland area. Soils within the UWF Replacement Forestry lands comprise mainly peaty and poorly draining soils over sandstone and shale till. An Oak-Birch-Holly with Hazel Woodland (GPC9) is considered the most appropriate for the ground conditions.

All species which will be planted at the UWF Replacement Forestry site will be silviculturally compatible, native to the Island of Ireland, representative of the native wood land type Oak-Birch-Holly Hazel Woodland, and acceptable to the Forest Service.

5.2.3.3. Species Mix, Composition and Layout

The lands will be planted with a mixture of tall trees and understory shrubs, and the design includes varied spacing between the clusters of trees and wide ride-lines between deeper areas of core woodland.

The predominant trees and shrubs associated with Oak-Birch-Holly Hazel Woodland are sessile oak, downy birch, ash, hazel, rowan & holly. Once established, the predominant ground flora will generally comprise species such as bramble, ivy, broad buckler-fern, wood sorrel, bluebell, violet, woodrush & wood avens. Dwarf shrubs are largely absent.

The planting mixture at the site will comprise: sessile oak (50%), with hazel (15%) and downy birch (10%) scattered throughout, and with wild cherry (5%) planted in groups of 5 to 10 trees. Scots pine (10%) planted in small pure groups on free-draining areas of the plot, particularly on slopes. Minor species (10%) to comprise *at least two of the following*, positioned alongside planned woodland edges & glades: hawthorn, holly, rowan, crab apple.

The UWF Replacement Forestry will be planted in accordance with Forest Service Department of Agriculture, Food & the Marine *Felling and Reforestation Policy (2017)*, and Guidance Documents – *Native Woodland Establishment GPC9 and GPC10 Silvicultural Standards (2015)*, *Environmental Requirements for Afforestation (2016)* and *Management Guidelines for Ireland Native Woodlands (2017)*.

Ride-lines will be provided which will create an open space with tree-lined boundaries, which is much favoured by birds of prey during the day (e.g. hen harrier) and bats at night as hunting ground. A mixture of

¹ *Felling and Reforestation Policy* Forest Service Department of Agriculture, Food & the Marine (2017)

land cover – tall grasses, short grasses and scrub will be maintained under the planting and in the ride lines. Tree guards will be used to protect the saplings and young trees from rabbit damage.

5.2.3.4. Water Setback

A small stream within the Clodiagh River catchment flows through the western part of the lands. A setback distance of 10m will be established from this watercourse, and no planting works will take place within this area.

5.2.3.5. Fencing

The new native woodland will be protected from livestock through the erection of perimeter fencing around the afforestation lands.

Relevant Volume C3 EIAR Figures:

Figure RF 5.2: Planting Layout on Aerial Photography Mapping

5.2.3.6. Permanent Entrance

An existing agricultural entrance leading off the L-2264-34, will be used to access the chosen Replacement Forestry lands in Foilnahan. The existing sightlines at the entrance already comply with North Tipperary County Development Plan 2010 (as amended) Table 10.1: Sightline Requirements.

A separate application has been submitted to Tipperary County Council to change the use of this entrance from a farm entrance to a farm and forestry entrance. The application is part of the planning permission application for UWF Related Works to Tipperary County Council.

Relevant Volume C3 EIAR Figures:

Figure RF 5.3 Entrance for Replacement Forestry Lands

5.2.4. Environmental Protection Measures designed into the UWF Replacement Forestry

In order to prevent potential significant effects to Environmental Factors, the following mitigation (by design) measures are part of UWF Replacement Forestry;

The design of UWF Replacement Forestry includes the Project Design Environmental Protection Measures listed on Table 5-1, which were devised to avoid, prevent or reduce likely or potentially significant effects on the environment.

Relevant individual Project Design Environmental Protection Measures from the list below are duplicated in the **Environmental Factor topic chapters**, and the interaction of Project Design Environmental Protection Measures across the various Environmental Factors is provided in matrix format in **Chapter 18: Interaction of the Foregoing**.

Table 5-1: Environmental Protection Measures as part of the UWF Replacement Forestry design

PD ID	Environmental Protection Measure for UWF Replacement Forestry
RF-PD 01	All planting and maintenance activities will be carried out during daylight hours
RF-PD 02	The lands will be planted by hand, using spades and hand tools.
RF-PD 03	No pesticide or fertilizer will be used at the UWF Replacement Forestry site.
RF-PD 04	There will be no refuelling of vehicles or plant, no storage of fuels and no overnight parking permitted within the site/
RF-PD 05	A water setback from the watercourse which flows through the site will be established during planting works. The setback will be 10m from the edge of the watercourse. No planting or other works will be carried out in this 10m wide buffer area. Native woodland will be planted beyond this distance in accordance with Silvicultural Standards for Native Woodland Establishment GP9 & GP10 (Department of Agriculture, Food and the Marine, 2015).
RF-PD 06	No planting works will take place within 500m of an active hen harrier nest, or active nesting activity, during the months of March to August. Additionally, during the winter season, October to February, planting works will only be carried out during the period between one hour after sunrise and one hour before sunset in areas within 1000m of an active winter roost.
RF-PD 07	The lands will be protected from livestock by the perimeter fence.
RF-PD 08	Confirmatory surveys for active Otter holts and activity (particularly holts at which breeding females or cubs are present) will be carried out 150m upstream and downstream of watercourse crossing locations.
RF-PD 09	All construction works within 150m of an active otter holt, will be carried out during daylight hours and outside of 2 hours after sunrise or before sunset during summer/outside of 1 hours after sunrise or before sunset during winter.
RF-PD 10	If an active holt (particularly holts at which breeding females or cubs are present) is located within 150 meters of the watercourse crossing points, no works will be undertaken <u>while cubs are present in the holt</u> and NPWS will be notified immediately
RF-PD 11	No wheeled vehicles (of any kind) will be used within 20m of active, but non-breeding otter Holts, and light work, such as digging by hand or scrub clearance will not take place within 15m of such holts, except under license.
RF-PD 12	The prohibited working area associated with otter holts will, where appropriate, be fenced with temporary fencing prior to any possibly invasive works and declared as 'out of bounds'. Fencing will be in accordance with Clause 303 of the NRA's Specification for Roadworks (National Roads Authority). Appropriate awareness of the purpose of the enclosure will be conveyed through toolbox talks with site staff and sufficient signage will be placed on each exclusion fence. All contractors or operators on site will be made fully aware of the procedures pertaining to each affected holt (NRA, 2006) and subject to audits and non-conformance records in the event of non-compliance, to be included in reports submitted to

	Local Authorities and relevant Statutory Consultees.
RF-PD 13	Confirmatory surveys will be carried out within 50 m of either side of the construction works area boundary of identified badger setts to determine the current status of known badger setts (i.e. active or inactive) and to determine if any new setts have been established in the intervening period following initial pre-planning surveys and the commencement of construction activity. These confirmatory badger surveys will be undertaken no more than 12 months in advance of proposed construction activities, during the period November and April when vegetation cover is reduced. NWPS will be notified immediately if the sett previously identified is confirmed as active or if a further active sett is located within 50 meters of the footprint of the development. If sett exclusion is required, this will be undertaken by an experienced ecologist under the necessary license and following best practice guidance (NRA, 2005).
RF-PD 14	No construction works will be carried within 50m of an active sett during the main breeding season (December 1 st to June 30 th).
RF-PD 15	Planting works in the environs of a known active badger sett outside of the breeding period will follow NRA (2005) guidelines, i.e. wheeled vehicles will not be used within 20m of a sett entrance; light work, such as digging by hand or scrub clearance will not take place within 10m of sett entrances.

5.2.4.1. Best Practice Measures

In addition to the Project Design Measures listed above, the following Best Practice Measures will be implemented during the planting and maintenance of the UWF Replacement Forestry. The Best Practice Measures have been developed by the authors of the Water and Biodiversity topic chapters using industry best practice, and will afford further protection to the Environment. These Best Practice Measures are listed below and included in full in **Appendix 5.1: UWF Replacement Forestry Best Practice Measures**.

RF-BPM-01	Monitoring of non-native invasive plant species
RF-BPM-02	Management of general non-native invasive species
RF-BPM-03	Best practice methods to ensure the protection of Viviparous lizard (<i>Lacerta (Zootoca) vivipara</i>)

5.2.4.2. Invasive Species Management Plan

In addition to the Best Practice Measures relating to Invasive Species, an Invasive Species Management Plan has been developed to prevent the introduction and/or spread of the invasive species.

This plan includes monitoring and biosecurity measures which will inform the actions required to effectively respond to incursions and control existing invasive species populations. The Invasive Species Management Plan is included as **Appendix 5.2: Invasive Species Management Plan**.

5.2.4.3. Monitoring

An Environmental Clerk of Works will be employed during the planting stage to monitor the implementation of the environmental protection measures, listed above.

5.3. Life Cycle Stages of UWF Replacement Forestry

5.3.1. Planting Stage - UWF Replacement Forestry

5.3.1.1. Duration & Timing

Table 5-2: Duration and Timing of the Planting Stage

Planting Activities	Duration of the Planting Stage	Timing of Construction Activities
Planting of native woodland species	1 month	October through to March to correspond to the dormant period of deciduous tree species.

Hours of Work

Normal planting times will be 07.00 to 19.00hrs Monday to Friday and 08.00 – 16.30hrs on Saturdays. All planting will be carried out during daylight hours.

5.3.1.2. Planting Personnel

Tree planting will be carried out by 4 No. forestry professionals.

5.3.1.3. Welfare Facilities

The facilities at the Upperchurch Windfarm, comprising offices, welfare, and canteen and parking facilities will be available to the planting personnel.

5.3.1.4. Planting Stage Activities

Planting stage activities will involve the following works:

- The planting areas and ride lines will be marked out as per **Figure RF 5.2: Planting Layout on Aerial Photography Mapping**.
- The perimeter of the lands, including the watercourse, will be fenced with livestock proof fencing.
- A spade will be used to dig a suitable sized hole at the appropriate spacing. The roots of the transplant stock will be placed in the hole and spread evenly.
- The soil dug from the hole will then be placed around the roots and the plant will be fastened in by compacting the soil using a spade and by foot.
- The plant will be checked to ensure it is upright and secure in the ground.
- Protective tree guards will be fitted to protect the young trees from rabbit damage.
- Livestock proof fencing will be erected around the perimeter of the new woodland.

5.3.1.5. Use of Machinery and Equipment

The main machinery, equipment and tools which will be required during the planting stage are listed in:

Table 5-3: Planting Stage machinery, equipment and tools

Planting Machinery
Four-wheel drive vehicle
Tractor with post-driver fitted
Planting Equipment and Tools
Planting spades
Fencing tools

5.3.1.6. Use of Hydrocarbons

Hydrocarbons will be used during planting activities and will be limited to the diesel or petrol fuel and mechanical oils used by the site vehicles and machinery.

5.3.1.7. Other Facilities - Fuel Storage & Tool Storage

There will be no requirement for either fuel or tool storage.

5.3.1.8. Imported Planting Materials

The materials, which will be brought onto the site, are listed in Table 5-4 along with details of the quantity and source of the materials.

Table 5-4: Quantities, type and source of planting materials

Materials	Quantity	Source of Materials
Tree Saplings – c.20,000	2 No. loads	Dundrum, Co Tipperary
Wooden fencing posts	2 No. loads	Arrabawn Co-Op, Reiska
Fencing – sheep wire / barbed wire, gate	2 No. loads	Arrabawn Co-Op, Reiska

5.3.1.9. Water Quality Management

All planting will be carried out by hand. No pesticides, fertilizers or herbicides will be used.

5.3.2. Growth Stage – UWF Replacement Forestry

Once planted, the trees will go through numerous stages of growth from seed to sapling, through to maturity, old age and eventual decay with natural regeneration occurring through the lifecycle of the native wood.

5.3.2.1. Duration and Timing of Growth Stage

The UWF Replacement Forestry will be a permanent native woodland, of type GPC9, according to Native Woodland Establishment GPC9 and GPC10 Silvicultural Standards 2015.

Table 5-5: Duration and Timing of the Growth Stage

Description	Duration	Timing
Growth Stage of the UWF Replacement Forestry	Permanent	None
Maintenance Activities	2 days to 1 week per year.	Early Summer / Late Autumn

5.3.2.2. Growth Stage - Personnel

2 No. personnel will be involved in annual inspections and maintenance of the new native wood.

5.3.2.3. Operational Activities

The new wood will require more maintenance during the first five years of its growth than at later stages of growth. During the first five years, the wood will be inspected twice yearly and brambles and rough grasses removed from the area immediately around the tree trunks.

The tree guards, which will have been fitted during planting, will also be removed once the tree has outgrown them.

The level of light and mix of ground cover (tall grass, short grass & scrub) in the open space ride lines will be managed throughout the growth stage by thinning, clearing and controlled grazing.

5.3.2.4. Use of Machinery and Equipment

Use of machinery and equipment and tools which will be limited to thinning operations and scrub clearance. No materials will be required during the Growth Stage.

Table 5-5-6: Use of Machinery and Equipment during the Growth Stage

Machinery	Equipment	Materials
4x4 vehicle for routine inspection	Trimming and scrub clearance tools	None
Small tractor for fence maintenance	Chainsaws and axes	

5.3.2.5. Use of Hydrocarbons

A small volume of hydrocarbons will be used during maintenance activities and is limited to the diesel or petrol fuel used for the occasional site vehicles and equipment.

5.3.2.6. Welfare Facilities

Due to the very low levels of activity, there will be no requirement for welfare facilities.

5.3.2.7. Other Facilities - Fuel Storage & Tool Storage

There will be no requirement for fuel storage. There will also be no requirement for tool storage facilities - all tools will be brought onto the UWF Replacement Forestry site as required.

5.3.3. Changes to the Project

Other than thinning activities, natural maturation, old age and regeneration, no other changes to the native woodland are expected. The UWF Replacement Forestry will be permanent forest cover and will not be felled.

5.4. Use of Natural Resources, Emissions & Waste

5.4.1. Use of Natural Resources

The resources which will be imported onto the site or which will be obtained from within the site during planting and growth stage are described below.

5.4.1.1. Use of Resources: Land

In total, 6ha of agricultural land will permanently change use to forestry.

5.4.1.2. Use of Resources: Biodiversity

Planting and Growth Stages

In total 6ha of mixed species, native woodland will be created, which will comprise tall trees and understory shrubs, along with wide ride-lines, and a mix of tall grasses, short grasses and scrub land cover maintained during the growth stage. This will enhance biodiversity in the area.

New trees and shrubs will be set back at least 10m from the watercourse which runs through the western portion of the UWF Replacement Forestry lands.

The afforestation lands will be protected from livestock by the perimeter fence.

Invasive Species Management

Best Practice Measures will be employed during the planting of the UWF Replacement Forestry (see RF-BPM-01 and RF-BPM-02 in [Appendix 5.1 UWF Replacement Forestry Best Practice Measures](#)). These best practice measures includes; checking packaging for the presence of white toothed shrew and prior to arrival on site, thoroughly cleaning and drying the contractor's vehicles and equipment; high-pressure steam cleaning, with water hotter than 65 degrees Celsius, in addition to the removal of all vegetative material, of all vehicles and equipment involved in the planting of the new woodland.

In addition to the Best Practice Measures, an Invasive Species Management Plan has been developed to prevent the introduction and/or spread of the invasive species. This plan includes monitoring and biosecurity measures which will inform the actions required to effectively respond to incursions and control existing invasive species populations. The Invasive Species Management Plan is included as [Appendix 5.2: Invasive Species Management Plan](#).

5.4.1.3. Use of Resources: Water

Planting Stage

All water requirements for welfare facilities and drinking purposes will be supplied at the Upperchurch Windfarm Site Office during the Planting Stage, no additional water will be required.

Growth Stage

There will be no requirements for water during the growth stage.

5.4.1.4. Use of Resources: Soils**Planting Stage**

Planting will be carried out by hand using spades, small localised patches of disturbed soil will occur at the sapling tree trunks.

Growth Stage

No soils or rock will be excavated during the growth stage.

5.4.2. Emissions

Planting & Growth Stages

Dust will not arise, due to the absence of mechanical excavation of and storage of soils.

Very small quantities of **Vehicle Exhausts Fumes** will be emitted by vehicles and machinery during planting and occasional maintenance activities.

Noise: Vehicles, machinery and equipment to be used during planting and maintenance activities will emit some noise during their operation.

Vibration: Due to the type of machinery which will be used and the nature of the planting and growth activities - no vibration emissions are expected.

Light: No light emissions will occur as there will be no requirement to light any part of the UWF Replacement Forestry. All planting and maintenance activities will be carried out during daylight hours.

5.4.3. Waste

Planting Stage

Waste Water: No waste water will occur at the UWF Replacement Forestry site. Toilet facilities at the Upperchurch Windfarm site office will be used by planting personnel.

General Waste such as packaging, and excess planting materials will be generated in small quantities during the Planting Stage. This waste will be removed from the lands and stored at a designated area at the Upperchurch Windfarm site office with other General Waste arising from the Upperchurch Windfarm operational activities. General waste will be collected by licensed collector - Arlo Group or other appropriately licensed operator and transported to their approved licensed facilities at Thurles, County Tipperary or other appropriately licensed facility.

Arising's and Contaminated Material: No arisings or contaminated materials are expected.

Chemical waste: No chemical wastes are expected.

Growth Stage:

Waste will be minimal at the growth stage and confined to maintenance activities.

5.5. Vulnerability of the Project to Major Accidents and Risks to Human Health

Major accidents or natural disasters which have the potential to affect the UWF Replacement Forestry are described hereunder. The vulnerability (exposure and resilience) of the UWF Related Works to major accidents and disasters and the risk of these accidents or disasters is classified according to the *Guide to Risk Assessment in Major Emergency Management* (DoEHLG, 2010). This Guide is included as **Appendix 5.5 Volume C4: EIA Appendices**.

5.5.1. Vulnerability to Major Accidents

It is clear from the EIA Directive that 'major accident' mainly applies to notified Seveso establishments which operate under the Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015, where Dangerous Substances are identified in Schedule 1.

The UWF Replacement Forestry is **not vulnerable to Major Accidents**, due to the negligible volumes of the Dangerous Substances which will be used, limited to small volumes of diesel fuel used by vehicles during the planting and growth stages. Furthermore there are no Seveso sites in proximity to the UWF Replacement Forestry site, the closest being Grassland Agro in Limerick and MSD (pharmaceutical) in Kilsheelan, near Clonmel, Co Tipperary.

5.5.2. Vulnerability to Natural Disasters

The following natural disasters are considered; land slippage and flooding. The likelihood of these natural disasters occurring is discussed below, with likelihood of the natural disaster occurring rated according to the DoEHLG 2010 Guidelines. The risk classification tables are included in **Appendix 5.5: A Guide to Risk Assessment in Major Emergency Management Jan 2010**.

5.5.2.1. Land Slippage

The UWF Replacement Forestry is **not vulnerable to land slippage** as the afforestation site is located on agricultural grassland which is inherently stable and no excavations will occur – planting will be carried out by hand.

5.5.2.2. Flooding

In recent years, high rainfall events and subsequent flooding have become more frequent in Ireland. Where complete the Catchment Flood Risk Assessment and Management (CFRAM)² OPW Flood Risk Assessment Maps are now the primary reference for flood risk planning in Ireland and supersede the Preliminary Flood Risk Assessment Maps (PFRA) maps. CFRAM mapping is not currently available for the area of the UWF Grid Replacement Forestry and therefore the PFRA maps have been consulted.

A Stage II Flood Risk Assessment was completed for the subject development by Hydro Environmental Services, a specialist hydrological and hydrogeological consultancy, who concluded that although a section of the UWF Replacement Forestry site is located in a mapped fluvial Flood Zone A (100-year flood zone),

² CFRAM is Catchment Flood Risk Assessment and Management. The national CFRAM programme commenced in Ireland in 2011, and is managed by the OPW. The CFRAM Programme is central to the medium to long-term strategy for the reduction and management of flood risk in Ireland.

there will be no new permanent infrastructure (roads or watercourse crossing structures) required for the UWF Replacement Forestry. In addition, the planting will be carried out by hand with minimal disturbance to soil. The authors of the Flood Risk Assessment concluded that the UWF Replacement Forestry **is not vulnerable to flooding**.

5.5.3. Overall Risk

Should a disaster occur, unconnected to the project but in the locality – the UWF Replacement Forestry will not make the consequences of the event worst. In addition the presence of the UWF Replacement Forestry will not increase the likelihood of such an event occurring.

5.6. Cumulative Descriptions

Table 5-7: UWF Replacement Forestry - Element 3 of the Whole UWF Project

Element No.	The Subject Development	Composition of the Subject Development	Relevant Appendix Location for description of each element
3	<u>The Subject Development</u> UWF Replacement Forestry (RF)	Replacement Forestry at Foilnaman	Current afforestation license application to Department of Agriculture, Food & the Marine

An **overview of Element 3, UWF Replacement Forestry**, the subject development, is provided in **Section 5.2.2** above. A **full description** of the subject development is provided in the **successive Sections 5.2 to 5.5**.

5.6.1. Description of the Other Elements of the Whole UWF Project

In order that a cumulative evaluation can be carried out for the UWF Replacement Forestry, an overview description is provided hereunder of all the other elements of the whole UWF project.

Table 5-8: Element 1 and Element 3 to 5 of the Whole UWF Project

	Element of the whole UWF project	Composition of each Element	Relevant Appendix Location for description of each element
1	UWF Grid Connection (GC)	Mountphilips Substation Mountphilips – Upperchurch 110kV UGC Grid Connection Access Roads Grid Connection Ancillary Works	Appendix 5.1
2	UWF Related Works (RW)	Internal Windfarm Cabling Realigned Windfarm Roads Haul Route Works Telecom Relay Pole RW Ancillary Works	Appendix 5.2
4	Upperchurch Windfarm (UWF)	Consented UWF Turbines Consented UWF Substation Consented UWF Roads UWF Ancillary Works	Appendix 5.3
5	UWF Other Activities (OA)	Haul Route Activities Upperchurch Hen Harrier Scheme Monitoring Activities Overhead Line Activities	Appendix 5.4

Relevant Volume C3 EIAR Figures:

Figure CE 1.1: Location of UWF Replacement Forestry and the Other Elements of the Whole UWF Project on OSI Mapping.

An EIA Report has also been prepared to accompany concurrent planning applications to the relevant Competent Authorities, for the UWF Grid Connection and the UWF Related Works.

This information on these other elements of the whole UWF project can be found in the following locations;

- **Full EIA Report** or EIS (as appropriate) for **Elements 1, 2, and 4** in **Volume E: Reference Documents for Other Elements of the Whole UWF Project**.
- **Description of each elements 1, 2, 4, and 5** (presented in a format similar to this chapter and with smaller scale reference mapping and figures) in **Appendix 5.1 to Appendix 5.4**, see **Volume C4: EIAR Appendices**.
- **Overview description of each elements 1, 2, 4, and 5** in this Section hereunder.

5.6.1.1. Element 1: UWF Grid Connection

An application for planning permission for UWF Grid Connection has been submitted directly to An Bord Pleanála under Section 182A (9) of the Planning and Development (Strategic Infrastructure) Act (2006). The application is accompanied by an EIA Report.

The full **EIA Report including mapping and figures for UWF Grid Connection** is included in **Volume E: Reference Documents for Other Elements of the Whole UWF Project**.

An extract from Volume E of the **detailed description** of the UWF Grid Connection (presented in a format similar to 5.2 to 5.5 above) along with a **copy of the accompanying figures** is included in **Appendix 5.1: Description of Development (UWF Grid Connection)**.

A summary overview of UWF Grid Connection is provided hereunder.

5.6.1.1.1. Location and Characteristics of UWF Grid Connection

The UWF Grid Connection will comprise of the following:

Mountphilips Substation: A new substation is proposed for a location adjacent to the existing Killonan - Nenagh 110kV overhead line in agricultural grassland in Mountphilips townland, 2km north of Newport, 4km south of Birdhill, 17km north east of Limerick City and 23km west of the Upperchurch Windfarm. The new 110kV electrical substation will comprise 2 No. End Masts located at the Killonan – Nenagh 110kV overhead line; a compound, 230 meters east of the overhead line, measuring 95 meters x 94 meters which will contain a control building; 110kV busbars; circuit breakers; line disconnects; current and voltage measuring equipment; cable chairs; surge arresters; lightening protection monopoles and other electrical apparatus. The 2 No. End Masts will be connected to the electrical equipment in the compound via underground cable.

Mountphilips - Upperchurch 110kV UGC: The 110kV UGC will connect the Mountphilips Substation to the Upperchurch Windfarm through the Consented UWF Substation, through the installation of underground cables. The route of the underground cables, which is 27.5km in length, will follow a generally west/east course through a mix of agricultural grassland (11.9km), commercial forestry plantations (1.9km), private forestry and farm roads (c.12km) and public roads (c.1.7km) through the townlands of Mountphilips, Coole, Freagh, Oakhampton, Newross, Castlewaller, Killeen, Knockacullin, Bealaclave, Baurnadomeeny, Goulmore, Laghile, Churchquarter, Knocknabansha, Knockmaroe, Knockcurraghbola Crownlands and Knockcurraghbola Commons. The 110kV UGC will be installed underground in trenches, which will be laid with ducts through which the electrical cables and communications cables will be pulled. The cable lengths will be pulled through and joined together at Joint Bay locations, in joint bay chambers. The ducts will be surrounded by concrete and the trench backfilled with excavated material or aggregate depending on the location. The only surface expression of the 110kV UGC will be the man-hole type covers over the Joint Bays and the over-ground identification marker posts and marker plates.

UWF Grid Connection Access Roads: To provide access to Mountphilips Substation and the Joint Bay locations along the 110kV UGC, New Permanent Access Roads will be constructed. Permanent access will also include upgraded existing farm and forestry roads.

UWF Grid Connection Ancillary Works will support the construction of UWF Grid Connection and will include the construction of Temporary Access Roads along the 110kV UGC construction works areas; Permanent Site Entrances (including the provision of sightlines) at Mountphilips, Bealaclave and Knockcurraghbola Commons; Temporary Site Entrances at public road crossings along the 110kV UGC; installation of temporary and permanent watercourse crossing structures; construction and use of 3 No.

Temporary Compounds, installation of drainage systems at Mountphilips Substation, around Temporary Compounds and along new UWF Grid Connection Access Roads; forestry felling; temporary and permanent hedgerow/tree removal; permanent hedgerow replanting; fencing; relocation of existing overhead electricity and telephone services and; storage of excavated materials at various locations within the construction works area boundary.

5.6.1.1.2. UWF Grid Connection: Construction & Operation

UWF Grid Connection Construction Phase: All elements of the whole UWF project will be constructed at the same time. Construction of UWF is expected to commence in 2018/2019 and will take approx. 12 months. Approximately 100 persons will be engaged in the pre-construction, main construction, cable jointing and commissioning works for the UWF Grid Connection. 1050 No. loads of concrete; 455 No. loads of aggregate; 59 No. loads of hard core; and 108 No. loads of surface dressing (public road sections) will be imported from Roadstone Killough, Co Tipperary and Bunratty, Co Clare and Shanballyedmond, Rear Cross. 22 No. loads of general building materials including geotextile, and 126 No. loads of electrical plant and equipment including lattice towers, control building doors and switching gear, will be imported to the site from various suppliers throughout Ireland and the EU.

UWF Grid Connection Operational Phase: Once commissioned and energised, the Grid Connection will be taken in charge by ESB Networks and the Mountphilips Substation and the Mountphilips – Upperchurch 110kV UGC will become part of the national electricity network. The new asset will be managed and operated by ESB Networks. Scheduled inspection and maintenance activities will be carried out by ESB Networks personnel (2 men crews) over a total of 13 days per year. Very infrequent planned maintenance or unplanned repairs may be required, if at all, during the lifetime of the Grid Connection, it is expected that one crew with c.6 ESB Networks personnel would be required for 1 week – 2 weeks duration, depending on the nature of the repairs work. The Grid Connection will remain permanently in place as part of the national electricity network and thus decommissioning is not envisaged.

UWF Grid Connection use of Natural Resources: Construction Phase – There will be 39.1 hectares of **land** required for the construction works site. 1.3ha of **coniferous forestry** will be permanently felled. 45m of **hedgerow** and 30 No. of **trees** of varying maturity will be permanently removed to facilitate either a permanently widened entrance off the public road or a new permanent access road. These hedgerows and trees will be replaced immediately adjacent to the area. On a number of hedgerows, a specially designed bat crossing structure will be erected at new entrances. These structures will be timber frames with vegetation attached, which will provide a continuation of flight-line for bats during the works. 820m of hedgerows, which include trees of varying maturity, located close to works areas will be pruned to facilitate passage of machinery along works areas. c.700m of new hedgerow will be planted with locally sourced native species. **Water** required for welfare facilities will be brought onto site. Approximately 9,615m³ of **topsoil**, 1,265m³ of **peat**, 2,390m³ of **subsoil** and 120m³ of **rock** will be permanently excavated from the works areas. 660m³ of spoil will also arise during excavations in public roads. 8,370m³ of the excavated material will be permanently stored along the 110kV UGC works area as linear berms and remainder (5,020m³) will be reinstated within the works area. In addition, up to 11,140m³ of soils will be temporarily excavated from the construction works area boundary, including from the cable trench and from the footprint of any excavated temporary stone roads and will be temporarily stored, within the construction works area, to backfill, reinstate and landscape the works areas.

UWF Grid Connection use of Natural Resources: Operation Phase – The Land required will reduce considerably to just 4.2ha of land permanently changing use - mainly comprising the footprint of the Mountphilips Substation and the footprint of any new access roads which will provide access to the Joint Bays. No further **forestry felling, hedgerow or tree pruning or removal** will be required during the operational stage. Non-potable **water** requirements will be provided at the Mountphilips Substation via a

rain water harvesting system, and drinking water will be brought onto site as needed. **No excavations of soils** will be required during the routine operation of the Grid Connection. Planned maintenance or unplanned repairs, if any occur are likely to involve the re-opening of the underground chambers, at Joint Bays. This work which will result in very small volumes of crushed stone and sand being temporarily removed from the area directly over the joint bay covers, stored adjacent to the Joint Bay, and re-used to reinstate the top of the Joint Bay following the completion of the repairs.

UWF Grid Connection Emissions: Dust, construction machinery exhaust, noise, vibration and light will be emitted during the construction stage, negligible levels are associated with the operation and maintenance activities. During operation, Mountphilips Substation will emit **noise** however this is unlikely to be audible above the existing background noise levels at nearest residence, which is 385m distant. The operational sub-station and 110kV underground cable will be a source of very low frequency (50Hz) **electromagnetic fields**.

UWF Grid Connection Waste: Waste water from construction stage welfare facilities will be contained in self-contained units and emptied by a licenced facility. General and chemical waste will be segregated and stored in allocated tanks, bins, skips or areas at the Temporary Compounds, C1, C2 and C3. Waste will be collected by an appropriately licensed waste contractor. Any wastes which result from the construction of the UWF Grid Connection will be managed under a specific **Waste Management Plan**. During operation, there will be minimal general and chemical waste during the Operational Stage, with any waste taken offsite by ESNB personnel.

5.6.1.2. Element 2: UWF Related Works

An application for planning permission for UWF Related Works has been submitted to Tipperary County Council. This application is accompanied by an EIA Report.

The full **EIA Report including mapping and figures for UWF Related Works** is included in **Volume E: Reference Documents for Other Elements of the Whole UWF Project**.

An extract from Volume E of the **detailed description** of the UWF Related Works (presented in a format similar to 5.2 to 5.5 above) along with a **copy of the accompanying figures** is included in **Appendix 5.2: Description of Development (UWF Related Works)**.

A summary overview of UWF Related Works is provided hereunder.

5.6.1.2.1. Location and Characteristics of UWF Related Works

The UWF Related works comprises of the following:

Internal Windfarm Cabling of c. 17.9km in length, to connect the Consented UWF Turbines to the Consented UWF Substation, through the installation of underground cables within ducts in trenches 1.25m deep and 0.6 wide. The majority (11.1km) of the Internal Windfarm Cabling will be installed under Consented Windfarm Roads or Realigned Windfarm Roads. The remainder of the Internal Windfarm Cabling will be installed in agricultural lands (4.6km), forestry lands (2.1km, requiring forestry felling of 0.1ha.), and crossing under 9 No. public roads (40 meters). The cabling will traverse the townlands of Graniera, Shevry, Knockcurraghbola Commons, Knockmaroe, Grousehall, Cummer, Foilnahan, Gleninchaveigh, Coumnageeha, Coumbeg, Knocknamena Commons, Glenbeg and Seskin.

The Internal Windfarm Cabling consists of electrical cables and communication cables and the copper conductor cables which are installed inside High Density Polyethylene (HDPE) ducting in underground trenches. The trench will be excavated, ducting and warning tapes installed and trench backfilled and reinstated. When the ducting installation is finished and the trench reinstated, the electrical, communication and copper conductor cables will then be pulled through the ducting. The only surface expression of the Internal Windfarm Cabling will be the over-ground identification marker posts and marker plates which will be installed at regular intervals above the cables trench

Realigned Windfarm Roads to realign the consented UWF Roads at three locations;

The consented windfarm road to Turbine No.5 in Shevry is 560m in length, and it will replace this road in its entirety with a new road 230m in length through forestry. This will require forestry felling of 0.2ha.

The consented UWF road between Turbine No.19, Turbine No. 20 and Turbine No. 21, is 840m in length. It will replace 370m of this road with a new road also 370m in length. 220m of this road will be located on grassland field, with the remaining 150m in length located on existing farm road. The existing farm road section will be upgraded during construction works.

A short length (30m) of new access road will be between the consented UWF roads in Knockmaroe to the new Telecom Relay Pole.

Haul Route Works are along public road verges, roadside boundaries and grassland fields in order to widen parts of the L4139-0, L4138-12, L2264-50, L6188-0, L6185-13 by between 0.5m and 1.5m and to widen an entrance off the R503 by 30m. These works will facilitate the delivery of turbine components to the Upperchurch Windfarm site and will take place in the following townlands: Shevry, Knockcurraghbola Commons, Knocknabansha, Knockmaroe and Grousehall. Works include the removal of soils and laying of crushed stone and hard-core in roadside verges for 1710m in total; temporary removal and reinstatement of 1035m of hedgerow and earthen banks which form roadside boundaries; permanent removal of 25m of roadside boundary and the construction of 290m temporary access roads on private lands.

The **Telecom Relay Pole** will relay communication signals around the Consented UWF Turbines in order to avoid interference from the operating Upperchurch Windfarm. The Telecom Relay Pole will comprise a wooden pole, up to 18m in height, with relay equipment attached to the top of the pole. A small compound, 5m X 5m in size, will enclose the relay pole, along with a ground based outdoor cabinet 2m high, 1.2m long and 1m wide and ancillary equipment. The compound will be securely fenced with 2.4m high palisade fencing; a native hedgerow will be planted on the berm created from the excavations. A communications and low voltage (LV) electricity supply will be cabled to the compound, from the existing supply at the Foilnahan mast, by 300m in length of cabling.

RW Ancillary Works will facilitate the construction of the UWF Related Works and will include a change of use for and existing agricultural entrance to agricultural and forestry entrance in permanent use, and 14 No. temporary site entrances; 5300m of temporary access roads; temporary and permanent watercourse crossings, involving 24 No. small field drains and 8 no. streams; drainage systems around permanent features and temporary drainage around works areas; 0.3 hectares of forestry to be felled; temporary and permanent hedgerow/tree removal; temporary and permanent fencing, temporary goal posts and bat crossing structures; relocation of 5 No. existing telephone poles; 11,830m³ of material will be excavated and temporarily stored for subsequent reinstatement or permanently placed in berms; reinstatement of roadside boundaries and public road surfaces.

5.6.1.2.2. UWF Related Works: Construction & Operation

UWF Related Works Construction Phase: All elements of the whole UWF project will be constructed at the same time and is expected to commence 2018/2019 and will take approx. 12 months. 5 of the c.100 persons working directly on the Upperchurch Windfarm site will work on UWF Related Works. A specialist communication engineering crew, made up of c. 2 personnel, will be involved in the erection and set up of the Telecom Relay Pole. The UWF Related Works, 23 No. loads of concrete and 292 No. loads of aggregate will be transported to the site by HGV, from local suppliers. A further 2 No. loads of road surfacing material, 7 No. loads of hard core and 43 No. loads of specific building materials will also be imported to the site, from various suppliers in the Region.

UWF Related Works Operational Phase: UWF has been granted permission to operate for 25 years from the date of commissioning. UWF Related Works will operate for the same period as the windfarm. The personnel employed in O&M for the windfarm will also maintain the UWF Related Works.

UWF Related Works use of Natural Resources: 20.9 hectares of land within the full UWF Related Works construction site which is reduced to just 25m² around the Telecom Relay Pole compound, during the operational phase; 4750m³ of topsoil, 6670m³ of subsoil and 360m³ of rock will arise from excavation works; small amounts of potable and non-potable water will be imported onto the site as required; 170m of hedgerow and 4 No. trees will be removed and the equivalent amount replanted following construction.

UWF Related Works Emissions: Insignificant dust, construction machinery exhaust, noise, vibration and light will be emitted during the **Construction Stage**. During the **Operational Stage** there will be negligible dust, vehicle exhaust, noise, vibration and light emitted. The operational electrical plant will be a source of electromagnetic fields but these will not be at levels to cause significant effects.

UWF Related Works Waste UWF Related Works personnel will use the welfare facilities and waste facilities provided at the Windfarm Site Compound No. 1 and No. 2. At these facilities, waste water will be contained

in self-contained units and emptied by a licenced facility or, in the case of the Site Offices, will be treated in the existing septic tank. General and chemical waste will be segregated and stored in allocated tanks, bins, skips or areas at Site Compound No.1 and collected by an appropriately licensed waste contractor. There will be minimal general and chemical waste during the **Operational Stage**. This waste will be stored in a designated and secure area at the windfarm site offices and collected by an appropriately licenced operator. Welfare facilities for the O&M crew will be provided at the windfarm site offices. Any wastes which result from the construction, operation and decommissioning of UWF Related Works will be managed under the Waste Management Plan for the operating UWF.

5.6.1.3. Element 4: Upperchurch Windfarm

An overview description of already consented Upperchurch Windfarm (UWF) is provided hereunder.

An application for planning permission for Upperchurch Windfarm (Consented UWF) was made to Tipperary County Council in January 2013. The windfarm was permitted by Tipperary County Council in January 2014 and the permission was upheld by An Bord Pleanála in August 2014. The application was accompanied by an EIA Report (known as EIS at the time) and Natura Impact Statement. The full planning documents for consented UWF can be found in [Volume E: Reference Documents for Other Elements of the Whole UWF Project](#).

5.6.1.3.1. Overview of the Location and Characteristics of Upperchurch Windfarm

UWF will comprise 22 wind turbines with an overall height up to 126.6 metres, 2 meteorological masts with an overall height of up to 80 metres, turbine foundation and crane hardstanding areas, access roads and an electrical substation.

The Upperchurch Windfarm site is located in the townlands of Graniera, Shevry, Knockcurraghbola Commons, Knockmaroe, Grousehall, Cummer, Foilnahan, Gleninchaveigh, Coumnameeha, Coumbeg, Knocknamena Commons, Glenbeg and Seskin. This is an area 2km west of Upperchurch village and 18km to the west of Thurles, County Tipperary.

The 22 wind turbines, associated crane hardstandings and ancillary works will be constructed on a series of small hills ranging in elevation from 280m to 401m OD, set out generally over four areas. The substation will be constructed in Knockcurraghbola Commons and the turbines will be connected by underground cables to the substation. There will be two meteorological masts erected, one in Grousehall and a second in Knocknamena townlands. Ancillary Works will include borrow pits in Shevry, Knocknamena, Knockmaroe and Grousehall; 1 No. site entrance from the R503 Regional Road at Graniera and; 10 No. site entrances from local public roads, through and around the site, which will provide access to the windfarm.

A document, with a **detailed description of the Upperchurch Windfarm**, has been compiled from the original 2013 Upperchurch Windfarm EIS, from the Reply to Further Information, the additional information submitted during the planning process and mitigation measures and planning conditions attaching to the Grant of Permission, to reflect a description of the development as it is now permitted. This compilation document has been prepared in the same format as the current application Chapter 5, for ease of cross referencing. The compilation document can be found in [Appendix 5.3: Compiled Description of Upperchurch Windfarm](#).

The full planning documents for consented UWF can be found in [Volume E: Reference Documents](#).

Upperchurch Windfarm (UWF) is comprised of the following parts:

- **Consented UWF Turbines** - 22 No. wind turbines of the three-bladed, tubular tower model, light grey in colour and an overall height to blade tip upto 126.6m. The turbines will be constructed on concrete bases with an adjacent hard-core hardstand area. There is no requirement for fencing of turbine areas. The turbines will be connected by underground cables to the Consented UWF Substation.
- **Consented UWF Substation** - 110kV substation compound which includes a control building, main transformer and other electrical equipment enclosed in a compound by a palisade fence. The substation will measure 64m x 41m.
- **Consented UWF Windfarm Roads** - 11.6km of windfarm access roads will comprise 8km of newly built 5m wide roads and 3.6km of existing farm roads which will require upgrading and widening (by an average of 2m).
- **Consented Ancillary Works** - The main items of ancillary works will include, 2 No. meteorological masts up to 80m in height; 11 No. site entrances; 1 No. stream crossing; site drainage system; 2 No.

construction site compounds; 6 No. borrow pits from which most of the aggregate required will be won; forestry felling, hedgerow removal and reinstatement; excavation, storage and reinstatement of soils..

5.6.1.3.2. Upperchurch Windfarm: Construction & Operation

UWF Construction Phase: All elements of the whole UWF project will be constructed at the same time.

Construction of UWF is expected to commence 2018/2019 and will take approx. 12 months. Approximately 277 persons will be engaged in the civil, electrical, project management, legal and financial services, material supply and component deliveries for the windfarm. Approximately 950 No. loads of concrete; 15 No. loads of reinforcing steel and 5 No. loads of general building materials and 212 No. loads of electrical plant and equipment (abnormal size loads) will be imported to the site by HGV. The abnormal turbine loads will be transported from Foynes Port.

UWF Operational Phase: UWF has been granted permission to operate for 25 years from the date of commissioning of the wind turbines, whereupon there will then be an option to apply for continuance of use or decommission the plant and restore the site. There will be 8 permanent jobs created in operation and maintenance activities, legal, electricity sales and asset management during the operational phase.

UWF use of Natural Resources: 56.3 hectares of land within the construction works site will reduced to 6.4 ha during the operational phase; Approx. 108,000m³ of excavated soils; 43,000m³ of aggregate mostly won on-site and otherwise imported from local quarry at Shanballyedmond, Rear Cross; small amounts of potable and non-potable water, sourced at an existing well at the windfarm site offices in Site Compound No. 2; felling of 4.4 hectares of conifers; 960m of hedgerow removed.

UWF Emissions: Dust, construction machinery exhaust, noise, vibration and light will be emitted during the construction stage. There is no house within 200m of the construction works. During the **Operational Stage** there will be negligible dust, vehicle exhaust, vibration and light emitted. The turbines will emit noise during operation. Permitted noise emissions are prescribed by planning condition. The operational electrical plant will be a source of very low frequency (50Hz) electromagnetic fields but these will not be at levels to cause significant effects at the turbine locations, and no effects will occur at local residences.

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

5.6.1.4. Element 5: UWF Other Activities

Although UWF Other Activities do not require planning permission, they do form part of the whole UWF project and therefore are included in the cumulative evaluation. A description of these activities, along with **mapping and figures** is included in **Appendix 5.4: Description of the UWF Other Activities**.

An overview of UWF Other Activities is provided hereunder.

5.6.1.4.1. Location and Activities of UWF Other Activities

The **Haul Route Activities** will facilitate the transportation of turbine components to the Upperchurch Windfarm site and are located at various points on the national and regional road network along the UWF turbine component haul route between Foynes Port in County Limerick and junction of the R503 and R497 Regional Roads in Knockmaroe townland, County Limerick. Activities comprise the laying of matting over verges at up to 5 No. locations, removal and replacement of street furniture (mainly signposts) at 13 No. locations and the trimming of up to 960m of hedgerow/trees at up to 15 No. locations.

The **Upperchurch Hen Harrier Scheme** will enhance and protect habitat for hen harrier in the vicinity of Upperchurch Windfarm, in order to fulfil planning condition No.18, attaching to the windfarm. The Upperchurch Hen Harrier Scheme is located in Knockcurraghbola Commons, Coumnageeha, Foilnaman, Knockmaroe and Grousehall townlands on 128ha of agricultural lands between the Slievefelim to Silvermines SPA and the Upperchurch Windfarm. Activities associated with the Scheme includes once off activities such as planting of hedgerows and trees; enhancement of riparian corridors and scrub/wood areas; and the fencing off of watercourses and newly planted trees and shrubs. The Scheme also includes long-term farm management practices such as management of rush coverage, livestock grazing and the control of the use of lime, fertilizers and burning of gorse, amongst others. Nine local landowners are signed-up to the Scheme. Implementation involves a mix of initial once-off activities which will both create new habitat and protect and enhance existing habitat; and on-going farming practices which will result in the long term maintenance of hen harrier habitat.

Monitoring Activities will monitor the Whole UWF Project for compliance with the environmental protection measures and mitigation measures detailed in the UWF 2013 EIS and 2013 RFI (including the Construction Environmental Management Plan for Upperchurch Windfarm and the Ecological Management Plan for Upperchurch Windfarm); Planning Conditions attaching to the already consented UWF; and measures in the 2018 UWF Grid Connection EIA Report, the 2018 UWF Related Works EIA Report and the 2018 UWF Replacement Forestry EIA Report and associated UWF Grid Connection Environmental Management Plan and UWF Related Works Environmental Management Plans. Monitoring will also involve the supervision and recording of key construction activities, and monitoring of progress of land reinstatement.

Overhead Line Activities include re-sagging activities and fibre wrapping activities. The purpose of the re-sagging activities is to correct the tension of the existing overhead line, following the installation of the UWF Grid Connection End Masts, so that the lines are held within predefined tension parameters. The purpose of fibre wrapping is to provide a communication link to the newly installed Mountphilips Substation. The tension will be corrected on 2 no. Sections - i) between ESNB Angle Mast Structure No. 79 (c.200m south of Mountphilips substation) to New Mountphilips End Mast No. 1 and ii) between New Mountphilips End Mast No. 2 and ESNB Angle Mast Structure No. 90 (2.3 km north of Mountphilips substation). Wrapping the overhead line with fibre optic cable from Killonan ESNB substation (just east of Limerick City) to Mountphilips substation. The Overhead Line Activities will be carried out according to

industry standard method statements, including standard health & safety and environmental management systems.

5.6.1.4.2. UWF Other Activities: Construction & Operation

Timing: The **Haul Route Activities** will occur prior to commencement of turbine component haulage and reinstatement will occur immediately after the passage of all components. The initial once-off activities associated with the **Upperchurch Hen Harrier Scheme** such as permanent planting and fencing of newly planted areas and watercourses will be carried out during the same period as the construction of UWF and UWF Related Works. There will be pre-construction **Monitoring Activities** before UWF and UWF Related Works commence. **Overhead Line Activities** will take place at the same time as the construction of Mountphilips substation.

UWF Other Activities Construction Phase: Approximately 50 persons will be engaged in UWF Other Activities including haul route activities, landowners involved in the hen harrier scheme, environmental experts engaged in the monitoring schemes and ESB Crews involved in overhead line activities. There will be very little materials delivered to the activity sites, these will include deliveries of geotextile matting, trees and shrubs, fencing materials and specialist ESB equipment.

UWF Other Activities Operational Phase: The same **Haul Route Activities** as for the construction phase, will be required in the occasional event of a large component delivery to UWF, if required, during the operational phase. The farming practices required under the **Upperchurch Hen Harrier Scheme** will continue throughout the lifetime of UWF. **Monitoring** of the success of Upperchurch Hen Harrier Scheme will be carried out during the operational lifetime of UWF. Monitoring will also include operational planning conditions and Ecological Management Plan compliance.

Use of Natural Resources: No land use changes required. No water or welfare facilities required. No mechanical excavations required; all planting will be carried out by hand. For haul route activities, up to 960m of roadside boundary hedges/treelines will be trimmed, outside of the general bird breeding season. For the Hen Harrier Scheme, 2.2ha of trees, 1.4km of riparian habitat and 2.8km of new hedgerow will be enhanced or created during initial activities. In total 128 hectares of agricultural lands will be management for the benefit of hen harrier.

There will be negligible **Emissions** from vehicles transporting personnel and any general **Waste** arising on-site will be removed by the crew themselves during the **construction** and **operational phase** of these Other Activities.

5.6.2. Cumulative Locational Context of all the Elements

The vast majority of the whole UWF project is located in County Tipperary with some minor activities along the Upperchurch Windfarm turbine component haul route and on the Killonan to Nenagh 110kV overhead line, in County Limerick (these activities are part of Element 5: UWF Other Activities).

The vast majority of the interaction of the Elements is in and around the consented Upperchurch Windfarm.

The UWF Replacement Forestry is located adjacent to Other Elements of the Whole UWF Project, in particular:

- the UWF Other Activities (Upperchurch Hen Harrier Scheme)
- the consented Upperchurch Windfarm
- the UWF Related Works – Internal Windfarm Cabling

Relevant Volume C3 EIAR Figures:

Figure CE 1.2: UWF Related Works and the Other Elements of the Whole UWF Project in the Upperchurch Windfarm area.

5.6.3. Secondary Projects

The development of the UWF Replacement Forestry is not expected to result in any secondary or consequential development.

In relation to the Other Elements of the Whole UWF Project, the addition of Mountphilips Substation (UWF Grid Connection) will add a new high voltage electrical substation in the Newport area. This may facilitate new connections to the Mountphilips substation in the future. There are no new connections planned at present.

5.6.4. Description of Other Projects and Activities

A cumulative evaluation of the effects of the subject development together with the Other Elements of the Whole UWF Project and Other Projects or Activities is presented in the Environmental Factor topic chapters.

Other Projects or Activities in the area were scoped using geographical and time-frame boundaries and conceptual site model exercises, see [Appendix 2.3: Scoping of Other Projects or Activities](#). The results of this scoping exercise is presented in Table 5-12, where Other Projects or Activities which have been scoped in for cumulative evaluation are listed in the left hand column of the matrix table, and the relevant Environmental Factor topic is identified in grey shading in the matrix.

Table 5-9: List of Other Projects or Activities included in the Environmental Factor Cumulative Evaluation

Project (These projects are identified on Figure CE 2.1: Other Projects or Activities Scoped In for Evaluation in the Environmental Factor Topic Chapters)	Population	Human Health	Biodiversity	Land	Soils	Water	Air	Climate	Built Services	Roads & Traffic	Cultural Heritage	Landscape
Existing Killonan to Nenagh 110kV Overhead Line									-			
Existing Shannonbridge – Killonan 220kV Overhead Line												
Consented Bunkimalta Windfarm												
Consented Castlewaller Windfarm												
Existing Milestone Windfarm (includes permitted turbine at Inchivara) currently under construction												
Operational Windfarms in the Republic of Ireland												
Existing Communication Structures - Foilnahan Mast - Cummermore Communications Pole												
Consented Project – Newport Distributor Road, Newport												
Consented Project - Industrial warehouse Units at Thurles												
Existing/consented Project - Thurles Regional Water Treatment Works												
Consented Gortnahalla Turbine												
Killuragh Digester Plant												
Housing Development in Doon and Annacotty												
Agricultural Developments - Milk Milking Parlour in Cappamore, Milking Parlour in Lisnagry, Slatted Sheds and Stores in Pallasgreen, Slatted Shed in Gortussa.												
Activity – Forestry												
Activity – Agriculture												
Activity –Turf-cutting												

A brief overview of each of the above listed projects is provided below. The location of each project in relation to the elements of the Whole UWF Project is identified on [Figure CE 2.1: Other Projects or Activities Scoped In for Cumulative Evaluation in the Environmental Factor topic chapters](#).

5.6.4.1 Existing Killonan to Nenagh 110kV Overhead Line

A high voltage (110kV) overhead line which runs between Killonan Station and Nenagh ESB substation (County Tipperary). The existing line is located to the west of the UWF Grid Connection and does not pass over the route of the 110kV UGC. The new Mountphilips Substation will be connected to this line via two new End Masts in farmland, west of the substation compound.

5.6.4.2 Existing Shannonbridge – Killonan 220kV Overhead Line

A high voltage (220kV) overhead line which runs between Shannonbridge ESB substation in County Offaly and Killonan ESB substation in County Limerick. A section of the line passes close to the UWF Grid Connection 110kV UGC in the townlands of Coole and Mountphilips.

5.6.4.3 Consented Bunkimalta Windfarm

The Bunkimalta Windfarm is a consented 16-turbine windfarm, located on Coillte lands, c.2.5km to the north of the UWF Grid Connection at Bunkimalta, Bauraglanna, Lackabrack, Knockfune and Foilduff at, Keeper Hill, Co. Tipperary.

Bunkimalta Windfarm will comprise 16 wind turbines, each having a rated electrical output of approximately 2,500 - 3,000 kilowatts, access tracks, a fenced Electrical Transformer Station comprising a single-storey Control Building and Substation, an effluent treatment system, three anemometer masts, repository areas, borrow pits and all associated site works, above and below ground. Each wind turbine will comprise a tower up to a maximum of 100 metres high, with a diameter of about 4 metres at the base. Three blades, up to a maximum of 50 metres in length, will be attached.

The Bunkimalta Windfarm will connect to the National Grid via an already consented underground grid connection to the existing Nenagh Substation, on the outskirts of Nenagh town.

The Bunkimalta Windfarm could be constructed during the same period as the UWF Grid Connection and the Whole UWF Project. Bunkimalta Windfarm, when built, will be operational during the operational stage of the Whole UWF Project.

An Environmental Impact Statement and Natura Impact Statement accompanied the planning application 13510035.

5.6.4.4 Consented Castlewaller Windfarm

The Castlewaller Windfarm is a 16-turbine windfarm, comprising 16 wind turbine generators (each with a maximum hub height of 100m, maximum rotor diameter of 90m, and with a total tip height of 145m), one permanent meteorological mast, 2 borrow pits, a sub-station including a control building, new internal access roads, upgrading of existing internal access roads, expansion of drainage system, turbine hardstands, wastewater holding tank, underground cables and ancillary works which is located along part of the 110kV UGC route in Castlewaller townland.

An Environmental Impact Statement and Natura Impact Statement accompanied the planning application 11/51/0251 for Castlewaller Windfarm.

Castlewaller Windfarm has not as yet secured a grid connection offer to connect to the National Grid from either Eirgrid or E.S.B Networks and therefore is not likely to be in construction at the same time as the construction of the Whole UWF Project.

5.6.4.5 Existing Milestone Windfarm

Milestone Windfarm is a consented 6-turbine windfarm located adjacent to the southwest of the consented Upperchurch Windfarm with 5 No. turbines consented under planning ref: 12510385 at Knockcurraghbola Commons, Knockcurraghbola Crownlands, Graniera, Shevry and 1 No. turbine consented

under planning ref: 1410 at Inchivara and Knockduff. When constructed, Milestone Windfarm will comprise of wind turbines each with a maximum tip height of 126m, along with new access tracks, and electrical substation, a borrow pit and associated works. The grid connection associated with the Milestone Windfarm is towards the south at ESBN Cautteen Station, to be cabled along the public road network. An Environmental Impact Statement accompanied the planning applications for Milestone Windfarm – Ref: 12510385 & 1410.

Milestone Windfarm is currently under construction with construction works expected to be completed before the commencement of the construction of the subject development or any of the other elements of the Whole UWF Project. Therefore there will be no overlap of construction periods.

Part of the landholding associated with the Milestone Windfarm occurs within one of the landholdings associated with the 110kV UGC element of the UWF Grid Connection, in Knockcurraghbola Commons townland.

5.6.4.6 Operational Windfarms in the Republic of Ireland

The Republic of Ireland has a generating capacity of 2,909.66 MW based on 233 windfarms.

5.6.4.7 Existing Communication Structures

Foilnaman Mast: An existing communications mast comprising a 30m steel lattice mast structure at Knockmaroe townland, in the vicinity of the UWF Related Works/Upperchurch Windfarm site.

Cummermore Communications Pole: An existing communications structure comprising a 20m support pole, c.2km to the southwest of the Upperchurch Windfarm, and within 4km of the UWF Related Works (Telecom Relay Pole). This existing pole carries radio aerials and a communications dish, together with associated equipment, cabling, gantry pole, GPS timing antenna, cabinet and fencing. Planning Ref: 14600313

5.6.4.8 Consented Project – Newport Distributor Road, Newport

Consented public road development at Newport, County Tipperary, comprising the demolition of two habitable dwellings and the provision of a distributor road between the R503 and local county road (Murroe Road) and associated site works including footpaths, lighting, cycle tracks and drainage, at Tullow, Newport County Tipperary. The road development is within the Newport River catchment and also located upstream of the Lower River Shannon SAC. Planning Ref: 07511157.

5.6.4.9 Consented Project – Industrial Warehouse Units at Thurles

The construction of 1 No. Light Industrial/Warehousing building (gross floor area 2360.6sq.m.) at Bawntameena, Nenagh Road, Thurles, along with a roundabout and access Road from Nenagh Road (R498) complete with necessary improvement works and road markings, a car park and loading areas and ancillary works; in addition the construction of a foul water pumping station and all associated works. Planning ref: 16600037.

5.6.4.10 Consented Project - Thurles Regional Water Treatment Works

The construction of a water treatment plant at Bohernacrusha, Killeenyarda, Holycross and outfall to the River Suir. The water treatment plant will consist of a water treatment and administration building, sludge dewatering building, ESB sub-station, generator & oil tank enclosure, raw water balancing tank, clear water tanks, sludge balancing tank, sludge thickening and sludge holding tank, washwater tank, sludge skip and emergency sludge storage area, chemical storage tanks, washwater storage tank and all associated site development and site excavation works above and below ground. Planning Ref: 16600877.

5.6.4.11 Consented Gortnahalla Turbine

Single wind generator with a maximum output set at 500kw, hub height 65m at Gortnahalla, near Upperchurch, Co Tipperary. Planning Ref: 12510368.

5.6.4.12 Killuragh Digester Plant

Development of a digester plant, associated ABP building and associated site works to process farm slurry and other organic material to provide renewable energy and fertilizer, in Killuragh, Pallasgreen, Co Limerick. Planning Ref: 111066.

5.6.4.13 Housing Development in Doon and Annacotty

Two housing developments: Construction of 25 no. houses consisting of 5 no. 4 bed detached dwellings, 20 no. 3 bed semi-detached dwellings, a bored well, entrance and roads together with associated site works and services at Bottle Hill, Doon, Co Limerick, Planning Ref: 16530; and Construction of 48 dwellings at Annacotty & construction of 240 dwellings in three areas/lots at Walkers Road, Annacotty, Co Limerick, Planning Ref: 137026 and 137094.

5.6.4.14 Agricultural Developments

Agricultural developments include a milk Milking Parlour in Cappamore, Co Limerick (Planning Ref: 15255), a Milking Parlour in Lisnagry, Co Limerick (Planning Ref: 15194), Slatted Sheds and Stores in Pallasgreen, Co Limerick (Planning Ref: 17133), and a Slatted Shed in Gortussa, Dundrum Co Tipperary (Planning Ref: 14600343).

5.6.4.15 Activities – Forestry, Agriculture

Agriculture and forestry are the predominant land uses in the area of the Whole UWF Project.

5.6.4.16 Activity – Turf-Cutting

Turbary (rights to cut turf) exists at Bleanbeg Bog immediately to the north of the UWF Grid Connection (110kV UGC) in the Castlewaller area.

The above projects and activities are included in the cumulative evaluations in the Environmental Topic chapters – Chapters 6 to 17. The relevant Environmental Factor topic is identified on Table 5-9.

Description of Development (UWF Replacement Forestry)

Figures and Mapping

Title:
Figure RF 5.1

Location of UWF Replacement Forestry on OSI Discovery Mapping

Map Number:
Map 1 of 1

Legend:



UWF Replacement Forestry



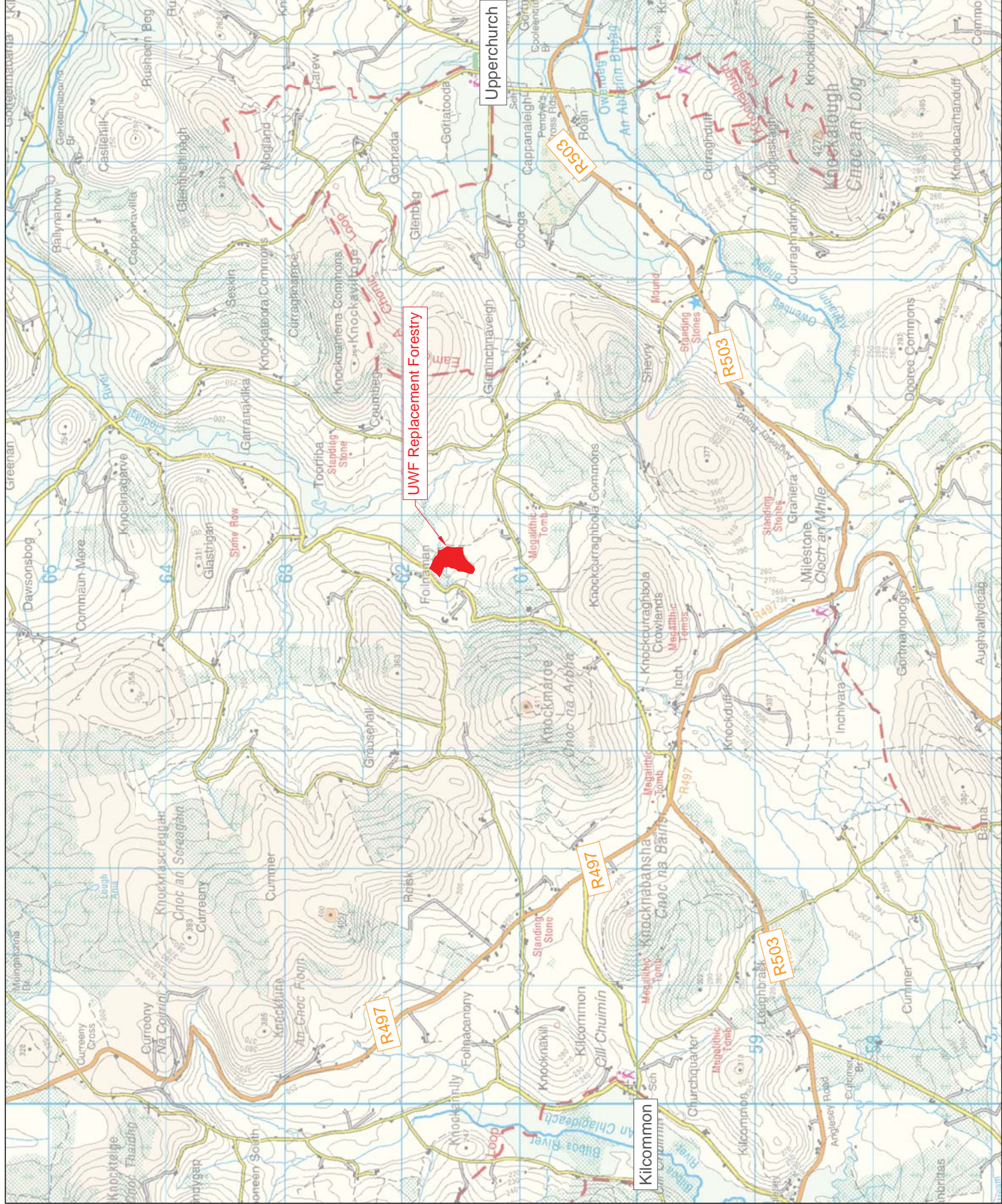
Project: UWF Replacement Forestry (RF)

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ECOPOWER

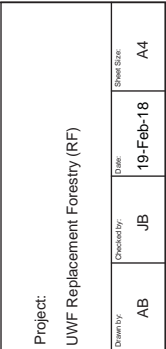


Title:
Figure RF 5.2
Planting Layout on Aerial
Photography Mapping

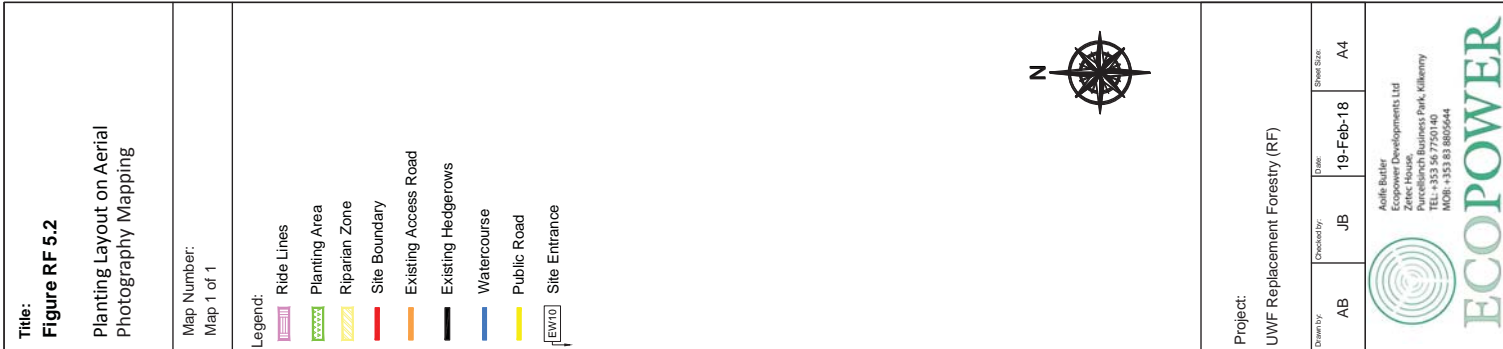
Map Number:
Map 1 of 1

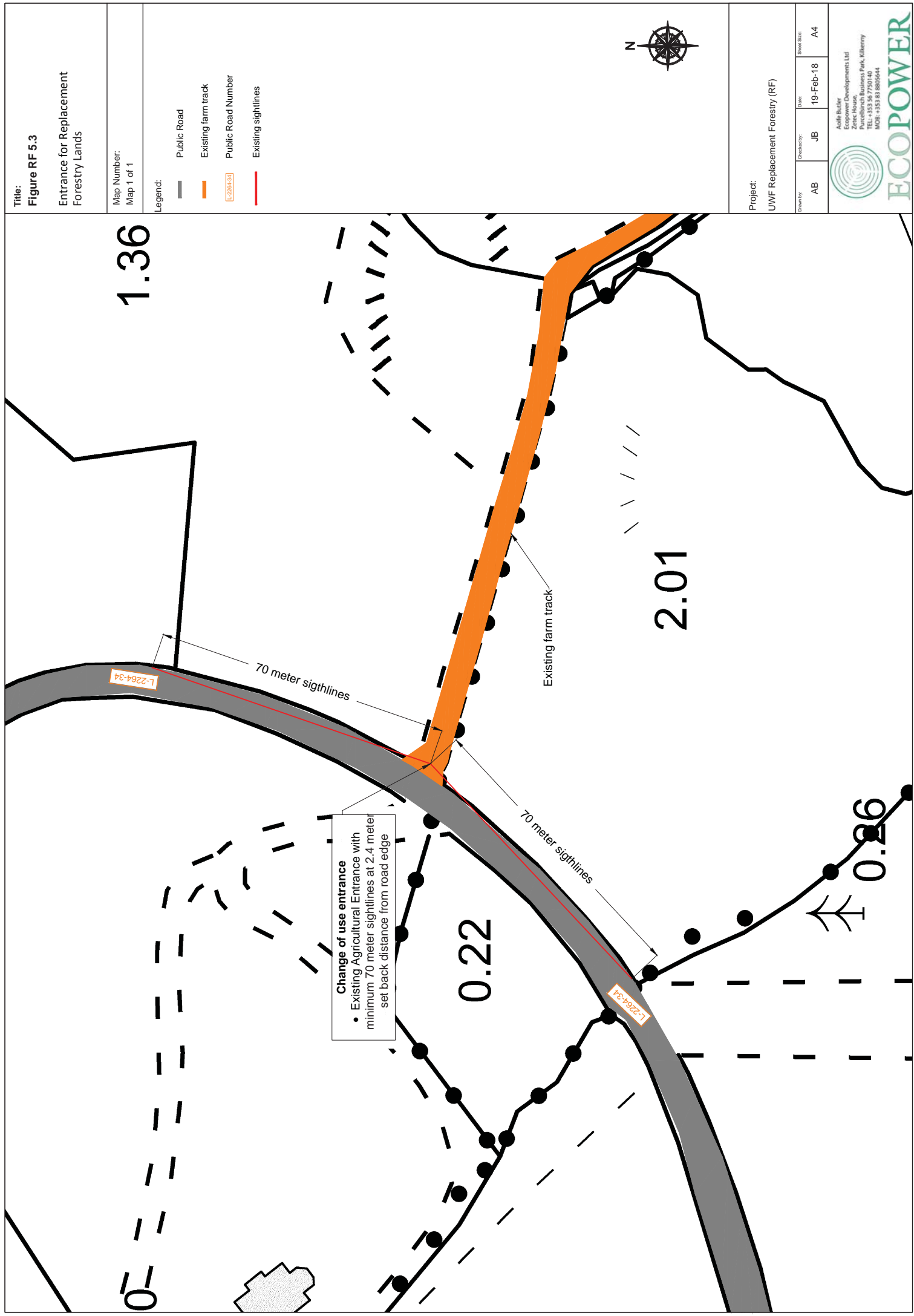
Legend:

- Legend**
- Ride Lines
 - Planting Area
 - Riparian Zone
 - Site Boundary
 - Existing Access Road
 - Existing Hedgerows
 - Watercourse
 - Public Road
 - Site Entrance



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Appendix 5.1: Best Practice Measures

The data and descriptions in this appendix have informed Chapter 5: Description of Development (UWF Replacement Forestry) of the EIA Report. The information presented in this Appendix 5.1 is outlined below and the relevant element(s) of the Whole UWF Project are also identified.

Appendix Heading	Relevant Individual Project Element
Best Practice Measures	UWF Replacement Forestry

UWF REPLACEMENT FORESTRY

Appendix 5.1 Best Practice Measures



ECOPOWER

February 2018

BPM No.	BPM Title
RF-BPM-01	Monitoring of non-native invasive plant species
RF-BPM-02	Management of general non-native invasive species
RF-BPM-03	Best practice methods to ensure the protection of Viviparous lizard (<i>Lacerta (Zootoca) vivipara</i>

RF-BPM-01 Best Practice Measure	
Title:	Monitoring of non-native invasive plant species
RF-BPM-01	Monitoring of non-native invasive plant species.
Environmental Commitment	
Monitoring of non-native invasive plant species.	
Work Sections/Locations	
Afforestation lands	
Responsibility of	Role/Duty
Project Ecologist	<ul style="list-style-type: none"> Implementation of surveying Must be aware of the best practice guidance listed in References below.
Avoid adverse effects of the introduction and spread of non-native invasive species	
<ul style="list-style-type: none"> Monitoring in the form of confirmatory surveys will be carried out by the Project Ecologist to identify any infestations within or close to the afforestation lands. Surveying will be carried out annually and this survey information will be used to inform any maintenance activities. Surveys will focus always on the works area plus 7m. Surveying of municipal areas – i.e. public road haulage routes, will not be included in surveys. The results of this will be made available to the Promoter, and any bodies as agreed at the consenting stage. The measures included in the Invasive Species Management Plan will be implemented. 	
References	
<ul style="list-style-type: none"> National Roads Authority (2010). Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads. National Roads Authority, Dublin. Appendix 5.2: Invasive Species Management Plan. 	

RF-BPM-02 Best Practice Measure	
Title:	Management of general non-native invasive species
Environmental Commitment	
To avoid the introduction, establishment and spread of non-native species to the afforestation lands during the planting and growth stages.	
Work Sections/Locations	
All sections	
Responsibility of	Role/Duty
Construction Manager	<ul style="list-style-type: none"> Requiring supply companies to clean delivery vehicles before entering the site to gain access to works area Obtaining and keeping a record of delivery companies cleaning of vehicles
Project Ecologist	<ul style="list-style-type: none"> Carrying out spot checks on flagmen during cleaning of delivery/site vehicles. Must be aware of the best practice guidance listed in References below.
Inspection and Cleaning of Delivery Vehicles	
<ul style="list-style-type: none"> Prior to arrival on site, the planting contractor's vehicles and equipment will be thoroughly cleaned and then dried using high-pressure steam cleaning, with water > 65 degrees C, in addition to the removal of all vegetative material. Items difficult to soak/spray will be wiped down with a suitable disinfectant (e.g. Virkon Aquatic). Evidence that all machinery has been cleaned will be required to be on file for review by the statutory authorities. Given that Crayfish Plague has affected rivers in the area recently (2017) the level of evidence required of the Contractor will be actual registration plates of vehicles onsite and a register of when, how and where each of these were cleaned before they arrived on site. The planting personnel will be responsible for inspecting and cleaning site/delivery vehicles both entering and exiting the site, and will receive training from the Project Ecologist in the correct techniques. The planting crew will be equipped with a 'disinfection box'. This will contain Virkon Aquatic or another proprietary disinfectant, a spraying mechanism, cloths or sponges, a scrubbing brush and protective gloves. Protective gloves will be worn when using any disinfectant solution. Visual inspections will be carried out on all machinery and equipment for evidence of attached plant or animal material, or adherent mud or debris. Any attached or adherent material will be removed before entering or leaving the site of operation, securely stored away from traffic for removal to the waste storage area in the Temporary Compound at the end of the work day. No removed material or run-off will be allowed to enter a water body of any sort. Following cleaning, all equipment and vehicles will be visually inspected to ensure that all adherent material and debris has been removed manually. Records of supplies and cleaning of site/delivery vehicles will be kept by Project Ecologist. Spot checks on the adequacy of cleaning will be carried out by the Project Ecologist. 	
Measures at or in watercourses	
<ul style="list-style-type: none"> Residual water in any containers/vessels used in works near watercourses will be flushed with disinfectant (Virkon Aquatic) onto grass. A drying period of at least 24 hours will be adhered to. Any observations of mass mortality of Crayfish will be reported to the relevant authorities within 1 hour of evidence being found. 	
Measures for white toothed shrew	

- ## References

- <http://www.fisheriesireland.ie/Research/invasive-species.html>
- <http://www.nonnativespecies.org/checkcleandry/>

RF-BPM-03 Best Practice Measure	
Title:	Best practice methods to ensure the protection of Viviparous lizard (<i>Lacerta (Zootoca) vivipara</i>)
Environmental Commitment	
To avoid effects on Viviparous lizard (<i>Lacerta (Zootoca) vivipara</i>) during the planting works.	
Work Sections/Locations	
All sections	
Responsibility of	Role/Duty
Project Ecologist	<ul style="list-style-type: none"> Monitor the planting works to ensure that mitigation measures are strictly adhered to. Must be aware of the best practice guidance listed in References below.
To avoid effects on Viviparous lizard.	
<ul style="list-style-type: none"> As Viviparous lizards are widespread in Ireland and can be found in a range of habitat types such as in bog, heath, the margins of coniferous woodlands, in addition to being common in a range of grassland habitats, particularly those not subject to heavy grazing pressure, a spot-check confirmatory survey by the Project Ecologist will be required within these habitats prior to the commencement of the planting stage to confirm the presence/absence of individuals. Capture and relocation operations for this species can be extremely labour-intensive and in most cases the most efficient approach is to cut down and rake-off vegetation during warm weather, with the intention of displacing the resident lizards prior to earthworks or other activities that could result in their incidental mortality (NRA, 2009). Whether or not reptile-proof fencing is then required to exclude the animals will need to be reviewed on a location-specific basis by the Project Ecologist. Note: The proposed development is beyond the geographical range of the non-native Slow-worm (<i>Anguis fragilis</i>), thus this species does not require mitigation within this Project. 	
References	
<ul style="list-style-type: none"> NRA (2009). Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes. National Roads Authority, Dublin. 	

Whole Upperchurch Windfarm Project

Natura Impact Statement for Whole UWF Project Elements 1 to 5

March 2018

Appendix A7: Project Information

Compiled Description of the consented Upperchurch Windfarm



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Appendix A7: Project Information Compiled Description of the consented Upperchurch Windfarm

A7 - 5.1 Introduction

An application for planning permission for Upperchurch Windfarm (UWF) was made to Tipperary County Council in January 2013. The windfarm was permitted by Tipperary County Council in January 2014 and the permission was upheld by An Bord Pleanála in August 2014. The application was accompanied by an EIA Report (known as EIS at the time) and Natura Impact Statement. The full planning documents for consented UWF can be found in **Volume F: Whole UWF Project Reference Documents**.

This Compiled Description of Upperchurch Windfarm, has been compiled from information in the original 2013 UWF EIS, in the 2013 Reply to Further Information, in the additional information submitted during the planning process and planning conditions attaching to the Grant of Permission, in order to present a description of the development, in the final form, as has been granted permission. This compilation chapter has been prepared in the same format as the Description of the Development chapters (Main EIA Report Chapter 5's) for the UWF Grid Connection, the UWF Related Works and the UWF Replacement Forestry in particular Sections 5.2, 5.3, 5.4 and 5.5. For ease of cross referencing the number system used here is also the same, i.e. A7-5.2, A7-5.3 etc. Figures and drawings are included at the end of this compilation document, and are as submitted as part of the consented Upperchurch Windfarm Planning Application.

The data and descriptions in this appendix have informed the environmental factor evaluations in the EIAR Main Report, in relation to the evaluation of cumulative effects of the subject development together with the other elements of the Whole UWF Project and with other existing or consented projects or activities.

Upperchurch Windfarm (UWF) is described in this compilation chapter, in the following order:

Appendix Sections	7	Section Heading	Relevant Individual Project Element
A7 -5.2		Characteristics of Upperchurch Windfarm (UWF)	Upperchurch Windfarm
A7-5.3		Life Cycle Stages of the UWF The durations and timing, main activities, personnel and material requirements for both the construction and operation stages. Any changes to the Project, such as decommissioning.	
A7-5.4		The use of natural resources, emissions and production of wastes for each stage.	
A7-5.5		The vulnerability of the Project to major accidents and natural disasters.	
A7-5.6		Figures and Mapping	

List of Figures for Appendix 7

Figure UWF-1: Location of Upperchurch Windfarm

Figure UWF 2: Wind Turbine Elevation

Figure UWF 3: Electrical Substation Compound Elevation View

Figure UWF 4: Proposed Internal Roads Details

Figure UWF 5: Site Entrance No. 1 (Graniera, R503)

Figure UWF 6: Turbine Component Haul Route

A7 - 5.2 Characteristics of Upperchurch Windfarm

Upperchurch Windfarm (UWF) will comprise 22 No. wind turbines, 2 No. meteorological masts, 22 No. turbine foundation and crane hardstanding areas, site roads and an electrical substation.

A7 - 5.2.1 Purpose of Upperchurch Windfarm (UWF)

These 22 No. wind turbines will produce 150 million kWh of green electricity, capable of supplying 23,000 houses in the region. The production of 150million kW/h per annum of green electricity will avoid the emission of 128,118 tonnes of greenhouse gases per annum which would have resulted from generating the same amount of electricity by fossil fuel plant. Unlike conventional power sources, the creation of electricity from the wind does not pollute the physical environment; it creates no contribution to climate change or acid rain and emits no radiation or nuclear waste.

A7 - 5.2.2 Location and overview description of UWF

The Upperchurch Windfarm site is located in the townlands of Graniera, Shevry, Knockcurraghbola Commons, Knockmaroe, Grousehall, Cummer, Foilnahan, Gleninchaveigh, Coumnageeha, Coumbeg, Knocknamena Commons, Glenbeg and Seskin. This is an area 2km west of Upperchurch village and 18km to the west of Thurles, County Tipperary.

The windfarm and ancillary works will be constructed on a series of small hills ranging in elevation from 280m to 401m OD, set out generally over four areas. The electrical substation will be constructed in Knockcurraghbola Commons and the wind turbines will be connected by underground cables to this substation. There will be two meteorological masts erected, one in Grousehall and a second in Knocknamena townlands. Ancillary Works will include borrow pits in Shevry, Knocknamena, Knockmaroe and Grousehall; 1 No. site entrance from the R503 Regional Road at Graniera; and 10 No. site entrances from local public roads, through and around the site, which will provide access to the windfarm.

Relevant Figures (contained at the end of this Appendix A7)

Figure UWF-1: Location of Upperchurch Windfarm

A7 - 5.2.3 Characteristics of UWF

Upperchurch Windfarm comprises:

- Consented UWF Turbines
- Consented UWF Substation
- Consented UWF Roads
- UWF Ancillary Works

Note: “Consented” prefixes each part of the already consented Upperchurch Windfarm in order to clearly identify the already consented elements of the whole windfarm project, throughout the project documents.

A7 -5.2.3.1 Consented UWF Turbines

Planning Permission has been received to develop 22 No. wind turbines of the three-bladed, tubular tower model, light grey in colour not exceeding an overall height of 126.6 metres and a hub height of 81.6 metres. The turbines will be constructed on concrete bases, 225m² in plan, with an adjacent concrete hardstand of 1040m² in plan area. There is no requirement for fencing of turbine areas. The turbines will be connected by underground cables to the Consented UWF Substation.

Relevant Figures (contained at the end of this Appendix A7)

Figure UWF 2: Wind Turbine Elevation

A7 -5.2.3.2 Consented UWF Substation

Planning Permission has been received to build an electrical substation at the windfarm, comprising an 110kV substation compound which includes a control building, main transformer and an end-mast enclosed in a compound by a palisade fence. The substation will measure 64m x 41m and will be 2624m² in plan area.

Relevant Figures (contained at the end of this Appendix A7)

Figure UWF 3: Electrical Substation Compound Elevation View

A7 -5.2.3.3 Consented UWF Roads

Planning Permission has been received to build 11.6km of windfarm access roads, comprising 8km of newly built, 5m wide roads and 3.6km of existing farm roads which will require upgrading and widening (average by 2m widening).

Relevant Figures (contained at the end of this Appendix A7)

Figure UWF 4: Proposed Internal Roads Details

A7 -5.2.3.4 Consented UWF Ancillary Works

A7 -5.2.3.4.1 Meteorological Masts

Planning Permission has been received to erect two meteorological masts with wind measuring equipment attached, not exceeding a height of 80 metres. One mast is permitted in Grousehall and the second in Knocknamena townlands.

A7 -5.2.3.4.2 UWF Site Entrances

Planning Permission has been received to develop 1 No. site entrance from the R503 Regional Road at Graniera, which is the main site entrance (No.1) and; 10 No. site entrances from Local Roads, through and around the site, which will provide access to the Consented UWF Roads and thereon to the wind turbines and substation.

Site Entrance No.1 at Graniera is an existing field gate on Regional Road R503. This entrance will be widened to satisfy the sightline requirements as set out in Table 10.1 of the North Tipperary County Development Plan 2010 (as amended).

During the operation phase, the other entrances from the Local Roads throughout the site will be used for operation and maintenance traffic, which will mainly be four wheel drive vehicles and vans. Site Entrance No.1 will be closed, except in the very occasional event of a replacement of a major component or for decommissioning the windfarm.

Relevant Figures (contained at the end of this Appendix A7)

Figure UWF 5: Site Entrance No. 1 (Graniera, R503)

A7 -5.2.3.4.3 Watercourse Crossing

The Upperchurch Windfarm site drains into streams that form the upper reaches of the Turraheen, Owenbeg, Clodiagh and Aughvana Rivers. One stream crossing will be required on the UWF site, to the north of Turbine No.4. Planning Permission has been received to construct a new permanent clear span bridge or bottomless culvert at this crossing point.

A7 -5.2.3.4.4 Drainage System

The Sediment and Erosion Plan, detailed in Appendix 15-I of the 2013 EIS, described the drainage measures which will be implemented during construction of UWF. The drainage plan will control erosion, minimise disturbance to the current hydrological regime and minimise suspended sediment loading to watercourses during construction.

Access tracks will be provided with drainage ditches to collect surface water runoff from the tracks and to ensure that road foundations are protected from standing water. Surface water drains will also be provided around hardstandings, foundations and the compound. Upslope drains will be constructed so as to keep clean water separate from runoff that may be contaminated by sediment. This is standard practice in the control of sediments in windfarm construction. Sediment traps will be used to ensure that all water discharged is clean.

A7 -5.2.3.4.5 UWF Site Compounds

Permission has been received to develop 2 No. site compounds, to be used during the construction phase of UWF. The location of these two site compounds is identified on **Figure UWF 1**.

Site Compound No. 1, will be the main site compound and is proposed for 170m inside of Site Entrance No. 1 (at Graniera). All construction and deliveries vehicles will access the site at Site Entrance No. 1. All vehicles will be fully clear of the public road before stopping at the compound. The compound will comprise sign-in hut; main site offices; parts storage area; employee/visitor parking; induction office; canteen (including self-contained fresh water tank and waste water tank); drying room; toilet cabin unit (including self-contained effluent tank and water storage tank); wheel wash area with siltation pond for wheel wash wastewater; concrete wash in a designated bunded and impermeable truck wash area with siltation pond for settling out of solids; and a bunded fuel storage area. Following construction, Site Compound No.1 and associated facilities will be removed and the area will be appropriately reinstated.

Site Compound No. 2 is proposed for an area around an unoccupied house, yard and outhouses, belonging to one of the windfarm landowners, in the centre of the site and 155m east of the windfarm sub-station compound. It is intended as a convenience area in the centre of the site. This smaller compound will comprise car parking and parts storage sheds. The unoccupied house will be converted to an office space, canteen and toilet facility for the windfarm construction personnel. This house already has water (ground water from a well) and sanitary facilities (septic tank).

A7 -5.2.3.4.6 [UWF Site Office](#)

Following construction, Site Compound No. 2 will be retained for use by the maintenance personnel for the operational phase of the Upperchurch Windfarm.

A7 -5.2.3.4.7 [Borrow Pits](#)

There are six borrow pits identified on the Upperchurch Windfarm site which will be used to quarry stone for the construction. Post construction, borrow pits will be backfilled and covered with topsoil and reseeded. The finished levels will follow the natural contours of the ground to prevent ponding and maintain the natural surface water flow. Depressions will be avoided to ensure surface water ponding does not occur.

A7 -5.2.3.4.8 [Forestry Felling](#)

Prior to construction, clear-felling of 4.4 hectares of conifer plantation will be required to facilitate the construction the proposed windfarm and associated infrastructure.

A7 -5.2.3.4.9 [Hedgerow Removal](#)

Approximately 980m of hedgerow along field boundaries will be removed as part of the construction of Upperchurch Windfarm infrastructure. 360m relates to suitable bat foraging habitat. To mitigate this loss of habitat, an equivalent amount of new hedgerow will be planted.

A7 -5.2.3.4.10 [Fencing](#)

The Consented UWF Substation will be fenced according to ESB regulation. There is no requirement for fencing of turbine areas as access can only be gained to the towers through a steel door which is locked at all times. There will be some agricultural fencing erected on the UWF site where required by the landowners and any existing fencing along farm boundaries will be restored.

During construction, buffer zones will be fenced off to protect environmental features, such as Recorded Monuments and watercourses. Sediment ponds will also require perimeter fencing and signage to ensure that there are no health and safety risks.

A7 -5.2.3.4.11 [Storage of Excavated Material](#)

Approximately 28,000m³ of topsoil and peat will be excavated as part of the construction of UWF.

Temporary engineered deposition areas will be designated and designed to hold temporary stockpiles which will be located away from drains and watercourses. Soil will be formed into bunds along the access roads and around the crane hardstand areas. These bunds will be constructed to a maximum height of 1.0m with a width at base of 3.0m and side slopes of 2:1. Bunds and stockpiles at risk of erosion, will be protected by silt trapping apparatus such as a geo-textile silt fences to prevent contaminated runoff.

A7 - 5.2.4 Environmental Project Measures which are part of the Consented UWF

The consented Upperchurch Windfarm includes a number of mitigation and management measures which will prevent likely significant effects occur to the receiving environment. These measures will be implemented through two separate Environmental Management Plans for the UWF; one for the construction stage and one for the early operational stage. A copy of these Plans was submitted with the 2013 RFI documents.

The Construction Environmental Management Plan will include:

- Surface Water Management Plan
- Ecological Management Plan
- Waste Management Plan
- Traffic Management Plan
- Construction Phase Environmental Monitoring Schedule
- Environmental Management Procedures (EMP) for:
 - Site Environmental Training and Awareness Procedure
 - Environmental Emergency Response Plan
 - Wheel Wash and Dewatering Procedure
 - Concrete Control Procedure
 - Fuel and Oil Management Plan
 - Surface Water management Plan
 - Traffic Management Plan
 - Protection of Archaeological and Cultural Heritage
 - Management of Excavation and Spoil
 - Management of Borrow Pits
 - Waste Management Plan
 - Air, Dust and Noise Management Plan
 - Site Reinstatement Procedure (post construction)
 - Monitoring and Auditing Procedure
 - Environmental Accidents, Incidents and Corrective Actions Procedure
 - Environmental Complaints Procedure
 - Environmental Monitoring Committee Procedure

The Early Operational Phase Environmental Management Plan will include:

- Ecological Management (Post Construction)
- Operation Phase Environmental Monitoring Schedule
- Environmental Management Procedures (EMP) for:
 - UWF-EMP-OP-1: Monitoring and Auditing Procedure
 - UWF-EMP-OP-2: Site Reinstatement Procedure (post construction)
 - UWF-EMP-OP-3: Procedure for Ecological Management (Post Construction)

The following planning conditions, which formed part of the 2014 Grant of Permission will be included, as relevant, in the Environmental Management Plans:

- Condition-1: The development shall be carried out and completed in accordance with the plans and particulars lodged with the application.
- Condition-2: All environmental mitigation measures set out in the Environmental Impact Statement, Natura Impact Statement and associated documentation shall be implemented in full.
- Condition-6: Prior to commencement of construction, details of the phasing of the construction works shall be agreed with the National Parks and Wildlife Service.
- Condition-10: The construction works shall be carried out in accordance with construction details submitted to the planning authority, including the Construction Management Plan.
- Condition-11: Wind Turbine noise arising from the development shall not exceed stated levels.
- Condition-12: Wind Turbine shadow flicker arising from the development shall not exceed stated levels.
- Condition-13: In the event that the development causes interference with telecommunications signals, effective measures shall be introduced to minimise interference.
- Condition-15: The management of drainage and surface water during the construction stage shall be in accordance with the details submitted in the Construction Management Plan, the Ecological Management Plan and the Environmental Management Plan. Furthermore revised drawings shall be submitted to the planning authority prior to commencement showing compliance with condition 15 regarding fuel storage, designated refuelling areas, wheel wash areas and concrete wash areas.
- Condition-16: There shall be no new provision for discharge of foul effluent on site without a prior grant of planning permission.
- Condition-17: Prior to construction between mid-March and mid-August, a survey for breeding hen harriers shall be carried out. Taking account of the results of this survey, no construction works shall be carried out within the above period within 500m of a pre nesting breeding site, except with the written approval of the National Parks and Wildlife Service.
- Condition-18: The Ecological Management Plan submitted shall be implemented in full. A timescale of enhancement of foraging areas, rush management, hedgerows enclosures and trees and land management shall be agreed with the planning authority following consultation with the National Parks and Wildlife Service prior to commencement. A programme of ongoing surveys and monitoring in years 2 and 3 after commencement of the operation of the turbines shall be submitted and agreed in writing with the planning authority following consultation with the National Parks and Wildlife Service prior to commencement.
- Condition-19: Details as outlined in the Ecological Management Plan shall be implemented. A timescale for implementation shall be submitted and agreed in writing with the planning authority following consultation with the National Parks and Wildlife Service prior to commencement.
- Condition-20: The developer shall facilitate the archaeological appraisal of the site and shall provide for the preservation, recording and protection of archaeological materials or features. This will allow for an onsite archaeologist, in consultation with the National Monuments Service and the National Museum of Ireland, to monitor groundworks and stop works in the event of any archaeological features or objects being uncovered during excavation works, and will ensure that any features or objects uncovered will be correctly recorded and/or preserved, in consultation with the National Monuments Service and the National Museum of Ireland.

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- Condition-21: Mitigations measures submitted for the protection of water quality shall be implemented in full and according to best practice guidelines. The works shall be supervised as set out in the Construction Management Plan. In the event of a water pollution incident or damage the relevant authorities shall be immediately notified and works cease until authorized to continue. A programme of hydrographic monitoring shall be carried out over a period commencing pre-construction and concluding in year 3 of the operational phase of the development.
 - Condition-23: The developer shall lodge a cash deposit/bond to secure the reinstatement of public roads that may be damaged by the transport of materials to the site.

A7 - 5.3 Life Cycle Stages of Upperchurch Windfarm

A7 - 5.3.1 Construction Stage of Upperchurch Windfarm

A7 -5.3.1.1 Duration & Timing

The construction timetable is detailed in Table 1 below;

Table 1: Duration and timing of the construction of the Upperchurch Windfarm

Activities	Duration	Timing of Activities
<ul style="list-style-type: none">• Civil works• Delivery and erection of wind turbines• Electrical works• Commissioning of the electrical works.	6 months	Projected Start Date: 2018/2019
<ul style="list-style-type: none">• Electrical Works<ol style="list-style-type: none">1. (carried out in conjunction with the civil works)	4 months	
<ul style="list-style-type: none">• Turbine Erection and commissioning<ol style="list-style-type: none">2. (turbines are normally installed when the majority of the civil works are completed)	16 weeks	

A7 -5.3.1.1.1 Construction Hours of Work

Normal construction times will be 07.00 to 19.00hrs Monday to Friday and 08.00 – 16.30hrs on Saturdays.

A7 -5.3.1.1.2 Scheduling of Works

To protect residential amenity, surface water quality and biodiversity, the following timing or scheduling of works will be implemented according to planning conditions No. 6 and No. 17 per;

Condition No. 6: Prior to commencement of construction, details of the phasing of the construction works shall be agreed in writing with the planning authority, following consultation with the National Parks and Wildlife Service. **Reason:** In the interest of the protection of the environment.

Condition No. 17: Prior to the carrying out of any construction works between mid-March and mid-August, a survey for breeding hen harriers shall be carried out by a competent, experienced ornithologist. The survey will cover the area within 500 metres of the works to be carried out during the above period. It will be the responsibility of the ornithologist to ensure that the survey methodology is sufficient to ensure that a hen harrier breeding site is not overlooked. Taking into account the results of this survey, no construction works shall be carried out within the above period within 500 metres of a pre nesting breeding site and/or nest, except with the written approval of the National Parks and Wildlife Service. **Reason:** In the interest of the protection of the environment and of the habitat of the hen harrier species.

A7 -5.3.1.2 Construction Personnel

During the construction stage, c.277 persons will be engaged in the civil, electrical, project management, legal and financial services, material supply and component deliveries for UWF, approximately 100 people will work on-site during construction.

A7 -5.3.1.2.1 Construction Personnel Welfare Facilities

Welfare facilities will be available at Site Compound No. 1 (adjacent to Site Entrance No. 1) and Site Compound No. 2 (in the centre of the site).

A7 -5.3.1.3 Construction Stage Activities

The Construction stage of the windfarm will include the following activities

- Clearance and construction of hard-core area for temporary compound and mobilisation of site offices including bunded area for fuel and diesel tanks.
- Construction of new access roads and hardstandings including installation of drainage per the Surface Water Management Plan.
- Installation of meteorological mast.
- Excavation of the turbine bases and storage of soil locally for backfilling and re-use.
- Place blinding concrete to turbine bases. Fix reinforcing steel and anchorage system for turbine tower section. Construct shuttering and fix any ducts to be cast in. Pour and cure concrete for turbine bases. Excavate cable trenches; lay cables and backfill.
- Erect towers, nacelles and blades.
- Complete earthings to towers and complete backfilling to foundations.
- Construction of substation compound, install the electrical and telecom plant, test and commission the plant.
- Provide any gates, landscaping and signage and complete any site works outstanding.
- Reinstate the site including removal of the two temporary compounds; reinstatement and landscaping of the two temporary compound hardstands; reinstatement of road verges (use of soil); reinstatement of any temporary construction hardstands; reinstatement of the site borrow pits and; replacement and renewal of hedgerows.
- Provision of the as-constructed tip heights and co-ordinates of the turbines and wind monitoring mast to the planning authority and the Irish Aviation Authority.

A7 -5.3.1.4 Use of Machinery and Equipment

The machinery, equipment and tools to be used during construction are listed on Table 2.

Table 2: Construction Machinery, equipment and tools

Construction Machinery	Equipment and Tools
30-50T Excavators; Low ground pressure excavators (Bogmaster); Mobile cranes for construction; Cranes (1 main, 1 assist) Erection 120t to 800t; Dump trucks; Tractors and trailers; 12t Rollers; Crushers; Screener;	Rebar/shuttering/ precast units/concrete pipe/box culverts Double contained fuel bowzers; Diesel powered generators; and Water bowzers Hand tools Silt traps, silt fences Spill Kits Fencing Materials – post and wire

A7 -5.3.1.5 Use of Hydrocarbons

The plant and equipment that will be used during the construction stage will be run on hydrocarbons. Mobile equipment will require regular refuelling from a fuelling station which will be located in a designated impermeable bunded area, drained through an oil interceptor at Site Compound No.1 (adjacent to Site Entrance No. 1).

A7 -5.3.1.6 Other Facilities - Fuel Storage

According to **Planning Condition No. 15**: The management of drainage and surface water during the construction stage of the development shall be in accordance with the details submitted in the Construction Management Plan, the Ecological Management Plan and Environmental Management Plan.

Furthermore:

- (a) all oils and fuels shall be stored in an area bunded to 110% of the total volume of stored oils and fuels,
- (b) Re-fuelling or machine servicing shall take place only within designated impermeable bunded areas, which shall be drained through an oil interceptor,
- (c) a wheel wash shall be provided within the site, near the entrance to the public road, and
- (d) an appropriately sized facility shall be provided on site for concrete washings.

Revised drawings showing compliance with these requirements shall be submitted to, and agreed in writing with, the planning authority prior to commencement of development.

Reason: In the interest of maintaining water quality.

Site Compound No. 1 will contain all the facilities listed from (a) to (d) above. Hydrocarbon use and storage during construction will be managed under a Fuel and Oil Management Plan.

A7 -5.3.1.7 Imported Construction Materials

The materials identified in Table 3 will be imported onto UWF site.

Table 3: Quantities, type and source of construction materials

Materials	Quantity	Likely Source of Materials
Aggregate (crushed stone)	4,010 No. loads.	Most expected to be won on-site with some capping stone grades imported from the local quarry at Shanballyedmond, Rear Cross
Reinforcing Steel (rebar)	15 No. loads	Various Irish Suppliers
Concrete	950 No. loads	Roadstone Killough, Co Tipperary
General building materials	5 No. loads	Various Irish Suppliers
Electrical plant and Switchgear	14 No. loads	EU Various Suppliers
Turbine towers	66 No. loads	Via Foynes Port
Turbine Nacelles	44 No. loads	Via Foynes Port
Turbine Blades	66 No. loads	Via Foynes Port
Generators, gearboxes and transformers	22 No. HGV loads	Via Foynes Port

Relevant Figures (contained at the end of this Appendix A7)

Figure UWF 6: Turbine Component Haul Route

A7 -5.3.1.8 Construction Stage: Traffic Management

The Appointed Contractor will prepare a detailed Traffic Management Plan prior to the works commencing. This Plan will be finalised in agreement with the Gardaí and the Local Authority.

A7 -5.3.1.8.1 Construction Stage: Material and Delivery Traffic Management

Aggregate and Concrete

HGV loads of aggregate, concrete and public road dressing will be delivered directly to construction works areas. These HGVs will travel to the works areas using both the regional and local road networks, on specified haul routes. These haul routes have been agreed with the Area Roads Engineer.

Other Construction Material

Other materials, such as ducting, geotextile and other construction materials, will be transported to the Upperchurch Windfarm Site Compound No.1. From this point the construction vehicles will access the full site using newly built windfarm roadways, upgraded farm and forestry tracks and site entrances from the Local Road network within the site area.

A7 - 5.3.2 Operational Stage of Upperchurch Windfarm

A7 -5.3.2.1 Duration and Timing of Operational Stage

The duration and timing of the operational stage of the Upperchurch Windfarm, as per Condition 4 of the Grant of Permission (PL.22.243040) is set out in Table 4;

Table 4: Duration of Operation Stage

Description	Duration & Timing
Operating Upperchurch Windfarm	25 years from the date of commissioning of the wind turbines (Condition 4)

A7 -5.3.2.2 Operational Personnel

There will be 8 permanent jobs created in operation and maintenance activities, legal, electricity sales and asset management relating to UWF. Four maintenance personnel will be employed at the windfarm site to service, maintain and monitor the turbines for operational safety and performance.

A7 -5.3.2.2.1 Welfare Facilities

Following construction, Site Compound No. 2 will be retained for use by the maintenance personnel for the operational phase of the Upperchurch Windfarm. The unoccupied house will be converted to an office space, canteen and toilet facility for the maintenance personnel. This house already has water (ground water from a well) and sanitary facilities (septic tank).

A7 -5.3.2.3 Operational Activities

UWF will be maintained in good working order throughout the operational stage. The operational stage will involve:

- Daily remote monitoring of wind turbine performance by the owner's operator,
- Visits by maintenance crews to carry out scheduled and unscheduled maintenance and repairs,
- Occasional replacement of major components,
- Monitoring and surveying of sensitive aspects of the local environment, and the establishment of the Upperchurch Hen Harrier Scheme, as set out in Appendix 5.6: Description of the UWF Other Activities.

A7 -5.3.2.4 Use of Machinery and Equipment

The machinery and equipment listed in Table 5 will be used during the operational stage.

Table 5: Use of Machinery and equipment during the Operation Phase

Machinery	Equipment	Materials
<ul style="list-style-type: none">• Light 4-wheel drive vehicle• Cranes and hoists for major component replacement and repairs	<ul style="list-style-type: none">• Specialist electrical and mechanical tools• Testing equipment	<ul style="list-style-type: none">• Replacement turbine parts• Replacement electrical or communication parts

A7 -5.3.2.5 Use of Hydrocarbons

A small volume of hydrocarbons will be used on the windfarm during operational activities and is limited to the diesel or petrol fuel used by the site vehicles and machinery and any mobile generators used. Mechanical oils and grease will be used during maintenance of the turbine and electrical equipment. These will be brought on-site and receptacles removed by the O&M personnel.

A7 -5.3.2.6 Welfare & Other Facilities

Site Compound No. 2 with a car parking area, parts storage sheds and a refurbished house (which includes already existing provisions for sanitary facilities) will be retained for use as the Upperchurch Windfarm Site Office during the operational phase. There will be no requirement for fuel storage during the operational stage, with any fuels being brought onto site as required.

A7 - 5.3.3 Changes to the Upperchurch Windfarm

In the Grant of Permission (PL.22.243040), Condition 4 outlines the duration of operation of the windfarm, and potential for decommissioning at the end of the operational period, and Condition 22 outlines the requirements for decommissioning of the Upperchurch Windfarm:

Condition 4: The permission shall be for a period of 25 years from the date of the commissioning of the wind turbines. The wind turbines and related ancillary structures shall then be decommissioned and removed unless, prior to the end of the period, planning permission shall have been granted for their retention for a further period.

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

A7 -5.3.3.1 Decommissioning Activities (if required)

Decommissioning will involve the removal of all the turbines, removal of the above ground turbine foundation elements and covering the hardstanding areas with topsoil and reseeded. Any roads or hardstands that are not required by the landowner for farm use, can be covered with topsoil and reseeded also. There is a significant amount of soil in the roadside bunds, excavated for road construction and drainage. This topsoil will be used to infill associated roadside drainage for elements being removed and the remaining soil will be used for hardstands and foundations. The topsoil will be replaced to re-establish the original depth and to match the original surface contours where possible. To minimise the environmental impact, the access roads of UWF were designed to use and upgrade suitable existing agricultural tracks. At the decommissioning stage the access roads can be removed, however it is expected that they will be retained in situ as an integral part of the infrastructure for use by the landowner as farm tracks. If it is decided at the time of decommissioning that tracks are to be removed, the underlying material will be treated to relieve compaction and / or to promote re-vegetation. This may include the careful manipulation of the soil or building up ground levels with additional topsoil.

Cabling will be isolated and left in-situ underground. The substation compound includes an ESB control room and a windfarm owned control room. It is most likely that the substation will remain after the wind farm site is reinstated. Any equipment associated with the wind farm side of the substation will be electrically isolated and removed off site and disposed of appropriately. If at the decommission stage the planning authority requests the substation is screened, a stand of conifer trees can be planted around the substation.

The wind farm infrastructure is predominantly located in areas of improved agricultural grassland. Any reseeded of lands will be agreed with the landowner to ensure consistency with the surrounding land uses. In areas of felled forestry, acid and wet grass land, heath and bog, these areas will be allowed to naturally revegetate and be managed for nature conservation purposes. Monitoring of the reinstated areas will be undertaken following the completion of decommissioning works to confirm the successful reinstatement of the vegetation, the turbine foundation and hardstand areas and possibly the access tracks. A monitoring period, of two years, will allow for the observation of the reestablishment of the flora. This will ensure remedial action is taken as necessary, which may include further reseeded as required.

A7 - 5.4 Use of Natural Resources Emissions and Waste

A7 - 5.4.1 Use of Natural Resources

The resources which will be imported onto the Upperchurch Windfarm site or which will be obtained from within the site during the development of the Upperchurch Windfarm are described below.

To facilitate the evaluation of the use of natural resources for the whole UWF project, the information on the Use of Resources for the Upperchurch Windfarm is presented in the same format as the Use of Natural Resources for UWF Grid Connection, UWF Related Works, UWF Replacement Forestry and UWF Other Activities.

A7 -5.4.1.1 Use of Resources: Land

In order to safely accommodate the construction works and construction traffic, the land requirement for the construction of the Upperchurch Windfarm is greater than for the operation of the Upperchurch Windfarm.

In total Upperchurch Windfarm works will take place on 56.3 hectares of land within construction works areas, as follows; 12.8ha of farm roads, 33.7ha of agricultural land, 9.8ha of forestry land. The use of the lands by the landowner will be controlled during construction for safety reasons.

Following construction, the lands within the construction works areas will be returned to the landowner for their own use with the exception of 6.4ha of lands at the hardstandings areas associated with the Consented UWF Turbines, the Consented UWF Substation and the meteorological masts, and the keyhole felled areas of forestry around the Consented UWF Turbines. Of these 6.4ha of lands; 2.6ha of agricultural lands and 3.5ha of forestry lands will change use to utility for the duration of the operation of the Upperchurch Windfarm; 0.3ha of agricultural land will permanently change use to utility at the Consented UWF Substation. Of the lands returned to use by the landowner; 2.3ha of these lands will change use from agricultural lands (1.5ha) or forestry lands (0.8ha) to access road.

6.1ha of lands associated with the hardstandings areas at the Consented UWF Turbines, the meteorological masts, and the keyhole felled areas of forestry around the Consented UWF Turbines will be returned to agricultural use (2.6ha) and forestry use (3.5ha).

A7 -5.4.1.2 Use of Resources: Biodiversity

A7 -5.4.1.2.1 Field Boundaries – Earthen Banks/Hedgerow/Trees

In total 980m of hedgerow/field boundaries will be removed to facilitate the construction of the UWF, of which 360m of hedgerow will be removed from works areas for the protection of bats. In order to provide alternative bat and bird habitat and **equivalent length of new hedgerow** will be planted, with native species, to mitigate this loss of habitat. Existing hedgerows in poor condition will be planted with native species to increase their ecological value.

A7 -5.4.1.2.2 Forestry Felling

In total 4.4 hectares of coniferous forestry will be permanently felled, under a felling license from the Forest Service. Forestry felling will be carried out prior to the construction works beginning and outside of the bird breeding season. No further forestry felling will be required during the operational stage.

A7 -5.4.1.3 Use of Resources: Water

A7 -5.4.1.3.1 Potable Water and Non-Potable Water

Bottled drinking water will be imported and stored in the canteen at Site Compound No.1. At Site Compound No.2, drinking water will be drawn from the existing well associated with the old house.

Non-potable water for hand washing or toilet flushing will be imported to Site Compound No.1 from a local municipal supply and stored in water holding tanks for the toilet and wash facilities. Non-potable water will be sourced from the existing well associated with the old house at Site Compound No.2.

Operational stage water requirements are limited to potable and non-potable water, both of which will be available at the Upperchurch Windfarm Site Office at Site Compound No.2, which is an existing dwelling which will be refurbished to accommodate the windfarm worker's welfare facilities. The decommissioning stage water requirements will be similar to the Operational Stage and will be provided at the Upperchurch Windfarm Site Office.

A7 -5.4.1.3.2 Dewatering of Excavations

It is likely that groundwater will need to be pumped from turbine excavations, mostly during very wet weather. De-watering, if required, will be carried out using mobile diesel generator water pumps. Water will be settled in a settlement pond and silt trap, before being released to the surrounding downslope vegetation. Dewatering will only be carried out at a flow rate that is within the capacity of the sediment pond.

A7 -5.4.1.4 Use of Resources: Soils

A7 -5.4.1.4.1 Excavated Soils

Construction of UWF will result in the removal of soil, subsoil, peat and rock in parts of the site in order to facilitate the construction of access roads, crane hard standings, substation compound and turbine bases. Approximately c.25,500m³ of topsoil, c.79,600m³ of subsoil and c.2,900m³ of peat will be excavated from the works areas. It is estimated that up to 43,000m³ of rock will be excavated from the on-site borrow pits to construct the Upperchurch Windfarm Roads and hardstanding areas.

A7 -5.4.1.4.2 Permanent Storage

It is estimated that up to 52,000m³ of soils will be permanently stored in bunds along Consented UWF Roads and at Consented UWF Turbines hardstanding areas and around the met mast areas.

A7 -5.4.1.4.3 Temporary Storage

The remaining excavated material will be temporarily stored, within the construction works area. Topsoil, subsoil and rock will be stored separately, with as much surface vegetation left intact on the topsoil layer as possible. The excavated material will be used to backfill, reinstate and landscape the works areas.

A7 -5.4.1.4.4 Imported Rock

If additional rock to that won on the Upperchurch Windfarm site (higher grade for road capping for example) then this will be imported from the local Rear Cross Quarry.

A7 -5.4.1.4.5 Operational/Decommissioning Stage

No excavations of soils will be required during the routine operation of the Upperchurch Windfarm or during the decommissioning stage. The foundations will be left in situ to avoid disturbance of the lands. The soils stored in the bunds alongside Consented UWF Roads and at Consented UWF Turbines hardstands will be used to reinstate the turbine hardstanding areas, met mast areas.

A7 - 5.4.2 Upperchurch Windfarm: Emissions

The emissions associated with the Upperchurch Windfarm are described below.

To facilitate the evaluation of emissions associated with the whole UWF project, the information on Emissions for UWF is presented in the same format as the Emissions associated with UWF Grid Connection, UWF Related Works, UWF Replacement Forestry and UWF Other Activities.

A7 -5.4.2.1 Emissions

A7 -5.4.2.1.1 Dust

Dust may arise during the construction stage, due to the transportation of aggregate to the Upperchurch Windfarm site, the movement of excavated material within the site and from stored excavated materials at the works areas, particularly during dry and windy weather. The potential for dust emissions and the effect on Air Quality has already been assessed by the An Bord Pleanála Inspector. In the Inspector's Report 2014 no significant impacts to Air quality were identified and any dust impacts considered 'temporary in nature and confined to the immediate area'.

Excavations on UWF, and therefore dust emissions, during the operation or decommissioning stages will be negligible and will be limited to the roads and turbine hardstanding areas.

A7 -5.4.2.1.2 Vehicle Exhausts

During construction, operating machinery used during the construction stage will be run on hydrocarbons and will emit nitrogen dioxide and other greenhouse gas emissions during their operation. The potential for fugitive emissions from site machinery and increased traffic has already been assessed by the An Bord Pleanála Inspector. In the Inspector's Report 2014 no significant impacts to Air quality are identified and any vehicle emission impacts are considered 'temporary in nature and confined to the immediate area'.

During operation, the presence of vehicles on UWF, and therefore nitrogen dioxide and other greenhouse gas emissions, during operation is negligible with a light four wheel drive vehicle used on site by maintenance crews, and occasionally the use of cranes and HGV's delivering replacement parts.

A7 -5.4.2.1.3 Noise

During construction, heavy machinery and vehicles which will be used at works areas during the construction stage will emit noise during their operation, noise will also be emitted from certain construction activities such as excavation or rock breaking or by mobile generators which may be used at work areas. The potential for noise emissions effects during the construction stage has already been assessed by the An Bord Pleanála Inspector. The Inspector's Report 2014 states 'exceedance of permitted levels will occur during the construction phase ... but I note that there is no house within 200m of the construction works'.

During operation, the Consented UWF Turbines will emit noise during their operation. An evaluation of the likely noise impact of the Consented UWF Turbines has already been carried out by a competent expert, in accordance with methodology described in ETSU-R-97, Assessment and Rating of Noise from Wind Farms. The potential for noise emissions effects during the operational stage has already been assessed by the An Bord Pleanála Inspector. The Inspector's Report 2014 states that 'the development will impact in relation to noise as there will be a rise in noise levels from the current ambient noise levels associated with a rural area for many of the houses and sensitive receptors in the general and study area. The level of increase will however be within permitted levels for the most part even in a worst case scenario.'

During decommissioning: Very low levels from dismantling activities and reinstatement works, no effects expected to local residents due to the low levels combined with the distances to nearest residences.

A7 -5.4.2.1.4 Vibration

Construction works, including excavations and the use of heavy machinery will cause low levels of ground vibration. The potential for vibration effects has already been appraised in the Revised Vibration Impact Assessment, 2013 EIS, where it state: 'Once operational there will be no significant sources of vibration' from UWF.

Once operational there will be no significant sources of vibration from UWF. There will be no sources of vibration during the decommissioning works.

A7 -5.4.2.1.5 Light

Construction activities will only be conducted during daylight hours. Therefore no lights are required at construction works areas at the Upperchurch Windfarm.

During operation, the turbines will be fitted with red coloured intermittent lighting. The potential for disturbance and collision effects on bats has already been evaluated in the EIS 2013, and considered 'not significant'.

All decommissioning activities will take place during daylight hours, no requirement for lights.

A7 -5.4.2.1.6 Electromagnetic Radiation:

No emissions of electromagnetic radiation will occur during the construction or decommissioning stages.

Operational Stage; Low frequency electrical and magnetic fields (EMF) will be present anywhere electricity is generated, distributed or used and therefore these fields are a common occurrence in everyday life. The operational Consented UWF Turbines will be a source of very low frequency (50Hz) electromagnetic fields. Electromagnetic radiation emissions will not be at levels to cause significant effects at the turbine locations, and no effects will occur at local residences.

A7 - 5.4.3 Upperchurch Windfarm: Waste

The wastes which will arise at UWF are described below. The greatest potential for waste occurs during the Construction stage of the windfarm. Wastes which result from the construction, operation and decommissioning of UWF will be managed under a Waste Management Plan.

A7 -5.4.3.1 Waste Water

During construction, self-contained toilets, with integrated waste water storage tanks, will be provided for construction workers at Site Compound No.1, Waste from toilets will be taken from site on a regular basis by approved contractors and disposed of in an authorised facility in accordance with best practice. At Site Compound No 2. an existing septic tank will be used to treat waste water at Site Compound No.2. .

During operation, Toilet facilities for operational personnel will be provided at the permanent Site Office (identified as Site Compound No.2 during construction). Waste water will be treated in the existing septic tank associated with the building.

Toilet facilities for decommissioning personnel will be provided at UWF Site Office (identified as Site Compound No.2 during construction). Waste water will be treated in the existing septic tank associated with the building.

A7 -5.4.3.2 General Waste and Chemical Waste

Construction phase waste may consist of hard-core, stone, concrete, steel reinforcement, shuttering timber and unused oil and diesel. Wastes will be segregated and stored in the allocated tanks, bins, skips or areas at Site Compound No.1. The Appointed Contractor must finalise all storage areas and organise the relevant licensed contractors for the appropriate waste collections. The Appointed Contractor will ensure all permits and licences are in place and maintain relevant copies in the site office.

Very small quantities of chemical waste may be generated during the construction stage, this waste is limited to solid waste oil, such as oily rags. Waste oils and hydraulic fluids will be collected in leak-proof containers and removed from the site for disposal or re-cycling. The Appointed Contractor will ensure all permits and licences are in place and maintain relevant copies in the site office.

Wastes arising during the operating phase include but are not limited to lubricating oils, cooling oils and packaging from spare parts. The containment and disposal of such oils will be carried out in a safe manner by an approved contractor. Such operations will be carried out in accordance with the Waste Management (Hazardous Waste) Regulations, 1998 (as amended). The remaining wastes will all be removed from UWF and reused, recycled or disposed of in an authorised facility in accordance with best practice.

Wastes arising during decommissioning will include packaging, turbine and transformer oils and some fiberglass. All waste generated during the decommissioning phase will be taken off the UWF site and disposed of appropriately.

A7 -5.4.3.3 Arisings

No arisings will occur, as the construction of UWF will not involve the excavation of the public road network.

A7 -5.4.3.4 Decommissioned Windfarm Components

The electrical components and the decommissioned turbines can be sold as second hand plant, because these components have a designed life in excess of the wind farm planning permission; i.e. greater than 25 years. If they are not sold as s/h working plant then all steel and electrical plant can be recycled.

The blades are mainly made up of composite materials, which can be incinerated for electricity generation/direct heat or disposed of in landfill. Production methods for the blades in modern turbines principally involves the use of epoxy composites. This method helps to reduce emissions from organic solvents, thus appreciably reducing impact on the environment at the production and disposal stage.

General and hydrocarbon wastes generated during the decommissioning phase will be taken off site and disposed of in an appropriately licenced facility.

Welfare facilities for decommissioning personnel will be available at the Windfarm Site Offices at formerly Construction Site Compound No. 2.

A7 - 5.5 The Vulnerability of UWF to Major Accidents and Natural Disasters

Major accidents or natural disasters which have the potential to affect the Upperchurch Windfarm are described hereunder. The vulnerability (exposure and resilience) of the UWF to major accidents and disasters and the risk of these accidents or disasters is classified according to the *Guide to Risk Assessment in Major Emergency Management* (DoEHLG, 2010).

A7 - 5.5.1 Vulnerability to Major Accidents

It is clear from the EIA Directive that ‘major accident’ mainly applies to notified Seveso establishments which operate under the Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015, where Dangerous Substances are identified in Schedule 1.

The consented Upperchurch Windfarm **is not vulnerable to Major Accidents**, due to the minimal volumes of the Dangerous Substances which will be used, limited to small volumes of diesel fuel used by vehicles during the construction and operation of the windfarm, and small volumes of oils and grease used during turbine maintenance. Furthermore there are no Seveso sites in proximity to the UWF, the closest being Grassland Agro in Limerick and MSD (pharmaceutical) in Kilsheelan, near Clonmel, Co Tipperary.

A7 - 5.5.2 Vulnerability to Natural Disasters (High Winds, Land slippage, Flooding)

Natural disasters which could potentially affect the Upperchurch Windfarm include land slippage and flooding. The likelihood of these natural disasters occurring is discussed below, with likelihood of the natural disaster occurring rated according to the DoEHLG 2010 Guidelines. The risk classification tables are included in [Appendix 2.2: EIAR Descriptive Terminology](#).

A7 -5.5.2.1 High Winds

In recent years, high wind events including hurricane force winds, have become more frequent in Ireland, and have resulted in major damage and loss of life. However, it is considered that the Upperchurch Windfarm is **not vulnerable to high wind events**, as the wind turbines which will be installed at the Upperchurch Windfarm will all be the highest specification turbine (IEC Class 1A turbines), and will easily tolerate hurricane force winds. Due to the design of the windfarm (Class 1A turbines), it is considered that windfarm the likelihood of an accident occurring due to high winds is **Extremely Unlikely**.

A7 -5.5.2.2 Land-Slippage

It is considered that the Upperchurch Windfarm is **not vulnerable to land slippage**. During site investigations for the 2013 EIS, geotechnical surveys undertaken at the windfarm site, all parts of the site were examined, no stress indicators were identified and there is no evidence of historical peat slides in the area. The conclusions of the 2013 EIS were that there is a very low risk of slippage or landslides on the Upperchurch Windfarm site because of the stable sub-surface ground conditions and the absence of any significant peat coverage. Furthermore, the windfarm infrastructure is not considered vulnerable to land slippage due to the construction of the infrastructure in competent ground. Therefore it is considered that the likelihood of land slippage disaster occurring on the windfarm site is **Extremely Unlikely**.

A7 -5.5.2.3 Flooding

In recent years, high rainfall events and subsequent flooding have become more frequent in Ireland. Where complete the Catchment Flood Risk Assessment and Management (CFRAM)¹ OPW Flood Risk Assessment Maps are now the primary reference for flood risk planning in Ireland and supersede the Preliminary Flood Risk Assessment Maps (PFRA) maps. CFRAM mapping is not currently available for the area of the Upperchurch Windfarm site and therefore the PFRA maps have been examined and these show that all of the construction works areas and permanent infrastructure (roads, turbine hardstands, substation compound) are located in Flood Zone C (Low Risk) – where the probability of flooding is low (less than 0.1% or 1 in 1,000). Therefore it is considered that the likelihood of flooding disaster affecting the Upperchurch Windfarm site is **Unlikely**.

A7 - 5.5.3 Consequences of Natural Disasters Occurring

The consequence of the impact if the event occurs is described here.

Due to the low number of personnel working on-site at any one location, the consequence of any high wind, flooding or land slippage events, if they did occur, is considered to be **Limited**.

Due to the low number of people living or working locally, the consequence of any high wind, flooding or land slippage events, if they did occur, is also considered to be **Limited**.

The consequences to water quality due to land slippage or flooding could be **Serious** due to the widespread effects and extended duration of sedimentation effects in downstream watercourses.

A7 - 5.5.4 Overall Risk

When the likelihood and the consequence of a potential high wind, land slippage or flooding event occurring is applied to the risk matrix from the DoEHLG 2010 guidelines, a broad indication of the critical nature of each risk can be determined.

In relation to on-site personnel and other people in the locality, a high wind, land slippage or flooding event would be classed a 'normal emergency' - based on a likelihood rating of Extremely Unlikely and a consequence rating of Limited.

In relation to downstream water quality, due to the higher level of effect (Serious) on water quality a land slippage or flooding event could be a major emergency. According to the DoEHLG 2010 guidelines, both flooding and landslip events would be at the lowest extreme of 'major emergency'.

A7 -5.5.4.1 Mitigation Measures

The installation of the highest specification IEC Class 1A turbines at the Upperchurch Windfarm site will ensure that high wind events do not cause turbine failure at the site.

No measures are required for land slippage risk. In relation to flooding, no instream works are required for the windfarm, with a clearspan bridge being constructed over the 1 no. stream onsite. In addition, flood

¹ CFRAM is Catchment Flood Risk Assessment and Management. The national CFRAM programme commenced in Ireland in 2011, and is managed by the OPW. The CFRAM Programme is central to the medium to long-term strategy for the reduction and management of flood risk in Ireland.

attenuation measures are built into the project through drainage system design, these measures will prevent any increase in discharge rates and associated flooding risk, downstream of the windfarm.

Should a disaster occur, unconnected to the project but in the locality – the above mitigation measures already designed into the project will ensure that the project will not make the consequences of the event worst. In addition the presence of the project will not increase the likelihood of such an event occurring.

Figure UWF-1: Location of Upperchurch Windfarm

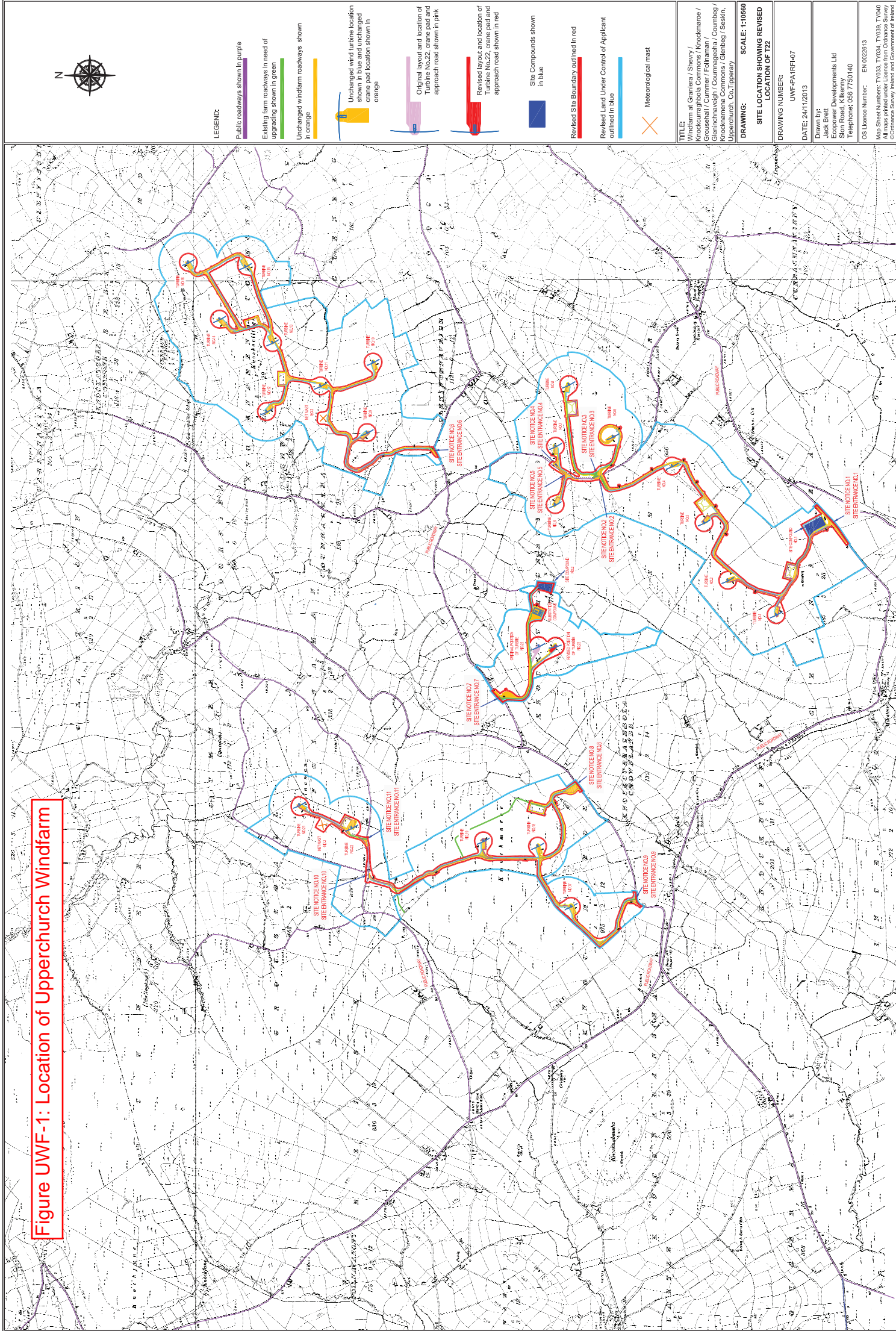
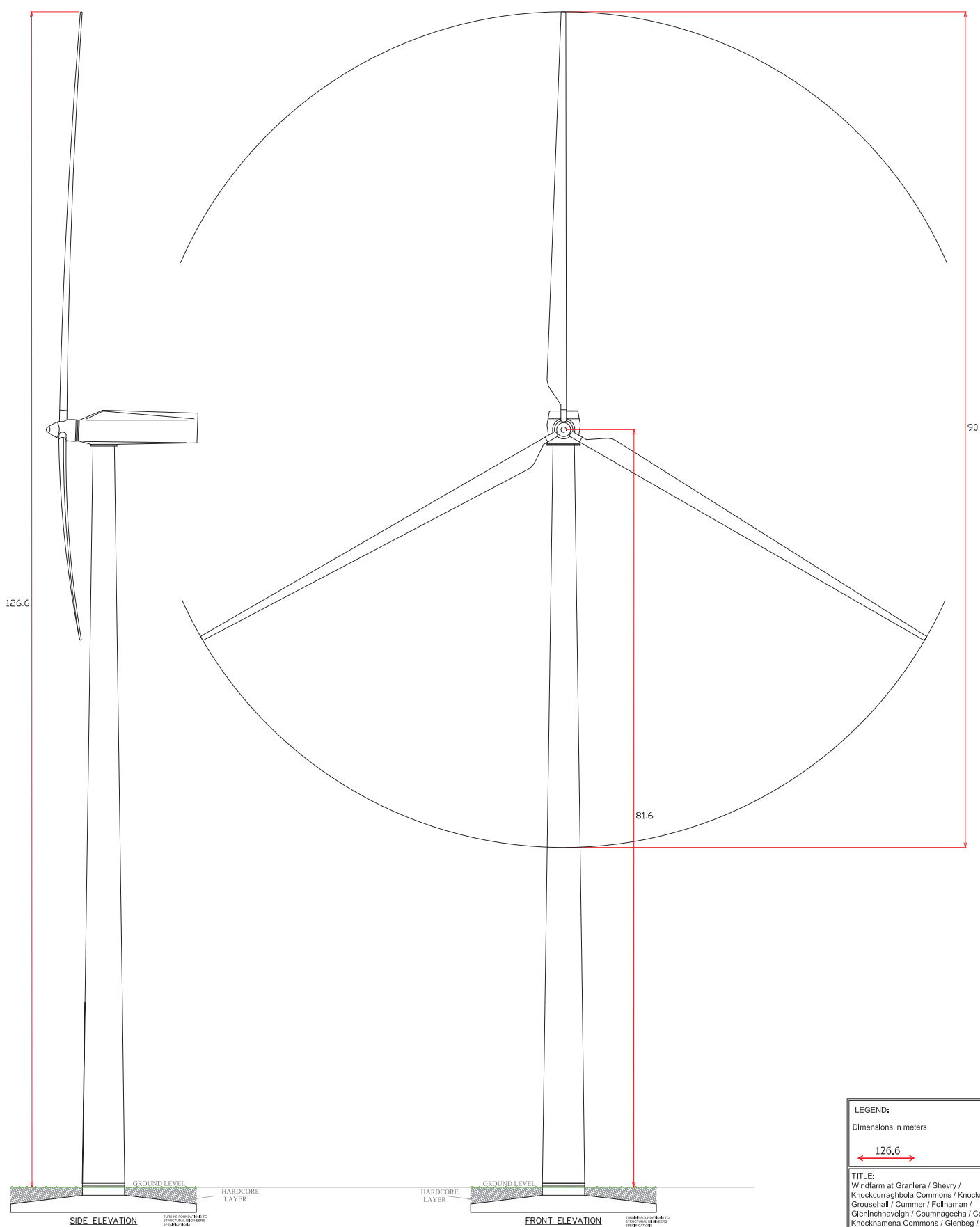
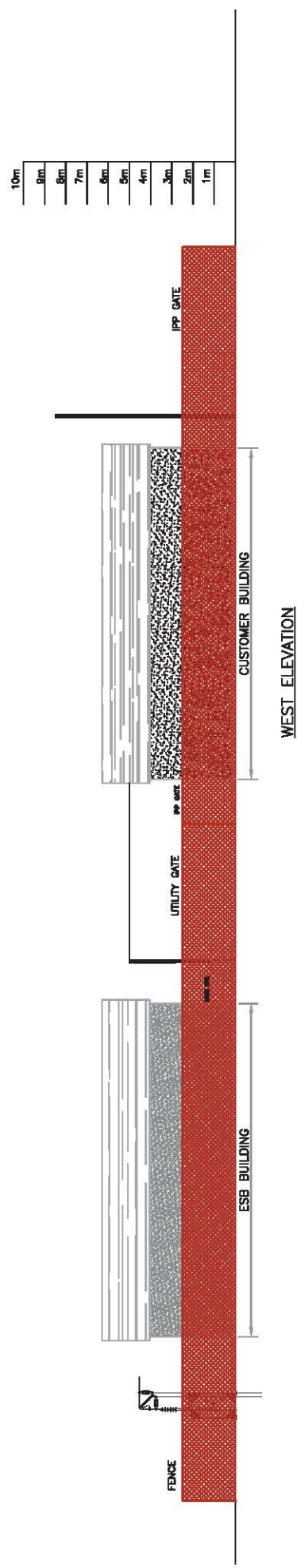


Figure UWF-2: Wind Turbine Elevation



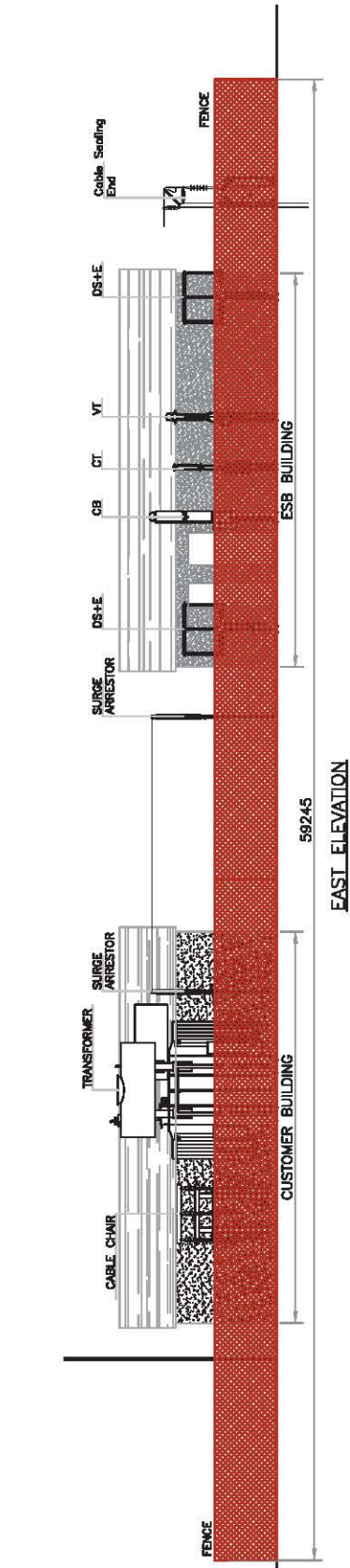
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TITLE: Windfarm at Grantera / Shevry / Knockcurraghbola Commons / Knockmaroe / Grousehall / Cummer / Follneman / Gleninchaveigh / Coumnageeha / Coumbeg / Knocknamena Commons / Glenbeg / Seskin, Upperchurch, Co.Tipperary
DRAWING: WIND TURBINE ELEVATIONS SCALE: 1:200
DRAWING NUMBER: UWF-PA1-03 DATE: 19/12/12
Drawn by: Jack Brett Ecopower Developments Ltd Sion Road, Kilkenny Telephone: 056 7750140

10m
9m
8m
7m
6m
5m
4m
3m
2m
1m



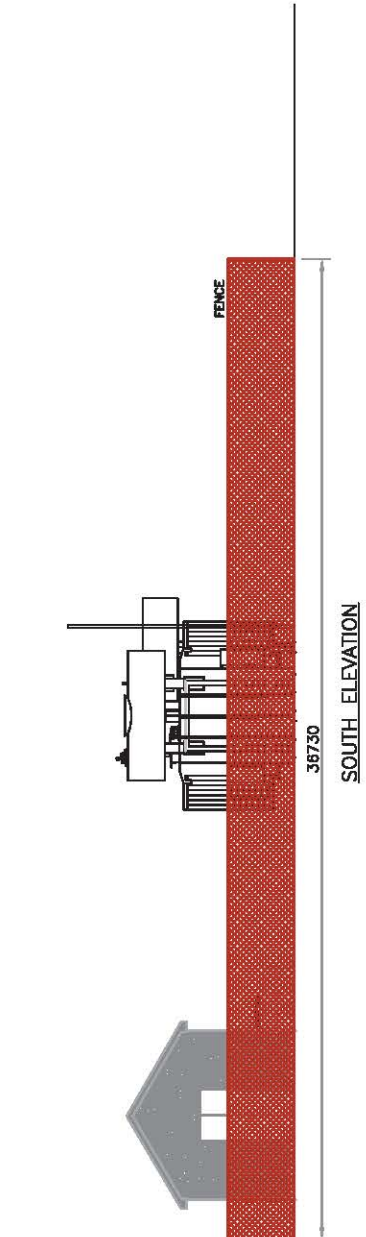
WEST ELEVATION

10m
8m
7m
6m
5m
4m
3m
2m
1m



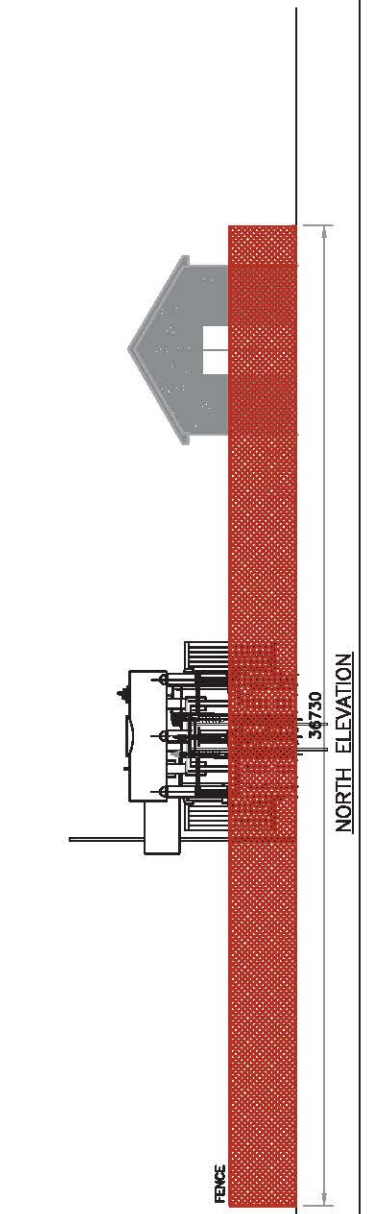
EAST ELEVATION

10m
8m
7m
6m
5m
4m
3m
2m
1m



SOUTH ELEVATION

10m
8m
7m
6m
5m
4m
3m
2m
1m



NORTH ELEVATION

Figure UWF-3: Electrical Substation Compound Elevation View

UNIVERSITY OF WISCONSIN - STEVENS POINT
SCHOOL OF ENGINEERING
ELECTRICAL ENGINEERING
ELECTRICAL SUBSTATION COMPOUND
ELEVATION VIEW

Dimensions are in millimeters

1:100

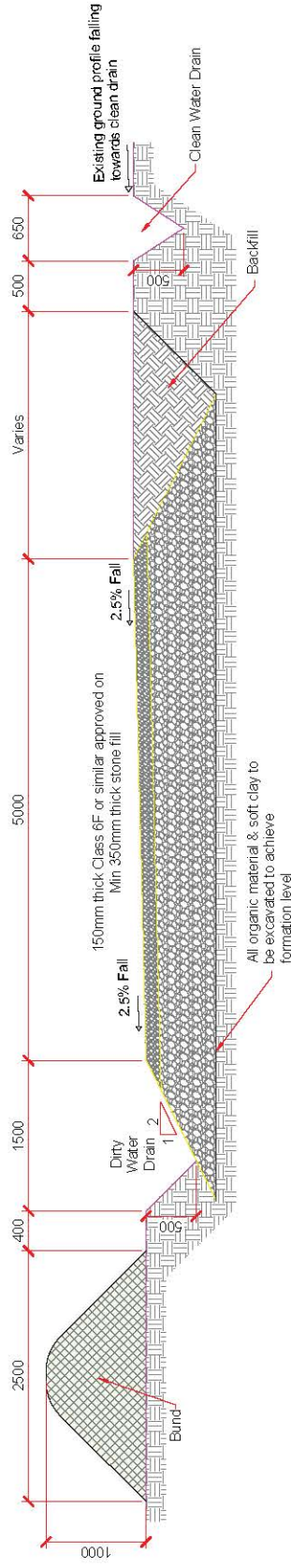
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BY: M. KAYES

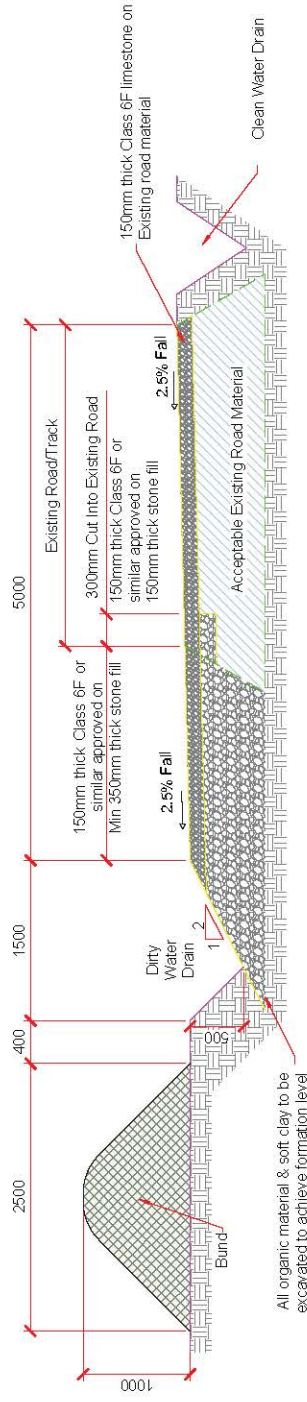
CHECKED BY: C. DONNELLY

PROJECT: CUNY d001.1.2

SCALE: A



Typical Excavated Access Track Detail Scale 1:50



Typical Widening To Existing Access Track Detail Scale 1:50

Figure UWF-4: Proposed Internal Roads Details

Client				Ecopower Developments Ltd			
Project				Upperchurch Wind Farm			
Title				Proposed Internal Road Details			
Rev				A			
Date				13.06.12			
Description				Issued For Planning			
by				PN TB JoL			
ch'd/app				by			
Scales (A3)				1:50			
Drawn				PN			
Checked				TB			
Drg No				14708 - 5005			
Rev				A			



Malachy Walsh and Partners
Consulting Engineers
 Cork | Tralee | London | Limerick

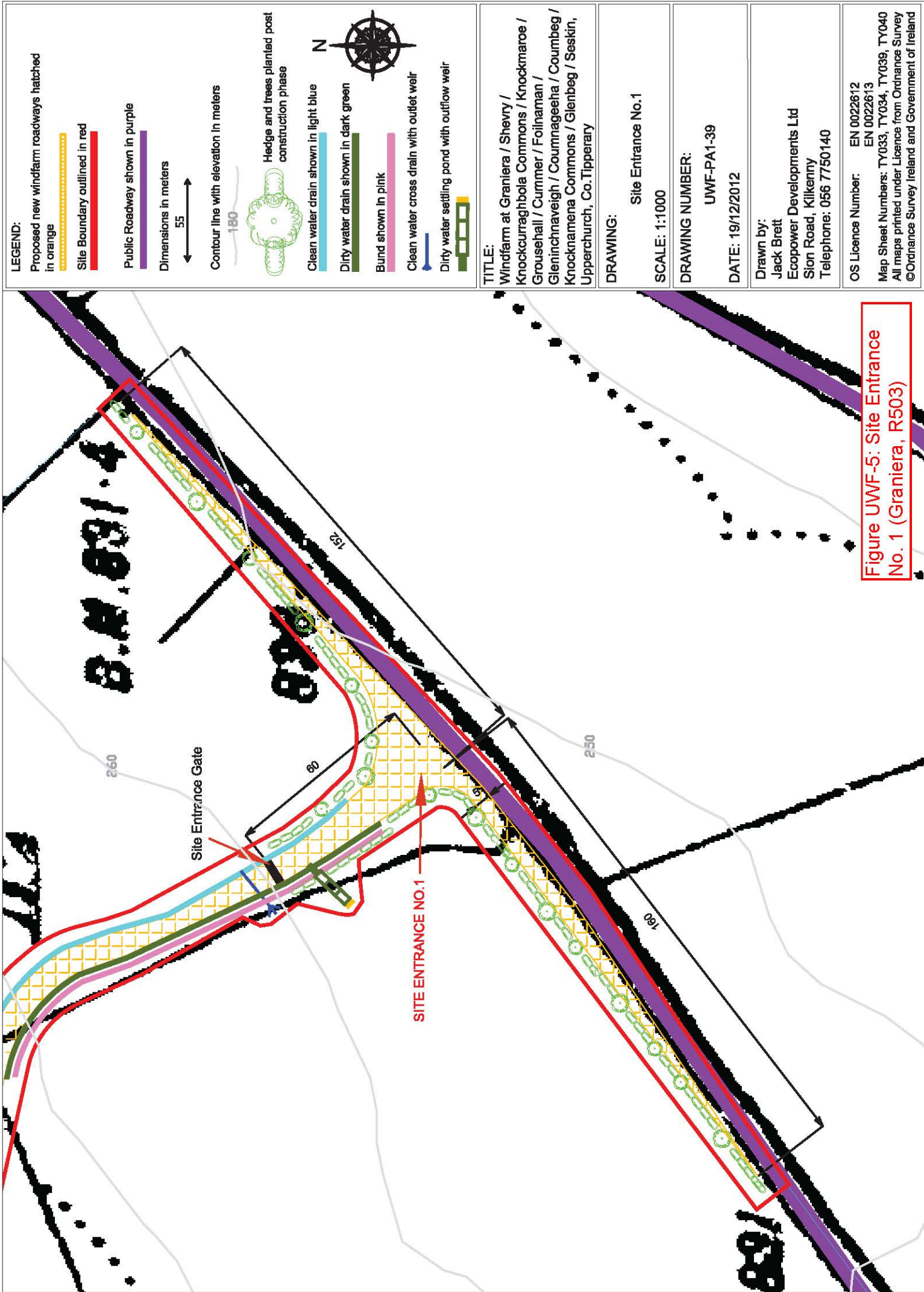
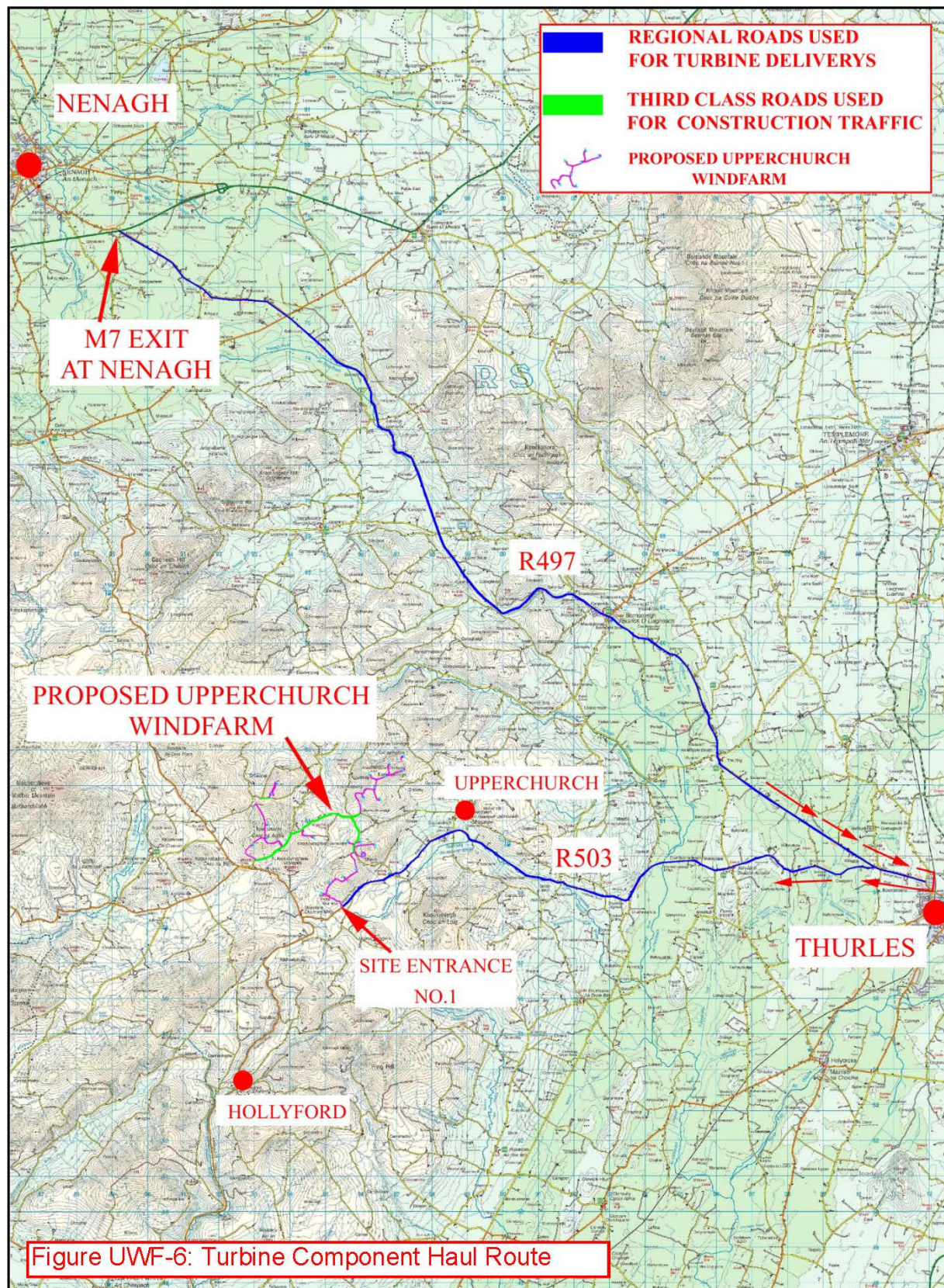


FIGURE 7-1: TURBINE COMPONENTS HAUL ROUTE



Whole Upperchurch Windfarm Project

Natura Impact Statement for Whole UWF Project Elements 1 to 5

March 2018

Appendix A8: Project Information **Description of UWF Other Activities**



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Appendix to Chapter 5: Description of Development

Appendix 5.6: Description of UWF Other Activities

A5.6 -5.1 Introduction to Appendix 5.6

UWF Other Activities do not form part of the permission applications, however they do form part of the Whole UWF Project and therefore this description has been prepared to facilitate the cumulative evaluation.

This Description of UWF Other Activities has been prepared in the same format as the Description of Development chapters (Main EIA Report Chapter 5's) for the UWF Grid Connection, the UWF Related Works and the UWF Replacement Forestry in particular Sections 5.2, 5.3, 5.4 and 5.5.

For ease of cross referencing the number system used here is also the same, i.e. A5.6-5.2, A5.65-5.3 etc. Figures and mapping are included at the end of this appendix.

The data and descriptions in this appendix have informed the environmental factor evaluations in the EIAR Main Report, in relation to the evaluation of cumulative effects of the subject development together with the other elements of the Whole UWF Project and with other existing or consented projects or activities.

UWF Other Activities are described in this appendix, in the following order:

Appendix Sections	Section Heading	Relevant Individual Project Element
A5.6-5.2	Characteristics of UWF Other Activities including environmental protection measures	UWF Grid Connection UWF Related Works UWF Replacement Forestry Upperchurch Windfarm
A5.6-5.3	Life Cycle Stages The durations and timing, main activities, personnel and material requirements during construction, operation and decommissioning stages (relative to the Other Elements of the Whole UWF Project)	
A5.6-5.4	The use of natural resources, emissions and production of wastes	
A5.6-5.5	Figures and Mapping	UWF Replacement Forestry
	<i>Note: Section 5.6 of the EIAR Main Report Chapter 5 relates to Vulnerability to Major Accidents and Natural Disasters. As the UWF Other Activities do not relate to works or the development of lands or infrastructure, it is considered that their vulnerability to these events is not applicable.</i>	

A5.6 -5.2 Characteristics of UWF Other Activities

UWF Other Activities include the following activities:

- Haul Route Activities;
- Overhead Line Activities;
- Upperchurch Hen Harrier Scheme; and
- Monitoring Activities.

A5.6 -5.2.1 Purpose of UWF Other Activities

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

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

Monitoring Activities to monitor the Whole UWF Project for compliance with the environmental protection measures and mitigation measures detailed in the UWF 2013 EIS and 2013 RFI (including the Construction Environmental Management Plan for Upperchurch Windfarm and the Ecological Management Plan for Upperchurch Windfarm); Planning Conditions attaching to the already consented UWF; and measures in the 2018 UWF Grid Connection EIA Report, the 2018 UWF Related Works EIA Report and the 2018 UWF Replacement Forestry EIA Report and associated UWF Grid Connection Environmental Management Plan and UWF Related Works Environmental Management Plans. Monitoring will also involve the supervision and recording of key construction activities, and monitoring of progress of land reinstatement.

Overhead Line Activities: to correct the tension of the existing overhead line, following the installation of the UWF Grid Connection End Masts, so that the lines are held within predefined tension parameters and fibre wrapping to provide a communication link to the newly installed Mountphilips Substation.

A5.6 -5.2.2 Location and overview description of UWF Other Activities

The **Haul Route Activities** relate to the laying of matting over verges at up to 5 No. locations, removal of street furniture (mainly signposts) at 13 No. locations and the trimming of up to 960m of hedgerow/trees at up to 15 No. locations on the national and regional road network along the turbine component haul route between Foynes Port in Co Limerick and the junction of the R503 and R497 Regional Roads in Knockmaroe townland. Note: the Haul Route Activities are also referred to as Ancillary Haul Route Activities in this EIA Report.

The **Upperchurch Hen Harrier Scheme** is located in Knockcurraghbola Commons, Coumnageeha, Foilnahan, Knockmaroe and Grousehall townlands on a mixture of wet grassland and improved grassland between the Slievefelim to Silvermines SPA and the already consented Upperchurch Windfarm. Activities associated with the Scheme includes once off activities such as planting of hedgerows and trees; enhancement of riparian corridors and scrub/wood areas and the fencing off of watercourses and newly planted trees and shrubs. These activities will create new habitat and protect and enhance existing habitat.

The Scheme also includes long-term farm management practices such as management of rush coverage, livestock grazing and the control of the use of lime, fertilizers and burning of gorse, amongst others, which will result in the long term maintenance of hen harrier habitat. Nine local landowners are signed-up to the Scheme.

Overhead Line Activities are associated with the existing overhead 110kV line between Killonan ESBN Station (just east of Limerick City) and ESBN Angle Mast Structure No. 90 (2.3 km north of Mountphilips Substation). These activities will be carried out by ESBN or ESBN contractors. Activities include (a) re-sagging/correcting the tension using puller/tensioner machines at Angle and End Masts and stringing wheels at Intermediary Structures, and (b) Wrapping of the overhead line with fibre-optic cable (called fibre wrapping) using an aerial crawler fibre wrap machine.

Monitoring Activities relate to water quality monitoring; ecology surveys for habitats, vegetation, birds, bats, badgers; otters; invasive species monitoring; archaeological monitoring; reinstatement monitoring; Falling Weight Deflectometer confirmatory surveys of public road condition; noise and shadow flicker monitoring and reporting; monitoring, auditing, visual inspections and supervision during the Whole UWF Project preconstruction, construction and operational stages. Monitoring Activity locations relate to all works areas associated with the UWF Grid Connection, UWF Related Works, UWF Replacement Forestry and Upperchurch Windfarm locations.

Relevant Figures (contained at the end of this Appendix 5.6)

Figure OA 1: Location of UWF Other Activities on OSI Mapping

A5.6 -5.2.3 Characteristics of UWF Other Activities**A5.6 -5.2.3.1 Haul Route Activities**

Haul Route Activities will be carried out on the public road network between Foynes Port in Co Limerick and the junction of the R503 and R497 Regional Roads in Knockmaroe townland.

The Haul Route Activities are located along the Upperchurch Windfarm turbine component haul route and will facilitate the transport of abnormal loads associated with the transport of turbine blades and towers to the windfarm through the laying of matting over verges at up to 5 No. locations, removal and replacement of street furniture (mainly signposts) at up to 13 No. locations and the trimming of up to 960m of hedgerow/trees at up to 15 No. locations, as outlined in Table 1.

The use of heavy duty geotextile matting will facilitate the delivery of the component without any requirement for excavation works and without causing any damage to the verge soils. The matting will provide sufficient carrying capacity to allow the trailers carrying the turbines components to pass.

Table 1: Description of Haul Route Activities

Activity ID	Description of the Haul Route Activity
HA1	Removal of street furniture at T-Junction on N69 at Foynes Port, Co Limerick
HA2	Removal of street furniture and laying of matting on the roundabout on the N69 at Clarina, near Limerick City
HA3	Removal of street furniture at roundabout on the N18, on the Dock Road at Bunlicky, Limerick
HA4	Removal of street furniture at roundabout on the N18, on the Dock Road at Ballykeefe, Limerick
HA5	Removal of street furniture and laying of matting on the verge at the M7 Exit 25 at Knockalton Upper, near Nenagh, County Tipperary
HA6	Removal of street furniture and laying of matting the roundabout at the M7 Exit 25/R498 at Knockalton Upper, near Nenagh, County Tipperary
HA7	Vegetation trimming of the roadside boundary on the R498 at Sallypark, Co. Tipperary
HA8	Vegetation trimming of the roadside boundary on the R498 at Bigpark, Co. Tipperary
HA9	Vegetation trimming of the roadside boundary on the R498 at Bigpark, Co. Tipperary
HA10	Vegetation trimming of the roadside boundary on the R498 at Bigpark, Co. Tipperary
HA11	Vegetation trimming of the roadside boundary on the R498 at Bigpark, Co. Tipperary
HA12	Removal of street furniture and vegetation trimming on the R498 at Glennanoge, Co. Tipperary
HA13	Removal of street furniture and laying of matting at the Killinane junction of the R498 with the R503 in Thurles
HA14	Removal of street furniture at a roundabout on the R498 at Racecourse in Thurles
HA15	Vegetation trimming of the roadside boundary on the R503 at Ballynahow, Co. Tipperary
HA16	Vegetation trimming and laying of matting on the R503 at Ballynahow, Co. Tipperary
HA17	Removal of street furniture and vegetation trimming on the R503 at Drumminnagleagh, Co. Tipperary
HA18	Removal of street furniture and vegetation trimming on the R503 at Rosmult, Co. Tipperary
HA19	Removal of street furniture and vegetation trimming on the R503 at Ballyboy, Co. Tipperary
HA20	Vegetation trimming of the roadside boundary on the R503 at Gortnaskehy, Co. Tipperary
HA21	Removal of street furniture and vegetation trimming on the R497 at Knockduff, Co. Tipperary
HA22	Vegetation trimming of the roadside boundary on the R497 at Knockmaroe, Co. Tipperary
HA23	Removal of street furniture and vegetation trimming on the R497 and L2264-50 Knockmaroe, Co. Tipperary

Relevant Figures (contained at the end of this Appendix 5.6)

Figure OA 2: Haul Route Activities (8 maps)

A5.6 -5.2.3.2 Upperchurch Hen Harrier Scheme

As required by Condition No.18, the promoters of Upperchurch Windfarm will develop the Upperchurch Hen Harrier Scheme which, as detailed in the 2013 RFI will provide and enhance foraging habitat for hen harrier on agricultural grassland, in the vicinity of the Slievefelim to Silvermines SPA. Nine local landowners are signed-up to the Scheme covering 128 hectares and the participating landowners will be compensated for implementing a set of habitat improvement measures for foraging hen harrier on their lands. (Note: Upperchurch Windfarm is located outside the SPA).

Upperchurch Windfarm 2014 Grant of Permission (PL.22.243040) Condition No. 18:

- (a) The Ecological Management Plan submitted to the planning authority on the 21 day of November, 2013, shall be implemented in full. Details including timescale, and monitoring shall be agreed with the planning authority following consultation with the National parks and Wildlife service.*
- (b) A timescale for the provision of the enhanced foraging areas including rush managements, the provision of additional hedgerows enclosures for native scrub and trees and measures by landowners in relation to spreading, burning, interference with drainage, retention of hedgerows, restrictions on use of poisons and new forestry plantation shall be agreed with the planning authority following consultation with the National parks and Wildlife service prior to the commencement of development works on the site.*
- (c) A programme of on-going surveys and monitoring of the species in years 2 and 3 after the commencement of the operation of the turbines shall be submitted to, and agreed in writing with the planning authority, following consultation with the National parks, and prior to the commencement of development works on the site.*

Reason: *In the interest of the protection of the environment and the protection of the foraging habitat of the hen harrier species.*

The Upperchurch Hen Harrier Scheme is based on the NPWS Hen Harrier Scheme for farmers. This scheme (NPWS Scheme) has now finished, however, the Upperchurch Hen Harrier Scheme will bring about a very similar scheme in the Upperchurch area, which is set out in detail in the Ecological Management Plan (EcMP), to be found in the 2013 RFI in the Reference Documents volume with the planning application.

Activities associated with the Upperchurch Hen Harrier Scheme includes once off activities such as planting of hedgerows and trees; enhancement of riparian corridors and scrub/wood areas and the fencing off of watercourses and newly planted trees and shrubs. These activities will create new habitat and protect and enhance existing habitat. The Scheme also includes long-term farm management practices such as management of rush coverage, livestock grazing and the control of the use of lime, fertilizers and burning of gorse, amongst others, which will result in the long term maintenance of hen harrier habitat. Training and development for those farmers involved will be conducted, and the success of the Scheme will be monitored throughout the lifetime of the associated Upperchurch Windfarm.

Relevant Figures (contained at the end of this Appendix 5.6)

Figure OA 3: Upperchurch Hen Harrier Scheme – Layout on Aerial Photography Mapping

A5.6 -5.2.3.3 Overhead Line Activities

Overhead line activities are associated with the existing overhead 110kV line between Killonan ESBN Station (just east of Limerick City) and ESBN Angle Mast Structure No. 90 (2.3 km north of Mountphilips Substation).

These activities will be carried out by ESBN or ESBN contractors.

Activities include will involve (a) re-sagging/correcting the tension, and (b) fibre-wrapping.

Re-sagging: The connection of Upperchurch Windfarm to the National Grid will cause a change in the configuration of the existing line between the new End Mast locations and the nearest Angle Masts, which will require line tension correction, or re-sagging, on 2 no. Sections:

- i) between ESBN Angle Mast Structure No. 78 (c.200m south of Mountphilips substation) to New Mountphilips End Mast No. 1 and
- ii) between New Mountphilips End Mast No. 2 and ESBN Angle Mast Structure No. 90 (2.3 km north of Mountphilips substation).

Re-sagging will be carried out using puller/tensioner machines at Angle and End Masts and stringing wheels at Intermediary Structures.

Fibre-wrapping: One of the conductors (wires) on the line between Killonan ESBN Station to Mountphilips Substation will also be wrapped with fibre optic cable, using an aerial crawler fibre wrap machine

The activities will be carried out according to industry standard method statements, including standard health & safety and environmental management systems.

Relevant Figures (contained at the end of this Appendix 5.6)

Figure OA 4: Overhead Line Activities – Layout on OSI Discovery Mapping

A5.6 -5.2.3.4 Characteristics of Monitoring Activities

Monitoring Activities will be carried out during the construction, operation and decommissioning stages. Monitoring relates to UWF Grid Connection, UWF Related Works, Upperchurch Windfarm, UWF Replacement Forestry and the UWF Other Activities, and includes the following:

- Inspections and maintenance of sediment and erosion control measures
- Water quality monitoring
- Hydrographic monitoring and reporting after rainfall events
- FWD and video survey of the local road network
- Preconstruction hen harrier, badger, otter, curlew, bat and marsh fritillary surveys
- Monitoring of pre-construction management of marsh fritillary habitat
- Archaeological monitoring of initial groundworks
- Supervision of the vegetative planting of the UWF Grid Connection Concealed Access Roads,
- Annual monitoring and assessment of re-vegetation and recovery success at construction works areas
- Annual hen harrier, badger and bat surveys, including fatality searches
- Invasive species monitoring
- On-going annual monitoring of the Upperchurch Hen Harrier Scheme
- Monitoring of compliance with planning condition No. 11 for Upperchurch Windfarm (operating windfarm noise)
- Monitoring of compliance with planning condition No. 12 for Upperchurch Windfarm (operating windfarm shadow flicker)
- Monitoring the implementation of and compliance with the environmental planning conditions and commitments in the 2013 EIS, 2013 RFI, including the EMP for the Upperchurch Windfarm
- Monitoring the implementation of and compliance with the environmental commitments (including the Surface Water, Traffic, Waste and Invasive Species Management Plans) in the UWF Grid Connection Environmental Management Plan and UWF Related Works Environmental Management Plan, and any additional requirements conditioned with a grant of planning permission.
- Monitoring the implementation of and compliance with the environmental protection measures set out in UWF Replacement Forestry EIA Report (Volume C2: EIAR Main Report: Chapter 5 and Volume C4: EIAR Appendices: Appendix 5.1 and Appendix 5.2) and any additional requirements conditioned with the afforestation license.
- Monitoring the implementation of and compliance with the environmental protection measures for UWF Other Activities set out in Section A5.6 -5.2.4 below. Monitoring compliance with these measures will be through the relevant UWF construction and operational stage Environmental Management Plans, the UWF Grid Connection Environmental Management Plan and the UWF Related Works Environmental Management Plan – for example compliance with environmental protection measures which relate to Overhead Line Activities will be carried out through the UWF Grid Connection Environmental Management Plan.

These monitoring and survey activities will be carried out both prior to and during, the construction of Upperchurch Windfarm, UWF Related Works, UWF Grid Connection and prior to and during the planting of UWF Replacement Forestry. Monitoring activities also relate to the operational stage of the Elements, and to the decommissioning stage of the Upperchurch Windfarm and UWF Related Works where relevant.

A5.6 -5.2.4 Environmental Protection Measures for UWF Other Activities

- Except with the approval of the National Parks and Wildlife Service: no activities will be carried out within 500 metres of an active hen harrier nest or nesting attempt; no activities will be carried out within 30m of an active main badger set or within 150m of an active otter holt.
- In order to prevent disturbance to breeding birds, tree trimming for Haul Route Activities will be conducted outside of the bird breeding season.
- Invasive Species monitoring in the form of confirmatory surveys will be carried out during the construction stage of the UWF Grid Connection, UWF Related Works and Upperchurch Windfarm to identify any infestations within or close to the relevant UWF Other Activity locations. Surveys will focus always on the activity location plus 7m and will be carried out ahead of any activities taking place. The measures included in the Invasive Species Management Plan for UWF Grid Connection and UWF Related Works will be implemented – See Volume D of the planning applications for these Elements.
- To minimise disturbance or displacement to lands, landowners will be contacted ahead of activities taking place on their lands and personnel involved in Overhead Line Activities or the Upperchurch Hen Harrier Scheme will ensure that the lands are left in at least as good condition than before the activity began. Activities will be carried out with minimum interference to land or livestock.
- In order to protect water quality, Overhead Line Activities, Haul Route Activities and Upperchurch Hen Harrier Scheme activities which occur within 50m of a watercourse will be carried out during a dry spell of weather; a minimum buffer of 5m will be maintained between the activity and the watercourse where possible; straw bales will be placed between the activity location and the watercourse if there is a risk of sediment runoff from the activity (such as tree planting); all machinery or equipment used will be steam-cleaned before use at the location and checked for oil leaks prior to use; no refuelling of machinery or equipment will take place with 100m of a watercourse; access matting such as bog mats will be used in wet/boggy areas to provide access to vehicles, and any ground rutted by vehicles associated with UWF Other Activities will be repaired through loosening the compacted soil under any ruts with fork; any disturbed ground will be re-seeded immediately following the completion of the activity at a location.

These environmental protection measures will be implemented as part of the UWF Grid Connection, UWF Related Works and Upperchurch Windfarm and will be incorporated into their respective Environmental Management Plans. For example, measures listed above which are relevant to Overhead Line Activities will be monitored through the UWF Grid Connection Environmental Management Plan.

A5.6 -5.3 UWF Other Activities during Life Cycle Stages**A5.6 -5.3.1.1 Duration & Timing****Table 5-1: Duration and timing of the construction of the Upperchurch Windfarm**

Activities	Duration	Timing of Activities
Haul Route Activities: Laying of Matting	15 mins per location 1 day to put down, and 1 day to take up	Prior to commencement of turbine component haulage
Haul Route Activities: Street furniture and signage removal and reinstatement	15 mins to 4 hours per location	Immediately prior to the arrival of turbine components at the location, with reinstatement after the passage of the turbine components.
Haul Route Activities: Tree Trimming along public road corridor	15 mins per location 1 day to carry out	In order to prevent disturbance to breeding birds, tree trimming will be conducted outside of the bird breeding season
Upperchurch Hen Harrier Scheme – initial once-off activities	2 – 3 months	Trees and shrubs will be planted during the dormant period October to March, fencing around new plants will be carried out at the same time. A tractor will only be used during dry weather in the riparian area.
Upperchurch Hen Harrier Scheme – farming practices	On-going	None
Monitoring Activities Inspections and maintenance of sediment and erosion control measures	1hr – 1 week	6 months Post construction
Monitoring Activities Monthly Water monitoring	6 hrs	1st year Post construction
Monitoring Activities Hydrographic monitoring and reporting after rainfall events	6hr	3 years Post construction
Monitoring Activities Monitoring and care of Concealed Access Roads during the establishment phase	3 hours per month	First 18 months post construction
Monitoring Activities Annual monitoring and assessment of re-vegetation and recovery success	6 hrs	5 years Post construction
Monitoring Activities: Survey of invasive species locations	1 hour per location	Immediately prior to works in an area, and prior to the delivery of turbine components.
Monitoring Activities Annual bird, badger and bat surveys	1hr – 2 weeks per survey	3 years Post construction

including fatality searches		
Monitoring Activities On-going annual monitoring of the Upperchurch Hen Harrier Scheme	c. 5 days per survey	Operational Stage Annually monitoring and reporting to NPWS for the first five years, and then every 2 to 3 years from Yr6 onwards
Monitoring Activities Monitoring compliance with planning conditions, EIS/EIAR/EMP commitments	Ongoing observations throughout the construction stage – carried out by the Environmental Clerk of Works and throughout the operational (and where relevant decommissioning) stage by the Environmental Manager	Entire Life Cycle
Monitoring Activities Monitoring of compliance with planning condition No. 11 for Upperchurch Windfarm (operating windfarm noise)	c.2 months	Report to be submitted within 6 months of commissioning of UWF
Monitoring Activities Monitoring of compliance with planning condition No. 12 for Upperchurch Windfarm (operating windfarm shadow flicker)	Ongoing by computer software	Report to be submitted within 12 months of commissioning of UWF
Overhead Line Activities Re-sagging/tensioning	2 ‘straights’ and 11 structures	Following connection of Mountphilips substation.
Overhead Line Activities Fibre wrapping	1 day per ‘straights’ i.e. 17 days	Prior to connection of Mountphilips substation.

A5.6 -5.3.1.2 UWF Other Activities Personnel

In total c.50 personnel will be required to carry out the UWF Other Activities as per:

- **Haul Route Activities** will require a 3-man crew for each type of activity – mat laying, street furniture removal and tree trimming.
- The **Upperchurch Hen Harrier Scheme** will be implemented by the 9 landowners involved in the Scheme.
- The **Monitoring Activities** will be carried out by c.16 individual expert engineering and environmental consultants.
- **Overhead Line Activities** will be carried out by small teams of up to 8 overhead linesmen for both re-sagging and fibre wrapping.

A5.5 -5.3.1.2.1 Welfare Facilities

The Upperchurch Windfarm construction stage Site Compound No. 1 and the operational stage site office containing welfare and canteen facilities will be available to personnel carrying out UWF Other Activities.

A5.6 -5.3.1.3 Activities**A5.5 -5.3.1.3.1 Haul Route Activities**

Haul Route Activities will involve the following activities:

Trimming of roadside vegetation within the road corridor, using a tractor mounted hedge trimmer to trim any protruding vegetation along the haul route roadside hedgerows, where required. Flag men will control and manage traffic on both sides of the tractor.

Laying of matting by hand at roundabouts and verges. This will involve covering the relevant part of the verge along the public road corridor with heavy duty geotextile or rigid geocell material or aluminium or plastic matting, which will be secured in place. When the turbine component deliveries are complete the matting will be removed.

Street furniture removal will involve the following activities: Immediately prior to the passage of turbine components being delivered to the consented Upperchurch Windfarm, the street furniture will be removed from its sockets, and stored safely nearby. Immediately after the passage of the convoy, the street furniture will be refitted into its sockets as before. This will be done for every turbine component delivery that requires the road signage to be temporarily removed.

A5.5 -5.3.1.3.2 Upperchurch Hen Harrier Scheme ActivitiesInitial Once-Off Activities

- Planting of 2.2 hectares of tree and shrub species in scrub areas, improvement planting with suitable trees and shrub species along existing field boundary hedgerows, and planting of 2.8km of new hedgerows with native trees and shrubs, which will improve cover for hen harrier;
- Erection of 4.8km livestock-proof fencing on newly planted or improvement planting areas to prevent damage by livestock, which will improve hen harrier habitat quality;
- Attachment of fence markers to electric fences in the areas, which will improve visibility of electric fences to hen harrier; and
- Planting of 1.4km of woody scrub species along riparian corridors and fencing of watercourse corridors to prevent access to the watercourses by livestock, which will enhance the quality of riparian habitats.

On-Going Farming Practices

- Management of rush coverage with controlled grazing and rush cutting starting in year 3, and thereafter as required, to achieve 30 – 70% rush coverage in fields, which will improve cover for hen harrier;
- During the first 2 years of the Plan, stocking levels between 0.6 and 1.6 LU (livestock units) per hectare which will maintain the appropriate sward within fields and not allow excessive stands of scrub or rush to dominate. To be reviewed at the start of Year 3;

Restrictions to farming practices

- No excavation of drains, which will allow improved grassland swards to revert back to wet grassland and more semi-natural grassland habitats;
- Limiting spreading of fertilizer and/or lime to every 4 – 5 years;
- No burning of gorse, scrub or heather to improve land cover;
- No removal of hedgerows, or new forestry plantation;

- No recreational off-roading with vehicles; and
- No use of poisons or stupefying baits.

Educational Measures

Hen harrier workshops will be delivered by the project ecologist at the initiation of the scheme to all landowners participating in the plan as well as those involved in the Upperchurch Windfarm development. The aim of the workshop will be to advise on the importance of the conservation of the hen harrier and the proper and full implementation of the Scheme, and to fully explain the measures and the restrictions set down in the Scheme.

Monitoring of the Scheme

The continual monitoring of the Hen Harrier scheme especially in the early years when measures are initiated, is crucial for the plan to be fully successful. Annual inspections will be carried out for the first 5 years of the scheme, by the project ecologist. The project ecologist shall assess the alternative habitats, raise any specific issues which need to be addressed and discuss with landowners any further measures required. A report will be prepared annually and submitted to National Parks and Wildlife Services for comment. Inspections and reporting will take place every 2 to 3 years from Year 6 onwards.

A5.5 -5.3.1.3.3 Overhead Line Activities

Overhead Line Activities will include the following activities;

- The Overhead Line Activities will be carried out during a planned outage of the overhead line.
- Access: The relevant sections of the Killonan to Nenagh overhead line are across open farmland and near Killonan, around the perimeter of an industrial estate. In order to gain access to the ESBN structures for ESBN contractor crews and equipment, the local public road network in the vicinity of the line will be used and from there they will gain access through private land, utilising existing private track or road, wherever possible. This access already exists at each location for line maintenance and no change to the established access is anticipated.
- Re-sagging: the intermediary ESBN Structure Nos. 79, and 80 to 89 will be climbed and fitted with stringing wheels, in order to facilitate the re-sagging activity. Puller/tensioner equipment will be positioned at the bases of Mountphilips End Mast No. 1 and No. 2 and Angle Mast ESBN Structure No. 78 and No. 90. The tension will be corrected on all 3 No. conductors (wires) between the structures, using the puller/tensioner equipment. Once the tension is corrected, the stringing wheels will be removed.
- Fibre-wrapping: 1 No. conductor (wire) on the overhead line between the Killonan Station and the new Mountphilips Substation will be wrapped with fibre-optic cable. Intermediary structures between angle masts, will be climbed and stringing wheels will be fitted. The aerial crawler fibre wrap machine will be set up at an Angle Mast structure and will wrap the wire as far as the next Angle Mast, where it will be set up once more for the next 'straight'. Following the fibre wrapping of the overhead line between Angle Masts, the intermediary structures will be climbed once more and the stringing wheels removed.

A5.5 -5.3.1.3.4 Monitoring Activities

Monitoring Activities will involve the following activities:

- Pre-construction confirmatory surveys of public road condition,
- Pre-construction confirmatory ecological surveys of habitats, hen harrier, curlew, bats, badgers, otters and marsh fritillary;
- Pre-construction management of Marsh Fritillary (butterfly) habitat
- Construction stage collection of water samples and monitoring of water quality, archaeology, invasive species, monitoring of works, monitoring of vegetation of Concealed Access Roads, monitoring of reinstatement of lands and
- Monitoring and auditing of compliance with the UWF Construction Environmental Management Plan, UWF Ecological Management Plan, UWF Grid Connection Environmental Management Plan, and UWF Related Works Environmental Management Plan;
- Early operational UWF monitoring to include adherence to the UWF Ecological Management Plan; the UWF Surface Water Management Plan including inspections and maintenance of sediment and erosion control measures and water sampling; hydrographic monitoring and reporting after rainfall events, monitoring and assessment of re-vegetation and recovery success; bird surveys; fatality survey for badger and bat. In addition, compliance with planning conditions for UWF in relation to noise and shadow flicker requires that results of monitoring be submitted and agreed with the planning authority.
- Monitoring of the Upperchurch Hen Harrier Scheme annually in Years 1 to 5 and thereafter every 2 or 3 years, and associated reporting to NPWS.

A5.6 -5.3.1.4 Use of Equipment and Tools

The main equipment and tools which will be required are listed in

Table 5-2 Equipment and tools

Equipment	Tools
Haul Route Activities <ul style="list-style-type: none"> - tractor with mounted hedge trimmers 	<ul style="list-style-type: none"> - hand tools
Upperchurch Hen Harrier Scheme <ul style="list-style-type: none"> - tractor will pole driver attached - tractors for rush cutting and land cover management 	<ul style="list-style-type: none"> - spades - slash hooks - hand tools
Monitoring Activities <ul style="list-style-type: none"> - FWD survey machine 	<ul style="list-style-type: none"> - bat detectors - cameras - containers - noise monitoring equipment
Overhead Line Activities <ul style="list-style-type: none"> - Puller/Tensioner - Teleporter - Fibre wrap crawler - Crew cab 4X4 - Van - Climbing and Electrical Safety Equipment 	<ul style="list-style-type: none"> - Stringing wheels - Chains/hand tools

A5.6 -5.3.1.5 Use of Hydrocarbons

Very small volumes of hydrocarbons will be used during UWF Other Activities and will be limited to the diesel or petrol fuel and mechanical oils used by vehicles and machinery.

A5.6 -5.3.1.6 Other Facilities - Fuel Storage & Tool Storage

There will be no requirement for either fuel or tool storage.

A5.6 -5.3.2 Imported Materials

The materials, which will be brought onto the UWF Other Activities areas, are listed in Table 5-3 along with details of the quantity and likely source of the materials.

Table 5-3: Quantities, type and source of construction materials

Materials	Quantity	Likely Source of Materials
Geotextile material / matting	1 No. load	Nenagh, Co Tipperary / Cork
Native trees and shrubs and peat for topdressing Concealed Access Roads (if required)	2 No. loads	Established nurseries in Ireland or Scotland
Wooden posts, fencing wire	7 No. loads	Arrabawn Co-Op, Reiska
Fibre optic cable spools/cassettes	14.7km on 17 drums	EU Region

A5.6 -5.4 UWF Other Activities: Use of Natural Resources, Emissions and Waste**A5.6 -5.4.1 UWF Other Activities: Use of Natural Resources****A5.6 -5.4.1.1 Use of Resources: Land**

No requirement for lands or change of use of lands due to the UWF Other Activities.

A5.6 -5.4.1.2 Use of Resources: Water

All water requirements for welfare facilities will be supplied at the temporary construction stage compound associated with the Upperchurch Windfarm during the construction stage and at the Upperchurch Windfarm site office during the operational (and if relevant decommissioning) stages. Bottled drinking water will be carried with personnel.

A5.6 -5.4.1.3 Use of Resources: Soils

Haul Route Activities: No excavation or other disturbance of soils are required.

Upperchurch Hen Harrier Scheme: any initial planting will be carried out by hand using spades, small localised patches of disturbed soil will occur at the sapling tree root areas.

Monitoring Activities: No excavation or other disturbance of soils are required.

Overhead Line Activities: No mechanical excavations are required.

A5.6 -5.4.1.4 Use of Resources: Biodiversity

Haul Route Activities: Up to 960m of roadside boundary hedges/treelines will be trimmed, outside of the general bird breeding season.

Upperchurch Hen Harrier Scheme: in total, 2.2ha of trees, 1.4km of riparian habitat and 2.8km of new hedgerow will be enhanced or created during initial activities. In total 128 hectares of agricultural lands will be management for the benefit of hen harrier, protecting foraging habitat in the vicinity of the Slievefelim to Silvermines SPA.

Monitoring Activities: monitoring and auditing will ensure compliance with the Environmental Management Plans and Ecological Management Plans for Upperchurch Windfarm, UWF Grid Connection, UWF Related Works and with the environmental protection measures for UWF Replacement Forestry and UWF Other Activities; monitoring will include confirmatory surveys for birds, mammals and invertebrates, surveys for invasive species, the reinstatement of lands at felling locations and construction works areas, monitoring of construction works, monitoring of the planting of heather and grasses in the UWF Grid Connection Concealed Access Roads; monitoring the development of hen harrier foraging habitat under the Upperchurch Hen Harrier Scheme, the timing of works and the implementation of environmental protection measures, all of which will protect biodiversity in the area.

Overhead Line Activities: The activities will be carried out according to electrical industry standard method statements, including standard health & safety and environmental management systems and adherence to guidelines set by IFI for water quality protection, all of which will protect biodiversity in the area.

A5.6 -5.4.2 UWF Other Activities: Emissions

Dust will not arise, due to the absence of mechanical excavation of and storage of soils.

Vehicle Exhausts Fumes will be emitted by vehicles and machinery during planting and some monitoring activities but the amounts will be negligible.

Noise: Machinery and vehicles which will be used during planting and monitoring activities will emit noise during their operation, but the levels will be negligible.

Vibration: FWD survey of the public road network will emit low levels of vibration, but the levels will be negligible.

Light: No light emissions will occur.

Electromagnetic Radiation: No emissions of electromagnetic radiation will occur.

A5.6 -5.4.3 UWF Other Activities: Waste

Waste Water: No waste water will occur at UWF Other Activities locations. Toilet facilities at the temporary construction stage compound associated with the Upperchurch Windfarm during the construction stage and at the Upperchurch Windfarm site office during the operational (and if relevant decommissioning) stages will be available to personnel involved in UWF Other Activities.

General Waste: such as excess geotextile material and packaging, will be generated in very small quantities. This waste will be removed from the activity location and stored at a designated area at the temporary construction stage compound associated with the Upperchurch Windfarm during the construction stage and at the Upperchurch Windfarm site office during the operational (and if relevant decommissioning) stages. General waste will be collected by an appropriately licensed operator.

Chemical waste: No chemical wastes are expected.

With the exception of Overhead Line Activities, the wastes from UWF Other Activities will be managed under the construction stage Waste Management Plans for the consented Upperchurch Windfarm as relevant. During the operational stage, waste related to UWF Other Activities will be managed under the Upperchurch Windfarm's **Waste Management Plan**. Overhead line activities will be managed by the System owner (ESBN) who will have their own waste management commitments and plans.

A5.6 -5.5 Figures and Mapping

Title:
Figure OA 1
Location of UWF Other
Activities on OSI Mapping

Map Number:
Map 1 of 1

Legend:

Ancillary Haul Route Activities

Street Furniture Removal

Vegetation Trimming

Mating Overlay

Identification Number (HA1 - HA23)

Haul Route

Upperchurch Hen Harrier Scheme

Agricultural lands included in the
Upperchurch Hen Harrier Scheme

Overhead Line Activities

Overhead 110kV Line between Killonan
ESBN Station and Structure No.90

Public Road Numbers

Monitoring Activity locations relate to the works
areas associated with UWF Grid Connection,
UWF Related Works and Upperchurch Windfarm.

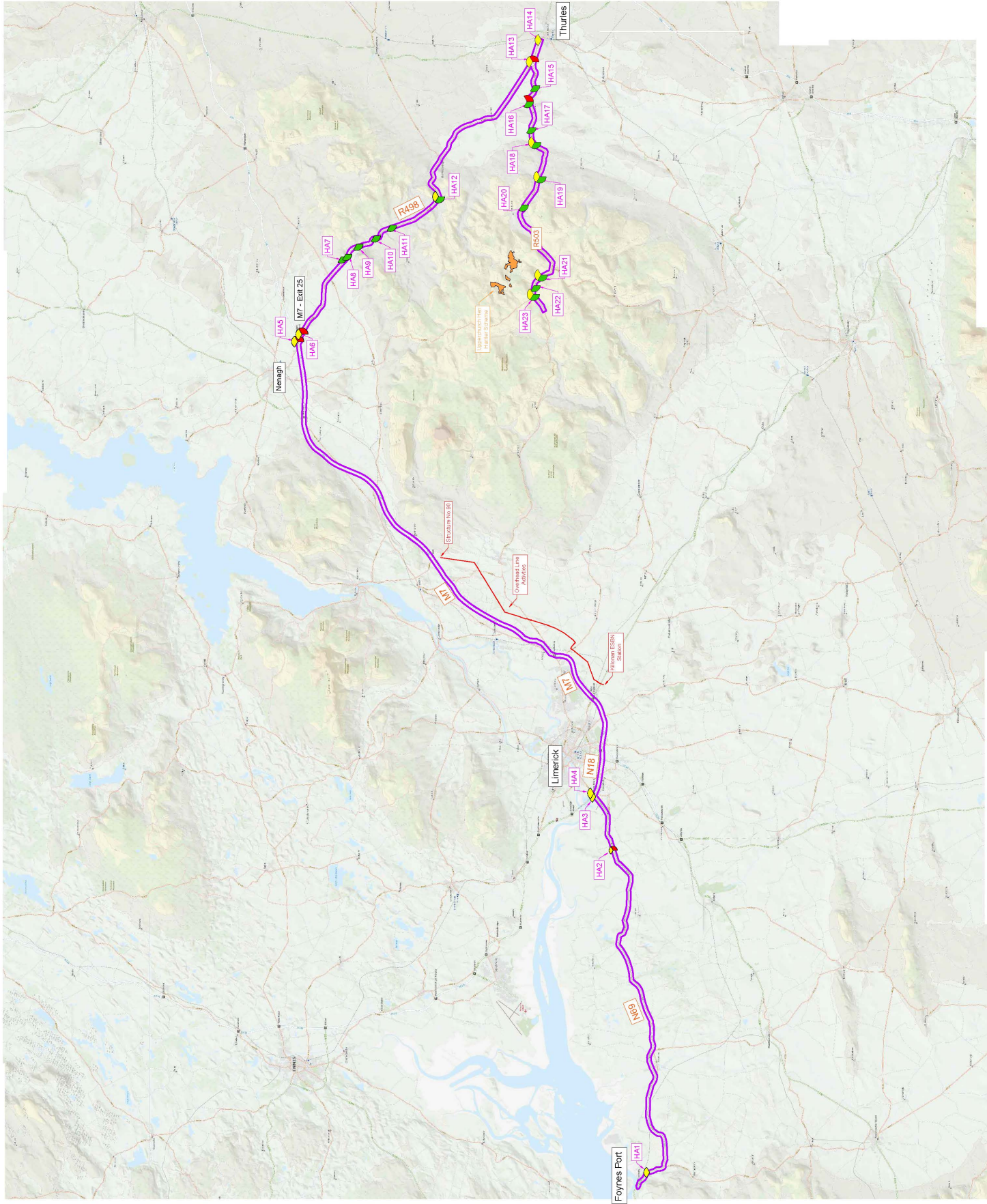


Project:
UWF Other Activities (OA)

Drawn By:	Checked By:	Date:	Sheet Size:
AB	JB	19-Feb-18	A4

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Title:
Figure OA 2

Haul Route Activities (8 maps)

Map Number:
Map 1 of 8

Legend:

Haul Route Activities:
Street Furniture Removal

Haul Route Activities:
Matting

Direction of which the photo has been taken


Project:
UWF Other Activities (OA)

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Checked by:
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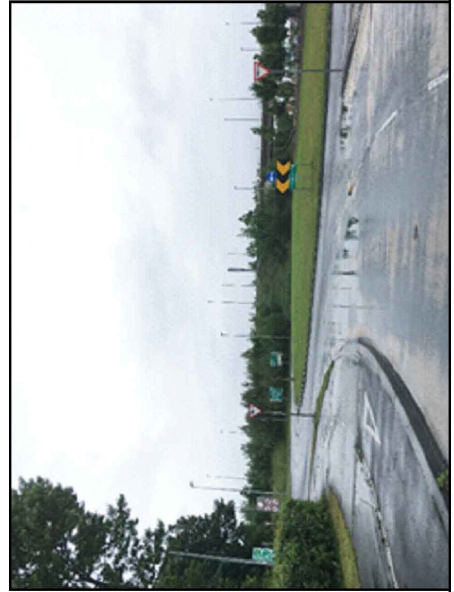
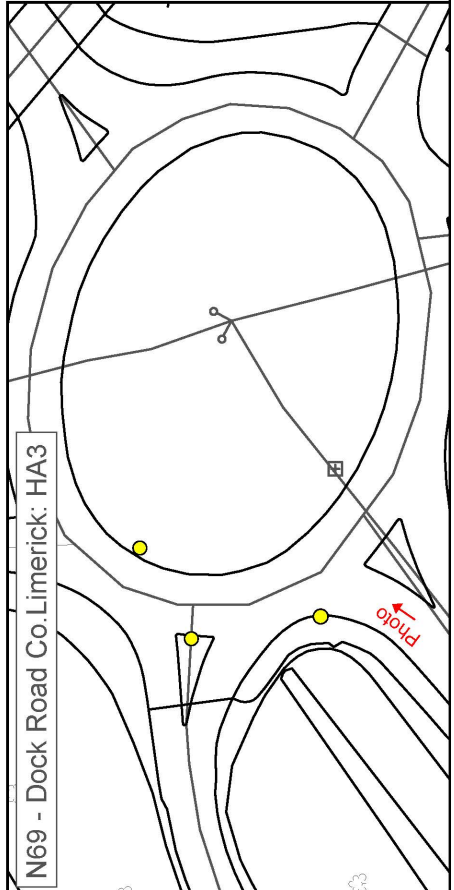
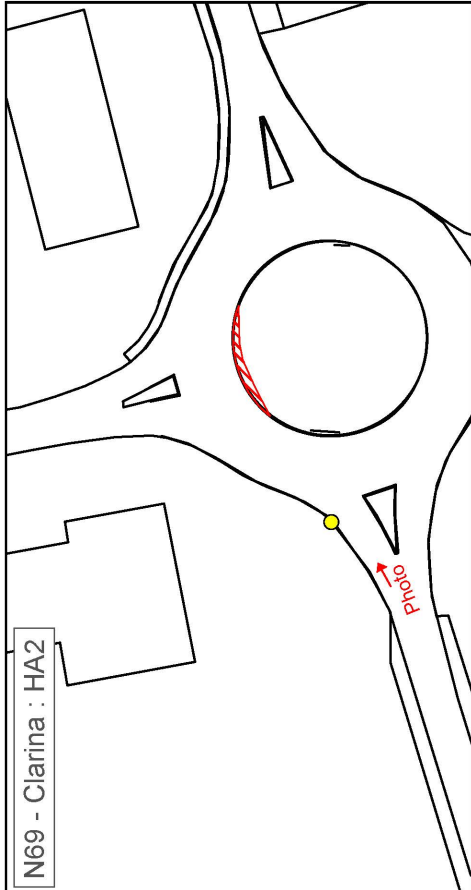
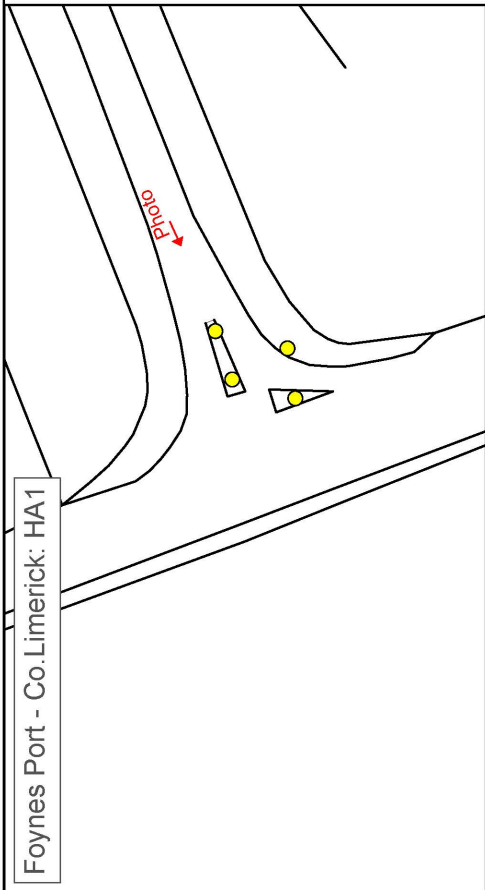
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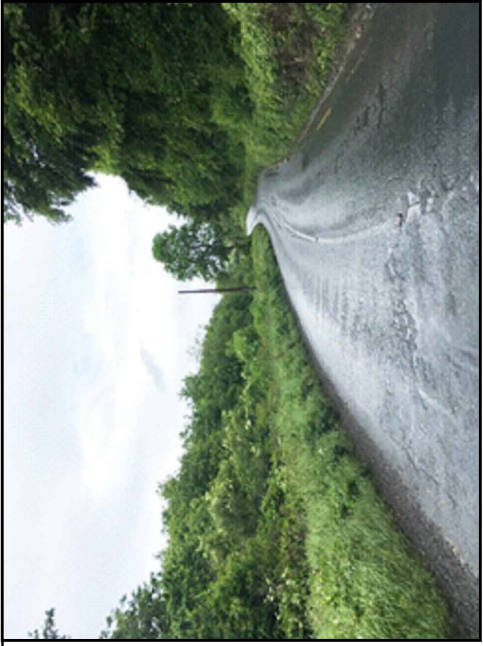
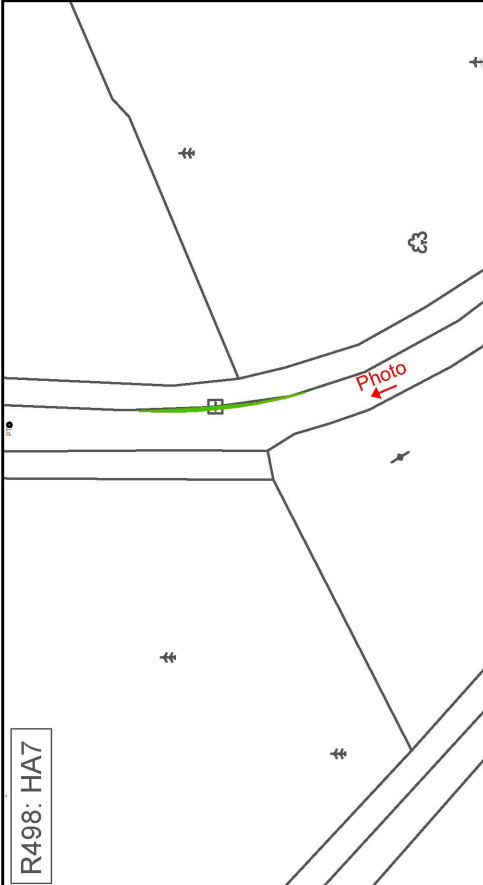


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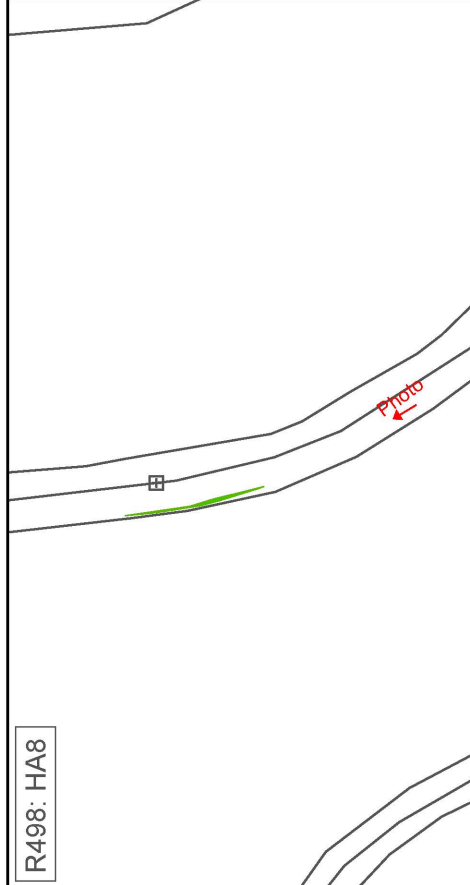
ECOPower



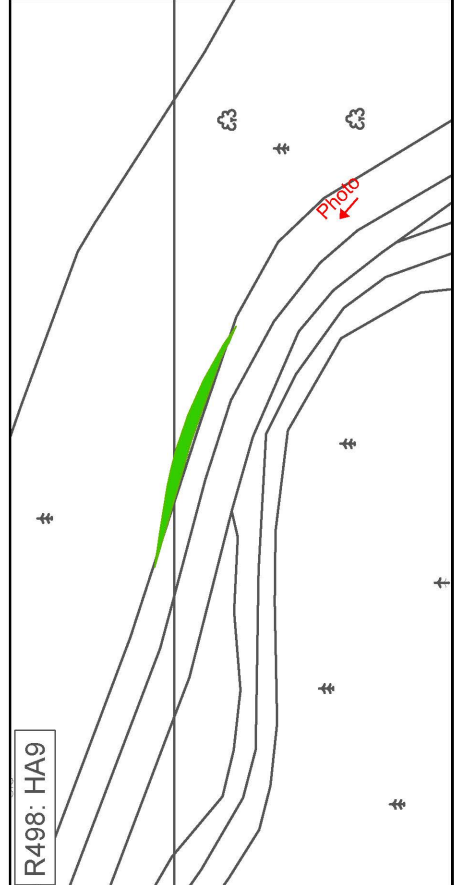
R498: HA7



R498: HA8



R498: HA9



Title:

Figure OA 2

Haul Route Activities (8 maps)

Map Number:

Map 3 of 8

Legend:

Haul Route Activities:
Vegetation Trimming

Direction of which the photo has been taken



Project:

UWF Other Activities (OA)

Drawn By

AB

Checked By

JB

Date:

19-Feb-18

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Title:
Figure OA 2
Haul Route Activities (8 maps)

Map Number:
Map 4 of 8

Legend:
Haul Route Activities:
● Street Furniture Removal
■ Haul Route Activities:
■ Vegetation Trimming
→ Direction of which the photo has been taken


Project:
UWF Other Activities (OA)

Drawn by:
AB

Checked by:
JB

Date:
19-Feb-18

Sheet Size:
A4



Aoife Butler

Co-ordinator

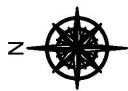
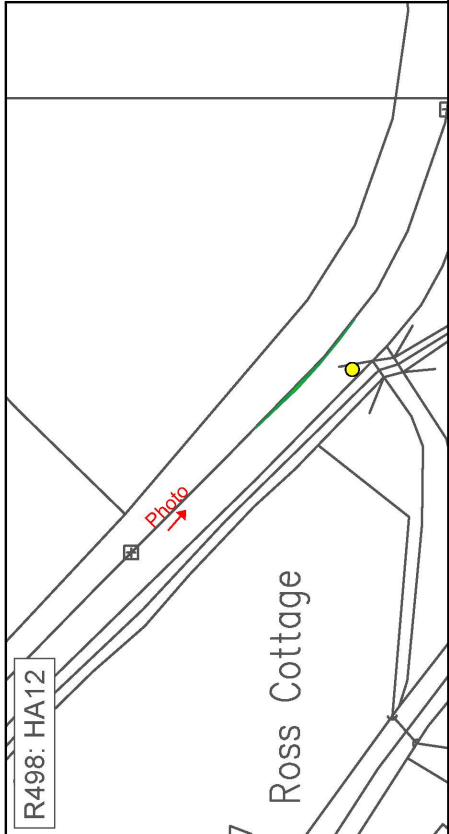
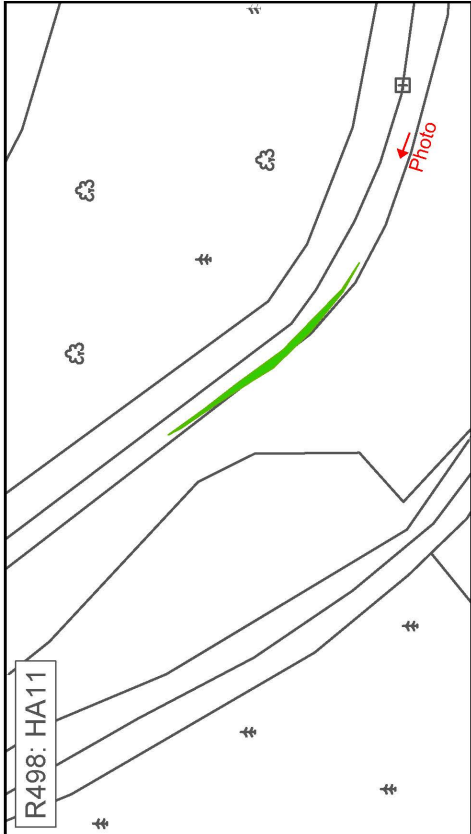
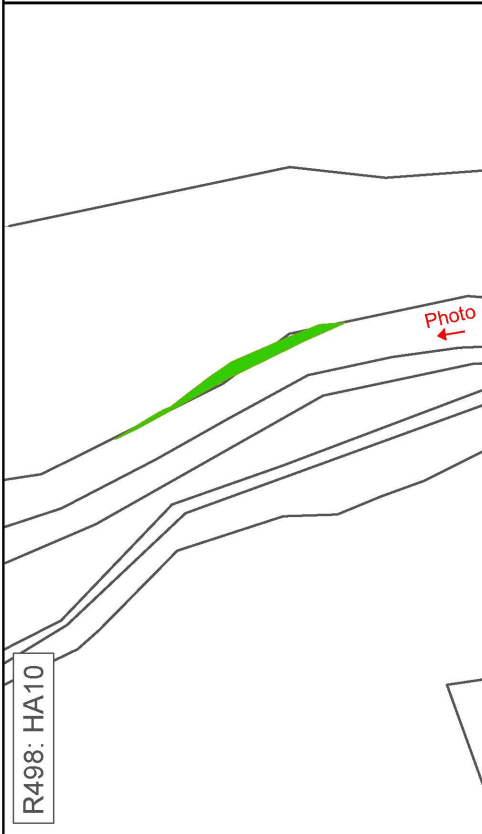
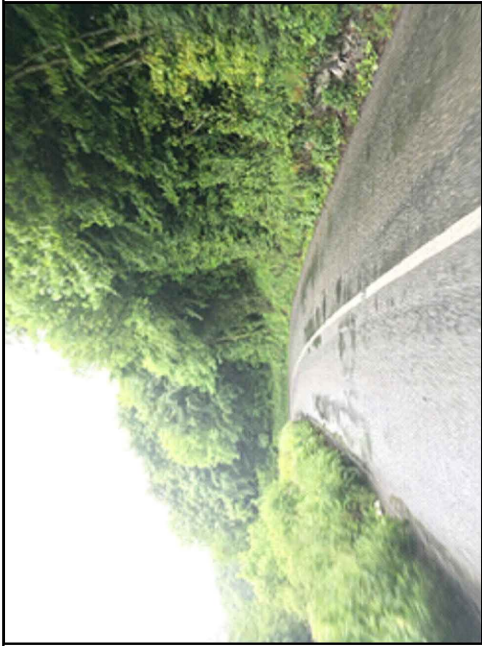
Zone 1 Road

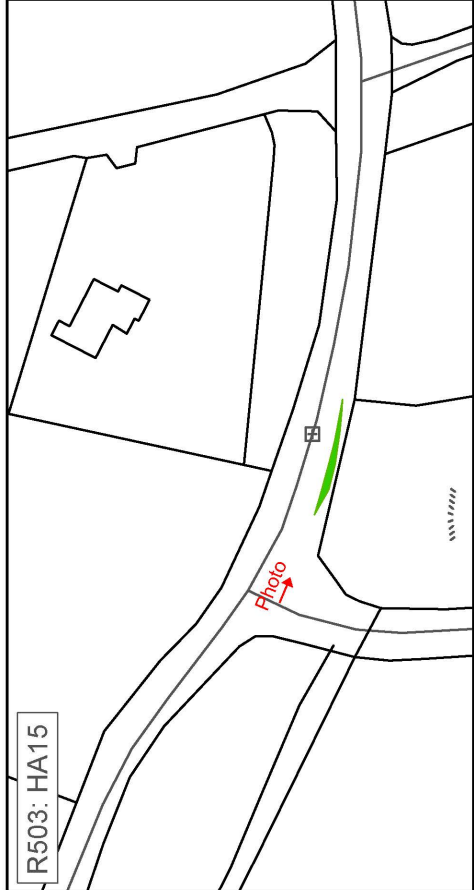
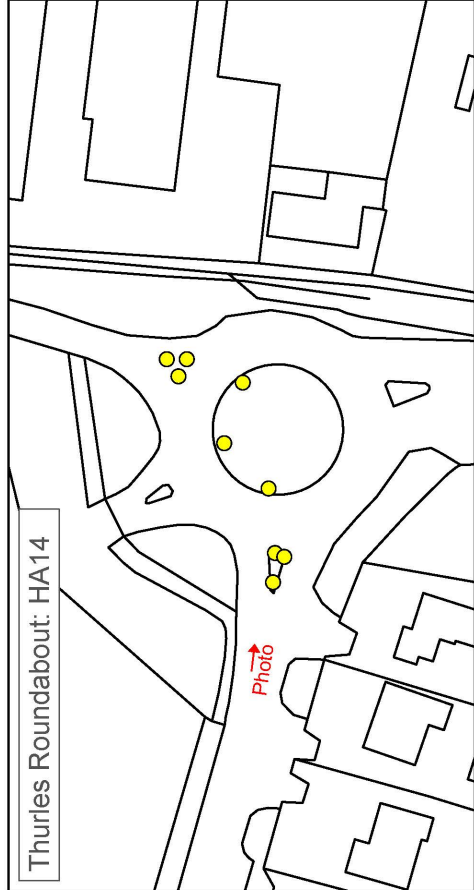
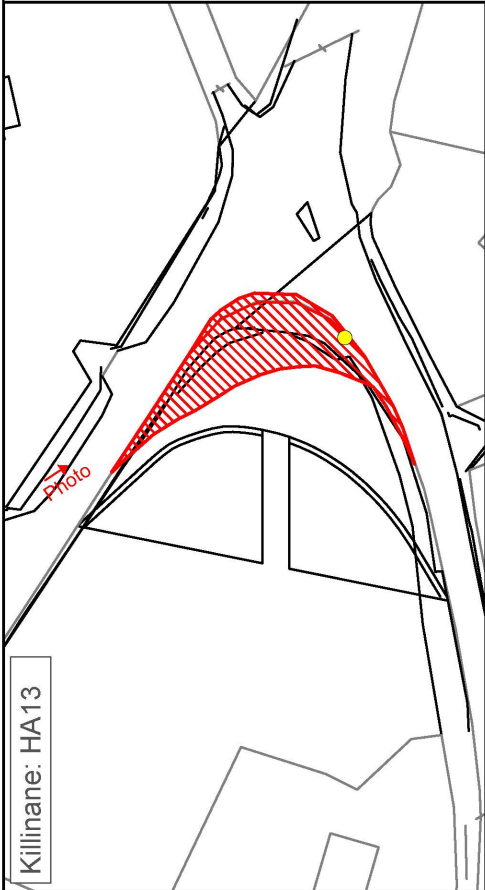
Purcellinch Business Park, Kilkenny

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Title:
Figure OA 2
Haul Route Activities (8 maps)

Map Number:
Map 5 of 8

Legend:

●

Haul Route Activities:
Street Furniture Removal

zzzz

Haul Route Activities:
Matting

■

Haul Route Activities:
Vegetation Trimming

→

Direction of which the photo has been taken

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Project:
UWF Other Activities (OA)

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Title:
Figure OA 2

Haul Route Activities (8 maps)

Map Number:
Map 6 of 8

Legend:

Haul Route Activities:

Street Furniture Removal

Haul Route Activities:

Matting

Haul Route Activities:

Vegetation Trimming

Direction of which the photo has been taken

Project:
UWF Other Activities (OA)

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JB

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19-Feb-18

Sheet Size
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A photograph showing a road junction with a green area marked for vegetation trimming. A red arrow points to the green area, indicating the direction of the photo.

A photograph showing a road junction with a green area marked for vegetation trimming. A red arrow points to the green area, indicating the direction of the photo.

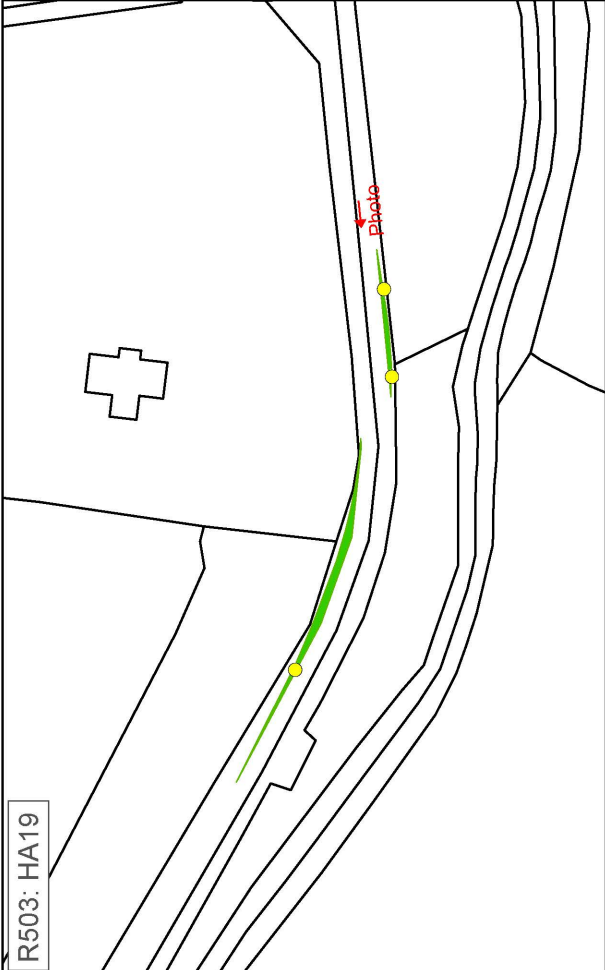
A photograph showing a road junction with a green area marked for vegetation trimming. A red arrow points to the green area, indicating the direction of the photo.

A map of R503: HA16 showing a green area marked for vegetation trimming. A red arrow points to the green area, indicating the direction of the photo.

A map of R503: HA17 showing a green area marked for vegetation trimming. A red arrow points to the green area, indicating the direction of the photo.

A map of R503: HA18 showing a green area marked for vegetation trimming. A red arrow points to the green area, indicating the direction of the photo.

R503: HA19



Title:
Figure OA 2

Haul Route Activities (8 maps)

Map Number:
Map 7 of 8

Legend:

- Haul Route Activities:
 - Street Furniture Removal
- Haul Route Activities:
 - Vegetation Trimming

Direction of which the photo has been taken

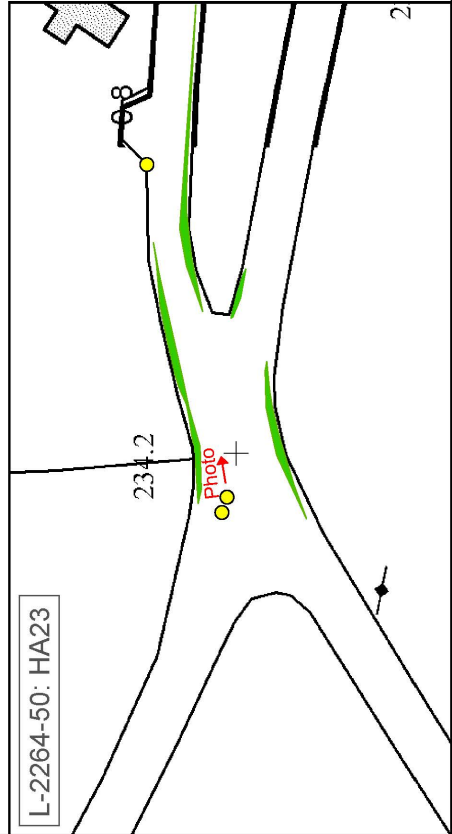
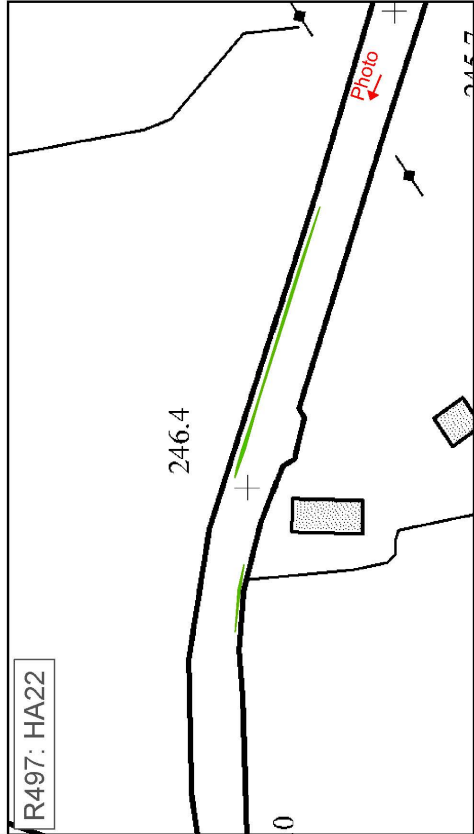
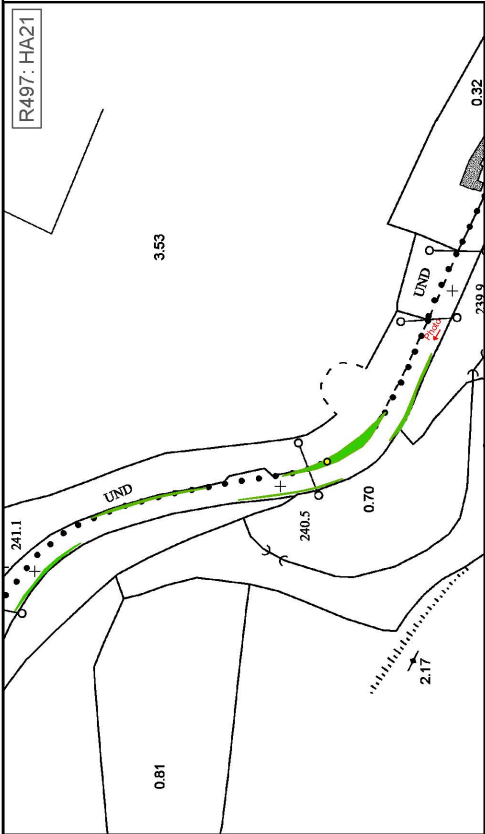


Project:
UWF Other Activities (OA)

Drawn by: AB
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Title:
Figure OA 2
Haul Route Activities (8 maps)

Map Number:
Map 8 of 8

Legend:

- Haul Route Activities:
Street Furniture Removal
- Haul Route Activities:
Vegetation Trimming
- Direction of which the photo has been taken

Project:
UWF Other Activities (OA)

Drawn by:	AB	Checked by:	JB	Date:	19-Feb-18	Sheet Size:	A4
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Ecopower Developments Ltd
Purcell Road, Business Park, Kilsenny
TEL: +353 26 7750140
MOB: +353 83 5805644

Title:

Figure OA 3

**Upperchurch Hen Harrier Scheme -
Layout on Aerial Photography Mapping**

Map Number:
Map 1 of 1

Legend:

Hedgerow Planting

Fencing of Riparian Area

Tree Planting

Agricultural lands included in the
Upperchurch Hen Harrier Scheme

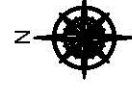
Slievefelim - Silvermines SPA

Consented Upperchurch
Windfarm Turbines

Consented Upperchurch
Windfarm Turbine Identification

250m Radius from each
Consented Windfarm Turbine

Upperchurch Hen Harrier
Scheme Identification



Project

UWf Other Activities (OA)

Team By:

AB

Created By:

JB

Date:

19-Feb-18

Section:

A4



ECOPower

Avon Energy
Avon Energy Development Limited
Purcell Park Business Park, Kilmenny
11-15, 16-17, 18-19, 20-21, 22-23, 24-25, 26-27, 28-29, 30-31, 32-33, 34-35, 36-37, 38-39, 40-41, 42-43, 44-45, 46-47, 48-49, 50-51, 52-53, 54-55, 56-57, 58-59, 60-61, 62-63, 64-65, 66-67, 68-69, 70-71, 72-73, 74-75, 76-77, 78-79, 80-81, 82-83, 84-85, 86-87, 88-89, 90-91, 92-93, 94-95, 96-97, 98-99, 100-101, 102-103, 104-105, 106-107, 108-109, 110-111, 112-113, 114-115, 116-117, 118-119, 120-121, 122-123, 124-125, 126-127, 128-129, 130-131, 132-133, 134-135, 136-137, 138-139, 140-141, 142-143, 144-145, 146-147, 148-149, 150-151, 152-153, 154-155, 156-157, 158-159, 160-161, 162-163, 164-165, 166-167, 168-169, 170-171, 172-173, 174-175, 176-177, 178-179, 180-181, 182-183, 184-185, 186-187, 188-189, 190-191, 192-193, 194-195, 196-197, 198-199, 200-201, 202-203, 204-205, 206-207, 208-209, 210-211, 212-213, 214-215, 216-217, 218-219, 220-221, 222-223, 224-225, 226-227, 228-229, 230-231, 232-233, 234-235, 236-237, 238-239, 240-241, 242-243, 244-245, 246-247, 248-249, 250-251, 252-253, 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Title:
Figure OA 4
Overhead Line Activities -
Layout on OSI Discovery Mapping

Map Number:
Map 1 of 1

Legend:

Overhead 110kV Line between Killonan
ESBN Station and Structure No.90

Angle Mast

Intermediate Structure

Structure Identification Number (P1 - P90)

Mountphilips Substation



Project:
UWF Other Activities (OA)

Drawn by: AB
Checked by: JB
Date: 19-Feb-18
Sheet Size: A4



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