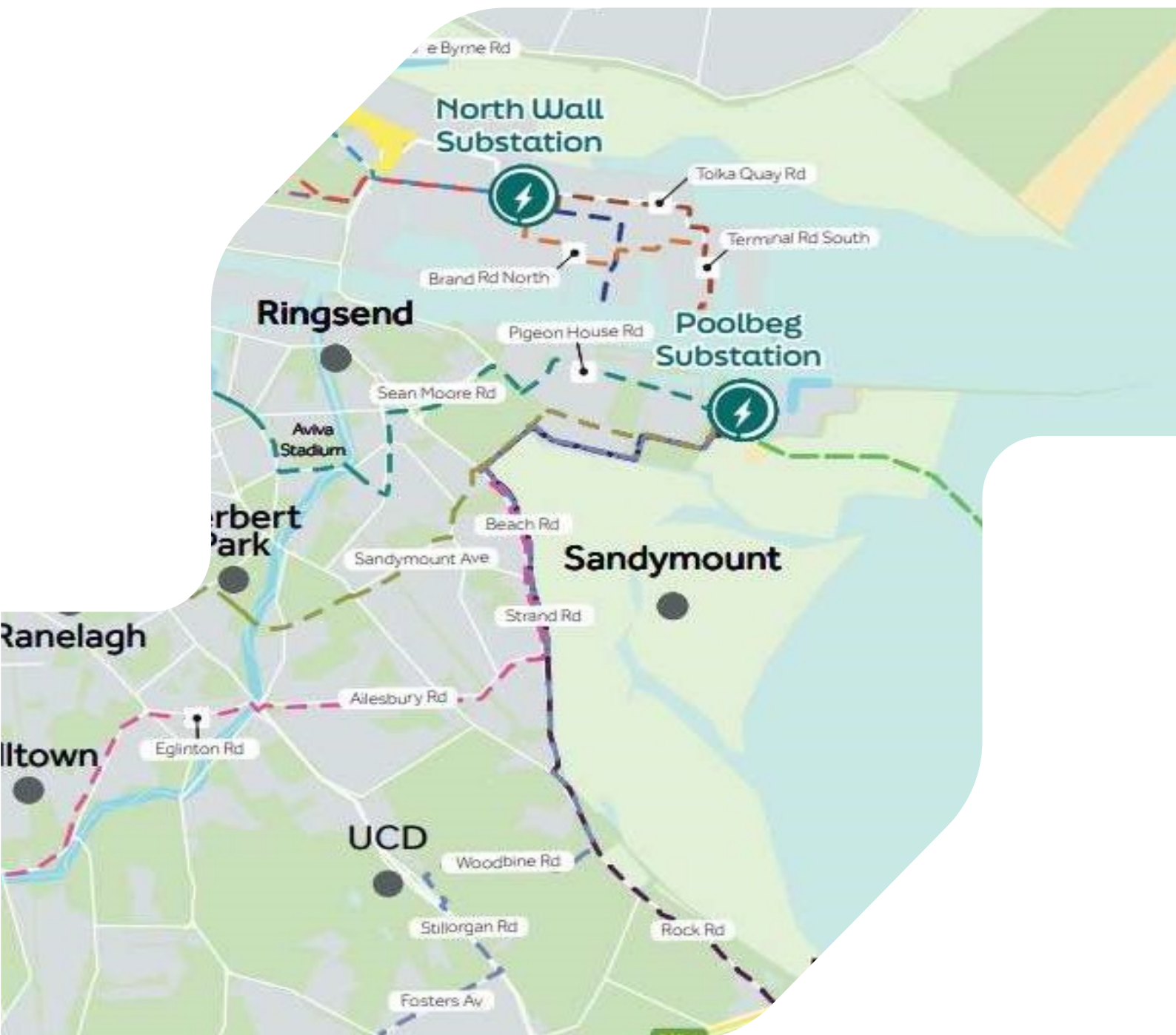


DUBLIN REPLACEMENT UNDERGROUND CABLE PROGRAMME

Best Performing Option - CP1146 Carrickmines to Poolbeg Cable Replacement



Context

This report presents an independent review and analysis of submissions received to the public consultation on the EirGrid “Powering Up Dublin Project”.

This report has been prepared for the EirGrid by RPS Consulting Engineers Ltd.



Disclaimer

Although every effort has been made to ensure the accuracy of the material contained in this report, complete accuracy cannot be guaranteed. Neither the EirGrid, nor the authors accept any responsibility whatsoever for loss or damage occasioned or claimed to have been occasioned, in part or in full, as a consequence of any person acting or refraining from acting, as a result of a matter contained in this report.

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EXECUTIVE SUMMARY

What is the Powering Up Dublin - Replacement Underground Cable programme?

Powering Up Dublin is a critical programme that will strengthen key electricity infrastructure in Dublin and the surrounding areas, making the city ‘renewable ready.’ Dublin’s demand for electricity has grown and will continue to grow in the years ahead as we move to using electricity for heat and transport. These works allow us to meet our energy demands now and in the future.

In this first phase of the project, approximately 50km of cables will be installed across the city. Upgrades will also take place in a number of substations to support Dublin’s electricity network. Due to the city landscape of Dublin, these new cables are proposed to be placed underground and they will connect electricity substations located in and around Dublin.

Studies have been carried out to identify new underground cable routes that will link the following 220kV electricity substations to each other.

- Carrickmines and Poolbeg (CP1146)
- North Wall and Poolbeg (CP1216)
- Finglas and North Wall (CP1100)
- Inchicore and Poolbeg (double connection) (CP1150 & CP1157)

This report identifies the Best Performing Option to replace the existing Carrickmines to Poolbeg 220kV circuit.

Purpose of this Report

The Dublin Replacement Underground Cable Programme is following EirGrid’s Framework for Grid Development, which is an end-to-end process for all EirGrid’s grid development projects. The framework takes projects from their inception - the identification of a need to develop the electricity transmission grid - to their eventual construction and subsequent energisation. The framework is explained in EirGrid’s “Have your Say” document and is illustrated in Figure 0-1.

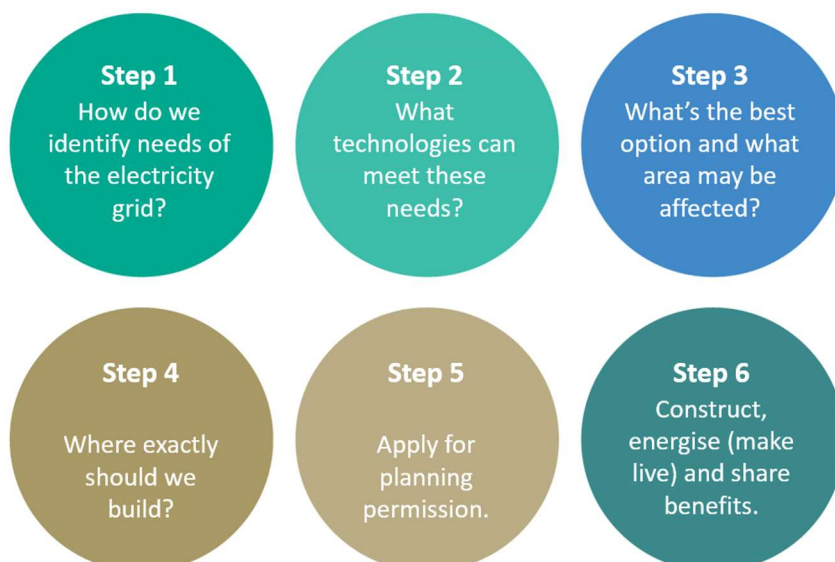


Figure 0-1: EirGrid's Six-Step Framework for Grid Development

This approach facilitates engagement and consultation with stakeholders and the public which helps to explore options fully and make more informed decisions.

This project is currently in Step 4. The objective of Step 4 is to determine the best performing option and the precise route where the project will be built. This step is characterised by two main outputs:

- Route Options Assessment (Step 4A), and
- Best Performing Option Assessment (Step 4B).

The Route Options Assessment identifies all possible route options to replace the existing Carrickmines to Poolbeg 220kV circuit, analyses these route options and identifies the Emerging Best Options. The Route Options Assessment was completed (March 2023), and the report was subsequently published for public consultation. The public consultation period closed eight weeks later in May 2023. Section 3 provides a summary and conclusion of the assessment process.

The second phase of Step 4, the Best Performing Option Assessment, develops the Route Options Assessment, taking account of feedback obtained during the public consultation phase and additional technical information (from initial surveys and route walks) to arrive at the Best Performing Option. The Best Performing Option is based on the information currently available and further refinement of the option may be triggered by site investigations performed as the detailed design phase progresses. This second phase was progressed between May and October 2023. The assessment process is explained in more detail in Section 4.

Summary of Route Options Assessment (Step 4A)

All the potential route options for the Carrickmines to Poolbeg circuit were identified, broken down into unique sections and each section was assessed using a Multicriteria Analysis (MCA) comprising EirGrid’s five multicriteria assessment categories: Technical, Deliverability, Economic, Socio-Economic, and Environmental, shown in Figure 0-2.

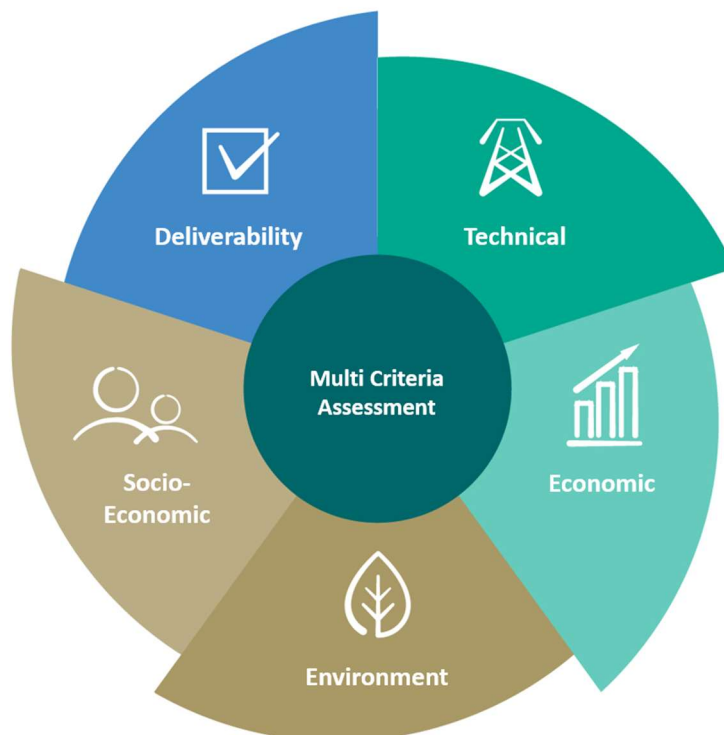


Figure 0-2: EirGrid’s Five Multi-Criteria Assessment Categories

From the MCA results, using the best possible ranked sections, three optimised routes, Option G, Option H and Option I were progressed as Emerging Best Options (EBOs) for further consideration. These routes are shown in Figure 0-3.

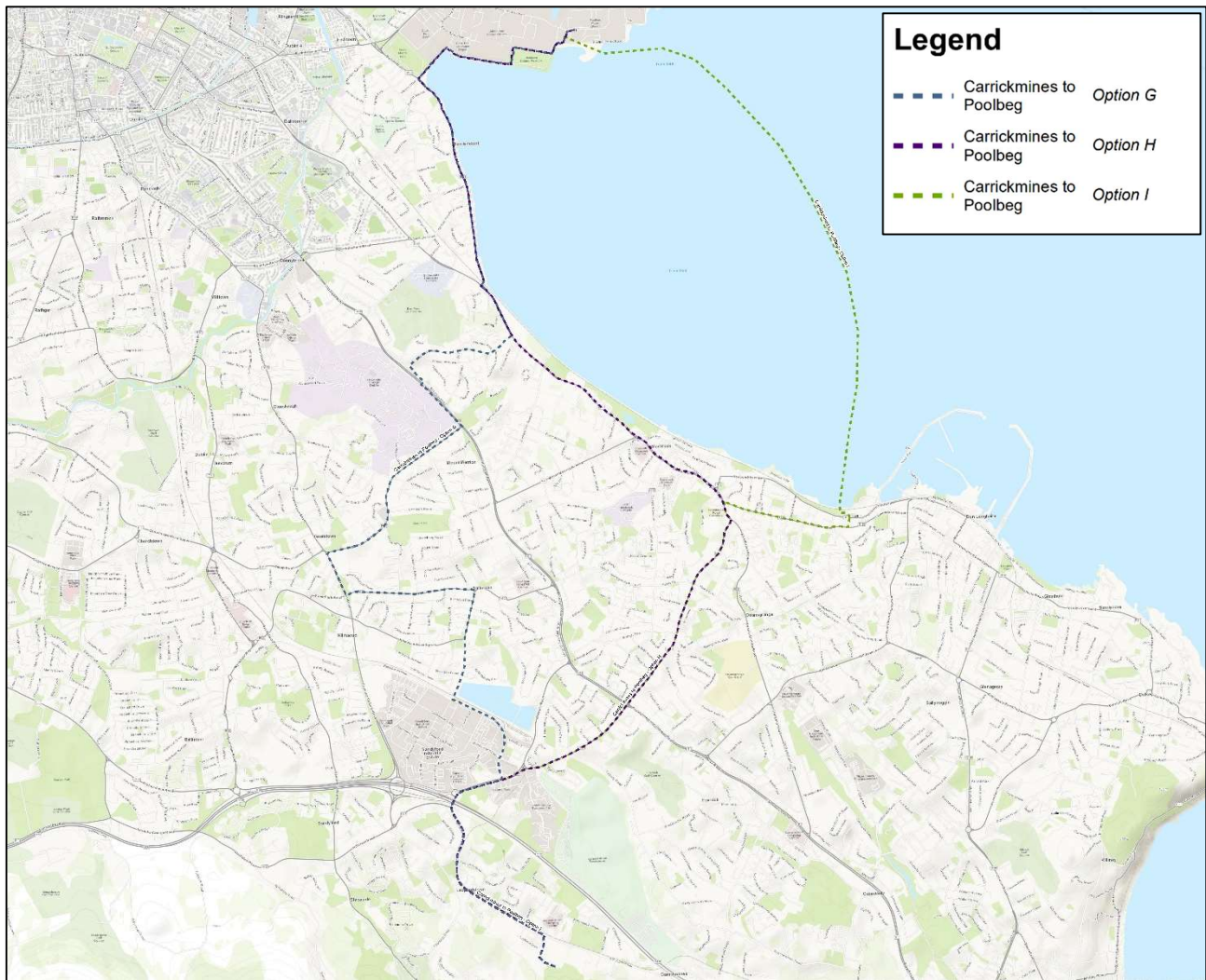


Figure 0-3: Map of Option G, Option H and Option I

The EBOs were published for public consultation in March 2023 and the consultation ran for eight weeks. Various consultation materials were provided, including brochures, leaflets, maps, and an online survey. In-person events and Community Liaison Officers facilitated communication with the public.

The feedback received from this consultation was included in the Best Performing Option Assessment. While most respondents understood the need for this project, some concerns were raised about local environmental issues, cumulative impacts, business impacts, and traffic disruption during construction. A strong preference for collaboration between utility companies and local authorities to minimize disruption was highlighted in the responses.

Best Performing Option Assessment (Step 4B)

The Best Performing Option Assessment for the Carrickmines to Poolbeg circuit replacement involved detailed examination of the three Emerging Best Options (EBOs) through route surveys, stakeholder engagement, and route design. The iterative process considered environmental, social, and technical factors, incorporating input from landowners and stakeholders and the conclusions are summarised below.

Poolbeg Peninsula

Four 220kV circuits across the cables programme are required to connect into Poolbeg Substation; with Carrickmines to Poolbeg being one of them. Two circuits from Inchicore (CP1150 & CP1157), and one from

North Wall (CP1216) make up the other three. It is critical that all four cables are able to connect into the substation on the peninsula.

To determine feasibility of three circuits traversing Poolbeg peninsula from the west into Poolbeg substation, a detailed assessment identifying planned projects, landowners, and utility congestion was completed. The cable from North Wall on CP1216 will approach the substation from the north, crossing the River Liffey via a trenchless methodology and entering the peninsula without utilising street level routes.

Six route options (provided in Figure 4-5) were considered from the south and west into the Poolbeg Substation. The assessment identified the best performing route corridor which can accommodate a maximum of two circuits. Due to the high utility congestion, the remaining routes would require lengthy outages of important transmission circuits and significant diversions of other utilities. These are not deemed to be operationally feasible, due to system security as the grid does not have the resilience to accommodate the outages that would be required.

Space has been identified to the east from the Shelley Banks car park to the substation site. This has been considered as part of our assessment criteria for the Carrickmines to Poolbeg BPO.

Option G

Option G overall ranking	Moderate-high
--------------------------	---------------

Option G was subjected to a detailed assessment, considering technical, deliverability, economic, socio-economic, and environmental criteria. Feedback from public engagement highlighted concerns about ongoing projects, education institutions, and impacts on hospitals and Stillorgan Village. The assessment revealed major deliverability and constructability challenges in areas such as the M50 crossing, Dart line crossing, Strand Road, and Poolbeg Peninsula.

The BPO Route Comparison assessed the route using multi-criteria analysis, resulting in a **moderate-high** overall assessment ranking for Option G. Challenges include non-standard trenchless crossings, potential outages, and slow construction progress. The socio-economic ranking increased due to public consultation feedback.

Option H

Option H overall ranking	Moderate-high
--------------------------	---------------

Option H faces public concerns about ongoing projects, disruptions in Blackrock and Sandymount, and the impact on education institutions, and hospitals. The assessment revealed major deliverability and constructability challenges in areas such as the M50 crossing, Rock Road, Dart line crossing, Strand Road, and Poolbeg Peninsula.

The BPO Route Comparison assessed the route using multi-criteria analysis, resulting in a **moderate-high** overall assessment ranking for Option H. Challenges include non-standard trenchless crossings, potential outages, slow construction progress, and recent work done on the Rock Road and Strand Road. The socio-economic ranking increased due to public consultation feedback.

Option I

Option I overall ranking	Mid-level/moderate
--------------------------	--------------------

Option I received significant public support due to its potential to minimise impacts on local population, such as traffic disruption and impact on public services.

The BPO Route Assessment identified challenges at critical points, including the M50 crossing, and marine crossing of South Dublin Bay and the feasibility was confirmed through design progression. Overall, Option I was ranked as **mid-level/moderate**. The potential for delays in the consenting process may have an impact

on the delivery programme. The economic ranking has been increased to high following an assessment of the costs of the marine crossing. Public consultation feedback led to a decrease in the socio-economic ranking.

Best Performing Option

The Best Performing Option (BPO) identified through the work undertaken at this phase of the project is Option I. This BPO is shown in Figure 0-4. There are a number of changes to this route that were identified during the Best Performing Option assessment, which have arisen due to feedback from stakeholder engagement; route surveys; and detailed design assessments. These changes are outlined in Section 5.3.

Additional work will be undertaken as this project moves into Step 5 which may result in further refinements and alterations to the route. This work includes site investigation (both non-invasive and limited invasive site investigation) and further engagement with landowners and stakeholders. Any changes to the route will be tracked and described in detail in the Step 5 reports.



Figure 0-4: Carrickmines to Poolbeg Best Performing Route

The next steps include publishing the Best Performing Option Report; engaging with stakeholders; conducting necessary studies, investigations, and surveys; progressing design work; and preparing the necessary statutory applications (Step 5). Updates will be available on EirGrid's project website here: [Powering Up Dublin](https://www.eirgrid.ie).

1 INTRODUCTION

1.1 Who is EirGrid?

EirGrid develops, manages, and operates Ireland's electricity grid and is responsible for the safe, secure, and reliable supply of Ireland's electricity. EirGrid is also leading the secure transition of the grid to a sustainable low-carbon future.

The grid brings power from where it is generated to where it is needed throughout Ireland. It supplies power directly to industry and businesses that use large amounts of electricity. The grid also brings power from generators to the domestic network that supplies the electricity you use every day in homes, businesses, schools, and hospitals.

This critical infrastructure supports the current development of our society and economy. But just as importantly, work carried out now to improve the grid will help to create a more sustainable future for future generations.

1.2 What is the Powering Up Dublin - Replacement Underground Cable programme?

Dublin's electricity infrastructure is ageing and reaching its end of life. Work must be done to transform and modernise the city's electricity infrastructure, so Dublin can continue to develop and thrive, while increasingly using power from renewable sources.

Powering Up Dublin is a critical programme that will strengthen key electricity infrastructure in Dublin and the surrounding areas, making the city 'renewable ready.' Dublin's demand for electricity has grown and will continue to grow in the years ahead as we move to using electricity for heat and transport. These works allow us to meet our energy demands now and in the future.

While these works could be disruptive at times, EirGrid seeks to minimise any potential disruption during construction by working with local communities, authorities and businesses in Dublin.

Ireland's energy future lies in our ability to continue to harness and grow the potential of renewable energy. Ireland has made good progress to date, currently on average 40% of our electricity is coming from renewable sources annually. By 2030, we must strive to reach 80% of electricity demand being supplied by renewable resources.

Powering Up Dublin is key to meeting this target, which is set out in Ireland's Climate Action Plan.

In this first phase of the project, approximately 50km of cables will be installed across the city. Upgrades will also take place in a number of substations to support Dublin's electricity network. Due to the city landscape of Dublin, these new cables are proposed to be placed underground and they will connect electricity substations located in and around Dublin.

Studies have been carried out to identify new underground cable routes that will link the following 220kV electricity substations to each other.

- Carrickmines and Poolbeg
- North Wall and Poolbeg
- Finglas and North Wall
- Inchicore and Poolbeg (double connection)

The 220kV circuits which are to be replaced are detailed in Figure 1-1 and Table 1-1.

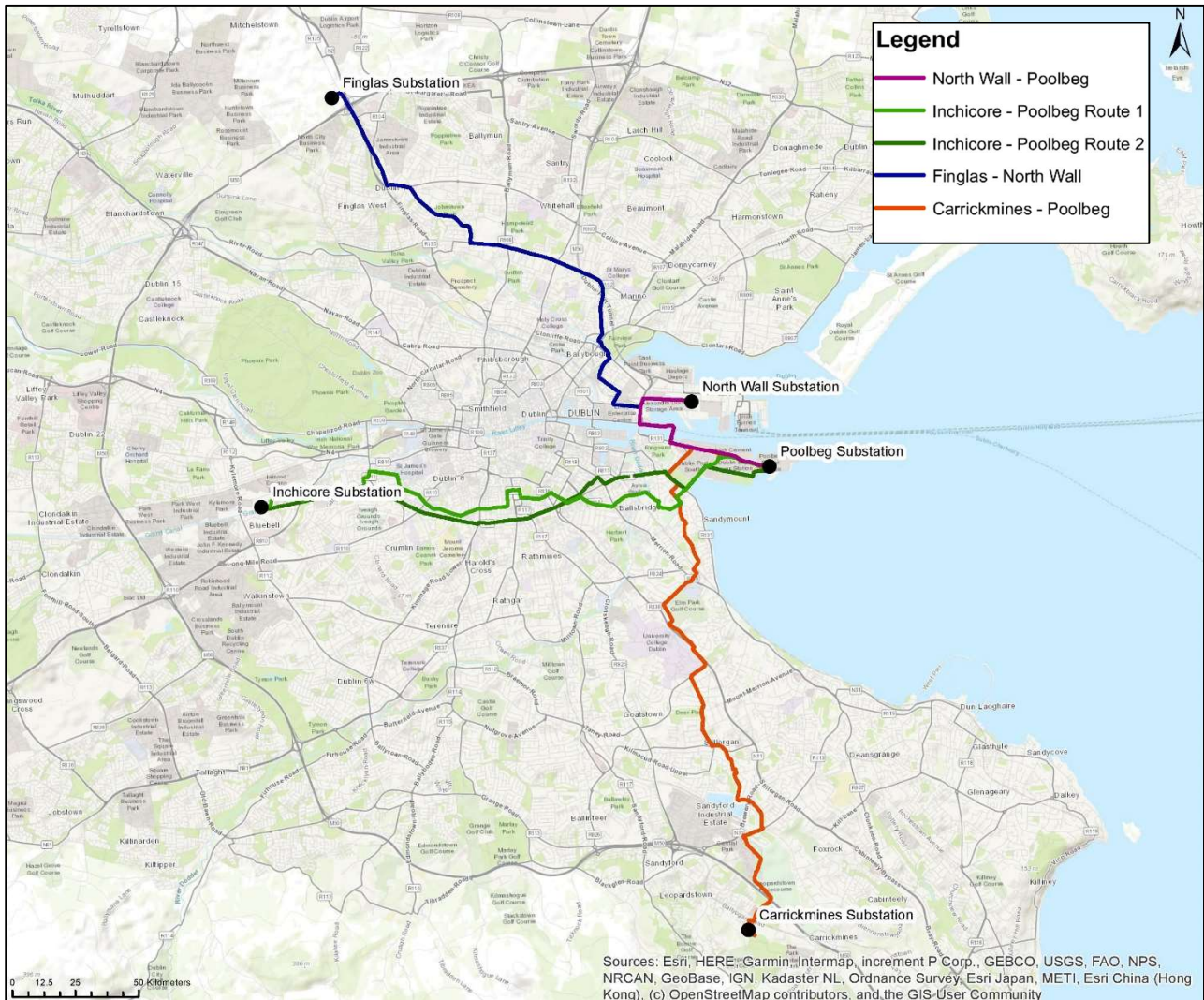


Figure 1-1: Existing 220kV to be replaced as part of the Powering Up Dublin Programme

Table 1-1: Dublin Replacement Cable Projects in the Dublin Area

Project Name	Existing Circuit Route Length
CP1146 Carrickmines - Poolbeg	11.9 km
CP1150 Inchicore - Poolbeg	14.5 km
CP1157 Inchicore - Poolbeg	14.5 km
CP1216 North Wall - Poolbeg	4.6 km
CP1100 Finglas - North Wall	11.3 km

EirGrid proposes to replace all the existing circuits with cross-linked polyethylene (XLPE) cable primarily on an offline route to minimize power outages on the existing circuits. These XLPE cables are more efficient and robust, which will enable the grid to carry more power.

Replacing the existing circuits in an offline route means the new circuit follows a separate route to the existing circuit. The advantage of this is that there are minimal disruptions to the existing circuit and no, or very few, planned outages would be required during construction.

The alternative to this is an online replacement where the new circuit follows the existing circuit route. The old circuit is decommissioned as the new circuit is laid. For this method, a circuit outage of the existing circuit would be required for the entire construction period.

Due to the electricity needs of Dublin, an online replacement is not feasible. For this reason, offline installation will be considered for the replacement of this circuit.



Figure 1-2: The existing Carrickmines to Poolbeg 220kV circuit within the study area for this project

1.3 Purpose of this Report

The Dublin Replacement Underground Cable Programme is following EirGrid’s Framework for Grid Development, which is an end-to-end process for all EirGrid’s grid development projects. The framework takes projects from their conception - the identification of a need to develop the electricity transmission grid - to their eventual construction and subsequent energisation. The framework is explained in EirGrid’s “Have your Say” document and is illustrated in Figure 1-3.

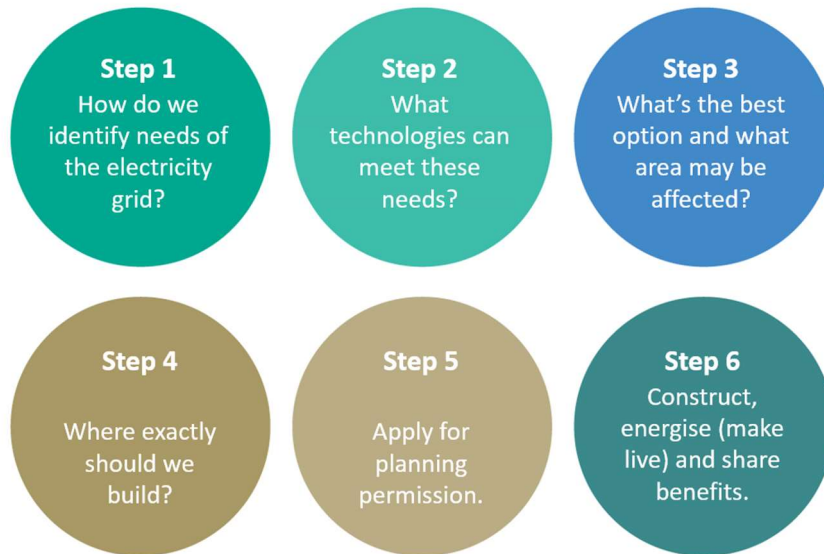


Figure 1-3: EirGrid's Six-Step Framework for Grid Development

This approach facilitates engagement and consultation with stakeholders and the public which helps to explore options fully and make more informed decisions. The project is currently in Step 4. The timeline for this step is shown in Figure 1-4.



Figure 1-4: The timeline of EirGrid's Six-Step process for this project

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

In Step 2, EirGrid assessed and confirmed the technology required to achieve the need; namely the required ratings to support the capacity of (renewable) energy to be transmitted. The cable technology selected is XLPE 220kV cable.

In Step 3, EirGrid assessed the feasibility of the Dublin Replacement Underground Cable Programme in December 2022. This Step looked at the key constraints, considerations, and opportunities in the Inchicore, Carrickmines and Poolbeg areas as well the proposed technology options. The report confirmed the need for the replacement of the existing 220kV circuits, in a mostly offline replacement to limit the outages required.

We are currently in Step 4 where we determine where we will build. The initial Route Options Assessment Report was published in March 2023. This report fully described and analysed the route options within the Carrickmines to Poolbeg study area. Each route option was assessed, and the Emerging Best Options were identified.

The project is currently in the second phase of Step 4, where the project team, in consultation with Community and Business stakeholders, identifies exactly where the underground cables will be built.

As the project progresses through to Step 5, the project team will identify specific requirements and prepare the necessary statutory applications. 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.

1.4 Accompanying Reports

This Best Performing Option report is supplemented by the following other publicised reports;

- Route Options Assessment Carrickmines to Poolbeg
- Powering Up Dublin project brochure
- Constraints Report Carrickmines to Poolbeg
- EirGrid Dublin Fluid Filled Cables Replacement Feasibility Study
- Powering Up Dublin Strategic Framework for Planning & Environment
- Public Consultation Feedback Report

These reports as well as further information on the Powering Up Dublin project can be found here: [Powering Up Dublin](#).

2 DESCRIPTION OF STEP 4 PROCESS

In EirGrid's Six-Step Framework, the objective of Step 4 is to determine the best performing option and the precise route where the project will be built. This step is characterised by two main outputs:

- Route Options Assessment, and
- Best Performing Option Assessment.

Figure 2-1 outlines the design process followed in Step 4, showing the process used for Route Options Assessment and how that is developed to identify the Best Performing Option.

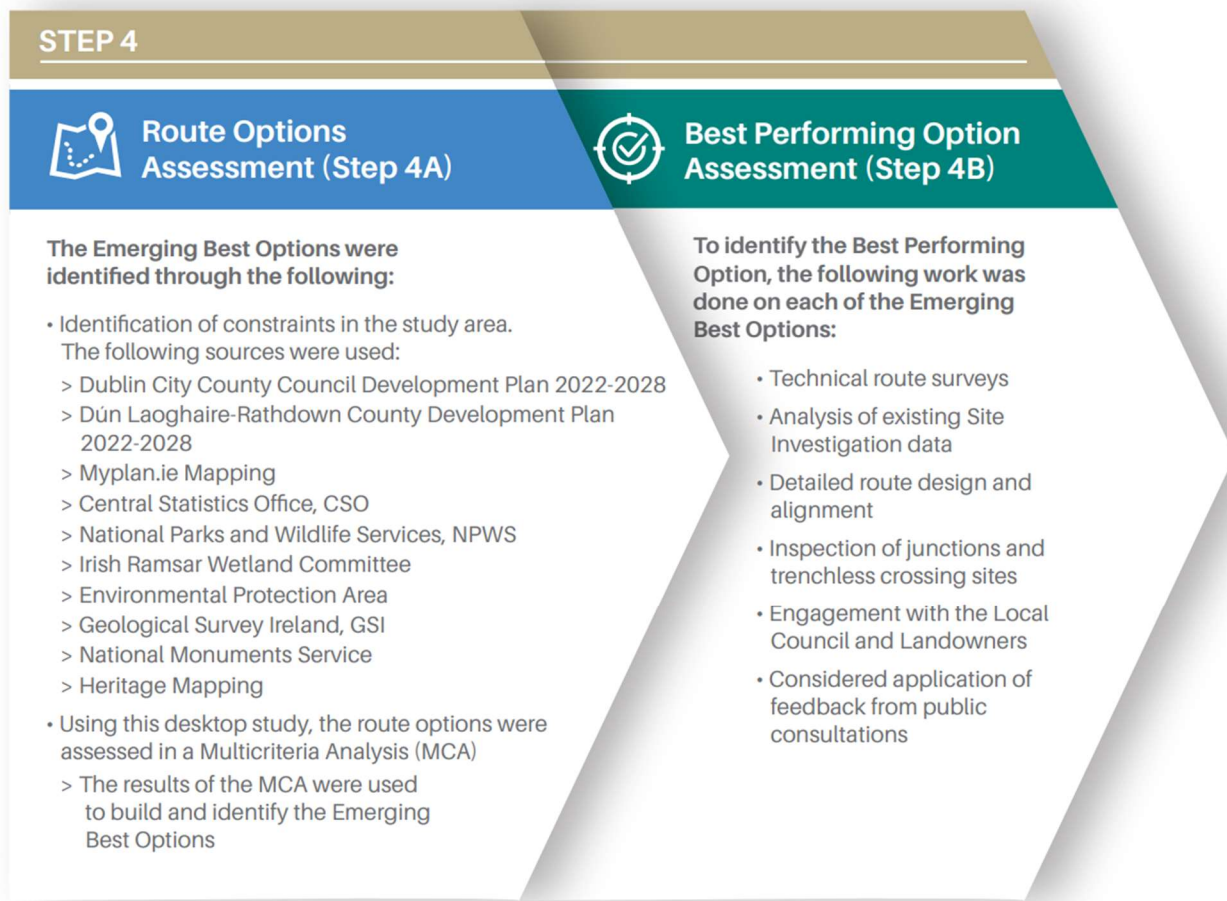


Figure 2-1: Step 4 design process

The Route Options Assessment identifies all possible route options to replace the existing Carrickmines to Poolbeg 220kV circuit, analyses these route options and identifies the Emerging Best Options. The Route Options Assessment was completed (March 2023), and the report was subsequently published for public consultation. The public consultation period closed eight weeks later in May 2023. Section 3 provides a summary and results of the assessment process.

The second phase of Step 4, the Best Performing Option Assessment, develops the Route Options Assessment, taking account of feedback obtained during the public consultation phase and additional technical information (from initial surveys and route walks) to arrive at the Best Performing Option. The Best Performing Option is based on the information currently available and further refinement of the option may be triggered by site investigations performed as the detailed design phase progresses. This second phase was progressed between May and October 2023. The assessment process is explained in more detail in Section 4.

3 SUMMARY OF ROUTE OPTIONS ASSESSMENT (STEP 4A)

The study area for this project was carried through from Step 3. We completed the first phase in Step 4 by identifying the constraints in the study area in December 2022. We then established all possible route options to replace the existing Carrickmines to Poolbeg 220kV circuit. These options were then assessed, with the results of the assessment included in the Route Options Assessment Report. The Emerging Best Options (EBOs) were shortlisted for further investigation in March 2023. This Route Options Assessment design process is shown in Figure 3-1 and the report can be found [here](#).

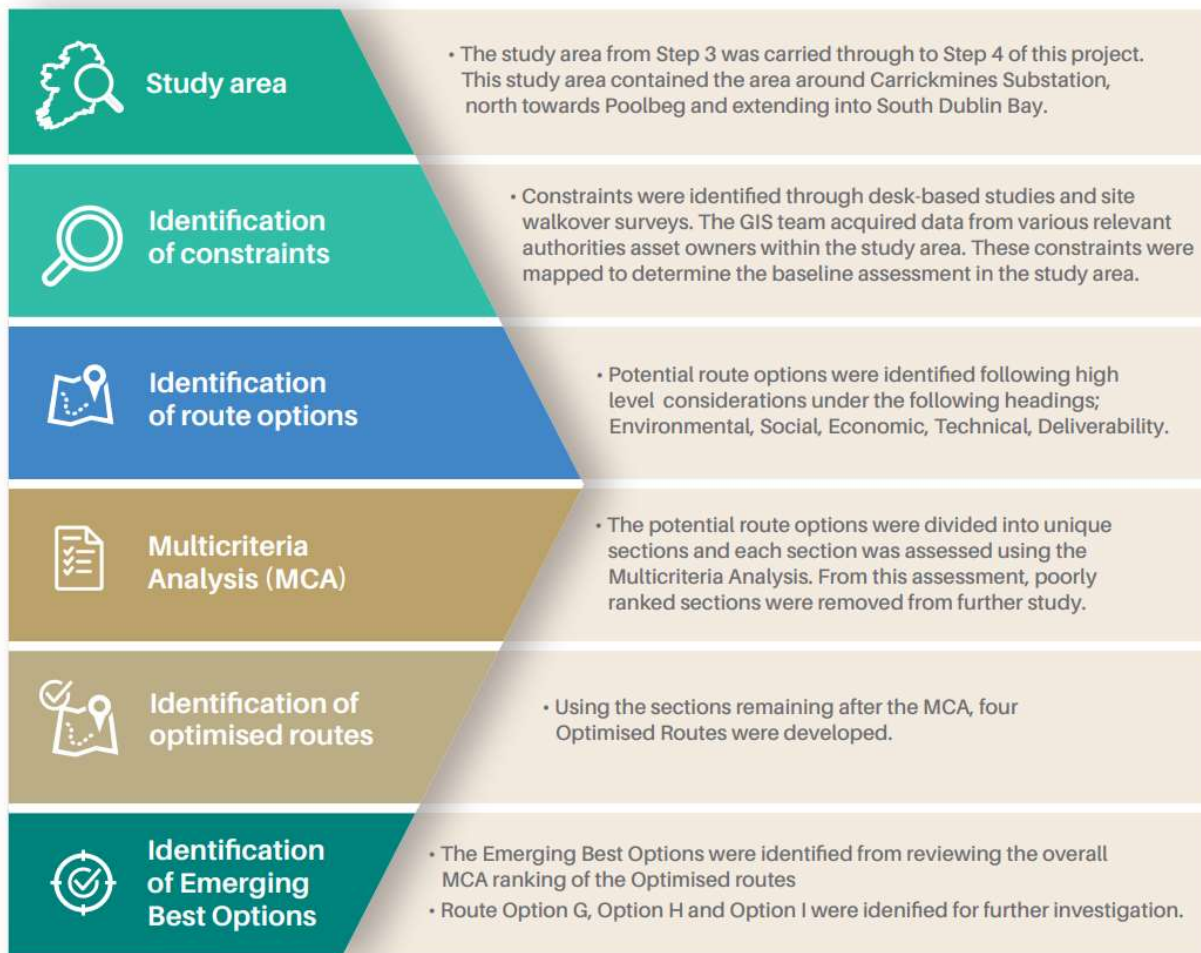


Figure 3-1: Route Options Assessment Design Process

This section summarises the Route Options Assessment process from the identification of the route options, through to the identification of the Emerging Best Options.

All the potential route options for the Carrickmines to Poolbeg circuit were identified, broken down into unique sections and each section was assessed using a Multicriteria Analysis (MCA) comprising EirGrid’s five multicriteria assessment categories, shown in Figure 3-2.



Figure 3-2: EirGrid’s Five Multi-Criteria Assessment Categories

The categories were further split into the subcategories shown in Table 3-1.

Table 3-1: Categories and subcategories in the Multi-Criteria Analysis

Category	Subcategories
Technical	<ul style="list-style-type: none"> Technical Operating Risk Compliance with EirGrid Functional Specification for 220kV Expansion/Extendibility Geotechnical conditions
Deliverability	<ul style="list-style-type: none"> Road Access Outage Impact Route Geometry Land Availability Planning and other statutory requirements Material Assets Utility Congestion Working Time Constraints Reinstatement Requirements Dependence on other projects
Economic	<ul style="list-style-type: none"> Number of complex crossings Reinstatement Costs Utility Diversion Requirements Bespoke Circuit Trench Requirements
Socio-Economic	<ul style="list-style-type: none"> Cultural heritage Proximity to critical services Duration of the works Settlements and Communities Amenity Traffic and Transport Emergency services
Environmental	<ul style="list-style-type: none"> Planning policy and land use Biodiversity, Flora, and Fauna Landscape and Visual Contaminated land Flood risk Water Impact

The map of all route sections between nodes that were assessed as part of this MCA are shown in Figure 3-3. The colour of each section shows the overall MCA ranking of that section.

The colour coding of the MCA is outlined in Table 3-2.

Table 3-2: Colour coding of Risk / Significance / Sensitivity levels

Colour Key	Level of Risk / Significance / Sensitivity
Yellow	Low
Green	Low-Moderate
Dark Green	Mid-Level / Moderate
Blue	Moderate-High
Dark Blue	High

From the MCA results, using the best possible ranked sections, three optimised routes, Option G, Option H and Option I were progressed as Emerging Best Options for further consideration. These routes are shown in Section 3.1.

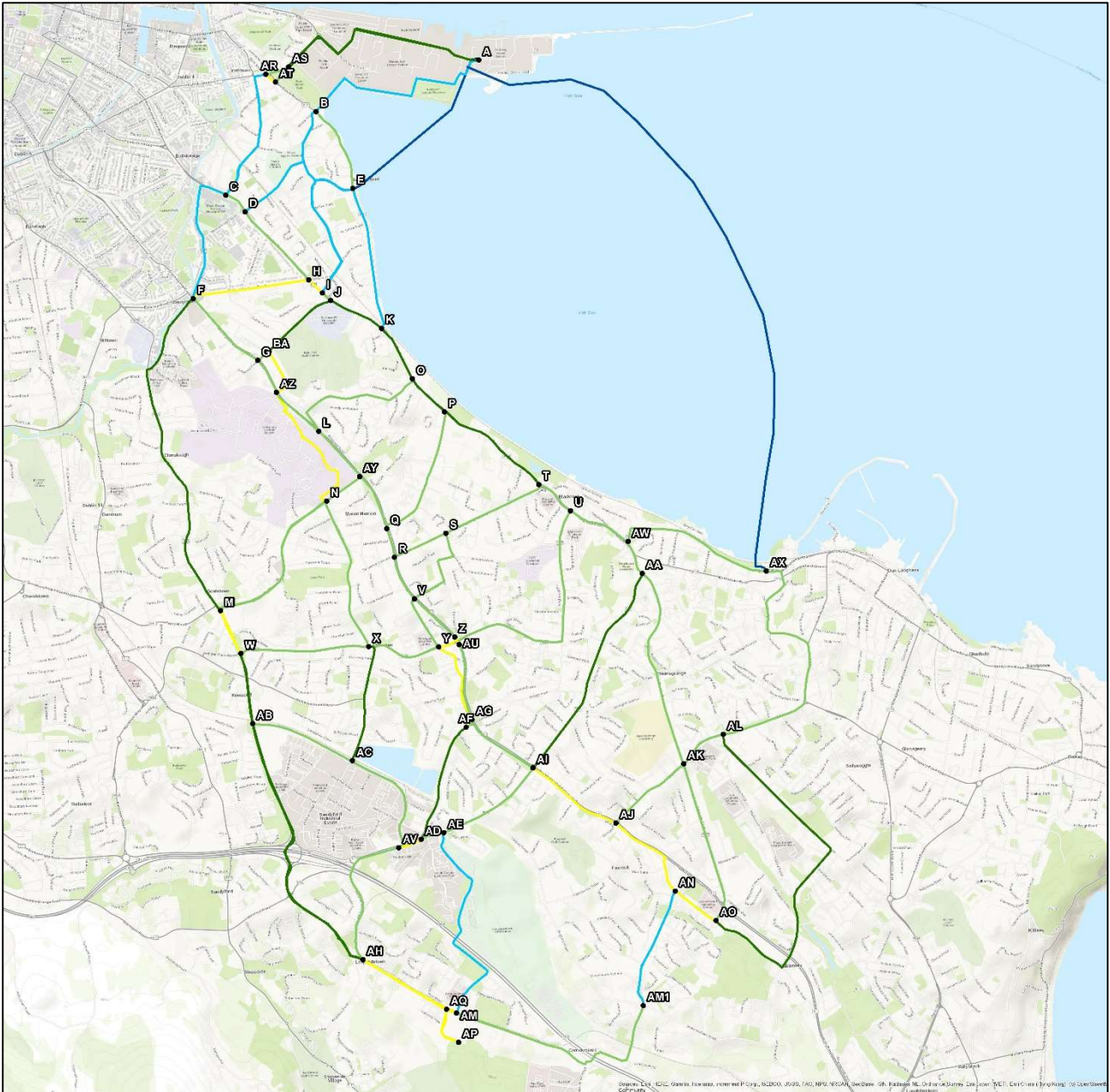


Figure 3-3: Route section and node map for Carrickmines to Poolbeg route options

3.1 Step 4A Emerging Best Options

Option G, Option H and Option I were identified as the Emerging Best Options for further consideration in this report. This section outlines the overall MCA ranking of each Option and the outstanding challenges that were identified at this stage for each route. Figure 3-4 shows a map of these EBOs.

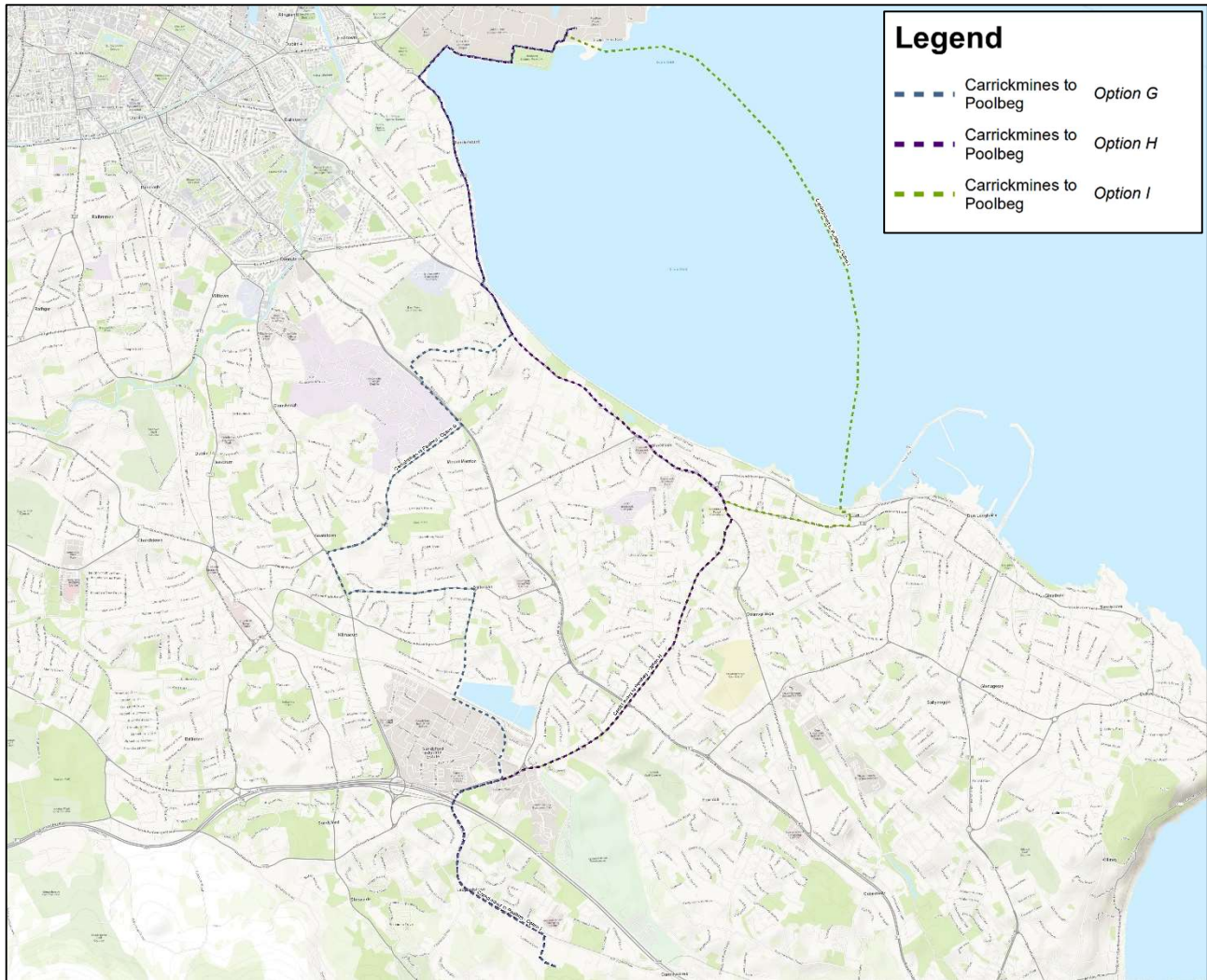


Figure 3-4: Map of Route Option G, Option H and Option I

Option G was selected due to the overall MCA ranking of low-moderate. The higher ranking of mid-level/moderate in the Deliverability and Socio-Economic criteria was driven by the working time constraints, utility congestion and duration of the works. The high working time constraint was due to large sections of the route having high Traffic Impact Numbers which may increase the working time for construction in these areas. Another factor driving the ranking were the two Horizontal Directional Drill (HDD) crossings under Luas and Dart lines. This route could be constructed in compliance with EirGrid specifications and would have minimal expansion/extendibility issues.

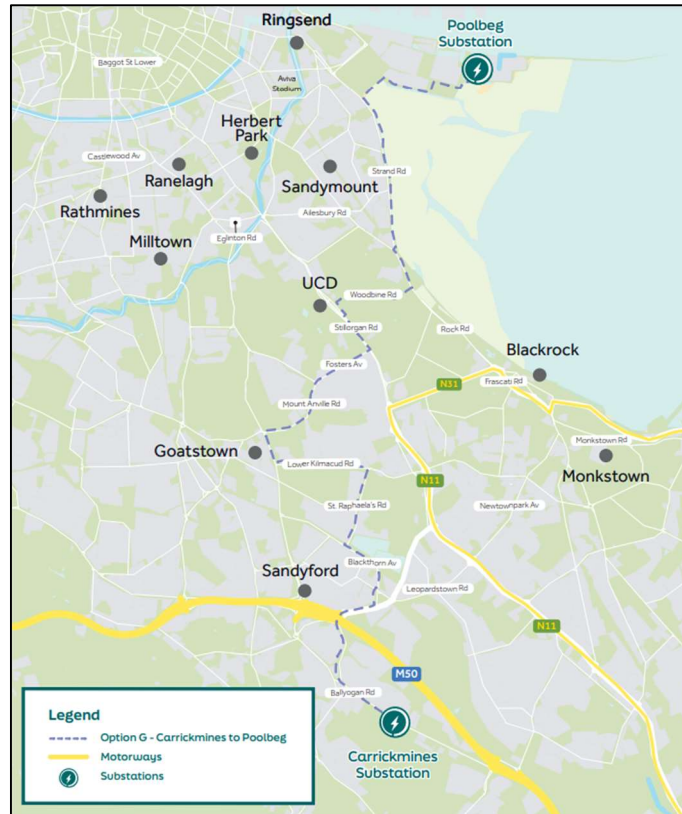


Figure 3-5: Map of Option G

There are several outstanding challenges on Option G that were identified at this phase to be addressed with further investigation and design during the Best Performing Option Assessment. They are as follows:

- Crossing through Sean Moore Park and Irishtown Nature Park, inland bird feeding sites.
- High utility congestion on Poolbeg peninsula
- M50 crossing. Space in bridge deck or space for a trenchless crossing
- Luas crossing. Trenchless crossing.
- DART crossing onto Strand Road at Merrion gates. This crossing appears to have the most space required for a trenchless crossing.

Option H had an overall MCA ranking of low-moderate. The criteria of Deliverability, Economic, and Socio-Economic were rated as mid-level / moderate. The main sub-criteria driving the higher rankings of this route were working time constraints, duration of works and proximity to critical services. The high working time constraint was due to a section of the route running from Leopardstown Road to the Rock Road having a Traffic Impact Number of 5 which is likely to increase the working time for construction along this section. This route could also be constructed in compliance with EirGrid specifications and would have minimal expansion/extendibility issues.

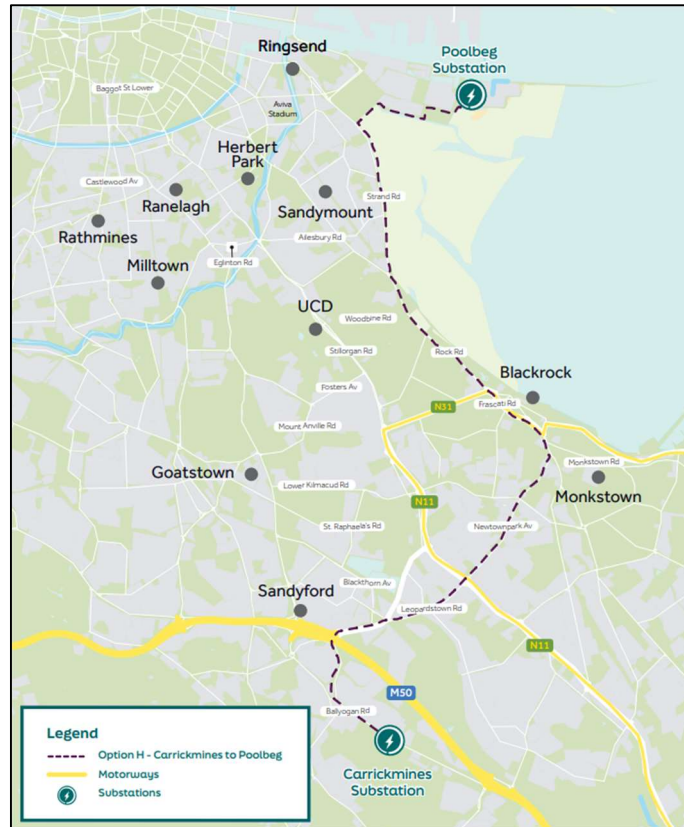


Figure 3-6: Map of Option H

There are several outstanding challenges on Option H that were identified at this phase that would need to be addressed with further investigation and design during the Best Performing Option Assessment. They are as follows:

- Crossing through Sean Moore Park and Irishtown Nature Park, inland bird feeding sites.
- High utility congestion on Poolbeg peninsula
- M50 crossing. Space in bridge deck or space for trenchless crossing
- DART crossing onto Strand Road at Merrion gates. This crossing appears to have the most space required for trenchless crossing.

Option I was the final route to be considered for further investigation. This route was ranked as low-moderate overall. The main challenge of this route was the long submarine section which travels through South Dublin Bay pHNA, SPA and SAC which will require a foreshore licence.

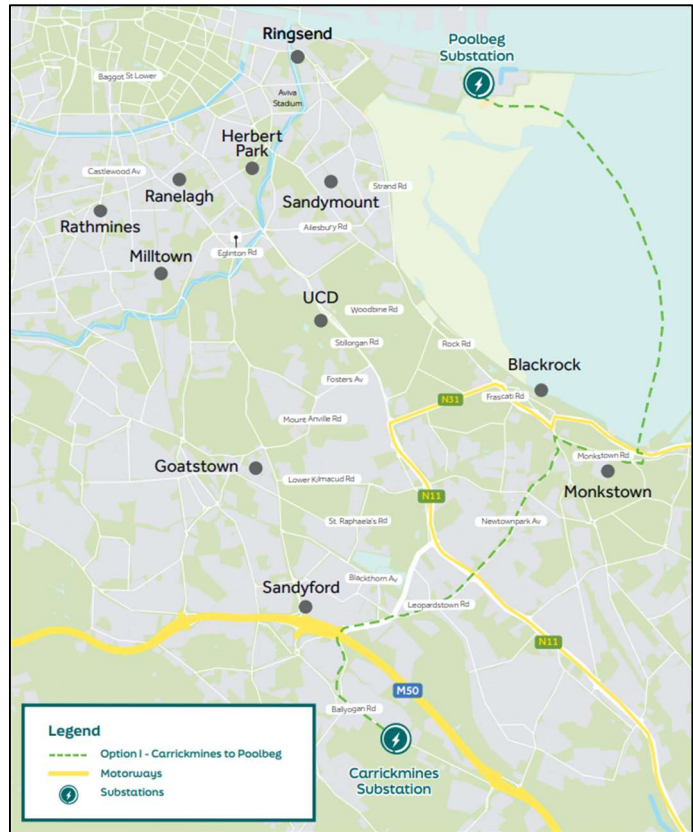


Figure 3-7: Map of Option I

There are several outstanding challenges on Option I that were identified at this phase that would need to be addressed with further investigation and design. They are as follows:

- M50 crossing. Space in bridge deck or space for a trenchless crossing
- DART crossing at Monkstown to gain access to the offshore launch location. This crossing appears to be highly complex.
- Space for landfall on Poolbeg Peninsula and Salthill and Monkstown
- Planning/environmental permissions for the submarine routing

3.2 Emerging Best Options Public Consultation

The public consultation period commenced on Tuesday, 28 March 2023 and ran for an eight-week period ending on Tuesday 23 May 2023. All relevant consultation material was available on the EirGrid Powering Up Dublin (PUD) website <https://www.eirgridgroup.com/the-grid/projects/dublin/the-project/>. This included:

- Project Summary Brochure
- Project Leaflet
- Route Maps including an Interactive Map Tool
- Link to Online Consultation Survey
- Link to Submission Portal
- Supporting Information

The consultation was promoted by EirGrid through advertising, social media and generating local / national news reports and interviews.

For up to three weeks before the consultation phase began, advertising was placed in newspapers, bus shelters, outdoor adshels, online and on radio. Advertising to promote the consultation continued throughout the eight-week consultation period on radio and social media.

Several in-person consultation events were conducted at relevant locations in the greater study area. Two dedicated Community Liaison Officers (CLOs) have been in place since the start of the project. Community Liaison Officer drop-in clinics were undertaken throughout the public consultation period (i.e., March to May 2023). Briefings were offered and delivered to elected representatives, schools, businesses, and community groups, where requested.

Powering Up Dublin

8-Week Public Consultation: 28 March - 23 May 2023

"Building a More Resilient and Reliable Electricity Grid"

135,638
560

Leaflets Distributed
Stakeholder Emails Sent

11

Public Information Events

189 Attendees

2

Online Webinars
20 Attendees

Briefings

32 Community

9 Business

2 Public Reps

1 Oireachtas Briefing
25 Attendees



60

Local / National News Reports

Forums

2 Business
32 Attendees

2 Community
24 Attendees

15

Technical Briefings
18 Attendees

350

Radio Ads

148

Outdoor Ads

21

Newspaper Ads



86 Virtual Room Visits

5 Community Liaison Clinics
22 Attendees

2 School Outreach Events
90 Attendees

Social Media Campaign



554

Participated

463 People Met

91 Submissions Received



Figure 3-8: Consultation Activity Summary

3.3 Emerging Best Options Public Consultation Feedback

The *PUD Consultation Findings Report* summarises feedback, responses and comments received relating to the first non-statutory public consultation on the first phase of the Powering Up Dublin (PUD) Project.

Overall, most people understood the need for the project and there was widespread acceptance of the PUD project. Notwithstanding this, submissions received included valuable feedback on the concerns related to the project.

The most frequently emerging themes raised included local environmental issues, cumulative impacts, business impacts and traffic disruption. Concerns regarding the potential traffic impact on schools and the disruption to businesses in the area were also raised.

There were concerns regarding the potential impacts of the required works when the project reaches the final route selections and subsequent construction stage. The area of primary concern and most frequently recurring issue was that of traffic disruption (general, business and traffic specific) and congestion resulting from construction stage. A high volume of respondents referenced the need for robust traffic management measures, routing preferences and retention of public transport/pedestrian routes throughout construction.

Respondents also voiced concerns in relation to the potential for cumulative impacts in the communities in which several of the potential routes pass through, where multiple utilities projects are programmed, in progress and recently completed.

Some respondents mentioned the environmental impacts of the offshore option, stating that investments should be made into the protection of the environment if this option is pursued.

Individual respondents expressed strong preferences for collaboration between utilities companies and local authorities where possible and this sentiment was echoed by several utilities' companies and local authorities (e.g.: ESB Networks, Uisce Éireann and Dublin City Council) themselves in their submissions. Those utility companies and local authorities called for continued dialogue and engagement regarding the project, route development and collaborative opportunities. The overarching sentiment of responses referring to collaborative opportunities was that they may reduce disruption potentially experienced by communities, such as through reducing the need for ongoing or repeated carriageway excavations.

The Consultation Findings Report can be found [here](#) and all consultation submissions can be found [here](#).

4 BEST PERFORMING OPTION ASSESSMENT (STEP 4B)

4.1 Introduction

To determine the Best Performing Option, the three Emerging Best Options (EBOs) identified in the Route Options Assessment Report were examined in greater detail. This process included route surveys, stakeholder and landowner engagement, and detailed route design, focusing on areas of particular difficulty such as water course or railway crossings.

The design process to determine the Best Performing Option is shown in Figure 4-1. It is noted that the assessment process is iterative. This means, for example, that information found at the information gathering stage could be used to inform the technical route surveys and stakeholder engagement, which feeds back into the information gathering and route assessment.

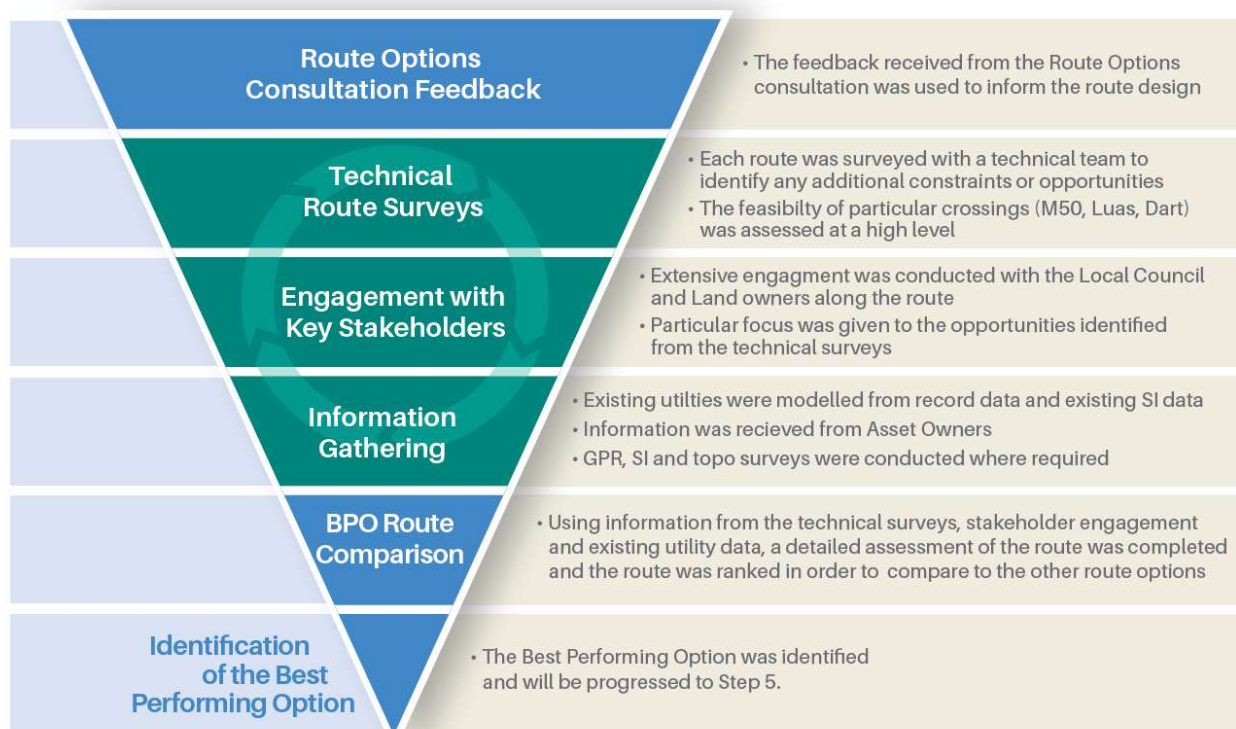


Figure 4-1: Best Performing Option Assessment (Step 4B) Design Process

4.2 Information Gathering and Route Assessment

The first step for the technical team was to perform surveys of all three route options identified. The team identified any constraints that may affect the constructability of the circuit in this location, as well as potential opportunities that may benefit the construction of the circuit in a particular location.

Some route modifications were identified as a result of the constraints identified during the Best Performing Option assessment. The changes identified have resulted in an improved route from the original EBO.

Multidisciplinary assessments were undertaken on each EBO route. This included engineering, archaeology, environmental and ecological assessments. These assessments were primarily desktop based, with targeted walkover surveys of particular areas of sensitivity or importance.

EirGrid also carried out particular engagement with stakeholders that may be affected along the cable route. This engagement has allowed the landowners and stakeholders to inform the route option based off their preference, current or future land use and any land conditions they have knowledge of.

Detailed assessments were conducted along the route to identify the best crossing locations of important features such as the M50, Luas line, DART railway, amongst others. The suitability of each crossing was assessed considering the crossing methodology, crossing location including space for works areas and existing factors such as utility congestion in the area. Existing bridges were assessed to determine the availability of space for routing the circuit in the bridge deck. This included considering if the bridge depth was of suitable depth as well as space required to achieve minimum separation from existing utilities.

This process allowed for the careful examination and comparison of the EBOs, including environmental, social, and technical considerations as well as input from landowners, stakeholders, and the community. The Best Performing Option for the Carrickmines to Poolbeg circuit was selected from this process.

4.3 BPO Route Assessment

The three EBOs were analysed using the process outlined in the previous section, Section 4.2. This section summarises the findings for each route option.

There are four existing 220kV circuits within the Poolbeg Peninsula that must be replaced as part of the PUD programme of works. The Route Options Assessment for Carrickmines to Poolbeg and Inchicore - Poolbeg projects identified a number of route options which are located in the south and west of the Poolbeg Peninsula. Two options for Carrickmines to Poolbeg and three options for Inchicore - Poolbeg.

For this reason, capacity for replacement 220kV circuits within the Poolbeg Peninsula is identified as a critical success factor for CP1146 and CP1150/CP1157. To determine feasibility of these route options a detailed assessment of the available capacity for future circuits has been completed.

4.3.1 Poolbeg Peninsula

As part of the work done in the Best Performing Option Assessment process, an in-depth study was completed, with a full day workshop, focused on the Poolbeg Peninsula. This study looked at current and planned projects in the area, existing utility congestion and landowners.

The following are planned projects in the Poolbeg area that may affect the PUD project:

- Poolbeg West Strategic Development Zone (SDZ), including the mixed-use development at the former Irish Glass Bottle site
- DPC 3FM Project
- Codling Wind Park
- LUAS Proposed Red Line Extension.
- Dublin District Heating Project
- Ringsend Wastewater Treatment Plant Upgrade Project

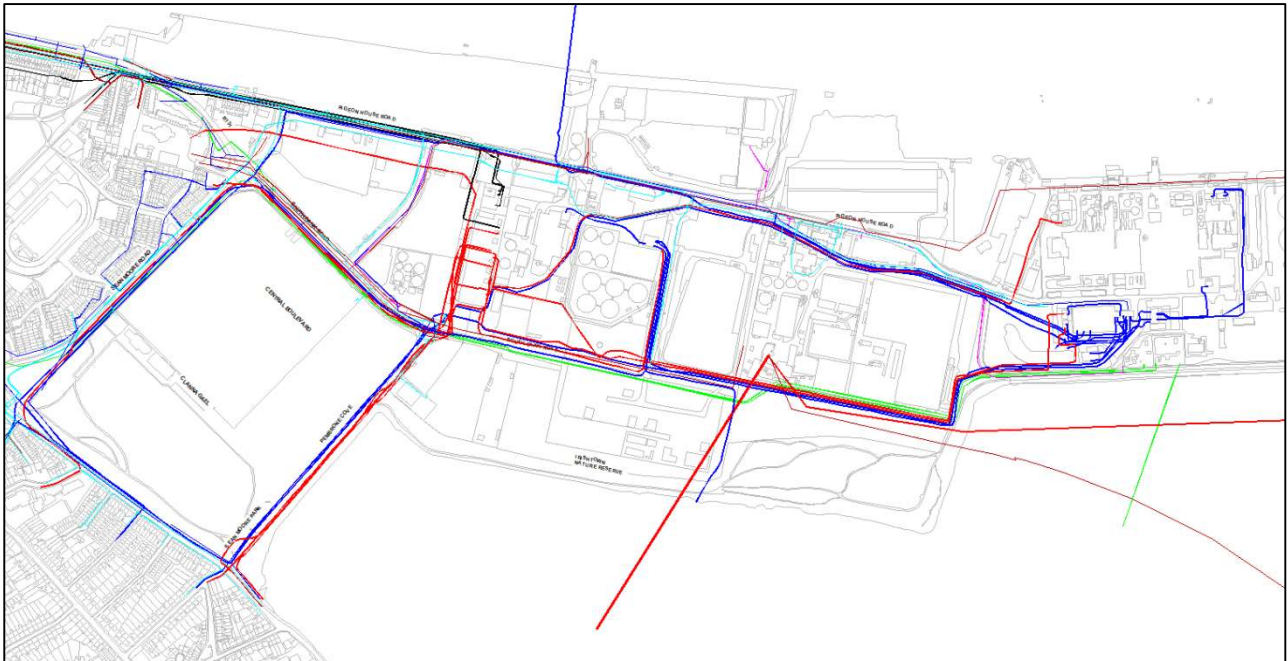


Figure 4-4: Existing utility congestion in the Poolbeg area²

This study identified six potential route options from the southwest into the Poolbeg Substation. These route options are shown in Figure 4-5.



Figure 4-5: Six route options considered in the Poolbeg area

Capacity for new circuits within the Poolbeg Peninsula is extremely limited due to land availability and utility congestion. It will be extremely challenging, if not impossible to route three circuits from the southwest into the Poolbeg Substation. This study identified the best performing route corridor (route option 1), in which a maximum of two circuits can be placed within the same trench. Due to the high utility congestion, the remaining routes would require lengthy outages of important transmission circuits and

² Sources in Appendix A

significant diversions of other utilities. These are not deemed to be operationally feasible, due to system security as the grid does not have the resilience to accommodate the outages that would be required.

There was space identified to the east, in the Shelley Banks car park, which is relatively unconstrained and offers a good landfall location for a marine crossing of South Dublin Bay. There is a feasible route from this landing location to the Poolbeg substation for the Carrickmines - Poolbeg circuit replacement.



Figure 4-6: The best performing route option identified into the Poolbeg Substation

4.3.2 Option G Assessment

The following sections summarise the findings from the Best Performing Option Assessment on Option G.

4.3.2.1 Route Options Consultation Feedback

The following public engagement feedback was received on Option G:

- High levels of ongoing projects in the Sandymount area, as well as concerns over potential disruption to roads and commuters throughout this route option.
- The issue was raised regarding Uisce Éireann works on Beach and Strand Road, Sandymount, in 2022 and 2023 and resultant traffic issues and “pollution” on Merrion Road as a result. As a result of the perceived ongoing traffic disruption in the Sandymount area, the establishment of a “taskforce to co-ordinate the flood defence, cycle way and PUD programme” was requested.
- Impact on three 2nd and 3rd level education institutions along this route: Mount Annville, University College Dublin, and St Raphael’s
- Impact on St Vincent’s Hospital.
- This route involves works on Woodbine Road which forms part of the “DLR UCD Belfield Campus to DART and Luas’ network” which is used by UCD students accessing Belfield Campus. The submissions put forward that “construction work on this road would cause significant disruption” and cause further disruption on other congested roads in the area.

-
- In their submission Tesco Ireland stated that Route Option G is least preferred due to potential impact on Stillorgan Village.

4.3.2.2 BPO Route Assessment

Technical surveys, key stakeholder engagement and information gathering all formed part of the route assessment. Information gathering included assessment of available existing utility record data, information from asset owners and feedback from key stakeholders. In some critical areas, detailed design was completed to assess the feasibility of the route through these areas.

The critical areas identified through this process, which are major constraints to the successful delivery of this route, are as follow:

- R113 bridge crossing over M50

There is limited space in the bridge deck to accommodate a 220kV circuit. This was confirmed with as-built diagrams from the asset owner. The crossing location is very challenging for a trenchless crossing due to the bedrock in the area and the depth of the crossing required.

A preferred alternative crossing option of the M50 onto Leopardstown Racecourse land was identified during the technical surveys and was progressed further through stakeholder engagement with the landowner. An agreement on the route location, including the crossing location for the trenchless crossing of the M50 and the location of the route through the private land back towards the R113, has been reached.

- Level crossing of Dart line at Merrion Gate.

The Irish Rail crossing standards were received as part of stakeholder engagement with Irish Rail. In keeping with these standards, a detailed crossing design was completed. This detailed design showed that the trenchless crossing of the Dart line in this location is technically very challenging due to available space and existing circuits in this location and is not a preferred crossing location.

- Strand Road

Uisce Éireann works on Beach and Strand Road were observed during the technical surveys. This is of particular concern where Strand Road narrows towards the northern section of this road. Site investigation and detailed design would be needed to confirm route feasibility. Due to the observed works in this area, the impact on the public of additional work in this area is also of concern.

- Poolbeg Peninsula

In Section 4.3.1, the high utility congestion in the Poolbeg Peninsula was discussed. Capacity for new circuits within the Poolbeg Peninsula is extremely limited due to land availability and utility congestion. It will be extremely challenging, if not impossible, to route three circuits from the southwest into the Poolbeg Substation.

4.3.2.3 BPO Route Comparison

Using all the information gathered throughout this BPO Assessment, the route was evaluated using EirGrid's multi criteria analysis to progress the assessment of the route in greater detail and to compare this route with the other two EBOs. Table 4-1 shows the main comments under each criterion for this route.

Table 4-1: BPO Route Assessment of Option G

Criteria	Step 4A Ranking	Comment	BPO Ranking
Technical		<p>The technical ranking of this route during the Route Options Assessment was low-moderate.</p> <p>The following has been identified during the BPO route assessment phase:</p> <ul style="list-style-type: none"> • Non-standard trenchless crossings envisaged. <ul style="list-style-type: none"> ▪ Detailed review of the major utility crossings, Luas and Dart identified that there is not space for a flat formation, and as a result would require trefoil formation (in a single conduit) which is not a standard crossing formation. ▪ Irish Rail identified that an open trenched solution would not be feasible and that the Dart crossing would require a trenchless crossing at a depth of 4.7m below the railway. At this depth, bentonite backfill would be required to ensure the required rating can be achieved by the circuit. • Limitations on other routes <ul style="list-style-type: none"> ▪ This route option will greatly impact the potential for future expansion in the Poolbeg Peninsula. This route option will affect the deliverability of the Inchicore - Poolbeg circuits 1&2. <p>As a result of these items the ranking has been increased to mid-level/moderate in this assessment.</p>	
Deliverability		<p>The deliverability ranking of this route during the Route Options Assessment was mid-level/moderate.</p> <p>The following has been identified during the BPO route assessment phase:</p> <ul style="list-style-type: none"> • Due to the utility congestion in Poolbeg, with the existing 220kV network as well as with the planned Inchicore - Poolbeg replacement circuit, there is a high potential that this route would require outages during construction. • Project timeline uncertainty <ul style="list-style-type: none"> ▪ This route passes Sandyford industrial area as well as through many residential areas and this option is entirely within public roads (15.4km) which will necessitate the construction of approximately 30 joint bays. ▪ Due to constrained working times and utility congestion, construction progress is likely to be slow with a relatively high potential for delay to individual sections of the works. • The crossing of the Dart line is very technically challenging, this has been increased by the recent construction of the East City Arterial Watermain Replacement Project, which involved replacement of a 24" watermain from Beach Road/Strand Road through Merrion Gates and this included a new crossing of the DART line. Observations of the construction works highlighted the limited space available for launch/reception shafts outside the track support zone. <p>As a result of these items the ranking has been increased to high in this assessment.</p>	

Criteria	Step 4A Ranking	Comment	BPO Ranking
Economic		<p>The economic ranking of this route during the Route Options Assessment was mid-level/moderate.</p> <p>The following has been identified during the BPO route assessment phase:</p> <ul style="list-style-type: none"> • Non-standard trenchless crossings envisaged. The crossing of the Luas and Dart would require significant trenchless operations, ensuring that the circuits are at the required depth and are outside the track support zone. These crossings are likely to require utility diversions to accommodate launch and reception pits. • Bespoke trenches may be required at the trenchless crossing locations as well as in areas of high utility congestion. These may require special treatments such as bentonite backfill. • There are sections of the route that have been recently surfaced, in some cases with new road alignments, such as on the Rock Road. The reinstatement requirements in these locations will require a higher requirement than trench or lane reinstatement. • The extent of utility diversions along the route is unknown at this stage, however, given the requirement for approximately 30 joint bays it is expected that there will be a requirement for diversion of existing utilities. <p>As a result of these items the ranking has been increased to moderate-high in this assessment.</p>	
Socio-Economic		<p>The socio-economic ranking of this route during the Route Options Assessment was mid-level/moderate.</p> <p>The following has been identified during the BPO route assessment phase:</p> <ul style="list-style-type: none"> • The public consultation feedback is highlighted in Section 4.3.2.1, with the main concern being the high potential disruption to roads and commuters throughout this route option and the large number of ongoing projects in the Sandymount area. <p>As a result of these items the ranking has been increased to moderate-high in this assessment.</p>	
Environmental		<p>No additional environmental issues have been identified during the BPO route assessment phase. The environmental assessment of this route remains at low-moderate ranking.</p>	
Overall		<p>The overall assessment ranking is moderate-high. This has increased from low-moderate during the Route Options Assessment.</p>	

4.3.3 Option H Assessment

The following sections summarise the findings from the Best Performing Option Assessment on Option H.

4.3.3.1 Route Options Consultation Feedback

The following public engagement feedback was received on Option H:

- High levels of ongoing projects in the Blackrock and Sandymount areas, as well as concerns over potential disruption to roads and commuters throughout this route option.
- The issue was raised regarding Uisce Éireann works on Beach and Strand Road, Sandymount, in 2022 and 2023 and resultant traffic issues and “pollution” on Merrion Road as a result. As a result of the perceived ongoing traffic disruption in the Sandymount area, the establishment of a “taskforce to co-ordinate the flood defence, cycle way and PUD programme” was requested.
- The feedback also highlighted the impact on three schools along this route: Guardian Angels National School, Blackrock College, and Newpark Comprehensive School
- Impact on St Vincent’s Hospital.
- There will be a high impact on the Rock Road, as well as the schools, nursing homes and Montessori schools on the route.
- In their submission Tesco Ireland stated that Option H is not preferred as it is perceived to have a potential impact on the Merrion Centre and Sandymount.

4.3.3.2 BPO Route Assessment

Technical surveys, key stakeholder engagement and information gathering all formed part of the route assessment. Information gathering included assessment of available existing utility record data, information from asset owners and feedback from key stakeholders. In some critical areas, detailed design was completed to assess the feasibility of the route.

The critical areas identified through this process, which are major constraints to the successful delivery of this route, are as follow:

- R113 bridge crossing over M50

There is limited space in the bridge deck to accommodate a 220kV circuit. This was confirmed with as-built diagrams from the asset owner. The crossing location is very challenging for a trenchless crossing due to the bedrock in the area and the depth of the crossing required.

A preferred alternative crossing option of the M50 onto Leopardstown Racecourse land was identified during the technical surveys and was progressed further through stakeholder engagement with the landowner. An agreement on the route location, including the crossing location for the trenchless crossing of the M50 and the location of the route through the private land back towards the R113, has been reached.

- Crossing the N11 on the R113

There is high existing utility congestion in this location, as well as high traffic congestion. An alternative crossing location to the north through Belmont Lawn was identified from the technical surveys and was progressed through detailed route design.

- Newtownpark Avenue

Through stakeholder engagement with Dun Laoghaire Rathdown County Council (DLRCC), it was advised that Newtownpark Avenue has undergone recent improvements, including roadworks and the development of cycle paths on this route. An alternative route option on Carysfort Avenue was suggested. Carysfort Avenue is in poor condition, and it was suggested by DLRCC that resurfacing the road through this project will

benefit the local residents. Carysfort Avenue was found to be a feasible alternative through technical surveys and route design.

- Rock Road

Through stakeholder engagement with DLRCC, it was pointed out that the northern section of Rock Road from Blackrock Park to Trimleston Avenue has undergone recent improvements, including roadworks and the development of cycle paths on this route. No suitable alternative route was found during this assessment.

- Level crossing of Dart line at Merrion Gate.

The Irish Rail crossing standards were received from stakeholder engagement with Irish Rail. In keeping with these standards, a detailed crossing design was completed. This detailed design showed that the trenchless crossing of the Dart line in this location is technically very challenging and is not a preferred crossing location.

- Strand Road

Uisce Éireann works on Beach and Strand Road were observed during the technical surveys. This is of particular concern where Strand Road narrows towards the northern section of this road. Site investigation and detailed design would be needed to confirm route feasibility. Due to the observed works in this area, the impact on the public of additional work in this area is also of concern.

- Poolbeg Peninsula

In Section 4.3.1, the high utility congestion in the Poolbeg Peninsula was discussed. Capacity for new circuits within the Poolbeg Peninsula is extremely limited due to land availability and utility congestion. It will be extremely challenging, if not impossible, to route three circuits from the southwest into the Poolbeg Substation.

4.3.3.3 BPO Route Comparison

Using all the information gathered throughout this BPO Assessment, the route was assessed using EirGrid’s five assessment categories to progress the assessment of the route to a higher level and compare this route with the other two EBOs. Table 4-2 shows the main comments under each criterion for this route.

Table 4-2: BPO Route Assessment of Option H

Criteria	Step 4A Ranking	Comment	BPO Ranking
Technical		<p>The technical ranking of this route during the Route Options Assessment was low-moderate.</p> <p>The following has been identified during the BPO route assessment phase:</p> <ul style="list-style-type: none"> • Non-standard trenchless crossings envisaged. <ul style="list-style-type: none"> ▪ Detailed review of the major utility crossings, Luas and Dart identified that there is no space for flat formation, and as a result would require trefoil formation (in a single conduit) which is not a standard crossing formation. ▪ Irish Rail identified that an open trenched solution would not be feasible and that the Dart crossing would require a trenchless crossing at a depth of 4.7m below the railway. At this depth, bentonite backfill would be required to ensure the required rating can be achieved by the circuit. • Limitations on other routes <ul style="list-style-type: none"> ▪ This route option will greatly impact the potential for future expansion in the Poolbeg Peninsula. This route option will affect the deliverability of the Inchicore - Poolbeg circuits 1&2. <p>As a result of these items the ranking has been increased to mid-level/moderate in this assessment.</p>	

Criteria	Step 4A Ranking	Comment	BPO Ranking
Deliverability		<p>The deliverability ranking of this route during the Route Options Assessment was mid-level/moderate.</p> <p>The following has been identified during the BPO route assessment phase:</p> <ul style="list-style-type: none"> • Due to the utility congestion in Poolbeg, with the existing 220kV network as well as with the planned Inchicore - Poolbeg replacement circuit, there is a high likelihood this route will require outages on numerous circuits during construction. • Project timeline uncertainty <ul style="list-style-type: none"> ▪ This route passes many commercial areas as well as through many residential areas and this option is entirely within public roads (14.7km) which will necessitate the construction of approximately 28 joint bays. ▪ Due to constrained working times and utility congestion, construction progress is likely to be slow with a relatively high potential for delay to individual sections of the works. • The crossing of the Dart line is very technically challenging. This has been increased by the recent construction of the East City Arterial Watermain Replacement Project, which involved replacement of a 24" watermain from Beach Road/Strand Road through Merrion Gates and this included a new crossing of the DART line. Observations of the construction works highlighted the limited space available for launch/reception shafts outside the track support zone. <p>As a result of these items the ranking has been increased to high in this assessment.</p>	
Economic		<p>The economic ranking of this route during the Route Options Assessment was mid-level/moderate.</p> <p>The following has been identified during the BPO route assessment phase:</p> <ul style="list-style-type: none"> • Non-standard trenchless crossings envisaged. The crossing of the Luas and Dart would require significant trenchless operations, ensuring that the circuits are at the required depth and are outside the track support zone. These crossings are likely to require utility diversions to accommodate launch and reception pits. • Bespoke trenches may be required at the trenchless crossing locations as well as in areas of high utility congestion. These may require special treatments such as bentonite backfill. • There are sections of the route that have been recently surfaced, in some cases with new road alignments, such as on the Rock Road. The reinstatement requirements in these locations will require a higher requirement than trench or lane reinstatement. • The extent of utility diversions along the route is unknown at this stage, however, given the requirement for approximately 28 joint bays it is expected that there will be a requirement for diversion of existing utilities. <p>As a result of these items the ranking has been increased to moderate-high in this assessment.</p>	
Socio-Economic		<p>The socio-economic ranking of this route during the Route Options Assessment was mid-level/moderate.</p> <p>The following has been identified during the BPO route assessment phase:</p> <ul style="list-style-type: none"> • The public consultation feedback is highlighted in Section 4.3.3.1, with the main concern being the high potential disruption to roads and commuters throughout this route option and the large number of ongoing projects in the Sandymount area. <p>As a result of these items the ranking has been increased to moderate-high in this assessment.</p>	
Environmental		<p>No additional environmental issues have been identified during the BPO route assessment phase. The environmental assessment of this route remains at low-moderate ranking.</p>	
Overall		<p>The overall assessment ranking is moderate-high. This has increased from low-moderate during the Route Options Assessment.</p>	

4.3.4 Option I Assessment

The following sections summarise the findings from the Best Performing Option Assessment on Option I.

4.3.4.1 Route Options Consultation Feedback

The following public engagement feedback was received on Option I:

- This route received the most amount of support from the public engagement process.
- Several respondents favoured Option I, due to its potential for minimal traffic disruption, efficient use of existing infrastructure, and reduced road surface disturbance.
- The reduced environmental impact, and considerate approach toward affected communities was also cited as preferable for this option.

4.3.4.2 BPO Route Assessment

Technical surveys, key stakeholder engagement and information gathering all formed part of the route assessment. Information gathering included assessment of available existing utility record data, information from asset owners and feedback from key stakeholders. In some critical areas, detailed design was completed to assess the feasibility of the route.

The critical areas identified through this process, which are major constraints to the successful delivery of this route, are as follow:

- R113 bridge crossing over M50

There is limited space in the bridge deck to accommodate a 220kV circuit. This was confirmed with as-built diagrams from the asset owner. The crossing location is very challenging for a trenchless crossing due to the bedrock in the area and the depth of the crossing required.

A preferred alternative crossing option of the M50 onto Leopardstown Racecourse land was identified during the technical surveys and was progressed further through stakeholder engagement with the landowner. An agreement on the route location, including the crossing location for the trenchless crossing of the M50 and the location of the route through the private land back towards the R113, has been reached.

- Crossing the N11 on the R113

There is high existing utility congestion in this location, as well as high traffic congestion. An alternative crossing location to the north through Belmont Lawn was identified from the technical surveys and was progressed through detailed route design. The alternative crossing location of the N11 through Belmont Lawn was identified from the technical surveys.

- Newtownpark Avenue

Through stakeholder engagement with DLRCC, it was pointed out that Newtownpark Avenue has undergone recent improvements, including roadworks and the development of cycle paths on this route. An alternative route option on Carysfort Avenue was suggested. Carysfort Avenue is in poor condition, and it was suggested by DLRCC that resurfacing the road through this project will benefit the local residents. Carysfort Avenue was found to be a feasible alternative through technical surveys and route design.

A potential route option off Carysfort Avenue, turning onto Angelsea Avenue and Sydney Avenue was also assessed. This route option may reduce the impact on the Frascati Shopping Centre. Through a detailed assessment, it was determined there is insufficient space for a 220kV circuit on these roads. The identified best performing route therefore travels the length of Carysfort Avenue, to Frascati Road.

- Marine launch location - Salthill & Monkstown

Option I contained a marine crossing of South Dublin Bay. The proposed launch site for this marine crossing was the car park of the Salthill & Monkstown Dart station. An HDD crossing of Dart line, converting into the submarine crossing was proposed. Through the technical surveys, it was determined that this location is too small for the works area required. A number of alternatives along the coast were investigated between Dun Laoghaire and Merrion Gate. Blackrock Park was identified as the best location for this launch site due to space available, utilities congestion, social and environmental impacts. Engagement was held with the local council to agree on this crossing location.

- Marine crossing of South Dublin Bay.

A feasibility assessment has been completed in partnership with ESB Major Projects to determine technical and environmental feasibility of the marine crossing of South Dublin Bay. The assessment considered several options for the marine crossing. The best performing option is from Blackrock Park to a location on the eastern edge of the Poolbeg Peninsula.

During Step 5, the project team will undertake further assessments and surveys to support any necessary statutory applications. This work may 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.

- Reception site for the marine crossing - beach adjacent to the Poolbeg Substation.

An alternative landfall location was identified in the Shelley Banks car park. Engagement was held with the local council to agree on this reception location. Detailed design of the reception site was completed.

4.3.4.3 BPO Route Comparison

Using all the information gathered throughout this BPO Assessment, the route was assessed using EirGrid’s five assessment categories to progress the assessment of the route to a higher level and compare this route with the other two EBOs. Table 4-3 shows the main comments under each criterion for this route.

Table 4-3: BPO Route Assessment of Option I

Criteria	Step 4A Ranking	Comment	BPO Ranking
Technical		<p>The technical ranking of this route during the Route Options Assessment was low-moderate.</p> <p>The following has been identified during the BPO route assessment phase:</p> <ul style="list-style-type: none"> • The bedrock level at the M50 crossing negatively impacts the constructability of a trenchless crossing in this location, however the alternative crossing location onto Leopardstown Racecourse is a preferred alternative location. • A detailed feasibility study has been carried out on the marine crossing element of this route, to confirm that it is feasible. <p>This ranking has increased to mid-level/moderate level after this assessment.</p>	

Criteria	Step 4A Ranking	Comment	BPO Ranking
Deliverability		<p>The deliverability ranking of this route during the Route Options Assessment was mid-level/moderate.</p> <p>The following has been identified during the BPO route assessment phase:</p> <ul style="list-style-type: none"> The statutory consenting process is likely to fall under the remit of the new Maritime Area Regulatory Authority. There is a potential for delay due to the new consenting regime. Only the 7.5km onshore section of the 15.5km route is located within public roads. While there is a potential on this section for constrained working times and utility congestion, which will slow construction, the overall effect of the constrained working time and delays will be less on this route than the other two which are entirely onshore. The marine and land-based sections can proceed at the same time, which may not be possible for extensive onshore sections due to cumulative impacts. <p>This ranking has increased to moderate-high level after this assessment.</p>	
Economic		<p>The economic ranking of this route during the Route Options Assessment was mid-level/moderate.</p> <p>The following has been identified during the BPO route assessment phase:</p> <ul style="list-style-type: none"> Non-standard trenchless crossings envisaged. The crossing of the Luas and Dart would require significant trenchless operations, ensuring that the circuits are at the required depth and are outside the track support zone. These crossings are likely to require utility diversions to accommodate launch and reception pits. Bespoke trenches may be required at the trenchless crossing locations as well as in areas of high utility congestion within the 7.5km onshore section. These may require special treatments such as bentonite backfill. A more expensive option is preferred for the marine cables (three single-phase cables) to meet the rating requirements. <p>As a result of these items, the ranking has been increased to high in this assessment.</p>	
Socio-Economic		<p>The socio-economic ranking of this route during the Route Options Assessment was mid-level/moderate.</p> <p>The following has been identified during the BPO route assessment phase:</p> <ul style="list-style-type: none"> The public consultation feedback is highlighted in Section 4.3.4.1. This route received the most amount of support from the public engagement process. With the route changes identified during this process and considering the feedback from the public consultation, the length of public road used for this route has been reduced by 1.75km. <p>As a result of these items the ranking has been decreased to low-moderate in this assessment.</p>	
Environmental		<p>The environmental ranking of this route during the Route Options Assessment was mid-level/moderate.</p> <p>The following has been identified during the BPO route assessment phase:</p> <ul style="list-style-type: none"> The preferred alternative launch site for the marine crossing has been relocated to Blackrock Park, which is an inland bird feeding site. The marine crossing passes through designated sites in Dublin Bay. The feasibility of the marine crossing has been confirmed as part of the work supporting BPO assessment. Further assessments will be undertaken at Step 5 to address the environmental concerns associated with this option. <p>As a result of these items, the ranking has remained at mid-level/moderate in this assessment.</p>	
Overall		<p>The overall assessment ranking is mid-level/moderate.</p> <p>This has increased from low-moderate during the Route Options Assessment.</p>	

4.4 Identification of Best Performing Option

Table 4-4 shows a summary of the BPO Route Assessment, using EirGrid’s five multicriteria assessment categories. This assessment has been used to identify the Best Performing Option.

Table 4-4: Identification of Best Performing Option

Route	Length	Technical	Deliverability	Economic	Socio-Economic	Environmental	Overall
Option G	15.4	Non-standard trenchless crossings envisaged. This route option will limit the potential for future expansion of other HV circuits in the Poolbeg Peninsula.	This option is considered challenging to construct within the project timelines. This is due to the length of the route within residential and commercial areas and high utility congestion all of which will limit progress.	This option is entirely onshore (15.4km) and is envisaged to use non-standard crossings for the four major trenchless crossings.	This option has a high traffic impact. It also passes a number of schools as well as one very large hospital. This route option was not a preferred option from the public consultation feedback.	The environmental assessment of this route remains at low-moderate ranking.	
Option H	14.7	Non-standard trenchless crossings envisaged. This route option will limit the potential for future expansion of other HV circuits in the Poolbeg Peninsula.	This option is considered challenging to construct within the project timelines. This is due to the length of the route within residential and commercial areas and high utility congestion all of which will limit progress.	This option is entirely onshore (14.7km) and is envisaged to use non-standard crossings for the two major trenchless crossings.	This option has a high traffic impact. It also passes a number of schools as well as one hospital. This route option was not a preferred option from the public consultation feedback.	The environmental assessment of this route remains at low-moderate ranking.	
Option I	15.5	A detailed feasibility study has been carried out to determine the technical feasibility and environmental risk of the marine element of this project.	The consenting process for the marine element may impact on timelines for the deliverability of this option.	This option is a combination of 7.5km onshore and 8km offshore. To achieve the required rating for the marine crossing, three separate cables are required. This will increase the cost.	This option was identified as the preferred option through public consultation. Only the onshore 7.5km of this route will affect traffic and residential areas.	The potential for impact on the SAC/SPA presents an environmental risk.	

The Best Performing Option identified through the work undertaken at this phase of the project is Option I. There are a number of changes to this route from the published Option I that were established during the Best Performing Options assessment, with particular focus on the feedback from landowners, stakeholders and the community and detailed design assessments. These route changes are discussed in Section 5.3.

5 DESCRIPTION OF THE BEST PERFORMING OPTION

5.1 Introduction

The Best Performing Option identified through the work undertaken at this phase of the project, is Option I. There are a number of changes to this route that were identified during the Best Performing Option assessment, and which have arisen due to feedback from landowners and the public engagement; route surveys; and detailed design assessments. These changes are outlined in Section 5.3.

Additional work will be undertaken as this project moves into Step 5 which may result in further refinements and alterations to the route. This work includes site investigation (both non-invasive and limited invasive site investigation) and further engagement with landowners and stakeholders. Any changes to the route will be tracked and described in detail in the Step 5 reports.

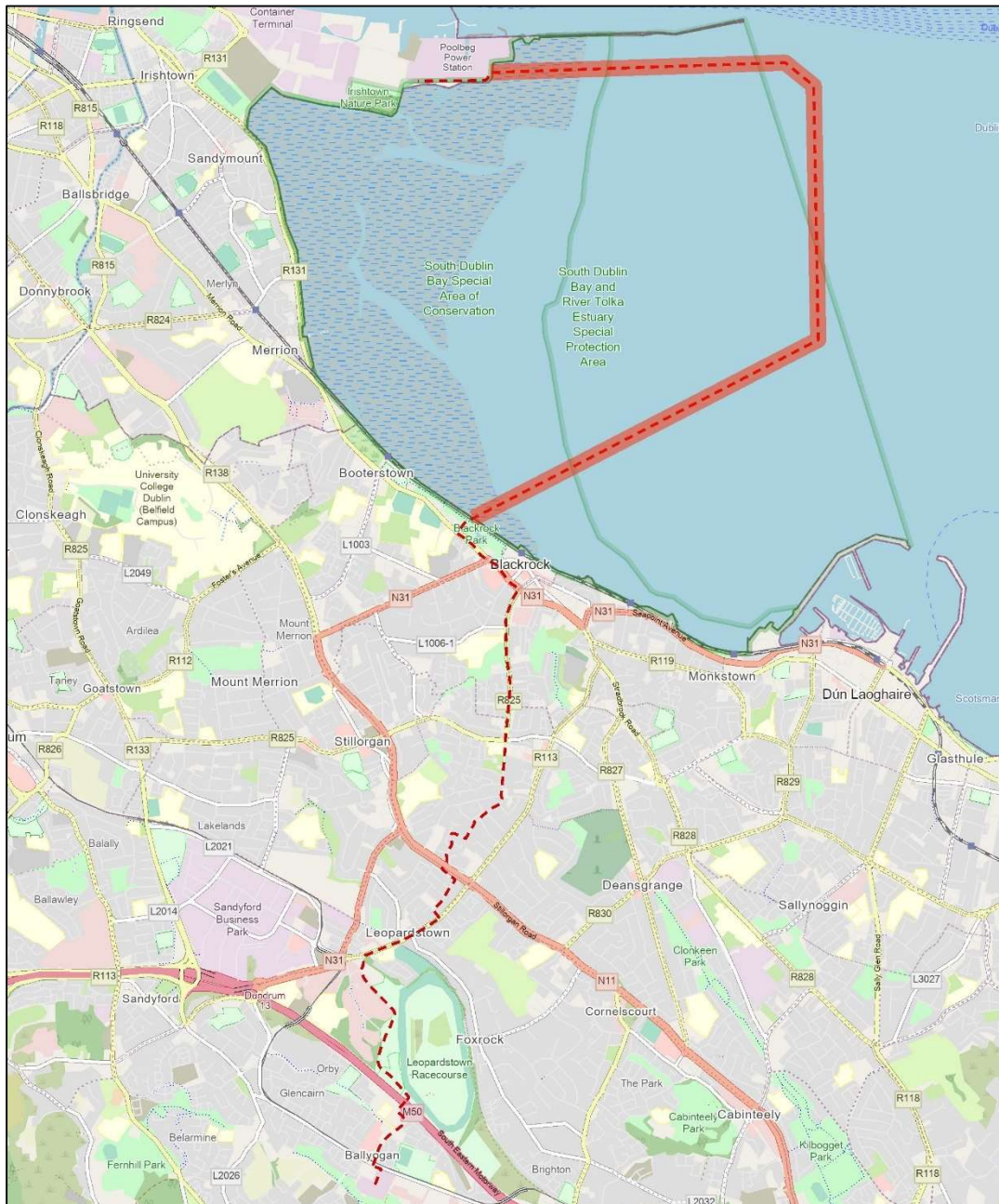


Figure 5-1: Carrickmines to Poolbeg Best Performing Option

5.2 Route Corridor

The route corridor considered at this phase is the width of the public roadway (including footpaths) or 20m wide where the route not located within public lands. This allows for the adjustments to the exact positioning of the circuit trench within this corridor depending on existing services to minimise the impact on the existing services and ensure ideal placement of the circuit within this corridor.

Within this route corridor, the circuit will be installed in a trench 1100mm wide. This follows the EirGrid standard for 220kV circuits in flat formation. Where required due to space constraints, the trench can be narrowed to 600mm, and the circuit can be laid in trefoil formation according to the EirGrid standard for 220kV circuits in trefoil formation. The exact location of this trench within the Best Performing Option route corridor is subject to site investigation and landowner agreement along the route.

Most of the onshore section of the Best Performing Option is located within public roads. A traffic management plan will be established to ensure the minimal impact on road users. Depending on the location of the works, temporary single lane closures, temporary road closures, or night works may be required. The works will take place along small sections of the route, in approximately 50m - 100m long stretches at a time. This means that only small sections of the roads along the route will be disrupted at one time. This disruption is also temporary in nature, as once the road or section has been reinstated, normal activity can resume above the cables installed.

Approximately every 500-700m along the circuit route, a joint bay will be required to joint up the separate cable sections. These joint bays are 8x2.5m and will also require a temporary works area to facilitate construction. During the detailed design of the circuit route, careful consideration is given to the joint bay location to minimise the traffic impact of the works. Where it is necessary to locate a joint bay in the roadway, careful traffic management plans will be established to facilitate the flow of traffic around the works area and reduce the need for road closures.

The route crosses watercourses, utilities, the M50 motorway, the Luas, and the Dart railway. Trenchless techniques such as horizontal directional drill will be used to cross these major obstacles.

This route also includes a marine crossing of the South Dublin Bay. The route corridor required for the submarine crossing is 150m wide. This allows for three cables each to be laid in their own corridor of 50m.

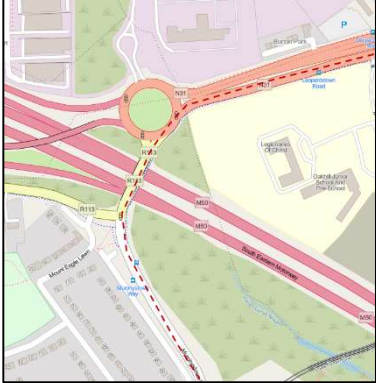
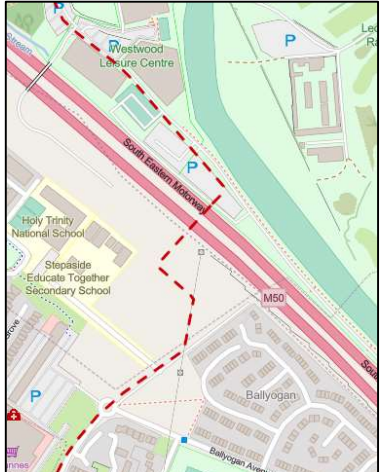

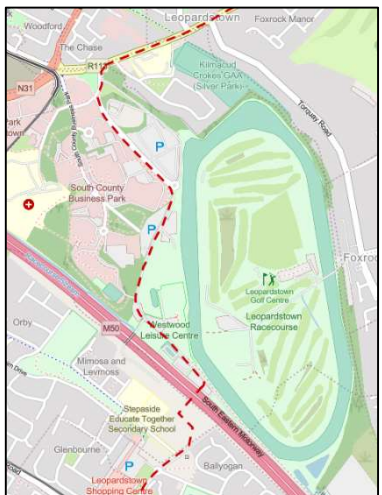
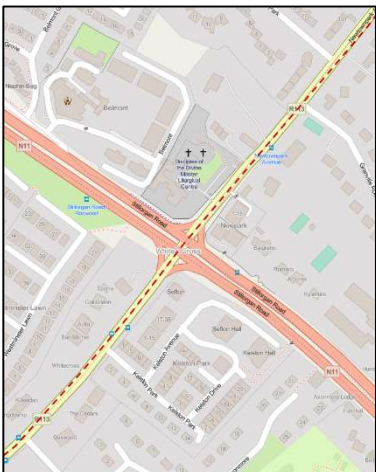

This crossing will make use of specialised submarine cables and landfall compounds where the cable transitions between the onshore cable and the submarine cable. The launch location for the submarine cable on the southern side is in Blackrock Park. At this location, the cable will cross the railway line via HDD into the bay. The submarine cable will be buried by specialist techniques and cross the bay to the landfall location in the Shelley Bank car park.

5.3 Route Changes from the Route Options Assessment Report

From the work undertaken to identify the Best Performing Option, including technical surveys, stakeholder, landowner, and community engagement, changes were identified to the Emerging Best Option, Option I. These changes have been defined in Table 5-1.

The changes identified in Table 5-1 reduce the length of the route in public roads by 1.75km.

Table 5-1: Changes to Emerging Best Option

Option 1 / Emerging Best Option	Reason for Change	Best Performing Option
<p>M50 crossing location</p> 	<p>Upon detailed inspection of the Leopardstown Way bridge over the M50, it was not considered suitable to accommodate the 220kV circuit and a preferred option was identified.</p> <p>The Best Performing Option crosses the M50 via a trenchless crossing (Horizontal Directional Drilling is envisaged) using the green space/overflow parking at the end of Ballyogan Avenue, crossing onto Leopardstown Racecourse/Horse Racing Ireland land on the north-eastern side of the M50.</p>	
<p>N31</p> 	<p>Following on from the identification of Best Performing crossing location of the M50, the Best Performing Option travels through Leopardstown Racecourse, instead of travelling in the N31 roadway.</p> <p>The Best Performing Option follows the existing Carrickmines - Poolbeg 220kV circuit through Leopardstown Racecourse.</p>	
<p>N11 crossing location</p> 	<p>During the route refinement and stakeholder engagement with the local authority, an alternative crossing location of the N11 was identified. This north-western crossing location crosses fewer utilities from the green space alongside the N11 to the green space adjacent to Belmont Lawn. This will reduce the traffic impact on the N11.</p> <p>The exact crossing location is subject to ongoing stakeholder engagement, as well as detailed design.</p>	

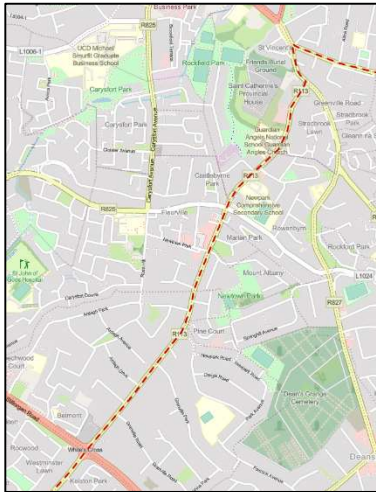
Option 1 / Emerging Best Option

Reason for Change

Best Performing Option

From stakeholder engagement with Dun Laoghaire-Rathdown County Council, an alternative to Newtownpark Avenue was suggested as this road has just undergone active travel upgrades.

Newtownpark Avenue



Carysfort Avenue was suggested as it has not recently been resurfaced and has lower traffic congestion compared to Newtownpark Avenue. There were also a high number of submissions regarding Newtownpark Avenue through the public consultation due to the number of schools on this road (Step 4 Public Consultation Findings Report)

The preferred launch location was changed from Salthill & Monkstown to Blackrock Park (discussed below). The change in route from Newtownpark Avenue to Carysfort Avenue is beneficial for this location change as a shorter section of the N31 will be impacted by the work.



Marine crossing launch location



The original launch location for the submarine option was in the vicinity of the Salthill & Monkstown Dart station parking lot.

With further design and site investigation, it was determined this location is too small for the works area required. Several alternatives along the coast were investigated between Dun Laoghaire and Merrion Gate. Blackrock Park was identified as the best location for this launch site considering space available, utilities congestion, social and environmental impacts.



Option 1 / Emerging Best Option

Reason for Change

Best Performing Option

Marine crossing reception location



The original landfall location for the submarine cable was the beach adjacent to the Poolbeg Substation.

Considering technical, environmental, and social constraints identified at this stage, this landfall location has been relocated to the Shelley Banks car park located to the eastern end of the Poolbeg Peninsula.



5.4.2 Luas Green Line crossing to M50



Figure 5-3: Best Performing Option: Luas Green Line Crossing to M50

After crossing the Luas Green Line, the route travels on Ballyogan Avenue to the open green space at the end of this road. This green space is occasionally used as overflow parking from Leopardstown Racecourse. At this point, the route turns parallel to the M50 to reach the area identified as the best crossing location for the M50.

5.4.3 Trenchless crossing of M50 motorway

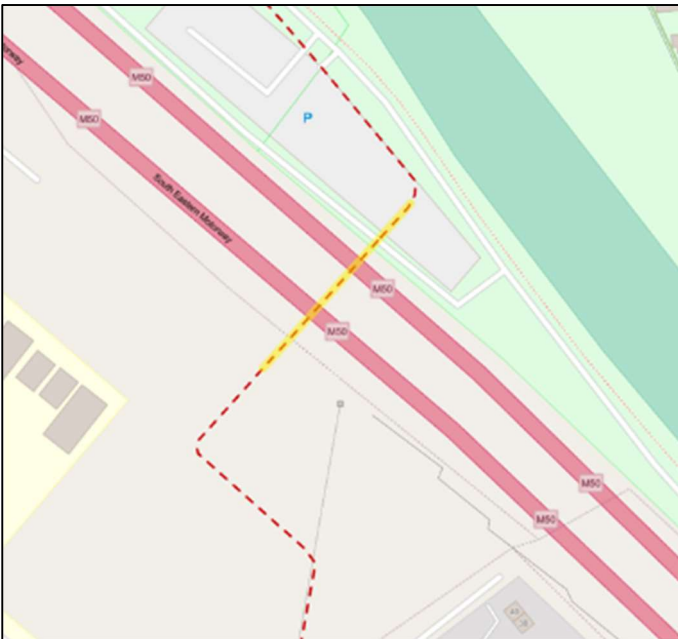


Figure 5-4: Best Performing Option: Trenchless crossing of M50 motorway

From the green space on the southern side of the M50, the route crosses the M50 to the parking space on the northern side. The crossing methodology will be trenchless (envisaged to be horizontal directional drill);

however, the detailed crossing design and exact location will be determined in Step 5 of this project. There is ongoing stakeholder engagement with the landowners of Leopardstown Racecourse.

5.4.4 Leopardstown Racecourse crossing



Figure 5-5: Best Performing Option: Leopardstown Racecourse crossing

The route crosses Leopardstown Racecourse from the M50 crossing location in the south to Leopardstown Road in the north. The route travels along the western boundary of the land, adjacent to the existing Carrickmines to Poolbeg 220kV circuit.

5.4.5 Leopardstown Racecourse to N11 crossing

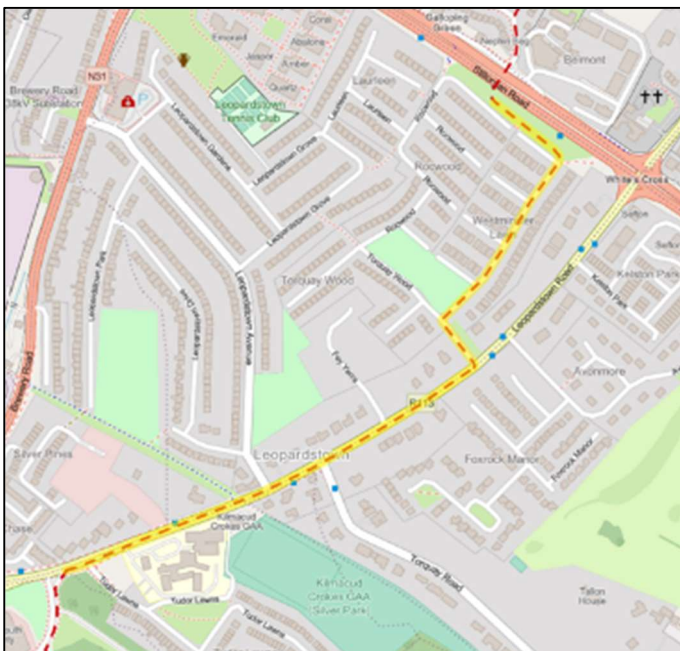


Figure 5-6: Best Performing Option: Leopardstown Racecourse to N11 crossing

5.4.7 Belmont Lawn to Blackrock Park

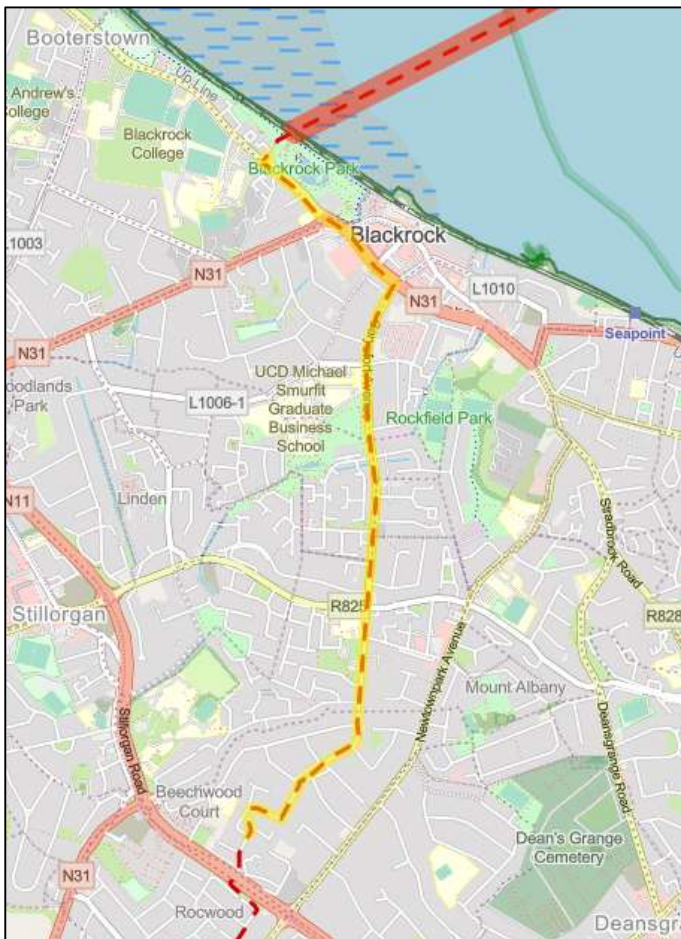


Figure 5-8: Best Performing Option: Belmont Lawn to Blackrock Park

After crossing the N11, the route travels from Belmont Lawn onto Ardagh Crescent and Ardagh Drive. Here, the route crosses the green space onto Ardagh Park Road, Ardagh Close and Carysfort Avenue. Due to the planned upgrades to Carysfort Avenue, including active travel corridors, this road was identified through stakeholder engagement as a preferred route option.

The route travels the length of Carysfort Avenue and onto the N31 (Frascati Road). The route continues from the N31 onto Rock Road and turns east into Blackrock Park.

5.4.8 Submarine cable from Blackrock Park to Shelley Banks car park



Figure 5-9: Best Performing Option: Submarine cable from Blackrock Park to Shelley Banks car park

This route uses a submarine cable to cross South Dublin Bay from Blackrock to Poolbeg. The launch location for the submarine cable on the southern side is in Blackrock Park. At this location, the cable will cross the railway line via HDD into the bay. The submarine cable will be buried by specialist techniques and cross the bay to the landfall location in the Shelley Bank car park.

5.4.9 Shelley Banks car park to Poolbeg Substation



Figure 5-10: Best Performing Option: Shelley Banks car park to Poolbeg Substation

The route travels from the Shelley Banks car park along Shelley Banks Road to the Poolbeg Substation.

6 CONCLUSION

Following the publication of the Options Assessment Report and a public consultation, work has continued to develop and refine the Emerging Best Option through design, assessment, and surveys of the routes. We have also engaged with key stakeholders, such as local authorities, asset owners and landowners and considered feedback from the consultation phase. This has allowed us to refine the Emerging Best Options and identify the Best Performing Option.

On the basis of the assessments completed, we have concluded that a refined version of the Route Option I (Green) as shown in this report is the Best Performing Option.

The route refinements have slightly increased the circuit length from 14.4 km to 15.5 km. The off-road length of the route has also increased from 6.2 km to 9.8 km, with the marine crossing of the bay forming 8.1 km of the off-road section.

The increase in off-road length is due to changes in the route design where opportunities have been identified to route through private lands and the increase in length of the marine crossing route. The feedback from the public consultation highlighted the traffic impact on residents, educational facilities, and businesses. This feedback was used to identify opportunities through private lands and other areas.

Further minor route refinements may be required at Step 5, after we have completed additional design, surveys, engagement, and assessment. As in previous steps, we will seek feedback on the developing design from affected landowners, local communities, and prescribed bodies. Details will be provided to the public on EirGrid's website. We may also incorporate additional design features at Step 5, but these will generally be within the area of the route described, a final decision will be made at Step 5.

7 NEXT STEPS

The following actions will be completed on the Carrickmines to Poolbeg project as part of the wider Powering up Dublin Replacement Underground Cable programme:

- EirGrid will publish this Best Performing Option Report and review any feedback received. Where appropriate the route will be refined on the basis of feedback, additional information or other engagement;
- EirGrid will continue to engage with affected landowners, local communities, local public representatives, the Community Forum, and other relevant stakeholders to discuss the Carrickmines to Poolbeg project as part of the wider Powering up Dublin programme;
- EirGrid will continue to engage with bodies such as Dun Laoghaire Rathdown County Council and Dublin City Council, Transport Infrastructure Ireland, National Transport Authority, Inland Fisheries Ireland, Irish Rail, and utility providers such as Uisce Éireann and Gas Networks Ireland. Meetings have taken place with some of these organisations and subsequent meetings will be facilitated to examine further details of the proposed route design;
- EirGrid will engage with environmental stakeholders such as EPA, Local Authorities, Inland Fisheries Ireland, the National Parks and Wildlife Service, and local authority heritage officers. Matters to be discussed will include crossing of Dublin Bay, the agreement of watercourse crossing mitigation and reinstatement principles. EirGrid will incorporate biodiversity enhancement into the design, where possible. Natural recolonisation will be adopted, in lieu of sowing commercial wildflower seed in the reinstatement of semi-natural habitats. All biodiversity enhancement methods will be discussed in consultation with relevant stakeholders;
- EirGrid will determine the requirement for statutory applications such as planning permission and foreshore licences in accordance with the statutory requirements. Appropriate assessment screening and EIA screening will be undertaken as part of this process;
- EirGrid will complete a wide range of studies, investigations, and surveys to inform the development of the route design and support any necessary statutory applications. This will include consideration of the approach to the construction phase and potential mitigation measures, such as traffic management, to minimise traffic disturbance. Surveys include archaeology, ecology, marine investigations, ground investigations, utility surveys, hydrology, and technical assessments. As these surveys are progressed and further information is gathered, new issues may be identified, resulting in changes to the route. This is a normal part of the design development process;
- Further design work will be progressed to ensure that the final design of the route is optimal and has the minimal adverse impact on the public and the environment;
- The project team will prepare the necessary statutory applications (Step 5) for the Carrickmines to Poolbeg 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: [Powering Up Dublin](#).

Appendix 1 Source of Existing Utility Records

Table 7-1: Data source for Material Assets/Infrastructure used in the Poolbeg study

Material Assets / Infrastructure	Data Source
ESB Transmission Network (110 kV, 220 kV and 400 kV) and Distribution Network (38 kV and below)	ESB
Water Infrastructure - Foul/Watermains	Irish Water
Underground Gas Services _409a_HighPressure_GasPipeline _409b_Proposed_GasPipeline	Gas Networks Ireland
Telecommunication Networks	BT Ireland Cable & Wireless Eir E-Net UPC Vodafone
Surface Water Networks	Fingal
Surface Water Networks	DCC
Surface Water Networks	DLRCC
Dublin Port Foul/Surface	Dublin Port
Covanta - as built PM - CDM Smith	DCC contact
Public Lighting DLRCC	GOV.ie
Surface Water Dataset from RPS servers	IW