
Appendix A3.3
Preliminary Options Selection
Report



PRELIMINARY OPTION SELECTION REPORT

MAIN REPORT



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Glossary of Technical Terms

Abbreviation	Definition
AA	Appropriate Assessment
ABP	An Bord Pleanála
CAF	Common Appraisal Framework
CAWS/ATP	Continuous Automatic Warning System/Automatic Train Protection
CBI	Computer Based Interlocking
CCTV	Closed-Circuit Television
CIÉ	Córas Iompair Éireann
CSO	Central Statistics Office
CRR	Commission for Rail Regulation (formerly RSC – Railway Safety Commission)
CTC	Central Traffic Control
DART	Dublin Area Rapid Transit
DC	Direct Current
DMU	Diesel Multiple Unit
DTTAS	Department of Transport, Tourism and Sport
DOO	Driver Only Operation
DTTAS	Department of Transport, Tourism and Sport
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EPA	Environmental Protection Agency
ERM	Eastern Regional Model
ESB	Electricity Supply Board
ECS	Empty Coaching Stock
EU	European Union
FLU	Full Length Unit (one FLU train consists of two HLUs)
GAA	Gaelic Athletic Association
GI	Ground Investigation
GDA	Greater Dublin Area
GDP	Gross Domestic Product
GFRP	Glass Fibre Reinforced Plastic
HLU	Half Length Unit (one FLU train consists of two HLUs)
ÍÉ / IR	Iarnród Éireann / Irish Rail
ITM	Irish Transverse Mercator
LAP	Local Area Plan
MCA	Multi-Criteria Analysis
MDC	Multi-Disciplinary Consultant
NDP	National Development Plan
NIAH	National Inventory of Architectural Heritage

Abbreviation	Definition
NIFTI	National Investment Framework for Transport in Ireland
NPF	National Planning Framework
NSO	National Statistics Outcomes
NTA	National Transport Authority
OHLE	Overhead Line Equipment
P&C	Points and Crossings
PC1	Public Consultation No. 1
PC2	Public Consultation No. 2
pNHA	Proposed Natural Heritage Area
PPP	Public Private Partnership
REB	Relocatable Equipment Buildings
RO	Railway Order
RS	Rolling Stock
RRV	Road / Rail Vehicle
RSES	Regional Spatial and Economic Strategy
SAC	Special Area of Conservation
SEB	Signalling Equipment Building
SET	Signalling, Electrical and Telecom
SDZ	Strategic Development Zone
SP	Security Purpose
SPA	Special Protected Area
TEN-T	Trans-European Network for Transport
TII	Transport Infrastructure Ireland
TOD	Transport-Oriented Development
TPHPD	Trains Per Hour Per Direction
TSS	Train Service Specification
UN	United Nations

Executive Summary

ES1.1 DART+ Programme overview

The DART+ Programme is a transformative railway investment programme that will deliver a high quality and integrated public transport system within the Greater Dublin Area (GDA). The DART+ Programme will both modernise and improve the existing rail services in the GDA, providing a range of benefits for both the residents of the GDA itself, as well as those living in surrounding regions.

The DART+ Programme will play a significant role in contributing to Ireland’s transition to a low carbon and climate resilient society by providing a sustainable, electrified, reliable and more frequent rail service with improved capacity to meet current and future demands. This will be achieved through the modernisation of existing railway corridors and by utilising electric powered trains in place of diesel trains.

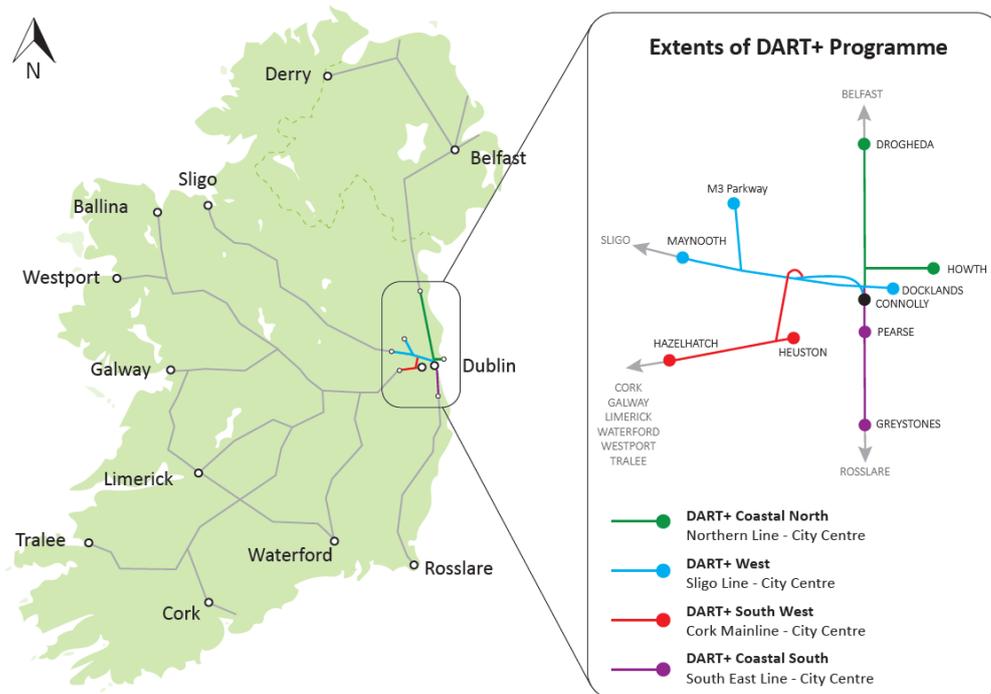


Figure ES-1: Schematic of Overall DART+ Programme

The existing, electrified DART network extends from Malahide to Greystones (including the Howth Branch) over a length of approximately 50km. The DART+ Programme will seek to increase the length of high capacity and electrified network to 150km across the four main rail corridors within the GDA.

The modernisation includes the electrification, re-signalling and other specific interventions to remove constraints across the four main rail corridors within the GDA, as follows:

- **DART+ Coastal North (this project)** – circa 50km, extending from Drogheda to Dublin City Centre (north of Connolly Station).
- DART+ Coastal South – circa 30km, extending from Greystones to Dublin City Centre.
- DART+ West – circa 40km, extending from Maynooth and M3 Parkway stations to Dublin City Centre.
- DART+ South West – circa 16km, extending from Hazelhatch & Celbridge Station to Heuston Station and also circa 4km between Heuston Station and Glasnevin, via the Phoenix Park Tunnel Branch Line.

As part of the DART + Programme, Iarnród Éireann is purchasing a new fleet of trains to enhance the capacity on the DART network. This procurement will allow Iarnród Éireann to choose a fleet made up of Electric Multiple Units (EMUs) and Battery Electric Multiple Units (BEMUs). The provision of BEMUs will allow for running enhanced services on the network in advance of full electrification.

ES1.2 DART+ Coastal North project overview

The DART+ Coastal North project primarily involves the extension of the existing electrified rail network over circa 37km from Malahide to Drogheda, with associated re-signalling and modification of some low clearance overbridges to accommodate the overhead line electrification system. There will also be modifications to existing depots at Drogheda and Fairview to support the new DART+ Fleet. As a principle, the project is seeking to contain works, insofar as possible, within the existing railway corridor. However, some infrastructure such as traction power substations will need to be constructed outside of the railway corridor where space cannot be found.

The project will provide the infrastructure to facilitate an increase to the rail capacity on the Northern Line between Dublin City Centre and Drogheda MacBride Station, including the Howth Branch, by implementing an extended electrified railway network with higher capacity and higher frequency DART trains. The DART+ Coastal North project will serve all existing stations along the railway corridor between Dublin City Centre and Drogheda, including those located on the Howth Branch, using electrical power that has a lower carbon footprint than existing diesel trains.

To achieve this increased capacity and enable a higher frequency of DART services, the DART+ Coastal North project will need track modifications, including the provision of turnback facilities at Malahide, Clongriffin and Howth Junction & Donaghmede stations. These modifications are essential to facilitate the increase in train services by allowing trains to be turned back clear of continuing services on separate tracks at Clongriffin and Malahide stations.

Works at Clongriffin involve the construction of some additional tracks to the east of the station. The original station construction anticipated this construction requirement and therefore it will have minimal impact on the station building/existing infrastructure.

Additional turnback tracks at Howth Junction & Donaghmede Station will allow for a higher frequency and a more reliable service. A platform extension will be constructed at Howth Junction & Donaghmede Station to provide direct access between services on the Howth Branch and southbound DART services to the city centre.

At Drogheda MacBride Station the existing track and depot layout does not provide sufficient operational capacity to meet the planned increase in number of train services. Consequently, track and depot alterations are required, along with associated alterations to signalling, electrification, telecoms and structures. This includes the installation of a new platform and stabling facilities.

To achieve the peak capacity increases proposed by the DART+ Programme, DART+ Coastal North project will seek a reconfiguration of Howth Junction & Donaghmede Station to enable the use of a shuttle service on the Howth Branch. By removing crossing conflicts at Howth Junction, a shuttle DART operation between Howth and Howth Junction & Donaghmede Stations will maximise frequency and reliability on the Northern Line. The interchange at Howth Junction & Donaghmede Station will be facilitated by an increase in Northern Line stopping

trains from 6 to 11. The removal of crossing conflicts at Howth Junction will also result in a more frequent and reliable Howth DART service at every ten minutes each way, with a change at Howth Junction to access the Northern Line. This would represent an increase to a maximum of six trains per hour per direction from the current three. Final operational decisions will be made subject to demand requirements and assessment.

Initial assessment of the four existing level crossings along the Howth Branch has indicated that these level crossings can continue to operate as per the current arrangements while still providing a more efficient rail service overall.

Map Part B



Map Part A



Figure ES-2: DART+ Coastal North project extents

ES1.3 Capacity increases

The DART+ Coastal North project will improve performance and increase train frequencies in the AM and PM peaks along the full length of the Northern Line. This will include enhanced capacity from the city centre to as far north as Drogheda, and on the Howth Branch. Customers will experience enhanced levels of service in both AM and PM peaks, and in both southbound and northbound directions.

Additionally, as a result of the DART+ Coastal North project the current AM and PM peak hours will be extended to become peak periods, with DART extending the proportion of the day it provides its maximum number of trains from 1 hour to 3

hours. This extension of enhanced peak service frequencies will take advantage of infrastructure enhancements and new rolling stock, providing more flexibility, comfort, and capacity to DART customers (**Figure ES-3**).

New Battery Electric Multiple Units trains (BEMUs) will be introduced on this section of the network before the DART+ Coastal North project. The timetable for the BEMUs will be different to today's current timetable. The provision of these BEMUs will allow for the possibility of running enhanced services on the network in advance of full electrification. Iarnród Éireann identified the Northern Line as the most suitable route for BEMU deployment and Drogheda MacBride Station and depot area as the preferred charging location. These BEMU works will be delivered under a separate project and the increase in service levels provided will be in advance of the electrification under the DART+ Coastal North project. Accordingly, the increase in service level referred to below compares DART+ Coastal North to service levels post-BEMU.

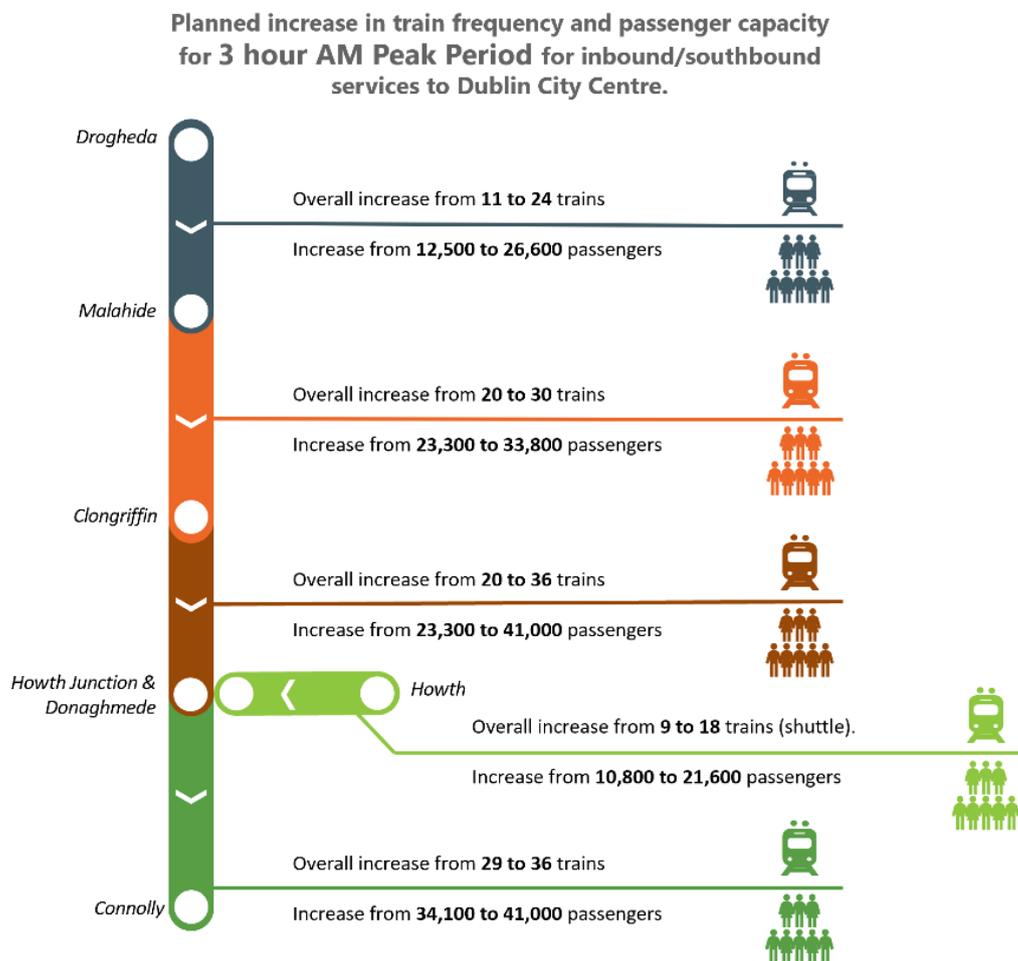


Figure ES-3: Inbound/Southbound Services Capacity Increases

ES1.4 The Emerging Preferred Option

The process to determine the Emerging Preferred Option for the DART+ Coastal North project followed a two-step optioneering process – Stage 1: Preliminary Assessment (Sifting) (longlist of options), followed by Stage 2: Multi-Criteria Analysis (shortlist of options). This led to the identification of location-specific Emerging Preferred Options in respect of interventions required. These, and general linear works required along the full length of the project, are the key elements of the Emerging Preferred Option. Note not all design features require option selection but are instead subjected to technical assessment only. Consequently, the two-stage approach is not applicable to all general works or interventions that require option selection.

For the purpose of describing the Emerging Preferred Option end-to-end for the project, general linear works to facilitate electrification are described first, followed by interventions at specific locations (from north to south) as follows:

- General linear works to facilitate electrification;
- Works to Drogheda and Fairview depots;
- Works around Drogheda MacBride Station;
- Works to the existing user worked level crossing south of Donabate;
- Works around Malahide Station;
- Works around Clongriffin Station;
- Works around Howth Junction & Donaghmede Station.

ES1.5 General Linear Works

The following works are required to electrify the Northern Line between Malahide and Drogheda inclusive of the Howth Branch:

- Overhead Line Equipment (OHLE) will be required from the current limit of electrification at Malahide to be extended through to Drogheda. This will be similar to the OHLE currently used on the existing DART network.
- 8 new electrical substations will be required at intervals along the railway line between Malahide and Drogheda to provide power to the network.
- Power supply upgrades may be required on the Howth Branch including provision of a new substation. Studies to confirm the exact requirements are ongoing.
- An assessment has been undertaken to review the existing clearances at all overbridges along the route in regard to future electrification requirements. The preliminary findings from the assessment conclude that a large proportion of the bridges have the necessary clearances and are unlikely to be impacted by the project. At this stage, the structures which will require reconstruction are those located in and around Drogheda MacBride Station and depot. Further studies and surveys are ongoing for a number of other bridges along the route

which shall confirm the extent of interventions required to achieve the necessary clearance for OHLE. These interventions would typically include specialist electrical solutions, lowering the rail track under the bridge or making alterations to the existing bridge.

- OHLE will be required to be fixed and necessitate localised modification to underbridges/viaducts at:
 - Malahide Viaduct;
 - Rogerstown Viaduct;
 - Balbriggan Viaduct;
 - Laytown Viaduct.
- Modifications to existing overbridge parapets between Malahide and Drogheda will be required to ensure that parapets are imperforate, climb-resistant and at least 1.8m high. This will reduce the risk of people coming into contact with the OHLE.
- Interfaces with existing utilities, boundary treatments (including new retaining walls and fencing), drainage works, vegetation management and other ancillary works will be required along the length of the project.
- There is an existing user worked level crossing located south of Donabate, connecting farmlands either side of the railway. Intervention at the current crossing is required due to an increase in risk from the electrification of the railway line and greater frequency of trains.

The Emerging Preferred Option is to close the crossing and for IÉ to purchase the associated land to the east of the railway.

ES1.6 Depot works

There are two existing depots within the scope of the DART+ Coastal North project: Fairview and Drogheda depot. Modifications at Fairview and Drogheda depots are required to provide the infrastructure, maintenance, and servicing facilities necessary for the new DART fleet. These modifications are predominantly internal to the buildings, although they will also encompass some localised track modifications within the depot compounds.

ES1.7 Works around Drogheda MacBride Station

At Drogheda MacBride Station the existing track and depot layout does not provide sufficient operational capacity to meet the planned increase in number of train services. Consequently, track and depot alterations are required, along with associated alterations to signalling, electrification, telecoms and structures.

The Emerging Preferred Option provides a new platform on the Drogheda freight siding (see **Figure ES-4**). The new platform will extend over Dublin Road (R132), hence the existing Dublin Road Underbridge requires widening or replacement. The new platform will be interconnected with the existing Platform 1 and requires modification to allow for pedestrian movements to the new platform. Retaining walls and other civil works are also required to accommodate the new platform. Other track modification works are necessary to cater for the increase in stabling requirements.

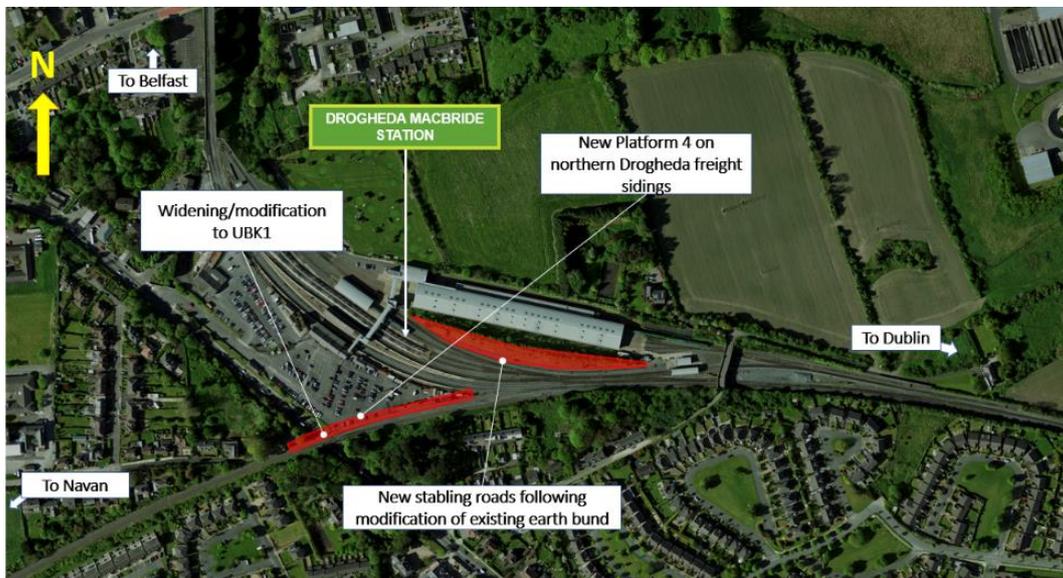


Figure ES-4: General Overview of Works around Drogheda MacBride Station
(Source: OSI aerial imagery)

ES1.8 Works around Malahide Station

The works at Malahide comprise track modification which are essential to facilitate the increase in train services, by allowing trains to be turned back clear of continuing services on separate tracks.

The Emerging Preferred Option is to introduce a turnback immediately north of Malahide Station between the Strand Road Underbridge and the Malahide Viaduct (see **Figure ES-5**). This turnback will be situated between the two existing running lines which will necessitate the existing running lines to be slewed to the east between the two aforementioned bridges. This slewing will introduce the need to widen the existing embankment to the east, which will be accomplished by building a retaining structure alongside the realigned track.

New OHLE and signalling installations as well as modifications to the existing systems will be required.

The proposed works are in close proximity to Irish Water’s wastewater treatment works at Malahide and there is potential interference to third party property rights but further design development and technical and construction related solutions will seek to minimise this.

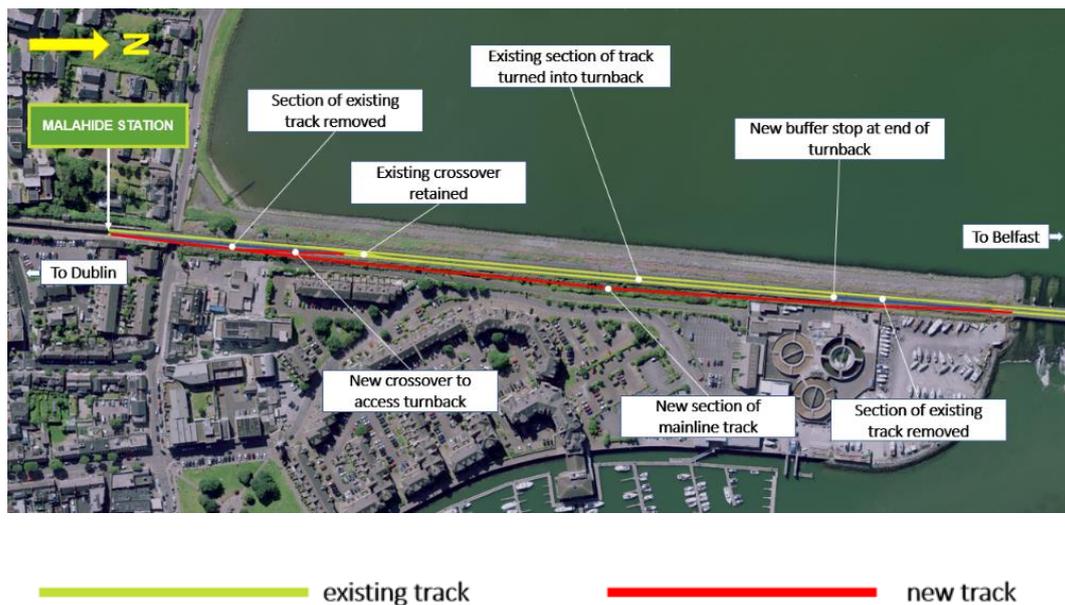


Figure ES-5: Schematic of Emerging Preferred Option around Malahide Station (Source: OSI aerial imagery)

ES1.9 Works around Clongriffin Station

The works at Clongriffin Station comprise of track modification which are essential to facilitate the increase in train services by allowing trains to be turned back clear of continuing services on separate tracks.

The Emerging Preferred Option is to introduce a new loop to serve a platform to the east side of the station, within the existing railway corridor. It is proposed to use the platform face that was constructed when the station was originally built but is not currently served by any tracks (see **Figure ES-6**).

Modifications will be made to the track alignment to the south of the station to allow trains to access the new platform. New OHLE and signalling installations, as well as modifications to the existing systems, will be required.

Based upon the level of information at the current concept design stage for Public Consultation No. 1, the development areas to the east may be temporarily affected during construction. Technical and construction methodologies related solutions will seek to minimise these in subsequent design stages.

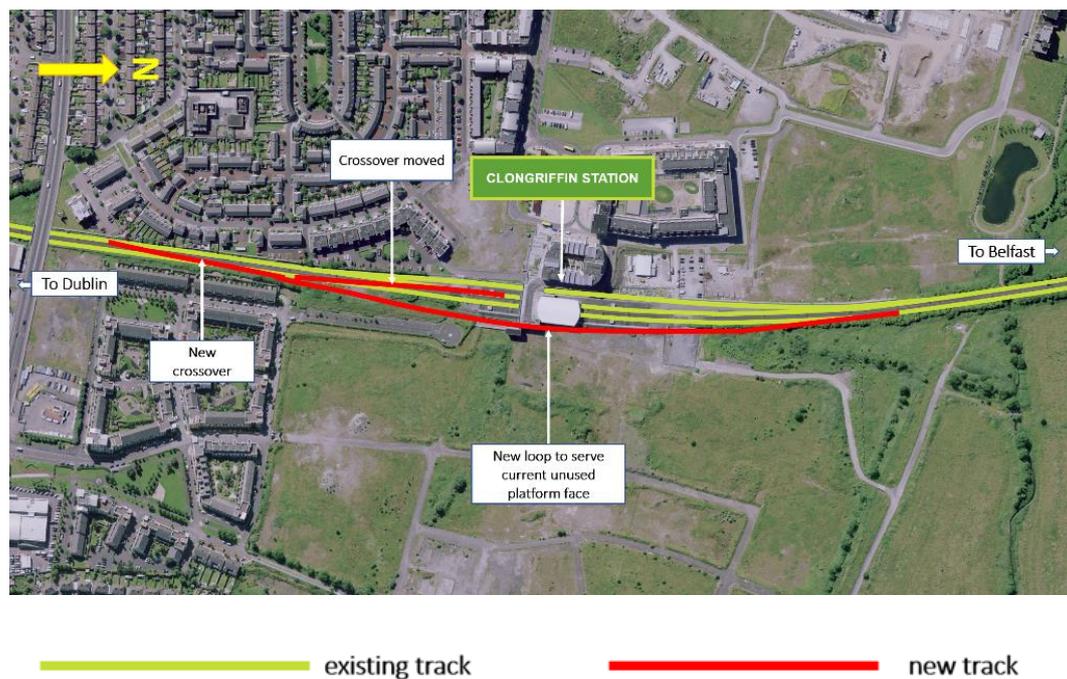


Figure ES-6: Aerial view of Emerging Preferred Option around Clongriffin Station
(Source: OSI aerial imagery)

ES1.10 Works around Howth Junction & Donaghmede Station

To achieve the peak capacity increases proposed by the DART+ Programme, the DART+ Coastal North project will seek a reconfiguration of Howth Junction & Donaghmede Station to enable the use of a shuttle service on the Howth Branch. By removing crossing conflicts at Howth Junction, a shuttle DART operation between Howth and Howth Junction & Donaghmede Stations will maximise frequency and reliability on the Northern Line. The interchange at Howth Junction & Donaghmede Station will be facilitated by an increase in Northern Line stopping trains from 6 to 11. The removal of crossing conflicts at Howth Junction will also result in a more frequent and reliable Howth DART service at every ten minutes each way, with a change at Howth Junction to access the Northern Line. This would represent an increase to a maximum of six trains per hour per direction from the current three. Final operational decisions will be made subject to demand requirements and assessment.

The Emerging Preferred Option at Howth Junction & Donaghmede Station involves extending the existing Platform 2 to allow the platform to be used by services from Howth without impacting on services running along the Northern Line (see **Figure ES-7**). Modifications will be made to track to include a new crossover east of the platforms. Alterations to existing OHLE, signalling and telecoms will also be required.



Figure ES-7: Aerial view of Emerging Preferred Option around Howth Junction & Donaghmede Station (platform extension in orange) (Source: OSI aerial imagery)

ES1.11 Howth Branch Level Crossings

There are four level crossings located on the Howth Branch, as listed below:

- Baldoyle Road Level Crossing;
- Sutton Level Crossing;
- Cosh Level Crossing;
- Claremont Level Crossing.

Initial assessment of the four existing level crossings along the Howth Branch has indicated that these level crossings can continue to operate while still providing a more efficient service overall.

Further survey data will be collected to validate the model and assumptions, including additional traffic count surveys and observed level crossing operational data. This information will be used to establish if the proposal to keep the level crossings in operation is feasible, or if more significant interventions are required at the crossing.

ES1.12 Further design development & option selection

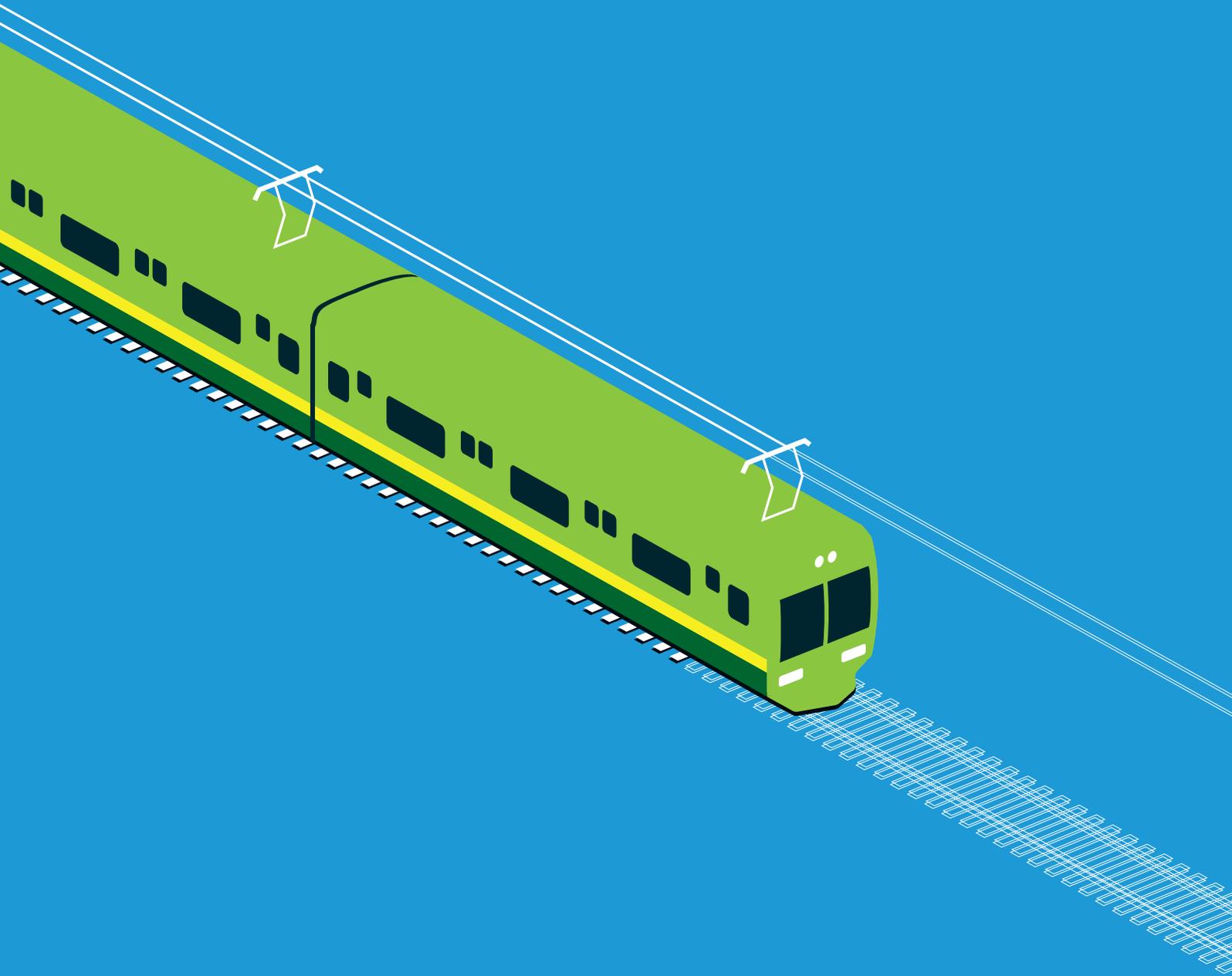
The preliminary option selection and design development that has been undertaken has led to the determination of the Emerging Preferred Option, which is now the focus of public consultation. Following public consultation, all gathered feedback will be reviewed and considered by the project team to inform the next stage of the design development.

Designs will also be informed by further technical and environmental surveys and investigations, as well as consultations with property owners and other stakeholders. This will lead to the development of the Preferred Option, which will be presented to the public at Public Consultation No. 2.

All information gathered by the project team will be used to inform the design development of the project which will be the subject of the Environmental Impact Assessment and Appropriate Assessment (if required), and ultimately the Railway Order application which will be submitted to An Bord Pleanála.

Section 1

Introduction



1 Introduction

1.1 Purpose of the report

The purpose of this report is to summarise the early concept level design work undertaken to date in respect of the DART+ Coastal North project, and in particular to explain the preliminary option selection process that has led to the identification of the Emerging Preferred Option.

The main elements of the project for which options have been considered are:

- Electrification of the railway from Malahide to Drogheda – including installation of Overhead Line Equipment (OHLE), e.g. foundations, masts and wires, associated re-signalling and telecommunications works, and modifications and upgrades to existing depots;
- Track works – e.g. provision of turnback facilities to enhance train service capacity by allowing trains to be turned back clear of continuing services on separate tracks;
- Bridges – e.g. modifications to existing structures (overbridges, underbridges, etc.) to achieve the necessary clearances for electrification, to facilitate the installation of OHLE.

The report draws together work undertaken to date by the Project Team and:

- Explains the need for the project and the policy context for the DART+ Programme;
- Presents and evaluates the information gathered to date in relation to technical and environmental constraints along the DART+ Coastal North rail corridor;
- Provides a summary of relevant findings to date with reference to technical reports and associated drawings;
- Identifies feasible options that have been developed to date;
- Considers the options and identifies the Emerging Preferred Option.

1.2 Status of information within this report

This report presents the Emerging Preferred Option for DART+ Coastal North for the purposes of ongoing technical and environmental analysis, as well as consultation and engagement with the public and potentially affected property owners. In this regard, the Emerging Preferred Option will continue to be analysed and refined based on the feedback received from the public consultation. This ongoing work will inform the Preferred Option, which will be published as part of Public Consultation No.2 (PC2) when additional surveys and assessments such as ground investigation and topographic and utility surveys have been completed. The information presented to the public and stakeholders as part of this public consultation (Public Consultation No. 1) is at a concept design level, reflecting the early stage of design that the project is at. Accordingly, not all design detail or

construction requirements are known at this time; these will become available as the project moves forward into preliminary and detailed design phases.

The purpose of presenting this Preliminary Option Selection Report at this stage of the project is to show the public the current status of the option selection process, the methodology that has been followed to identify the Emerging Preferred Option and to assist in eliciting feedback. As part of the public consultation process, the public will be invited to make observations on the current design proposals for consideration by the Project Team.

1.3 Structure of the Report

This Preliminary Option Selection Report and related material is presented in a manner consistent with how it is presented on the DART+ Programme website www.dartplus.ie:

- Executive Summary;
- Main Report (this report);
- Annex 1 – Emerging Preferred Option Maps;
- Annex 2 – Policy Context and Useful Links;
- Annex 3 – Technical Reports.

1.3.1 Report Annexes

This report is supported by a series of maps that illustrate the Emerging Preferred Option. The study area of the project extends from just north of the Tolka River to Drogheda MacBride Station and has been divided into 37 maps. The Annex reference, map title and area of the railway corridor covered by each map is set out in **Table 1-1**.

Table 1-1: Annex 1: Emerging Preferred Option maps

Annex Reference	Title	Area Covered
1.0	Emerging Preferred Option - Key Plan Map	Key Plan
1.1	Emerging Preferred Option - Map 01 of 37	Clontarf Road Station and surrounds
1.2	Emerging Preferred Option - Map 02 of 37	Killester Station and surrounds
1.3	Emerging Preferred Option - Map 03 of 37	Harmonstown Station and surrounds
1.4	Emerging Preferred Option - Map 04 of 37	Kilbarrack Station and surrounds
1.5	Emerging Preferred Option - Map 05 of 37	Howth Junction & Donaghmede Station and surrounds

Annex Reference	Title	Area Covered
1.6	Emerging Preferred Option - Map 06 of 37	Bayside Station and surrounds
1.7	Emerging Preferred Option - Map 07 of 37	Sutton Station and surrounds
1.8	Emerging Preferred Option - Map 08 of 37	Burrow Road and surrounds
1.9	Emerging Preferred Option - Map 09 of 37	Howth Station and surrounds
1.10	Emerging Preferred Option - Map 10 of 37	Clongriffin Station and surrounds
1.11	Emerging Preferred Option - Map 11 of 37	Portmarnock Station and surrounds
1.12	Emerging Preferred Option - Map 12 of 37	South Malahide and surrounds
1.13	Emerging Preferred Option - Map 13 of 37	Malahide Station and surrounds
1.14	Emerging Preferred Option - Map 14 of 37	Malahide Viaduct and surrounds
1.15	Emerging Preferred Option - Map 15 of 37	South Donabate and surrounds
1.16	Emerging Preferred Option - Map 16 of 37	Donabate Station and surrounds
1.17	Emerging Preferred Option - Map 17 of 37	Rogerstown and surrounds
1.18	Emerging Preferred Option - Map 18 of 37	Rush and Lusk Station and surrounds
1.19	Emerging Preferred Option - Map 19 of 37	Tyrrelstown and surrounds
1.20	Emerging Preferred Option - Map 20 of 37	Baldongan and surrounds
1.21	Emerging Preferred Option - Map 21 of 37	Skerries Golf Club and surrounds
1.22	Emerging Preferred Option - Map 22 of 37	Skerries Station and surrounds
1.23	Emerging Preferred Option - Map 23 of 37	Barnageeragh and surrounds
1.24	Emerging Preferred Option - Map 24 of 37	Barnageeragh Bay and surrounds
1.25	Emerging Preferred Option - Map 25 of 37	Hampton Cove and surrounds
1.26	Emerging Preferred Option - Map 26 of 37	Balbriggan Station and surrounds

Annex Reference	Title	Area Covered
1.27	Emerging Preferred Option - Map 27 of 37	Bremore Bay and surrounds
1.28	Emerging Preferred Option - Map 28 of 37	Gormanston Viaduct and surrounds
1.29	Emerging Preferred Option - Map 29 of 37	Gormanston Station and surrounds
1.30	Emerging Preferred Option - Map 30 of 37	Mosney and surrounds
1.31	Emerging Preferred Option - Map 31 of 37	Laytown Viaduct and surrounds
1.32	Emerging Preferred Option - Map 32 of 37	Laytown Station and surrounds
1.33	Emerging Preferred Option - Map 33 of 37	Pilltown Road and surrounds
1.34	Emerging Preferred Option - Map 34 of 37	Pilltown and surrounds
1.35	Emerging Preferred Option - Map 35 of 37	South Drogheda and surrounds
1.36	Emerging Preferred Option - Map 36 of 37	Drogheda MacBride Station and surrounds
1.37	Emerging Preferred Option - Map 37 of 37	Drogheda MacBride Station to Platin Road

There are several key background reports that provide the policy context, objectives, and requirements for the DART+ Programme and for the DART+ Coastal North project. These documents and useful websites are provided in **Table 1-2**.

Table 1-2: Annex 2: Supporting Material

Annex Reference	Title	Detail
2.1	Policy Context	This presents a detailed review of the European, National, Regional and Local policy context for the DART+ Programme and the DART+ Coastal North project
2.2	Useful Links	A list of links to publicly available documents or websites referred to in this report

The scope of work for the DART+ Coastal North project covers a number of interventions on the Northern Line needed to improve the frequency of train services between Connolly and Drogheda and meet the project objectives and requirements – see section 3.2 and 3.3. To appropriately assess options, the scope of the work has been split into separate work packages, as detailed in the separate sub-annexes (technical studies) of Annex 3 shown in **Table 1-3**.

Table 1-3: Annex 3: Technical Reports

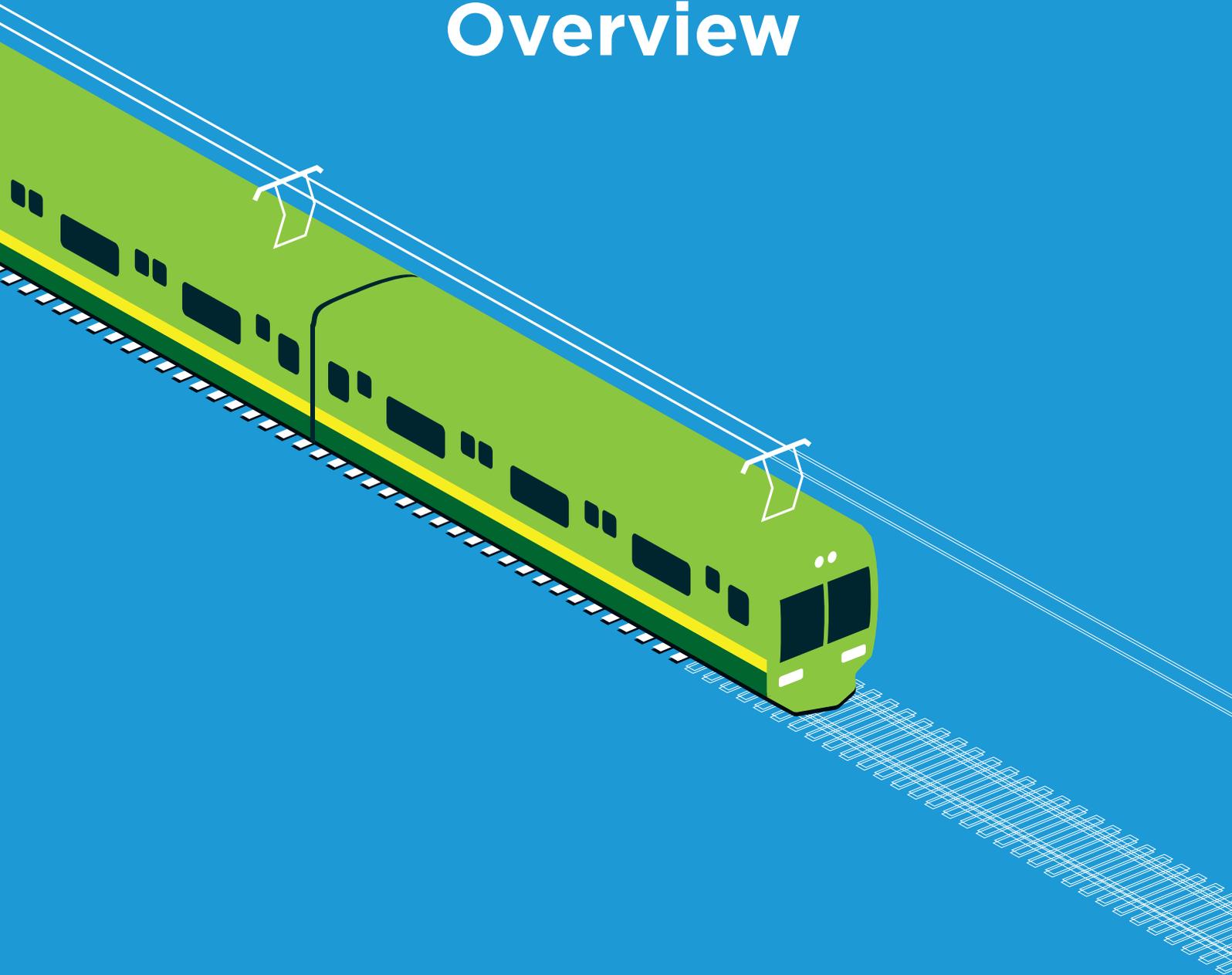
Annex Reference	Title	Description
3.1	Constraints Report	<p>This report reviews the DART+ Coastal North constraints in the following topic areas and includes constraints mapping:</p> <ul style="list-style-type: none"> • Traffic and transportation • Landscape and visual • Archaeology and cultural heritage • Architectural heritage • Noise and vibration • Air quality and climate • Material assets • Population and human health • Land and soils • Water resources • Biodiversity
3.2	Technical Optioneering Report: Electrification of the Northern Line between Malahide and Drogheda	<p>The Technical Optioneering Report for the Electrification of the Northern Line between Malahide and Drogheda. The report is divided into a series of sections covering the following aspects of the electrification:</p> <ul style="list-style-type: none"> A) OHLE system B) OHLE foundation solutions C) OHLE support solutions at underbridges D) Bridge parapet modifications for OHLE E) OHLE bridge clearance works

Annex Reference	Title	Description
		<p>F) Traction power supply (will form part of Public Consultation 2)</p> <p>G) User worked level crossing south of Donabate</p> <p>H) Fencing and lineside safety</p>
3.3	Technical Optioneering Report: Works around Drogheda MacBride Station	The Technical Optioneering Report for Works around Drogheda MacBride Station. The report addresses track and station modifications to allow for the increased number of DART services.
3.4	Technical Optioneering Report: Works around Malahide Station	The Technical Optioneering Report for Works around Malahide Station. The report addresses track modifications required to allow trains to be turned back clear of through running services.
3.5	Technical Optioneering Report: Works around Clongriffin Station	The Technical Optioneering Report for Works around Clongriffin Station. The report addresses track modifications required to allow trains to be turned back clear of through running services.
3.6	Technical Optioneering Report: Works around Howth Junction & Donaghmede Station	The Technical Optioneering Report for Works around Howth Junction & Donaghmede Station. The report addresses modifications to the station to meet the planned increase of train services.
3.7	Technical Optioneering Report Howth Branch Level Crossings	The Technical Optioneering Report for the Howth Branch Level Crossings. The report addresses the impacts of all proposed increases in train

Annex Reference	Title	Description
		frequency on existing level crossings on the Howth Branch.

Section 2

DART+ Programme Overview



2 DART+ Programme Overview

The DART+ Programme is a transformative railway investment programme that will deliver a high quality and integrated public transport system within the Greater Dublin Area (GDA). The DART+ Programme will both modernise and improve existing rail services in the GDA, providing a range of benefits for both the residents of the GDA itself, as well as those living in surrounding regions.

The DART+ Programme will play a significant role in contributing to Ireland’s transition to a low carbon and climate resilient society by providing a sustainable, electrified, reliable and more frequent rail service with improved capacity to meet current and future demands. This will be achieved through the modernisation of existing railway corridors and by utilising electric powered trains in place of diesel trains.

The existing, electrified DART network extends from Malahide to Greystones (including the Howth Branch) over a length of approximately 50km. The DART+ Programme will seek to increase the length of high capacity and electrified network to 150km across the four main rail corridors within the GDA.

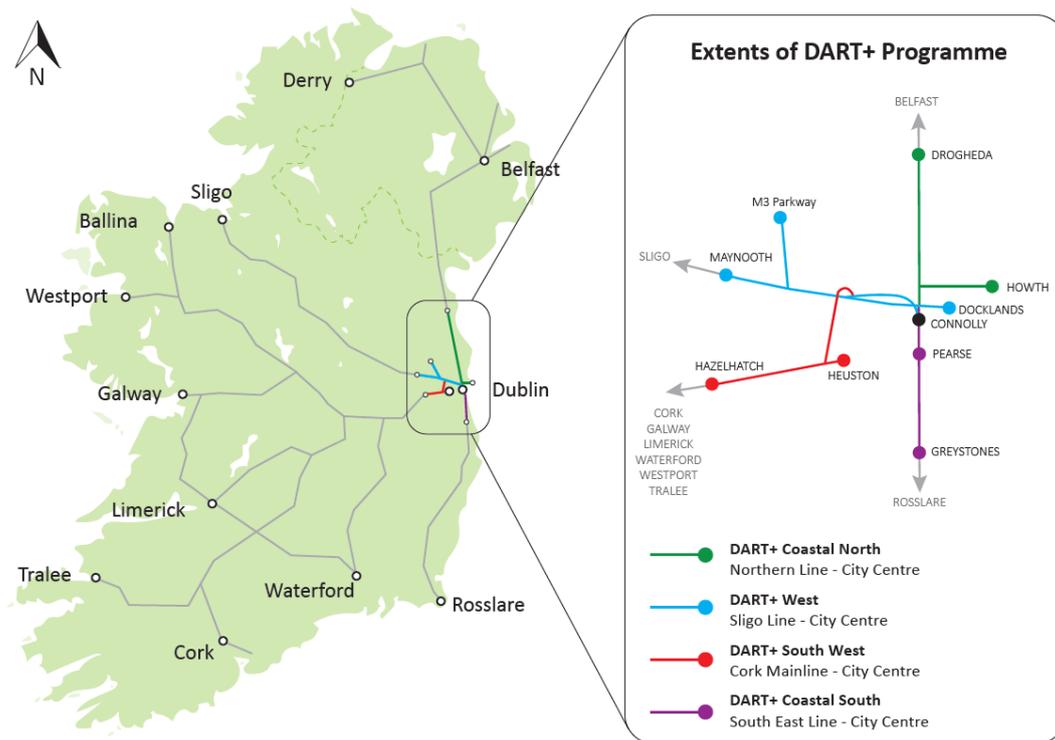


Figure 2-1: Schematic of Overall DART+ Programme

This modernisation includes the electrification, re-signalling and certain interventions to remove constraints across the four main rail corridors within the GDA, as follows:

- **DART+ Coastal North (this project)** – circa 50km, extending from Drogheda to Dublin City Centre (north of Connolly Station).

- DART+ Coastal South – circa 30km, extending from Greystones to Dublin City Centre.
- DART+ West – circa 40km, extending from Maynooth and M3 Parkway stations to Dublin City Centre.
- DART+ South West – circa 16km, extending between Hazelhatch & Celbridge Station and Heuston Station and also circa 4km between Heuston Station and Glasnevin, via the Phoenix Park Tunnel Branch Line.

As part of the DART + Programme, Iarnród Éireann is purchasing a new fleet of trains to enhance the capacity on the DART network. This procurement will allow Iarnród Éireann to choose a fleet made up of Electric Multiple Units (EMUs) and Battery Electric Multiple Units (BEMUs). The provision of BEMUs will allow for running enhanced services on the network in advance of full electrification. These BEMU works will be delivered under a separate project and the increase in service levels provided will be in advance of the electrification under the DART+ Coastal North project.

The DART+ Programme is a key component in the national public transportation network. It will provide a high-capacity transit system for the GDA, improved connectivity to outer regional towns, and a greater level of integration with other public transport systems and active travel infrastructure, benefiting all current and future users of public transport. The delivery of the DART+ Programme will encourage a modal shift away from private car usage towards public transport. This transition will be achieved through the provision of a more reliable, frequent and accessible rail service.

The DART+ Programme will provide enhanced, greener public transport to communities along the DART+ Programme routes, delivering economic and societal benefits for current and future generations. The expected reduction in road traffic congestion resulting from the DART+ Programme, especially during peak traffic periods, will contribute to a more sustainable transport system within the GDA and surrounding regions.

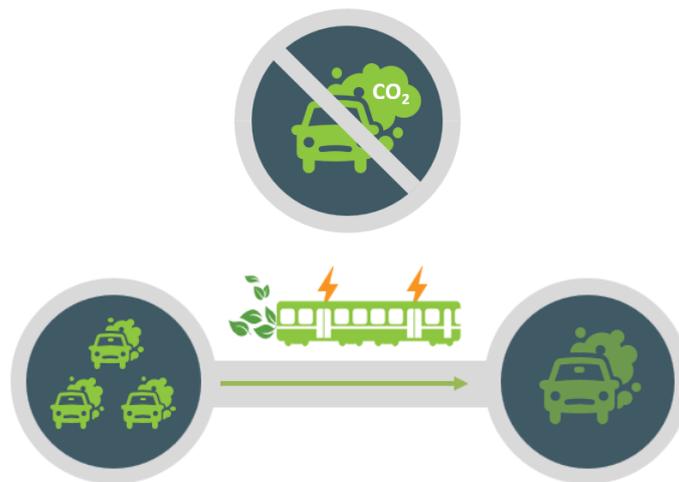
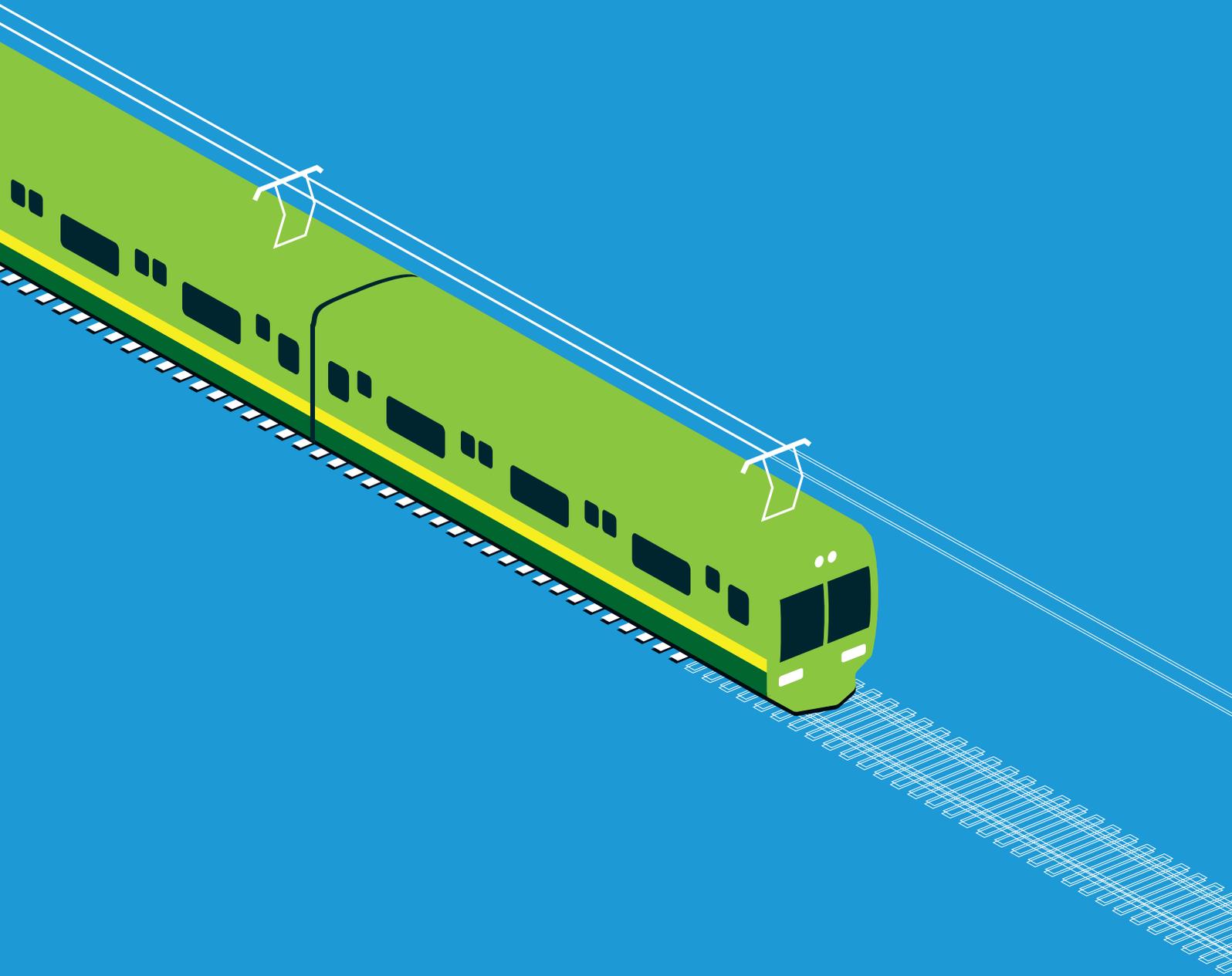


Figure 2-2: Reduced congestion leading to reduction in CO₂ emissions

Section 3

Need, Strategic Fit



3 Need, Strategic Fit

3.1 Need for DART+

The section sets out the need for the DART+ Programme and, specifically, the DART+ Coastal North project.

To Facilitate Growth in Demand

At the end of 2019, the existing heavy rail network within the GDA was operating at, or near, full capacity. Passenger numbers are expected to return to pre-Covid levels and there is a continuous growth in demand for a higher frequency, higher capacity, rail service. This is fuelled by an increase in the population along public transportation corridors in line with current government policy. The increase in demand is expected to continue in the coming years as the populations in towns and suburbs such as Drogheda, Bettystown, Malahide, Portmarnock, and Clongriffin continue to expand. The delivery of the DART+ Programme is required to meet and cater for this projected growth in demand.

Limited frequency and capacity not only affects the viability of the DART service as a genuine transport option in the eyes of local communities but also limits the potential growth of new communities along the corridor.

To promote a modal shift from unsustainable private car usage to public transport, higher frequency and higher capacity services must be provided to ensure convenient and viable alternatives are available for road users. The DART+ Coastal North project will increase train frequency as shown in **Figure 3-6**.

To play an important part in achieving environmental targets

In 2020, the Environmental Protection Agency (EPA), reported that the transport sector was responsible for 17.9% of Ireland's greenhouse gas emissions. In addition to this, private passenger cars were responsible for 59% of all road transport emissions. The recently published Climate Action Plan 2021 calls for a significant cut in transport emissions by 2030 through measures including:

- 500,000 extra walking, cycling and public transport journeys per day by 2030;
- All replacements for bus and commuter rail vehicles and carriages to be low or zero carbon by 2030.

The delivery of the DART+ Programme will help to achieve national decarbonisation targets by providing a highly efficient mass transit system with relatively low emissions that can encourage a modal shift away from the private car and towards greener public transport.

Investment in a more modern DART fleet and in an improved and extended electrified rail network will also reduce the current dependency on diesel trains, reducing associated greenhouse gas emissions and assisting in the decarbonisation of the transport sector, enabling an overall reduction of CO₂ emissions by 2050 in line with Government targets.



Figure 3-1: Contribution to achieving Environmental Targets

To support economic and population growth

The GDA is expected to see a significant growth in population based on the Central Statistics Office’s (CSO) Regional Population Projections 2017-2036, which predicts that the population of Dublin could potentially increase by 31.9% by 2036. This, coupled with the expectation that the need for people to travel into Dublin City for employment will continue to grow, has led to Project Ireland 2040 promoting the development of higher density developments along transport corridors to promote a sustainable compact urban form.

The DART+ Programme will support land use policy allowing for these high-density developments along the railway corridors, as well as delivering high quality and efficient transport required to reduce congestion along commuter routes and support the wider movement of the workforce within the GDA.

The DART+ Programme will bring fast, frequent, reliable, and sustainable transport to existing communities along existing rail corridors, making it easier to travel for work, education, or leisure purposes. It will also facilitate the development of new communities that will greatly benefit from the connectivity that the DART+ Programme will deliver.



Figure 3-2: DART+ Coastal North supporting economic and population growth

To encourage and enable a modal shift

Within the GDA, the highest levels of car dependency are evident around the outer edge of the Metropolitan area and in peri-urban fringe locations, where more than 7 in 10 people drive to work. Without the provision of public transport, this dependency on private car usage is expected to increase year on year with knock on negative effects on society, the environment, and the economy.

Through the creation of an attractive and well-integrated transport system, the DART+ Programme will encourage and enable a modal shift in people’s choice of travel. The provision of trains with higher frequency and capacity, greater reliability, improved customer experience, and improved integration with public transport services within the wider network will aim to appeal to those commuters

who currently sit in some of the heaviest congestion in the country during peak travel times.



Figure 3-3: Modal shift towards public transport

To modernise the railway

The upgrade of the Northern Line to include for additional turnback facilities at Drogheda MacBride, Malahide, Clongriffin and Howth Junction & Donaghmede stations will greatly improve the operational capacity of the railway line between Drogheda and Dublin City Centre by allowing the DART services to be terminated at the turnback facilities and allowing for the Intercity and Regional rail services to pass uninterrupted.

The modernisation of the DART fleet to allow for a significant reduction in the number of diesel fuelled trains in the eastern region will be a significant step towards modernising the existing rail network and a positive step towards a reduction in our CO2 emissions.

The DART+ Coastal North project will play a significant part in allowing the rail network within the GDA to both realise and maximise the potential that exists within the existing rail system to the benefit of the GDA.

To enable compact growth

Compact growth is identified as a National Strategic Outcome in the National Development Plan. For compact growth to be effective within the GDA, it will be necessary to provide support for the ambition and policy for long term concentrated developments along established population centres dependent on the provision of attractive public transport facilities. The DART+ Programme will form a key component in this development and will help to ensure the impact of land-use planning is maximised.

It is evident that focusing development along railway corridors and providing higher densities at key transport nodes to create a compact urban form will increase the viability of public transport facilities, combat unnecessary urban sprawl, and reduce the unsustainable reliance on private car transportation. However, the public transport systems, as well as active travel links, must be in place for this to happen. The DART+ Programme will ensure a high capacity, integrated network is provided, enabling a more plan-led transport-oriented development (TOD) approach which is fully aligned with Ireland’s international and national policy positions, and with recent institutional developments in relation to active land

management by the State, as set out in Transport-Oriented Development: Assessing the Opportunity for Ireland (No. 148 June 2019). Refer to Annex 2.2 *Useful Links*.

Population growth and planned developments of significance along the extents of the Northern Line will benefit from the increased train frequency and greater train capacity provided by the DART+ Coastal North project. Road traffic congestion will be reduced as a result of the modal shift from these development areas, from private cars to public transport. The DART+ Coastal North project will allow for a greater volume of commuters to travel to Dublin City Centre in a more efficient and reliable way.



Figure 3-4: Encouraging Compact Growth

3.2 DART+ Programme objectives

The primary objective of the DART+ Programme is to support urban compact growth and contribute to the reduction of transport congestion and emissions in Dublin by enabling modernised high-quality commuter rail services between Dublin City Centre and the areas of Drogheda, Maynooth, Dunboyne, Celbridge and Greystones. This is aimed to provide a safe, sustainable, efficient, integrated, and accessible public transport service along these corridors.

Sub-objectives of the DART+ Programme include:

- Cater for existing heavy rail travel demand and improve customer services along established rail corridors in the GDA through the provision of a higher frequency, higher capacity, electrified heavy rail service which supports sustainable economic development and population growth.
- Improve accessibility to jobs, education, and other social and economic opportunities through the provision of improved inter-rail and inter-modal connectivity and integration with other public transport services.
- Enable further urban compact growth along existing rail corridors, unlock regeneration opportunities and more effective use of land in the GDA, for present and future generations.
- Deliver an efficient, sustainable, low carbon and climate resilient heavy rail network, which contributes to a reduction in congestion on the road network in the GDA and which supports the advancement of Ireland's transition to a lower emissions transport system and the delivery of Ireland's emission reduction targets.

- Provide a higher standard of customer experience, including the provision of clean, safe, quiet, modern vehicles and a reliable and punctual service with regulated and integrated fares.

3.3 DART+ Coastal North objectives & requirements

Below are the objectives for the DART+ Coastal North project:

- To deliver a higher frequency, higher capacity, reliable, electrified route to enable an increased DART service frequency between Drogheda and Dublin City Centre.
- To deliver solutions which improve the passenger experience where passenger infrastructure interventions are required to meet the Train Service Specification.
- To deliver a sustainable, low carbon and climate resilient design solution including making use of existing infrastructure where possible with targeted improvement works.
- To identify cost-effective solutions from a capital, operations, and maintenance perspective.
- To minimise adverse impacts on the natural and built environment associated with the construction, operation and maintenance of the project
- To minimise adverse impacts on existing rail services, road users and landowners associated with the construction, operation and maintenance of the project.
- To provide efficient and cost-effective integration of systems with the other DART+ Programme projects.

The delivery of the DART+ Coastal North project will clearly assist in meeting the DART+ Programme objectives to deliver a higher frequency, higher capacity electrified rail service between Dublin City Centre and Drogheda.

The requirements for the DART+ Coastal North project comprise technical and functional attributes derived from the objectives for the project. These requirements are:

General

- To design in accordance with IÉ Standards and relevant national and EU standards and guidelines.
- Designs shall comply with the Minimum Employer's Functional Requirements and meet the Train Service Specification

Electrification

- Electrification of the line from the end of the current electrified section at Malahide to Drogheda with 1500V DC overhead.
- Provision of an appropriate number of substations to support electrification.
- Undertake necessary infrastructure change to achieve the clearances required for electrification at bridges and structures.

- Undertake safety improvements resulting from the introduction of 1500V DC Overhead.

Howth Junction & Donaghmede

- Provision of new turnback infrastructure at Howth Junction & Donaghmede Station which will meet the Train Service Specification.
- Maintain provision for through running from Connolly to the Howth Branch Line.

Howth Branch

- To provide an appropriate level of accessibility across the Howth Branch level crossings whilst providing a safe, reliable solution which allows the Train Service Specification to be met.

Turnback at Clongriffin

- Provision of appropriate new turnback infrastructure at Clongriffin which will meet the Train Service Specification.

Turnback at Malahide

- Provision of new turnback infrastructure at Malahide which will meet the Train Service Specification.
- To take cognisance of the planned Broadmeadow Way Greenway and not to do anything which would preclude the construction of the Greenway.

Turnback at Drogheda

- Provision of new turnback infrastructure at Drogheda MacBride Station which will meet the Train Service Specification.
- To allow for continued movements of freight traffic to and from the Drogheda freight sidings.
- Provide DART rolling stock stabling within the Drogheda area as per the DART+ stabling strategy.

Modifications at Fairview depot

- To determine and provide the infrastructure, maintenance, and servicing facilities necessary for the new DART+ Fleet.

Modifications at Drogheda depot

- To determine and provide the infrastructure, maintenance, and servicing facilities necessary for the new DART+ Fleet.

Northern Line Level Crossings

- To close the user worked level crossing (XB001) in order to deliver the Train Service Specification and replace with appropriate relief infrastructure if necessary.

Signalling and Telecoms

- To provide signalling and telecoms systems to support the Train Service Specification.

3.4 Policy Context

The DART+ Coastal North project has been assessed for its strategic fit in relation to European, national, regional and local policy. A list of the policy documents which have been reviewed can be found below in **Table 3-1**.

Table 3-1 List of policy documents

European Policy
Trans-European Network for Transport (TEN-T)
National Policy
Project Ireland 2040: National Planning Framework (NPF)
National Development Plan 2021-2030 (NDP)
Department of Transport: Statement of Strategy 2021-2023
Building on Recovery: Infrastructure and Capital Investment 2016-2021
Climate Action Plan 2021
Regional Policy
Eastern & Midland Regional Assembly, Regional Spatial and Economic Strategy (RSES) 2019-2031
Transport Strategy for the Greater Dublin Area 2016-2035
Local Policy
Dublin City Development Plan 2016-2022
Clongriffin-Belmayne Local Area Plan
Fingal County Development Plan 2017-2023
Baldoyle-Stapolin Local Area Plan 2013
Portmarnock South Local Area Plan 2013
Donabate Local Area Plan 2016
Meath County Development Plan 2021-2027
East Meath LAP 2014-2020
Louth County Development Plan 2021-2027

Key objectives from European and national policy which the DART+ Coastal North project is in alignment with includes the following:

- The DART+ Coastal North project will promote a mobility that is efficient, safe, secure and environmentally friendly. It will allow for more efficient transportation along the east coast of Ireland, and encourage greater use of public transportation, reducing the dependency on car-based commuting. (TEN-T)
- The DART+ Coastal North project will, by providing a more efficient public transport infrastructure, make urban areas and zoned lands along the route more attractive areas in which to live and work in, encouraging *Compact Growth*. (NPF)
- The DART+ Coastal North project will promote *Sustainable Mobility* through the electrification of part of a busy public transportation route along the east coast of Ireland, expanding the range of public transport services available and reducing congestion and emissions. (NPF)

- The DART+ Coastal North project will help in the *Transition to a Low Carbon and Climate Resilient Society* by providing a more efficient public transport electric train service, encouraging less car-based travel and reducing carbon emissions. (NPF)
- The DART+ Coastal North project will contribute to achieving the national objective of transitioning to a competitive, low carbon, climate resilient and environmentally sustainable economy and society by 2050, as identified by *NDP Strategic Investment Priorities*.
- The DART+ Coastal North project is part of the overall *Infrastructure and Capital Investment* strategy to improve public transport in Ireland, along the east coast in particular.
- The DART+ Coastal North project will contribute to *Climate Action Plan* targets by expanding the electrified rail network, increasing public transport capacity, and providing a more efficient public transport route to encourage a modal shift.

Regional policy analysis has identified the following areas where the DART+ Coastal North project is in compliance:

- The DART+ Coastal North project will address Regional Policy Objectives (RSES) by facilitating *Sustainable Settlement Patterns* along the expanded electrification route, provide a more efficient public transport route to promote *Compact Growth and Urban Regeneration*, and achieve *Integrated Transport and Land Use* by facilitating access to currently underutilised locations.
- The DART+ Coastal North project fulfils the objectives of the Transport Strategy for the Greater Dublin Area by delivering the expansion of DART to Drogheda, and improving infrastructure for increased capacity of the existing system.

The DART+ Coastal North project is also in alignment with the following local policy:

- The DART+ Coastal North project aligns with Dublin City Development Plan policies and objectives, and the overall vision of enabling the growth of a more sustainable city with enhanced access to public transport facilities.
- The DART+ Coastal North project complements the aims and objectives of the Clongriffin-Belmayne LAP (including track interventions at Clongriffin Station) by enabling the development of a sustainable, mixed use urban quarter adjoining a high-quality public transport node.
- The DART+ Coastal North project complies with Fingal Development Plan vision and objectives by providing sustainable transport solutions, facilitate growth, and increase public transport capacity.

- The DART+ Coastal North project will help realise the vision and objectives of the Baldoyle-Stapolin LAP by providing a better service to the area, thereby encouraging the full development of the village and greater usage of the DART, leading to a more sustainable community.
- The DART+ Coastal North project will contribute to the sustainable development of Portmarnock South LAP lands by providing high-quality public transit in close proximity.
- The DART+ Coastal North project will help facilitate the development of Donabate LAP lands in a sustainable manner by extending the electrification of the network and support the continued growth of a vibrant and attractive town.
- The DART+ Coastal North project complies with the strategic vision and the specific policies of the Meath County Development Plan by supporting the development of compact settlements which are well served by public transport, and promoting sustainable land uses which minimise environmental impacts and encourage greater use of public transportation.
- The DART+ Coastal North project is consistent with the policies of the East Meath LAP by developing the “east coast rail line” and the electrification of this rail line extended to Drogheda.
- The DART+ Coastal North project supports the overall vision of the Louth County Development Plan, particularly in relation to the development of Drogheda as a Regional Growth Centre.

Through careful analysis of the aforementioned documents, it has been identified that the project is both compliant and complementary to all relevant policy. In providing a more efficient mode of public transportation, the DART+ Coastal North project is consistent with policy objectives relating to environmental, economic and social improvements. The project aims to cut carbon emissions, reduce reliance on private cars, improve accessibility for all, alleviate pressures on existing systems, promote regeneration and create opportunities for underutilised lands, and enable the growth of more sustainable urban centres.

The full policy analysis can be found in Annex 2.1 *Policy Context*.

3.5 DART+ Coastal North project

3.5.1 Overview

The DART+ Coastal North project is the third infrastructure project to launch as part of the DART+ Programme. The extents of the DART+ Coastal North project are presented in **Figure 3-5**.

The DART+ Coastal North project primarily involves the extension of the existing electrified rail network over circa 37km from Malahide to Drogheda, with associated re-signalling and modification of some low clearance overbridges to

accommodate the overhead line electrification system. There will also be modifications to existing depots at Drogheda and Fairview to support the new DART+ Fleet. As a principle, the project is seeking to contain works, insofar as possible, within the existing railway corridor; however, some infrastructure such as traction power substations will need to be constructed outside of the railway corridor where space cannot be found.

The project will provide the infrastructure to facilitate a significant increase to the rail capacity on the Northern Line between Dublin City Centre and Drogheda MacBride Station, including the Howth Branch, by implementing an extended electrified railway network with higher capacity and higher frequency DART trains. The DART+ Coastal North project will serve all existing stations along the railway corridor between Dublin City Centre and Drogheda, including those located on the Howth Branch, using electrical power that has a lower carbon footprint than existing diesel trains.

To achieve this increased capacity and enable a higher frequency of DART services, the DART+ Coastal North project will require track modifications, including the provision of turnback facilities at Malahide, Clongriffin and Howth Junction & Donaghmede stations. These modifications are essential to facilitate the increase in train services by allowing trains to be turned back clear of continuing services on separate tracks at Clongriffin and Malahide stations.

Works at Clongriffin involve the construction of some additional tracks to the east of the station. The original station construction anticipated this construction requirement and therefore it will have minimal impact on the station building/existing infrastructure.

Additional turnback tracks at Howth Junction & Donaghmede Station will allow for a higher frequency and a more reliable service. A platform extension will be constructed at Howth Junction & Donaghmede Station to provide direct access between services on the Howth Branch and southbound DART services to the city centre. Consideration will also be given to improvements to station facilities to provide a satisfactory customer experience.

At Drogheda MacBride Station the existing track and depot layout does not provide sufficient operational capacity to meet the planned increase in number of train services. Consequently, track and depot alterations are required, along with associated alterations to signalling, electrification, telecoms and structures. This includes the installation of a new platform.

To achieve the peak capacity increases proposed by the DART+ Programme, DART+ Coastal North will seek a reconfiguration of Howth Junction & Donaghmede Station to enable the use of a shuttle service on the Howth Branch. By removing crossing conflicts at Howth Junction, a shuttle DART operation between Howth and Howth Junction & Donaghmede Stations will maximise frequency and reliability on the Northern Line. The interchange at Howth Junction & Donaghmede Station will be facilitated by an increase in Northern Line stopping trains from 6 to 11. The removal of crossing conflicts at Howth Junction will also result in a more frequent and reliable Howth DART service at every ten minutes each way, with a change at Howth Junction to access the Northern Line. This would represent an increase to a maximum of six trains per hour per direction from the

current three. Final operational decisions will be made subject to demand requirements and assessment.

Initial assessment of the four existing level crossings along the Howth Branch has indicated that these level crossings can continue to operate while still providing a more efficient service overall.

Map Part B



Map Part A



Figure 3-5: DART+ Coastal North project extents

3.5.2 Capacity increases associated with DART+ Coastal North

The DART+ Coastal North project will improve performance and increase train frequencies in the AM and PM peaks along the full length of the Northern Line, providing enhanced capacity from the city centre to as far north as Drogheda. Customers will experience enhanced levels of service in both AM and PM peaks, and in both southbound and northbound directions. (Figure 3-6).

Additionally, in DART+ Coastal North the current AM and PM peak hours will become peak periods, with DART extending the proportion of the day it provides its maximum number of trains from 1 hour to 3 hours. This extension of enhanced peak service frequencies will take advantage of infrastructure enhancements and new rolling stock, providing more flexibility, comfort, and capacity to DART customers.

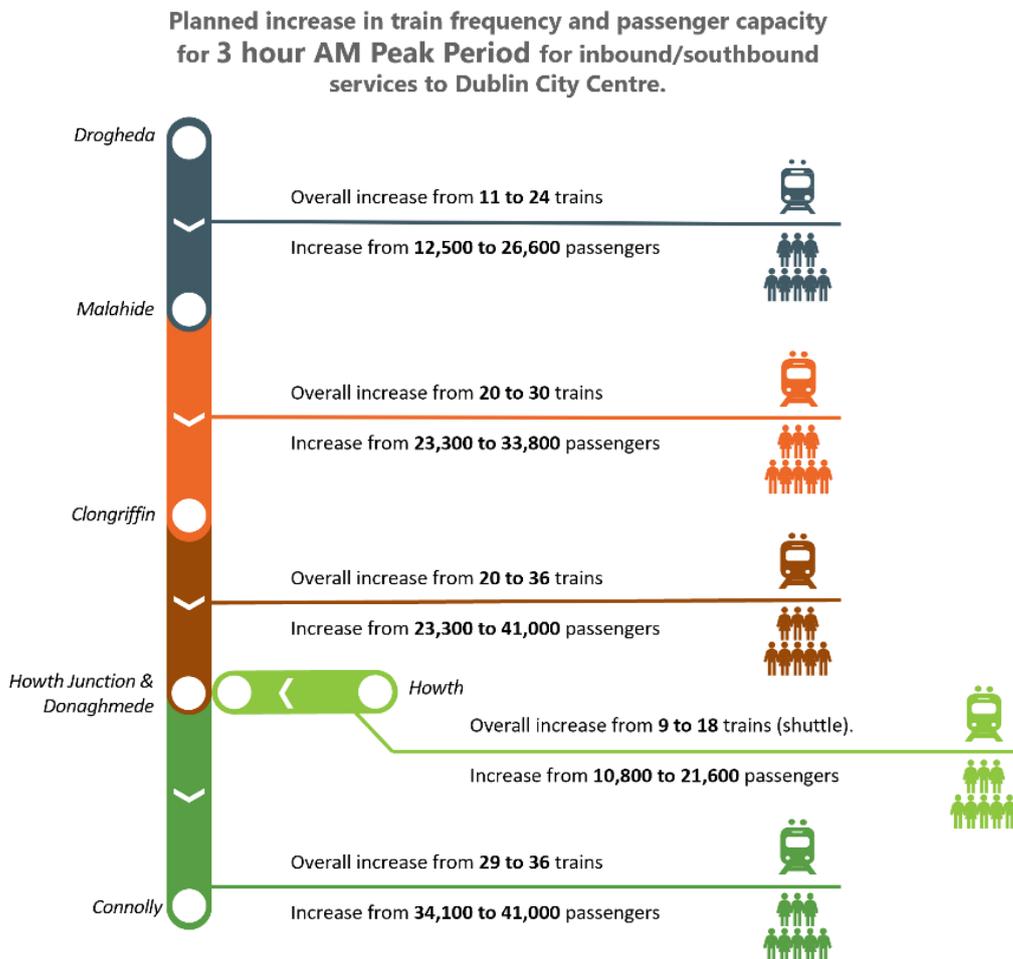


Figure 3-6: Services Capacity Increases during AM peak period

During a typical morning commute, a DART customer travelling can look forward to these enhanced frequencies starting an hour earlier and ending an hour later and similarly in the typical evening commute, a customer will benefit from the enhanced frequencies, starting an hour earlier and ending an hour later.

In addition to the improvements in the AM and PM peaks, DART+ Coastal North customers will also benefit from increases in the number of services operating throughout the day, outside the peak periods. During both peak and non-peak times, customers will benefit from enhanced reliability, with DART able to provide a service designed to incur fewer delays, and robust enough to recover from delays when they do occur.

Note that between the current timetable and the DART+ Coastal North project, Iarnród Éireann plans to purchase Battery Electric Multiple Units trains (BEMUs). The provision of these BEMUs will allow for the possibility of running enhanced services on the network in advance of full electrification. Iarnród Éireann identified the Northern Line as the most suitable route for BEMU deployment and Drogheda MacBride Station and depot area as the preferred charging location. These BEMU works will be delivered under a separate project and the increase in service levels provided will be in advance of the electrification under the DART+ Coastal North project. Accordingly, the increase in service level referred to in **Figure 3-6** compares DART+ Coastal North to service levels post implementation of the BEMU fleet.

3.5.3 Key infrastructural elements of DART+ Coastal North

The key infrastructural elements of DART+ Coastal North include:

- **Linear Works along the Northern Line to introduce electrification**
 - Extension of existing 1500V DC electrification, which currently terminates at Malahide, as far as Drogheda MacBride Station (approximately 37km). This entails the installation of foundations, masts and overhead wires, as well as the installation of new traction power substations to supply the required power and modified railway boundary fences to protect the public from coming into contact with the overhead line. These works take place alongside the existing railway corridor, predominantly in Iarnród Éireann-owned land with the exception of the substations;
 - Whilst the section of the Northern Line between Dublin City Centre and Malahide, inclusive of the Howth Branch, is already electrified, changes and upgrades to signalling equipment and associated power supply installations will be required in these areas to accommodate the proposed infrastructure works;
 - Undertaking improvements / modifications to bridges spanning the railway arising from track reconfigurations and/or electrical clearances to achieve necessary vertical and horizontal clearances;
 - Undertaking localised bridge modifications to enable OHLE to be fixed to bridges carrying the railway;
 - Modifications to existing depots at Drogheda and Fairview to support the new train fleet, including the provision of additional train stabling at Drogheda;
 - Drainage works, including surface water drainage and attenuation; and

- Any required landscaping in areas of intervention.
- **Infrastructure works to facilitate increase in service frequency and capacity**
 - These works will take place in specific areas of intervention as outlined below (from north to south).
 - Works around Drogheda MacBride Station;
 - Works to the existing user worked level crossing south of Donabate;
 - Works around Malahide Station;
 - Works around Clongriffin Station;
 - Works around Howth Junction & Donaghmede Station;
 - The works at existing stations entail modifications to existing tracks and platforms, as well as the addition of new tracks, where required, to stable and facilitate the turn back and through running of trains. These works are primarily located within existing railway land.

3.5.4 DART + Coastal North timeline

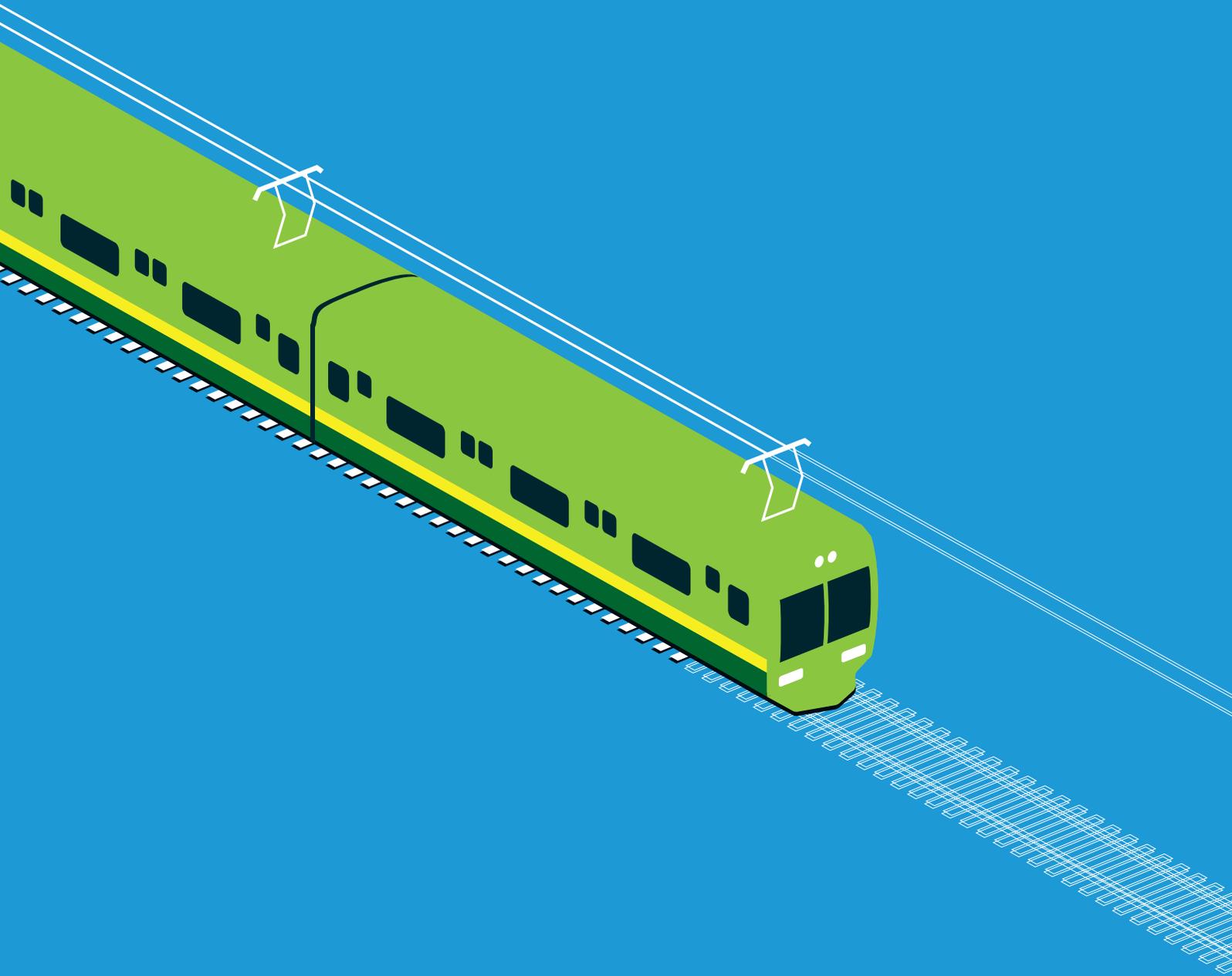
A high-level timeline for statutory approval process for the DART+ Coastal North project is set out in **Figure 3-7**. In addition to this, the construction relating to all proposed works is potentially expected to commence in 2024.



Figure 3-7: DART+ Coastal North Timeline for Approval Process and public consultation process

Section 4

Transport Analysis



4 Transport Analysis

4.1 Train Service Specification (TSS)

In 2018, the *DART-Expansion-Programme-Options-Assessment* (Oct 2018) by Jacobs and Systra recommended that the DART Expansion Programme (now the DART+ Programme) be delivered by enhancing the existing rail network in the short to medium term (Scheme Bundle 6). This recommendation followed modelling of the bundle options using the National Transport Authority's (NTA) Eastern Regional Model (ERM), which allowed for the performance and attractiveness of the bundles to be analysed by considering how transport demand is served by the rail system within a multi-modal network (i.e. including the public transport modes of rail, bus, Luas, Metro, as well as that of car, walking and cycling). Refer to Annex 2.2 *Useful Links* for a hyperlink to *DART-Expansion-Programme-Options-Assessment* (August 2018).

In 2018, the *DART-Expansion-Programme-Options-Assessment-Addendum* (August 2010) was published (also by Jacobs and Systra). It details the strategic modelling outputs of a revised Train Service Specification (TSS) Option 1 – Balanced City Centre Distribution of the preferred option (i.e. Scheme Bundle 6). Refer to Annex 2.2 *Useful Links* for a hyperlink to *DART-Expansion-Programme-Options-Assessment-Addendum* (June 2019).

Building on the work undertaken by Jacobs and Systra, the DART+ West Multi-disciplinary Consultant (MDC) undertook feasibility and robustness analysis to demonstrate whether the desired level of service is feasible / achievable, and the effects of each key element of the infrastructure on performance. The analysis provided a set of recommendations for further enhancements and considerations to improve the capacity of the network and obtain a more robust and predictable service pattern. The main outcome of the assessment is the definition of the TSS, which is the 'desired' number of train services to have on each branch of the DART network (i.e. trains per hour per direction (TPHPD)). The specific recommendation for the Northern Line is shown in **Figure 4-1**.

The TSS calls for increased service frequencies that are the same in both directions, as described in Section 3.5.2. Where there are existing DART services, nine DART services will operate in each direction to Clongriffin, with seven in each direction continuing on to Malahide. In peak hours, five DART services in each direction will extend north from the current terminus at Malahide to Drogheda MacBride Station. These will be accompanied by two DMU commuter services an hour from Dublin Connolly to Dundalk in each direction, stopping at all stations. During the peak period the TSS accommodates a further one intercity Enterprise service in each direction per hour between Dublin Connolly and Belfast, stopping only at Drogheda MacBride and Dundalk stations between Dublin and the border. On the Howth Branch, peak services will run as a shuttle between Howth and Howth Junction & Donaghmede stations, with frequencies doubling compared to existing service levels. In the TSS, train frequencies will become more regular, and peak periods will extend further throughout the day.

DART+ Coastal North has reviewed the analysis and it has been addressed in the design. Analysis of a range of specific infrastructure intervention possibilities has been undertaken at Clongriffin, Malahide, Howth Junction & Donaghmede, and Drogheda MacBride stations. Further confirmation of feasibility and robustness will take place at preliminary design phase, after the confirmation of infrastructure enhancements.

Feasibility and robustness analysis of the proposed infrastructure will include examining performance from both a site-specific (e.g. train turnback infrastructure) and linear (e.g. signalling improvements) perspective. This analysis is intended to provide assurance as to the ability of DART+ Coastal North's works to facilitate the planned increase in train services and may lead to further design refinements to increase performance.

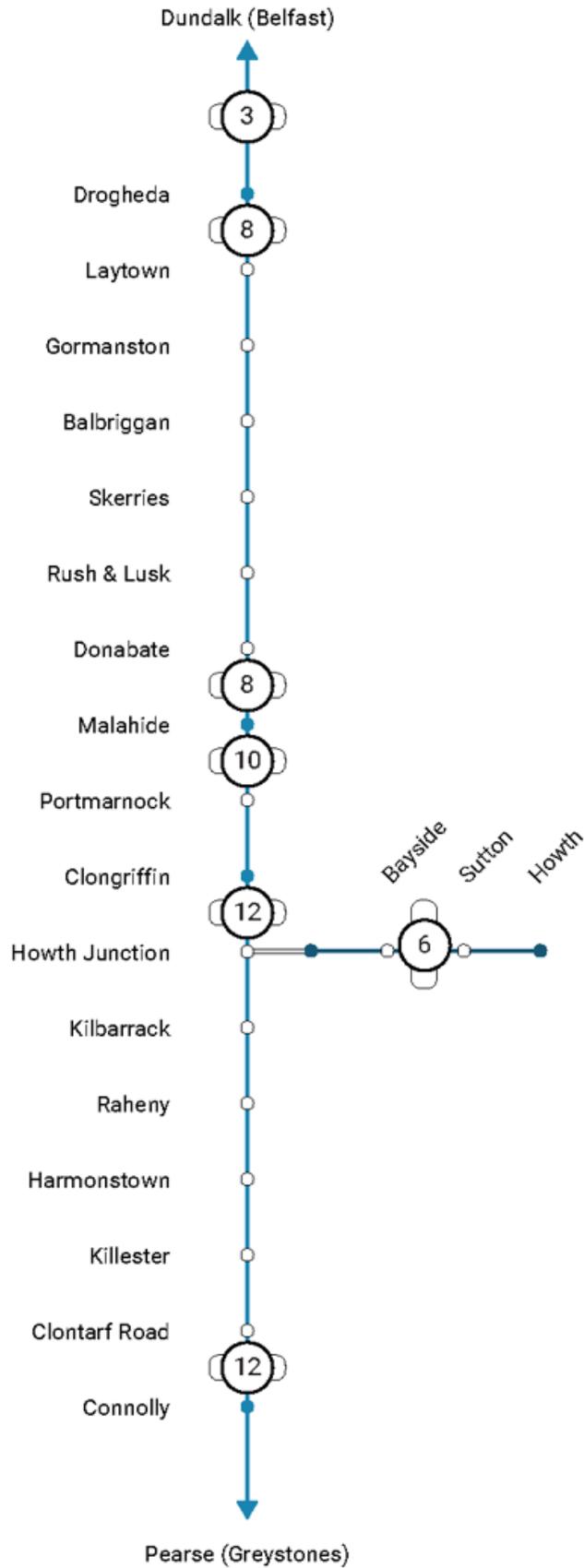


Figure 4-1: Number of trains per hour (Train Service Specification)

DART+ Coastal North will serve as a part of a highly integrated network and will directly interface with trains from DART+ South West and DART+ West in the East Wall Junction / Tolka River area. The critical city centre route section, starting at this point and going south to Pearse Station, is part of the DART+ West project and is therefore outside of the scope of the DART+ Coastal North project. Achieving the service goals of the DART+ Coastal North project that are set out in the train service specification will only be possible with a sufficient level of performance in capacity and reliability around this city centre area.

4.2 NTA Eastern Regional Traffic Model

The Eastern Regional Model (ERM) is one of five models that comprise the NTA's Regional Modelling System. The ERM covers the whole of Ireland with a focus on the counties within Leinster and the GDA. These areas are represented by 1,907 geographic zones, with travel between these areas and the rest of Ireland represented by 39 road route zones and 7 rail route zones. The base year of the model is 2016 and it represents an average weekday with five separate peak periods modelled:

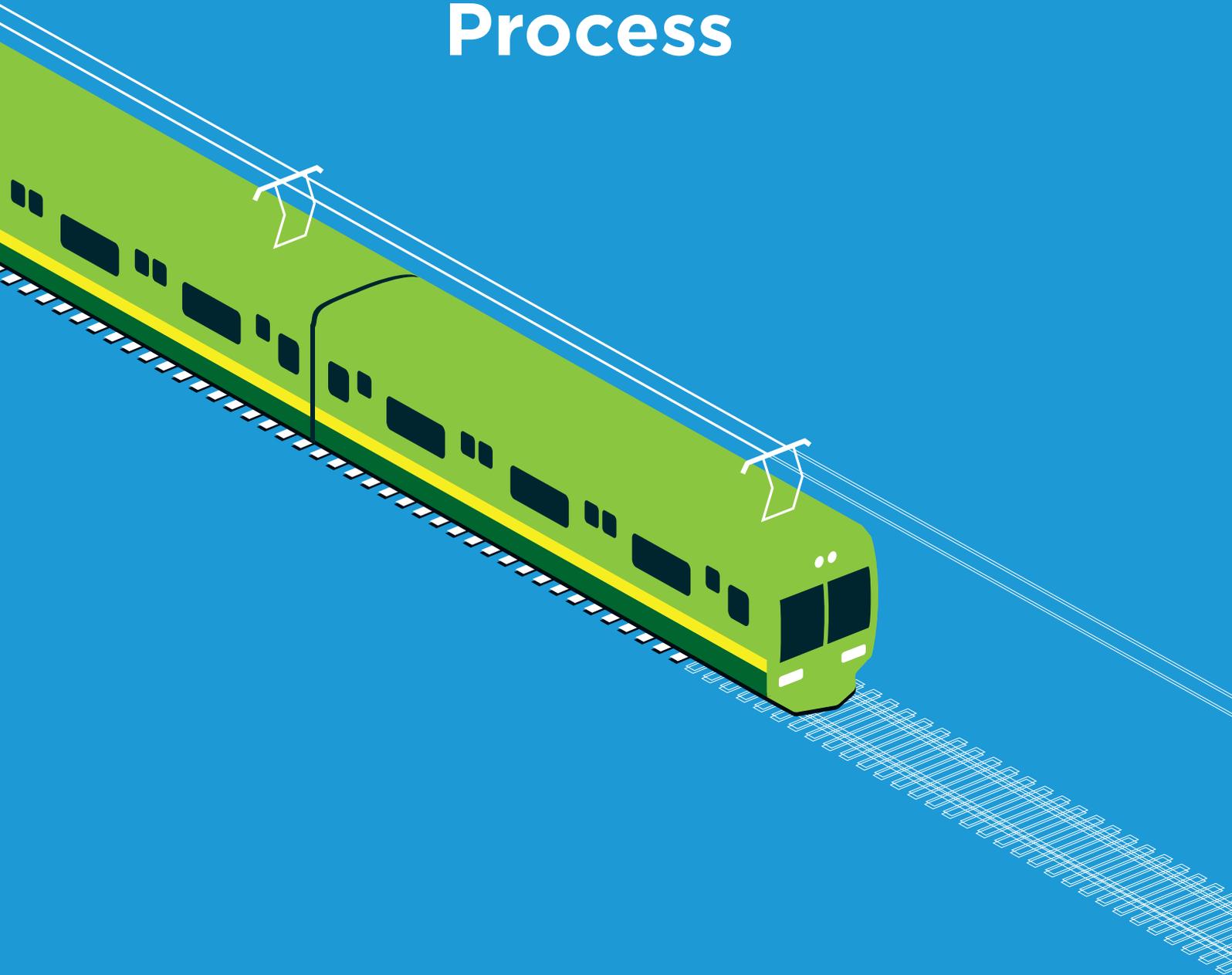
- AM peak (07:00-10:00);
- Morning Inter peak (10:00-13:00);
- Afternoon Inter peak (13:00-16:00);
- PM peak (16:00-19:00); and
- Off peak (19:00-07:00).

The model covers all surface access modes for personal travel and goods vehicles including private vehicles (taxis and cars), public transport (bus, rail, Luas, Bus Rapid Transit, Metro), active modes (walking and cycling) and goods vehicles (light goods vehicles and heavy goods vehicles).

The model is being used to carry out the demand modelling associated with the DART+ Programme. This work is currently being carried out by AECOM (on behalf of the NTA) and the output from the study will be used to update the transportation modelling for the DART+ Programme.

Section 5

Option Selection Process



5 Option Selection Process

5.1 Introduction

The primary purpose of this report is to present an early-stage characterisation of the option selection and decision-making process for the DART+ Coastal North project at the time of advancing the first round of public consultation.

A clearly defined appraisal methodology has been used in the selection of the Emerging Preferred Option for the project. Consistent with other Exchequer-funded projects, it is based on ‘Guidelines on a Common Appraisal Framework for Transport Projects and Programmes’ (CAF) published by the Department of Transport, Tourism, and Sport (DTTAS), March 2016 (updated 2020) and NTA /Iarnród Éireann’s Project Approval Guidelines. The process comprises a two-stage approach (if / as appropriate):

- **Stage 1** – Preliminary Assessment (Sifting); and
- **Stage 2** – Multi-Criteria Analysis (MCA)

Not all design features require option selection but are instead subjected to technical assessment only. Consequently, the two-stage approach is not applicable to all general works or interventions that require option selection. The following criteria have been used to scope out elements from a CAF MCA assessment:

- If the type of system to be used is solely governed by IÉ standards and specified by technical requirements, then the CAF/MCA process will not be utilised;
or
- If the type of design/systems to be used has no material effect on external parties, the public and/or environment, then the CAF/MCA process will not be utilised;
or
- If there is no material geographic difference between the options, then the CAF/MCA process will not be utilised

This section of the report provides an overview of these two stages. In keeping with the principles of the CAF Preliminary Appraisal approach, the purpose of Stage 1: Preliminary Assessment (Sifting) is to subject a range of options to a preliminary appraisal, before subjecting a smaller number of options to a more detailed Stage 2: Multi-Criteria Analysis (MCA). General works are required to modernise and electrify the existing railway line between Malahide and Drogheda as part of DART+ Coastal North. The emerging preferred options are interventions at specific locations and when combined with the general works forms the end-to-end emerging preferred option. Refer to **Figure 5-1**.

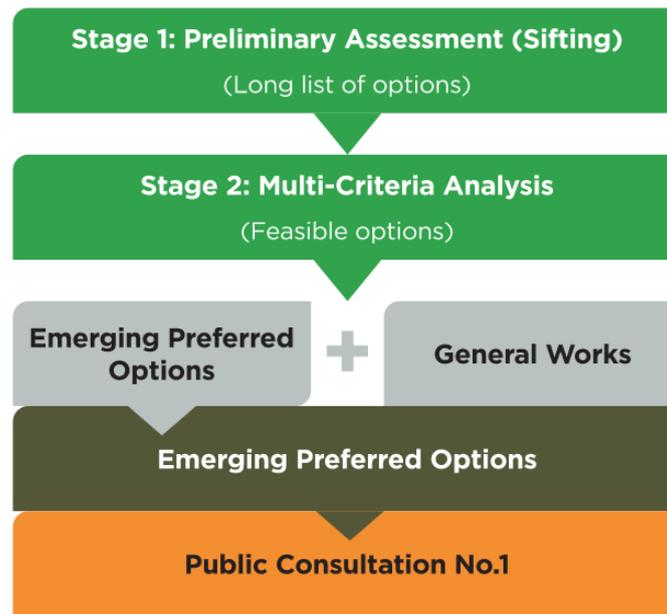


Figure 5-1: Option Selection Process (Emerging Preferred Option)

5.2 Options to be Assessed

Many elements of the project require option assessment at a local level prior to incorporation into the end-to-end Emerging Preferred Option for the project. The options presented for assessment include:

- **Do-Nothing Option:** This option describes what is likely to occur in the absence of works and interventions needed to meet the project objectives and requirements.
- **Do-Minimum Option:** This represents the least burdensome option to maintain an intervention. In some cases (e.g. where legal commitments are in place) this can act as the Base Case.
- **Do-Something Option(s):** These options are available to address the objective of the intervention (i.e., the project objectives and requirements). The various options (Do-Something) are compared against a Base Case which can either be a Do-Nothing or Do-Minimum option as described above.

5.3 Longlisting of Possible Options

At each location, a list of options is developed to allow the CAF framework to commence. A longlist is developed based on carrying out the following:

- a. Identify a Study Area and scope of the assessment.
- b. Identify key constraints (at an appropriate level of detail) within the study area such that a reasonable number of feasible options can be included on the longlist and subsequent shortlisting can take place.

- c. Identify all reasonable and feasible alternatives and options.

Possible options must be significantly different from each other such that the likely impacts and benefits of the options would be materially different from each other.

5.4 Stage 1 – Preliminary Assessment (Sifting)

The CAF framework allows shortlisting of possible options as part of a preliminary appraisal, having sifted through a longlist of options:

‘For some schemes, a large number of Do-Something options may present themselves. In order to keep the appraisal process manageable, it is appropriate to adopt an approach which subjects a large number of options to a preliminary appraisal, before subjecting a smaller number to a more complete appraisal’.

If only 1 possible option was identified at the sifting stage, Stage 2 – MCA methodology does not need proceed. Also, where the Do-Nothing or Do-Minimum options suffice, the optioneering process can be completed at this stage.

The sifting process considered the project objectives and project requirements. Each possible option was assessed on its ability to meet the project objectives and requirements documented in section 3.3.

A pass / fail approach was utilised. A fail against any of the project objectives and project requirements resulted in that option not being taken forward to the MCA stage.

5.5 Stage 2 – MCA Methodology

Where necessary, Stage 2 of the optioneering process comprised a detailed multi-disciplinary comparative analysis of those feasible options that passed through Stage 1: Preliminary Sifting. The options were assessed against the criteria of Economy, Safety, Environment, Accessibility and Social Inclusion, Integration and Physical Activity in line with the criteria required for multi-criteria analysis in the CAF guidelines. These parameters were split into a number of sub-criteria considered relevant to the DART+ Coastal North project.

Table 5-1 CAF Criteria

Criteria	Sub-Criteria	Example considerations	Assessment Type
Economy	Capital Expenditure (CAPEX): Construction, land acquisition, temporary works	Estimate high level cost of construction of option. Extent and type of third party lands required permanently. Extent and type of third party land required temporarily for temporary works during construction	Quantitative Assessment

Criteria	Sub-Criteria	Example considerations	Assessment Type
	OPEX: Operational costs (IÉ or other entities), Technology advancements and future proofing / obsolescence	<p>Cost to maintain the infrastructure over the whole life.</p> <p>Effects of infrastructure maintenance to services.</p> <p>Provision of ways of undertaking routine inspections and maintenance activities while minimising the effect on service to customers.</p>	<p>Qualitative Assessment</p> <p>Quantitative Assessment on key differences between options</p>
	Train Operations Functionality/Economic Benefit	<p>Potential improvement or deterioration of the operation conditions of the line (reduction or increase of the risk of interruption of service).</p> <p>Increased DART service improving connectivity and economy (leading to increased competition in economy, increased output of firms, increased tax revenue).</p>	Qualitative Assessment
	Traffic functionality and associated economic activities and opportunities	<p>Potential benefit to vehicular traffic flows in the vicinity of the works during construction and associated economic activities and opportunities in the vicinity.</p> <p>Consideration of duration of traffic disruption and length of diversions.</p> <p>To minimise the impacts on traffic and transportation during the construction and operational stages.</p>	Qualitative Assessment
Safety	Employer's Safety	<p>To reduce safety risks associated with construction maintenance and operations.</p> <p>To reduce the potential for incidents or near misses for IÉ/construction staff.</p>	Qualitative assessment

Criteria	Sub-Criteria	Example considerations	Assessment Type
	Public safety	<p>To reduce safety risks associated with passengers at platforms, public adjacent to the railway and road, pedestrian and cycle users at level crossings.</p> <p>To reduce the potential for accidents for members of the public/passengers on railway infrastructure.</p> <p>To reduce the potential for conflict between rail and road users.</p>	Qualitative assessment
Environment	Landscape and Visual Quality	<p>To avoid / minimise impact on designated amenities, landscapes, protected trees or views.</p> <p>To avoid / minimise visual impact on properties & amenities.</p> <p>To avoid / minimise removal of trees / hedgerows.</p> <p>To avoid / minimise impact from light pollution.</p> <p>To provide opportunities to enhance the local amenity and green infrastructure.</p>	Qualitative assessment
	Biodiversity	<p>To consider effects on biodiversity of the area and/, such as impacts on specific flora or fauna, or on defined habitats.</p> <p>To provide opportunities to enhance biodiversity.</p> <p>To ensure that impacts on nature conservation resources are prevented and mitigated. These can occur through direct loss or damage to habitat or specific species, creation of barriers to population movement or indirect effects resulting from, for example, changes in water quality of levels, air quality or noise and light levels.</p>	Qualitative assessment
	Noise and Vibration	To provide minimum levels of noise and vibration.	Qualitative assessment
	Water resources	To minimise impact or provide opportunities to enhance the quality of surface waters and associated floodplains, ground waters and coastal waters.	Qualitative assessment

Criteria	Sub-Criteria	Example considerations	Assessment Type
	Archaeology, Architectural and Cultural Heritage	<p>The construction, presence and operation of transport infrastructure can impact directly on such cultural heritage resources through physical impacts resulting from direct loss or damage, or indirectly through changes in setting, noise and vibration levels, air quality, and water levels.</p> <p>To minimise the impact on cultural heritage such as on below ground archaeological remains, historic buildings (individual and areas), and historic landscapes and parks.</p>	Qualitative assessment
	Geology and Soils	<p>To consider the impacts on designated areas of geological interest, unstable natural ground and ground contamination</p> <p>To consider the impacts on agricultural soil and sensitive or vulnerable soils and material resources, including the reuse of site won materials.</p>	Qualitative assessment
	Agricultural and non-agricultural	<p>Qualitative appraisal of impacts on valued resources either from a human or natural origin with value arising for economic or cultural reasons. These assets can be existing utilities or non-renewable resources.</p>	Qualitative assessment
	Air Quality & Climate Change	<p>Impacts of Construction Traffic.</p> <p>Improvements in air quality through use of EMUs over DMUs.</p> <p>Improvements in greenhouse gas emission through modal shift from road to rail.</p> <p>Improvements in greenhouse gas emission through use of EMUs over DMUs.</p> <p>Reduction in greenhouse gas emissions.</p> <p>Preservation or enhancement the local air quality.</p>	Qualitative assessment
Accessibility and social Inclusion	Accessibility	Capacity of options to facilitate the movement of people (either within, on to or across the rail system).	Qualitative assessment

Criteria	Sub-Criteria	Example considerations	Assessment Type
		<p>Impact on the wellbeing of the passenger and public.</p> <p>Positive impact on passenger and public experience.</p> <p>Improve accessibility to key facilities, such as employment, education, transport and healthcare to satisfy transport demand for all trip types.</p>	
	Social Inclusion	<p>Positive impact towards vulnerable groups.</p> <p>Positive impact to deprived geographic areas.</p> <p>Improvement of accessibility to public transport facilities, in particular from deprived geographic areas.</p>	Qualitative assessment
Integration	Adaptability in the future	Allowance for future internal transport links within Ireland.	Qualitative assessment
	Transport Integration	<p>Similarity of systems with other DART+ Programmes.</p> <p>The solution proposed should integrate with other transport systems such as DART+ West, Metrolink and light rail lines, local and national traffic road systems, walkways, and cycleways.</p>	Qualitative assessment
	Land Use Integration	<p>Integration with land use policies and objectives.</p> <p>Integration with regional and local land use plans.</p> <p>Adhesion to regional and local plans and policies.</p>	Qualitative assessment
	Geographical Integration	<p>Integration with land use policies and objectives</p> <p>Integration with regional and local land use plans.</p>	Qualitative assessment
	Government policy Integration	Integration with national and international plans and policies.	Qualitative assessment
Physical Activity	Walking / cycling opportunities	<p>To enable walking and cycling opportunities in a safer environment in the communities along the route.</p> <p>To create a healthy environment conducive to active travel.</p>	Qualitative assessment

The assessment compares the options, identifying and summarising the comparative advantages and disadvantages of each alternative under all applicable

criteria and sub-criteria leading to an Emerging Preferred Option for the intervention required.

Each specialist included a commentary of their analysis for each option. They then compared the options relative to each other based on whether an option had ‘some’ or a ‘significant’ advantage or disadvantage over other options or whether all options were ‘comparable / neutral’. Ultimately, each optioneering exercise concluded with the determination of a site-specific Emerging Preferred Option.

Table 5-2: Legend for MCA Summary Table

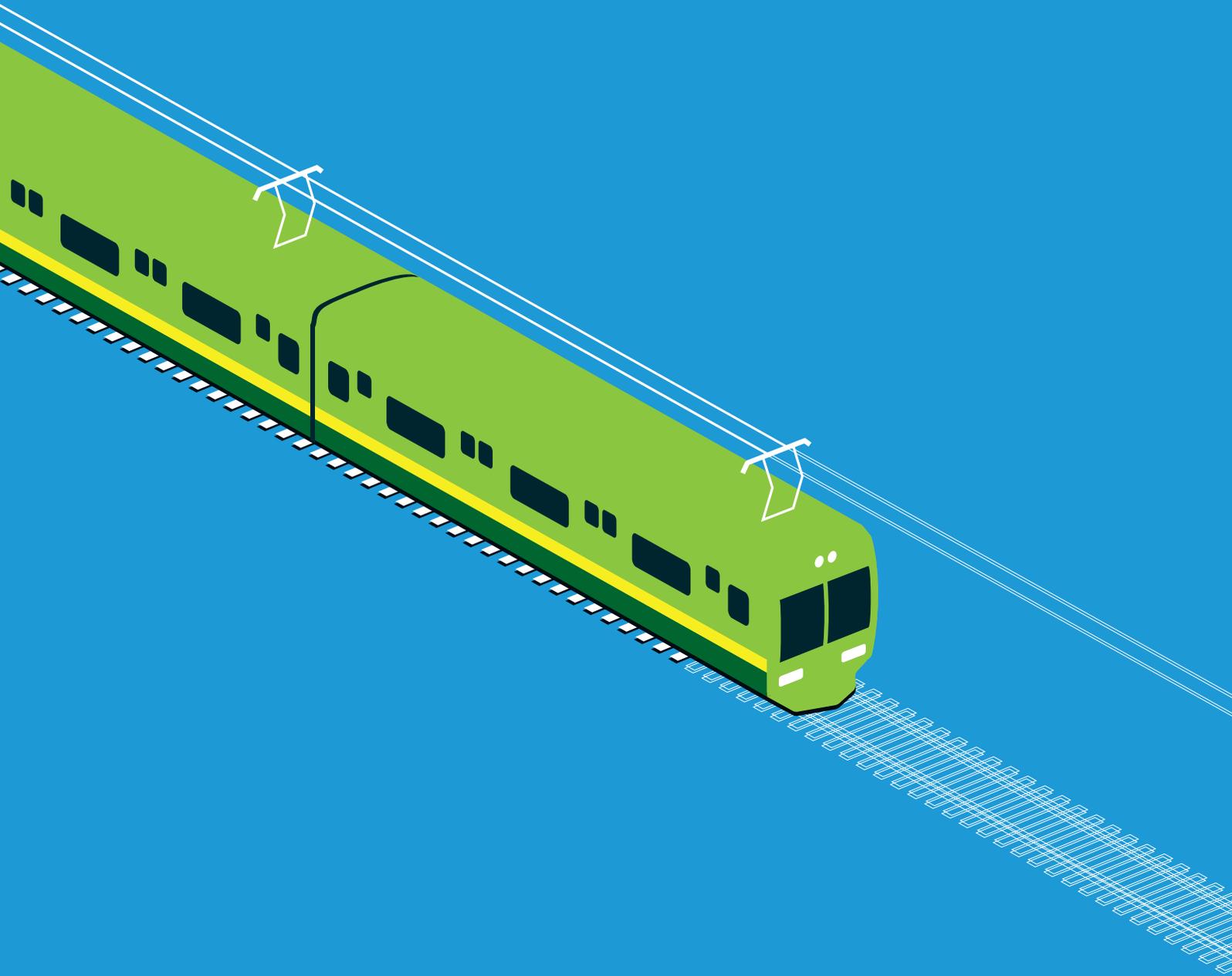
Significant comparative advantage over other options
Some comparative advantage over other options
Comparable to other options / neutral
Some comparative disadvantage over other options
Significant comparative disadvantage over other options

5.6 End-to-End Emerging Preferred Options

The various Emerging Preferred Options, in respect of particular elements or interventions, are then combined with general linear works needed to upgrade and modernise the railway to define the end-to-end ‘Emerging Preferred Option’. Other end-to-end considerations factored into the option development and assessment process, and will continue to inform the project development process.

Section 6

General Linear Works



6 General Linear Works

This section introduces the range of general linear works required to modernise and electrify the existing railway line between Malahide and Drogheda as part of DART+ Coastal North. This section of the report also provides an overview of the optioneering undertaken for works of a linear nature.

6.1 Electrification

The following works are required:

- 1) Installation of Overhead Line Equipment, e.g. foundations, masts and wires, between Malahide and Drogheda;
- 2) Modifications to surrounding station structures, such as canopies at stations between Malahide and Drogheda, to achieve required clearances to OHLE;
- 3) Modifications to existing parapets on overbridges – bridges that span over the railway – between Malahide and Drogheda, to provide the minimum height clearance and solidity required by safety standards for areas in proximity to OHLE;
- 4) Modifications to underbridges / viaducts – bridges carrying the railway – between Malahide and Drogheda, to facilitate connection of OHLE structures to these bridges;
- 5) Installation of power supply substations and electrical feeding infrastructure between Malahide and Drogheda;
- 6) Closure of the existing user worked level crossing south of Donabate;
- 7) Modifications to existing railway fencing and installation of new fencing to prevent the public coming into contact with the OHLE;
- 8) Installation of maintenance and access point facilities for the OHLE.

These works are described in detail in the following sub-sections.

6.1.1 Installation of Overhead Line Equipment between Malahide and Drogheda

OHLE generally refers to the mechanical and electrical items used to carry and deliver electrical power to the trains. Electrical energy is supplied to the train through contact between the equipment mounted on the top of the train (pantograph) and an electrically live overhead cable. This cable is suspended from a system of steel masts. The live overhead cable is fed electricity from individual substations which are located along the route.



Figure 6-1: An example of OHLE on an existing line



Figure 6-2: A typical OHLE in a densely configured track area

The DART+ Coastal North will adopt a 1500V Direct Current (DC) system which aligns with the existing DART network for traction power supply.

The existing railway corridor between Malahide and Drogheda is not currently electrified, therefore OHLE will be required. Options for the types of OHLE masts, their positioning and attachment to existing bridge structures, are currently being considered; this will be subject to more detailed assessment as the design evolves. However, in general the OHLE concept design for the DART+ Coastal North will comprise a pre-sagged simple (2-wire) auto-tensioned system, supported on galvanised steel support structures, which will be adapted in specific locations where needed. While functionally similar to the OHLE on the existing DART

network, modern day design standards will be applied to optimise reliability and safety on the route. Due consideration will also be given to the impact of the live overhead cables on bird migration, with mitigation measures considered and identified in the Ecological Impact Assessment Report and Natura Impact Statement that will be developed during future design phases of the project.

While a standardised approach to electrification will be adopted, specific, bespoke arrangements may also need to be considered at particular locations.

For further details, refer to Section A *OHLE System* of Annex 3.2 *Electrification of the Northern Line between Malahide and Drogheda*.

6.1.1.1 OHLE Mechanical Compensation Equipment

The OHLE wires are divided into sections which are individually held in tension by springs to maintain a constant height above the track irrespective of changes in ambient temperature.

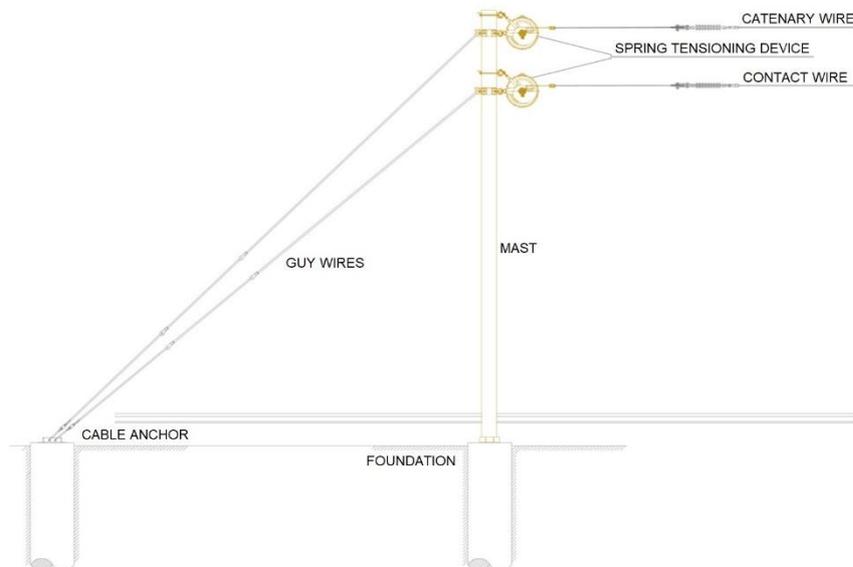


Figure 6-3: Tensioning Device

6.1.1.2 OHLE Support Structures

The new OHLE masts to be used for supporting OHLE wires will typically be H-section steel structures. The height of the masts and their profile depends on the stress they are subjected to and their type, function and location. Typically, OHLE mast heights will be between 6.5m and 8.5m, with a typical mast spacing of between 50m and 60m. The masts will be predominantly located in IÉ land along the existing rail corridor.

The OHLE arrangement will generally utilise the simplest suspension method compatible with the technical requirements for supplying power to the trains. The design will also, however, mitigate the environmental and ecological impacts by

utilising the most appropriate solution for sensitive locations, e.g. at Malahide Viaduct.

6.1.1.3 OHLE in stations

The type of mast and cantilever is influenced by the various different constraints at each location. For stations without impeding structures on the platform, single track cantilever masts can be used with insulators at the top to avoid live elements over the platforms, such as those currently used in stations such as Malahide or Portmarnock, as shown in **Figure 6-4**.



Figure 6-4: Existing single-track cantilevers at Malahide Station

Where there are existing constraints at a station, such as canopies, preventing placement of a mast with a single-track cantilever, alternative solutions can be used. These include the use of two track cantilevers, portals or headspans. Refer to **Figure 6-5**, **Figure 6-6** and **Figure 6-7** for examples.



Figure 6-5: Current two track cantilever at Kilbarrack Station



Figure 6-6: Existing head span at Howth Station



Figure 6-7: Existing portal at Clongriffin Station

6.1.2 Installation of power supply substations and electrical feeding infrastructure

The OHLE system will be supplied with electrical power from the ESB distribution network at regular intervals, at which a new electrical substation will be required. These substations will receive power at voltages up to 38kV AC and transform this into the required 1500V DC for distribution along the OHLE system. The specific voltage to be adopted will be determined at a later date in consultation with the ESB.

A power study indicates that eight new substations may be required between Malahide and Drogheda to provide power to the network. Power supply upgrades will be required on the Howth Branch including provision of a new substation. Studies to confirm this requirement are ongoing

The site-specific location and layout for the proposed substations have yet to be finalised, but preliminary findings from the power simulation studies have identified the following general locations along the line:

- Donabate;
- Rush and Lusk;
- Skerries South;
- Skerries North;
- Balbriggan;
- Gormanston;
- Bettystown;
- Drogheda;

Further studies are ongoing to confirm the exact sites and layout of the substations with consideration given to the following:

- The land-use and development context of potential locations;
- The substations will be located adjacent to the railway line in the form of a fenced compound surrounding a single storey building which will house all the necessary electrical switching and feeding equipment;
- The substations will be connected to the local power distribution network and the OHLE system using insulated cables. These cables will be installed in buried routes for additional protection;
- The substations will need to be accessible from the local road network for construction and maintenance purposes;
- The footprint of each substation compound is estimated to be up to approximately 1,900 sqm and will include the building required to house the electrical equipment for both IÉ and ESB.

Proposed substation locations will be presented as part of Public Consultation No. 2 and engagement with impacted landowners will start as soon as the potential sites are identified and assessed. While every effort will be made to locate substations within existing IÉ owned lands, this may not always be possible.

6.1.3 Installation of OHLE foundations between Malahide and Drogheda

Foundations are required at each mast location and shall be designed to resist the applied loads from the OHLE system. The various foundation solutions will be selected based on the specific ground conditions which tend to vary along the route. To cater for the different ground conditions expected, three foundation options have been identified (steel pile driven, concrete bored pile and concrete pad). The type of foundation selected at each location shall be determined at a later stage of the design process when further ground investigation information is available.

For further details, refer to Section B *OHLE foundation solutions* of Annex 3.2 *Electrification of the Northern Line between Malahide and Drogheda*.

6.1.4 Works around bridge structures

The following sections describe works on bridge structures relating to the installation of the OHLE. ‘Underbridge’ is the term used to describe a bridge or viaduct that carries the railway and ‘overbridge’ is used to describe a bridge which spans over the railway.

The diagram below demonstrates the difference between an underbridge and overbridge.

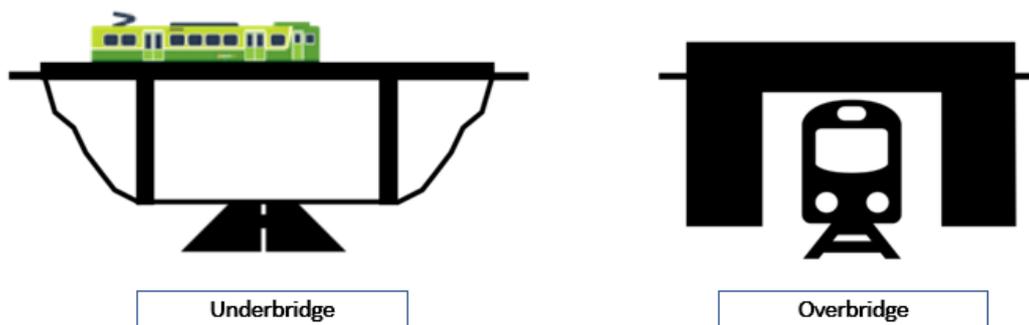


Figure 6-8: Underbridge and overbridge sketch

6.1.4.1 Installation of OHLE structures onto underbridges

Bespoke fixing arrangements for OHLE will be required at some locations where the railway is supported on underbridges. It is envisaged that typical OHLE foundations can be placed either side of underbridges with spans of less than 60m, removing the need to fix OHLE to the bridge. Underbridges with spans around, or in excess of, this value have been subject to further assessment and optioneering. The resulting list of impacted underbridges is as follows:

- UBB30 – Malahide Viaduct;
- UBB36 – Rogerstown Viaduct;
- UBB56 – Balbriggan Viaduct;
- UBB72 – Laytown Viaduct;

A typical list of the possible OHLE support arrangements considered for each bridge is as follows (in addition to a ‘Do-nothing’ scenario):

- Option A – Supported on superstructure;
 - Option A1 – In-board of parapets;
 - Option A2 – Aligned with parapets;
 - Option A3 – Outside of parapets.
- Option B – Supported on substructure
 - Option B1 – Supported off pier;

- Option B2 – Supported off abutment;
- Option C – Independent supports.

It should be noted that not all options are feasible for each bridge since they depend upon the clearance available between tracks and bridge parapets, as well as the technical feasibility of the construction methodology.

The emerging preferred option selected for each bridge has been selected based on the outcome of the optioneering process, which included initial sifting and MCA.

Additionally, the positioning of OHLE masts along the length of the bridges has been considered, seeking to provide a visually preferable, symmetrical solution.

The emerging preferred option for each structure is as follows:

- UBB30 – Malahide Viaduct – installation of concrete foundations placed beneath the ballast under the tracks which allow a mast to be founded on them approximately at the location of the existing parapet;
- UBB36 – Rogerstown Viaduct – installation of masts fixed off the existing abutments, either on the face or by replacing the top proportion of the existing stonework with a new concrete foundation;
- UBB56 – Balbriggan Viaduct – installation of masts fixed off the existing wall located between the walkway and the track by replacing the top proportion of the existing stonework with a new concrete foundation;
- UBB72 – Laytown Viaduct – Installation of additional supporting steelwork within the structure to provide sufficient strength for a mast to be fixed.

Further detail can be found in Section C *OHLE support solutions at underbridges* of Annex 3.2 *Electrification of the Northern Line between Malahide and Drogheda*.

Further research, including site investigation, will be required at subsequent design stages to confirm the structural feasibility of the options.

6.1.4.2 Bridge clearance works

Wherever a bridge spans over the railway it is necessary to ensure that the OHLE passes safely below the bridge. This can often mean that the height of the wires needs to be reduced to pass under the bridge. In this case, the wire height will be reduced gradually on approach to the bridge so that the performance of the system is maintained. There is, however, an absolute minimum wire height from top of rail that needs to be achieved.

At some bridges, the OHLE will pass beneath without connection to the bridge. At other lower bridges, it will be necessary to connect the OHLE safely to the bridge, using insulators. Occasionally, it may be necessary to place an OHLE mast directly next to the bridge to support the OHLE.

Where existing bridges do not, or may not, provide the necessary clearance for OHLE, a range of options to reduce impacts have been considered on a case-by-case basis. The options include modifications to the track layout and structural

solutions to gain the necessary vertical and horizontal clearance. The options considered include the following (either standalone or in combination):

- Provision of specialist electrical solutions for the OHLE with reduced clearance;
- Lowering the rail track under the bridge;
- Modification of the existing bridge structure;
- Removal of the existing structure and provision of a replacement structure.

Along the project route corridor, there are a relatively low number of bridges that have insufficient clearance for installation of OHLE. In these cases reconstruction is unavoidable in order to provide electrification and meet the project requirements. At this early stage of design the affected structures are expected to be those located in and around Drogheda MacBride Station and depot. This will be confirmed as the design evolves and detailed survey data is received.

For other bridges, where the required electrical clearance beneath the bridges cannot be achieved, clearances will be increased by means of track lowering or fitted OHLE. Detailed surveys are currently being undertaken, and this information will be used to establish if the options under consideration are feasible, or if more significant interventions are required to the bridges.

Further detail can be found in Section E *OHLE Bridge Clearance Works* of Annex 3.1 *Electrification of the Northern Line between Malahide and Drogheda*.

6.1.4.3 Bridge parapet modifications

Existing overbridges between Malahide and Drogheda need to be modified to meet safety requirements for an electrified railway, i.e. to protect the public from direct contact with the live OHLE. As a result, reasonable steps to prevent people from accidentally or otherwise falling onto or touching the OHLE are required.

This will be achieved by modifying the composition and height of existing bridge parapets to achieve the required 1.8m height. A variety of options for increasing height are being considered on a case-by-case basis for each bridge, accounting for Protected Structures. These are listed below:

- Demolish and reconstruct parapet to correct height;
- Extend parapet height using similar materials (stone, brick, concrete, etc.);
- Extend parapet height using a lightweight panel (e.g. mesh, steel plate, GFRP, glass, acrylic/polycarbonate).

Further detail can be found in Section D *Bridge parapet modifications for OHLE* of Annex 3.1 *Electrification of the Northern Line between Malahide and Drogheda*.

6.1.5 Modifications to existing railway fencing and installation of new railway fencing

Further detail can be found in Section H *Fencing and Lineside Safety* of Annex 3.1 *Electrification of the Northern Line between Malahide and Drogheda*.

Necessary safety improvement works will be required to railway fencing where OHLE is to be introduced. Similar to bridge parapet works, reasonable steps will be taken to prevent people from accidentally or otherwise falling onto or making contact with the OHLE. This will comprise assessment of the level of trespass prevention provided along the route and subsequent proposal of new fencing/fencing improvements. The installation of fencing shall consider the urban or rural nature of the setting and mitigate adverse environmental, heritage and visual impacts in so far as is reasonably practicable.

For urban areas:

- For those areas with a perceived high risk of trespass, a security purpose (SP) steel palisade fence will be installed.
- Where risk of trespass is lower and the fencing is required only as either a boundary marker or to deter a casual intruder, an open mesh steel panel for general purposes shall be installed.

For rural areas:

- The type of fence is to be determined following an environmental assessment and a safety risk assessment that will consider the settings in which the fence will pass through.

In addition to this, existing fencing (where OHLE is to be introduced) will need to be assessed as to whether it complies with the necessary electrical safety clearances. Should this not be the case, the fencing will either need to be replaced or relocated with suitable earthing and bonding arrangements.

6.1.6 Works to the existing user worked level crossing south of Donabate

This section provides an outline of the assessment undertaken for the existing level crossing south of Donabate.

The existing user worked level crossing is located close to the Malahide Estuary south of Donabate (level crossing reference number XB001), connecting farmlands either side of the railway. Refer to Map 15 in Annex 1 Emerging Preferred Option maps for location. Intervention at the current crossing is required due to an increase in risk from the electrification of the railway line and greater frequency of trains.

Aerial views indicating the location of the level crossing and associated structures are provided in **Figure 6-9** and **Figure 6-10**.



Figure 6-9: Location of user worked level crossing in relation to Malahide and Donabate Station (Source: OSI aerial mapping)



Figure 6-10: Location of user worked level crossing (Source: OSI aerial mapping)

The Emerging Preferred Option is to close the level crossing and purchase the land east of the railway such that third party access requirements are removed. Consideration would need to be given as to the access method for maintenance activities in the field/to the estuary shoreline. The option also presents the opportunity to improve biodiversity/ecological value of the area of land in question, which is currently designated as farmland.

This option will have no impact on the electrification design, nor will it require modification of signalling systems or structural/geotechnical interventions. Any works required to close the crossing are expected to be minor and undertaken with no disruption to trains. Works will be either offline or during non-disruptive possessions.

Based on the level of information and design available at this time for Public Consultation No. 1, the extent of permanent works that may potentially interfere with property rights relate to:

- The circa 5 to 5.5ha area of severed farmland projecting into the estuary, east of the crossing

Construction requirements (including potential temporary interference of property rights) and methodologies will be presented at Public Consultation No. 2.

Refer to Annex 3.2: Section G: *User worked level crossing south of Donabate* for more detailed information.

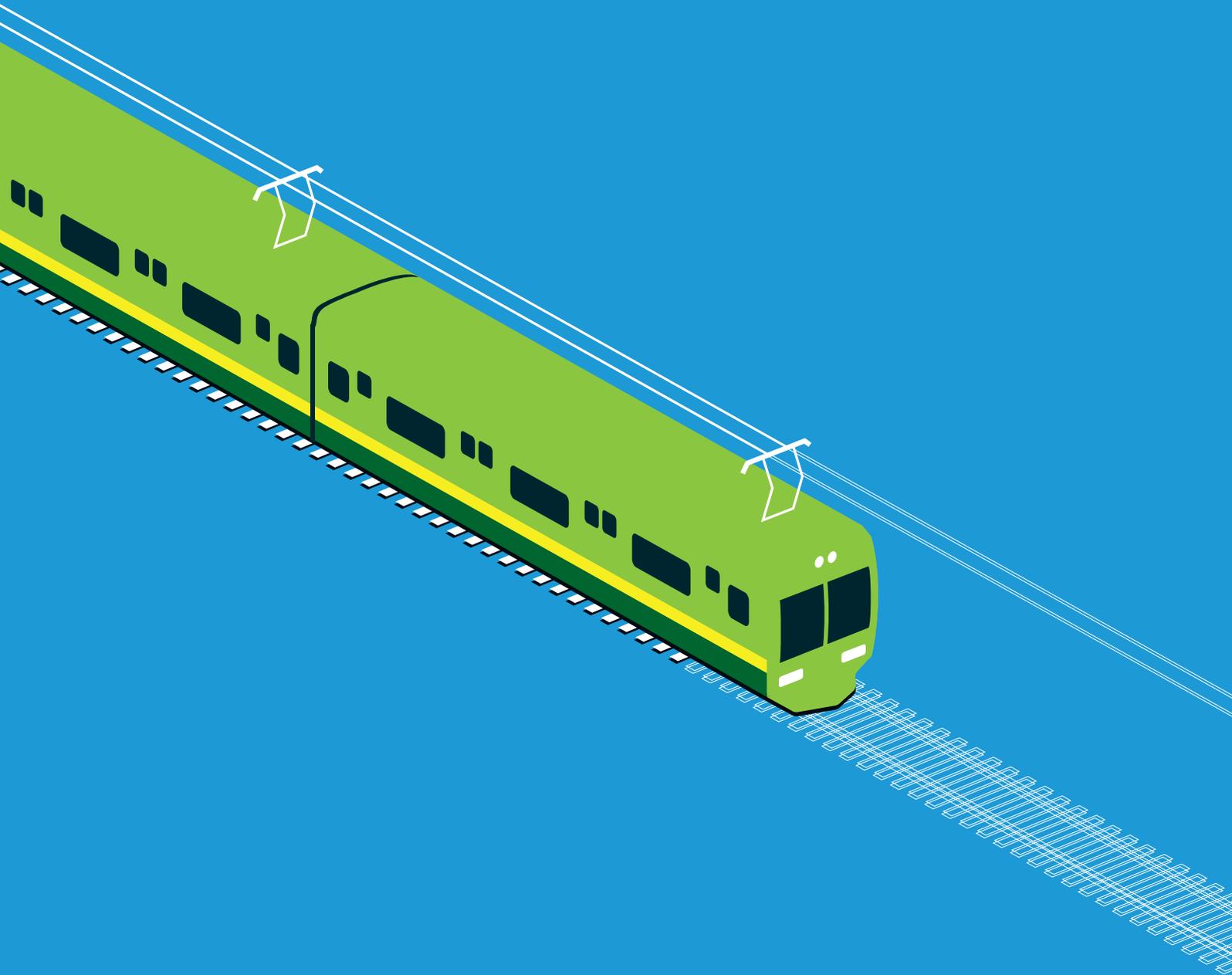
6.2 Signalling and telecommunication works

In order to support the delivery of the improved train service specification between Dublin City Centre and Drogheda, enhancements to the signalling system will be required. The extent of the enhancements relates to accommodating the changes to the track layout at Howth Junction & Donaghmede, Clongriffin and Malahide stations, as well as the delivery of additional services over the new and existing tracks. This upgrade is needed to exploit the efficient use of the trackwork. In addition, further changes may be made to the signalling system to enable the delivery of a robust Train Service Specification.

These enhancements will require the provision of new signalling and telecommunication equipment accommodation buildings along the line to house new equipment at strategic locations, located within IÉ land where possible. The equipment will operate signals and point machines as well as communicate the locations of trains to the National Train Control Centre located at Heuston. Where necessary, systems will be upgraded or modified to support the delivery of the TSS. All the equipment will be connected together by a new fibre cable network running the length of the upgraded area.

Section 7

Depot Works



7 Depot Works

There are two depots forming part of the DART+ Coastal North project: Fairview and Drogheda depots. Fairview depot is located directly adjacent to Clontarf Road Station and to the north of Dublin Connolly Station. Directly to the southwest of the depot is the East Wall Road and Tolka River Underbridge (UBB3). Drogheda depot is located within the extents of Drogheda MacBride Station, east of the existing platforms.

Modifications at Fairview and Drogheda depots are required to provide the infrastructure, maintenance, and servicing facilities necessary for the new DART+ Fleet.

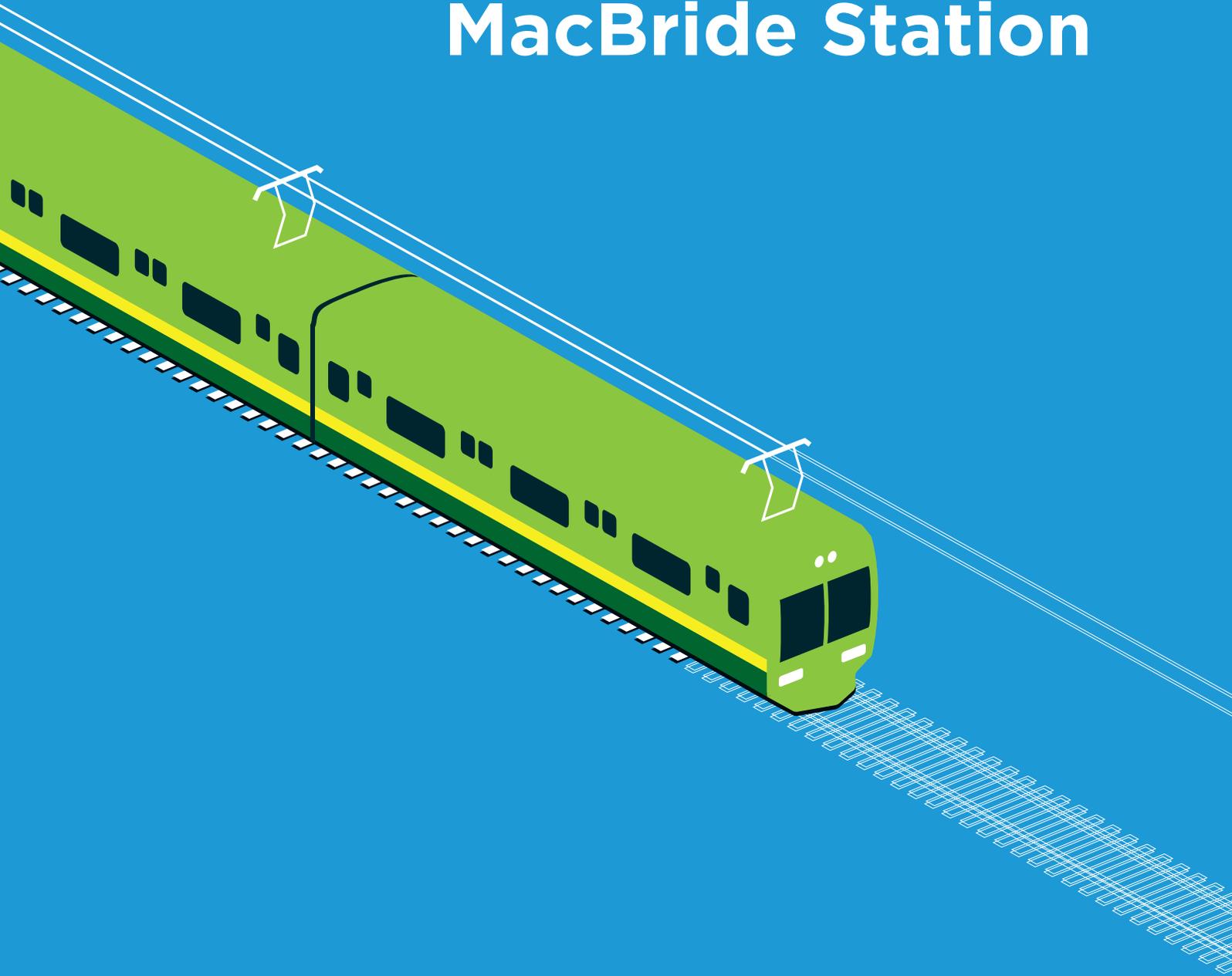
To facilitate the maintenance of the new trains at Drogheda depot, an additional stabling road is required for the depot along with some track modifications to accommodate the works on the mainline and at Drogheda MacBride Station (refer to Section 8). The existing bund will be modified to facilitate the new stabling road. With the introduction of OHLE to the depot and the differing characteristics of the new trains, several aspects of the depot require modification in order to maintain these new trains, including modifications to the train wash. It is not envisaged that the train wash will require movement from its current location.

In order to provide a greater output of cleaning at Fairview depot for the new trains, several modifications are required at the depot. These will include the provision of new cleaning platforms on the sidings to the East side of the mainline, along with associated walkways and services. On the West side modifications are proposed largely within the existing maintenance building to provide suitable access and services for cleaning staff.

All the above works will be within the current depot facilities.

Section 8

Works around Drogheda MacBride Station



8 Works around Drogheda MacBride Station

This section provides an outline of the assessment undertaken at Drogheda MacBride Station.

8.1 Context

Drogheda MacBride Station is located on the Northern Line at approximate mileage 31 $\frac{3}{4}$ miles. The station is located to the east of Dublin Road (R132) and south of the River Boyne – see Emerging Preferred Option map 36 of 38 in Annex 1 for context. The station consists of three platforms: Platform 1 on the Down Main line, Platform 2 on the Up Main line and Platform 3 on a spur. An earth bund is present next to the depot maintenance building.

Drogheda depot is located to the east of the station and directly to the north-west of the depot is Underbridge UBB82 (Boyne Viaduct) (see **Figure 8-1**). The Drogheda freight sidings connection to the mainline is in close proximity to the depot mainline connection.

The lands along the eastern and north-eastern boundaries of the station generally comprise of undeveloped lands which consist of a pitch and putt club, farmland and two dwellings. There have been recent proposals to develop the farmland for housing development.

Road access to the depot is through the road underpass at the northern end of the depot. A secondary restricted access to the depot is along Railway Terrace via overbridge OBB80/80A/80B. Pedestrian access is available to the depot building from the station via two pedestrian overbridges (OBB81 and OBB81C).

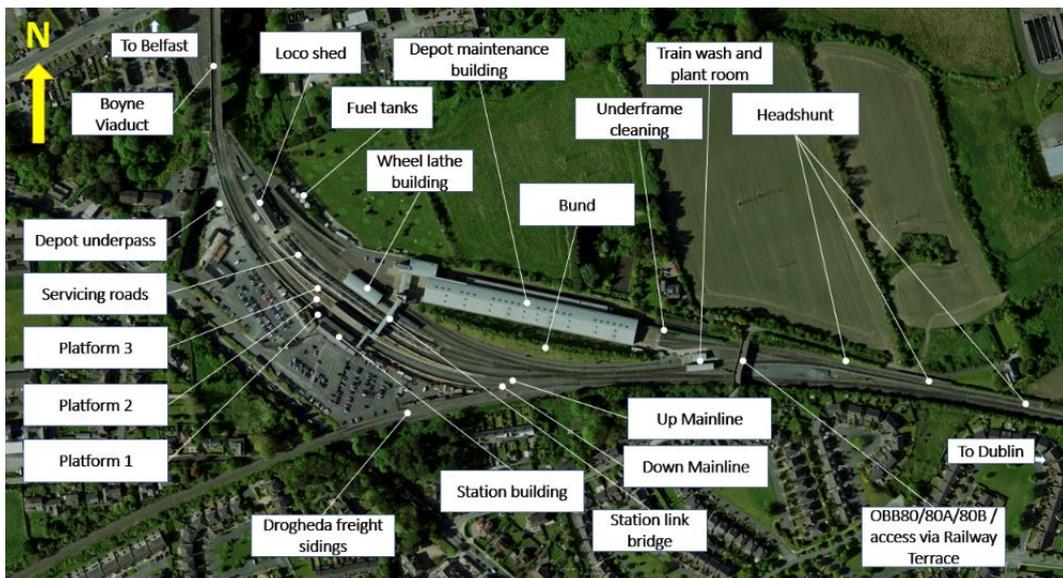


Figure 8-1: Drogheda MacBride Station Existing Arrangement (Source: OSI aerial mapping)

8.2 Stage 1: Preliminary Sifting

In addition to general feasibility requirements (for example constructability, safety, technical standard compliance, etc.) the specific requirements for this area are:

Turnback at Drogheda

- Provision of new turnback infrastructure at Drogheda MacBride Station which will meet the Train Service Specification (TSS).
- To allow for continued movements of freight traffic to and from the Drogheda freight sidings.
- Provide DART rolling stock stabling within the Drogheda area.

Modifications at Drogheda depot

- To determine and provide the infrastructure, maintenance, and servicing facilities necessary for the new DART+ Fleet.

The existing track and depot layout would not provide sufficient operational capacity to meet these requirements. Consequently, track and depot alterations are required, along with associated alterations to signalling, electrification, telecoms and structures.

A total of 18 options have been developed for this area (excluding the ‘Do-Nothing’ option), as summarised in **Table 8-1**. Note there is not a suitable ‘Do-Minimum’ option for this assessment. The options are grouped into three categories:

- Options 1 – constructing a new platform on the existing servicing road;
- Options 2 – constructing a new platform on the Drogheda freight sidings and;
- Options 3 – introducing a new headshunt (the terminal end of track used to move (shunt) rolling stock).

Table 8-1: Longlist of options considered for Works around Drogheda MacBride Station

Option	Description
Option 0 “Do-Nothing”	Do nothing
Option 1A	New platform at location of existing service road 4
Option 1B	New platform at location of existing service road 4 with new crossover from Down main at the station approach
Option 1C	New platform at location of existing service road 4 with new crossover allowing parallel moves from Down and Up main at the station approach
Option 1D	New platform at location of existing service road 4 with new crossover allowing parallel moves from Down and Up main at the station approach with no ECS (Empty Coaching Stock) moves to depot in peak

Option	Description
Option 1E	New platform at location of existing service road 4 with new depot headshunt to south and with new crossover from Down main at the station approach
Option 1F	New platform at location of existing service road 4 with new depot headshunt to south and with new crossover from Down main at the station approach. Southern headshunt depot arrivals only
Option 2A	Single Drogheda freight sidings platform
Option 2B	Single Drogheda freight sidings platform but with no ECS moves to Drogheda freight sidings platforms
Option 2C	Single Drogheda freight sidings platform with southern headshunt to depot
Option 2D	Island Drogheda freight sidings platform
Option 2E	Island Drogheda freight sidings platform with no ECS moves to new western platforms
Option 2F	Island Drogheda freight sidings platform with southern headshunt to depot
Option 2G	Drogheda freight sidings platform provided by removing dual track with no ECS moves to new western platforms
Option 2H	Drogheda freight sidings platform provided by removing dual track with southern headshunt to depot
Option 2I	New platform(s) in station car park with no ECS moves to new western platforms
Option 2J	New platform(s) in station car park with southern headshunt to depot
Option 3A	New headshunt to north
Option 3B	New headshunt to north with connection from Platform 2

The findings of the preliminary sifting are set out in **Table 8-2**.

Table 8-2: Summary of Long List Sifting for Works around Drogheda MacBride Station

Option	Description	Screening Result	Summary
Option 0 - "Do-Nothing"	Do-Nothing	FAIL	This option fails to meet the TSS, depot access or stabling requirements set
Option 1A	New platform at location of existing service road 4	FAIL	This option fails to meet the TSS and depot access requirements set. In addition, there is non-compliant track geometry on approach to new platform
Option 1B	New platform at location of existing service road 4 with new crossover from Down main at the station approach	FAIL	This option fails to meet the TSS and depot access requirements set

Option	Description	Screening Result	Summary
Option 1C	New platform at location of existing service road 4 with new crossover allowing parallel moves from Down and Up main at the station approach	FAIL	This option fails to meet the TSS and depot access requirements set
Option 1D	New platform at location of existing service road 4 with new crossover allowing parallel moves from Down and Up main at the station approach with no ECS moves to depot in peak	PASS	Met project objectives and requirements
Option 1E	New platform at location of existing service road 4 with new depot headshunt to south and with new crossover from Down main at the station approach	PASS	Met project objectives and requirements
Option 1F	New platform at location of existing service road 4 with new depot headshunt to south and with new crossover from Down main at the station approach. Southern headshunt depot arrivals only	PASS	Met project objectives and requirements
Option 2A	Single Drogheda freight sidings platform	FAIL	This option fails to meet the TSS and depot access requirements set
Option 2B	Single Drogheda freight sidings platform but with no ECS moves to Drogheda freight sidings platforms	PASS	Met project objectives and requirements
Option 2C	Single Drogheda freight sidings platform with southern headshunt to depot	PASS	Met project objectives and requirements

Option	Description	Screening Result	Summary
Option 2D	Island Drogheda freight sidings platform	FAIL	This option fails to meet the TSS and depot access requirements set
Option 2E	Island Drogheda freight sidings platform with no ECS moves to new western platforms	PASS	Met project objectives and requirements
Option 2F	Island Drogheda freight sidings platform with southern headshunt to depot	PASS	Met project objectives and requirements
Option 2G	Drogheda freight sidings platform provided by removing dual track with no ECS moves to new western platforms	FAIL	This option presents a severe risk to DART performance with the interaction with freight services
Option 2H	Drogheda freight sidings platform provided by removing dual track with southern headshunt to depot	FAIL	This option presents a severe risk to DART performance with the interaction with freight services.
Option 2I	New platforms in station car park with no ECS moves to new western platforms	FAIL	This option has significant impacts on heritage assets, compromises the current station functionality and car parking provision
Option 2J	New platforms in station car park with southern headshunt to depot	FAIL	This option has significant impacts on heritage assets, compromises the current station functionality and car parking provision
Option 3A	New headshunt to north	FAIL	This option fails to meet the TSS and depot access requirements set. It also has significant impacts on heritage assets
Option 3B	New headshunt to north with connection from Platform 2	FAIL	No compliant or suitable track geometry solution can be found. It also has significant impacts on heritage assets

8.3 Stage 2: MCA

Options 1D, 1E, 1F, 2B, 2C, 2E and 2F passed preliminary sifting and were taken forward to MCA.

8.3.1 Option 1D

For Option 1D, a new Platform 4 is provided at the location of the existing service roads between Platform 3 and the wheel lathe building. A new footbridge with lift access would be provided to Platform 4. The service roads would be relocated within the depot to the bund area where vegetation would be removed and earthworks required to level and regrade the ground.

Significant alteration of the depot and platform approach track configurations would be made, including two new crossovers for platform access and improved operational performance.

New stabling would be provided on the new platform and on depot servicing roads.

Track alterations would require significant modifications or, most likely, replacement of OBB80 and OBB80A. The adjacent OBB80B may also need replacing or modification depending on whether there are any interdependencies between the structures.

General overview of Option 1 solutions is provided in **Figure 8-2**.

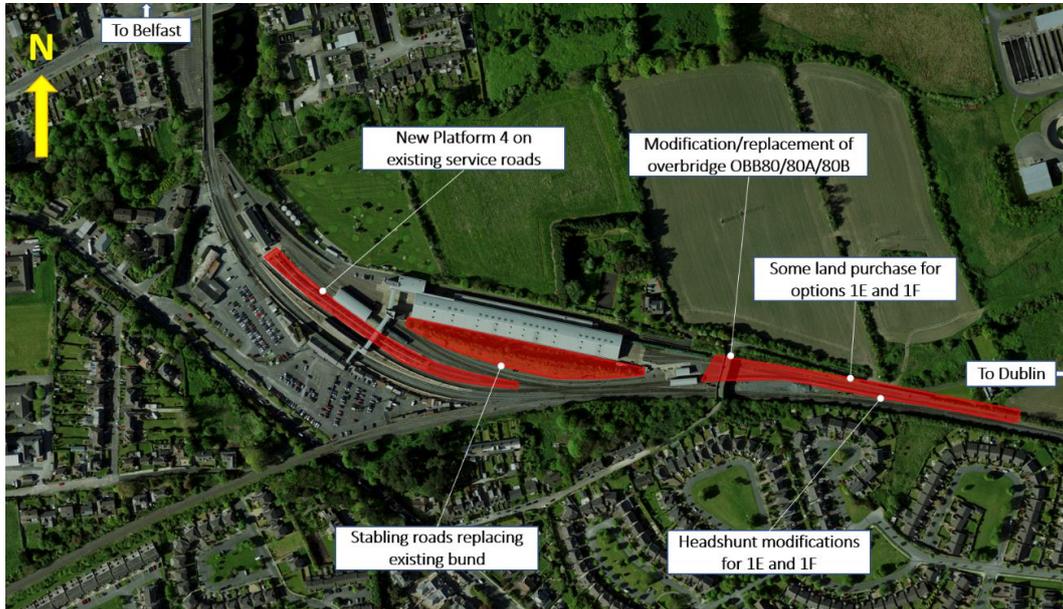


Figure 8-2: Option 1 general overview (Source: OSI aerial imagery)

8.3.2 Option 1E

Option 1E is similar to Option 1D with differences east of the train wash. An extra headshunt of length > 200m is added between the existing eastern headshunt and

the Up main. This would require some purchase of additional land to move the existing headshunts north. Refer to **Figure 8-2** for a general overview.

8.3.3 Option 1F

Similarly to Option 1D, Option 1F proposes a new Platform 4 between Platform 3 and the wheel lathe building with the servicing roads relocated to the bund area. The track changes differ from Option 1D on the platforms although this results in some operational impact when trains from Platforms 3 and 4 enter the depot.

Similar to Option 1E, Option 1F includes an extra headshunt with the existing headshunts slewed to the north requiring land purchase. Refer to **Figure 8-2** for a general overview.

8.3.4 Option 2B

Option 2B provides a new platform on the Drogheda freight sidings. This would require the installation of the platform over Dublin Road, requiring widening or replacement of Underbridge UBK1, a slew of the Drogheda freight sidings and modification to the mainline points and crossings. Retaining walls and other civil works would also be required to accommodate the new platform, along with other track modifications to cater for the increase in stabling requirements.

The new platform would be interconnected with the existing Platform 1 which would require modification to allow for pedestrian movements to the new platform. A new direct entrance to the new platform from the car park will also be provided. This option would require moving the existing SET buildings, SET equipment rooms and SET/CCE staff accommodation cabins to a new location and also result in the loss of some station car parking.

New stabling would be provided via a combination of the following:

1. Stabling on the southern Drogheda freight sidings.
2. Stabling on the northern Drogheda freight sidings.
3. Stabling within the bund area of the depot

Should the bund area be altered, the use of a retaining wall or reducing extent of bund may be considered to limit earthworks volumes generated, however its height will be notable to maintain the required clear distance to the structures from the line.

The provision of the new platform will allow current freight levels to continue but this will require the timing of freight trains, the use of the platform and any stabling to be considered and aligned with each other.

General overview of Option 2 solutions is provided in **Figure 8-3**.

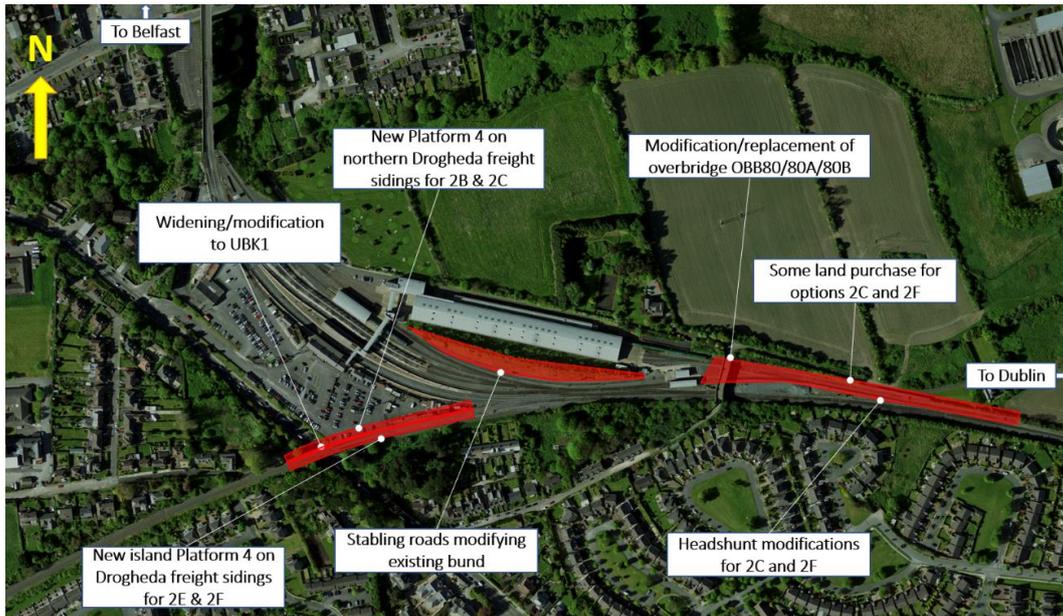


Figure 8-3 Option 2 general overview (Source: OSI aerial imagery)

8.3.5 Option 2C

Option 2C is a development of Option 2B, whereby the side platform on the Drogheda freight sidings and the proposed additional stabling road in the depot remain the same. An extra headshunt of length > 200m is added between the existing eastern headshunt and the Northern Line. In order to retain the two existing headshunts they have been slewed north which pushes them off of IÉ land and would require purchasing additional land, similar to Option 1E.

Track modifications would likely require structural modification or replacement of OBB80/80A/80B (Railway Terrace). Refer to **Figure 8-3** for a general overview.

8.3.6 Option 2E

Option 2E is similar to 2B but instead proposes an island platform on the Drogheda freight sidings. Similar widening or replacement of Underbridge UBK1, retaining structures and track alterations would be required.

A new footbridge with lifts would be provided which will be interconnected with the existing Platform 1. This option would require moving the existing SET buildings, SET equipment rooms and SET/CCE staff accommodation cabins to a new location. Alternatively, a new station entrance could be built which serves as the focal point for DART services.

The stabling and freight implications are the same as for Option 2B. Refer to **Figure 8-3** for a general overview.

8.3.7 Option 2F

Option 2F is a development of Option 2E with an extra headshunt added similar to Option 2C. Refer to **Figure 8-3** for a general overview.

8.3.8 MCA Findings

The findings from the MCA process are set out in **Table 8-3**

Table 8-3: Overall criteria MCA summary table for Works around Drogheda MacBride Station and depot

Criteria Summary	Opt 1D	Opt 1E	Opt 1F	Opt 2B	Opt 2C	Opt 2E	Opt 2F
Economy	Orange	Orange	Orange	Green	Light Green	Light Green	Light Green
Safety	Orange	Orange	Orange	Light Green	Light Green	Orange	Orange
Environment	Yellow						
Accessibility & Social Inclusion	Light Green	Light Green	Light Green	Orange	Orange	Light Green	Light Green
Integration	Yellow						
Physical Activity	Yellow						

Table 8-4: Legend for MCA Summary Table

Significant comparative advantage over other options
Some comparative advantage over other options
Comparable to other options / neutral
Some comparative disadvantage over other options
Significant comparative disadvantage over other options

Option 2B has been identified as the Emerging Preferred Option. The basis for the selection of Option 2B as the preferred option is as follows:

Economy: Option 2B is preferred as it can be constructed for a comparatively small capital cost and with relatively minimal disruption to existing passenger services. It can be shown that by splitting DART services between the new platform and the existing Platform 3, a robust operational solution for services exists. By “alternating” services between the platforms, the track infrastructure on the approach is most efficiently used. Options 2C and 2F perform better than Option 2B in terms of train and depot operations, as Option 2B lacks the extra headshunt necessitating turning back on the mainline. However, this higher operational performance is not required for the project and the significantly lower cost of Option 2B compared to Options 2C and 2F is considered to outweigh this.

In terms of Economy, Option 2B is the preferred option.

Safety: Options 2B and 2C are the preferred options for safety as the new platforms have clear escape routes to the rear of the car park. Options 1D, 1E and 1F are seen to have some disadvantages compared to these options as the new platform is constrained to one side by the depot and does not offer easy escape routes. Options

2E and 2F also have some disadvantages over Options 2B and 2C as the new island platform increases the number of platform interfaces. Also, with these options, the platform escape is more constrained.

In terms of Safety, Options 2B and 2C are the preferred options.

Environment: All options were found to be comparable in terms of impact on water resources, geology and soils, agricultural and non-agricultural land use and air quality and climate change. There are some differences between the options on these topics, such as the options trade off heritage impact and proximity to neighbouring residents, but overall the options are considered comparable.

In terms of Environmental, all options are identified as comparable overall.

Accessibility and Social Inclusion: Options 2B and 2C have some comparative disadvantages to the other options as construction of a single platform on the Drogheda freight sidings will result in DART serving Platform 3 and the new platform, resulting in uncertainty in platform destinations for passengers. Furthermore, this option introduces extended travel distances for passengers transferring services as well as the need to use a bridge to access DART services on Platform 3.

In terms of Accessibility and Social Inclusion, Options 2B and 2C have some disadvantage.

Integration: There is no comparative advantage or disadvantage between the options.

In terms of Integration, all options are identified as comparable

Physical activity: There is no comparative advantage or disadvantage between the options.

In terms of Physical Activity, all options are identified as comparable

8.4 Emerging Preferred Option

The Emerging Preferred Option for turnback and stabling facilities at Drogheda is Option 2B which provides a new platform on the Drogheda freight sidings. This option requires civils works such as widening or replacing the existing Dublin Road Underbridge UBK1 and construction of retaining structures.

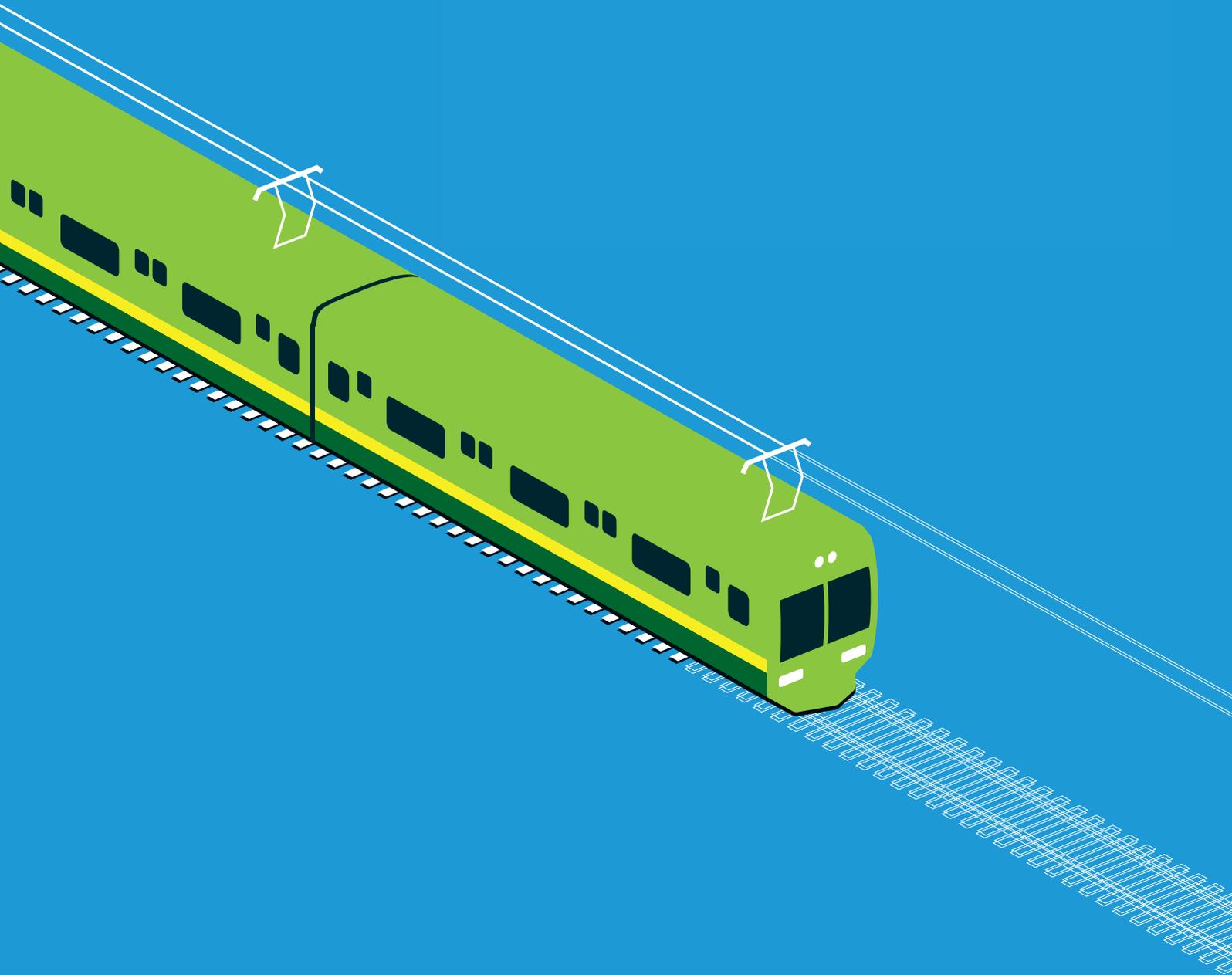
Track works include slewing the Drogheda freight sidings and installing new track at the toe of the bund area. New OHLE installations and modifications to the existing signalling and telecoms systems will be required.

Further design development will take place at the next stage of the project. There may be temporary interference of property rights during construction. Technical and construction related solutions will seek to minimise these in subsequent design stages. Construction requirements (including potential temporary interference of property rights) will be presented at Public Consultation No. 2.

Refer to Annex 3.3: *Works around Drogheda MacBride Station* for more detailed information.

Section 9

Works around Malahide Station



9 Works around Malahide Station

This section provides an outline of the assessment undertaken around Malahide Station.

9.1 Context

Malahide Station is located on the Northern Line at approximate mileage 9 miles. The station is located off Malahide Road (R106) – see Emerging Preferred Option Map 13 of 38 for context. The station consists of two platforms: Platform 1 on the Up Main line (trains travelling to Dublin) and Platform 2 on the Down Main line (trains travelling from Dublin), linked by a pedestrian bridge over the railway line.

North of Malahide Station is the Malahide Estuary and the Irish Water wastewater treatment works. The railway crosses the estuary by way of a viaduct.

An aerial view of the site is shown in **Figure 9-1** and **Figure 9-2**, and a view on the station is shown in **Figure 9-3**. The site under consideration is contained within Emerging Preferred Option Maps 13-16.

There is residential, commercial and amenity development in the vicinity of the railway line in Malahide and to the north of the Malahide Estuary in Donabate (including new development south of Donabate, the Malahide Marina and Malahide Marina Village).

The railway line passes through the Malahide Estuary Special Protected Area (SPA), Malahide Estuary Special Area of Conservation (SAC) and Malahide Estuary proposed Natural Heritage Area (pNHA), all of which are European sites. Other European sites in the vicinity include the Rogerstown Estuary SAC and Rogerstown Estuary SPA, both to the north of Donabate.

The proposed Broadmeadow Way Greenway by Fingal County Council, a planning approved walkway and cycleway, will be located parallel to the railway line over the Malahide Estuary. There is also a new road over the railway line (the Donabate Distributor Road, R126) to the north of the estuary, south of Donabate.



Figure 9-1: Aerial view of the Malahide area (Source: OSI Aerial Mapping)



Figure 9-2: Aerial view of the area South of Donabate (Source: OSI Aerial Mapping)

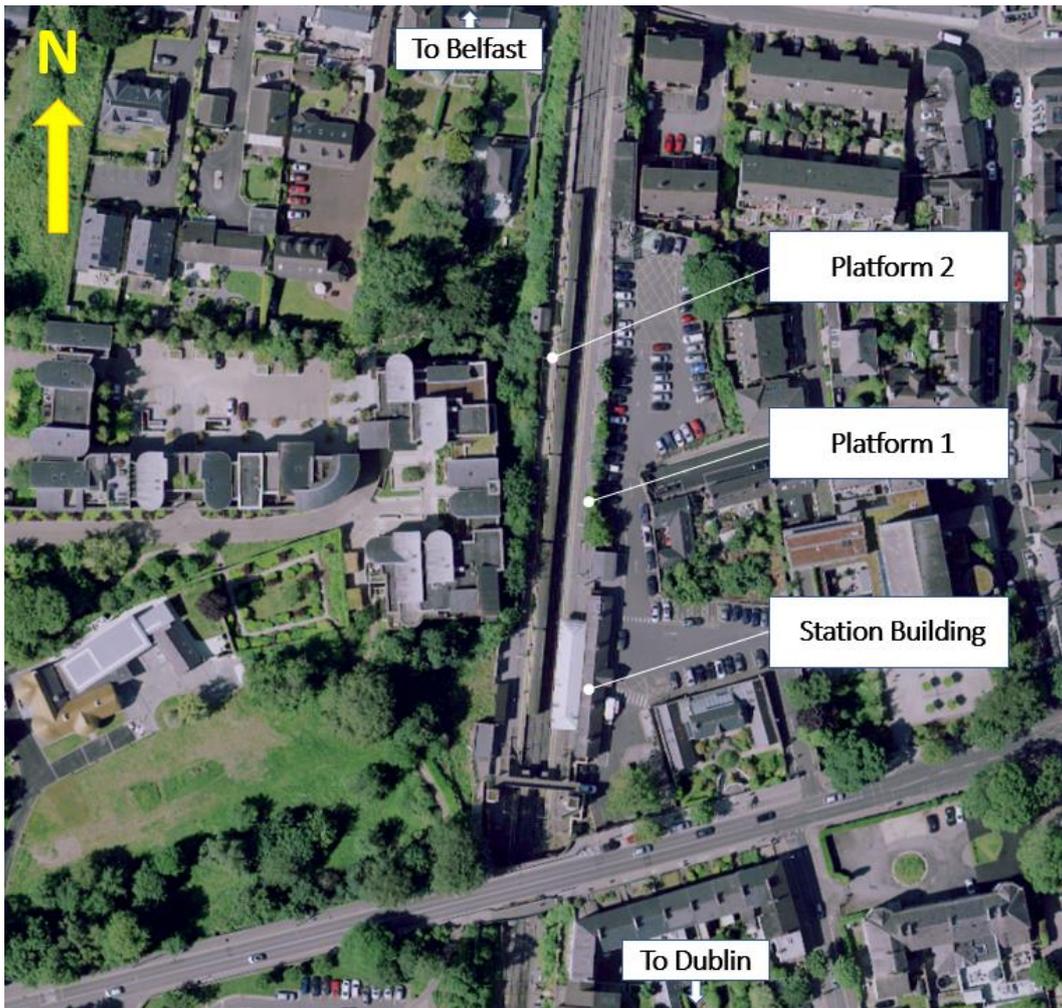


Figure 9-3: View of Malahide Station (Source: OSI aerial mapping)

9.2 Stage 1: Preliminary Sifting

In addition to general feasibility requirements (for example, constructability, safety, technical standard compliance, etc.), the specific requirements for this area are:

- Provide turnback infrastructure at Malahide which will meet the Train Service Specification (TSS) (i.e. allow a greater number of services to turnback at Malahide to return to the centre of Dublin);
- To take cognisance of the future Broadmeadow Way Greenway and not to do anything which would preclude the construction of the Greenway.

The existing track layout would not provide sufficient operational capacity to enable turnback of services to return to the centre of Dublin. Consequently, track alterations, along with associated signalling, electrification, telecoms and structures, are required to ensure the planned increase in train services can be achieved.

A total of 16 options have been developed for this area (excluding the ‘Do-Nothing’ option), as summarised in **Table 9-1**. Note there is not a suitable ‘Do-Minimum’ option for this assessment.

Table 9-1: Longlist of options considered for Works around Malahide Station

Option	Description
Option 0 “Do-Nothing”	Do Nothing
Option 1a	Down line slewed to provide central turnback north of Malahide Station (Down line on divergent route)
Option 1b	Down line slewed to provide central turnback north of Malahide Station (turnback on divergent route)
Option 2a	Up line slewed to provide central turnback north of Malahide Station (Up line on divergent route)
Option 2b	Up line slewed to provide central turnback north of Malahide Station (turnback on divergent route)
Option 3a	Turnback on Down side north of Malahide Station
Option 3b	Loop on Down side north of Malahide Station
Option 4a	Turnback on Up side north of Malahide Station
Option 4b	Loop on Up side north of Malahide Station
Option 5a	Central turnback south on Donabate Station
Option 5b	Central turnback north of Malahide Estuary
Option 5c	Turnback North of Donabate Station
Option 6a	New platform on Down side south of Malahide Station
Option 6b	New platform on Down side south of Malahide Station with passing loop
Option 7a	New Down side platform at Malahide Station
Option 7b	New Down side platform at Malahide Station
Option 8	Relocate station to south with additional platform

For those options that require signalling or OHLE changes, the solutions to each will involve various changes to existing equipment and additional equipment to be installed. Specific details differ between the various options.

The findings of the preliminary sifting are set out in **Table 9-2**.

Table 9-2: Summary of Long List Sifting for Works around Malahide Station

Option	Description	Screening Result	Summary
Option 0 “Do-Nothing”		Fail	This option fails to deliver the TSS requirements
Option 1A	Down line slewed to provide central turnback north of Malahide (Down line on divergent route)	Pass	Met project objectives and requirements
Option 1B	Down line slewed to provide central turnback north of Malahide (turnback on divergent route)	Pass	Met project objectives and requirements
Option 2A	Up line slewed to provide central turnback north of Malahide (Up line on divergent route)	Pass	Met project objectives and requirements
Option 2B	Up line slewed to provide central turnback north of Malahide (turnback on divergent route)	Pass	Met project objectives and requirements
Option 3A	Turnback on Down side north of Malahide	Fail	The introduction of train conflicting moves means this option fails to reliably deliver the TSS
Option 3B	Loop on Down side north of Malahide	Fail	The introduction of train conflicting moves means this option fails to reliably deliver the TSS
Option 4A	Turnback on Up side north of Malahide	Fail	The introduction of train conflicting moves means this option fails to reliably deliver the TSS
Option 4B	Loop on Up side north of Malahide	Fail	The introduction of train conflicting moves means this option fails to reliably deliver the TSS
Option 5A	Central turnback south of Donabate	Fail	The introduction of a service terminating just south of Donabate Station will cause a significant negative experience for passengers at Donabate Station. Furthermore, the turnback is located in an area designated in the local authority plan as for residential development.

Option	Description	Screening Result	Summary
Option 5B	Central turnback north of Malahide Estuary	Pass	Met project objectives and requirements
Option 5C	Turnback north of Donabate	Fail	The option provides service to one station further than what the TSS requires (trains would terminate at Donabate rather than Malahide). While from a passenger experience standpoint this would be beneficial, from a rail operations standpoint the additional train diagram length and reduced turnaround time required to facilitate travelling for one extra station would negatively impact the performance and reliability of the service.
Option 6A	New platform on Down side south of Malahide	Fail	The introduction of train conflicting moves means this option fails to reliably deliver the TSS
Option 6B	New platform on Down side south of Malahide with passing loop	Fail	The introduction of train conflicting moves means this option fails to reliably deliver the TSS
Option 7A	New Down side platform at Malahide	Fail	This option fails due to the significant negative impacts on the built environment
Option 7B	New Down side platform at Malahide	Fail	This option fails due to the significant negative impacts on the built environment
Option 8	Relocate station to south with additional platform	Fail	This option fails due to the significant negative impacts on the built environment

9.3 Stage 2: MCA

Options 1A, 1B, 2A, 2B and 5B passed preliminary sifting and were taken forward to MCA.

The five shortlisted options only have minor differences from an OHLE perspective. New masts and support structures will be required to facilitate the new track layout. This would likely be via new headspans or portal frames. Cantilevers could be used from the existing masts in locations where this is suitable.

Similarly, from a signalling perspective the five shortlisted options do not vastly differ but reworking to the signalling will be required to accommodate the new tracks and control new points and crossings.

9.3.1 Option 1A

For Option 1A, the Down line will follow a new alignment slewed to the west towards Malahide Estuary. The original track then forms a central turnback with a driver walkway provided. The Up line remains as is, with a new turnout presented to allow egress from the turnback road to the Up line.

This option requires a new retaining structure approximately 325m in length and 3m high long running along the west side of the tracks. None of the existing bridge structures will be impacted by this option. There is the potential for direct and indirect impacts to the SAC and SPA designated environmental sites, and there would likely be impact to the Broadmeadow Way Greenway during construction.

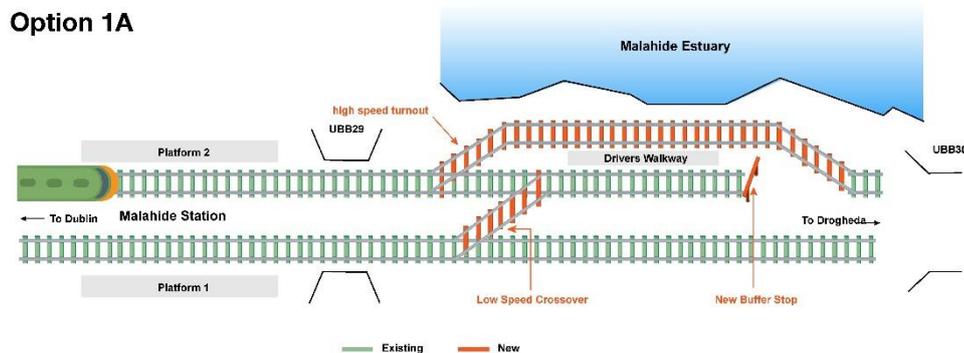


Figure 9-4: Schematic of Option 1A

9.3.2 Option 1B

For Option B, the Down line will follow a new alignment slewed to the west towards Malahide Estuary. The original track then forms a central turnback. This would be accessed from both the Up and altered Down lines via new switches.

Similar works to Option 1A would be required for the OHLE, signalling and structural interventions. As the length of affected track is approximately 100m greater than Option 1A, retaining structures would be longer and a greater number of OHLE masts would be required. There is the potential for direct and indirect impacts to the SAC and SPA designated environmental sites, and there would likely be impact to the Broadmeadow Way Greenway during construction.

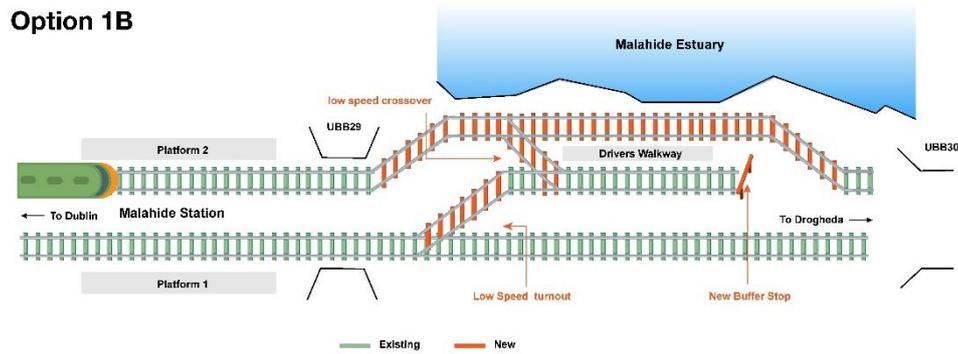


Figure 9-5: Schematic of Option 1B

9.3.3 Option 2A

Option 2A is an inversion of option 1A, on the east side of the railway. It requires a retaining structure of similar length and comparable signalling/electrification modifications on the east side of the tracks. Works would impact the road into the wastewater treatment plant, requiring temporary traffic management and potentially modified kerb lines in the permanent situation.

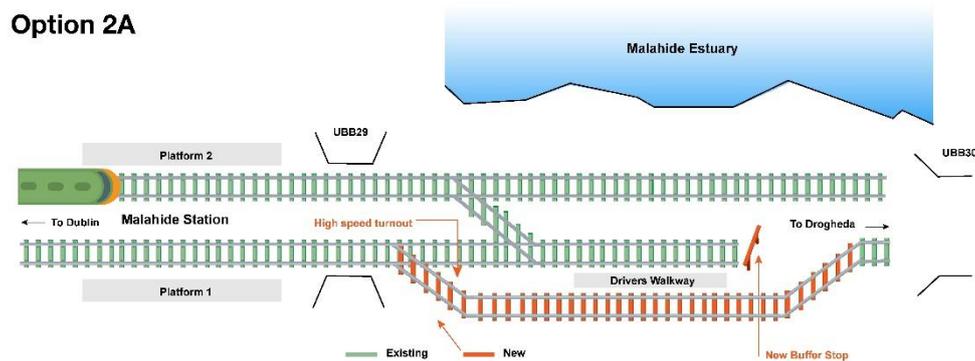


Figure 9-6: Schematic of Option 2A

9.3.4 Option 2B

Option 2B is an inversion of Option 1B, on the east side of the railway. It requires a retaining structure of similar length and comparable signalling/electrification modifications. Works would impact the road into the wastewater treatment plant, requiring temporary traffic management and potentially modified kerb lines in the permanent situation.

Option 2B

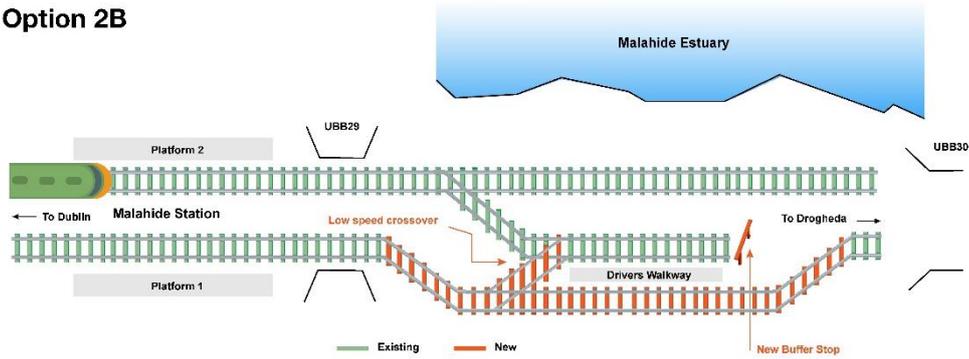


Figure 9-7: Schematic of Option 2B

9.3.5 Option 5B

This option involves provision for a turnback to the north of Malahide Estuary. The track layout and arrangement are the same as in Option 1B but in an alternative geographical location.

The option requires similar OHLE and signalling modifications to previous options. A new retaining structure would be required, approximately 275m long and 3.5m high running along the west side of the tracks. The existing tidal overflow underbridge UBB31 would also require widening on the west side to accommodate the new horizontal track alignment. There would likely be direct/indirect impacts on the adjacent SAC, SPA and pNHA.

Option 5B

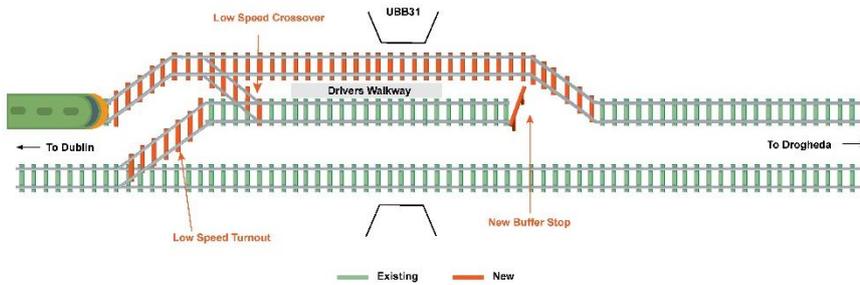


Figure 9-8: Schematic of Option 5B

9.3.6 MCA findings

The findings from the MCA process are set out in **Table 9-3**.

Table 9-3: Overall criteria MCA summary table for Works around Malahide Station

	Option 1a	Option 1b	Option 2a	Option 2b	Option 5b
Criteria Summary	<i>Down line slewed to provide central turnback north of Malahide (Down line on divergent route)</i>	<i>Down line slewed to provide central turnback north of Malahide (turnback on divergent route)</i>	<i>Up line slewed to provide central turnback north of Malahide (Up line on divergent route)</i>	<i>Up line slewed to provide central turnback north of Malahide (turnback on divergent route)</i>	<i>Turnback facility relocated to the north of the existing estuary crossing</i>
Economy					
Safety					
Environment					
Accessibility & Social Inclusion					
Integration					
Physical Activity					

Table 9-4: Legend for MCA Summary Table

Significant comparative advantage over other options
Some comparative advantage over other options
Comparable to other options / neutral
Some comparative disadvantage over other options
Significant comparative disadvantage over other options

Option 2B has been identified as the Emerging Preferred Option for a turnback at Malahide Station. The basis for the selection of Option 2B as the preferred option is as follows:

Economy: Option 2B is preferred as it presents a comparatively low capital cost by avoiding working over/near water and installation of lower speed switches and crossings with associated capital and maintenance cost savings. The option presents lesser construction impact on the Broadmeadow Way Greenway and thus less cost associated with necessary mitigation. It has benefit over option 5B from a train operations perspective since the turnback facility is adjacent to the station rather than on the other side of the estuary (i.e. empty trains using the turnback have to travel less distance). It also has a train operation benefit over option 1A which would introduce a lower speed limit.

In terms of Economy, Option 2B is the preferred option

Safety: There is no comparative advantage or disadvantage between the options in terms of safety of staff and the public in and around the station and the railway environment.

In terms of Safety, all options are identified as comparable

Environment: Options 2A and 2B were found to have comparative advantage over other options from biodiversity, water resources, archaeology, architectural and cultural heritage, and geology and soils perspectives. This can be attributed mainly to the fact that the other options are near or within designated sites. They were, however, found to have comparative disadvantage as regards landscape and visual quality due to being nearer to properties east of the railway, though it is noted that options to the west would still have some impact.

In terms of Environment, Options 2A and 2B are the preferred options

Accessibility and Social Inclusion: There is no comparative advantage or disadvantage between the options. This criterion is not relevant for this zone. There is no access to the public and, whilst there may be some impact to the Broadmeadow Way Greenway during construction, any closure would be short term.

In terms of Accessibility and Social Inclusion, all options are identified as comparable

Integration: Options 1A, 1B and 5B will have a greater impact on the Broadmeadow Way Greenway during construction, whereas 2A and 2B will impact the Malahide Marina Village and Irish Water's wastewater treatment works, also during construction. Any impact would be short term and hence there is no comparative advantage or disadvantage between the options.

In terms of Integration, all options are identified as comparable

Physical activity: All options are comparable. For Options 1A, 1B and 5B it is assumed that the Broadmeadow Way Greenway would be safely accommodated and then there is no temporary or long-term impact foreseen on walking or cycling opportunities. For Options 2A and 2B there is a temporary impact on the existing local road providing walking and cycling access to the Malahide Marina Village.

In terms of Physical Activity, all options are identified as comparable

9.4 Emerging Preferred Option

A turnback to the east of the existing railway, located between Malahide Station and the Malahide Viaduct has been identified as the Emerging Preferred Option (Option 2B).

The option requires widening of the rail corridor and the existing embankment, which will be achieved by constructing a retaining structure alongside the realigned track.

New OHLE and signalling installations as well as modifications to the existing telecoms systems will be required. The turnback will have a lit walking route alongside it.

Further design development will take place at the next stage of the project. Based upon the level of information at the current concept design stage for Public

Consultation No. 1, the following property rights may be affected by the permanent works:

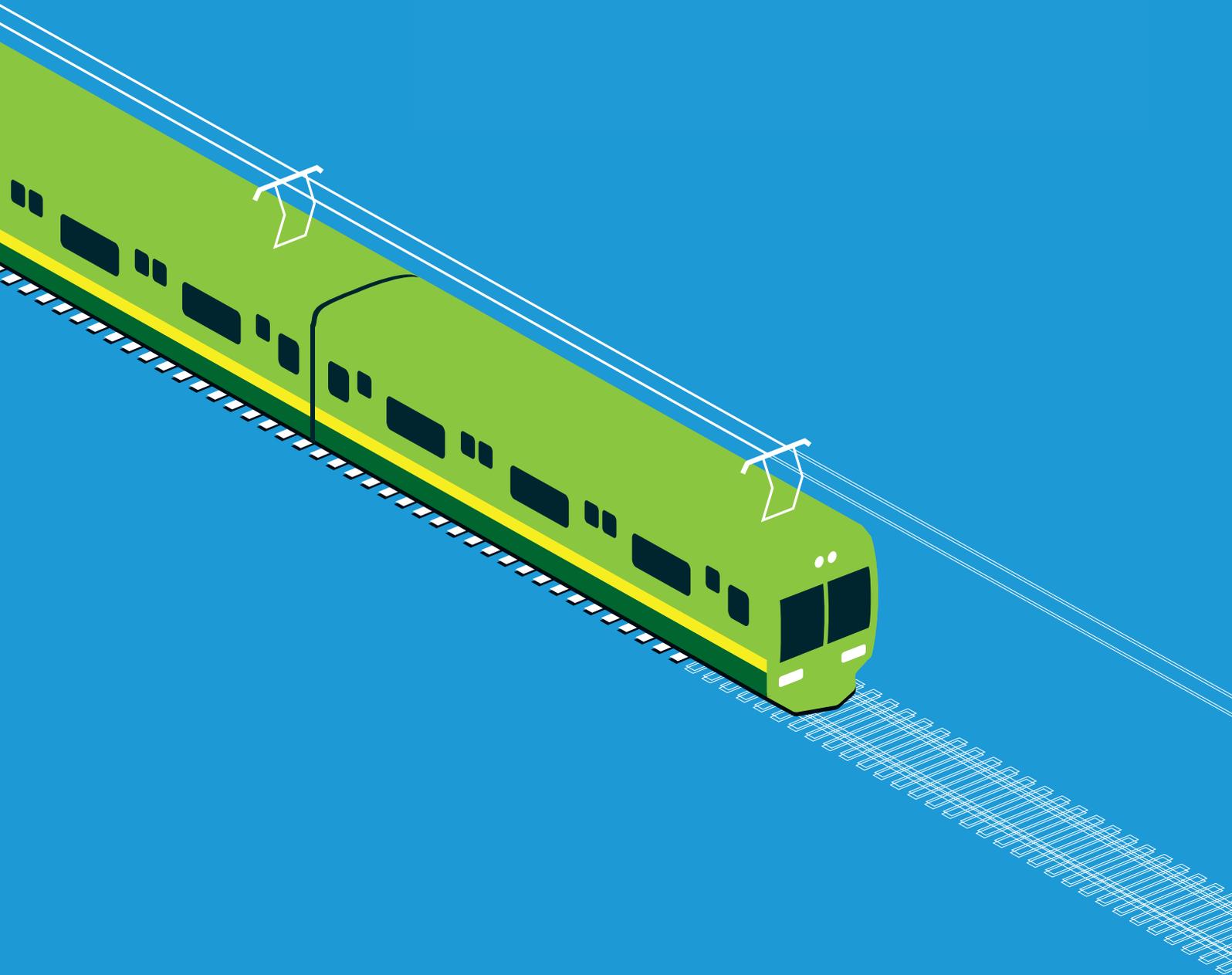
- Irish Water's wastewater treatment works at Malahide.

Along with ongoing consultations, technical and construction related solutions will seek to minimise these in subsequent design stages. Construction requirements (including potential temporary interference of property rights) and methodologies will be presented at Public Consultation No. 2

Refer to Annex 3.4: Works around Malahide Station for more detailed information.

Section 10

Works around Clongriffin Station



10 Works around Clongriffin Station

This section provides an outline of the assessment undertaken around Clongriffin Station.

10.1 Context

Clongriffin Station is located on the Northern Line at approximate mileage 6 miles. The centre of the station is located at 723085.417E, 740791.354N based on the ITM grid system.

There are three platforms at Clongriffin Station: Platform 1 is located on the Up Line (trains travelling to Dublin), Platform 2 is on the Down Line (trains travelling from Dublin) and Platform 3 is located on a passing loop off the Down Line. All platforms are 190m long. Access to the platforms is provided by an existing pedestrian overbridge at the station. The station was designed and constructed with a fourth track in mind and has an unused platform face which is not currently served by track.

The OHLE was extensively reconfigured and renewed when the station was built in 2010 and consequently is still in good condition. The OHLE is supported by portal frames mounted on masts on the platforms. In the station surrounds, the OHLE is instead supported on single track cantilevers.

Clongriffin Station is within the administrative area of Fingal County Council, located to the north of Donaghmede, approximately 5km east of the M1/M50 interchange and to the west of the former Baldoyle racecourse.

Much of the land to the west of the existing station and rail line is well developed, with residential and commercial development in the vicinity. There is further development planned/underway to the east of the existing station, where lands are zoned for residential development in the current Fingal Development Plan 2017 – 2023. Refer to Annex 3.1 *Constraints Report* for details of relevant existing planning applications. Areas to the north (east and west of the existing railway line), are currently zoned as high amenity areas.

The River Mayne crosses under the railway line approximately 1km north of the existing station before discharging to the Baldoyle Estuary to the east. The estuary forms part of the Baldoyle Bay Special Area of Conservation (SAC) and Special Protection Area (SPA). There are also a number of other European sites in the wider area, including both SPAs and SACs.

An aerial view of the site is shown in **Figure 10-1**. The site under consideration is contained within Emerging Preferred Option Map 10.

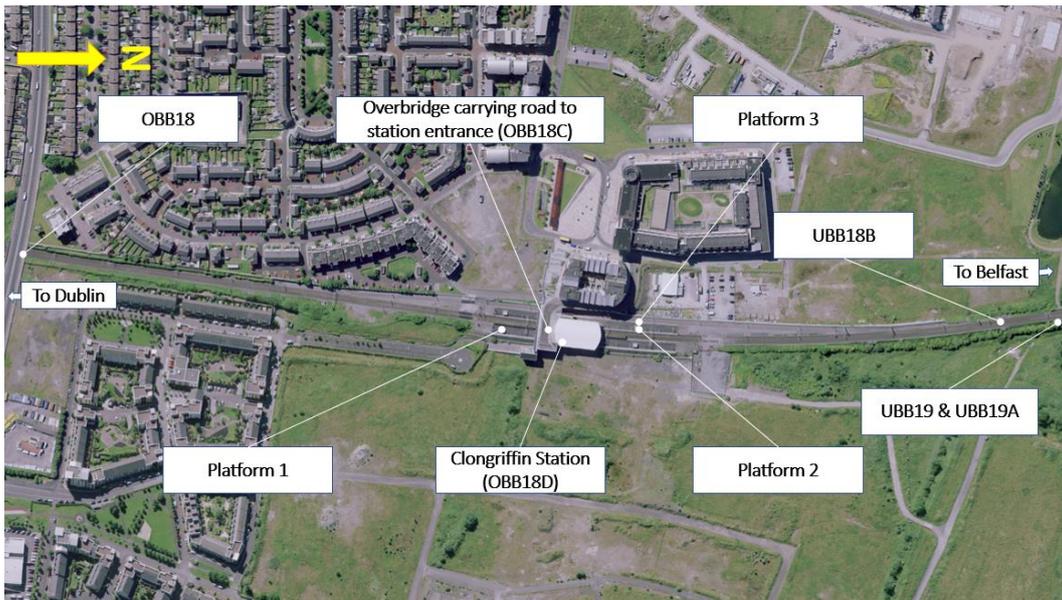


Figure 10-1: Aerial view of Clongriffin Station (source: Ordnance Survey of Ireland (OSI) aerial mapping)

10.2 Stage 1: Preliminary Sifting

In addition to general feasibility requirements (for example constructability, safety, technical standard compliance, etc.), the specific requirement for this area is to provide turnback infrastructure at Clongriffin which will meet the Train Service Specification (TSS).

The existing track layout would not provide sufficient operational capacity to enable turnback of services to return to the centre of Dublin and therefore track alterations, along with associated signalling, electrification and telecoms alterations are required.

A total of 7 options have been developed for this area (excluding the ‘Do-Nothing’ Option) as summarised in **Table 10-1**. Note there is not a suitable ‘Do-Minimum’ option for this assessment.

Table 10-1: Longlist of options considered for Works around Clongriffin Station

Option	Description
Option 0 “Do-Nothing”	Do-Nothing
Option 1	Increased speed on Platform 3
Option 2	Terminating trains on Platform 3
Option 3	New low speed Platform 0
Option 3A	New low speed Platform 0 with new crossover
Option 4	New low speed Platform 0 with new double crossover
Option 5	New higher speed Platform 0 and 3
Option 6	New higher speed Platform 3 and low speed Platform 0

Since the station was designed with a fourth track in mind, the options considered in this report are all broadly similar and examine the optimal arrangements for the fourth track.

Solutions to each would be generally similar in terms of the extent and type of additional equipment to be installed. Signalling could be designed to ensure that speeds are controlled according to the design of the track and turnouts.

The findings of the preliminary sifting are set out in **Table 10-2**.

Table 10-2: Summary of Longlist Sifting for Works around Clongriffin Station

Option	Description	Screening Result	Summary
Option 0 “Do-Nothing”	No interventions made to meet the project Objectives and Requirements	FAIL	Does not meet requirements due to the following: <ul style="list-style-type: none"> TSS requires 2 platforms dedicated to turning back trains due to dwell time, in addition to 2 platforms dedicated to through trains. Single platform would limit ability to regulate services (through constraint at Connolly) Single turnback would limit ability to recover in times of perturbation
Option 1	Increased speed on Platform 3	FAIL	Does not meet requirements due to the following: <ul style="list-style-type: none"> TSS requires 2 platforms dedicated to turning back trains due to dwell time, in addition to 2 platforms dedicated to through trains. Single platform would limit ability to regulate services (through constraint at Connolly) Single turnback would limit ability to recover in times of perturbation
Option 2	Terminating trains on Platform 3	FAIL	Does not meet requirements due to the following: <ul style="list-style-type: none"> TSS requires 2 platforms dedicated to turning back trains due to dwell time, in addition to 2 platforms dedicated to through trains. Single platform would limit ability to regulate services (through constraint at Connolly) Single turnback would limit ability to recover in times of perturbation

Option	Description	Screening Result	Summary
Option 3	New low speed Platform 0	FAIL	Does not meet requirements due to the following: <ul style="list-style-type: none"> TSS requires 2 platforms dedicated to turning back trains due to dwell time, in addition to 2 platforms dedicated to through trains. Single platform would limit ability to regulate services (through constraint at Connolly) Single turnback would limit ability to recover in times of perturbation
Option 3A	New low speed Platform 0 with new crossover	PASS	Meets project objectives and requirements
Option 4	New low speed Platform 0 with new double crossover	PASS	Meets project objectives and requirements
Option 5	New higher speed Platforms 0 and 3	PASS	Meets project objectives and requirements
Option 6	New higher speed Platform 3 and low speed Platform 0	PASS	Meets project objectives and requirements

10.3 Stage 2: MCA

Options 3A, 4, 5 and 6 passed preliminary sifting and were taken forward to MCA.

10.3.1 Option 3A

For Option 3A new trackwork to utilise the existing unused platform face to the east of the station along with a crossover on the mainline are introduced. In this option, terminating trains will typically use Platform 2 but the option offers significant flexibility to plan services. The flexibility would include the ability for trains to pass through Platforms 1 and 2 at speed.

New OHLE masts and support structures will be required to facilitate the new track layout. This would likely be via new headspans or portal frames. Cantilevers could be used from the existing masts in locations where this is suitable.

Reconfigurations to the signalling will be required to accommodate the new tracks and control new points and crossings.

This option does not have an impact on any of the existing major civil/bridge structures identified in this area. A new retaining structure (approx. 400 m long), parallel to the proposed platform, will be required to retain the earthworks associated with the level difference between proposed track and existing ground levels. Culvert UBB18A is likely to require widening.

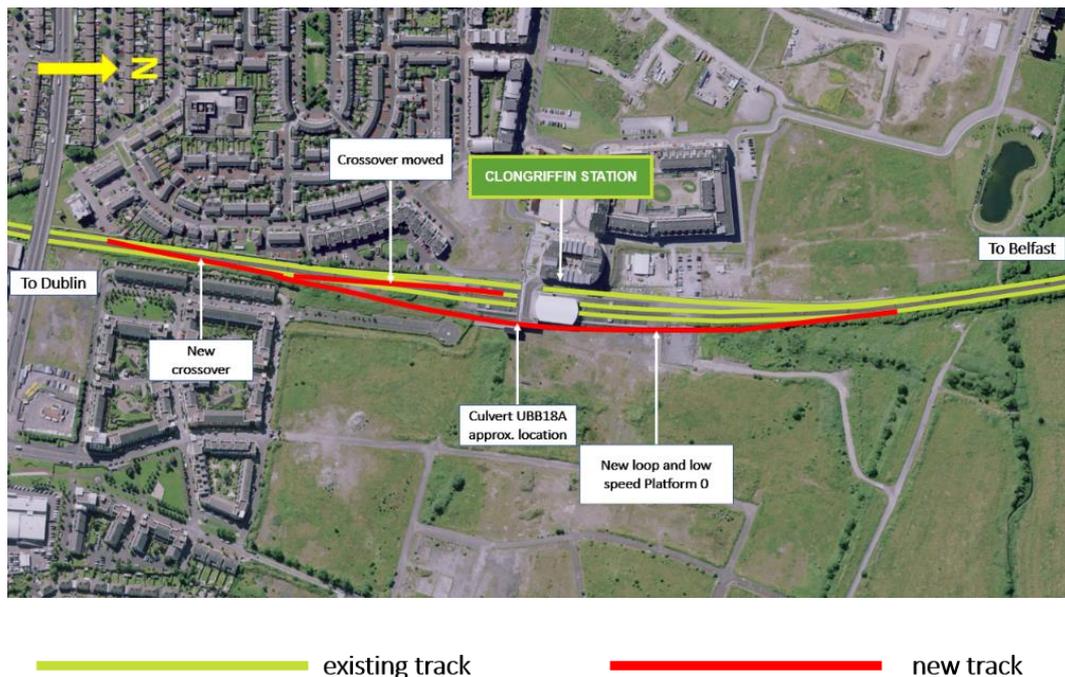


Figure 10-2: Aerial view of Option 3A

10.3.2 Option 4

For Option 4, new trackwork to utilise the existing unused platform face to the east of the station and a double crossover are introduced. Terminating trains will use the existing unused platform face and Platform 3, although the use of either platform would result in conflicting moves. In this option, the platforms can also be used to hold a DART service to allow a non-stop service to pass.

This option requires comparable interventions from an OHLE, signalling, civils and structural perspective in relation to the other shortlisted options.

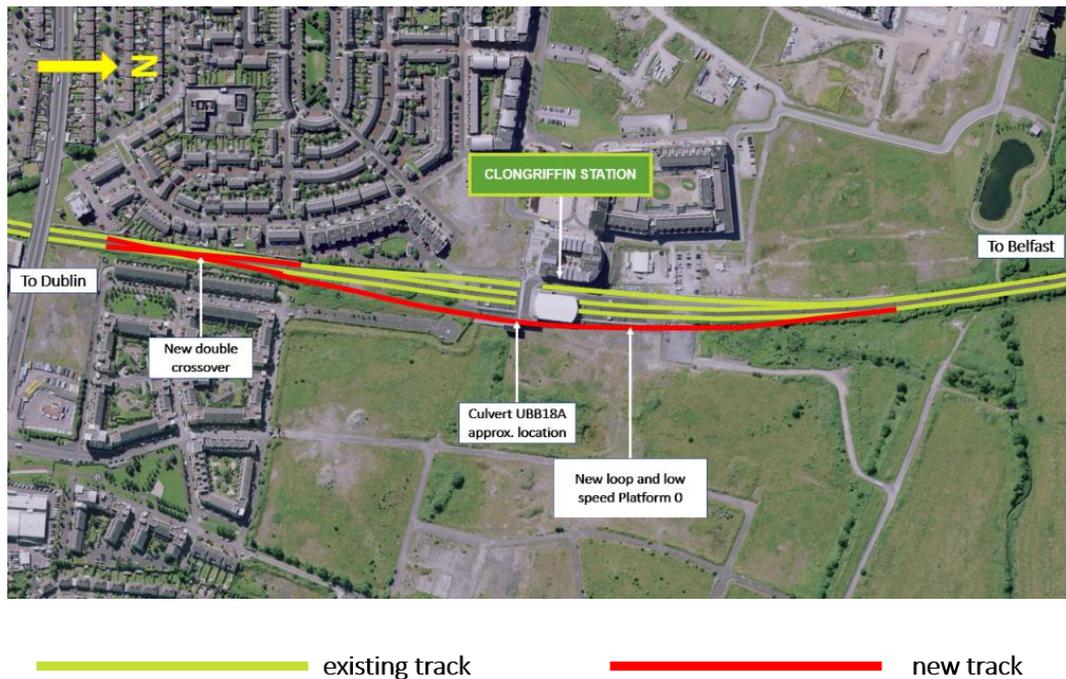


Figure 10-3: Aerial view on Option 4

10.3.3 Option 5

Option 5 involves the introduction of new trackwork to utilise the existing unused platform face to the east of the station and alteration of the existing track to Platform 3. Both are suitable for higher speeds. In this option, the terminating trains would use Platforms 1 and 2, and the platforms can also be used to hold a DART service to allow a non-stop service to pass.

This option requires comparable interventions from an OHLE and signalling perspective, although it should be noted that OHLE alterations will be required over a greater length of track.

From a structural perspective, the option requires a greater length of retaining wall (circa 850m long) to accommodate the new track. Widening/replacement would be required for UBB19, along with culverts UBB18A and UBB19A.

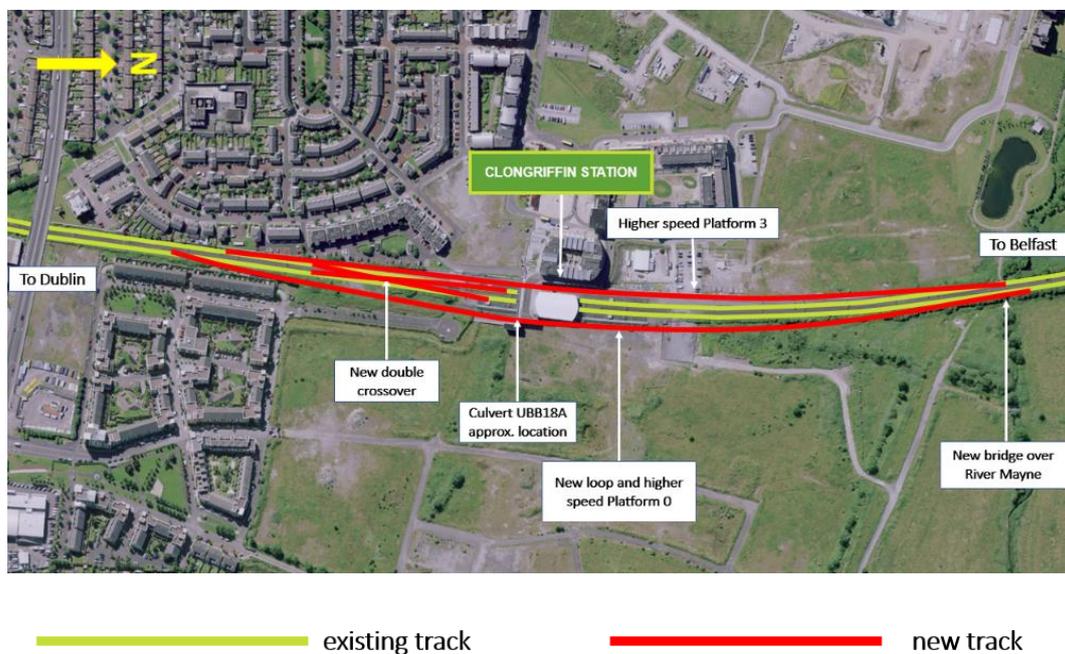


Figure 10-4: Aerial view on Option 5

10.3.4 Option 6

Option 6 involves introduction of new trackwork to utilise the existing unused platform face to the east of the station. The track at Platform 3 would be altered to suit higher speeds. Terminating trains would use the new platform and Platform 2. A new crossover would be required.

This option requires comparable interventions to the other shortlisted options from an OHLE and signalling perspective, although it should be noted that OHLE alterations will be required over a greater length of track, albeit less than Option 5 due to the new platform being lower speed and hence a lesser length of track.

From a structural perspective, a new retaining wall (approx. 70 m long) north of Clongriffin Station is required to contain the earthworks to the west of the proposed alignment, along with a 450 m long retaining wall to the east.

Culverts UBB18B and UBB19A are likely to require widening.

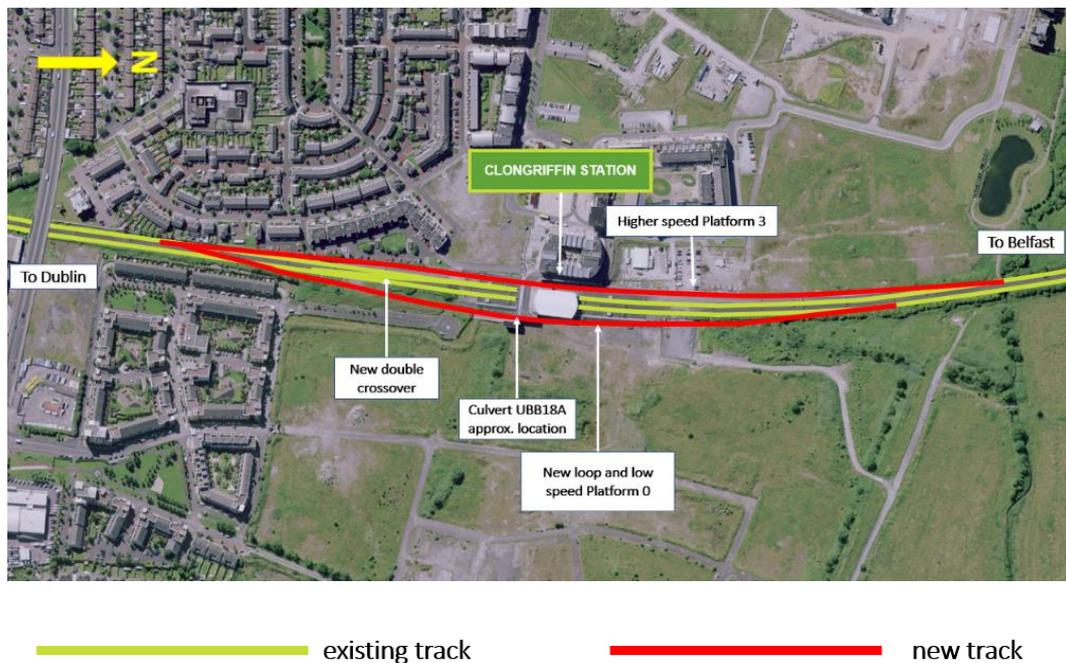


Figure 10-5: Aerial view on Option 6

10.3.5 MCA Findings

The findings from the MCA process are set out in **Table 10-3**.

Table 10-3: Overall criteria MCA summary table for Works around Clongriffin Station

	Option 3A	Option 4	Option 5	Option 6
Criteria Summary	New low speed Platform 0 with new crossover	New low speed Platform 0 with new double crossover	New higher speed Platform 0 and Platform 3	New higher speed Platform 3 and low speed Platform 0
Economy				
Safety				
Environment				
Accessibility & Social Inclusion				
Integration				
Physical Activity				

Table 10-4: Legend for MCA Summary Tables

Significant comparative advantage over other options
Some comparative advantage over other options
Comparable to other options / neutral
Some comparative disadvantage over other options
Significant comparative disadvantage over other options

Option 3A is identified as the Emerging Preferred Option in respect of the Works around Clongriffin Station. The basis for the selection of Option 3A as the preferred option is as follows:

Economy: Options 3A and 4 have significant comparative advantage over other options from a capital expenditure perspective due to less significant structural works and the simpler points and crossings required. They both also have significant advantage from a traffic functionality point of view. Whilst Option 5 is the strongest from a train operations perspective, slightly ahead of Option 3A, this is not enough to change the overall outcome. Option 3A has advantages from a train operations perspective over Option 4, making it the preferred option overall.

In terms of Economy, Option 3A is the preferred option

Safety: There is no comparative advantage or disadvantage between the options.

In terms of Safety, all options are identified as comparable

Environment: Options 3A and 4 have significant advantage over both Options 5 and 6 from biodiversity and noise and vibration perspectives. Similarly, Options 3A, 4 and 6 have advantages over Option 5 from landscape and visual, water

resources and geology and soils perspectives. The disadvantages to Options 5 and 6 are primarily due to the greater site extents affecting the surrounding environment, and in particular, Mayne River and associated SAC lands.

In terms of Environment, Options 3A and 4 are the preferred options

Accessibility and Social Inclusion: There is no comparative advantage or disadvantage between the options. All options present various opportunities to improve general accessibility at platforms with none of notable advantage over the others.

In terms of Accessibility and Social Inclusion, all options are identified as comparable

Integration: There is no comparative advantage or disadvantage between the options. This criterion is not relevant for this zone.

In terms of Integration, all options are identified as comparable

Physical activity: There is no comparative advantage or disadvantage between the options. This criterion is not relevant for this zone.

In terms of Physical Activity, all options are identified as comparable

10.4 Emerging Preferred Option

The Emerging Preferred Option for turnback facilities at Clongriffin Station focuses construction east of the railway. It is proposed to use the platform face that was constructed when the station was originally built but is not currently served by any tracks.

Modifications will be made to the track alignment to the south of the station to allow trains to access the new platform. New OHLE and signalling installations as well as modifications to the existing telecoms systems would be required.

Further design development will take place at the next stage of the project. Based upon the level of information at the current concept design stage for Public Consultation No. 1, the following property rights may be temporarily affected during construction:

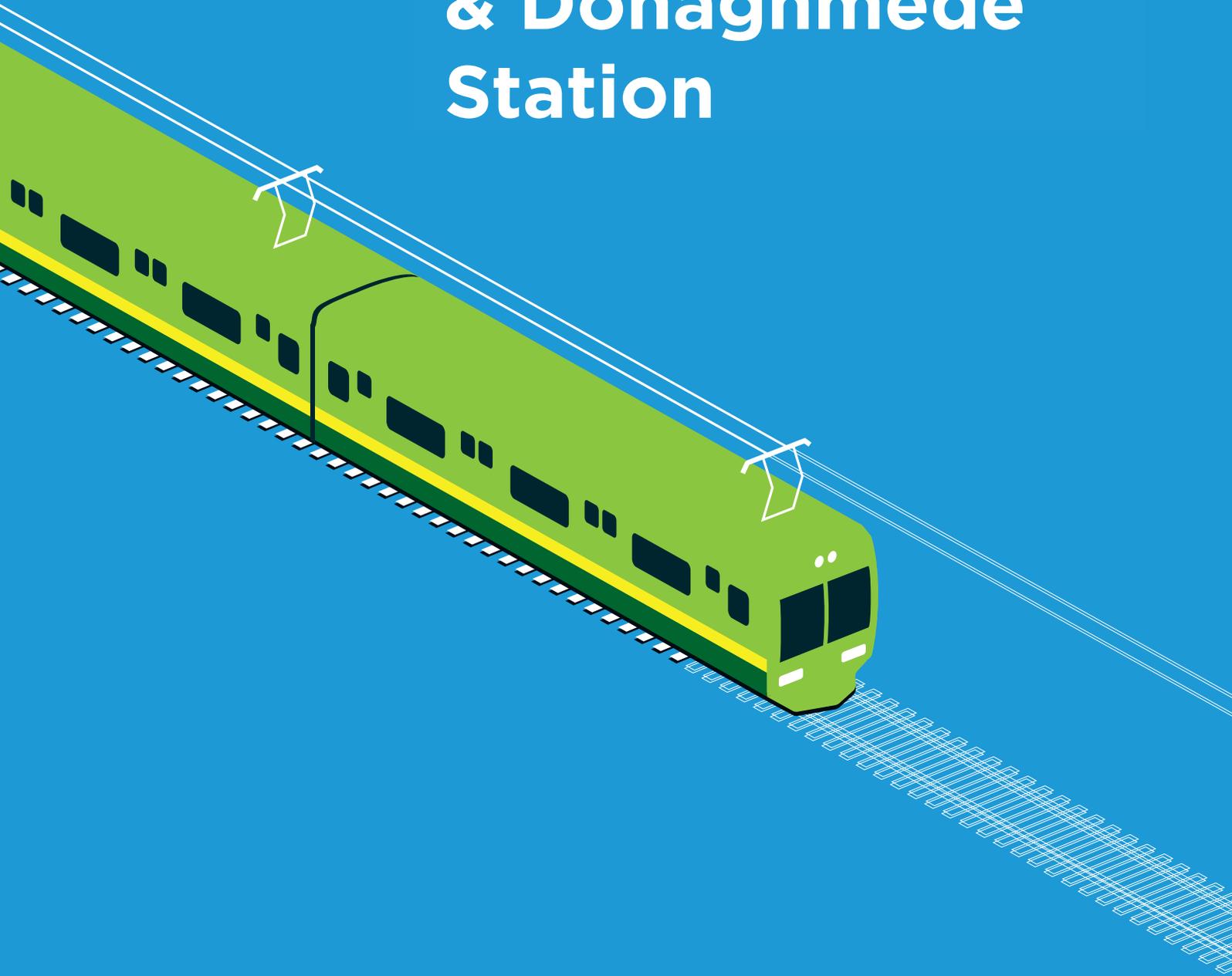
- The development area to the east.

Along with ongoing consultations, technical and construction related solutions will seek to minimise these in subsequent design stages. Construction requirements (including potential temporary interference of property rights) and methodologies will be presented at Public Consultation No. 2.

Refer to Annex 3.5: *Works around Clongriffin Station* for more detailed information.

Section 11

Works around Howth Junction & Donaghmede Station



11 Works around Howth Junction & Donaghmede Station

This section provides an outline of the optioneering undertaken for works around Howth Junction & Donaghmede Station.

11.1 Works around Howth Junction & Donaghmede Station

11.1.1 Context

Howth Junction & Donaghmede Station is located at the point where the Northern Line and the Howth Branch diverge from each other – see **Figure 11-1** and Emerging Preferred Option map 5 of 38 in Annex 1.

Howth Junction & Donaghmede Station comprises four platforms: Platforms 1 and 2 are located on the Howth Branch, and Platforms 3 and 4 are located on the Up and Down Northern Line respectively. Access to Platforms 2 and 3 is provided by the existing station pedestrian footbridge (OBQ0). An aerial view of the site is shown in **Figure 11-1**, with a focus on station structures provided in **Figure 11-2**.

The study area is northeast of Dublin City, straddling the administrative areas of Dublin City Council (to the east and south) and Fingal County Council (most of the study area, to the north and west). The station and Howth Branch are wholly within the Fingal County Council administrative area.

The area around the railway line in the vicinity of the proposed works is well developed, with Howth Junction Business Park to the south of the railway, Baldoyle Industrial Estate to the north, and residential development to the northwest, south and east.

The R104 Tongleegee – Kilbarrack Road crosses the railway to the south (on the mainline) with Naomh Barrog GAA (Gaelic Athletic Association) club and Bayside National School located to the south/southeast of the Howth Branch.

There are no European sites in the immediate vicinity, with Baldoyle Bay Special Area of Conservation (SAC), Special Protected Area (SPA) and Proposed Natural Heritage Area (pNHA) sites located to the northeast and North Dublin Bay SAC and pNHA and North Bull Island SPA located to the southeast, respectively. Further to the east and south, there are a number of European sites, including Ireland's Eye SAC, SPA and pNHA, Rockabill to Dalkey Island SAC, Howth Head SAC and

pNHA, as well as South Dublin Bay and River Tolka Estuary SPA and South Dublin Bay SAC and pNHA.



Figure 11-1: Aerial view on Howth Junction & Donaghmede Station (source: OSI aerial mapping)

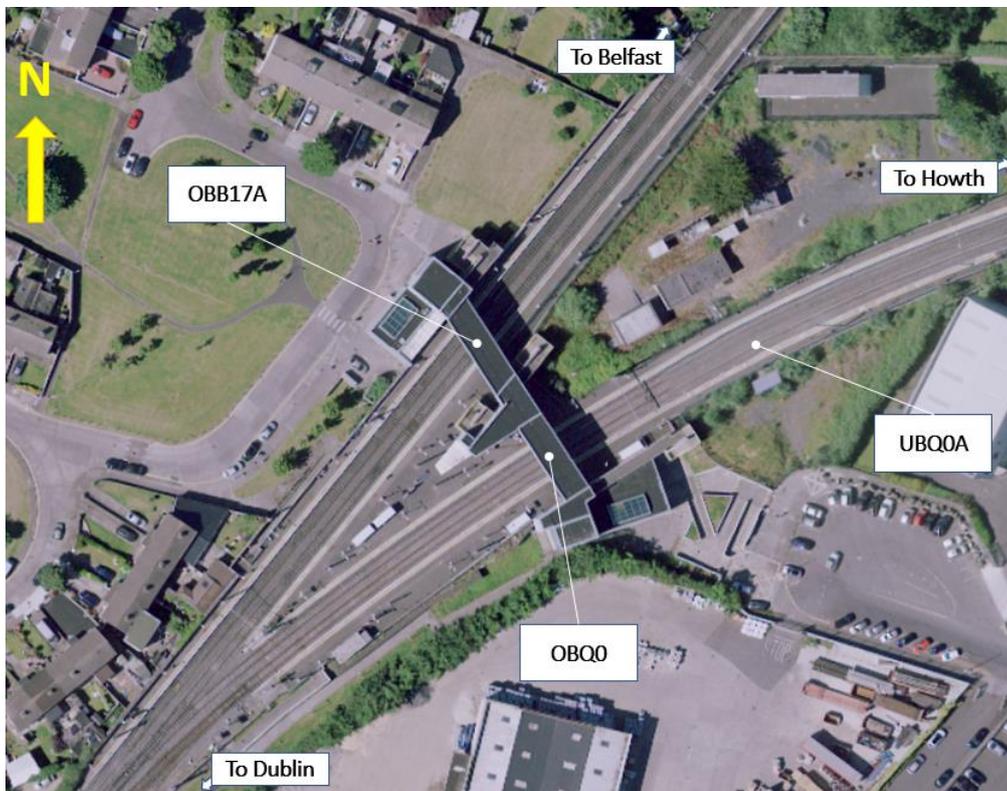


Figure 11-2: Aerial view of existing structures located within the vicinity of Howth Junction & Donaghmede Station (source: OSI aerial mapping)

11.1.2 Stage 1: Preliminary Sifting

The works around Howth Junction & Donaghmede Station predominantly relate to enabling the use of a shuttle service on the Howth Branch. By removing crossing conflicts at Howth Junction, a shuttle DART operation between Howth and Howth Junction & Donaghmede Stations will maximise frequency and reliability on the Northern Line.

In addition to general feasibility requirements (for example constructability, safety, technical standard compliance etc.) the specific requirement for this area is to provide turnback infrastructure at Howth Junction & Donaghmede Station which will meet the TSS and increase capacity on the Northern Line.

The existing track layout would not provide sufficient operational capacity to enable turnback of services to return to the centre of Dublin and therefore track alterations, along with associated signalling, electrification and telecoms alterations are required.

A total of 9 options have been developed for this area (excluding the ‘Do-Nothing’ Option) as summarised in **Table 11-1**. Note there is not a suitable ‘Do-Minimum’ option for this assessment.

Table 11-1: Longlist of options considered for Works around Howth Junction & Donaghmede Station

Option	Description
Option 0 “Do-Nothing”	Do-Nothing
Option 1	Platform 1 via new crossover on straight
Option 2	Platform 1 via new crossover on curve
Option 3	Platform 2 using crossover and Platform 1 trap
Option 4	Stopping up of Platform 2
Option 5	Signalling overlap on Platform 2
Option 6	New platform behind to Platform 2 on a curve
Option 7	New platform behind to Platform 2 on a straight alignment
Option 7A	New platform behind to Platform 2 with reduced curve alignment
Option 8	Option 5 but only using half-length units (HLU) in majority of services of services on branch

For those options that require signalling or OHLE changes, the solutions to each will involve relatively minor revisions in terms of the additional equipment to be installed and the type of equipment to be utilised. Specific details will, however, differ between the various options.

The findings of the preliminary sifting are set out in **Table 11-2**.

Table 11-2 Summary of Longlist Sifting for Works around Howth Junction Donaghmede Station

Option	Description	Screening Result	Summary
Option 0 “Do-Nothing”	No interventions made to meet the project objectives and requirements	FAIL	The constraint on operations will make the TSS unachievable especially in times of perturbation
Option 1	Platform 1 via new crossover on straight	PASS	Met project objectives and requirements
Option 2	Platform 1 via new crossover on curve	PASS	Met project objectives and requirements
Option 3	Platform 2 using new crossover and Platform 1 trap	FAIL	Failed on the basis this has disadvantages when compared to Option 5 and no benefits when compared to Option 5
Option 4	Stopping up of Platform 2	FAIL	Failed as the option of through running from the Northern Line to the Howth Branch is NOT maintained in both directions.
Option 5	Signalling overlap on Platform 2	PASS	Met project objectives and requirements
Option 6	New platform behind to Platform 2 on a curve	FAIL	Failed on the basis this has disadvantages compared to Option 7A and no benefits.
Option 7	New platform behind to Platform 2 on a straight alignment	FAIL	Failed on the basis this has disadvantages compared to Option 7A and no benefits.
Option 7A	Install new platform behind existing Platform 2 on a similar alignment for terminating services	PASS	Met project objectives and requirements.
Option 8	Option 5 but only using HLU in majority of services on branch	FAIL	Failed to meet the TSS requirement to use full-length units (FLUs).

11.1.3 Stage 2: MCA

Options 1, 2, 5 and 7A passed preliminary sifting and were taken forward to MCA.

11.1.3.1 Option 1

For Option 1, a new crossover from the Up Howth Branch to the Down Howth Branch is introduced to allow terminating trains to use Platform 1 on the straight section of track.

OHLE masts and a variety of support structures will be needed to provide the revised OHLE configuration to equip the new crossover. Additional headspans or portal frames will be used to span the new crossover. Cantilevers from the existing masts may be used in locations where these are suitable.

Additional signals and point machines will be required to accommodate the new crossover.



Figure 11-3: Aerial view of Option 1

11.1.3.2 Option 2

Similar to Option 1, this option introduces a new crossover from the Up Howth Branch to the Down Howth Branch to allow terminating trains to use Platform 1. Option 2, however, has the crossover located on the curve. The points on Platform 1 can be set such that terminating trains have no effect on mainline signalling.

As in Option 1, this option also impacts a few existing OHLE structures on the Up and Down Howth Branch and new OHLE wires for the new proposed crossover will be required.

Additional signals and point machines will be required to accommodate the new crossover.



Figure 11-4: Aerial view of Option 2

11.1.3.3 Option 5

Option 5 involves the installation of new signalling along Platform 2 to allow sufficient space for terminating trains to stop without disrupting the mainline (achieved by providing 90m of overrun protection). It requires a platform extension to the east to offset the required stopping position in advance of the signal. A new crossover is required to enable trains on the Howth Branch to access Platform 1.

Two existing OHLE structures on the Down Howth Branch will need to be replaced because they interfere with the proposed platform. Alternative support structures will be required along the extended platform.

The option will require changes to the existing signalling, including the relocation of trackside location cases. Existing cabling will also need to be replaced and signalling scheme plans and other documentation will need to be updated.

Changing the platform length will require new lighting surveys to be carried out and possibly new lighting to be installed. This will also impact the existing placement of Driver Only Operation (DOO) CCTV (closed-circuit television) which will need to be re-assessed and altered as required.

The existing platform will be widened to the rear to allow passengers to access the new platform extension without compromising the circulation space for the existing platform. A new retaining structure (<1m height) may be required along the back of the platform extension. The existing culvert UBQ0A may be affected.



Figure 11-5: Aerial view of Option 5

11.1.3.4 Option 7A

Option 7A involves construction of a new platform behind the existing Platform 2 on a similar alignment for terminating services. Due to the location of the existing Signalling Equipment Building (SEB) and adjacent technical rooms, this new platform will affect the cable routes into the buildings and potentially affect some of the buildings themselves.

OHLE masts and a variety of support structures will be required to facilitate the new platform and track. Headspans or portal frames will be used. Cantilevers from existing masts may be used in locations where this is suitable.

Additional signals and point machines will be required to serve the new platform, along with associated trackside infrastructure to connect them to the SEB. Using the new platform for terminating trains would be ideal from a signalling perspective as it would have no impact on the running of trains on the mainline.

Adding a new platform will require new lighting surveys to be carried out and new lighting to be installed. A new DOO CCTV installation will also be required at the new platform. Customer information services will also have to be updated to reflect the change, and possibly new systems installed.

A new retaining structure may be required along the back of the platform extension. The existing culvert UBQ0A may be affected, along with UBQ0B, depending on its exact location.



Figure 11-6: Aerial view of Option 7A

11.1.3.5 MCA Findings

The findings from the MCA process are set out in **Table 11-3**

Table 11-3: Overall criteria MCA summary table for Works around Howth Junction & Donaghmede Station

Criteria Summary	Option 1	Option 2	Option 5	Option 7A
		Platform 1 via new crossover on straight	Platform 1 via new crossover on curve	Signalling overlap on Platform 2
Economy				
Safety				
Environment				
Accessibility & Social Inclusion				
Integration				
Physical Activity				

Table 11-4: Legend for MCA Summary Tables

Significant comparative advantage over other options
Some comparative advantage over other options
Comparable to other options / neutral
Some comparative disadvantage over other options
Significant comparative disadvantage over other options

Option 5 has been identified as the Emerging Preferred Option in respect of the Works around Howth Junction and Donaghmede Station. The basis for the selection of Option 5 is as follows:

Economy: Options 2 and 5 have comparative advantage over other options as they require lesser construction and alteration works than 7A, so they can be delivered for a lower capital cost. Option 5 performs better operationally than Option 2 because the trains can use two platforms instead of just one as is the case in Option 2.

In terms of Economy, Options 2 and 5 are the preferred options

Safety: Options 5 and 7A have significant advantage over the other options as they provide additional platform space to accommodate increased passenger numbers and reduce crowding.

In terms of Safety, Option 7A is the preferred option

Environment: Options 5 and 7A have comparable advantage from a noise and vibration perspective. All other environmental factors are deemed comparable across the four options.

In terms of Environment, Options 5 and 7A are the preferred options

Accessibility and Social Inclusion: Option 7A has comparable advantage over the other options since the wider platform and greater space gives improved passenger flows, whilst its location means the majority of services can use Platform 2 and hence passengers getting connecting services in the morning can avoid using a footbridge.

In terms of Accessibility and Social Inclusion, Option 7A is the preferred option

Integration: There is no comparative advantage or disadvantage between the options. This criterion is not relevant for this zone.

In terms of Integration, all options are identified as comparable

Physical activity: There is no comparative advantage or disadvantage between the options.

In terms of Physical Activity, all options are identified as comparable

11.1.4 Emerging Preferred Option

The Emerging Preferred Option for turnback facilities at Howth Junction and Donaghmede Station, Option 5, focuses construction north of the Howth Branch, extending the existing Platform 2 to allow the platform to be used by services from Howth without impacting on services running along the Northern Line.

Modifications will be made to track to include a new crossover east of the platforms. Alterations to existing OHLE, signalling and telecoms will be required.

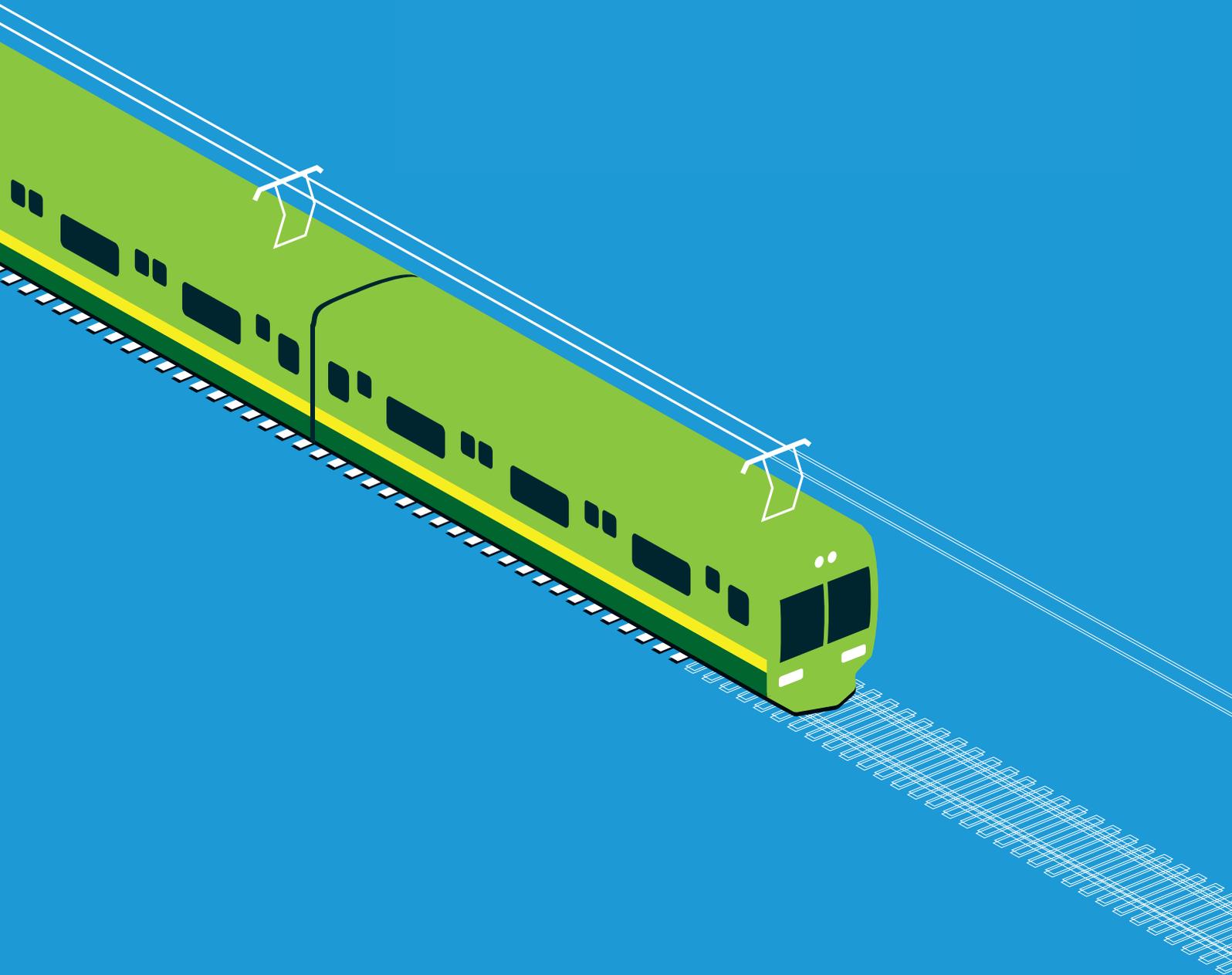
As the Howth Branch will largely operate as a shuttle service, consideration will be given to what improvements to station facilities will be made to provide a satisfactory customer experience.

There may be temporary interference with property rights during construction of the permanent works along the rail corridor, however technical and construction related solutions will seek to minimise these. Construction requirements (including potential temporary interference of property rights) will be presented at Public Consultation No. 2.

Refer to Annex 3.6: *Works around Howth Junction & Donaghmede Station* for more detailed information.

Section 12

Howth Branch Level Crossings



12 Howth Branch Level Crossings

This section provides an outline of the assessment undertaken for the existing level crossings on the Howth Branch.

There are four level crossings located on the Howth Branch, as listed below:

- Baldoyle Road Level Crossing;
- Sutton Level Crossing;
- Cosh Level Crossing;
- Claremont Level Crossing.

The location of these level crossings can be seen on the Emerging Preferred Option Maps in Annex 1.

The proposed changes to the Howth Branch, as defined in the Train Service Specification (TSS), will see both the service frequency and capacity increase, along with improvement to the reliability of timetabling. The effect of these changes on the barrier opening times of level crossings has been assessed for a variety of timetable scenarios, as shown in **Table 12-1**. TSS 1C assumes all Howth Branch trains will operate as a shuttle service at regular intervals between Howth and Howth Junction & Donaghmede stations (although some through trains off-peak may be timetabled). Services are assumed to change from a 3-4TPHPD service, that is dictated by the scheduling needs in other parts of the network, to a shuttle service, operating 6 full-length trains per hour (i.e. trains departing every 10 minutes).

A model of the existing and proposed barrier opening and closing timings has been developed to compare how running the current 3TPH timetable would affect level crossing closure times compared to the proposed 6TPH scenario. Further sensitivity analysis has been undertaken to test the robustness of the level crossing findings. Whilst the total closure time increases for most crossings, the maximum single closure time decreases.

For most crossings, the increased train frequency (6TPH scenario) results in the trains in opposite directions passing each other at or near to the crossings. As can be seen from **Table 12-1**, this results in 6 closures per hour to accommodate the passing trains. The exception to this is Cosh Level Crossing where trains do not pass near to the crossing and hence the number of closures here increases to 12 per hour.

The barrier opening and closing timings shown in **Table 12-1** have been used to inform a traffic model assessing the effects on vehicles, cyclists and pedestrians. The analysis indicates that this will lead to fewer, longer closures in the current 3TPH scenario being supplanted by more frequent, shorter closures in the proposed 6TPH scenario. This change is a more optimal use of the level crossings. In the 3TPH scenario, the longer closure times result in significant queuing, with the corresponding longer opening times being excessive to dissipate such queues, while in the 6TPH scenario the closure pattern allows for traffic to be released in a more regular way. As such, this analysis has shown some overall improvement to the

surrounding vehicular flows and pedestrian experience following the change in train service specification.

The assessment to date concludes that the crossings can continue to operate and provide an appropriate level of cross connectivity and accessibility whilst still meeting the increased DART service frequency requirement.

Further survey data will be collected to validate the model and assumptions, and this information will be used to establish if the proposal to keep the level crossings in operation is feasible, or if more significant interventions are required at the crossings.

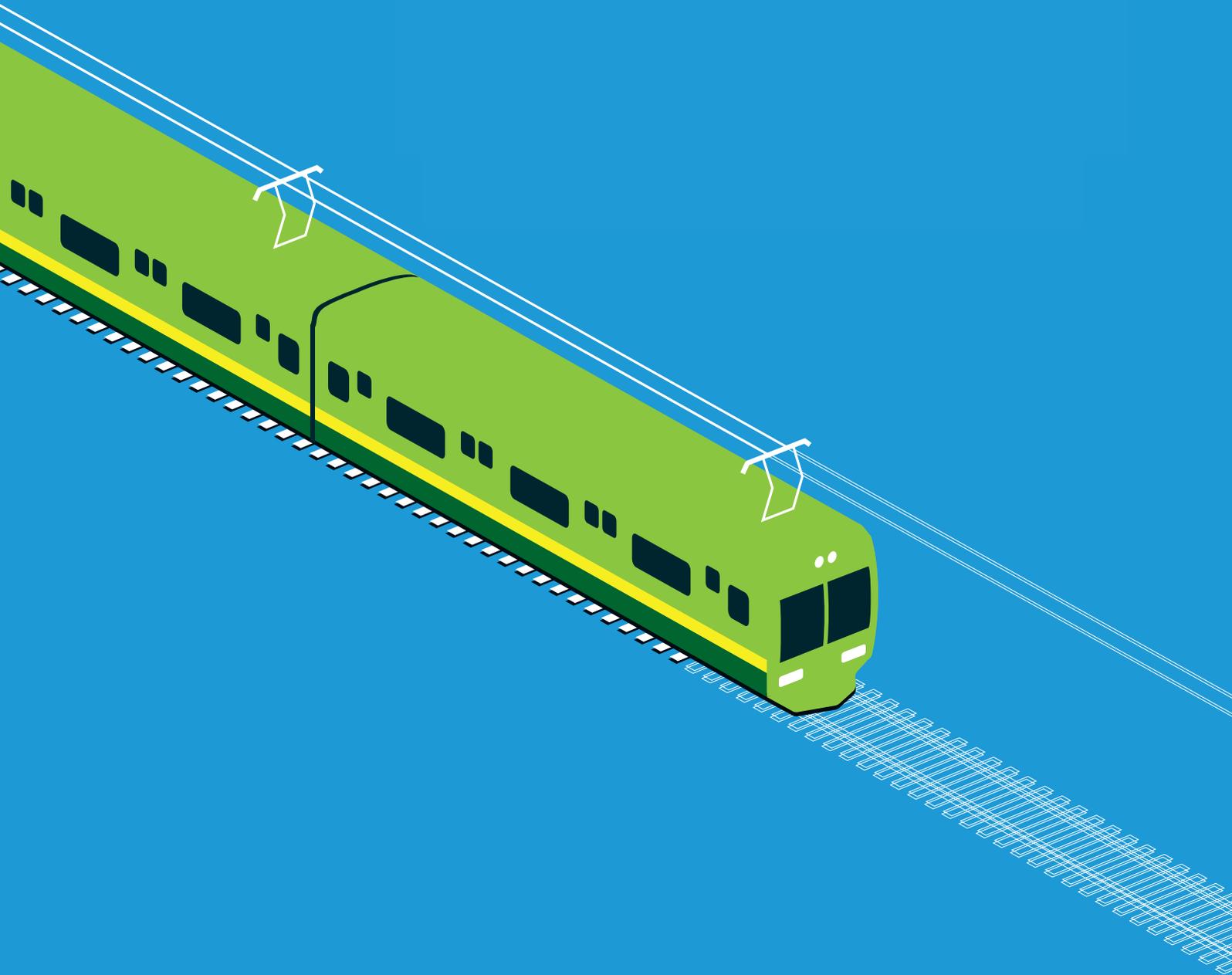
Refer to Annex 3.7: *Howth Branch Level Crossings* for more detailed information.

Table 12-1: Howth Branch level crossing timings

Baseline	3TPH Baseline with current through trains			Proposed 6TPH with shuttle service		
	Number of closures per hour	Total closure time per hour	Maximum single closure time	Number of Closures per hour	Total proposed closure time per hour	Maximum proposed single closure time
Baldoye Road Level Crossing	5	00:09:32	00:03:18	6	00:10:51	00:01:58
Sutton Level Crossing	3	00:12:21	00:05:00	6	00:30:54	00:05:26
Cosh Level Crossing	3	00:10:44	00:04:39	12	00:24:48	00:02:12
Claremont Level Crossing	5	00:16:37	00:06:40	6	00:26:42	00:04:44

Section 13

Emerging Preferred Option



13 Emerging Preferred Option

13.1 Description of proposed Emerging Preferred Option

The process to determine the ‘Emerging Preferred Option’, as described in Section 5 – Option Selection Process, has led to the identification of Emerging Preferred Options in respect of works required.

For the purpose of describing the end-to-end Emerging Preferred Option for the project, general linear works to facilitate electrification are described first followed by interventions at specific locations (from north to south) as follows:

- General linear works to facilitate electrification;
- Works around Drogheda MacBride Station;
- Works to the existing user worked level crossing south of Donabate;
- Works around Malahide Station;
- Works around Clongriffin Station;
- Works around Howth Junction & Donaghmede Station.

These location-specific interventions, together with general linear works along the full length of the project extents, are the key elements of the Emerging Preferred Option for the DART+ Coastal North project.

13.1.1 General Linear Works

The project will require a number of modernisations and modifications to some elements of the existing railway line infrastructure. There are a range of general works required on the project to enable the TSS requirements to be achieved:

Signalling and Telecommunications

- Signalling upgrades and additional signals will be required between Malahide and Drogheda;
- Minor changes will be required to signalling between East Wall Junction / Tolka River, north of Connolly Station and Malahide;
- Upgrades to the telecommunication systems will be required between East Wall Junction / Tolka River and Drogheda.

Electrification

- OHLE will be required to be extended from the current limit of electrification at Malahide through to Drogheda MacBride Station. This will be similar to the OHLE currently used on the existing DART network;
- 8 no. new electrical substations will be required at intervals along the rail line between Malahide and Drogheda to provide power to the network;

- Power supply upgrades may potentially be required on the Howth Branch, including provision of a new substation. Studies to confirm this requirement are ongoing;
- An assessment has been undertaken to review the existing clearances at all overbridges along the route in regard to future electrification requirements. The preliminary findings from the assessment conclude that a large proportion of the bridges have the necessary clearances and are unlikely to be impacted by the project. At this stage, the structures which will require reconstruction are those located in and around Drogheda MacBride Station and depot. Further studies and surveys are ongoing for a number of other bridges along the route which shall confirm the extent of interventions required to achieve the necessary clearance for OHLE. These interventions would typically include specialist electrical solutions, lowering the rail track under the bridge or making alterations to the existing bridge
- Localised modifications to underbridges/viaducts will be required to enable OHLE to be fixed to the structures at the following locations:
 - Malahide Viaduct;
 - Rogerstown Viaduct;
 - Balbriggan Viaduct;
 - Laytown Viaduct.
- Modifications to existing overbridge parapets between Malahide and Drogheda will be required to ensure that parapets are imperforate, climb-resistant and at least 1.8m high. This will reduce the risk of people coming into contact with the OHLE;
- Interfaces with existing utilities, boundary treatments (including new retaining walls and fencing), drainage works, vegetation management and other ancillary works will be required along the length of the project.

Works to the existing under worked level crossing south of Donabate

There is an existing user worked crossing between Malahide and Donabate (XB001) which provides the solitary access to the land east of the railway, which is owned by one landowner, on the edge of the Malahide Estuary.

The introduction of electrification and the increased train frequency significantly increases the safety risk of this level crossing to users of the crossing and to rail traffic.

The Emerging Preferred Option is to close the level crossing and IE to purchase the associated land to the east of the railway.

13.1.2 Depot Works

There will be localised modifications to the depot facilities at Drogheda and Fairview to cater for the changes in rolling stock. These modifications are predominantly internal within the existing depot buildings, although some localised exterior changes to tracks and railway systems will also be required. The depot at Drogheda will be electrified with OHLE.

13.1.3 Works around Drogheda MacBride Station

The changes at Drogheda MacBride Station predominately relate to the provision of new infrastructure to allow a greater number of services to turn back at Drogheda and return to Dublin. There are currently insufficient platforms to cater for the proposed service frequency at Drogheda MacBride Station, therefore an additional platform for turnback services is required.

The Emerging Preferred Option provides a new platform on the Drogheda freight sidings. The new platform extends over Dublin Road and therefore the existing Dublin Road Underbridge requires widening or replacement. The new platform will be interconnected with the existing Platform 1 and requires modification to allow for pedestrian movements to the new platform. Retaining walls and other civil engineering works are also required to accommodate the new platform. Other track modification and civils works are necessary to cater for the increase in train stabling requirements.

13.1.4 Works around Malahide Station

The works at Malahide Station relate to allowing a greater number of services to turn back to return to the centre of Dublin.

The Emerging Preferred Option is to introduce a turnback immediately north of Malahide Station between the Strand Road Underbridge and the Malahide Viaduct. This turnback will be situated between the two existing running lines which will necessitate the existing running lines to be slewed to the east between the two aforementioned bridges. This slewing will introduce the need to widen the existing embankment which will be facilitated by a retaining structure to be built alongside the realigned track.

New OHLE and signalling installations as well as modifications to the existing systems would be required. The turnback would have a lit staff walking route alongside it.

13.1.5 Works around Clongriffin Station

The works at Clongriffin Station relate to the provision of new infrastructure to allow a greater number of services to turn back to and return to the centre of Dublin.

The Emerging Preferred Option is to introduce a new loop to serve a platform to the east side of the station. It is proposed to use the platform face that was constructed when the station was originally built but is not currently served by any tracks.

Modifications will be made to the track alignment to the south of the station to allow trains to access the new platform. New OHLE and signalling installations, as well as modifications to the existing systems, would be required.

13.1.6 Works around ‘Howth Junction and Donaghmede’ Station and the Howth Branch

The works to increase capacity on the Northern Line predominantly relate to allowing a greater number of services to turn back at Howth Junction & Donaghmede Station.

The Emerging Preferred Option at Howth Junction & Donaghmede Station is to undertake signalling alterations and construct an extension to the existing Platform 2 to allow the platform to be used by a shuttle service from Howth without impacting on services running up the Northern Line. Further changes are required to the track to the east as well and associated modifications to the OHLE equipment.

Initial assessment of the four existing level crossings along the Howth Branch has indicated that these level crossings can continue to operate while still providing a more efficient service overall.

13.2 Construction Requirements

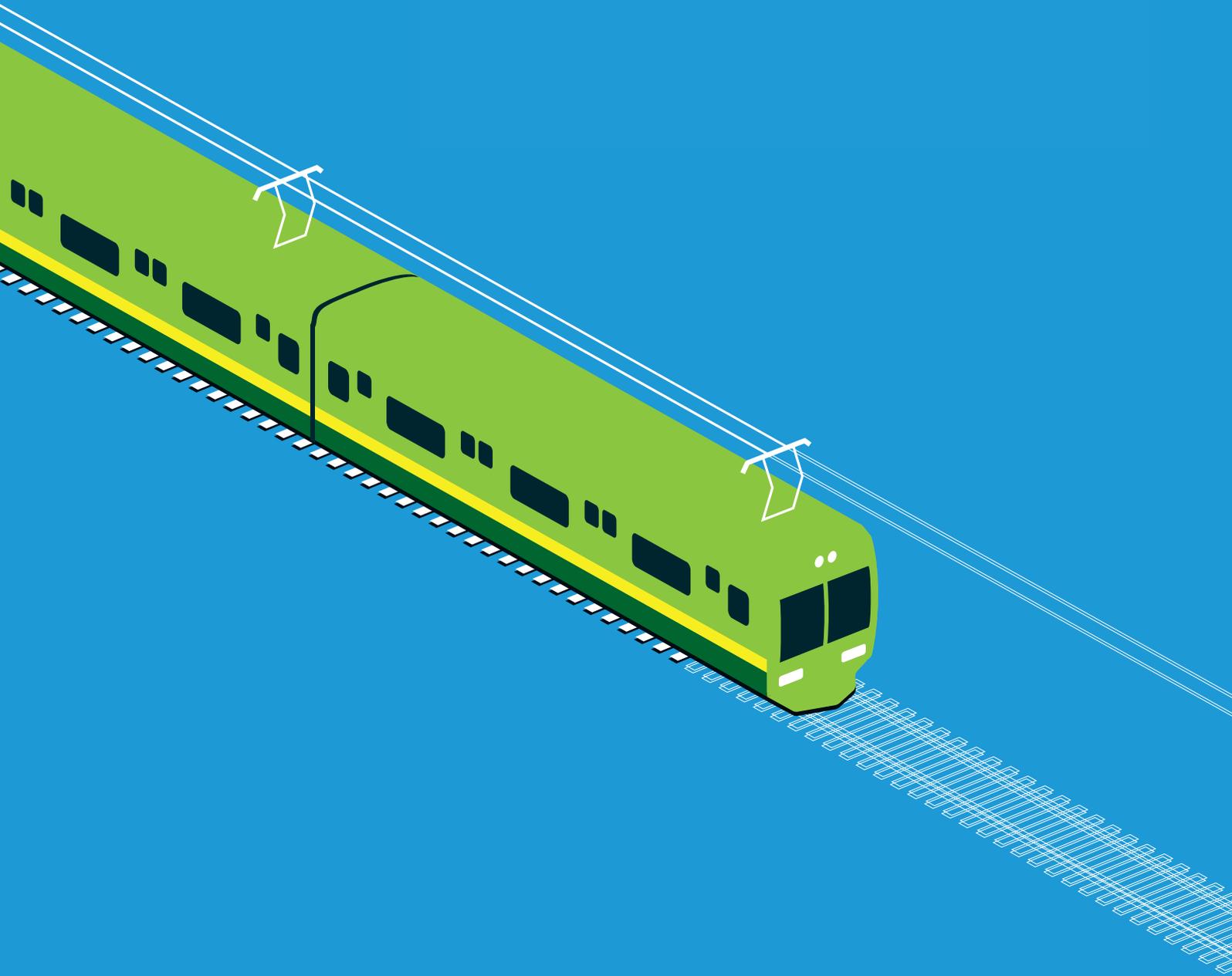
The level of information presented for Public Consultation No. 1 focuses on the early work undertaken to date in respect of the project, to explain the preliminary option selection process that has led to the identification of the end-to-end Emerging Preferred Option. The design will evolve and become more detailed over the forthcoming months and this information will be presented at Public Consultation No. 2. General considerations for the construction stage and details that will be presented during Public Consultation No. 2 include, for example:

- Construction works (including piling locations, crane positions and works required at substation locations, etc);
- Temporary bridge requirements and road closures;
- Traffic Management (including diversions);
- Utility diversions and related works;
- The location of contractor compounds during construction. In this regard, a series of construction compounds will be needed along the route;
- Equipment storage compounds.

Some of these will require locations outside of the existing rail corridor / Iarnród Éireann’s land and will require temporary or permanent land acquisition.

Section 14

Next Steps



14 Next Steps

14.1 Public Consultation 1 (PC1)

The preliminary option selection process and concept design development that has been undertaken has led to the development of the Emerging Preferred Option, which will be the focus of this public consultation. Following public consultation, all feedback will be reviewed and considered by the Project Team to inform the next stage of the design development.

Designs will be further developed and informed by further technical and environmental surveys and investigations, as well as consultations with property owners and other stakeholders. This will lead to the development of the Preferred Option that will be presented to the public at Public Consultation No. 2 (PC2). It is noted that the Preferred Option for the project may differ from the Emerging Preferred Option following consideration of observations from the public and following further development of the design.

All information gathered by the Project Team will be used to inform the design development of the project which will be the subject of the Environmental Impact Assessment (EIA) and Appropriate Assessment (AA) (if required), and ultimately the Railway Order (RO) application will be submitted to An Bord Pleanála (ABP).

14.2 Public Consultation 2 (PC2)

The Preferred Option will be presented to the public in PC2. It will include an enhanced level of detail to assist the public in appreciating the impacts and the benefits of the project. This will also facilitate the environmental assessment necessary for the Railway Order to be submitted to An Bord Pleanála.

14.3 Statutory Process

The Railway Order application process is set out in the Transport (Railway Infrastructure) Act 2001 (as amended) and the application will be submitted to An Bord Pleanála (ABP) for statutory approval. This is currently expected to be in the first quarter of 2023. An Environmental Impact Assessment Report (EIAR) will accompany the Railway Order Application. This will detail the nature and extent of the proposed project and identify and describe the impacts on the environment. It will also detail measures that will be taken to avoid, reduce and/or monitor these impacts.

The vast majority of the works for the project are anticipated to be on lands currently in the ownership of IÉ. Notwithstanding this, some works will require the acquisition of third party lands – either on a permanent or temporary basis. The design process will seek to minimise the need to acquire privately-owned lands.

A Compulsory Purchase Order is a legal function that allows certain statutory bodies, like IÉ, to acquire land and property for large projects such as road and railway schemes. Land, property, and other interests (including new rights) can only

be acquired once the Railway Order has been confirmed by ABP. Additional guidance on this matter will be provided at PC2.