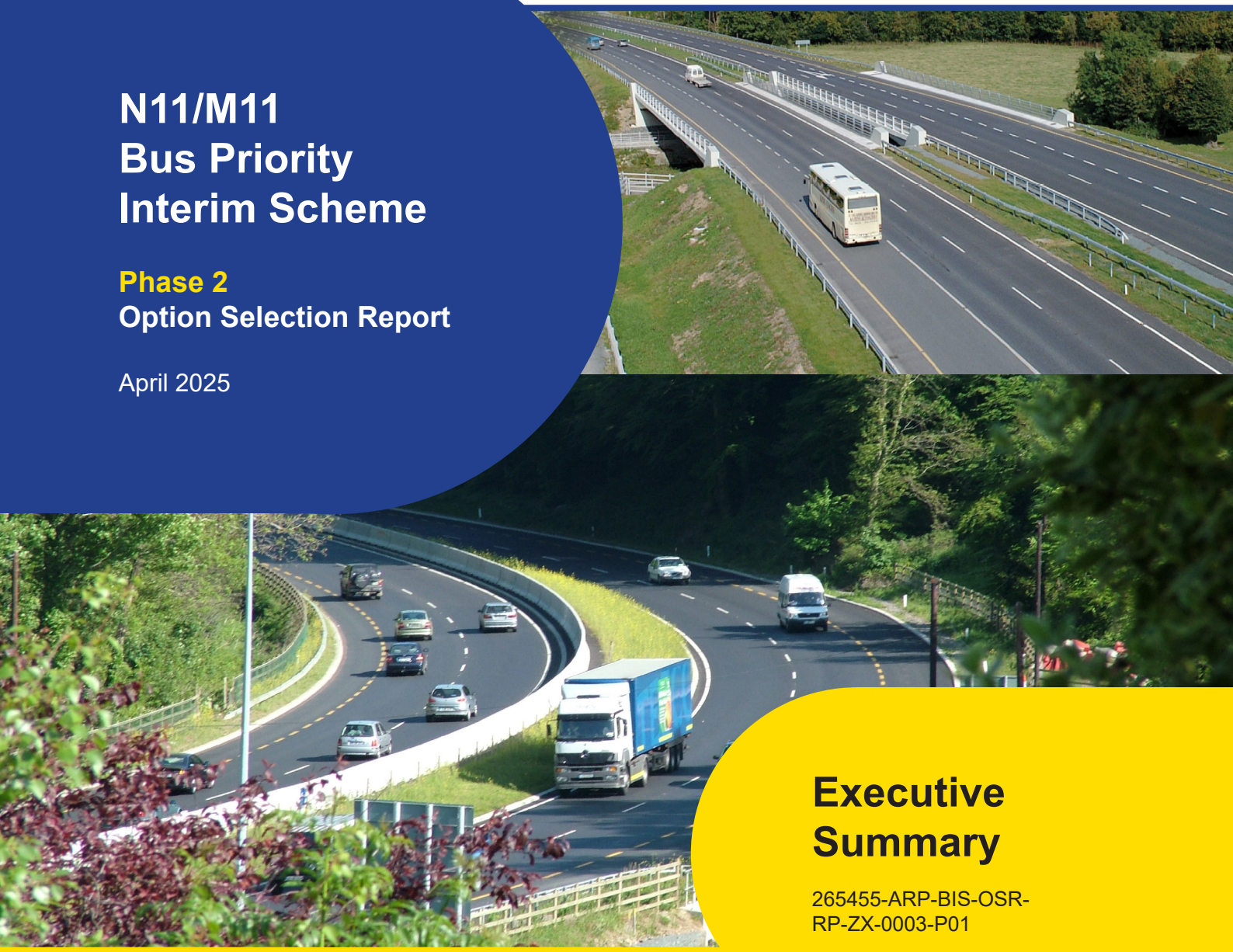
N11/ M11

Project Ireland 2040
Building Ireland's Future

N11/M11 Bus Priority Interim Scheme

Phase 2
Option Selection Report

April 2025



Executive Summary

265455-ARP-BIS-OSR-RP-ZX-0003-P01

Bonneagar Iompair Éireann
Transport Infrastructure Ireland

NTA
Údarás Náisiúnta Iompair
National Transport Authority

Kildare nro
National Roads Office

An Roinn Iompair
Department of Transport

Comhairle Contae Chill Mhantáin
Wicklow County Council

dlr
Comhairle Contae County Council

ARUP

Introduction

In July 2020, Wicklow County Council appointed Arup to undertake consultancy services for the N11/M11 Bus Priority Interim Scheme (hereafter referred to as the 'N11/M11 BPIS'). The N11/M11 BPIS is progressing as a multi-authority project involving Transport Infrastructure Ireland (TII), the National Transport Authority (NTA), Wicklow County Council (WCC) and Dún Laoghaire-Rathdown County Council (DLRCC). Under a Section 85 Agreement, WCC are acting as the Lead Local Authority and Sponsoring Agency for the project. Kildare National Roads Office (KNRO) has been appointed to project manage the delivery of the scheme.

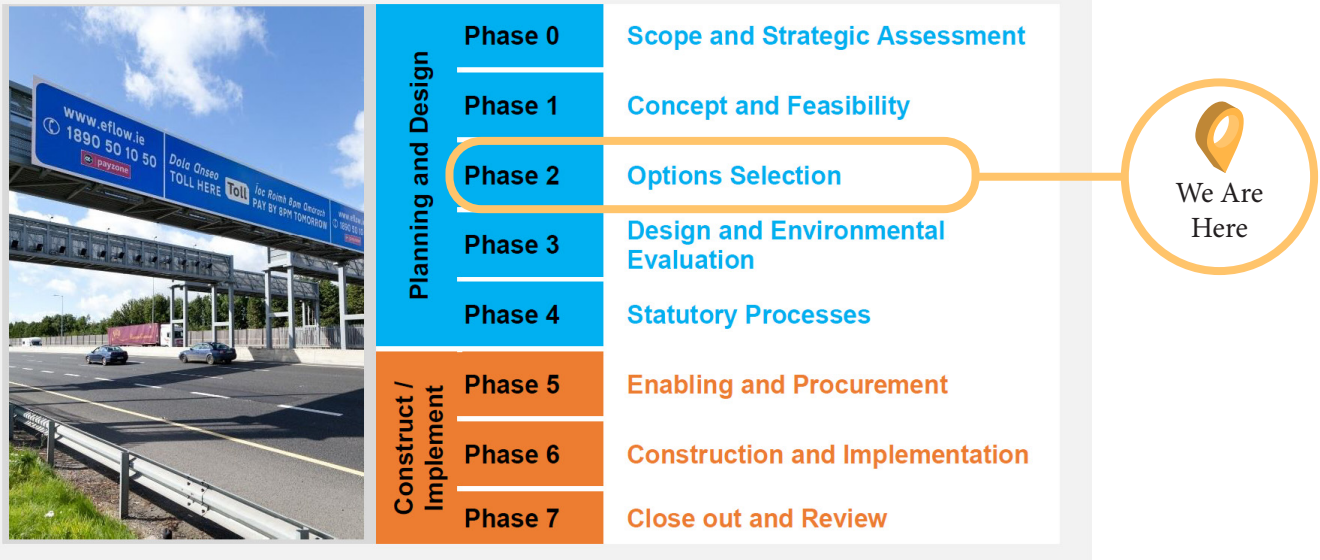
Since the outset of the project, the overriding objective of the N11/M11 BPIS has been to develop a proposal for the provision of bus priority measures in both directions on the N11/M11 national road. Priority facilities can be used by buses and coaches to avoid congested traffic lanes and help to reduce the current unsustainable dependency on the private car. As the project has evolved, the broader project objectives have been subject to review and development. Where feasible, it is envisaged that the N11/M11 BPIS would be considered for implementation in advance of the larger and more comprehensive N11/M11 Junction 4 to Junction 14 Improvement Scheme (N11/M11 J4-J14 Scheme).

The N11/M11 BPIS is being implemented in accordance with the TII Project Management Guidelines (PMGs), which divide the evolution and progression of a project into an eight-phase process (Phase 0 – 7 inclusive) as illustrated in Figure 1. Following the completion of the Phase 1 Feasibility Studies in early 2021, Phase 2 of the project was progressed since 2021, culminating in the publication of this Option Selection Report.

Overview of the Proposed Project

The N11/M11 national road is the primary artery connecting Dublin to the southeast of the country and from its connection to the M50 Motorway, the N11/M11 route forms part of Trans-European Transport Network (TEN-T) route E01, linking the Greater Dublin Area (GDA) to Rosslare Europort. Given the location of the scheme within the GDA, the subject section of the corridor supports high volumes of traffic engaging in local activities such as commuting, retail and amenity, as well as supporting more strategic roles in parallel, such as freight distribution, inter-urban trade and access to key ports and airports. Moreover, to satisfy modern mobility needs against an urban backdrop, the N11/M11 corridor must support accessibility across a variety of transport modes, including public transport.

Figure 1 - TII PMG Project Phases



The N11/M11 has been identified within the NTA's Transport Strategy for the Greater Dublin Area 2022-2042 (GDA Strategy) as one of six Regional Bus Corridors forming part of the Core Bus Network, serving longer distance buses from Wexford and regional services from Arklow, Wicklow and the N11/M11 corridor. The GDA Strategy acknowledges that the bus remains the backbone of the regional transport system and 'Measure BUS13' of the GDA Strategy outlines the NTA's commitment to collaborate with TII and the local authorities to provide enhanced levels of bus priority along the N11/M11 route.

In this regard, the N11/M11 BPIS aims to deliver enhanced accessibility via a more transit friendly N11/M11 route, prioritising person throughput over vehicle throughput. In doing so, the scheme will enable an increase in the transportation or people carrying capacity of the route in a manner which maximises the value of existing assets and encourages more efficient behaviour and sustainable use of the network.

The extent of the N11/M11 BPIS covers the section of existing N11/M11 route extending from Loughlinstown Roundabout in the north to Junction 9 (Glenview) in the south, as shown in Figure 2. The scheme covers sections of the existing route both designated as Motorway and Type 1 Dual Carriageway. It is within this 11.5km length of the existing route that the option selection process has examined the viability, type and optimal extent of bus priority to be provided.

Figure 2 - N11/M11 BPIS Scheme extents

Background and Development of the Scheme

Several factors have contributed to the development of the N11/M11 BPIS, including:

- The feasibility and option studies undertaken for the (separate) N11/M11 Junction 4 to Junction 14 Improvement Scheme, had identified strong demand for an enhanced bus service provision along the N11/M11 corridor. To be effective, it was recognised that an enhanced bus service provision would likely require that the congestion issues afflicting the corridor are also addressed, or that that an element of bus priority is provided in tandem with the improved service pattern, such that the bus services are not subject to the same delays as in the present situation.
- The strategic objectives of regional transport policy (and broader national policy) increasingly pointed to the need for more sustainable transport solutions, as well as identifying the N11/M11 as a Regional Core Bus Corridor.
- In response to the NTA's GDA Strategy and its own strategic objectives, TII, in 2020, began developing a technical design standard for the inclusion of bus priority measures on high-speed national roads (motorways and dual carriageways).

Phase 2 Option Selection Process

Following the completion of a Phase 1 Engineering Feasibility Study, the N11/M11 BPIS progressed to Phase 2 (Option Selection) in mid-2021. The fundamental purpose of Phase 2 is to examine options and identify a preferred option for the scheme. Phase 2 of the N11/M11 BPIS Project has been undertaken in three distinct stages, as described below.

1. **Part 8 Planning Process (July 2021 – December 2021)** At the commencement of Phase 2 in July 2021, a Design Basis was agreed with the Sponsoring Agency and other key project stakeholders, which was commensurate with the intended scope of the of the N11/M11 BPIS as a practicable interim scheme. At this initial stage, a Part 8 Statutory Process in accordance with the Planning and Development Regulations 2001 (as amended) was identified as the preferred planning route for the N11/M11 BPIS. Based upon an agreed set of project objectives, an option selection assessment was undertaken with initial recommendations on a preferred option proposed in December 2021.

2. **EIA and Project Re-shape (January 2022 – September 2023)** During the initial option selection assessment, it was acknowledged that the envisaged Part 8 Planning Process would be contingent on certain conditions being met, most notably that the project would not require Environmental Impact Assessment (EIA) in accordance with EIA Directive 2014/52/EU. However, in January 2022, it was determined that the preferred option arising from the first stage assessment would meet the mandatory thresholds for Environmental Impact Assessment (EIA) as detailed in the Roads Regulations 1994 (as amended). Following the determination that the N11/M11 BPIS would mandatorily require the preparation of an Environmental Impact Assessment Report (EIAR), the scope and ambition of the project was re-evaluated. This included a review of the original Design Basis, with a view to removing some of the constraints which had been set in support of an envisaged Part 8 Development, and which imposed certain restrictions on the first stage scheme design. A re-shaping of the N11/M11 BPIS was subsequently undertaken, comprising a reassessment of revised options in Phase 2 and culminating in revised set of preferred option proposals for the scheme in September 2023.

3. **Phase 2 Revisit (January 2024 – February 2025)** Following the second stage project re-shape, further work progressed in late 2023 to develop the emerging preferred option in greater detail and to undertake a thorough environmental evaluation of the scheme proposals. This is typically an iterative process, which has taken consideration of the feedback from the September 2023 Public Display and further information gathered from environmental, engineering and traffic studies. In December 2023, this work brought several factors to light, primarily between Junction 6 and Junction 8, which prompted a comprehensive review of the emerging preferred option displayed in September 2023. As an outcome of this review, it was decided to revisit certain aspects of the Phase 2 option selection assessments previously undertaken. In doing so, the primary aim is to ensure that all information gathered since December 2023 is appropriately considered in the options assessment and appraisal process, and the optimum option to deliver on the objectives of the project is identified.

The collective work undertaken through the stages described above has now culminated in a further update to the preferred option for the N11/M11 BPIS and the publication of the Option Selection Report.

Project Objectives

On the basis of the characteristics of the existing road corridor and responding to the aspirations of national and strategic policy documentation, a series of defined objectives were developed at the outset of the project, as presented in Table 1 Project Objectives.

With reference to the distinct stages of Phase 2 as described above, the original objectives supported and informed the options assessments from the commencement of Phase 2 in July 2021, through the subsequent project re-shape and up to the identification of an emerging preferred option for the scheme in September 2023. Subsequently, a review of the project objectives was undertaken in February 2024, as part of the commencement of and to inform the Phase 2 Revisit in early 2024. This review resulted in several modifications to the objectives listed in Table 1 Project Objectives (with some new objectives also added), the details of which are presented in Table 5.

Economy Objective 1:
Provide the infrastructure to increase the people carrying capacity of the N11/M11 between Loughlinstown Roundabout and Junction 9 (Glenview)

Economy Objective 2:
Deliver a practicable interim transport solution capable of delivering benefits required in the short/medium term

Economy Objective 3:
Generate positive economic benefits to public transport users by: Reducing bus journey times and Improving bus journey time reliability

Safety Objective 1:
To deliver bus priority measures which are clearly delineated and understood by general road users and bus drivers in the environment of an inter-urban route.

Safety Objective 2:
Ensure bus priority can be delivered without adversely impacting on the safety of all road users.

Environment Objective 1:
To provide for more sustainable transport solutions on the N11/M11 corridor, supporting a balance of alternative modes and enabling a reduction in private car dependency and reducing the carbon intensity of travel.

Physical Activity Objective:
To provide a facility that allows for the delivery of an attractive alternative mode of transport for communities which supports the creation of a healthier urban environment for active travel, through congestion relief.

Accessibility & Social Inclusion Objective 1:
To increase bus patronage along the N11/M11 corridor and enable sustainable travel to provide a faster and more reliable choice.

Accessibility & Social Inclusion Objective 2:
To support improved access to the GDA for all transport users along the N11/M11 corridor.

Integration Objective 1:
To deliver a practicable interim transport solution which does not introduce significant constraint on the subsequent development of the N11/M11 Junction 4 to Junction 14 Improvement scheme.

Integration Objective 2:
To support integration of road-based transport with other transport modes.

Integration Objective 3:
To complement wider government transport policy.

Table 1 - Project Objectives

Policy Context

The objectives of and the need to deliver the N11/M11 BPIS are supported in terms of current transport and planning policy aims as set out at European, national, regional and local level.

European Policy

The Trans-European Network for Transport (the "TEN-T Regulations")[2] is a European Union policy directed towards the implementation and development of a Europe-wide network of roads, railway lines, inland waterways, maritime shipping routes, ports, airports and rail-road terminals. With the N11/M11 corridor forming part of the TEN-T Comprehensive Network, the N11/M11 BPIS is firmly supportive of the specific objectives set out within Article 4 of the TEN-T Regulations, by demonstrating European added value through (a) sustainability, (b) cohesion, (c) efficiency, and (d) increasing the benefits for its users.

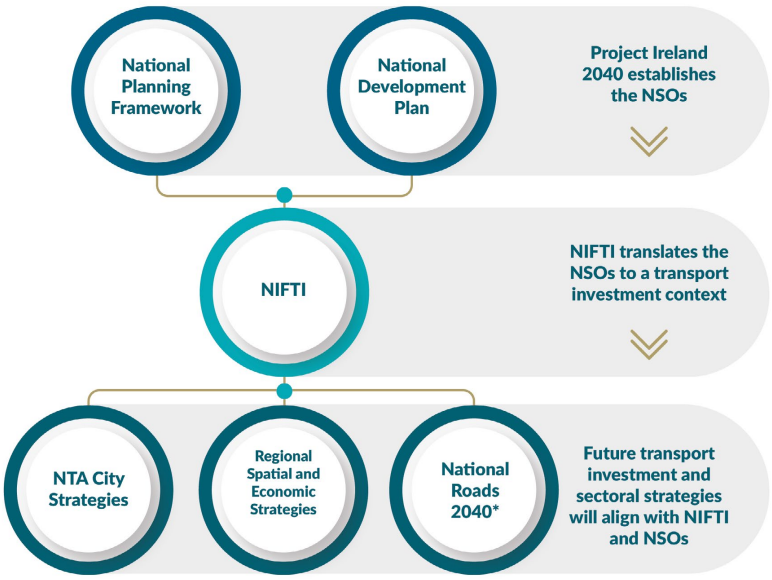
National Policy

Project Ireland 2040 is the Government's long-term overarching strategy to make Ireland a better country for all and to build a more resilient and sustainable future. By 2040, there will be approximately one million additional people living in Ireland, requiring hundreds of thousands of new jobs, homes and social amenities, enhanced regional connectivity and improved environmental sustainability. The hierarchy of national and sub-national frameworks, strategies and plans is shown in Figure 3.

The **National Planning Framework (NPF)** was published by the Government on 16 February 2018. It sets out a high-level planning and development strategy for Ireland and its regions to shape the future growth and development of the country to the year 2040. The NPF is published together with its companion document – the **National Development Plan 2021 – 2030 (NDP)**, meaning that the delivery of the Framework will be fully supported by the Government's capital investment strategy.

Ten National Strategic Outcomes (NSOs) are outlined in the NPF along with corresponding Strategic Investment Priorities. One of the "National Strategic Outcomes" within this framework relates to "Enhanced Regional Accessibility", with a key objective to strengthen public transport connectivity between cities and large growth towns in Ireland with improved services and reliable journey times. A further NSO is "Sustainable Mobility", the delivery of which is underpinned by the stated strategic priority to invest in environmentally sustainable public transport. The NDP recognises the importance of significant investment in sustainable mobility (active travel and public transport) networks if the NPF population growth targets are to be achieved. The N11/M11 BPIS will therefore contribute to the NDP's National Strategic Objectives of Enhanced Regional Accessibility and Sustainable Mobility, connecting communities and encouraging economic activity.

Figure 3 - Hierarchy of Planning Frameworks and Strategies



[2] Regulation (EU) No. 2024/1679 of the European Parliament and of the Council

The Climate Action Plan (CAP) 2024 was published on 20 December 2023 and represents the third annual update to Ireland's Climate Action Plan. The plan is a roadmap of actions which will ultimately lead us to meeting our national climate objective of pursuing and achieving, by no later than the end of the year 2050, the transition to a climate resilient, biodiversity rich, environmentally sustainable and climate neutral economy. The proposed pathway for achieving sectoral emissions targets include a range of 'Avoid-Shift-Improve' measures, some of which include Strategic Transport Planning, Road Space Reallocation, and a Major Public Transport Infrastructure Programme. The provision of an enhanced and functional N11/M11 transport corridor is key to developing an integrated multi-modal transport network, where public transport services – in particular bus – can operate more efficiently and provide a meaningful alternative to the private car.

In December 2021, the Department of Transport published the **National Investment Framework for Transport in Ireland (NIFTI)**, which is the Department's high-level strategic framework for prioritising future investment in the land transport network. NIFTI has established specific investment priorities (in no particular order) to which future transport projects must align in order to be considered for funding, as shown in Figure 4.

Figure 4 - NIFTI Investment Priorities

Complementary to the four investment priorities and to ensure that transport investment is delivered in a sustainable manner, NIFTI establishes a set of modal and intervention hierarchies, aimed at identifying solutions which are preferred from an environmental and cost-effectiveness perspective, as illustrated in Figure 5 and Figure 6. The N11/M11 BPIS strongly aligns with both the modal and intervention hierarchies outlined in NIFTI, by aiming to optimise the efficiency of an existing transport asset for sustainable modes of travel.

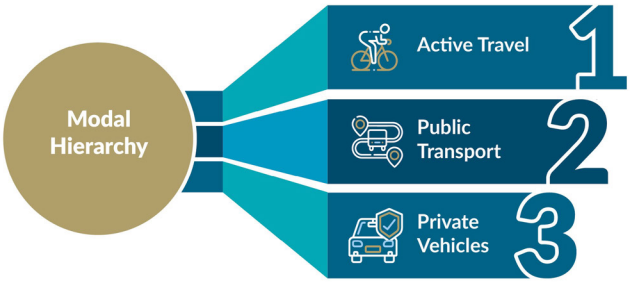


Figure 5 - NIFTI Modal Hierarchy

Figure 6 - NIFTI Intervention Hierarchy

Under 'National Roads Projects', the GDA Strategy specifically notes the intention to deliver, "the provision of bus priority on the N/M11 corridor and the implementation of measures which protect the capacity of the mainline for strategic traffic."

Regional Policy

The **Regional Spatial and Economic Strategy (RSES)** provides a 12-year strategic regional development framework for investment to better manage spatial planning and economic development throughout the (Eastern and Midland) Region, with the objective of supporting the implementation of Project Ireland 2040 and the economic policies and objectives of the Government at regional level.

Within the Dublin Metropolitan Area, the RSES supports (under Regional Policy Objective RPO 8.9), *"the delivery of bus projects set out in Table 8.3"*, which includes the provision of Core Bus Corridors on Dublin's radial routes and the Regional Bus Corridors connecting the major regional settlements to Dublin.

The RSES also recognises the importance of maintaining, improving and protecting the strategic function of the key transport corridors, with RPO 8.10 supporting the appraisal and or delivery of the road projects listed in Table 8.4 of the strategy, including the *"M11 from Jn 4 M50 to Kilmacanogue"*.

The **Transport Strategy for the Greater Dublin Area 2022-2042** (GDA Strategy) will drive the investment and delivery of a transport network for the GDA which is consistent with the spatial planning policies and objectives set out in the RSES and the broader sustainability and mobility targets in the NDP and Climate Action Plan.

The delivery of bus priority measures as part of the N11/M11 BPIS is an integral component within the broader strategy to incentivise and encourage a shift to sustainable transport modes and acknowledges the N11/M11 as a key spine network for sustainable mobility within the southeastern region. Under 'National Roads Projects', the GDA Strategy specifically notes the intention to deliver, "the provision of bus priority on the N/M11 corridor and the implementation of measures which protect the capacity of the mainline for strategic traffic."

Local Policy

The **Wicklow County Development Plan (WCDP) 2022-2028** sets out the overall strategy for the proper planning and sustainable development of the county for the plan period and beyond. The plan recognises that integrating land use planning with transportation is key to addressing climate change, supporting economic prosperity and enhancing local environment and communities, by reducing the need to travel long distances by private car and increasing the use of sustainable and healthy travel alternatives. It is noted within the WCDP that in the absence of frequent rail services, most commuters on the eastern side of the county using public transport rely on bus and coach services. These services use the M11/N11 as the primary access road to the Dublin region, with the peak hour delays on this route causing significant delay to such public transport commuters. The delivery of the N11/M11 BPIS is a central component to achieving the stated objectives of WCDP to prioritise public transport services along the M11/N11 whilst enhancing access to the southeast of the country.

The **Dún Laoghaire-Rathdown County Development Plan 2022-2028** (DLRCC CDP) sets out the policy objectives and the overall strategy for the proper planning and sustainable development of the county over the plan period. Consistent with CAP 2024, the DLRCC CDP sets out an overall transport policy strategy which seeks to adopt the 'Avoid-Shift-Improve' approach, prioritising the movement of people to more sustainable modes, providing high-quality inclusive and connected walking and cycling networks and adopting a balanced approach to road and street design. The N11/M11 BPIS aligns with the central policy objectives in the DLRCC CDP, as a critical national road improvement project with a multimodal focus.

Project Specific Need

Concept and feasibility studies undertaken for the scheme have identified numerous operational issues affecting the capacity, reliability and safety of the N11/M11 corridor, and concluded that there was strong justification for advancing a scheme to provide solutions to these transportation issues, which include:

Traffic Volumes – The existing N11/M11 was not designed to accommodate the traffic volumes it experiences today and is heavily congested and inefficient. The significant congestion stymies the intended function of the N11/M11 as an efficient transport corridor. In the absence of any bus priority facilities, bus services must also negotiate the heavy congestion and are subject to the same unreliability of journey time – all of which fosters an unsustainable dependency on the private car.

Vulnerable Road Users – The provision of bus priority measures on the N11 Dual Carriageway needs to consider the safety of vulnerable road users (pedestrians and cyclists), who are currently forced to use the hard shoulder in the absence of alternative facilities.

Mode Choice Constrained – The integration of the existing N11/M11 road with other transport modes is highly inadequate. Mode choice is constrained by limited accessibility to the rail corridor and an absence of park and ride capacity.

Unreliability of Public Transport – A 2018 commuter survey undertaken by Wicklow County Council indicated that 68% of Wicklow commuters drive to work, with only 4% of commuters choosing to travel by bus. Respondents cited the unreliability of public transport as the main reason for choosing the car as the primary means of transport.

Constraints Study

The initial step in the Option Selection Process was to undertake a detailed and comprehensive Constraints Study to identify the nature and extent, at an appropriate level of detail, of constraints within a defined study area. For the N11/M11 BPIS, a comprehensive Constraints Study prepared as part of Phase 2 of the separate N11/M11 J4-J14 Scheme, was considered valid and suitable to inform the identification and assessment of options. This wider study area for the N11/M11 J4-J14 Scheme extends to the Irish Sea coastline to the east, the Dublin and Wicklow mountains to the west and as far south as Coyne's Cross to the south of Newcastle village. As such, this study area encompasses the full extent of the N11/M11 corridor from Loughlinstown Roundabout to Junction 9 (Glenview), which is under assessment for the N11/M11 BPIS.

Specific key constraints identified include:

- Engineering constraints along the existing N11/M11 route, including existing structures, junctions and drainage infrastructure.
- Existing major utility assets, in particular gas transmission and trunk water mains.
- Sensitive receptor locations for potential noise and air quality impacts, including residential housing, schools, hospitals, community facilities, businesses, educational and religious facilities.
- Ecological sites (including designated sites), Annex I Habitats outside of designated sites, watercourses of high ecological value.

Assessment of Options and Alternatives

Understanding the Challenges

From the outset of the project, the overriding objective of the N11/M11 BPIS has been focussed on the provision of bus priority measures on the N11/M11 route between Loughlinstown Roundabout and N11 Junction 9 (Glenview). However, the feasibility assessments undertaken as part of Phase 1 of this project have demonstrated that the development of an improvement scheme of any form on the N11/M11 corridor, requires a thorough appreciation and understanding of the inherent technical challenges and operational complexities already present.

The Phase 1 Engineering Feasibility Study very clearly identified several potential barriers to the safe and efficient implementation of bus priority on the route, including inter alia, the junction frequency and associated weaving movements, the potential for static queuing to impede bus movements and the presence of vulnerable road users on the all-purpose sections of the route.

As the option selection process has developed for the N11/M11 BPIS, these considerations in respect of overcoming operational complexities, managing safety concerns and achieving an economically viable outcome, have shaped the evolution of the design options considered and assessed in Phase 2. As described previously, Phase 2 of the project has been undertaken in three distinct stages, with consideration of the issues described above necessitating iteration and re-appraisal to identify a preferred intervention to meet the project objectives. At each stage, the development and assessment of scheme options has followed an incremental approach, aligned with the principles of the Department of Transport Common Appraisal Framework (CAF) and NIFTI, with options which seek to maximise use of existing infrastructure considered in the first instance, prior to assessing any provision of new infrastructure.

Initial Selection of Intervention

Commensurate with the nature and scale of the N11/M11 BPIS, a structured appraisal process has been adapted from the TII Project Appraisal Guidelines for the purposes of systematically evaluating options for bus priority and identifying the preferred option for the scheme. Aligned with the objectives for the project established at the outset, the process sought to deliver an outcome which optimised the extent of bus priority practically and safely achievable, whilst recognising that some level of discontinuity in bus priority may be necessary.

Firstly, an initial long list of potential cross-sectional configurations and operational regimes was developed and qualitatively sifted, to establish, at a fundamental level, if these options could be suitable for implementation on the N11/M11 route. The options on the long list considered whether it was preferable to provide bus priority on the nearside or offside, whether it should be physically segregated or non-physically segregated, temporary or permanent, and whether existing lanes on the N11/M11 should be repurposed. Following the initial long list sifting assessment, three cross-sectional options were advanced and assessed as part of the Stage 1 Preliminary Options Assessment, as follows:

Option 1 – Nearside hard shoulder bus priority (northbound and southbound);

Option 2 – Offside bus priority (northbound and southbound); and

Option 3 – Contra-flow median bus lane (located along the existing central reserve).

These options were chosen in recognition that each can be expected to differ in terms of the extent of carriageway widening required, impacts to existing structures, safety, constructability, junction strategy and environmental impact.

Stage 1 Preliminary Options Assessment

A Multi Criteria Analysis (MCA) of the three cross-section options was carried out taking account of a broad range of sub-criteria under the three principal headings of Engineering, Environment and Economy.

While the assessments recognised that all options would align favourably with the specific objective of providing infrastructure to increase the people carrying capacity of the N11/M11, a distinction was drawn across several assessment criteria, as follows:

- Option 1 was preferred across most of the **Engineering** sub-criteria assessed. The cross-sectional configuration aligns with the requirements of the TII Technical Standard (DN-GEO-03087) and is expected to provide the safest and most readily intuitive layout to road users, as nearside bus lanes are commonly implemented across the road network in Ireland. While the extent of carriageway widening works are significant for Option 1 (within the context of the constrained N11/M11 corridor), this is expected to be more manageable with works at existing structures involving generally minor modifications and/or remedial works and avoiding the more significant impacts or demolition associated with Option 3.
- As the option involving the lowest extent of carriageway widening, Option 3 was preferred overall across the environmental assessment. However, it was determined that none of the options would be likely to have significant adverse impacts on **Environmental** constraints.
- Option 1 was favoured under the **Economy** criterion, which comprised a qualitative comparison of options in terms of their relative expected costs, placing particular emphasis on what are typically the most expensive elements in highway construction, i.e. pavement and structures. Although involving the second largest extent of pavement widening (behind Option 2), Option 1 was preferred given the expected minor impacts to existing structures, with Option 3 least preferred on the basis of requiring extensive demolition and reconstruction of existing overbridges where median piers are present.

The overall result of the Stage 1 Preliminary Options Assessment is presented in Table 2.

The outcome of the Stage 1 Preliminary Options Assessment indicated that cross-section Option 1 (Nearside Hard Shoulder Bus Priority) is the preferred cross-sectional arrangement for bus priority measures proposed on the N11/M11 route between Loughlinstown Roundabout and Junction 9 (Glenview).

Table 2- Stage 1 Preliminary Options Assessment result

	Option 1 Nearside Hard Shoulder Bus Priority	Option 2 Offside Bus Priority	Option 3 Median Contra-Flow Bus Lane
Engineering	Preferred	Intermediate	Least Preferred
Environment	Intermediate	Least Preferred	Preferred
Economy	Preferred	Intermediate	Least Preferred
Qualitative Ranking			
Stage 1 Outcome	Preferred	Intermediate	Least Preferred

Stage 2 Project Appraisal Matrix – Overview and Methodology

Following the selection of the preferred cross-sectional arrangement, the Stage 2 Project Appraisal Matrix sought to determine the optimal extent of bus priority to be provided along the subject section of the route, taking cognisance of the existing constraints along the route and the objectives of the interim scheme.

Given the highly variable conditions along the existing N11/M11 between Loughlinstown Roundabout and Junction 9 (Glenview) and the recognition that bus priority provision will not be fully continuous, it was decided to split the overall scheme extent into the following three sub-schemes, as shown in Figure 7:

- **Sub-Scheme A** runs from Loughlinstown Roundabout in the north to Junction 6 (Bray / Fassaroe);
- **Sub-Scheme B** runs from Junction 6 (Bray / Fassaroe) to Junction 8 (Kilmacanogue); and
- **Sub-Scheme C** runs from Junction 8 (Kilmacanogue) to Junction 9 (Glenview).

The sub-scheme splits were chosen to reflect the fact that certain sections of the existing N11/M11 would be considered more suitable and readily amendable to bus priority provision than other sections (for example, where geometry standard is poor or existing junctions closely spaced). As such, it is expected that costs, engineering complexity and safety implications will differ in each sub-scheme and that some level of discontinuity in bus priority may be necessary where the costs or implications of providing full continuity are considered excessive or disproportionate (in the context of an interim scheme).

A corollary of this approach is that the three sub-schemes listed above were not directly comparable, as each has a different start and end point along a single route. Accordingly, the Stage 2 appraisal considered the design of each sub-scheme independently, with a view to identifying the merits and impacts of each. The preferred sub-scheme(s) which emerged from the Stage 2 appraisal would combine to form the overall recommended scheme option to be taken forward to Stage 3 Preferred Option.

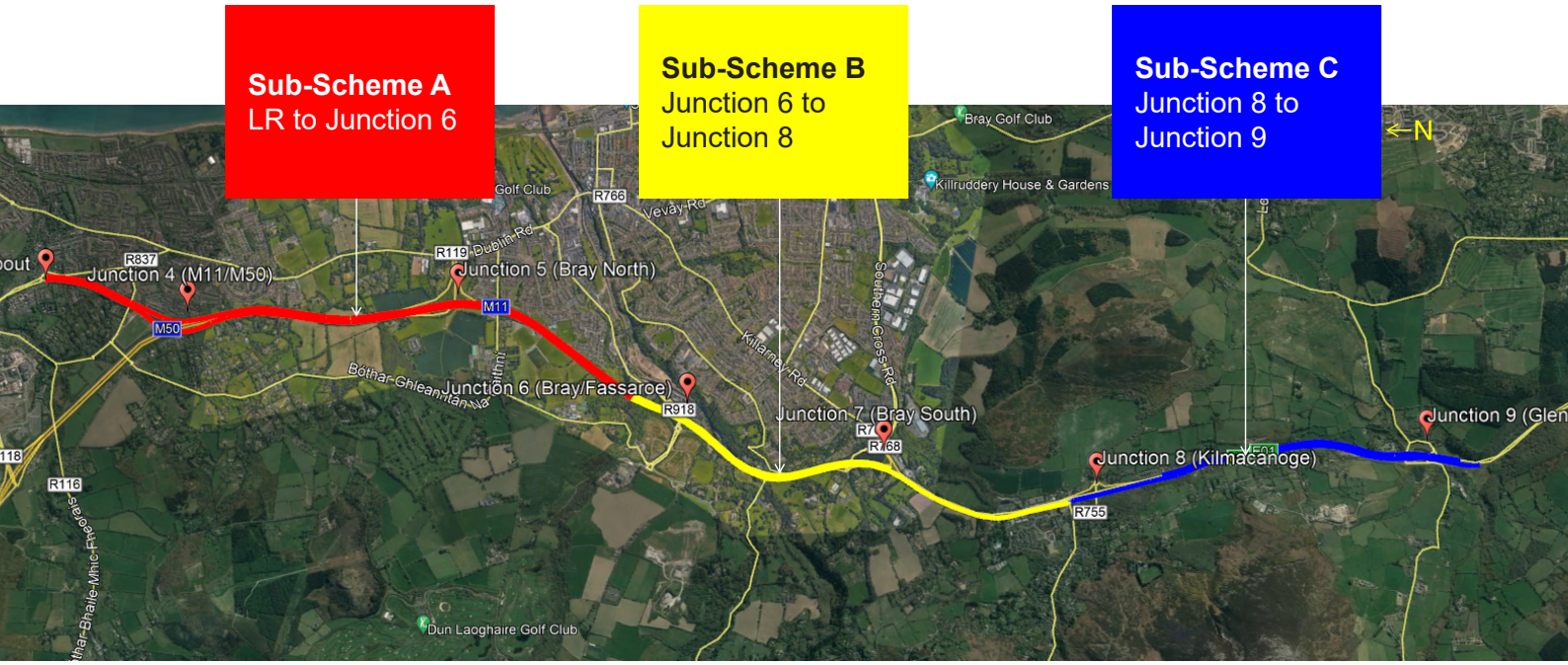


Figure 7 - Stage 2 Project Appraisal Matrix Sub-Scheme Extents

As previously discussed, the Stage 2 process undertaken was essentially sub-divided into three distinct periods, as follows:

1. **Stage 2** – Assumed Part 8 Planning Process (July 2021 – December 2021)
2. **Stage 2** – EIA and Project Re-shape (January 2022 – September 2023)
3. **Stage 2** – Phase 2 Revisit (January 2024 – February 2025)

During each successive period, further development and iteration of design options was undertaken, with corresponding updates and revisions to the Stage 2 Project Appraisal processes and conclusions. The evolution of the Stage 2 Project Appraisal process (refer Figure 8) can essentially be summarised as follows:

- Based on assumed Part 8 Statutory Planning process and an agreed Design Basis, scheme options were developed, and an initial Stage 2 Project Appraisal was undertaken against the six CAF criteria of:

  Economy

  Safety

  Environment

  Accessibility & Social Inclusion

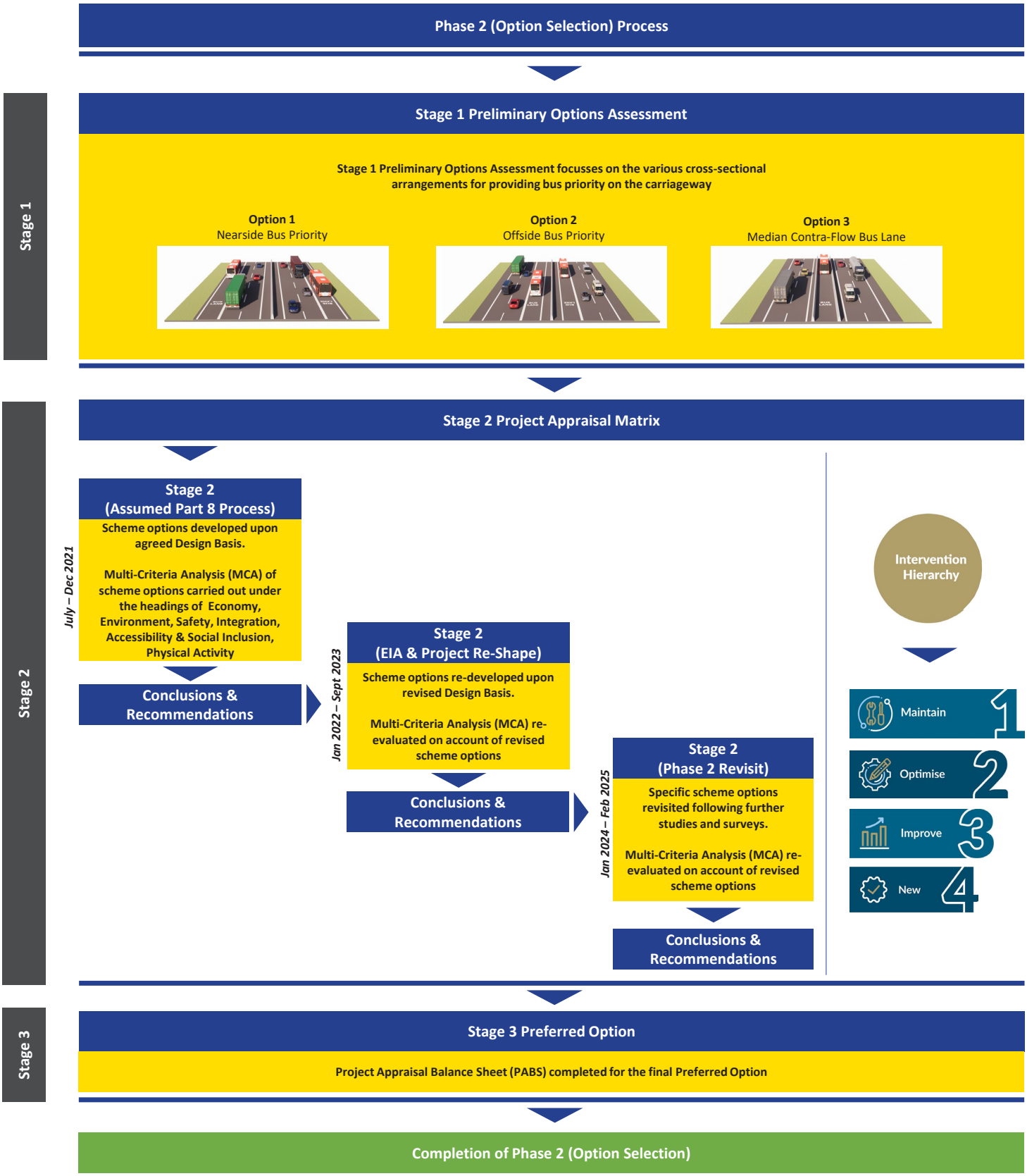
  Integration

  Physical Activity

- Following confirmation that the envisaged Part 8 process would no longer be possible, and the scheme would meet the mandatory threshold for Environmental Impact Assessment (EIA), a revised Design Basis was agreed, and scheme options were re-examined. The Stage 2 Project Appraisal was re-evaluated against the six CAF criteria.

- Following the completion of further studies and surveys and a Public Consultation process in late 2023, a targeted revisit of specific scheme options was undertaken. The Stage 2 Project Appraisal was again re-evaluated against the six CAF criteria.

Figure 8 - N11/M11 BPIS Phase 2 (Stage 2) assessment process



Stage 2 Project Appraisal Matrix (Assumed Part 8 Process)

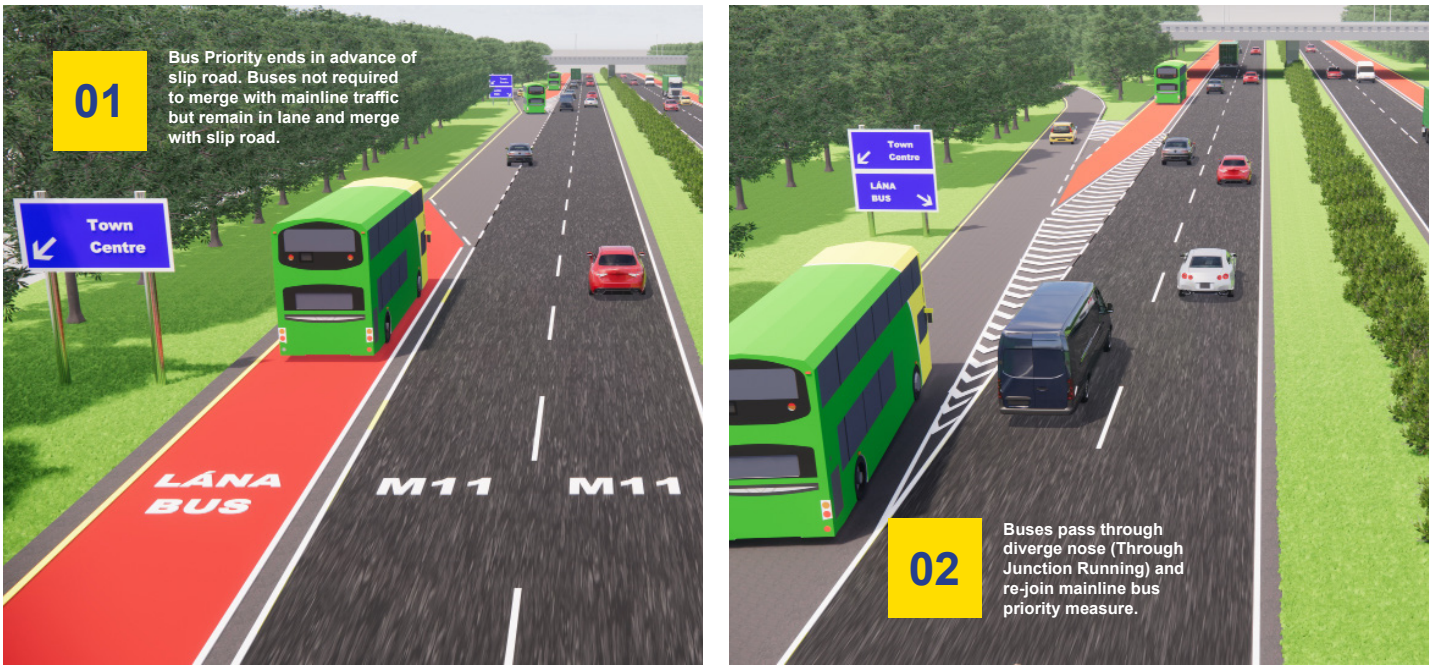
Design Development of Sub-Schemes
In response to the targeted objectives of this interim scheme and aligned with the originally intended Part 8 planning process, a Design Basis was developed in consultation with the Sponsoring Agency and other key project stakeholders. The Design Basis defined a high-level set of governing parameters which would be used to develop the design of each sub-scheme, and specifically included the following:

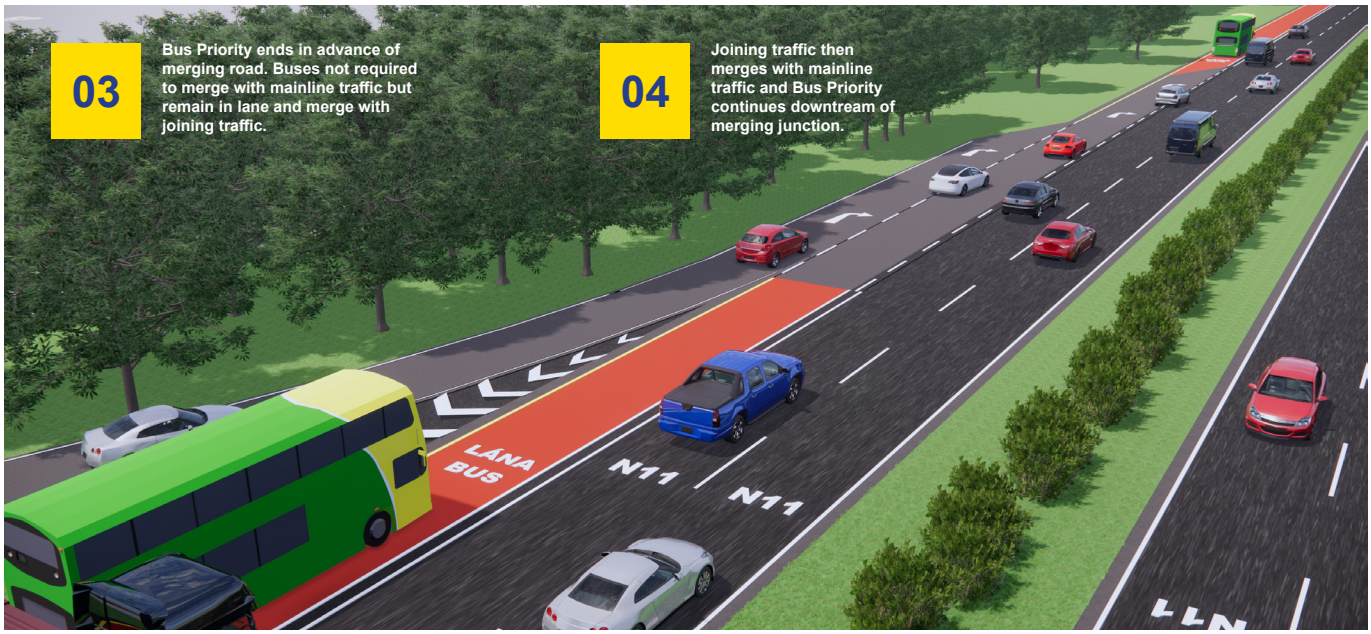
- The scheme extents and form should be developed to avoid third-party landtake insofar as possible.
- The scheme should take a balanced approach to providing physical infrastructure (i.e. bus priority) in areas of maximum benefit.
- The scheme would initially not seek to close existing minor junctions and accesses in between the primary junctions.
- The provision of bus priority facilities would be considered only where it is not envisaged to adversely impact on the operational safety of all road users.
- The scheme extents and form should not introduce an excessive or significant constraint on the subsequent development of the N11/M11 J4-J14 Scheme.

It was recognised that the above agreed design parameters would likely curtail the extent of bus priority which could be practicably delivered.

Junction Treatments
At the outset of the N11/M11 BPIS, it was agreed with the project stakeholders that the scheme would primarily cater for longer distance bus services, aligned with the intention of the Core Regional Bus Network as set out in the GDA Strategy. Accordingly, there is no requirement for the scheme to facilitate access to off-line bus stops at major junctions or any other points along the corridor. Considering this, the most appropriate form of junction arrangement for the scheme is Through Junction Running (TJR). The TJR approach avoids the need for the bus to exit and re-enter the mainline at the junction and eliminates potentially hazardous weaving manoeuvres should the bus wish to leave the bus priority measure to stay on the mainline. An illustration of how the TJR treatment is implemented at major junction merges and diverges is shown in Figure 9, which is consistent with the requirements of TII Standard DN-GEO-03087.

Figure 9 - Proposed TJR Treatment





Multi-Criteria Analysis

Following the development of the individual sub-scheme designs in accordance with the agreed design basis, each sub-scheme was quantitatively and qualitatively assessed against a broad range of sub-criteria under the six CAF headings and a performance matrix for each sub-scheme compiled. An impact score was assigned against each sub-scheme based on the likely predicted impact against these criteria, using the seven-point scale as recommended per TII PAG Unit 7.0. In developing the Stage 2 Project Appraisal Matrix for the N11/ M11 BPIS, an equal weighting was applied across the six headline assessment criteria by converting the total score for each to marks out of 100.

The overall Stage 2 Project Appraisal Matrix at the conclusion of the assessment is presented in Table 3, where key differentiators between sub-schemes were identified in respect of the Safety, Accessibility and Social Inclusion, Integration and Physical Activity criteria. In particular, several inherent issues were identified in Sub-Scheme B, including:

- The retention of intermediate junctions and accesses within Sub-Scheme B resulted in a high number of potential conflict points between buses and general traffic in areas where a high degree of weaving is expected. The issues would be exacerbated by the fact that the existing junctions are sub-standard in terms of junction form and visibility requirements.

Table 3 - Stage 2 Project Appraisal Matrix (Assumed Part 8 Process)

Stage 2 Project Appraisal Matrix			
	Sub-Scheme A	Sub-Scheme B	Sub-Scheme C
Economy Weighted Sub-Total Score (out of 100)	71	61	61
Safety Weighted Sub-Total Score (out of 100)	62	29	52
Environment Weighted Sub-Total Score (out of 100)	51	46	50
Accessibility & Social Inclusion Weighted Sub-Total Score (out of 100)	86	57	71
Integration Weighted Sub-Total Score (out of 100)	83	49	71
Physical Activity Weighted Sub-Total Score (out of 100)	57	29	29
Overall Weighted Score	410	271	334

- In the absence of any alternative facilities for active travel, cyclists would continue to mix closely with general traffic, creating additional safety and security concerns for vulnerable road users. These safety issues would be exacerbated if pedestrians and cyclists were also sharing the hard shoulder with high-speed bus services.
- The provision of bus priority measures through the Sub-Scheme B section could be expected to hamper the subsequent development of the N11/M11 J4-J14 Scheme and potentially result in significant abortive works.

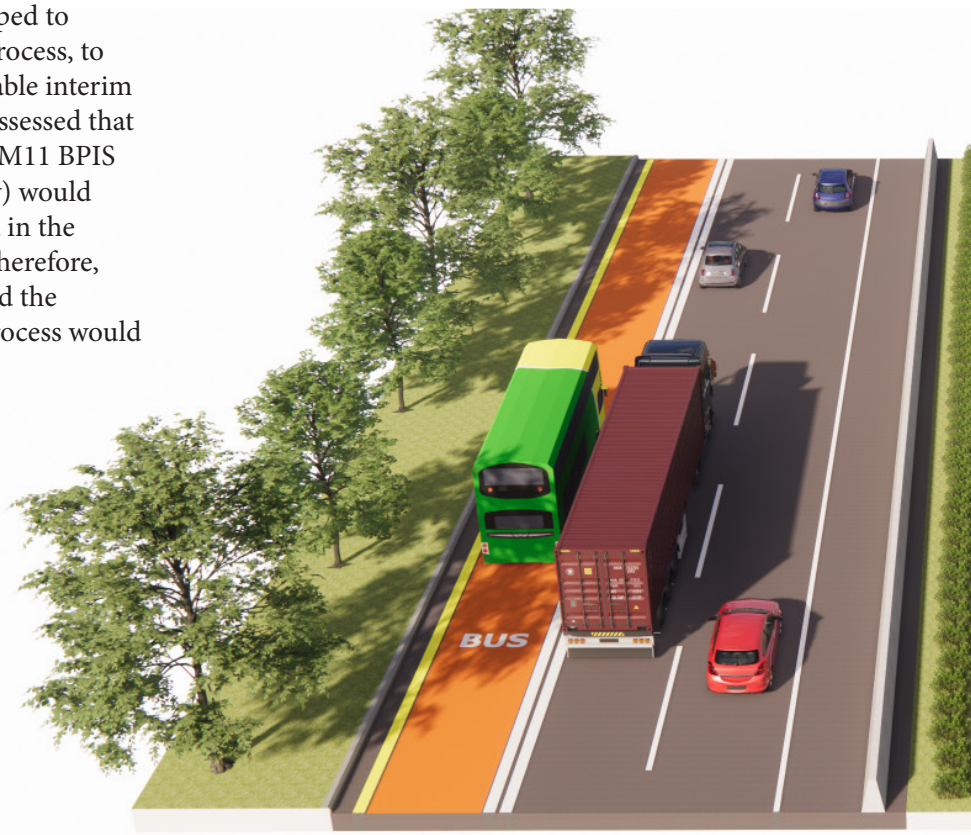
Although these limitations also existed to some extent within Sub-Scheme C, it was not considered to generate the same concern. At the conclusion of the December 2021 option selection process, it was therefore recommended that Sub-Scheme B should not form part of the emerging preferred option.

EIA and Project Re-shaping

At the conclusion of the original option selection process, the initial preferred option for the N11/M11 BPIS was assessed to determine if the proposed project would meet the threshold for automatic Environmental Impact Assessment (EIA) under the Roads Act 1993. As noted previously, the original Design Basis for the scheme was developed to support an envisaged Part 8 Statutory Process, to enable the efficient delivery of a practicable interim scheme. However, it was subsequently assessed that the initial preferred option for the N11/M11 BPIS (comprising Sub-Schemes A and C only) would meet the mandatory thresholds detailed in the Roads Regulations 1994, as amended. Therefore, a mandatory EIA would be required, and the previously envisaged Part 8 Statutory Process would no longer be possible.

Following the determination that the N11/M11 BPIS would mandatorily require the preparation of an Environmental Impact Assessment Report (EIAR), the scope and ambition of the project was re-evaluated. This included a review of the original Design Basis, with a view to removing some of the constraints which had been set in support of an envisaged Part 8 development.

This combination of the mandatory requirement for EIA and the limitations inherent in the original scheme design brought about a re-shaping of the N11/M11 BPIS to be delivered under an EIA Statutory Process under Section 51 of the Roads Act (1993). The design of the scheme was subsequently re-examined to establish if further bus priority could be achieved from that provided in the preferred option identified in December 2021.



Stage 2 Project Appraisal Matrix (Project Re-shape)

Revised Design Basis and Options Considered
In response to the outcomes of the first Stage 2 Project Appraisal, the following principal revisions were made to the Design Basis:

- The acquisition of third-party lands could be considered where beneficial in meeting the project objectives. Any proposed landtake, where deemed necessary, would need to be thoroughly assessed and justified as part of the scheme appraisal.
- The N11/M11 BPIS would now examine how existing minor junctions and direct accesses onto the N11 could be closed. It was recognised that this may require the provision of alternative connections to maintain accessibility, potentially requiring landtake.
- The N11/M11 BPIS would now examine how alternative facilities for vulnerable road users (pedestrians and cyclists) could be incorporated into the scheme along the all-purpose section of the N11.
- In accordance with the requirements of TII Publication DN-GEO-03087, the use of bus priority signalling at junction merges would be considered as part of the scheme design and subject to appropriate traffic modelling and analysis.

The revised Design Basis enabled consideration of additional scheme options within Sub-Schemes B and C to address the two primary limitations highlighted during the review of the initial Stage 2 Project Appraisal Matrix outcomes, namely the minor junction conflict points and absence of any alternative facilities for active travel. In principle, these additional options included consideration of the following within the project re-shaping exercise:

- A range of options were developed to close existing intermediate junctions and accesses, which would otherwise impede bus priority and present potential conflict points between buses and general traffic. While the outcomes of the original assessment had noted the retention of minor junctions and accesses to be especially problematic in Sub-Scheme B, it was considered prudent as part of the project re-shaping exercise to develop options for minor junction closures within both Sub-Schemes B and C (northbound and southbound).
- Options were developed along the all-purpose N11 (covering the extents of Sub-Schemes B and C), to provide alternative active travel facilities and thereby avoid potential hard shoulder conflicts between buses and vulnerable road users.

Revised Stage 2 Appraisal

The feasible options identified were subjected to a rigorous and systematic appraisal against a broad range of criteria, with the aim of determining a preferred option for achieving intermediate junction closures and the provision of active travel facilities within Sub-Schemes B and C. The updated Stage 2 Appraisal therefore considered the further likely impacts of these additional interventions on the assessment of the sub-schemes.

The appraisal of the re-shaped N11/M11 BPIS necessarily sub-divided the updated Stage 2 Project Appraisal into a number of further stages, as illustrated in Figure 10. (See next page)

Long-List Option Sifting

Numerous options were considered which sought to remove the conflict points at intermediate junctions and accesses and provide active travel facilities within Sub-Schemes B and C. While the primary basis behind options development was to identify ways of closing existing minor junctions and accesses northbound and southbound within Sub-Schemes B and C – as required by TII Standard DN-GEO-03087 – the challenges involved in doing so meant that the following approach was taken:

- The closure of many of the legacy accesses along the N11 dual carriageway poses very specific and difficult challenges in terms of engineering feasibility, environmental impact, and cost. Although the retention of any minor junction or direct access would require a departure, a pragmatic view has been taken in line with the objectives of the scheme, which does not seek to close each access at all costs or impact.

Figure 10 - Updated Stage 2 Project Appraisal process

- It was acknowledged that the presence of certain minor junctions/accesses poses a greater impediment to the safe operation of bus priority than others. For example, some accesses are more geometrically sub-standard than others, such that it would not be acceptable to retain the access along the hard shoulder bus priority measure under any circumstance. In other cases, it may be possible to retain an existing access and mitigate or manage any safety implications to an acceptable level.
- Furthermore, the degree to which each minor junction or accesses is likely to impede bus journey time is also variable. Highly trafficked accesses with greater turning movements will result in higher weaving volumes into the hard shoulder, frequently slowing the progress of the bus through the network. Conversely, lightly trafficked accesses may impede bus priority only very occasionally.
- Options were therefore developed which close all accesses, or only close certain accesses within Sub-Schemes B and C. The aim of the analysis was to determine the optimal junction strategy in consideration of the specific objectives of the scheme. Following this analysis, a refined list of options was progressed to Stage 2A to be assessed in further detail.

Stage 2A Appraisal

Having advanced a number of options in each sub-scheme through the long-list sifting, the purpose of the Stage 2A appraisal was to identify a singular preferred option for closing accesses and providing for active travel within Sub-Scheme B and C. On completion of the Stage 2A appraisal, the preferred options for achieving these objectives were identified as follows:

Sub-Scheme B (Junction 6 to Junction 8)

- Provision of new Junction 6 Link Road (East) via an extension of the existing local road link through the La Vallee development, facilitating permanent closure of the existing Silverbridge and Dargle Lane minor junctions.
- Permanent closure of existing N11 Herbert Road Junction.
- Provision of new Realigned R117 Link Road, connecting the R117 to Junction 6 via an off-line link through lands at Fassaroe, facilitating permanent closure of the existing N11 R117 Enniskerry Road Junction.
- Permanent closure of existing N11 accesses to the Dublin Oak Academy and Woodlands Academy.
- Provision of new on-line, off-road Active Travel facility to east of N11 connecting Junction 6 and Junction 7.

Sub-Scheme C (Junction 8 to Junction 9)

- Provision of a new Access Road connecting existing residential properties at Moorepark to Quill Road, facilitating permanent closure of the existing N11 merge/diverge to Moorepark.
- Permanent closure of all existing N11 direct residential, commercial and field accesses.
- Retention of the existing Quill Road Junction.
- Provision of new on-line off-road Active Travel facility to east of N11 connecting Junction 8 and Junction 9.

Stage 2B Appraisal

Having defined the updated preferred option for Sub-Scheme B and C, Stage 2B revisited the overall Project Appraisal Matrix previously presented in Table 3. The impacts of the design amendments were presented in terms of a revised overall assessment score across each of the six headline CAF criteria. As before, the outcome of this step was to recommend the overall extent of the scheme, i.e. to determine whether the final scheme should consist of all sub-schemes combined, or just one or two of the sub-schemes.

The primary focus of the Stage 2B assessments was therefore to consider how the changes to the Sub-Scheme B and C design affected the overall Stage 2 Project Appraisal Matrix. As part of this process however, the Economy assessment of all sub-schemes was reviewed to consider updated cost estimates prepared for each (accounting for inflation) and the outcomes of detailed micro-simulation traffic modelling, which could more accurately estimate bus journey time savings on a scheme-wide basis.

The overall Stage 2 Project Appraisal Matrix at the conclusion of the Phase 2 Project Re-shape is presented in Table 4, with the key conclusions summarised as follows:

- The revised Stage 2 appraisal concluded that the Safety, Accessibility and Social Inclusion and Physical Activity issues previously identified within Sub-Scheme B and Sub-Scheme C had been appropriately addressed. These were no longer key differentiators between the sub-schemes.
- The revised Stage 2 appraisal indicated a significant improvement in the overall impact score for Sub-Scheme B, increasing to 349 (from 271). This improvement was largely attributed to the safety enhancements, with the closure of the majority of intermediate junctions resulting in a significant reduction in the number of potential conflict points and weaving areas, particularly between Junction 6 and Junction 7. The revised design also ensured that pedestrians and cyclists would be provided with a two-way shared Active Travel facility, away from the N11 mainline, ensuring that the safety and comfort of existing active travel users is improved from the existing condition.

- Due to the additional off-line works associated with Sub-Scheme B and C, a greater degree of environmental impact was identified. This was reflected in the revised assessments, with the environmental criteria now a key differentiator.
- The micro-simulation modelling assessments indicated that strong bus journey time savings can be expected within each of the sub-schemes, with the exception of Sub-Scheme C southbound (due to limited congestion and relatively high speeds achieved in the Do-Minimum scenario).
- Although the micro-simulation modelling indicated bus journey time improvements within Sub-Scheme B, the modelling also captured the known queuing issues at the existing Junction 7 merges and diverges. It was considered that such queuing, extending on to the N11 mainline from slip roads could still impede the progression of buses and pose a considerable safety risk. In response to this, early-stage testing using the micro-simulation model examined the option of installing traffic signals on the Junction 7 eastern roundabout, with a view to more efficiently managing conflicting flows at the junction and thereby preventing the build-up of queues extending back to the N11. However, the modelling demonstrated that signalising the roundabout alone would not provide sufficient capacity to overcome the problem. Accordingly, the modelling exercises concluded that the replacement of the Junction 7 eastern roundabout with a signalised junction would be sufficient to more efficiently manage conflicting flows at the junction and prevent queues from extending back to the N11, with the precise design of the signalised layout to be developed in future stages.

At the conclusion of the project re-shape and updated Stage 2 Project Appraisal Matrix, it was recommended that each of Sub-Schemes A, B and C should be progressed to Stage 3 Preferred Option.

Public Display of Emerging Preferred Option

Following the completion of the option selection process, a Public Display of the emerging Preferred Option for the N11/M11 BPIS was held on 12 September 2023. Further to the assessment outcomes as part of the project re-shape, the Public Display presented the preferred option for the project with the inclusion of Sub-Schemes A, B and C.

Table 4 - Stage 2 Project Appraisal Matrix (following Project Re-shape)

Stage 2 Project Appraisal Matrix			
	Sub-Scheme A	Sub-Scheme B	Sub-Scheme C
Economy Weighted Sub-Total Score (out of 100)	75	43	50
Safety Weighted Sub-Total Score (out of 100)	62	71	76
Environment Weighted Sub-Total Score (out of 100)	51	33	42
Accessibility & Social Inclusion Weighted Sub-Total Score (out of 100)	86	71	86
Integration Weighted Sub-Total Score (out of 100)	83	60	86
Physical Activity Weighted Sub-Total Score (out of 100)	57	71	71
Overall Weighted Score	414	349	411

Further Work and Phase 2 Revisit

Following the conclusion of the second non-statutory public display in September 2023, further studies were initiated to develop the design of the emerging preferred option in greater detail and to undertake a detailed environmental evaluation of the scheme. Primarily undertaken between September and December 2023, these studies comprised specialist biodiversity and habitat surveys, topographical surveys, detailed traffic analysis and further engineering and road safety assessments. In conjunction with this, over 1,150 submissions received in response to the September 2023 public display were analysed by the project team, to understand and assimilate the key issues for members of the public and interested stakeholders.

The further studies undertaken brought several factors to light, which were deemed of relevance to the design and assessment of Phase 2 options. On review of the information gathered during this time, it was considered that certain aspects of the option selection assessments previously undertaken in Phase 2 could alter and be improved upon, if this information was factored into analysis.

Summary of Further Studies (September – December 2023)

R117 Habitat Surveys
The emerging preferred option presented in the September 2023 public display proposed the closure of the existing R117 Enniskerry Road left-in left-out junction to the N11 along the northbound carriageway between Junction 7 (Bray South) and Junction 6 (Bray/Fassaroe). To provide a connection from the R117 to the N11/M11 Corridor, the proposals also included a realignment of the R117 northwards through lands at Fassaroe, connecting to Kilbride Lane and the existing southern roundabout at Fassaroe (close to Junction 6). However, multidisciplinary biodiversity surveys conducted in Autumn 2023 identified the presence of a number of calcareous (tufa) spring seepages along the banks of the Glencullen River, in close proximity to the proposed crossing of this watercourse along the Realigned R117 near Fassaroe. Upon specialist ecological review, it was concluded that given the proximity and connectivity of this Annex I habitat type to Knocksink Wood SAC, and the priority level of protection associated with this habitat, it must be considered an ex-situ extension of the SAC protected habitat.

The presence of this priority Annex I habitat, which had not been previously mapped as part of the original Constraints Study, introduced a new ecological constraint of very high conservation value. It was therefore considered necessary to revisit the assessments which had informed the emerging preferred option of September 2023 and re-examine options for closing the R117 Enniskerry Road Junction to the N11.

Junction 7 (Bray South)
From the outset of the Phase 1 Engineering Feasibility Study, attention was drawn to the specific operational challenges around the safe and efficient implementation of bus priority measures through the major junctions along the N11/M11, which included:

- At each merge and diverge, the bus priority lane would essentially double-up as an auxiliary lane for general traffic manoeuvring through the junction. Given the high number and close spacing of junctions along the N11/M11 route, this would mean that the provision of a dedicated lane exclusively for bus traffic would be intermittent.
- Insufficient junction capacity, leading to queuing extending into the merge and diverge areas, would likely impede the path of the bus through the junction – even with the application of TJR – causing disruption to the service and exacerbating already present safety issues.

This potential for significant delay to bus traffic was especially apparent at Junction 7 (Bray South), which plays a critical role in the flow of traffic across the network. The Phase 2 options assessments informing the emerging preferred option of September 2023, recognised that the safe and efficient provision of bus priority within Sub-Scheme B centred around finding an appropriate solution to effectively manage bus passage through Junction 7. Micro-simulation modelling to inform the development and performance of the scheme very clearly captured the known queuing issues at the existing Junction 7 merges and diverges, concluding that signalisation of the junction would likely be sufficient to achieve the objective of removing stationary queues from the merge and diverge areas, which would otherwise impede the progression of buses using the nearside bus priority measures.

Following the September 2023 public display of the emerging preferred option, the signalised junction layout shown in Figure 11 was developed and tested as a proposal to replace the existing Junction 7 eastern roundabout.

The design year modelling analysis confirmed that the signalised junction (in conjunction with other proposed interventions) did achieve certain benefits in respect of managing hazardous queuing from the N11 diverges versus the Do-Minimum scenario, which would otherwise generate safety issues and impede bus priority through the junction. However, the micro-simulation analysis equally laid bare the severe impacts of the future traffic growth within the immediate vicinity of the junction, in particular on the R767 Killarney Road and R768 Southern Cross Road approaches, as illustrated in Figure 12 for the 2042 AM peak.

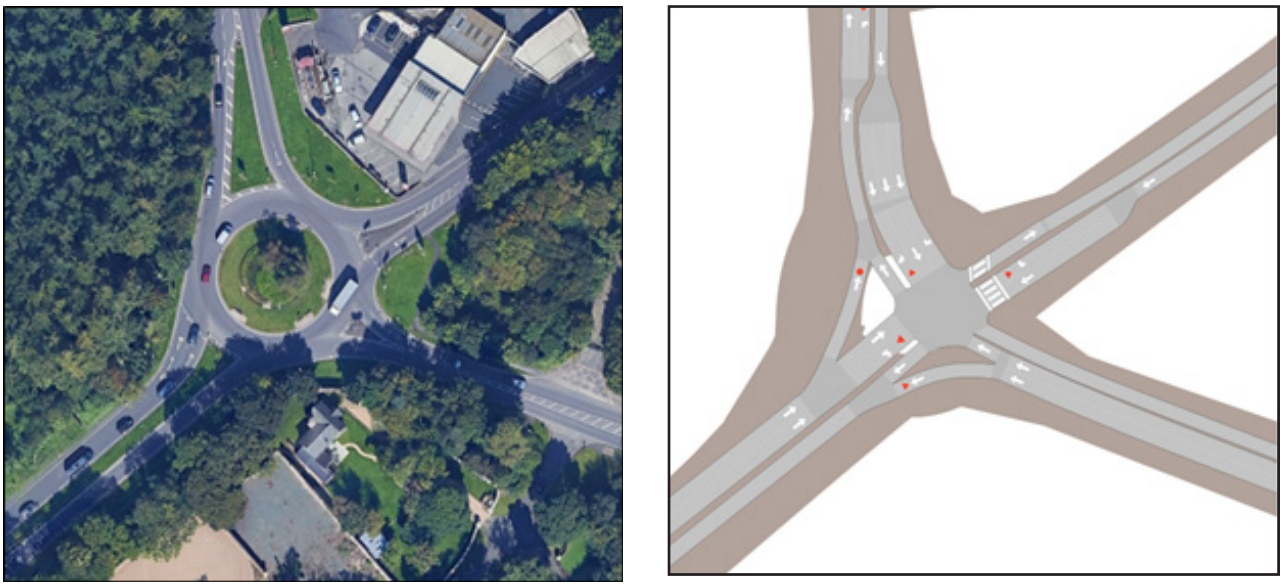


Figure 11 - Proposed signalised junction option at Junction 7 eastern roundabout

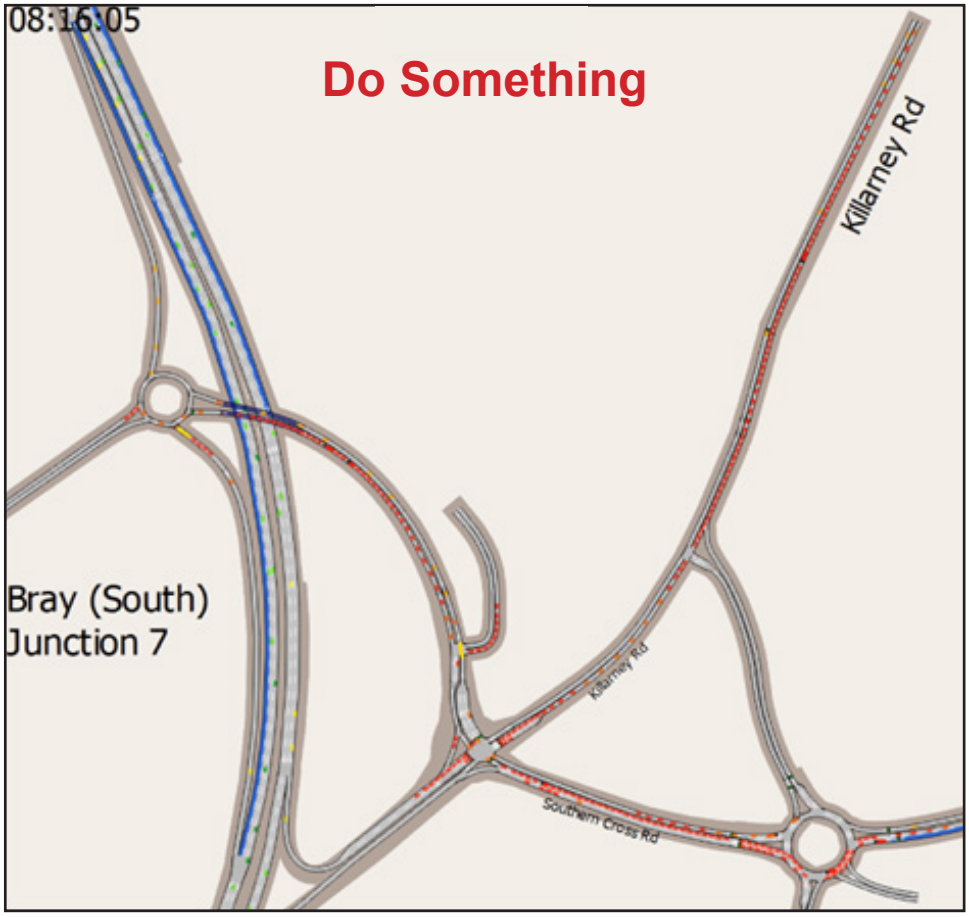


Figure 12 - Junction 7 2042 Design Year Do-Something micro-simulation model (AM peak)

Red line indicates extent of queuing, which reaches to 1.3km on Killarney Road and 1.7km on Southern Cross Road

The outcomes of the detailed traffic analysis prompted a re-evaluation of what should be the appropriate level of intervention at Junction 7 (Bray South). It was decided that a revisit of options at Junction 7 should be undertaken in Phase 2, with a view to finding a more holistic solution to the broader transport deficiencies in the area and ensuring better value for money on investment.

Junction 8 and Kilmacanogue (Northbound)
The emerging preferred option presented at the September 2023 public display did not propose dedicated bus priority northbound through Junction 8 and Kilmacanogue Village. Instead, it was proposed that dedicated bus priority would terminate at the Junction 8 diverge, with a shared auxiliary lane through Kilmacanogue village and the existing service road to Glencormick and Avoca remaining in place. Dedicated bus priority was proposed to recommence at a point north of the existing merge from Glencormick/Avoca. However, the emerging preferred option did propose the inclusion of bus priority signalling at the Junction 8 merge, to assist bus traffic in navigating more efficiently through the merge area.

Subsequently, more detailed traffic analysis using the micro-simulation model confirmed two operational difficulties with the signalling proposal, as follows:

1. The existing road layout at the Junction 8 northbound merge comprises a sub-standard diverge followed by a short merge immediately beyond the Circle K Service Station. This layout would leave very little space for detection of oncoming buses to trigger the signal change.
2. Any priority signalling for buses would simply release the bus into a shared (and frequently congested) merge area, without a clear exit into a dedicated bus priority facility.

The traffic analysis prompted a re-evaluation of what should be the appropriate level of intervention, if any, northbound through Junction 8 and Kilmacanogue Village.

Review of Project Objectives

In light of the further studies completed between September and December 2023, a review of the Project Objectives (previously presented in Table 1) was undertaken in February 2024. The purpose of this review was to ensure that the objectives set for the project at the outset did not unnecessarily constrain the delivery of an optimal solution. This review of the objectives did not seek to alter the fundamental purpose of the N11/M11 BPIS, and many of the original objectives defined at the outset of the project did not change. However, the review was considered necessary owing to the following factors:

- At the outset of the project, the objectives had been set with a very targeted intervention envisaged (i.e. bus priority on the N11/M11) and with the initial expectation of a Part 8 Statutory Planning process. As the Phase 2 process had evolved however, the scope and ambition of the scheme had been re-shaped to examine a broader set of possible options and interventions under an EIA Statutory Process.
- It was evident that viable options to deliver bus priority needed to consider broader operational complexities and specific inherent safety concerns, whilst achieving an economically viable outcome. Although appropriate at the outset of the project, it was considered that certain objectives were too narrow in focus to complement and respond to the evolution of the scheme during Phase 2.
- The studies undertaken between September and December 2023 further supported the need to review the project objectives, given the revisit of options instigated by these assessments. In particular, it was apparent that the developing scheme design had greater potential to impact environmental constraints where options outside of the immediate road corridor were under consideration (e.g. R117, Junction 7). Furthermore, it was considered that the strong emphasis within the original project objectives on delivering a practicable solution for short-term benefit, could favour low-cost interventions which left critical operational and safety issues unresolved.

In summary, the key updates made to the project objectives sought to prioritise an overall value for money solution in lieu of a more practicable and short-term emphasis. The revised objectives also recognised the increased potential for the scheme to impact environmental constraints and introduced specific safeguards to minimise such impacts. Additionally, the revised objectives sought to pro-actively enhance operational safety on the N11/M11 corridor, as opposed to merely avoiding adverse impacts (See Table 5).

Design Development of Options and Revised Stage 2A Appraisal

Commencing in January 2024, a re-evaluation of scheme options began at the three locations where further information and studies had identified the need to revisit previous assessments, with the revisit specifically focussing on identifying the following:

- The preferred option to accommodate the closure of the existing R117 Enniskerry Road junction onto the N11;
- The preferred option and level of intervention at Junction 7 (Bray South); and
- The preferred option at Junction 8 (Kilmacanogue) and through Kilmacanogue Village northbound.

Options Assessment for R117 Junction Closure

Following the identification of priority Annex I habitat within the boundary of the previous preferred option, two additional options were developed to facilitate the closure of the R117 left-in left-out junction, as follows:

Option 1 – A one-way segregated service road (northbound) between Junction 7 (Bray South) and Junction 6 (Bray/Fassaroe). With this option, the R117 would connect to the service road via a left in – left out junction.

Option 2 – A two-way realignment of the R117 connecting to the western roundabout at Junction 7 (Bray South).

Following a comparative assessment of options under the six CAF headline criteria, it was recommended that Option 1 be progressed to Stage 2B as the preferred option at the R117 Junction closure.

Table 5 - N11/M11 BPIS Project Objectives following February 2024 review)

Economy Objective 1:
To increase the people carrying capacity of the N11/M11 between Loughlinstown Roundabout and Junction 9 (Glenview)

Economy Objective 2:
Deliver an interim transport solution capable of delivering value for money

Economy Objective 3:
Generate positive economic benefits to public transport users by: Reducing bus journey times and Improving bus journey time reliability

Safety Objective 1:
To deliver bus priority measures which are clearly delineated and understood by general road users and bus drivers in the environment of an inter-urban route.

Safety Objective 2:
Ensure bus priority can be delivered without adversely impacting on the safety of all road users.

Safety Objective 3:
To enhance the operational safety of the N11/M11 Corridor.

Environment Objective 1:
To provide for more sustainable transport solutions on the N11/M11 corridor, supporting a balance of alternative modes and enabling a reduction in private car dependency and reducing the carbon intensity of travel.

Environment Objective 2:
To minimise impacts to sensitive ecological sites, well-established communities, heritage and amenity resources.

Physical Activity Objective:
To provide a facility that allows for the delivery of an attractive alternative mode of transport for communities which supports the creation of a healthier urban environment for active travel, through congestion relief.

Accessibility & Social Inclusion Objective 1:
To support an increase in bus patronage along the N11/M11 corridor and enable sustainable travel to provide a faster and more reliable choice.

Accessibility & Social Inclusion Objective 2:
To support improved access to the GDA for all transport users along the N11/M11 corridor.

Integration Objective 1:
To deliver an interim transport solution which does not introduce significant constraint on the subsequent development of the N11/M11 Junction 4 to Junction 14 Improvement scheme.

Integration Objective 2:
To support integration of road-based transport with other transport modes.

Integration Objective 3:
To complement wider government transport policy.

Options Assessment for Junction 7 (Bray South)
The emerging preferred option of September 2023 involved a medium-scale level of intervention, including signalisation of Junction 7 and capacity upgrades. A revised options assessment was undertaken to consider a more holistic solution to the broader transport deficiencies in the area and ensuring better value for money on investment. Following initial stage optioneering assessments, a variation of a 3 way – 2 level trumpet arrangement was proposed. This arrangement effectively removed the conflict between the diverge and merge movements, providing free-flow access to and from the eastern roundabout at Junction 7 and the N11 mainline.

For the revised Junction 7 layout, as shown in Figure 13, micro-simulation modelling indicated that flow conditions are greatly enhanced relative to the Do-Minimum scenario. Even accounting for the additional traffic arising as a result of the proposed closure of the N11 Herbert Road junction, the revised Junction 7 layout maintains smooth running of the N11 mainline, by preventing blocking back on the slip roads and queues forming on the N11. However, unlike the previous signalised junction arrangements, the revised layout also greatly reduces the build-up of queues along the R767 Killarney Road and R768 Southern Cross Road approaches to Junction 7.

Following the completion of the initial micro-simulation exercises locally at the junction, the design of the revised layout of Junction 7 was developed in further detail, to enable more accurate assessments of environmental impact, cost and constructability to be undertaken.

Following a comparative assessment of options under the six CAF headline criteria, it was recommended that this option be progressed to Stage 2B as the preferred option at Junction 7.

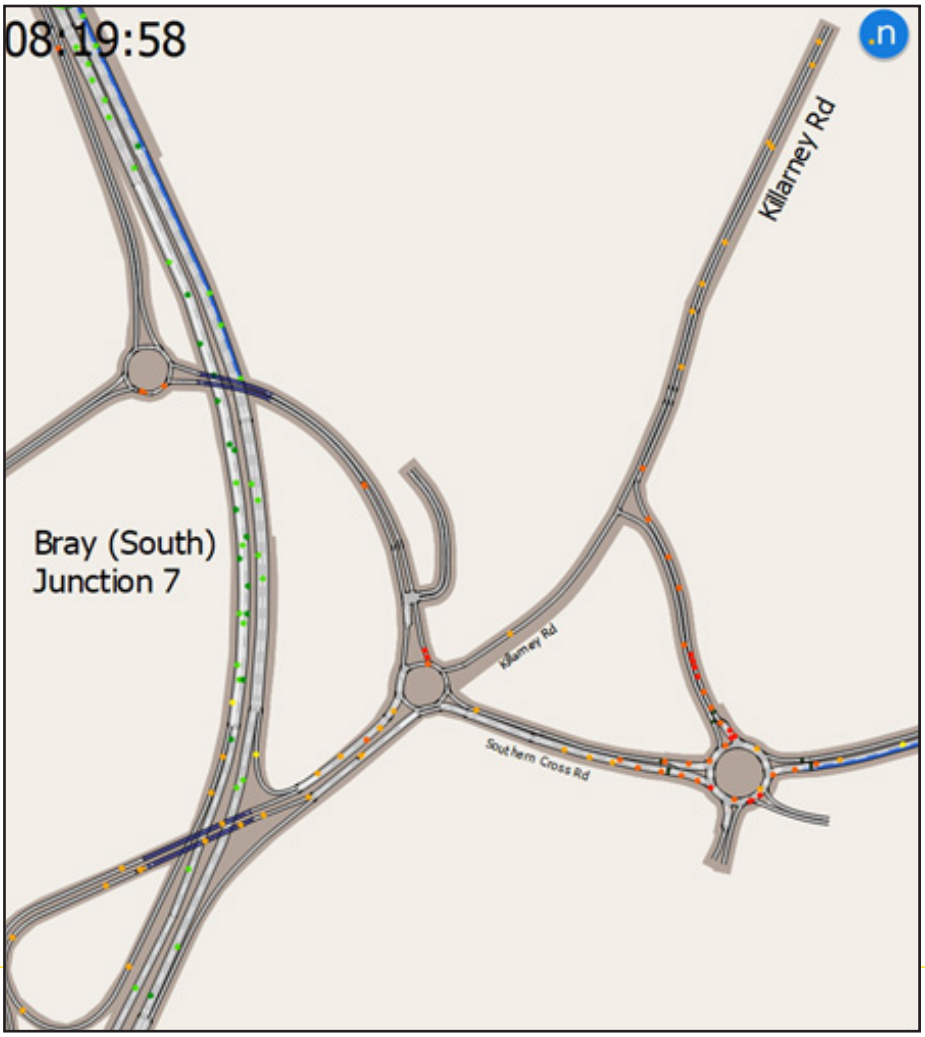


Figure 13 - Junction 7 2042 Design Year Do-Something (Major Upgrade) micro-simulation model (AM peak)

Options Assessment for Junction 8 / Kilmacanogue (Northbound)

In response to additional traffic studies undertaken between September – December 2024, two further options were considered to add to the option previously presented at the September 2023 public display. The revised list of options therefore comprised:

1. **Option 1** – bus priority signalling at the Junction 8 merge, together with the reconfiguration of the existing mini-roundabout into a left in – left out junction (as per September 2023).
2. **Option 2** – Provision of a segregated parallel service road northbound through Kilmacanogue, commencing in advance of the existing Junction 8 (Kilmacanogue) diverge and extending north beyond the existing accesses to Glencormick (L1019) and Avoca.
3. O**ption 3 –** Terminating the bus priority in advance of the Junction 8 diverge and retaining the existing road layout and access arrangements northbound through Kilmacanogue Village (essentially a localised Do-Minimum option).

Although costing less than the other options, Option 3 ranked least favourably from a safety perspective, as it did not seek to address any of the existing operational deficiencies northbound through Kilmacanogue, including the short weaving length and sub-standard access arrangement at the Junction 8 northbound diverge and merge. It was considered that the resolution of these issues with the provision of a segregated service road (similar to the recently constructed southbound service road through Kilmacanogue), would offer the optimum solution for all traffic travelling northbound through Kilmacanogue, by improving operational safety. Consequently, the outcome of the assessment was that Option 2 should progress for more detailed design analysis and environmental appraisal.

Revised Stage 2B Appraisal

As before, the purpose of the Stage 2B appraisal was to determine the overall optimal extent of bus priority to be delivered between Loughlinstown Roundabout and Junction 9 (Glenview). This aim of this stage is to determine if the final scheme should consist of all sub-schemes combined, or just one or two of the sub-schemes.

A Stage 2 Project Appraisal Matrix was previously undertaken for all schemes as part of original Design Basis (assuming a Part 8 Statutory Planning process) and presented in Table 3. Following confirmation that the scheme would require an EIA Planning process, the Design Basis was revised, and the Stage 2 Project Appraisal Matrix was subsequently updated for Sub-Schemes B and C and presented in Table 4.

As part of the Phase 2 Revisit undertaken in 2024, no further changes were made to the designs of Sub-Schemes A and C, such that final Stage 2 Appraisal considered the inclusion of the revised elements of the Sub-Scheme B design on the overall Stage 2 Project Appraisal Matrix, which is presented in Table 5.

Table 5 - Stage 2 Project Appraisal Matrix (following Phase 2 Revisit)

Stage 2 Project Appraisal Matrix			
	Sub-Scheme A	Sub-Scheme B	Sub-Scheme C
Economy Weighted Sub-Total Score (out of 100)	75	71	79
Safety Weighted Sub-Total Score (out of 100)	62	76	76
Environment Weighted Sub-Total Score (out of 100)	51	31	42
Accessibility & Social Inclusion Weighted Sub-Total Score (out of 100)	86	86	86
Integration Weighted Sub-Total Score (out of 100)	83	74	86
Physical Activity Weighted Sub-Total Score (out of 100)	57	71	71
Overall Weighted Score	414	409	440

As part of the revised Economy assessment at Stage 2B, micro-simulation modelling has very clearly demonstrated that the combined impact of bus priority facilities, improvements to Junction 7 and 8 and minor junction closures, has a very positive impact on bus journey times and overall network performance. The proposed scheme is expected to deliver significant bus journey time improvements in the AM peak northbound (22 minutes) and PM peak southbound (13 minutes).

Stage 3 Preferred Option

Following completion of the revisited Stage 2 Project Appraisal Matrix in 2024, the recommendations of this Phase 2 Option Selection Report is to advance Sub-Schemes A, B and C (the components of which are described below) as the preferred option to meet the project objectives. The preferred option design details are presented in the drawings in Appendix 10-1 of the Option Selection Report.

The economic assessment has demonstrated that, based on the scheme costs developed to date and the associated forecast performance of the transport network, the proposed option represents value for money with a highly positive Benefit to Cost Ratio (BCR).

Sub-Scheme A

The emerging preferred option in this sub-scheme proposes the provision of northbound and southbound bus priority measures within the hard shoulders with widening proposed in places to achieve desirable minimum Stopping Sight Distance (SSD) and to meet the cross-sectional requirements of DN-GEO-03087. Dedicated bus priority is temporarily suspended to enable provision of the Through Junction Running (TJR) detail at Junction 5 (Bray North). In addition, priority signalling is proposed at the Junction 5 Southbound Merge ramp, to enable buses to pass more efficiently through the merge area. The motorway classification also means that non-motorised users are prohibited, with the result that conflicts between buses using the hard shoulder and vulnerable pedestrians and cyclists will not occur. Accordingly, there is no requirement to provide dedicated active travel facilities within Sub-Scheme A.

Sub-Scheme B

The emerging preferred option for the sub-scheme proposes the provision of dedicated bus priority measures within the hard shoulders in the southbound direction with the implementation of the TJR detail at major junctions. In the southbound direction, it is proposed that the following minor junctions/accesses will be permanently closed:

- Access to Silverbridge Halting Site
- L152 Dargle Lane Junction
- L1956 Herbert Road Junction
- One private residential access

To provide an alternative means of access to Silverbridge and Dargle Lane, an extension of the access road serving the existing residential/commercial development at La Vallee is proposed, which will terminate at a cul de sac at Dargle Lane. This access road includes a two-way active travel facility, which is proposed to extend as far south as Junction 7 (Bray South) via a combination of dedicated and shared-use space (partially using Ballywaltrim Lane).

Between Junction 7 (Bray South) and Junction 8, no dedicated bus priority is proposed in the southbound direction, as there is insufficient space to accommodate bus priority facilities downstream of the Junction 7 merge and through Kilmacanogue Village, following the construction of the southbound segregated service road.

In the northbound direction commencing from Junction 8 (Kilmacanogue), a one-way segregated service road, starting in advance of the Junction 8 northbound diverge and extending through Kilmacanogue Village as far as the access to Glencormick (L1019) and Avoca, is proposed. To the north of these accesses, no further dedicated bus priority is proposed northbound within Sub-Scheme B, given the need to provide auxiliary lanes along the N11 mainline to accommodate weaving movements between Glencormick (L1019) / Avoca and Junction 7, and between Junction 7 and Junction 6.

In the northbound direction between Junction 8 and Junction 6, it is proposed that the following minor junctions/accesses will be permanently closed:

- Private Access (Woodlands Academy)
- R117 Junction 6a (Enniskerry)
- Private Access (Dublin Oak Academy)

To provide an alternative means of access to the R117 Enniskerry Road, a one-way segregated service road (northbound) between Junction 7 (Bray South) and Junction 6 (Bray/Fassaroe) is proposed, with the R117 connecting to the service road via a left in – left out junction.

Within Sub-Scheme B, a significant upgrade of Junction 7 (Bray South) is also proposed, which includes the provision of improved grade separation and new merge and diverge layouts.

Sub-Scheme C

The emerging preferred option for the sub-scheme proposes the provision of northbound bus priority measures within the hard shoulder, commencing downstream of the Junction 9 (Glenview) merge. No bus priority is proposed in the southbound direction, with the existing N11 mainline configuration to be retained. It is proposed that the following minor junctions/accesses will be permanently closed:

- L95111 Moorepark Diverge and Merge
- All existing private residential, commercial and field accesses (northbound and southbound).

It is also proposed to provide an off-road active travel facility to the east of the existing mainline, commencing at the existing Junction 8 Eastern Roundabout and extending as far south as Junction 9 Glenview, via a combination of dedicated and shared-use space (partially using the L5530 Kilmurry Cottages Road).

N11/M11
Bus Priority
Interim Scheme

Phase 2
Option Selection Report

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