MOTT MACDONALD

Road Safety Impact Assessment

North Connacht 110 kV Project

October 2022

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1 Introduction

1.1 Background to this Road Safety Impact Assessment Report

The North Connacht 110 kV Project is an electricity transmission connection project consisting of approximately 59 kilometres of underground cable (UGC) between the existing Moy substation near Ballina, County Mayo and the existing Tonroe substation near Ballaghaderreen, County Roscommon. Approximately 23 kilometres of UGC is proposed to be located in the N5, approximately 11 kilometres is proposed to be located in the N26 and approximately 17 kilometres is proposed to be in the local road network. Approximately 700 metres will be located in the N59.

This Road Safety Impact Assessment (RSIA) report has been prepared by Mott MacDonald in response to the following request for further information (RFI) in respect of the North Connacht 110 kV Project (Planning Reference: ABP-313724-32), in accordance with Section 182A(5)(a) of the Planning and Development Act 2000, as amended.

"The Updated Infrastructure Safety Management Directive (EU) 2019/1936 was transposed into Irish Law by the European Communities (Road Infrastructure Safety Management) Regulations (Sl612/2021). In accordance with Article 5 of the said Regulations, the applicant is requested to undertake a Road Safety Impact Assessment. This assessment should in accordance with the above Regulations:

a. ***indicate the road safety considerations which contributed to the choice of the proposed solution, and***
b. ***provide all relevant information necessary for a cost benefit analysis of the options assessed.***
c. ***Any other matters specifically concerning road safety issues which the applicant may wish to address in the context of Directive EU 2019/1936. "***

Article 5 of the European Communities (Road Infrastructure Safety Management) Regulations (Sl612/2021), transposed on 19 November 2021, states (emphasis added) that:

5. (1) Any person undertaking a substantial modification to a road to which these Regulations apply shall ensure that a road safety impact assessment is carried out for that project, in accordance with guidelines issued by the Authority.

(2) The road safety impact assessment shall be carried out at the initial planning stage of the infrastructure project, before—

> *(a) in the case of an infrastructure project coming within Part IV of the Act of 1993, submitting a scheme to An Bord Pleanála, pursuant to sections 47 and 49 of the Act of 1993, or,*
>
> *(b) in any other case, submitting an application for consent for the infrastructure project under the Planning and Development Act 2000 (No.30 of 2000) and Regulations made under Part XI of that Act.*

(3) Any road safety impact assessment being carried out shall—

> *(a) indicate the road safety considerations which contribute to the choice of the proposed solution, and*

(b) provide all relevant information necessary for a cost-benefit analysis of the different options assessed.

(4) In issuing guidelines referred to in paragraph (1), the Authority shall endeavour to meet the criteria set out in Annex 1 to the Directive.

The Regulations apply to roads in the State which are part of the Trans-European road network (TERN), to motorways and to other National Primary Roads, whether they are at the design stage, under construction or in operation.

The Authority, in this instance, refers to Transport Infrastructure Ireland (TII)

TII guidance[1] PE-PMG-02001 Road Safety Impact Assessment (TII, December 2017) defines a RSIA as (emphasis added):

"The strategic comparative analysis of the impact on the safety performance of the road network of different planning alternatives for a new road or a substantial modification to the existing network."

PE-PMG-02005 Road Safety Impact Assessment Guidelines (TII, December 2017) states that (emphasis added):

"Road Safety Impact Assessment shall apply to Major Schemes on national roads as defined in PE-PMG-02041 Project Management Guidelines, which result in a substantial modification to the existing national road network. Smaller projects will not generally require assessment but if there is any doubt the TII Roads and Tunnels Safety section should be consulted in order to determine the requirement for Road Safety Impact Assessment for each specific scheme."

PE-PMG-02005 Road Safety Impact Assessment Guidelines (TII, December 2017) states that it should be read in conjunction with PE-PMG-02041 Project Management Guidelines (TII, July 2022).

PE-PMG-02041 Project Management Guidelines (PMGs) (TII, July 2022) outlines the processes and deliverables within each phase of a Project. As illustrated in Figure 1.1: RSIA (Minor Projects) a RSIA may be required at (Phase 1 or 2) conceptual/option selection stage. Figure 1.2: RSIA (Major Projects), demonstrates that a RSIA is required at (Phase 1 or 2) conceptual/option selection stage. Minor Projects, in the PMGs, are noted as those between €5million and €20million. Major Projects are noted as these greater than €20 million, noting that the Guidelines "apply to the planning, design and development and construction /implementation of National Road, Greenway and Public Transport Capital Projects". The Project is currently at Phase 4 Statutory Process Stage.

It is contended that the proposed development does not constitute a substantial modification of the existing national road network for the reasons set out below.

- The UGC will be installed within the road. Following installation, the road above the trench will be reinstated to match the environment in which it is installed to the standard required by the relevant authority at that location, in this case Mayo County Council/ Roscommon County Council and / or TII.
- The construction phase works required to facilitate installation of the UGC will be sequential and transient in nature. It is generally the case that cable ducts can be laid in a road at a rate of approximately 50m per day, although a rate of 20m-50m per day is anticipated in built up areas where utilities are more common. Joint bays, generally located at intervals of approximately 850 metres along the UGC route of the proposed development (shorter

[1] Current Documents (Sept 2022) (tiipublications.ie)

intervals occur where the route alignment is more complex), are typically installed in three days, with the road reinstated, to the standard required as above, post installation.

- No new access / egress to / from the existing road network is proposed as part of the proposed development.
- There will be no discernible changes to traffic flows arising during the operational stage of the UGC.

Notwithstanding the points above, this RSIA has been completed in accordance with the request from An Bord Pleanála.

Figure 1.1: RSIA (Minor Projects)

Minor Projects

Processes	Deliverables
Phase 0 Scope and Pre-Appraisal Ensure Project alignment with current TII strategic programmes and plans.	
• Project Information Summary Notices (PISN) • Strategic Assessment Report (SAR) in accordance with PSC and PAG, where required • Collation of Project Dossier	• Project Information Summary Notices (PISN) • Strategic Assessment Report (SAR), where required • Phase 0 Gate Review Statement
Approval Point (Pre-Appointment of Technical Advisors)	
Phase 1 Concept and Feasibility Develop and investigate in further detail the feasibility of the Project and Project management structure.	
• Assignment and Structure of Project Team • Preparation of Project Execution Plan (PEP) and associated documentation • Appointment of Project Supervisor Design Process (PSDP) • Preparation of Project Brief in accordance with PAG Unit: 3.0 – Project Brief • Stakeholder interface including Public Consultation • Preparation of Road Safety Impact Assessment (RSIA) if required • Cost, Risk and Value Management • Preparation of Project Feasibility Report (if required)	• Project Execution Plan (PEP) – including Lessons Learned • Project Brief • Feasibility Report (if required)
Phase 2 Option Selection Examination of alternative options to determine a Preferred Option.	
• Update Project Execution Plan (PEP) and associated documentation • Preparation of Cost, Risk and Value Management Deliverables • Undertake evaluation of constraints • Undertake Option Selection Process • Prepare Road Safety Impact Assessment (RSIA) if required • Undertake Road Safety Audit Stage F (Parts 1 & 2) if required • Undertake Health & Safety Risk Assessment of Preferred Option • Prepare Project Appraisal documentation in accordance with PAG Unit: 12.0 – Project Appraisal for Minor Projects • Preparation of Option Selection Report	• Updated Project Execution Plan (PEP) – including Lessons Learned • Option Comparison Estimate (if required) • Project Appraisal Report

Source: PE-PMG-02041 Project Management Guidelines (TII, July 2022)

Figure 1.2: RSIA (Major Projects)

Major Projects

Processes	Deliverables
Phase 0 Scope and Pre-Appraisal Ensure project alignment with current TII strategic programmes and plans.	
• Project Information Sheet Note (PISN). • Project Dossier (All information to date on the Project, inclusion of Plans, programmes etc.). • PAG requirements.	• Strategic Assessment Report (SAR) • Phase 0 Gate Review Statement.
Approval Point (Pre-Appointment of Technical Advisors)	
Phase 1 Concept and Feasibility Develop and investigate in further detail the feasibility of the Project and Project management structure.	
• Assignment of Project Archaeologist. • Project Programme. • Documentation Management Plan. • Project Communications Strategy including Stakeholder and Public Consultation. • Feasibility Reports, if necessary. • Road Safety Impact Assessment. • Procurement Strategy. • Procurement File Setup. • Safety File Setup. • Appointment of PSDP. • Cost Management. • Risk Management. • Value Management. • PAG Requirements.	• Project Execution Plan. • Project Brief (Refer to PAG). • Phase 1 Gate Review Statement.
Phase 2 Option Selection Examination of alternative options to determine a Preferred Option.	
• Project Set-up Workshop, if required. • Stakeholder and Public Consultation. • Option Selection Process. • Evaluation of Environmental Constraints • Road Safety Impact Assessment. • Road Safety Audit Stage F (Parts 1 and 2). • Option Selection Peer Review. • Health and Safety requirements. • Variation to Development Plan(s), if necessary. • Cost Management. • Risk Management. • Value Management. • PAG Requirements. • Structures Technical Acceptance.	• Option Comparison Estimates (refer to Cost Management Manual). • Option Selection Report. • Signed Option Selection Report Peer Review Report. • Preliminary Business Case (Refer to PAG). • Updated Project Execution Plan. • Phase 2 Gate Review Statement.
Phase 3 Design and Environmental Evaluation Develop the Project design, following the selection of a Preferred Option, based on both technical and environmental inputs, to a stage where sufficient levels of detail exist to establish landtake requirements and to progress the Project through the statutory processes.	
• Stakeholder and Public Consultation. • Determination and undertaking of appropriate Statutory Processes (planning, environmental assessment, land acquisition). • Topographical surveys, preliminary GI, miscellaneous surveys.	• Design Report. • Signed Design Report Peer Review Report. • Environmental Deliverables (EIA screening and Appropriate Assessment screening reports, EIAR, NIS, &c., as appropriate).

Source: PE-PMG-02041 Project Management Guidelines (TII, July 2022)

1.2 Report Overview

This report describes a RSIA carried out on the proposed North Connacht 110 kV Project. The assessment took place in October 2022. The Project is currently at Phase 4 Statutory Process Stage.

This report is divided into the following sections:

- Section 2 provides a background to the proposed development.

- Section 3 outlines the alternatives considered.
- Section 4 outlines the existing road network and the study area.
- Section 5 details the consequences of options considered.
- Section 6 is the comparison of alternatives.
- Section 7 is the conclusion section.

1.3 RSIA Team

The assessment team members are:

- Marguerite Murphy (BE, CEng, MIEI, Mott MacDonald) - (Road Safety Auditor/Road Design Engineer); and
- John O'Riordan (BEng, CEng, MIEI, Mott MacDonald) - (Road Safety Auditor/Road Design Engineer).

The above assessment team meet the qualifications and experience requirements as set out in TII publication PE-STY-02003 (Road Safety Impact Assessment – Impact Assessment Team Qualifications).

The assessment comprised an examination of the drawings and documentation relating to the North Connacht 110 kV Project prepared by Mott MacDonald, and a visit to the site of the scheme. Both team members visited the site together on 6 October 2022. Weather conditions on the day of the site visit were overcast and the ground was wet.

This RSIA has been carried out in accordance with the requirements of TII publications PE-PMG-02001 (Road Safety Impact Assessment) and PE-PMG02005 (Road Safety Impact Assessment Guidelines).

The drawings and documentation examined by the audit team are listed include the Underground Cable Route Options Transport Study issued to TII on 26 February 2021 and the planning application documentation available here which includes:

- Chapter 14 Roads and Traffic assessment (North-Connacht-110-kV-Project-PECR.pdf (eirgridnorthconnacht.ie)).
- Appendix 4 Alternative Options Considered (North-Connacht-110-kV-Project-PECR.pdf (eirgridnorthconnacht.ie)).
- Planning Drawings including Key plan and Site Locations (Plans and Drawings (eirgridnorthconnacht.ie)).
- Underground Cable Route Options Transport Study (Appendix A of this RSIA).

2 Overview of The Proposed Development

2.1 Background to the Proposed Development

An extensive optioneering process, in line with EirGrid's Framework for Grid Development (as illustrated in Figure 2.1: EirGrid's Six-Step Framework for Grid Development) has been undertaken for the North Connacht 110 kV project.

Figure 2.1: EirGrid's Six-Step Framework for Grid Development

Source: EirGrid

The optioneering process included publication and stakeholder engagement on the following reports[2].

- Step 4A Report (Mott MacDonald, September 2020) described the constraints mapped within the Project study area, and the identified potential areas of opportunity for both UGC and overhead line (OHL) options.
- Step 4B Report (Mott MacDonald, March 2021) included a comparative evaluation of four potential OHL corridor options and three potential UGC corridor options. Based on a multi-criteria analysis approach (which included a comparative evaluation of technical, economic, environmental and social performance; and deliverability), the Step 4B report identified the emerging best performing option) EBPO, UGC corridor option 2; and
- Step 4C Report ((Mott MacDonald, July 2021), confirmed the Best Performing Option (BPO) to be taken into the next (planning) stage; Moy to the N26 junction (Cuillonaghtan townland), N26 junction (Cuillonaghtan townland) to Swinford; and Swinford to Tonroe.

The Underground Cable Route Options Transport Study focused on the appraisal of the three identified UGC options and considered, at a high level, matters which have realistic potential impact upon Ireland's public road transport network.

In relation to national roads, the report advised that traffic diversions were unlikely to be required to facilitate cable works on any of the National Roads affected but traffic management will involve either;

- Localised carriageway closure and traffic management signing and sharing of remaining carriageway space for two-way traffic on carriageway sections which include hard shoulders; or
- Single alternate lane operation controlled by temporary traffic signals on two lane single carriageway sections.

The report advised that further consultation should be undertaken with TII to fully appraise constraints associated with the installation of UGC in National Road corridors with matters for discussion including:

[2] Related Documents (eirgridgroup.com)

- Road safety and traffic management issues on a strategic, highly trafficked, high speed, national road, during construction.
- Impact on the ability of general maintenance and safety works to existing roads, including signing, drainage works, safety barriers, etc., as a result of having high voltage cabling laid on a national road corridor.
- Constraints associated with the on-line national road improvements and upgrades, including potential requirement for minor horizontal alignment impact, where cabling may require relocation.

The report further advised that, as the project moves toward planning, the following potential construction phase effects will need to be considered:

- Disruption and delay to users of roads from cable installation work in road corridors
- Disruption and delay of users of footpaths and cycle paths from cable installation work in or adjacent to active travel infrastructure
- Disruption and delay to users of roads as a result of the additional traffic movements that will be generated by the Project
- Detrimental impact on road safety as a result of the additional traffic movements that will be generated by the Project.

A copy of the Underground Cable Route Options Transport Study is included in Appendix A of this RSIA.

An application for approval for the proposed development was submitted to An Bord Pleanála in June 2022. The application was supported by a Planning and Environmental Considerations Report (PECR), which included an assessment of impacts on roads and traffic undertaken with reference to the following guidance:

- Traffic and Transport Assessment Guidelines (TII, 2014);
- The Institute of Environmental Management and Assessment Guidelines for the Environmental Assessment of Road Traffic (The Institute of Environmental Management and Assessment, 1993); and
- The UK Design Manual for Roads and Bridges (DMRB, various dates).

The assessment of impacts on roads and traffic included an evaluation of detrimental impact on road safety as a result of the additional traffic movements that will be generated by the proposed development.

The assessment of impacts on roads and traffic in relation to accidents and road safety concluded that there would be a negligible increase in collisions in the study area during the construction period as a consequence of the increased traffic generated by the proposed development and the significance of the effect would be none and therefore not significant.

The overall assessment of impacts on roads and traffic concluded that there are no significant residual traffic and road effects predicted during the construction and operational phases with the successful incorporation of specific measures described in the PECR and within the TMP. It acknowledged that inconvenience will be caused in some areas due to the diversion routes and construction of the UGC route, however as the construction period is over a number of months all routes will only be affected during certain periods of the construction phase and not simultaneously and therefore only on a temporary basis.

On 31 August 2022, An Bord Pleanála issued a RFI to EirGrid plc, a response to which is the subject of this RSIA.

2.2 Objectives of the Proposed Development

2.2.1 Project Appraisal Guidelines for National Roads Unit 1.0 - Introduction PE-PAG-02009 March 2021

The PAG incorporate the requirements of project appraisal which are set out in the following governmental publications:

- The Public Spending Code (Department of Public Expenditure and Reform, 2019); and
- Common Appraisal Framework for Transport Projects and Programmes (Department of Transport (2016).

As set out in the PAG, from a transport perspective, the key purpose of appraisal is to ensure that scarce public funds are allocated in an efficient manner by establishing the merits of a proposal using a consistent and comprehensive framework.

In relation to the appraisal, the PAG includes the following statements:

Proportionality

It is crucial that *the level of appraisal, and the resources invested in appraisal are proportionate to the scale and complexity of the proposal. All proposals should be subject to comprehensive and robust appraisal. However, the scale of the appraisal should be tailored to match the decision being made. The concept of proportionality in the case of National Road projects and programmes will mean that a detailed appraisal may not be appropriate in every case and that a more simplified or light touch approach may be more appropriate*.

Rationale

There must be a clear rationale for any proposal and it must be based on the presentation of existing deficiencies and future challenges, which establish the need for a scheme. In the early project phases a clear transport related problem should be identified, with supporting evidence.

Objective Based Appraisal

The PSC states that 'poor objective setting' can be among a number of shortcomings that commonly arise with public investment projects and programmes. Scheme objectives should not be tailored to suit a particular intervention. There must be consideration of genuine, discrete options, and not an assessment of a previously selected option against some clearly inferior options.

Scheme objectives are set out in the PAG, however, these relates to roads schemes.

The proposed North Connacht 110 kV Project is not a roads project. While PAG is not applicable, the objectives of the North Connacht 110 kV Project are provided hereunder:

The need for the North Connacht 110 kV Project is not in response to a clear transport related problem. Rather the proposed installation of a utility within the public road network is in response to the need to connect new renewable generation to the national electricity grid infrastructure to help with meeting national Climate Action Plan targets.

The current level of renewable energy generation in the North Connacht region is far greater than the capacity of the local electricity network. This requires solutions to improve the electricity infrastructure in the region.

The proposed development is needed in order to facilitate the connection of renewable energy from wind farms in the North Connacht region onto the national electricity grid.

3 Description of Alternatives

3.1 Introduction

Sections 3.2 and 3.3 provide a summary of the alternative options considered at various stages of project development, notwithstanding that the subject of this RSIA is the North Connacht 110 kV Project.

The North Connacht 110 kV Project is an electricity transmission connection project consisting of approximately 59 kilometres of underground cable (UGC) between the existing Moy substation near Ballina, County Mayo and the existing Tonroe substation near Ballaghaderreen, County Roscommon. Approximately 23 kilometres of UGC is proposed to be located in the N5, approximately 11 kilometres is proposed to be located in the N26 and approximately 17 kilometres is proposed to be in the local road network. Approximately 700 metres will be located in the N59

3.2 Consideration of Overhead Lines and Underground Cables

Both OHL and UGC options were considered for the North Connacht 110 kV Project.

The Step 4 process (refer to Section 2.1 of this RSIA), sought to identify potential routes for both OHL and UGC options. Initially corridors were identified which could later be refined throughout Step 4.

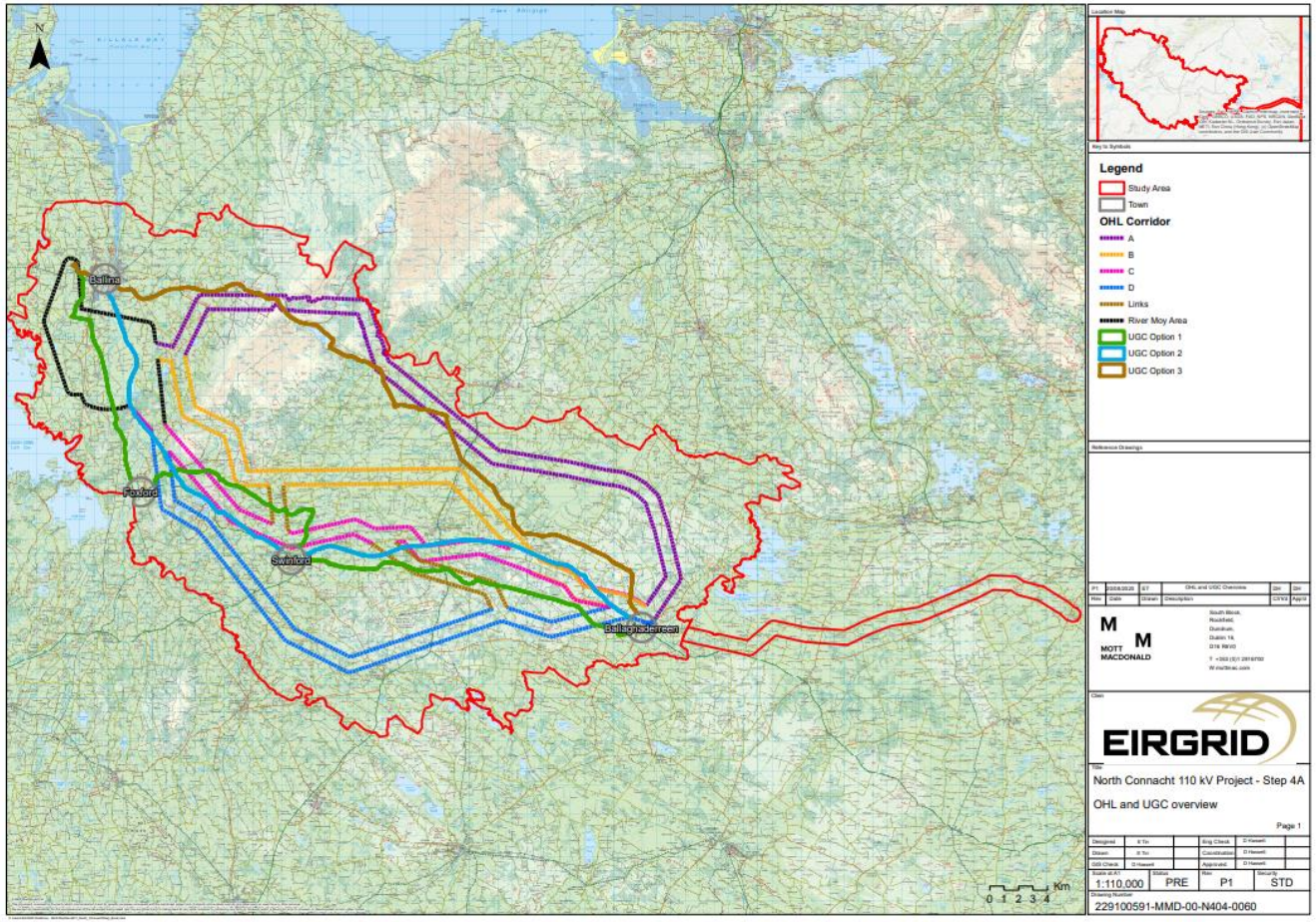
EirGrid considered the strategic importance of the national road network when considering the route between Swinford and Ballina. All options provided as part of the Step 4A Report were routed, following GIS analysis and engagement with TII, to avoid that portion of the N26 from the townland of Cuillonaghtan, Foxford and Ballina, utilising the local road network instead to Ballina. This was a result of the nature of the road network in this area and understanding the portion of road between Foxford and Ballina may require a significant upgrading in future. This was a key consideration of alternative routing options for the cable. The avoidance of the use of the National Road between Cuillonaghtan and Ballina ensures avoidance of approximately 20km of the National Road network.

During the Step 4B assessment the overall Emerging Best Performing Option (EBPO) for the North Connacht 110 kV Project was identified as an UGC option.

The figures listed below are presented overleaf and illustrate the alternative options considered up the proposed North Connacht 110 kV project, the subject of this RSIA, Figure 3.4: The Proposed North Connacht 110 kV Project.

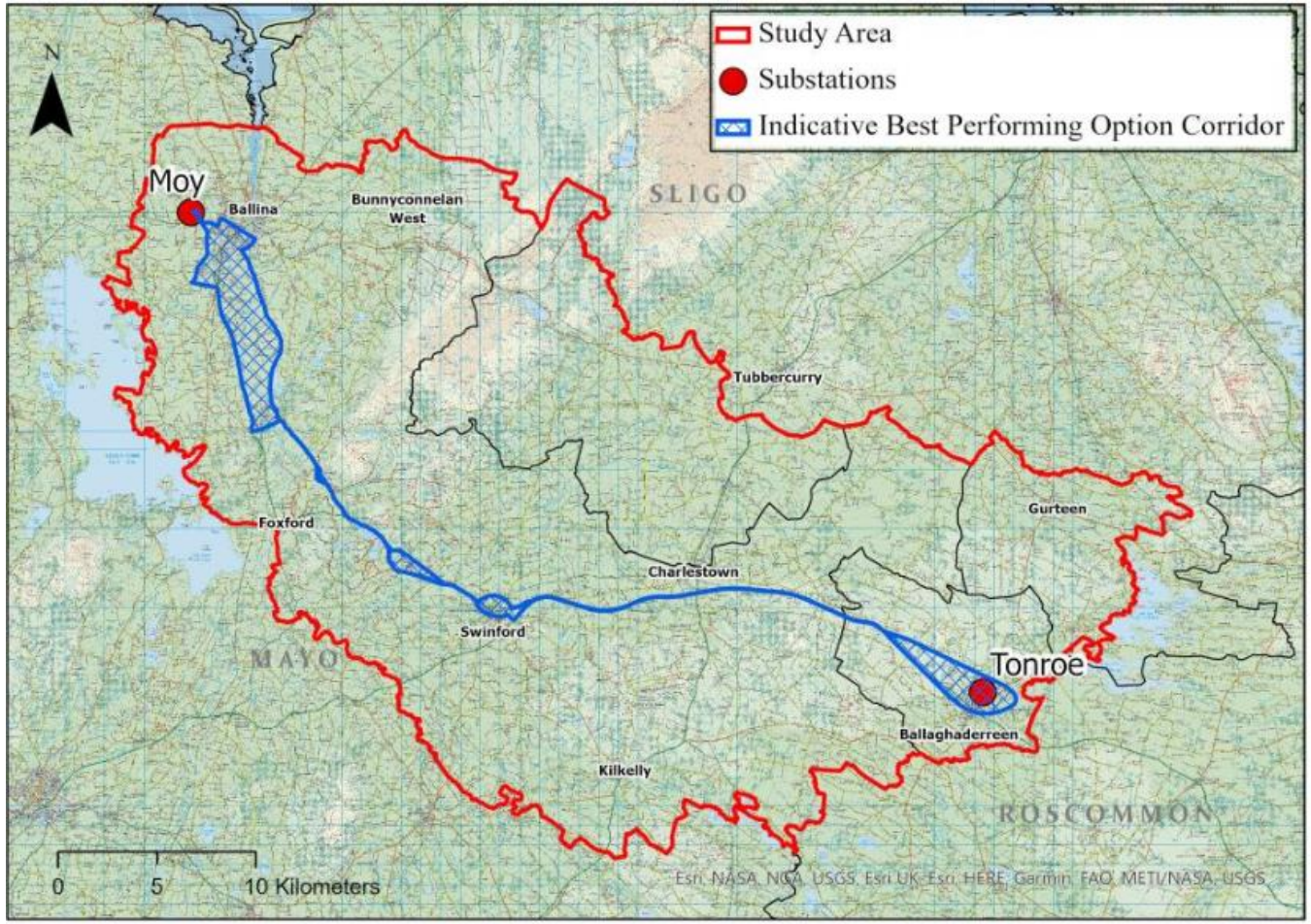
- Figure 3.1: North Connacht 110 kV Project Alternatives Considered (Step 4A, September 2020).
- Figure 3.2: North Connacht 110 kV Project Alternatives Considered (Step 4B, March 2020).
- Figure 3.3: North Connacht 110 kV Project EBPO (Step 4C, July 2021).
- Figure 3.4: The Proposed North Connacht 110 kV Project.

Figure 3.1: North Connacht 110 kV Project Alternatives Considered (Step 4A, September 2020)



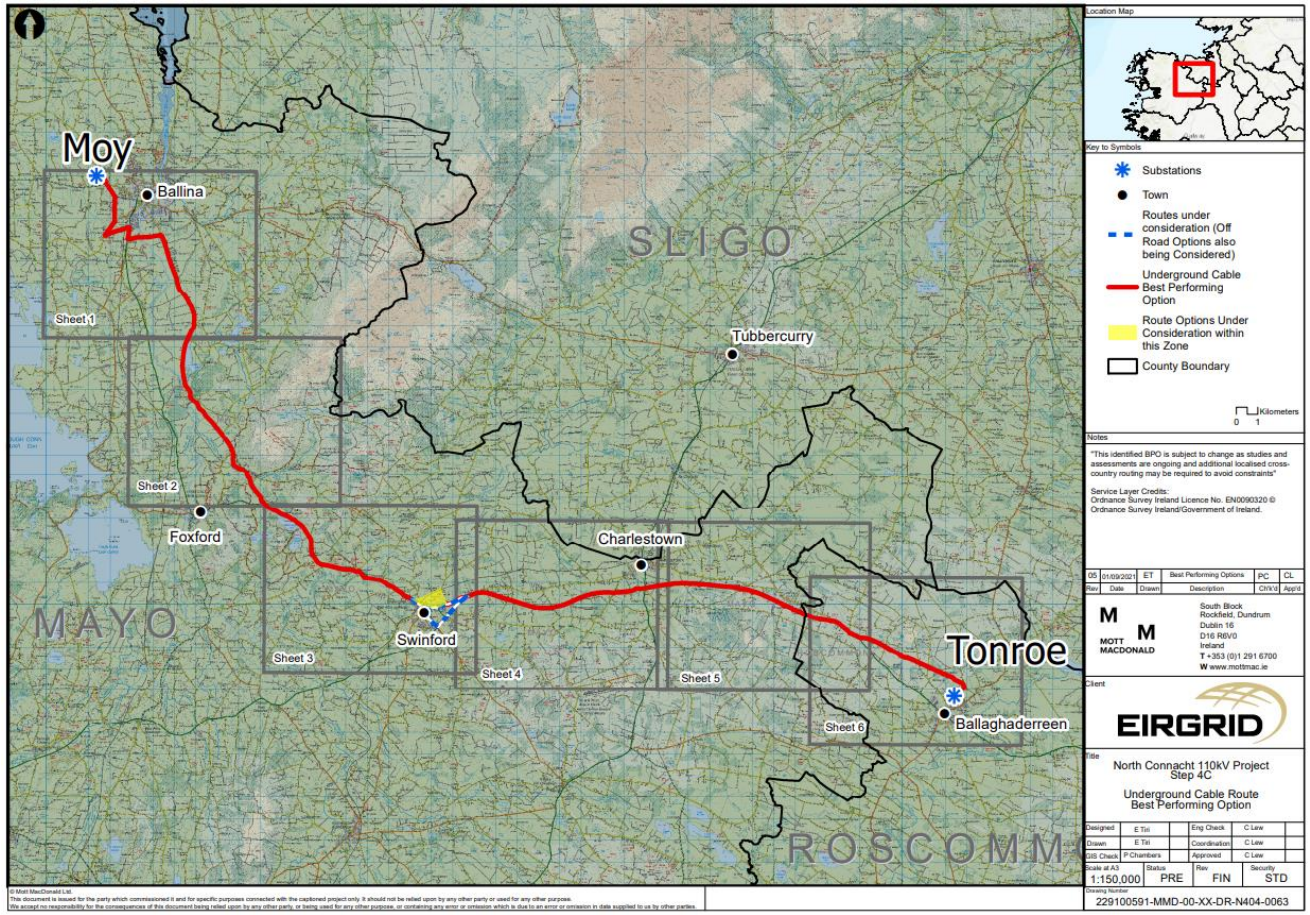
Source: North_Connacht_110kV_Map_Book.pdf (eirgridgroup.com)

Figure 3.2: North Connacht 110 kV Project Alternatives Considered (Step 4B, March 2020)



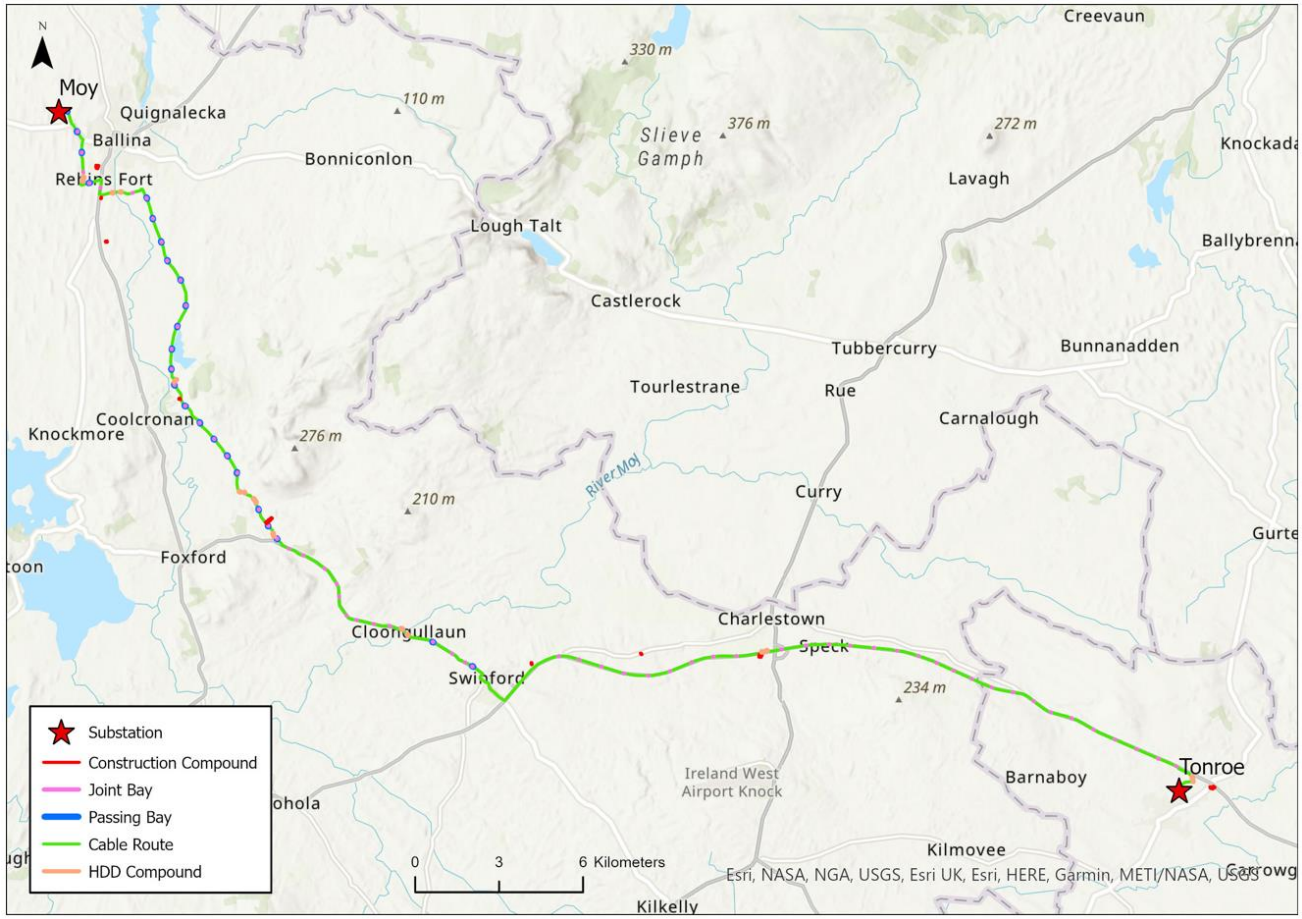
Source: Related Documents (eirgridgroup.com)

Figure 3.3: North Connacht 110 kV Project EBPO (Step 4C, July 2021)



Source: Step-4C-Development-Options-and-Evaluation-Report-03.09.2021.pdf (eirgridgroup.com)

Figure 3.4: The Proposed North Connacht 110 kV Project



Source: Mott MacDonald

4 Existing Road Network and Study Area

4.1 Introduction

In September 2020 (Step 4A Optioneering Stage, RSIA Phase 2 Stage), there were a number of locations within the study area which interfaced with national roads infrastructure. The national roads considered were the N5, N17, N26 and N59; all administered by TII.

The N5, and the N17 are important strategic national roads and are part of the EU's TEN-T Comprehensive Network. They provide access to regional and international markets, including strategic airport and port locations, as well as linking with other strategic national roads.

The N17 provides direct access to Ireland West Knock Airport which is located approximately 5km South from Charlestown and was in close proximity to UGC Route Option 1.

The N26 and N59 provide important regional and inter-regional connectivity. The N59 is a key Link between important towns/cities in Connacht, including Sligo, Westport and Galway City as well as linking with the popular touristic region of Connemara on the West Coast.

The primary traffic routes in the area are the N59 and N26 in Mayo, the N17 in Sligo, and N5 in Roscommon.

Refer to Figure 3.4: The Proposed North Connacht 110 kV Project,

4.2 Road Network and Route Profiles

The N59 starts in County Sligo, and circles around the west of Ireland, passing west from Sligo into County Mayo and through Ballina, continues around Mayo and into Galway. The N59 ends in Galway at a junction with the N4.

The local road to the south of Ballina varies in cross section. There are minimal areas with verges and the road varies between 7-8m wide and 5-6m wide. In addition there are some sharp bends on the route.

The N26 is a national primary road in the Northeast of County Mayo which connects to the N5 at Swinford, County Mayo, the N58 at Foxford, County Mayo, and the N59 at Ballina, County Mayo.

The N5 connects Longford with Westport in County Mayo. The N5 is the main access route from Dublin via the M4 to Mayo's largest towns, Castlebar, Ballina and Westport. The N17 crosses over the N5 south of Charlestown. The roads vary from dual carriageways with hard shoulders to single carriageways with no hard shoulders.

Public roads within the study area are presented in Table 4.1.

Table 4.1: Public roads within the study area

Road Section
N59 - (GORTEEN to CARROWCUSHLAUN) (Moy Substation to unnamed public road at Carrowcushlaun (via crossing of the River Moy)]
Unnamed Local Road - CARROWCUSHLAUN to CARROWKERIBLY (One section of unnamed local road to southernly section of same road - north of Carrowkeribly Lough)
Unnamed Local road to L1321 - CARROWKERIBLY to BOHERHALLAGH (Section of unnamed road, north of Carrowkeribly Lough to section of the L1321 north of the Yellow [Foxford] River)
L1321 to N26 - BOHERHALLAGH to POLLSHARVOGE (L1321 north of the Yellow [Foxford] River to section of N26 west of Cloonygoawn River)

Road Section
N26 - POLLSHARVOGE to CLOONGULLAUN (Section of N26 west of Cloonygowan River to Ballina Road (N26))
N26/R375/N5/L5346 - LAGCURRAGH to CLOONLARA Ballina Road (N26) / Circular Road / Station Road / junction of Davitt Place and Kilkenny Road (R375) / junction with R375 and Swinford Bypass (N5) to a section of N5 adjacent the junction with L5346).
N5 - CLOONLARA to MULLENMADOGE (Section of N5 Swinford Bypass, to section of N5 Charlestown Bypass)
N17 - MULLENMADOGE to BALLYGLASS EAST (Section of N5 Charlestown Bypass to northern junction with N17)
N17/N5/L55016 - BALLYGLASS EAST to BALLYOUGTHER (Junction of N5 Charlestown Bypass and N17 to Section of N5 Ballaghaderreen Bypass / field access track / L55016 / Off road until Tonroe Substation
BALLYOUGHTER Tonroe Substation

Confirmation of the construction route will be agreed following the consenting of the development (should this occur) with the relevant local authorities/TII when a contractor has been appointed, and detailed design of the development is undertaken.

The key characteristics of the identified public road sections in the study area have been appraised through desktop study and are set out in Table 4.2: Route network and route profiles.

Table 4.2: Route network and route profiles

Section Name	Relevant Cable Section	Description	Construction Access Route	Cable Route
L1109	Moy Substation	The L1109 local road runs from the Moy Substation south towards the Gurteens Roundabout joining to the N59. The road has an 80 km/h speed limit and there are a number of local accesses off the road. There is a passing bay and a joint bay present near the substation.	Y	Y
N59	Multiple	The N59 forms part of the National Road network in Ireland. It is a single carriageway with a partial speed limit of 60 km/h which then changes to 50 km/h once entering the built-up area. There are several entrances to the residencies and Gurteens Industrial Estate. The cable route follows the N59 for approximately 700m and turns south onto the unnamed local road. Approximately halfway along the 700m, a passing bay and a joint bay are present.	Y	Y
Unnamed local road (North and South of Knockleagha)	Multiple	This unmarked local road has grassy verge and few local access points to farmhouses and farmlands. The speed limit is 80 km/h. Cable runs along the road for 630m and then shifts to the east and runs through the fields for 1 km until it joins the L1122 Commons Road. There is 1 passing bay and 2 joint bays on this route.	Y	Y
L1122 Commons Road	Multiple	This is a narrow rural road with a bridge that has train tracks on top. The speed limit is 80 km/h but changes to 50 km/h once entering the build-up area near the entrance to N26. The cable runs for 780m along this road and then turns south onto N26. There is a passing bay and a joint bay halfway along the road. A small bit of the cable dips into the fields right after the bays.	Y	Y
N26	Multiple	The N26 is a single carriageway road with a 60 km/h speed limit. There are a number of	Y	Y

Section Name	Relevant Cable Section	Description	Construction Access Route	Cable Route
		residential accesses along the road. The cable runs for 550m along the west side of the road and turns east onto an unnamed local road. There is a joint bay present along this route.		
Unnamed local road (South of Rehins Fort)	Multiple	The unnamed local road is an access point to Hollister ULC with a speed limit of 15 km/h. The cable runs through the road for 450m and then is offline for 1.17km until it joins another unnamed road. The cable also passes through River Moy. There are 2 joint bays present along this cable route.	Y	Y
Unnamed road (south of Jones Avenue, goes through Cloonislaun, Cloonagun, Mullahowney, Bonnifinglas and Coolagagh)	Mulitple	This unnamed road runs parallel to the N26 from Church Road in Jones Avenue, South of Ballina to Oulogue where it joins N26. The road is two-way, is wide and has marking in the middle. The speed limit is 80 km/h. There are few local accesses present along this route. There are also three quarries present along this route. The cable runs through this road for 14.5km but occasionally is offline (off the national road network). There are 20 joint bays and 18 passing bays present at this route.	Y	Y
N26	Multiple	The N26 is a single carriageway with a speed limit of 100 km/h. There are hard shoulders present and several points with double line in the middle for no overtaking. There are scattered local accesses throughout. The cable runs for 9km until it reaches Swinford. There is one offline point in Pollsharvoge/Cloongullaun. There are 15 joint bays and two passing bays.	Y	Y
Circular Road/Station Road/Davitt Place	Multiple	Circular Road, Station Road and Davitt Place are local roads in Swinford. They run in between houses, have footpaths on both sides and have a speed limit of 50 km/h. The cable runs through Swinford for 520m and then joins R375. There is 1 joint bay present.	Y	Y
R375	Multiple	This is a single carriageway regional road. There is a footpath present on one side of the road. There are no hard shoulders. The speed limit is 50 km/h where access to local houses is present. The speed limit changes to 80 km/h by the industrial part of the road until it joins the N5. The cable runs for 900m from R375 in Swinford to the end of R375 where it joins N5 and turns North-East direction. There is 1 joint bay present.	Y	Y
N5	Multiple	The N5 is part of the National Road Network in Ireland. It is a national single carriageway with a speed limit of 100 km/h. There are hard shoulders present which occasionally change into turning lanes. The cable runs for 26.2 km from the R375/N5 junction to Ballaghaderreen. There are 5 offline points in this route. There are 33 joint bays present.	Y	Y
R293	Tonroe Substation	This is a single carriageway regional road. There is a footpath present on one side of the road and there are no hard shoulders. The speed limit is 50 km/h. The cable runs parallel to this road for 300m and then runs for 640m through the fields	Y	Y

Section Name	Relevant Cable Section	Description	Construction Access Route	Cable Route
		until it reaches the Tonroe substation. There are 2 joint bays present.		

4.3 Existing Traffic Flows

Traffic flow information for roads within the defined study area was sourced from the TII Online Data Portal. (TII, 2022) The routes assessed are sections of the N26 and N5 within the study area or in close proximity. The data collected was obtained from four TII traffic counters located along sections of the N26 and N5. Table 4.3: Route existing baseline traffic count data details the existing baseline traffic flows and capacities on the routes within the study area considered in the assessment. **It** should be noted that the route traverses a section of Local Road to the south of Ballina for which there is no traffic count information.

Figure 4.1 TII Traffic Counter Locations shows the locations of the four traffic counters assessed.

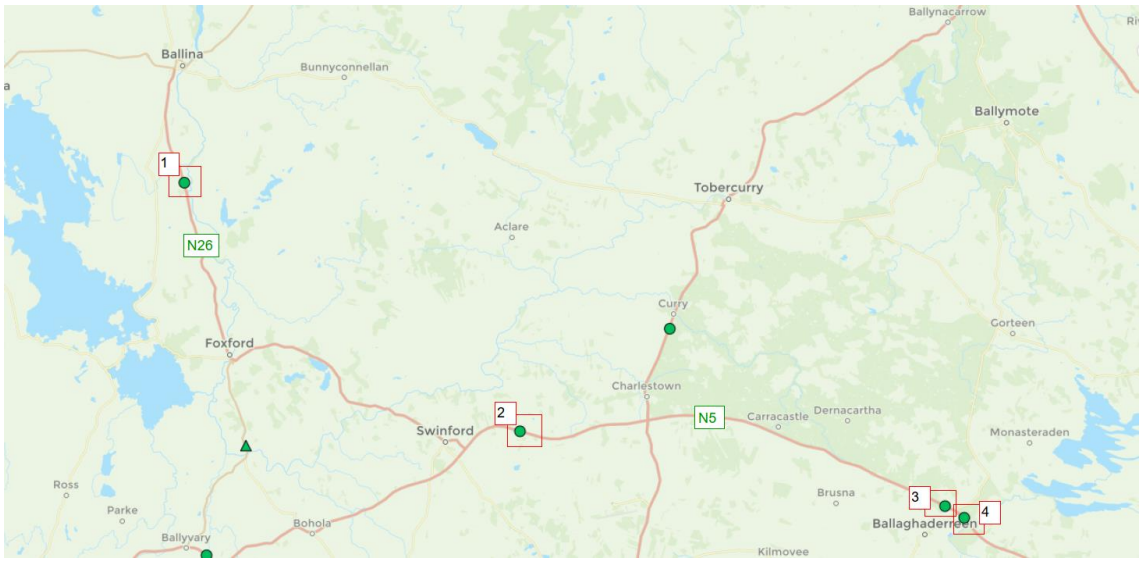
Table 4.3: Route existing baseline traffic count data

Road Section (TII Traffic Counter Location)	Speed Limit (kph)	AADT	% HGV
N26 Between Foxford and Ballina, Drumrevagh, Co. Mayo	100kph	8,134	4.4%
N5 Between Swinford and Charlestown, Cloonaghboy, Co. Mayo	Varies between 100kph and 50kph	5,571	7.2%
N5 Ballaghaderreen Bypass	100kph	4,666	9.9%
N5 Ballaghaderreen Bypass	100kph	4,876	10.1%

Source: https://trafficdata.tii.ie/ (TII, 2022)

It should be noted that the route traverses a section of Local Road to the south of Ballina for which there is no traffic count information.

Figure 4.1 TII Traffic Counter Locations



Source: TII

4.4 Seasonal and Climatic Conditions

The variable weather conditions in Ireland throughout the year, including flooding and icy conditions, can have a direct influence on road safety. Weather conditions can also result in maintenance issues such as potholes and other road defects. Combined, these can result in collisions of all severities to occur.

Subject to the grant of consents, it is anticipated that installation of the UGC will take approximately 26 months. The works will be sequential and transient in nature. As stated in Section 6.11 of the PECR that supported the application for approval, safety requirements for the installation operations / procedures and weather condition will ultimately dictate the final construction programme.

There will be no discernible changes to traffic flows arising from the operation of the North Connacht 110 kV Project.

Following installation, the road above the trench will be reinstated to match the environment in which it is installed to the standard required by the relevant authority at that location, in this case Mayo County Council, Roscommon County Council and / or TII. Reinstatement of the trench should be undertaken such that it does not further cause issues, e.g. creating a step between a well-formed reinstatement and an adjacent substandard road substructure.

4.5 Existing Road Safety Issues

Collision data was obtained from the rsa.ie statistics map of collisions. (RSA, 2022) The most recent data available on the map is from 2016. The data from more recent years has not yet been released to the public. In addition the RSA website no longer details the collision data so no updates other than that already received are available to view. Data from the most recent four years available has been used, 2013 to 2016 and is presented in Table 4.4: Collisions by route section and serving roads.

Table 4.4: Collisions by route section and serving roads

Route Section	No. of Collision's 2013-2016	Collision Data
N59	3	• 3 minor (1 – 2013, 1 – 2015, 1 – 2016)
N26	28	• 2 fatal (1- 2014, 1 – 2016) • 2 serious (1 – 2013, 1- 2016) • 24 minor (7 – 2013, 4 – 2014, 10 – 2015, 3 – 2016)
N5	8	• 1 fatal (2016) • 1 serious (2014) • 6 minor (2 - 2014, 2 – 2015, 2 – 2016)

The cable route starts at N59 and continues through the N26 and N5. N59 recorded the smallest number of collisions as it is only analysed in a short section between Gurteens and the centre of Ballina. The most common type of collision is minor. The highest number of collisions was observed in 2013. The majority of the collision cited above occurred within the conurbations of Ballina and Swinford. Images of the information garnered from the RSA website are shown below which demonstrate where the collisions/clusters are.

There is no collision data for the section of Local Road to the south of Ballina along which the proposed development will traverse until it connects back on to the N26.

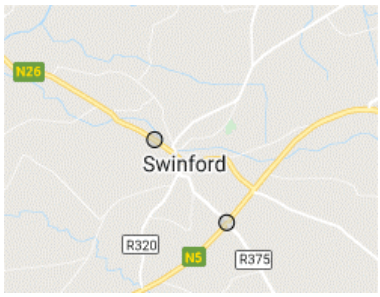
Collision Data - Ballina

2013

2014

2015

2016

Collision Data - Swinford	
 **2013**	 **2014**
 **2015**	 **2016**

It can be seen from the data presented that the collision locations in Ballina are all within the town and outside of the route along which the proposed development will be constructed should it be consented.

In the case of Swinford, of the years selected six collisions occurred within the area of the route selected. These were minor collisions.

5 Consequences of Options Considered

5.1 Road Safety Consequences of 'Do Nothing' Scenario

In the 'Do Nothing' scenario there are no road safety consequences as a result of the proposed development as there would be no works constructed and the status quo would remain as it is.

5.2 Consequences of Do-Something Scenarios

As outlined in Section 4.5 above there are collision clusters along the existing National Road network over which the proposed development traverses. Whilst these are minor collisions it may be the case that in future 'safety schemes' are to be considered to undertake works such that these collision clusters can be omitted. In addition, the local road to the south of Ballina has sections of reduced width and poor alignment that may need upgrade works. This may require some works that will interact with the proposed development, e.g. realignments, alteration of junction types; installation of footpaths/active travel initiatives, etc. Safety of the end road user is paramount and as such if these safety schemes are deemed required, they should be constructed.

The route as selected traverses the road network. It is likely that this will mostly be within available verges. In some cases, this will be within the main carriageway. There is a requirement to locate joint bays along the transmission network. These will also, in some cases, be required to be within the main carriageway. Joint bays are not required to be readily accessible as there is no ongoing maintenance required, however they would need to be accessed in the unlikely event of cable failure requiring replacement. The extent to which traffic management is required in this situation will depend on the location of the joint bay within the roadway, whether in the verge, hard shoulder or on the carriageway. The safety implication of laying the trench/joint bay is that it may introduce a different surface type. This could lead to a collision. However, it should be noted that the reinstatement of the trenches will be such that the material is replaced to the standard required by the relevant authority and so, as a minimum is likely to be undertaken in accordance with "Guidelines for the Opening, Backfilling and Reinstatement of Openings in Public Roads" published by the Department of Transport, Tourism and Sport (April 2017). In addition, it is intended that the joint bay covers will match the material adjacent. As such there should be no inherent safety implications as a result of changing surface type.

In addition to above, it was noted during the site visit that the local road along which the proposed development traverses is in quite a 'boggy' section of road. It is considered that if a trench is laid along this road in areas of poor ground that the trench reinstatement may need to be wider. If the trench is too narrow there may be differential settlement between the trench and the adjacent poor substructure and a 'lip' or a 'step' may occur within the road/wheelpath. This should be avoided so as to avoid vehicle swerving type actions that may result in collisions.

An assessment of operational phase considerations has concluded that, overall, that there are no discernible changes to traffic flows arising from operation of the UGC. As such because the traffic flows/configurations are unlikely to change as a result of the proposed development it can be ascertained that there should be no inherent safety implication.

Protocols to be adopted in terms of approvals, signage and information provision regarding maintenance works, in the unlikely event of a cable failure, will be discussed and agreed between ESB, EirGrid, TII, Mayo and Roscommon County Council as might be required.

5.2.1 Assessment of Effects on Traffic Flow

There will be no discernible changes to traffic flows arising from the operation of the North Connacht 110 kV Project.

5.2.2 Assessment of Effects on Vulnerable Road Users

The installed electricity cable does not present an inherent safety risk to vulnerable road users (VRUs) as it is underground. Issues likely to affect VRUs are change in surface type, kerbing being misplaced as a result of works, etc. Any works adjacent to footpaths, etc. should be reinstated to the highest quality such that the VRU is not compromised.

5.2.3 N17 Knock to Collooney Scheme.

The N17 Knock to Collooney Scheme is currently at Options Selection Stage. The proposed development traverses the study area for the N17 scheme and as such it is likely that there will be further interactions. At this stage it is too early to envisage what these interactions may be but interactions will need to be considered, should the proposed development be consented, at detailed design stage and any interactions be examined for Safety.

6 Comparison of Alternatives

6.1 Overview

As per the guidance of PE-PMG-02001 the comparison of the alternatives should include an analysis of the monetary benefits from a safety perspective. This can be done using a 'First Year Rate of Return' (FYRR) calculation or a 'Net Present Value' (NPV) calculation. The North Connacht 110 kV Project however comprises the installation of an underground cable within roads. There will be no discernible changes to traffic flows arising from operation of the UGC and road options are not being compared in this instance. As such the First Year Rate of Return approach is not applicable.

7 Conclusions and Summary

This report is undertaken to respond to a Request for Further Information from An Bord Pleanála. The request is to undertake a Road Safety Impact Assessment of the proposed development. A RSIA is normally required where there are road network options to be considered, e.g. junction location and layout and assess the safety benefits/disbenefits of same. In the case of this development, there are no such modifications to the road network. As such, the RSIA was undertaken with a view to assessing safety on a more 'localised' level.

The main area of concern relates to sections of the road network with poor alignment or where collisions occur in clusters. Across the road network, where there are such occurrences 'safety schemes' are put in place in an attempt to improve road safety by eliminating the substandard section/collision cluster. At the time of writing it is not known if such schemes are planned in the area. However, it may be that they may be required at a later date (particularly if the occurrence of collisions increases). If this is the case then, in order to not compromise road safety, these schemes will need to be constructed. All measures will need to be explored to ensure that this can happen.

Other areas of concern relate to the vulnerable road users (VRUs). Any footpaths, kerbing being disturbed as part of the works should be reinstated appropriately so as not to create a hazard for VRUs. Indeed, it may be the case that when the works are being undertaken there will be an opportunity to install new footpaths/cycleways as part of the reinstatement works that would benefit the VRUs.

Finally, there is a concern related to the reinstatement of trenches in soft/poor ground. Careful overview will be required on site during the construction works to ensure that the reinstatement is constructed such that it does not compromise adjacent poor ground that may cause a differential settlement between the two types of construction.

To conclude, there are no significant impacts on road safety envisaged as a result of the proposed development so long as the suggestions/protocols highlighted above are implemented.

A. Underground Cable Route Options Transport Study

MOTT MACDONALD

North Connacht 110 kV Project

Underground Cable Route Options Transport Study

January 2021

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Underground Cable Route Options Transport Study

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1 Introduction

1.1 North Connacht 110kV Project

EirGrid is planning an upgrade to the electricity network that supplies North Connacht. This will be implemented through the provision of a new circuit between the existing substations in Moy, Ballina, Co. Mayo and Tonroe, Ballaghaderreen, Co. Roscommon.

A large amount of electricity is generated by wind farms in North Connacht with the level of renewable generation exceeding the capacity of the local electricity grid network. A new circuit is required to connect the energy generated to the transmission system. This electricity can then be transferred to where it is required.

The North Connacht Project options are as follows:

- 110kV overhead line (OHL)
- 110kV underground cable (UGC)

With each of the above options, a 32km upgrade of the existing line between Tonroe and Flagford will be required.

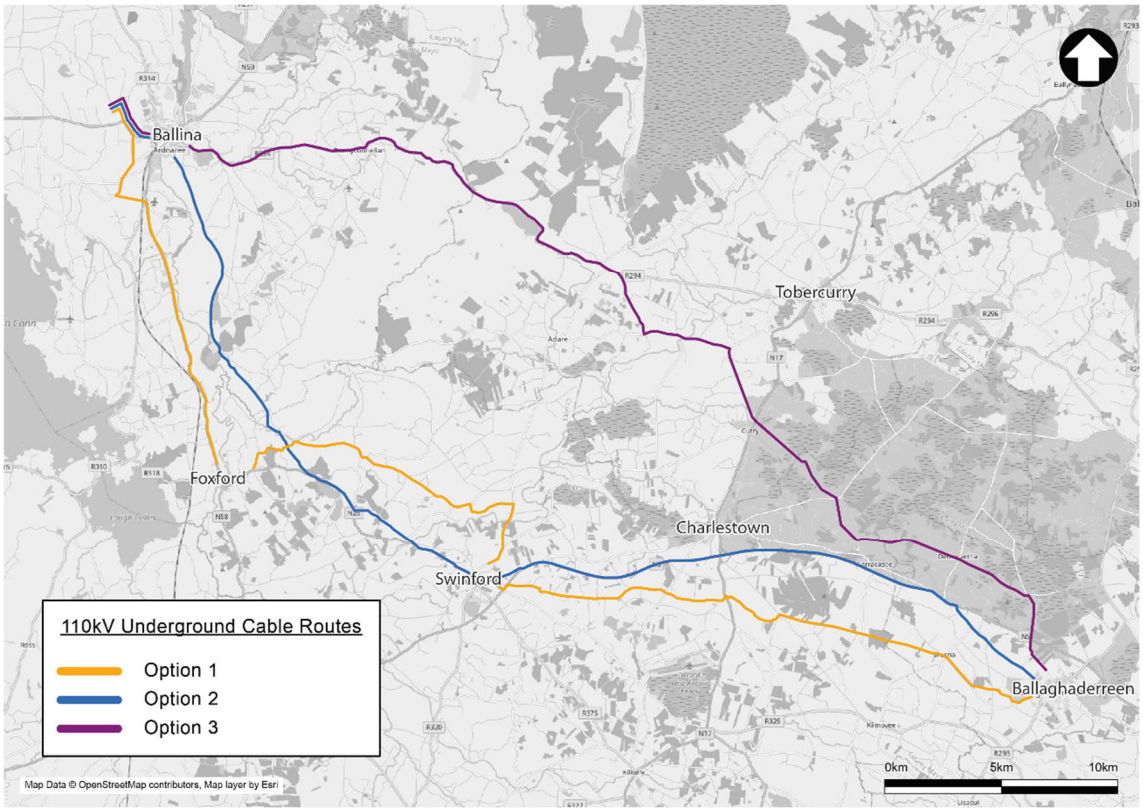
1.2 General

As part of the ongoing assessment of the North Connacht Project options (i.e. OHL and UGC), EirGrid have commissioned Mott MacDonald to undertake a Transport Study for the UGC route options.

The Transport Study has focused on the appraisal of the three identified UGC route options and considers, in high level, potential transport related impacts, highlighting relevant constraints and opportunities which might require further and more detailed appraisal.

Figure 1-1 indicates the three UGC route options considered in the Transport Study.

Figure 1-1: Underground Cable Route Options



Source: Mott MacDonald based on Open Street Map

1.3 Structure of the Report

This Report is sub-divided into the following sections:

Section 2 sets out the study methodology

Section 3 presents the Transport Study findings

Section 4 provides a summary of the study findings and recommendations for a 'way forward'

The Appendices provide supporting information to accompany this Report.

2 Study Methodology

2.1 Overview

The Transport Study sought to identify constraints and highlight potential mitigation options and advice on further studies which may be necessary to establish greater certainty and reassurance for reviewing authorities at planning stage.

The Transport Study considered the following aspects:

- requirement for road/lane closures and implications
- potential traffic management requirements e.g. stop/go systems
- bridge and structure crossings
- impact upon existing public transport services

2.2 Preliminary Desk-Top Study

An initial review of available background information was undertaken, including consultation information, GIS Project information of the three UGC route options and the cable installation Technical Note produced by Mott MacDonald:

- 110kV Cable Installation in National Roads – Document Ref. 229100591-TN-1-A, by Mott MacDonald dated 10 November 2020

The above Technical Note includes details of cable trench and typical arrangements for installation of the underground cable within the public road corridor.

For the purpose of the assessment, the following has been assumed:

- cable works will necessitate excavation of a 1m wide trench, situated either within the carriageway or the adjacent verge space
- the width of trench would require, in the worst case, a working cross section of 6m width. In situations where such geometry is not achievable, rationalisation of workspace arrangements will be required.

2.3 Desk-Top Route Analysis

A focused desk-top assessment of the three UGC route options was completed. Google Maps and the GIS Project information were used to identify existing road conditions and constraint including:

- road type
- approximate road carriageway widths
- bridge/structure

A review was undertaken to identify bus services using the public roads considered for installation of the UGC. This task was completed referencing the Transport for Ireland website https://www.transportforireland.ie/getting-around/by-bus/route-maps/.

3 Transport Study Findings

3.1 Interaction with Existing National Road Primary Routes

3.1.1 National Roads

From review of the North Connacht 110 kV project documentation available, there are a number of locations within the study area which interface with national roads infrastructure. The national roads considered were the N5, N17, N26 and N59; all administered by TII.

The N5, and the N17 are important strategic national roads and are part of the EU's TEN-T Comprehensive Network. They provide access to regional and international markets, including strategic airport and port locations, as well as linking with other strategic national roads. The N17 provides direct access to Ireland West Knock Airport which is located 5km South from Charlestown and is in close proximity to UGC Route Option 1.

In addition, the N26 and N59 provide important regional and inter-regional connectivity. The N59 is a key Link between important towns/cities in Connaught, including Sligo, Westport and Galway City as well as linking with the popular touristic region of Connemara on the West Coast.

Table 3-1 indicates the National Roads affected for each of the three UGC route options.

Table 3-1: Summary of Interactions with National Roads

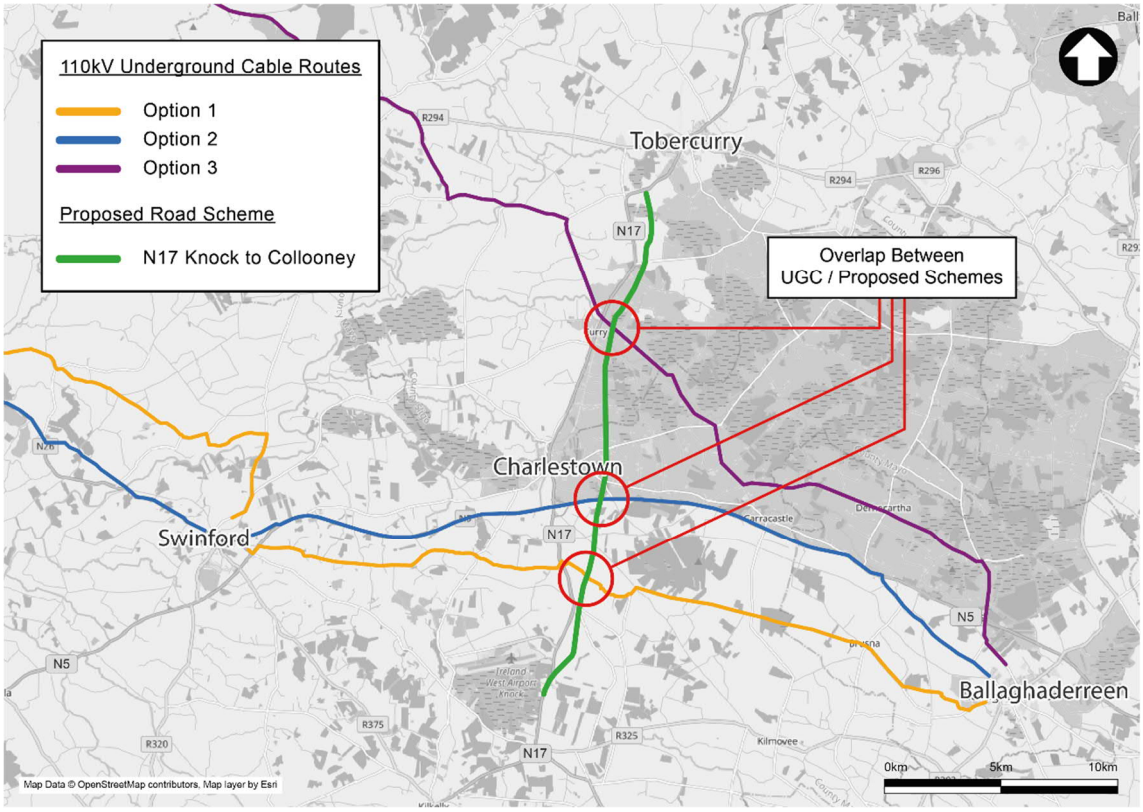
Underground Cable Route Option	National Roads Affected
1	N5, N17, N26 and N59
2	N5 and N26
3	N17 and N5

3.1.2 Future National Road Schemes

Transport Infrastructure Ireland (TII) advised of the following projects and schemes for the Nationals Roads considered within the Transport Study:

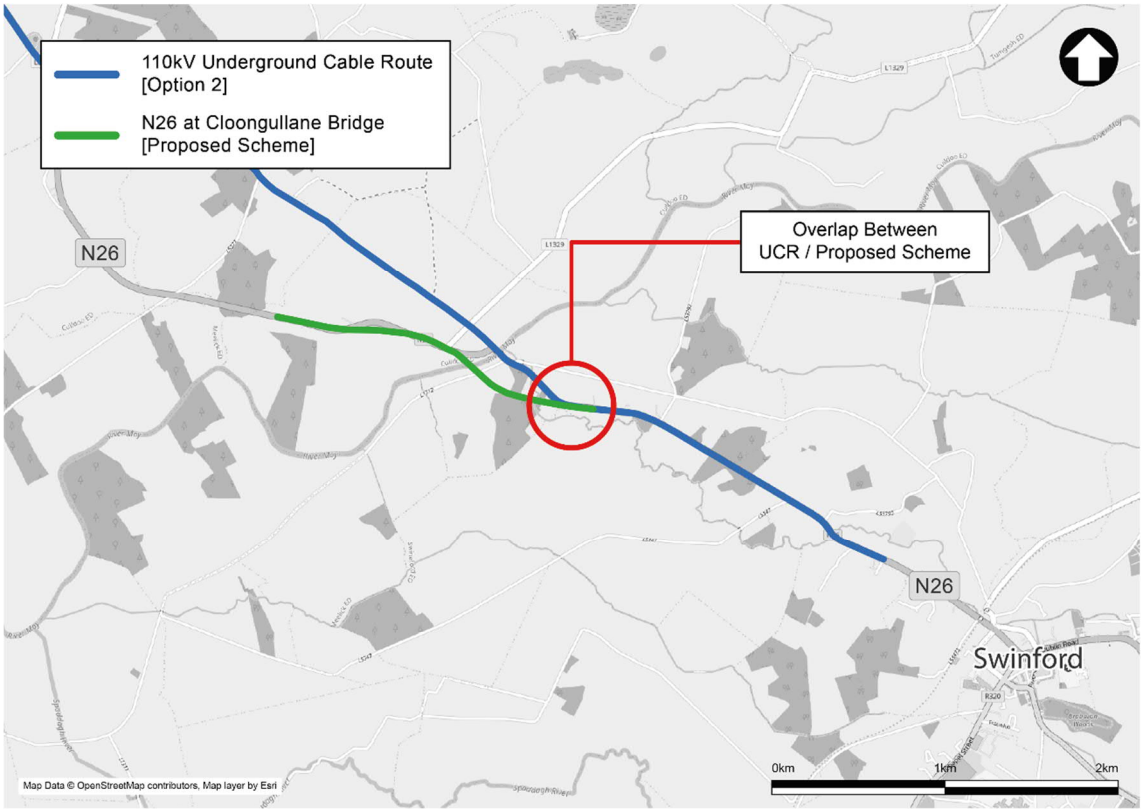
- **N17 Knock to Collooney** is included as a scheme to be progressed through pre-appraisal and early planning in the National Development Plan. The Scheme is being progressed by Sligo County Council and Mayo County Council. The proposed project will consider the upgrade of the existing N17 from Knock in County Mayo to Collooney in County Sligo. A Project Team has been assembled in the Sligo Project Office to progress the scheme along statutory procedures. The N17 Knock to Collooney Public Consultation Phase 2, Feasible Route Options has commenced, with a closing date of 2 December 2020 for comments or observations. The web site to view feasibility options is available at https://n17knockcollooney.ie/mapping/

Figure 3-1: N17 Knock to Collooney Scheme



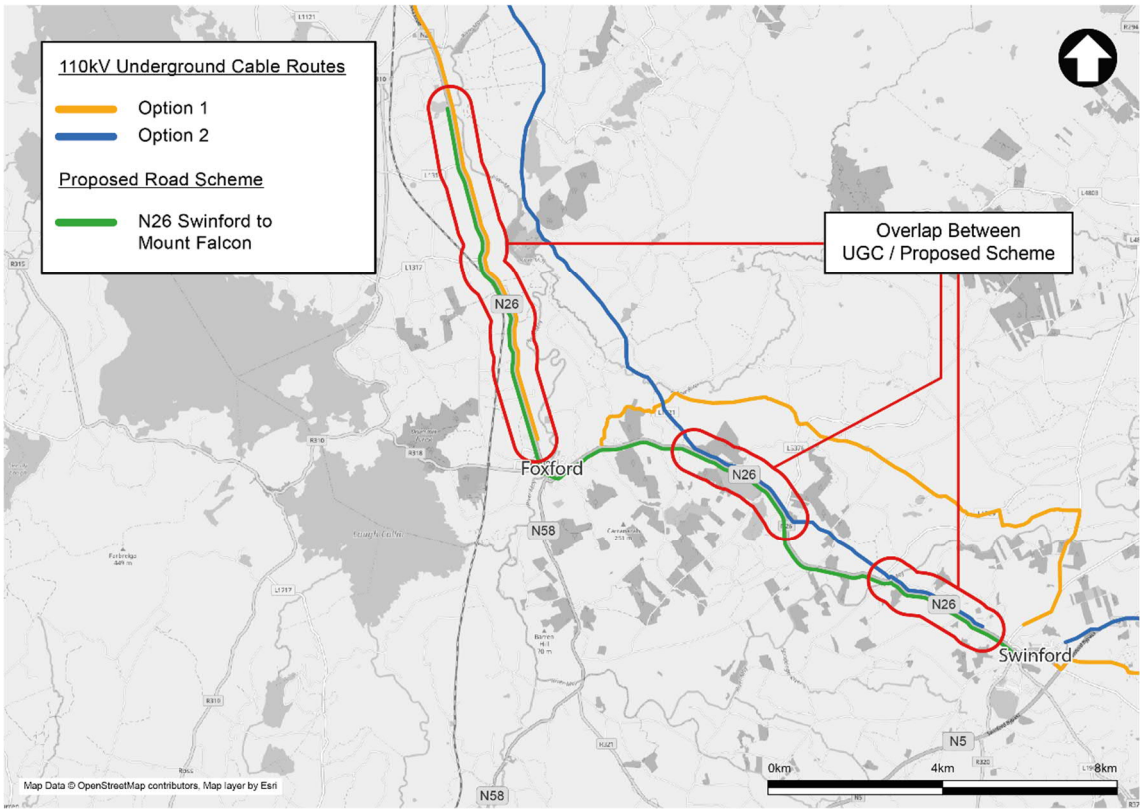
- **N26 at Cloongulanne Bridge**: A contract was recently awarded to realign the N26 at Cloongulanne Bridge west of Swinford, with a new bridge crossing the river Moy.

Figure 3-2: N26 at Cloongulanne Bridge Scheme



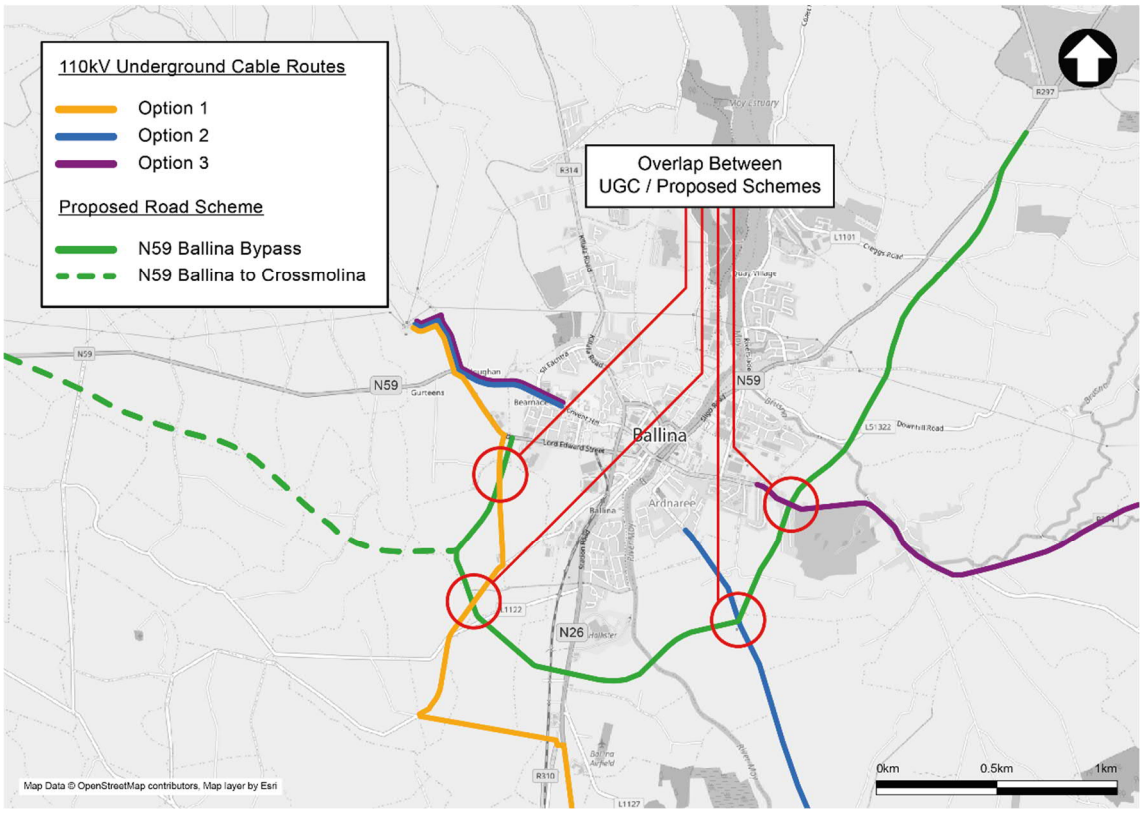
- **N26 Swinford to Mount Falcon Road Project:** Mayo County Council has applied for funding to upgrade the N26 between Foxford and Mount Falcon. Approval to proceed is subject to future funding.

Figure 3-3: N26 Swinford to Mount Falcon Road Project



- **N26/N59 Ballina Bypass**: Mayo County Council have submitted a Strategic Assessment Report to the Department of Transport to commence the N26 Ballina Bypass Phase 1, linking the N26 and N59 on the west side of the town.
- **N59 Ballina to Crossmolina** is being progressed.

Figure 3-4: N26/N59 Ballina Bypass & N59 Ballina to Crossmolina Schemes



3.2 Traffic Management

3.2.1 National Roads

Traffic diversions are unlikely to be required to facilitate cable works on any of the National Roads affected by the Project, however, dependent upon the local arrangement and the precise location of the works (i.e. whether in carriageway or verge), traffic management will involve either:

- localised carriageway closure and traffic management signing and sharing of remaining carriageway space for two-way traffic on carriageway sections which include hard shoulders; or
- single alternate lane operation controlled by temporary traffic signals on two lane single carriageway sections

Further consultation should be undertaken with TII to fully appraise constraints associated with the installation of UGC in National Road corridors. Matters for discussion include:

- road safety and traffic management issues on a strategic, highly trafficked, high speed, national road, during construction

- impact on the ability of general maintenance and safety works to existing roads, including signing, drainage works, safety barriers, etc., as a result of having high voltage cabling laid on a national road corridor
- constraints associated with the on-line national road improvements and upgrades, including potential requirement for minor horizontal alignment impact, where cabling may require relocation

3.2.2 Other Roads

Given local road corridor width constraints, it is unfortunately inevitable that full road closures and local traffic diversions will be required at many locations, however, dependent upon the local geometry of the road corridor and the precise location of works (i.e. whether in carriageway or verge), localised traffic management may be practical as an alternative to a diversion and involve single alternate lane operation controlled by temporary traffic signals or manual stop/go boards.

At locations where local road diversions would be implemented, all reasonable and practically achievable measures will be implemented to facilitate local access requirements for emergency services, residential and commercial purposes.

3.2.3 Active Travel

In some road sections, the installation of the UGC will have an impact on the existing active travel infrastructure (i.e. footways, cycling lanes).

Further consultation will be required with Mayo County Council, Sligo County Council and Roscommon County Council to identify reasonable and practically achievable measures to mitigate any disruption to cyclists and pedestrians.

3.2.4 Public Transport Routes

Bus services that use sections that are subject to cable installation and may therefore be affected by local traffic management are listed in the summary tables of each UGC route options included in the relevant Appendix.

Further consultation will be required with Mayo County Council, Sligo County Council, Roscommon County Council and local bus operators regarding matters that could affect the flow of buses, particularly in relation to the bus stop locations which might be redundant when a formal traffic diversion is in operation, and, as appropriate, would implement reasonable and practically achievable measures to mitigate any disruption to bus services and inconvenience to service users.

3.3 Assessment of Underground Cable Route Options

The assessment findings for each UGC route options are included in the summary tables presented in the Appendices of this Report. The summary assessment findings incorporate:

- road characteristics
- comments on the possible UGC installation
- anticipated traffic management measures required and requirement for road closures
- impact upon existing public transport services
- information on bridge/structure

Note: Road carriageway widths as shown in the summary tables are indicative only and based on desktop review only. It is recommended that these should be verified via a focused field survey.

3.3.1 Underground Cable Route Option 1

Table 3-2Table 3-1 provides a summary of the assessment of UGC Road Option 1. Further details are presented in **Appendix A**.

Table 3-2: Underground Cable Route Option 1 Summary

Item	Note
Total Route Length:	58.7km
Length of National Road affected	N5: 400m N17: 150m N26: 11.6km N59: 700m
Length of local roads affected	45.8km
Traffic Management	
Length of anticipated road closure necessitating diversions	42.1km
Length of anticipated single lane operation	12.6km
Length of anticipated localised carriageway closure while maintaining 2-way traffic	4km (N26)
Bridge/Structures	
Number of bridge/structures identified along the route	15
Public Transport	
Length of routes where public transport is anticipated to be affected	14km

3.3.2 Underground Cable Route Option 2

Table 3-3 provides a summary of the assessment of UGC Road Option 2. Further details are presented in **Appendix B.**

Table 3-3: Underground Cable Route Option 2 Summary

Item	Note
Total Route Length:	49.9km
Length of National Road affected	N5: 19.1km N26: 4.8km
Length of local roads affected	26km
Traffic Management	
Length of anticipated road closure necessitating diversions	8.1km
Length of anticipated single lane operation	22.7km
Length of anticipated localised carriageway closure while maintaining 2-way traffic	19.1km
Bridge/Structures	
Number of bridge/structures identified along the route	18
Public Transport	
Length of routes where public transport is anticipated to be affected	44.9km

3.3.3 Underground Cable Route Option 3

Table 3-4 provides a summary of the assessment of UGC Road Option 3. Further details are presented in **Appendix C.**

Table 3-4: Underground Cable Route Option 3 Summary

Item	Note
Total Route Length:	51.5km
Length of National Road affected	N5: Crossing only N17: Crossing only
Length of local roads affected	51.5km
Traffic Management	
Length of anticipated road closure necessitating diversions	28.5km
Length of anticipated single lane operation	23km
Length of anticipated localised carriageway closure while maintaining 2-way traffic	n/a
Bridge/Structures	
Number of bridge/structures identified along the route	21
Public Transport	
Length of routes where public transport is anticipated to be affected	25.5km

3.3.4 Underground Cable Route Options Comparison

Table 3-5 presents a comparison of the characteristics of each UGC Route Options.

Table 3-5: Comparison Table

Item	Option 1	Option 2	Option 3
Total Route Length:	58.7km	49.9km	51.5km
Length of National Road affected	N5: 400m N17: 150m N26: 11.6km N59: 700m	N5: N17: n/a N26: N59: n/a	N5: Crossing only N17: Crossing only N26: n/a N59: n/a
Length of local roads affected	45.8km	26km	51.5km
Traffic Management			
Length of anticipated road closure necessitating diversions	42.1km	8.1km	28.5km
Length of anticipated single lane operation	12.6km	22.7km	23km
Length of anticipated localised carriageway closure while maintaining 2-way traffic	4km (N26)	19.1km (N5)	n/a
Bridge/Structures			
Number of bridge/structures identified along the route	15	18	21
Public Transport			
Length of routes where public transport is anticipated to be affected	14km	44.9km	25.5km

3.4 Other Considerations

3.4.1 Bridges and Structures

Bridges/structures identified on the UGC route options are listed in the summary tables of each UGC route options included in the relevant Appendix.

Depending on the construction form of the bridge, it might be possible to install the cables within the bridge deck, however at most locations, it is anticipated that Horizontal Directional Drilling (HDD) will be required to facilitate the installation of the cable.

A review of existing construction records for the bridges and structures identified alongside an on-site review/inspection should be undertaken to ascertain suitable crossing technique.

3.4.2 Abnormal Load Deliveries

The Transport Study has not considered the impact of the transportation of any potential abnormal loads for the North Connacht 110kV Project, should abnormal load deliveries required for the Project, then it is recommended that an abnormal load route survey is undertaken to identify suitable access route(s) and associated mitigations measures as necessary.

3.5 Traffic and Transport Impact Assessment

As the Project moves toward planning, the following potential construction phase effects will need to be considered:

- disruption and delay to users of roads from cable installation work in road corridors
- disruption and delay of users of footpaths and cycle paths from cable installation work in or adjacent to active travel infrastructure
- disruption and delay to users of roads as a result of the additional traffic movements that will be generated by the Project
- detrimental impact on road safety as a result of the additional traffic movements that will be generated by the Project

4 Summary and Way Forward

4.1 Summary

Mott MacDonald was commissioned by EirGrid undertake a Transport Study for the UGC route options considered for the North Connacht 110kV Project.

The Transport Study has focused on the appraisal of the three identified UGC options and consider, in high level, matters which have realistic potential impact upon Ireland's public road transport network.

The assessment findings for each UGC route options are summarised in individual tables in **Section 3** of this Report, a table providing a comparison of each option is also included.

Further details for each route are presented in the Appendices of this Report and further considerations are included within **Section 3** of this Report.

4.2 Way Forward

Recommendations for follow up study and consultation are set out hereafter.

To formally verify the findings of the Transport Study it will be essential to conduct a field survey to review existing road conditions for each of the considered UGC route options

Further consultation should be undertaken with TII to fully appraise constraints associated with the installation of UGC in National Road corridors, this include:

- road safety and traffic management issues on a strategic, highly trafficked, high speed, national road, during construction
- impact on the ability of general maintenance and safety works to existing roads, including signing, drainage works, safety barriers, etc., as a result of having high voltage cabling laid on a national road corridor
- the constraints associated with the on-line national road improvements and upgrades, including very minor horizontal alignments, where any cabling would have to be relocated in advance of any works

Further consultation should be undertaken with Mayo County Council, Sligo County Council, Roscommon County Council to fully appraise the constraints associated with the installation of UGC in local road corridors.

A review of existing construction records for the bridges and structures identified alongside an on-site review/inspection should be undertaken to ascertain suitable crossing technique.

The Transport Study has not considered the impact of the transportation of any potential abnormal loads for the North Connacht 110kV Project, should abnormal load deliveries required for the Project, then it is recommended that an abnormal load route survey is undertaken to identify suitable access route(s) and associated mitigations measures as necessary.

As the Project moves toward planning, the following potential construction phase effects will need to be considered:

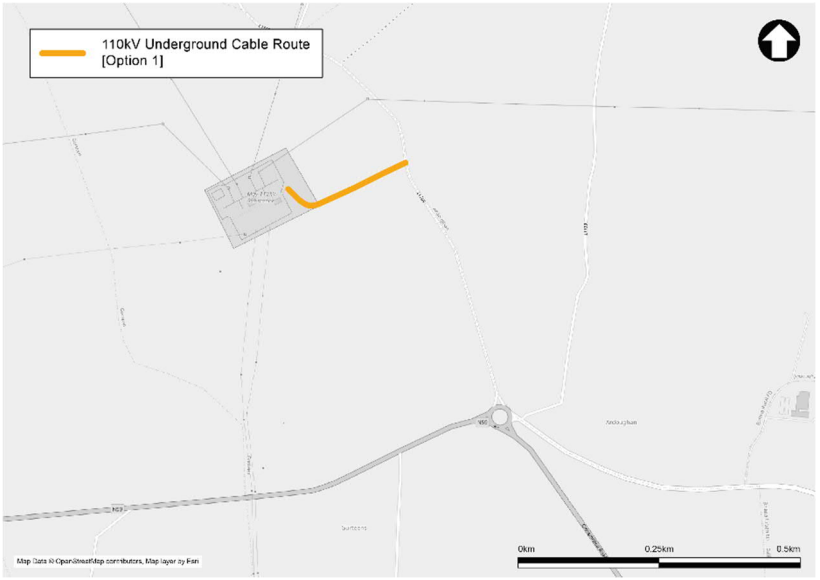
- disruption and delay to users of roads from cable installation work in road corridors

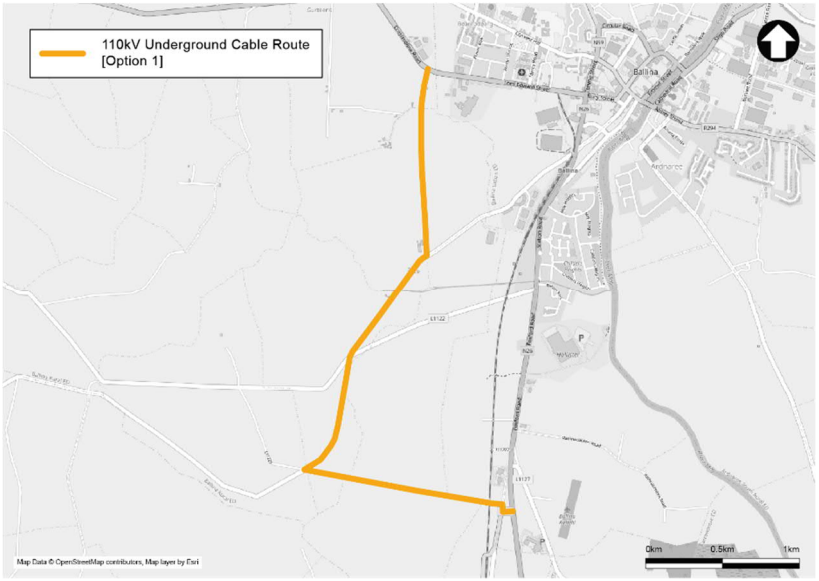
- disruption and delay of users of footpaths and cycle paths from cable installation work in or adjacent to active travel infrastructure
- disruption and delay to users of roads as a result of the additional traffic movements that will be generated by the Project
- detrimental impact on road safety as a result of the additional traffic movements that will be generated by the Project

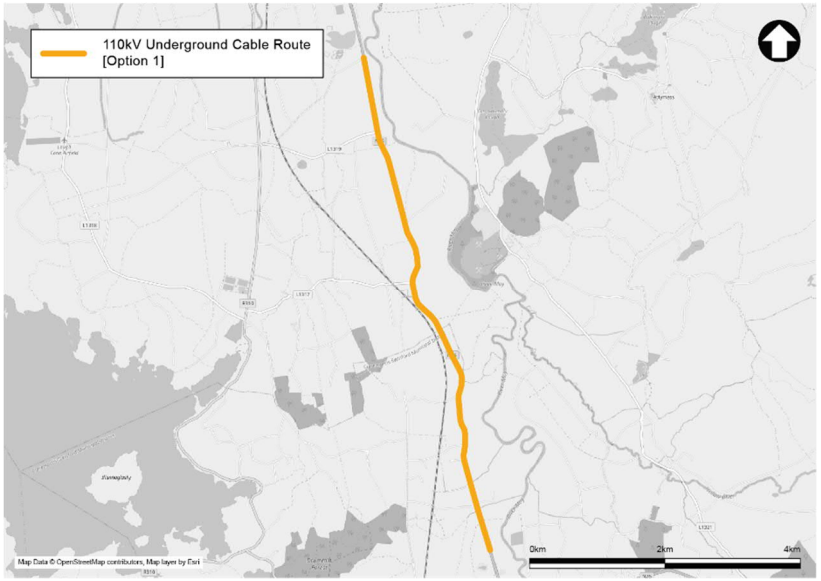
Appendices

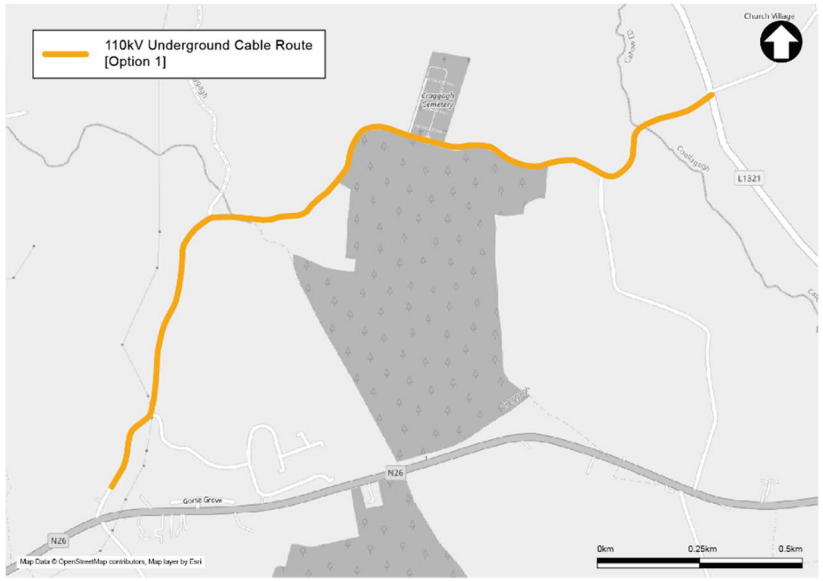
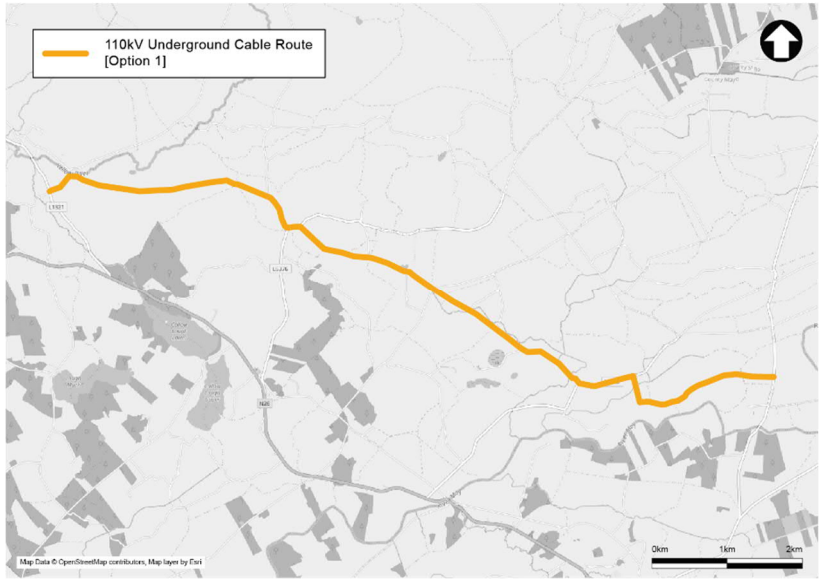
A. Underground Cable Route Option 1 Summary Table 16
B. Underground Cable Route Option 2 Summary Table 24
C. Underground Cable Route Option 3 Summary Table 31

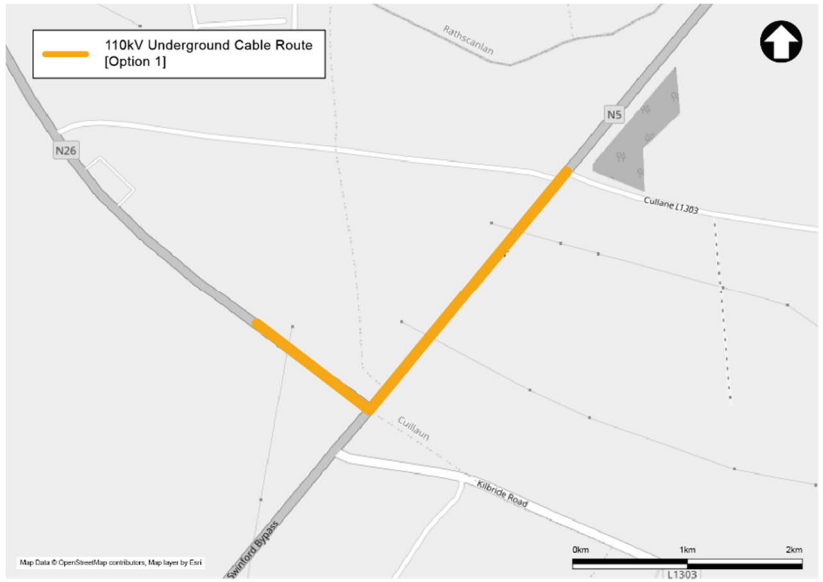
A. Underground Cable Route Option 1 Summary Table

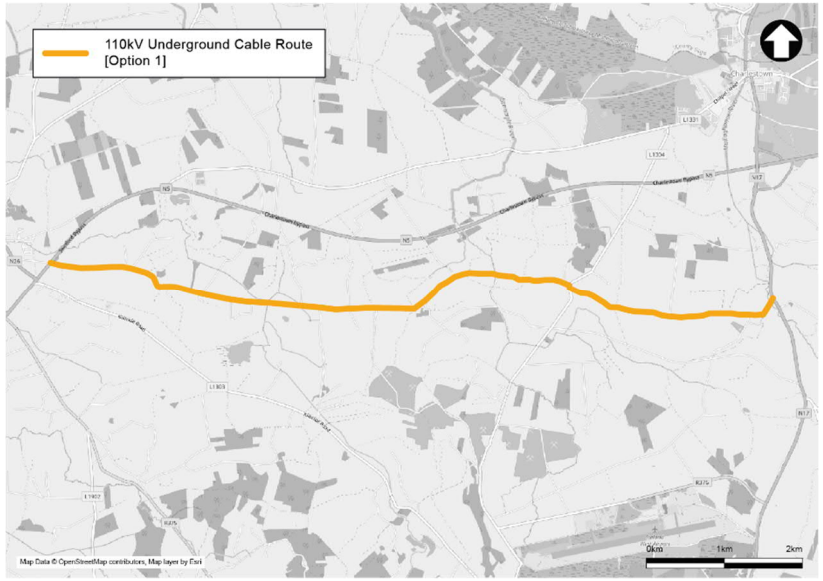
Road Section (Location) [Cable Route Section]	Route Plan	Notes
Access Road to Moy Substation (North of Gurteens) [MY]		**Road Name:** Unclassified Road **Road Type:** Single track road **Road Width:** c. 3.5m **Cable Route Length:** c. 250m **Cable Route Alignment** Cable trench assumed to be installed within the road. **Traffic Management Measures** The road is only providing access to the substation and therefore it is anticipated that works could easily be implemented without any disruption to public road users. **Other Considerations** No bus services affected.
L1109 (North of Gurteens) [MY]		**Road Name:** L1109 **Road Type:** Rural single carriageway **Road Width:** c. 5.5m **Cable Route Length:** c. 450m **Cable Route Alignment** Cable trench assumed to be installed within the road. **Traffic Management Measures** Based on a desktop review, it is anticipated that the road is sufficiently wide to accommodate installation of the cable trench whilst maintaining access. In order to do so, this would require single alternate lane operation controlled by temporary traffic signals or manual stop/go boards. **Other Considerations** No bus services affected.

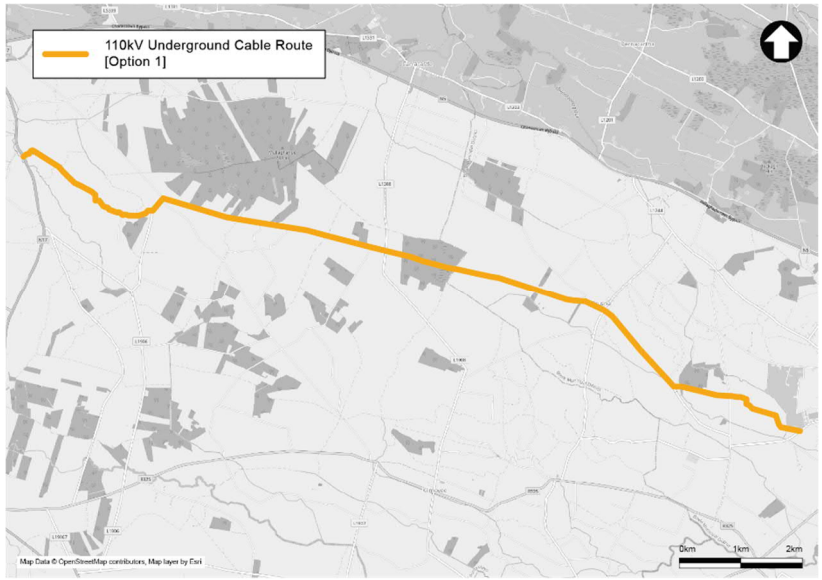
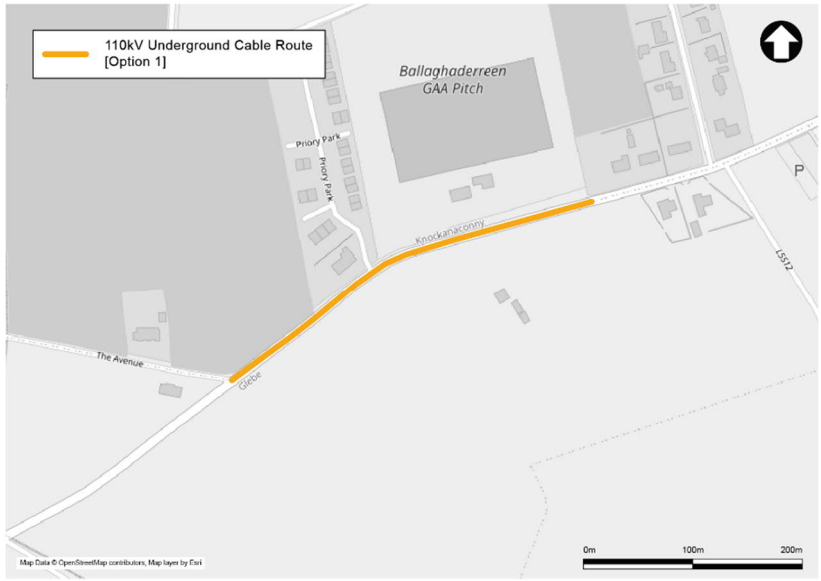
Road Section (Location) [Cable Route Section]	Route Plan	Notes
N59 (South of Gurteens) [1A]		**Road Name:** N59 **Road Type:** Urban single carriageway **Road Width:** c. 7.3m with sections including central right-hand turning lane **Cable Route Length:** c. 700m **Cable Route Alignment** Footway provision is present on that section of road, however it is likely that other utility services would restrict the possibility of installing the cable trench within the footway and as such it might be necessary to install the cable within the road. **Traffic Management Measures** Based on a desktop review, it is anticipated that the road is sufficiently wide to accommodate installation of the cable trench whilst maintaining access. In order to do so, this would require single alternate lane operation controlled by temporary traffic signals or manual stop/go boards. **Other Considerations** Bus services affected: 446, 454, 455, 496, NUG11.
UC Road / L11225 (between N59 and N26) [1A /1B]		**Road Name:** Unclassified Roads / L11225 **Road Type:** Single track road **Road Width:** c. 3m **Cable Route Length:** c. 4.3km **Cable Route Alignment** Cable trench assumed to be installed within the road. **Traffic Management Measures** Based on a desktop review, the road does not appear to be sufficiently wide enough to accommodate installation of the cable trench whilst maintaining road access. This section would therefore require temporary rolling road closures. **Other Considerations** No bus services affected. Possible Structure – Coordinates: 522984.1068, 817603.8588

Road Section (Location) [Cable Route Section]	Route Plan	Notes
N26 (between R310 and L5358 at Leam) [1B]		**Road Name:** N26 **Road Type:** Rural single carriageway including hard shoulders **Road Width:** c. 13m **Cable Route Length:** c. 4km **Cable Route Alignment** Cable trench assumed to be installed within the road, either within the hard shoulder or central carriageway depending on the presence of existing utilities. **Traffic Management Measures** Based on a desktop review, it is anticipated that the road is sufficiently wide to accommodate installation of the cable trench whilst maintaining access. In order to do so, this would require localised carriageway closure and traffic management signing and sharing of remaining carriageway space for two-way traffic. **Other Considerations** Bus services affected: 22, 52, 421, 451, 731, NUG11 Possible Structure (bridge) – Coordinates: 524332.68530, 813939,6729
N26 (between L5358 at Leam and Belass) [1B /1C]		**Road Name:** N26 **Road Type:** Rural single carriageway **Road Width:** c. 7.3m **Cable Route Length:** c. 7.6km **Cable Route Alignment** Cable trench assumed to be installed either within the road verge or road carriageway (depending on presence of existing utilities). **Traffic Management Measures** Based on a desktop review, it is anticipated that the road is sufficiently wide to accommodate installation of the cable trench whilst maintaining access. In order to do so, this would require single alternate lane operation controlled by temporary traffic signals or manual stop/go boards. **Other Considerations** Bus services affected: 22, 52, 421, 451, 731, NUG11. Possible Structure (unspecified) – Coordinates: 526076.0904, 807531.3782 Possible Structure (bridge) – Coordinates: 526283.8968, 805837.6608

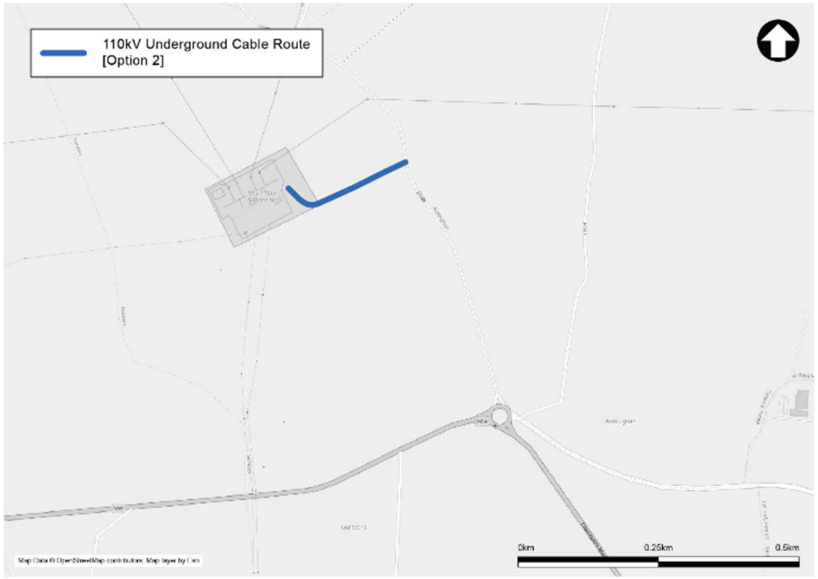
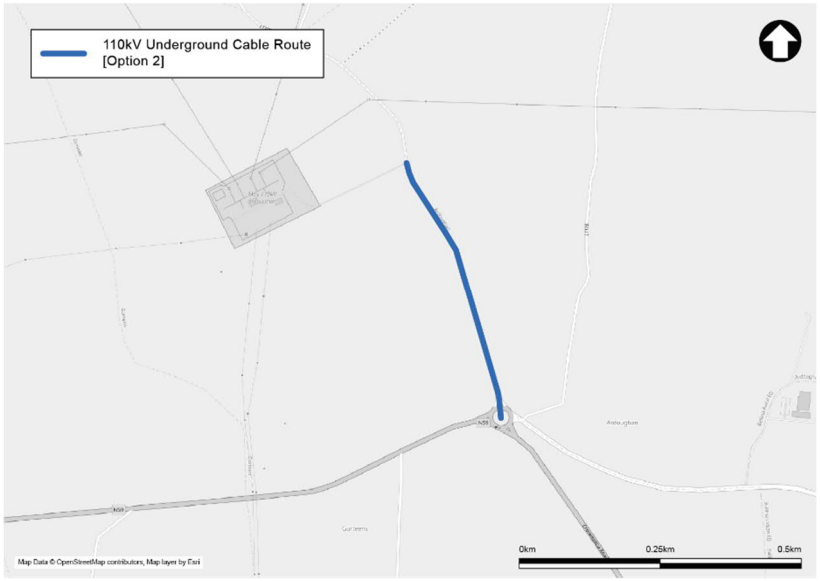
Road Section (Location) [Cable Route Section]	Route Plan	Notes
L1326 / UC Road sections (between N26 and L1321 at Coolagagh) [1D]		**Road Name:** L1326 / Unclassified Roads **Road Type:** Rural single carriageway **Road Width:** Varies: c. 3m – 5.5m **Cable Route Length:** c. 2.2km **Cable Route Alignment** Cable trench assumed to be installed within the road. **Traffic Management Measures** Based on a desktop review, the road does not appear to be sufficiently wide enough to accommodate installation of the cable trench whilst maintaining road access. This section would therefore require temporary rolling road closures. **Other Considerations** No bus services affected. Possible Structure (bridge) – Coordinates: 529360.3705, 805611.7508
UC Road (between L1321 and Loobnamuck) [1D / 1E]		**Road Name:** Unclassified roads **Road Type:** Single track road, Rural single carriageway **Road Width:** Varies: c. 3m – 5.5m **Cable Route Length:** c. 11.1km **Cable Route Alignment** Cable trench assumed to be installed within the road. **Traffic Management Measures** Based on a desktop review, the road does not appear to be sufficiently wide enough to accommodate installation of the cable trench whilst maintaining road access. This section would therefore require temporary rolling road closures. **Other Considerations** No bus services affected. Possible Structure (culvert) – Coordinates: 532703.2736, 805157.6269 Possible Structure (bridge) – Coordinates: 534770.8353, 804197.4466 Possible Structure (bridge) – Coordinates: 535078.8640, 804013.0242

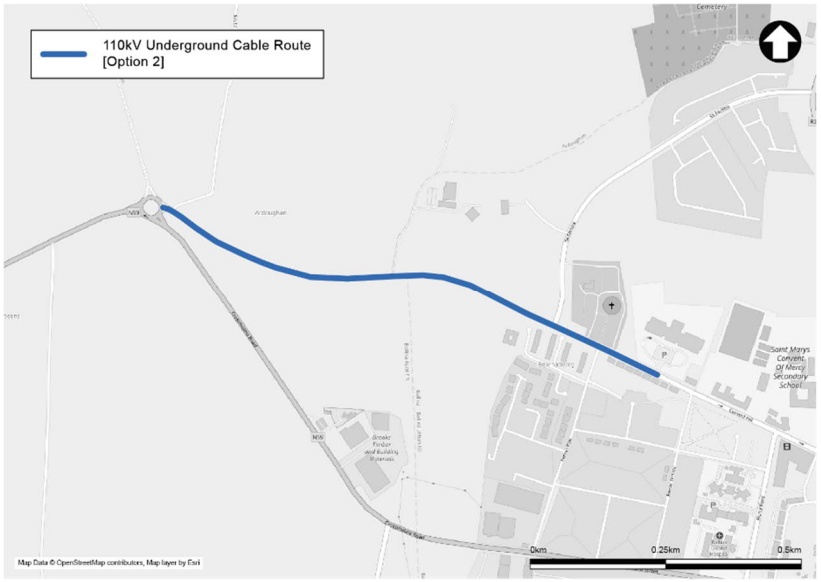
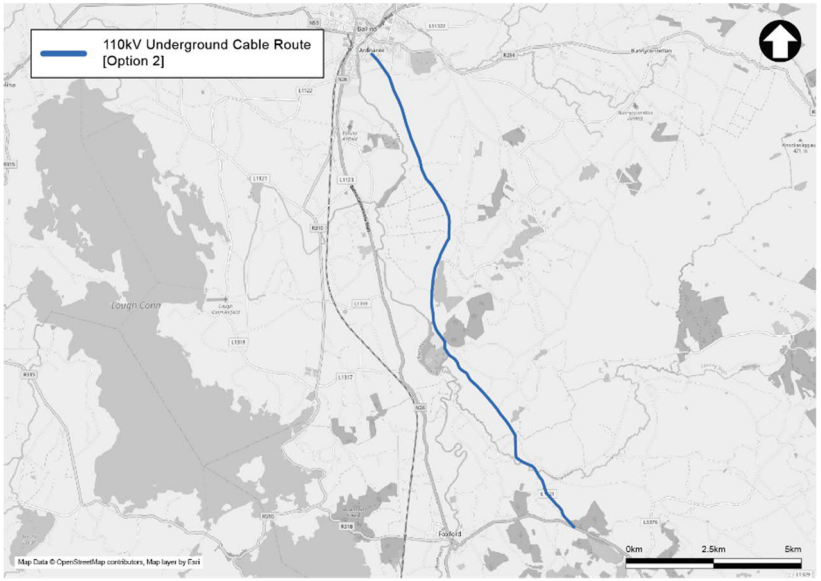
Road Section (Location) [Cable Route Section]	Route Plan	Notes
UC Road sections (between Loobnamuck and Tawnamullagh) [1E]		**Road Name:** N5 **Road Type:** Rural single carriageway **Road Width:** c. 5.5m **Cable Route Length:** c. 3km **Cable Route Alignment** Cable trench assumed to be installed within the road. **Traffic Management Measures** Based on a desktop review, it is anticipated that the road is sufficiently wide to accommodate installation of the cable trench whilst maintaining access. In order to do so, this would require single alternate lane operation controlled by temporary traffic signals or manual stop/go boards. **Other Considerations** Bus services affected: 451 (for 1km at southernmost section between Tawnamullagh and UC Road at turn-off for Curry). Possible Structure (bridge) – Coordinates: 538933.0930, 804013.0242
N26 / N5 (between Swinford and L1303) [1F]		**Road Name:** N26, N5 **Road Type:** Urban single carriageway including hard shoulders (N5) **Road Widths:** N26**,** c. 7.3m; N5, c. 13m **Cable Route Length:** c. 400m **Cable Route Alignment** Cable trench assumed to be installed within the road, either within the hard shoulder or central carriageway depending on the presence of existing utilities. **Traffic Management Measures** Based on a desktop review, it is anticipated that the road is sufficiently wide to accommodate installation of the cable trench whilst maintaining access. In order to do so, this would require single alternate lane operation controlled by temporary traffic signals or manual stop/go boards or localised carriageway closure and traffic management signing and sharing of remaining carriageway space for two-way traffic. **Other Considerations** Bus services affected: 22, 440, 451, 731, 922.

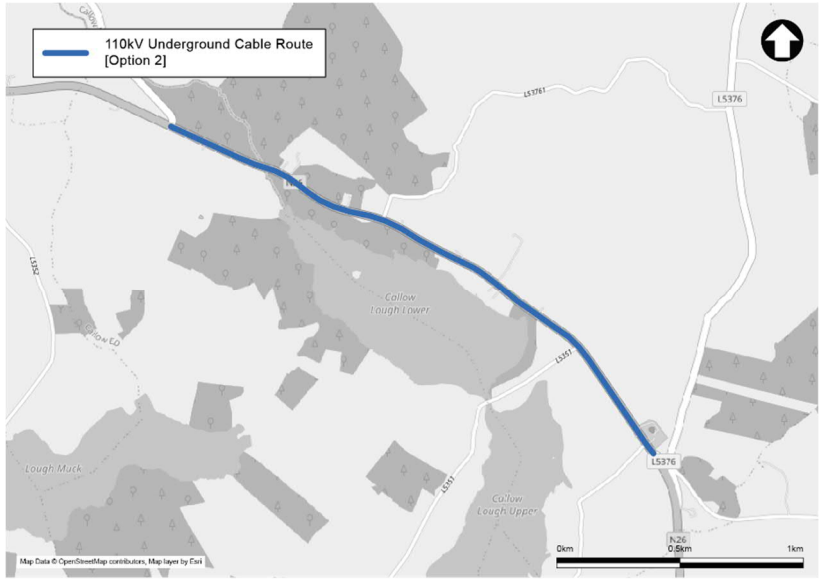
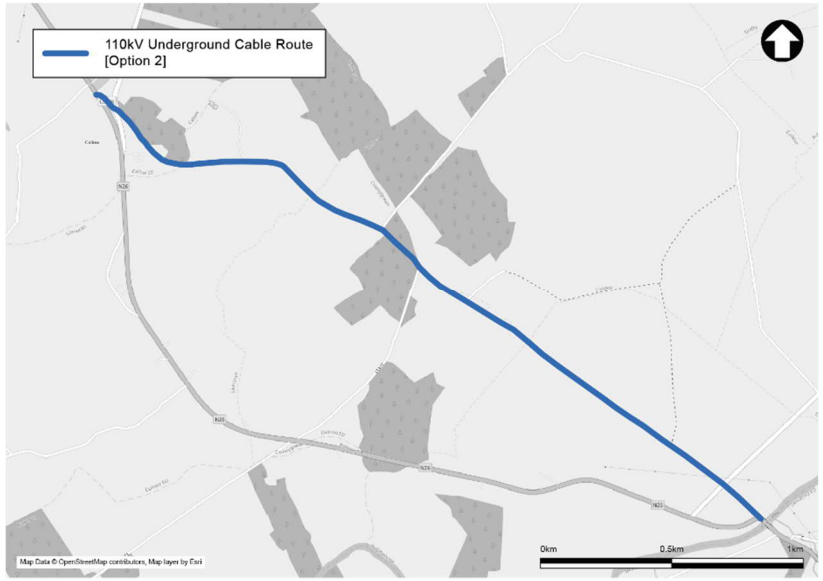
Road Section (Location) [Cable Route Section]	Route Plan	Notes
Local Road / UC Road sections (between N5 and N17) [1F]		**Road Name:** L1303, Unclassified Roads, L5336 **Road Type:** Rural single carriageway **Road Width:** Varies: c. 3m – c 5.5m **Cable Route Length:** c. 9.8km **Cable Route Alignment** Cable trench assumed to be installed within the road. **Traffic Management Measures** Based on a desktop review, the road does not appear to be sufficiently wide enough to accommodate installation of the cable trench whilst maintaining road access. This section would therefore require temporary rolling road closures. **Other Considerations** No bus services affected. Possible Structure (bridge) – Coordinates: 548108.6573, 799029.2695
N17 (between L5336 (N) and L5336 (S)) [1G]		**Road Name:** N17 **Road Type:** Rural single carriageway including hard shoulders **Road Width:** c 13m **Cable Route Length:** c. 150m **Cable Route Alignment** Cable trench assumed to be installed within the road, either within the hard shoulder or central carriageway depending on the presence of existing utilities. **Traffic Management Measures** Based on a desktop review, it is anticipated that the road is sufficiently wide to accommodate installation of the cable trench whilst maintaining access. In order to do so, this would require single alternate lane operation controlled by temporary traffic signals or manual stop/go boards. **Other Considerations** Bus services affected: 64, 440, 442, 964.

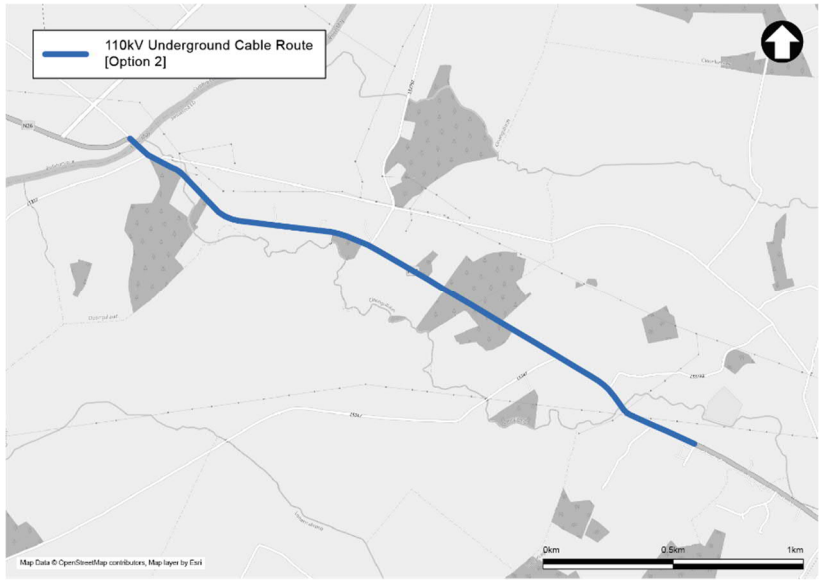
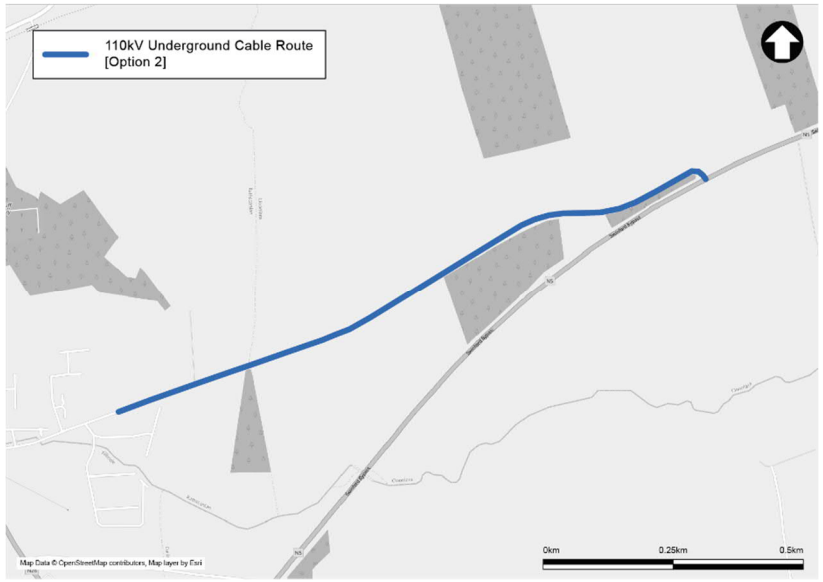
Road Section (Location) [Cable Route Section]	Route Plan	Notes
Local Road / UC Road sections (between N17 and Priory Park West of Ballaghaderreen) [1G]		**Road Name:** L5336, Unclassified Roads **Road Type:** Single track road **Road Width:** c 3-4m **Cable Route Length:** c. 14.1km **Cable Route Alignment** Cable trench assumed to be installed within the road. **Traffic Management Measures** Based on a desktop review, the road does not appear to be sufficiently wide enough to accommodate installation of the cable trench whilst maintaining road access. This section would therefore require temporary rolling road closures. **Other Considerations** No bus services affected. Possible Structure (bridge) – Coordinates: 551974.5182, 797812.2932 Possible Structure (culvert) – Coordinates: 553090.3854, 797584.4744 Possible Structure (bridge) – Coordinates: 555104.2221, 797041.1933 Possible Structure (culvert) – Coordinates: 556461.0412, 796668.7285 Possible Structure (bridge) – Coordinates: 560373.0333, 794434.3195
UC / Local Road sections (West of Ballaghaderreen) [1G]		**Road Name:** Unclassified Roads, Priory Park **Road Type:** Rural single carriageway **Road Width:** c 4m, widening to 5.5m at Priory Park **Cable Route Length:** c. 350m **Cable Route Alignment** Cable trench assumed to be installed within the road. **Traffic Management Measures** Based on a desktop review, the road does not appear to be sufficiently wide enough to accommodate installation of the cable trench whilst maintaining road access. This section would therefore require temporary rolling road closures. **Other Considerations** No bus services affected.

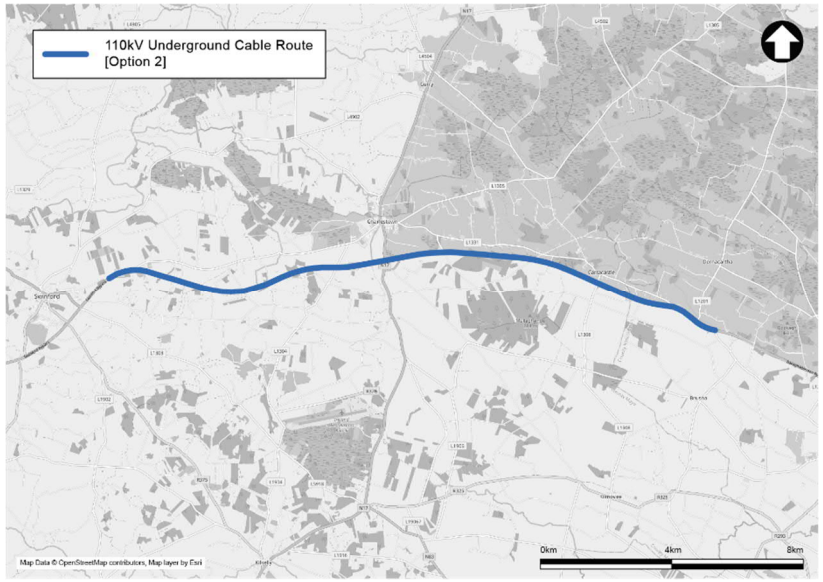
B. Underground Cable Route Option 2 Summary Table

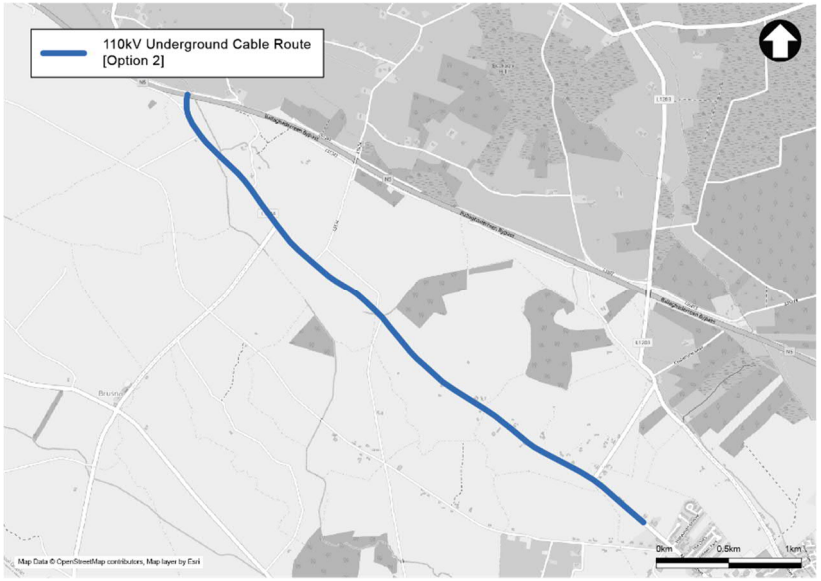
Road Section (Location) [Cable Route Section]	Route Plan	Notes
Access Road to Moy Substation (North of Gurteens) [MY]		**Road Name:** Unclassified Road **Road Type:** Single track road **Road Width:** c. 3.5m **Cable Route Length:** c. 250m **Cable Route Alignment** Cable trench assumed to be installed within the road. **Traffic Management Measures** The road is only providing access to the substation and therefore it is anticipated that works could easily be implemented without any disruption to public road users. **Other Considerations** No bus services affected.
L1109 (North of Gurteens) [MY]		**Road Name:** L1109 **Road Type:** Rural single carriageway **Road Width:** c. 5.5m **Cable Route Length:** c. 450m **Cable Route Alignment** Cable trench assumed to be installed within the road. **Traffic Management Measures** Based on a desktop review, it is anticipated that the road is sufficiently wide to accommodate installation of the cable trench whilst maintaining access. In order to do so, this would require single alternate lane operation controlled by temporary traffic signals or manual stop/go boards. **Other Considerations** No bus services affected.

Road Section (Location) [Cable Route Section]	Route Plan	Notes
McDermott Street (West of Ballina) [2A]		**Road Name:** McDermott Street **Road Type:** Urban single carriageway **Road Width:** c. 9m reducing to 6m at the entrance of Ballina **Cable Route Length:** c. 1km **Cable Route Alignment** There is footway provision on that section of road, however it is likely that other utility services would restrict the possibility of installing the cable trench within the footway and as such it might be necessary to install the cable trench assumed to be installed within the road. **Traffic Management Measures** Based on a desktop review, it is anticipated that the road is sufficiently wide to accommodate installation of the cable trench whilst maintaining access. In order to do so, this would require single alternate lane operation controlled by temporary traffic signals or manual stop/go boards. **Other Considerations** Bus services affected: 446 Note the presence of cycling lanes and on street parking which will need to be considered.
Church Road to N26 [2A / 2B / 2C]		**Road Name:** Church Road, Unclassified Roads, L1321 **Road Type:** Rural single carriageway **Road Width:** c. 6m **Cable Route Length:** c. 15.6km **Cable Route Alignment** Cable trench assumed to be installed either within the road verge or road carriageway (depending on presence of existing utilities). **Traffic Management Measures** Based on a desktop review, it is anticipated that the road is sufficiently wide to accommodate installation of the cable trench whilst maintaining access. In order to do so, this would require single alternate lane operation controlled by temporary traffic signals or manual stop/go boards. **Other Considerations** Bus services affected: 451 Possible Structure (culvert) – Coordinates: 525638.8400, 816442.5436 Possible Structure (culvert) – Coordinates: 526112.0206, 814932.3028 Possible Structure (bridge) – Coordinates: 526388.3053, 810477.8943

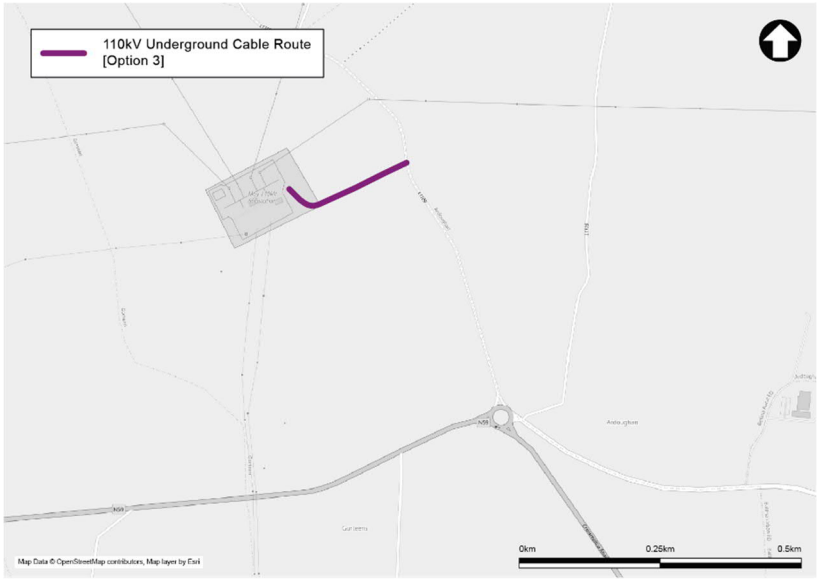
Road Section (Location) [Cable Route Section]	Route Plan	Notes
		Possible Structure (unspecified) – Coordinates: 529158.9492, 806314.4363 Possible Structure (culvert) – Coordinates: 529280.9065, 806152.7879
N26 (between L1321 and L5376) [2A / 2B / 2C]		**Road Name:** N26 **Road Type:** Rural single carriageway **Road Width:** c. 7.3m **Cable Route Length:** c. 2.4km **Cable Route Alignment** Cable trench assumed to be installed either within the road verge or road carriageway (depending on presence of existing utilities). **Traffic Management Measures** Based on a desktop review, it is anticipated that the road is sufficiently wide to accommodate installation of the cable trench whilst maintaining access. In order to do so, this would require single alternate lane operation controlled by temporary traffic signals or manual stop/go boards. **Other Considerations** Bus services affected: 22, 421, 451, 731
UC Road (between N26 at Callow and N26 at the River Moy) [2C]		**Road Name:** Unclassified Road **Road Type:** Single track road **Road Width:** c. 3m **Cable Route Length:** c. 3.1km **Cable Route Alignment** Cable trench assumed to be installed within the road. **Traffic Management Measures** Based on a desktop review, the road does not appear to be sufficiently wide enough to accommodate installation of the cable trench whilst maintaining road access. This section would therefore require temporary rolling road closures. **Other Considerations** No bus services affected. Possible Structure (unspecified) – Coordinates: 533079.6392, 802751.4432

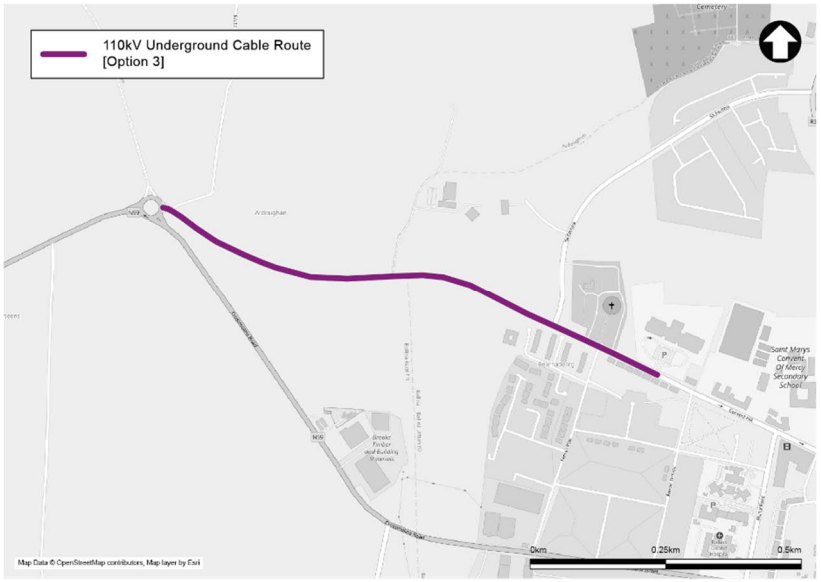
Road Section (Location) [Cable Route Section]	Route Plan	Notes
N26 (River Moy to Swinford) [2C]		**Road Name:** N26 **Road Type:** Rural single carriageway **Road Width:** c. 7.3m **Cable Route Length:** c. 2.4km **Cable Route Alignment** Cable trench assumed to be installed either within the road verge or road carriageway (depending on presence of existing utilities). **Traffic Management Measures** Based on a desktop review, it is anticipated that the road is sufficiently wide to accommodate installation of the cable trench whilst maintaining access. In order to do so, this would require single alternate lane operation controlled by temporary traffic signals or manual stop/go boards. **Other Considerations** Bus services affected: 22, 421, 451, 731 Structure (bridge) – Coordinates: 534767.4735, 801493.4647 Structure (bridge) – Coordinates: 534961.2792, 801363.0432 Structure (bridge) – Coordinates: 536590.373, 800478.781
L5346 (East of Swinford) [2D]		**Road Name:** L5346 **Road Type:** Rural single carriageway **Road Width:** c. 5.5m **Cable Route Length:** c. 1.2km **Cable Route Alignment** Cable trench assumed to be installed within the road. **Traffic Management Measures** Based on a desktop review, it is anticipated that the road is sufficiently wide to accommodate installation of the cable trench whilst maintaining access. In order to do so, this would require single alternate lane operation controlled by temporary traffic signals or manual stop/go boards. **Other Considerations** No bus services affected.

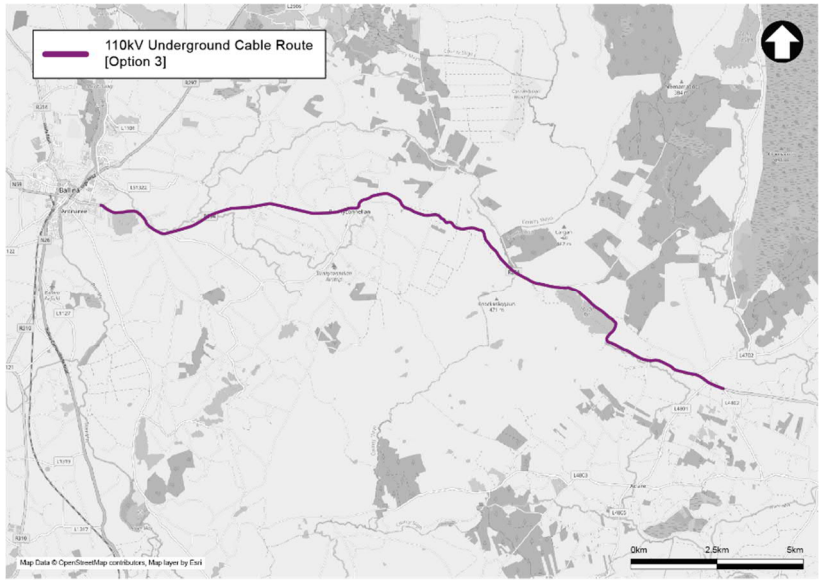
Road Section (Location) [Cable Route Section]	Route Plan	Notes
N5 (L5346 to L1244) [2D / 2E]		**Road Name:** N5 **Road Type:** Rural single carriageway including hard shoulders **Road Width:** c. 13m **Cable Route Length:** c. 19.1km **Cable Route Alignment** Cable trench assumed to be installed either within the road verge or road carriageway (depending on presence of existing utilities). **Traffic Management Measures** Based on a desktop review, it is anticipated that the road is sufficiently wide to accommodate installation of the cable trench whilst maintaining access. In order to do so, this would require localised carriageway closure and traffic management signing and sharing of remaining carriageway space for two-way traffic. **Other Considerations** Bus services affected: 22, 440, 451, 731, 922 (only affected on stretches of N5 between L5346 and L1331 and between L1202 and L1244) Possible Structure (unspecified) – Coordinates: 543993.8761, 799956.9918 Possible Structure (unspecified) – Coordinates: 545507.3723, 800500.2816 Structure (bridge) – Coordinates: 546471, 800554 Structure (bridge) – Coordinates: 547564, 800689 Possible Structure (unspecified) – Coordinates: 548535, 800854 Possible Structure (unspecified) – Coordinates: 550436.6535, 800941.7598 Structure (bridge) – Coordinates: 552462.3882, 800734.2853 Structure (bridge) – Coordinates: 552963, 800612 Structure (bridge) – Coordinates: 554421, 800001

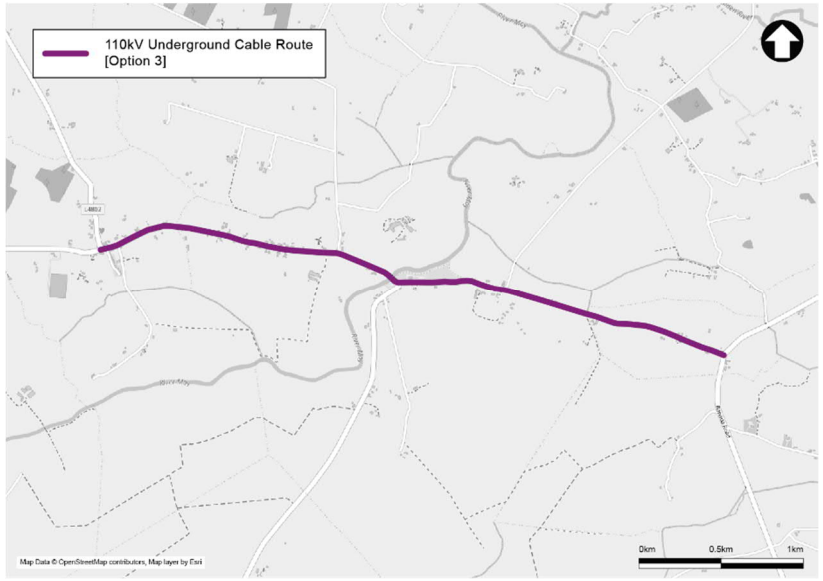
Road Section (Location) [Cable Route Section]	Route Plan	Notes
L1244 (between N5 and Ballaghaderreen) [2E]		**Road Name:** L1244 **Road Type:** Rural single carriageway **Road Width:** c. 7.3m **Cable Route Length:** c. 4.4km **Cable Route Alignment** Cable trench assumed to be installed either within the road verge or road carriageway (depending on presence of existing utilities). **Traffic Management Measures** Based on a desktop review, it is anticipated that the road is sufficiently wide to accommodate installation of the cable trench whilst maintaining access. In order to do so, this would require single alternate lane operation controlled by temporary traffic signals or manual stop/go boards. **Other Considerations** Bus services affected: 22, 440, 451, 731, 922 (only affected on stretches of N5 between L5346 and L1331 and between L1202 and L1244)

C. Underground Cable Route Option 3 Summary Table

Road Section (Location) [Cable Route Section]	Route Plan	Notes
Access Road to Moy Substation (North of Gurteens) [MY]		**Road Name:** Unclassified Road **Road Type:** Single track **Road Width:** c. 3.5m **Cable Route Length:** c. 250m **Cable Route Alignment** Cable trench assumed to be installed within the road. **Traffic Management Measures** The road is only providing access to the substation and therefore it is anticipated that works could easily be implemented without any disruption to public road users. **Other Considerations** No bus services affected.
L1109 (North of Gurteens) [MY]		**Road Name:** L1109 **Road Type:** Rural single carriageway **Road Width:** c. 5.5m **Cable Route Length:** c. 450m **Cable Route Alignment** Cable trench assumed to be installed within the road. **Traffic Management Measures** Based on a desktop review, it is anticipated that the road is sufficiently wide to accommodate installation of the cable trench whilst maintaining access. In order to do so, this would require single alternate lane operation controlled by temporary traffic signals or manual stop/go boards. **Other Considerations** No bus services affected.

Road Section (Location) [Cable Route Section]	Route Plan	Notes
McDermott Street (West of Ballina) [3A]		**Road Name:** McDermott Street **Road Type:** Urban single carriageway **Road Width:** c. 9m reducing to 6m at the entrance of Ballina **Cable Route Length:** c. 1km **Cable Route Alignment** There is footway provision on that section of road, however it is likely that other utility services would restrict the possibility of installing the cable trench within the footway and as such it might be necessary to install the cable trench assumed to be installed within the road. **Traffic Management Measures** Based on a desktop review, it is anticipated that the road is sufficiently wide to accommodate installation of the cable trench whilst maintaining access. In order to do so, this would require single alternate lane operation controlled by temporary traffic signals or manual stop/go boards. **Other Considerations** Bus services affected: 446 Note the presence of cycling lanes and on street parking which will need to be considered.

Road Section (Location) [Cable Route Section]	Route Plan	Notes
R294 (between Ballina and XX) [3B / 3C / 3D]		**Road Name:** R294 **Road Type:** Rural single carriageway **Road Width:** c. 6m **Cable Route Length:** c. 21.5km **Cable Route Alignment** Cable trench assumed to be installed either within the road verge or road carriageway (depending on presence of existing utilities). **Traffic Management Measures** Based on a desktop review, it is anticipated that the road is sufficiently wide to accommodate installation of the cable trench whilst maintaining access. In order to do so, this would require single alternate lane operation controlled by temporary traffic signals or manual stop/go boards. **Other Considerations** Bus services affected: 444 (for c.3km of the R294 at Corrimbla South until the L6612) and 479 (for c.700m of the R294 between Castlerock and Drummartin) Structure (bridge) – Coordinates: 528690.7067, 818160.9459 Structure (bridge) – Coordinates: 529623.5465, 818385.2968 Structure (bridge) – Coordinates: 530020.8225, 818423.2781 Structure (bridge) – Coordinates: 530518.8514, 818480.1807 Structure (bridge) – Coordinates: 530908.575059, 818387.548224 Structure (bridge) – Coordinates: 533207.9973, 818563.7132 Structure (bridge) – Coordinates: 534570.6877, 818257.7775 Structure (bridge) – Coordinates: 535435.2781, 818034.0259 Possible Structure (unspecified) – Coordinates: 539710.0174, 815546.5165 Possible Structure (unspecified) – Coordinates: 540472.1503, 814213.8675 Possible Structure (unspecified) – Coordinates: 540605.9126, 814147.6846 Possible Structure (unspecified) – Coordinates: 540964.6890, 813958.0935 Possible Structure (unspecified) – Coordinates: 541303.1355, 813778.8500

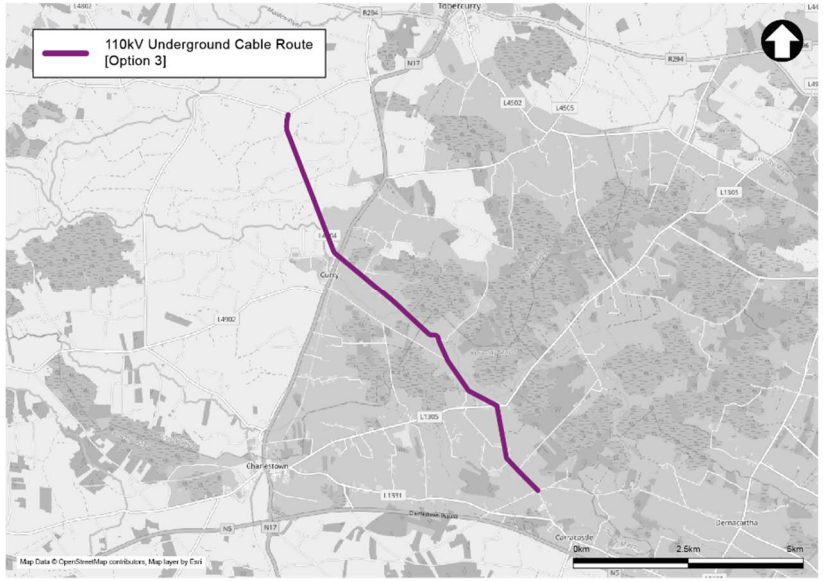
Road Section (Location) [Cable Route Section]	Route Plan	Notes
L4802 (between R294 and The High Road at Tourlestrane) [3D]		**Road Name:** L4802 **Road Type:** Single track road **Road Width:** c. 3.5m **Cable Route Length:** c. 3km **Cable Route Alignment** Cable trench assumed to be installed within the road. **Traffic Management Measures** Based on a desktop review, the road does not appear to be sufficiently wide enough to accommodate installation of the cable trench whilst maintaining road access. This section would therefore require temporary rolling road closures. **Other Considerations** Bus services affected: 479
The High Road (between L4802 and L4504) [3E]		**Road Name:** Unclassified Road **Road Type:** Rural single carriageway **Road Width:** c. 5.5m **Cable Route Length:** c. 3.8km **Cable Route Alignment** Cable trench assumed to be installed within the road. **Traffic Management Measures** Based on a desktop review, it is anticipated that the road is sufficiently wide to accommodate installation of the cable trench whilst maintaining access. In order to do so, this would require single alternate lane operation controlled by temporary traffic signals or manual stop/go boards. **Other Considerations** No bus services affected. Structure (bridge) – Coordinates: 546489.2128, 810040.3182

Road Section (Location) [Cable Route Section]	Route Plan	Notes

L4504

(between High Road and UC Road at Lissymulgee)

[3E]



Road Name: L4504
Road Type: Varies: Single track road / Rural single carriageway
Road Width: Varies c. 3m – 5.5m
Cable Route Length: c. 10.3km

Cable Route Alignment

Cable trench assumed to be installed within the road.

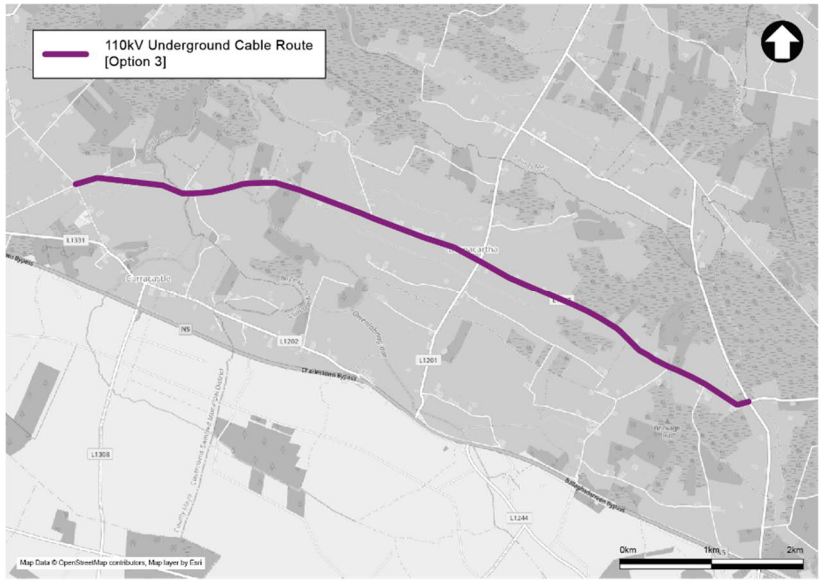
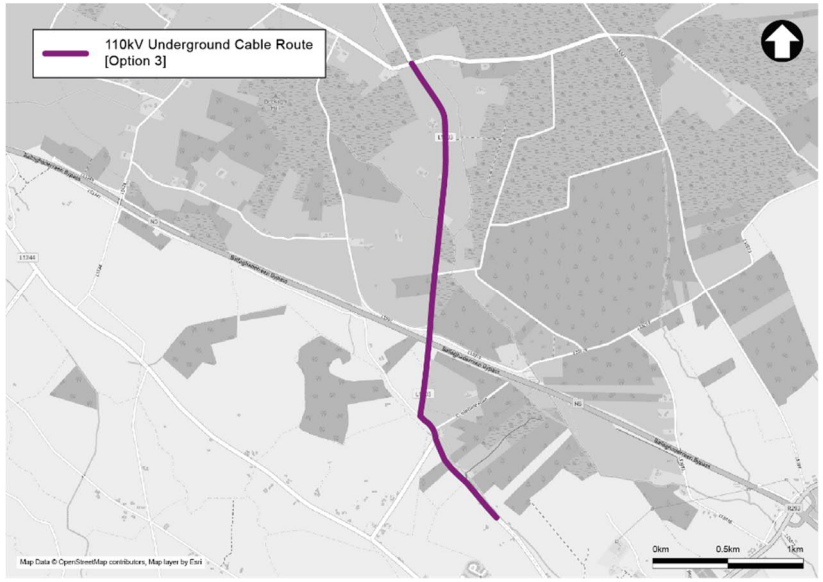
Traffic Management Measures

Based on a desktop review, the road does not appear to be sufficiently wide enough to accommodate installation of the cable trench whilst maintaining road access. This section would therefore require temporary rolling road closures.

Other Considerations

No bus services affected.

Structure (culvert) – Coordinates: 548594.8656, 808700.0868
Structure (bridge) – Coordinates: 549069.9471, 807432.7546
Structure (bridge) – Coordinates: 551685.6620, 804548.5311

Road Section (Location) [Cable Route Section]	Route Plan	Notes
UC / Local Road sections (between L4504 and L1203) [3F]		**Road Name:** Unclassified Road, L1203 **Road Type:** Single track road **Road Width:** c. 3m **Cable Route Length:** c. 7.9km **Cable Route Alignment** Cable trench assumed to be installed within the road. **Traffic Management Measures** Based on a desktop review, the road does not appear to be sufficiently wide enough to accommodate installation of the cable trench whilst maintaining road access. This section would therefore require temporary rolling road closures. **Other Considerations** No bus services affected. Structure (bridge) – Coordinates: 554988.8076, 801237.9872 Structure (bridge) – Coordinates: 555545.6695, 801331.2012
L1203 (North of Ballaghaderreen) [3F]		**Road Name:** L1203 **Road Type:** Rural single carriageway **Road Width:** c. 4.5m **Cable Route Length:** c. 3.3km **Cable Route Alignment** Cable trench assumed to be installed within the road. **Traffic Management Measures** Based on a desktop review, the road does not appear to be sufficiently wide enough to accommodate installation of the cable trench whilst maintaining road access. This section would therefore require temporary rolling road closures. **Other Considerations** No bus services affected. Structure (bridge) – Coordinates: 561236.3619, 797873.1864 Structure (bridge) – Coordinates: 561159.4867, 797108.1665