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1 INTRODUCTION

RPS have been appointed to undertake a desktop environmental study for proposed electrical transmission network reinforcements in Tyrone. This is known as the Connect West Project. The study area encompasses the Dromore – Omagh – Tamnamore area. The overall study area within which the proposed development will be located is shown in Figure 1.1.

Seven options have been identified that meet the network needs identified for the Mid Tyrone area. A summary of these options is as follows:

Option 1c involves a new underground 500MW HVDC link between Omagh and Tamnamore. This would also require a 110kV substation to be built at Omagh with a converter station at both ends of the circuit. The indicative route for Option 1c is shown in Figure 1.2.

Option 2 involves a new 275/110kV substation located between the Gort and Tremoge substations. This would be known as Mid Tyrone. This would involve a new 275kV circuit being constructed between Tamnamore and Mid Tyrone. This circuit would ideally follow the existing Tamnamore – Dungannon circuit, bypassing Dungannon by cable and then following the Dungannon - Omagh 110kV circuits as far as the Mid Tyrone substation. Additionally, two new 110kV circuits would be constructed, one between Tremoge and Mid Tyrone and one between Gort and Mid Tyrone. The remaining portion of the Dungannon - Omagh 110kV circuits would be redirected to Mid Tyrone and the Tremoge to Tamnamore 110kV circuit would be redirected to Dungannon. Once these works are completed, the Tamnamore – Dungannon and Dungannon – Mid Tyrone 110kV circuits would be removed. The indicative route for Option 2 is shown in Figure 1.3.

Option 3 involves a new 275kV circuit along the path of the existing Tamnamore – Dungannon and Dungannon – Omagh 110kV circuits. This would also involve a new 275kV/110kV substation at Omagh. The Gort and Tremoge circuits would be redirected to the existing 110kV Omagh substation. The Tremoge – Tamnamore 110kV circuit would be redirected to Dungannon. Once these works are completed, the Tamnamore – Dungannon and Dungannon – Omagh 110kV circuits would be removed. The indicative route for Option 3 is shown in Figure 1.4.

Option 4 involves the construction of a new 110kV circuit between Dromore and Tamnamore substations. This would involve partial undergrounding at the Tamnamore substation. The indicative route for Option 4 is shown in Figure 1.5.

Option 4b involves the construction of a new 275kV circuit between Turleenan and Dromore substations. This would likely require a c. 300m cable connecting the circuit to Turleenan and a short section of cable at Dromore. The Dromore substation will be extended to add further 110kV bays and build a new 275kV compound. The indicative route for Option 4b is shown in Figure 1.6.

Option 4c involves a new underground 275kV AC link between Turleenan and Dromore. The indicative route for Option 4c is shown in Figure 1.7.

Option 5 involves the uprating of the Omagh – Gort, Gort – Tamnamore, Omagh – Dungannon, Omagh – Tremoge and Tremoge – Tamnamore 110kV circuits. The indicative route for Option 5 is shown in Figure 1.8.

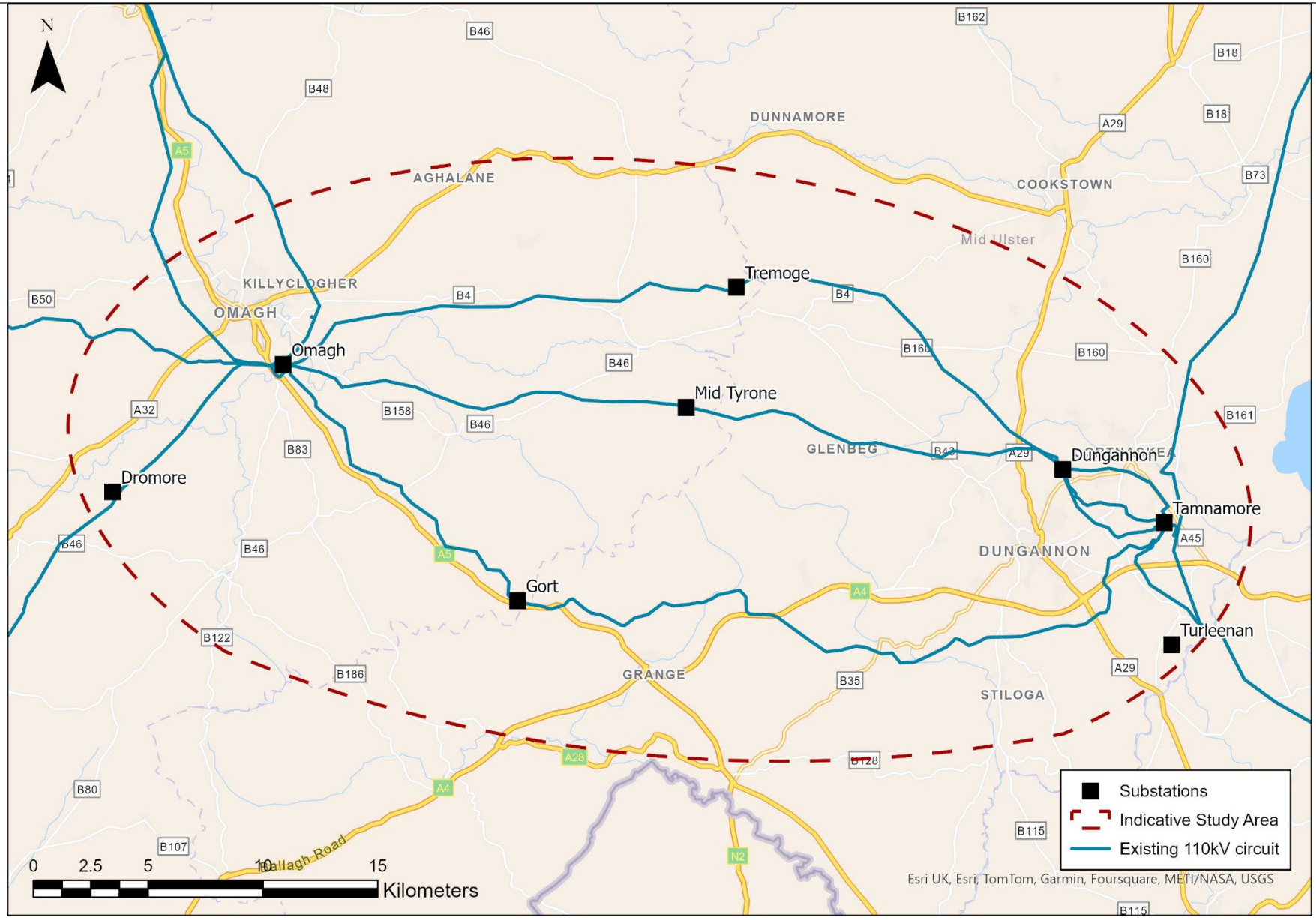

Figure 1.1 Study Area

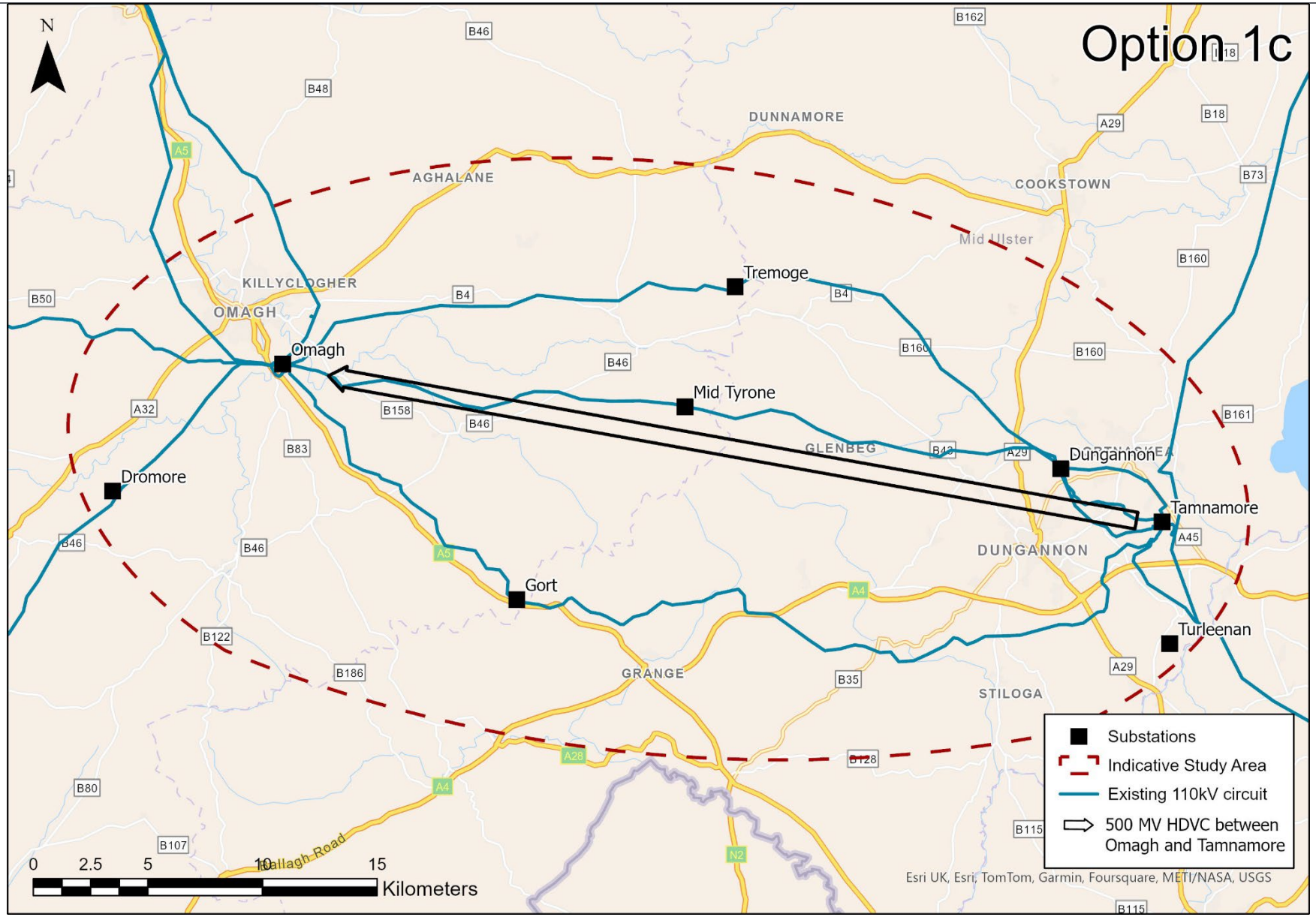

Figure 1.2 Option 1c Indicative Route

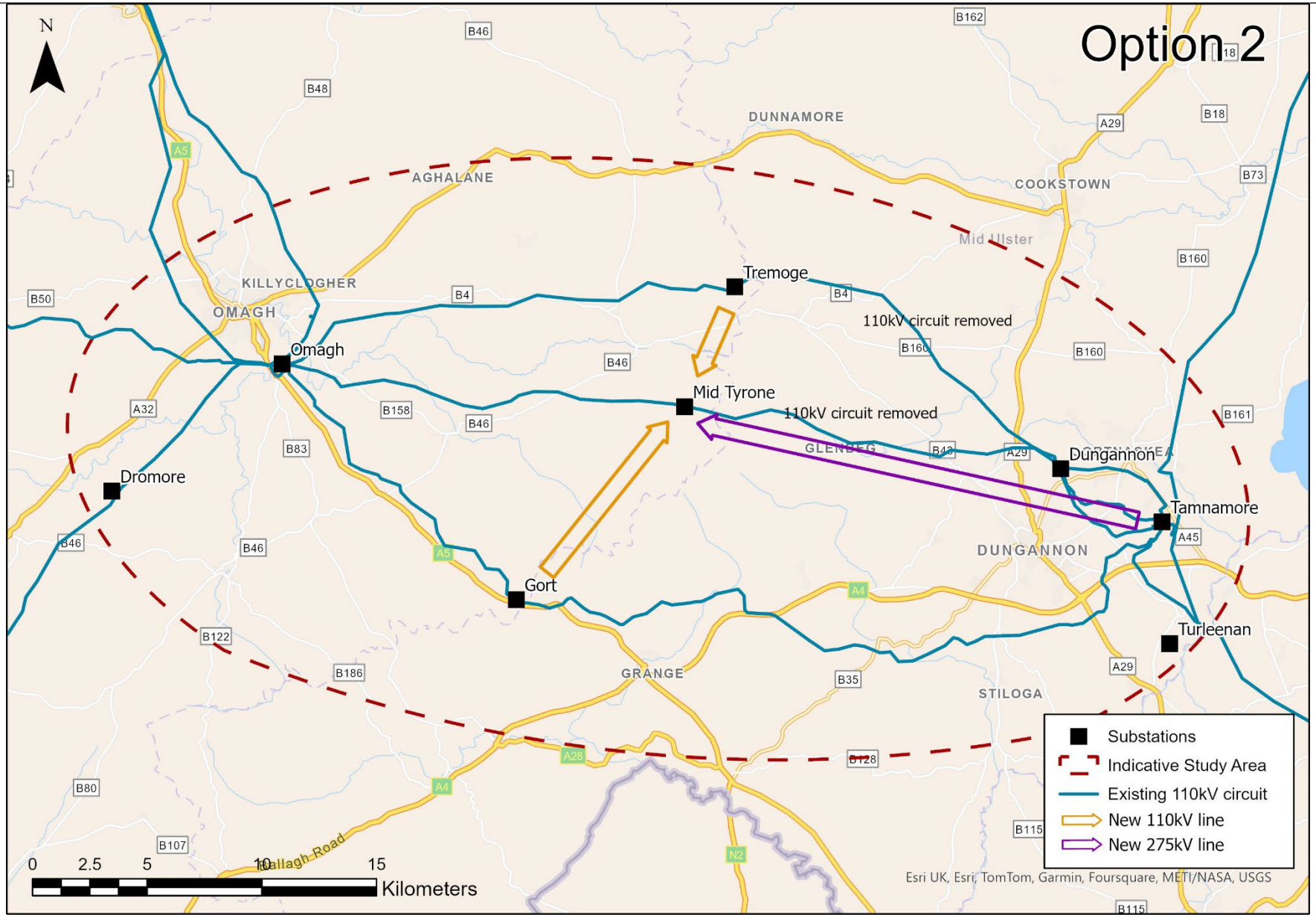

Figure 1.3 Option 2 Indicative Routes

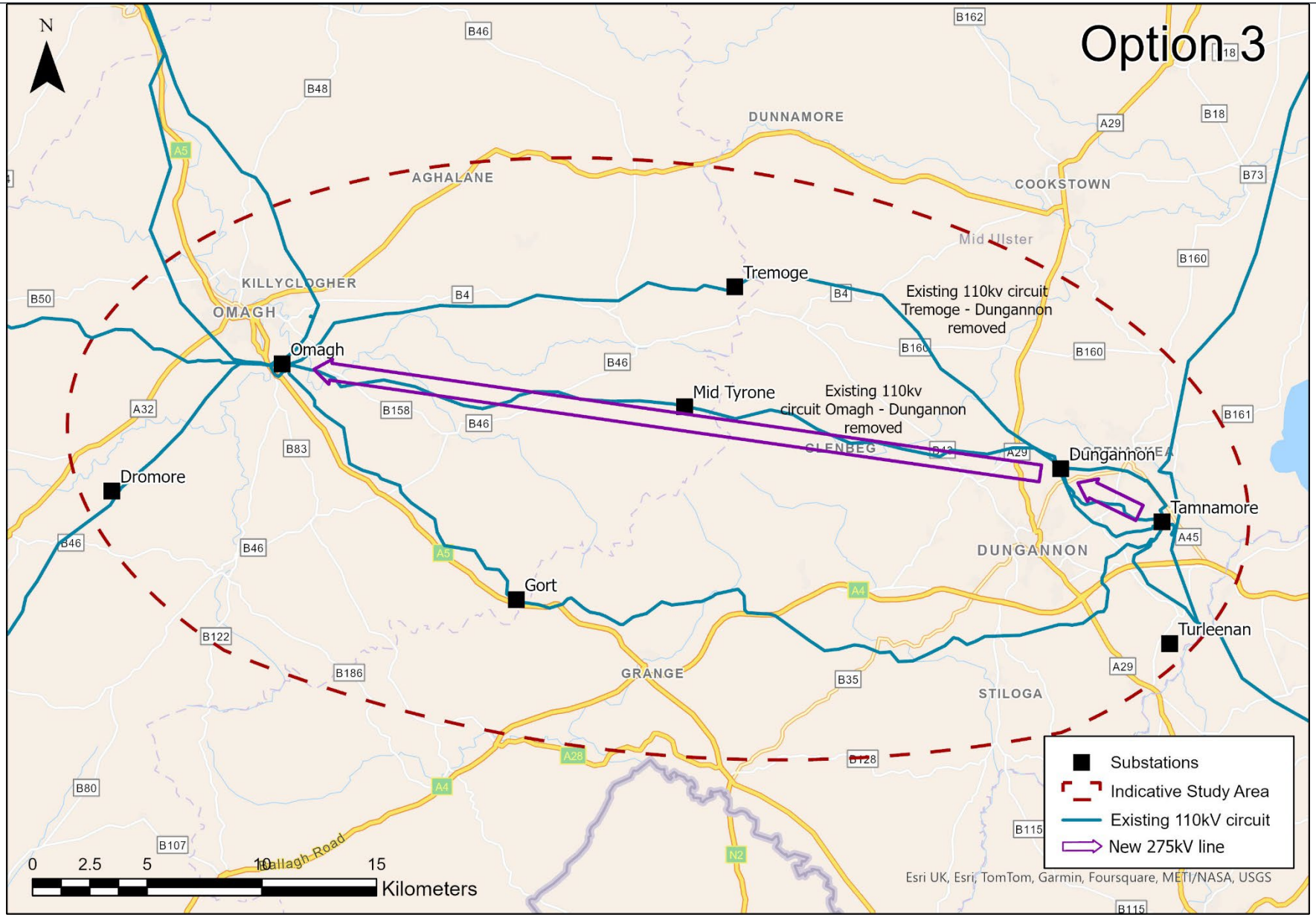

Figure 1.4 Option 3 Indicative Routes

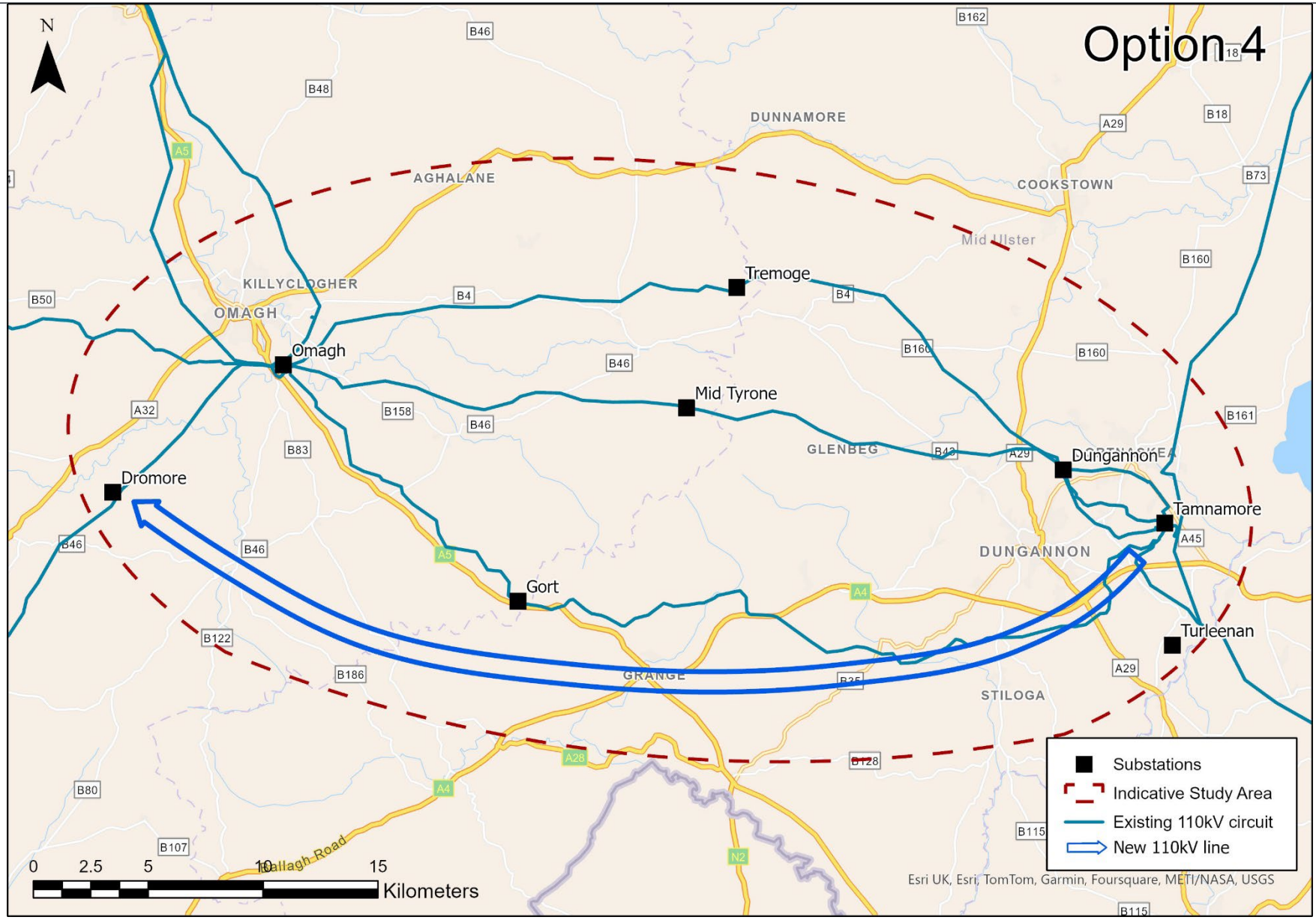

Figure 1.5 Option 4 Indicative Routes

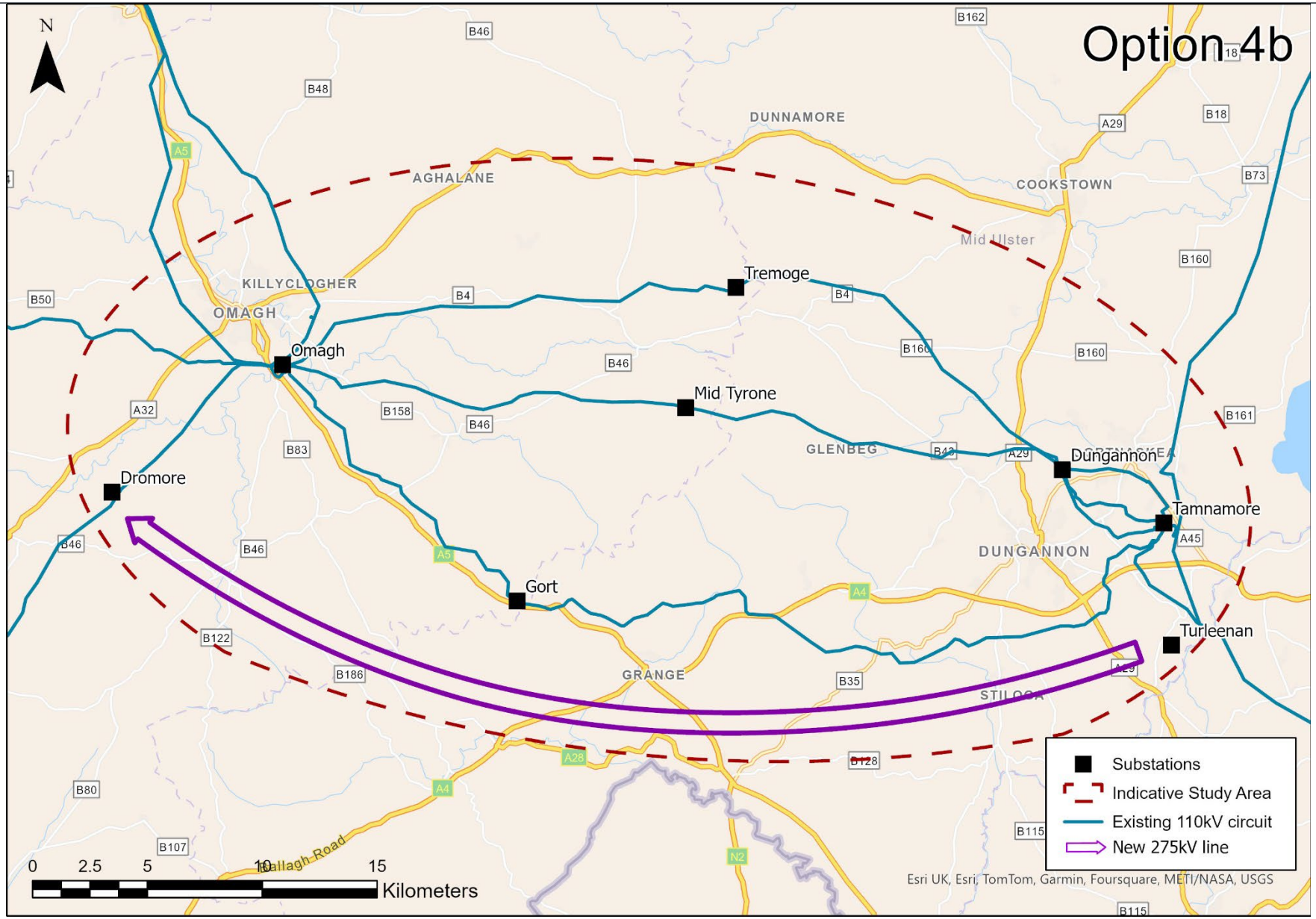

Figure 1.6 Option 4b Indicative Routes

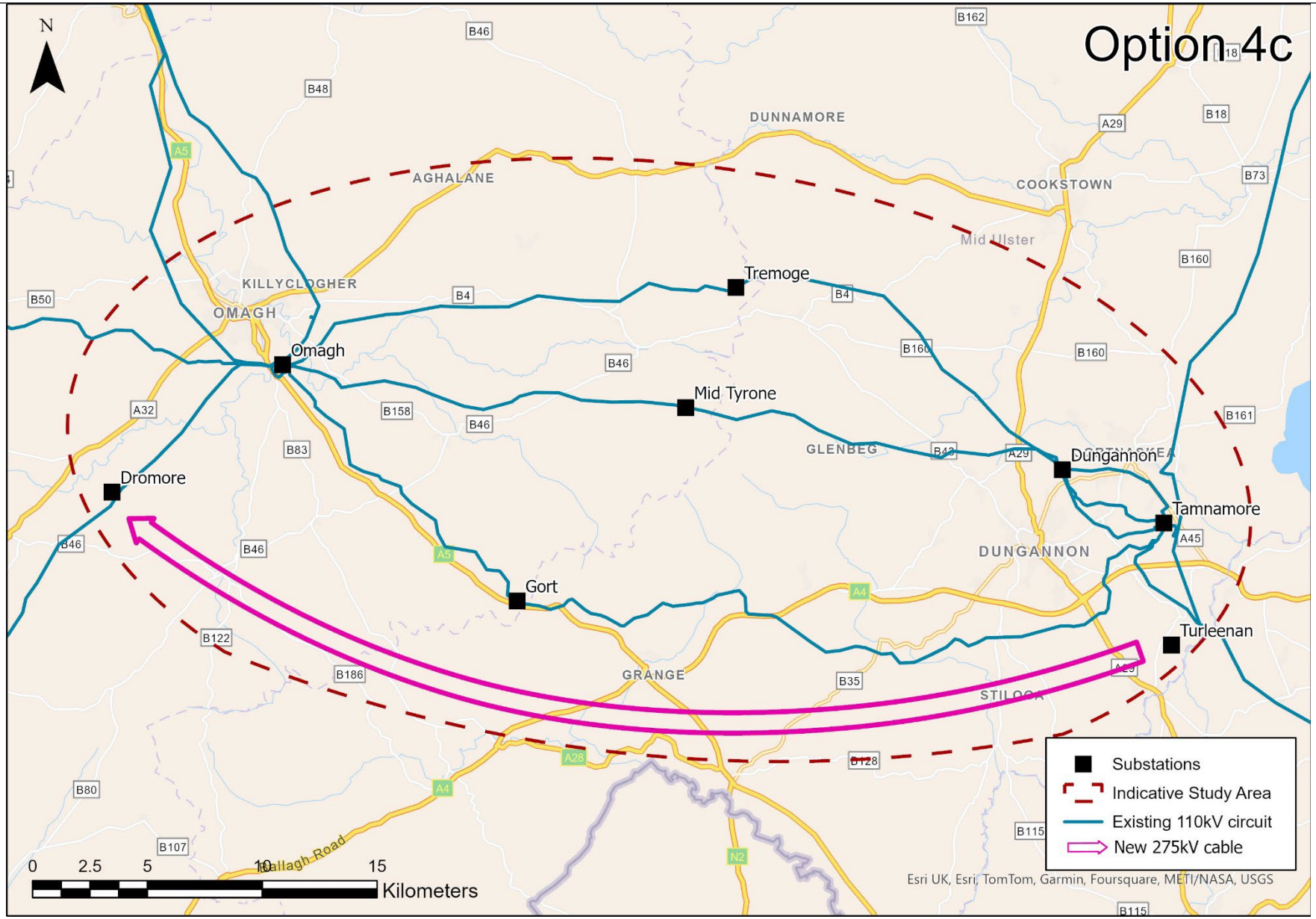

Figure 1.7 Option 4c Indicative Route

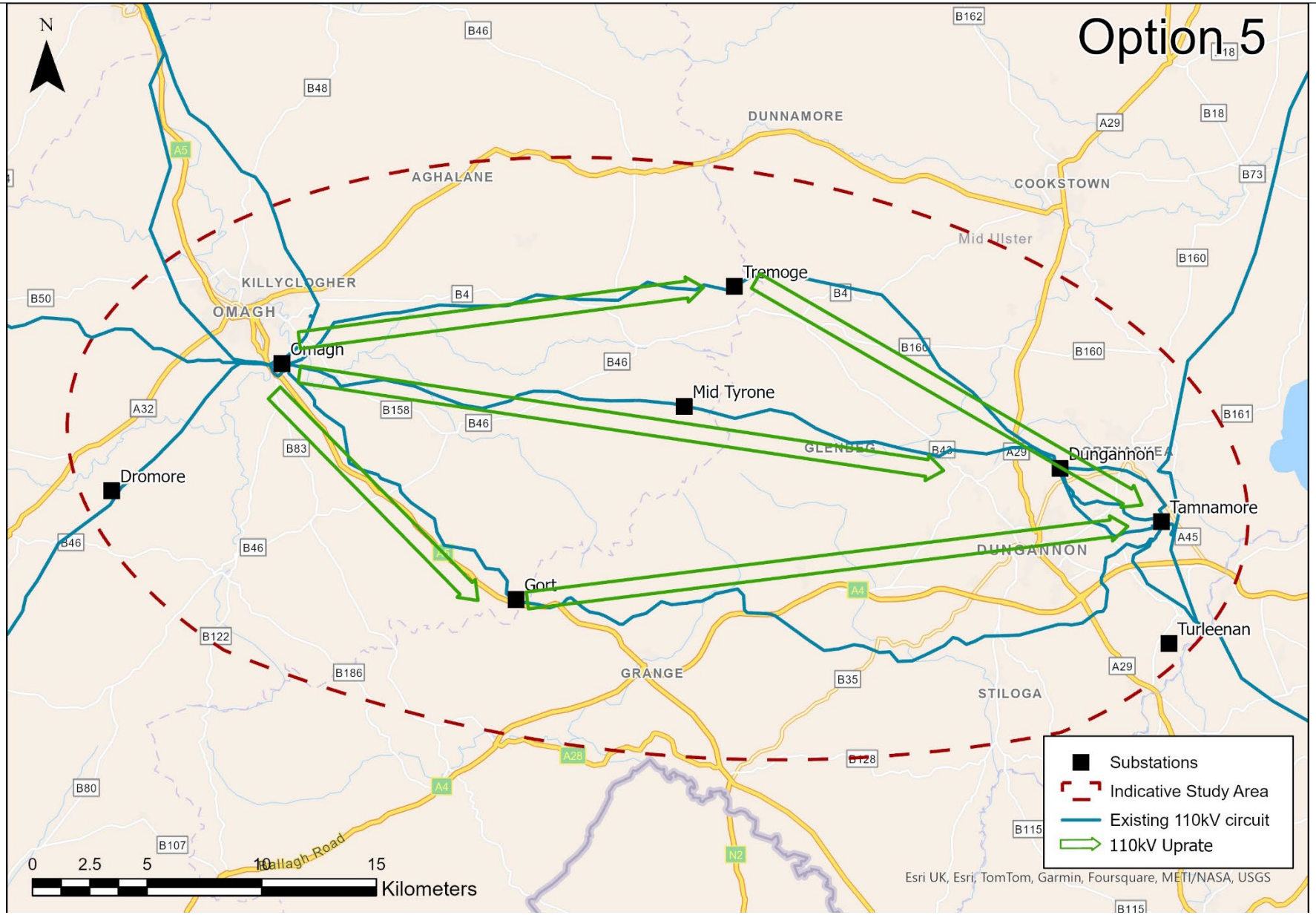

Figure 1.8 Option 5 Indicative Routes

2 CONSTRAINTS SCREENING - BRAG

There are many constraints to the proposed development. These constraints can be grouped as either technical, environmental, or social constraints. Technical constraints have the potential to impact on the engineering feasibility of the proposed development. Environmental constraints are designated environmentally sensitive sites that may impact on the consenting of the proposed development, due to their legislative protection. Social constraints are designated features, areas of population and recreational areas that may impact on the consenting of the proposed development, due to their legislative protection or due to their potential impacts on the local communities.

As a first step in the constraints assessment, a long list of the technical, environmental, and social constraints was screened, to determine if they were applicable to the study area. These constraints were also given a BRAG ranking. This ranked each constraint as either Black, Red, Amber or Green, based on their potential level of constraint to the proposed development. A description of these BRAG rankings is shown in Table 2.1 below.

Table 2.1 Constraints ranking definitions.

Constraint Ranking	Environment / Social	Technical
Black	Features or designations which affect the likelihood of an option being achievable to such a degree that the option should not be considered as part of the proposed transmission option.	Features or constraints that are likely to affect the feasibility of construction and/or buildability of the transmission option to such a degree that the option should not be considered as part of the proposed transmission option.
Red	Features or designations that are so significant or pose such a high degree of risk to the design that they should be avoided*, except in exceptional cases which include: where potential mitigation (or compensation) is known; where the potential benefits to the design would clearly outweigh the potential harm and/or impacts; or where there are no alternatives.	Features or constraints that are likely to affect the feasibility of construction and/or buildability of the design to such a degree that the option affecting them should not be included in the transmission option without potential solutions to the issues raised.
Amber	The most protected features and/or areas that are likely to require detailed assessment and/or mitigation and should be avoided* if possible.	Significant technical constraints that may cause cost increases and/or significant schedule delays; not ideal but likely to be achievable and/or capable of resolution.
Green	Features or designations to be considered in constraint assessment/study but which are likely to be capable of resolution.	Informative of approach but medium to low likely technical constraint causing significant cost increase and/or significant schedule delays.

*To be avoided except for linear constraints - being point to point features, where it may not be possible to avoid crossing these constraints.

A list of the constraints screened in or out, summary information on the constraints and their BRAG rankings are listed in Table 2.2. Figure 2.1 shows the study area and the screened in constraints.

Table 2.2 Technical, Environmental and Social Constraints Screening

Constraints	Constraint Summary	Constraint Type	Constraint Ranking	Screened in / out
Active Quarries	Active quarries are high-risk sites to electricity transmission planning developments. Traffic and other operational activities in an active quarry, along with unstable land conditions, are constraints to electricity transmission lines. There is also a higher potential for ground contamination in these areas. Active quarries should be avoided where possible.	Technical		Screened in
Dfl River Assets	Dfl River Assets include culverted watercourses that may require to be crossed. Electricity transmission developments have the potential to directly impact these underground assets.	Technical		Screened in
Electricity Transmission Network	The electrical transmission network poses a hazard due to the danger from electric shock, electric burn, electrical explosion or arcing, or from fire or explosion initiated by electrical energy. The route should avoid running in close proximity or parallel to existing overhead transmission lines.	Technical		Screened in
Flood Extents (100 yr. Fluvial and 200 yr. Pluvial)	100-year fluvial flood extents are areas that have a one percent probability of fluvial flooding in any given year. While 200-year pluvial flood extents are areas that have a 0.5 percent probability of pluvial flooding in any given year. Proposed electricity transmission developments in these areas will have a higher risk of experiencing a flood event. Development within a floodplain can be technically difficult due to poor ground conditions and can cause instability of foundations in the long term. Developments within a floodplain can alter the hydrology and hydrodynamics within the area, causing knock-on effects downstream, increasing flood risk to other sensitive receptors. Some electricity transmission infrastructure may not be compatible with planning policies in areas of identified flood risk.	Technical		Screened in
Flood Extents (100 yr. Fluvial and 200 yr. Pluvial) Climate Change Scenario	100-year fluvial flood extents CC are areas that have a one percent probability of fluvial flooding in any given year under the current climate change scenario. While 200-year pluvial flood extents CC are areas that have a 0.5 percent probability of pluvial flooding in any given year under the current climate change scenario. Proposed electricity transmission developments in these areas will have a higher risk of experiencing a flood event. Development within a floodplain can be technically difficult due to poor ground conditions and can cause instability of foundations in the long term. Developments within a floodplain can alter the hydrology and hydrodynamics within	Technical		Screened in

	the area, causing knock on effects downstream, increasing flood risk to other sensitive receptors. Some electricity transmission infrastructure may not be compatible with planning policies in areas of identified flood risk. These climate change flood extents are larger and more pessimistic than the current day 100-year flood extents, due to the predicted impacts of climate change.			
Forest Service Lands	The primary role of the Forest Service is to supply timber, provide public access to forests and protect forest environments, enhance plant health and standards of production, and work with their partners to deliver public services and promote economic development. Much of the land managed by the Forest Service comprises important woodland habitats. These areas are often utilised by protected species, which have the potential to be impacted by electricity transmission developments. These are also commercially harvested crop areas, which could be difficult to develop through.	Technical		Screened in
Gas Pipelines	Electricity transmission planning should avoid existing gas transmission lines, due to the potential health and safety risk of disturbance to pipelines and the added risk of ground contamination.	Technical		Screened in
Historic Land Use	Historic Land Use identifies areas of potential ground contamination, due to the historic land use that previously inhabited the site. Development of infrastructure through or on these sites has the potential for mobilising contaminants to other areas, including into water bodies.	Technical		Screened in
Historic Mines	Historic Mines are areas of known previous mining activity. These areas have a higher risk of ground contamination and ground instability. Development of infrastructure through or on these sites has the potential for mobilising contaminants to other areas, including into water bodies, and for foundational instability.	Technical		Screened in
Known Mines	Known Mines are areas of known current mining activity. These areas have a higher risk of ground contamination and ground instability. Development of infrastructure through or on these sites has the potential for mobilising contaminants to other areas, including into water bodies, and for foundational instability. Traffic and other operational activities on an active mine have the potential to be a constraint to electrical transmission line development.	Technical		Screened in
NIW Assets	Large trunk sewer and major water supply pipes may be difficult to cross and work in the vicinity of in development of an electricity transmission line. Electricity transmission developments have the potential to directly impact these underground assets.	Technical		Screened in

Pollution Prevention Control Sites	Pollution prevention and control (PPC) regulates certain types of businesses, such as those carrying out power generation, manufacturing and other industrial activities, waste management activities, intensive pig and poultry farming, activities involving solvents and the operation of a landfill site. These sites have a high potential for containing potentially contaminating and hazardous materials or activities. Development of transmission infrastructure through or on these sites has the potential for mobilising contaminants to other areas, including into water bodies. Construction in the vicinity of these sites could be hazardous.	Technical		Screened in
Railways	Active railways are a potential constraint to electrical transmission development due to health and safety issues during development and operation.	Technical		Out. None within the study area
Roads	Existing roads are a potential constraint to electrical transmission development due to health and safety issues during development and operation.	Technical		Screened in
Steep Slopes	Steep, sloping land is difficult to access and construct upon. There is also the added risk of soil erosion, soil creep and / or landslides. There is also the potential for long term foundational stability issues on steeply sloping ground, as well as access issues for asset maintenance.	Technical		Out. None within the study area
Unstable Land	Unstable lands, such as landslips and peatlands, are a potential constraint to electrical transmission development due to the poor ground conditions for construction. There is also the potential for long term foundational stability issues on unstable lands, as well as access issues for asset maintenance.	Technical		Screened In
Upland Areas	Upland areas can be difficult to access and construct upon. These areas can often be visible from long distances and therefore there is the potential for greater impacts on the overall landscape. Upland habitats, such as bogs and acid grasslands, can be sensitive to developments and slow to recover.	Technical		Screened In
Ancient Woodland	Ancient woods are areas of woodland that have persisted since 1600 in the UK. These woodlands are relatively undisturbed by human activity or development. This has led to these woodlands becoming an important and unique complex community of plants, fungi, fauna insects, and other microorganisms. These areas have the potential to be impacted by electricity transmission developments via direct loss of woodland, habitat degradation, loss of biodiversity	Environmental		Screened in

	and loss of foraging area. Ancient woodland is provided protection through planning policy in Northern Ireland.			
Areas of Special Scientific Interest (ASSI)	Areas of Special Scientific Interest (ASSIs) are protected areas that represent the best of Northern Ireland's wildlife and geological sites that make a considerable contribution to the conservation of Northern Irelands most valuable natural places. Under the Environment Order (Northern Ireland) 2002, Part IV, they are protected sites.	Environmental		Screened in
National Nature Reserves (NNR)	In Northern Ireland, statutory nature reserves (NNRs) are designated under the Nature Conservation and Amenity Lands (Northern Ireland) Order 1985. NNRs are areas of land set aside for nature; most of these sites contain nationally or internationally important habitats and species and they also provide potential research opportunities. As such, there is the potential for adverse impacts to the environment from electricity transmission development.	Environmental		Out. There are no National Nature Reserves within the study area
Ramsar	Ramsar Sites are wetlands of international importance designated under the Ramsar Convention. The impacts that construction such as electricity transmission developments can have upon these protected wetlands and the species that they support include habitat loss, change, fragmentation, species disturbance and hydrological alterations.	Environmental		Out. There are no Ramsar sites within the study area or its vicinity
Sites of Local Nature Conservation Importance (SLNCI)	Sites of Local Nature Conservation Importance (SLNCIs) are identified as areas supporting habitats, species, or earth science features. SLNCIs are designated by Local Councils. As well as contributing to the local natural heritage, they also contribute to National and European biodiversity. Electricity transmission developments have the potential to impact on these environmentally sensitive areas through habitat loss, change, fragmentation, species disturbance and hydrological alterations.	Environmental		Screened in
Special Areas of Conservation (SAC)	Special Areas of Conservation (SACs) are protected by the Conservation (Natural Habitats) Regulations (Northern Ireland) 1995 (SR No. 380 of 1995), and amendments, in Northern Ireland, which implements the Habitats Directive (92/43/EEC) for the conservation of certain habitats and species. These habitats and species can be impacted by developments, such as electricity transmission development, and should be avoided when possible.	Environmental		Screened in

Salmon Lakes	Lakes, loughs and waterbodies of known habitat for Atlantic salmon (*Salmo salar*), which are provided protection by their listing as an Annex II species under the Habitats Directive. There is the potential for electricity transmission developments to impact on these water bodies by increased sediment loading and decreased bank stability due to compromised bank sides.	Environmental		Out. There are no Salmon Lakes within the study area or its vicinity
Salmon Rivers	Waterways of known habitat for Atlantic salmon (*Salmo salar*), which are provided protection by their listing as an Annex II species under the Habitats Directive. There is the potential for electricity transmission developments to impact on these waterways by increased sediment loading and decreased bank stability due to compromised riverbanks.	Environmental		Screened in
Special Protection Areas (SPA)	Special Protection Areas (SPAs) are designated under The EU Directive on the Conservation of Wild Birds (EC/79/409), “The Birds Directive”, as areas that are important for rare and vulnerable bird species as they use them for breeding, feeding, wintering or migration. These sites are protected by the Conservation (Natural Habitats) Regulations (Northern Ireland) 1995 (SR No. 380 of 1995) and amendments in Northern Ireland. Electricity transmission development in the vicinity of these areas has the potential for disturbance to these bird species during construction and bird strike during operation of the lines.	Environmental		Out. There are no SPAs within the study area or its vicinity
WFD Rivers	The Water Framework Directive (WFD) aims to prevent the deterioration of water bodies and to protect, enhance and restore them with the aim of achieving at least good status, and to achieve compliance with the requirements for designated protected areas. WFD rivers are rivers that are monitored and measured for their water quality and status. Electricity transmission developments have the potential to impact the water environment via effects on hydrology, sediment loading and bank stability, which has the potential to impact on water body status.	Environmental		Screened in
WFD Lakes	The Water Framework Directive (WFD) aims to prevent the deterioration of water bodies and to protect, enhance and restore them with the aim of achieving at least good status, and to achieve compliance with the requirements for designated protected areas. WFD lakes are lakes, loughs and surface water bodies that are monitored and measured for their water quality and status. Electricity transmission developments have the potential to impact the water environment via effects on hydrology, sediment loading and bank stability, which has the potential to impact on water body status.	Environmental		Screened in

Areas of Archaeological Potential (AAPs)	Areas of Archaeological Potential (AAPs) are areas within the historic cores of towns and villages where, based on current knowledge, it is likely that archaeological remains will be encountered during continuous development and change. Electricity transmission development has the potential to impact on archaeological features and their settings.	Social		Screened in
Areas of Outstanding Natural Beauty	The value of the landscape present in Northern Ireland is recognised through the designation of eight Areas of Outstanding Natural Beauty (AONB), designated for their distinctive landscape character and high scenic value. These are protected areas under the Nature Conservation and Amenity Lands (NI) Order 1985. Electricity transmission development has the potential for negative visual impact on a landscape causing a wider area of loss of landscape appeal.	Social		Out. None within the study area
Areas of Significant Archaeological Interest	Areas of Significant Archaeological Interest are non-statutory designations that seek to identify distinctive areas of the historic landscape in Northern Ireland. Electricity transmission development has the potential to impact on archaeological features and their settings.	Social		Screened in
Buildings	Electricity transmission is generally perceived as a nuisance and a health and safety risk by the public. Buildings are where people live and work. Properties should be avoided in the planning for a transmission line.	Social		Screened in
Defence Heritage Sites	Defence heritage sites are sites designated for defence heritage features that have been recorded as part of the Defence Heritage Project (1997). A number of these sites have been scheduled for protection under the Historic Monuments and Archaeological Objects (NI) Order 1995. Electricity transmission development has the potential to impact on defence heritage sites and their settings.	Social		Screened in
Drinking Water Lakes	Lakes, loughs and water bodies used for extraction of drinking water. Construction activities in the vicinity of these designated areas has the potential to lead to short term sedimentation and contamination impacts on the water bodies. Damage to banks and changes in hydrology also have the potential for negative impacts during construction.	Social		Out. None within the study area
Drinking Water Protected Areas	Drinking Water Protected Areas (DWPAs) are designated under Article 8 of The Water Environment (WFD) Regulations (NI) 2017, with the aim of protecting the safety of drinking water	Social		Out. As all NI.

	supplies and reducing the need for additional treatments. Construction activities, particularly that involve excavation, have the potential to impact on drinking water supplies.			
Drinking Water Rivers	Rivers used for extraction of drinking water. Construction activities in the vicinity of these designated rivers has the potential to lead to short term sedimentation and contamination impacts on the water bodies. Damage to banks and changes in hydrology also have the potential for negative impacts during construction.	Social		Screened in
Historic Parks and Gardens	A Register of Parks, Gardens and Demesnes of Special Historic Interest was established in the late 1990s to identify those sites that can be considered of exceptional importance within Northern Ireland. These sites contribute to the quality and character of the local landscape and those that are open to the public provide an important recreational resource. Electricity transmission development in their vicinity has the potential for direct and indirect impacts on these protected areas.	Social		Screened in
Industrial Heritage Sites	Industrial heritage sites are sites in the UK that have been designated for historical civil engineering, transport, and manufacturing value. These sites often have socioeconomic factors acting upon them such as tourism and walking trails. Electricity transmission development has the potential to impact on industrial heritage sites and their settings.	Social		Screened in
Listed Buildings	Listed Buildings are those designated through listing as being of 'special architectural or historic interest' under Section 80 of the Planning Act (NI) 2011. Electricity transmission development has the potential to impact on listed buildings and their settings.	Social		Screened in
Population Density	Electricity transmission is generally perceived as visually unappealing, a nuisance, and a health and safety risk by the public. The higher the population density, the more people that are likely to negatively view a proposal within their vicinity.	Social		Screened in
Population Health	Electricity transmission is perceived as a health and safety risk by the public. Areas of population with more health problems, which tend to be areas of higher deprivation, can be difficult to develop within, as development within these areas may be considered as contributing to cumulative negative effects on the population.	Social		Screened in

Scheduled Zones	Scheduled Zones are areas scheduled for protection under Article 3 of the Historic Monuments and Archaeological Objects (Northern Ireland) Order 1995. A Scheduled Monument Consent is required for any works within a Scheduled Area. Electricity transmission development has the potential to impact on Scheduled Zones and their settings.	Social		Screened in
Settlements	Electricity transmission is generally perceived as visually unappealing, a nuisance, and a health and safety risk by the public. Settlement areas have more people that are likely to negatively view a proposal within their vicinity.	Social		Screened in
Sites and Monuments (SMR)	The sites and monuments record is a list of known important archaeological sites. Its purpose is to inform decision-makers of the potential a new development might have on an archaeological site. Electricity transmission development has the potential to impact on sites and monuments and their settings.	Social		Screened in
Sensitivity of Landscape to wind farm development	DAERA have assessed the sensitivity of the various Landscape Character Areas (LCAs) in Northern Ireland to wind farm development. This data is used as a proxy for the sensitivity of the landscape to development of electricity transmission infrastructure.	Social		Screened in
World Heritage Sites	There is one UNESCO world heritage site in Northern Ireland; being the Giant's Causeway, designated for its unique geological heritage.	Social		Out. None within the study area

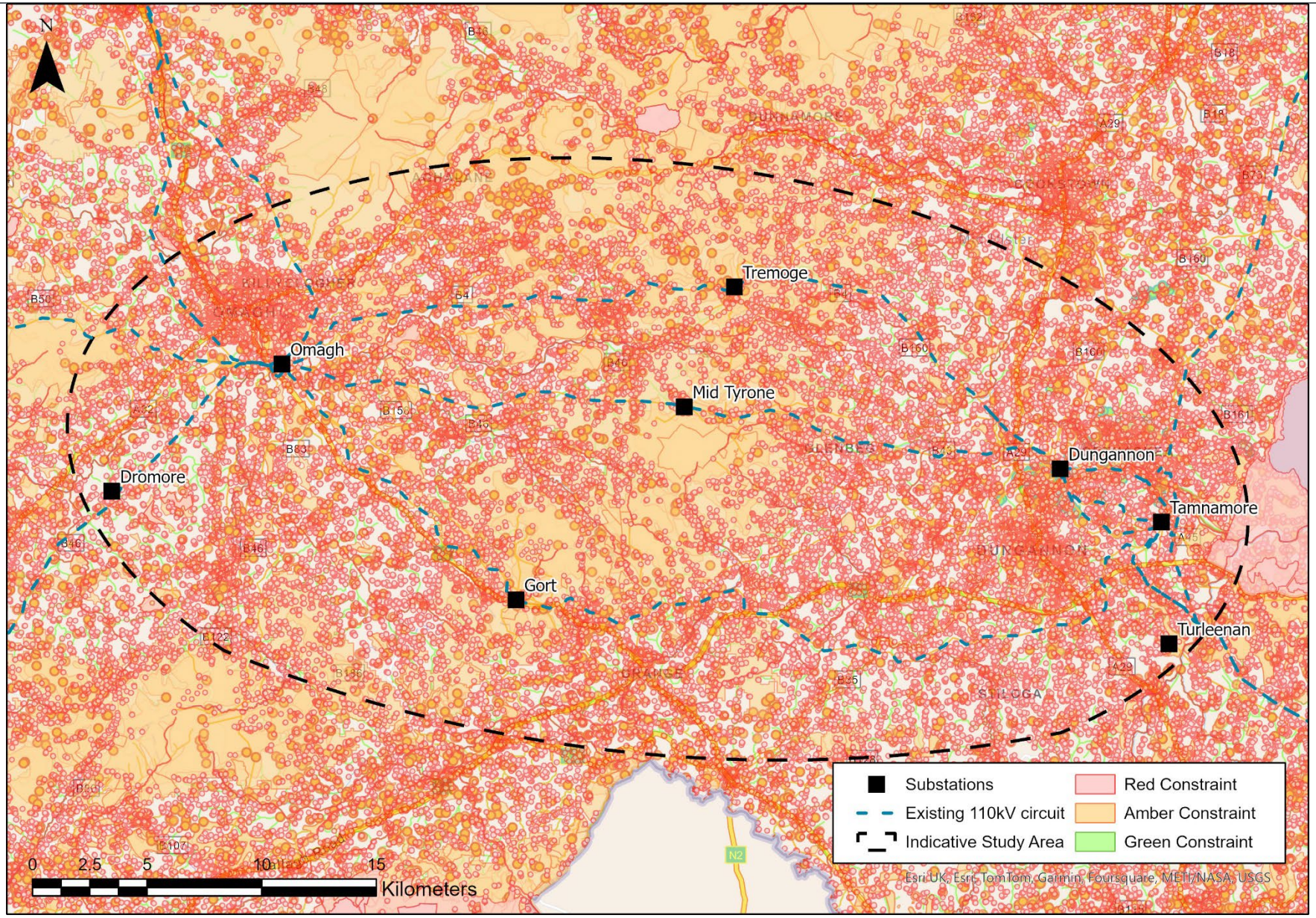

Figure 2.1 Study area constraints.

3 SHORT LIST CONSTRAINTS

From the long list of constraints shown in Table 2.2, any potential constraints which are not present within the study area were removed to provide a short list of constraints. These constraints were then given a scoring based on their relative BRAG ranking. The higher the score, the greater the relative constraint the feature poses to development of electrical transmission infrastructure. These constraints, their constraint scoring and any proposed buffer areas to be added to the features' geographical locations are shown in Table 3.1. These constraints and their scores were included within a constraints model.

Table 3.1 Short listed constraints

Constraints	Constraint Ranking	Type	Scoring	Buffer (m)
Active Quarries		Technical	5	20
DfI River Assets		Technical	5	0
Electricity Transmission Network		Technical	5	20
Flood Extents 100 yr. (fluvial) and 200 yr. (pluvial, coastal)		Technical	3	0
Flood Extents 100yr CC (fluvial) and 200 yr. (pluvial, coastal)		Technical	3	0
Forest Service Lands		Technical	5	0
Gas Pipelines		Technical	10	20
Historical Land Use		Technical	5	0
Historic Mines		Technical	3	20
Known Mines		Technical	5	20
NIW Assets		Technical	5	0
Pollution Prevention Control Sites		Technical	5	20
Roads		Technical	3	20
Unstable Land		Technical	5	0
Upland Areas		Technical	5	0
Ancient Woodland		Environmental	5	0
ASSI		Environmental	5	0

Ramsar		Environmental	10	0
SAC		Environmental	10	0
Salmon Rivers		Environmental	10	0
SLNCI		Environmental	5	0
WFD Rivers		Environmental	3	0
Areas of Archaeological Potential		Social	5	0
Buildings		Social	10	100
Defence Heritage Sites		Social	5	20
Drinking Water Rivers		Social	5	0
Historic Parks and Gardens		Social	5	0
Industrial Heritage Sites		Social	5	20
Listed Buildings		Social	5	100
Population Density		Social	1-5	0
Population Health		Social	1-5	0
Scheduled Zones		Social	5	0
Settlements		Social	5	0
Sites and Monuments		Social	5	20
Sensitivity of Landscape (to wind farm development)		Social	1-5	0

4 CONSTRAINTS MODELLING

Constraints Modelling is used to digitally represent and model all potential spatially related constraints that could hinder a proposed development. The following **Sections 4.1** to **4.4** give a brief introduction to the principles behind the constraints modelling process. As the modelling was developed and undertaken using ArcGIS and ArcGIS Spatial Analyst, much of the text used is sourced from the ArcGIS Resource Centre (ESRI, 2024): https://pro.arcgis.com/en/pro-app/latest/tool-reference/spatial-analyst/.

4.1 Cost Surface

A *cost surface* raster identifies the cost of travelling through each cell in a raster. To create this raster, the relative cost (constraint value) of constructing electricity lines through each cell was determined. A 20m^2 cell size was selected for the purpose of this analysis. Although the cost surface raster is a single dataset, it represents multiple criteria (constraints). **Section 3** of this report provides more detail on the constraints that were combined to make the *cost surface* for this study. A cost will be extracted based on the potential corridor of each option and the centreline of each corridor option.

4.2 Cost-Distance Modelling

The *cost distance* tool creates an output raster in which each cell is assigned the accumulative cost to the closest source cell. The algorithm utilises the node/link cell representation used in graph theory. In the node/link representation, the centre of a cell is considered a node, and each node is connected to its adjacent nodes by multiple links. Every link has an impedance associated with it which is derived from the costs associated with the cells at each end of the link (from the cost surface) and from the direction of movement through the cells. The final value is the cumulative cost across the cells.

4.3 Cost Surface Model

A cost surface model is developed to represent the study area, which is the accumulation of all potential strategic constraints (and opportunities if present) into one layer. This is the surface that the electricity lines have to cross to get from one substation to the next. Some areas of this surface will be more costly to cross than others, as they have technical, environmental and/or social constraints. This cost surface is the digital representation of the cumulative constraints. The cost surface is shown in Figure 4.1, which demonstrates areas of higher and lower constraint within the overall study area. This is the basis of the *constraint model*. This constraint model then allows us to generate a route that defines the least cost path area between two locations. This allows strategic corridors to be generated from the identified least cost areas.

An alternative constraints model was developed for Option 1c and Option 4c. Option 1c involves a new HVDC cable and Option 4c involves a new AC underground cable, both of which can be laid within the road network. In order for the road network to be seen as an opportunity rather than a constraint, minor roads were given a negative value, and major roads (Motorways and A-Roads) remained as a constraint and were avoided. This alternative cost surface is shown in Figure 4.2, which demonstrates areas of higher and lower constraint within the overall study area.

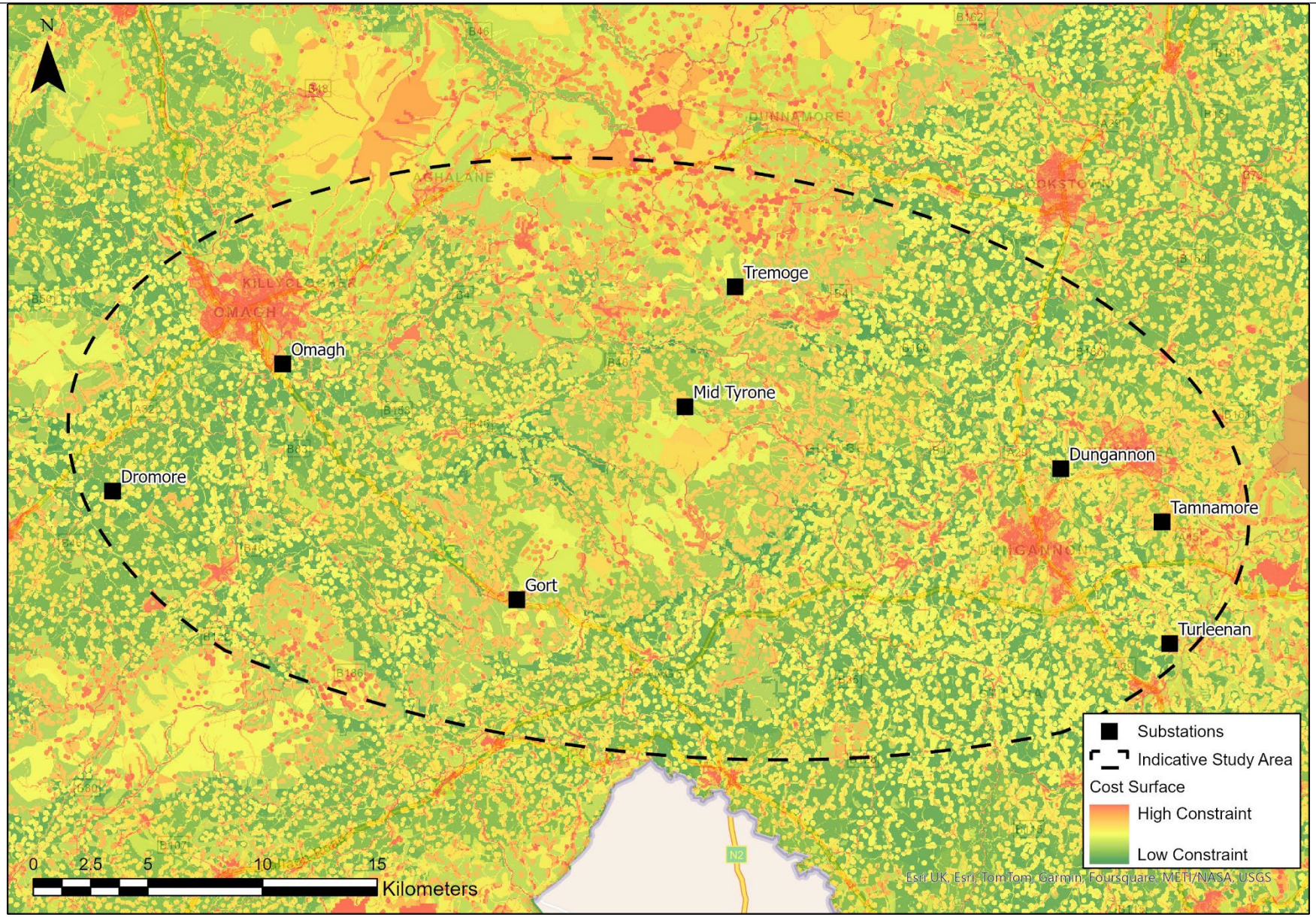

Figure 4.1 Cost Surface

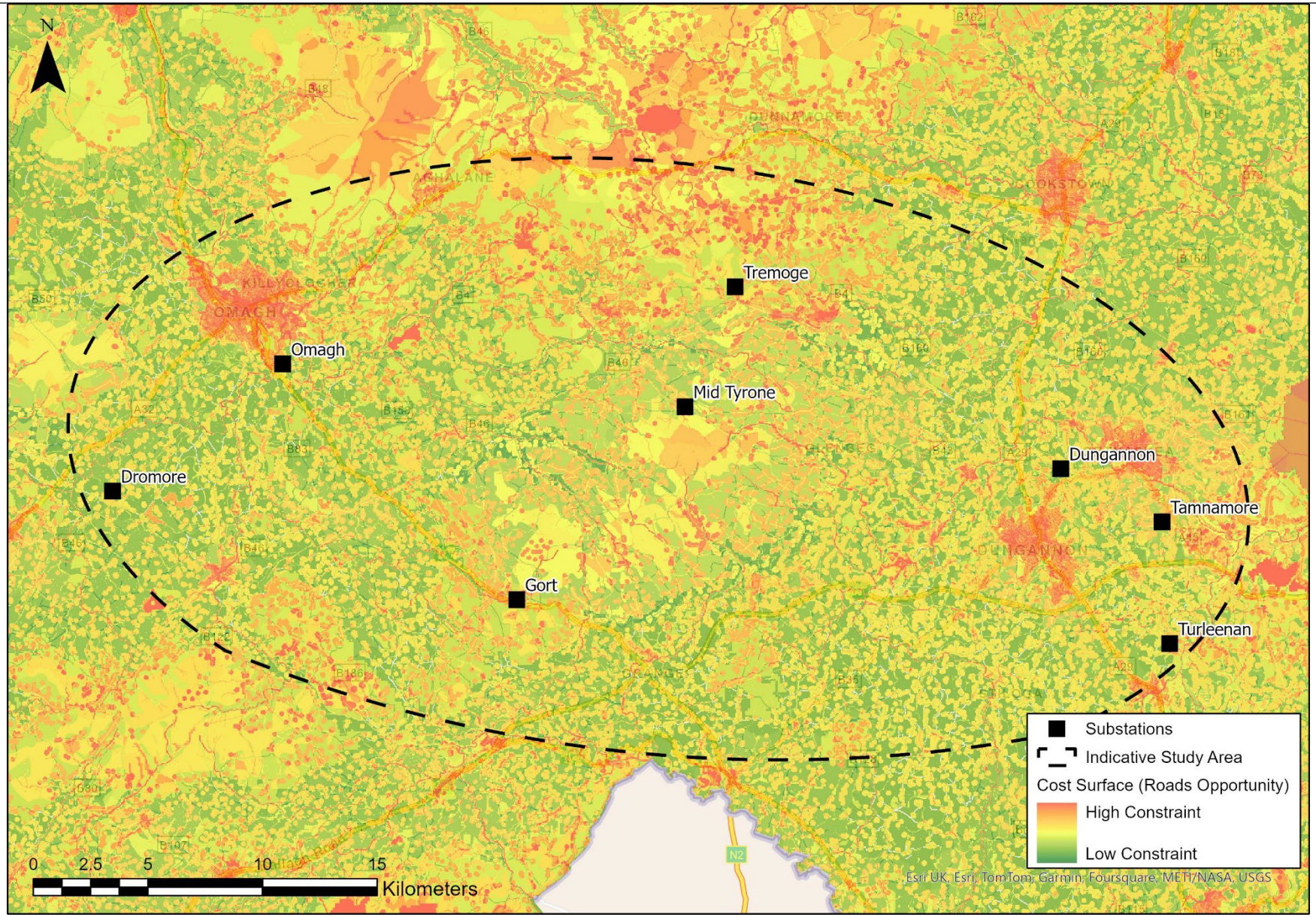

Figure 4.2 Option 1c and Option 4c Cost Surface

4.4 Least Constrained Routes

A least cost path is generated that finds the shortest and least costly path (in constraint costs) between starting points and ending points (substations) across the cost surface. A cost-distance analysis is run on each substation location to give an output cost distance raster. To identify the least constrained route between two locations, the cost distance rasters are combined to give a sum of the accumulative cost between the two substation locations. The least cost path analyses all the possible paths and defines the least-cost geographic area between two locations.

For Option 2, Option 3, Option 4, Option 4b and Option 4c, a 10% threshold is applied to the score of the least constrained route. This identifies a corridor within which all potential route scores are within 10% of the least constrained option.

Figure 4.3 shows the least cost path for Option 1c between Tamnamore and Omagh.

Figure 4.4 shows the least cost path and 10% least cost corridor for Option 2 between Gort – Mid Tyrone, Tremoge – Mid Tyrone, and Tamnamore – Mid Tyrone.

Figure 4.5 shows the least cost path and 10% least cost corridor for Option 3 between Tamnamore – Dungannon and Dungannon – Omagh.

Figure 4.6 shows the least cost path and 10% least cost corridor for Option 4 between Tamnamore – Dromore.

Figure 4.7 shows the least cost path and 10% least cost corridor for Option 4b between Turleenan – Dromore.

Figure 4.8 shows the least cost path and 10% least cost corridor for Option 4c between Turleenan – Dromore.

4.5 Strategic Routes

For Option 1, one strategic corridor was identified between Tamnamore and Omagh. This strategic route is shown in Figure 4.9.

For Option 2, Option 3, Option 4, Option 4b and Option 4c, 500m wide corridors were developed to identify strategically different corridors which were within 10% of the least constrained route.

For Option 2, for the routes between Gort and Mid-Tyrone and Tremoge and Mid-Tyrone, 500m wide corridors were developed based on the least cost line - Route 2-1a and Route 2-2a, respectively. Additionally, one alternative 500m wide strategic corridor was developed for each route, Routes 2-1b (Gort to Mid-Tyrone) and Route 2-2b (Tremoge to Mid-Tyrone). These corridors are shown in Figure 4.10 and Figure 4.11.

For Option 2, in addition to the corridors between Gort to Mid-Tyrone and Tremoge to Mid-Tyrone, strategic 500m wide corridors were identified between Tamnamore to Mid-Tyrone. One strategic corridor was established based on the least cost line (Route 2-3a). Two alternative strategic corridors were identified within 10% of the least cost line (Route 2-3b and Route 2-3c). These corridors are shown in Figure 4.12.

For Option 3, 500m wide corridors were identified between Tamnamore and Dungannon. One strategic corridor was established based on the least cost line (Route 3-1a). Two alternative strategic corridors were identified within 10% of the least cost line (Route 3-1b and Route 3-1c). These corridors are shown in Figure 4.13.

Additionally, 500m wide corridors were identified between Dungannon and Omagh. One strategic corridor was established based on the least cost line (Route 3-2a). Two alternative strategic corridors were identified within 10% of the least cost line (Route 3-2b and Route 3-2c). These corridors are shown in Figure 4.14.

For Option 4, 500m wide corridors were identified between Tamnamore and Dromore. One strategic corridor was established based on the least cost line (Route 4-1a). Two alternative strategic corridors were identified within 10% of the least cost line (Route 4-1b and Route 4-1c). These corridors are shown in Figure 4.15.

For Option 4b, 500m wide corridors were identified between Turleenan and Dromore. One strategic corridor was established based on the least cost line (Route 4b-1a). Two alternative strategic corridors were identified within 10% of the least cost line (Route 4b-1b and Route 4b-1c). These corridors are shown in Figure 4.16.

For Option 4c, 500m wide corridors were identified between Turleenan and Dromore. One strategic corridor was established based on the least cost line (Route 4c-1a). Two alternative strategic corridors were identified within 10% of the least cost line (Route 4c-1b and Route 4c-1c). These corridors are shown in Figure 4.17

For Option 5, 500m wide corridors were identified between Omagh – Gort (Route 5-1a), Gort – Tamnamore (Route 5-1b), Omagh – Dungannon (Route 5-1c), Omagh – Tremoge (Route 5-1d) and Tremoge – Tamnamore (Route 5-1e). These are based on the existing 110kV line. These corridors are shown in Figure 4.18.

In order to help ascertain the most sustainable route, these strategic corridors were then compared using a BRAG assessment.

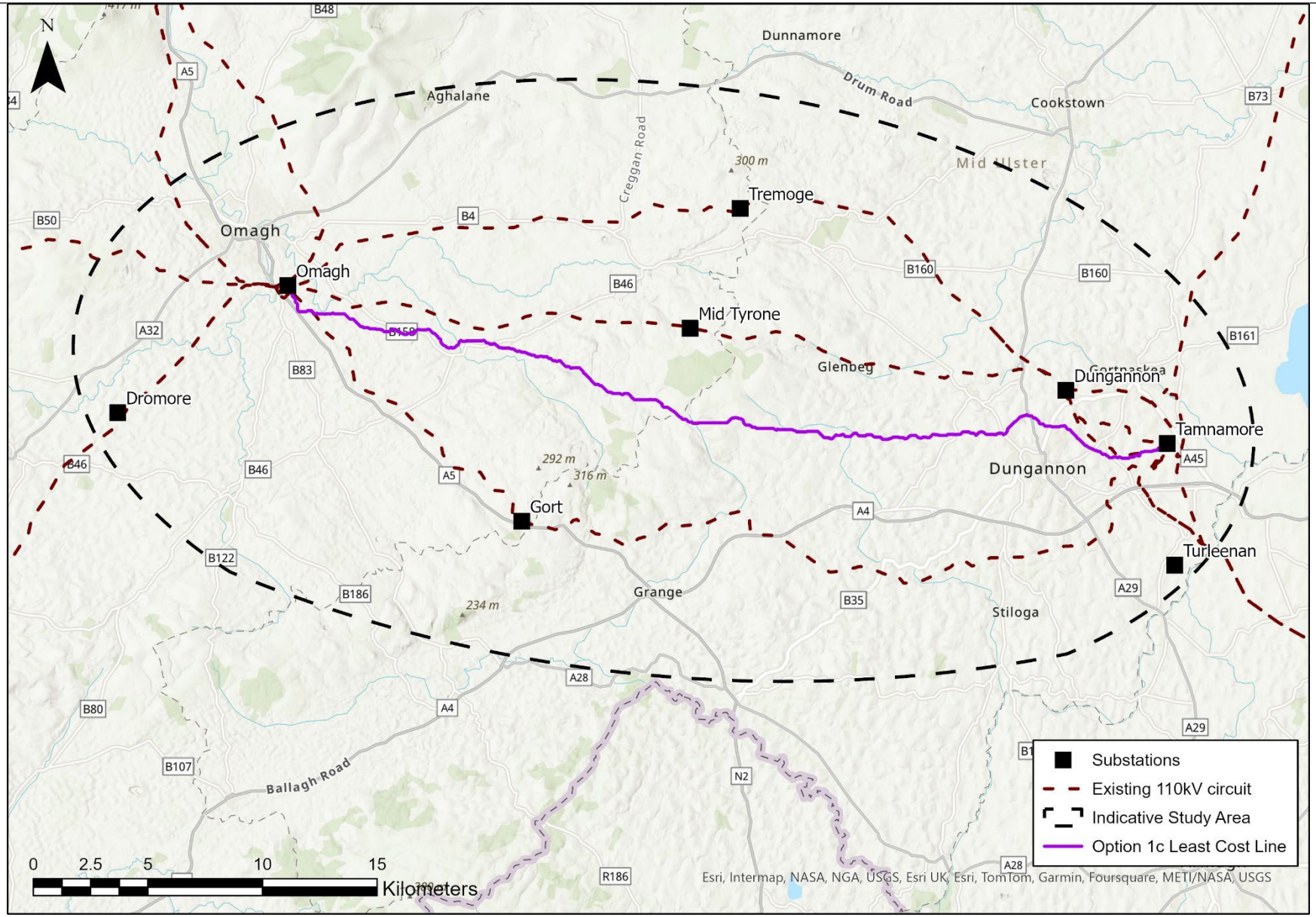

Figure 4.3 Least Cost Line for Option 1c.

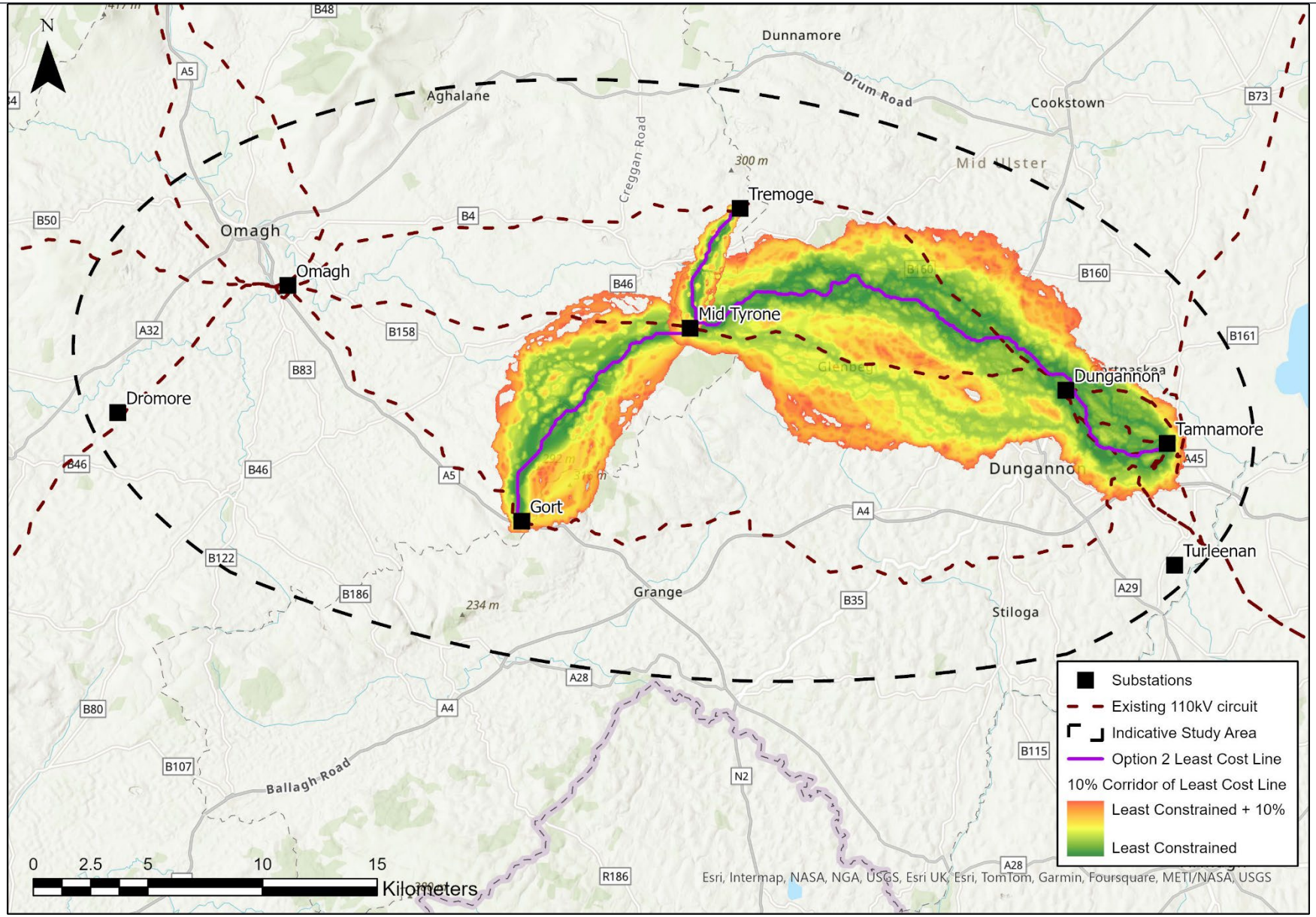

Figure 4.4 Least Cost Line for Option 2

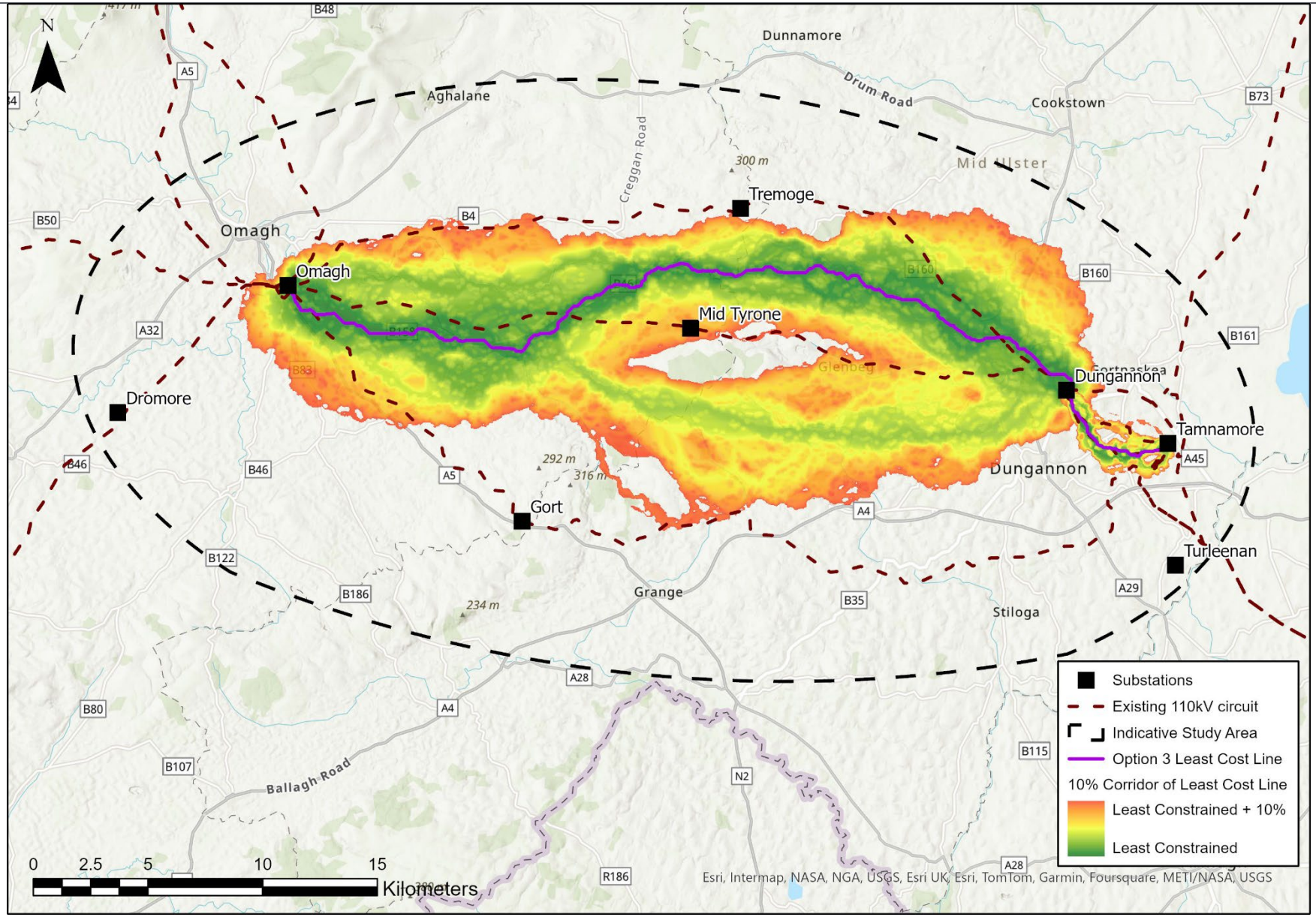

Figure 4.5 Least Cost Line for Option 3

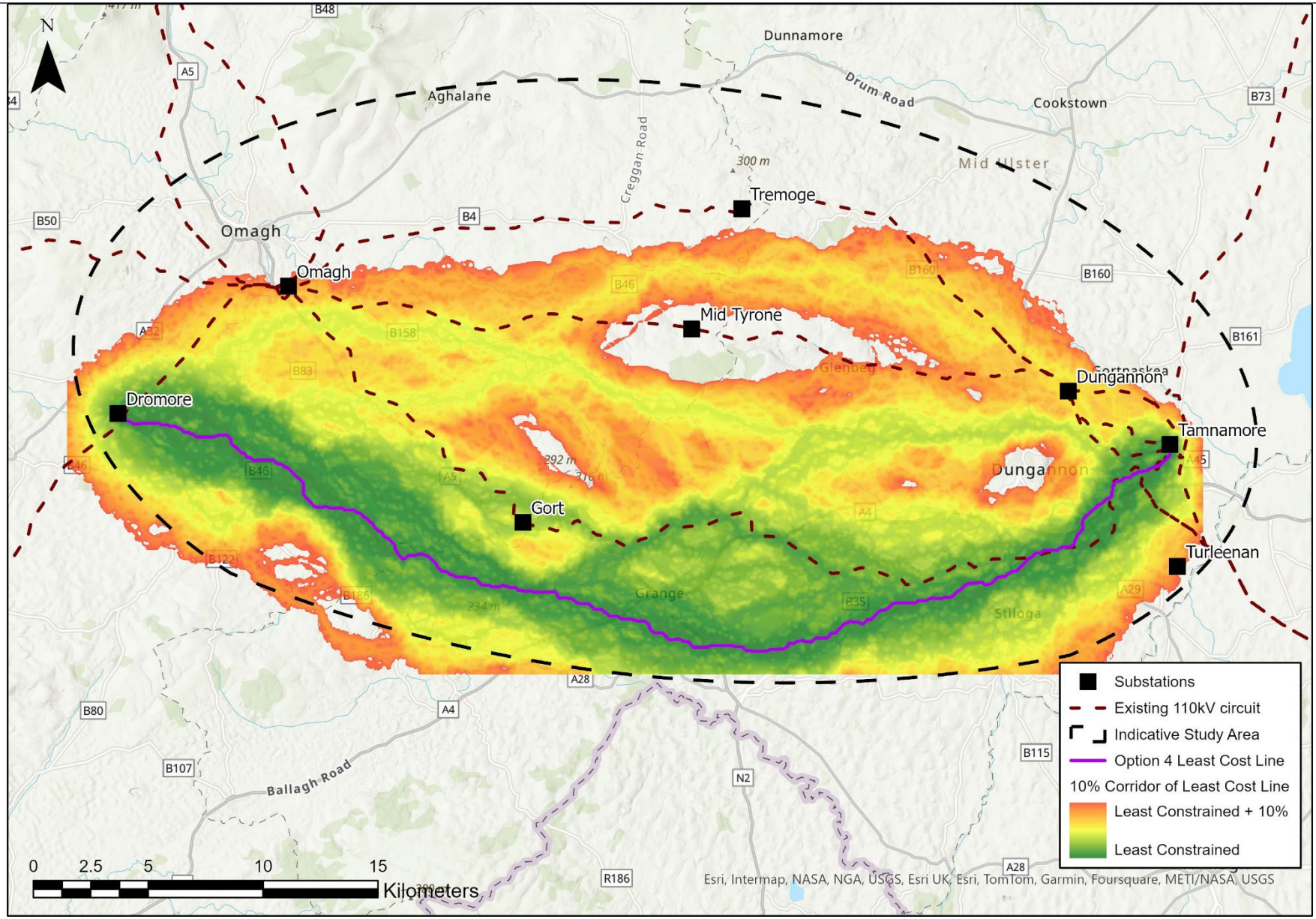

Figure 4.6 Least Cost Line for Option 4

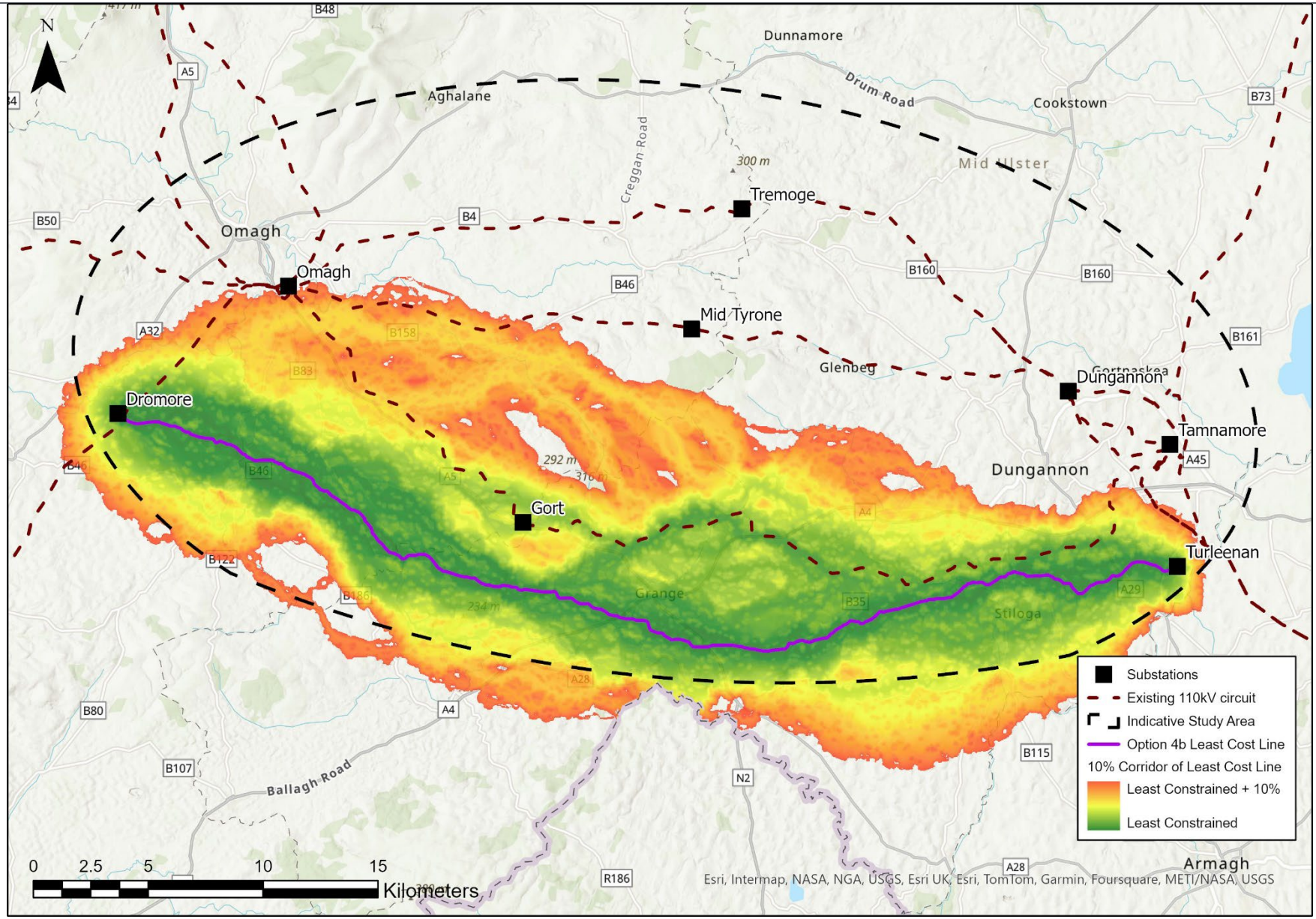

Figure 4.7 Least Cost Line for Option 4b.

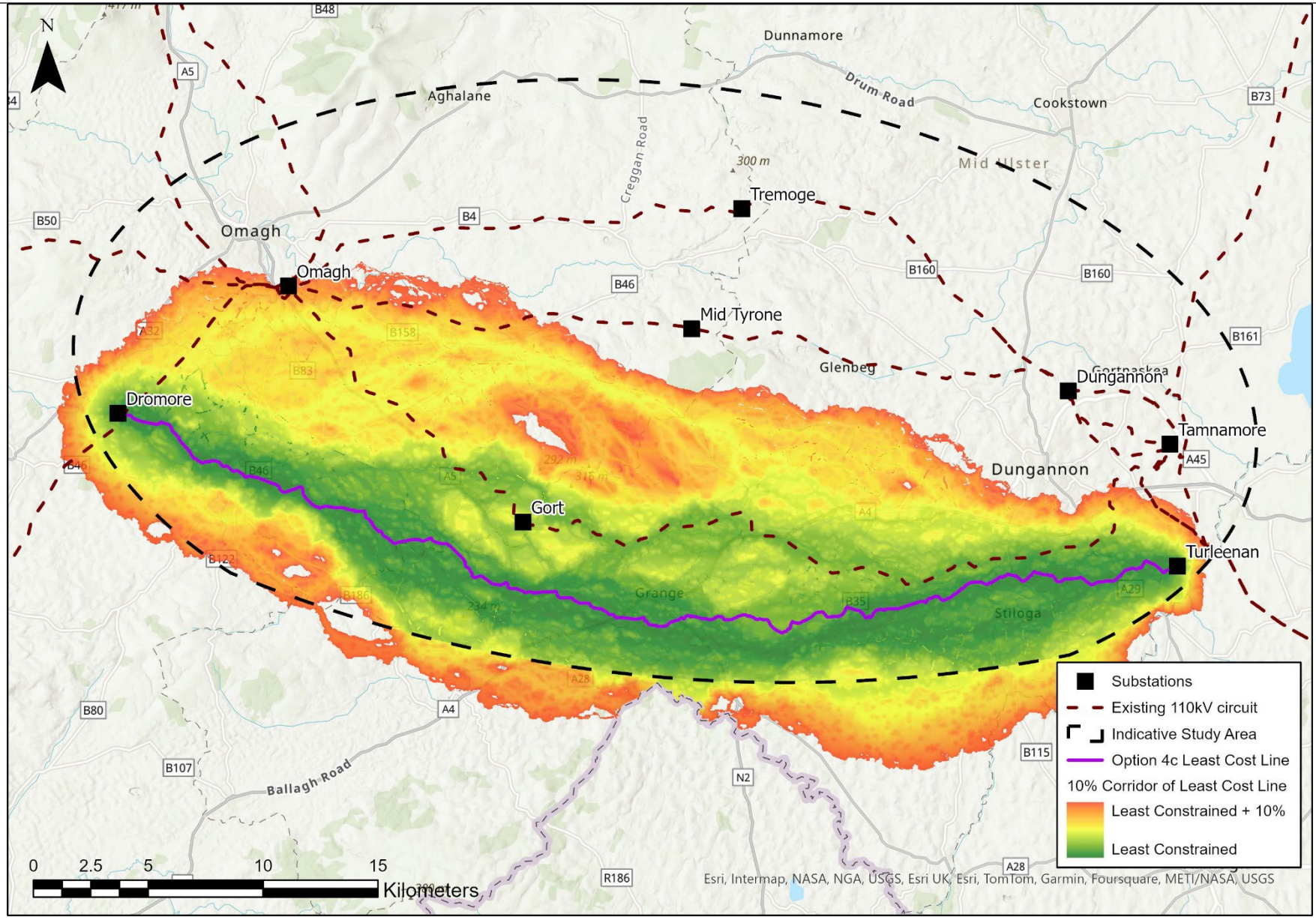

Figure 4.8 Least Cost Line for Option 4c.

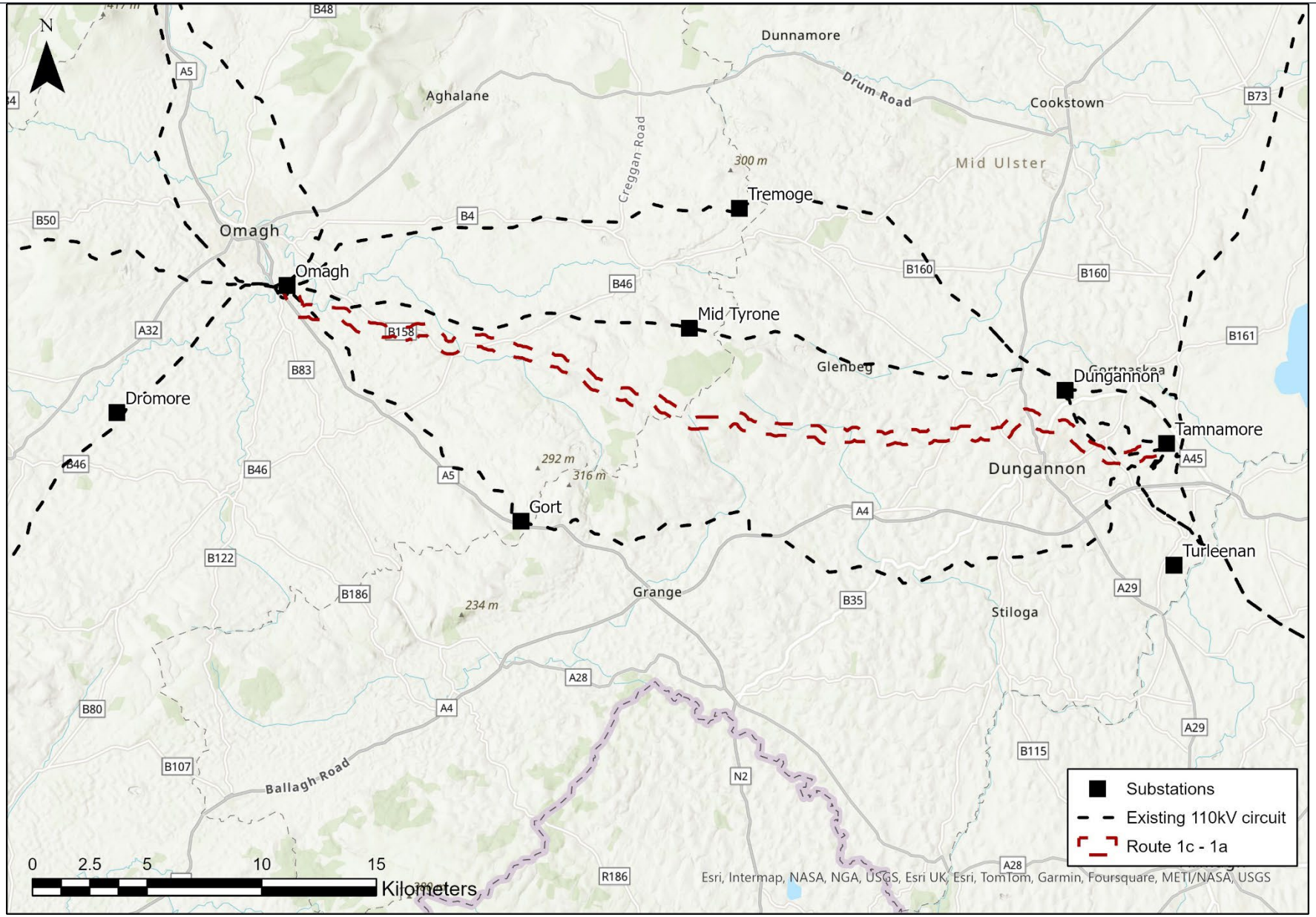

Figure 4.9 Option 1c Strategic Corridor 1c-1a for assessment between Tamnamore and Omagh

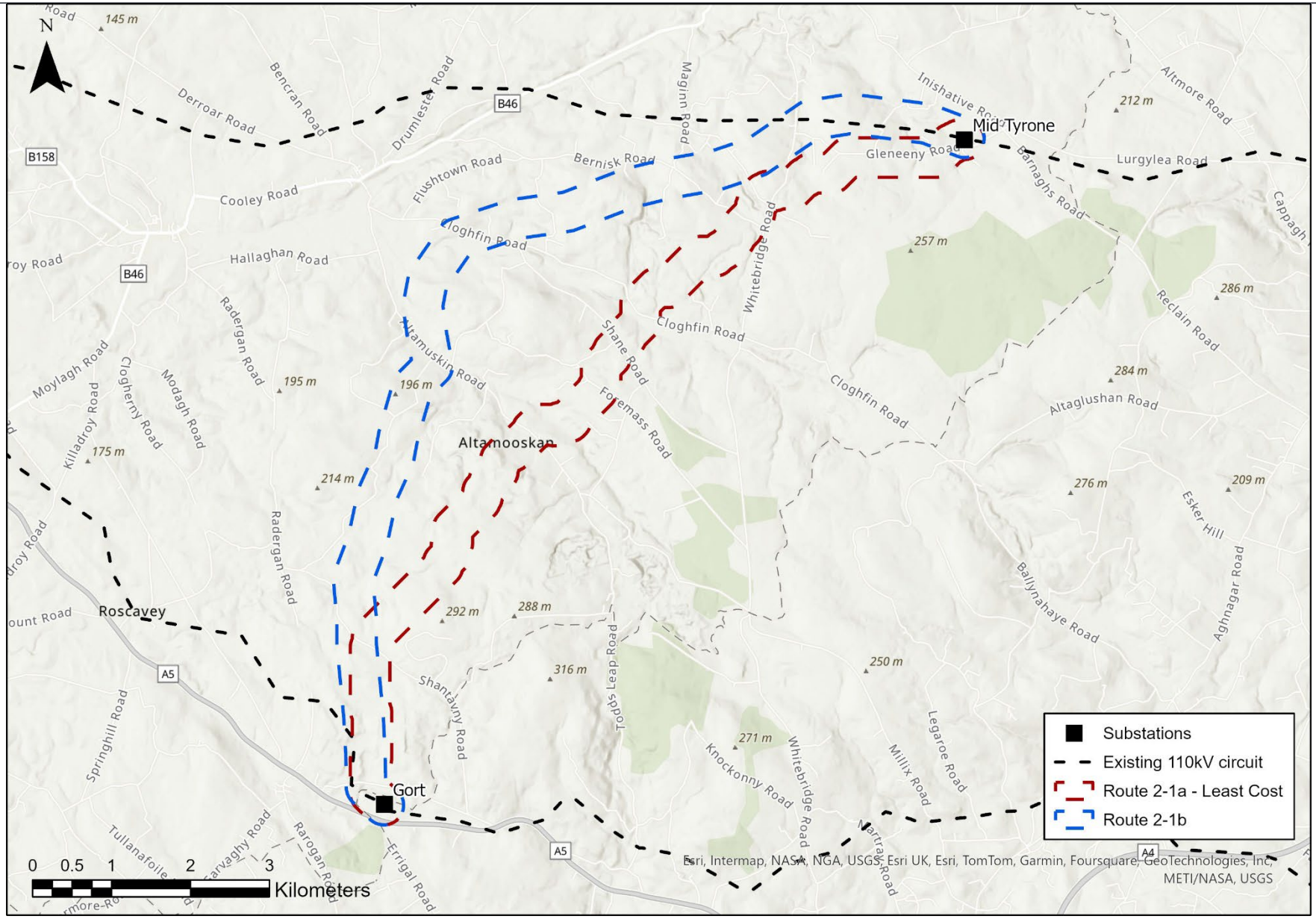

Figure 4.10 Option 2 Strategic Corridors 2-1a and 2-1b for assessment between Gort and Mid-Tyrone

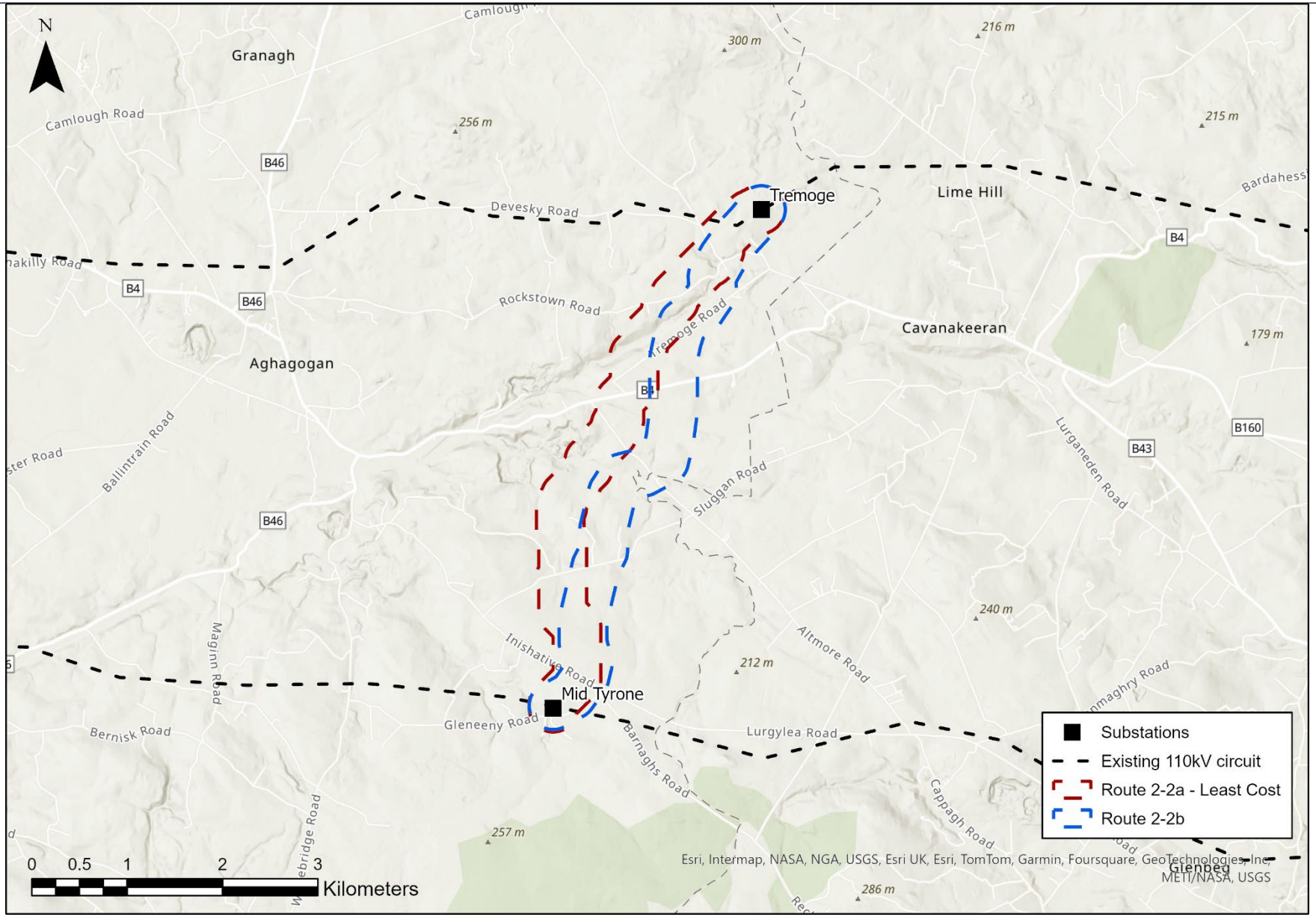

Figure 4.11 Option 2 Strategic Corridors 2-2a and 2-2b for assessment between Tremoge and Mid-Tyrone

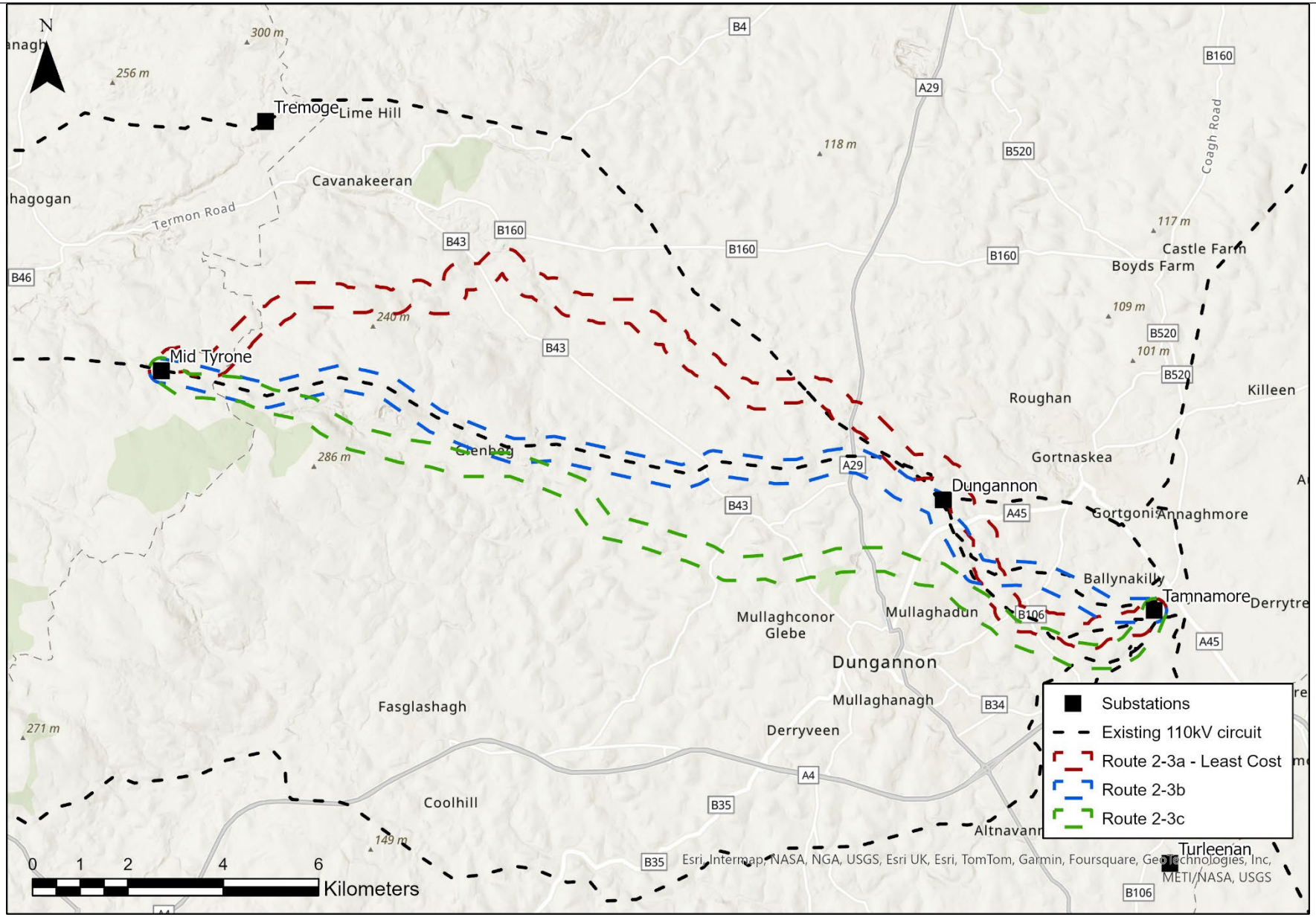

Figure 4.12 Option 2 Strategic Corridors 2-3a, 2-3b and 2-3c for assessment between Tamnamore and Mid-Tyrone

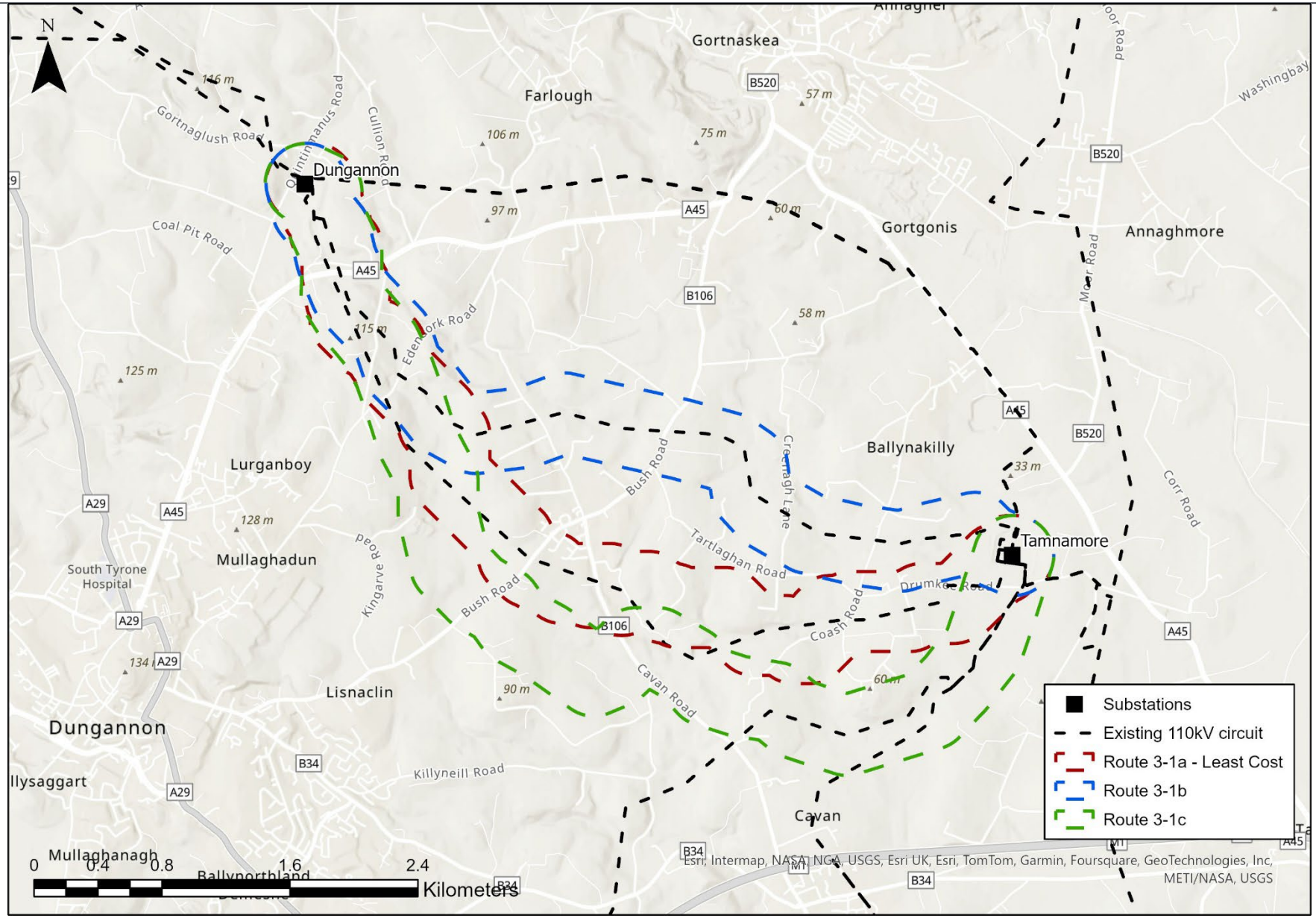

Figure 4.13 Option 3 Strategic Corridors 3-1a, 3-1b and 3-1c for assessment between Tamnamore and Dungannon

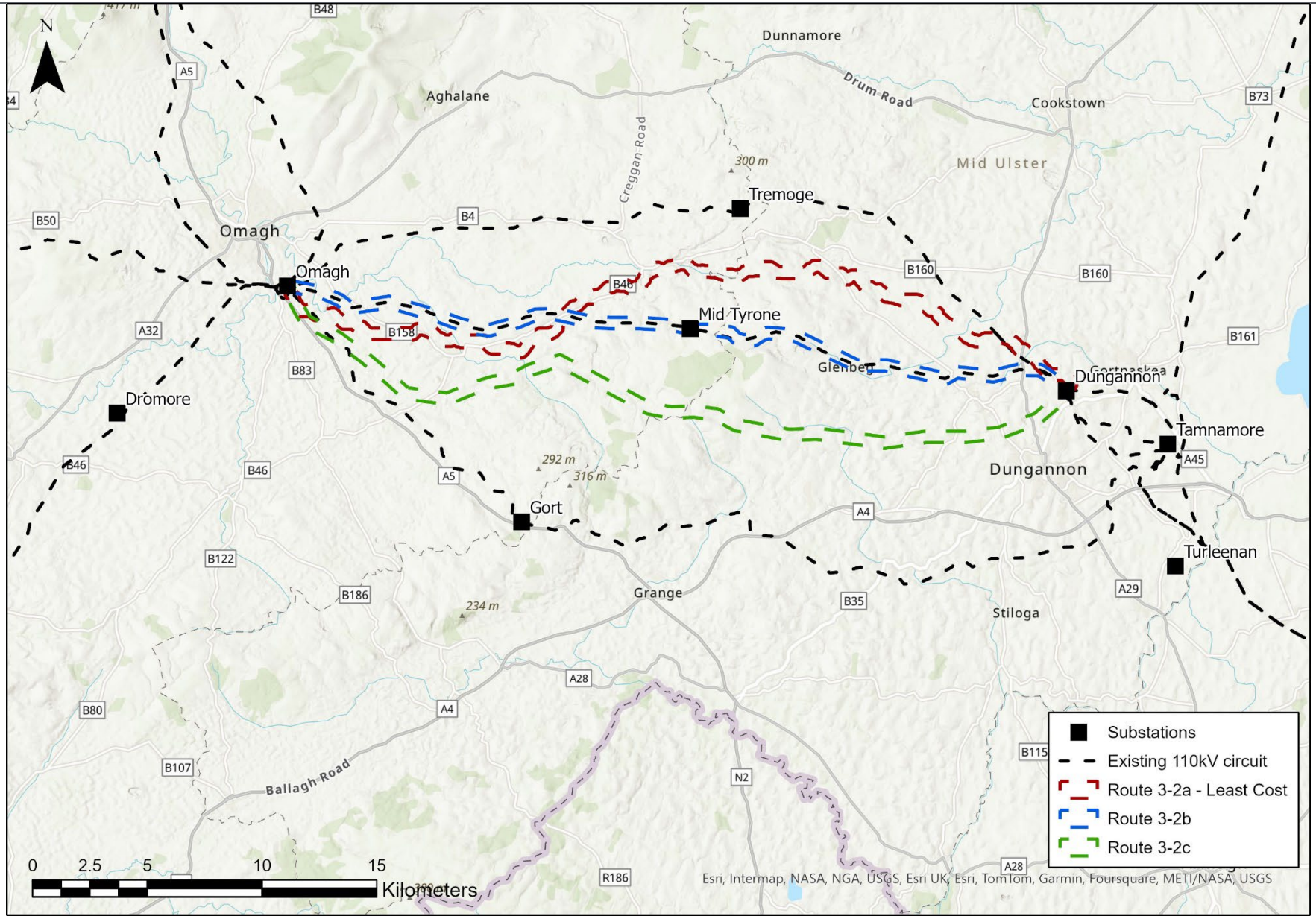

Figure 4.14 Option 3 Strategic Corridors 3-2a, 3-2b and 3-2c for assessment between Dungannon and Omagh

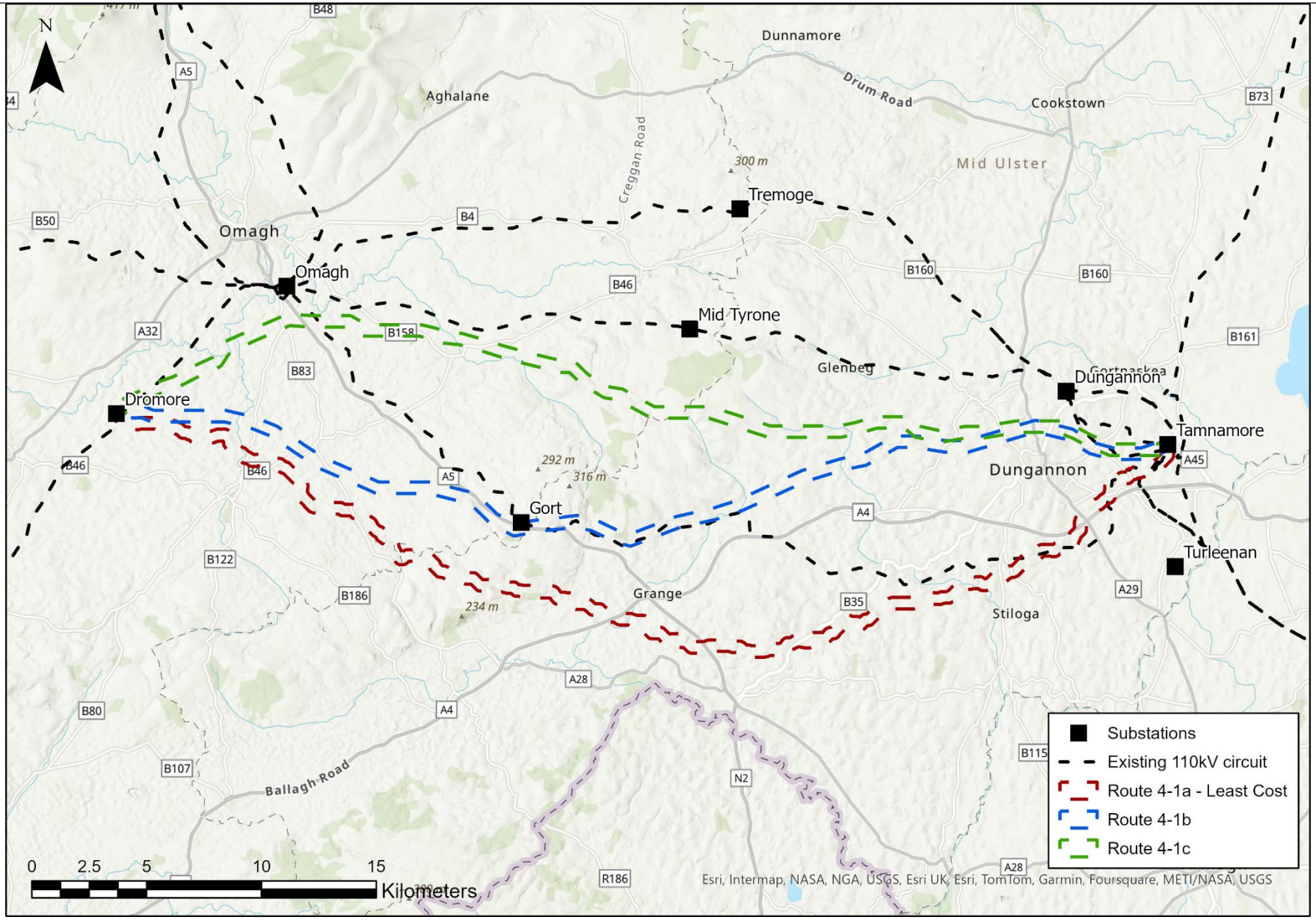

Figure 4.15 Option 4 Strategic Corridors 4-1a, 4-1b and 4-1c for assessment between Tamnamore and Dromore

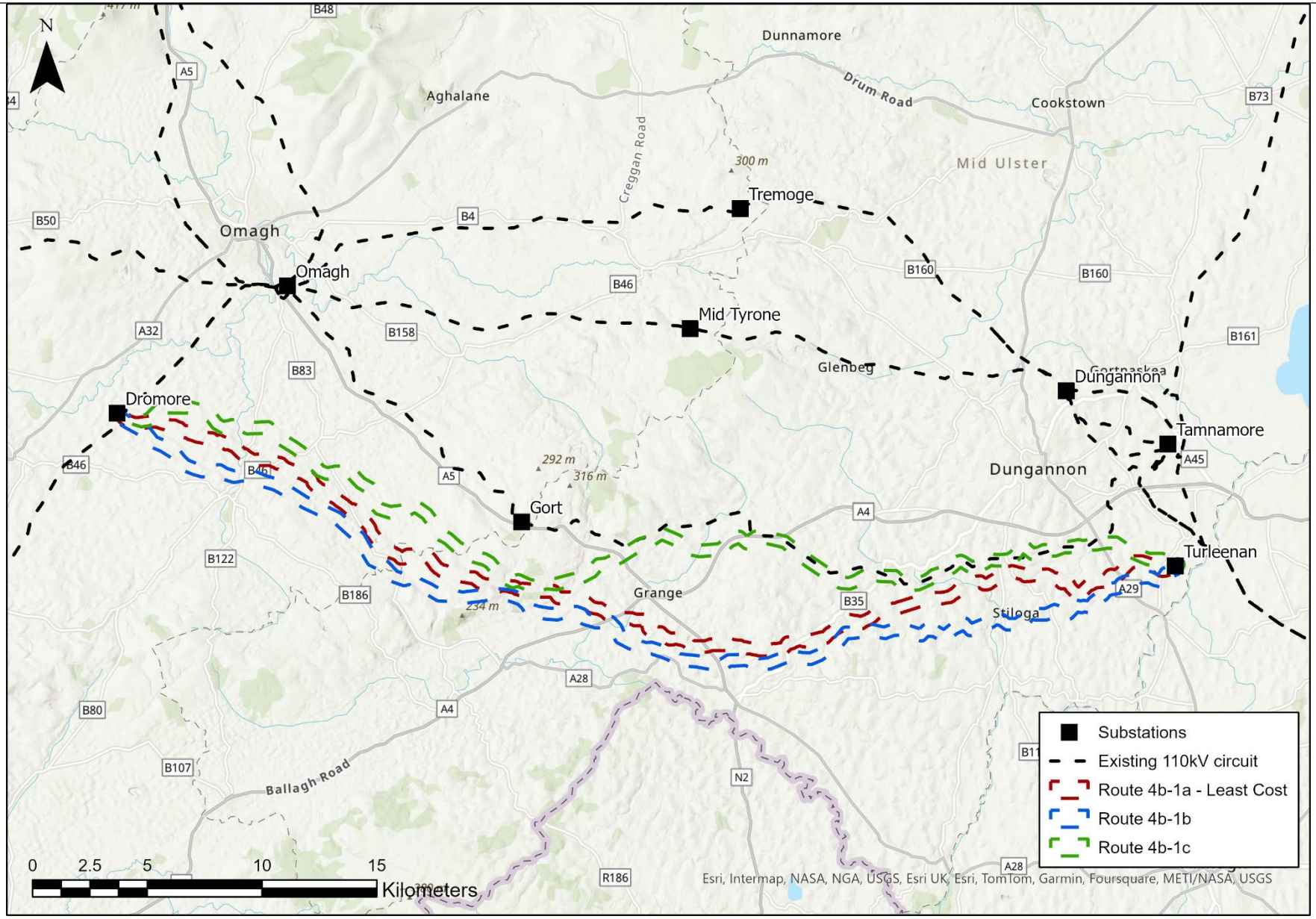

Figure 4.16 Option 4b Strategic Corridors 4b-1a, 4b-1b and 4b-1c for assessment between Turleenan and Dromore

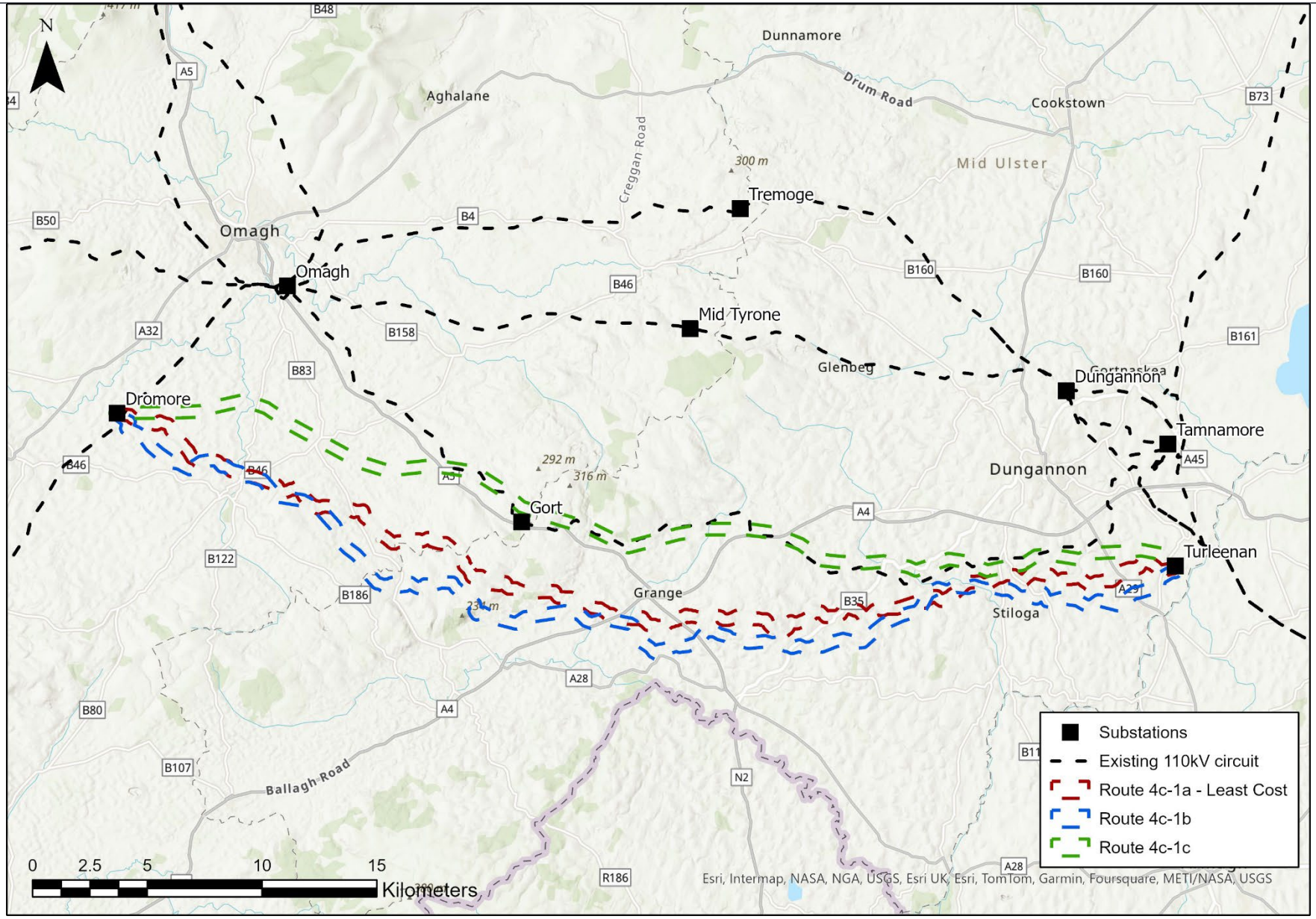

Figure 4.17 Strategic Corridors 4c-1a, 4c-1b and 4c-1c for assessment between Turleenan and Dromore

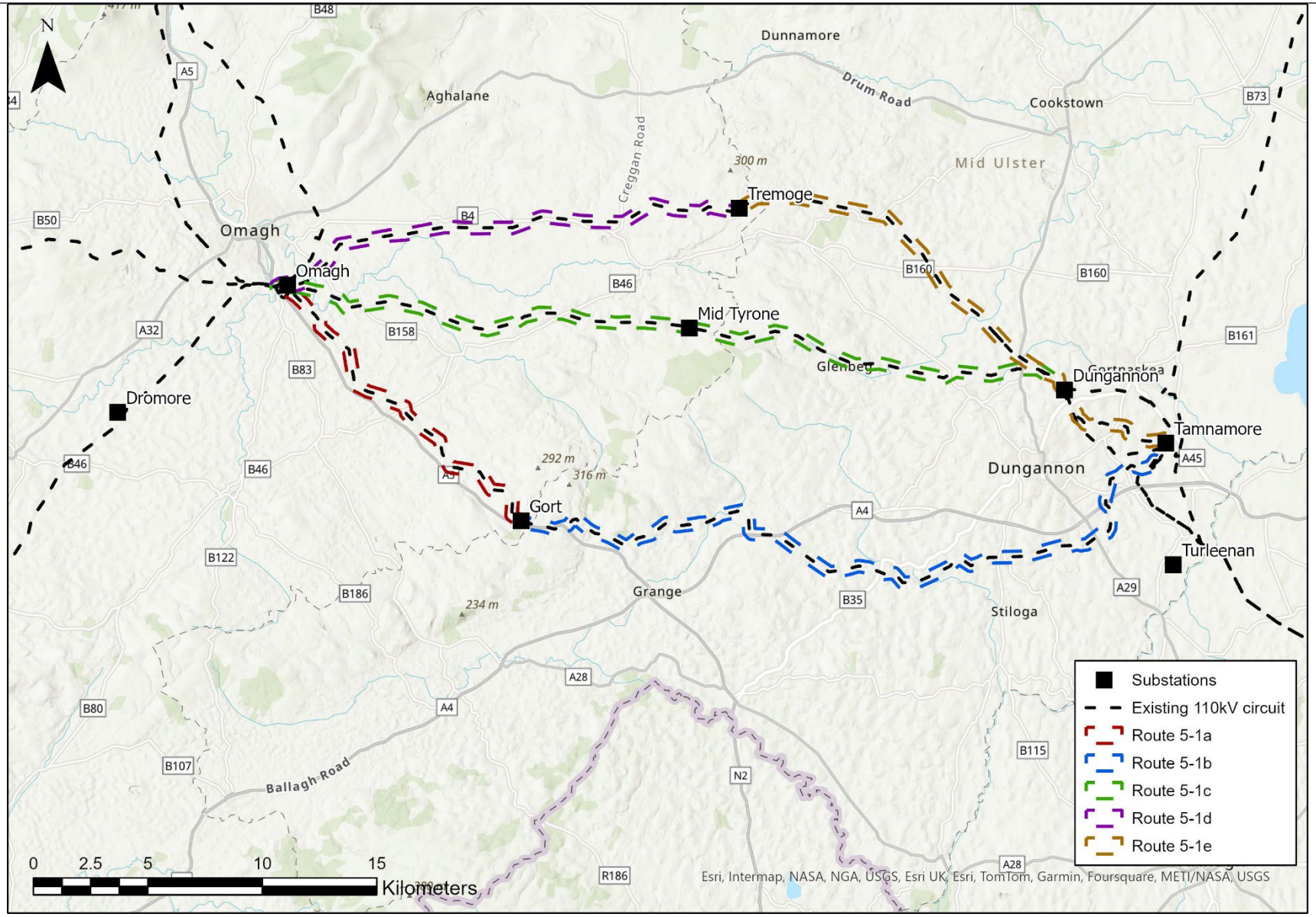

Figure 4.18 Option 5 Strategic Corridors 5-1a, 5-1b, 5-1c, 5-1d and 5-1e for assessment.

5 BRAG ASSESSMENT – ROUTES

Using the short-listed constraints identified in Table 3.1, a BRAG assessment was undertaken for each identified route corridor. This assessment identifies key technical, environmental and social constraints located within the corridor, their BRAG ranking as well as identifying whether they can be avoided and any potential strategic level mitigation that may be required.

5.1 Option 1c - Omagh to Tamnamore HVDC

Option 1c involves an underground 500MW HVDC connection between Omagh and Tamnamore. A strategic 500m corridor was identified based on the least cost line, Route 1c-1a. A BRAG assessment was undertaken to identify any key constraints located within this corridor. Table 5.1 summarises the identified constraints within the corridor.

5.2 Option 2 - Mid Tyrone 275 kV

5.2.1 Gort to Mid Tyrone (Route 2-1a & 2-1b)

Option 2 involves a new 110kV circuit between Gort and Mid-Tyrone. Strategic 500m corridors were identified based on a 10% corridor of the least cost route between Gort and Mid-Tyrone. Two strategically different corridors were identified, Route 2-1a and Route 2-1b.

Route 2-1a consists of a 500m corridor based on the least cost line between Gort and Mid-Tyrone. A BRAG assessment was undertaken to identify any key constraints located within this corridor. This is shown in Table 5.2. In order to assess whether there was a more suitable route, an alternative route corridor was developed, Route 2-1b. A BRAG assessment was undertaken to identify any key constraints located within this corridor. Table 5.3 shows the identified constraints along this alternative route.

To aid the comparison of these alternative route options, Table 5.4 summaries the key constraints for Routes 2-1a and 2-1b.

5.2.2 Tremoge to Mid Tyrone (Route 2-2a & 2-2b)

Option 2 involves a new 110kV circuit between Tremoge and Mid-Tyrone. Strategic 500m corridors were identified based on a 10% corridor of the least cost route between Tremoge and Mid-Tyrone. Two strategically different corridors were identified, Route 2-2a and Route 2-2b.

Route 2-2a consists of a 500m corridor based on the least cost line between Tremoge and Mid-Tyrone. A BRAG assessment was undertaken to identify any key constraints located within this corridor. This is shown in Table 5.5.

In order to assess whether there was a more suitable route, an alternative route corridor was developed, Route 2-2b. A BRAG assessment was undertaken to identify any key constraints located within this corridor. Table 5.6 shows the identified constraints along this alternative route.

To aid the comparison of these alternative route options, Table 5.7 summaries the key constraints for Routes 2-2a and 2-2b.

5.2.3 Tamnamore to Mid-Tyrone (Route 2-2a, 2-2b & 2-2c)

Option 2 involves the construction of a new 275kV circuit between Tamnamore and a new substation located between Gort and Tremoge, called Mid-Tyrone. The new circuit would ideally follow the existing 110kV network. Three strategically different corridors were identified based on a 10% corridor of the least cost line, Route 2-2a, Route 2-2b and Route 2-2c.

Route 2-2a consists of a 500m corridor based on the least cost line between Tamnamore and Mid-Tyrone. A BRAG assessment was undertaken to identify any key constraints located within this corridor. This is shown in Table 5.8.

In order to assess whether there was a more suitable route, two alternative route corridors were developed, Route 2-2b and Route 2-2c. A BRAG assessment was undertaken to identify any key constraints located within these corridors. Table 5.9 and Table 5.10 show the identified constraints along these alternative routes.

To aid the comparison of these alternative route options, Table 5.11 summaries the key constraints for Routes 2-2a, 2-2b and 2-2c.

5.2.4 Removal of existing 110kV transmission line

Upon completion of the works, the Tamnamore – Dungannon and Dungannon – Mid Tyrone 110 kV circuits are to be removed. There may be temporary impacts associated with the removal of the 110kV circuits.

During the removal of the 110kV circuit between Tamnamore and Dungannon, there may potentially be temporary impacts on several buildings as well as a NIW sewer which would need to be crossed. During the removal of the 110kV circuit between Dungannon and Mid-Tyrone, there may potentially be temporary impacts on several buildings, two salmon rivers, the existing 33kV transmission line, the Skea Bog SLNCI and areas of upland and unstable ground. However, once the line is removal, there should be no additional impacts on these areas.

5.3 Option 3 - Tamnamore – Omagh 275 kV

5.3.1 Tamnamore to Dungannon (Route 3-1a, 3-1b & 3-1c)

Option 3 involves the construction of a new 275kV circuit between Tamnamore and Dungannon. The new circuit would ideally follow the existing 110kV network. Three strategically different corridors were identified based on a 10% corridor of the least cost line, Route 3-1a, Route 3-1b and Route 3-1c.

Route 3-1a consists of a 500m corridor based on the least cost line between Tamnamore and Dungannon. A BRAG assessment was undertaken to identify any key constraints located within this corridor. This is shown in Table 5.12.

In order to assess whether there was a more suitable route, two alternative route corridors were developed, Route 3-1b and Route 3-1c. A BRAG assessment was undertaken to identify any key constraints located within these corridors. Table 5.13 and Table 5.14 show the identified constraints along these alternative routes.

To aid the comparison of these alternative route options, Table 5.15 summaries the key constraints for Routes 3-1a, 3-1b and 3-1c.

5.3.2 Dungannon to Omagh (Route 3-2a, 3-2b & 3-2c)

Option 3 involves the construction of a new 275kV circuit between Dungannon and Omagh. The new circuit would ideally follow the existing 110kV network. Three strategically different corridors were identified based on a 10% corridor of the least cost line, Route 3-2a, Route 3-2b and Route 3-2c.

Route 3-2a consists of a 500m corridor based on the least cost line between Tamnamore and Mid-Tyrone. A BRAG assessment was undertaken to identify any key constraints located within this corridor. This is shown in Table 5.16.

In order to assess whether there was a more suitable route, two alternative route corridors were developed, Route 3-2b and Route 3-2c. A BRAG assessment was undertaken to identify any key constraints located within these corridors. Table 5.17 and Table 5.18 show the identified constraints along these alternative routes.

To aid the comparison of these alternative route options, Table 5.19 summaries the key constraints for Routes 3-2a, 3-2b and 3-2c.

5.3.3 Removal of existing 110kV transmission line

Upon completion of the works, the Tamnamore – Dungannon and Dungannon – Omagh 110 kV circuits are to be removed. There may be temporary impacts associated with the removal of the 110kV circuits.

During the removal of the 110kV circuit between Tamnamore and Dungannon, there may potentially be temporary impacts on several buildings as well as a NIW sewer which would need to be crossed. During the removal of the 110kV circuit between Dungannon and Omagh, there may potentially be temporary impacts on several buildings, four salmon rivers, a drinking water river, the existing 33kV transmission line, the Skea Bog SLNCI and areas of upland and unstable ground. However, once the line is removal, there should be no additional impacts on these areas.

5.4 Option 4 - Dromore – Tamnamore 110 kV

5.4.1 Dromore to Tamnamore (Route 4-1a, 4-1b & 4-1c)

Option 4 involves the construction of a new 110kV circuit between Tamnamore and Dromore. Three strategically different corridors were identified based on a 10% corridor of the least cost line, Route 4-1a, Route 4-1b and Route 4-1c.

Route 4-1a consists of a 500m corridor based on the least cost line between Tamnamore and Dromore. A BRAG assessment was undertaken to identify any key constraints located within this corridor. This is shown in Table 5.20.

In order to assess whether there was a more suitable route, two alternative route corridors were developed, Route 4-1b and Route 4-1c. A BRAG assessment was undertaken to identify any key constraints located within these corridors. Table 5.21 and Table 5.22 show the identified constraints along these alternative routes.

To aid the comparison of these alternative route options, Table 5.23 summaries the key constraints for Routes 4-1a, 4-1b and 4-1c.

5.5 Option 4b – Turleenan – Dromore 275kV

5.5.1 Turleenan - Dromore (Route 4b-1a, 4b-1b & 4b-1c)

Option 4b involves the construction of a new 275kV circuit between Turleenan and Dromore. Three strategically different corridors were identified based on a 10% corridor of the least cost line, Route 4b-1a, Route 4b-1b and Route 4b-1c.

Route 4b-1a consists of a 500m corridor based on the least cost line between Turleenan and Dromore. A BRAG assessment was undertaken to identify any key constraints located within this corridor. This is shown in Table 5.24.

In order to assess whether there was a more suitable route, two alternative route corridors were developed, Route 4b-1b and Route 4b-1c. A BRAG assessment was undertaken to identify any key constraints located within these corridors. Table 5.25 and Table 5.26 show the identified constraints along these alternative routes.

To aid the comparison of these alternative route options, Table 5.27 summaries the key constraints for Routes 4b-1a, 4b-1b and 4b-1c.

5.6 Option 4c – Turleenan – Dromore 275kV

5.6.1 Turleenan - Dromore (Route 4c-1a, 4c-1b & 4c-1c)

Option 4c involves the construction of a new 275kV underground cable between Turleenan and Dromore. Three strategically different corridors were identified based on a 10% corridor of the least cost line, Route 4c-1a, Route 4c-1b and Route 4c-1c.

Route 4c-1a consists of a 500m corridor based on the least cost line between Turleenan and Dromore. A BRAG assessment was undertaken to identify any key constraints located within this corridor. This is shown in Table 5.28.

In order to assess whether there was a more suitable route, two alternative route corridors were developed, Route 4c-1b and Route 4c-1c. A BRAG assessment was undertaken to identify any key constraints located within these corridors. Table 5.29 and Table 5.30 show the identified constraints along these alternative routes.

To aid the comparison of these alternative route options, Table 5.31 summaries the key constraints for Routes 4c-1a, 4c-1b and 4c-1c.

5.7 Option 5 - Mid Tyrone 110 kV Uprate.

5.7.1 Mid Tyrone 110kV Uprate (Route 5-1a, 5-1b, 5-1c, 5-1d & 5-1e)

Option 5 involves a 110kV uprate of the circuits between Omagh – Gort, Gort – Tamnamore, Omagh – Dungannon, Omagh – Tremoge and Tremoge – Tamnamore. Strategic 500m corridors were identified based on the existing 110kV line. A BRAG assessment was undertaken to identify any key constraints located within these corridors. Table 5.32 summarises the identified constraints within the corridor of Route 5-1a (Omagh – Gort). Table 5.33 summarises the identified constraints within the corridor of Route 5-1b (Gort - Tamnamore). Table 5.34 summarises the identified constraints within the corridor of Route 5-1c (Omagh – Dungannon). Table 5.35 summarises the identified constraints within the corridor of Route 5-1d (Omagh – Tremoge). Table 5.36 summarises the identified constraints within the corridor of Route 5-1e (Tremoge - Tamnamore).

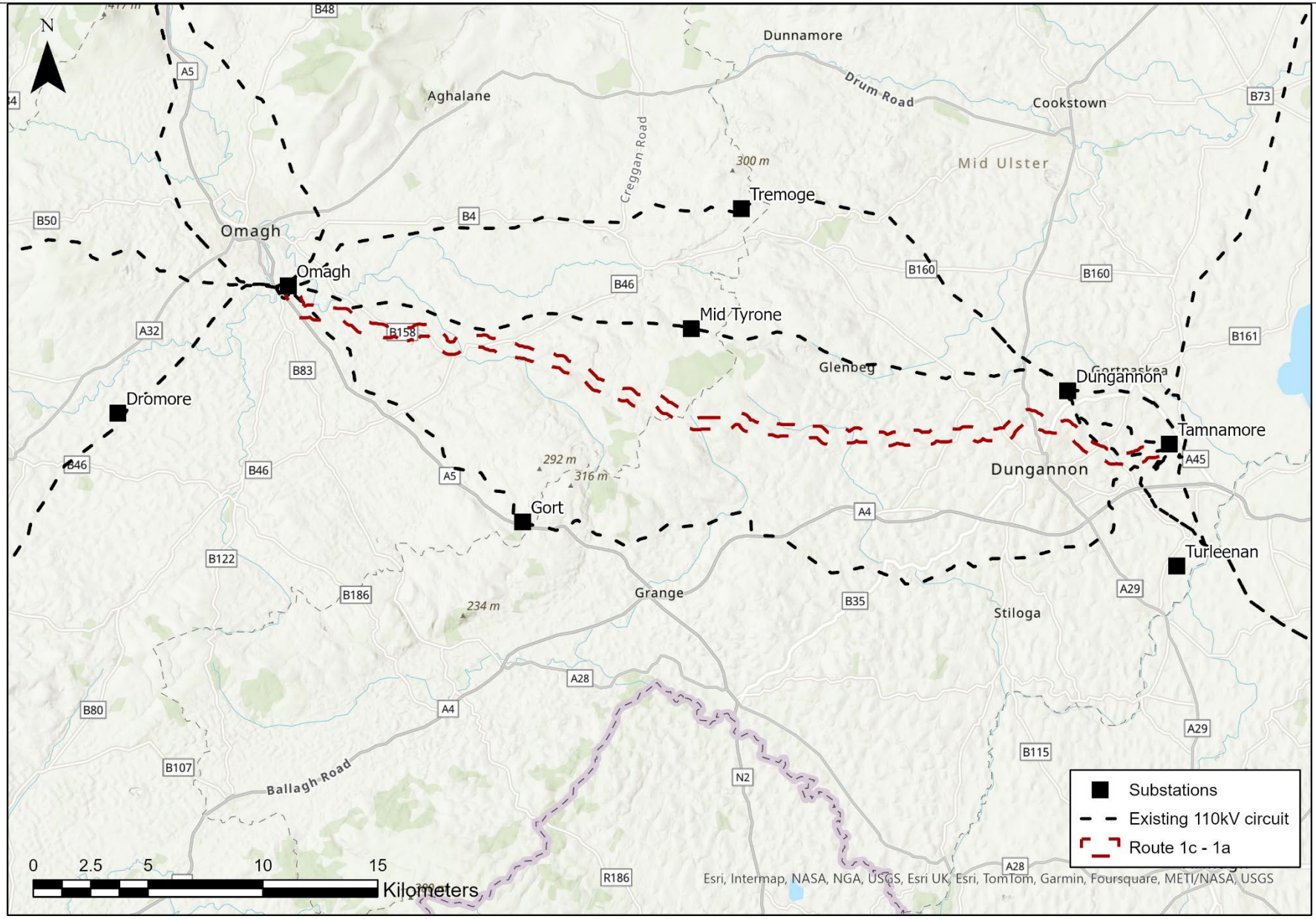

Figure 5.1 Option 1c, Routes 1c-1a.

Table 5.1 Constraints along a 500m corridor of the least cost line between Tamnamore and Omagh – Option 1c, Route 1c-1a

Route Name	Description				Length (km)
Route 1c-1a	The route corridor from Tamnamore to Omagh initially extends southwest from the Tamnamore substation, before extending generally north to avoid passing through Dungannon. The route corridor then extends west, passing north of Castlecaulfield. The route corridor then extends northwest, passing south of Sixmilecross and north of Beragh, until it reaches the Omagh substation. This route corridor is based on the least cost line.				45.9km
Feature/ Constraint	**Name**	**Description/Features/Potential Effects (adverse and beneficial)**	**Ranking**	**Mitigation Identified/Residual Effects**	**Ranking with Mitigation**
Technical Constraints					
Active Quarries	Active quarries (2)	There are two active quarries located within the route corridor.		These active quarries cannot completely be avoided by the route corridor; however, there may be the potential to route around them within the corridor.	
Transmission Network	33kV transmission line	The route corridor intersects the 33kV transmission line a number of times between Tamnamore and Omagh.		This cannot be avoided as the transmission line spans the width of the corridor.	
Transmission Network	110kV transmission line	The route corridor intersects the 110kV transmission line a number of times between Tamnamore and Omagh.		This cannot be avoided as the transmission line spans the width of the corridor.	
Forest Service lands	Altmore	There is an area of Forest Service land within the route corridor.		This area cannot be avoided by the route corridor; however, there may be the potential to route around the area within the corridor.	
Uplands	Uplands	The route corridor passes through a significant section of uplands.		These areas of uplands cannot be avoided.	
Unstable Ground	Unstable ground	The route corridor passes through sections of unstable ground.		These areas of unstable ground cannot be avoided.	
Known Mines	Known mines (1)	There is one known mine area location within the route corridor, situated just north of Dungannon.		The mine location cannot be avoided by the route corridor, however there may be the potential to route around it within the corridor.	
Historic Land use	Historic Land use	There are several areas of historic land use located around Dungannon.		These areas of historic land use cannot entirely be avoided by the route corridor. However, there may be the potential to route around them within the corridor.	
Historic Mines	Historic mines	There are a number of historic mine locations to the north of Dungannon.		These mine locations cannot be avoided.	
Fluvial Flood Extents (100yr)	Fluvial Flood Extents (100yr)	There are fluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	

Pluvial Flood Extents (200yr)	Pluvial Flood Extents (200yr)	There are pluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Fluvial CC Flood Extents (100yr)	Fluvial CC Flood Extents (100yr)	There are fluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Pluvial CC Flood Extents (200yr)	Pluvial CC Flood Extents (200yr)	There are pluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Environmental Constraints					
Salmon Rivers	Salmon Rivers (5)	The route corridor intersects five Salmon Rivers. These are the Ballygawley Water, Camowen River, Cloghfin River, Oona Water and Torrent River. These would need to be crossed.		These Salmon Rivers cannot be avoided as they span the width of the corridor and would need to be crossed. However, it is anticipated that directional drilling will be utilised for all river crossings which could potentially reduce the impact on the rivers.	
SLNCI	SLNCI	The route corridor passes through two SLNCIs, Edenfore and Torrent River.		These SLNCIs cannot be avoided and would need to be crossed.	
Ancient Woodland	Ancient woodland	There is an area of ancient woodland located north of Dungannon.		This area cannot be avoided by the route corridor, however there may be the potential to route around the area within the corridor.	
Rivers	Rivers	There are a number of rivers which span the width of the route corridor.		These rivers cannot be avoided and would need to be crossed.	
Social Constraints					
Buildings	Buildings (2,345)	The route corridor intersects 2,345 buildings.		These buildings cannot completely be avoided by the route corridor.	
Drinking Water Rivers	Drinking water rivers	There are a number of drinking water rivers within the route corridor.		These cannot be avoided as they span the width of the corridor. However, it is anticipated that directional drilling will be utilised for all river crossings which could potentially reduce the impact on the rivers.	
Industrial Heritage Record	IHR sites (14)	There are 14 IHR sites located within the route corridor.		These IHR sites cannot be avoided completely by the route corridor, however there may be the potential to route around them within the corridor.	
Defence Heritage Record	DHR sites (1)	There is one DHR site located within the route corridor.		This DHR site cannot be avoided completely by the route corridor, however there may be the potential to route around the site within the corridor.	
Settlements	Settlements	The route corridor intersects a number of settlements.		These settlements cannot be avoided by the route corridor; however, there may be the potential to route around them within the corridor.	
Scheduled Zones	Scheduled Zones (3)	There are three scheduled zones within the route corridor.		These scheduled zones cannot be avoided by the route corridor; however, there may be the potential to route around them within the corridor.	

Population Density	Population Density	The corridor is located within a low population density area.		There should be minimal impacts on population due to a low population density.	
Population Health	Population Health	The corridor is located within a low population density area.		There should be minimal impacts on population health due to a low population density.	
Sensitivity to Windfarm	Medium – High / Medium / Low	The corridor is located within a Medium – High / Medium – Low sensitivity area.		As the option involves a buried HVDC cable, there should be minimal impacts on the landscape.	

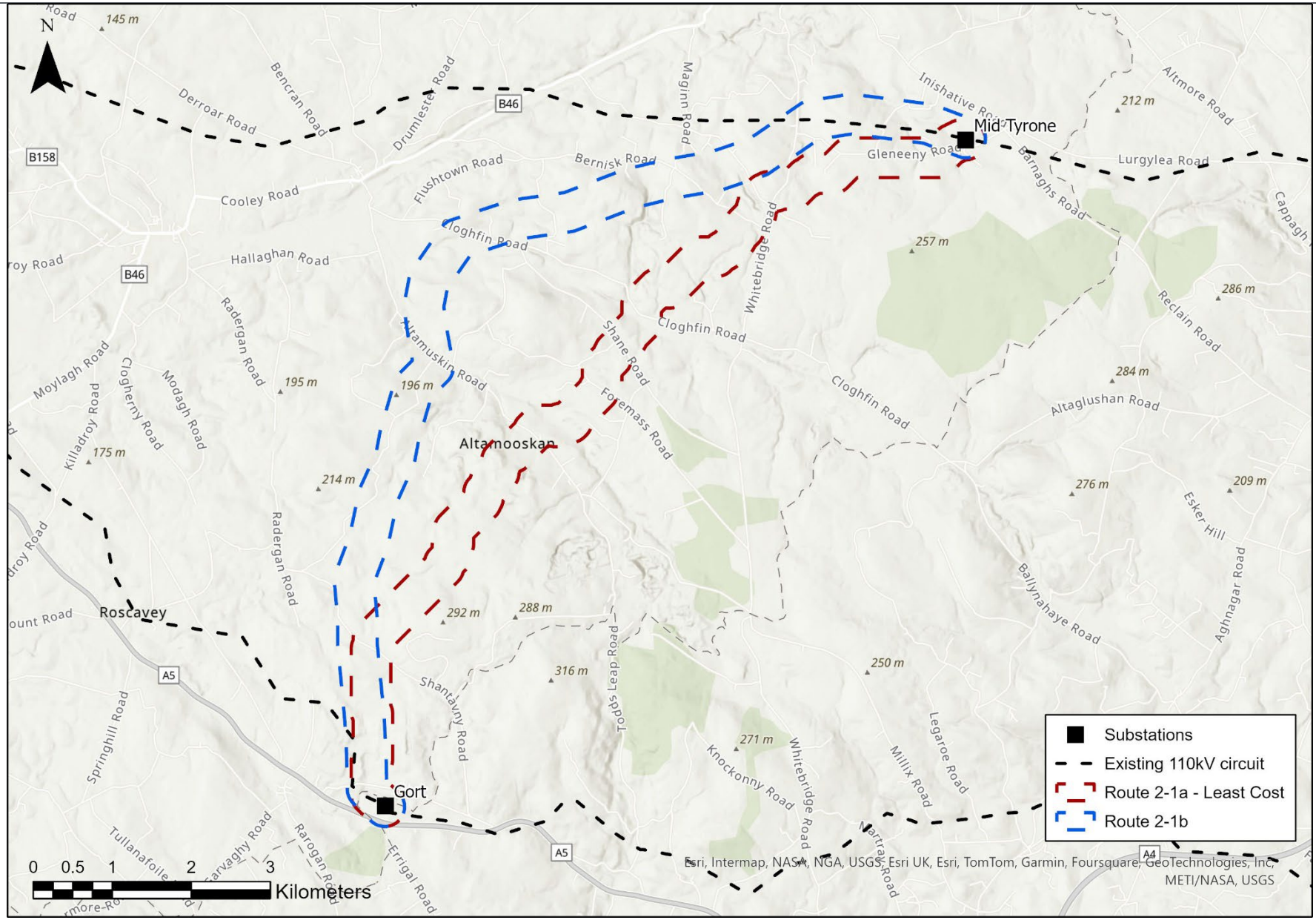

Figure 5.2 Option 2, Routes 2-1a, 2-1b.

Table 5.2 Constraints along a 500m corridor of the least cost line between Girt and Mid-Tyrone – Option 2, Route 2-1a

Route Name	Description				Length (km)
Route 2-1a (Gort – Mid Tyrone)	The route corridor from Gort to Mid Tyrone initially extends north from the Gort substation, before heading northeast to pass through Altamuskin. The route corridor continues northeast until it reaches the Mid Tyrone substation. This route corridor is based on the least cost line.				13.3km
Feature/ Constraint	**Name**	**Description/Features/Potential Effects (adverse and beneficial)**	**Ranking**	**Mitigation Identified/Residual Effects**	**Ranking with Mitigation**
Technical Constraints					
Historic land use	Historic land use (3)	There are three areas of historic land use located within the route corridor.		These areas of historical land use cannot be completely avoided by the route corridor; however, there may be the potential to route around them within the corridor.	
NIW Assets	NIW Sewers	There is a NIW Sewer located at Altamuskin.		This NIW Asset cannot be avoided and would need to be crossed.	
Transmission Network	33kV transmission line	The route corridor intersects the 33kV network between Gort and Mid Tyrone.		This cannot be avoided as the transmission line spans the width of the corridor.	
Upland Areas	Upland areas	The route corridor passes through large stretches of upland areas.		These areas cannot be avoided by the route corridor.	
Unstable Ground	Unstable ground	The route corridor passes through areas of unstable ground.		These areas cannot be avoided by the route corridor.	
Roads	Roads	There are a number of roads located within the corridor.		These roads cannot be avoided and would need to be crossed.	
Fluvial Flood Extents (100yr)	Fluvial Flood Extents (100yr)	There are fluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Pluvial Flood Extents (200yr)	Pluvial Flood Extents (200yr)	There are pluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Fluvial CC Flood Extents (100yr)	Fluvial CC Flood Extents (100yr)	There are fluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Pluvial CC Flood Extents (200yr)	Pluvial CC Flood Extents (200yr)	There are pluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	

Environmental Constraints					
Salmon River	Salmon Rivers (3)	The route corridor intersects three salmon rivers. These are the Ballykeel River, Cloghfin River and Garvaghy Burn. These would need to be crossed.		The Salmon Rivers cannot be avoided as they span the width of the corridor and would need to be crossed. However, with mitigation measures such as of line profiling and pole positioning, riverbank disturbance to the river can be minimised.	
Ancient woodland	Ancient woodland	There is an area of ancient woodland to the southwest of the Mid Tyrone substation.		There is the potential to avoid this area of ancient woodland with a minor amendment to the route corridor without impacting other constraints.	
Rivers	Rivers	The route corridor intersects a number of rivers.		These rivers cannot be avoided and would need to be crossed.	
Social Constraints					
Buildings	Buildings (255)	There are 255 buildings within or partially within the route corridor.		These buildings cannot completely be avoided by the route corridor.	
Scheduled Monument Record	SMR (4)	There are four SMR Sites located within the route corridor.		These SMR sites cannot completely be avoided by the route corridor, however there may be the potential to route around them within the corridor.	
Industrial Heritage Record	IHR (2)	There are two IHR sites located within the route corridor.		These IHR sites cannot completely be avoided by the route corridor, however there may be the potential to route around them within the corridor.	
Scheduled Zones	Scheduled zones (2)	There are two scheduled zones located within the route corridor.		These scheduled zones cannot completely be avoided by the route corridor; however, there may be the potential to route around them within the corridor.	
Population Density	Population Density	The corridor is located within a low population density area.		There should be minimal impacts on population due to a low population density.	
Population Health	Population Health	The corridor is located within a low population density area.		There should be minimal impacts on population health due to a low population density.	
Sensitivity to Windfarm	Medium / Low	The corridor is located within a Medium – Low sensitivity area.		There should be minimal impacts on the landscape.	

Table 5.3 Constraints along a strategic 500m corridor between Gort and Mid-Tyrone – Option 2, Route 2-1b

Route Name	Description	Length (km)
Route 2-1b (Gort – Mid Tyrone)	The route corridor from Gort to Mid Tyrone initially extends north from the Gort substation, before heading generally north to pass west of Altamuskin. The route corridor then turns northeast until it reaches the Mid Tyrone substation.	14.4km

Feature/ Constraint	Name	Description/Features/Potential Effects (adverse and beneficial)	Ranking	Mitigation Identified/Residual Effects	Ranking with Mitigation
Technical Constraints					
Historic land use	Historic land use (7)	There are seven areas of historic land use located within the route corridor.		These areas of historical land use cannot completely be avoided by the route corridor; however, there may be the potential to route around them within the corridor.	
Transmission Network	33kV transmission line	The route corridor intersects the 33kV network between Gort and Mid Tyrone.		This cannot be avoided as the transmission line spans the width of the corridor.	
Transmission Network	110kV transmission line	The route corridor intersects the 110kV network between Gort and Mid Tyrone.		This cannot be avoided as the transmission line spans the width of the corridor.	
Upland Areas	Upland areas	The route corridor passes through large stretches of upland areas.		These areas cannot be avoided by the route corridor.	
Unstable Ground	Unstable ground	The route corridor passes through areas of unstable ground.		These areas cannot be avoided by the route corridor.	
Roads	Roads	There are a number of roads located within the corridor.		These roads cannot be avoided and would need to be crossed.	
Fluvial Flood Extents (100yr)	Fluvial Flood Extents (100yr)	There are fluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Pluvial Flood Extents (200yr)	Pluvial Flood Extents (200yr)	There are pluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Fluvial CC Flood Extents (100yr)	Fluvial CC Flood Extents (100yr)	There are fluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Pluvial CC Flood Extents (200yr)	Pluvial CC Flood Extents (200yr)	There are pluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Environmental Constraints					
Salmon River	Salmon Rivers (3)	The route corridor intersects three salmon rivers. These are the Ballykeel River, Cloghfin River and Garvaghy Burn. These would need to be crossed.		The Salmon Rivers cannot be avoided as they span the width of the corridor and would need to be crossed. However, with mitigation measures such as line profiling and pole positioning, riverbank disturbance to the river can be minimised.	
Ancient woodland	Ancient woodland	There is an area of ancient woodland to the southwest of the Mid Tyrone substation.		There is the potential to avoid this area of ancient woodland with a minor amendment to the route corridor without impacting other constraints.	

Rivers	Rivers	The route corridor intersects a number of rivers.		These rivers cannot be avoided and would need to be crossed.	
Social Constraints					
Buildings	Buildings (376)	There are 376 buildings within or partially within the route corridor.		These buildings cannot completely be avoided by the route corridor.	
Scheduled Monument Record	SMR (7)	There are seven SMR Sites located within the route corridor.		These SMR sites cannot completely be avoided by the route corridor, however there may be the potential to route around them within the corridor.	
Industrial Heritage Record	IHR (1)	There is one IHR site located within the route corridor.		This IHR site cannot completely be avoided by the route corridor, however there may be the potential to route around the site within the corridor.	
Population Density	Population Density	The corridor is located within a low population density area.		There should be minimal impacts on population due to a low population density.	
Population Health	Population Health	The corridor is located within a low population density area.		There should be minimal impacts on population health due to a low population density.	
Sensitivity to Windfarm	Medium / Low	The corridor is located within a Medium – Low sensitivity area.		There should be minimal impacts on the landscape.	

Table 5.4 Gort to Mid-Tyrone – Summary of Option 2 strategic alternative Routes 2-1a and 2-1b

Route	Length (km)	Corridor Constraint Score	Rank	Centreline Constraints Score	Rank	Summary
2-1a	13.3	138,179	1	6,296	1	For Route 2-1a, the identified constraints include two red constraints; these are buildings and Salmon Rivers. The corridor intersects nine amber constraints, eight of which are unavoidable. There are also a number of green constraints which cannot be avoided within the corridor.
2-1b	14.4	146,462	2	7,866	2	For Route 2-1b, the identified constraints include two red constraints; these are buildings and Salmon Rivers. The corridor intersects eight amber constraints, seven of which are unavoidable. There are also a number of green constraints which cannot be avoided within the corridor.
Summary Comparison						
Route 2-1a is based on the least cost line. This route is the shortest in length and both the centreline and the overall corridor have a lower constraint score than the equivalents for Route 2-1b. Both route corridors intersect a number of buildings, however Route 2-1a intersects over 100 less than Route 2-1b. There may also be potential to further avoid a number of these buildings within the Route 2-1a corridor. Both route corridors intersect three Salmon Rivers however, with mitigation measures such as line profiling and pole positioning, riverbank disturbance to the river can be minimised.						

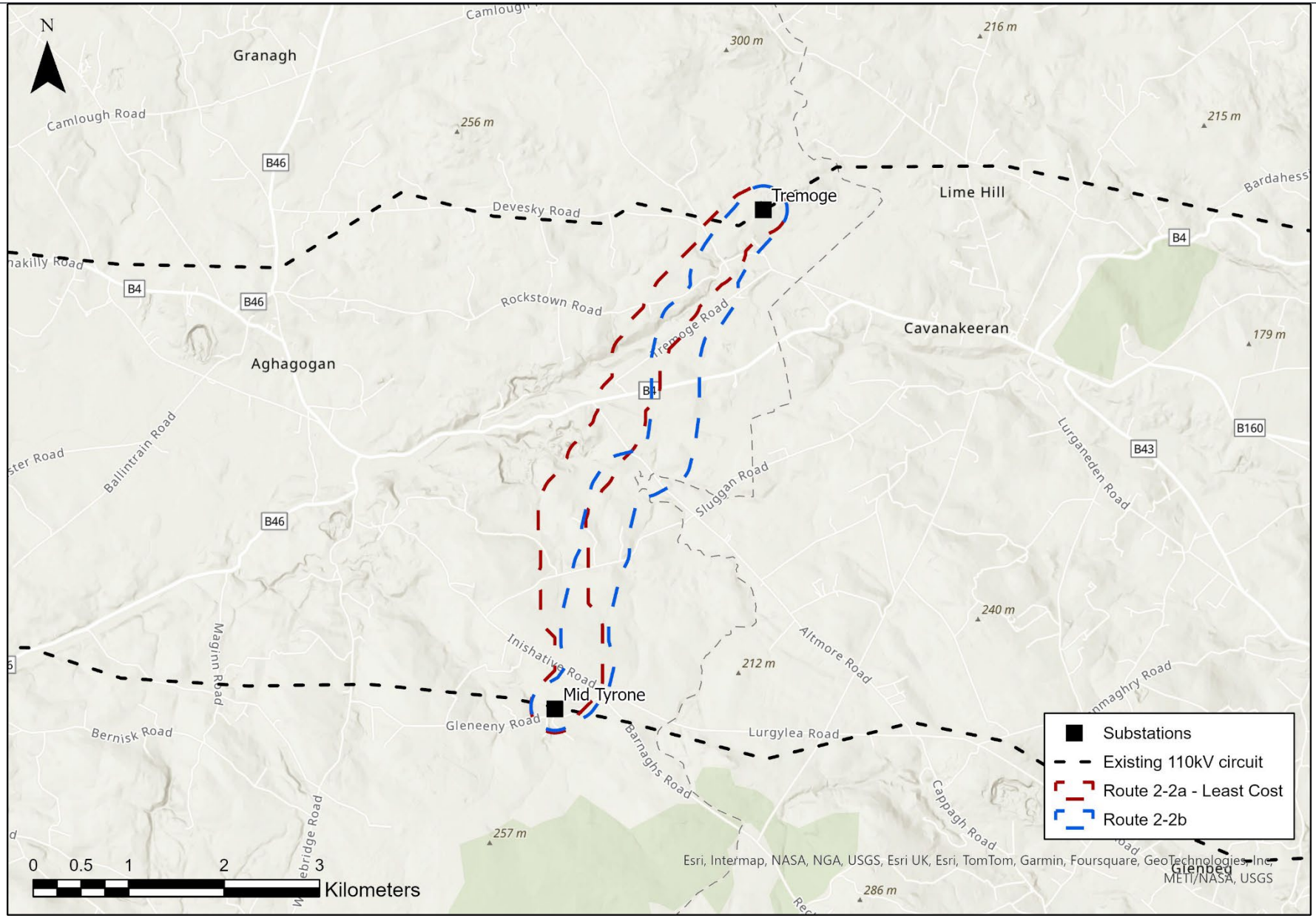

Figure 5.3 Option 2, Routes 2-2a, 2-2b.

Table 5.5 Constraints along least cost 500m corridor between Tremoge and Mid-Tyrone – Option 2, Route 2-2a

Route Name	Description				Length (km)
Route 2-2a (Tremoge – Mid Tyrone)	The route corridor from Tremoge to Mid Tyrone extends generally south to approach the Mid Tyrone substation from the north. This route corridor is based on the least cost line.				6.4km
Feature/ Constraint	**Name**	**Description/Features/Potential Effects (adverse and beneficial)**	**Ranking**	**Mitigation Identified/Residual Effects**	**Ranking with Mitigation**
Technical Constraints					
Historic land use	Historic land use	There is an area of historic land use located to the south of the Tremoge substation.		These areas of historical land use cannot completely be avoided by the route corridor; however, there may be the potential to route around this area within the corridor.	
Transmission Network	33kV transmission line	The route corridor intersects the 33kV network between Tremoge and Mid Tyrone.		This cannot be avoided as the transmission line spans the width of the corridor.	
Upland Areas	Upland Areas	The route corridor passes through large stretches of upland areas.		These areas cannot be avoided by the route corridor.	
Unstable Ground	Unstable Ground	The route corridor passes through areas of unstable ground.		These areas cannot be avoided by the route corridor; however, there may be the potential to route around them within the corridor.	
Roads	Roads	There are a number of roads located within the corridor.		These roads cannot be avoided and would need to be crossed.	
Fluvial Flood Extents (100yr)	Fluvial Flood Extents (100yr)	There are fluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Pluvial Flood Extents (200yr)	Pluvial Flood Extents (200yr)	There are pluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Fluvial CC Flood Extents (100yr)	Fluvial CC Flood Extents (100yr)	There are fluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Pluvial CC Flood Extents (200yr)	Pluvial CC Flood Extents (200yr)	There are pluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Environmental Constraints					

Salmon River	Cam Owen River	The route corridor intersects the Camowen Salmon River. This would need to be crossed.		This Salmon River cannot be avoided as it spans the width of the corridor and would need to be crossed. However, with mitigation measures such as line profiling and pole positioning, riverbank disturbance to the river can be minimised.	
Rivers	Rivers	The route corridor intersects a number of rivers.		These rivers cannot be avoided and would need to be crossed.	
Social Constraints					
Buildings	Buildings (136)	There are 136 buildings within or partially within the route corridor.		These buildings cannot completely be avoided by the route corridor.	
Scheduled Monument Record	SMR (1)	There is one SMR site located within the route corridor.		There is the potential to avoid this SMR site with minor amendments to the route corridor without impacting other constraints.	
Population Density	Population Density	The corridor is located within a low population density area.		There should be minimal impacts on population due to a low population density.	
Population Health	Population Health	The corridor is located within a low population density area.		There should be minimal impacts on population health due to a low population density.	
Sensitivity to Windfarm	Medium / Low	The corridor is located within a Medium – Low sensitivity area.		There should be minimal impacts on the landscape.	

Table 5.6 Constraints along a strategic 500m corridor between Tremoge and Mid-Tyrone – Option 2, Route 2-2b

Route Name	Description				Length (km)
Route 2-2b (Tremoge – Mid Tyrone)	The route corridor from Tremoge to Mid Tyrone extends generally south to approach the Mid Tyrone substation from the north.				6.1km
Feature/ Constraint	**Name**	**Description/Features/Potential Effects (adverse and beneficial)**	**Ranking**	**Mitigation Identified/Residual Effects**	**Ranking with Mitigation**
Technical Constraints					
Historic land use	Historic land use	There are two areas of historic land use located to the south of the Tremoge substation.		These areas of historical land use cannot be completely avoided by the route corridor; however, there may be the potential to route around them within the corridor.	
Transmission Network	33kV transmission line	The route corridor intersects the 33kV network between Tremoge and Mid Tyrone.		This cannot be avoided as the transmission line spans the width of the corridor.	
Upland Areas	Upland Areas	The route corridor passes through large stretches of upland areas.		These areas cannot be avoided by the route corridor.	

Unstable Ground	Unstable Ground	The route corridor passes through areas of unstable ground.		These areas cannot be avoided by the route corridor.	
Roads	Roads	There are a number of roads located within the corridor.		These roads cannot be avoided and would need to be crossed.	
Fluvial Flood Extents (100yr)	Fluvial Flood Extents (100yr)	There are fluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Pluvial Flood Extents (200yr)	Pluvial Flood Extents (200yr)	There are pluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Fluvial CC Flood Extents (100yr)	Fluvial CC Flood Extents (100yr)	There are fluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Pluvial CC Flood Extents (200yr)	Pluvial CC Flood Extents (200yr)	There are pluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Environmental Constraints					
Salmon River	Camowen River	The route corridor intersects the Camowen Salmon River. This would need to be crossed.		This Salmon River cannot be avoided as it spans the width of the corridor and would need to be crossed. However, with mitigation measures such as line profiling and pole positioning, riverbank disturbance to the river can be minimised.	
Rivers	Rivers	The route corridor intersects a number of rivers.		These rivers cannot be avoided and would need to be crossed.	
Social Constraints					
Buildings	Buildings (113)	There are 113 buildings within or partially within the route corridor.		These buildings cannot completely be avoided.	
Scheduled Monument Record	SMR (2)	There are two SMR sites located within the route corridor.		These SMR sites cannot completely be avoided by the route corridor, however there may be the potential to route around them within the corridor.	
Population Density	Population Density	The corridor is located within a low population density area.		There should be minimal impacts on population due to a low population density.	
Population Health	Population Health	The corridor is located within a low population density area.		There should be minimal impacts on population health due to a low population density.	
Sensitivity to Windfarm	Medium / Low	The corridor is located within a Medium – Low sensitivity area.		There should be minimal impacts on the landscape.	

Table 5.7 Tremoge to Mid-Tyrone - Summary of Option 2 strategic alternatives 2-2a and 2-2b

Route	Length (km)	Corridor Constraint Score	Rank	Centreline Constraints Score	Rank	Summary
2-2a	6.4	63,879	1	2,848	1	For Route 2-2a, the identified constraints include two red constraints; these are buildings and Salmon Rivers. The corridor intersects five amber constraints, four of which are unavoidable. There are also a number of green constraints which cannot be avoided within the corridor.
2-2b	6.1	65,089	2	3,226	2	For Route 2-2b, the identified constraints include two red constraints; these are buildings and Salmon Rivers. The corridor intersects five amber constraints, all of which are unavoidable. There are also a number of green constraints which cannot be avoided within the corridor.
Summary Comparison						
Route 2-2a is based on the least cost line. This route is longer in length however both the centreline and the overall corridor have a lower constraint score than the equivalents for Route 2-2b. Both route corridors intersect a number of buildings, with Route 2-2b intersecting 113 and Route 2-2a intersecting 136. However, there also may be the potential to further avoid a number of these buildings within the corridors. Both route corridors intersect one Salmon River however, with mitigation measures such as line profiling and pole positioning, riverbank disturbance to the river can be minimised.						

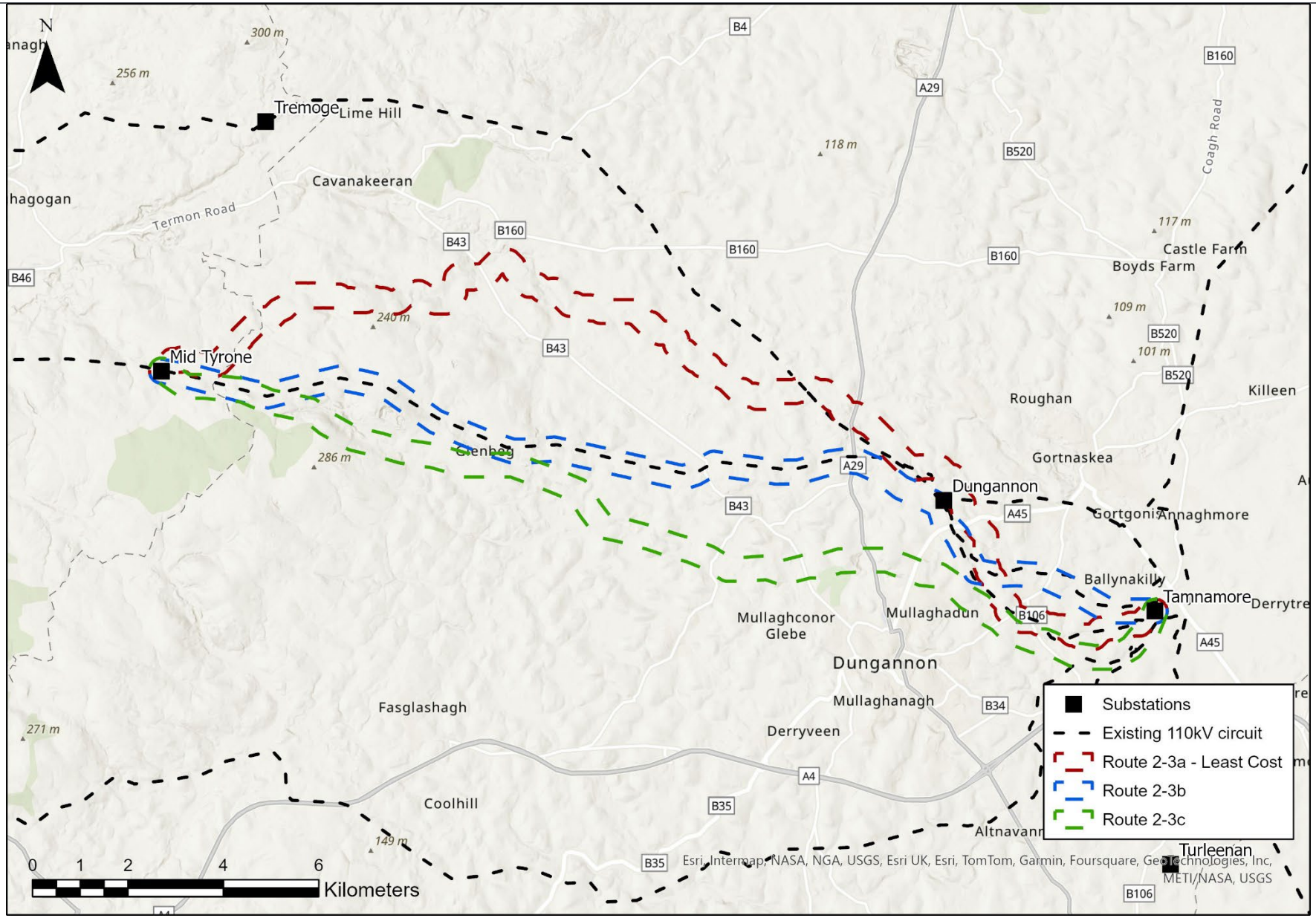

Figure 5.4 Option 2, Routes 2-3a, 2-3b, 2-3c.

Table 5.8 Constraints along a least cost strategic 500m corridor between Tamnamore and Mid-Tyrone – Option 2, Route 2-3a

Route Name	Description				Length (km)
Route 2-3a (Tamnamore – Mid Tyrone)	The route corridor from Tamnamore to Mid Tyrone initially extends west, before heading north to avoid Dungannon. The route corridor then extends generally northwest, before extending west, and then southwest to reach the Mid Tyrone substation. This route is based on the least cost line.				27.6km
Feature/ Constraint	**Name**	**Description/Features/Potential Effects (adverse and beneficial)**	**Ranking**	**Mitigation Identified/Residual Effects**	**Ranking with Mitigation**
Technical Constraints					
Pollution Prevention Control Sites	PPC Sites (1)	There is one PPC site located within the route corridor.		There is the potential to avoid this PPC site with a minor amendment to the route corridor without impacting other constraints.	
Historic land use	Historic land use (13)	There are 13 areas of historic land use located within the route corridor.		These areas of historical land use cannot be avoided by the route corridor.	
NIW Assets	NIW Sewers	There are NIW sewers located around Dungannon.		These sewers cannot be avoided and would need to be crossed.	
Transmission Network	33kV transmission line	The route corridor intersects the 33kV line several times		The 33kV transmission network cannot be avoided.	
Transmission Network	110kV transmission line	The route corridor intersects the 110kV line several times		The 110kV transmission network cannot be avoided. However, the 110kV network will be removed upon completion.	
Upland Areas	Upland Areas	The route corridor passes through large stretches of upland areas.		These areas cannot be avoided by the route corridor.	
Unstable Ground	Unstable Ground	The route corridor passes through areas of unstable ground.		These areas cannot be avoided by the route corridor; however, there may be the potential to route around them within the corridor.	
Historic Mines	Historic Mines (9)	There are nine historic mines located within the route corridor within the vicinity of Dungannon.		These historic mines cannot completely be avoided by the route corridor; however, there may be the potential to route around them within the corridor.	
Roads	Roads	There are a number of roads located within the corridor.		These roads cannot be avoided and would need to be crossed.	
Fluvial Flood Extents (100yr)	Fluvial Flood Extents (100yr)	There are fluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Pluvial Flood Extents (200yr)	Pluvial Flood Extents (200yr)	There are pluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	

Fluvial CC Flood Extents (100yr)	Fluvial CC Flood Extents (100yr)	There are fluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Pluvial CC Flood Extents (200yr)	Pluvial CC Flood Extents (200yr)	There are pluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Environmental Constraints					
Salmon River	Salmon Rivers (5)	The route corridor intersects five Salmon Rivers. These are the Camowen River, Claggan River, Coolmaghry Tributary, Torrent River and Tullyaran Tributary. These would need to be crossed.		These Salmon Rivers cannot be avoided as they span the width of the corridor and would need to be crossed. However, with mitigation measures such as line profiling and pole positioning, riverbank disturbance to the river can be minimised.	
SLNCI	Torrent River	The route corridor crosses the Torrent River SLNCI.		This SLNCI cannot be avoided and would need to be crossed.	
Ancient Woodland	Ancient Woodland	The route corridor passes through a small area of ancient woodland to the east of Carland.		There is the potential to avoid this area of ancient woodland with a minor amendment to the route corridor without impacting other constraints.	
Rivers	Rivers	The route corridor intersects a number of rivers.		These rivers cannot be avoided and would need to be crossed.	
Social Constraints					
Buildings	Buildings (1290)	There are 1290 buildings within or partially within the route corridor.		These buildings cannot completely be avoided.	
Settlements	Settlements	The route corridor intersects a small settlement located to the east of Dungannon.		There is limited scope to avoid this settlement, however there may be the potential to route around it within the corridor.	
Scheduled Monument Record	SMR (7)	There are seven SMR sites located within the route corridor.		These SMR sites cannot be avoided by the route corridor. However, there may be the potential to route around them within the corridor.	
Listed Buildings	Listed Buildings (1)	There is one listed building located within the route corridor.		There is the potential to avoid this listed building by a minor amendment to the route corridor without impacting other constraints.	
Drinking Water Rivers	Drinking Water Rivers	The route corridor intersects three drinking water rivers.		One of these rivers cannot be avoided and would need to be crossed. However, with mitigation measures such as line profiling and pole positioning, riverbank disturbance could be minimised.	
Industrial Heritage Record	IHR (10)	There are ten IHR sites located within the route corridor.		These IHR sites cannot completely be avoided by the route corridor. However, there may be the potential to route around them within the corridor.	
Population Density	Population Density	The corridor is located within a low population density area.		There should be minimal impacts on population due to a low population density.	

Population Health	Population Health	The corridor is located within a low population density area.		There should be minimal impacts on population health due to a low population density.	
Sensitivity to Windfarm	Medium / Low	The corridor is located within a Medium – Low sensitivity area.		There should be minimal impacts on the landscape.	

Table 5.9 Constraints along a strategic 500m corridor between Tamnamore and Mid-Tyrone – Option 2, Route 2-3b

Route Name	Description				Length (km)
Route 2-3b (Tamnamore – Mid Tyrone)	The route corridor from Tamnamore to Mid Tyrone follows the existing 110kV transmission network. This is the ideal route. The route corridor initially extends west from the Tamnamore substation. The route then extends northwest to bypass the Dungannon substation towards Carland. The route then extends generally west until it reaches Galbally before turning northwest to reach the Mid Tyrone substation.				22.7km
Feature/ Constraint	**Name**	**Description/Features/Potential Effects (adverse and beneficial)**	**Ranking**	**Mitigation Identified/Residual Effects**	**Ranking with Mitigation**
Technical Constraints					
Pollution Prevention Control Sites	PPC Sites (1)	There is one PPC site located within the route corridor.		This PPC site cannot be avoided, however there may be the potential to route around the site within the corridor.	
Historic land use	Historic land use (8)	There are eight areas of historic land use located within the route corridor.		These areas of historical land use cannot be avoided by the route corridor; however, there may be the potential to route around them within the corridor.	
NIW Assets	NIW Sewers	There are NIW sewers located around Dungannon.		These sewers cannot be avoided and would need to be crossed.	
Transmission Network	33kV transmission line	The route corridor intersects the 33kV line several times		The 33kV transmission network cannot be avoided.	
Transmission Network	110kV transmission line	The route corridor follows the 110kV network.		The 110kV transmission network cannot be avoided. However, the 110kV network will be removed upon completion.	
Forest Service Lands	Forest Service Lands	The route corridor intersects three Forest Service lands in the vicinity of the Mid Tyrone substation.		There is limited scope to avoid these Forest Service areas completely. However, there may be potential to route around them within the corridor.	
Upland Areas	Upland Areas	The route corridor passes through large stretches of upland areas.		These areas cannot be avoided by the route corridor.	
Unstable Ground	Unstable Ground	The route corridor passes through areas of unstable ground.		These areas cannot be avoided by the route corridor.	
Known Mines	Known Mines	The route corridor intersect two known mine areas in the vicinity of Dungannon.		There is limited scope to completely avoid these areas. However, there may be the potential to route around them within the corridor.	
Historic Mines	Historic Mines (13)	There are 13 historic mines located within the route corridor within the vicinity of Dungannon.		These historic mines cannot completely be avoided by the route corridor; however, there may be the potential to route around them within the corridor.	
Roads	Roads	There are a number of roads located within the corridor.		These roads cannot be avoided and would need to be crossed.	

Fluvial Flood Extents (100yr)	Fluvial Flood Extents (100yr)	There are fluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Pluvial Flood Extents (200yr)	Pluvial Flood Extents (200yr)	There are pluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Fluvial CC Flood Extents (100yr)	Fluvial CC Flood Extents (100yr)	There are fluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Pluvial CC Flood Extents (200yr)	Pluvial CC Flood Extents (200yr)	There are pluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Environmental Constraints					
Salmon River	Salmon Rivers (3)	The route corridor intersects three Salmon rivers. These are the Camowen River, Torrent River and the Tullyaran Tributary. These would need to be crossed.		These Salmon Rivers cannot be avoided as they span the width of the corridor and would need to be crossed. However, with mitigation measures such as line profiling and pole positioning, riverbank disturbance to the river can be minimised.	
SLNCI	SLNCI (3)	The route corridor crosses the Torrent River, Cappagh Bog and Skea Bog SLNCIs.		The Torrent River SLNCI and Skea Bog SLNCI cannot be avoided. Cappagh Bog SLNCI can be avoided within the route corridor.	
Rivers	Rivers	The route corridor intersects a number of rivers.		These rivers cannot be avoided and would need to be crossed.	
Social Constraints					
Buildings	Buildings (1202)	There are 1202 buildings within or partially within the route corridor.		These buildings cannot completely be avoided by the route corridor.	
Settlements	Settlements	The route corridor intersects a small settlement located to the east of Dungannon.		There is limited scope to avoid this settlement, however there may be the potential to route around it within the corridor.	
Scheduled Monument Record	SMR (5)	There are five SMR sites located within the route corridor.		These SMR sites cannot be avoided by the route corridor, however there may be the potential to route around them within the corridor.	
Drinking Water Rivers	Drinking Water Rivers	The route corridor intersects one drinking water river.		This river cannot be avoided and would need to be crossed. However, with mitigation measures such as line profiling and pole positioning riverbank disturbance could be minimised.	
Industrial Heritage Record	IHR (6)	There are six IHR sites located within the route corridor.		These IHR sites cannot be completely avoided by the route corridor. However, there may be the potential to route around them within the corridor.	
Population Density	Population Density	The corridor is located within a low population density area.		There should be minimal impacts on population due to a low population density.	
Population Health	Population Health	The corridor is located within a low population density area.		There should be minimal impacts on population health due to a low population density.	

Sensitivity to Windfarm	Medium / Low	The corridor is located within a Medium – Low sensitivity area.		There should be minimal impacts on the landscape.	

Table 5.10 Constraints along a strategic 500m corridor between Tamnamore and Mid-Tyrone – Option 2, Route 2-3c

Route Name	Description				Length (km)
Route 2-3c (Tamnamore – Mid Tyrone)	The route corridor from Tamnamore to Mid Tyrone initially extends south from the Tamnamore substation before extending generally northwest, bypassing the settlement of Dungannon. The route corridor passes south of Donaghmore and then north of Galbally before approaching the Mid Tyrone substation.				23km
Feature/ Constraint	**Name**	**Description/Features/Potential Effects (adverse and beneficial)**	**Ranking**	**Mitigation Identified/Residual Effects**	**Ranking with Mitigation**
Technical Constraints					
Active Quarries	Active quarry	There is one active quarry located within the route corridor.		There is limited scope to completely avoid this quarry within the route corridor.	
Pollution Prevention Control Sites	PPC Sites (1)	There is one PPC site located within the route corridor.		There is the potential to avoid this PPC site with a minor amendment to the route corridor without impacting other constraints.	
Historic land use	Historic land use (13)	There are 13 areas of historic land use located within the route corridor.		These areas of historical land use cannot be avoided by the route corridor. However, there may be the potential to route around them within the corridor.	
NIW Assets	NIW Sewers	There are NIW sewers located around Dungannon and Galbally.		These sewers cannot be avoided and would need to be crossed.	
Transmission Network	33kV transmission line	The route corridor intersects the 33kV line several times		The 33kV transmission network cannot be avoided.	
Transmission Network	110kV transmission line	The route corridor intersects the 110kV line several times		The 110kV transmission network cannot be avoided. However, the 110kV network will be removed upon completion.	
Forest Service Lands	Forest Service Lands (3)	The route corridor intersects three Forest Service lands in the vicinity of the Mid Tyrone substation.		There is limited scope to avoid these Forest Service areas completely. However, there may be the potential to route around the areas within the corridor.	
Upland Areas	Upland Areas	The route corridor passes through large stretches of upland areas.		These areas cannot be avoided by the route corridor.	
Unstable Ground	Unstable Ground	The route corridor passes through areas of unstable ground.		These areas cannot be avoided by the route corridor.	
Historic Mines	Historic Mines (99)	There are 99 historic mines located within the route corridor within the vicinity of Dungannon.		These historic mine areas cannot completely be avoided by the route corridor.	
Roads	Roads	There are a number of roads located within the corridor.		These roads cannot be avoided and would need to be crossed.	
Fluvial Flood Extents (100yr)	Fluvial Flood Extents (100yr)	There are fluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	

Pluvial Flood Extents (200yr)	Pluvial Flood Extents (200yr)	There are pluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Fluvial CC Flood Extents (100yr)	Fluvial CC Flood Extents (100yr)	There are fluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Pluvial CC Flood Extents (200yr)	Pluvial CC Flood Extents (200yr)	There are pluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Environmental Constraints					
Salmon River	Salmon Rivers (2)	The route corridor intersects two Salmon rivers. These are the Torrent River and the Tullyaran Tributary. These would need to be crossed.		These Salmon Rivers cannot be avoided as they span the width of the corridor and would need to be crossed. However, with mitigation measures such as line profiling and pole positioning, riverbank disturbance to the river can be minimised.	
SLNCI	Torrent River, Mullygruen Lough.	The route corridor crosses the Torrent River SLNCI and Mullygruen Lough SLNCI.		These SLNCIs cannot completely be avoided and would need to be crossed.	
Ancient Woodland	Ancient Woodland	The route corridor passes through a small area of ancient woodland to the north of Dungannon.		There is limited scope to avoid this area of ancient woodland, however there may be the potential to route around the areas within the corridor.	
Rivers	Rivers	The route corridor intersects a number of rivers.		These rivers cannot be avoided and would need to be crossed.	
Social Constraints					
Buildings	Buildings (1371)	There are 1371 buildings within or partially within the route corridor.		These buildings cannot completely be avoided by the route corridor.	
Settlements	Settlements	The route corridor intersects a few small settlements around Dungannon and Donaghmore.		There is limited scope to avoid these settlements, however there may be the potential to route around them within the corridor.	
Scheduled Monument Record	SMR (6)	There are six SMR sites located within the route corridor.		These SMR sites cannot be avoided by the route corridor. However, there may be the potential to route around them within the corridor.	
Listed Buildings	Listed Buildings (1)	There is one listed building located within the route corridor.		There is the potential to avoid this listed building by a minor amendment to the route corridor without impacting other constraints.	
Drinking Water Rivers	Drinking Water Rivers	The route corridor intersects one drinking water river.		This river cannot be avoided and would need to be crossed. However, with mitigation measures such as line profiling and pole positioning riverbank disturbance could be minimised.	
Industrial Heritage Record	IHR (9)	There are nine IHR sites located within the route corridor.		These IHR sites cannot completely be avoided by the route corridor. However, there may be the potential to route around them within the corridor.	

Population Density	Population Density	The corridor is located within a low population density area.		There should be minimal impacts on population due to a low population density.	
Population Health	Population Health	The corridor is located within a low population density area.		There should be minimal impacts on population health due to a low population density.	
Sensitivity to Windfarm	Medium / Low	The corridor is located within a Medium – Low sensitivity area.		There should be minimal impacts on the landscape.	

Table 5.11 Tamnamore to Mid-Tyrone - Summary of Option 2 strategic alternatives 2-3a, 2-3b and 2-3c

Route	Length (km)	Corridor Constraint Score	Rank	Centreline Constraints Score	Rank	Summary
2-3a	27.6	265,067	3	10,221	1	For Route 2-3a, the identified constraints include two red constraints; these are buildings and Salmon Rivers. The corridor intersects 14 amber constraints, 11 of which are unavoidable. There are also a number of green constraints which cannot be avoided within the corridor. This is the longest route and is based on the least cost line.
2-3b	22.7	259,326	2	14,823	3	For Route 2-3b, the identified constraints include two red constraints; these are buildings and Salmon Rivers. The corridor intersects 14 amber constraints, all of which are unavoidable. There are also a number of green constraints which cannot be avoided within the corridor. This is the shortest route.
2-3c	23	247,221	1	14,073	2	For Route 2-3c, the identified constraints include two red constraints; these are buildings and Salmon Rivers. The corridor intersects 16 amber constraints, 13 of which are unavoidable. There are also a number of green constraints which cannot be avoided within the corridor.
Summary Comparison						
Route 2-3c has the lowest corridor constraints score. Route 2-3a has the lowest centreline constraints score, however the overall corridor has the highest constraints score and is the longest route. All three routes intersect a number of buildings, however there is the potential to reduce the number of buildings intersected within each of the route corridors. Route 2-3a intersects Salmon Rivers at five locations, Route 2-3b at three locations and Route 2-3c at four locations. However, with mitigation measures such as line profiling and pole positioning, riverbank disturbance to these rivers can be minimised. All three routes intersect a number of amber constraints, the majority of which are unavoidable. Route 2-3c scores lower in terms of corridor constraints than Route 2-3a owing to its length, which is shorter by approximately 4.6km.						

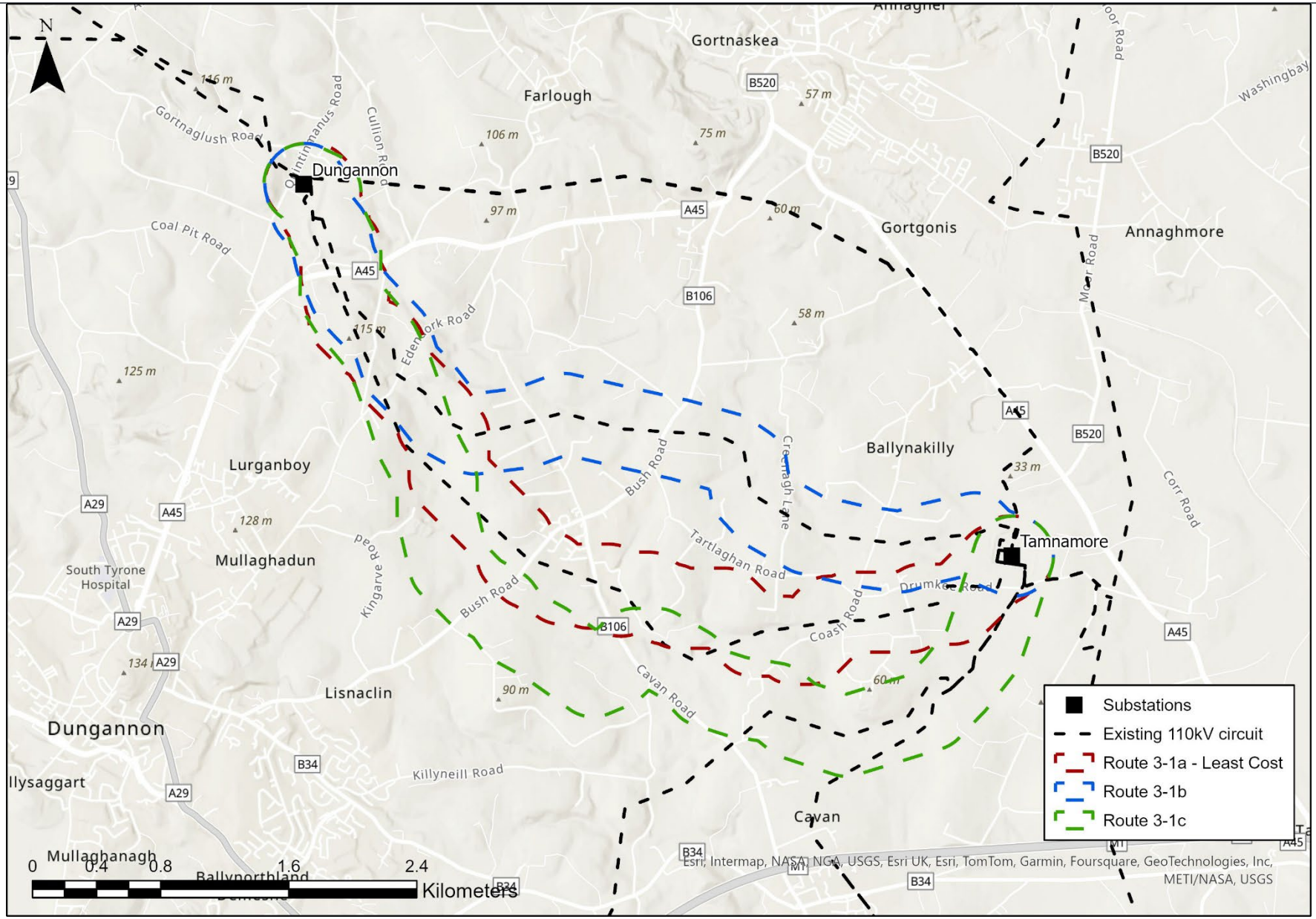

Figure 5.5 Option 3, Routes 3-1a, 3-1b, 3-1c.

Table 5.12 Constraints along a least cost strategic 500m corridor between Tamnamore and Dungannon – Option 3, Route 3-1a

Route Name	Description				Length (km)
Route 3-1a (Tamnamore to Dungannon)	The route corridor from Tamnamore to Dungannon initially extends west before turning north to approach the Dungannon substation. This route is based on the least cost line.				6.6km
Feature/ Constraint	**Name**	**Description/Features/Potential Effects (adverse and beneficial)**	**Ranking**	**Mitigation Identified/Residual Effects**	**Ranking with Mitigation**
Technical Constraints					
Historic land use	Historic land use (7)	There are seven areas of historic land use located within the corridor.		There is limited scope to completely avoid all areas of historic land use. However, there may be potential to route around them within the corridor.	
NIW Assets	NIW Sewers	There are NIW assets located within the route corridor.		These sewers cannot be avoided as they span the width of the route corridor.	
Transmission Network	33kV Line	The route corridor intersects the 33kV network between Tamnamore and Dungannon.		This transmission network cannot be avoided as it spans the width of the corridor.	
Transmission Network	110kV Line	The route corridor intersects the 110kV line several times between Tamnamore and Dungannon.		The 110kV transmission network cannot be avoided. However, the 110kV network will be removed upon completion.	
Known Mines	Annagher Colliery	There is one known mine located within the route corridor.		There is the potential to avoid this known mine area with a minor amendment to the route corridor without impacting other constraints.	
Historic Mines	Historic Mines (11)	There are 11 historic mines located within the route corridor.		These historic mine areas cannot completely be avoided by the route corridor; however, there may be the potential to route around them within the corridor.	
Roads	Roads	There are a number of roads located within the corridor.		These roads cannot be avoided and would need to be crossed.	
Fluvial Flood Extents (100yr)	Fluvial Flood Extents (100yr)	There are fluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Pluvial Flood Extents (200yr)	Pluvial Flood Extents (200yr)	There are pluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Fluvial CC Flood Extents (100yr)	Fluvial CC Flood Extents (100yr)	There are fluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Pluvial CC Flood Extents (200yr)	Pluvial CC Flood Extents (200yr)	There are pluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	

Environmental Constraints					
Rivers	Rivers	The route corridor intersects a number of rivers.		These rivers cannot be avoided and would need to be crossed.	
Social Constraints					
Buildings	Buildings (534)	There are 534 buildings located within the route corridor.		These buildings cannot completely be avoided.	
Industrial Heritage Record	IHR (4)	There are four IHR sites located between Tamnamore and Dungannon.		There is limited scope to completely avoid all four IHR sites. However, there may be potential to route around them within the corridor.	
Settlements	Settlements	The route corridor intersects a small settlement located to the east of Dungannon.		There is limited scope to avoid this settlement, however there may be potential to route around them within the corridor.	
Population Density	Population Density	The corridor is located within a low population density area.		There should be minimal impacts on population due to a low population density.	
Population Health	Population Health	The corridor is located within a low population density area.		There should be minimal impacts on population health due to a low population density.	
Sensitivity to Windfarm	High / Medium	The corridor is located within a High - Medium sensitivity area.		There should be minimal impacts on the landscape.	

Table 5.13 Constraints along a strategic 500m corridor between Tamnamore and Dungannon – Option 3, Route 3-1b

Route Name	Description				Length (km)
Route 3-1b (Tamnamore to Dungannon)	The route corridor from Tamnamore to Dungannon follows the existing 110kV transmission network. The route corridor extends west from the Tamnamore substation before extending north, and then west. The route corridor then continues north to approach the Dungannon substation.				5.7km
Feature/ Constraint	**Name**	**Description/Features/Potential Effects (adverse and beneficial)**	**Ranking**	**Mitigation Identified/Residual Effects**	**Ranking with Mitigation**
Technical Constraints					
Historic land use	Historic land use (6)	There are six areas of historic land use located within the corridor.		There is limited scope to completely avoid all areas of historic land use. However, there may be potential to route around them within the corridor.	
NIW Assets	NIW Sewers	There are NIW assets located within the route corridor.		These sewers cannot be avoided as they span the width of the route corridor.	
Transmission Network	33kV Line	The route corridor intersects the 33kV network between Tamnamore and Dungannon.		This transmission network cannot be avoided as it spans the width of the corridor.	
Transmission Network	110kV Line	The route corridor intersects the 110kV line several times between Tamnamore and Dungannon.		The 110kV transmission network cannot be avoided. However, the 110kV network will be removed upon completion.	

Historic Mines	Historic Mines (8)	There are eight historic mines located within the route corridor.		These historic mine areas cannot completely be avoided by the route corridor; however, there may be the potential to route around them within the corridor.	
Roads	Roads	There are a number of roads located within the corridor.		These roads cannot be avoided and would need to be crossed.	
Fluvial Flood Extents (100yr)	Fluvial Flood Extents (100yr)	There are fluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Pluvial Flood Extents (200yr)	Pluvial Flood Extents (200yr)	There are pluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Fluvial CC Flood Extents (100yr)	Fluvial CC Flood Extents (100yr)	There are fluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Pluvial CC Flood Extents (200yr)	Pluvial CC Flood Extents (200yr)	There are pluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Environmental Constraints					
Rivers	Rivers	The route corridor intersects a number of rivers.		These rivers cannot be avoided and would need to be crossed.	
Social Constraints					
Buildings	Buildings (432)	There are 432 buildings located within the route corridor.		These buildings cannot completely be avoided.	
Industrial Heritage Record	IHR (4)	There are four IHR sites located between Tamnamore and Dungannon.		There is limited scope to completely avoid all four IHR sites. However, there may be the potential to route around them within the corridor.	
Population Density	Population Density	The corridor is located within a low population density area.		There should be minimal impacts on population due to a low population density.	
Population Health	Population Health	The corridor is located within a low population density area.		There should be minimal impacts on population health due to a low population density.	
Sensitivity to Windfarm	High / Medium	The corridor is located within a High - Medium sensitivity area.		There should be minimal impacts on the landscape.	

Table 5.14 Constraints along a strategic 500m corridor between Tamnamore and Dungannon – Option 3, Route 3-1c

Route Name	Description	Length (km)
Route 3-1c (Tamnamore to Dungannon)	The route corridor initially extends south from the Tamnamore substation before turning west to cross the B106. The route corridor then extends north to approach the Dungannon substation.	7.3

Feature/ Constraint	Name	Description/Features/Potential Effects (adverse and beneficial)	Ranking	Mitigation Identified/Residual Effects	Ranking with Mitigation
Technical Constraints					
Historic land use	Historic land use (3)	There are three areas of historic land use located within the corridor.		There is limited scope to completely avoid all areas of historic land use. However, there may be potential to route around them within the corridor.	
NIW Assets	NIW Sewers	There are NIW assets located within the route corridor.		These sewers cannot be avoided as they span the width of the route corridor.	
Transmission Network	33kV Line	The route corridor intersects the 33kV network between Tamnamore and Dungannon.		This transmission network cannot be avoided as it spans the width of the corridor.	
Transmission Network	110kV Line	The route corridor intersects the 110kV line several times between Tamnamore and Dungannon.		The 110kV transmission network cannot be avoided. However, the 110kV network will be removed upon completion.	
Known Mines	Annagher Colliery	There is one known mine located within the route corridor.		There is potential to avoid this known mine area with a minor amendment to the route corridor without impacting other constraints.	
Historic Mines	Historic Mines (16)	There are 16 historic mines located within the route corridor.		These historic mine areas cannot completely be avoided by the route corridor; however, there may be potential to route around them within the corridor.	
Roads	Roads	There are a number of roads located within the corridor.		These roads cannot be avoided and would need to be crossed.	
Fluvial Flood Extents (100yr)	Fluvial Flood Extents (100yr)	There are fluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Pluvial Flood Extents (200yr)	Pluvial Flood Extents (200yr)	There are pluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Fluvial CC Flood Extents (100yr)	Fluvial CC Flood Extents (100yr)	There are fluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Pluvial CC Flood Extents (200yr)	Pluvial CC Flood Extents (200yr)	There are pluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Environmental Constraints					
Rivers	Rivers	The route corridor intersects a number of rivers.		These rivers cannot be avoided and would need to be crossed.	
Social Constraints					
Buildings	Buildings (362)	There are 362 buildings located within the route corridor.		These buildings cannot completely be avoided by the route corridor.	

Scheduled Monument Record	SMR (2)	There are two SMR sites located within the route corridor.		There is limited scope to avoid these SMR sites, however there may be the potential to route around them within the corridor.	
Industrial Heritage Record	IHR (2)	There are two IHR sites located between Tamnamore and Dungannon.		There is limited scope to completely avoid these IHR sites, however there may be the potential to route around them within the corridor.	
Population Density	Population Density	The corridor is located within a low population density area.		There should be minimal impacts on population due to a low population density.	
Population Health	Population Health	The corridor is located within a low population density area.		There should be minimal impacts on population health due to a low population density.	
Sensitivity to Windfarm	High / Medium	The corridor is located within a High - Medium sensitivity area.		There should be minimal impacts on the landscape.	

Table 5.15 Tamnamore to Dungannon - Summary of Option 3 strategic alternatives 3-1a, 3-1b and 3-1c

Route	Length (km)	Corridor Constraint Score	Rank	Centreline Constraints Score	Rank	Summary
3-1a	6.6	74,151	3	2,883	1	For Route 3-1a, the identified constraints include one red constraint; this is buildings. The corridor intersects seven amber constraints, six of which are unavoidable. There are also a number of green constraints which cannot be avoided within the corridor. This route is based on the least cost line.
3-1b	5.7	69,655	1	3,786	3	For Route 3-1b, the identified constraints include one red constraint; this is buildings. The corridor intersects five amber constraints, all of which are unavoidable. There are also a number of green constraints which cannot be avoided within the corridor.
3-1c	7.3	73,884	2	3,489	2	For Route 3-1c, the identified constraints include one red constraint; this is buildings. The corridor intersects seven amber constraints, six of which are unavoidable. There are also a number of green constraints which cannot be avoided within the corridor.
Summary Comparison						
Route 3-1b has the lowest corridor constraints score and is the shortest in length. Route 3-1a has the highest corridor constraints score and is based on the least cost line. All routes intersect a number of buildings however, within these route corridors, the number intersected could potentially be reduced. All three routes intersect a number of amber constraints, the majority of which are unavoidable. Route 3-1b has the lowest corridor constraints score due to intersecting the least number of buildings and the fewest amber constraints.						

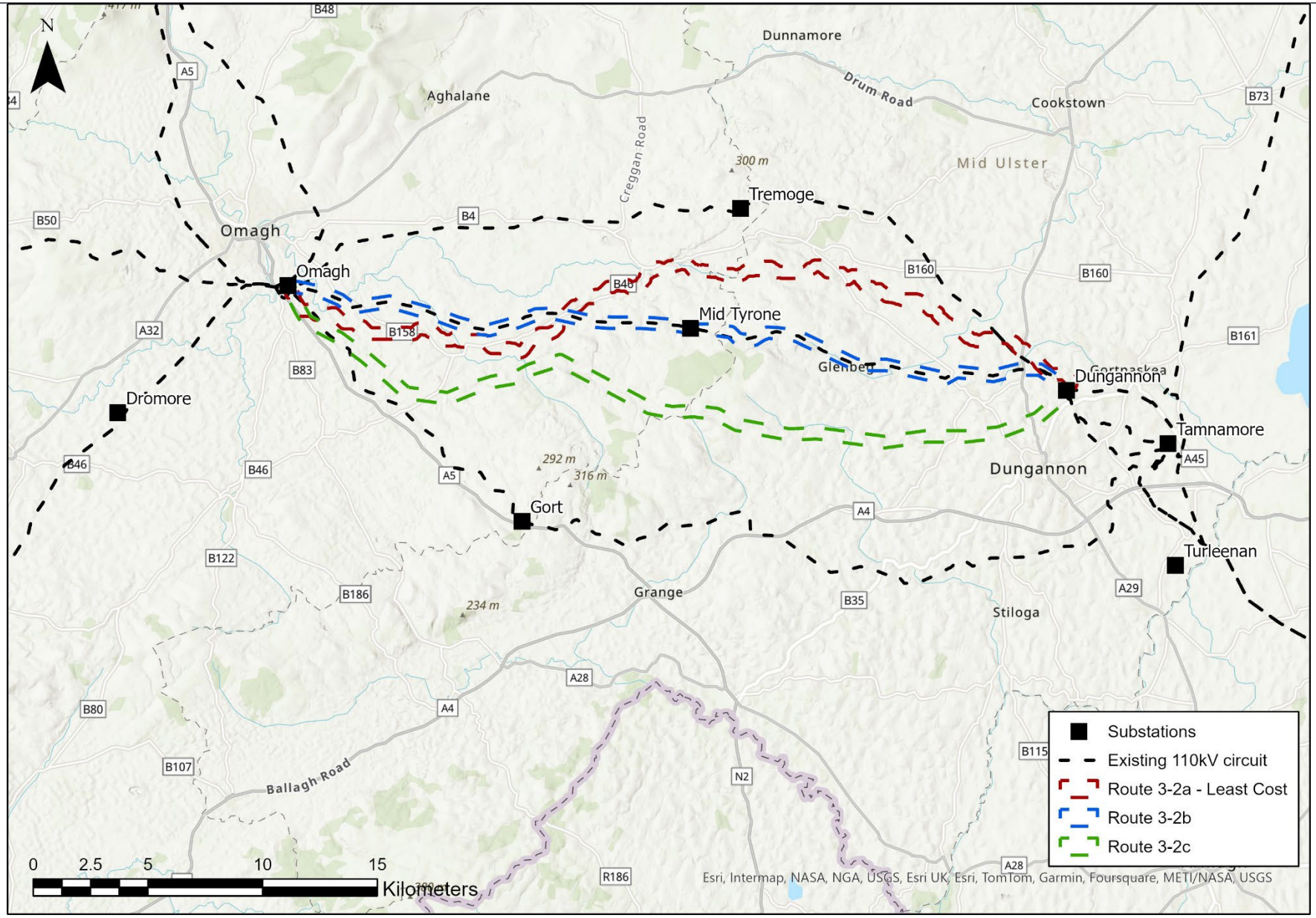

Figure 5.6 Option 3, Routes 3-2a, 3-2b, 3-2c.

Table 5.16 Constraints along a least cost strategic 500m corridor between Dungannon to Omagh – Option 3, Route 3-2a

Route Name	Description				Length (km)
Route 3-2a (Dungannon to Omagh)	The route corridor from Dungannon to Omagh initially extends east, and then north from the Dungannon substation. The route then extends generally northwest past Pomeroy before turning southwest past Sixmilecross, and then west towards the Omagh substation. This route is based on the least cost line.				42.3
Feature/ Constraint	**Name**	**Description/Features/Potential Effects (adverse and beneficial)**	**Ranking**	**Mitigation Identified/Residual Effects**	**Ranking with Mitigation**
Technical Constraints					
Active Quarries	Grogan Quarry	There is one active quarry located within the route corridor.		There is limited scope to completely avoid this quarry.	
Pollution Prevention Control Sites	PPC (2)	There are two PPC sites located within the route corridor.		There is limited scope to avoid these PPC sites within the route corridor, however there may be potential to route around them within the corridor.	
Historic land use	Historic land use (35)	There are 35 areas of historic land use located within the route corridor.		There is limited scope for all areas of historic land use to be avoided by the route corridor. However, there may be potential to route around them within the corridor.	
NIW Assets	NIW Sewer	There is one NIW Sewer located within the route corridor, spanning the width of the corridor from Sixmilecross to Beragh.		This NIW Sewer cannot be avoided and would need to be crossed.	
Transmission Network	33kV Line	The route corridor intersects the 33kV network between Dungannon and Omagh.		This transmission network cannot be avoided as it spans the width of the corridor.	
Transmission Network	110kV Line	The route corridor intersects the 110kV line several times between Dungannon and Omagh.		The 110kV transmission network cannot be avoided. However, the 110kV network will be removed upon completion.	
Forest Service Lands	Forest Service Lands	There is one area of Forest Service land located within the route corridor just south of Pomeroy.		There is limited scope to avoid this area within the route corridor. However, there may be potential to route around the area within the corridor.	
Upland Areas	Upland Areas	The route corridor passes through large stretches of upland areas.		These areas cannot be avoided by the route corridor.	
Unstable Ground	Unstable Ground	The route corridor passes through areas of unstable ground.		These areas cannot be avoided by the route corridor; however, there may be the potential to route around the areas within the corridor.	
Historic Mines	Historic Mines (5)	There are five historic mines located within the route corridor.		There is the potential to avoid these historic mines with a minor amendment to the route corridor without impacting other constraints.	
Roads	Roads	There are a number of roads located within the corridor.		These roads cannot be avoided and would need to be crossed.	
Fluvial Flood Extents (100yr)	Fluvial Flood Extents (100yr)	There are fluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	

Pluvial Flood Extents (200yr)	Pluvial Flood Extents (200yr)	There are pluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Fluvial CC Flood Extents (100yr)	Fluvial CC Flood Extents (100yr)	There are fluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Pluvial CC Flood Extents (200yr)	Pluvial CC Flood Extents (200yr)	There are pluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Environmental Constraints					
Salmon Rivers	Salmon Rivers (6)	The route corridor intersects six salmon rivers. These are Camowen River, Claggan River, Cloghfin River, Coolmaghry Tributary, Torrent River and Tullyaran Tributary. These would need to be crossed.		These Salmon Rivers cannot be avoided as they span the width of the corridor and would need to be crossed. However, with mitigation measures such as line profiling and pole positioning, riverbank disturbance to the river can be minimised.	
SLNCI	Torrent River	The route corridor crosses the Torrent River SLNCI.		This SLNCI cannot be avoided and would need to be crossed.	
ASSI	Tandragee	There is one ASSI located within the route corridor. This site is designated for its earth science features (Glacial topography).		There is potential to avoid this ASSI with a minor amendment to the route corridor without impacting other constraints.	
Ancient Woodland	Ancient Woodland (2)	There are two areas of ancient woodland located within the route corridor.		There is potential to avoid these areas of ancient woodland with a minor amendment to the route corridor without impacting other constraints.	
Rivers	Rivers	The route corridor intersects a number of rivers.		These rivers cannot be avoided and would need to be crossed.	
Social Constraints					
Buildings	Buildings (1519)	There are 1519 buildings located within the route corridor.		These buildings cannot completely be avoided.	
Scheduled Monument Record	SMR (16)	There are 16 SMR sites located within the route corridor.		These SMR sites cannot completely be avoided by the route corridor. However, there may be the potential to route around them within the corridor.	
Listed Buildings	Listed Buildings (1)	There is one listed building located within the route corridor.		There is limited scope for this listed building to be avoided by the route corridor, however there may be the potential to route around the site within the corridor.	
Drinking Water Rivers	Drinking Water Rivers	The route corridor intersects three drinking water rivers.		One of these rivers cannot be avoided and would need to be crossed. However, with mitigation measures such as line profiling and pole positioning riverbank disturbance could be minimised.	
Industrial Heritage Record	IHR (23)	There are 23 IHR sites located between Dungannon and Omagh.		There is limited scope to completely avoid all IHR sites.	

Scheduled Zones	Scheduled Zones (5)	There are five scheduled zones located within the route corridor.		There is limited scope to avoid all scheduled zones.	
Historic Parks and Gardens	Termon	There is one historic park / garden within the route corridor.		There is limited scope to avoid this historic park and garden. However, there may be the potential to route around the area within the corridor.	
Population Health	Population Density	The corridor is located within a low population density area.		There should be minimal impacts on population due to a low population density.	
Population Density	Population Health	The corridor is located within a low population density area.		There should be minimal impacts on population health due to a low population density.	
Sensitivity to Windfarm	Medium – High / Medium / Low	The corridor is located within a Medium – High / Medium – Low sensitivity area.		There should be minimal impacts on the landscape.	

Table 5.17 Constraints along a strategic 500m corridor between Dungannon to Omagh – Option 3, Route 3-2b

Route Name	Description				Length (km)
Route 3-2b (Dungannon to Omagh)	The route corridor from Dungannon to Omagh follows the existing 110kV transmission network. The route corridor initially extends north from the Dungannon substation towards Carland. The route corridor then extends generally west to approach the Omagh substation.				35.6km
Feature/ Constraint	**Name**	**Description/Features/Potential Effects (adverse and beneficial)**	**Ranking**	**Mitigation Identified/Residual Effects**	**Ranking with Mitigation**
Technical Constraints					
Pollution Prevention Control Sites	PPC (2)	There are two PPC sites located within the route corridor.		There is limited scope for these PPC sites to be avoided by the route corridor. However, there may be potential to route around the sites within the route corridor.	
Historic land use	Historic land use (15)	There are 15 areas of historic land use located within the route corridor.		There is limited scope for all areas of historic land use to be avoided by the route corridor. However, there may be potential to route around them within the corridor.	
NIW Assets	NIW Sewer	There is one NIW Sewer located within the route corridor at Edenderry.		There is potential to avoid this NIW Sewer without impacting other constraints.	
Transmission Network	33kV Line	The route corridor intersects the 33kV network between Dungannon and Omagh.		This transmission network cannot be avoided as it spans the width of the corridor.	
Transmission Network	110kV Line	The route corridor intersects the 110kV line between Dungannon and Omagh.		The 110kV transmission network cannot be avoided. However, the 110kV network will be removed upon completion.	
Forest Service Lands	Forest Service Lands	There is one area of Forest Service land located within the route corridor just south of Pomeroy.		There is limited scope to avoid this area by the route corridor. However, there may be the potential to route around the area within the corridor.	
Upland Areas	Upland Areas	The route corridor passes through large stretches of upland areas.		These areas cannot be avoided by the route corridor.	

Unstable Ground	Unstable Ground	The route corridor passes through areas of unstable ground.		These areas cannot be avoided by the route corridor.	
Historic Mines	Historic Mines (4)	There are four historic mines located within the route corridor.		There is limited scope for these historic mine areas to be avoided by the route corridor. However, there may be potential to route around them within the corridor.	
Roads	Roads	There are a number of roads located within the corridor.		These roads cannot be avoided and would need to be crossed.	
Fluvial Flood Extents (100yr)	Fluvial Flood Extents (100yr)	There are fluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Pluvial Flood Extents (200yr)	Pluvial Flood Extents (200yr)	There are pluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Fluvial CC Flood Extents (100yr)	Fluvial CC Flood Extents (100yr)	There are fluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Pluvial CC Flood Extents (200yr)	Pluvial CC Flood Extents (200yr)	There are pluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Environmental Constraints					
Salmon Rivers	Salmon Rivers (4)	The route corridor intersects four salmon rivers. These are Camowen River, Cloghfin River, Torrent River and Tullyaran Tributary. These would need to be crossed.		These Salmon Rivers cannot be avoided as they span the width of the corridor and would need to be crossed. However, with mitigation measures such as line profiling and pole positioning, riverbank disturbance to the river can be minimised.	
SLNCI	Torrent River and Skea Bog	The route corridor crosses the Torrent River SLNCI and the Skea Bog SLNCI.		These SLNCIs cannot be avoided and would need to be crossed.	
Rivers	Rivers	The route corridor intersects a number of rivers.		These rivers cannot be avoided and would need to be crossed.	
Social Constraints					
Buildings	Buildings (1344)	There are 1344 buildings located within the route corridor.		These buildings cannot completely be avoided by the route corridor.	
Scheduled Monument Record	SMR (10)	There are ten SMR sites located within the route corridor.		These SMR sites cannot completely be avoided by the route corridor. However, there may be potential to route around them within the corridor.	
Listed Buildings	Listed Buildings (2)	There are two listed buildings located within the route corridor.		There is limited scope to avoid these listed buildings within the route corridor, however there may be potential to route around them within the corridor.	
Drinking Water Rivers	Drinking Water Rivers	The route corridor intersects two drinking water rivers.		These rivers cannot be avoided and would need to be crossed. However, with mitigation measures such as line profiling and pole positioning riverbank disturbance could be minimised.	

Industrial Heritage Record	IHR (11)	There are 11 IHR sites located between Dungannon and Omagh.		There is limited scope to completely avoid all IHR sites. However, there may be the potential to route around them within the corridor.	
Settlements	Settlements	The route corridor intersects a small settlement at Edenderry.		There is potential to avoid this settlement with a minor amendment to the route corridor.	
Population Health	Population Density	The corridor is located within a low population density area.		There should be minimal impacts on population due to a low population density.	
Population Density	Population Health	The corridor is located within a low population density area.		There should be minimal impacts on population health due to a low population density.	
Sensitivity to Windfarm	Medium – High / Medium / Low	The corridor is located within a Medium – High / Medium – Low sensitivity area.		There should be minimal impacts on the landscape.	

Table 5.18 Constraints along a least cost strategic 500m corridor between Dungannon to Omagh – Option 3, Route 3-2c

Route Name	Description				Length (km)
Route 3-2c (Dungannon to Omagh)	The route corridor from Dungannon to Omagh initially extends southwest from the Dungannon substation, before extending west towards Altamuskin. The route corridor then extends northwest and then southwest to pass south of Beragh. The corridor then extends northwest to approach the Omagh substation.				37.5km
Feature/ Constraint	**Name**	**Description/Features/Potential Effects (adverse and beneficial)**	**Ranking**	**Mitigation Identified/Residual Effects**	**Ranking with Mitigation**
Technical Constraints					
Active Quarries	Derraghadon Shale Quarry	There is one active quarry located within the route corridor.		There is limited scope to completely avoid this quarry.	
Historic land use	Historic land use (20)	There are 20 areas of historic land use located within the route corridor.		There is limited scope for all areas of historic land use to be avoided by the route corridor. However, there may be potential to route around them within the corridor.	
NIW Assets	NIW Sewer	There are NIW Assets located partially within the route corridor, just north of Dungannon.		There is potential to avoid these assets with a minor amendment to the route corridor without impacting other constraints.	
Transmission Network	33kV Line	The route corridor intersects the 33kV network between Dungannon and Omagh.		This transmission network cannot be avoided as it spans the width of the corridor.	
Transmission Network	110kV Line	The route corridor intersects the 110kV line in the vicinity of Omagh.		The 110kV transmission network cannot be avoided. However, the 110kV network will be removed upon completion.	
Upland Areas	Upland Areas	The route corridor passes through large stretches of upland areas.		These areas cannot be avoided by the route corridor.	
Unstable Ground	Unstable Ground	The route corridor passes through areas of unstable ground.		These areas cannot be avoided by the route corridor.	
Known Mines	Known Mines	The route corridor intersects two known mines just south of Dungannon.		These areas cannot be avoided by the route corridor.	

Historic Mines	Historic Mines (45)	There are 45 historic mines located within the route corridor.		These mine areas cannot be avoided by the route corridor.	
Roads	Roads	There are a number of roads located within the corridor.		These roads cannot be avoided and would need to be crossed.	
Fluvial Flood Extents (100yr)	Fluvial Flood Extents (100yr)	There are fluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Pluvial Flood Extents (200yr)	Pluvial Flood Extents (200yr)	There are pluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Fluvial CC Flood Extents (100yr)	Fluvial CC Flood Extents (100yr)	There are fluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Pluvial CC Flood Extents (200yr)	Pluvial CC Flood Extents (200yr)	There are pluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Environmental Constraints					
Salmon Rivers	Salmon Rivers (5)	The route corridor intersects five salmon rivers. These are Ballygawley Water, Ballykeel River, Cloghfin River, Oona Water and Torrent River. These would need to be crossed.		These Salmon Rivers cannot be avoided as they span the width of the corridor and would need to be crossed. However, with mitigation measures such as line profiling and pole positioning, riverbank disturbance to the river can be minimised.	
SLNCI	Torrent River	The route corridor crosses the Torrent River SLNCI.		This SLNCI cannot be avoided and would need to be crossed.	
ASSI	Annaghagh Bog	There is one ASSI located within the route corridor. This site is designated for its physiographical features and peatland flora and associated fauna.		There is limited scope to completely avoid this ASSI. The potential for direct or indirect effects on designated features will need to be considered at the detailed design stage. Any works that may damage these features may require assent from DAERA. There may be a requirement for mitigation.	
Rivers	Rivers	The route corridor intersects a number of rivers.		These rivers cannot be avoided and would need to be crossed.	
Social Constraints					
Buildings	Buildings (1261)	There are 1261 buildings located within the route corridor.		These buildings cannot completely be avoided by the route corridor.	
Scheduled Monument Record	SMR (14)	There are 14 SMR sites located within the route corridor.		These SMR sites cannot completely be avoided by the route corridor. However, there may be potential to route around them within the corridor.	
Listed Buildings	Listed Buildings (1)	There is one listed building located within the route corridor.		There is limited scope for this listed building to be avoided by the route corridor, however there may be potential to route around the site within the corridor.	

Drinking Water Rivers	Drinking Water Rivers	The route corridor intersects two drinking water rivers.		These rivers cannot be avoided and would need to be crossed. However, with mitigation measures such as line profiling and pole positioning riverbank disturbance could be minimised.	
Industrial Heritage Record	IHR (12)	There are 12 IHR sites located between Dungannon and Omagh.		There is limited scope to completely avoid all IHR sites. However, there may be potential to route around them within the corridor.	
Settlements	Settlements	The route corridor intersects settlements in the vicinity of Dungannon.		These settlements can be avoided with minor amendments to the route corridor.	
Scheduled Zones	Scheduled Zones (1)	There is one scheduled zone located within the route corridor.		This area can be avoided with a minor amendment to the route corridor without impacting other constraints.	
Population Health	Population Density	The corridor is located within a low population density area.		There should be minimal impacts on population due to a low population density.	
Population Density	Population Health	The corridor is located within a low population density area.		There should be minimal impacts on population health due to a low population density.	
Sensitivity to Windfarm	Medium – High / Medium / Low	The corridor is located within a Medium – High / Medium – Low sensitivity area.		There should be minimal impacts on the landscape.	

Table 5.19 Dungannon to Omagh - Summary of Option 3 strategic alternatives 3-2a, 3-2b and 3-2c

Route	Length (km)	Corridor Constraint Score	Rank	Centreline Constraints Score	Rank	Summary
3-2a	42.3	388,589	3	13,621	1	For Route 3-2a, the identified constraints includes two red constraints; these are buildings and Salmon Rivers. The corridor intersects 18 amber constraints, 16 of which are unavoidable. There are also a number of green constraints which cannot be avoided within the corridor. This route is based on the least cost line and is the longest.
3-2b	35.6	377,310	2	24,248	3	For Route 3-2b, the identified constraints includes two red constraints: these are buildings and Salmon Rivers. The corridor intersects 14 amber constraints, 12 of which are unavoidable. There are also a number of green constraints which cannot be avoided within the corridor.
3-2c	37.5	354,800	1	20,062	2	For Route 3-2c, the identified constraints includes two red constraints; these are buildings and Salmon Rivers. The corridor intersects 16 amber constraints, 12 of which are unavoidable. There are also a number of green constraints which cannot be avoided within the corridor
Summary Comparison						
Route 3-2c has the lowest corridor constraints score. Route 3-2a, which is based on the least cost line, has the highest corridor constraints score and is the longest. All routes intersect a number of buildings, however within these route corridors the number intersected could potentially be reduced. The routes all intersect Salmon Rivers at a number of locations - Route 3-2a intersects these at six locations, Route 3-2b at five locations, and Route 3-2c at six locations. All three routes intersect a number of amber constraints, the majority of which are unavoidable. Route 3-2c scores the lowest in terms of corridor constraints due to intersecting the least number of buildings and the fewest unavoidable amber constraints.						

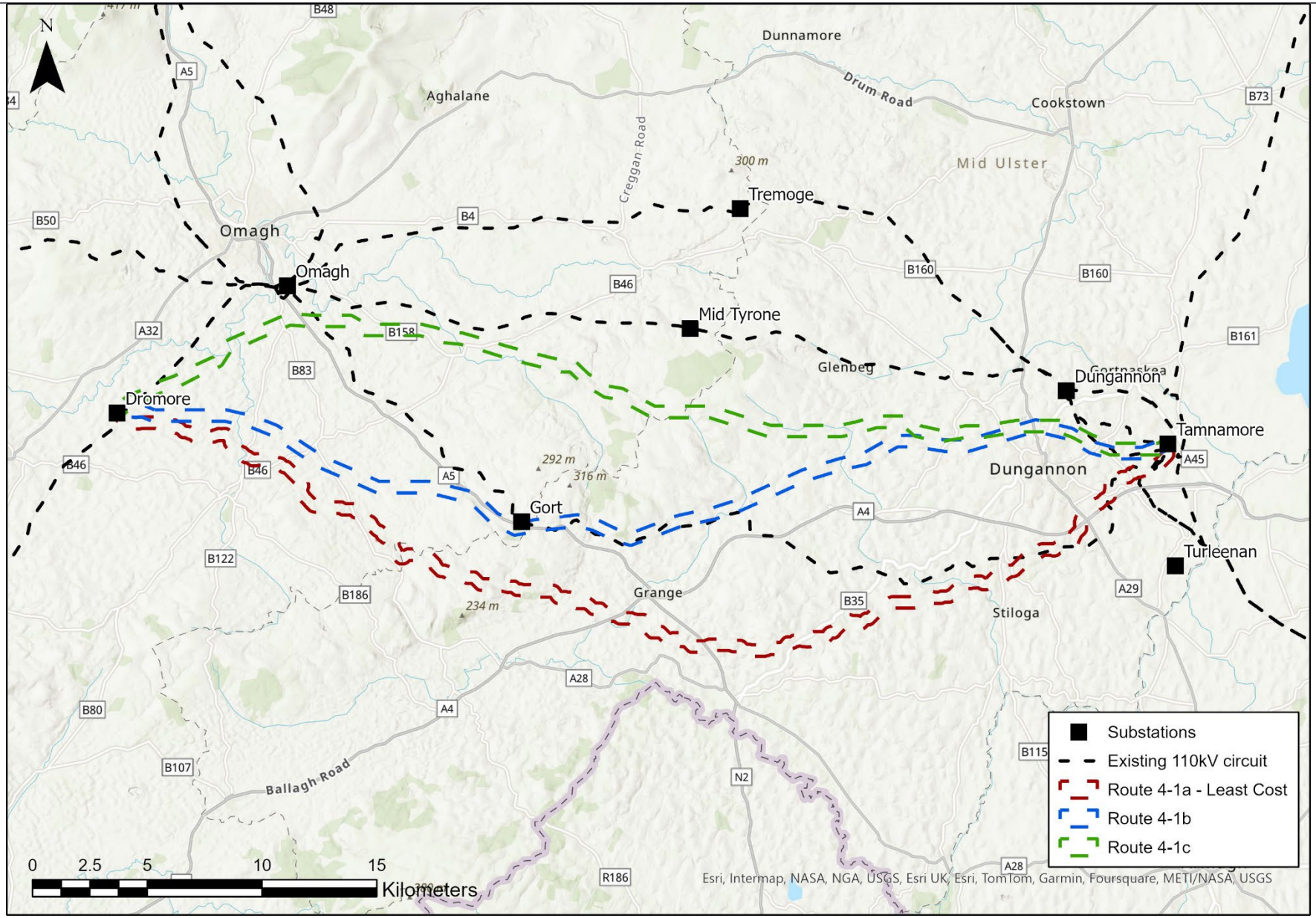

Figure 5.7 Option 4, Routes 4-1a, 4-1b and 4-1c.

Table 5.20 Constraints along a least cost strategic 500m corridor between Tamnamore to Dromore – Option 4, Route 4-1a

Route Name	Description				Length (km)
Route 4-1a (Tamnamore to Dromore)	The route corridor from Tamnamore to Dromore initially extends southwest from the Tamnamore substation, passing through Moygashel and north of Eglish. Once the route corridor approaches Carnteel it extends west briefly before turning northwest to pass by Eskra and Fintona and approach the Dromore substation. This route is based on the least cost line.				56.8km
Feature/ Constraint	**Name**	**Description/Features/Potential Effects (adverse and beneficial)**	**Ranking**	**Mitigation Identified/Residual Effects**	**Ranking with Mitigation**
Technical Constraints					
Gas Line	Gas Line	The route corridor intersects the Gas to the West gas pipeline in three locations. Two of these span the width of the corridor.		The gas pipeline is laid across open country and cannot be avoided. It would need to be crossed, however, with mitigation measures such as line profiling and pole positioning, land disturbance to the gas pipeline may be reduced.	
Active Quarries	Active quarry	There is one active quarry within the route corridor located just south of Eskra		There is potential to avoid this quarry with a minor amendment to the route corridor without impacting other constraints.	
Historic land use	Historic land use (16)	There are 16 areas of historic land use located within the route corridor.		There is limited scope to avoid all areas of historic land use within the route corridor. However, there may be potential to route around them within the corridor.	
NIW Assets	NIW Sewers	There are several NIW Sewers located within the route corridor.		These NIW Sewers cannot completely be avoided as one spans the width of the corridor and would need to be crossed.	
Transmission Network	33kV Line	The route corridor intersects the 33kV network between Tamnamore and Dromore.		This transmission network cannot be avoided as it spans the width of the corridor.	
Transmission Network	110kV Line	The route corridor intersects the 110kV line several times between Tamnamore and Dromore.		This transmission network cannot be avoided as it spans the width of the corridor.	
Transmission Network	275kV Line	The route corridor intersects the 275kV line just south of Tamnamore.		There is limited scope to avoid the 275kV line within the route corridor.	
Forest Service Lands	Forest Service Lands	The route corridor intersects areas of forest just south of Garvaghey.		There is limited scope to for these forest lands to be avoided by the route corridor. However, there may be potential to route around these areas within the corridor.	
Pollution Prevention Control Sites	PPC (4)	There are four PPC sites located within the route corridor.		There is limited scope for all PPC sites to be avoided by the route corridor. However, there may be potential to route around them within the corridor.	
Upland Areas	Upland Areas	The route corridor passes through large stretches of upland areas.		These areas cannot be avoided by the route corridor.	
Unstable Ground	Unstable Ground	The route corridor passes through areas of unstable ground.		There is potential to avoid these areas of unstable ground by a minor amendment to the route corridor without impacting other constraints.	
Roads	Roads	There are a number of roads located within the corridor.		These roads cannot be avoided and would need to be crossed.	

FluvialFlood Extents (100yr)	Fluvial Flood Extents (100yr)	There are fluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Pluvial Flood Extents (200yr)	Pluvial Flood Extents (200yr)	There are pluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Fluvial CC Flood Extents (100yr)	Fluvial CC Flood Extents (100yr)	There are fluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Pluvial CC Flood Extents (200yr)	Pluvial CC Flood Extents (200yr)	There are pluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Environmental Constraints					
Salmon Rivers	Salmon Rivers (5)	There are five Salmon Rivers located within the route corridor. These are Ballygawley Water, Eskragh Water, Oona Water, Quiggery Water and River Blackwater. Four of these span the width of the corridor and cannot be avoided.		These Salmon Rivers cannot be avoided and would need to be crossed. However, with mitigation measures such as line profiling and pole positioning, riverbank disturbance to the river can be minimised.	
SAC	Cranny Bogs SAC	The route corridor intersects the Cranny Bogs SAC in the vicinity of the Dromore substation. This site comprises three inter-drumlin lowland raised bogs and is designated for the priority Annex I habitat Active raised bogs.		There is limited scope to completely avoid the SAC within the route corridor without impacting other constraints. There may be potential for direct or indirect effects on the designated feature of this site. This will need to be considered by a screening for Appropriate Assessment / Appropriate Assessment and may involve a requirement for mitigation.	
ASSI	Cranny Bogs	The route corridor intersects the Cranny Bogs ASSI in the vicinity of the Dromore substation. This site comprises three inter-drumlin lowland raised bogs and is designated for its physiographical features and peatland flora and associated fauna.		There is limited scope to completely avoid the ASSI within the route corridor without impacting other constraints. The potential for direct or indirect effects on designated features will need to be considered at the detailed design stage. Any works that may damage these features may require assent from DAERA. There may be a requirement for mitigation.	
Ancient Woodland	Ancient woodland	There are scattered areas of ancient woodland located within the route corridor.		There is limited scope to avoid all areas of ancient woodland within the route corridor.	
Rivers	Rivers	The route corridor intersects a number of rivers.		These rivers cannot be avoided and would need to be crossed.	
Social Constraints					

Buildings	Buildings (1951)	There are approximately 1951 buildings located within or partially within the route corridor.		These buildings cannot completely be avoided by the route corridor.	
Scheduled Monument Record	SMR (32)	There are 32 SMR sites located within the route corridor.		There is limited scope for all SMR sites to be avoided by the route corridor. However, there may be potential to route around them within the corridor.	
Industrial Heritage Record	IHR (9)	There are nine IHR sites located within the route corridor.		There is limited scope for all IHR sites to be avoided by the route corridor. However, there may be potential to route around them within the corridor.	
Scheduled Zones	Scheduled zones (5)	There are five scheduled zones located within the route corridor.		There is limited scope for all scheduled zones to be avoided by the corridor. However, there may be potential to route around them within the corridor.	
Areas of Archaeological Potential	AAPs (1)	There is one AAP located within the route corridor at Carnteel.		There is limited scope for this AAP to be avoided by the route corridor, however there may be potential to route around the site within the corridor.	
Drinking Water River	River Blackwater Monaghan	The route corridor intersects the River Blackwater just north of Aughnacloy		This river cannot be avoided as it spans the width of the corridor and would need to be crossed. However, with mitigation measures such as line profiling and pole positioning, riverbank disturbance to the river can be minimised.	
Population Health	Population Density	The corridor is located within a low population density area.		There should be minimal impacts on population due to a low population density.	
Population Density	Population Health	The corridor is located within a low population density area.		There should be minimal impacts on population health due to a low population density.	
Sensitivity to Windfarm	Medium – High / High	The corridor is located within a Medium – High / High sensitivity area.		There should be minimal impacts on the landscape.	

Table 5.21 Constraints along a strategic 500m corridor between Tamnamore to Dromore – Option 4, Route 4-1b

Route Name	Description				Length (km)
Route 4-1b Tamnamore to Dromore	The route corridor from Tamnamore to Dromore initially extends west from the Tamnamore substation to bypass Dungannon. The route corridor then extends southwest towards Garvaghey, where it turns northwest to pass Seskinore and approach the Dromore substation.				48.6km
Feature/ Constraint	**Name**	**Description/Features/Potential Effects (adverse and beneficial)**	**Ranking**	**Mitigation Identified/Residual Effects**	**Ranking with Mitigation**
Technical Constraints					
Historic land use	Historic land use (31)	There are 31 areas of historic land use located within the route corridor.		There is limited scope for all areas of historic land use to be avoided by the route corridor. However, there may be the potential to route around them within the corridor.	
NIW Assets	NIW Sewers	There are several NIW Sewers located within the route corridor.		These NIW Sewers cannot completely be avoided as some span the width of the corridor and would need to be crossed.	
Transmission Network	33kV Line	The route corridor intersects the 33kV network between Tamnamore and Dromore.		This transmission network cannot be avoided as it spans the width of the corridor.	

Transmission Network	110kV Line	The route corridor intersects the 110kV line several times between Tamnamore and Dromore.		This transmission network cannot be avoided as it spans the width of the corridor.	
Forest Service Lands	Forest Service Lands	The route corridor intersects areas of Forest Service land just east of Garvaghey.		There is limited scope to avoid these Forest Service lands within the route corridor.	
Pollution Prevention Control Sites	PPC (1)	There is one PPC site located within the route corridor.		This PPC site cannot be avoided by the corridor, however there may be potential to route around the site within the corridor.	
Upland Areas	Upland Areas	The route corridor passes through large stretches of upland areas.		These areas cannot be avoided by the route corridor.	
Unstable Ground	Unstable Ground	The route corridor passes through areas of unstable ground.		These areas cannot be avoided by the route corridor.	
Historic Mines	Historic mines (42)	There are 42 historic mines located around Dungannon.		There is limited scope to avoid all of these historic mines.	
Roads	Roads	There are a number of roads located within the corridor.		These roads cannot be avoided and would need to be crossed.	
Fluvial Flood Extents (100yr)	Fluvial Flood Extents (100yr)	There are fluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Pluvial Flood Extents (200yr)	Pluvial Flood Extents (200yr)	There are pluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Fluvial CC Flood Extents (100yr)	Fluvial CC Flood Extents (100yr)	There are fluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Pluvial CC Flood Extents (200yr)	Pluvial CC Flood Extents (200yr)	There are pluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Environmental Constraints					
Salmon Rivers	Salmon Rivers (7)	There are seven Salmon Rivers located within the route corridor. These are Ballygawley Water, Eskragh Water, Oona Water, Quiggery Water, River Blackwater Garvaghy Burn and Torrent River.		These Salmon Rivers cannot be avoided as they span the width of the corridor and would need to be crossed. However, with mitigation measures such as line profiling and pole positioning, riverbank disturbance to the river can be minimised.	
SAC	Cranny Bogs SAC	The route corridor intersects the Cranny Bogs SAC in the vicinity of the Dromore substation. This site comprises three inter-drumlin lowland raised bogs and is designated for the priority Annex I habitat Active raised bogs.		There is limited scope to completely avoid the SAC within the route corridor without impacting other constraints. However, with a slight amendment to the indicative line, the SAC could be avoided. There may be potential for direct or indirect effects on the designated feature of this site. This will need to be considered by a screening for Appropriate Assessment / Appropriate Assessment and may involve a requirement for mitigation.	

SLNCI	Torrent River	The route corridor crosses the Torrent River SLNCI.		This SLNCI cannot be avoided and would need to be crossed.	
ASSI	Cranny Bogs	The route corridor intersects the Cranny Bog ASSI in the vicinity of the Dromore substation. This site comprises three inter-drumlin lowland raised bogs and is designated for its physiographical features and peatland flora and associated fauna.		There is limited scope to completely avoid the ASSI within the route corridor without impacting other constraints. The potential for direct or indirect effects on designated features will need to be considered at the detailed design stage. Any works that may damage these features may require assent from DAERA. There may be a requirement for mitigation.	
Ancient Woodland	Ancient woodland	There are scattered areas of ancient woodland located within the route corridor.		There is limited scope to avoid all areas of ancient woodland within the route corridor.	
Rivers	Rivers	The route corridor intersects a number of rivers.		These rivers cannot be avoided and would need to be crossed.	
Social Constraints					
Buildings	Buildings (2605)	There are approximately 2605 buildings located within or partially within the route corridor.		These buildings cannot be completely avoided by the route corridor.	
Scheduled Monument Record	SMR (14)	There are 14 SMR sites located within the route corridor.		There is limited scope for all SMR sites to be avoided by the route corridor. However, there may be potential to route around them within the corridor.	
Listed Buildings	Listed Building (1)	There is one listed building within the route corridor.		There is limited scope for this listed building to be avoided by the route corridor, however there may be potential to route around the site within the corridor.	
Industrial Heritage Record	IHR (20)	There are 20 IHR sites located within the route corridor.		There is limited scope for all IHR sites to be avoided by the route corridor. However, there may be potential to route around them within the corridor.	
Defence Heritage Record	DHR (1)	There is one DHR site located within the route corridor.		There is limited scope for this DHR site to be avoided by the route corridor. However, there may be potential to route around the site within the corridor.	
Settlements	Settlements	The route corridor intersects settlements around Dungannon.		There is limited scope to completely avoid these settlements within the route corridor.	
Drinking Water River	Torrent River	The route corridor intersects the Torrent River.		This river cannot be avoided as it spans the width of the corridor and would need to be crossed. However, with mitigation measures such as line profiling and pole positioning, riverbank disturbance to the river can be minimised.	
Scheduled Zones	Scheduled zones (1)	There is one scheduled zone located within the route corridor.		There is the potential to avoid this scheduled zone with a minor amendment to the route corridor without impacting other constraints.	
Population Health	Population Density	The corridor is located within a low population density area.		There should be minimal impacts on population due to a low population density.	
Population Density	Population Health	The corridor is located within a low population density area.		There should be minimal impacts on population health due to a low population density.	

Sensitivity to Windfarm	Medium – High / High	The corridor is located within a Medium – High / High sensitivity area.		There should be minimal impacts on the landscape.	

Table 5.22 Constraints along a strategic 500m corridor between Tamnamore to Dromore – Option 4, Route 4-1c

Route Name	Description				Length (km)
Route 4-1c Tamnamore to Dromore	The route corridor from Tamnamore to Dromore initially extends west from the Tamnamore substation to bypass Dungannon. The route corridor then continues west before extending northwest to pass north of Beragh before turning southwest to reach the Dromore substation.				48.6
Feature/ Constraint	**Name**	**Description/Features/Potential Effects (adverse and beneficial)**	**Ranking**	**Mitigation Identified/Residual Effects**	**Ranking with Mitigation**
Technical Constraints					
Historic land use	Historic land use (31)	There are 31 areas of historic land use located within the route corridor.		There is limited scope for all areas of historic land use to be avoided by the route corridor. However, there may be potential to route around them within the corridor.	
NIW Assets	NIW Sewers	There are several NIW Sewers located within the route corridor.		These NIW Sewers cannot completely be avoided as some span the width of the corridor and would need to be crossed.	
Transmission Network	33kV Line	The route corridor intersects the 33kV network between Tamnamore and Dromore.		This transmission network cannot be avoided as it spans the width of the corridor.	
Transmission Network	110kV Line	The route corridor intersects the 110kV line several times between Tamnamore and Dromore.		This transmission network cannot be avoided as it spans the width of the corridor.	
Forest Service Lands	Forest Service Lands	The route corridor intersects areas of Forest Service land just east of Altamuskin.		There is limited scope for these Forest Service lands to be avoided by the route corridor. However, there may be potential to route around these areas within the corridor.	
Pollution Prevention Control Sites	PPC (2)	There are two PPC sites located within the route corridor.		These PPC sites cannot be avoided by the corridor, however there may be potential to route around them within the corridor.	
Upland Areas	Upland Areas	The route corridor passes through large stretches of upland areas.		These areas cannot be avoided by the route corridor.	
Unstable Ground	Unstable Ground	The route corridor passes through areas of unstable ground.		These areas cannot be avoided by the route corridor.	
Known Mines	Known Mines (1)	There is one known mine in the location of Dungannon.		There is limited scope to avoid this known mine area, however there may be potential to route around the site within the corridor.	
Historic Mines	Historic mines (78)	There are 78 historic mines located around Dungannon.		There is limited scope to avoid all of these historic mines.	
Roads	Roads	There are a number of roads located within the corridor.		These roads cannot be avoided and would need to be crossed.	
Fluvial Flood Extents (100yr)	Fluvial Flood Extents (100yr)	There are fluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	

Pluvial Flood Extents (200yr)	Pluvial Flood Extents (200yr)	There are pluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Fluvial CC Flood Extents (100yr)	Fluvial CC Flood Extents (100yr)	There are fluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Pluvial CC Flood Extents (200yr)	Pluvial CC Flood Extents (200yr)	There are pluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Environmental Constraints					
Salmon Rivers	Salmon Rivers (8)	There are eight Salmon Rivers located within the route corridor. These are Ballygawley Water, Ballykeel River, Cloghfin River, Oona Water, Owenreagh River, Quiggery Water, Torrent River and Tullyaran Tributary.		These Salmon Rivers cannot be avoided as they all span the width of the corridor and would need to be crossed. However, with mitigation measures such as line profiling and pole positioning, riverbank disturbance to the river can be minimised.	
SLNCI	Torrent River	The route corridor crosses the Torrent River SLNCI.		This SLNCI cannot be avoided and would need to be crossed.	
Ancient Woodland	Ancient woodland	There are scattered areas of ancient woodland located within the route corridor.		There is limited scope to avoid all areas of ancient woodland within the route corridor.	
Rivers	Rivers	The route corridor intersects a number of rivers.		These rivers cannot be avoided and would need to be crossed.	
Social Constraints					
Buildings	Buildings (2040)	There are approximately 2040 buildings located within or partially within the route corridor.		These buildings cannot completely be avoided within the route corridor.	
Scheduled Monument Record	SMR (15)	There are 15 SMR sites located within the route corridor.		There is limited scope to avoid all SMR sites within the route corridor. However, there may be potential to route around them within the corridor.	
Listed Buildings	Listed Building (1)	There is one listed building within the route corridor.		There is limited scope to avoid this listed building, however there may be the potential to route around the site within the corridor.	
Industrial Heritage Record	IHR (18)	There are 18 IHR sites located within the route corridor.		There is limited scope to avoid all IHR sites within the route corridor. However, there may be potential to route around them within the corridor.	
Settlements	Settlements	The route corridor intersects settlements around Dungannon.		There is limited scope to completely avoid these settlements within the route corridor.	
Scheduled Zones	Scheduled zones (2)	There are two scheduled zones located within the route corridor.		These scheduled zones cannot be completely avoided by the route corridor. However, there may be potential to route around them within the corridor.	

Drinking Water River	Drinking Water Rivers (2)	The route corridor intersects two drinking water rivers.		These rivers cannot be avoided as they span the width of the corridor and would need to be crossed. However, with mitigation measures such as line profiling and pole positioning, riverbank disturbance to the river can be minimised.	
Population Health	Population Density	The corridor is located within a low population density area.		There should be minimal impacts on population due to a low population density.	
Population Density	Population Health	The corridor is located within a low population density area.		There should be minimal impacts on population health due to a low population density.	
Sensitivity to Windfarm	Medium – High / High	The corridor is located within a Medium – High / High sensitivity area.		There should be minimal impacts on the landscape.	

Table 5.23 Tamnamore to Dromore - Summary of Option 4 strategic alternatives 4-1a, 4-1b and 4-1c

Route	Length (km)	Corridor Constraint Score	Rank	Centreline Constraints Score	Rank	Summary
4-1a	56.8	488,249	2	17,535	1	For Route 4-1a, the identified constraints include four red constraints; these are buildings, Salmon Rivers, a gas pipeline and an SAC, all of which are unavoidable. The corridor intersects 17 amber constraints, 14 of which are unavoidable. There are also a number of green constraints which cannot be avoided within the corridor. This route is based on the least cost line and is the longest.
4-1b	48.6	506,180	3	30,814	3	For Route 4-1b, the identified constraints include three red constraints; these are buildings, Salmon Rivers, and an SAC, all of which are unavoidable. The corridor intersects 18 amber constraints, 15 of which are unavoidable. There are also a number of green constraints which cannot be avoided within the corridor.
4-1c	48.6	446,496	1	24,655	2	For Route 4-1c, the identified constraints include two red constraints; these are buildings and Salmon Rivers, both of which are unavoidable. The corridor intersects 17 amber constraints, all of which are unavoidable. There are also a number of green constraints which cannot be avoided within the corridor.
Summary Comparison						
Route corridor 4-1c has the lowest corridor constraints score and is the shortest in length. Route 4-1a, which is based on the least cost line, has the highest constraints score and is the longest in length. All routes intersect a number of buildings, however within these route corridors the number intersected could potentially be reduced. The routes all intersect Salmon Rivers at a number of locations; Route 4-1a intersects these at five locations, Route 4-1b at seven locations and Route 4-1c at seven locations. Routes 4-1a and 4-1b intersect Cranny Bog SAC, and Route 4-1a also intersects a gas pipeline. All three routes intersect a number of amber constraints, the majority of which are unavoidable. Route 4-1c scores the lowest in terms of corridor constraints due to intersecting the least number of red constraints and because it is shortest in length.						

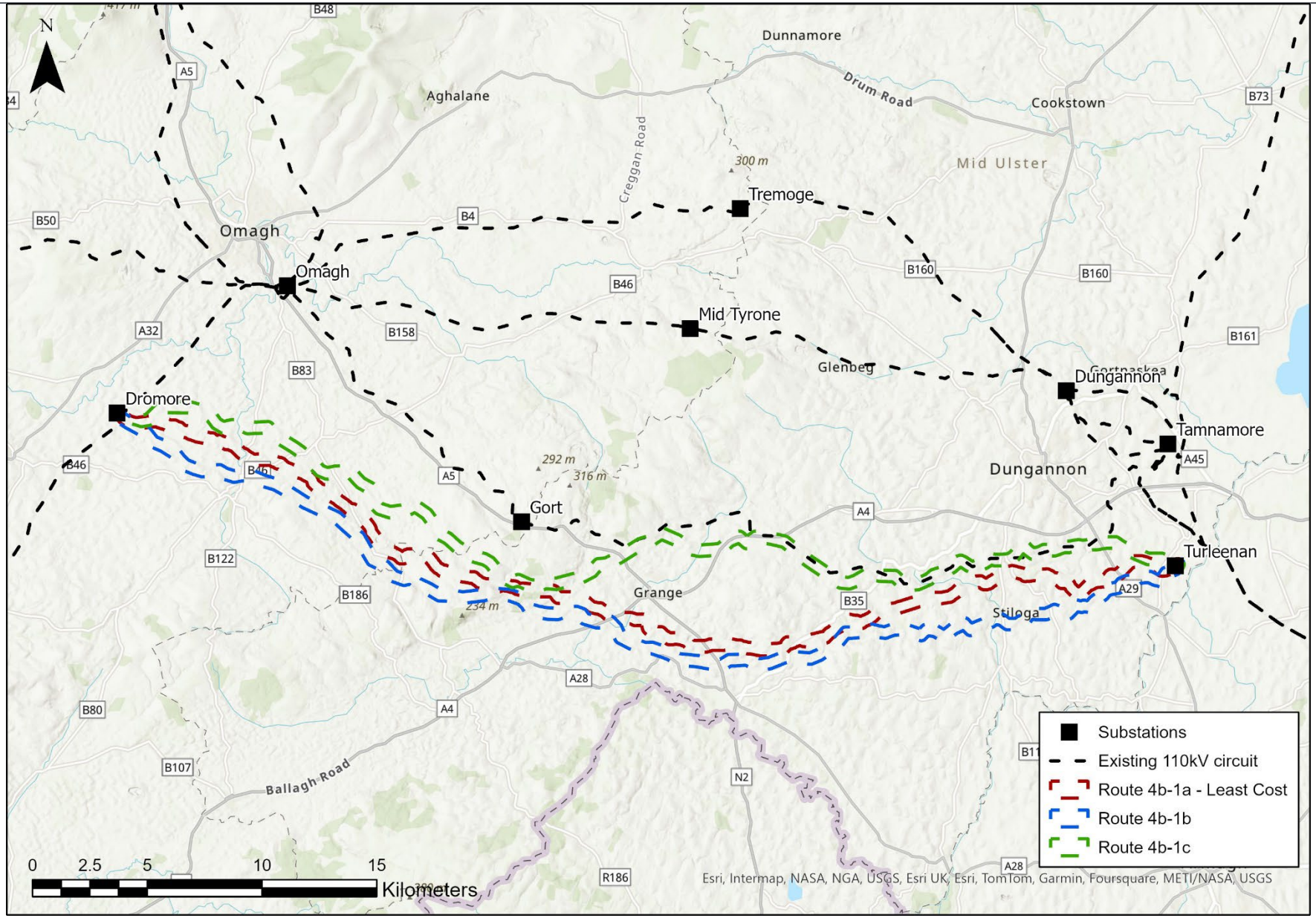

Figure 5-8 Option 4b, Routes 4b-1a, 4b-1b and 4b-1c.

Table 5.24 Constraints along a least cost strategic 500m corridor between Turleenan to Dromore – Option 4b, Route 4b-1a

Route Name	Description				Length (km)
Route 4b-1a Turleenan to Dromore	The route corridor from Turleenan to Dromore initially extends west from the Turleenan substation, passing south of Altnavannog and north of Stiloga. The route corridor then extends in a southwest direction before extending in a northwest direction by Grange. The route passes to the north of Cranny to approach the Dromore substation. This route is based on the least cost line.				53.2km
Feature/ Constraint	**Name**	**Description/Features/Potential Effects (adverse and beneficial)**	**Ranking**	**Mitigation Identified/Residual Effects**	**Ranking with Mitigation**
Technical Constraints					
Gas Line	Gas Line	The route corridor intersects the Gas to the West gas pipeline just south of Grange.		The gas pipeline is laid across open country and cannot be avoided. It would need to be crossed, however, with mitigation measures such as line profiling and pole positioning, land disturbance to the gas pipeline may be reduced.	
Historic land use	Historic land use (12)	There are 12 areas of historic land use located within the route corridor.		There is limited scope for all areas of historic land use to be avoided by the route corridor. However, there may be potential to route around them within the corridor.	
Transmission Network	33kV Line	The route corridor intersects the 33kV network in several locations between Turleenan and Dromore.		This transmission network cannot be avoided as it spans the width of the corridor.	
Transmission Network	110kV Line	The route corridor intersects the 110kV line as it approaches the Dromore substation.		This transmission network cannot be avoided as it spans the width of the corridor.	
Forest Service Lands	Forest Service Lands	The route corridor intersects areas of forest just south of Garvaghey.		There is limited scope for these forest lands to be avoided by the route corridor. However, there may be potential to route around these areas within the corridor.	
Pollution Prevention Control Sites	PPC (5)	There are five PPC sites located within the route corridor.		There is limited scope for all PPC sites to be avoided by the route corridor. However, there may be potential to route around them within the corridor.	
Upland Areas	Upland Areas	The route corridor passes through a stretch of upland.		This area cannot be avoided by the route corridor.	
Unstable Ground	Unstable Ground	The route corridor passes through areas of unstable ground.		There is potential to avoid these areas of unstable ground by a minor amendment to the route corridor without impacting other constraints.	
Roads	Roads	There are a number of roads located within the corridor.		These roads cannot be avoided and would need to be crossed.	
Fluvial Flood Extents (100yr)	Fluvial Flood Extents (100yr)	There are fluvial flood extents located within the corridor.		These flood extents cannot be avoided by the corridor.	
Pluvial Flood Extents (200yr)	Pluvial Flood Extents (200yr)	There are pluvial flood extents located within the corridor.		These flood extents cannot be avoided by the corridor.	
Fluvial CC Flood Extents (100yr)	Fluvial CC Flood	There are fluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided by the corridor.	

	Extents (100yr)				
Pluvial CC Flood Extents (200yr)	Pluvial CC Flood Extents (200yr)	There are pluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided by the corridor.	
Environmental Constraints					
Salmon Rivers	Salmon Rivers (4)	There are four Salmon Rivers located within the route corridor. These are Ballygawley Water, Oona Water, Quiggery Water and River Blackwater. All four of these span the width of the corridor and cannot be avoided.		These Salmon Rivers cannot be avoided and would need to be crossed. However, with mitigation measures such as line profiling and pole positioning, riverbank disturbance to the river can be minimised.	
SAC	Cranny Bogs SAC	The route corridor intersects the Cranny Bogs SAC in the vicinity of the Dromore substation. This site comprises three inter-drumlin lowland raised bogs and is designated for the priority Annex I habitat Active raised bogs.		There is limited scope to completely avoid the SAC within the route corridor without impacting other constraints. There may be potential for direct or indirect effects on the designated feature of this site. This will need to be considered by a screening for Appropriate Assessment / Appropriate Assessment and may involve a requirement for mitigation.	
ASSI	Cranny Bogs	The route corridor intersects the Cranny Bogs ASSI in the vicinity of the Dromore substation. This site comprises three inter-drumlin lowland raised bogs and is designated for its physiographical features and peatland flora and associated fauna.		There is limited scope to completely avoid the ASSI within the route corridor without impacting other constraints. The potential for direct or indirect effects on designated features will need to be considered at the detailed design stage. Any works that may damage these features may require assent from DAERA. There may be a requirement for mitigation.	
Ancient Woodland	Ancient woodland	There are scattered areas of ancient woodland located within the route corridor.		There is limited scope for all areas of ancient woodland to be avoided by the route corridor.	
Rivers	Rivers	The route corridor intersects a number of rivers.		These rivers cannot be avoided and would need to be crossed.	
Social Constraints					
Buildings	Buildings (1775)	There are approximately 1775 buildings located within or partially within the route corridor.		These buildings cannot completely be avoided by the route corridor.	
Scheduled Monument Record	SMR (28)	There are 28 SMR sites located within the route corridor.		There is limited scope for all SMR sites to be avoided by the route corridor. However, there may be potential to route around them within the corridor.	
Industrial Heritage Record	IHR (19)	There are 19 IHR sites located within the route corridor.		There is limited scope for all IHR sites to be avoided by the route corridor. However, there may be potential to route around them within the corridor.	

Settlements	Settlements	The route corridor passes through the settlement of Carnteel.		There is limited scope to avoid the settlement by the corridor. However, there may be potential to route around them within the corridor.	
Scheduled Zones	Scheduled zones (6)	There are six scheduled zones located within the route corridor.		There is limited scope to avoid all scheduled zones by the corridor. However, there may be potential to route around them within the corridor.	
Areas of Archaeological Potential	AAPs (1)	There is one AAP located within the route corridor at Carnteel.		There is potential to avoid these this AAP by a minor amendment to the route corridor without impacting other constraints.	
Listed Buildings	Listed Buildings (4)	There are four listed buildings located within the route corridor.		There is limited scope for all listed buildings to be avoided by the route corridor. However, there may be potential to route around them within the corridor.	
Drinking Water River	River Blackwater Monaghan	The route corridor intersects the River Blackwater just north of Aughnacloy		This river cannot be avoided as it spans the width of the corridor and would need to be crossed. However, with mitigation measures such as line profiling and pole positioning, riverbank disturbance to the river can be minimised.	
Population Health	Population Density	The corridor is located within a low population density area.		There should be minimal impacts on population due to a low population density.	
Population Density	Population Health	The corridor is located within a low population density area.		There should be minimal impacts on population health due to a low population density.	
Sensitivity to Windfarm	Medium – High / High	The corridor is located within a Medium – High / High sensitivity area.		There should be minimal impacts on the landscape.	

Table 5.25 Constraints along a strategic 500m corridor between Turleenan to Dromore – Option 4b, Route 4b-1b

Route Name	Description				Length (km)
Route 4b-1b Turleenan to Dromore	The route corridor from Turleenan to Dromore initially extends in a southwest direction from the Turleenan substation. The route corridor passes north of Aughnacloy before heading northwest. The route passes to the north of Cranny to approach the Dromore substation.				52.7km
Feature/ Constraint	**Name**	**Description/Features/Potential Effects (adverse and beneficial)**	**Ranking**	**Mitigation Identified/Residual Effects**	**Ranking with Mitigation**
Technical Constraints					
Gas Line	Gas Line	The route corridor intersects the Gas to the West gas pipeline just south of Grange.		The gas pipeline is laid across open country and cannot be avoided. It would need to be crossed, however, with mitigation measures such as line profiling and pole positioning, land disturbance to the gas pipeline may be reduced.	
Historic land use	Historic land use (17)	There are 17 areas of historic land use located within the route corridor.		There is limited scope for all areas of historic land use to be avoided by the route corridor. However, there may be potential to route around them within the corridor.	
NIW Assets	NIW Sewers	There are NIW Sewers located within the route corridor.		These NIW Sewers cannot completely be avoided by the corridor.	

Transmission Network	33kV Line	The route corridor intersects the 33kV network in several locations between Turleenan and Dromore.		This transmission network cannot be avoided as it spans the width of the corridor.	
Transmission Network	110kV Line	The route corridor intersects the 110kV line as it approaches the Dromore substation.		This transmission network cannot be avoided as it spans the width of the corridor.	
Forest Service Lands	Forest Service Lands	The route corridor intersects areas of forest just south of Garvaghey.		There is limited scope for these forest lands to be avoided by the route corridor. However, there may be potential to route around these areas within the corridor.	
Pollution Prevention Control Sites	PPC (3)	There are three PPC sites located within the route corridor.		There is limited scope for all PPC sites to be avoided by the route corridor. However, there may be potential to route around them within the corridor.	
Upland Areas	Upland Areas	The route corridor passes through areas of upland.		These areas cannot be avoided by the route corridor.	
Unstable Ground	Unstable Ground	The route corridor passes through areas of unstable ground.		There is potential to avoid these areas of unstable ground by a minor amendment to the route corridor without impacting other constraints.	
Roads	Roads	There are a number of roads located within the corridor.		These roads cannot be avoided and would need to be crossed.	
Fluvial Flood Extents (100yr)	Fluvial Flood Extents (100yr)	There are fluvial flood extents located within the corridor.		These flood extents cannot be avoided by the corridor.	
Pluvial Flood Extents (200yr)	Pluvial Flood Extents (200yr)	There are pluvial flood extents located within the corridor.		These flood extents cannot be avoided by the corridor.	
Fluvial CC Flood Extents (100yr)	Fluvial CC Flood Extents (100yr)	There are fluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided by the corridor.	
Pluvial CC Flood Extents (200yr)	Pluvial CC Flood Extents (200yr)	There are pluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided by the corridor.	
Environmental Constraints					
Salmon Rivers	Salmon Rivers (4)	There are four Salmon Rivers located within the route corridor. These are Ballygawley Water, Oona Water, Quiggery Water and River Blackwater. All four of these span the width of the corridor and cannot be avoided.		These Salmon Rivers cannot be avoided and would need to be crossed. However, with mitigation measures such as line profiling and pole positioning, riverbank disturbance to the river can be minimised.	
SAC	Cranny Bogs SAC	The route corridor intersects the Cranny Bogs SAC in the vicinity of the Dromore substation. This site comprises three inter-drumlin lowland raised bogs and is designated for the		There is limited scope to completely avoid the SAC within the route corridor without impacting other constraints. There may be potential for direct or indirect effects on the designated feature of this site. This will need to be considered by a screening for	

		priority Annex I habitat Active raised bogs.		Appropriate Assessment / Appropriate Assessment and may involve a requirement for mitigation.	
SLNCI	Carrick Lough and Plaister Quarry SLNCI	The route corridor intersects the Carrick Lough SLNCI to the west of Gortmerron and Plaister Quarry SLNCI to the northeast of Aughnacloy.		The SLNCIs can potentially be avoided by a minor amendment to the route corridor without impacting other constraints. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
ASSI	Cranny Bogs	The route corridor intersects the Cranny Bogs ASSI in the vicinity of the Dromore substation. This site comprises three inter-drumlin lowland raised bogs and is designated for its physiographical features and peatland flora and associated fauna.		There is limited scope to completely avoid the ASSI within the route corridor without impacting other constraints. The potential for direct or indirect effects on designated features will need to be considered at the detailed design stage. Any works that may damage these features may require assent from DAERA. There may be a requirement for mitigation.	
Ancient Woodland	Ancient woodland	There are scattered areas of ancient woodland located within the route corridor.		There is limited scope to avoid all areas of ancient woodland within the route corridor.	
Rivers	Rivers	The route corridor intersects a number of rivers.		These rivers cannot be avoided and would need to be crossed.	
Social Constraints					
Buildings	Buildings (1680)	There are approximately 1680 buildings located within or partially within the route corridor.		These buildings cannot completely be avoided by the route corridor.	
Scheduled Monument Record	SMR (18)	There are 18 SMR sites located within the route corridor.		There is limited scope for all SMR sites to be avoided by the route corridor. However, there may be potential to route around them within the corridor.	
Industrial Heritage Record	IHR (13)	There are 13 IHR sites located within the route corridor.		There is limited scope for all IHR sites to be avoided by the route corridor. However, there may be potential to route around them within the corridor.	
Settlements	Settlements	The route corridor passes through the settlement of Fintona.		There is limited scope for the settlement to be avoided by the corridor. However, there may be potential to route around them within the corridor.	
Scheduled Zones	Scheduled zones (4)	There are four scheduled zones located within the route corridor.		There is limited scope for all scheduled zones to be avoided by the corridor. However, there may be potential to route around them within the corridor.	
Areas of Archaeological Potential	AAPs (1)	There is one AAP located within the route corridor at Carnteel.		There is potential to avoid these this AAP by a minor amendment to the route corridor without impacting other constraints.	
Listed Buildings	Listed Buildings (3)	There are three listed buildings located within the route corridor.		There is limited scope for all listed buildings to be avoided by the route corridor. However, there may be potential to route around them within the corridor.	
Drinking Water River	River Blackwater Monaghan	The route corridor intersects the River Blackwater just north of Aughnacloy.		This river cannot be avoided as it spans the width of the corridor and would need to be crossed. However, with mitigation measures such as line profiling and pole positioning, riverbank disturbance to the river can be minimised.	

Population Health	Population Density	The corridor is located within a low population density area.		There should be minimal impacts on population due to a low population density.	
Population Density	Population Health	The corridor is located within a low population density area.		There should be minimal impacts on population health due to a low population density.	
Sensitivity to Windfarm	Medium – High / High	The corridor is located within a Medium – High / High sensitivity area.		There should be minimal impacts on the landscape.	

Table 5.26 Constraints along a strategic 500m corridor between Turleenan to Dromore – Option 4b, Route 4b-1c

Route Name	Description				Length (km)
Route 4b-1c Turleenan to Dromore	The route corridor from Turleenan to Dromore initially extends in a general west direction from the Turleenan substation. The route corridor passes north of Grange before heading northwest. The route passes to the north of Cranny to approach the Dromore substation.				53km
Feature/ Constraint	**Name**	**Description/Features/Potential Effects (adverse and beneficial)**	**Ranking**	**Mitigation Identified/Residual Effects**	**Ranking with Mitigation**
Technical Constraints					
Gas Line	Gas Line	The route corridor intersects a gas pipeline just south of Grange.		The gas pipeline is laid across open country and cannot be avoided. It would need to be crossed, however, with mitigation measures such as line profiling and pole positioning, land disturbance to the gas pipeline may be reduced.	
Historic land use	Historic land use (12)	There are 12 areas of historic land use located within the route corridor.		There is limited scope for all areas of historic land use to be avoided by the route corridor. However, there may be potential to route around them within the corridor.	
NIW Assets	NIW Sewers	There are NIW Sewers located within the route corridor.		These NIW Sewers cannot completely be avoided as some span the width of the corridor and would need to be crossed.	
Transmission Network	33kV Line	The route corridor intersects the 33kV network in several locations between Turleenan and Dromore.		This transmission network cannot be avoided as it spans the width of the corridor.	
Transmission Network	110kV Line	The route corridor intersects the 110kV line in the proximity of the Dromore and Turleenan substations. The route runs parallel to the existing line for approximately 10km.		This transmission network cannot be avoided as it spans the width of the corridor.	
Forest Service Lands	Forest Service Lands	The route corridor intersects areas of forest just west of Grange.		There is limited scope for these forest lands to be avoided by the route corridor. However, there may be potential to route around these areas within the corridor.	
Pollution Prevention Control Sites	PPC (1)	There is one PPC site located within the route corridor.		There is limited scope for the PPC site to be avoided by the route corridor. However, there may be potential to route around the site within the corridor.	
Upland Areas	Upland Areas	The route corridor passes through areas of upland.		These areas cannot be avoided by the route corridor.	

Unstable Ground	Unstable Ground	The route corridor passes through areas of unstable ground.		There is potential to avoid these areas of unstable ground by a minor amendment to the route corridor without impacting other constraints.	
Roads	Roads	There are a number of roads located within the corridor.		These roads cannot be avoided and would need to be crossed.	
Fluvial Flood Extents (100yr)	Fluvial Flood Extents (100yr)	There are fluvial flood extents located within the corridor.		These flood extents cannot be avoided by the corridor.	
Pluvial Flood Extents (200yr)	Pluvial Flood Extents (200yr)	There are pluvial flood extents located within the corridor.		These flood extents cannot be avoided by the corridor.	
Fluvial CC Flood Extents (100yr)	Fluvial CC Flood Extents (100yr)	There are fluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided by the corridor.	
Pluvial CC Flood Extents (200yr)	Pluvial CC Flood Extents (200yr)	There are pluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided by the corridor.	
Environmental Constraints					
Salmon Rivers	Salmon Rivers (7)	There are seven Salmon Rivers located within the route corridor. These are Ballygawley Water, Eskragh Water, Killymaddy Trib, Oona Water, Quiggery Water, Garvaghy Burn and River Blackwater. Five of these span the width of the corridor and cannot be avoided.		These Salmon Rivers cannot be avoided and would need to be crossed. However, with mitigation measures such as line profiling and pole positioning, riverbank disturbance to the river can be minimised.	
SLNCI	Mullycar Lough SLNCI	The route corridor intersects the Mullycar Lough SLNCI.		The SLNCI cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Ancient Woodland	Ancient woodland	There are scattered areas of ancient woodland located within the route corridor.		There is limited scope to avoid all areas of ancient woodland within the route corridor.	
Rivers	Rivers	The route corridor intersects a number of rivers.		These rivers cannot be avoided and would need to be crossed.	
Social Constraints					
Buildings	Buildings (1852)	There are approximately 1852 buildings located within or partially within the route corridor.		These buildings cannot completely be avoided by the route corridor.	
Scheduled Monument Record	SMR (27)	There are 27 SMR sites located within the route corridor.		There is limited scope for all SMR sites to be avoided by the route corridor. However, there may be potential to route around them within the corridor.	

Industrial Heritage Record	IHR (32)	There are 32 IHR sites located within the route corridor.		There is limited scope for all IHR sites by the route corridor. However, there may be potential to route around them within the corridor.	
Settlements	Settlements	The route corridor passes through the settlement of Altnavannog.		There is limited scope for the settlement to be avoided by the corridor. However, there may be potential to route around the settlement within the corridor.	
Scheduled Zones	Scheduled zones (2)	There are two scheduled zones located within the route corridor.		There is limited scope for all scheduled zones to be avoided by the corridor. However, there may be potential to route around them within the corridor.	
Historic Parks and Gardens	Martray House	The route corridor partially intersect the Martray House grounds.		There is limited scope for the historic park/garden to be avoided by the corridor. However, there may be potential to route around the site within the corridor.	
Listed Buildings	Listed Buildings (9)	There are nine listed buildings located within the route corridor.		There is limited scope for all listed buildings to be avoided by the route corridor. However, there may be potential to route around them within the corridor.	
Population Health	Population Density	The corridor is located within a low population density area.		There should be minimal impacts on population due to a low population density.	
Population Density	Population Health	The corridor is located within a low population density area.		There should be minimal impacts on population health due to a low population density.	
Sensitivity to Windfarm	Medium – High / High	The corridor is located within a Medium – High / High sensitivity area.		There should be minimal impacts on the landscape.	

Table 5.27 Turleenan to Dromore - Summary of Option 4b strategic alternatives 4b-1a, 4b-1b and 4b-1c

Route	Length (km)	Corridor Constraint Score	Rank	Centreline Constraints Score	Rank	Summary
4b-1a	53.2km	446,677	1	16,107	1	For Route 4b-1a, the identified constraints include four red constraints; these are buildings, Salmon Rivers, a gas pipeline and an SAC, all of which are unavoidable. The corridor intersects 16 amber constraints, 13 of which are unavoidable. There are also a number of green constraints which cannot be avoided within the corridor. This route is based on the least cost line and is the longest.
4b-1b	52.7km	465,094	2	22,092	2	For Route 4b-1b, the identified constraints include four red constraints; these are buildings, Salmon Rivers, the gas pipeline and an SAC, all of which are unavoidable. The corridor intersects 18 amber constraints, 14 of which are unavoidable. There are also a number of green constraints which cannot be avoided within the corridor.
4b-1c	53km	466,421	3	23,722	3	For Route 4b-1c, the identified constraints include three red constraints; these are buildings and Salmon Rivers and the gas pipeline, all of which are unavoidable. The corridor intersects 16 amber constraints, 15 of which are unavoidable. There are also a number of green constraints which cannot be avoided within the corridor.
Summary Comparison						
Route corridor 4b-1a has the lowest corridor and centreline constraints score and is the longest in length. All routes intersect a number of buildings, however within these route corridors the number intersected could potentially be reduced. The routes all intersect Salmon Rivers at a number of locations; Route 4b-1a intersects four rivers. Route 4b-1b						

intersects four rivers and Route 4b-1c intersects seven rivers. Routes 4b-1a and 4b-1b intersect Cranny Bog SAC. All routes cross the gas pipeline. All three routes intersect a number of amber constraints, the majority of which are unavoidable.

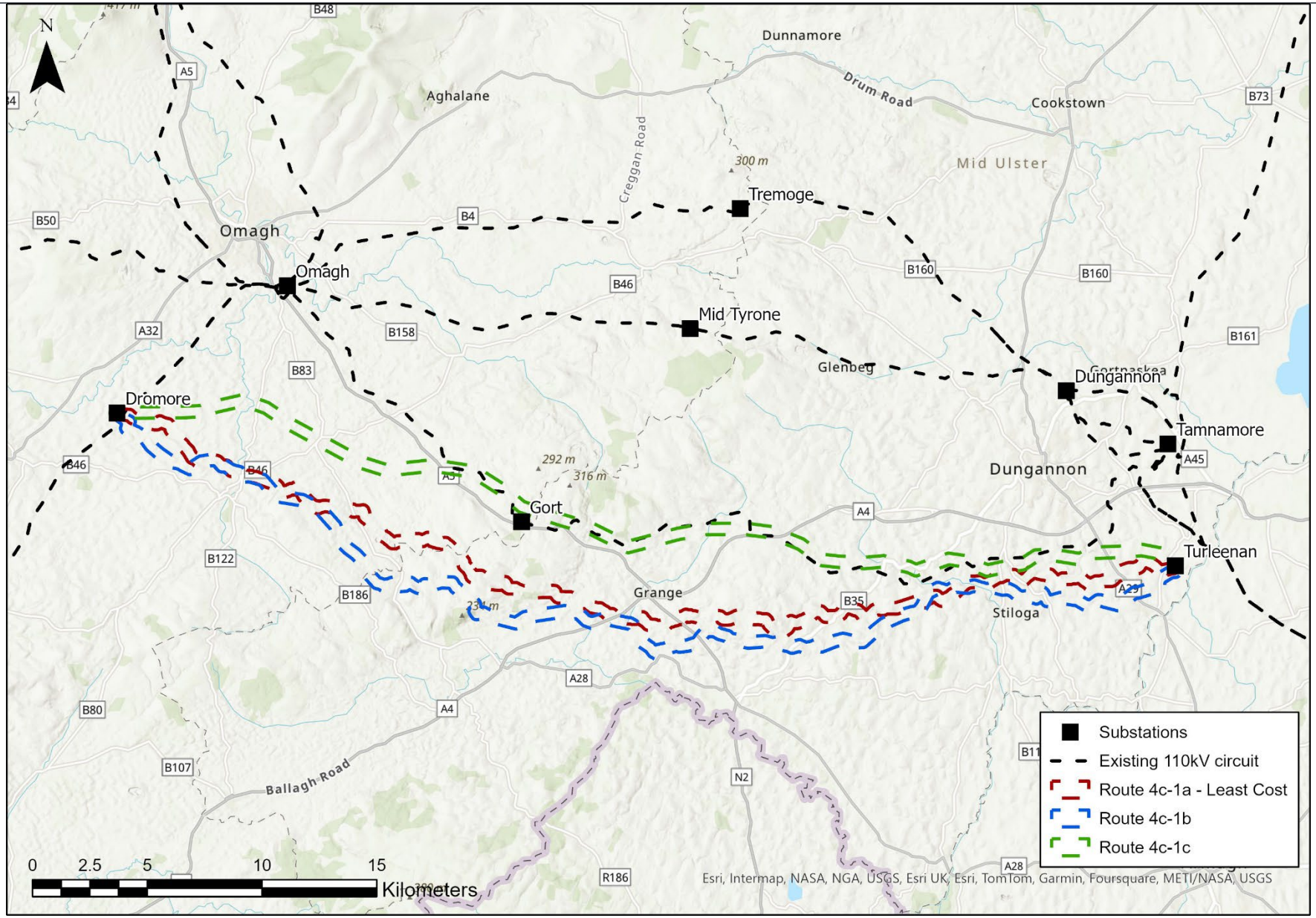

Figure 5.8 Option 4c, Routes 4c-1a, 4c-1b and 4c-1c.

Table 5.28 Constraints along a 500m corridor of the least cost line between Turleenan to Dromore – Option 4c, Route 4c-1a

Route Name	Description				Length (km)
Route 4c-1a	The route corridor from Turleenan to Dromore initially extends west from the Turleenan substation, extending generally west passing south of Grange. The route corridor then extends northwest until it reaches the Dromore substation. This route corridor is based on the least cost line.				57km
Feature/ Constraint	**Name**	**Description/Features/Potential Effects (adverse and beneficial)**	**Ranking**	**Mitigation Identified/Residual Effects**	**Ranking with Mitigation**
Technical Constraints					
Gas Line	Gas Line	The route corridor intersects the Gas to the West gas pipeline just south of Grange.		The gas pipeline is laid across open country and cannot be avoided. It would need to be crossed, however, with mitigation measures disturbance to the gas pipeline may be reduced.	
Active Quarries	Active quarries (3)	There are three active quarries located within the route corridor.		These active quarries cannot completely be avoided by the route corridor; however, there may be the potential to route around them within the corridor.	
Pollution Prevention Control Sites	PPC (3)	There are three PPC sites located within the route corridor.		There is limited scope for these PPC sites to be avoided by the route corridor. However, there may be potential to route around the site within the corridor.	
NIW Assets	NIW Sewers	There are NIW Sewers located within the route corridor.		These NIW Sewers can be avoided.	
Transmission Network	33kV transmission line	The route corridor intersects the 33kV transmission line a number of times between Turleenan and Dromore.		This cannot be avoided as the transmission line spans the width of the corridor.	
Transmission Network	110kV transmission line	The route corridor intersects the 110kV transmission line at Dromore.		This cannot be avoided as the transmission line spans the width of the corridor.	
Forest Service lands	Caledon and Knockmany	There are two areas of Forest Service land within the route corridor.		These areas cannot be avoided; however, there may be the potential to route around these areas within the corridor.	
Uplands	Uplands	The route corridor passes through sections of uplands.		These areas of uplands cannot be avoided.	
Unstable Ground	Unstable ground	The route corridor passes through sections of unstable ground.		These areas of unstable ground cannot be avoided.	
Historic Land use	Historic Land use	There are several areas of historic land use located throughout the route corridor.		These areas of historic land use cannot entirely be avoided by the route corridor. However, there may be the potential to route around them within the corridor.	

Fluvial Flood Extents (100yr)	Fluvial Flood Extents (100yr)	There are fluvial flood extents located within the corridor.		These flood extents cannot be avoided by the corridor.	
Pluvial Flood Extents (200yr)	Pluvial Flood Extents (200yr)	There are pluvial flood extents located within the corridor.		These flood extents cannot be avoided by the corridor.	
Fluvial CC Flood Extents (100yr)	Fluvial CC Flood Extents (100yr)	There are fluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided by the corridor.	
Pluvial CC Flood Extents (200yr)	Pluvial CC Flood Extents (200yr)	There are pluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided by the corridor.	
Environmental Constraints					
Salmon Rivers	Salmon Rivers (5)	The route corridor intersects five Salmon Rivers. These are the Ballygawley Water, Eskragh Water, Oona Water, Quiggery Water and River Blackwater. These would need to be crossed.		These Salmon Rivers cannot be avoided as they span the width of the corridor and would need to be crossed. However, it is anticipated that directional drilling will be utilised for all river crossings which could potentially reduce the impact on the rivers.	
SAC	Cranny Bogs SAC	The route corridor intersects the Cranny Bogs SAC in the vicinity of the Dromore substation. This site comprises three inter-drumlin lowland raised bogs and is designated for the priority Annex I habitat Active raised bogs.		There is limited scope to completely avoid the SAC within the route corridor without impacting other constraints. There may be potential for direct or indirect effects on the designated feature of this site. This will need to be considered by a screening for Appropriate Assessment / Appropriate Assessment and may involve a requirement for mitigation.	
ASSI	Cranny Bogs	The route corridor intersects the Cranny Bogs ASSI in the vicinity of the Dromore substation. This site comprises three inter-drumlin lowland raised bogs and is designated for its physiographical features and peatland flora and associated fauna.		There is limited scope to completely avoid the ASSI within the route corridor without impacting other constraints. The potential for direct or indirect effects on designated features will need to be considered at the detailed design stage. Any works that may damage these features may require assent from DAERA. There may be a requirement for mitigation.	
Ancient Woodland	Ancient woodland	There are areas of ancient woodland located throughout the route corridor.		These areas cannot be completely avoided by the route corridor.	
Rivers	Rivers	There are a number of rivers which span the width of the route corridor.		These rivers cannot be avoided and would need to be crossed.	
Social Constraints					
Buildings	Buildings (1772)	The route corridor intersects 1772 buildings.		These buildings cannot completely be avoided by the route corridor.	

Scheduled Monument Record	SMR (25)	There are 25 SMR sites located within the route corridor.		There is limited scope for all SMR sites to be avoided by the route corridor. However, there may be potential to route around them within the corridor.	
Listed Buildings	Listed Buildings (3)	There are three listed buildings located within the route corridor.		There is limited scope for all listed buildings to be avoided by the route corridor. However, there may be potential to route around them within the corridor.	
Industrial Heritage Record	IHR sites (35)	There are 35 IHR sites located within the route corridor.		These IHR sites cannot be avoided completely by the route corridor, however there may be the potential to route around them within the corridor.	
Settlements	Settlements	The route corridor intersects the settlement of Castletown.		This settlement cannot be avoided by the route corridor; however, there may be the potential to route around them within the corridor.	
Scheduled Zones	Scheduled Zones (5)	There are five scheduled zones within the route corridor.		These scheduled zones cannot be avoided by the route corridor; however, there may be the potential to route around them within the corridor.	
Population Density	Population Density	The corridor is located within a low population density area.		There should be minimal impacts on population due to a low population density.	
Population Health	Population Health	The corridor is located within a low population density area.		There should be minimal impacts on population health due to a low population density.	
Sensitivity to Windfarm	High / High - Medium	The corridor is located within a High / High-Medium sensitivity area.		As the option involves a buried HVDC cable, there should be minimal impacts on the landscape.	

Table 5.29 Constraints along a 500m corridor of the least cost line between Turleenan to Dromore – Option 4c, Route 4c-1b

Route Name	Description				Length (km)
Route 4c-1b	The route corridor from Turleenan to Dromore initially extends in a general west from the Turleenan substation, before extending generally southwest passing south of Grange. The route corridor then extends northwest until it reaches the Dromore substation.				55.4km
Feature/ Constraint	**Name**	**Description/Features/Potential Effects (adverse and beneficial)**	**Ranking**	**Mitigation Identified/Residual Effects**	**Ranking with Mitigation**
Technical Constraints					
Gas Line	Gas Line	The route corridor intersects the Gast to the West gas pipeline just south of Grange.		The gas pipeline is laid across open country and cannot be avoided. It would need to be crossed, however, with mitigation measures, disturbance to the gas pipeline may be reduced.	
Pollution Prevention Control Sites	PPC (6)	There are six PPC sites located within the route corridor.		There is limited scope for these PPC sites to be avoided by the route corridor. However, there may be potential to route around the site within the corridor.	

NIW Assets	NIW Sewers	There are NIW Sewers located within the route corridor.		These NIW Sewers cannot be avoided as they span with width of the corridor.	
Dfl Culverts	Dfl Culverts	There are culverts located within the route corridor.		There is limited scope for these culverts to be avoided by the route corridor. However, there may be potential to route around the site within the corridor.	
Transmission Network	33kV transmission line	The route corridor intersects the 33kV transmission line a number of times between Turleenan and Dromore.		This cannot be avoided as the transmission line spans the width of the corridor.	
Transmission Network	110kV transmission line	The route corridor intersects the 110kV transmission line at Dromore.		This cannot be avoided as the transmission line spans the width of the corridor.	
Forest Service lands	Knockmany	There is one area of Forest Service land within the route corridor.		This area cannot be avoided; however, there may be the potential to route around this area within the corridor.	
Uplands	Uplands	The route corridor passes through sections of uplands.		These areas of uplands cannot be avoided.	
Unstable Ground	Unstable ground	The route corridor passes through sections of unstable ground.		These areas of unstable ground cannot be avoided.	
Historic Land use	Historic Land use	There are several areas of historic land use located throughout the route corridor.		These areas of historic land use cannot entirely be avoided by the route corridor. However, there may be the potential to route around them within the corridor.	
Fluvial Flood Extents (100yr)	Fluvial Flood Extents (100yr)	There are fluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Pluvial Flood Extents (200yr)	Pluvial Flood Extents (200yr)	There are pluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Fluvial CC Flood Extents (100yr)	Fluvial CC Flood Extents (100yr)	There are fluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Pluvial CC Flood Extents (200yr)	Pluvial CC Flood Extents (200yr)	There are pluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Environmental Constraints					
Salmon Rivers	Salmon Rivers (5)	The route corridor intersects five Salmon Rivers. These are the Ballygawley Water, Eskragh Water, Oona Water, Quiggery Water and River Blackwater. These would need to be crossed.		These Salmon Rivers cannot be avoided as they span the width of the corridor and would need to be crossed. However, it is anticipated that directional drilling will be utilised for all river crossings which could potentially reduce the impact on the rivers.	
SAC	Cranny Bogs SAC	The route corridor clips the Cranny Bogs SAC in the vicinity of the Dromore substation. This site comprises three inter-drumlin lowland raised bogs and is		There is the potential to avoid the SAC without impacting other constraints. There may be potential for direct or indirect effects on the designated feature of this site. This will need to be considered by a screening for Appropriate Assessment / Appropriate Assessment and may involve a requirement for mitigation.	

		designated for the priority Annex I habitat Active raised bogs.			
ASSI	Cranny Bogs	The route corridor intersects the Cranny Bogs ASSI in the vicinity of the Dromore substation. This site comprises three inter-drumlin lowland raised bogs and is designated for its physiographical features and peatland flora and associated fauna.		There is the potential to avoid the ASSI without impacting other constraints. The potential for direct or indirect effects on designated features will need to be considered at the detailed design stage. Any works that may damage these features may require assent from DAERA. There may be a requirement for mitigation.	
SLNCI	Annaghloughan Bog and Carrick Lough	The route corridor intersects the Annaghloughan Bog SLNCI and Carrick Lough SLNCI.		There is limited scope to avoid both SLNCIs within the route corridor.	
Ancient Woodland	Ancient woodland	There are areas of ancient woodland located throughout the route corridor.		These areas cannot be completely avoided by the route corridor.	
Rivers	Rivers	There are a number of rivers which span the width of the route corridor.		These rivers cannot be avoided and would need to be crossed.	
Social Constraints					
Buildings	Buildings (2054)	The route corridor intersects 2054 buildings.		These buildings cannot completely be avoided by the route corridor.	
Scheduled Monument Record	SMR (21)	There are 21 SMR sites located within the route corridor.		There is limited scope for all SMR sites to be avoided by the route corridor. However, there may be potential to route around them within the corridor.	
Listed Buildings	Listed Buildings (7)	There are seven listed buildings located within the route corridor.		There is limited scope for all listed buildings to be avoided by the route corridor. However, there may be potential to route around them within the corridor.	
Drinking Water River	River Blackwater Monaghan	The route corridor intersects the River Blackwater just north of Aughnacloy.		This river cannot be avoided as it spans the width of the corridor and would need to be crossed. However, it is anticipated that directional drilling will be utilised for all river crossings which could potentially reduce the impact on the river.	
Industrial Heritage Record	IHR sites (37)	There are 37 IHR sites located within the route corridor.		These IHR sites cannot be avoided completely by the route corridor, however there may be the potential to route around them within the corridor.	
Settlements	Settlements	The route corridor intersects small settlements within the route corridor.		These settlements cannot be avoided by the route corridor; however, there may be the potential to route around them within the corridor.	
Scheduled Zones	Scheduled Zones (4)	There are four scheduled zones within the route corridor.		These scheduled zones cannot be avoided by the route corridor; however, there may be the potential to route around them within the corridor.	
Areas of Archaeological Potential	AAPs (1)	There is one AAP located within the route corridor at Carnteel.		There is potential to avoid these this AAP by a minor amendment to the route corridor without impacting other constraints.	

Population Density	Population Density	The corridor is located within a low population density area.		There should be minimal impacts on population due to a low population density.	
Population Health	Population Health	The corridor is located within a low population density area.		There should be minimal impacts on population health due to a low population density.	
Sensitivity to Windfarm	High / High - Medium	The corridor is located within a High / High-Medium sensitivity area.		As the option involves a buried HVDC cable, there should be minimal impacts on the landscape.	

Table 5.30 Constraints along a 500m corridor of the least cost line between Turleenan to Dromore – Option 4c, Route 4c-1c

Route Name	Description				Length (km)
Route 4c-1c	The route corridor from Turleenan to Dromore initially extends in a general west from the Turleenan substation, before extending generally southwest passing south of Grange. The route corridor then extends northwest until it reaches the Dromore substation.				49km
Feature/ Constraint	**Name**	**Description/Features/Potential Effects (adverse and beneficial)**	**Ranking**	**Mitigation Identified/Residual Effects**	**Ranking with Mitigation**
Technical Constraints					
Gas Line	Gas Line	The route corridor intersects the Gas to the West gas pipeline just south of Grange.		The gas pipeline is laid across open country and cannot be avoided. It would need to be crossed, however, with mitigation measures, disturbance to the gas pipeline may be reduced.	
Pollution Prevention Control Sites	PPC (2)	There are two PPC sites located within the route corridor.		There is limited scope for these PPC sites to be avoided by the route corridor. However, there may be potential to route around the site within the corridor.	
NIW Assets	NIW Sewers	There are NIW Sewers located within the route corridor.		There is limited scope for these sewers to be avoided by the route corridor.	
Transmission Network	33kV transmission line	The route corridor intersects the 33kV transmission line a number of times between Turleenan and Dromore.		This cannot be avoided as the transmission line spans the width of the corridor.	
Transmission Network	110kV transmission line	The route corridor intersects the 110kV transmission line in a number of locations		This cannot be avoided as the transmission line spans the width of the corridor.	
Forest Service lands	Dunmoyle and Seskinore	There are two areas of Forest Service land within the route corridor.		This area cannot be avoided; however, there may be the potential to route around these areas within the corridor.	
Uplands	Uplands	The route corridor passes through sections of uplands.		These areas of uplands cannot be avoided.	

Unstable Ground	Unstable ground	The route corridor passes through sections of unstable ground.		These areas of unstable ground cannot be avoided.	
Historic Land use	Historic Land use	There are several areas of historic land use located throughout the route corridor.		These areas of historic land use cannot entirely be avoided by the route corridor. However, there may be the potential to route around them within the corridor.	
Fluvial Flood Extents (100yr)	Fluvial Flood Extents (100yr)	There are fluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Pluvial Flood Extents (200yr)	Pluvial Flood Extents (200yr)	There are pluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Fluvial CC Flood Extents (100yr)	Fluvial CC Flood Extents (100yr)	There are fluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Pluvial CC Flood Extents (200yr)	Pluvial CC Flood Extents (200yr)	There are pluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor.	
Environmental Constraints					
Salmon Rivers	Salmon Rivers (7)	The route corridor intersects seven Salmon Rivers. These are the Ballygawley Water, Eskragh Water, Oona Water, Quiggery Water, Killymaddy Trib, Garvaghy Burn and River Blackwater. These would need to be crossed.		These Salmon Rivers cannot be avoided as they span the width of the corridor and would need to be crossed. However, with mitigation, disturbance to the river can be minimised. However, it is anticipated that directional drilling will be utilised for all river crossings which could potentially reduce the impact on the rivers.	
SAC	Cranny Bogs SAC	The route corridor clips the Cranny Bogs SAC in the vicinity of the Dromore substation. This site comprises three inter-drumlin lowland raised bogs and is designated for the priority Annex I habitat Active raised bogs.		There is the potential to avoid the SAC without impacting other constraints. There may be potential for direct or indirect effects on the designated feature of this site. This will need to be considered by a screening for Appropriate Assessment / Appropriate Assessment and may involve a requirement for mitigation.	
ASSI	Cranny Bogs	The route corridor intersects the Cranny Bogs ASSI in the vicinity of the Dromore substation. This site comprises three inter-drumlin lowland raised bogs and is designated for its physiographical features and peatland flora and associated fauna.		There is the potential to avoid the ASSI without impacting other constraints. The potential for direct or indirect effects on designated features will need to be considered at the detailed design stage. Any works that may damage these features may require assent from DAERA. There may be a requirement for mitigation.	
Ancient Woodland	Ancient woodland	There are areas of ancient woodland located throughout the route corridor.		These areas cannot be completely avoided by the route corridor.	
Rivers	Rivers	There are a number of rivers which span the width of the route corridor.		These rivers cannot be avoided and would need to be crossed.	
Social Constraints					

Buildings	Buildings (2177)	The route corridor intersects 2177 buildings.		These buildings cannot completely be avoided within the route corridor.	
Scheduled Monument Record	SMR (24)	There are 24 SMR sites located within the route corridor.		There is limited scope for all SMR sites to be avoided by the route corridor. However, there may be potential to route around them within the corridor.	
Listed Buildings	Listed Buildings (19)	There are 19 listed buildings located within the route corridor.		There is limited scope for all listed buildings to be avoided by the route corridor. However, there may be potential to route around them within the corridor.	
Industrial Heritage Record	IHR sites (41)	There are 41 IHR sites located within the route corridor.		These IHR sites cannot be avoided completely by the route corridor, however there may be the potential to route around them within the corridor.	
Settlements	Settlements	The route corridor intersects small settlements within the route corridor.		These settlements cannot be avoided by the route corridor; however, there may be the potential to route around them within the corridor.	
Scheduled Zones	Scheduled Zones	There are three scheduled zones within the route corridor.		These scheduled zones cannot be avoided by the route corridor; however, there may be the potential to route around them within the corridor.	
Population Density	Population Density	The corridor is located within a low population density area.		There should be minimal impacts on population due to a low population density.	
Population Health	Population Health	The corridor is located within a low population density area.		There should be minimal impacts on population health due to a low population density.	
Sensitivity to Windfarm	High / High - Medium /Medium - Low	The corridor is located within a High / High-Medium / Medium - Low sensitivity area.		As the option involves a buried HVDC cable, there should be minimal impacts on the landscape.	

Table 5.31 Turleenan to Dromore - Summary of Option 4c strategic alternatives 4c-1a 4c-1b, and 4c-1c

Route	Length (km)	Corridor Constraint Score	Rank	Centreline Constraints Score	Rank	Summary
4c-1a	57km	431,305	1	12,000	1	For Route 4c-1a, the identified constraints include four red constraints; these are buildings, Salmon Rivers, a gas pipeline and an SAC, all of which are unavoidable. The corridor intersects 16 amber constraints, 15 of which are unavoidable. There are also a number of green constraints which cannot be avoided within the corridor. This route is based on the least cost line and is the longest.
4c-1b	55.4km	458,836	3	20,703	2	For Route 4c-1b, the identified constraints include four red constraints; these are buildings, Salmon Rivers, the gas pipeline and an SAC, there is the potential to avoid the SAC however the buildings, salmon rivers and gas pipeline cannot be avoided. The corridor intersects 19 amber constraints, 17 of which are unavoidable. There are also a number of green constraints which cannot be avoided within the corridor.
4c-1c	49km	436,065	2	24.088	3	For Route 4c-1c, the identified constraints include four red constraints; these are buildings, Salmon Rivers, the gas pipeline and an SAC, there is the potential to avoid the SAC however the buildings, salmon rivers and gas pipeline cannot be avoided. The corridor intersects 15 amber constraints, 14 of which are unavoidable. There are also a number of green constraints which cannot be avoided within the corridor.

Summary Comparison
Route corridor 4c-1a has the lowest corridor and centreline constraints score and is the longest in length. All routes intersect a number of buildings, however within these route corridors the number intersected could potentially be reduced. The routes all intersect Salmon Rivers at a number of locations; Route 4c-1a and Route 4c-1b intersects four rivers. Route 4b-1c intersects seven rivers. All three routes intersect the Cranny Bog SAC, however there is the potential to avoid around the site within Routes 4c-1b and 4c-1c. All routes cross the gas pipeline. All three routes intersect a number of amber constraints, the majority of which are unavoidable.

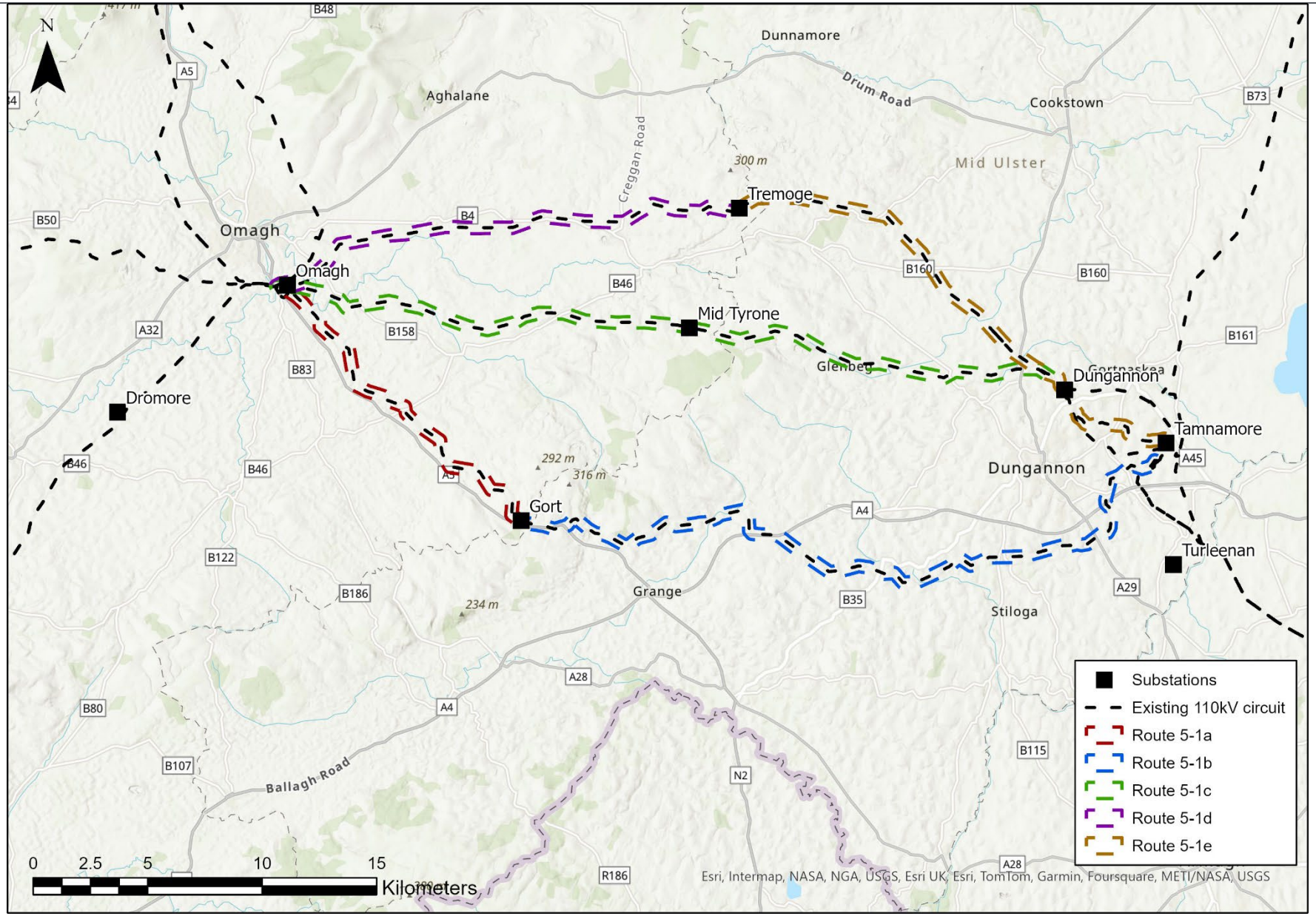

Figure 5-9 – Option 5, Routes 5-1a, 5-1b, 5-1c, 5-1d, 5-1e.

Table 5.32 Constraints along a strategic 500m corridor between Omagh and Gort – Option 5, Route 5-1a

Route Name	Description				Length (km)
Route 5-1a	The identified route corridor from the Omagh substation to the Gort substation follows the existing 110kV transmission line. The line extends out of the Omagh substation in a southeast direction to pass by Garvaghey, where it approaches the Gort substation from the west.				15.5km
Feature/Constraint	**Name**	**Description/Features/Potential Effects (adverse and beneficial)**	**Ranking**	**Mitigation Identified/Residual Effects**	**Ranking with Mitigation**
Technical Constraints					
Historic land use	Historic land use (2)	There are two areas of historic land use. One of these is located approximately 16m from the existing 110kV line.		These areas cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Transmission Network	33kV line	The route corridor intersects the existing 33kV line within the vicinity of the Gort substation.		This 33kV transmission line cannot be avoided. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Upland areas	Upland areas	The route corridor passes through upland areas.		These upland areas cannot be avoided. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Unstable Ground	Unstable ground	The route corridor passes through areas of unstable ground.		These areas of unstable ground cannot be avoided.	
Roads	Roads	The route corridor crosses a number of roads.		These roads cannot be avoided and would need to be crossed. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Fluvial Flood Extents (100yr)	Fluvial Flood Extents (100yr)	There are fluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Pluvial Flood Extents (200yr)	Pluvial Flood Extents (200yr)	There are pluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Fluvial CC Flood Extents (100yr)	Fluvial CC Flood Extents (100yr)	There are fluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Pluvial CC Flood Extents (200yr)	Pluvial CC Flood Extents (200yr)	There are pluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Environmental Constraints					
Salmon Rivers	Garvaghy Burn	The route corridor intersects the Garvaghy Burn just northwest of the Gort substation.		This Salmon River cannot be avoided and would need to be crossed. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase. Particular care should be taken during the construction phase of the refurbishment	

				works to avoid impacts via disturbance to habitats or sediment loss into waterbodies.	
Rivers	Rivers	The route corridor intersects a number of rivers.		These rivers cannot be avoided and would need to be crossed. However, with mitigation, disturbance to the river can be minimised and any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Social Constraints					
Buildings	Buildings (473)	The route corridor intersects 473 buildings.		Given the 110kV line is already in existence, with associated impacts to buildings, potential impacts are likely to be short term and temporary in nature and confined to the construction phase.	
Scheduled Monument Record	SMR (12)	There are 12 SMR sites located within the route corridor.		These SMR sites cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Pollution Prevention Control Sites	PPC (1)	There is one PPC site located within the route corridor.		This PPC site cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Listed Buildings	Listed Buildings (1)	There is one listed building located within the route corridor.		This listed building cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Drinking Water Rivers	Drinking Water Rivers (1)	The route corridor intersects the Camowen Drinking Water River.		This river cannot be avoided and would need to be crossed. However, with mitigation, disturbance to the river can be minimised and any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Industrial Heritage Record	IHR (4)	There are four IHR sites located within the route corridor.		These IHR sites cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Population Health	Population Density	The corridor is located within a low population density area.		There should be minimal impacts on population due to a low population density.	
Population Density	Population Health	The corridor is located within a low population density area.		There should be minimal impacts on population health due to a low population density.	
Sensitivity to Windfarm	High - Medium	The corridor is located within a High - Medium sensitivity area.		Given that the 110 kV line already exists in the area, there are no additional long-term impacts to the visual landscape anticipated.	

Table 5.33 Constraints along a strategic 500m corridor between Gort and Tamnamore – Option 5, Route 5-1b

Route Name	Description				Length (km)
Route 5-1b	The identified route corridor from the Gort substation to the Tamnamore substation follows the existing 110kV transmission line. The line extends out of the Gort substation in an easterly direction towards Moygashel before turning north, where it approaches the Tamnamore substation from the southwest.				33.6km
Feature/Constraint	**Name**	**Description/Features/Potential Effects (adverse and beneficial)**	**Ranking**	**Mitigation Identified/Residual Effects**	**Ranking with Mitigation**

Technical Constraints					
Gas Line	Gas Line	The route corridor intersects the Gas to the West gas transmission line.		The gas pipeline is laid across open country and cannot be avoided. It would need to be crossed, however, with mitigation measures, land disturbance to the gas pipeline may be reduced. Given that this Option involves the uprate of the existing 110kv line, impact to the gas line should be minimal.	
Historic land use	Historic land use (21)	There are 21 areas of historic land use located within the route corridor.		These areas cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
NIW Assets	NIW Sewers	There are NIW Sewers located within the route corridor.		These NIW assets cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Transmission Network	33kV Line	The 33kV transmission network intersects the route corridor in a number of locations.		This 33kV transmission line cannot be avoided. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Forest Service Lands	Forest Service Lands	The route corridor intersects areas of Forest Service Lands just east of the Gort substation.		These areas cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Upland Areas	Upland areas	The route corridor passes through upland areas.		These areas cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Unstable Ground	Unstable ground	The route corridor passes through areas of unstable ground.		These areas cannot be avoided by the route corridor.	
Roads	Roads	The route corridor crosses a number of roads.		These roads cannot be avoided and would need to be crossed. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Fluvial Flood Extents (100yr)	Fluvial Flood Extents (100yr)	There are fluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Pluvial Flood Extents (200yr)	Pluvial Flood Extents (200yr)	There are pluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Fluvial CC Flood Extents (100yr)	Fluvial CC Flood Extents (100yr)	There are fluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Pluvial CC Flood Extents (200yr)	Pluvial CC Flood Extents (200yr)	There are pluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Environmental Constraints					
Salmon Rivers	Salmon Rivers (5)	The route corridor intersects five Salmon Rivers These are Ballygawley Water, Killymaddy Tributary, Oona		All five Salmon Rivers span the width of the corridor and cannot be avoided and would need to be crossed. However, any impacts will likely be short term and temporary in nature and will be confined to	

		Water Middle, River Blackwater and Garvaghy Burn Upper.		the construction phase. Particular care should be taken during the construction phase of the refurbishment works to avoid impacts via disturbance to habitats or sediment loss into waterbodies.	
SLNCI	Mullycar Lough	The route corridor intersects part of the Mullycar Lough SLNCI.		The SLNCI cannot be avoided within the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase. Consideration should be taken to avoid any disturbance to sensitive habitats	
Ancient Woodland	Ancient Woodland	The existing transmission line passes through an area of Ancient Woodland.		These areas cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Rivers	Rivers	The route corridor intersects a number of rivers.		These rivers cannot be avoided and would need to be crossed. However, with mitigation, disturbance to the rivers can be minimised and any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Social Constraints					
Buildings	Buildings (1389)	The route corridor intersect 1389 buildings.		Given the 110kV line is already in existence, with associated impacts to buildings, potential impacts are likely to be short term and temporary in nature and confined to the construction phase.	
Scheduled Monument Record	SMR (12)	There are 12 SMR sites located within the route corridor.		These SMR sites cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Listed Buildings	Listed Buildings (3)	There are three listed buildings located within the route corridor.		These listed buildings cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Industrial Heritage Record	IHR (2)	There are two IHR sites located within the route corridor.		These IHR sites cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Scheduled Zones	Scheduled Zones (1)	There is one scheduled zone located within the route corridor.		This scheduled zone cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Population Health	Population Density	The corridor is located within a low population density area.		There should be minimal impacts on population due to a low population density.	
Population Density	Population Health	The corridor is located within a low population density area.		There should be minimal impacts on population health due to a low population density.	
Sensitivity to Windfarm	High - Medium	The corridor is located within a High - Medium sensitivity area.		Given that the 110 kV line already exists in the area, there are no additional long-term impacts to the visual landscape anticipated.	

Table 5.34 Constraints along a strategic 500m corridor between Omagh and Dungannon – Option 5, Route 5-1c

Route Name	Description				Length (km)
Route 5-1c	The identified route corridor from the Omagh substation to the Dungannon substation follows the existing 110kV transmission line. The line extends out of the Omagh substation in an easterly direction towards Carland before turning south, where it approaches the Dungannon substation from the northwest.				36.1km
Feature/Constraint	**Name**	**Description/Features/Potential Effects (adverse and beneficial)**	**Ranking**	**Mitigation Identified/Residual Effects**	**Ranking with Mitigation**
Technical Constraints					
Pollution Prevention Control Sites	PPC (3)	There are three PPC sites located within the route corridor.		These PPC sites cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Historic land use	Historic land use (15)	There are 15 areas of historic land use located within the route corridor.		These areas cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
NIW Assets	NIW Sewer	There is one NIW Sewer located within the route corridor at Edenderry.		This asset cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Transmission Network	33kV Line	The route corridor intersects the 33kV network between Dungannon and Omagh.		This 33kV transmission line cannot be avoided. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Forest Service Lands	Forest Service Lands	There is one area of Forest Service land located within the route corridor just south of Pomeroy.		This area cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Upland Areas	Upland Areas	The route corridor passes through large stretches of upland areas.		These areas cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Unstable Ground	Unstable Ground	The route corridor passes through areas of unstable ground.		These areas cannot be avoided by the route corridor.	
Historic Mines	Historic Mines (4)	There are four historic mines located within the route corridor.		These historic mine areas cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Roads	Roads	There are a number of roads located within the corridor.		These roads cannot be avoided and would need to be crossed. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Fluvial Flood Extents (100yr)	Fluvial Flood Extents (100yr)	There are fluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Pluvial Flood Extents (200yr)	Pluvial Flood Extents (200yr)	There are pluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	

Fluvial CC Flood Extents (100yr)	Fluvial CC Flood Extents (100yr)	There are fluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Pluvial CC Flood Extents (200yr)	Pluvial CC Flood Extents (200yr)	There are pluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Environmental Constraints					
Salmon Rivers	Salmon Rivers (4)	The route corridor intersects four salmon rivers. These are Camowen River, Cloghfin River, Torrent River and Tullyaran Tributary. These would need to be crossed.		These Salmon Rivers cannot be avoided and would need to be crossed. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase. Particular care should be taken during the construction phase of the refurbishment works to avoid impacts via disturbance to habitats or sediment loss into water bodies.	
SLNCI	Torrent River and Skea Bog	The route corridor crosses the Torrent River SLNCI and the Skea Bog SLNCI.		These SLNCIs cannot be avoided within the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase. Consideration should be taken to avoid any disturbance to sensitive habitats	
Rivers	Rivers	The route corridor intersects a number of rivers.		These rivers cannot be avoided and would need to be crossed. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase. Particular care should be taken during the construction phase of the refurbishment works to avoid impacts via disturbance to habitats or sediment loss into waterbodies.	
Social Constraints					
Buildings	Buildings (1394)	There are 1394 buildings located within the route corridor.		Given the 110kV line is already in existence, with associated impacts to buildings, potential impacts are likely to be short term and temporary in nature and confined to the construction phase.	
Scheduled Monument Record	SMR (10)	There are 10 SMR sites located within the route corridor.		These SMR sites cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Listed Buildings	Listed Buildings (2)	There are two listed buildings located within the route corridor.		These listed buildings cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Drinking Water Rivers	Drinking Water Rivers (2)	The route corridor intersects two drinking water rivers.		These rivers cannot be avoided and would need to be crossed. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase. Particular care should be taken during the construction phase of the refurbishment works to avoid impacts via disturbance to habitats or sediment loss into water bodies.	
Industrial Heritage Record	IHR (10)	There are 10 IHR sites located between Dungannon and Omagh.		These IHR sites cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	

Settlements	Settlements	The route corridor intersects a small settlement at Edenderry.		This settlement cannot be avoided by the route corridor. Any impacts will likely be short term and temporary in nature and will be confined to the construction phase. However, there may be restrictions on accessing the line in these residential areas.	
Population Health	Population Density	The corridor is located within a low population density area.		There should be minimal impacts on population due to a low population density.	
Population Density	Population Health	The corridor is located within a low population density area.		There should be minimal impacts on population health due to a low population density.	
Sensitivity to Windfarm	Medium – High / Medium / Low	The corridor is located within a Medium – High / Medium – Low sensitivity area.		Given that the 110 kV line already exists in the area, there are no additional long-term impacts to the visual landscape anticipated.	

Table 5.35 Constraints along a strategic 500m corridor between Omagh and Tremoge – Option 5, Route 5-1d

Route Name	Description				Length (km)
Route 5-1d	The identified route corridor from the Omagh substation to the Tremoge substation follows the existing 110kV transmission line. The line extends out of the Omagh substation in a northeasterly direction towards Carrickmore before it approaches the Tremoge substation from the west.				21.5km
Feature/Constraint	**Name**	**Description/Features/Potential Effects (adverse and beneficial)**	**Ranking**	**Mitigation Identified/Residual Effects**	**Ranking with Mitigation**
Technical Constraints					
Pollution Prevention Control Sites	PPC (2)	There are two PPC sites located within the route corridor.		These PPC sites cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Historic land use	Historic land use (5)	There are five areas of historic land use located within the route corridor.		These areas cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
NIW Assets	NIW Sewer	There is one NIW Sewer located within the route corridor at Edenderry.		This asset cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Transmission Network	33kV Line	The route corridor intersects the 33kV network between Omagh and Tremoge.		This 33kV transmission line cannot be avoided. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Upland Areas	Upland Areas	The route corridor passes through large stretches of upland areas.		These areas cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Unstable Ground	Unstable Ground	The route corridor passes through areas of unstable ground.		These areas cannot be avoided by the route corridor.	

Roads	Roads	There are a number of roads located within the corridor.		These roads cannot be avoided and would need to be crossed. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Fluvial Flood Extents (100yr)	Fluvial Flood Extents (100yr)	There are fluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Pluvial Flood Extents (200yr)	Pluvial Flood Extents (200yr)	There are pluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Fluvial CC Flood Extents (100yr)	Fluvial CC Flood Extents (100yr)	There are fluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Pluvial CC Flood Extents (200yr)	Pluvial CC Flood Extents (200yr)	There are pluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Environmental Constraints					
Salmon Rivers	Salmon Rivers (3)	The route corridor intersects three salmon rivers. These are Camowen River, Drumnakilly Burn and Granagh Burn. These would need to be crossed.		These Salmon Rivers cannot be avoided and would need to be crossed. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase. Particular care should be taken during the construction phase of the refurbishment works to avoid impacts via disturbance to habitats or sediment loss into water bodies.	
Rivers	Rivers	The route corridor intersects a number of rivers.		These rivers cannot be avoided and would need to be crossed. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase. Particular care should be taken during the construction phase of the refurbishment works to avoid impacts via disturbance to habitats or sediment loss into waterbodies.	
Social Constraints					
Buildings	Buildings (992)	There are 992 buildings located within the route corridor.		Given the 110kV line is already in existence, with associated impacts to buildings, potential impacts are likely to be short term and temporary in nature and confined to the construction phase.	
Scheduled Monument Record	SMR (10)	There are 10 SMR sites located within the route corridor.		These SMR sites cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Listed Buildings	Listed Buildings (1)	There is one listed building located within the route corridor.		This listed building cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Drinking Water Rivers	Drinking Water Rivers (1)	The route corridor intersects one drinking water river.		This river cannot be avoided and would need to be crossed. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase. Particular care should be taken during the construction phase of the refurbishment	

				works to avoid impacts via disturbance to habitats or sediment loss into waterbodies.	
Industrial Heritage Record	IHR (5)	There are 5 IHR sites located within the route corridor.		These IHR sites cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Settlements	Settlements	The route corridor intersects a few small settlements.		These settlements cannot be avoided by the route corridor. Any impacts will likely be short term and temporary in nature and will be confined to the construction phase. However, there may be restrictions on accessing the line in these residential areas.	
Scheduled Zones	Scheduled Zones (6)	There are six scheduled zones located within the route corridor.		These areas cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Population Health	Population Density	The corridor is located within a low population density area.		There should be minimal impacts on population due to a low population density.	
Population Density	Population Health	The corridor is located within a low population density area.		There should be minimal impacts on population health due to a low population density.	
Sensitivity to Windfarm	High – Medium	The corridor is located within a High - Medium sensitivity area.		Given that the 110 kV line already exists in the area, there are no additional long-term impacts to the visual landscape anticipated.	

Table 5.36 Constraints along a strategic 500m corridor between Tremoge and Tamnamore – Option 5, Route 5-1e

Route Name	Description				Length (km)
Route 5-1e	The identified route corridor from the Tremoge substation to the Tamnamore substation follows the existing 110kV transmission line. The line extends out of the Tremoge substation in a southeast direction towards Dungannon before it approaches the Tamnamore substation from the west.				17.7km
Feature/Constraint	**Name**	**Description/Features/Potential Effects (adverse and beneficial)**	**Ranking**	**Mitigation Identified/Residual Effects**	**Ranking with Mitigation**
Technical Constraints					
Historic land use	Historic land use (9)	There are nine areas of historic land use located within the route corridor.		These areas cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
NIW Assets	NIW Sewer	There is one NIW Sewer located within the route corridor at Edenderry.		This asset cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Transmission Network	33kV Line	The route corridor intersects the 33kV network between Tremoge and Tamnamore.		This transmission network cannot be avoided as it spans the width of the corridor.	
Forest Service Lands	Forest Service Lands	There is one area of Forest Service land located within the route corridor just north of Pomeroy.		This area cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	

Upland Areas	Upland Areas	The route corridor passes through large stretches of upland areas.		These areas cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Unstable Ground	Unstable Ground	The route corridor passes through areas of unstable ground.		These areas cannot be avoided by the route corridor.	
Known Mines	Annagher Colliery	There is one known mine located within the route corridor.		This mine area cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Historic Mines	Historic Mines (10)	There are 10 historic mines located within the route corridor.		These mines cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Roads	Roads	There are a number of roads located within the corridor.		These roads cannot be avoided and would need to be crossed. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Fluvial Flood Extents (100yr)	Fluvial Flood Extents (100yr)	There are fluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Pluvial Flood Extents (200yr)	Pluvial Flood Extents (200yr)	There are pluvial flood extents located within the corridor.		These flood extents cannot be avoided within the corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Fluvial CC Flood Extents (100yr)	Fluvial CC Flood Extents (100yr)	There are fluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Pluvial CC Flood Extents (200yr)	Pluvial CC Flood Extents (200yr)	There are pluvial climate change flood extents located within the corridor.		These flood extents cannot be avoided within the corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Environmental Constraints					
Salmon Rivers	Salmon Rivers (3)	The route corridor intersects three salmon rivers. These are Claggan River, Rock River and Torrent River. These would need to be crossed.		These Salmon Rivers cannot be avoided and would need to be crossed. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase. Particular care should be taken during the construction phase of the refurbishment works to avoid impacts via disturbance to habitats or sediment loss into waterbodies.	
SLNCI	Torrent River	The route corridor crosses the Torrent River SLNCI.		This SLNCI cannot be avoided and would need to be crossed. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase. Consideration should be taken to avoid any disturbance to sensitive habitats.	
ASSI	ASSI (2)	There are two ASSIs located north of Pomeroy, these are Bardahessiagh and Limehill Farm.		These ASSIs cannot be avoided. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase. Consideration should be taken to avoid any disturbance to sensitive habitats	
Rivers	Rivers	The route corridor intersects a number of rivers.		These rivers cannot be avoided and would need to be crossed. However, any impacts will likely be short term and temporary in	

				nature and will be confined to the construction phase. Particular care should be taken during the construction phase of the refurbishment works to avoid impacts via disturbance to habitats or sediment loss into water bodies.	
Social Constraints					
Buildings	Buildings (1275)	There are 1275 buildings located within the route corridor.		Given the 110kV line is already in existence, with associated impacts to buildings, potential impacts are likely to be short term and temporary in nature and confined to the construction phase.	
Scheduled Monument Record	SMR (2)	There are two SMR sites located within the route corridor.		These SMR sites cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Drinking Water Rivers	Drinking Water Rivers (1)	The route corridor intersects one drinking water river.		This river cannot be avoided and would need to be crossed. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase. Particular care should be taken during the construction phase of the refurbishment works to avoid impacts via disturbance to habitats or sediment loss into water bodies.	
Industrial Heritage Record	IHR (8)	There are eight IHR sites located between Dungannon and Omagh.		These IHR sites cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Scheduled Zones	Scheduled Zones (1)	There is one scheduled zone located within the route corridor.		These areas cannot be avoided by the route corridor. However, any impacts will likely be short term and temporary in nature and will be confined to the construction phase.	
Population Health	Population Density	The corridor is located within a low population density area.		There should be minimal impacts on population due to a low population density.	
Population Density	Population Health	The corridor is located within a low population density area.		There should be minimal impacts on population health due to a low population density.	
Sensitivity to Windfarm	High – Medium	The corridor is located within a high – Medium sensitivity area.		Given that the 110 kV line already exists in the area, there are no additional long-term impacts to the visual landscape anticipated.	

6 ENVIRONMENTAL ASSESSMENT OF OPTIONS

The following section summarises the constraints for options 1c, 2, 3, 4, 4b, 4c and 5. Summaries of the technical, environmental, and social constraints associated with each of these Options, as well as the potential high-level impacts associated with the construction and operation of each option is provided, to assist in the selection of a preferred option.

6.1 Comparison of Options

Table 6.1 provides a summary of the options for comparative purposes.

Table 6.1 Comparison of Options

Option	Range of Lengths per Option (km)	Range of Corridor Constraint Score per Option	Option Summary
1c	45.9km	n/a	Option 1c involves an underground 500MW HVDC link between Omagh and Tamnamore. This would ideally be laid within the road network. Any potential impacts are anticipated to be short term and temporary in nature and confined to the construction phase. As the cable is underground, there are no long-term visual impacts associated with this option. There are Salmon Rivers within the option which would need to be crossed. However, it is anticipated that directional drilling will be utilised for all river crossings which could potentially reduce the impact on the rivers. There are a number of buildings within the route corridor, these would need to be avoided at the detailed routing stage. Within Option 1c, there are also a number of technical, environmental and social amber constraints which are not completely avoidable within the route corridor. These constraints include active quarries, the electricity transmission line, forest service lands, uplands, unstable ground, known mines, historic land use, Torrent River SLNCI and Edenfore SLNCI, ancient woodland, drinking water rivers, IHR sites, SHR sites, settlements and scheduled zones. However, any potential impacts should be short term and temporary in nature and confined to the construction phase.
2	42.1 – 48.4 km	449,279 - 476,618	Option 2 involves a new 275kV circuit between Tamnamore and the new Mid-Tyrone substation. The option also involves two new 110kV circuits between Gort - Mid-Tyrone and Tremoge – Mid-Tyrone. Upon completion, the above mentioned Tamnamore – Dungannon and Dungannon – Mid Tyrone 110 kV circuits are to be removed. Within each new line route corridor, the significant unavoidable constraints include several Salmon Rivers and buildings. Any construction impacts are anticipated to be short term and temporary in nature. However, there would be long term visual impacts due to the installation of new overhead lines between Gort – Mid Tyrone, Tremoge – Mid Tyrone and Tamnamore – Mid Tyrone. Visual impacts between Tamnamore – Dungannon and Dungannon – Mid Tyrone would be reduced by the removal of the existing 110kV transmission line. Within Option 2, there are also a number of technical, environmental and social amber constraints which are not completely avoidable within the route corridor. These constraints include historic land use, 33kV and 110kV transmission lines, uplands, unstable ground, Torrent River SLNCI, SMR sites, IHR sites, Drinking water rivers and settlements. However, any potential impacts should be short term and temporary in nature and confined to the construction phase.
3	41.3 – 49.6km	424,255 – 462,740	Option 3 involves a new 275kV circuit, ideally along the path of the existing Tamnamore – Dungannon and Dungannon – Omagh 110 kV circuits. Upon completion, the above mentioned Tamnamore – Dungannon and Dungannon – Omagh 110 kV circuits are to be removed. Within each new line route corridor, the significant unavoidable constraints include several Salmon Rivers and buildings. Any construction impacts are anticipated to be short term and temporary in nature. However, there would be long term visual impacts due to the installation of new overhead lines. Within Option 3, there are also a number of technical, environmental and social amber constraints which are not completely avoidable within the route corridor. These constraints include historic land use, NIW sewers, 33kV and 110kV transmission lines, upland areas, unstable ground, Torrent River SLNCI, SMR sites, IHR sites, Listed buildings and drinking water rivers. However,

			any potential impacts should be short term and temporary in nature and confined to the construction phase.
4	48.6 – 56.6 km	446,496 – 506,180	Option 4 involves a new 110kV circuit to be constructed between Dromore substation and Tamnamore substation. Within the option, the significant unavoidable constraints include several buildings and Salmon River crossings. There is limited potential to avoid the Cranny Bog SAC within the option and there may be potential for direct or indirect effects on the designated feature of this site. This will need to be considered by a screening for Appropriate Assessment / Appropriate Assessment and may involve a requirement for mitigation. Any construction impacts are anticipated to be short term and temporary in nature. However, there would be long term visual impacts due to the installation of new overhead lines. Within Option 4, there are also a number of technical, environmental and social amber constraints which are not completely avoidable within the route corridor. These constraints include historic land use, NIW sewers, 33kV and 110kV transmission lines, forest service lands, PPC sites upland areas, ancient woodland, SMR sites and IHR sites. However, any potential impacts should be short term and temporary in nature and confined to the construction phase.
4b	52.7 – 53.2km	446,677 – 466,421	Option 4b involves a new 275kV circuit to be constructed between Turleenan substation and Dromore substation. Within the option, the significant unavoidable constraints include several buildings, Salmon River crossings and the gas pipeline crossing. There is limited potential to avoid the Cranny Bog SAC within the option and there may be potential for direct or indirect effects on the designated feature of this site. This will need to be considered by a screening for Appropriate Assessment / Appropriate Assessment and may involve a requirement for mitigation. Any construction impacts are anticipated to be short term and temporary in nature. However, there would be long term visual impacts due to the installation of new overhead lines. Within Option 4b, there are also a number of technical, environmental and social amber constraints which are not completely avoidable within the route corridor. These constraints include historic land use, 33kV and 110kV transmission lines, forest service lands, PPC sites upland areas, unstable ground, ancient woodland, SMR sites, IHR sites, scheduled zones, listed buildings, settlements and AAPs. However, any potential impacts should be short term and temporary in nature and confined to the construction phase.
4c	49-57km	431,605 – 458,836	Option 4c involves a new 275kV underground cable to be constructed between Turleenan substation and Dromore substation. Within the option, the significant unavoidable constraints include several buildings, Salmon River crossings and the gas pipeline crossing. There is limited potential to avoid the Cranny Bog SAC within the option and there may be potential for direct or indirect effects on the designated feature of this site. This will need to be considered by a screening for Appropriate Assessment / Appropriate Assessment and may involve a requirement for mitigation. Any construction impacts are anticipated to be short term and temporary in nature. As the cable is underground, there are no long-term visual impacts associated with this option. Within Option 4c, there are also a number of technical, environmental and social amber constraints which are not completely avoidable within the route corridor. These constraints include historic land use, 33kV and 110kV transmission lines, forest service lands, PPC sites upland areas, unstable ground, Cranny Bog ASSI, ancient woodland, SMR sites, IHR sites, scheduled zones, listed buildings and settlements. However, any potential impacts should be short term and temporary in nature and confined to the construction phase.
5	130.3 km	n/a	Option 5 involves an uprate of the 110kV circuits between Omagh – Gort, Gort – Tamnamore, Omagh – Dungannon, Omagh – Tremoge and Tremoge – Tamnamore. The impacts for this option are likely to be short term and temporary in nature. Visual impacts are expected to remain the same due to no change to the existing line routes. Within Option 5, there are also a number of technical, environmental and social amber constraints which are not completely avoidable within the route corridor. These constraints include the 33kV transmission line, unstable grounds, Mullycar SLNCI, Torrent River SLNCI and Skea Bog SLNCI, Bardahessiagh ASSI and Limehill Farm ASSI and areas of ancient woodland. However, any potential impacts should be short term and temporary in nature and confined to the construction phase.
Comparison of Options			

- Option 5 has the longest average route length at 130.3km
- Option 2 has the shortest average route length at 44.5km.
- Within all six options, there are a number of buildings which cannot completely be avoided by the corridors.
- All options cross a number of Salmon Rivers, which cannot be avoided. There is the potential for electricity transmission developments to impact on these rivers through increased sediment loading and decreased bank stability due to compromised bank sides.
    - Option 5 crosses Salmon Rivers at 17 separate locations
    - In term of options which include new lines, Option 4 and 4b have the most Salmon River crossings; crossing at nine separate locations, it is likely to increase the potential for negative impacts on these water bodies. However, with mitigation measures such as line profiling and pole positioning, riverbank disturbance to these rivers can be minimised.
- Within Option 5, there is a gas transmission line that is unavoidable; however, as Option 5 involves an uprate of the existing 110kV line, the impacts to this gas transmission line should be minimal.
- Within Option 4b and Option 4c, there is a gas transmission line that is unavoidable. However, with mitigation measures disturbance to the gas pipeline may be reduced.
- All options cross the electrical transmission network, and this cannot be avoided within any option.
- Within Option 4, Option 4b and Option 4c the Cranny Bog SAC is potentially unavoidable. There may be potential for direct or indirect effects on the designated feature of this site. This will need to be considered by a screening for Appropriate Assessment / Appropriate Assessment and may involve a requirement for mitigation.
- All five options encounter a number of amber and green constraints which cannot be completely avoided; however, the number of these constraints varies within the option route combination.