



DUBLIN REPLACEMENT UNDERGROUND CABLE PROGRAMME

Route Options Assessment – CP1216 North Wall to Poolbeg

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1 INTRODUCTION

1.1 The Project

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.

The Dublin Replacement Underground Cable Programme is a critical programme that will strengthen key electricity infrastructure in Dublin and the surrounding areas, making the city 'renewable ready.' This programme is set to replace and upgrade five 220kV circuits across Dublin city and the surrounding areas.



Figure 1-1: Existing 220kV circuits in Dublin, with the study area shown in pink

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

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 needed during construction.

The alternative to this is 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.

1.2 Purpose of this Report

The Dublin Replacement Underground Cables 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 1-1.

This approach facilitates engagement and consultation with stakeholders and the public which helps to explore options fully and make more informed decisions. Previous studies by EirGrid have brought the Dublin Replacement Underground Cables Programme through Steps 1, 2 and 3 of their Framework for Grid Development and the project is currently at Step 4. It is noted that as the project progresses through to Step 5, there is a possibility that the replacement of underground electricity transmission cables may be classified as exempted development, meaning planning permission is not required. This is subject to the detailed assessment of the project and meeting specific criteria including environmental and ecological criteria

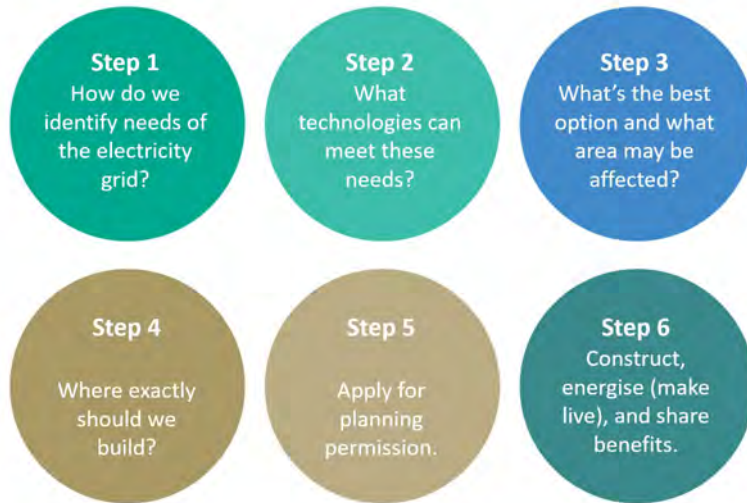


Figure 1-2: EirGrid's Six-Step Framework for Grid Development

As part of Step 4, seven route options to replace the existing North Wall – Poolbeg 220kV circuit were developed. To assist in the assessment, the route options were broken down into smaller sections. The sections were then assessed using EirGrid's five multi-criteria assessment categories as shown in Figure 1-3.



Figure 1-3: EirGrid's Five Multi-Criteria Assessment Categories

This Route Options Assessment report describes all the potential route options, the methodology used to identify these route options, and how the route options were broken down into sections. This report presents the assessment according to the five categories listed above and how the best performing sections are used to build optimised routes. From these routes, the Emerging Best Performing Routes are selected to progress and develop further.

To aid in the final selection of a Best Performing Route, site investigation will be undertaken, to supplement the desk-based investigations carried out to date. There are two types of site investigations proposed: non-invasive and invasive investigations.

Non-invasive investigations are performed to gain an accurate representation of the above and below ground environments, and include:

- Surveys of the landscape
- Inspecting manholes and chambers
- Using sonic and radar devices with CAT (Cable Avoidance Tool)/genny and Ground Penetrating Radar (GPR) and other geophysical methods.

Invasive investigations will be conducted to confirm the location of below ground services where non-invasive methods are unsuccessful and where ground conditions are important. This involves slit trenching and H trenching, trial pitting and ground sampling using boreholes.

- Slit trenches are long narrow trenches used to identify and confirm the position of existing underground utilities. H trenches are H-shaped trenches performed where Joint Bays are proposed.
- At sites where trenchless methods such as Horizontal Directional Drilling (HDD) is proposed to cross existing services, infrastructure or natural features, borehole may be needed to analyse soil and ground conditions to inform the feasibility and detailed design of the crossing.

2 METHODOLOGY AND APPROACH

2.1 Introduction

The purpose of this report is to assess the various route options and determine the Emerging Best Performing Route Option to develop further in the Best Performing Option Report and through Step 5 to completion. This section outlines the methodology applied to achieve this.

Initial route options were identified using high-level considerations as listed below, in Chapter 2.2, following the identification of constraints within the study area. The constraints identified in the study area were primarily based on a review of publicly available datasets, as well as route walkover surveys.

The data sources include but are not limited to the following:

- Development Plans – Fingal County Council and Dublin City Council
- Myplan.ie Mapping
- Central Statistics Office, CSO
- National Parks and Wildlife Services, NPWS
- Irish Ramsar Wetland Committee
- Environmental Protection Area (EPA) mapping
- Geological Survey Ireland, GSI
- National Monuments Service
- Heritage Mapping
- Corine 2018 and 2012 data (sourced from the EPA). This dataset was used with aerial imagery and supplemented with datasets obtained directly from other sources covering the Dublin area, to determine land use.
- Digital terrain mapping was sourced by EirGrid from the Ordnance Survey Ireland (OSI) for the study area. An orthographical map of the study area, sourced from OSI, was also reviewed.
- Information from local authorities, asset owners and utility providers.

To help minimise disruption and work as efficiently as possible, this project will coordinate with other state-owned utilities, transport providers and local authorities through the Dublin Infrastructure Forum (DIF). The forum meets quarterly.

The DIF has also setup three working groups at operational level:

- Stakeholder engagement and communications;
- Technical expertise; and
- Planning and environment.

While the initial focus of the work of the DIF has been on the **Powering Up Dublin** programme, it is intended to work more broadly across other major infrastructure projects being delivered in the area such as water, gas and transport.

2.2 Identification of Route Options

Potential route options for the North Wall - Poolbeg circuit were identified following the high-level considerations:

- Environmental

- Ecology
- Water bodies
- Social
 - Residential, amenity, commercial
 - Archaeology/Cultural heritage
- Economic
 - Land ownership
 - Length of route
- Technical
 - Major obstacles (crossings that may require trenchless techniques)
 - Route geometry (width, straight sections, sharp bends)
- Deliverability
 - Land availability
 - Road access

This led to the identification of seven potential route options, however the route options are not completely unique and there is some overlap between sections on some route options.

2.3 Definition of Sections

To assist with the multi-criteria assessment of each route, and to ensure each section assessed was distinct and no section was duplicated in the assessment, the route options were broken down into sections. These sections ran between two nodes along the route. A node was created wherever two routes crossed or diverted from each other. The sections are labelled according to the nodes they run between, for example the section running between Node A and Node B was labelled Section A-B.

2.4 Route Building

The advantage of breaking up the route options into smaller sections as described in Chapter 2.3 above is that these sections can then be combined in new ways to build an optimised route. This methodology grants a lot more freedom to build the best possible route, using sections that rank the best during the multi-criteria assessment.

This also allows certain constraints to be avoided more easily, by selecting alternative sections that bypass the constraint.

Each section was assessed using the multi-criteria assessment outlined in Chapter 2.5.

2.5 Criteria Used for Comparison of Options

The route sections were assessed using EirGrid's five multi-criteria assessment categories. These are as follows:

- Technical
- Deliverability
- Economic
- Socio-Economic
- Environmental

The categories were further divided into subcategories which are described below. For each subcategory, the section was ranked according to the colour scale shown in Table 2-1.

Table 2-1: 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

2.5.1 Technical

Table 2-2: Technical Subcategories for the Multi-Criteria Assessment

Subcategory	Description
Technical Operating Risk	Will the route lead to areas which are difficult to access to complete maintenance activities, examples include access to railways, motorways, fast lanes of major roads, etc.
Compliance with EirGrid Functional Specification for 220kV	Considers the limitations imposed by the specification in terms of routing with existing roadways, cable rating
Expansion/Extendibility	Considers the possibility of future extension of the network (would also consider the impact of the use of a particular route on future advised EirGrid routes).
Geotechnical conditions	Considers the impact of known ground conditions (from GSI data or other available datasets), this would include depth to bedrock, likely water table depth, known areas of poor ground / marsh.

2.5.2 Deliverability

Table 2-3: Deliverability Subcategories for the Multi-Criteria Assessment

Subcategory	Description
Road Access	Road access to the sites to be considered, specifically the ability to deliver plant and cable to a site (low bridges, narrow roads, load limits on roads/bridges)
Outage Impact	This item considers the requirement to deenergise existing cables to construct the new circuits.
Route Geometry	The number of acute bends or overall “bendiness” of a particular route should be considered against other routes Topography, topology etc.
Land Availability	Land availability for the construction of the circuit and specifically the joint bays and working space during cable pulling
Planning and other statutory requirements	Considers the requirement for planning, foreshore licenses or other statutory requirements
Material Assets	Considers the impact of the route on existing EirGrid assets. Number of crossings of canals, motorway, Luas, DART and feasibility of these, major utility infrastructure.
Utility Congestion	Considers the extent of existing utilities based on available datasets (risk of inaccuracy of existing datasets to be noted)

Subcategory	Description
Working Time Constraints	Considers the working time restrictions which will apply to the route, this data will most likely come from the Traffic Impact Number, however other sources may be considered (work in residential areas, at sports grounds etc.)
Reinstatement Requirements	Considers the technical / time impact of reinstatement on the proposed route, has the road been recently resurfaced, is the road of concrete construction are there special paving or surface treatments in place which will need to be reinstated
Dependence on other projects	Considers the likely interface, both positive and negative on the cable routes (Metro North and others)

2.5.3 Economic

Table 2-4: Economic Subcategories for the Multi-Criteria Assessment

Subcategory	Description
Length of Route	Comparison of route length against a baseline of the existing route length.
Number of Crossings	Quantity of non-standard crossings, HDD, Microtunnel, River Crossing etc.
Reinstatement Costs	Considers the cost impact of reinstatement on the proposed route, has the road been recently resurfaced, is the road of concrete construction are there special paving or surface treatments in place which will need to be reinstated
Utility Diversion Requirements	Considers the requirement to arrange for the diversion of known utilities to prevent a clash or to open a circuit corridor. This would be for significant utilities such as high-pressure gas mains etc.
Bespoke Circuit Trench Requirements	Sections where non-standard trenches cannot be achieved – e.g., Bridge deck crossings or similar.

2.5.4 Socio-Economic

Table 2-5: Socio-Economic Subcategories for the Multi-Criteria Assessment

Subcategory	Description
Cultural heritage	Considers the potential impact / proximity to areas (and specific points) of Cultural Heritage.
Proximity to critical services	Services that will have a critical socio-economic impact if affected (i.e., business parks, schools, smaller healthcare centres, etc)
Duration of the works	The overall duration of the works in a particular area should be considered, however it should be noted that some low impact routes may have long durations whilst some high impact routes may be completed quickly
Settlements and Communities	Proximity to buildings, specifically the number of buildings within a 50m buffer of the route
Amenity	Impact on recreational activities (e.g., fishing, sports) and tourism during and after construction, that are not included in the other sub-criteria.
Traffic and Transport	Considers the impact of the route on traffic, specifically on bus routes, on-street parking and cycle lanes.

Subcategory	Description
	When the route has been selected, it is important to note that a full Traffic Management Plan (TMP) will be created and implemented throughout the construction phase of this project. Any openings in the road will comply fully with the Guidelines for Managing Openings in Public Roads and will be licenced accordingly.
Emergency services	Considers the impact to Ambulance, Fire Engine and Garda dispatch points / depots as well as to Emergency Hospitals / ERs

2.5.5 Environmental

Table 2-6: Environmental Subcategories for the Multi-Criteria Assessment

Subcategory	Description
Planning policy and land use	Considers if the project is allowable under the development plan.
Biodiversity, Flora and Fauna	Considers the possible impact of the selected route on biodiversity – based on the significance from constraints mapping
Landscape and Visual	Considers the impact of the route on landscape – based on the significance from constraints mapping.
Contaminated land	Considers the risk of encountering and dealing with the impacts of contaminated ground. Based on constraints mapping and known areas of contamination such as landfills, historic landfills etc.
Flood risk	Considers the risk of flooding, this will be most applicable to the construction stage – based on the significance from constraints mapping.
Water Impact	Considers the risk arising from proximity to water bodies – based on the significance from constraints mapping. Number of crossings, proximity of circuits etc.
Probability of triggering NIS requirements	Considers the risk of a particular route or section of a route triggering an NIS, in particular proximity to a Natura 2000 site (or pathway link) or similar.

3 ROUTE OPTIONS

The existing North Wall – Poolbeg 220kV circuit and the seven route options identified are described below. The route options have subsequently been divided into nodes and sections and these are also described below.

3.1 Summary of the Existing Route

The existing North Wall – Poolbeg 220kV circuit was constructed in the 1970s/80s and is a Self Contained Fluid Filled (SCFF) cable circuit approximately 4.5km in length. This cable is reaching its end of life, but the circuit is vital for the transmission grid in Dublin. To minimise the disruption to the grid, the circuit needs to be replaced in an offline route as discussed in Chapter 1.1.

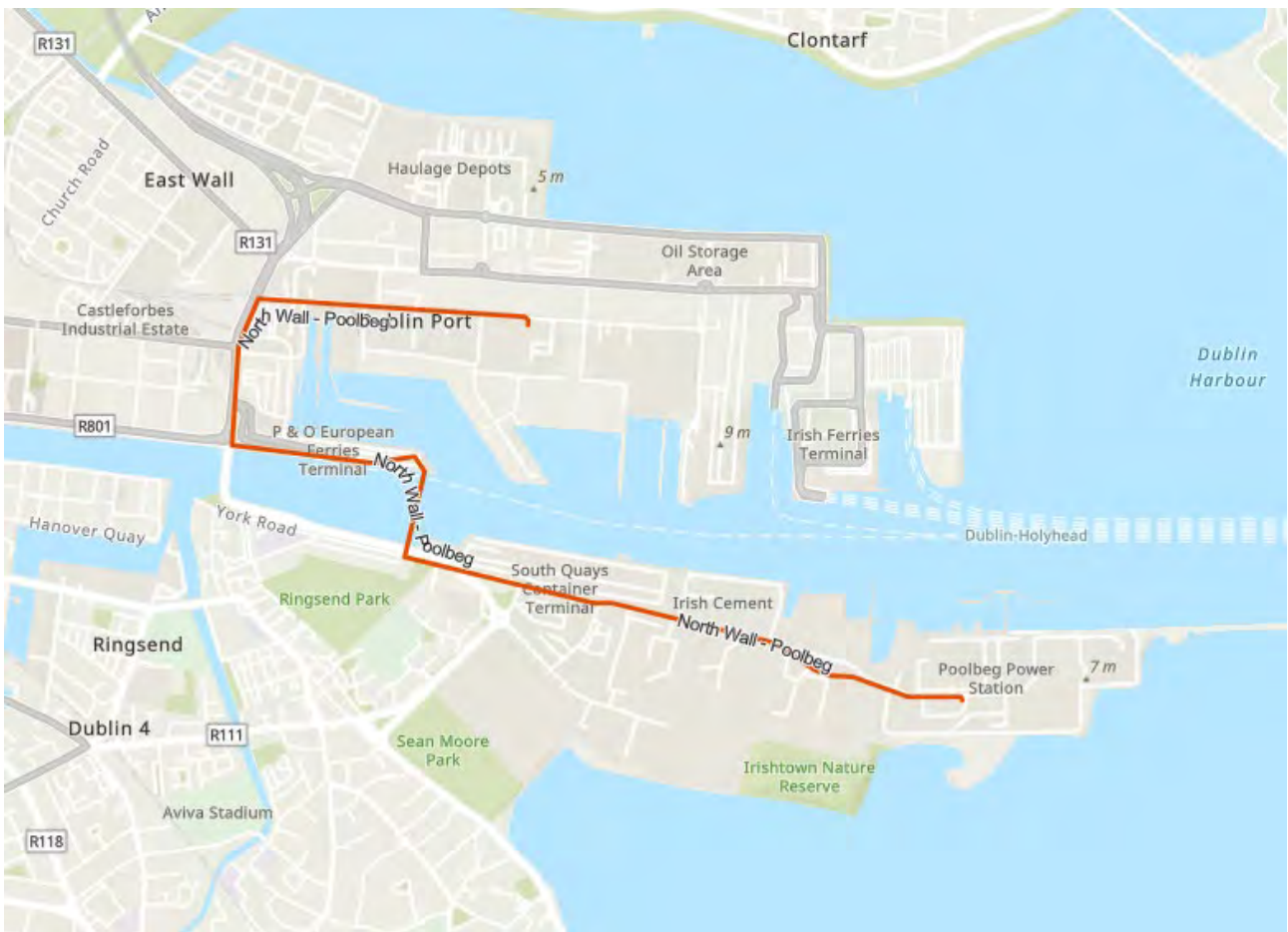


Figure 3-1: Map of existing the North Wall - Poolbeg 220kV SCFF cable circuit

3.2 Option Selection Overview

Potential route options were developed according to the high-level criteria outlined in Chapter 2.2. Seven route options were developed. These route options are all shown in Figure 3-2.

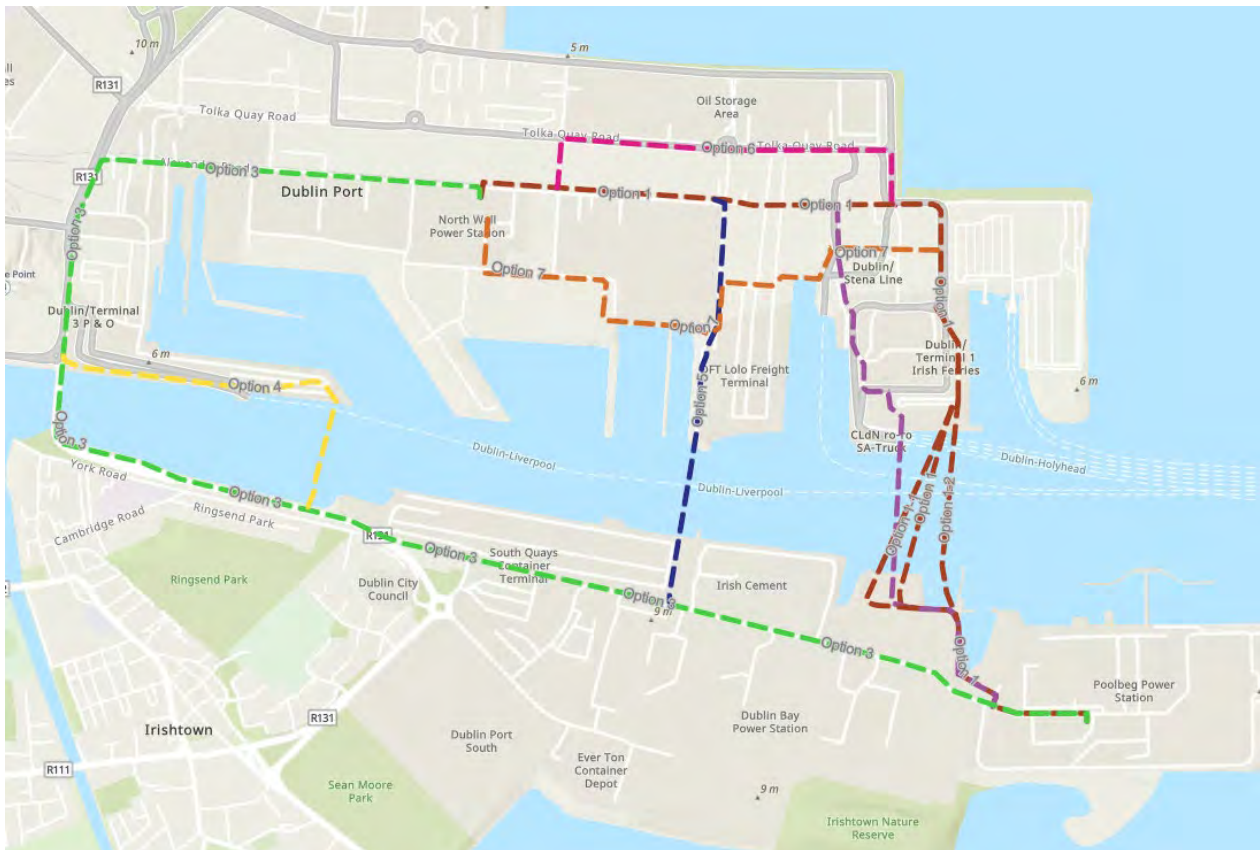


Figure 3-2: All route options developed in the North Wall to Poolbeg Constraints Report

Individual route options are described and shown in Chapters 3.2.1 to 3.2.9.

3.2.1 Route Option 1

Route option 1 commences at the North Wall Substation and follows Alexandra Road east, crossing some of Dublin Port Company’s (DPC’s) land, and on to Terminal Road South. It follows Terminal Road South to the parking lot of Irish Ferries.

At this point, the route crosses the River Liffey to the eastern side of the open land adjacent to Celtic Anglian Water and Pigeon House Road. The crossing methodology is most likely to be HDD. The route follows an unnamed road to Pigeon House Road as far as the Poolbeg Substation.

A number of alternative crossings for this route have been identified:

- Route 1-1
This option crosses from the Irish Ferries parking lot to the west side of the open land. This option may be beneficial depending on the proposed future development of this site.
- Route 1-2
This option crosses from the Irish Ferries parking lot to the unnamed road between Celtic Anglian Water and the decommissioned Poolbeg power station. The HDD path for this route needs to curve around the piled jetty which is present at the end of the unnamed road.

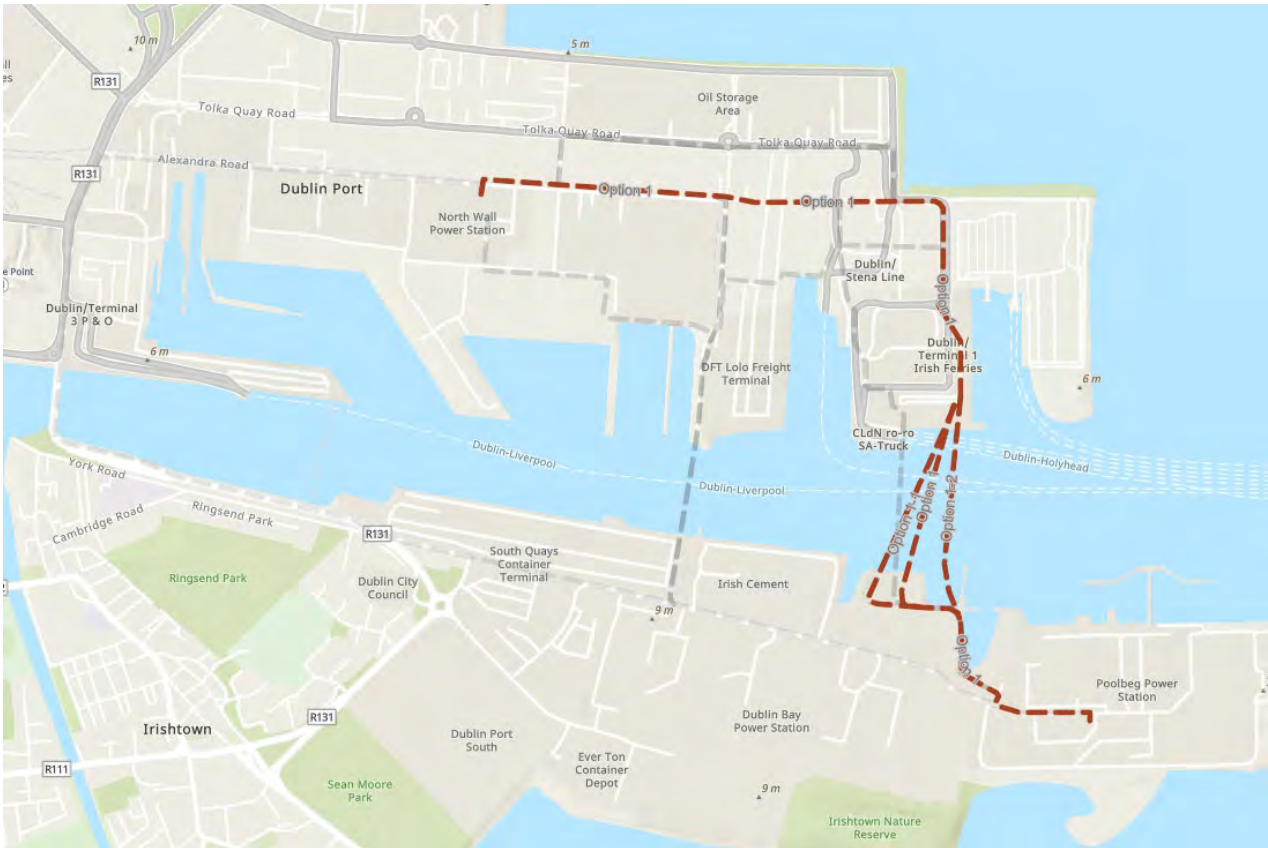


Figure 3-3: North Wall to Poolbeg Route Option 1

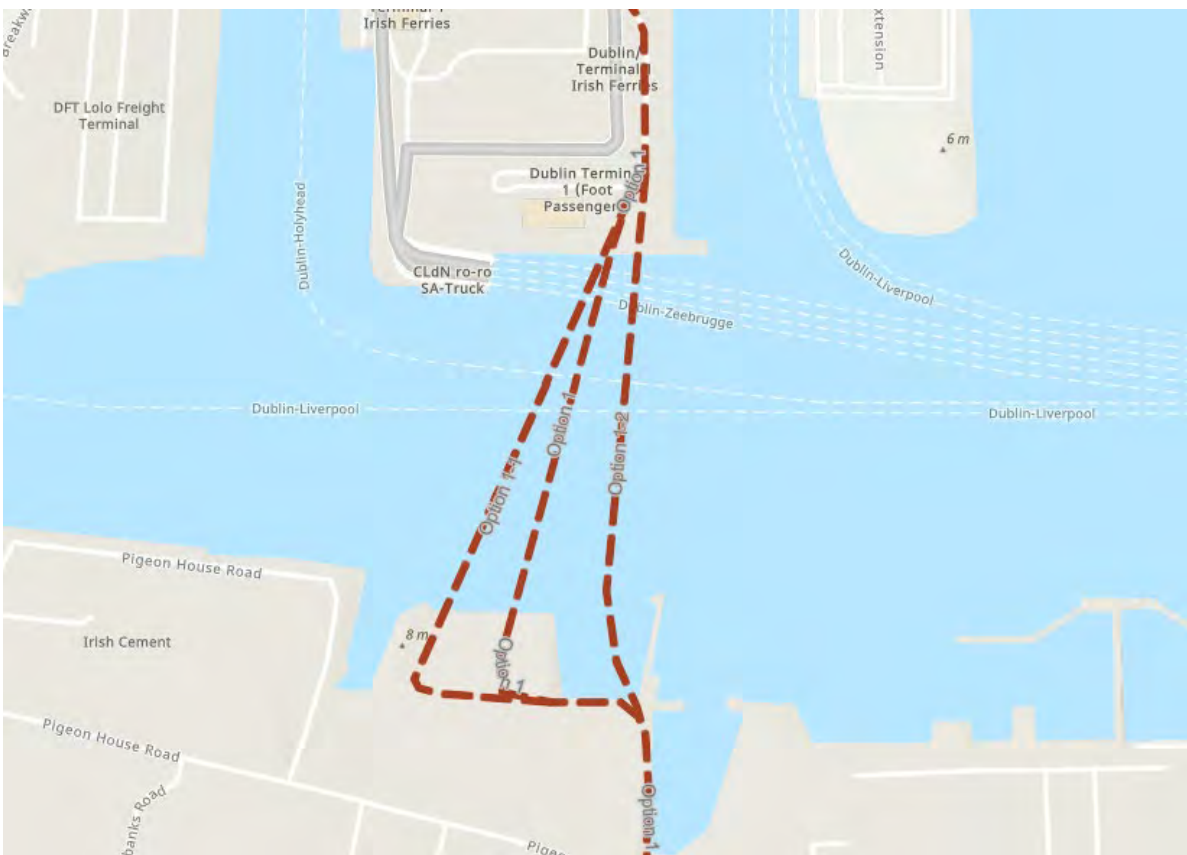


Figure 3-4: North Wall to Poolbeg Route Option 1, 1-1 and 1-2 crossing locations

3.2.2 Route Option 2

Route option 2 turns off from Route option 1 on Alexandra Road. Route option 2 crosses some of DPC’s land, meets Terminal Road West, which it follows to the ramp onto the Ferry and the parking lot of Irish Ferries. Due to this route crossing the ramp, it will have a high impact on Irish Ferries operation. For this reason, DPC does not prefer this route option.

At this point, the route crosses the River Liffey to the eastern side of the open land adjacent to Celtic Anlian Water and Pigeon House Road. The crossing methodology is most likely to be HDD. The route follows an unnamed road to Pigeon House Road as far as the Poolbeg Substation.

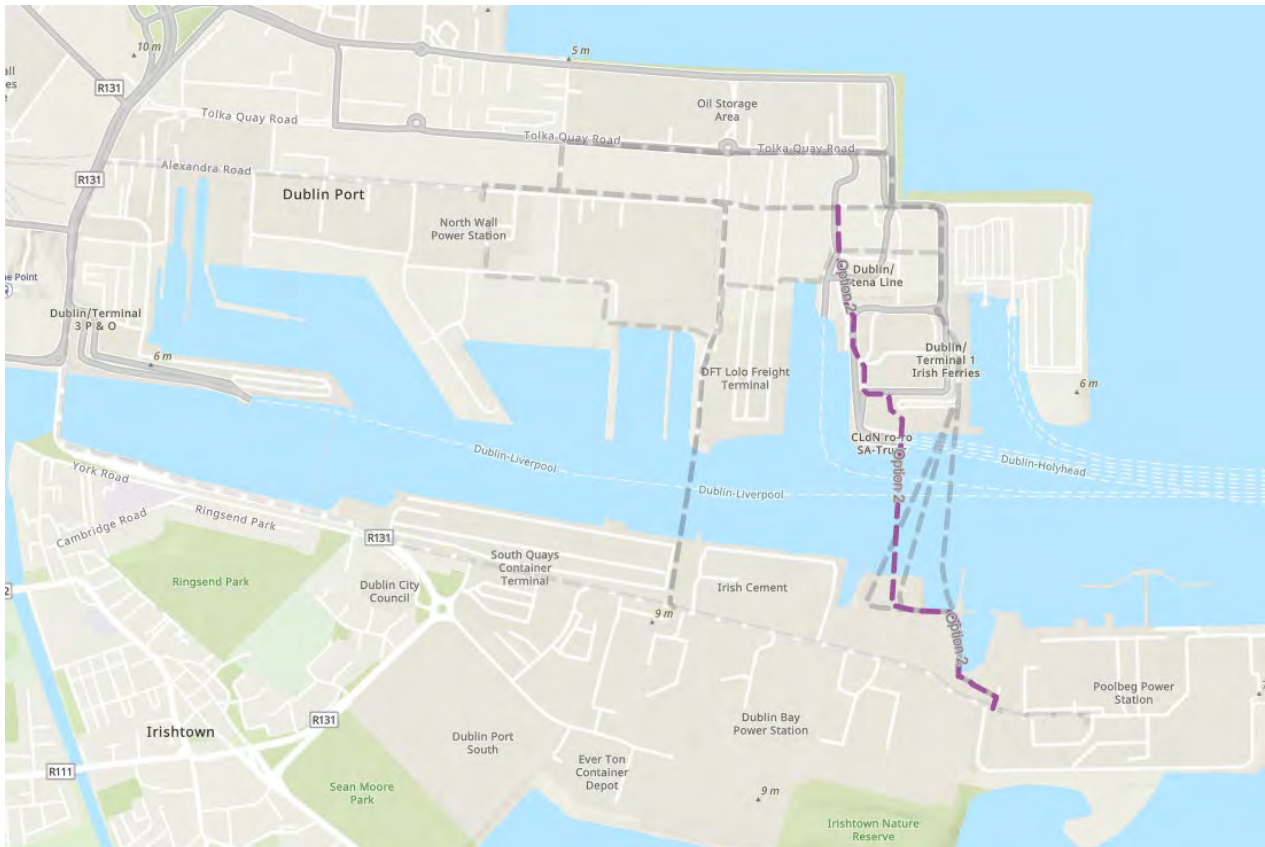


Figure 3-5: North Wall to Poolbeg - Route Option 2

3.2.3 Route Option 3

Route option 3 commences at the North Wall Substation and follows Alexandra Road west, to East Wall Road. It follows East Wall Road to the River Liffey.

At this point, the route crosses the River Liffey to the eastern side of the open land adjacent to East Wall Road on the southern bank. The crossing methodology is most likely to be HDD. It is not possible to cross using the bridge as it is a lifting bridge.

The route then follows East Wall Road, onto Pigeon House Road. It crosses some DPC land, and then routes back onto Pigeon House Road as far as the Poolbeg Substation.

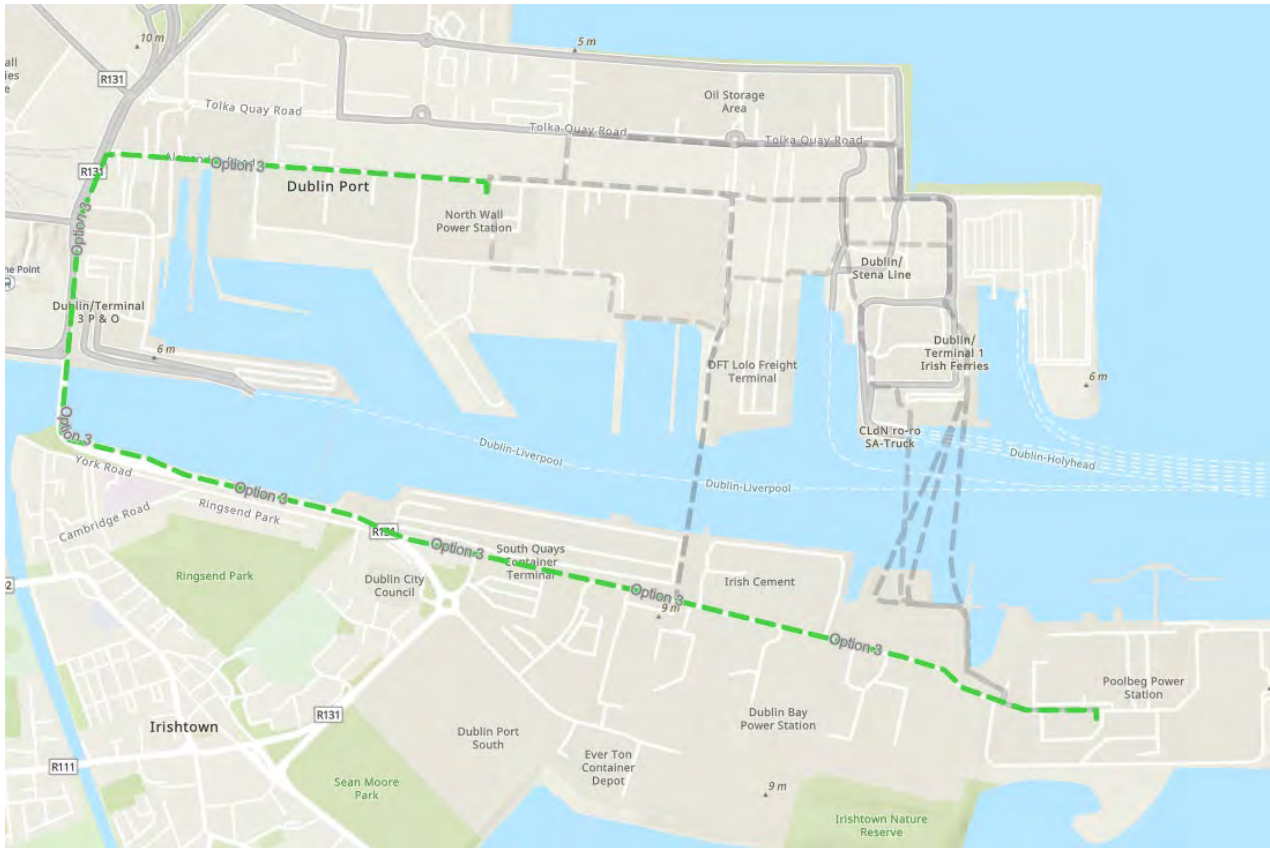


Figure 3-6: North Wall to Poolbeg - Route Option 3

3.2.4 Route Option 4

Route option 4 follows route option 3 until the intersection between East Wall Road and North Wall Quay. At this point, the route turns west onto Dublin Port Company land, following the existing North Wall – Poolbeg circuit. At the end of the quay, the route crosses the River Liffey estuary to the southern bank where to re-joins route option 3 along the East Wall Road.

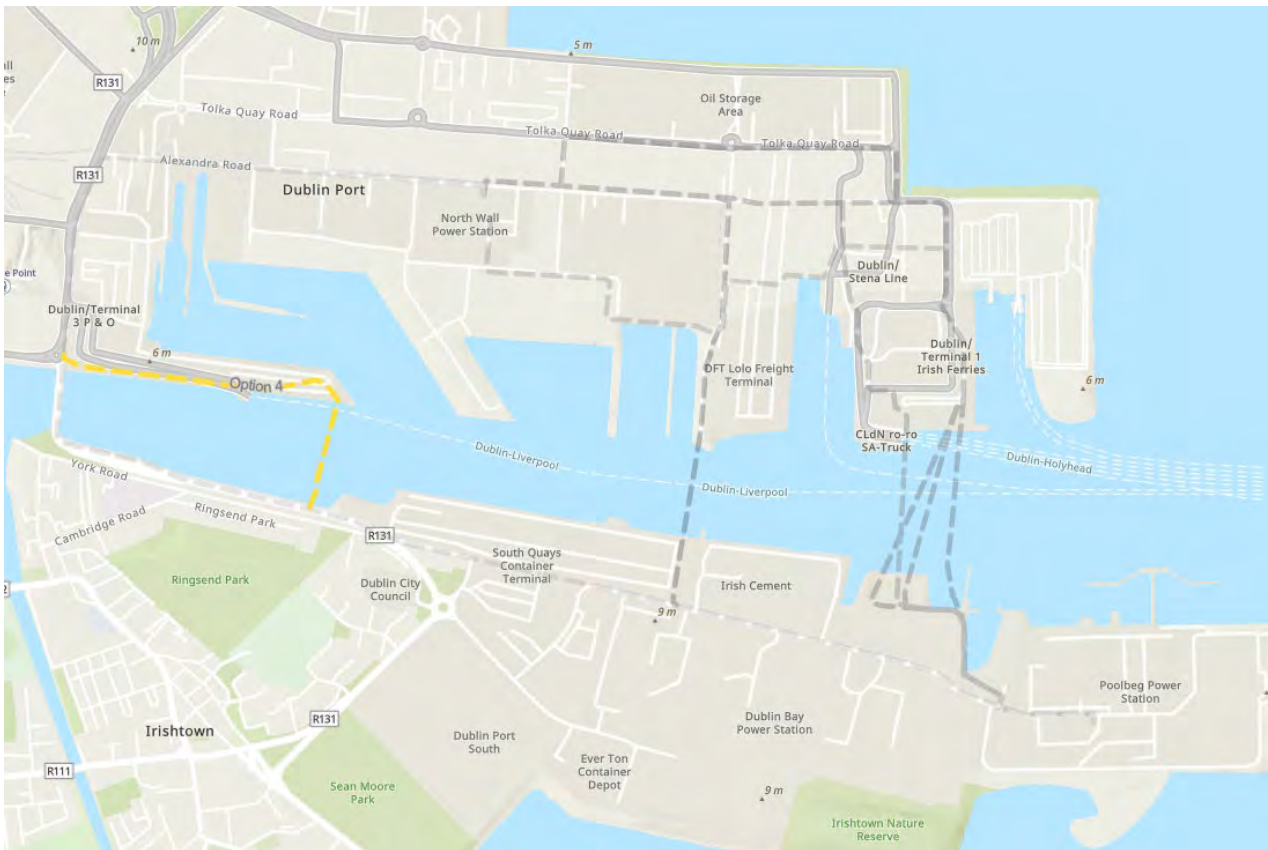


Figure 3-7: North Wall to Poolbeg - Route Option 4

3.2.5 Route Option 5

Route option 5 initially follows route option 1 from the North Wall substation. At Breakwater Road, the route diverts from route option 1 by following Breakwater Road towards the River Liffey. At the end of Breakwater Road, the route crosses the River Liffey onto DPC land on the southern bank.

The route crosses this land, and then joins route option 3 which follows Pigeon House Road as far as the Poolbeg substation.

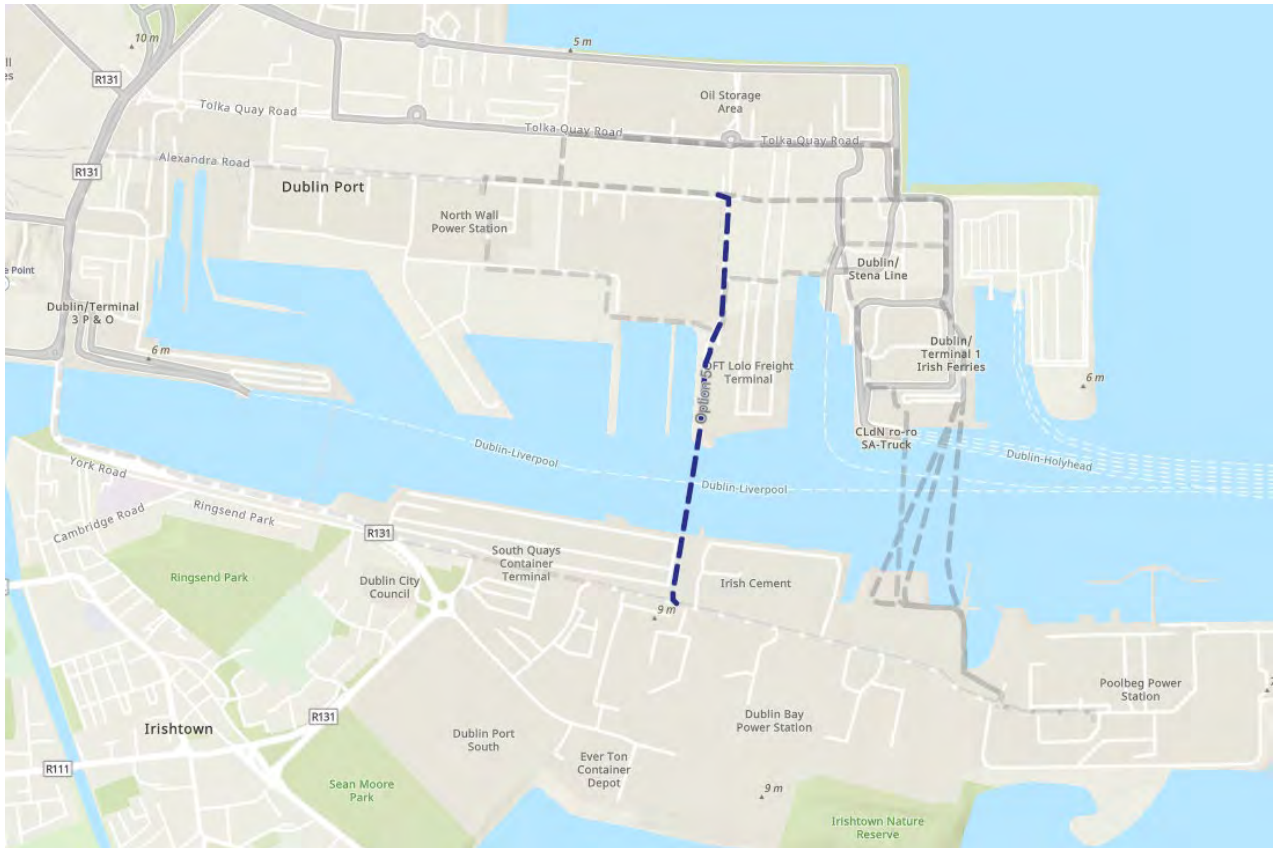


Figure 3-8: North Wall to Poolbeg - Route Option 5

3.2.6 Route Option 6

Route option 6 diverts from route option 1 on Alexandra Road. The route turns north up Branch Road North to Tolka Quay Road. It follows Tolka Quay Road and turns south onto Terminal Road North where it re-joins route option 1 as far as the Poolbeg substation.

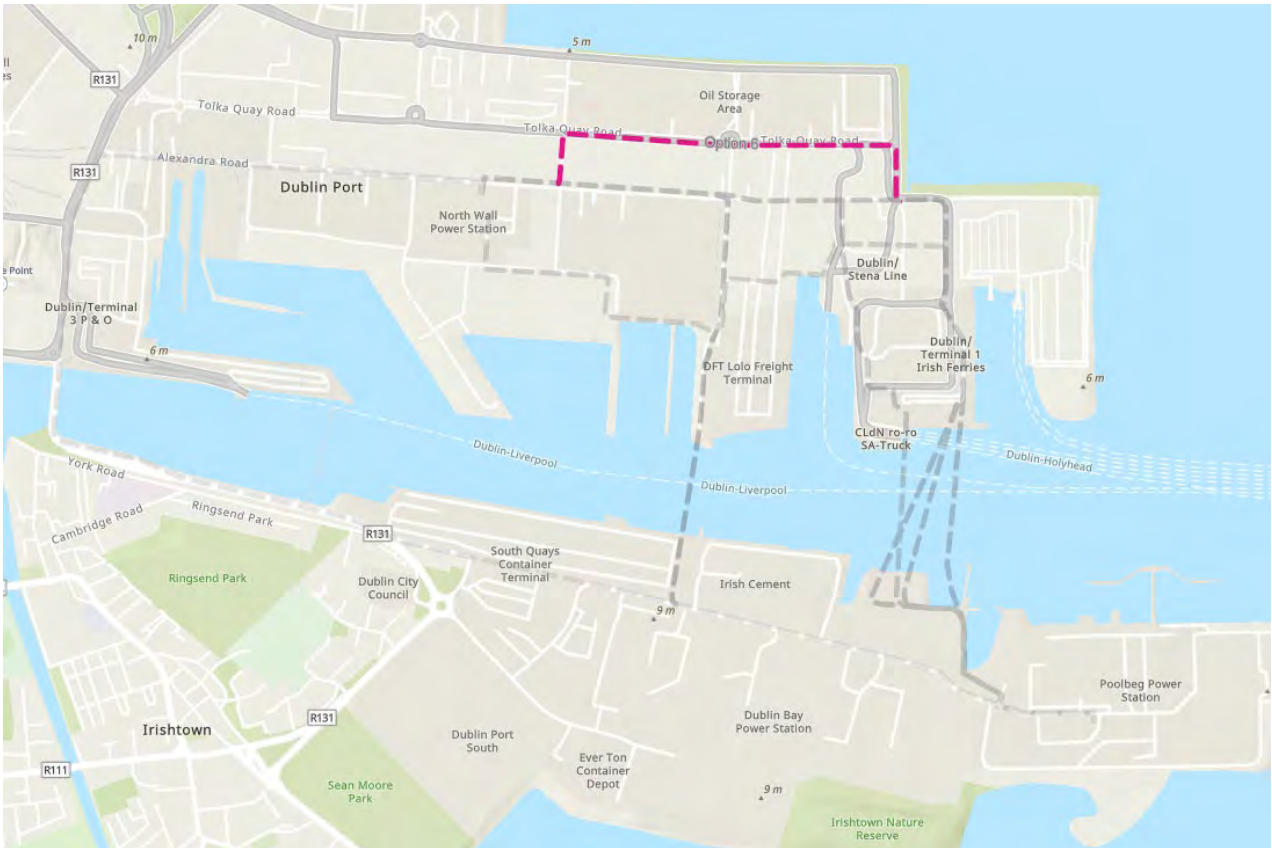


Figure 3-9: North Wall to Poolbeg - Route Option 6

3.2.7 Route Option 7

Route option 7 commences at the North Wall Substation and routes to the South into the container handling area of Dublin Port Company (DPC) where it tracks East and skirts around the perimeter of the fuel tank farm, before turning north and east once again entering DPC lands via a container handling area and the Stena Line truck marshalling area. This route option then joins Route 1 to cross the River Liffey by HDD and continue to Poolbeg.

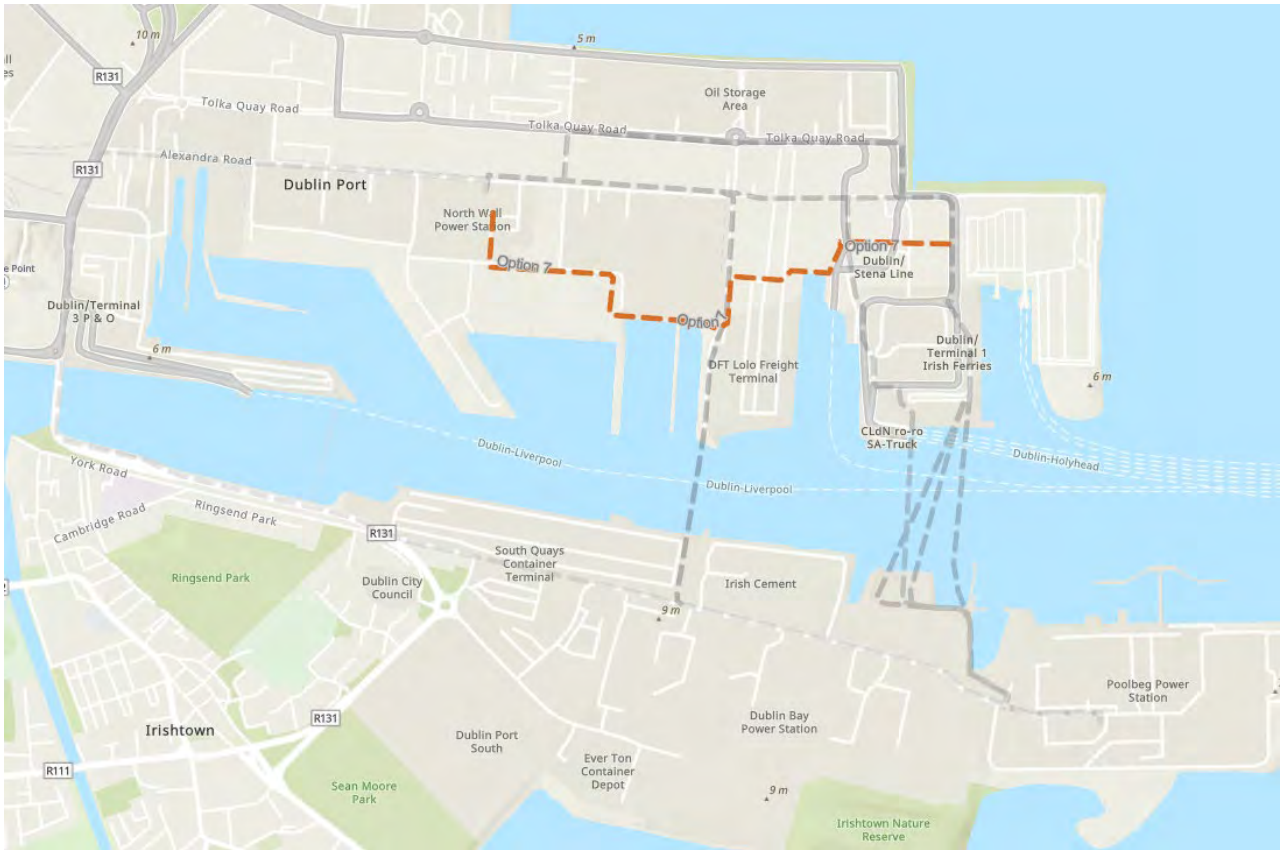


Figure 3-10: North Wall to Poolbeg - Route Option 7

3.3 Identification of Sections and Nodes

Nodes were identified wherever two or more route options crossed or diverged. The sections were labelled according to the nodes they run between, for example the section between Node A and Node B was called Section A-B.

A map of the identified nodes for all route options is shown in Figure 3-11.



Figure 3-11: Node Map for the North Wall to Poolbeg route options

The table below lists all Sections, which route options they form part of to make a complete route from North Wall to Poolbeg and which roads or areas the sections run through.

Table 3-1: All Sections assessed in the North Wall to Poolbeg study area

Section	Option 1	Option 1-1	Option 1-2	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Section Length (km)	Road Names
A-B	x	x	x	x			x	x		0.2	Alexandra Road
B-C	x	x	x	x			x			0.4	Alexandra Road
C-D	x	x	x	x						0.3	DPC Land
D-E	x	x	x							0.1	Alexandra Road
E-F	x	x	x					x		0.2	Terminal Road S
F-L	x	x	x					x	x	0.4	Terminal Road S
L-R	x							x	x	0.5	Liffey Crossing
R-S	x	x		x				x	x	0.1	Off Road
S-T	x	x	x	x				x	x	0.3	Off Road
T-U	x	x	x	x	x	x	x	x	x	0.3	Pigeon House Road
L-Q		x								0.6	Liffey Crossing
L-S			x							0.5	Liffey Crossing
D-G				x						0.1	Terminal Road N
G-R				x						1	DPC Land; Terminal Road S

Section	Option 1	Option 1-1	Option 1-2	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Section Length (km)	Road Names
A-M					x	x				1.5	Alexandra Road; East Wall Road
M-O						x				0.9	East Wall Road
O-P					x	x				0.9	Pigeon House Road; DPC Land; Pigeon House Road
P-T					x	x	x			0.8	Pigeon House Road
M-N					x					1	DPC Land; Liffey Crossing
C-I							x			0.2	Breakwater Road
I-J							x			0.1	Breakwater Road
J-P							x			0.7	Breakwater Road; Liffey Crossing; DPC Land
B-E								x		1.1	2 Branch Road N; Tolka Quay Road; Terminal Road N
H-J									x	0.8	DPC Land; 2 Branch Road N
I-G									x	0.4	DPC Land
G-F									x	0.3	DPC Land

4 SECTION LEVEL ASSESSMENT

4.1 Section Level Multi-Criteria Assessment

Each route section was assessed according to the methodology described in Chapter 2. A summary of this assessment can be found in Table 4-1, the main risk factors have been highlighted in this table.

Table 4-1: Summary of section assessments

Section	Section Length (km)	Road Names	Technical	Deliverability	Economic	Socio-Economic	Environmental
A-B	0.2	Alexandra Road	No technical issues.	This section is parallel to two railway lines on Alexandra Road and may interface with the Alexandra Road upgrades planned by DPC.	This section runs parallel to two railway lines and there are high expected utility diversion requirements on this section.	This section passes through an area with a high concentration of industry. There are bus routes on 100% of this section.	No significant known environmental issues, however, this section is constructed on reclaimed land.
B-C	0.4	Alexandra Road	No technical issues.	This section is parallel to two railway lines on Alexandra Road and may interface with the Alexandra Road upgrades planned by DPC. This section crosses three large service troughs containing fuel, fire water mains and other services which will take time to cross.	There may be bespoke trenches required to cross the service troughs.	This section passes through an area with a high concentration of industry. There are bus routes on 100% of this section.	No significant known environmental issues, however, this section is constructed on reclaimed land.
C-D	0.3	DPC Land	Majority of section is on private land, on container handing / operation area.	This section is 100% in the container handling area, so a working time / area agreement will be required.	There are no major economic concerns on this section.	This section passes through an area with a high concentration of industry.	No significant known environmental issues, however, this section is constructed on reclaimed land.
D-E	0.1	Alexandra Road	All of section is on private road with some maintenance issues.	The main deliverability concern is the location of this section on private road.	There are no major economic concerns on this section.	This section passes through an area with a high concentration of industry.	No significant known environmental issues, however, this section is constructed on reclaimed land.

DUBLIN REPLACEMENT UNDERGROUND CABLES PROGRAMME – ROUTE OPTIONS ASSESSMENT REPORT – NORTH WALL TO POOLBEG

Section	Section Length (km)	Road Names	Technical	Deliverability	Economic	Socio-Economic	Environmental
E-F	0.2	Terminal Road S	No technical issues.	This section has been recently resurfaced.	The road has been recently resurfaced which will increase the costs associated with this section.	This section passes through an area with a high concentration of industry. There are bus routes on 100% of this section.	This section is adjacent to the Tolka River Estuary SPA and is located on reclaimed land.
F-L	0.4	Terminal Road S	This section has a low probability of coastal flooding.	This section has been recently resurfaced.	The road has been recently resurfaced which will increase the costs associated with this section.	This section passes through an area with a high concentration of industry and passes the Irish Ferries Terminal. There are bus routes on 100% of this section and on street parking on 35% of the section.	No significant known environmental issues, however, this section is constructed on reclaimed land.
L-R	0.5	Liffey Crossing	This section crosses the Lower Liffey using HDD. The Lower Liffey has a high probability of coastal and river flooding. Crossing at this location may constrain crossing at this location for future expansions.	The crossing of the Lower Liffey will likely need a foreshore licence. The onshore sections are located on private, DPC land.	The HDD crossing of the Lower Liffey will impact the cost of this section.	This section passes no identified cultural heritage sites, emergency or critical services.	This section crosses the River Liffey using HDD which will have a temporary landscape and visual affect during construction. The section passes adjacent to Dolphins, Dublin Docks pHNA.
R-S	0.1	Off Road	This section is located on private land and has a low probability of coastal flooding.	This section is located on private land, with a narrow untarred road to access this section.	There are no major economic concerns on this section.	This section passes no identified cultural heritage sites, emergency or critical services.	No significant known environmental issues, however, this section is constructed on reclaimed land.
S-T	0.3	Off Road	This section is located on private land and has a low probability of coastal flooding.	This section is located on private land, with a narrow untarred road to access this section.	40% of this section crosses concrete surface.	This section passes one SMR buffer.	No significant known environmental issues, however, this section is constructed on reclaimed land.
T-U	0.3	Pigeon House Road	Using this section may constrain future expansion on this road into / out Poolbeg substation.	This section is parallel to three existing 220 kV circuit and this section has moderate utility congestion.	There are no major economic concerns on this section.	This section passes through an area with a high concentration of industry.	No significant known environmental issues, however, this section is constructed on reclaimed land.

Section	Section Length (km)	Road Names	Technical	Deliverability	Economic	Socio-Economic	Environmental
L-Q	0.6	Liffey Crossing	<p>This section crosses the Lower Liffey using HDD. The Lower Liffey has a high probability of coastal and river flooding.</p> <p>Crossing at this location may constrain crossing at this location for future expansions.</p>	<p>The crossing of the Lower Liffey will likely need a foreshore licence.</p> <p>The onshore sections are located on private, DPC land.</p>	<p>The HDD crossing of the Lower Liffey will impact the cost of this section.</p>	<p>This section passes no identified cultural heritage sites, emergency or critical services.</p>	<p>This section crosses the River Liffey using HDD which will have a temporary landscape and visual affect during construction. The section passes adjacent to Dolphins, Dublin Docks pHNA.</p>
L-S	0.5	Liffey Crossing	<p>This section crosses the Lower Liffey using HDD. The Lower Liffey has a high probability of coastal and river flooding.</p> <p>Crossing at this location may constrain crossing at this location for future expansions.</p>	<p>The crossing of the Lower Liffey will likely need a foreshore licence.</p> <p>There is a piled jetty in front of the HDD launch site which will impact the geometry of the crossing.</p> <p>The onshore sections are located on private, DPC land.</p>	<p>The HDD crossing of the Lower Liffey will impact the cost of this section.</p>	<p>This section passes no identified cultural heritage sites, emergency or critical services.</p>	<p>This section crosses the River Liffey using HDD which will have a temporary landscape and visual affect during construction. The section passes adjacent to Dolphins, Dublin Docks pHNA.</p>
D-G	0.1	Terminal Road N	<p>This section is located on private land.</p>	<p>This section is located on private land, so a working time / area agreement will be required.</p>	<p>There are no major economic concerns on this section.</p>	<p>This section passes Irish Ferries terminal parking and loading ramp, which is a very critical service.</p>	<p>No significant known environmental issues, however, this section is constructed on reclaimed land.</p>
G-R	1	DPC Land; Terminal Road S	<p>This section crosses the Lower Liffey using HDD. The Lower Liffey has a high probability of coastal and river flooding.</p> <p>Crossing at this location may constrain crossing at this location for future expansions.</p> <p>This section crosses private / DPC land.</p>	<p>The crossing of the Lower Liffey will likely need a foreshore licence.</p> <p>This section crosses the ramp for Irish Ferries, which is a vital transport route.</p> <p>The onshore sections are located on private, DPC land.</p>	<p>The HDD crossing of the Lower Liffey will impact the cost of this section.</p>	<p>This section passes Irish Ferries terminal parking and loading ramp, which is a very critical service.</p>	<p>This section crosses the River Liffey using HDD which will have a temporary landscape and visual affect during construction. The section passes adjacent to Dolphins, Dublin Docks pHNA.</p>

DUBLIN REPLACEMENT UNDERGROUND CABLES PROGRAMME – ROUTE OPTIONS ASSESSMENT REPORT –NORTH WALL TO POOLBEG

Section	Section Length (km)	Road Names	Technical	Deliverability	Economic	Socio-Economic	Environmental
A-M	1.5	Alexandra Road; East Wall Road	Part of this section has a low probability of coastal flooding.	<p>This section is parallel to two railway lines, and crosses two turn outs, on Alexandra Road. It may interface with the Alexandra Road upgrades planned by DPC.</p> <p>This section is parallel to four 220kV circuits.</p> <p>35% of this section has a TIN of 4.</p>	<p>This section runs parallel to two railway lines and crosses 2 railway turn outs. There are high expected utility diversion requirements on this section.</p>	<p>This section passes through an area with a high concentration of industry and passes the Irish Ferries Terminal.</p> <p>There are bus routes on 100% of this section and on street parking on 35% of the section.</p>	<p>No significant known environmental issues, however, this section is constructed on reclaimed land.</p>
M-O	0.9	East Wall Road	<p>This section crosses the Lower Liffey using HDD. The Lower Liffey has a high probability of coastal and river flooding.</p> <p>Crossing at this location may constrain crossing at this location for future expansions.</p>	<p>The crossing of the Lower Liffey will likely need a foreshore licence. The bridge is a lifting bridge so HDD will likely be required.</p> <p>This section has a TIN of 4 where on the road.</p>	<p>The HDD crossing of the Lower Liffey will impact the cost of this section.</p> <p>There are high expected utility diversion requirements on this section.</p>	<p>This section passes two schools, two paddling/rowing clubs and one SMR buffer.</p> <p>This route passes the East Link Toll bridge.</p>	<p>This section crosses the River Liffey using HDD which will have a temporary landscape and visual affect during construction.</p> <p>There is an inland bird feeding site 200m from this section.</p>
O-P	0.9	Pigeon House Road; DPC Land; Pigeon House Road	Half of this section is located on private land.	<p>100% of this section is parallel to the existing circuit and it is located on roads and private land with high utility congestion.</p>	<p>Parts of this section has been recently resurfaced which will increase the costs associated with this section.</p> <p>There are high expected utility diversion requirements on this section.</p>	<p>This section passes through active port land and the Poolbeg Yacht and Boat club.</p>	<p>There is an inland bird feeding site 200m from this section.</p>
P-T	0.8	Pigeon House Road	Using this section may constrain future expansion on this road into / out Poolbeg substation.	This section is parallel to three existing 220 kV circuits and has moderate utility congestion.	There are no major economic concerns on this section.	This section passes one SMR buffer and through areas of highly concentrated industry.	There is an inland bird feeding site 250m from this section.

Section	Section Length (km)	Road Names	Technical	Deliverability	Economic	Socio-Economic	Environmental
M-N	1	DPC Land; Liffey Crossing	<p>This section crosses the Lower Liffey using HDD. The Lower Liffey has a high probability of coastal and river flooding.</p> <p>Crossing at this location may constrain crossing at this location for future expansions.</p>	<p>The crossing of the Lower Liffey will likely need a foreshore licence.</p> <p>This location is the crossing location of the existing 220kV circuit.</p> <p>30% of this section is located on DPC land and has concrete paving along the section.</p>	<p>The HDD crossing of the Lower Liffey will impact the cost of this section.</p> <p>There are high expected utility diversion requirements on this section.</p>	<p>This section will affect Dublin Port Terminal 3.</p>	<p>This section crosses the River Liffey using HDD which will have a temporary landscape and visual affect during construction.</p>
C-I	0.2	Breakwater Road	No technical issues.	<p>This section is located on public roads with low utility congestion. This section is parallel to a 220kV circuit.</p>	<p>There are no major economic concerns on this section.</p>	<p>This section passes through an area with a high concentration of industry.</p>	<p>No significant known environmental issues, however, this section is constructed on reclaimed land.</p>
I-J	0.1	Breakwater Road	No technical issues.	<p>This section is located on public roads with low utility congestion. This section is parallel to a 220kV circuit.</p>	<p>There are no major economic concerns on this section.</p>	<p>This section passes through an area with a high concentration of industry.</p>	<p>No significant known environmental issues, however, this section is constructed on reclaimed land.</p>
J-P	0.7	Breakwater Road; Liffey Crossing; DPC Land	<p>This section crosses the Lower Liffey using HDD. The Lower Liffey has a high probability of coastal and river flooding.</p> <p>Crossing at this location may constrain crossing at this location for future expansions.</p> <p>This section crosses private / DPC land.</p>	<p>The crossing of the Lower Liffey will likely need a foreshore licence.</p> <p>The onshore sections are located on private, DPC land.</p>	<p>The HDD crossing of the Lower Liffey will impact the cost of this section.</p>	<p>This section passes through an area with a high concentration of industry.</p> <p>There is on street parking along 25% of this section.</p>	<p>This section crosses the River Liffey using HDD which will have a temporary landscape and visual affect during construction.</p>

Section	Section Length (km)	Road Names	Technical	Deliverability	Economic	Socio-Economic	Environmental
B-E	1.1	2 Branch Road N; Tolka Quay Road; Terminal Road N	No technical issues.	This section crosses two large service troughs containing fuel, fire water mains and other services.	There may be bespoke trenches required to cross the two service troughs.	This section passes through an area with a high concentration of industry. There are bus routes on 60% of this section and on street parking on 10% of the section.	This section is adjacent to the Tolka River Estuary SPA and is located on reclaimed land.
H-J	0.8	DPC Land; 2 Branch Road N	Majority of section is on private land, on container handling / operation area.	There are narrow sections along this route, all of which are located on DPC land. There are pipe bridges on this section which may limit access. There are concrete surfaces on this section.	There is concrete surfacing along this section.	This section passes through active Port land.	No significant known environmental issues, however, this section is constructed on reclaimed land.
I-G	0.4	DPC Land	Majority of section is on private land, on container handling / operation area.	This section is located on DPC land, in the container handling area. There are concrete surfaces on this section.	There is concrete surfacing along this section.	This section passes through active Port land.	No significant known environmental issues, however, this section is constructed on reclaimed land.
G-F	0.3	DPC Land	This section is on DPC land (Ferry Compound) with some maintenance access issues.	This section is located on DPC land, in the container handling area. There are concrete surfaces on this section.	There is concrete surfacing along this section.	This section passes through active Port land.	No significant known environmental issues, however, this section is constructed on reclaimed land.

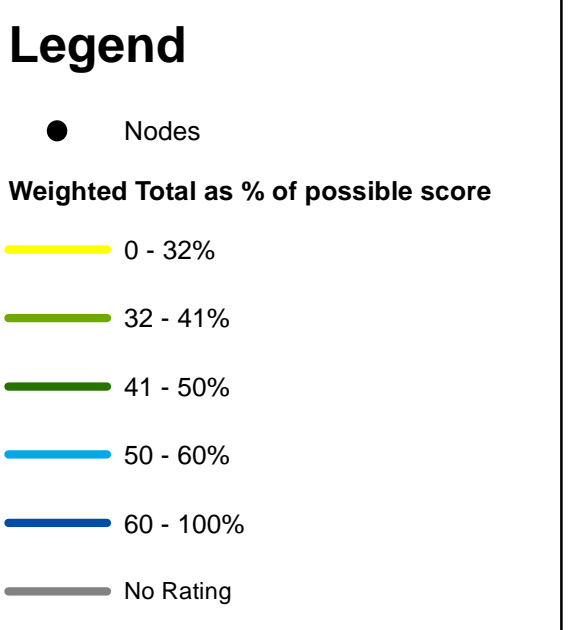
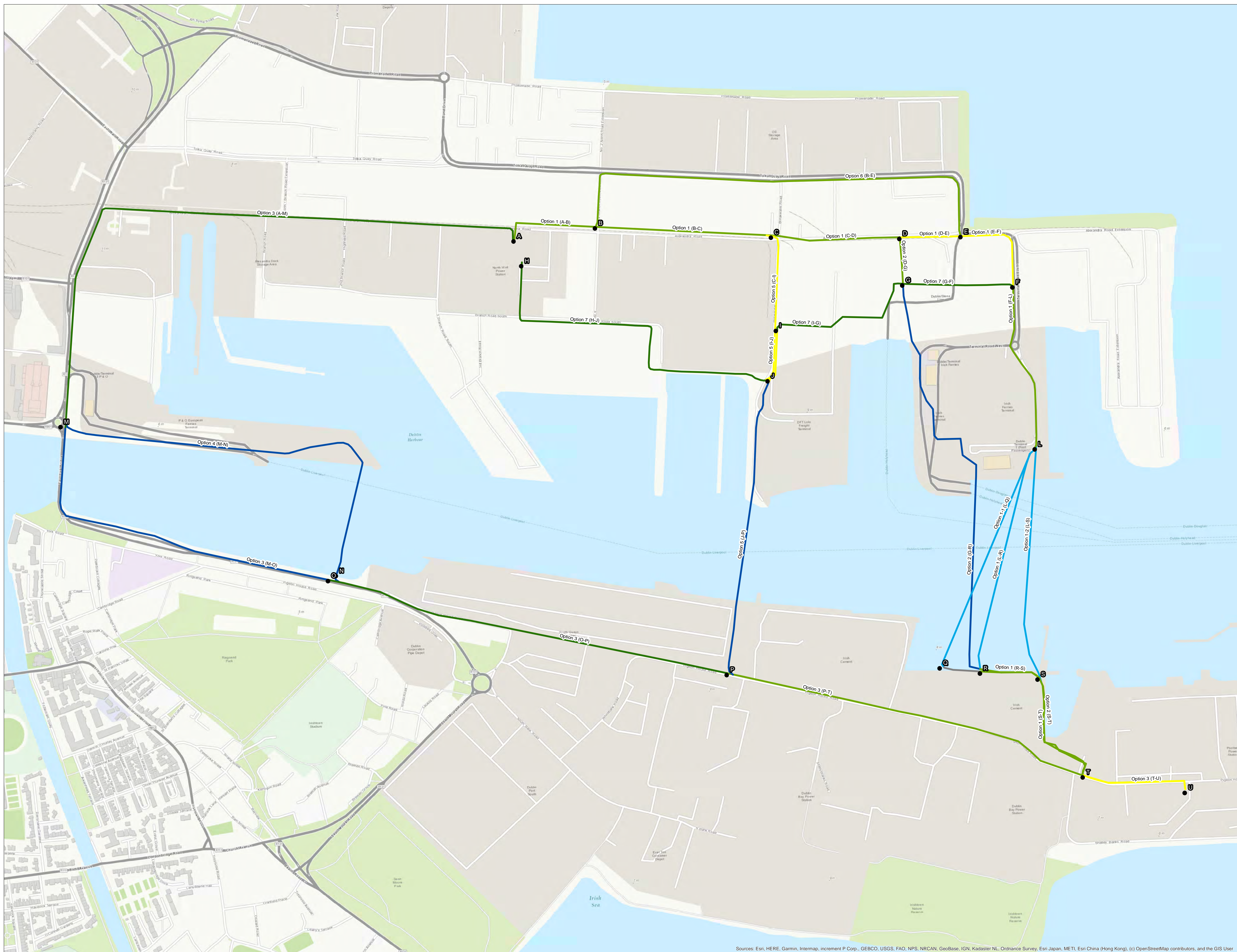
4.2 Section MCA Output Summary

Using the methodology outlined in Chapter 2, the results for each section are outlined in Table 4-2.

Table 4-2: Summary results of multi-criteria assessment

Section	Technical	Deliverability	Economic	Socio-Economic	Environmental	Overall Summary
A-B	Yellow	Green	Green	Green	Green	Green
B-C	Yellow	Green	Green	Green	Green	Green
C-D	Blue	Green	Green	Green	Green	Green
D-E	Green	Green	Green	Green	Green	Yellow
E-F	Yellow	Green	Green	Green	Green	Yellow
F-L	Green	Green	Green	Green	Green	Green
L-R	Blue	Blue	Green	Yellow	Blue	Blue
R-S	Green	Green	Yellow	Yellow	Green	Green
S-T	Green	Green	Green	Green	Green	Green
T-U	Green	Green	Green	Green	Green	Yellow
L-Q	Blue	Blue	Green	Yellow	Blue	Blue
L-S	Blue	Blue	Green	Yellow	Blue	Blue
D-G	Green	Green	Green	Green	Green	Green
G-R	Blue	Blue	Green	Green	Blue	Blue
A-M	Green	Blue	Green	Green	Green	Green
M-O	Blue	Blue	Blue	Green	Blue	Blue
O-P	Green	Blue	Green	Green	Green	Green
P-T	Green	Green	Green	Green	Green	Green
M-N	Blue	Blue	Blue	Green	Blue	Blue
C-I	Yellow	Green	Yellow	Green	Green	Yellow
I-J	Yellow	Green	Yellow	Green	Green	Yellow
J-P	Blue	Blue	Green	Green	Blue	Blue
B-E	Yellow	Green	Green	Green	Green	Green
H-J	Blue	Green	Green	Green	Green	Green
I-G	Blue	Green	Green	Green	Green	Green
G-F	Green	Green	Green	Green	Green	Green

The results from the multi-criteria assessment were mapped showing the overall ranking of each section. This map is shown in Figure 4-1 on Page 28.



Dublin Cables Project

Title

CP1216 North Wall to Poolbeg

Multi-Criteria Analysis Weighting



Issue Details

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Status:	Rev:	Model File Identifier:
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Approved:	DC	Projection: ITM

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5 ROUTE BUILDING

5.1 Multi Criteria Assessment Exceptions

To create optimised route options that have the lowest overall risk factors, some sections were excluded from the route building exercise. In general, any section that was ranked light blue or dark blue overall, was excluded from further studies.

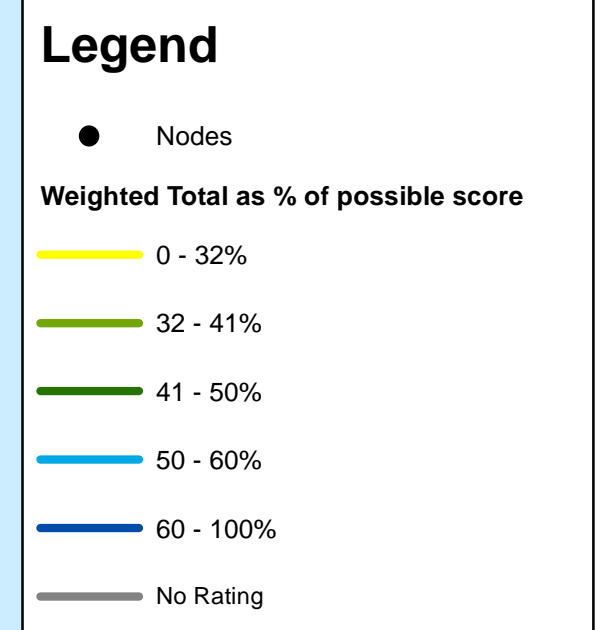
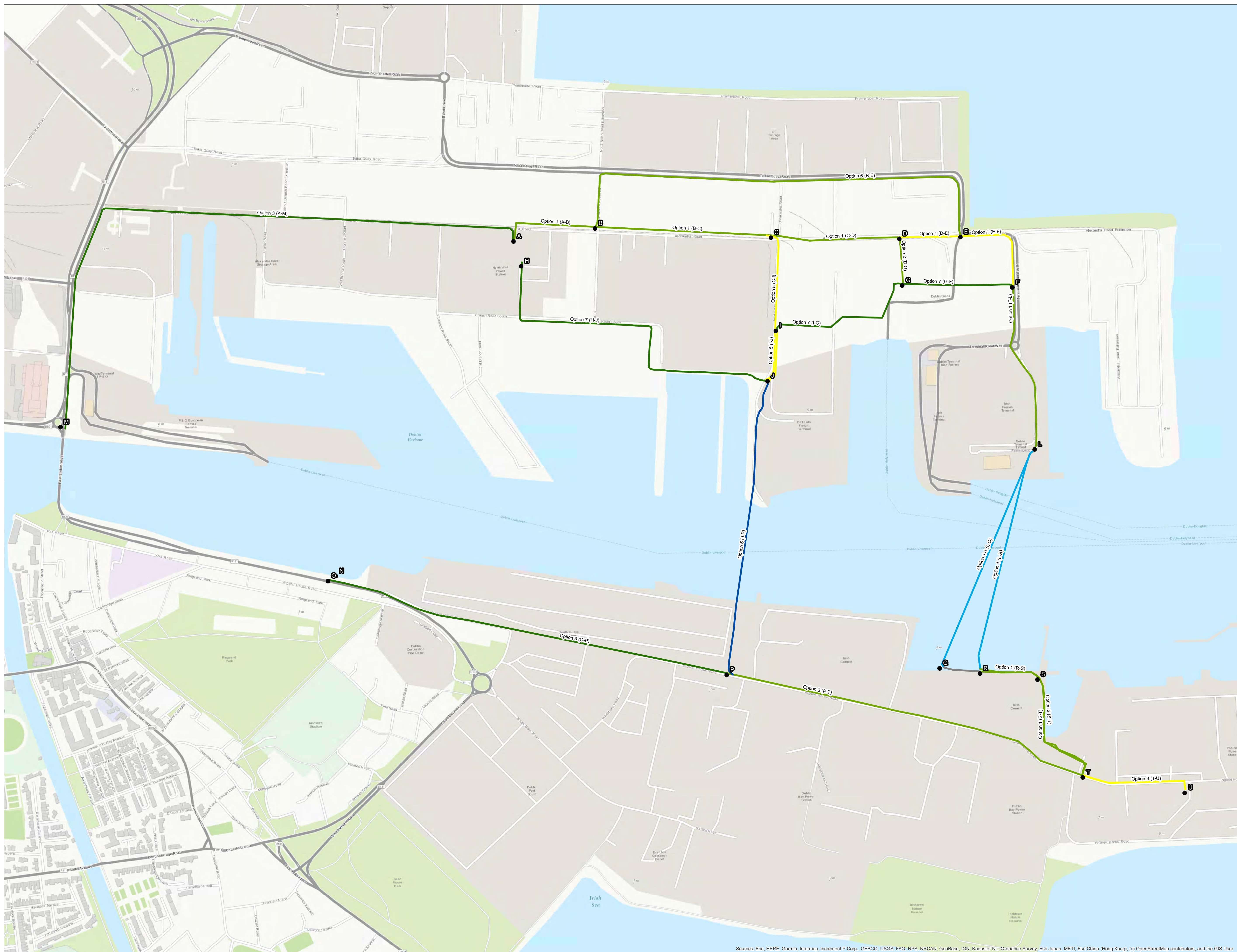
The overall summary output of the Multicriteria Assessment averages the ranking for each criterion, which are themselves averages of the sub criteria. Because of how many sub criteria and criteria there are, there might be an instance where a section may not be deemed feasible due to one factor, but if the other criteria rank well, the overall rank might be low risk. For example, the section might not be feasible from a deliverability perspective, but due to low environmental and technical risks, the overall ranking is low. In these cases, judgement is exercised and the section will be removed from further consideration despite the low overall risk ranking, and vice versa in the case of high-ranking sections that are feasible options. The explanation for these exceptions are given below.

The table below summarises whether sections will be included or excluded from future route building.

Table 5-1: Route sections included or excluded from route builder

Section	Overall Summary	Including/Excluding
L-R		Including. Viable crossing option from discussion with DPC
L-Q		Including. Viable crossing option from discussion with DPC
L-S		Excluding. Difficult HDD crossing geometry with piled jetty in line with launch pit.
G-R		Excluding. Cuts off traffic flow to Irish Ferries ramp.
M-O		Excluding. High density existing services, difficult HDD crossing.
M-N		Excluding. Crossing point of existing circuit. Difficult to manage without outages.
J-P		Including as second crossing point option for HDD.

A map of the study area excluding the sections listed above is shown in Figure 5-1 on page 30.



Client

Powering Up Dublin

Dublin Cables Project

Title

CP1216 North Wall to Poolbeg

Multi-Criteria Analysis Weighting

Progressed Sections

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Issue Details

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5.2 Possible Route Options

From the route sections that have been progressed to this stage, four possible route options can be built. These route options are discussed in Chapter 5.3 to 5.6.

5.3 Optimised Route Option 1 (Option D)

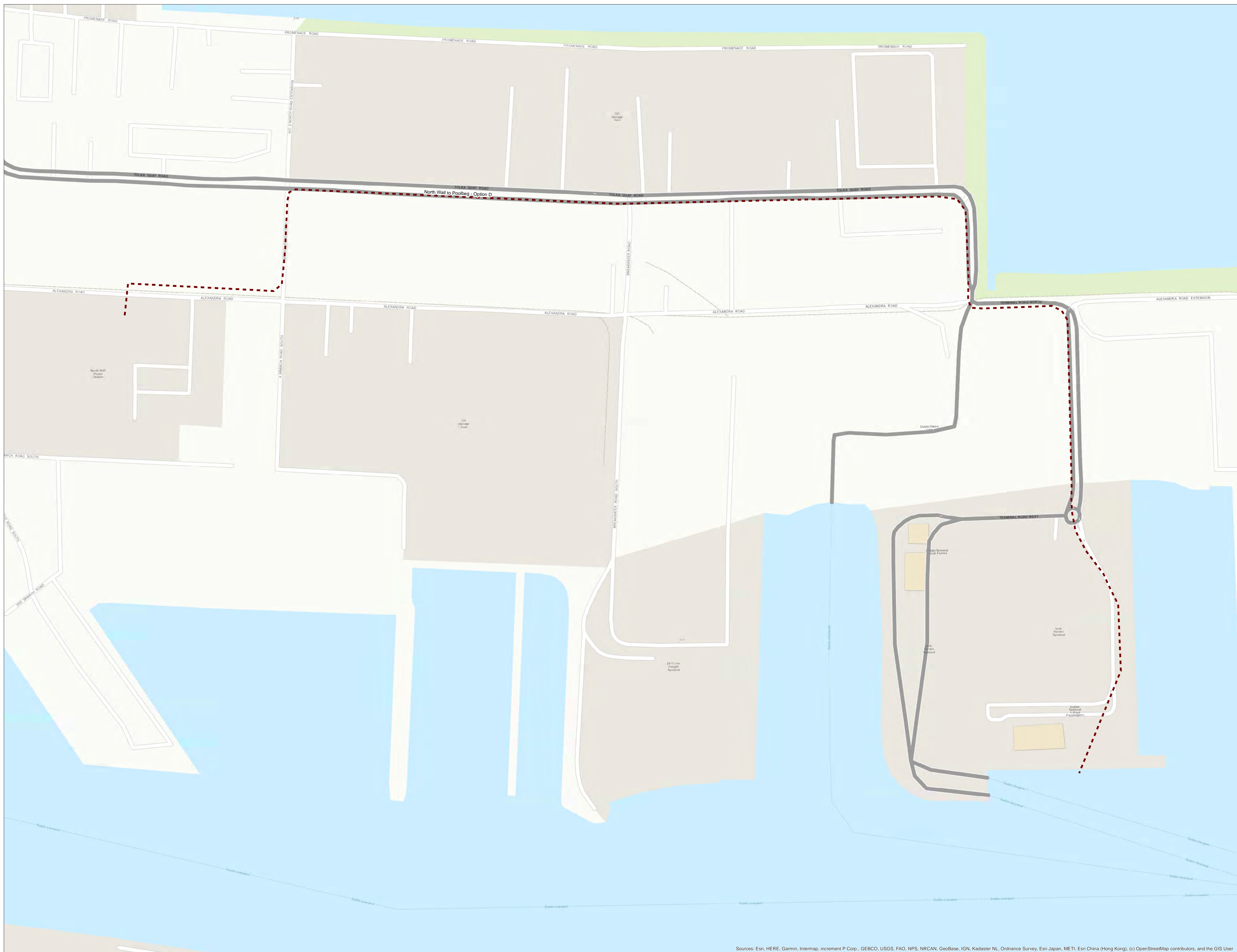
Optimised Route Option 1 is shown in Figure 5-2. Route length: 3.1 km.

Optimised Route Option 1 leaves the North Wall substation heading east on Alexandra Road. The route turns north up Branch Road North to Tolka Quay Road. It follows Tolka Quay Road and turns south onto Terminal Road North and then Terminal Road South. It follows this road to the car park adjacent to the Irish Ferries Terminal.

Here the route continues southwards and crosses under the Lower Liffey Estuary towards Poolbeg. At Poolbeg the route emerges on the east side of the open land adjacent to Celtic Anglian Water on Pigeon House Road. The crossing methodology will most likely be Horizontal Directional Drilling (HDD) and site investigations will determine the preferred crossing route. The route then follows the shoreline past the old Poolbeg Power station and joins Pigeon House Road before continuing to the Poolbeg Substation.

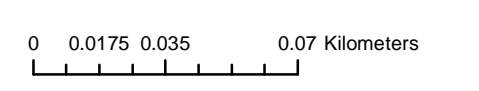
Optimised Route Option 1 Variation 1 (route length: 2.8 km, offroad length: 1.1 km)

Optimised Route Option 1 Variation 1 leaves the North Wall substation heading east on Alexandra Road, crossing Dublin Port Company lands to Terminal Road South. It follows this road to the car park adjacent to the Irish Ferries Terminal. Here the route continues southwards and crosses under the Lower Liffey Estuary towards Poolbeg. At Poolbeg the route emerges on the west side of the open land adjacent to Celtic Anglian Water on Pigeon House Road. The crossing methodology will most likely be Horizontal Directional Drilling (HDD) and site investigations will determine the preferred crossing route (See map below). The route then follows the shoreline past the old Poolbeg Power station and joins Pigeon House Road before continuing to the Poolbeg Substation.



Legend

--- North Wall to Poolbeg *Option D*



Dublin Cables Project

Title
Emerging Best Options
North Wall to Poolbeg
Option D



Issue Details

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5.3.1 Summary of Optimised Route Option 1 MCA Results

The overall risk ranking of this optimised route was low-moderate risk (light green). The breakdown showing the section level output is shown in Table 5-2.

Table 5-2: Multi-criteria assessment results of Optimised Route Option 1

Section	Section Length (km)	Road Names	Technical	Deliverability	Economic	Socio-Economic	Environmental	Overall
A-B	0.2	Alexandra Road	Yellow	Green	Green	Light Green	Light Green	Light Green
B-E	1.1	2 Branch Road N; Tolka Quay Road; Terminal Road N	Yellow	Light Green	Green	Light Green	Light Green	Light Green
E-F	0.2	Terminal Road S	Yellow	Light Green	Light Green	Light Green	Light Green	Yellow
F-L	0.4	Terminal Road S	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green
L-R	0.5	Liffey Crossing	Blue	Blue	Green	Yellow	Blue	Blue
R-S	0.1	Off Road	Green	Light Green	Yellow	Yellow	Light Green	Light Green
S-T	0.3	Off Road	Green	Green	Light Green	Light Green	Light Green	Light Green
T-U	0.3	Pigeon House Road	Light Green	Green	Light Green	Light Green	Light Green	Yellow
Total	3.1							

The overall risk ranking of Optimised Route Option 1 variation 1 was low-moderate risk (light green). The breakdown of the section level output is shown in Table 5-3.

Table 5-3: Multi-criteria assessment results of Optimised Route Option 1 Variation 1

Nodes	Section Length (km)	Road Names	Technical	Deliverability	Economic	Socio-Economic	Environmental	Overall
A-B	0.2	Alexandra Road	Yellow	Green	Green	Light Green	Light Green	Light Green
B-C	0.4	Alexandra Road	Yellow	Green	Light Green	Green	Light Green	Light Green
C-D	0.3	DPC Land	Blue	Green	Light Green	Light Green	Green	Light Green
D-E	0.1	Alexandra Road	Green	Light Green	Light Green	Light Green	Light Green	Yellow
E-F	0.2	Terminal Road S	Yellow	Light Green	Light Green	Light Green	Light Green	Yellow
F-L	0.4	Terminal Road S	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green
L-R	0.5	Liffey Crossing	Blue	Blue	Green	Yellow	Blue	Blue
R-S	0.1	Off Road	Green	Light Green	Yellow	Yellow	Light Green	Light Green
S-T	0.3	Off Road	Green	Green	Light Green	Light Green	Light Green	Light Green
T-U	0.3	Pigeon House Road	Light Green	Green	Light Green	Light Green	Light Green	Yellow
Total	2.8							

5.3.2 Outstanding Challenges of Optimised Route Option 1

There are several outstanding challenges on this route option that would need to be addressed with further investigation and design. They are as follows:

- Route crosses two service troughs on Alexandra Road. HDD will likely be needed for these crossings.

- River Liffey Crossing. HDD crossing envisaged for this section.
- This route passes adjacent to the Dolphins, Dublin Docks pNHA.
- The shoreline route section from the HDD site to Pigeon House Road is narrow which may be challenging for construction vehicles.
- High utility congestion in Pigeon House Road. Site investigations required to determine exact positioning of circuit.

Optimised Route 1 Variation 1:

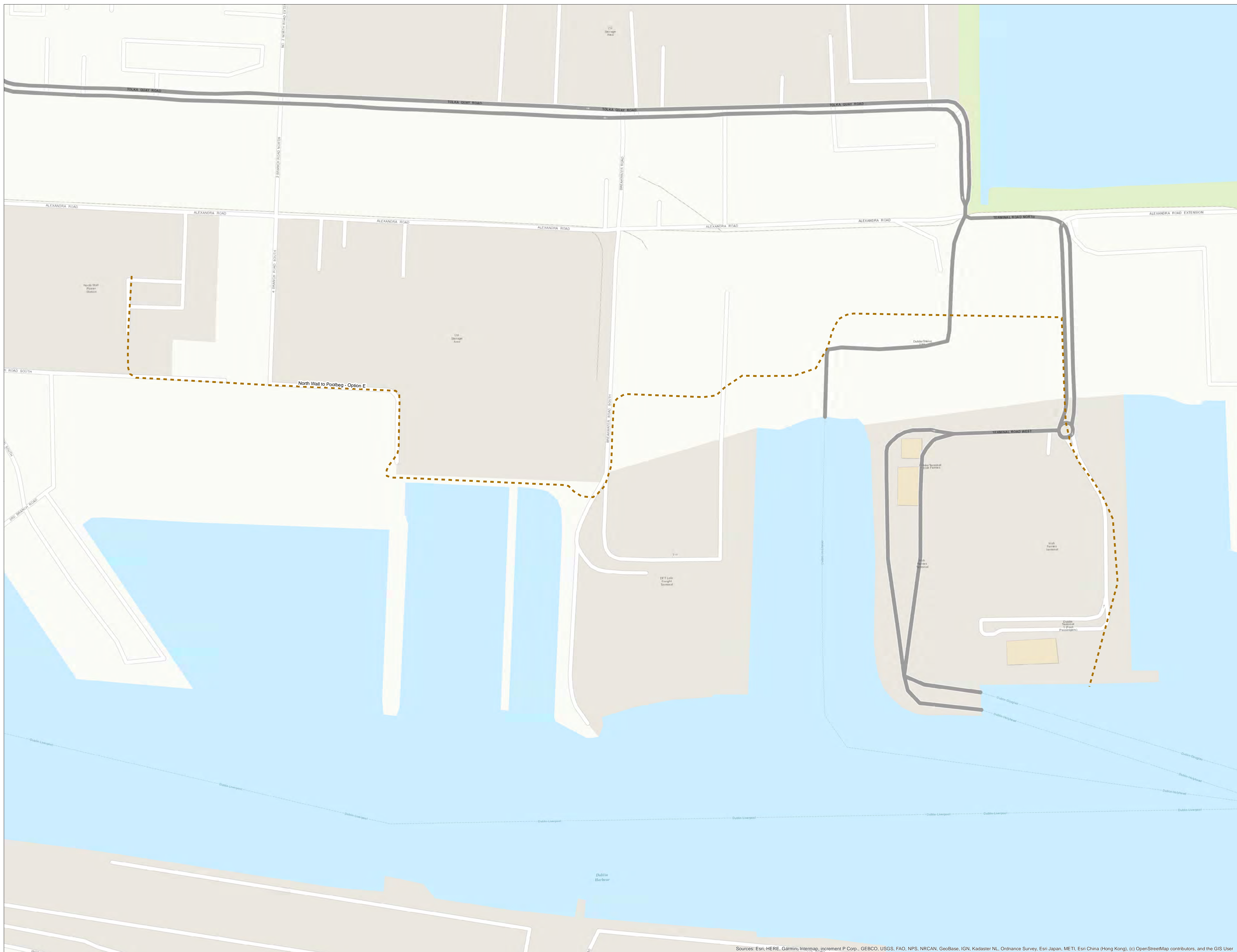
- There is an additional service trough (three total) on this section that will likely require HDD crossing.
- This route crosses DPC land which may necessitate a maintenance agreement.

5.4 Optimised Route Option 2 (Option E)

Optimised Route Option 2 is shown in Figure 5-3. The total length of this route is 3.2 km.

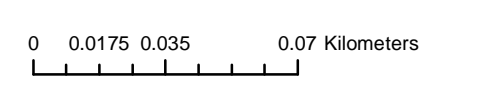
Optimised Route Option 2 commences at the North Wall Substation and travels to the south into the container handling area of Dublin Port Company (DPC) where it tracks east and skirts around the perimeter of the fuel tank farm along 2 Branch Road North. The route then turns north along Breakwater Road and east once again, entering DPC lands via a container handling area and the Stena Line truck marshalling area.

The route then turns south onto Terminal Road South. It follows this road to the car park adjacent to the Irish Ferries Terminal. Here the route continues southwards and crosses under the Lower Liffey Estuary towards Poolbeg. At Poolbeg, the route emerges on the east side of the open land adjacent to Celtic Anlian Water on Pigeon House Road. The crossing methodology will most likely be Horizontal Directional Drilling (HDD) and site investigations will determine the preferred crossing route. The route then follows the shoreline past the old Poolbeg Power station and joins the Pigeon House Road before continuing to the Poolbeg Substation.



Legend

--- North Wall to Poolbeg *Option E*



Dublin Cables Project

Title
Emerging Best Options
North Wall to Poolbeg
Option E



Issue Details

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5.4.1 Summary of Optimised Route Option 2 MCA Results

The overall risk ranking of this optimised route was low moderate risk (light green). The breakdown showing the section level output is shown in Table 5-4.

Table 5-4: Multi-criteria assessment results of Optimised Route Option 2

Section	Section Length (km)	Road Names	Technical	Deliverability	Economic	Socio-Economic	Environmental	Average
H-J	0.8	DPC Land; 2 Branch Road N	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green
I-J	0.1	Breakwater Road	Yellow	Light Green	Yellow	Light Green	Light Green	Yellow
I-G	0.4	DPC Land	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green
G-F	0.3	DPC Land	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green
F-L	0.4	Terminal Road S	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green
L-R	0.5	Liffey Crossing	Light Green	Light Green	Light Green	Yellow	Light Green	Light Green
R-S	0.1	Off Road	Light Green	Light Green	Yellow	Yellow	Light Green	Light Green
S-T	0.3	Off Road	Light Green	Light Green	Light Green	Light Green	Light Green	Light Green
T-U	0.3	Pigeon House Road	Light Green	Light Green	Light Green	Light Green	Light Green	Yellow
Total	3.2		Light Green	Light Green	Light Green	Light Green	Light Green	Light Green

5.4.2 Outstanding Challenges of Optimised Route Option 2

There are several outstanding challenges on this route option that would need to be addressed with further investigation and design. They are as follows:

- Large sections of this route are on private land (DPC owned land)
- Sections of the route are narrow, where the route travels around the fuel tank farm. There are overhead services (pipe bridges) on this section which may further constrain access.
- River Liffey Crossing. HDD crossing envisaged for this section.
- This route passes adjacent to the Dolphins, Dublin Docks pNHA.
- The shoreline section from the HDD site to Pigeon House Road is narrow which may be challenging for construction vehicles.
- High utility congestion in Pigeon House Road. Site investigations required to determine exact positioning of circuit.

5.5 Optimised Route Option 3 (Option F)

Optimised Route Option 3 is shown in Figure 5-4. This route option is 2.7 km.

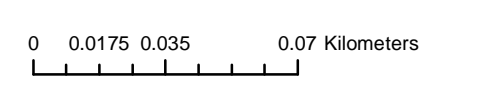
Optimised Route Option 3 leaves the North Wall substation heading east on Alexandra Road. At Breakwater Road, the route turns south onto Breakwater Road towards the River Liffey. At the end of Breakwater Road, the route crosses the Lower Liffey Estuary onto Dublin Port Company Lands (DPC) on the southern bank, The crossing methodology will most likely be Horizontal Directional Drilling (HDD) and site investigations will determine the preferred crossing route.

On the southern bank, the route crosses the DPC land to Pigeon House Road, which it follows east as far as the Poolbeg substation.



Legend

--- North Wall to Poolbeg Option F



Dublin Cables Project

Title
Emerging Best Options
North Wall to Poolbeg
Option F



Issue Details

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5.5.1 Summary of Optimised Route Option 3 MCA Results

The overall risk ranking of this optimised route was low moderate risk (light green). The breakdown showing the section level output is shown in Table 5-5.

Table 5-5: Multi-criteria assessment results of Optimised Route Option 3

Section	Section Length (km)	Road Names	Technical	Deliverability	Economic	Socio-Economic	Environmental	Average
A-B	0.2	Alexandra Road	Yellow	Green	Green	Light Green	Light Green	Light Green
B-C	0.4	Alexandra Road	Yellow	Green	Green	Green	Light Green	Light Green
C-I	0.2	Breakwater Road	Yellow	Light Green	Yellow	Light Green	Light Green	Yellow
I-J	0.1	Breakwater Road	Yellow	Light Green	Yellow	Light Green	Light Green	Yellow
J-P	0.7	Breakwater Road; Liffey Crossing; DPC Land	Blue	Blue	Green	Light Green	Blue	Blue
P-T	0.8	Pigeon House Road	Light Green	Green	Light Green	Light Green	Light Green	Light Green
T-U	0.3	Pigeon House Road	Light Green	Green	Light Green	Light Green	Light Green	Yellow
Total	2.7		Light Green	Green	Light Green	Light Green	Light Green	Light Green

5.5.2 Outstanding Challenges of Optimised Route Option 3

There are several outstanding challenges on this route option that would need to be addressed with further investigation and design. They are as follows:

- This route passes three service troughs on Alexandra Road. HDD crossing will likely be needed to cross each one.
- River Liffey Crossing. HDD crossing envisaged for this section. There is an existing 200kV circuit (Finglas to Shellybanks) crossing at this point. The crossing route will need to be carefully managed to ensure there is no damage to the existing 220kV circuit.
- Sections of this route are on private land (DPC owned land)
- High utility congestion in Pigeon House Road. Site investigations required to determine exact positioning of circuit.

5.6 Optimised Route Option 4

Optimised Route Option 4 is shown in Figure 5-5. This route option is 2.6 km.

Optimised Route Option 4 commences at the North Wall Substation and travels to the south into the container handling area of Dublin Port Company (DPC) where it tracks east and skirts around the perimeter of the fuel tank farm along 2 Branch Road North. The route then turns south along Breakwater Road.

At the end of Breakwater Road, the route crosses the Lower Liffey Estuary onto Dublin Port Company Lands (DPC) on the southern bank, The crossing methodology will most likely be Horizontal Directional Drilling (HDD) and site investigations will determine the preferred crossing route. On the southern bank, the route crosses the DPC land to Pigeon House Road, which it follows east as far as the Poolbeg substation.



Figure 5-5: Map of Optimised Route Option 4

5.6.1 Summary of Optimised Route Option 4 MCA Results

The overall risk ranking of this optimised route was mid-level / moderate risk (dark green). The breakdown showing the section level output is shown in Table 5-6.

Table 5-6: Multi-criteria assessment results of Optimised Route Option 4

Section	Section Length (km)	Road Names	Technical	Deliverability	Economic	Socio-Economic	Environmental	Average
H-J	0.8	DPC Land; 2 Branch Road N	Green	Green	Green	Green	Green	Green
J-P	0.7	Breakwater Road; Liffey Crossing; DPC Land	Blue	Blue	Green	Green	Blue	Blue
P-T	0.8	Pigeon House Road	Green	Green	Green	Green	Green	Green
T-U	0.3	Pigeon House Road	Green	Green	Green	Green	Green	Yellow
Total	2.6		Green	Green	Green	Green	Green	Green

5.6.2 Outstanding Challenges of Optimised Route Option 4

There are several outstanding challenges on this route option that would need to be addressed with further investigation and design. They are as follows:

- Large sections of this route are on private land (DPC owned land)

- Sections of the route are narrow, where the route travels around the fuel tank farm. There are overhead services (pipe bridges) on this section which may further constrain access.
- River Liffey Crossing. HDD crossing envisaged for this section. There is an existing 200kV circuit (Finglas to Shellybanks) crossing at this point. The crossing route will need to be carefully managed to ensure there is no damage to the existing 220kV circuit.
- Sections of this route are on private land (DPC owned land)
- High utility congestion in Pigeon House Road. Site investigations required to determine exact positioning of circuit.

6 EMERGING BEST PERFORMING ROUTES

The four optimised routes created after the multi-criteria assessment, outlined in Chapter 5, were assessed to determine the Emerging Best Performing routes to progress to the Best Performing Option Report.

Optimised Routes 1, 2 and 3 will be progressed for further consideration in the Best Performing Option Report where more detailed cable routing design and public consultation will be used to determine the Best Performing Option for Step 5.

Optimised Route 1 will be progressed for further consideration, and from here will be labelled **Option D**.

Option D has been selected due to the overall ranking of low-moderate risk. All the criteria for this route option are low-moderate risk, apart from deliverability which is ranked as mid-level / moderate risk. The factors driving this risk is the HDD crossing of the Liffey and the two service troughs on Alexandra Road. Both of these risks can be reduced during the detailed design phase.

Optimised Route 2 will be progressed for further consideration, and from here will be labelled **Option E**.

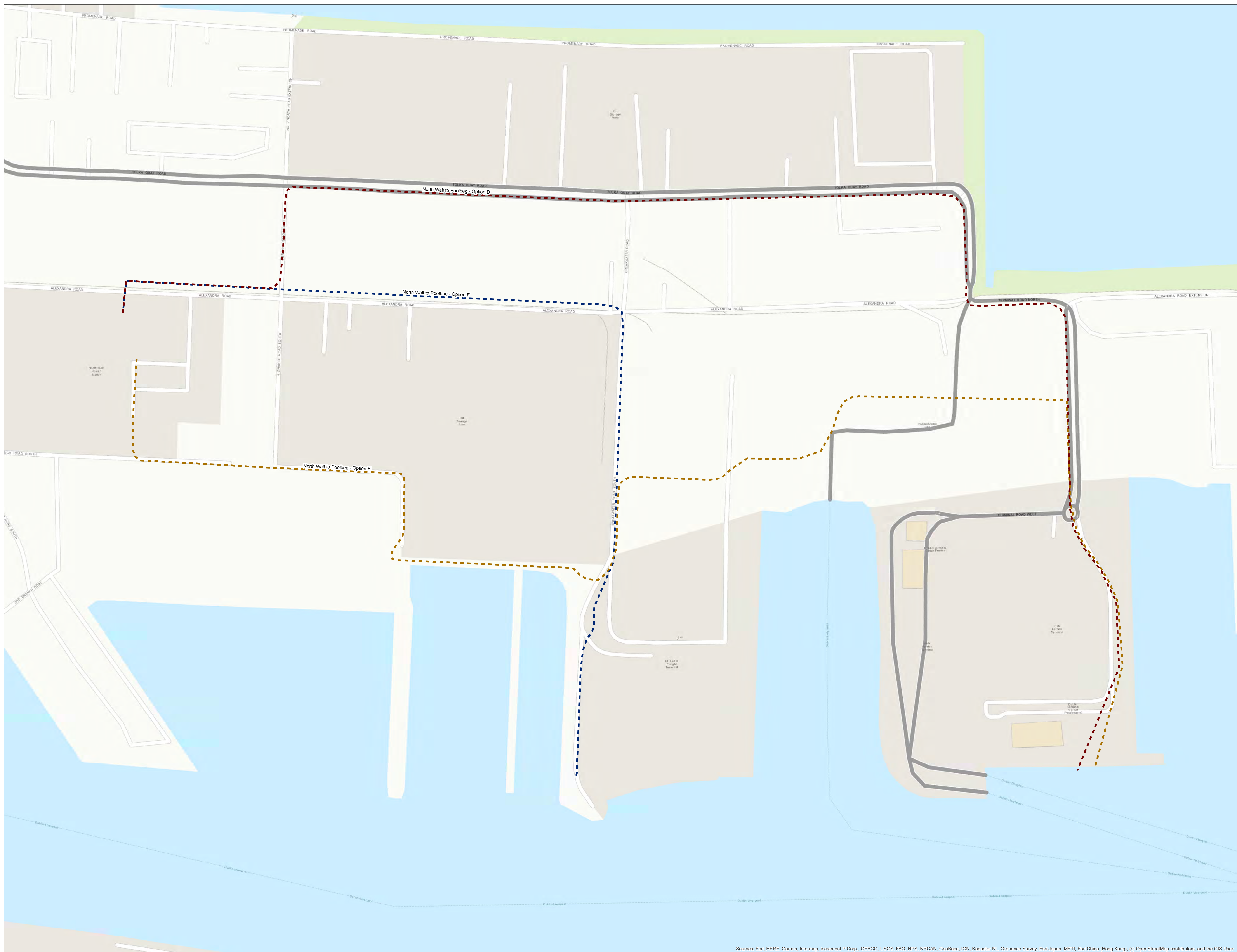
Option E also has an overall ranking of low-moderate risk. The criteria of Technical, Deliverability and Environmental are rated as mid-level / moderate risk. Technical and Deliverability risks are being driven by the HDD crossing of the Liffey, as well as large sections of this route travelling on Dublin Port Company land. This may necessitate agreements for both working time during construction and ongoing maintenance. Sections of this route are also quite narrow. With careful detailed design, and with the agreement with DPC, the risk ranking of this route can be managed.

Optimised Route 3 will be progressed for further consideration, and from here will be labelled **Option F**.

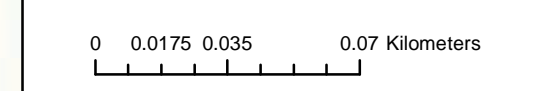
Option F is the final route that will be considered for further investigation. This route is ranked as low-moderate risk overall. The Deliverability of this route is the only criteria ranked slightly higher as mid-level / moderate. The HDD crossing of three service troughs on Alexandra Road, and the Liffey crossing contribute to this higher ranking. At the crossing point of the Liffey, there is an existing 220kV circuit (Finglas to Shellybanks). This will complicate the crossing, however, with detailed design and site investigation, this risk can be managed.

Due to the higher risk ranking of mid-level / moderate overall for **Optimised Route 4**, this route will not be progressed for further considerations at this time.

The map on Page 39 shows Option D, Option E and Option F



- Legend**
- - - North Wall to Poolbeg Option D
 - - - North Wall to Poolbeg Option E
 - - - North Wall to Poolbeg Option F



Client



Dublin Cables Project

Title

Emerging Best Options

North Wall to Poolbeg



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7 NEXT STEPS

This Route Options Assessment report will be published for public consultation. Any feedback received during the eight-week consultation will be considered in the project design moving forward.

EirGrid are also engaging through a Business Forum and Community Forum. Both forums will meet twice during the public consultation and the feedback received at each forum will also influence design where possible.

In addition to the feedback received from the consultation activity, a campaign of non-invasive investigations (such as Ground Penetrating Radar) will be performed to identify areas of high utility congestion, as well as limited invasive site investigations (such as slit trenches and H trenches) to validate the desktop designs. This approach informs and underpins the ongoing design, and in doing so reduces the risk of unexpected issues encountered during the construction phase.

Feedback and investigations are expected to iterate the design which may include sections that have previously assessed but ranked sub optimally during the Multi Criteria Assessment. These alternative sections have been subjected to the same scrutiny as all other route sections in order to provide this flexibility and are expected to enable minimal deviation from the proposed route options.

The next publication for this project is the Best Performing Option report. This report will contain the additional design and investigative work detailed above.