



Kildare- Meath Grid Upgrade
Step 4B Report – Route Options and Evaluation Report

June 2022

EirGrid



CP0966 Kildare Meath

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Executive Summary

What is this Report

EirGrid follows a six-step approach when they develop and implement solutions to any identified transmission network problem. The process and timescale of this project is shown in Figure A1-1 below. The Kildare-Meath Grid Upgrade project is currently at Step 4 – Where exactly should we build? To help identify the best location for the project, Step 4 has been divided into two sub-steps: Step 4A and Step 4B. Step 4A was completed in March 2022 and further details are on the project website¹. This Step 4B Report presents a description of the proposed route. This report identifies what EirGrid considers to be the Best Performing Option² for the route of the underground cable. This report will be published and EirGrid will consider all feedback arising and will use this, and any further survey and analysis undertaken, to confirm the final route at Step 5.

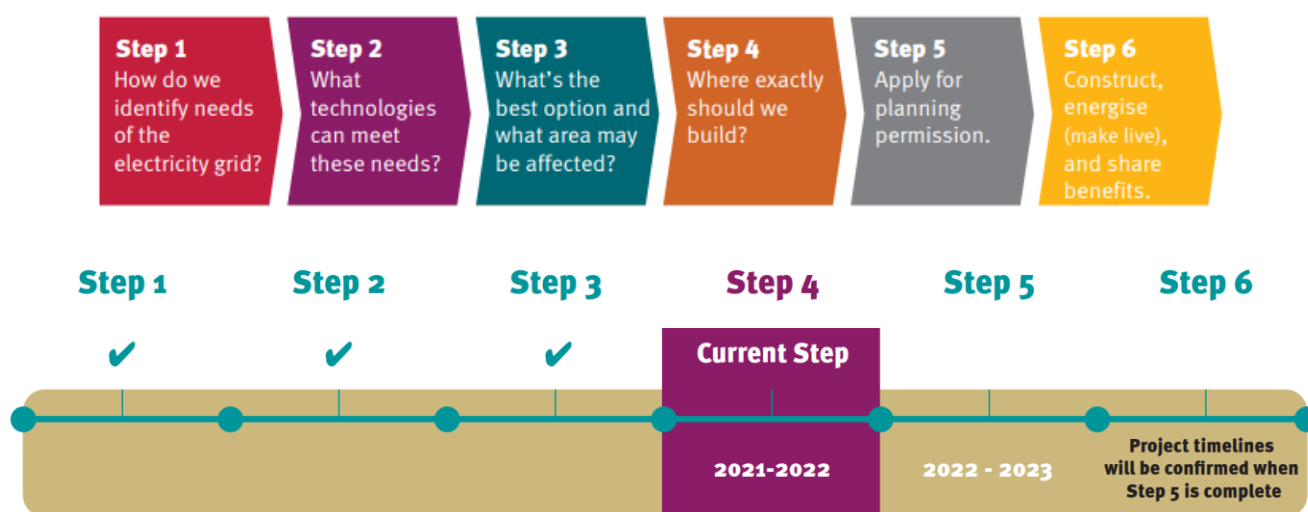


Figure A1-1: EirGrid's six-step approach and timeline for the project

What is the Kildare-Meath Grid Upgrade Project?

The project will help transfer electricity to the east of the country and distribute it within the network in Meath, Kildare and Dublin. The project will add a high-capacity electricity connection between Dunstown substation in Kildare and Woodland substation in Meath. The need for the project remains robust and will provide integration of electricity generation and an increase in demand on the East coast.

The project is essential to meet the Government of Ireland's Climate Action Plan target of up to 80% renewable energy generation by 2030, this includes transporting electricity from offshore renewable sources. It will also help meet the growing demand for electricity in the East. This growth is due mainly to increased population and economic activity in the region.

A significant number of Ireland's electricity generators are in the south and south west, where many wind farms and some modern electricity generators are located. The power they generate needs to be transported to where it is needed. The power is mainly transported cross-country on the two existing 400 kV lines from Moneypoint station in Clare to Dunstown substation in Kildare and Woodland substation in Meath. The proposed Kildare-

¹ <https://www.eirgridgroup.com/the-grid/projects/capital-project-966/the-project/>

² The preferred route as shown in Step 4B. It is Option A (Red) from Step 4A with some minor changes.

Meath Grid Upgrade will connect these two lines, and this will strengthen the transmission network by improving reliability and security in the region.

What Happened at Step 4A (the previous step of the project)?

The design of the proposed route options at Step 4A were based on the following routing principles:

- Avoid motorways;
- Maximise the use of national, regional and local roads;
- Avoid town centres and industrial estates;
- Avoid going off-road, through private land and through agricultural land where possible;
- Avoid sensitive natural and built heritage locations;
- Minimise impact on communities where possible; and
- Minimise the overall length of the route.

These routing principles align with EirGrid's five key assessment criteria - Environmental; Socio-Economic; Technical; Economic; and Deliverability. By following the routing principles, improved route options were designed. The routing process was refined through a Route Section Assessment and an End-to-End Assessment. Further details are in the Step 4A Report³.

Four route options were presented for public consultation between August and November 2021. The consultation process was promoted through on-site engagement in the project area, stakeholder engagement, public webinars, multi-channel advertisements and via the project website, and Community Forum meetings.

A Community Forum is established for each project that qualifies for an EirGrid Community Benefit scheme. The community forum for this project was established in July 2021. Each community forum develops a strategy for their specific community. A Community Forum does the following:

- Ensures communities are at the heart of the decision making over the project lifetime;
- Provides relevant input and key local knowledge to assist the project team in decision making;
- Works with community groups and organisations to build trust, identify local needs, grow partnerships and deliver on local projects;
- Provides governance and transparency around the implementation of Community Benefit;
- Receives regular updates from EirGrid team members on project delivery; and
- Advises EirGrid on the most effective approach to communicating feedback and key milestones to the wider community.

In March 2022, the Step 4A Report was published. This report described the process that has been completed during Step 4A and provided a comparative assessment of the four route options.

³ <https://www.eirgridgroup.com/site-files/library/EirGrid/KMGU-JAC-TN-0017-Step-4A-Report-08-03-2022-Compressed.pdf>

Option A (Red) was selected as the Emerging Best Performing Option⁴ as it scored more favourably in terms of Deliverability compared to the other options. Option A (Red) generally scored more favourably in four of the Deliverability topics compared to the other options – Design Complexity; Dependence on Other Projects; Permits and Wayleaves; and Implementation Timelines. Option A (Red) did score more highly than Options B and D and was equal to Option C for Traffic Disturbance because it has the most amount of in-road sections and potentially impacts more regional roads than the other options, which will increase traffic disturbance. While the potential traffic impacts will be temporary and restricted to the construction phase, in order to minimise the disturbance, traffic surveys will be undertaken to confirm this assumption. Other survey and design work will be completed to confirm the assumptions made on the required working area. In addition, localised route changes could be designed and assessed to minimise potential impacts further. Consultation will be undertaken with Meath and Kildare County Councils and other key stakeholders (such as Transport Infrastructure Ireland) to agree the approach to traffic management and avoid or reduce the potential impacts.

Option A (Red) also had less Socio-economic (community) impacts compared to other options. This is reinforced by the feedback received from respondents during the consultation period. Option A (Red) impacted the least amount of agricultural land and avoided concerns that the other options would have resulted in, such as, potential impacts to the settlement of Rathcoffey, and Ovidstown along the R403 and R406; and greater potential impacts to areas of amenity, such as Alexandra Bridge, near to Clane.

What Happened at Step 4B (the current step of the project)?

In Step 4A, Option A (Red) was re-examined to refine the route as far as possible to remove any wider areas (corridors) and to provide more certainty on the specific location. The five wider areas were shown in that way because these were off-road sections and further discussions were required with the affected landowners. Also, further surveys and design were needed to determine the best location for the cable route within these wider areas.

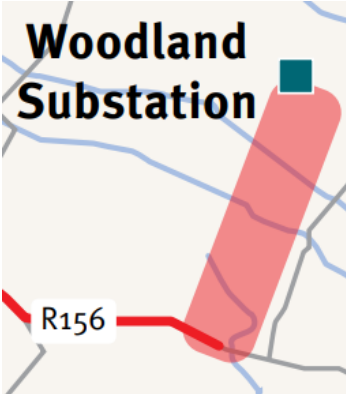
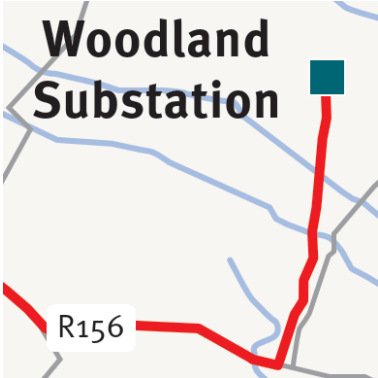



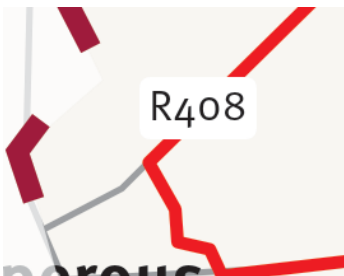
Option A (Red) from Step 4A provided a framework for the routing process at Step 4B. While it was explained in the Step 4A Report that route changes were a possibility because of further surveys and assessment, the project team sought to avoid significant changes. However, the Step 4B process had identified several areas where changes would result in an improved route. These changes are presented in Table A-1 and Table A-2 below. The changes were made for a number of reasons, such as reducing potential environmental impacts, or avoiding private lands. As a result, approximately 3% of the route (1.5km out of 51.4km⁵) has been moved from the route shown at Step 4A. The maximum movement of the cable route is 240m – this occurs on the approach to Dunstown substation where the route has moved 240m west from the location shown in Step 4A.

The one wider area that remains on the route is at the crossing point of the Grand Canal in Naas. Consultations with local stakeholders revealed that the area to the south of the canal is soft ground and is challenging in terms of ground conditions. A review of available geological data has not highlighted any significant constraints to construction in this area. However it was considered best to wait for the results of the ground investigations in this area and along the route. These results will inform the design and routing in this area.

⁴ The preferred route shown in Step 4A. This was Option A (Red).

⁵ At Step 4A, the cable route length was 51.4km.

Table A-1. Changes to Step 4A Wider Areas

Step 4A Wider areas	Step 4B Route	Reason for the Change at Step 4B (Best Performing Option)
 <p>Woodland substation to R156</p>		<p>This is now an off-road section approximately 3km in length through agricultural land. The use of the local roads in this area were ruled out because of two road bridges. These bridges are too shallow for a trench to be dug into them. Diversions around the bridges were ruled out because of potential impacts to residential properties and farm buildings. (Further information on the options considered in this area is outlined in Chapter 3 of this report).</p>
 <p>West of Kilcock</p>		<p>This section includes a crossing of the Rye Water, Royal Canal, Dublin-Sligo railway, and the M4. The route in this section will be a mixture of in-road⁶ along the R158 and R148, an off-road crossing of the Rye Water, and a crossing under the canal, railway, and the M4. From Commons West, the route travels to the south on the R407. (Further information on the options considered in this area is outlined in Chapter 3 of this report).</p>
 <p>East of Prosperous</p>		<p>This is an off-road section approximately 1.1 km in length through agricultural land. The section passes slightly to the west of the Study Area as previously shown, by approximately 220m. This decision was made in order to shorten the length of the cable route and to minimise potential impacts to landowners, hedgerows, and agricultural land. (Further information on the options considered in this area is outlined in Chapter 3 of this report).</p>

⁶ A section of the cable route that will be placed within an existing road. A trench will be dug in the road and the cable will be installed.




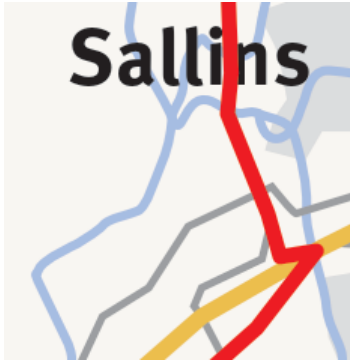
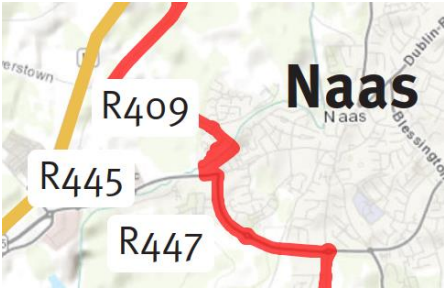

Step 4A Wider areas	Step 4B Route	Reason for the Change at Step 4B (Best Performing Option)
 <p>North of Sallins</p>		<p>This section is a mixture of in-road sections and off-road crossing through agricultural land. It will also pass close to the River Liffey, and the design will help avoid impacts to the landscape and ecology. (Further information on the options considered in this area is outlined in Chapter 3 of this report).</p>
 <p>Crossing of the M7</p>		<p>This section is a mixture of in-road and off-road sections. The route comes off the Sallins Bypass and crosses over agricultural land. The route crosses under the M7 in the existing underpass (Osberstown Road). The route then connects to the R407 (Millennium Parkway). (Further information on the options considered in this area is outlined in Chapter 3 of this report).</p>

Table A-2. Route Changes from Step 4A

Additional Areas of Changes	Reason for the Change at Step 4B
 <p>Grand Canal Crossing in Naas</p>	<p>This is a new wider area at Step 4B. A wider area is included in this section because further surveys on ground conditions are needed before the route can be finalised. The Naas Sports Centre and adjacent residential properties will be avoided. The canal could be crossed along the R409 (New Caragh Road) or with a crossing under the canal. (Further information on the options considered in this area is outlined in Chapter 3 of this report).</p>
 <p>Approach to Dunstown substation</p>	<p>This is a change from the route shown at Step 4A. The route was changed in this section to avoid a road bridge which is too shallow for the cable trench. The cable will now travel south west along the R448 for a greater length than at Step 4A, before turning east to connect with the R412. This change reduces potential environmental and social impacts. (Further information on the options considered in this area is outlined in Chapter 3 of this report).</p>

These changes have increased the length of the cable route from 51.4km to 52.6km – an increase of 1.2km. Within this 52.6km, there is also an increase of off-road length, from 6km to 7.9km.

This increase in off-road length is largely due to the changes at the Woodland substation, where the cable route is now off-road. As stated above, this is because local roads in the area were considered unsuitable because of two road bridges, which do not have sufficient depth for the cable trench. The increase in the overall length will increase the cost of the project. However, it was concluded that these route refinements were minor and did not change the assessment of Option A (Red) as presented in the Step 4A Report. It was concluded by the project team that Option A (Red) remained the Emerging Best Performing Option and that the route shown in this Step 4B Report is the Best Performing Option. It is possible that further changes will be required at Step 5, following further design, surveys, consultation, and assessment. However, these changes will be fully consulted upon with affected landowners, community forum, statutory bodies (such as Meath and Kildare County Councils), and details will be provided to the public through the EirGrid website and reports.

For the in-road sections the route is shown as the width of the road. Further design and assessment will refine the location of the cable within or adjacent to the road (e.g. in a footpath) at Step 5. For the off-road sections, the route is generally shown as up to a 40m wide strip. This width is mostly temporary construction areas and a smaller permanent easement above the cable, which will be required for future access and maintenance. The width of 40m is subject to ground conditions, severance issues, and other constraints. It may increase in size at watercourse crossings where additional land may be required for the proposed works. Additionally, in some locations along the in-road sections, an off-road crossing of a watercourse will be required. These areas are required where there is an existing bridge crossing of a watercourse. It is considered that those bridges would not have sufficient depth to accommodate a cable and so an off-road crossing is required.

Further design features will be added to the project at Step 5. These include jointing bays, passing bays, construction areas, access tracks, other associated works, and substation works. These works will be in the vicinity of the described route, however further surveys and assessment work is required before these elements can be designed. These elements will not affect the routing of the cable; however, they may result in additional temporary land requirements during the construction phase. Landowners will be consulted with directly to facilitate this.

A figure showing the Best Performing Option is presented in Appendix A of this report.

1. Introduction

1.1 Who is EirGrid?

EirGrid is responsible for a safe, secure and reliable supply of electricity – now and in the future. EirGrid develops, manages and operates the electricity transmission grid (the grid). This brings power from where it is generated to where it is needed throughout Ireland. EirGrid uses the grid to supply power to industry and businesses that use large amounts of electricity. The grid also powers the distribution network. This supplies the electricity used every day in homes, businesses, schools, hospitals and farms.

1.2 What is the Kildare Meath Grid Upgrade Project?

The project will help transfer electricity to the east of the country and distribute it within the network in Meath, Kildare and Dublin.

The project will add or upgrade a high-capacity electricity connection between Dunstown substation in Kildare and Woodland substation in Meath. The project is essential to meet the Government of Ireland's Climate Action Plan target of 80% renewable energy generation by 2030, which includes transporting electricity from offshore renewable sources. It will also help meet the growing demand for electricity in the East. This growth is due mainly to increased population and economic activity in the region.

A significant number of Ireland's electricity generators are in the south and southwest, where many wind farms and some modern electricity generators are located. The power they generate needs to be transported to where it is needed. The power is mainly transported cross-country on the two existing 400 kV lines from the Moneypoint station in Clare to the Dunstown substation in Kildare and Woodland substation in Meath (shown in Figure 1-1).



Figure 1-1: Cross-country 400 kV lines

To solve this emerging issue, EirGrid needs to strengthen the electricity network between Woodland and Dunstown substations to avoid capacity and voltage problems.

The project aims to strengthen the transmission network between Woodland and Dunstown substations – and EirGrid has assessed a number of technical solutions to do so. The project will have the following benefits:

- Competition - Apply downward pressure on the cost of electricity;
- Sustainability - Help facilitate Ireland's transition to a low carbon energy future;
- Security of Supply - Improve electricity supply for Ireland's electricity consumers;
- Economic - Contribute to the regional economy and support foreign direct investment; and
- Community - Deliver community benefit in the areas that facilitate the project infrastructure.

The need for the project has been established through a series of reports completed at Steps 1 to 4A (see **Figure 1-2** below for reference). These reports are available on the project website⁷. This series of studies identified the need for a new connection between Woodland and Dunstown substations and that an underground cable would be the best technology for this connection. The project is a high voltage (400 kV) underground cable between Woodland and Dunstown substations and the need for the project remains robust.

1.3 Purpose of this Report

EirGrid follow a six-step approach when they develop and implement the best performing solution option to any identified transmission network problem. This six-step approach is described in the document 'Have Your Say' published on EirGrid's website⁸. The six steps are shown at a high-level in **Figure 1-2**. Each step has a distinct purpose with defined deliverables and represents a lifecycle of a development from conception through to implementation and energisation.



Figure 1-2: EirGrid's six-step approach to developing the electricity grid

The project is currently in Step 4, where the project team, in consultation with stakeholders and the community, identifies exactly where the underground electricity connection will be built. The timeline for Step 4 can be seen in **Figure 1-3**.

⁷ <https://www.eirgridgroup.com/the-grid/projects/capital-project-966/the-project/>

⁸ <https://www.eirgridgroup.com/the-grid/projects/capital-project-966/related-documents/>

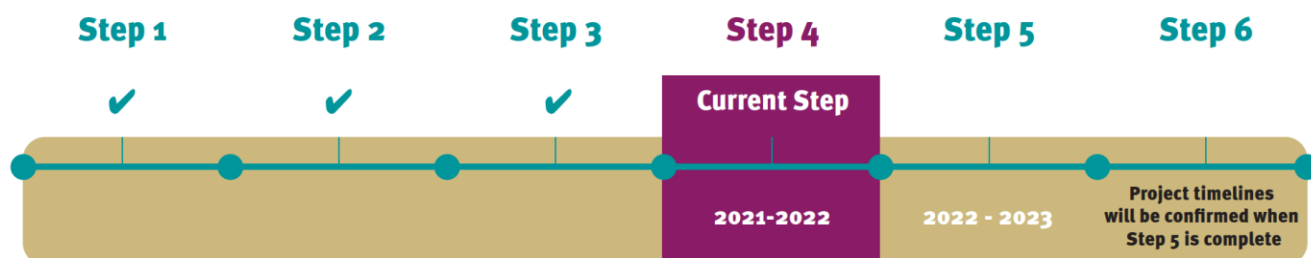


Figure 1-3: EirGrid's six-step timeline for the project

In Step 1, EirGrid identified the need for the project.

In Step 2, EirGrid compiled a shortlist of best performing technical options, which went out for public consultation between November 2018 and February 2019. This included a mix of overhead line, underground cable and up voltage technologies. Four of those options were taken forward to Step 3 in April 2019.

In Step 3, EirGrid re-confirmed the need for the project and investigated and consulted on the shortlisted technology options to strengthen the electricity network between the Woodland and Dunstown substations. In April 2021, EirGrid identified the 400 kV underground cable option as the best performing option to progress for this project.

As part of Step 4, EirGrid has identified four potential underground cable route options and have consulted on these. The four proposed route options have been assessed against five key assessment criteria (see also **Figure 1-4** below):

- Environmental factors;
- Socio-economic factors – such as the local economy and local amenities;
- Technical aspects;
- Deliverability factors – such as timeline and potential risks; and
- Economic factors.



Figure 1-4: EirGrid's Five Assessment Criteria for Projects

Step 4 has been divided into two sub-steps: Step 4A and Step 4B. This Step 4B Report identifies what EirGrid, following technical assessments and substantive public and stakeholder engagement and consultation, considers to be the Best Performing Option for the route of the underground cable. This report will be published and EirGrid will consider all feedback arising. Comments on this report can be made to EirGrid (See Chapter 4 of this report for further details) and they will be reviewed and considered by the project team. If design changes are required these will be detailed in the Step 5 reports. The Best Performing Option will be the route option taken forward to the planning process and the design will be finalised at that time.

1.4 Structure of this Report

This report is structured as outlined in Table 1.1.

Table 1-1. Report Structure

Chapter	Overview
Executive Summary	A summary of this report.
Chapter 1 Introduction	An outline of the report, a description of the project; and information on the approach to its development.
Chapter 2 Summary of Project to Date	An overview of the works that have been completed on the project at Step 4A and at Step 4B.
Chapter 3 Description of the Best Performing Option	This chapter of the report provides a description of the current cable route and highlights any changes from Step 4A.
Chapter 4 Next Steps	Information on providing comments on this report to EirGrid, and an overview of what the project team will do next (Step 5).

1.5 Accompanying Reports

The following reports accompany this Step 4B Report:

- EirGrid. 2020. Cable Feasibility Report. Available at:
<https://www.eirgridgroup.com/site-files/library/EirGrid/Cable-Feasibility-Report.pdf>
- EirGrid. 2021. Step 4A Environmental Constraints Report. Available at:
<https://consult.eirgrid.ie/system/files/materials/2055/Environmental%20Constraints%20Report%20-%20Step%204A%20-%20KMGU.pdf>
- EirGrid. 2022. Consultation Summary Report.
<https://www.eirgridgroup.com/the-grid/projects/capital-project-966/related-documents/>
- EirGrid. 2022. Step 4A Report. Available at:
<https://www.eirgridgroup.com/site-files/library/EirGrid/KMGU-JAC-TN-0017-Step-4A-Report-08-03-2022-Compressed.pdf>

2. Summary of Project to Date

2.1 Introduction

This chapter of the report provides an overview of the works that have been completed on the project at Step 4A. Further details are provided in the reports and mapping on the EirGrid website (see Chapter 1 of this report for the weblinks). This chapter also provides a description of the work that has been undertaken at Step 4B.

At Step 4A, Option A (Red) was presented as the Emerging Best Performing Option. This route option included five wider areas to allow for further refinement of the routing at Step 4B. That routing process has been completed and the majority of the wider areas have been removed and a route is provided. One wider area has been retained at the crossing of the Grand Canal (Corbally Section) in Naas. This is because ground investigations are required in this area to establish where and how the canal will be crossed within the wider area shown.

Figure 2-1 below provides a summary of the design process undertaken at Step 4A and 4B.

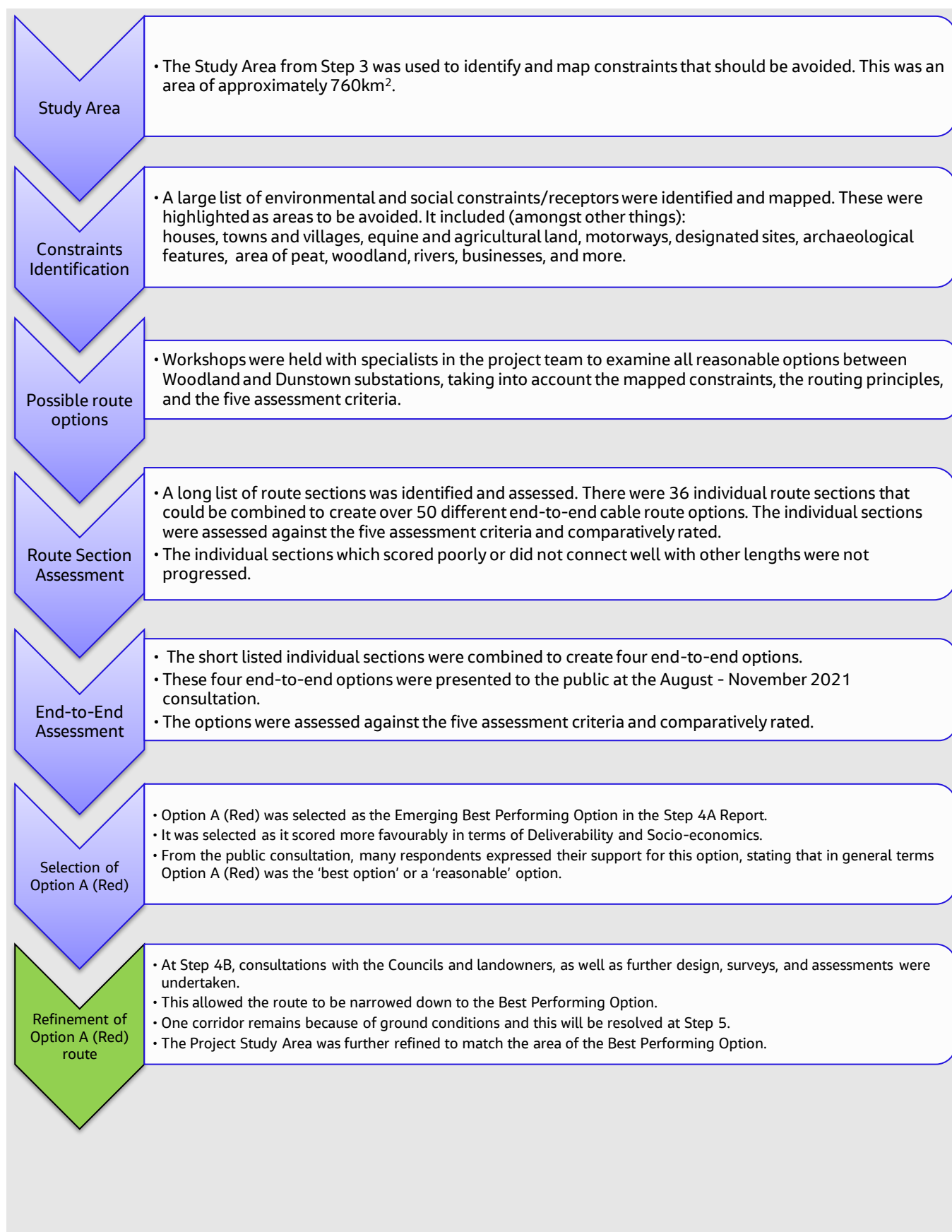


Figure 2-1: The Route Design Process for Step 4A and Step 4B

(Step 4A is shown in blue and Step 4B is shown in green)

2.2 Overview of Step 4A

In Step 4A, the project team re-examined the Study Area to design improved route options from the two feasible route options established during Step 3. The design of the proposed route options at Step 4A were based on the following routing principles:

- Avoid motorways;
- Maximise the use of national, regional and local roads;
- Avoid town centres and industrial estates;
- Avoid going off-road, through private land and through agricultural land where possible;
- Avoid sensitive natural and built heritage locations;
- Minimise impact on communities where possible; and
- Minimise the overall length of the route.

These routing principles align with EirGrid's five key assessment criteria - Environmental; Socio-Economic; Technical; Economic; and Deliverability. By following the routing principles, improved route options were designed. The routing process was refined through a Route Section Assessment and an End-to-End Assessment. This process culminated in four route options – as shown in **Figure 2-2**.

The four route options were presented for public consultation between August and November 2021.

The consultation process was promoted through Community Forum meetings, on-site engagement in the project area, stakeholder engagement, public webinars, multi-channel advertisements and via the project website.

A total of 108 responses were received during the public consultation. Consultation responses were received via an online portal (38), by email (nine) or by post (61). Public consultation has been an integral part of the project, with each response being considered in the routing of the project. A number of respondents expressed support for the overall project, highlighting that the project is needed, as it would bring economic benefits to the area by supporting job creation and by contributing to the development of a resilient energy network based on renewable energy sources. A number of respondents expressed support for the proposed route options generally following the road network, outlining that this would ensure ease of access for maintenance. A few of these responses outlined that the selection of roads should be determined by the amount of disruption on their use that the project would cause and emphasised that motorways should be avoided.

In March 2022, the Step 4A Report was published. This report described the process that has been completed during Step 4A, outlined the four route options, and provided a comparative assessment.

Option A (Red) was selected as the Emerging Best Performing Option as it scored more favourably in terms of Deliverability compared to the other options. It generally scored more favourably in four of the Deliverability topics compared to the other options – Design Complexity; Dependence on Other Projects; Permits and Wayleaves; and Implementation Timelines. Option A (Red) did score more highly than Options B and D and was equal to Option C for Traffic Disturbance because it has the most amount of road sections and potentially, impacts more regional roads than the other options, which will increase traffic disturbance. While the potential traffic impacts will be temporary and restricted to the construction phase, in order to minimise the disturbance, traffic surveys will be undertaken to confirm this assumption. Other survey and design work will be completed to confirm the assumptions made on the required working area. In addition, localised route changes could be designed and assessed to minimise potential impacts further. Consultation will be undertaken with Meath and Kildare County Councils (and Other key stakeholders such as Transport Infrastructure Ireland) to agree the approach to traffic management and avoid or reduce the potential impacts.

Option A (Red) also had fewer Socio-economic (community) impacts compared to other options. This is reinforced by the feedback received from respondents during the consultation period. Option A (Red) impacted the least amount of agricultural land and avoided concerns that the other options would have resulted in, such as potential impacts to the settlement of Rathcoffey, and Ovidstown along the R403 and R406; and greater potential impacts to areas of amenity, such as Alexandra Bridge, near to Clane.

Following the publication of the Step 4A Report, EirGrid held its eighth Community Forum and promoted the Emerging Best Performing Option for three weeks, including through local and regional press titles and radio including Kildare FM, the Meath Chronicle, Leinster Leader, Kildare Nationalist, and Liffey Champion, and on social media sites such as Facebook and Twitter. EirGrid corresponded with stakeholders throughout this period, including through emails, telephone calls, and information published on the EirGrid website to advise them of the Step 4A Report and the Emerging Best Performing Option.

EirGrid also engaged with a number of stakeholders through in-person information days and door-to-door site visits. Members of the EirGrid project team discussed the Step 4A Report and the Emerging Best Performing Option during these engagement days.

Between 29 March and 7 April 2022, EirGrid held six public information days in the following locations:

- The Grange, Sallins, Co. Kildare;
- Kilcock GAA Club, Co. Kildare;
- Two Mile House GAA Club, Co. Kildare;
- Blackhall Gaels GAA Club, Co. Meath;
- Naas Sports Centre, Co. Kildare; and
- Prosperous Parish Centre, Co. Kildare.

An Engagement Summary Report has been prepared which outlines the consultation responses since the publication of the Step 4A report and the Emerging Best Performing Option. This report is available on the project website⁹. Table 2-1 below provides a summary of key issues raised and how the project team have considered the comments.

Table 2-1. Post Step 4A Engagement Summary (2022)

Comment	Project Team Response
Potential disruption arising from the construction of the project, including lengthy roadworks and increased levels of traffic. The R125 should be closed because it is too narrow. The road between Mullagh and Kilcock should be closed and re-instated in better condition, meaning that the final route would have to be adjusted.	The Step 4A Report contained a multi-criteria assessment of the potential impacts at the construction phase, including traffic disruption. The construction phase impacts have been key considerations in the project to date and will be fully addressed in the Step 5 planning and environmental reports. Mitigation measures and traffic management will be included in those reports, following further consultation with key stakeholders like Meath and Kildare County Councils.
Land use - that the cable route would go through private land, could damage crops, and that land used may not be returned to	The routing principles have sought to avoid agricultural land as far as possible – roughly 15% of the total cable length is off-road (agricultural land). Agricultural liaison officers have met with the affected

⁹ <https://www.eirgridgroup.com/the-grid/projects/capital-project-966/related-documents/>

Comment	Project Team Response
its original condition.	landowners and discussed potential impacts from the project, and they will continue to discuss the project going forward. Reinstatement will be resolved during the construction phase.
Potential sterilisation arising from easement.	The easement will be discussed with the affected landowners to minimise impacts as far as possible.
Overhanging trees on the 'Red Road' and that re-aligning the road could have potential adverse impacts on the Rath. The Red Road should be re-instated following completion of the project.	The Red Road will be avoided following routing at Step 4B.
Details requested with EirGrid's ecologist on planting.	Contacts are available and EirGrid are happy for any such discussions.
Potential impact to the 'North-South' Interconnector.	The Kildare Meath project does not cross the proposed North-South Interconnector and so there will be no impacts. Both are important project for Ireland's electrical grid.
Cycling routes are considered during construction.	Provision will be allowed for cyclists in the construction traffic management. Mitigation measures and traffic management will be included in the Step 5 reports, following further consultation with key stakeholders like Meath and Kildare County Councils.
Compensation is supplied for sterilisation from easement, per linear metre across farm land, and for crop loss and damages. That there should be arrangements to facilitate dairy farming, including milk and silage production.	Agricultural liaison officers have met with the affected landowners and discussed potential impacts from the project, and they will continue to discuss the project going forward.
More detailed maps should be provided so that residents can identify the proximity of the route in relation to their properties.	More detailed maps have been provided on the project website and in this Step 4B Report.
If the road is to be dug up, other utilities such as cables should also be placed underground.	EirGrid is consulting with key stakeholders like Meath and Kildare County Councils and utilities providers.
The route may run through their land and farms or be in close proximity to their residence.	Agricultural liaison officers have met with the affected landowners and discussed potential impacts from the project, and they will continue to discuss the project going forward. The cable route has tried to maximise the distance from all residential properties in-line with the routing principles.

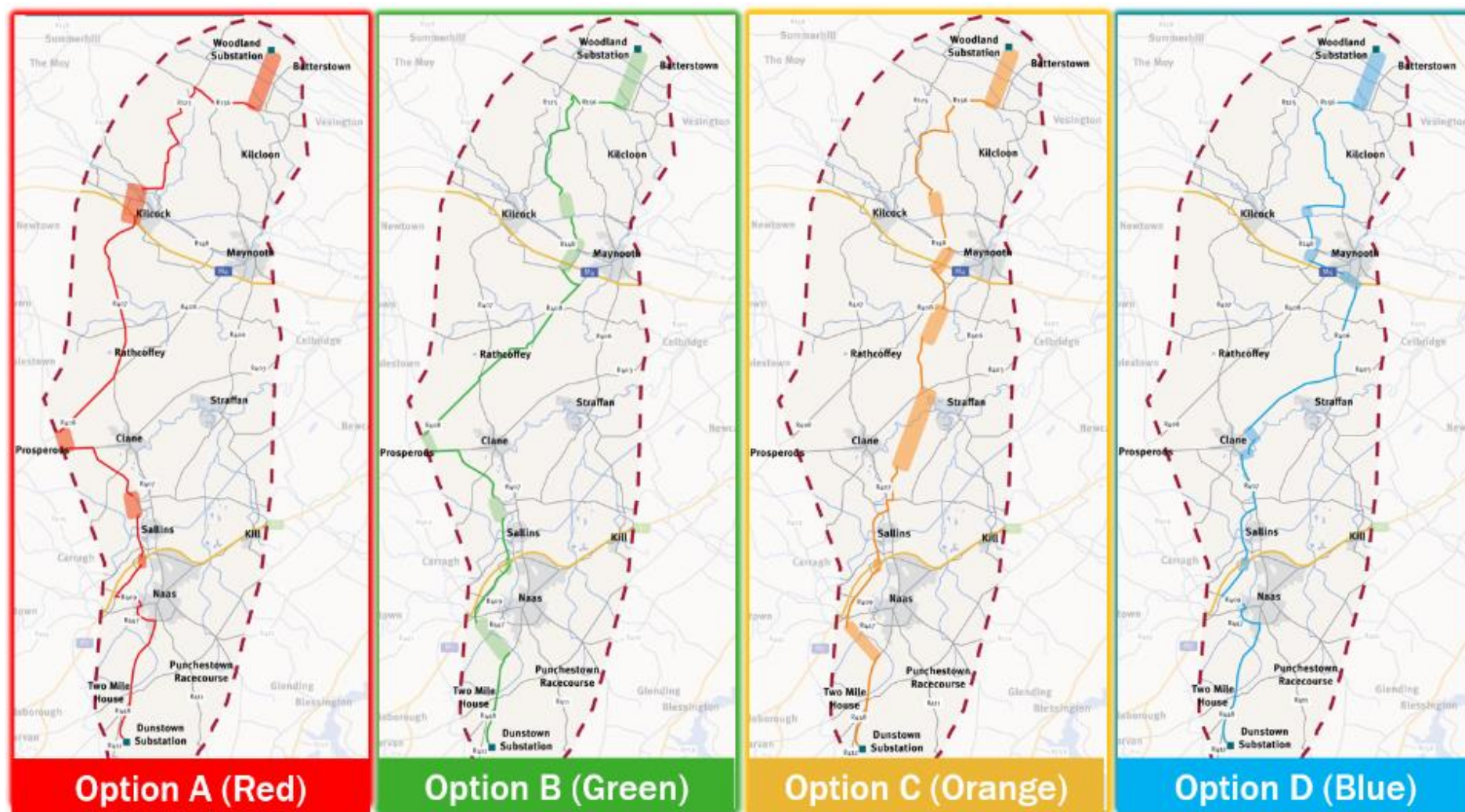


Figure 2-2: Shortlisted Options - shown in Step 4A Public Consultation (2021)

2.3 Approach to Step 4B

In Step 4B, Option A (Red) was re-examined to refine the route as far as possible to remove any wider areas (corridors) and to provide more certainty on the specific location. The five wider areas shown at Step 4A were shown in this way as these were off-road sections and further discussions were required with the affected landowners. Further surveys and design were needed to determine the best location for the cable route within these wider areas.

Option A (Red) from Step 4A provided a framework for the routing process at Step 4B. While it was explained in the Step 4A Report that route changes were a possibility because of further surveys and assessment, the project team sought to avoid significant changes. However, the Step 4B process had identified several areas where changes would result in an improved route. These changes are presented in Table 3-1 and Table 3-2 below. The changes were made for a number of reasons, such as reducing potential environmental impacts, reducing road closures, or avoiding private lands. As a result, approximately 3% of the route (1.5km out of 51.4km¹⁰) has been moved from the route shown at Step 4A. The maximum movement of the cable route is 240m – this occurs on the approach to Dunstown substation where the route has moved 240m west from the location shown in Step 4A.

The Step 4B process involved close cooperation between all members of the project team – agricultural liaison officers, and specialists in the fields of deliverability, technical, economic, environmental and socio-economic factors. This multi-disciplinary team, along with input from the stakeholders, landowners and the community ensured that the Best Performing Option would be selected through a consideration of all relevant issues.

Consultations were held with potentially affected landowners. This allowed landowner input into the potential routing and provided more information on ground conditions, environmental constraints, and farming practices that were considered in the routing process. At this time, further surveys and assessment were undertaken to determine how the route could be refined in order to avoid or reduce the potential environmental and social impacts, and to take account of technical issues. Issues such as the cable rating and the need to maintain the structural integrity of the cable (i.e. the cable must bend and not make 90° turns) have been factored into the routing. This process also included the technical assessment of the roads affected by the cable, for example, stone arch bridges in the existing roads may not be suitable for the digging of a cable trench. This is because the depth of the bridges below the roads are generally quite shallow. In these cases, off-road crossings adjacent to the bridges have been assessed to be the best solution, subject to the crossing methods including site-specific environmental mitigation. These locations are identified in Chapter 3 below.

Environmental and social considerations were addressed through aerial mapping, consultation with statutory bodies, field surveys, along with input from the landowners and the community, and discussions as a project team.

This process allowed for the consideration of all factors and for the project team to discuss potential routing options for the cable. The Step 4B Best Performing Option was chosen from this process and is detailed in Chapter 3 below.

The Project Study Area at Step 4A was roughly 340km² – a reduction of approximately 55% from the Step 3 Project Study Area, covering all four of the proposed route options. After the selection of Option A (Red) as the Emerging Best Performing Option, the Project Study Area was further refined to cover this area. The current Project Study Area is shown in Figure 2.3. It covers an area of 137 km² – a reduction from the Step 4A area of approximately 60%. These refinements have allowed community engagement to be focused to the relevant area of the route.

¹⁰ At Step 4A, the cable route length was 51.4km.



Figure 2-3: Step 4B Project Study Area

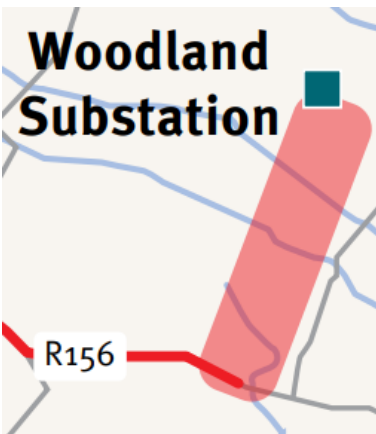

3. Description of the Best Performing Option

This chapter of the report provides a description of the Best Performing Option at Step 4B. The route described is based on the previous design and assessment work, surveys from Step 4A with updates at this Step, and consultations with the public, landowners, and statutory bodies. Further work will be undertaken as the project moves into Step 5 and this could result in some changes to the route as described. This could be because of new information from ground investigations, new constraints identified from environmental surveys or new details provided by the affected landowners. Any changes will be fully described in the Step 5 reports. The changes will be made because of technical, deliverability, or economic reasons, or to avoid or reduce potential impacts to the environment or to communities living along the cable route. Any changes will be fully described in the Step 5 reports.




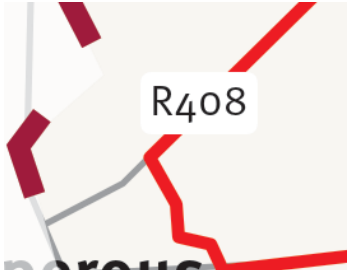

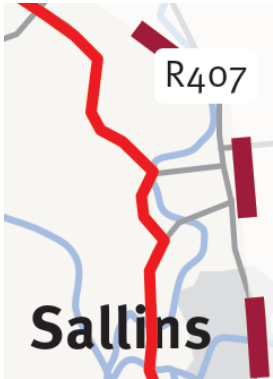
3.1 Route Changes from Step 4A

The work that has been undertaken by the project team has allowed the refinement of the Emerging Best Performing Option that was shown at Step 4A. Option A (Red), as shown at Step 4A, had five wider areas and these are shown in Figure 2-2. It was necessary to show these wider areas as further design, assessment and consultation was required. In Step 4B, only one wider area remains – the crossing point of the Grand Canal in Naas. Consultations with local stakeholders revealed that the area to the south of the canal is soft ground and was described as challenging in terms of ground conditions. Geological data from Geological Survey Ireland¹¹ have been reviewed and no recorded significant constraints to construction in this area were identified. However, it was determined by the project team that it would be prudent to undertake further surveys at this location before identifying the crossing type. Ground investigations are proposed in this area and along the route. These results will allow the design in this area to be resolved at Step 5. Further details are provided in the text below with a summary of the key changes in Table 3.1 and Table 3.2.

Table 3-1. Changes to Step 4A Wider areas

Step 4A Wider Areas	Step 4B Route	Reason for the Change at Step 4B (Best Performing Option)
 <p>Woodland Substation to R156</p>		<p>This is now an off-road section approximately 3km in length through agricultural land. The use of the local roads in this area were ruled out because of two stone arch road bridges on the Red Road. These bridges are too shallow for a trench to be dug into them (Further information on the options considered in this area is outlined below).</p>

¹¹ <https://www.gsi.ie/en-ie/data-and-maps/Pages/default.aspx>

Step 4A Wider Areas	Step 4B Route	Reason for the Change at Step 4B (Best Performing Option)
 <p>West of Kilcock</p>		<p>The route in this area will be a mixture of an in-road along the R158 and R148, an off-road crossing under the Rye Water, and crossing under the canal, railway, and the M4. From Commons South, the route travels to the south on the R407 (Further information on the options considered in this area is outlined below).</p>
 <p>East of Prosperous</p>		<p>This is an off-road section approximately 1.1 km in length through agricultural land. The section passes slightly to the west of the Study Area previously shown by approximately 220m. This decision was made in order to shorten the length of the cable route and to minimise potential impacts to landowners, hedgerows (through fewer hedge breaks), and agricultural land (Further information on the options considered in this area is outlined below).</p>
 <p>North of Sallins</p>		<p>This section is a mixture of in-road sections and off-road crossing through agricultural land. It will also pass close to the River Liffey, and the design will help avoid impacts to the landscape and ecology (Further information on the options considered in this area is outlined below).</p>



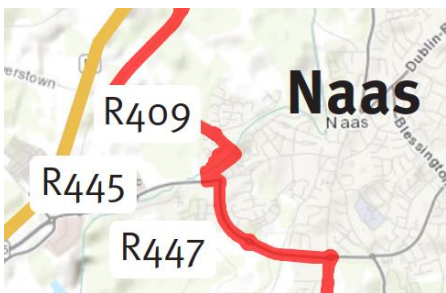
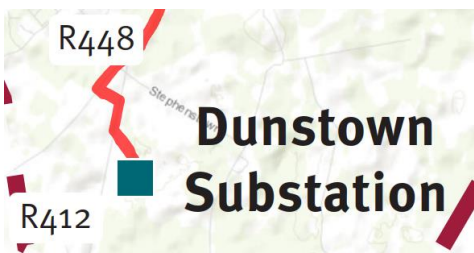
Step 4A Wider Areas	Step 4B Route	Reason for the Change at Step 4B (Best Performing Option)
 <p>Crossing of the M7</p>		<p>This section is a mixture of in-road and off-road sections. The route comes off the Sallins Bypass and crosses over agricultural land. The route crosses under the M7 in the existing underpass (Osberstown Road). The route then connects to the R407 (Millennium Parkway) (Further information on the options considered in this area is outlined below).</p>

Table 3-2. Route Changes from Step 4A

Additional Areas of Changes	Reason for the Change at Step 4B
 <p>Grand Canal Crossing in Naas</p>	<p>This is a new wider area at Step 4B.</p> <p>A wider area is included in this section because further surveys on ground conditions are needed before the route can be finalised. The Naas Sports Centre and adjacent residential properties will be avoided. The canal could be crossed along the R409 (New Caragh Road) or with a crossing under the canal. (Further information on the options considered in this area is outlined in Chapter 3 of this report).</p>
 <p>Approach to Dunstown Substation</p>	<p>This is a change from the route shown at Step 4A.</p> <p>The route was changed in this section to avoid a road bridge which is too shallow for the cable trench. The cable will now travel south west along the R448 for a greater length, before turning east to connect with the R412. This change reduces potential environmental and social impacts. (Further information on the options considered in this area is outlined in Chapter 3 of this report).</p>

3.2 Cable Details

The route shown in this report is based on a 2.1m wide trench (see Figure 3-1 below). It is possible that this width will be decreased when further technical assessments are completed at Step 5. However, 2.1m is the maximum width expected that could be used on this project and is used here as a reasonable “worst case”. A narrower cable trench will mean less construction activities and less road closures. These issues will be addressed at Step 5. In some areas, e.g. at watercourse crossings, it may be necessary to widen the cable route to overcome physical constraints present.

For the on-road sections, the route is shown as the width of the road. Further design and assessment will refine the location of the route within or adjacent to the road (e.g. in a footpath) at Step 5. For the off-road sections, the route is generally shown as a 40m wide strip. The width of 40m is subject to ground conditions, severance issues, and other constraints. It may increase in size at watercourse crossings where additional land may be required for the proposed works (e.g. Horizontal Directional Drilling (HDD)). This 40m width is mostly temporary construction areas within this area will be a smaller permanent easement above the cable, which will be required for maintenance.

In some on-road sections, an off-road crossing of a watercourse will be required. These areas are described below and are needed at some existing bridge crossings of watercourses. At this time, it is considered that those bridges would not have sufficient depth to accommodate a cable and so an off-road crossing is required. The cable trench is typically 1.5m in depth and that can change because of ground conditions or the presence of constraints, such as other utilities. Stone arch bridges that carry roads over watercourses may not have sufficient depth for cable trenches such as the Kildare-Meath Grid Upgrade project. An on-site assessment of the bridges was made by technical experts. Where it was determined that it would not be possible to dig the trench into the bridge, alternative designs were considered.

Further design features will be added to the project at Step 5. These include jointing bays, passing bays, construction areas, access tracks, other associated works, and substation works. These works will be in the vicinity of the described route, however further surveys and assessment work are required before these elements can be designed. These elements will not affect the routing of the cable; however, they may result in additional land requirements and landowner engagement.

Jointing bays (underground chambers) will also be constructed along the cable routes and are used to join together ('joint') consecutive lengths of cable and to facilitate the cable pulling. Typically, jointing bay separation for a cable is between approximately 500m and 750m. To facilitate traffic management at locations where jointing bays are to be located within the carriageway, the use of temporary passing bays is proposed. These are strips of land at the edge of a public road on one side of a jointing bay (approximately 50-80m in length), that are temporarily cleared and laid with a hard surface in order to facilitate vehicle movements around the jointing bay, thereby avoiding or minimising the need for road closures. This will entail removing the top layer of ground to the side of the carriageway (including removal of hedges if present) and temporarily storing it locally to the site for reinstatement following the works. New hedges would be planted as part of re-instatement works.

Other traffic control measures will also be implemented as appropriate along the cable routes. These are likely to include road diversions, temporary closures and stop / go traffic management. All traffic management measures will be implemented in the context that the laying of cable is a linear construction process, which will be done in smaller sections along the cable route. This means that not all roads along the cable route will be disrupted at the same time during construction.

A number of crossings of watercourses, drainage ditches, utilities, railway lines and motorways will also be required along the cable route. These crossings will be designed at Step 5 but typical crossing techniques include cable bridge, open-cut trenching or by use of HDD. The specific detail of each crossing will be developed at Step 5 of the project but an overview of the techniques are:

- Cable bridge – a structure to pass cables over an area such as a watercourse. Measures are designed in to prevent unauthorised access to the structure;
- Open-cut trenching – an excavated area dug through fields where the cable is constructed. Where it is done through watercourses, the water flow is temporarily diverted with pipes around the area of work and the watercourse is then reinstated; and
- Horizontal Directional Drilling (HDD) – one of a number of trenchless techniques. A drilling rig launches a bore underground and it is guided in the desired direction. The cable is then laid in the drilled hole. There is no above ground works except for the start and end points of the hole.

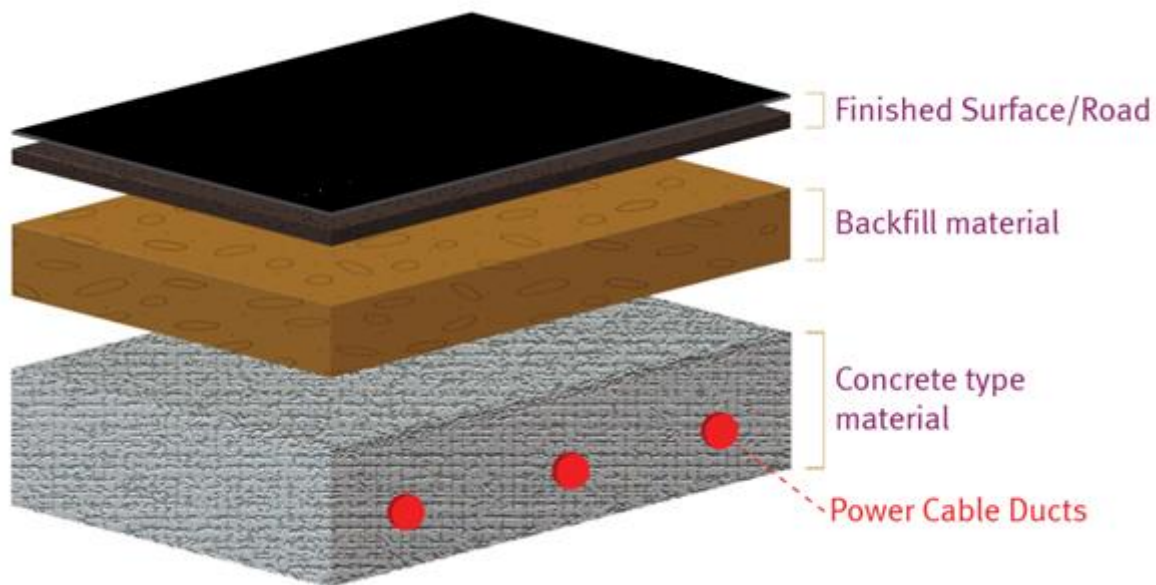


Figure 3-1: Indicative High-Voltage Alternating Current (HVAC) Cable Duct Arrangement (single conductor per phase solution)

The following sections of this chapter describe the Best Performing Option travelling from Woodland substation to Dunstown substation. For ease of reference the route has been broken into sections in this report. At the construction phase, the route may be progressed by multiple construction teams. This will be addressed in the Step 5 reports.

Please see Appendix A for a figure showing the Best Performing Option.

3.3 Woodland to R156

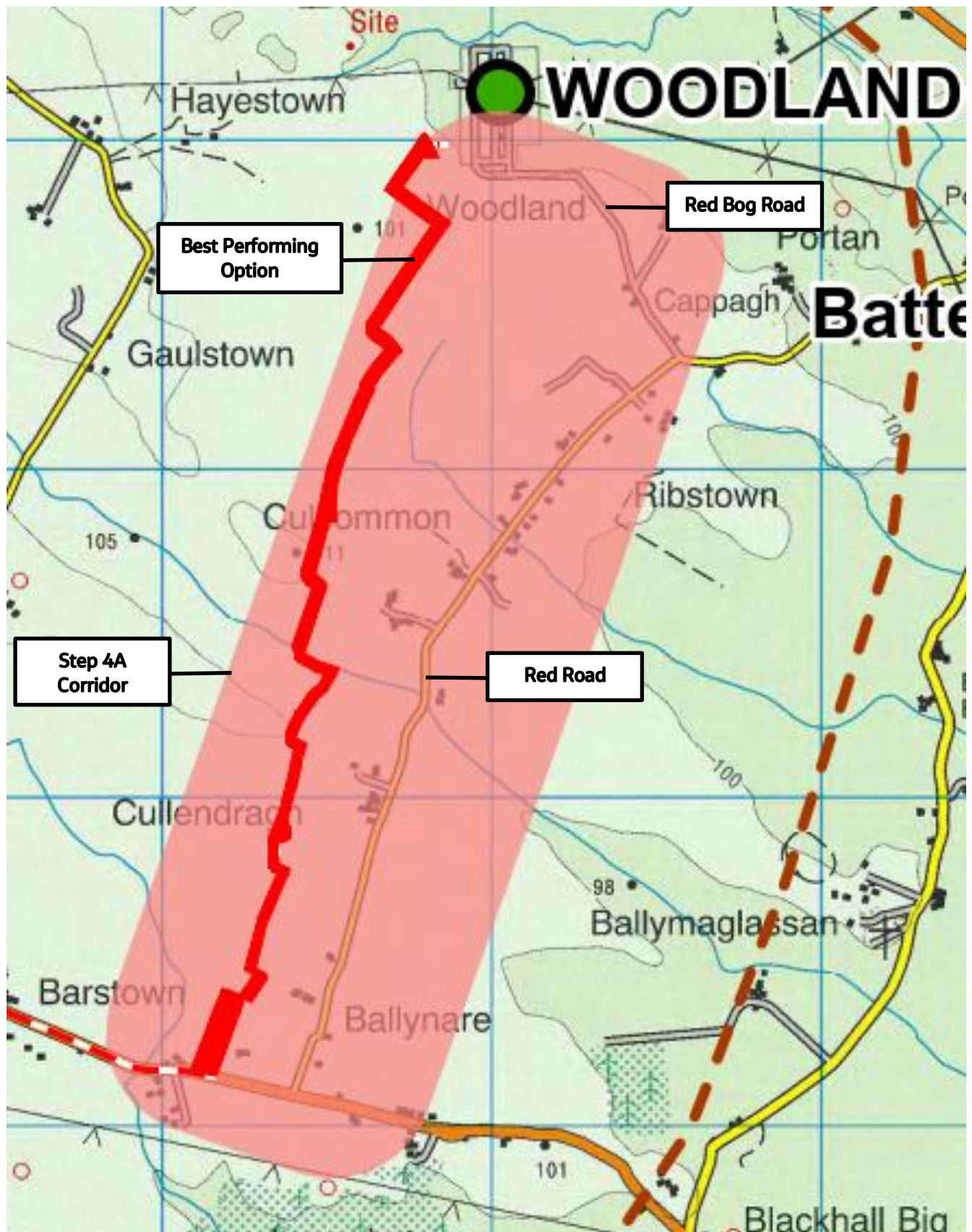


Figure 3-2: Woodland to R156

At Step 4A, a wider area was shown travelling from the substation in a south-westerly direction to the R156. At Step 4B, there were a number of routing options that were considered in-line with the routing principles for the project (See Chapter 2 of this report for further details). The option of an in-road section using the Red Bog Road and the Red Road to connect to the R156 was considered. However, this was ruled out because there are two existing in-road stone arch bridges, which were assessed to be unsuitable for trenching (See Section 3.2 for further details). Alternative design solutions (such as cable bridges) and off-road routes were considered in these areas; however, the area is constrained by residential properties and farm buildings adjacent to the bridges. Short off-road diversions at the bridges would have resulted in impacts to the properties and farm buildings and so this was ruled out.

These issues required the project team to identify an alternative off road route. This is in-line with the routing principles for the project, which aim to find the best overall option considering all issues. While there is a preference for on-road sections in the routing principles, that preference is to be considered on balance with all factors. In this case an off-road route was determined to be the Best Performing Option in this location.

Consultation with landowners between Woodland substation and the R156 helped to identify a viable route for the cable. Potential impacts to the affected area have been discussed and the route has sought to minimise the effects.

The route will cross approximately 17 hedgerows and treelines and there will be a crossing of the Dunboyne Stream_010¹². There are field drains along hedgerows and treelines which require crossing. Where it is required, mitigation will be proposed to avoid or reduce the potential impacts in the Step 5 reports. There are no known archaeological features directly impacted by the proposed route. An assessment of the potential impacts of the proposed route was undertaken in the Step 4A Report for the project¹³; however further assessment will be undertaken at Step 5.

Part of the cable route is shown outside of the north west corner of the wider area. This is because of the field boundary in this area and the small area outside of the wider area has been included to avoid severance of this land.

As noted above, additional design features may be added at Step 5, but these will generally be accommodated within the area stated. In certain areas, it may be necessary to expand the temporary working area. This will be determined at Step 5.

¹² The watercourse will be known by a local name. This technical name is the Water Framework Directive (WFD) water body name assigned by the Environmental Protection Agency and these names for WFD water bodies are used in this report for consistency.

¹³ <http://www.eirgridgroup.com/site-files/library/EirGrid/KMGU-JAC-TN-0017-Step-4A-Report-08-03-2022-Compressed.pdf>

3.4 R156 to Kilcock

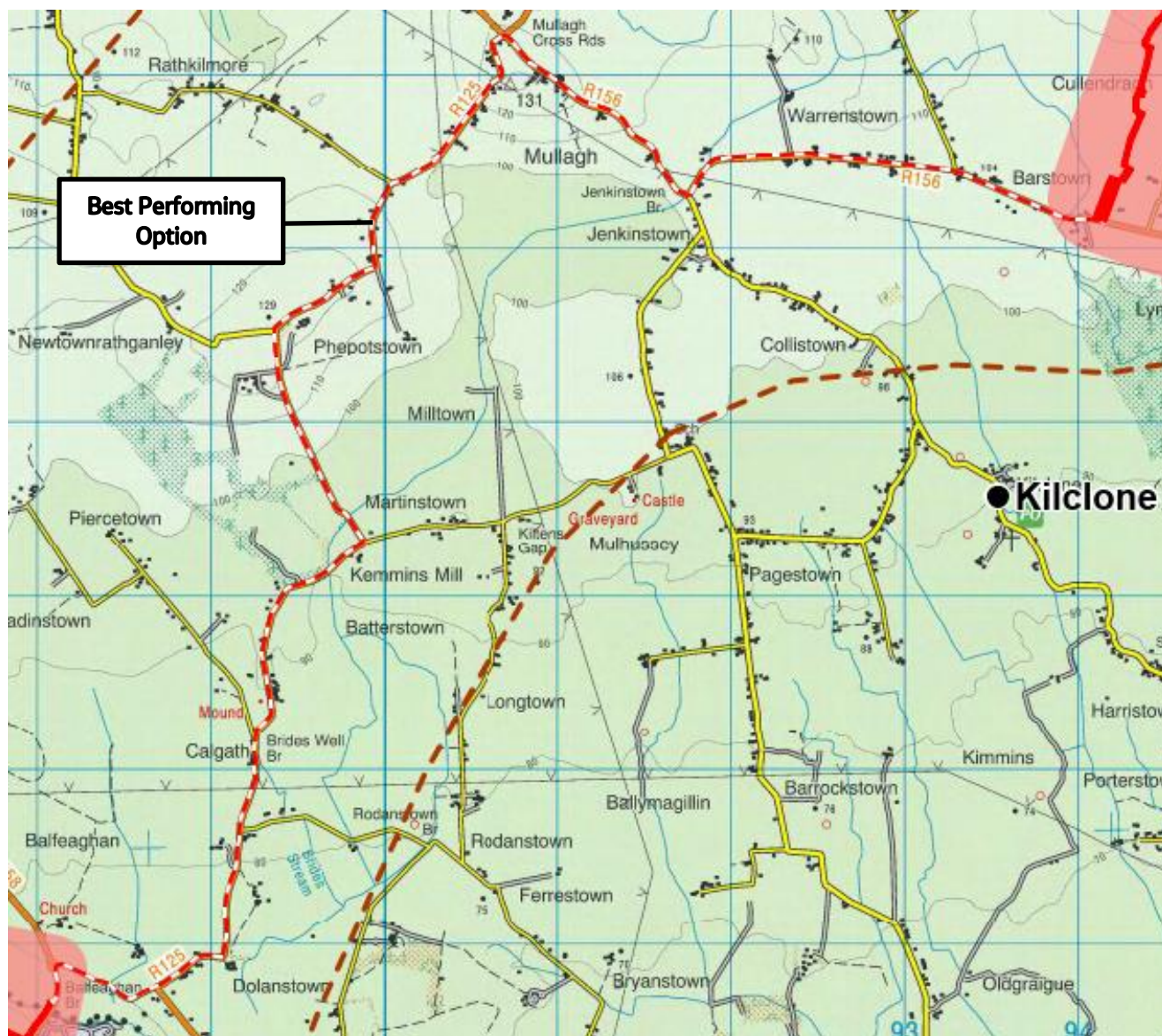


Figure 3-3: R156 to Kilcock

This section of the route (See **Figure 3-3**) is largely in-road with eight off-road sections for watercourse crossings. These are required where there is an existing stone bridge in the road. Technical assessments have determined that the bridges are unlikely to be suitable to accommodate the proposed cable because of the depth of the bridge. The crossing types at the stone arch bridges and other watercourses could be trenched or trenchless crossings, such as cable bridges or HDD. The crossing type will be resolved at Step 5 following further surveys, assessment, and consultations with affected landowners, Meath and Kildare County Councils and other key stakeholders (such as Inland Fisheries Ireland).

This section of the route joins the R156 close to the Barstown Industrial Estate. At the entrance to the Estate, there will be an off-road crossing of the Rye Water_030 water body. The route travels west along the R156 towards the townland of Jenkinstown. At the junction of the R156 and the Jenkinstown Road (a local road), there are water bodies including the Jenkinstown Stream_010 to the north and west of the junction. It is proposed to cross the water body to the south of the junction and then reconnect to the R156. A technical assessment was made and it was determined by the project team that the existing bridge was unsuitable for trenching. Options for off-road sections to the north and south of the junction were assessed. Because of field

drains and the agricultural land to the north, it was determined that an off-road section to the south was the best option.

From this location, the route travels to the north west along the R156 towards the Mullagh crossroads. It was determined by the project team that the best option for the route was to continue in-road through the crossroads rather than passing over agricultural land and impacting the landowner to the south of the crossroads. From the crossroads, the route turns south west along the R125 towards Kilcock. It continues for several kilometres, passing the front entrance to the Larchill Arcadian Gardens. Potential mitigation measures may be designed, in consultation with the owners to avoid/reduce any potential impacts to access to this tourism and community asset. Along this section of the route there are additional off-road crossings of the Jenkinstown Stream_010 and its tributaries:

- Mullagh townland – Jenkinstown Stream_010 tributary;
- Phepotstown townland – Jenkinstown Stream_010;
- Phepotstown townland – Jenkinstown Stream_010; and
- Phepotstown townland – Jenkinstown Stream_010 tributary.

Continuing towards Kilcock, an off-road crossing will be provided for the Rye Water_020 water body in the townland of Calgath. Before the roundabout junction with the R158 in Balfeaghan, there will be another off-road crossing of the Rye Water_020.

3.5 West of Kilcock

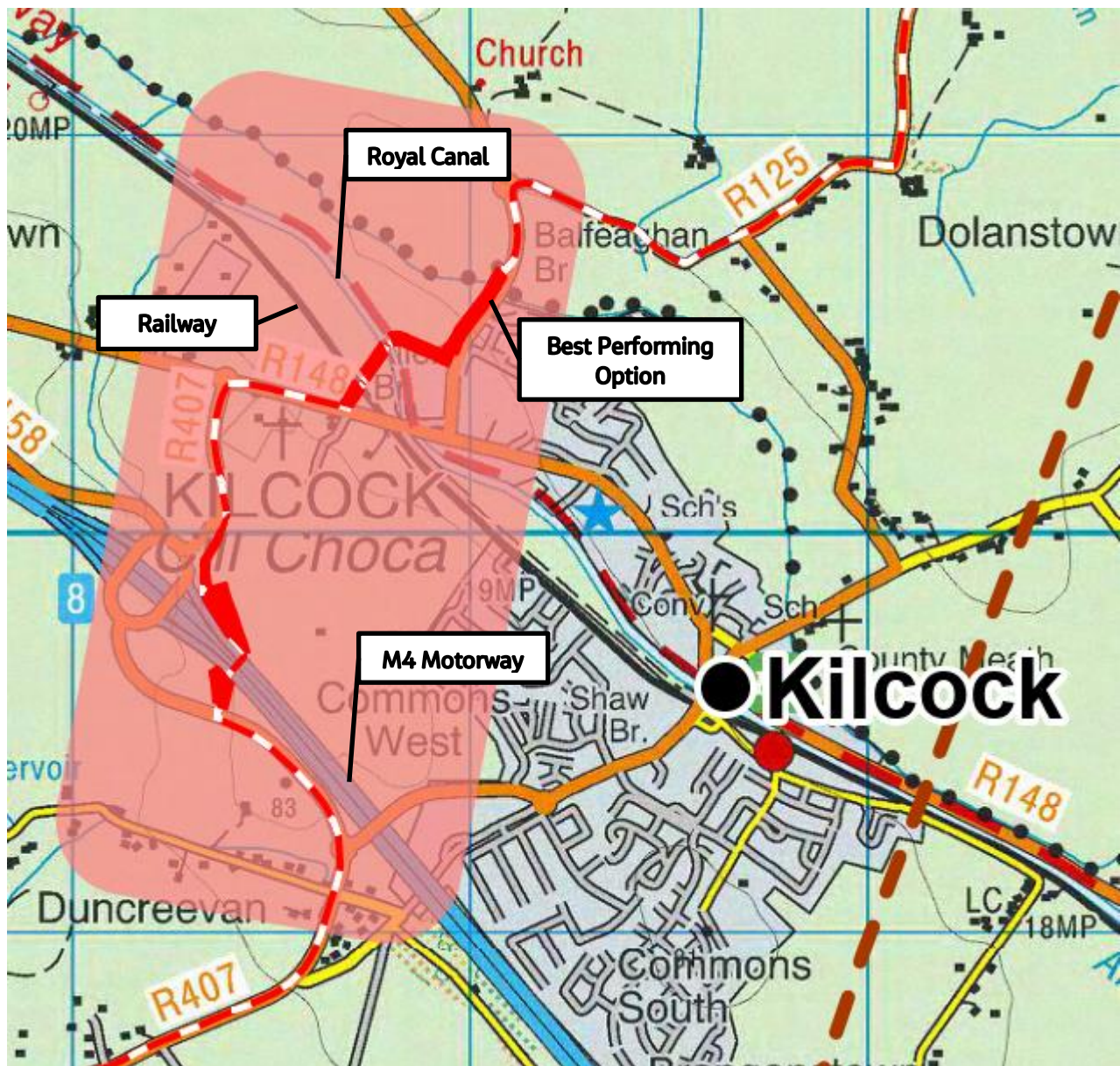


Figure 3-4: West of Kilcock

At Step 4A, the wider area was shown travelling to the west of Kilcock. This section of the route within the wider area is mostly off-road and will have several crossings – Rye Water_010; Royal Canal; Dublin-Sligo railway; and the M4 motorway. The route will travel south of the roundabout on the R158 until the Balfeaghan Bridge. This triple arch masonry bridge has been assessed to be unsuitable for a cable crossing and it will be avoided. The cable will pass to the west of the bridge and there will be a trenchless crossing of the Rye Water_010 water body. The crossing will be to the west as the cable must travel to the south west to avoid Kilcock and to a location suitable for crossing the canal and railway. From the Rye Water_010 the route will cross land zoned for industrial development, which is currently agricultural land. A crossing (e.g. HDD) will be provided to pass under the Royal Canal and the Dublin-Sligo railway. The use of HDD will avoid any impacts to the users of the canal, its adjacent walkway, and to the railway line. From that location the route will travel along the R148, and then the R158 (M4 slip road) until another crossing (e.g. HDD) for the M4 Motorway. From here the route will travel south along the R407.

Alternative options were assessed in this area in order to optimise the route of the cable. In-line with the project's routing principles, a route through Kilcock was ruled out due to the potential temporary construction disruption to the town and its residents. The selected route parts from the R158 to the north of the Balfeaghan Bridge; however, continuing the route along the R158 was also assessed. This option would have resulted in disruption at the busy junction with the R148 to the east of Allen Bridge. Allen Bridge was assessed to be unsuitable for trenching following an on-site technical assessment and so a route along the bridge was also ruled out.

It would have been feasible to have a HDD crossing under the R158 and R148 junction but that was ruled out as the route would have passed under Mulligans Solid Fuel business and under the Royal Canal, and with additional restrictions on the working area due to residential properties in the area. This option was also ruled out as to continue south from this area would have crossed the Commons West area which is marked in the Kilcock Local Area Plan¹⁴ for a mix of residential, amenity, and community and educational purposes.

The Best Performing Option in the Kilcock area was identified as having an off-road crossing of the Royal Canal and railway line, avoiding the junction of the R158 and R148. This was assessed to avoid impacts to Kilcock in terms of temporary traffic disruption during construction and to the residents that would have been adjacent to the proposed works. From that area, the route continues along the R148 to the west. Options to travel off-road to the south were ruled out because of the cemetery, existing residential properties, and proposed residential development on current agricultural land. It was determined that the route alongside the R158 (link road to the M4 Motorway) was the best route in this area. A crossing point to the east of the motorway junction (Junction 8) was identified. The area of the junction was avoided following consultations with Transport Infrastructure Ireland because of the volume of traffic using the junction and the likely traffic disruption during construction.

The Best Performing Option in this area was selected taking into consideration the other potential options, the potential impacts, and in-line with the routing principles for the project.

¹⁴ Available at: <https://kildarecoco.ie/AllServices/Planning/LocalAreaPlans/LocalAreaPlans/KilcockLocalAreaPlan2015-2021/Adopted%20Kilcock%20LAP%2020152021.pdf>

3.6 Kilcock to Firmount Crossroads

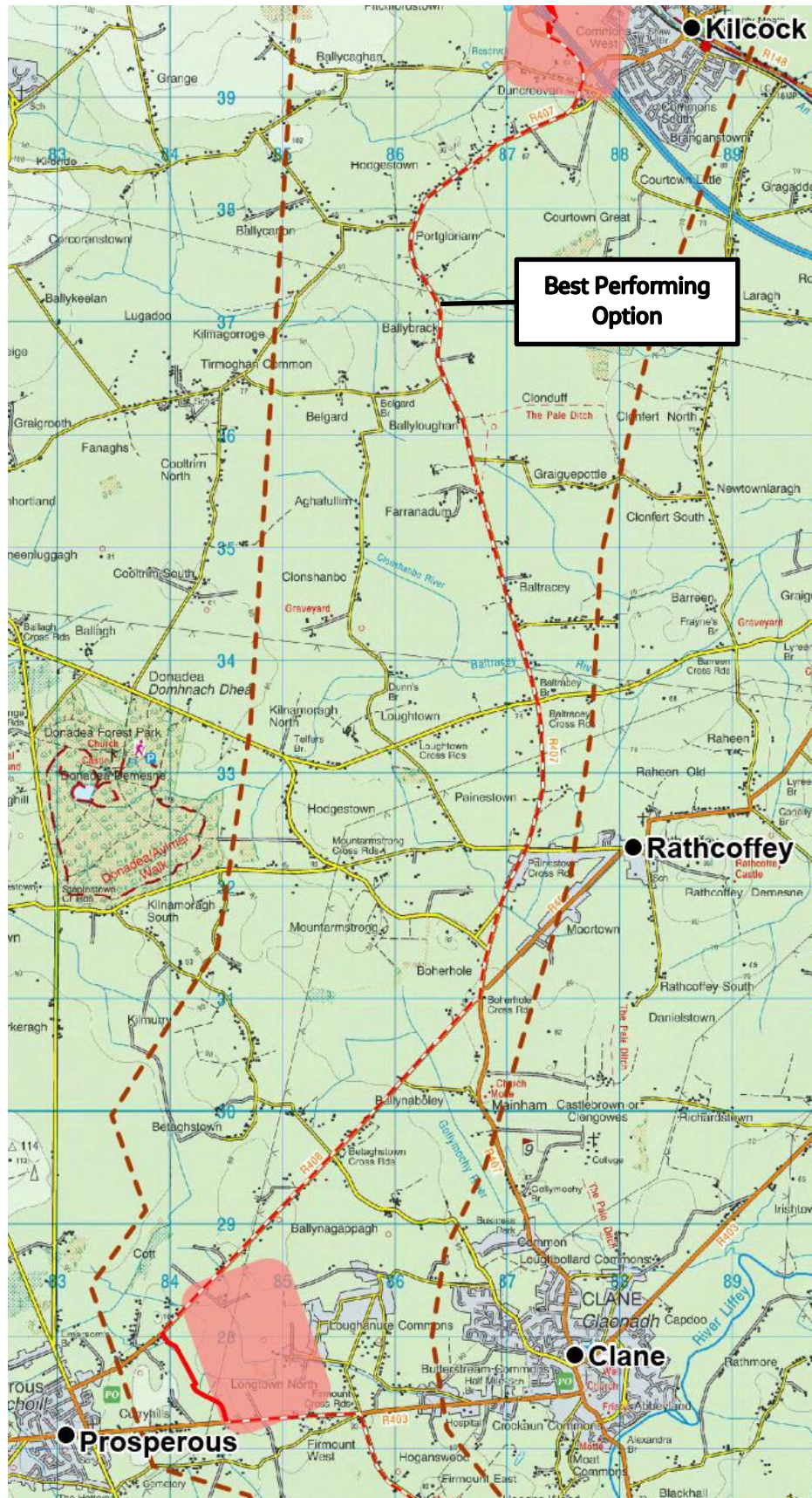


Figure 3-5: Kilcock to Firmount Crossroads

This section of the route is largely within the regional roads R407, R408, and R403. There is one off-road section which was shown as a wider area at Step 4A. The route travels south from the M4 motorway along the R407. There are many roadside residential properties and businesses, such as the Mountpleasant Nursing Home. The use of the regional road will help to minimise road closures because of the width of the road, which can largely accommodate the working area and traffic management/diversions will enable traffic to flow. The route travels along the R407 until the Boherhole Crossroads to the south west of Rathcoffey. At this location the route travels southwest along the R408 so to avoid Clane. Travelling along the R408, the route turns south before reaching Prosperous in the townland of Cott. This off-road section was shown as a wider area in Step 4A.

Following the surveys and consultations with landowners, it was determined that a better option could be found to the west of the Step 4A wider area. The route selected is approximately 220m outside of the Step 4A Study Area as shown in the Step 4A Report and during the public consultation. The reason for this change was to minimise potential impacts to agricultural land, which is one of the routing principles. By moving the off-road section to the west, its length was decreased by approximately 300m and the number of affected landowners decreased. The revised route also decreases the number of affected hedgerows and treelines from six to two. This also reduces the potential landscape and ecological impacts.

The off-road section connects to the R403 at the townland of Longtown North. It then travels east towards the Firmount Crossroads. The route then travels south on the Millicent Road (L2002).

There are nine off-road watercourse crossing in total along this section of the route. These are:

- Ballybrack townland – Lyreen_010 tributary;
- Ballyloughran townland – Lyreen_010 tributary;
- Ballyloughran townland – Lyreen_010 crossing;
- Baltracey townland – Lyreen_010 tributary;
- Baltracey townland – Lyreen_010 tributary;
- Baltracey townland – Clonshanbo_010;
- Ballynaboley townland – Kilmurry_010;
- Ballynaboley townland – Kilmurry_010 tributary; and
- Cott townland – Liffey_130 tributary.

3.7 Firmount Crossroads to Sallins Bypass



Figure 3-6: Firmount Crossroads to Sallins Bypass

This section of the route is a mix of in-road and off-road sections. The section travels to the south east along the Millicent Road (L2002). There are four roadside sites named on the Sites and Monument Record and five historic properties (these are not recorded as protected structures on the National Inventory of Architectural Heritage (NIAH)). None of these features will be directly impacted by the route. An assessment of any potential impacts to their setting will be undertaken at Step 5.

Between the Millicent Crossroads and Millicent Demesne, there is the roadside church of St. Michael and All Angels. The church will not be directly impacted; any potential impacts to access will be assessed at Step 5 and mitigation measures proposed, where required. Millicent Airfield is also in this area and further discussions will be held with the landowner and also with the Irish Aviation Authority.

There are three Garden and Designed Landscapes (demesnes) adjacent to the road – Firmount House, Moatfield House, and Millicent Demesne. There will be no direct impacts to Firmount or Moatfield, but the cable route will pass through the south west corner of Millicent Demesne. This is required to avoid Blundells Bridge. It has been assessed that the bridge is unsuitable to accommodate a cable crossing and so an off-road crossing of the Liffey_120 water body is required.

As outlined in Section 3.2 above, the cable trench is typically 1.5m in depth and that can change because of ground conditions or the presence of constraints, such as other utilities. Stone arch bridges that carry roads over watercourses generally do not have sufficient depth for cable trenches such as the Kildare-Meath Grid Upgrade project. An on-site assessment of the bridges was made by technical experts and it was determined that it would not be feasible to dig the trench into the bridge. Alternative options were considered, however the number of roadside properties and the bend in the Millicent Road at the bridge beside a junction meant that an off-road crossing to the north was the best option. Longer diversions to the west were explored however, these options would have increased the potential impacts to ecology, landscape, and agricultural land, in addition to being much more expensive and so were ruled out. A full assessment will be undertaken of the potential impacts to Millicent Demesne, residential amenity, and any other impacts at Step 5 and mitigation measures will be proposed to avoid/reduce any impacts.

After the Blundells Bridge off-road section, the route continues back on the Millicent Road until the junction of Millbank South Road. At this point the route enters the wider area that was shown at Step 4A. Here the route will travel off-road towards the Sallins Bypass. This section will avoid direct impacts to residential properties and their gardens and the River Liffey (Liffey_120) through the use of trenchless techniques (e.g. HDD). The route does not cross the River Liffey at this location but runs parallel to it for a distance. A design solution such as a HDD will allow the amenity of the gardens, the landscape of the River Liffey, and bankside ecology to be unaffected. Further assessment will be undertaken at Step 5. This area of the Liffey has an extensive floodplain in this area and an assessment of the flood risk, to and from the project, will be assessed at Step 5.

3.8 Sallins Bypass to M7 Motorway

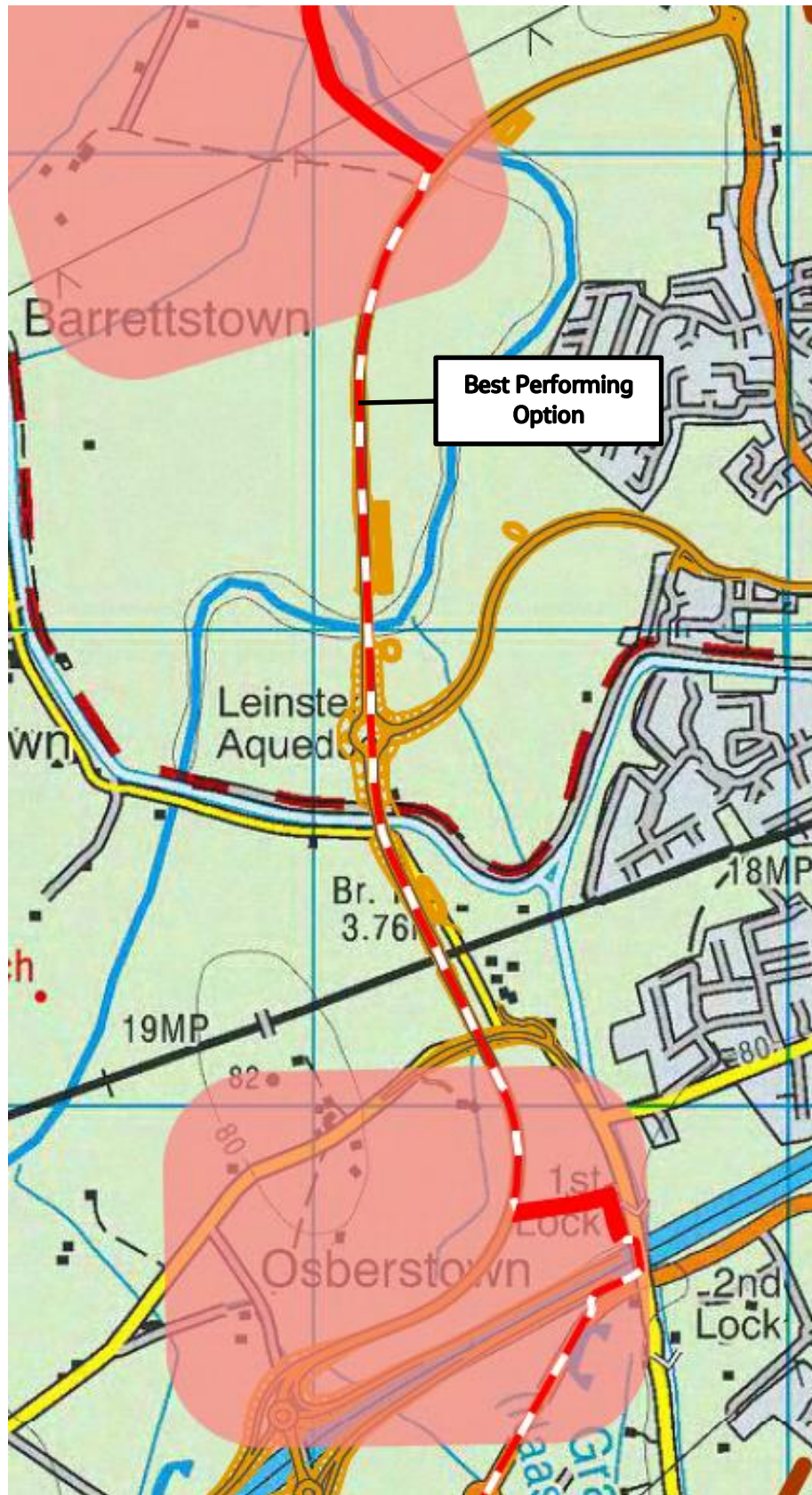


Figure 3-7: Sallins Bypass to M7 Motorway

This section of the route largely uses the recently constructed Sallins Bypass. The use of the road is in-line with routing principles in avoiding agricultural land and making use of roads, as far as possible. Consultations have been held with Kildare County Council on the use of the bypass. The route will seek to make use of the footpath that has been constructed on the eastern side of the road. The use of the footpath will minimise disruption to road users during the construction stage and temporary mitigation measures will be provided for cyclists, pedestrians, and other vulnerable road users. Its use will be subject to clarification on the presence of existing underground utilities in that area. The route will continue south to the bridge over the River Liffey (Liffey_120). A technical assessment has been undertaken and it has been determined that it will be possible to place the cable within the existing bridge structure. Further design and assessment will be undertaken to advance the design for Step 5. Additional consultation will be undertaken with Inland Fisheries Ireland (IFI), Kildare County Council, and other relevant stakeholders as required.

To the south of the River Liffey is the roundabout junction between the Sallins Bypass and the Sallins Link Road. To the east of the roundabout, a new public park is proposed to be constructed – Sallins Amenity Lands. A planning application for the park was submitted in January 2022 for the development of amenity and recreational facilities on 16.8ha of land. Further design and consultation are required to determine the best cable placement at the roundabout. The project team wish to avoid any potential impacts to the park; however, it may be possible to pass to the east of the roundabout without significantly impacting the park. Alternatively, the route could continue in-road through the roundabout. This will be resolved in Step 5 and fully assessed in the Step 5 reports.

Next along the route will be the crossings of the Grand Canal and the Dublin- Cork/Limerick railway. As with the Liffey bridge crossing, the project team has determined that the route can be incorporated into the existing bridge structure. Further design and consultation will be needed with Waterways Ireland, Irish Rail, and Kildare County Council and other relevant stakeholders as required.

The route will continue in the Sallins Bypass passing under the Osberstown Bridge (L2006). Before the Sallins Bypass turns west, the route will turn off the road and into agricultural land. This off-road crossing will connect the route to the Osberstown Road (L2006) and allow the route to pass under the M7 Motorway in the existing road. The use of the existing road will avoid the use of a crossing (e.g. HDD) for the M7 Motorway and will avoid disruption to development land to the west of this location.

Other options considered in this area included using the Osberstown Road to run the cable in-road parallel to the Grand Canal. This was ruled out following consultations with Waterways Ireland due to the potential impacts to the canal during construction. The use of the M7 Motorway Junction 9A was also ruled out following consultation with Transport Infrastructure Ireland due to the volume of traffic and the potential disruption to traffic flow during construction. Options to the east and west of the Sallins Bypass were considered but ruled out because of the presence of residential properties and the impact to agricultural land.

3.9 M7 Motorway to R448 (Naas section)

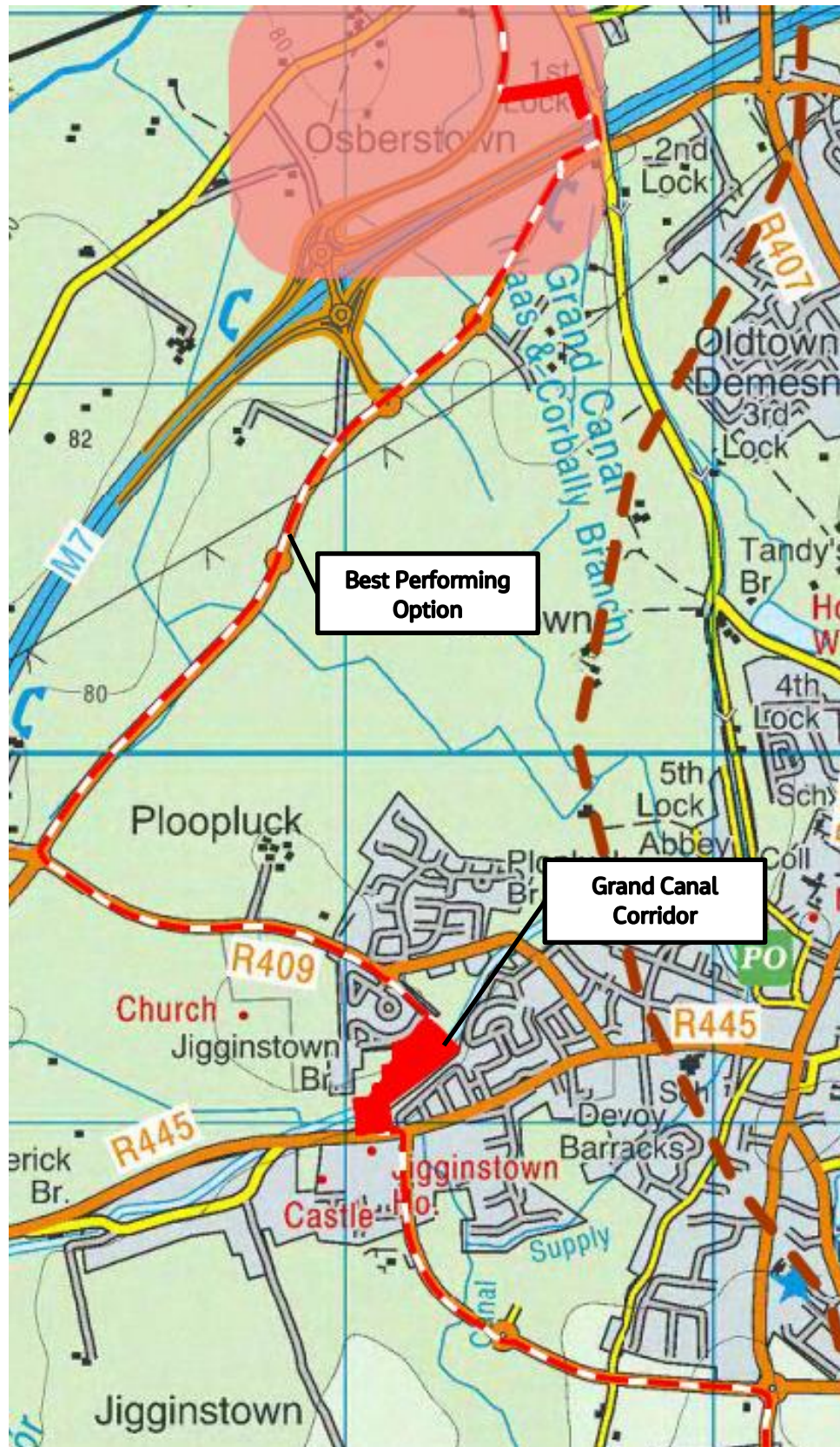


Figure 3-8: M7 Motorway to R448 (Naas section)

This section travels to the west of Naas town, largely using existing roads. Once under the M7 Motorway, the route will connect to the Millennium Parkway (also called the Western Distributor Road (R445)). The cable route will pass from the L2022 to the Millennium Parkway using the existing cycleway/footpath that connects the Parkway to the local road network. The use of the cycleway/footpaths will minimise temporary disruption to road users during construction. Temporary mitigation measures will be provided for cyclists, pedestrians, and other vulnerable road users.

As the route travels along the Millennium Parkway, it will continue in the existing cycleway/footpaths alongside the road. There are three roundabout junctions on this section of the Parkway. These roundabouts are entrances to Naas Community College, Kerry Group, Applegreen petrol station and other businesses. While the cable is planned to be in the cycleway/footpath, temporary traffic management will be required where the route crosses the approach to the roundabouts. This mitigation will minimise disruption to traffic flow in these areas.

At the junction of the R409 and Millennium Parkway, the route will travel to the east along the R409. This will take the route towards the Grand Canal Corbally Section.

This section of the route contains a wider area for the project. This is the only wider area remaining on the route and will be resolved at Step 5. The reason for the wider area is that ground investigations are required to determine the cable route at this location. Consultation with the public stakeholders has revealed that the land to the south of the canal is soft and could pose a challenge to any construction in this area. A review of available geological data from Geological Survey Ireland indicates that the area contains alluvium and glacial tills substrates and has moderate subsoil permeability. There are no recorded karst features in the area and the groundwater vulnerability is moderate in this area. These factors are not considered to be significant constraints to the construction of the cable. However, it has been determined by the project team that it would be prudent to undertake additional surveys in the area.

The ground investigations for the project will resolve where the crossing can be proposed and what type of crossing is possible. Naas Sports Centre and associated features, Naas Historic Trail, Grand Canal, Jigginstown Castle, House and associated features, and the residential properties in the area will be avoided and any potential impacts will be assessed at step 5. Mitigation measures will be proposed where required.

After the Grand Canal, the route will connect back into the road network through the R445 and the R447 (Southern Ring Road). The R447 has cycleways and footpath to the north and south of the carriageway. Like the Millennium Parkway, these could be utilised to minimise disruption to road users during the construction stage and temporary mitigation measures would be provided for cyclists, pedestrians, and other vulnerable road users. There is one watercourse crossed along this part of the route (Liffey_100). The crossing will be in the existing road network.

3.10 R448 to Dunstown Substation



Figure 3-9: R448 to Dunstown Substation

This section of the route makes use of the R448 (Kilcullen Road) which travels south from the R447 (Naas Southern Ring Road). The route will travel to the south away from Naas town, passing new housing developments off the R447 and new development at Killashee. This includes five schools, a hotel, and an Education and Training Board building. The project will not directly impact these; however, access will be disrupted during the construction works along the R448. Further mitigation measures and consultation will be required at Step 5.

To the south of Killashee, beyond the junction of the R448 and the L6044, there will be a crossing of an unnamed watercourse (tributary of the Liffey_110).

At the Sidegate Crossroads (junction of the R448 and R412), a change has been made to the route shown at Step 4A. Previously, the route travelled to the south east along the R412. However, this has been amended. From the Crossroads, the route now travels for an additional 420m along the R448, before turning east across agricultural land. This will cross an unnamed watercourse and then reconnect to the R412. This amendment to the route was made after the published option in Step 4A because of the presence of a stone arch bridge on the bypassed section of the R412. A technical assessment of the bridge determined that the bridge was not suitable for an in-road crossing. The presence of residential properties to the west and east of the bridge meant that an off-road crossing adjacent to the bridge was not possible. The bypassed section of the R412 was a common section to all four of the options presented at Step 4A and so the change has had no bearing on the option selection process.

The route travels along the R412 for a short length before entering the access road to the Dunstown substation where the route terminates.

3.11 Conclusions

The changes described above have increased the length of the cable route from 51.4km to 52.6km – an increase of 1.2km. Within this 52.6km, there is also an increase of off-road length, from 6km to 7.9km.

This increase in off-road length is largely due to the changes between the Woodland substation and the R156, where the cable route is now crossing agricultural land. As stated above, this is because local roads in the area were considered unsuitable because of two road bridges, which do not have sufficient depth for the cable trench. The increase in the overall length will slightly increase the cost of the project. However, it was concluded that these route refinements were minor and did not change the assessment of Option A (Red) as presented in the Step 4A Report. It was concluded by the project team that Option A (Red) remained the Emerging Best Performing Option and that the route shown in this Step 4B Report is the Best Performing Option. It is possible that further changes will be required at Step 5, following further design, surveys, consultation, and assessment. However, these changes will be fully consulted upon with affected landowners, community forum, statutory bodies (such as Meath and Kildare County Councils), and details will be provided to the public through the EirGrid website and reports.

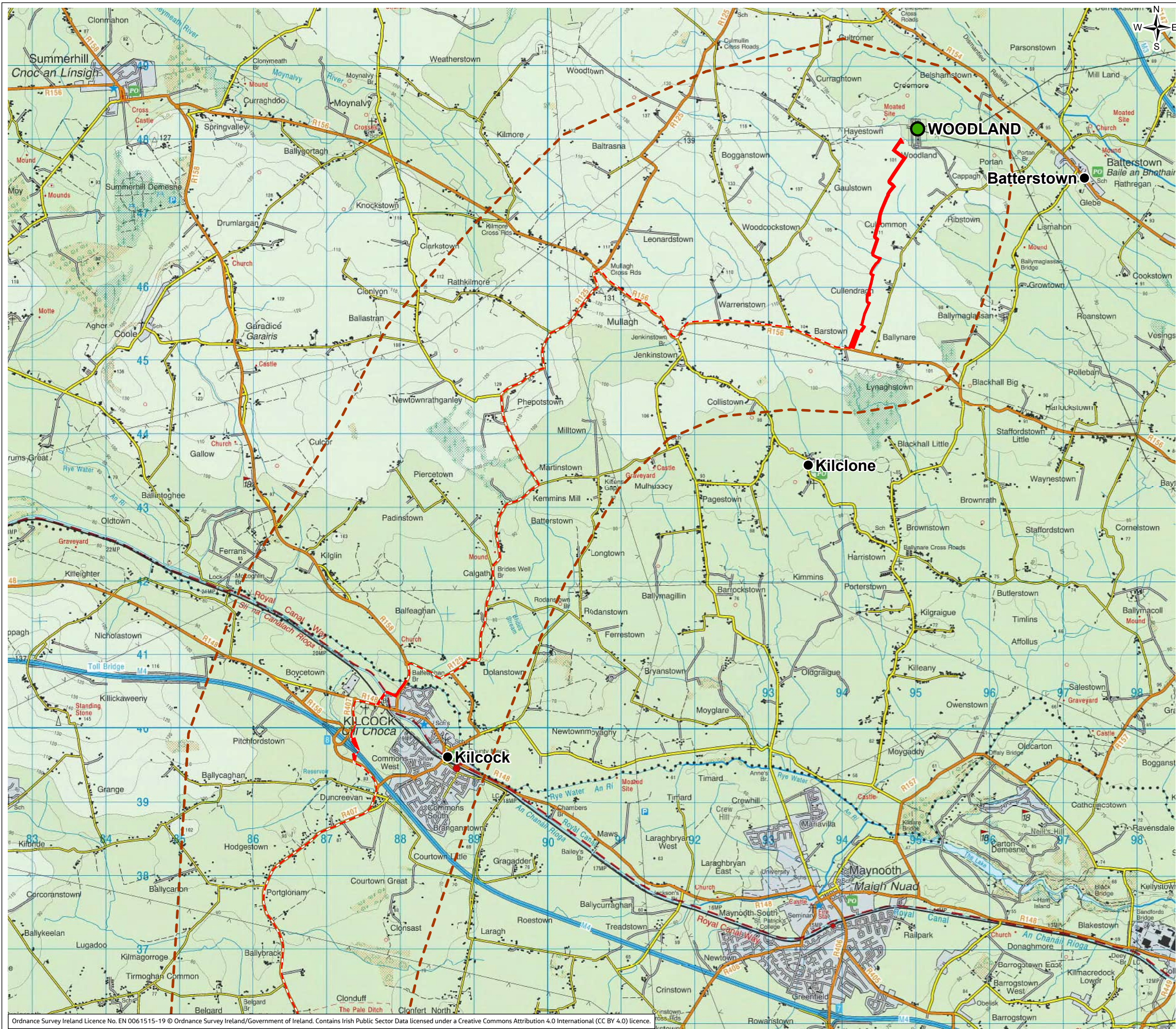
4. Next Steps

The following actions will be completed on the project:

- This Step 4B Report will be published and any feedback considered by the project team and amendments will be made where it is considered appropriate;
- EirGrid will continue to meet with affected landowners, Community Forum, and other relevant communities and residents to discuss the project;
- EirGrid will continue to hold meetings with bodies such as Meath and Kildare County Councils, Transport Infrastructure Ireland, Inland Fisheries Ireland, Irish Rail, Waterways Ireland, and the utility providers such as Irish Water and Gas Networks Ireland. Initial meetings took place in Step 4A and these next meetings will be to examine the detail of the proposed route (e.g. the bridge crossings);
- EirGrid will engage with nature conservation stakeholders including local authority heritage officers, Inland Fisheries Ireland and National Parks and Wildlife Service. Matters to include agreement of watercourse crossing mitigation, and reinstatement principles, including use of commercial seed. EirGrid will incorporate biodiversity enhancement into the design to 'build back better', in consultation with relevant stakeholders;
- Confirmation of Strategic Infrastructure Status of the Project under the Planning and Development Act, 2000 (as amended) will be sought. Preplanning Consultation with An Bord Pleanála will commence;
- The project team will undertake a wide range of surveys to help to refine the design and location of the proposed cable. This will also include designing how the cable will be constructed and how traffic disturbance will be minimised through traffic management. The surveys include archaeology, ecology, agriculture, ground investigations, utilities surveys, hydrology, technical assessments, etc. These surveys may result in changes to the route shown in this report. This is a normal part of the design process – as further information is gathered and new issues are identified, changes may be made to the route (note these are expected on an exceptional basis);
- Further design work will be progressed at the substations to determine the works required to connect the proposed cable into the grid;
- The project team will prepare the planning submission (Step 5) for the project. This work will include planning and environmental reports, which will describe the final design of the project, outline the potential impacts, and identify the mitigation measures that will be put into place to avoid or reduce any impacts; and
- Further updates will be published by EirGrid on the project website:
www.eirgridgroup.com/the-grid/projects/capital-project-966/the-project/

Comments on the project can be made to KildareMeath@eirgrid.com or to Eoghan O'Sullivan, EirGrid Community Liaison Officer: Phone: +353 (0)87 247 7732

Appendix A. Best Performing Option Figure



321084AH-JAC-00-XX-DR-S4B-0001

Legend

- 400kV Substation
- Study Area
- Proposed Cable Route - On-Road Section
- Proposed Cable Route - Off-Road Section



0	Jun 2022	Draft issue	GB	HS	FL	FL
Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd

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EirGrid Kildare-Meath Grid Upgrade

Step 4B Report
Best Performing Option
Sheet 1 of 3

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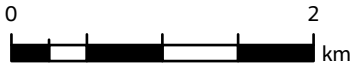
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Legend

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Step 4B Report
Best Performing Option

Sheet 2 of 3

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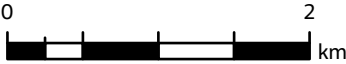




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Legend

- 400kV Substation
- Study Area
- Proposed Cable Route - On-Road Section
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EirGrid Kildare-Meath Grid Upgrade

Step 4B Report
Best Performing Option

Sheet 3 of 3

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