National Transport Authority

Bray to UCD CBC

Feasibility & Options Report

CH2M Barry

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EXECUTIVE SUMMARY

General

CH2M Barry were appointed by the National Transport Authority to undertake the Feasibility and Options Report for the Bray to UCD Core Bus Corridor as identified in the Draft Transport Strategy for the Greater Dublin Area (2016-2025).

The general objective of the scheme is to as far as reasonably practicable deliver the on-street infrastructure necessary to provide continuous priority bus movements along the Core Bus Corridor (CBC), thereby enabling the bus to provide a faster, more reliable and more attractive alternative to the private car. In addition, the scheme is to provide cycle facilities along any section of the route that are required under the Greater Dublin Area Cycle Network Plan.

Scheme Objectives

The objective of the study is to identify an emerging preferred route that delivers the on-street infrastructure necessary to provide continuous priority for bus movements along the CBC. This will mean enhanced bus lane provision on the corridor, removing current delays in relevant locations and enabling the bus to provide a faster and more reliable alternative to car traffic along the route. This in turn will make bus transport a more attractive alternative for the travelling public. It will also make the bus system more efficient, as faster bus journeys means that more people can be moved with the same level of vehicle and driver resources.

In addition, it is a scheme objective to provide any cycle facilities along the route that are required under the Greater Dublin Area Cycle Network Plan (published by the NTA, 2013) to the target Quality of Service(s) specified therein and to give consideration to further providing cycle facilities along sections of the route where they may not be expressly required under the Cycle Network Plan.

The Study Area

The Bray to UCD Bus Corridor Study Area runs from Bray town centre to the UCD interchange/ flyover on the N11. It should be noted that the CBC route terminates at the River Dargle north of Bray Town, however measures have been proposed to enhance bus priority within Bray Town to facilitate improved access for buses to the CBC. The study area was generally developed to include the main trip generators between UCD and Bray either side of the central spine formed by the existing N11 route and encompassing the urban area to the south of Bray. For the purposes of the study, and to aid a comparative analysis of various options, the study area was split into three sections. These study area sections are Bray to Wilford, Wilford to Wyattville and Wyattville to UCD.

Route Options Assessment Process

A two-stage options assessment process was adopted.

At Stage 1 all feasible route options underwent a high-level assessment or ‘sifting’ process in order to assess its suitability and ability to provide for a CBC. This qualitative assessment evaluated each potentially viable route option in terms of ability to achieve the scheme objectives previously identified and was based on professional judgement and a general appreciation of the existing physical conditions and constraints within the study area.

This assessment stage focused on high-level engineering and environmental constraints, comprising a desk study supplemented with site visits. The purpose of this assessment stage was to determine which route options were the most viable and should be considered for further detailed assessment.

Following the Stage 1, shorter route options that passed the sifting process were assembled into coherent route options which connected the common nodes at extremities of each section of the study area. Initial indicative schemes for each route option were developed based on the specific constraints along a particular route, with a number of scheme options considered for particulalry constrained routes where required.

The indicative scheme for each route option was then progressed to 'Stage 2' of the assessment process Multi-Criteria Analysis (MCA) in accordance with the Department of Transport "Guidelines on a Common Appraisal Framework for Transport Projects published by the Department of Transport (DTTAS), March 2016.

The MCA considered Economy, Integration, Accessibility and Social Inclusion, Safety and Environment for each scheme indicative option. Each route option was comparatively assessed against sub-criteria under each of these main criteria and also in terms of performance against the study objectives. The scheme options were then ranked accordingly in order to identify the Emerging Preferred Route Option.

The Emerging Preferred Route

Based on the results of the analysis carried out as described in this report, an Emerging Preferred Route has been identified, as illustrated in Figure 0.1 and is described in the following paragraphs and in detail in Section 8. The route commences in Bray at the Fran O'Toole (Dargle River) bridge and runs along Castle Street and Dublin Road to the Wilford junction and then follows the R119 (Dublin Road) between Wilford junction and Shankill, before turning north west to follow the R837 (Dublin Road) between Shankill and the Loughlinstown Roundabout. From the Loughlinstown Roundabout the emerging preferred route follows the existing N11 to its termination at the UCD flyover. Outbound services running along the CBC would take the same route to return to Bray.

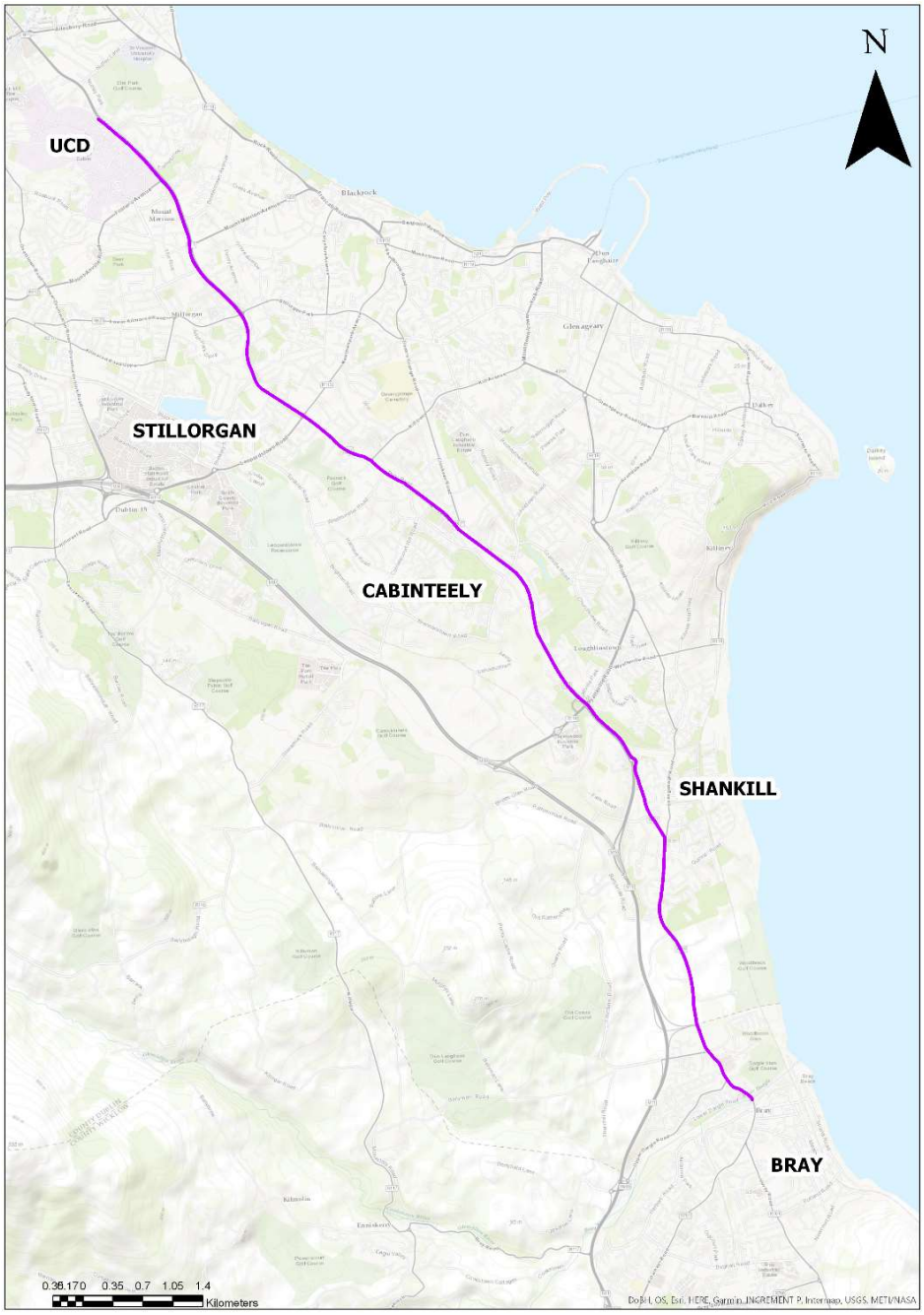


Figure 0.1 Emerging Preferred Route

This scheme details the on-street infrastructure necessary to provide continuous priority for bus movements along the corridor in accordance with the CBC scheme objectives.

Describing the emerging preferred route in the Bray to UCD (inbound) direction the CBC commences at the Fran O'Toole bridge. It is proposed to provide pedestrian bridges on either side of the existing bridge, the existing bridge can then facilitate southbound bus lanes reaching the Seapoint Road junction and provision of dedicated cycle lanes in both directions. It is proposed to widen Castle Street to provide bus and cycle lanes in each direction. Dublin Road would also be widened to accommodate bus and cycle lanes in each direction for its full length from Castle Street to the Wilford junction. This will include upgrades to the existing signal controlled junctions and includes an upgrade the Wilford roundabout to a signalised junction, which would enhance priority for buses and improve pedestrian and cyclist facilities. This will require land take on both sides of Dublin Road from portions of front gardens and commercial parking spaces, it will also require the purchase of two buildings.

Road widening will be required to provide bus and cycle lanes in both directions on the Dublin Road between Wilford junction and Crinken Lane, to the south of Shankill Village. This will require land take from agricultural land and the removal of a large number of significant mature trees. A new signalised junction servicing the Woodbrook/Shanganagh LAP lands will be incorporated.

Due to geometrical constraints through Shankill Village, it is not considered practical to provide dedicated cycle facilities through this section. An alternative route to the west of the village is proposed for cyclists, this would generally comprise cyclists sharing low traffic volume, low speed roads and would involve construction of a new access ramp to link Lower Road to the roundabout at St Anne's Church.

From Crinken Lane to Quin's Road junction it is proposed to widen the road to provide dedicated bus lanes in each direction. From here geometrical constraints mean that it is not practical to provide continuous bus lanes in both directions. For southbound buses continuous bus lanes are proposed through Shankill Village> For northbound buses two sets of traffic lights and a length of northbound bus lane through the village is proposed as part of a queue relocation system to provide priority. To the north of Shankill Village there is a narrow bridge over the old railway line and widening of this bridge is restricted by buildings on either side. For this 180m section, buses would be required to merge with general traffic.

It is proposed to upgrade the Quinn's Road roundabout to a signalised junction to improve pedestrian provision and to incorporate measures to provide priority for buses in both directions. It is also proposed to upgrade the roundabout at St Anne's Church to a signalised junction and a northbound bus lane would be provided on the approach to this junction from Shankill Village to ensure priority for buses in both directions at the junction.

Road widening is proposed to provide bus lanes, footpaths and cycle paths along the section between this new junction at St Anne's Church and the Loughlinstown Roundabout. This will include upgrading the existing signal controlled junction at Stonebridge Road. On the northbound approach to the Loughlinstown roundabout cyclists will cross over to the two-way cycle track on the eastern side of the road to enable them to safely bypass the Loughlinstown Roundabout before re-joining two-way cycle facilities on the N11.

It is proposed to partially signalise the Loughlinstown Roundabout to reduce overall delays for all users and to provide enhanced journey time reliability to buses. On the southbound approach to the roundabout road realignment will be required to extend the bus lane to and around the eastern side of the roundabout and to provide clearance for buses under the existing footbridge. It is proposed to provide a dedicated bus lane on the northbound approach to the Wyattville junction. This will require reconfiguration of the existing Cherrywood Road signalised junction, as well as amending the existing service road running parallel to the N11 into a one-way northbound only route.

Between Wyattville junction and UCD there are currently bus lanes in each direction. It is proposed to maintain and enhance these bus lanes. Currently Segregated cycle tracks and footpaths are provided along most of this section, with the exception of some areas where no footpaths or substandard shared footpath

and cycle tracks are provided. It is proposed to provide continuous footpath and cycle tracks along the route and upgrade and enhance existing facilities where required. This includes provision of footpaths parallel to the N11 between the Old Bray Road (south of Cabinteely) and Westminster Road junction and between The Hill and Trees Road, where pedestrians are currently forced to share with cyclists or use alternative, and sometimes circuitous, off-line routes. Two additional toucan crossings are proposed near the junctions with Knocksinna and Westminster Road.

It is proposed to upgrade all junctions along the N11 to provide enhanced facilities for pedestrians and cyclists, this involves the removal of several left turn slips onto the N11 and includes significant improvements to pedestrian facilities at the junctions at Lower Kilmacud Road and Mount Merrion Avenue. Junction improvements at Foster's Avenue and Leopardstown Road will reduce delays to buses caused by left turning traffic queueing in the bus lanes and also improve facilities for cyclists.

A number of bus stops will be relocated to improve safety, patronage numbers or where bus stops are currently provided in too close a proximity, rationalised to reduce delays to buses. It is proposed to upgrade bus stops to mitigate pedestrian and cyclist conflicts throughout, as well as providing Real Time Passenger Information (RTPI) and shelters where required. Indented bus bays will be provided where practicable along the N11 section as this has been identified as a high frequency bus route.

It is proposed to provide a bus stops on the northbound off-ramp at UCD. This will facilitate interchange with the proposed UCD to Blanchardstown Bus Rapid Transit (BRT) as well as facilitating buses continuing into the city along the N11 or turning back southbound via the UCD flyover.

Concept Scheme Design

The emerging preferred route measures approximately 14.5 km in total. Along the emerging preferred route existing bus infrastructure is provided along approximately 69% (10km) in the inbound direction and 69% (10.1km) in the outbound direction.

The emerging preferred scheme would improve this provision to approximately 97% (14.1km) for the inbound direction and 98% (14.2km) in the outbound direction. Queue relocation systems are provided through Shankill Village which will give buses some priority in the areas where it is not practicable to provide dedicated bus lanes. In addition, improvements to cycle infrastructure along the emerging preferred route, which incorporates primary routes 12 and 12A, would increase the overall provision to 13.35km (92%) in each direction, with an off-route cycle track provided for the section without cycle facilities.

Cost Estimate

A high-level cost estimate has been prepared based on the concept design for the scheme, which includes a number of assumptions regarding the scheme details. The estimated scheme infrastructure cost, which includes land acquisition and construction costs, is anticipated to be in the order of €45m-€55m.

Journey Time Benefits

Current journey times for the Dublin Bus route 145, for the section which follows the emerging preferred route from Bray to UCD, can be seen to vary by as much as 50% when comparing average peak and off-peak journey times. The variation in journey times is significantly more pronounced on the sections of the route which do not currently have dedicated bus lanes.

Similarly, comparing the average speed of buses during peak and off-peak times it can be seen that the average speed for buses along the route is considerably higher during off-peak times, in uncongested conditions compared to the lower speeds attained by the bus during peak times.

Based on the above, a conclusion can be drawn that by improving the provision of bus lanes along the route (coupled with the introduction of cashless fares) the risk of turbulence to buses would be significantly reduced, allowing the buses to move along the route quicker and with more consistent journey times. The extent of these benefits will be confirmed and quantified at the next design stage.

Next Steps

This report has identified an emerging preferred route for the bus infrastructure along this Core Bus Corridor for which a concept design has been developed.

The next project stage (the development of a Preliminary Design) will further refine and update the initial concept design along the route. Further account will be taken of likely public transport service levels, particularly the bus service patterns and any changes to the overall bus network which may arise from the separate bus network review process. The proposals will be amended, if and as required, to integrate any resultant changes. The Preliminary Design will define the final practically achievable scheme for the CBC, considering more detailed studies of constraints, impacts and environmental assessment required at a local level.

Prior to finalisation of the CBC scheme design, a public consultation process will be undertaken, with inputs and feedback received incorporated where practical and appropriate to do so.

This Preliminary Design will form the basis of the planning consent process for the scheme, which will require a development consent application to be made directly to An Bord Pleanála, due to the nature and extent of the proposed works.

1 INTRODUCTION & BACKGROUND

1.1 Preamble

The purpose of this Feasibility Study and Options Assessment Report is to identify an Emerging Preferred Route for the Bray to UCD CBC as identified in the Transport Strategy for the Greater Dublin Area 2016-2035 (NTA 2015). The CBC network represents the most important bus routes in the region, and are generally characterised by a high frequency of bus services, high passenger volumes and with significant trip attractors located along the route. The identified core network comprises sixteen radial bus corridors, three orbital bus corridors and six regional bus corridors. High quality bus corridors will reduce journey times and encourage modal shift away from private car including for work commuting trips and promote economic development.

An objective of the Transport Strategy for the Greater Dublin Area (GDA) is to develop the Core Bus network to achieve, as far as practicable, continuous priority for bus movement on the portions of the Core Bus Network within the Metropolitan Area. This will mean enhanced bus lane provision on these corridors, removing current delays on the bus network in the relevant locations and enabling the bus to provide a faster alternative to car traffic along these routes, making bus transport a more attractive alternative. It will also make the overall bus system more efficient, as faster bus journeys means that more people can be moved with the same level of vehicle and driver resources.

The Bray to UCD Bus Corridor Study Area runs from Bray Town Centre to the UCD interchange on the N11. The corridor is within the administrative areas of Dún Laoghaire Rathdown and Wicklow County Councils. The Radial Core Bus Network as identified in the GDA Transport Strategy is illustrated in Figure 1.1, with the Bray to UCD CBC highlighted. This report presents the results of the various studies and surveys undertaken, details all feasible scheme options, reports on the option assessment process and proposes an Emerging Preferred Route.

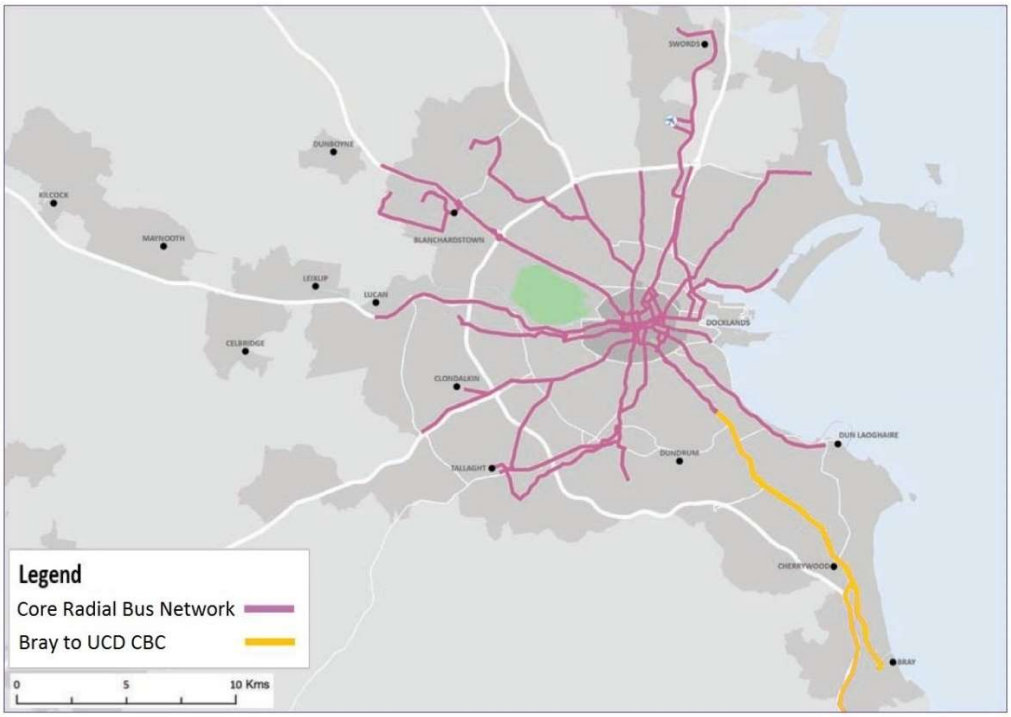


Figure 1.1 Radial Core Bus Networks (Source: Transport Strategy for the Greater Dublin Area 2016-2035)

1.2 Report Structure

This report is structured as follows:

- **Section 2** – This section outlines the general background information to the project and the proposed CBC network. It also outlines the policy context in which the CBC was developed and presents the concept of the CBC network as outlined in the Transport Strategy for the Greater Dublin Area 2016-2035 (NTA 2015). The objectives for the CBC scheme are also set out. In addition, any other transport policies relevant to the CBC network are presented.

- **Section 3** – In this section, the study area for the Bray to UCD CBC is detailed and divided into three distinct sections. Scheme specific constraints and opportunities are discussed. The integration of the scheme with existing and planned transport networks is considered, along with considerations of the scheme for other road users.

- **Section 4** – The assessment methodology for identifying the Emerging Preferred Route is outlined in this section. This includes:

  - Stage 1 Options Assessment Sifting Stage: development of the "spider's web" for each of the three study area sections and the criteria for selecting or deselecting plausible link options, based on previously defined project objectives (Sifting Process)
  - Stage 2 Options Assessment Detailed Assessment: Development of schemes for each study area section (comprising of coherent links which passed through the Stage 1 analysis). Each of these schemes are then subjected to a Multi-Criteria Analysis (Detailed Assessment)

- **Sections 5, 6 & 7** – These sections detail the Emerging Preferred Route selection process through Options Assessment Stage 1 and Stage 2 analysis. Each of the three study area sections are progressed through the selection process separately in Sections 5, 6 and 7 respectively.

- **Section 8** – This section gives the overall conclusions of the scheme options assessment process and identifies and describes the Emerging Preferred Route.

- **Section 9** – This section details the "next steps" in the delivery of the project.

2 TRANSPORT CONTEXT & SCHEME OBJECTIVES

2.1 Introduction

This section sets out the transport planning and policy framework within which the Bray to UCD CBC is being developed. It also details the relevant planned developments within the core study area which have been considered as part of the feasibility and options identification stage.

2.2 Transport Strategy for the Greater Dublin Area 2016-2035

Published by the NTA, the Transport Strategy for the Greater Dublin Area 2016 – 2035 report lays out a strategy for planning and delivery of transport infrastructure in the GDA over the next twenty years. The main relevant sections of this report relate to the identification of the core bus network. This core bus network consists of sixteen radial bus corridors, three orbital bus corridors and six regional bus corridors.

Of these identified bus corridors, the ones relevant to this Bray to UCD CBC are:

- The Bray/N11 – UCD – Donnybrook radial bus corridor
- The M11/N11 regional bus corridor

In addition to the CBCs, the NTA transport strategy report also identifies a number of the CBCs which will be developed as Bus Rapid Transit (BRT) routes. These are routes where the passenger numbers are close to the limits of normal bus route capacity and therefore require a system which provides higher speeds and better quality than normal bus services. This is proposed to be provided through the use of improved infrastructure and vehicles, as well as provision of high frequency service.

One of these BRT routes runs from Blanchardstown to UCD. Therefore, integration between this proposed BRT and CBC is a critical objective in identification of the preferred CBC route.

2.3 Integrated Implementation Plan 2013-2018

The Integrated Implementation Plan 2013 – 2018 was published by the National Transport Authority in 2014. The plan sets out a transport infrastructure investment programme. It includes the main objectives and outputs of the NTA over the period of the plan. In addition, it describes the actions necessary to "ensure the effective integration of public transport infrastructure over the period of the Plan".

In relation to bus investment – the report outlines the key objective of improving "bus priority for bus transport to ensure that the bus has the journey time advantages that it needs to compete effectively with the private car".

This report identified the need to further develop the quality bus network in the Greater Dublin Area so as to achieve:

"….as far as practicable, continuous inbound priority and the maximum possible outbound priority on key bus routes into Dublin City Centre"

2.4 Greater Dublin Area Cycle Network Plan

The National Transport Authority adopted and published the Greater Dublin Area Cycle Network Plan (GDA CNP) in 2014. The purpose of the plan was to establish the extent of the existing cycle infrastructure and facilities in the Greater Dublin Area and to set out a strategy to develop an integrated cycle network for the future.

Within the GDA CNP, primary, secondary, feeder and greenway cycle routes were identified. A number of these routes lie within the core study area of the UCD to Bray CBC. In accordance with the GDA CNP, any upgrade to bus infrastructure which runs along any of the cycle routes must provide cycle infrastructure to the appropriate level (described in the NTA National Cycle Manual). If appropriate cycle infrastructure cannot be provided along the CBC route (which also runs along an identified cycle route), alternative routes for cyclists, to the appropriate standard provided on parallel / alternative streets should be identified.

2.5 Development Plan, Local Area Plans and Strategic Development Zones

The Emerging Preferred Route design for the scheme shall fully integrate with or have consideration for planned development in the environs of the core study area. These are identified as:

- Cherrywood Strategic Development Zone
- Woodbrook / Shanganagh development lands
- Fassaroe and Old Connaught development lands
- Bray Town Development Plan 2011-2017

2.6 CBC Concept

The Core Bus Network is identified in the Transport Strategy for the Greater Dublin Area 2016-2035 report by the National Transport Authority. This network represents the most critical bus routes in the Greater Dublin Area. Critical in this sense is defined as bus routes with high frequency of services, coupled with high passenger volumes and significant trip attractors along the route. The Core Bus Network comprises of sixteen radial bus corridors, three orbital corridors and six regional corridors, one of which is the Bray/N11 – UCD – Donnybrook Core Bus Corridor.

One of the main purposes of the Core Bus Network is to serve certain destinations and trip attractors/generators in the Greater Dublin Area, with a particular emphasis on locations which are not served by light rail or rail. Convenient interchange with other transport modes, such as rail, is also an objective of this Core Bus Network. The main focus of the Core Bus Network will be to “achieve, as far as practicable, continuous priority for bus movement on the portions of the Core Bus Network within the Metropolitan Area”. This will be achieved by the removal of current delays on the bus network and the enabling of bus services to provide a more attractive service than car travel.

2.7 Objectives of CBCs

The National Transport Authority (NTA) have identified the following objectives for the Bray to UCD CBC:

- Deliver the on-street infrastructure necessary to provide continuous priority for bus movements along the Core Bus Corridor. This will mean enhanced bus lane provision on the corridor, removing current delays in relevant locations and enabling the bus to provide a faster alternative to car traffic along the route, making bus transport a more attractive alternative for road users. It will also make the bus system more efficient, as faster bus journeys means that more people can be moved with the same level of vehicle and driver resources; and

- Provide any cycle facilities along the route that are required under the Greater Dublin Area Cycle Network Plan (published by the NTA, 2013) to the target Quality of Service(s) specified therein and to give consideration to further providing cycle facilities along sections of the route where they may not be expressly required under the Cycle Network Plan.

2.8 Design Principles

2.8.1 Cross Sections

The following widths for the various components of the route cross section are assumed:

- 3.0 m CBC lane (3.5m on the N11)
- 3.0 m Traffic Lane in urban areas (3.65m on the N11)
- 2.0 m Footpath (can be reduced to a minimum of 1.8m in particularly constrained locations)
- 2.0 m Cycle Track

2.8.2 Bus Stops

In general, the locations of existing Dublin Bus stops will be retained. However, each bus stop location has been reviewed and where appropriate bus stops will be relocated to reduce conflict between bus passengers and cyclists and/or to increase the population and employment catchments. In cases where two or more existing bus stops are provided in close proximity their locations will be rationalised to reduce delays to buses. The type of bus stop used is suited to the individual conditions at each bus stop location.

3 STUDY AREA

3.1 Introduction

In this section, the study area for the Bray to UCD CBC is detailed and divided into three distinct sections. Scheme specific constraints and opportunities within the Study Area are discussed, and the potential for integration of the scheme with existing and planned transport networks is considered, along with considerations of the scheme for other road users.

3.2 Study Area & Sections

The Bray UCD Bus Corridor Study Area runs from Bray to the UCD interchange/flyover on the N11. The study area was generally developed to include the main trip generators between UCD and Bray either side of the central spine formed by the existing N11 route and encompassing the urban area to the south of Bray as illustrated in Figure 3.1. The study area lies within the administrative areas of Dun Laoghaire Rathdown and Wicklow County Councils.

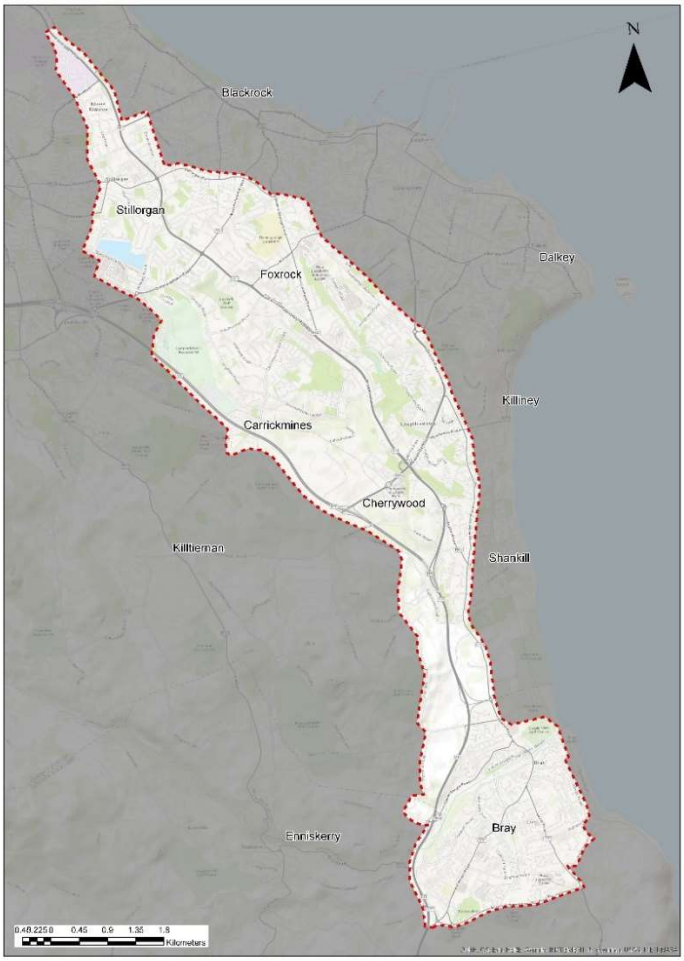


Figure 3.1 Study Area

To facilitate the assessment process the study area has been split into three sections:

- Section 1: Bray South (Southern Cross Road) to Bray North
- Section 2: Bray North (Wilford Roundabout) to Loughlinstown (Wyattville Road)
- Section 3: Loughlinstown (Wyattville Road) to UCD (UCD flyover).

The extents of the study area and study area sections are illustrated in Figure 3.2.

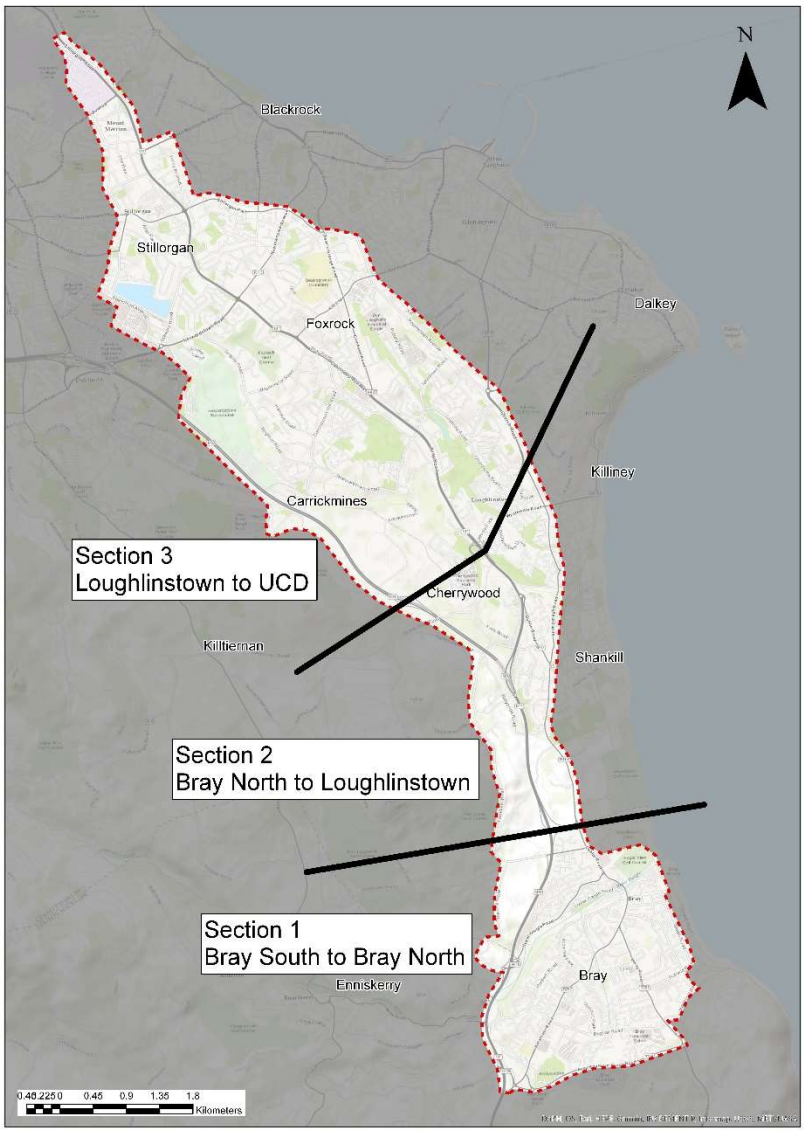


Figure 3.2 Study Area Sections

The termini for the CBC are identified as Bray Main Street in the south and the N11/UCD Flyover in the north. Main Street was identified as the southern route terminus as it can be reasonably assumed to represent the centre of Bray, with a terminus at this location serving the main trip attracters associated with the town commercial centre. Any routes which terminate on Bray Main Street could either link to, or be a short walk from, Bray Dart Station.

The UCD flyover was identified as the northern terminus as this location provides opportunities for interchange with the proposed UCD to Blanchardstown BRT and as well as other bus services which currently utilise this node.

3.2.1 Section 1: Bray South to Bray North

Most of this section of the study area comprises Bray Town and environs and as such the majority of land-use in this area is residential, retail and commercial along with a number of educational establishments. There are a number of green areas throughout the section and a former golf course to the north-east which is zoned for mixed use development. The Old Connaught and Fassaroe Local Area Plans lie to the north west of this section of the study area.

The River Dargle runs through this section from west to east. This is a significant pinch point as there are limited options available to cross the river. The M11 runs along the east of this section, running roughly south to north.

3.2.2 Section 2: Bray North to Loughlinstown

This section of the study area consists largely of residential areas including Shankill, Rathsallagh and parts of Loughlinstown.

The urban centre of Shankill is located in the middle of the section, along with a number of primary and secondary schools. There are agricultural and amenity lands in the south of this area, along with lands zoned for development as part of the Woodbrook/Shanganagh LAP. There are a number of hospitals and medical centres including Saint Joseph's Clinic to the south of Shankill Village and St. Columcille's Hospital adjacent the Loughlinstown roundabout. The Loughlinstown river runs through the north of this section.

The M11 runs through this section, linking with the N11 to the north of Shankill village at Loughlinstown and with a grade separated link connecting with the Dublin Road at Wilford.

3.2.3 Section 3: Loughlinstown to UCD

This section of the study area consists of a mix of residential areas and urban villages/centres with associated services such as schools, hospitals and commercial and retail areas. In addition, there are areas of parkland and sports and recreation facilities, Deer Park and Cabinteely Park. University College Dublin (UCD) is located to the north of this section. This section also incorporates Sandyford Business District as well as Cherrywood Business Park and Cherrywood SDZ.

3.3 Physical Constraints & Opportunities

There are a number of features in the natural and built environment within the study area which constrain scheme options or provide opportunities for enhanced integration. These are considered within the scheme assessment process and include the following:

- River Dargle crossing in Bray (area of funnelling where limited space either side of the corridor restricts design options)
- Public transport infrastructure such as DART, LUAS Green Line and proposed BRT interchange at UCD.
- Planned and committed developments including Cherrywood Strategic Development Zone, Woodbrook / Shanganagh, Fassaroe and Old Connaught development plans and Stillorgan Village Area Movement Framework Plan
- M11 and M50 motorways and potential M11 widening scheme,
- Trees and other natural and ecological features including rivers and streams,
- Architectural, archaeological and heritage sites and features
- Existing urban and sub-urban roads and street networks
- Limited availability of land in urban and suburban areas.

3.4 Integration with Existing and Proposed Public Transport Network

An objective of the Bray to UCD CBC is to improve interchange between different modes of transport within the study area, including current transport infrastructure and future transport plans. Route options within the

study area have been developed, in as far as is practical, to enhance interchange with these existing and future transport services which include:

- DART stations at Bray and Shankill and proposed DART station at Woodbrook.
- Woodbrook and Carrickmines Strategic Park and Rides as detailed in the NTA's "Transport Strategy for the Greater Dublin Area 2016-2035"
- Existing Dublin Bus services at numerous locations along the route.
- The LUAS Green Line at Cherrywood/Brides Glen and future extension to Bray/Fassaroe.
- Proposed Quality Bus Corridor to Bray and Old Connaught as identified in the DLRCC development plan.
- Blanchardstown to UCD BRT at UCD
- N11/M11 Regional corridor
- Greater Dublin Area Cycle Network Plan (GDACNP)

3.5 Compatibility with Other Road Users

Consideration of other road users is a key component of the CBC scheme and the scheme objectives refer specifically to cyclists and pedestrians.

It is proposed to provide on-street cycle facilities as required under the Greater Dublin Area Cycle Network Plan (published by the NTA, 2013) to the target Quality of Service(s) specified therein.

In addition, pedestrian connectivity and permeability to high trip generating locations shall be considered in the assessment of route options.

Where practical, segregated facilities shall be provided for pedestrians and cyclists. In cases where it is deemed impractical to achieve this, these facilities will be provided along a suitable alternative route.

In certain cases, it may not be possible to provide suitable cycle facilities along the CBC route and no alternative route may be available. In these circumstances, it may be necessary for cyclists to share the bus lane. In order to mitigate against safety risks due to this arrangement, certain measures may need to be implemented, such as speed restrictions.

Traffic flow and access routes will be maintained along the route where practical. However, inevitably, there will be a negative impact on traffic capacity along the CBC route (this is as a result of reallocation of sections of road to bus and cycle lanes, enhanced priority for buses, improved pedestrian and cycle infrastructure at junctions and the implementation of turning restrictions). However, this reduction in the carrying capacity of the roads along the CBC route is offset by the positive impacts of the scheme such as increased quality of bus service and increased total trip capacity.

4 ASSESSMENT METHODOLOGY

4.1 Assessment Process

The assessment methodology for identifying the Emerging Preferred Route is outlined in this section. A two-stage assessment process is utilised which comprised:

- Stage 1 Route Options Assessment (Sifting Stage) which includes development of a "spider's web" for each of the three study area sections of potential route options and appraisal of these potential route options at a high level in terms of their ability to achieve the project objectives;
- Stage 2 Scheme Options Assessment: Comparison of each viable scheme option for each of the study area sections using a Multi-Criteria Analysis to determine the Emerging Preferred Route.

4.2 Stage 1: Route Options Assessment – Sifting Stage

The first step at Stage 1 is to develop an initial 'spider's web' of all potential route options within the defined study area. To achieve this all roads within the study area are assessed on a high level for their ability to form part of a CBC. Route options are ruled out at this stage if they can clearly not form part of a CBC. The spider's web of route options remaining after this phase is then progressed through a sifting process.

The sifting process consists of a high-level assessment of the initial 'spider's web' route options. This assessment is based on professional judgement and a general appreciation of the existing physical conditions/constraints within the study area from available survey information and site visits and it assesses each route options suitability and ability to provide for a CBC. This assessment is comparative and qualitative in nature and evaluates each route option against the study objectives previously identified.

The purpose of this assessment stage is to determine which route options should be considered for further detailed assessment.

4.3 Stage 2: Route Options Assessment – Detailed Assessment

Following the Stage 1, the shorter route options that pass the sifting process are assembled into coherent routes that connect the common nodes at extremities of each section of the study area.

Within each route option identified in the previous step several indicative schemes are identified. Different schemes provide different levels of bus priority and infrastructure and they require different amounts of land take and capital expenditure. Several scheme options are considered for each route and indicative designs are developed in order to identify the scheme option for each route which best achieves the study objectives.

The indicative scheme identified for each route option is then progressed to the Stage 2 Multi-Criteria Analysis (MCA).

In accordance with the Department of Transport "Guidelines on a Common Appraisal Framework for Transport Projects" report, the multi-criteria analysis considers Economy; Integration; Accessibility and Social Inclusion; and Safety and Environment. The 'Physical Activity' criterion has been scoped out at this stage of the assessment as it is considered that all route options will promote physical activity equally and as such this criterion is not considered to be a differentiator between route options.

Project-specific route options assessment criteria have been established for the GDA CBC schemes by the NTA. These have been tailored to have commonality with the Common Appraisal Framework guidelines where practical.

The assessment criteria are detailed below in Table 4.1.

Table 4.1 Details of Multi-Criteria Analysis

Assessment Criteria		Sub-Criteria
1	Economy	1.a. Capital Cost
		1.b. Journey-time reliability and consistency
2	Integration	2.a. Land Use Integration
		2.b. Residential Population and Employment Catchments
		2.c. Transport Network Integration
		2.d. Cyclists and Pedestrian Integration
3	Accessibility and Social Inclusion	3.a. High volume trip attractors
		3.b. Deprived Geographic Areas
4	Safety	4.a. Road User Safety
5	Environment	5.a. Archaeological, Architectural and Cultural Heritage
		5.b. Flora and Fauna
		5.c. Soils and Geology
		5.d. Hydrology
		5.e. Landscape and visual
		5.f. Noise, Vibration and Air
		5.g. Land Use and the Built Environment

4.3.1 Economy (1)

Capital Cost (1.a.)

The capital cost of a scheme is comprised of the estimated infrastructure costs and the required land acquisition costs. These costs are normalised to per-kilometre rates for the purpose of comparison of one

scheme with another. All cost estimates herein exclude VAT and are subject to refinement based on more detailed analysis at preliminary and detailed design stages.

1.a.i Indicative Infrastructure Cost Estimate

The infrastructure cost estimate determines the likely capital infrastructure cost of a particular scheme, taking into account the extent of works required in order to construct that scheme and achieve the route objectives. The infrastructure costs include the following as required:

- Road re-alignment / new road construction
- Junction upgrades
- Drainage
- Services and utilities protection and relocation work
- Lighting
- Modification to existing structures or any new structures required
- Bus priority infrastructure (upgrading of existing infrastructure or provision of new infrastructure)
- Construction traffic management
- Pedestrian and Cycle route infrastructure

Corridor sections (between junctions)

Construction cost estimates for corridor sections (between junctions) have been categorised as Minor, or Major as detailed in Table 4.2 below. Minor works have been assumed where significant road widening is not anticipated, for example along sections of a route where bus and cycle infrastructure is already provided, or along sections where significant widening is geometrically constrained. A Moderate category has not been utilised as for all other sections, which requiring significant road widening, Major works have been assumed.

Table 4.2 Route Sections Infrastructure Cost Estimate Assumptions

Construction Category	Construction Works Assumptions	Cost Rate (€/km)
Minor	Minor Works: • Local improvements to bus lanes; • New sections of footpaths where necessary; • New sections of cycle paths where necessary;	€750,000

	• New or upgraded bus stops where necessary, including provision of Real Time Passenger Information (RTPI) and bus shelters; • Kerb improvement locally (removal and replacement); • Footpath improvement locally (breaking out/additional concrete) including tactile paving and dished kerbs • Road resurfacing locally (milling/reinstatement or overlay) • Road markings (non-destructive removal of existing road markings): and • Signage (removal/relocation/replacement of existing and/or installation of new)	
Major	Roadway widening (including boundary works): • General site clearance (street furniture removal/relocation, etc); • Services protection /relocation/ diversion (power supply, communications, water, gas); • Drainage works (removal of and installation of new drainage systems); • New or upgraded bus stops where necessary, including provision of Real Time Passenger Information (RTPI) and bus shelters; • Earthworks (embankment treatments, retaining walls, slopes regrading, etc); • Pavement (full depth reconstruction); • Kerbs, footways and paved areas (removal and new); • Road markings (non-destructive removal of existing road markings, new road markings); • Signage (removal /relocation /replacement of existing and/or installation of new); • Road lighting (replacement, cabling, ducting); • Landscaping works (top soiling, fence, trees relocation, hedges, road margins, re-grading, etc); • Property boundary reinstatement works (walls, gates, driveways, landscaping, etc).	€2,350,000

For each route option, the length of the route requiring either the minor or major works category is calculated and multiplied by the relevant cost rate to derive the cost estimate for the route.

Junctions

The likely scale of construction works required at junctions is identified for each route and categorised as Minor, Moderate or Major as per Table 4.3 following.

Table 4.3 Junctions Infrastructure Cost Estimate Assumptions

Construction Category	Construction Works Assumptions	Cost Rate (€)

Minor	Minor Works: Modifications to existing signal controlled junctions: • introduce bus priority (i.e. changing method of control, etc), without significant alteration to the existing geometry and layout: • Road markings (non-destructive removal of existing road markings, new road markings); • Anti-skid surface; • Signage (removal/relocation/replacement of existing and/or installation of new); • Dished kerbs and tactile paving; • Additional signal poles/heads; • Modifications to the signal controller and associated traffic signal installation works (including electrical); and • Additional loop detectors.	€75,000
Moderate	Upgrading existing minor/major junctions to signal control junctions, without significant alteration to their existing geometry and layout (excluding boundary works): • Kerbs improvement locally (removal and new); • Footpaths improvement locally (breaking out and • new); • Road markings (non-destructive removal of existing road markings, new road markings); • Signage (removal/relocation/replacement of existing and/or installation of new); • Anti-skid surface; • Dished kerbs and tactile paving; • New signal poles/heads; • New traffic signals ducting, cabling and chambers; • New signal controller and associated traffic signal • Installation works (including electrical); • New loop detectors; • Services protection/relocation/diversion (power supply, communications); • Limited earthworks; • Localised pavement reconstruction; and • Localised road lighting improvements (relocation, cabling, ducting).	€250,000
Major	Significant modifications to existing signal controlled junctions including upgrading of roundabouts to signal controlled junctions, including: • General site clearance (street furniture removal/relocation, etc); • Services protection/relocation/diversion (power supply, communications cables, water, gas); • Drainage works (removal of and installation of new drainage systems); • Earthworks (embankment treatments retaining walls, slopes re-grading, etc); • Pavement (full depth reconstruction);	€500,000

	• Kerbs, footways and paved areas (removal and new); • Road markings (non-destructive removal of existing, new road markings); • Anti-skid surface; • Signage (removal/relocation/replacement of existing and/or installation of new); • Dished kerbs and tactile paving; • Signal poles/heads, traffic signals ducting, cabling and chambers; • Signal controller and installation works (incl. electrical); • Loop detectors; • Localised Road lighting (replacement, cabling, ducting); • Landscaping works (top soiling, fence, trees, hedges, margins re-grading, etc); and; • Property boundary reinstatement works (walls, gates, driveways landscaping etc).	

Where more significant junction upgrades are identified, for example the upgrade of Wilford Roundabout into a signal controlled junction, then specific individual junction cost estimates have been included.

Land Acquisition Cost Estimate (1.a.ii)

The land acquisition costs consist of the cost of acquiring lands necessary for the scheme and also the costs of boundary / accommodation works associated with each scheme. It takes into account the likely number of properties required (commercial, public, residential and industrial) and also the extent of land required.

In this assessment, land is defined as either public or private. Public land is considered to be the space between road boundaries and any also any public open space. For this analysis, it is assumed that there is no cost associated with the acquisition of public land. The identification of land acquisition is based on available Ordnance Survey mapping only and as such is approximate. Any private land that may be located within the road reserve, but are not clearly private land, are considered as public areas as part of this methodology.

For the purposes of this high-level cost assessment, private land is generally assumed to have a standardised cost of €1,500 per square metre, however for a more detailed analysis, a more site-specific approach would be required.

Journey-time reliability and consistency (1.b.)

This sub-criterion assesses route options in terms of the degree to which journey-time reliability and consistency are likely to be achieved. It consists of the following:

- **Journey time** savings for public transport services (including the CBC) on the scheme. These are achieved through the enhancement and implementation of dedicated bus lanes and priority along the route, upgrading of road sections, removal of pinch points and redesign of existing bus stops. Journey times for each route option have been compared by calculating the estimated journey time between common start and end points.

  The following assumptions have been made in the calculations of overall journey time:

  - Buses proceed at an assumed top speed (50kph, or 60kph where permitted) unless they are delayed
  - Buses are delayed when they stop at bus stops to pick up passengers, the length of delay is based on the available patronage data for each stop.
  - Buses are delayed at junctions, the length of delay is based on the type of junction
  - Buses are delayed when they are required to share congested lanes with general traffic. The length of delays is based on available queue length information and automatic vehicle location data from Dublin Bus.

- The **level of bus priority** provided in each route option determines the journey time reliability for this criterion. Bus priority is a combination of physical infrastructure such as dedicated bus lanes and traffic management measures which provide priority to buses. The level of priority reasonably achievable is compared for each scheme. It is dependent on the amount of road space which can be allocated to dedicated bus lanes, the amount of segregation possible and the provision of bus lanes on approaches to junctions.

4.3.2 Integration (2)

This criterion compares how a scheme performs in relation to land use integration, residential population and employment catchments, transport network integration and cyclist and pedestrian integration.

Land Use Integration (2.a.)

This criterion assesses how a scheme would integrate with any planned developments in the catchment area and also how it might enhance the economic opportunities of an area. In addition, it assesses the potential of a scheme to regenerate particular areas. This criterion includes how a scheme integrates with local area plans (LAPs), master plans or any other objectives in area / county policies.

Residential Population and Employment Catchments (2.b.)

The current residential and employment population within a particular distance of each of the CBC stops is calculated in order to determine the number of potential users for each scheme option. To assess the potential population and employment catchments the walking distance from bus stop locations along each route was analysed using the Network analyst module of ArcGIS to create walk time isochrones from each stop.

The distances to the stops correlate to walk times of 5, 10 and 15min intervals and were estimated based on an average walking speed of 5kph. The population and employment within the isochrones was then calculated based on planning data received from the NTA at Central Statistics Office small area level. Where just a portion of a small area fell within the walking catchments the portion of the population/employment within walking distance was estimated proportionally based on area. The most significant figure used to score various options under this criterion is the sum of the population and employment catchments within a 10-min walking distance

Transport Network Integration (2.c.)

Under this criterion, integration with wider public transport links are assessed and compared for each scheme. These include transport modes such as LUAS, DART, BRT, railway and public and private bus operators. The potential for interchange facilities such as safe walking areas, cycle parking areas, etc. are also assessed under this criterion.

This criterion also assesses the impact of a particular scheme on traffic management along the scheme.

Cyclists and Pedestrian Integration (2.d.)

The compatibility of a scheme with the GDA Cycle Network Plan is assessed and the practicality of achieving cycle track segregation is explored. In some cases, it may be necessary to provide an alternative cycle route to that used by the CBC and this is considered under this criterion. The quality of infrastructure for cyclists and pedestrians achievable is also compared for each scheme option.

4.3.3 Accessibility & Social Inclusion (3)

High volume trip attractors (3.a.)

Trip attractors within a 10-minute walk from stops along a scheme are compared in order to determine schemes which would generate demand for buses along the CBC (in addition to residential and employment populations). Key trip attractors such as schools, universities, retail and commercial centres, hospitals and employment centres are considered in this analysis.

Deprived Geographic Areas (3.b.)

The government's RAPID (Revitalising Areas by Planning, Investment and Development) programme is aimed at improving the quality of life and the opportunity available to residents of the most disadvantaged communities in Irish cities and towns. It aims, in a focused and practical way, to reduce the deprivations faced by residents of disadvantaged communities. It attempts to do this through targeting significant state resources at the needs of disadvantaged areas. The potential of each scheme to impact on any deprived areas, including RAPID is assessed and compared under this criterion.

4.3.4 Safety (4)

Road Safety (4.a.)

Under this criterion, the number of junctions along each scheme, as an approximate measure for the potential for collisions, are compared. In addition, the number of turning movements required for buses are compared, as these can also potentially lead to lower safety conditions along the scheme. Differentials in traffic speeds along a route are also assessed under this criterion as a high relative speed difference between transport modes may result in an increased road safety risk.

4.3.5 Environment (5)

Archaeological, Architectural and Cultural Heritage (5.a)

Effects on cultural heritage can be considered in terms of impacts on below ground archaeological remains, historic buildings (individual and areas), and historic landscapes and parks. 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.

Provision of a CBC has the potential for impacts on archaeological, architectural and cultural heritage. Potential impacts of each scheme on recorded Monuments and Protected Structures (RMPs) within 50m of

the corridor are assessed and compared. Sites of Archaeological or Cultural Heritage are also assessed and impacts compared under this criterion.

Flora and Fauna (5.b.)

The provision of the CBC may have negative impacts on flora and fauna, for example, through construction of new infrastructure through green field sites. These impacts are compared for each scheme under this criterion.

Soils and Geology (5.c.)

Construction of infrastructure necessary for the provision of the CBC has the potential to negatively impact on soils and geology. For example, through land acquisition and ground excavation. There is also the potential to encounter ground contamination from historical industries. These considerations are compared for each scheme under this criterion.

Hydrology (5.d.)

The provision of CBC infrastructure may include aspects (for example structures) with the potential to impact on hydrology. Any such structures and impacts are considered for each scheme under this criterion.

Landscape and visual (5.e.)

Provision of CBC infrastructure has the potential to negatively impact on the landscape and visual aspects of the area, for example, by the removal of front gardens or green spaces or the altering of streetscapes, character and features. Different schemes are compared and any negative effects considered under this criterion.

The landscape (and visual) assessment of the route corridor options has had regard to:

- Land use zonings (amenity, open space, recreation, sport)
- Protected views and prospects
- Recreation Access Routes / Designated Walk Ways
- Tree Preservation Orders (TPO) and tree preservation/protection objectives
- Landscape impact on Protected Structures
- Landscape impact on sites on the Record of Monuments and Places (including Areas of Archaeological Potential)
- The designation of Architectural and candidate Architectural Conservation Areas (ACA)
- Visual impacts on properties
- Impact on landscape/townscape character.

Noise, Vibration and Air (5.f.)

Provision of CBC infrastructure has the potential to negatively impact on noise, vibration and air quality along a scheme. These impacts are compared for each scheme option under this criterion. The impact is quantified on whether the road is moving closer to a sensitive receptor, for example through road widening or new realignment.

Land Use and the Built Environment (5.g.)

The impact of each scheme option on land use character, for example, through land acquisition or severance which prevents the land from achieving its intended use, is assessed under this criterion.

4.3.6 Route Options Summary Table

Route options in each study area section are assessed for each assessment criterion and compared relative to each other on a five-point scale, from having significant advantages, some advantages, some disadvantages to significant disadvantages over other route options. Schemes could also be considered neutral when no apparent advantages or disadvantages were identified across all scheme options.

For each of the three study area sections, a scheme options summary is presented which illustrates the assessment of each scheme option under each of the 5 assessment criteria. The full table for each scheme is included in the appendices.

For each of the 5 assessment criteria, each viable scheme is compared to each of the other schemes ranked on a 5-point colour coded scale.

Table 4.4 below illustrates the 5-point colour coded scale, ranging from dark green for schemes that have significant advantages compared to other scheme options and dark red for schemes that have significant disadvantages compared to other schemes.

Table 4.4 Scheme Option Colour Coded Ranking Scale

Colour	Description
	Significant advantages over the other options
	Some advantages over the other options
	Neutral compared to other options
	Some disadvantages over other options
	Significant disadvantages compared to other options

4.3.7 Conclusion

In applying the assessment criteria to the Route Selection process, it is recognised that for different sections of the study area corridor, greater emphasis may need to be applied to some criterion over others in terms of their significance and influence on the route selection process. In drawing a conclusion as to which route represents the best option considering all of the criteria put together, judgement was applied to arrive at the preferred option.

The outcome and findings of the multi-criteria analysis are then finally considered in a holistic manner to derive a preferred end-to-end route for the proposed end-to-end CBC scheme.

5 STUDY AREA SECTION 1 – BRAY SOUTH TO BRAY NORTH

5.1 Stage 1: Route Options Assessment– Sifting Stage

This section outlines the options development process for Section 1 of the Study Area (Bray South to Bray North). All roads within the study area are assessed on a high level for their ability to form part of a CBC route. Route options are ruled out at this stage if they can clearly not form part of a CBC.

An initial examination of the road network to the south of Bray identified that it is not practically achievable to provide CBC infrastructure due to the restricted cross sections and the limited ability to reroute traffic. In addition, any routes which would approach Bray Town Centre from the south would be circuitous in their nature and lead to unnecessary longer journeys to the Terminus at Bray Main Street. For these reasons, roads to the south of Bray were discounted prior to sifting.

The 'spider's web' of potential route options remaining after this initial phase was then progressed to Stage 1 for further analysis. The links which are subject to sifting are shown in **Figure 5.1**.

Figure 5.1 Section 1 Route Options Bray South to Bray North

A summary of the Stage 1 is presented in Table 5.1

Table 5.1 Section 1 Stage 1 Route Option Assessment (Sifting) Summary

Link Option No.	Road Name(s)	Comments	Pass/Fail
1.01	M11/N11	This link consists of two all-vehicle lanes in each direction. The carriageway is approximately 35m at the narrowest point including a grassed central median with an overall reservation of approximately 55m. The existing carriageway could cater for bus traffic; however this link fails the initial sift as routes using it would have a circuitous route to the start/end point on Bray Main St and pedestrian integration is poor as no bus stops could be provided along the motorway section of this route.	Fail
1.02	Upper Dargle Road	Located between the M11 and the Dublin Road. This road provides one all-vehicle lane in each direction. The carriageway width is approximately 7m at its narrowest location with an overall reservation of 12m. There are numerous properties located adjacent to the roadside. Provision of dedicated bus lanes would require land take in the form of these adjacent properties. Greenway cycle route BG1 and inter-urban cycle route W2A of the GDA Cycle Network Plan run along sections of this link. This link fails as the scale of the works and the extent of the land take required would be excessive.	Fail
1.03	Lower Dargle Road	Located between the Upper Dargle Road and the Dublin Road. This road provides one all-vehicle lane in each direction. The carriageway width is approximately 6m at its narrowest location with an overall reservation of 9m. Greenway cycle route BG1 of the GDA Cycle Network Plan runs along the majority of this link. Bus lanes could be facilitated on the majority of the link by widening the road into the existing park to the south. However, there is a pinch point on the western end where purchase of houses would be required and a pinch point on the eastern end where road widening is restricted by the Dargle River. Construction of CBC infrastructure is not considered feasible and so this link fails the initial sift.	Fail
1.04	Main Street/Castle Street/Dublin Road	This link has one all traffic lane in each direction, with advisory cycle lanes and partial bus lanes in places. Secondary cycle route B1 of the GDA Cycle Network Plan runs along this link, with route secondary route B2 overlapping for a short section. On Castle St and Dublin Rd, widening of the road to provide dedicated bus lanes is feasible. This would require land take from commercial parking spaces, gardens and green areas. A petrol station and a stone cottage would also likely be affected. This link passes the initial sift despite the extensive land take required to provide bus priority as it forms a direct link from the Terminus on Bray Main St to connect with route options in section 2	Pass

1.05	New Road	Proposed new road through Bray Golf Course and bridge over the River Dargle to Bray DART station. Part of this route involves using a new road being constructed to serve the new St Philomena's School and part involves construction of a new road, generally following the alignment reserved for possible future LUAS extension as identified in the Bray Town Development Plan 2011-2017. Greenway routes 14 and W11 of the GDA Cycle Network Plan run along a section of this link. Construction is feasible and so this route passes the initial sift.	Pass
1.06	Main St	Bray Main St has been identified as the terminus location in Bray. Building lines are close to the road on both sides and as a result no road widening would be possible on this section. However, traffic management measures could be provided to enhance bus priority and Bray Main St has been identified as the CBC terminus, therefore this route passes the initial sift.	Pass
1.07	Quinsborough Rd & Florence Rd	Loop consisting of a combination of Quinsborough Road and Florence Road. This link has an average carriageway width of 8m and reserve width of 12m in the narrow sections. The road changes from one to two-way depending on the carriageway width available and on street parallel parking also varies from on one side to on both sides. On the section of Quinsborough closest to Main St the carriageway has been narrowed locally to 4m with wider footpaths as a traffic calming measure. Secondary cycle route B2 of the GDA Cycle Network Plan runs along most of the loop (except the western edge). Construction of a one-way system for a CBC is feasible on this link by reassigning space from footpaths and on street parking, no land take would likely be required. As a result, this link passes the initial sift.	Pass

Following the Stage 1, 4 of the 18 links assessed passed the initial sifting stage and were progressed to the next assessment stage. These links are presented in Figure 5.2.

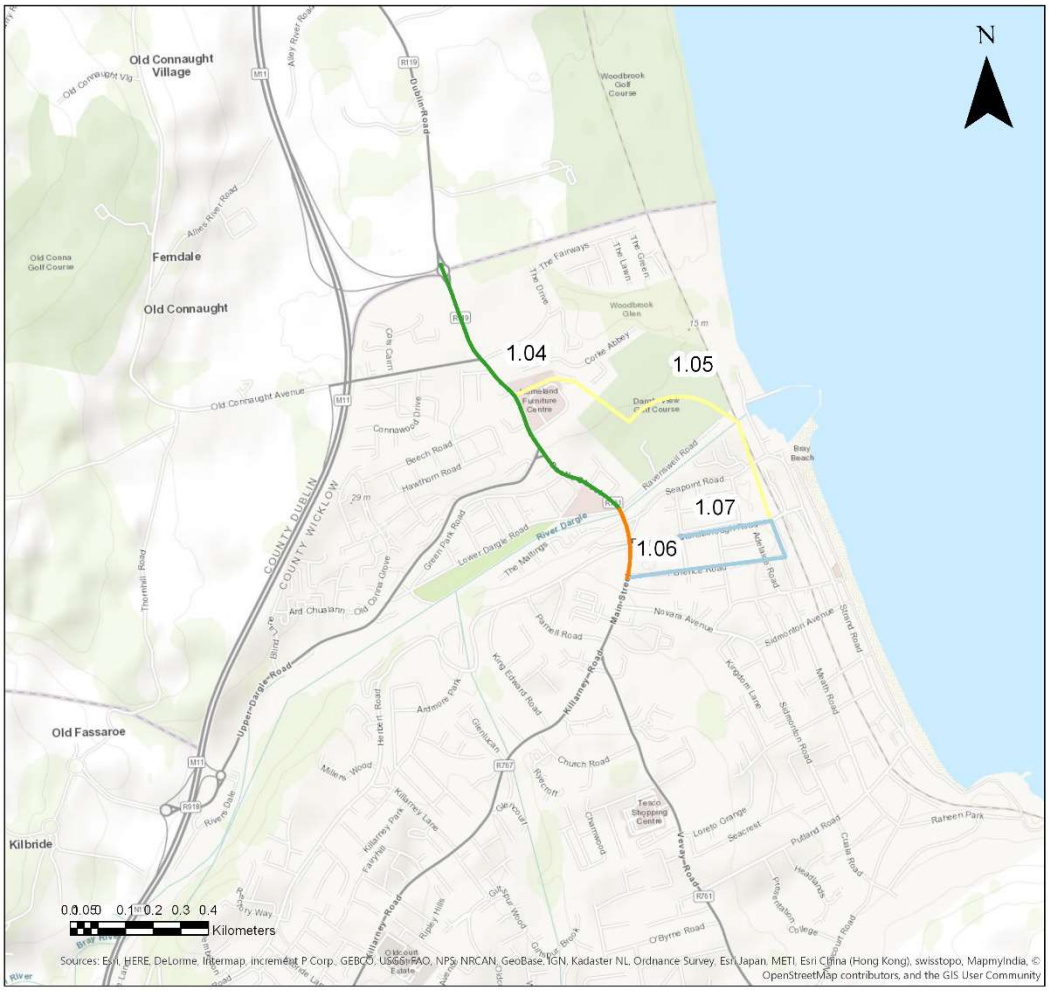


Figure 5.2 Section 1 Route Options Remaining After Stage 1 Assessment

5.2 Stage 2 – Route Options Assessment

5.2.1 Introduction

Following the Stage 1 the four remaining links are assembled together to form two viable route options for Section 1, as follows:

- Route 1A – A route option via Castle Street and Dublin Road to Wilford roundabout;
- Route 1B – A route option via Quinsborough Road (Northbound direction)/Florence Road (southbound direction), parallel to the DART line across the River Dargle via a new bridge, through the old Bray Golf Club lands onto Dublin Road to Wilford roundabout.

The terminus for both these routes for consideration in the Stage 2 Assessment is the Florence Road junction on Bray Main Street.

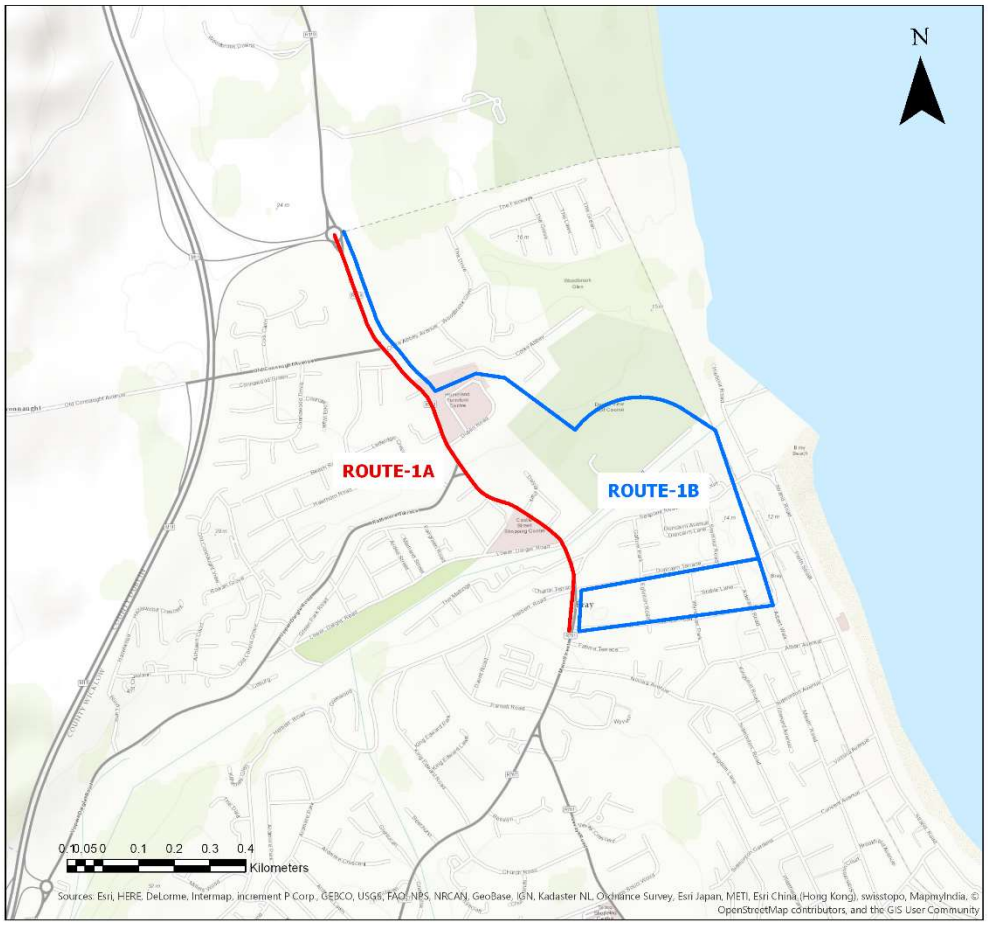


Figure 5.3 Section 1 Route Options

5.2.2 Route Option 1A – Bray Main Street to Wilford junction via Dublin Road

Route Description

Route 1A is presented in Figure 5.4 and described as follows.

Figure 5.4 Route Option 1A

Inbound: Route 1A would commence on Bray Main St, continue north on Fran O'Toole bridge over the River Dargle and then travel north along Castle Street and Dublin Road to the Wilford junction.

Outbound: The outbound route would follow the same route as the inbound routing.

Stops: A total of 4 bus stops would likely be provided in each direction along this route option.

Route Option 1A Indicative Scheme Design

Figure 5.5 illustrates the indicative scheme design for route Option 1A as well as location of indicative cross-sections.

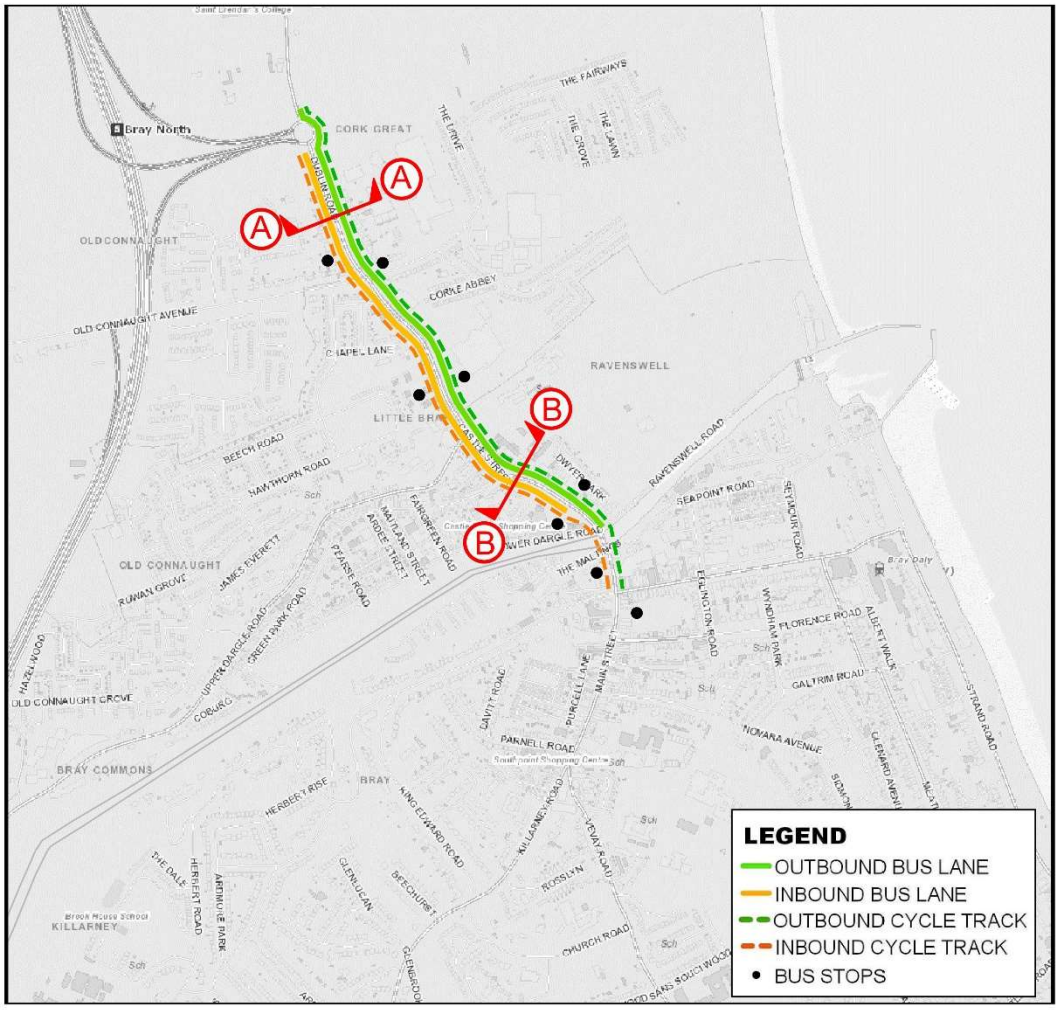


Figure 5.5 Route Option 1A Indicative Scheme Design

It is not practicable to provide dedicated bus lines on for the short section of the route on Bray Main St but traffic management measures could be used to provide a degree of bus priority here. Route Option 1A would provide pedestrian bridges on either side of the existing bridge, this would allow southbound bus lanes to reach the junction at Seapoint Road, and to provide dedicated cycle lanes in both directions. An existing bus lane is provided in the southbound direction on Castle Street, between the St. Cronan's Road and Dwyer Road junctions, and in the northbound direction between the St. Cronan's Road and Upper Dargle Road junctions. This option proposes to widen Castle Street to accommodate bus and cycle lanes in each direction. To facilitate this land take, including some car parking spaces, would be required from the Castle Street Shopping Centre, the Dargle Centre and adjoining commercial areas to the north and south, as well as parts of gardens (residential off-street parking will not be affected) and some land from St. Philomena's School. This option would require the removal of a tree on the grounds of St Philomena's School which is subject to a tree preservation order. A cross-section on Castle Street is presented in Figure 5.6.

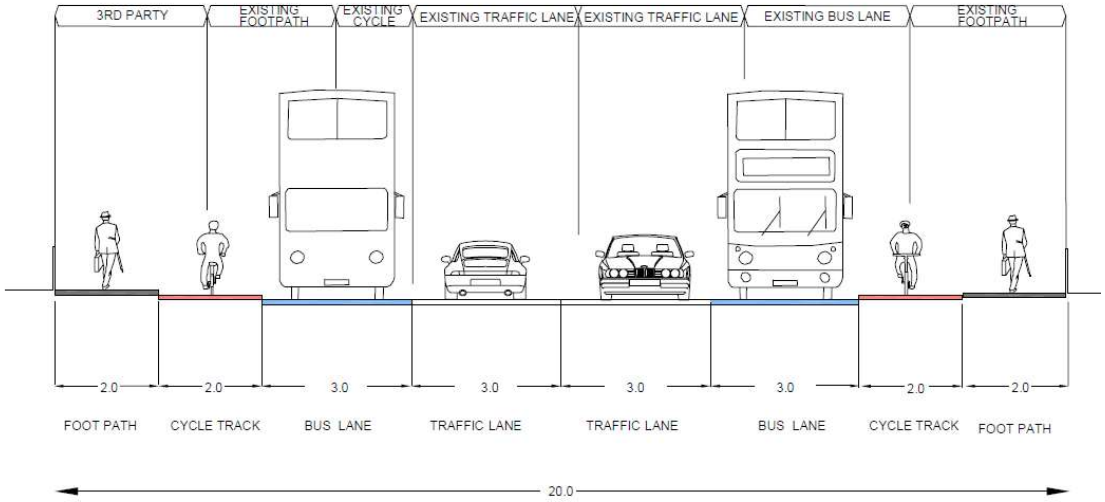


Figure 5.6 Cross Section A-A

Widening of Dublin Road would be required to accommodate bus and cycle lanes in each direction for its full length from Castle Street to the Wilford junction. To facilitate this, land take would be required which would include portions of private lands to the south and east of the existing Wilford junction including a cottage (protected structure) and an existing service station (Topaz), as well as portions of front gardens on Dublin Road between Windsor Motors and the Old Connaught Avenue (off-street residential parking would not be affected) and some car parking spaces along the existing frontages of Windsor Motors and AXA insurance. This would include upgrades to the existing signal controlled junctions of Upper Dargle Road, Old Connaught Avenue/Corke Abbey Avenue as well as incorporating the proposed signal controlled junction servicing the new entrance to St. Philomena's School which is under construction at the time of writing. A cross-section on Dublin Road is presented in Figure 5.7.

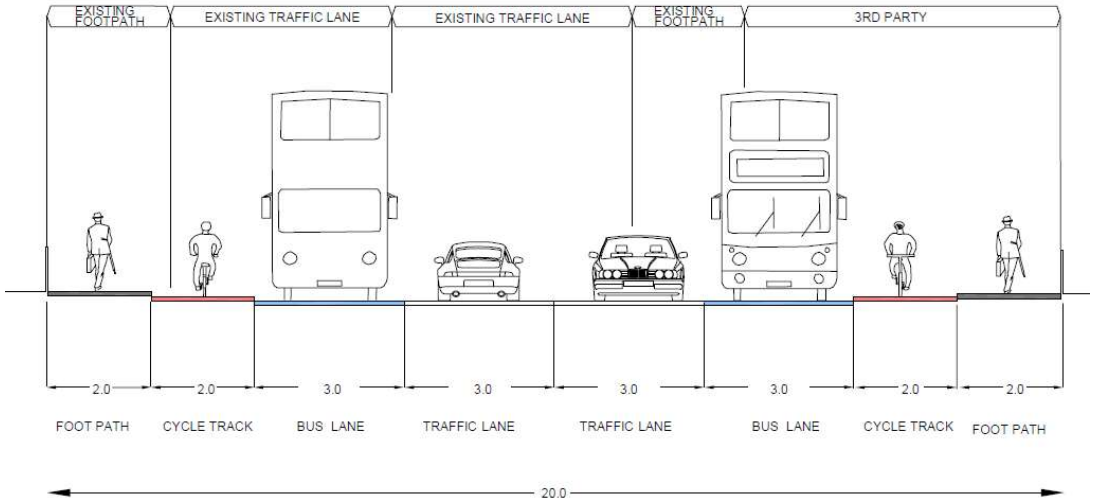


Figure 5.7 Cross Section B-B

5.2.3 Route Option 1B - Bray Main Street to Wilford junction via DART Station

Route Description

Route 1B is presented in Figure 5.8 and described as follows.

Figure 5.8 Route Option 1B

Inbound: Route 1B would commence on Main St and take a right onto Quinsborough road. The bus would take a left turn immediately before the DART line and continue along a new road parallel to the DART line, this road would cross new bridges over Seapoint Rd and the River Dargle before traversing through the Old Bray Golf Club lands to join the Dublin Road north of the Bray yarns complex. The bus would then continue north to the Wilford junction.

Outbound: The outbound route would be the same as above except that instead of using Quinsborough Road it travels down Florence Road.

Stops: A total of 6 bus stops would likely be provided in each direction along this route option.

Indicative Scheme Design

Figure 5.9 illustrates the indicative scheme design for Route Option 1B as well as the location of indicative cross-sections and junction locations.

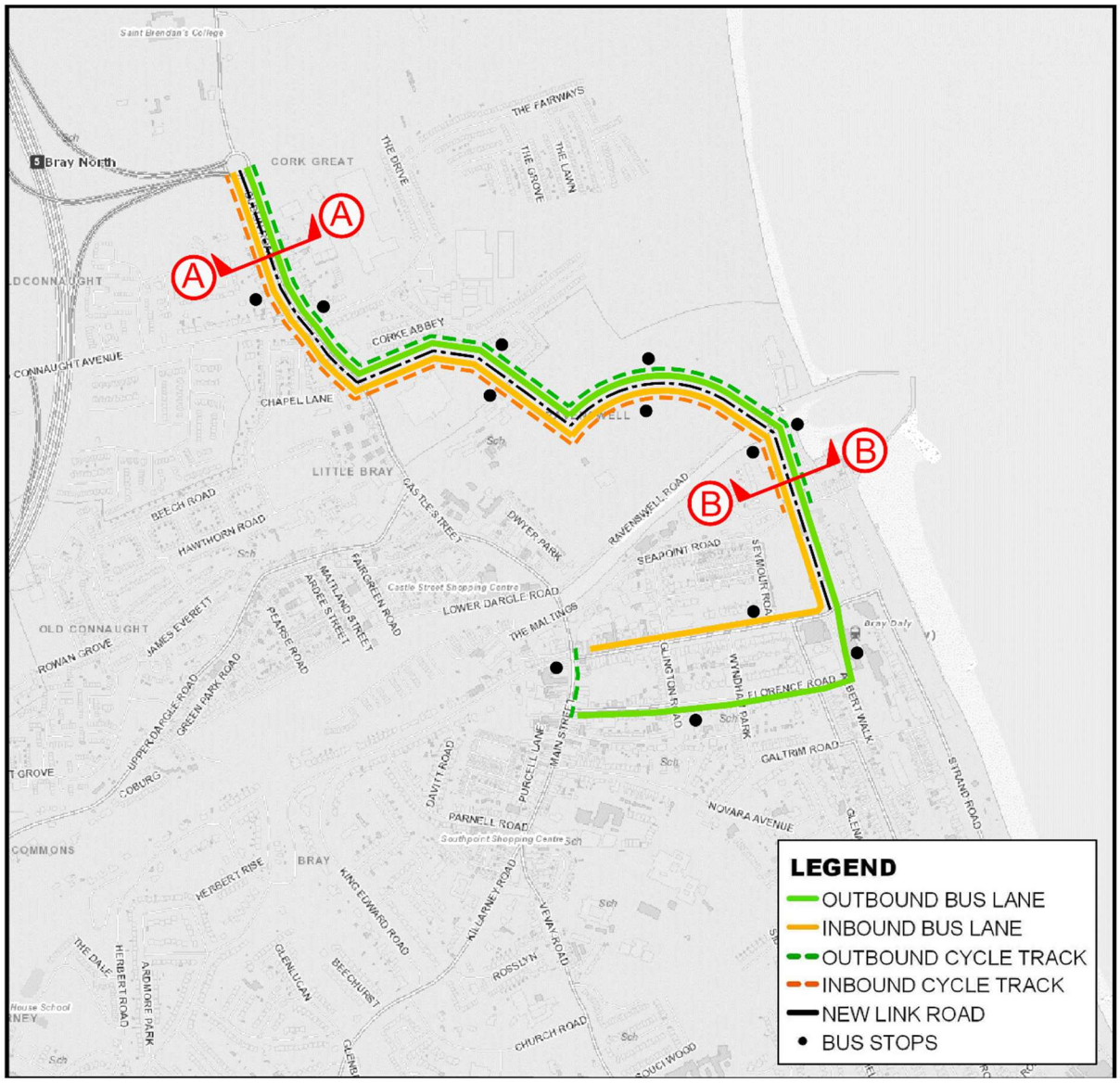


Figure 5.9 Route Option 1B Indicative Scheme Design

It is not practicable to provide dedicated bus lines for the short section of the route on Bray Main St but traffic management measures could be used to provide a degree of bus priority here. An inbound bus lane would be provided along the majority of Quinsborough Road between the junction with Galtrim Park and the railway line by removal of on-street parking. A new road would be required running parallel to the railway line with the acquisition of land associated with parking and services ancillary to the railway and pumping station. New bridges would be required to be constructed over Seapoint Road and the Dargle River. It is likely that bus and cycle lanes in both directions could be provided along this section, however there may be a requirement for sharing in the future with the LUAS line which may also follow this route. A cross-section of the bus-only route between Seapoint Road and the River Dargle is presented in Figure 5.10.

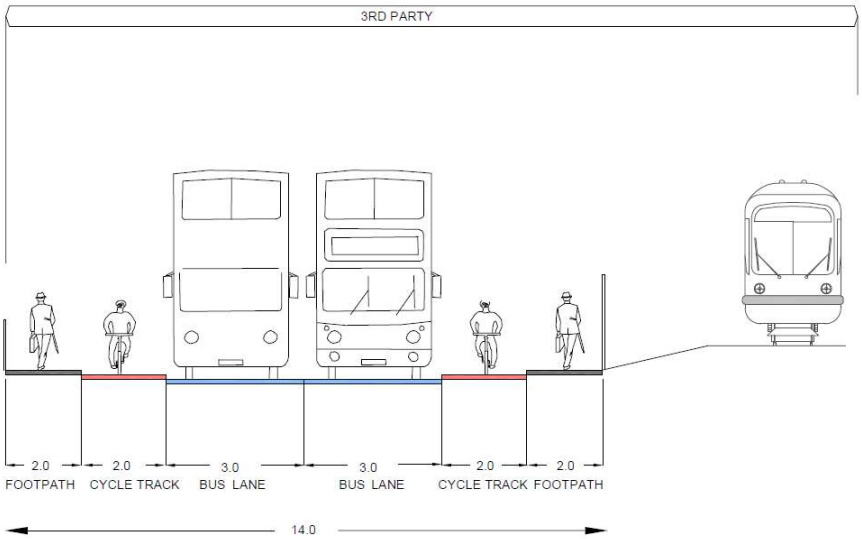


Figure 5.10 Cross Section B-B

The route option then proposes land acquisition and construction of a new road link through the old Bray Golf Club lands to Dublin Road north of the Bray Yarns complex which could accommodate bus and cycle lanes in both directions. This route would partially follow the road and junction under construction at the time of writing that will service St. Philomena's School development. From here the route would continue north to the Wilford junction and would require widening of the Dublin Road to accommodate bus and cycle lanes in each direction. This would include acquisition of private lands to the south and east of the existing Wilford junction including a cottage (protected structure) and an existing service station (Topaz), as well as portions of front gardens (residential off-street parking will not be affected) on the Dublin Road between Windsor Motors and the Old Connaught Avenue, private lands including some car parking spaces along the existing frontages of Windsor Motors, AXA insurance and the old Bray Yarns complex. This route would include upgrades to the existing signal controlled junctions of Old Connaught Avenue/Corke Abbey Avenue and the junction servicing St. Philomena's School currently under construction. A cross-section on Dublin Road is presented in Figure 5.11.

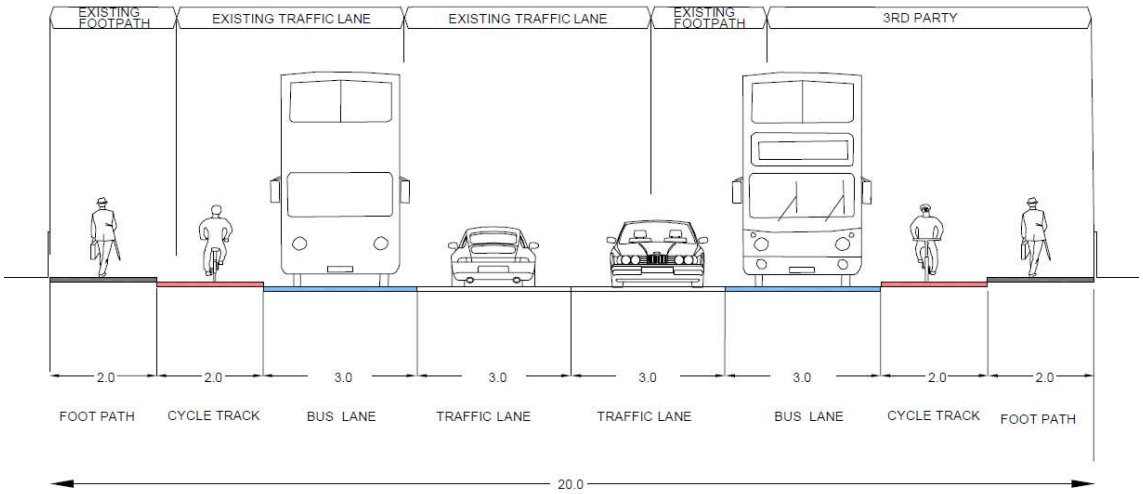


Figure 5.11 Cross Section A-A

In the outbound direction, the bus would follow the same route, with the exception of the one-way section where an outbound bus lane could be provided along the majority of Florence Road by removal of on-street parking and loading space and the reallocation of one of the lanes on the approach to Main Street to a bus-only lane.

5.2.4 Route Options Assessment

Details of the 'Stage 2' route options assessment undertaken for Section 1 are presented in **Appendix A**.

A summary of the ranking of route options against the scheme sub-criteria is presented in Table 5.2 below.

Table 5.2 Route Options Assessment Summary (Sub-Criteria)

Assessment Criteria	Sub-Criteria	SCHEME 1A	SCHEME 1B
Economy	Capital Cost		
	Journey-time reliability and consistency		
Integration	Land Use Integration		
	Residential Population and Employment Catchments		
	Transport Network Integration		
	Cyclists and pedestrian Integration		
Accessibility and Social Inclusion	High volume trip attractors		
	Deprived Geographic Areas		
Safety	Road Safety		
Environment	Archaeological, Architectural and Cultural Heritage		
	Flora and Fauna		
	Soils and Geology		
	Hydrology		
	Landscape and visual		
	Noise, Vibration and Air		
	Land Use and the Built Environment		

In terms of Economy Scheme 1A has a comparatively lower capital cost than 1B as it does not involve the construction of a new road through the Old Bray Golf Course lands or new vehicular bridges over Seapoint Road and the River Dargle, with only pedestrian bridges required at the Fran O'Toole bridge crossing. Scheme 1B has a slightly higher percentage of dedicated bus lanes however this is balanced by its longer route length and so the two options are considered equal in terms of Overall Journey Time and Reliability.

Scheme 1B scores higher on land use and transport network Integration as it directly connects with Bray DART station and serves the proposed Bray Town Centre development on the lands of the Old Bray Golf Course. Both options would align with Dun Laoghaire Rathdown Development Plan Objective to provide a '*Proposed Quality Bus-Bus Priority Route'* between Wilford roundabout and the county boundary to the south. The longer route also results in a higher residential and employment catchment for Scheme 1B.

Route 1A requires fewer turning movements for buses through junctions so therefore receives a higher ranking under safety.

In terms of Environment Scheme 1B runs through the existing green field site of the Old Bray Golf Course and requires a new vehicular crossing of the Dargle River and so will likely have comparatively greater environmental impacts than 1A and therefore scores lower for these criteria, in addition Scheme 1B requires the removal of residential car parking and street trees along Florence and Quinsborough Roads. The exceptions to this are in relation to 'Noise, Vibration and Air' where widening of Castle Street will result in a lower ranking for Route 1A, and Hydrology where there is little to distinguish between the route as any works could be designed to minimise potential hydrological impacts.

5.3 Conclusion – Study Area Section 1 Analysis

A summary of the assessment and a relative ranking for each of the five assessment criteria is shown below in Table 5.3.

Table 5.3 Route Options Assessment Summary (Main Criteria)

Assessment Criteria	1A	1B
Economy		
Integration		
Accessibility and Social Inclusion		
Safety		
Environment		

Based on the assessments above it has been determined that while Scheme 1B is preferred under the integration criterion, Scheme 1A offers the preferred route option for the following reasons:

- It has a significantly lower capital cost than Scheme 1B
- It is likely to have less environmental impacts when compared to Scheme 1B
- Scheme 1A is also preferred under the Safety criterion
-

Scheme 1A is identified as the preferred option for Section 1 and is brought forward into the Emerging Preferred Route as described in Chapter 8.

6 STUDY AREA SECTION 2 – BRAY NORTH TO LOUGHLINSTOWN

6.1 Stage 1 – Route Options Assessment– Sifting Stage

This section outlines the options development process for Section 2 of the study area (Bray North to Loughlinstown).

All roads within the study area are assessed on a high level for their ability to form part of a CBC. Route options are ruled out at this stage if they could clearly not form part of a CBC. The 'spider's web' of potential route options remaining after this initial phase is then progressed to Stage 1 for further analysis. The links brought forward are shown in Figure 6.1.

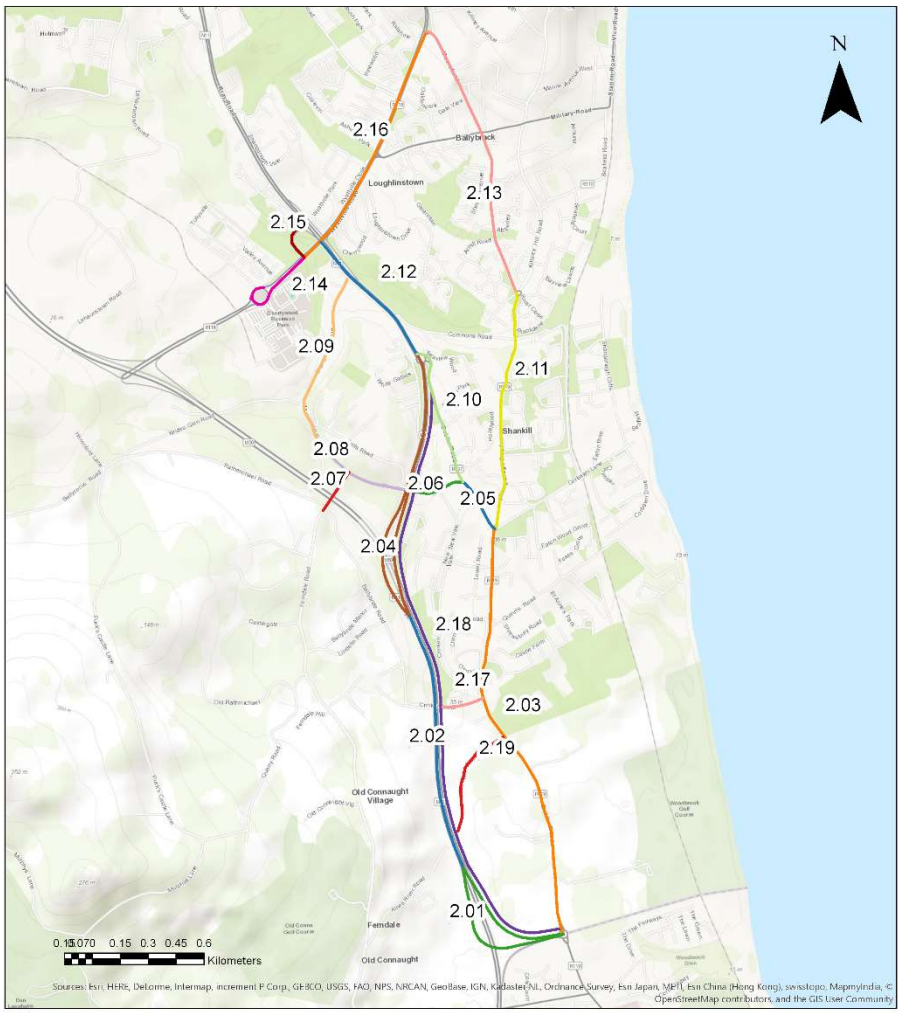


Figure 6.1 Section 2 Route Options – Bray North to Loughlinstown

A summary of the Stage 1 is presented in Table 6.1.

Table 6.1 Section 2 Stage 1 Route Option Assessment (Sifting) Summary

Link Option No.	Road Name(s)	Comments	Pass /Fail
2.01	M11	On/off ramps from Dublin Rd to M11. Section consists of a single one-way all-vehicle lane in each direction, 5m wide at the narrowest point. Primary cycle route 12A and secondary cycle route B1 of the GDA Cycle Network Plan intersect the south-eastern end of this link. Providing dedicated bus lanes on each side of the road would be severely constrained, particularly on the bridge over the M11 which would require widening to provide bus lanes. Sharing existing lanes with general traffic is not considered desirable due to potential for traffic congestion to delay buses, and also the potential for high speed differentials and safety concerns. Additionally, this route does not serve the catchment of Shankill. For these reasons, this is not considered a viable route option.	Fail
2.02	M11	Section of M11 from the on ramp at Dublin road (link 2.01) to the split for the M50. This link consists of two all-vehicle lanes in each direction, with an average carriageway reserve of 35m. No cycle routes proposed by the GDA Cycle Network Plan run along this link. The section of route forms part of Dun Laoghaire Rathdown Development Plan 6-year objective to upgrade the M11 from the M50 to Fassaroe. In addition, the proposed LUAS green line extension to Bray/Fassaroe is identified as following the M11 route. However, road widening to provide dedicated bus lanes on each side of the road would be severely constrained by structures such as overbridges etc. Sharing existing lanes with general traffic is not considered desirable due to potential for traffic congestion to delay buses, and also the potential for high speed differentials and safety concerns. Additionally, this route does not serve the catchment of Shankill. For these reasons, this is not considered a viable route option	Fail
2.03	Dublin Rd	From the junction with Wilford Roundabout to the roundabout north of Shankill village (Corbawn/Church roundabout). Link consists of one all-vehicle lane and a footpath in each direction. There is approx. 300m of dedicated bus lane provided in the Northbound direction. The section of route south of Shankill village has an average carriageway width of approximately 8m and a road reserve width in the order of 12m. Significant land take would be required along the entire route to provide dedicated bus and cycle lanes. Land take would be required from agricultural and amenity land, including many trees. Acquisition of private lands in the form of gardens would also be required. The northern section of the route passes through Shankill village, parts of which are geometrically constrained by building lines. Provision of bus and cycle infrastructure would require significant private and public land acquisition	Pass

		as well as environmental impacts including the removal of trees. Primary cycle route 12A of the GDA Cycle Network Plan runs along this link This link is significantly constrained and presents major challenges. However, due to few suitable alternatives is progressed to the next stage.	
2.04	M11	Section of M11 from split with M50 to the roundabout at Dublin Rd and the N11. Section consists of two all-vehicle motorway lanes in each direction. No cycle routes proposed by the GDA Cycle Network Plan run along this link. In addition, the proposed LUAS green line extension to Bray/Fassaroe is identified as following a section of this M11 route. Road widening to provide dedicated bus lanes on each side of the road would be severely constrained by structures such as overbridges etc. Sharing existing lanes with general traffic is not considered desirable due to potential for traffic congestion to delay buses, and also the potential for high speed differentials and safety concerns. Additionally, this route does not serve the catchment of Shankill. For these reasons, this is not considered a viable route option	Fail
2.05	Dublin Rd	From the St. Anne's Church (Corbawn) roundabout north of Shankill Village to Stonebridge Road junction. This link consists of one all-vehicle lane and one footpath in each direction. There is a carriageway width of 7.8m and reserve width of 12m at the narrowest points. Significant land take, in the form of private gardens and the church car park, would be required to provide dedicated bus and cycle lanes. Development on this route would require the removal of trees on both sides of the road and the provision of retaining structures along sections. Primary cycle route 12A of the GDA Cycle Network Plan runs along this link. This link is significantly constrained and presents major challenges. However, due to few suitable alternatives is progressed to the next stage.	Pass
2.06	Stonebridge Road	This link consists of one all-vehicle lane and a footpath in each direction. Inter-urban cycle route D4 of the GDA Cycle Network Plan runs along this link. The road features a steep gradient rising from the Dublin Road junction of approx. 7%. The road width is limited close to this junction by the hockey pitch in Rathmichael School and the houses on the opposite side of the road. There is a significant level difference between the road and the adjacent ground with the road crossing over the old railway line via a bridge. The bridge would require full reconstruction to facilitate bus and cycle lanes. This link fails the initial sift as the extent of the works and land take required would be excessive.	Fail
2.07	Stonebridge Road	This link is a continuation of Link 2.06. It consists of one all-vehicle lane in each direction. Footpaths and safety barriers are provided on each side of the road. The carriageway has an average width of 7m and a total reserve of 11m. No cycle routes proposed by the GDA Cycle Network Plan run along this link. As this link does not tie-into any feasible route option to the west it is not considered any further.	Fail

2.08	Mullinastill Rd/Stonebridge Road	It consists of one all-vehicle lane in each direction. Footpaths and safety barriers are provided on each side of the road. The carriageway has an average width of 7m and a total reserve of 11m. No cycle routes proposed by the GDA Cycle Network Plan run along this link. Bus and cycle lanes could be constructed with land take from green fields to the south. Construction of CBC infrastructure is feasible with land take and so this link passes the initial sift	Pass
2.09	Cherrywood Rd and Mullinastill Rd	Consists of one all-vehicle lane in each direction and a narrow footpath on one side only. Carriageway width is 6m with a 1.5m footpath at the narrowest parts. There is tight horizontal curvature on the road as well as steep vertical gradients to the adjacent land on both sides. No cycle routes proposed by the GDA Cycle Network Plan run along this link. Widening of the road to provide dedicated bus lanes would require land take from gardens along the route. There is a pinch point under the old railway bridge and others where building lines come close to the road on both sides, provision of CBC infrastructure in these locations is unfeasible. This link fails the initial sift as construction of CBC infrastructure is unfeasible	Fail
2.10	Dublin Rd	From the Stonebridge Road junction to the roundabout junction with the M11 at Loughlinstown. This link consists of one all-vehicle lane in each direction. There is a carriageway width of 8.2m and a total reserve width of 12m at the narrowest section. A bus lane is provided for 200m on the northbound approach to the Loughlinstown roundabout. Provision of dedicated bus lanes would require land take in the form of gardens including removal of many trees. Primary cycle route 12A of the GDA Cycle Network Plan runs along this link. This link is significantly constrained and presents major challenges. However, due to the few suitable alternatives available is progressed to the next stage.	Pass
2.11	Shanganagh Rd	From roundabout at junction with Killiney Road to Dublin Road junction. This link consists of one all-vehicle lane in each direction and one footpath. There are some narrow sections with a minimum carriageway width of 7.2m and a total reserve width of 9m. Secondary cycle route 13C of the GDA Cycle Network Plan runs along this link. While this link is narrow and would require significant road widening to provide CBC infrastructure on this link is considered feasible, as land take is available from green areas and gardens. It is not anticipated that any buildings or residential parking would be affected by the works.	Pass

		This link passes the initial sift as construction of CBC infrastructure is feasible	
2.12	N11	From the roundabout at the junction with Old Dublin Rd to Wyattville Road overpass. The road consists of two all-vehicle lanes in each direction. A combination of on and off-road cycle lanes are provided along the route. Total carriageway width at the narrowest point is 21m including a 2.7m grassed central median. There is a dedicated bus lane for approximately 90% of the outbound route and 50% of the inbound route. Land take would be required alongside the inbound side to facilitate a dedicated bus lane. The majority of the land take would be from a local access road which runs parallel to the main road (old main Bray road). This road provides access and parking for 7 homes and 5 businesses which would be affected. The remainder of the land take would be from green areas. Primary cycle route 12A of the GDA Cycle Network Plan runs along this link. This link is suitable for the construction of a CBC and therefore passes the initial sift.	Pass
2.13	Church Rd and Shanganagh Rd	Link consists of one all-vehicle lane in each direction and alternates between one and two footpaths, depending on width. The route is geometrically constrained with some very narrow sections with minimum and average carriageway widths of 5.7m and 7m and reserve widths of 7m and 10m respectively. Secondary cycle route 13C of the GDA Cycle Network Plan runs along this link. On the southern portion of the link on Shanganagh Road provision of dedicated bus and cycle facilities would require significant road widening. Construction would be feasible as land take is available from green spaces and large front gardens. However, the portion on Church Road particularly through Ballybrack Village is even more constrained. Building lines are close to the street and create several pinch points where providing bus priority would require the purchase of buildings. Significant land take would also be required from smaller front gardens and residential parking in many of these gardens could no longer be facilitated. This link fails the initial sift as the extent of the works required to provide bus priority on Church Road are deemed excessive.	Fail
2.14	R118/ Cherrywood Park	From the junction with the N11 to the roundabout immediately to the west. This link has two all vehicle lanes in each direction rising to three where there are right turning lanes. This link is not on the GDA CNP. There are wide grass verges either side. Bus priority could be provided by removing a lane of general traffic or by widening into the existing verges. The large roundabout may need to be converted to a signalised junction to provide bus priority.	Pass

		This link passes the initial sift as the construction of CBC infrastructure is feasible	
2.15	N11	Short section of ramp linking the N11 to the Wyattville Rd which passes above. The section consists of two all-vehicle lanes in the direction joining the N11. The section leaving the N11 is initially one lane but extends to two halfway along the section. No cycle routes proposed by the GDA Cycle Network Plan run along this link. Widening this short link would prove difficult due to geometrical constraints, however as it can cater for bus traffic it passes the initial sift.	Pass
2.16	Wyattville Rd	From the junction at Church Rd to the N11. Link consists of two all-vehicle lanes in each direction, widening to 3 at right turn areas. Pedestrian and cycle facilities are provided on both sides. Carriageway is an average of 19m wide including a 2m grassed median. Average road reservation width is 27m. It is anticipated that providing dedicated bus lanes would involve the reassignment of existing road space. Secondary cycle route 13G of the GDA Cycle Network Plan runs along this link. This link is suitable for the construction of a CBC and passes the initial sift.	Pass
2.17	Crinken Lane	From M11 over bridge to the Dublin Rd. Consists of one all vehicle lane in each direction with a footpath on the northern side only. This link does not feature on the GDA CNP network and no cycle facilities are provided. Road widening is feasible using existing verge space, this may require some removal of trees and hedges. This link could feasibly provide for a CBC and so passes the initial sift.	Pass
2.18	New Road	New link road running parallel to the M11 on the eastern side. This road would mostly be constructed within the road reserve of the M11 but would also require land take from back gardens and agricultural land in places. Bus priority could be provided on this new road and this link passes the initial sift.	Pass
2.19	Allies River Road	This is a very narrow local access route with average total carriageway width of 3m. It is lined on either side with hedgerows and large potentially significant trees. There is a very low population density along this route. This link is unsuitable for the construction of a CBC and fails the initial sift	Fail

Following the Stage 1, 10 of the 18 route options assessed passed the initial sifting stage and are progressed to the next assessment stage. These route options are presented in Figure 6.2 following.

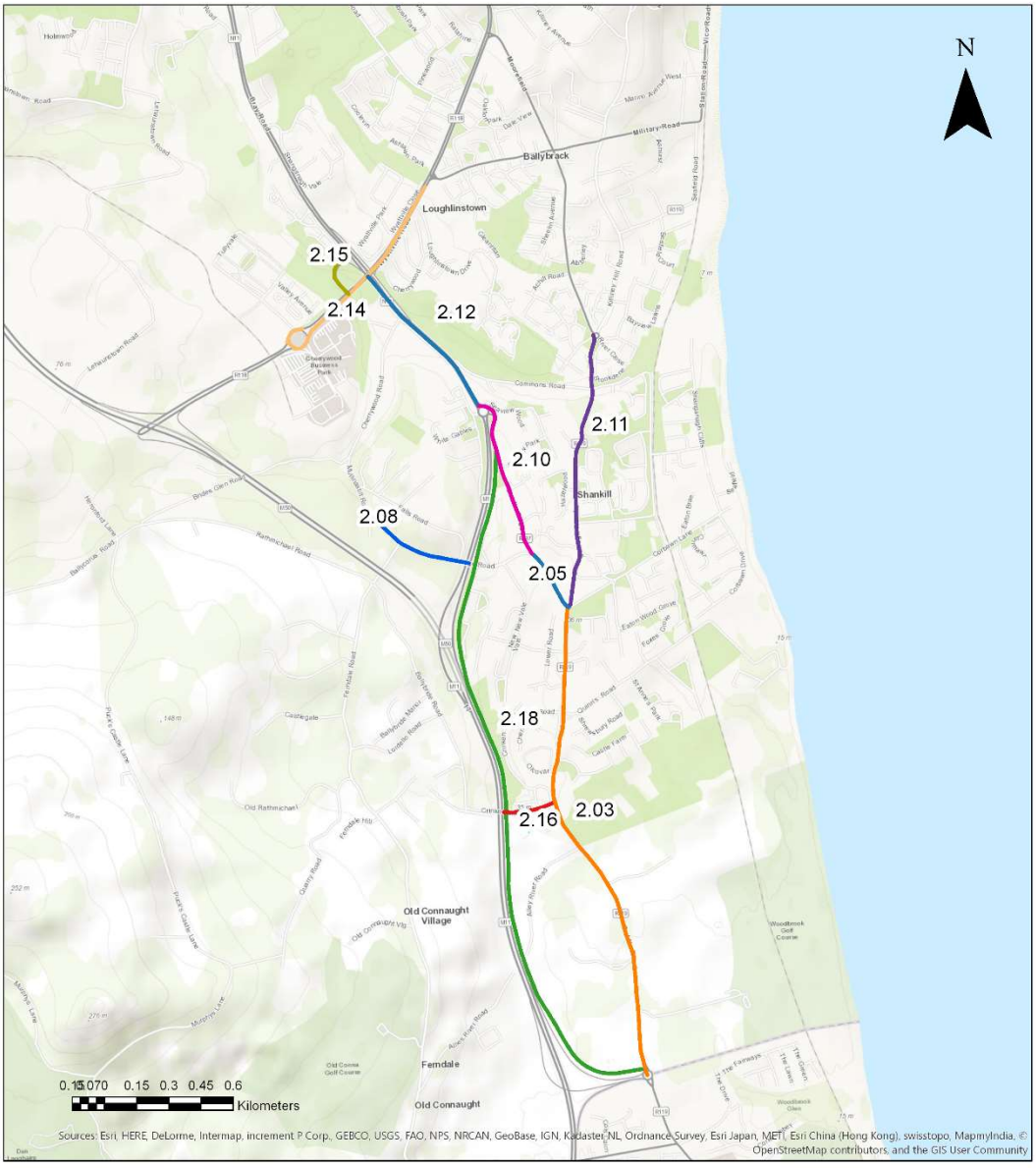


Figure 6.2 Section 2 Route Options Remaining After Stage 1 Assessment

6.2 Stage 2 - Viable Scheme Options and Multi-Criteria Analysis

6.2.1 Introduction

Following the Stage 1 the links that passed the sift are assembled together to form viable route options for Section 2, as seen in figure **Figure 6.3**.

- Scheme 2A – A route option running parallel to the M11 on a newly constructed bus-way from Wilford junction through to Loughlinstown roundabout and then along the existing N11 to the Wyattville interchange.

- Scheme 2B – A route option via Dublin Road from Wilford junction, through Shankill and onto the N11 at Loughlinstown roundabout to Wyattville interchange.

- Scheme 2C – A route option via Dublin Road and Crinken Lane it would then join a newly built bus-way parallel to the M11 until Loughlinstown Roundabout, before following the existing N11 to the Wyattville interchange

- Scheme 2D – For this option buses would follow the same route as 2B, but general traffic would be diverted around Shankill Village using a newly constructed road on the same alignment as that proposed for the bus route in 2C. A bus gate would be put in place on the Dublin Road between Shanganagh Road and Lower Road junctions

- Scheme 2E – This option is a combination of routes 2A and 2B whereby the CBC route runs parallel to the M11 on a newly constructed bus-way from Wilford junction to the intersection with Crinken Lane, then along the Dublin Road from Crinken Lane to Loughlinstown roundabout and then along the N11 to Wyattville.

Some Links passed the initial sift but did not form part of any of the route options brought forward to the Stage 2 Assessment, these are: Links 2.08, 2.11, 2.14 and 2.16. This is because they could not form part of a continuous route across the study area section.

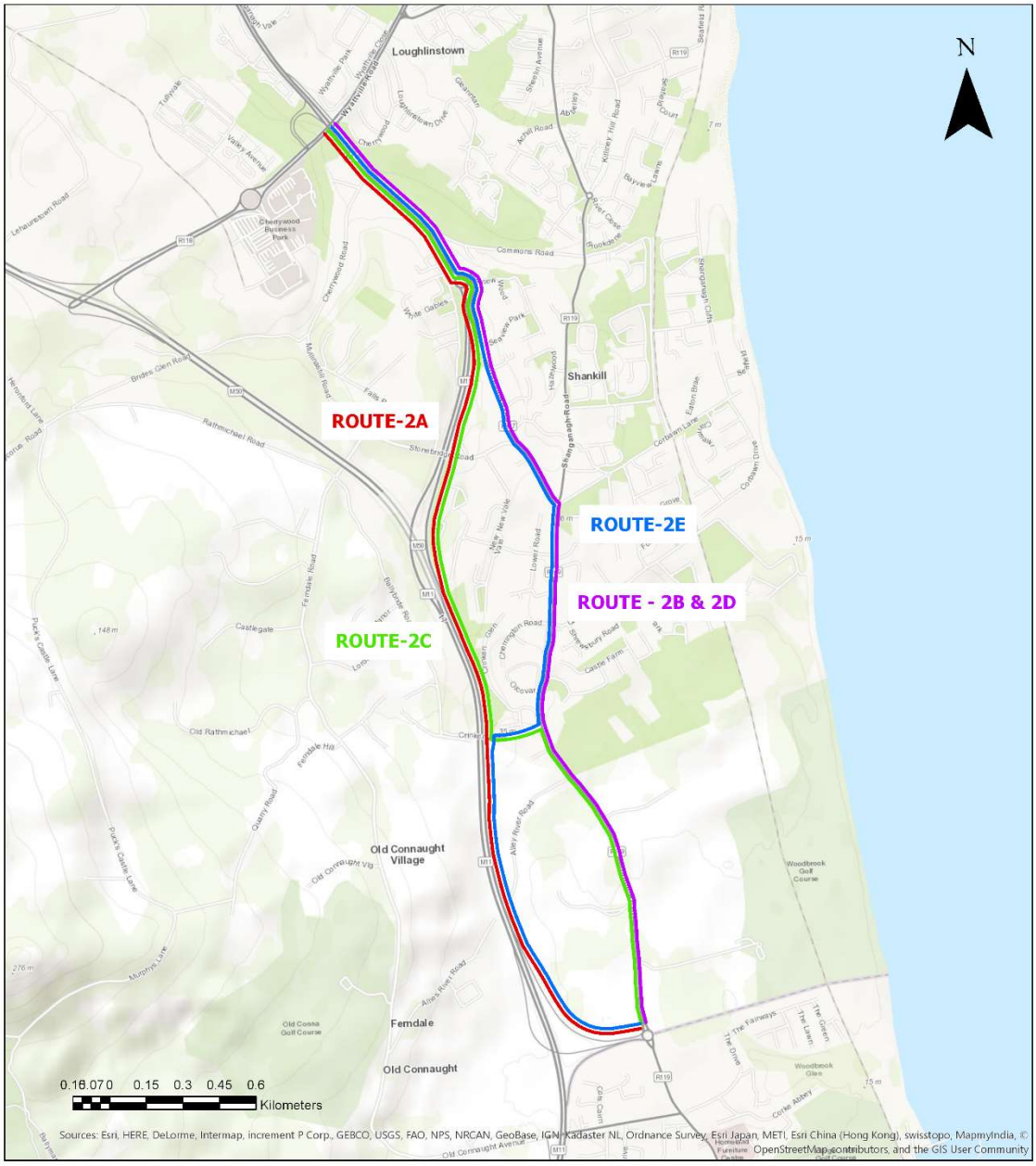


Figure 6.3 Section 2 Route Options

6.2.2 Route Option 2A

Route Description

Route 2A is presented in Figure 6.4 and described in text following.

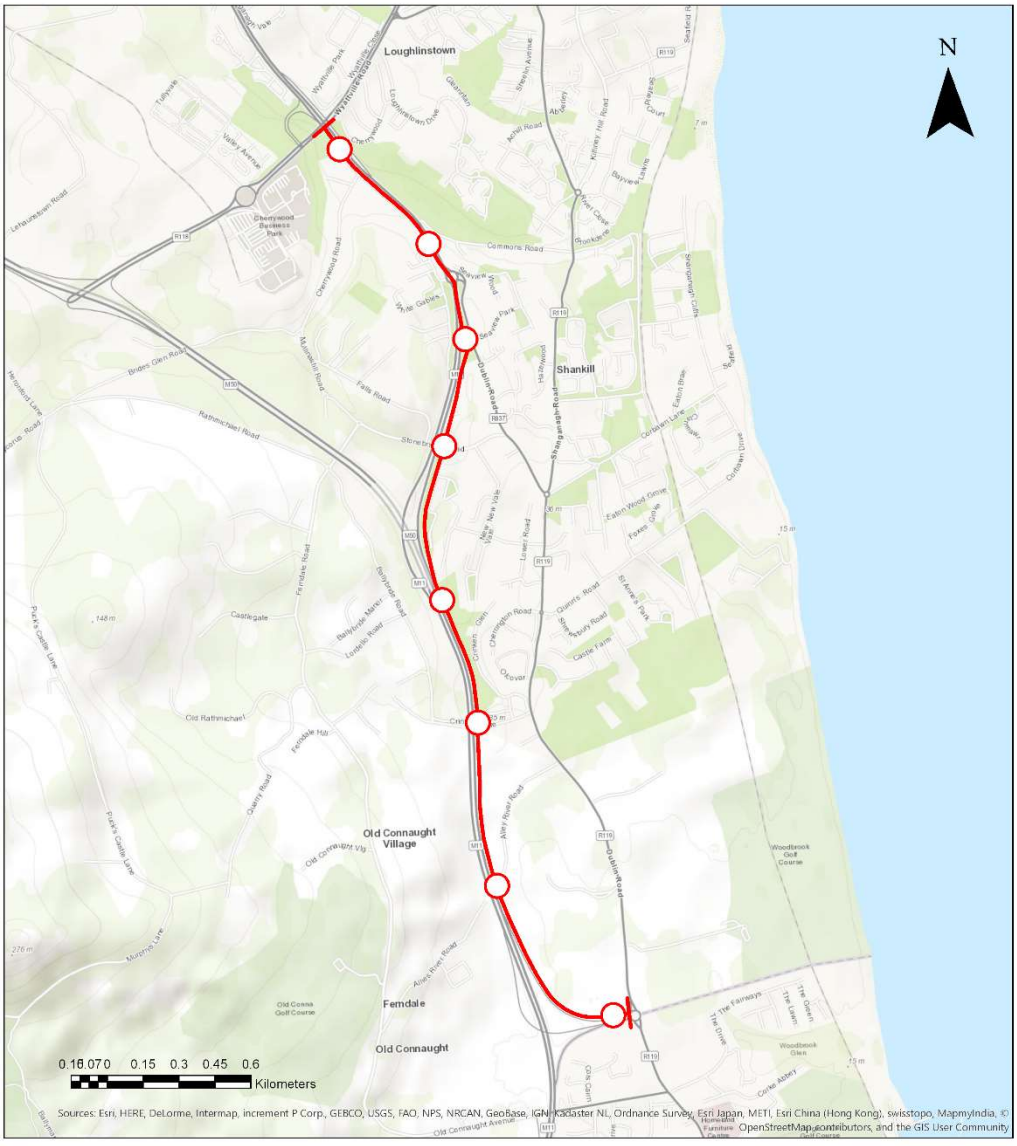


Figure 6.4 Route Option 2A

Inbound: Route 2A would commence at the Wilford junction and run east of and parallel to the M11 along a dedicated bus route, passing to the west of Shankill village, before joining the R837 Dublin Road south of Loughlinstown and continue north on the N11 to the Wyattville interchange.

Outbound: The outbound route would follow the same route as the inbound routing.

Stops: A total of 7 bus stop would likely be provided in each direction along the route.

Indicative Scheme Design

Figure 6.5 illustrates the indicative scheme design for this route option as well as the location of indicative cross-sections.

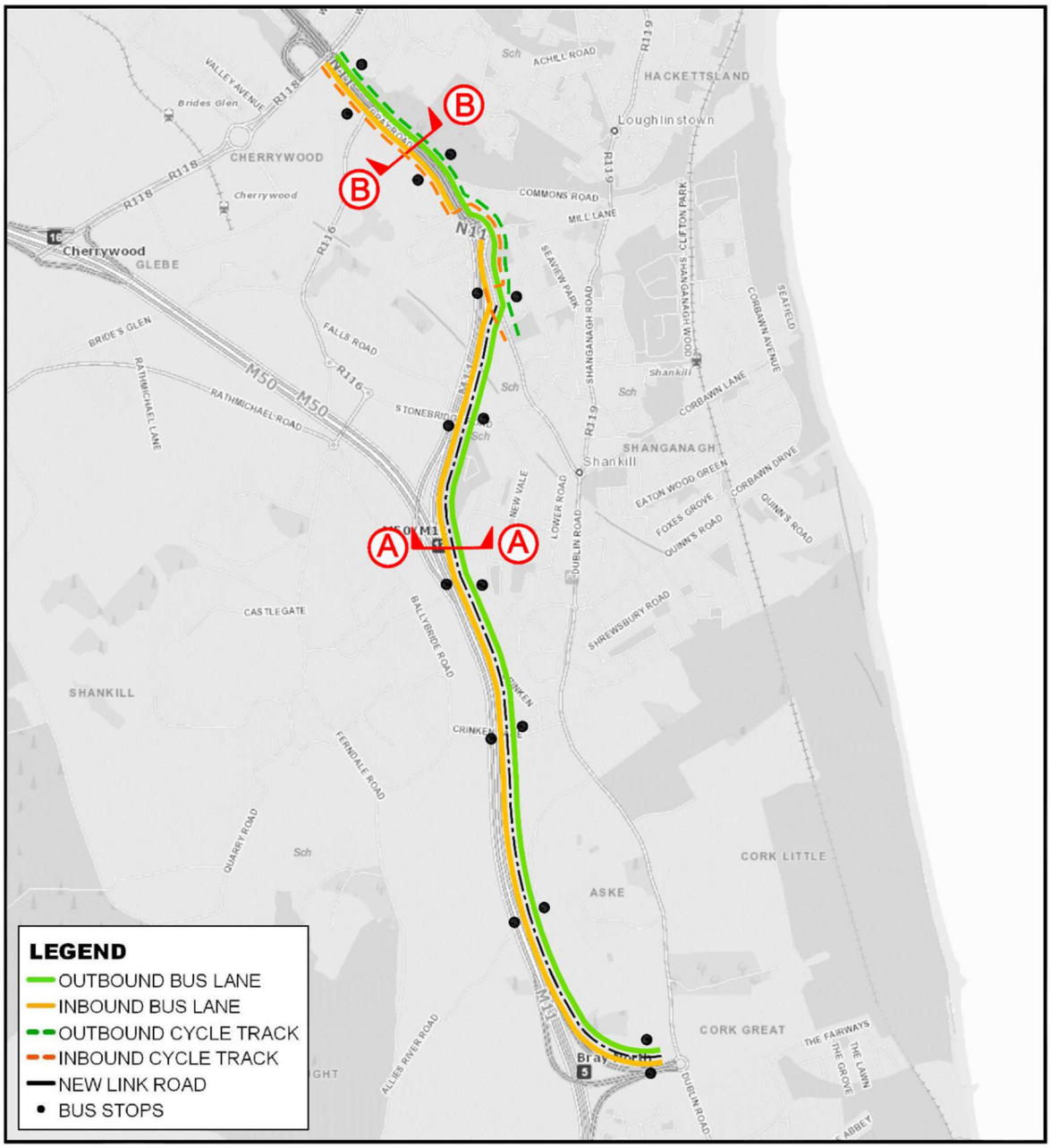


Figure 6.5 Route Option 2A Indicative Scheme Design

Scheme 2A would commence at the Wilford junction which would be upgraded to a signalised junction to provide bus priority. The route option would then travel north along a dedicated bus route crossing Allies River Road at grade. The route would continue north and rises to intersect Crinken Lane at grade before continuing north to the west of Mountain View and intersecting at ground level with the Lordello Road footbridge and pedestrian route to the west of New Vale. It would then travel to the west of Stonebridge Grove before rising to intersect with Stonebridge Road at grade.

The route would continue north running parallel to the M11 before joining the R837 Dublin Road to the south of Loughlinstown Roundabout via a proposed signalised junction. This option would require land take, including private lands and portions of gardens (residential off-street parking will not be affected), including woodland, treelines and grass verge along the entire route. This option would involve significant earthworks and construction of retaining structures. Construction of this section would require removal of trees and

hedgerows which currently provide visual and noise screening for the M11. Replacement noise and visual mitigation would be incorporated into the proposed scheme. Retaining structures would be required along sections of this route to provide for road widening. A cross-section on the new bus-only road is presented in Figure 6.6.

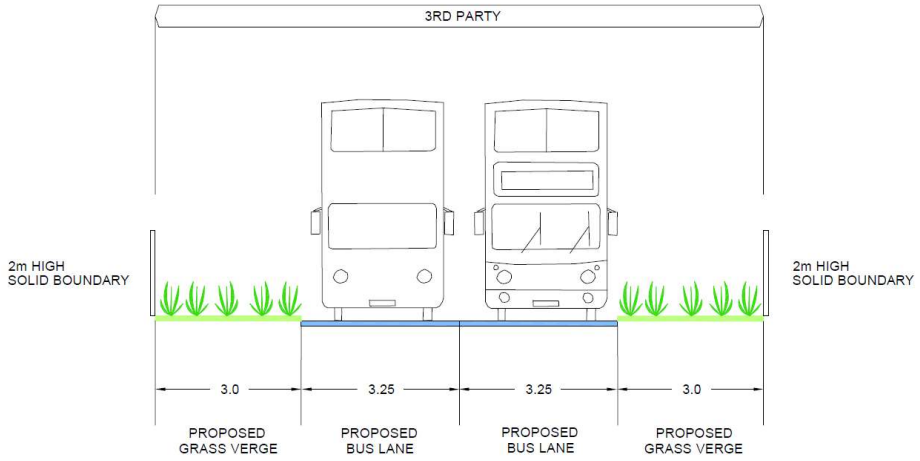


Figure 6.6 Cross Section A-A

The feasibility of the route alongside the M11 would be subject to confirmation following consultation with stakeholders including Transport Infrastructure Ireland (TII) as it requires lands which form part of the M11 motorway reservation.

On the southbound approach to the Loughlinstown roundabout road widening would be required to extend the bus lane to and around the eastern side of the roundabout. This would require realignment of the existing road to provide clearance for buses under the existing footbridge. It is proposed to provide a dedicated bus lane on the northbound approach to the Wyattville junction. This would require reconfiguration of the existing Cherrywood Road signalised junction, as well as amending the existing service road running parallel to the N11 into a one-way northbound only route, with access from the north re-routed via Loughlinstown roundabout. A dedicated northbound cycle lane would be provided linking the Rathmichael Manor/Loughlinstown Hospital area to the existing segregated cycle facilities further north via shared use of the service road. A cross-section on the N11 is presented in Figure 6.7.

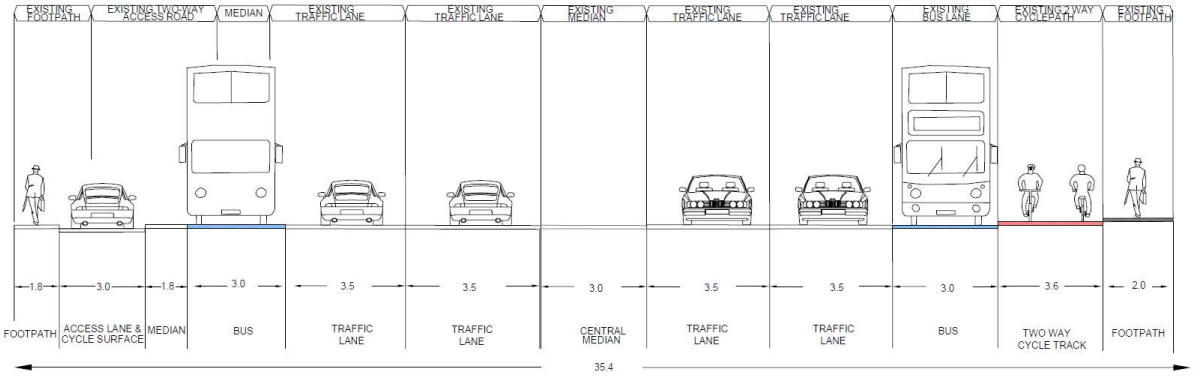


Figure 6.7 Cross Section B-B

This scheme would require provision of 3 additional signalised junctions, at Crinken Lane, Stonebridge Road and the R837 Dublin Road south of Loughlinstown to facilitate bus priority.

With the exception of the northern section of this route where cycle facilities will be incorporated, the route does not follow any cycle routes identified in the Greater Dublin Area Cycle Network Plan. Cycle facilities are therefore not proposed as part the offline section of bus-only route.

6.2.3 Route Option 2B

Route Description

Route 2B is presented in Figure 6.8 and described in the text below.

Figure 6.8 Route Option 2B Indicative Scheme Design

Inbound: Route 2B would commence at the Wilford junction and runs via the Dublin Road through Shankill Village to Loughlinstown roundabout and north to Wyattville.

Outbound: The outbound route would follow the same route as the inbound routing.

Stops: A total of 10 bus stops would likely be provided in each direction.

It is recognised that this route, in particular the area around Shankill Village from the roundabout at St Anne's Church to the Quin's Road junction, is particularly constrained, as building lines are close to the road on either side in a number of locations. The location of the building lines relative to the road presents major difficulties in providing dedicated bus lanes without acquiring and demolishing these buildings. It was therefore not considered reasonable practicable to provide continuous bus lanes in both directions in line with the scheme objectives at these locations.

A number of different schemes were considered and assessed for different sections of this route, in order to determine the optimum scheme along the route. These sub section assessments are outlined in Section 6.2.3.2 to Section 6.2.3.4

6.2.3.2 Route 2B – Sub-Section Assessment Wilford Roundabout to Crinken Lane

This section of the assessment process specifically looks at options within the section of Route 2B between Wilford Roundabout and Crinken Lane. Through this section the route is constrained, with an existing road reservation in the order of 13m, which is bounded by significant mature trees which are subject to development plan preservation objectives, as well as numerous protected buildings and structures which together form an important part of the local landscape character.

The options assessed are:

- Option 1 – Providing parallel bus lanes, cycle tracks and footpaths in a 20m cross section.
- Option 2 – Providing dedicated bus lanes and footpaths with a section of off-line cycle tracks running to the east of the Dublin Road.

Wilford Roundabout to Crinken Lane - Option 1

Option 1 is presented in Figure 6.9 and described in text following.

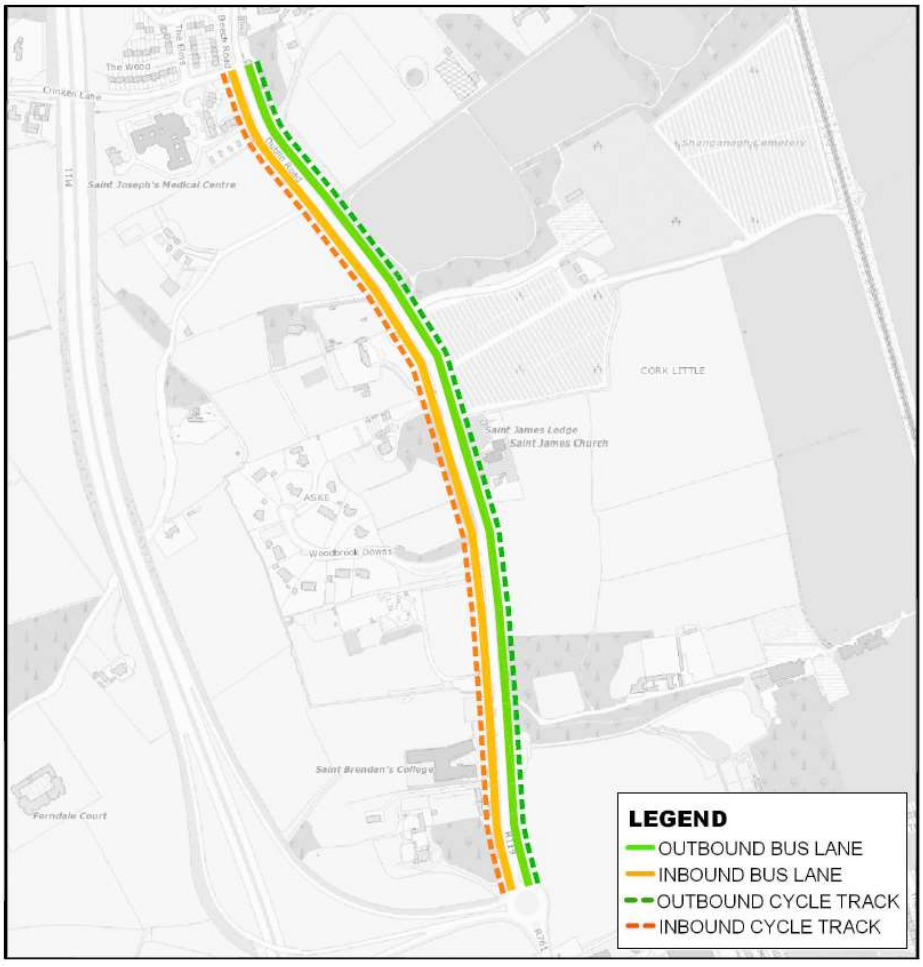


Figure 6.9 Wilford to Crinken Option 1 Scheme Design

This option proposes providing a typical 20m wide cross section including bus lanes and cycle tracks in each direction, bounded by footpaths. This option would require in the order of 7m of additional lands to facilitate road widening, including mature trees, and the setting back of boundary walls, on one or both sides of the road.

Wilford Roundabout to Crinken Lane - Option 2

Option 2 is presented in Figure 6.10 and described in text following.

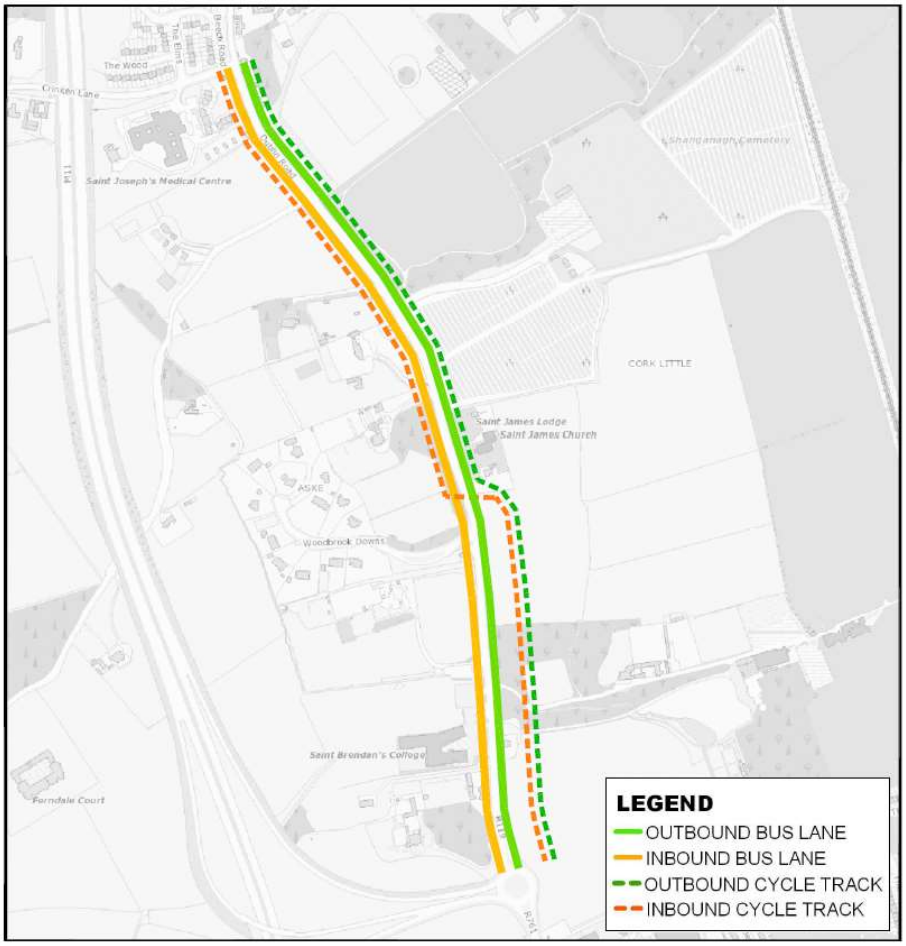


Figure 6.10 Wilford to Crinken Option 2 Scheme Design

This option proposes providing a bus lane in both directions between Wilford roundabout and Crinken Lane, with a section of off-line two-way cycle track between Wilford roundabout and St. James' Church (Crinken Church) provided to the east, running through agricultural lands and the Woodbrook LAP lands. This option would provide a 16m cross section on the Dublin road, comprising 2m footpaths, and 3m bus and running lanes in each direction. This option would require in the order of 4m of additional lands to facilitate road widening on one or both sides of the road, along with a further 3m to 4m strip of additional lands further east to provide the cycle track. Between St. James' Church and Crinken Lane the provision of off-line cycle tracks is constrained by the church and adjacent Shanganagh Cemetery and therefore cycle tracks along the Dublin Road would be provided. This scheme option would avoid some of the mature trees by passing the cycle track around the back of the tree line where possible, however a large number of trees would still be affected.

Wilford Roundabout to Crinken Lane Options Assessment

Details of the 'Stage 2' route options assessment undertaken for Route 2B section between Wilford Roundabout and Crinken Lane are presented in **Appendix A**.

A summary of the ranking of route options against the scheme sub-criteria is presented in Table 6.2 below.

Table 6.2 - Wilford Junction to Crinken Lane Scheme Assessment

Assessment Criteria	Sub-Criteria	Option 1	Option 2
Economy	Capital Cost		
	Journey-time reliability and consistency		
Integration	Land Use Integration		
	Residential Population and Employment Catchments		
	Transport Network Integration		
	Cyclists and pedestrian Integration		
Accessibility and Social Inclusion	High volume trip attractors		
	Deprived Geographic Areas		
Safety	Road Safety		
Environment	Archaeological, Architectural and Cultural Heritage		
	Flora and Fauna		
	Soils and Geology		
	Hydrology		
	Landscape and visual		
	Noise, Vibration and Air		
	Land Use and the Built Environment		

Option 1 requires land acquisition and road widening to facilitate the proposed scheme, resulting in the loss of significant mature trees and setting back of existing boundary walls. Option 2 provides a reduced cross section along the Dublin Road in comparison to Option 1, and will therefore require less road widening and is slightly more preferable in terms of Landscape and Visual, but will still result in the loss of significant mature trees and walls bounding the road. The cost of Option 2 is higher as additional works and land acquisition would be required along the cycle route. The cycle route for Option 1 follows a more direct route along the Dublin Road and does not require northbound cyclists to cross the road, as is the case for Option 2, and therefore Option 1 is slightly more preferable in terms of Cyclist and Pedestrian Integration.

There is little to differentiate between the options, however in reference to the overall scheme objectives Option 1 provides for cyclists directly along the route identified in the GDA Cycle Network Plan and is therefore considered preferable and is brought forward for this section of Option Route 2B.

6.2.3.3 Route 2B – Sub-Section Assessment Crinken Lane to St. Anne's Junction

Sub-Section Assessment Alternative Cycle Track

As discussed above it is not possible to provide continuous dedicated bus lanes and cycle tracks along the Dublin Road between Crinken Lane and the St Anne's junction. Cyclists would be required to use bus lanes and share sections of road with general traffic. Therefore, in order to meet the scheme objectives a number of potential cycle routes are assessed in order provide an alternative cycle route for this section. These routes are shown in Figure 6.11 below and are assessed as part of a Stage 1 as outlined in Table 6.3 following.

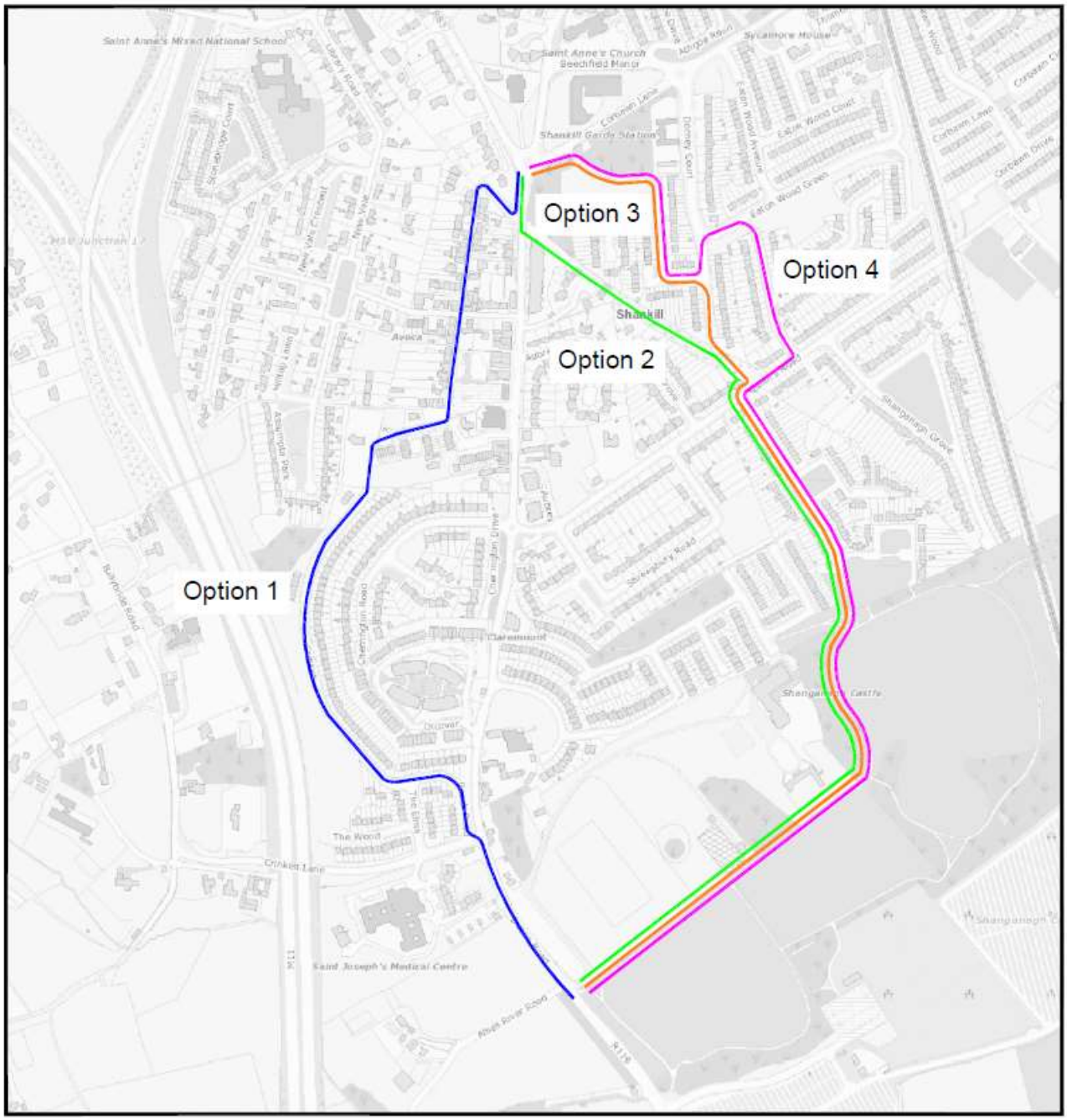


Figure 6.11 - Potential alternative cycle routes

Table 6.3 Assessment of alternative cycle routes

Option	Comments	Pass /Fail
1	For this option cyclists would share road space with general traffic on Beech Road, Mountain View, Stonebridge Close and Lower Road before using a newly constructed ramp to climb to the Dublin Road. Land take would be required to connect the sections on Mountain View and Stonebridge Close and also to construct the ramp, which would also result in removal of trees. Sections where land acquisition is required would also require lighting and screening. This route has a number of opportunities for connections through to Shankill Village and so would improve general pedestrian and cyclist connectivity. This option would also improve pedestrian and cyclist permeability between the residential areas to the south of Shankill Village with the schools to the north east. This is the shortest and most direct of the route options and construction is feasible and so this option passes the initial sift.	Pass
2	For this option cyclists would take a two-way cycle track to be constructed through Shanganagh Park, then share road space with general traffic on St Anne's Park before taking a ramp to a newly constructed cycle track along the old railway line. This cycle track would connect to the Dublin Road at St Anne's Roundabout. Considerable land take from gardens would be required to construct this new cycle track and would involve the removal of trees. New public lighting would be required along the majority, including through Shanganagh Park. This is not considered a viable alternate cycle route as the extent of land take required would be extensive, and the resultant route would be circuitous.	Fail
3	For this option cyclists would take a two-way cycle track to be constructed through Shanganagh Park, then share road space with general traffic on St Anne's Park before taking a ramp to a newly constructed cycle track along a section of the old railway line, before connecting to Dorney Court and link via a cycle track through a green space to Dublin Road at St Anne's Roundabout. Considerable land take from gardens would be required to construct this new cycle track and would involve the removal of trees. New public lighting would be required along sections of the route including through Shanganagh Park. This is not considered a viable alternate cycle route as the extent of land take required would be extensive, and the resultant route would be circuitous.	Fail
4	For this option cyclists would take a two-way cycle track to be constructed through Shanganagh Park, then share road space with general traffic on St Anne's Park, Foxes Grove, Eaton Wood Green and Dorney Court and link via a cycle track through a green space to Dublin Road at St Anne's Roundabout. New public lighting would be required along sections of the route including through Shanganagh Park. Although requiring the least land acquisition in comparison to the other options, this is not considered a viable alternate cycle route as the resultant route would be circuitous in nature and would be difficult for cyclists to follow due to the many turning movements.	Fail

Following this assessment Option 1 is considered the only viable route option and is therefore brought forward as part of Route Option 2B.

Sub-Section Scheme Options

This section of the assessment process looks at scheme options for the section of Route 2B between Crinken Lane and the junction of the Dublin Road and Shanganagh Road (St. Anne's junction). As noted previously the route is particularly constrained and it is not considered practicable to provide continuous bus lanes in both directions to meet the scheme objectives through this section and a number of alternative options are considered.

The options assessed are:

- Option 1 – A northbound bus lane between Crinken Lane and Quinn's Road junction, with a section of northbound bus lane through Shankill Village between Stonebridge Close and Lower Road junctions, and a southbound bus lane between Stonebridge Close and Crinken Lane junctions.
- Option 2 – Bus lanes in both directions between Crinken Lane and Quinn's Road junction, and a southbound bus lane between Lower Road and Crinken Lane junctions.
- Option 3 – A northbound bus lane between Crinken Lane and Quinn's Road junction, with a section of northbound bus lane through Shankill Village between Stonebridge Close and Lower Road junctions, and a southbound bus lane between Lower Road and Crinken Lane junctions

Crinken Lane to St. Anne's junction - Option 1

Option 2 is presented in Figure 6.12 and described in text following.

Figure 6.12 Crinken Lane to St Anne's Junction Option 1 Scheme Design

Option 1 would provide a northbound bus lane between Crinken Lane and Quinn's Road junction, with a section of northbound bus lane through Shankill Village between Stonebridge Close and Lower Road junctions, and a southbound bus lane between Stonebridge Close and Crinken Lane junctions. This option would result in land acquisition to facilitate road widening along the Dublin Road between Crinken Lane and Stonebridge Close junction, including portions of private gardens and public open space and would require the removal of mature trees, residential off-street parking would not be affected. Provision of a northbound bus lane between Stonebridge Close and Lower Road would require removal of on-street parking and a reconfiguration of the road and pedestrian space through Shankill Village. Enhanced priority could be provided for northbound buses on the approach to Shankill Village with the signalisation of the Quinn's Road and Lower Road junctions and implementation of queue relocation system at these locations.

Crinken Lane to St. Anne's Junction - Option 2

Option 2 is presented in Figure 6.13 and described in text following.

Figure 6.13 Crinken Lane to St Anne's Junction Option 2 Scheme Design

Option 2 would provide a northbound bus lane between Crinken Lane and Quinn's Road junction and a southbound bus lane between Lower Road and Crinken Lane junctions. This option would result in land acquisition to facilitate road widening along the Dublin Road between Crinken Lane and Lower Road junction, including portions of gardens and public open space and would require the removal of mature trees, residential off-street parking will not be affected. Provision of a southbound bus lane between Lower Road and Stonebridge Close would require removal of on-street parking and a reconfiguration of the road and pedestrian space through Shankill Village. Enhanced priority could be provided for northbound buses on the approach to Shankill Village with the signalisation of the Quinn's Road junction and implementation of a queue relocation system, however journey time reliability would still be compromised by general traffic movements through and in the village.

Crinken Lane to St. Anne's Junction - Option 3

Option 3 is presented in Figure 6.14 and described in text following.

Figure 6.14 Crinken Lane to St Anne's Junction Option 4 Scheme Design

Option 3 would provide a northbound bus lane between Crinken Lane and Quinn's Road junction, with a section of northbound bus lane through Shankill Village between Stonebridge Close and Lower Road junctions, and a southbound bus lane between Lower Road and Crinken Lane junctions. This option would result in land acquisition to facilitate road widening along the Dublin Road between Crinken Lane and Lower Road junctions, including portions of gardens and public open space and would require the removal of mature trees, residential off-street parking will not be affected. Provision of a northbound and southbound bus lanes through Shankill Village would require removal of on-street parking, loss of street trees and a reconfiguration of the road and pedestrian space including narrowing of existing footpath widths. Enhanced priority could be provided for northbound buses on the approach to Shankill Village with the signalisation of the Quinn's Road and Lower Road junctions and implementation of queue relocation system at these locations.

Crinken Lane to St. Anne's Junction Options Assessment

Details of the 'Stage 2' route options assessment undertaken for Route 2B section between Wilford Roundabout and Crinken Lane are presented in **Appendix A**.

A summary of the ranking of options considered between Crinken Lane and St. Anne's junction against the scheme sub-criteria used is presented in Table 6.4 following.

Table 6.4 - Crinken Lane to St Anne's Junction Assessment

Assessment Criteria	Sub-Criteria	Option 1	Option 2	Option 3
Economy	Capital Cost			
	Journey-time reliability and consistency			
Integration	Land Use Integration			
	Residential Population and Employment Catchments			
	Transport Network Integration			
	Cyclists and pedestrian Integration			
Accessibility and Social Inclusion	High volume trip attractors			
	Deprived Geographic Areas			
Safety	Road Safety			
Environment	Archaeological, Architectural and Cultural Heritage			
	Flora and Fauna			
	Soils and Geology			
	Hydrology			
	Landscape and visual			
	Noise, Vibration and Air			
	Land Use and the Built Environment			

All options require land acquisition to facilitate road widening along the Dublin Road between Crinken Lane and Stonebridge Close junction, including portions of gardens and public open space and would require the removal of mature trees. The extent of the construction works for Option 3 is slightly higher than the others and so it scores worse under the "Capital Cost" criterion.

Option 3 provides the highest level of bus priority of the three options and so is preferred under the Journey Time and Reliability criterion, Options 1 and 2 provide similar levels of priority to each other and are less preferable than Option 3.

In terms of Landscape and Visual criterion, Options 1 and 2 are considered preferable as they would have less of an impact on the village streetscape as they require road widening to a total width of three lanes, while Option 3 is considered less preferable as the road will be widened to four lanes in places. Similarly,

this option scores worse under the “Land Use and Built Environment” criterion as it would require the removal of larger numbers of car park spaces and further reduce the widths of footpaths.

Option 3 whilst having disadvantages in comparison to other options in terms of cost and environmental impacts, is considered the preferred option on the basis that it provides the highest level of bus priority and best achieves the scheme objectives in this regard and is therefore brought forward for this section of Route Option 2B.

Route 2B – Sub-Section Assessment St. Anne's Junction to Loughlinstown

This section of the assessment process looks at scheme options within the section of Route 2B between the junction of the Dublin Road and Shanganagh Road (St. Anne's junction) and the Loughlinstown Roundabout. The route is geometrically constrained by building lines and environmental features such as trees and protected structures.

The options assessed are:

- Option 1 – Bus lanes in both directions between St. Anne's roundabout and Loughlinstown roundabout, with a two-way cycle track on the western side of the Dublin Road between St. Anne's roundabout and the resource centre, and a two-way cycle track on the eastern side of the Dublin Road between Seaview Park and Loughlinstown roundabout.

- Option 2 – Bus lanes in both directions between St. Anne's roundabout and Loughlinstown roundabout, with an alternative cycle route provided linking Loughlinstown roundabout to Shanganagh Road and St. Anne's roundabout via Seaview Wood and Seaview Park.

Bus and Cycle Lanes on Dublin Road - Option 1

Option 1 is presented in Figure 6.15 and described in text following.

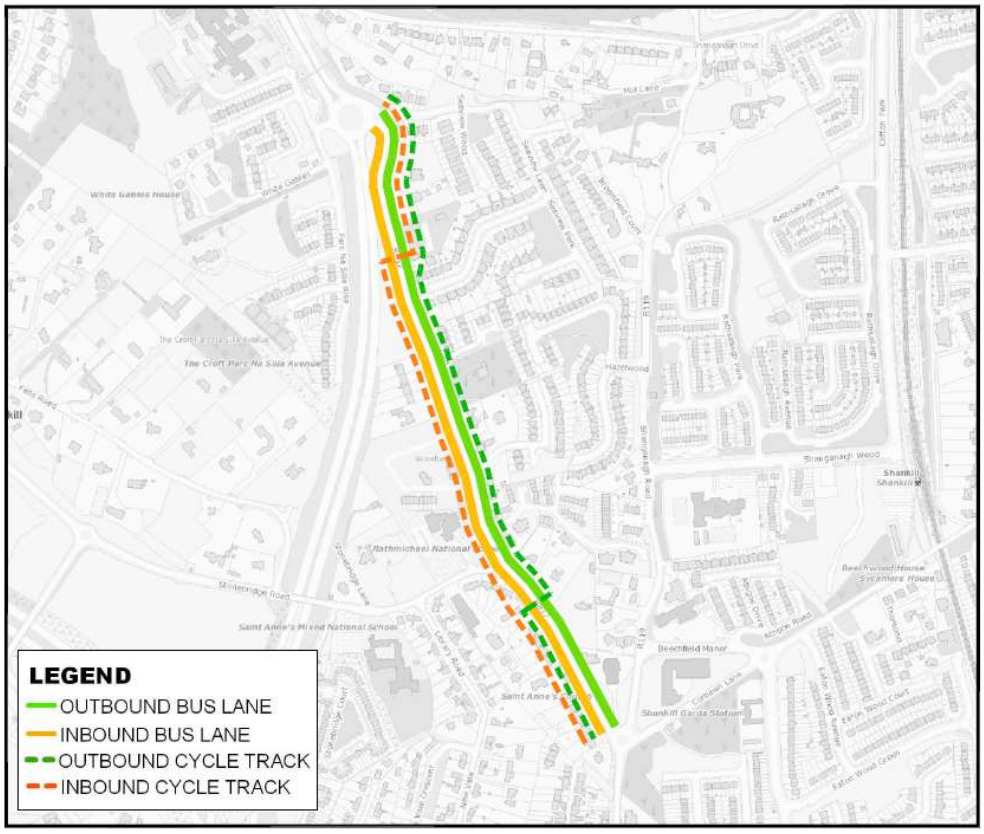


Figure 6.15 - St Anne's Junction to Loughlinstown Scheme Option 1

Option 1 would provide bus lanes in both directions between St. Anne's roundabout and Loughlinstown roundabout. This option would result in land acquisition to facilitate road widening along the Dublin Road, including private gardens and public open space and would require the removal of trees, residential off-street parking will not be affected. Significant retaining structures would also be required in places along this section of the route to facilitate road widening.

Due to geometrical constraints, it is not considered feasible to provide a two-way cycle track between St. Anne's roundabout and the resource centre, so this option would provide a two-way cycle track on the western side of the Dublin Road along this section of the route, with a toucan crossing north of the resource centre to facilitate cycle continuity. A two-way cycle track would also be provided on the eastern side of the Dublin Road between Seaview Park and Loughlinstown roundabout, linking in to the existing two-way cycle track to the east of the roundabout. To facilitate the provision of bus lanes in both directions south of Loughlinstown roundabout the existing toucan on Dublin Road would be moved further south to ensure an adequate separation buffer between the Dublin Road and the adjacent M11 motorway.

Bus Lanes on Dublin Road and Alternative Cycle Route - Option 2

Option 2 is presented in Figure 6.16 and described in text following.

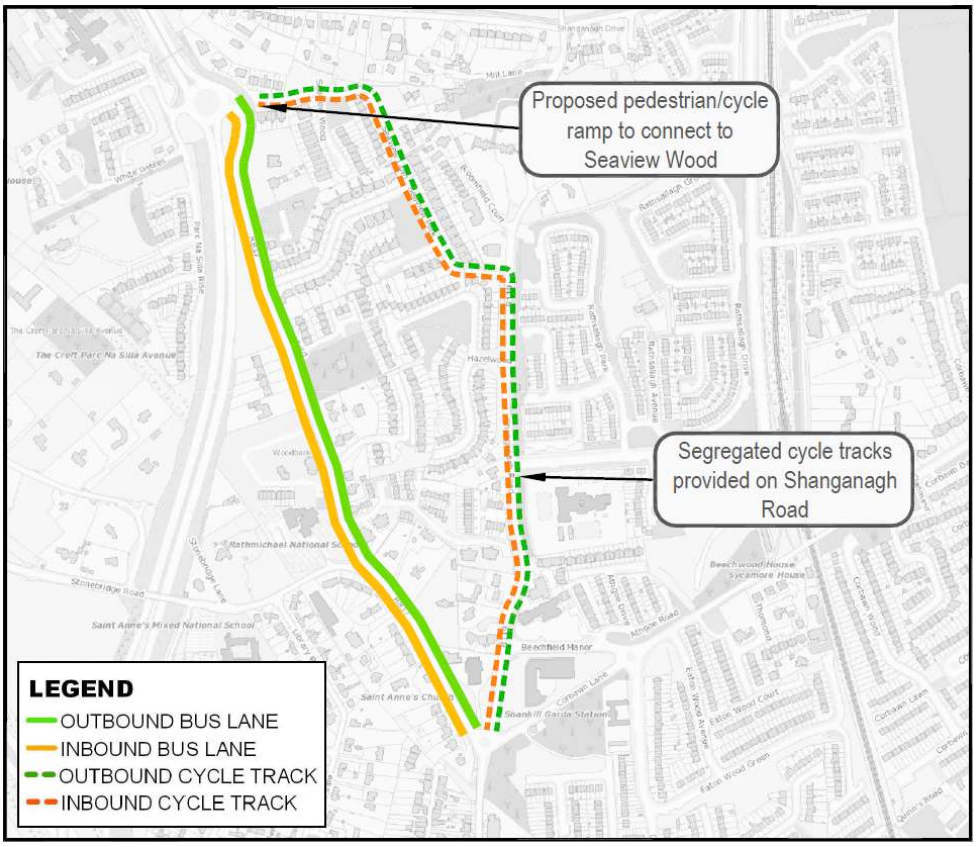


Figure 6.16 - St Anne's Junction to Loughlinstown Scheme Option 2

Option 2 would provide bus lanes in both directions between St. Anne's roundabout and Loughlinstown roundabout, with an alternative cycle route provided linking Loughlinstown roundabout to Shanganagh Road and St. Anne's roundabout via Seaview Wood and Seaview Park. This option would result in land acquisition to facilitate road widening along the Dublin Road to provide bus lanes, including portions of private gardens and public open space and would require the removal of trees, residential off-street parking would not be affected. Due to the level difference, a pedestrian and cycle ramp would be required linking the existing two-way cycle track to the east of Loughlinstown roundabout with Seaview Wood. Cyclists would share the existing carriageway along Seaview Wood and Seaview Park. Upgrading of Shanganagh Road would be required to provide cycle tracks, the majority of which could be provided in public open spaces and verges but would also require removal of trees and hedges and some private land acquisition.

St. Anne's junction to Loughlinstown junction Options Assessment

Details of the 'Stage 2' route options assessment undertaken for Route 2B section between Wilford Roundabout and Crinken Lane are presented in **Appendix A**.

A summary of the ranking of route options against the scheme sub-criteria is presented in Table 6.5 below.

Table 6.5 - St Anne's Junction to Loughlinstown Junction Options Assessment

Assessment Criteria	Sub-Criteria	Option 1	Option 2
Economy	Capital Cost		
	Journey-time reliability and consistency		
Integration	Land Use Integration		
	Residential Population and Employment Catchments		
	Transport Network Integration		
	Cyclists and pedestrian Integration		
Accessibility and Social Inclusion	High volume trip attractors		
	Deprived Geographic Areas		
Safety	Road Safety		
Environment	Archaeological, Architectural and Cultural Heritage		
	Flora and Fauna		
	Soils and Geology		
	Hydrology		
	Landscape and visual		
	Noise, Vibration and Air		
	Land Use and the Built Environment		

Option 2 is considered preferable in terms of capital costs as the majority of land required on Shanganagh Road to provide cycle tracks is public, whereas provision of cycle tracks along Dublin Road requires acquisition of an additional 4m of private lands in addition to lands required for bus lanes.

In terms of cyclist and pedestrian integration Option 1 is considered preferable as the facilities are provided along Primary Route 12A, whereas the alternative cycle route through Seaview Wood and Seaview Park is circuitous in nature and unlikely to be used by some cyclists, particularly commuter cyclists. In this regard Option 1 is considered slightly preferable in terms of journey-time reliability and quality of services due to the increased likelihood for cyclists cycling in the bus lanes associated with Option 2. In terms of landscape and visual Option 1 is considered less preferable as the increased cross section on Dublin Road will require acquisition of additional private lands, including portions of gardens, and the removal of trees, but residential off-street parking would not be affected.

There is little to differentiate between the options, however in reference to the overall scheme objectives Option 1 provides slight advantages in terms of cyclist integration and journey-time reliability for buses. It is therefore considered preferable and therefore brought forward for this section of Route Option 2B.

Route 2B Indicative Scheme Design

Figure 6.17 illustrates the indicative scheme design for this route option, based on the outcome of the sub-section assessments undertaken previously, as well as the location of indicative cross-sections.

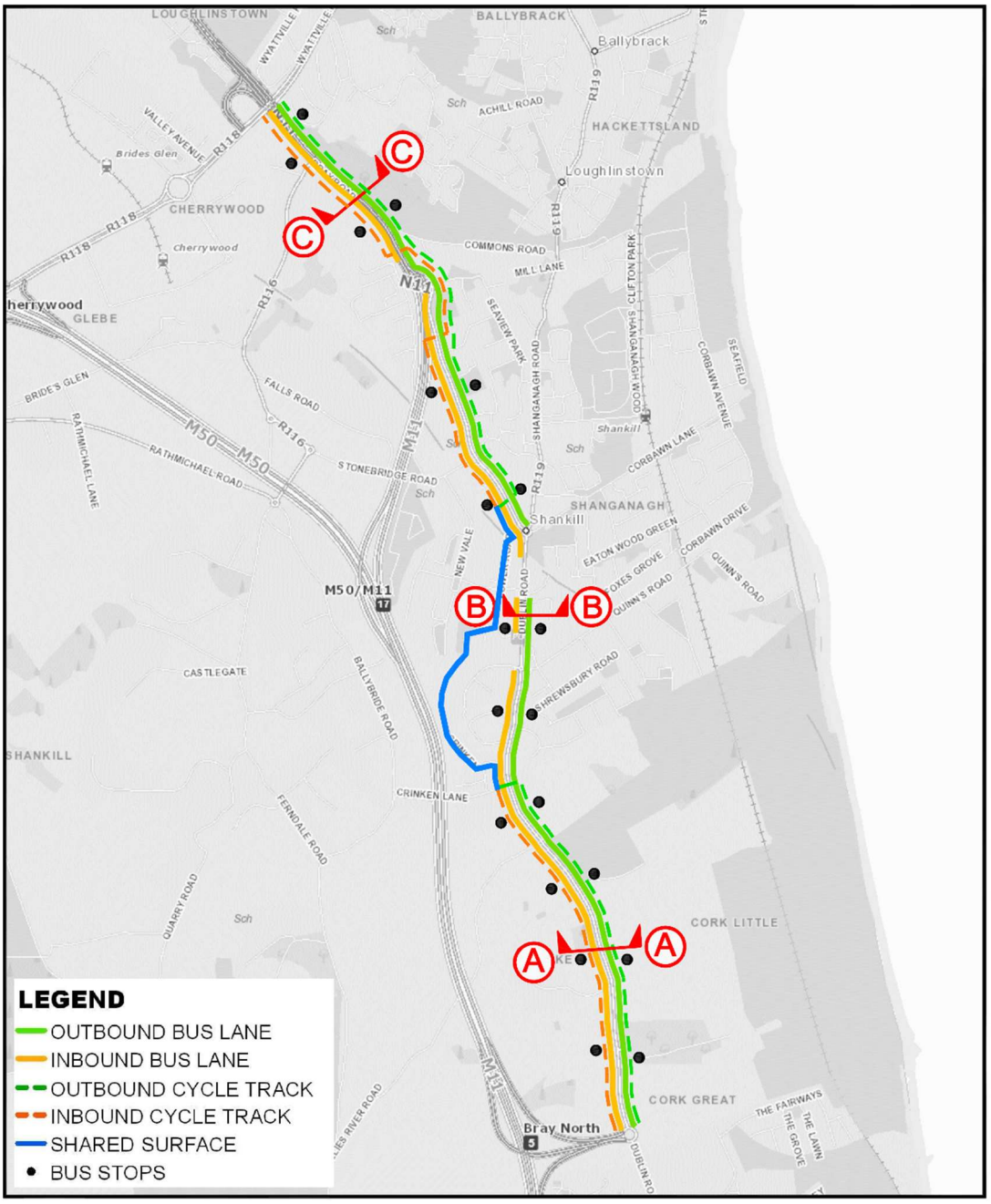


Figure 6.17 Route Option 2B Indicative Scheme Design

Scheme 2B would commence at the Wilford junction which would be upgraded to signalised junction to provide bus priority. Extensive road widening and land acquisition in the form of agricultural and amenity lands, as well as portions of gardens, would be required to provide bus and cycle lanes in both directions on Dublin Road between Wilford junction and Crinken Lane, to the south of Shankill Village. Residential off-street parking will not be affected. This would result in the removal of a large number of significant mature trees as well as impacting on walls and boundaries of architectural heritage significance. This route option would also incorporate a new signalised junction servicing the Woodbrook/Shanganagh LAP lands. A cross-section on the R119 Dublin Road is presented in Figure 6.18.

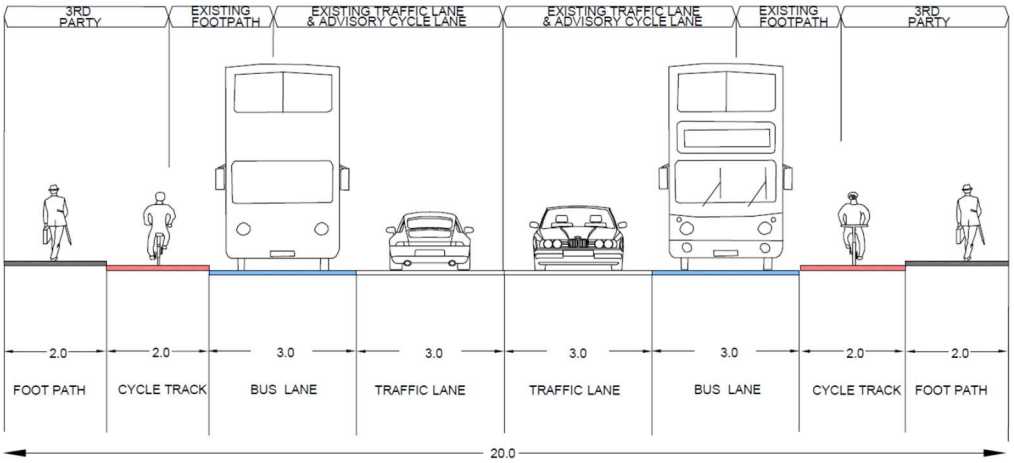


Figure 6.18 Cross Section A-A

Road widening and land acquisition in the form of portions of gardens and open green space, including trees and boundaries, would be required between the Crinken Lane and Quinn's Road junctions to provide bus lanes in both directions, residential off-street parking would not be affected. This route option includes an off-line cycle route to the west of the village which follows along Beech Road, Mountain View, and either Assumpta Park or Stonebridge Close, onto Lower Road and connects to Dublin Road. It would generally comprise cyclists sharing low volume, low speed roads. This cycle route would require land take in the form of private gardens.

It is proposed to upgrade the Quinn's Road roundabout to a signalised junction to improve pedestrian provision and also to incorporate traffic management measures to provide priority for northbound buses towards Shankill Village.

From Crinken Lane to Quin's Road junction it is proposed to widen the road to provide dedicated bus lanes in each direction. From here geometrical constraints mean that it is not practical to provide continuous bus lanes in both directions. Continuous bus lanes are proposed through Shankill Village for southbound buses and two sets of traffic lights and a length of northbound bus lane through the village would be used as part of a queue relocation system to provide priority for northbound buses. To the north of Shankill Village there is a narrow bridge over the old railway line and widening of this bridge is restricted by buildings on either side. For this 180m section buses would be required to merge with general traffic. A cross-section on the Dublin Road in Shankill Village is presented in Figure 6.19.

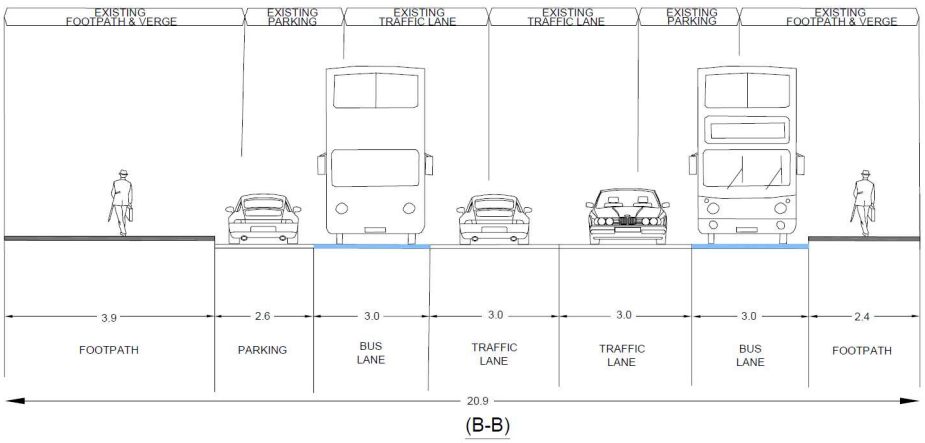


Figure 6.19 Cross Section B-B

Road widening between the Shanganagh Road junction and St. Anne's Resource centre to the north would be required to provide bus lanes and shared footpath/cycle paths along this section. This would require land take public green space and portions of gardens, residential off-street parking will not be affected. Land take would also be required from the grounds of St Anne's Church and their car park would need to be reconfigured in order to retain the same number of car parking spaces.

This option proposes to widen the Dublin Road between St. Anne's Resource Centre and Loughlinstown Roundabout to accommodate bus lanes in both directions. To facilitate this land take would be required, including portions of private gardens and open space. Cycle lanes would also be provided in each direction for the majority of this section, apart from on the northbound approach where cyclists would be crossed to the two-way cycle track on the eastern side of the road to enable them to safely bypass the Loughlinstown Roundabout before re-joining two-way cycle facilities on the N11. This would include an upgrade of the existing signal controlled junction at Stonebridge Road to provide priority for buses. Retaining structures would be required along sections of this route to provide for road widening.

On the southbound approach to the Loughlinstown Roundabout road widening would be required to extend the bus lane to and around the eastern side of the roundabout. This would require realignment of the existing road to provide clearance for buses under the existing footbridge. It is proposed to provide a dedicated bus lane on the northbound approach to the Wyattville junction. This would require reconfiguration of the existing Cherrywood Road signalised junction, as well as amending the existing service road running parallel to the N11 into a one-way northbound only route, with access from the north re-routed via Loughlinstown roundabout. A dedicated northbound cycle lane would be provided linking the Rathmichael Manor/Loughlinstown Hospital area to the existing segregated cycle facilities further north via shared use of the service road. A cross-section on the N11 is presented in Figure 6.20.

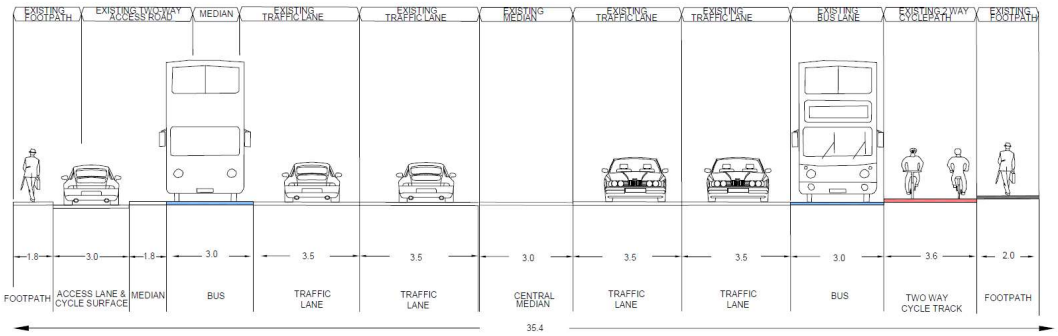


Figure 6.20 Cross Section C-C

6.2.4 Route Option 2C

Route Description

Route 2C is presented in Figure 6.21 and described in text following.

Figure 6.21 Route Option 2C

Inbound: Route 2C would commence at the Wilford junction and follow the R119 Dublin Road to Crinken Lane, and then run east of and parallel to the M11 along a dedicated bus route, passing to the west of Shankill village, before joining the R837 Dublin Road south of Loughlinstown and continue north on the N11 to the Wyattville interchange.

Outbound: The outbound route would follow the same route as the inbound route.

Stops: A total of 8 bus stop would likely be provided in each direction.

Indicative Scheme Design

Figure 6.22 illustrates the indicative scheme design for this route option as well as the location of indicative cross-sections.

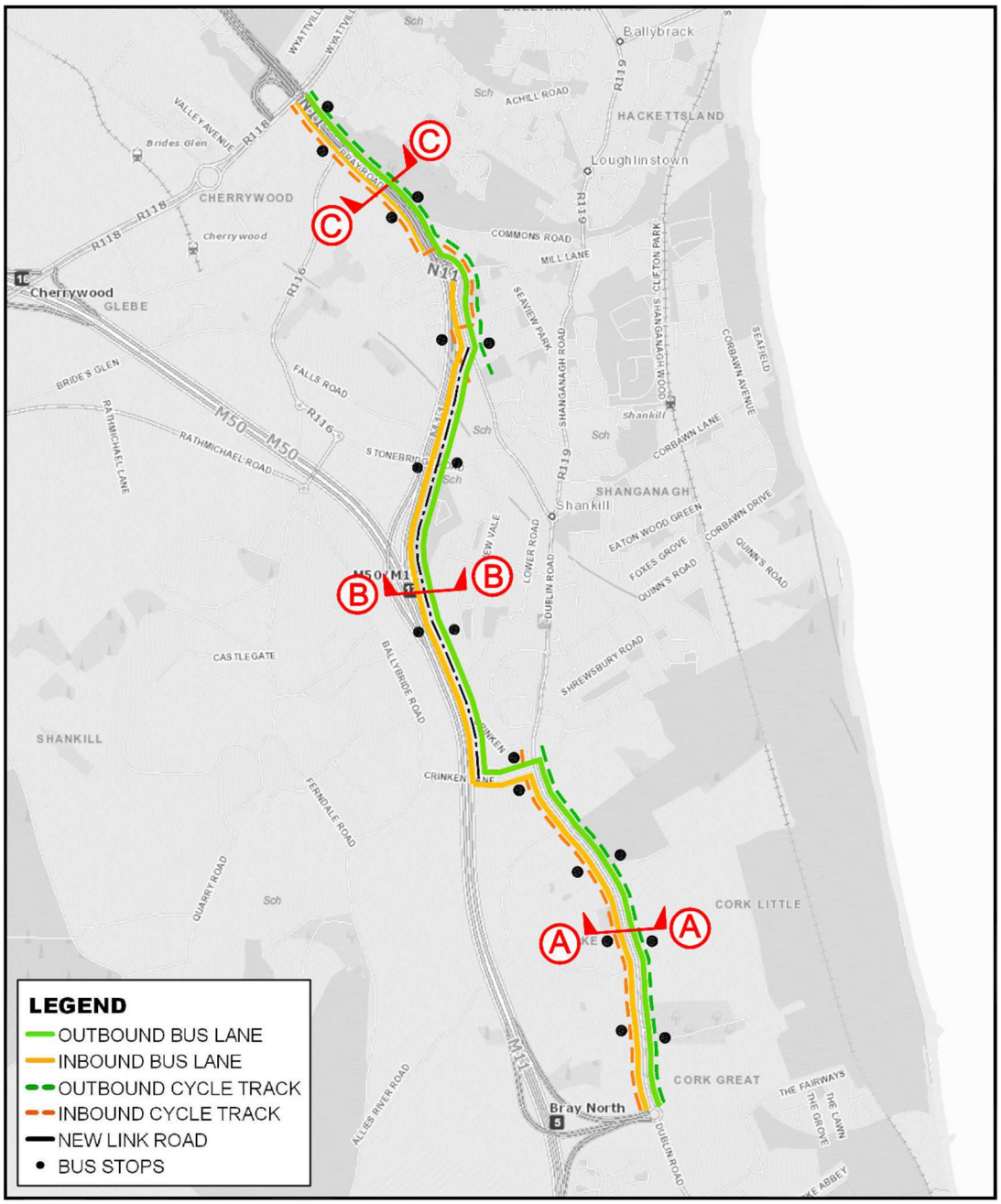


Figure 6.22 Route Option 2C Indicative Scheme Design

Scheme 2C would commence at the Wilford junction which would be upgraded to signalised junction to provide bus priority. Extensive road widening and land acquisition in the form of agricultural and amenity lands, as well as portions of gardens, would be required to provide bus and cycle lanes in both directions on Dublin Road between Wilford junction and Crinken Lane, residential off-street parking will not be affected. To the south of Shankill Village road widening to provide bus and cycle lanes would result in the removal of many significant mature trees as well as impacting on walls and boundaries of architectural heritage significance. This route option would also incorporate a new signalised junction servicing the Woodbrook/Shanganagh LAP lands. A cross-section on the R119 Dublin Road is presented in Figure 6.23.

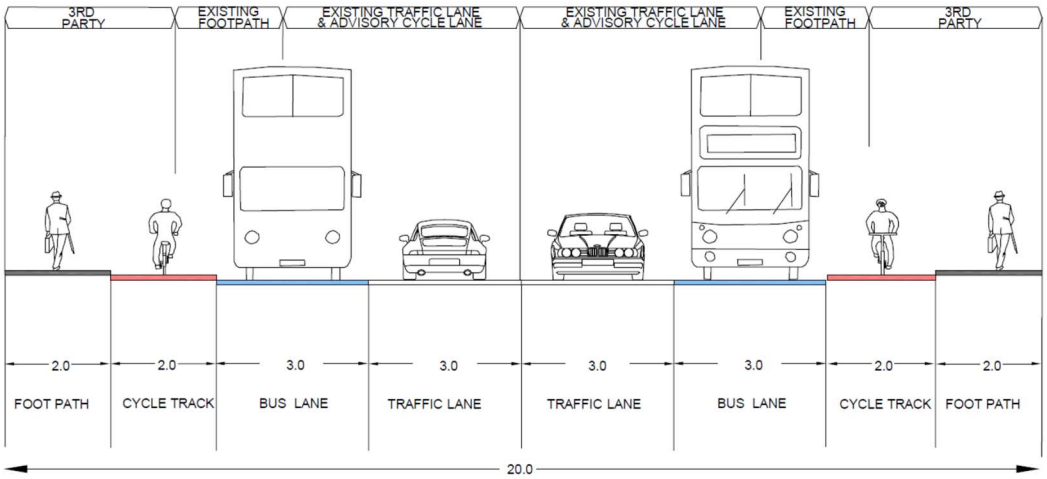


Figure 6.23 Cross Section A-A

A dedicated bus route would be provided running parallel to the M11, running to the west of Mountain View and intersecting at ground level with the Lordello Road footbridge and pedestrian route to the west of New Vale. The route would travel to the west of Stonebridge Grove before rising to intersect with Stonebridge Road at grade. The route would then continue north running parallel to the M11 before joining the R837 Dublin Road to the south of Loughlinstown Roundabout via a proposed signalised junction. This option would require land take, including private lands and portions of gardens, including woodland, treelines and grass verge along the entire route. Construction of this section would require removal of trees and hedgerows which currently provide visual and noise screening for the M11. Replacement noise and visual mitigation would be incorporated into the proposed scheme. Retaining structures would be required along sections of this route to provide for road widening. A cross-section on the new bus-only road is presented in Figure 6.24.

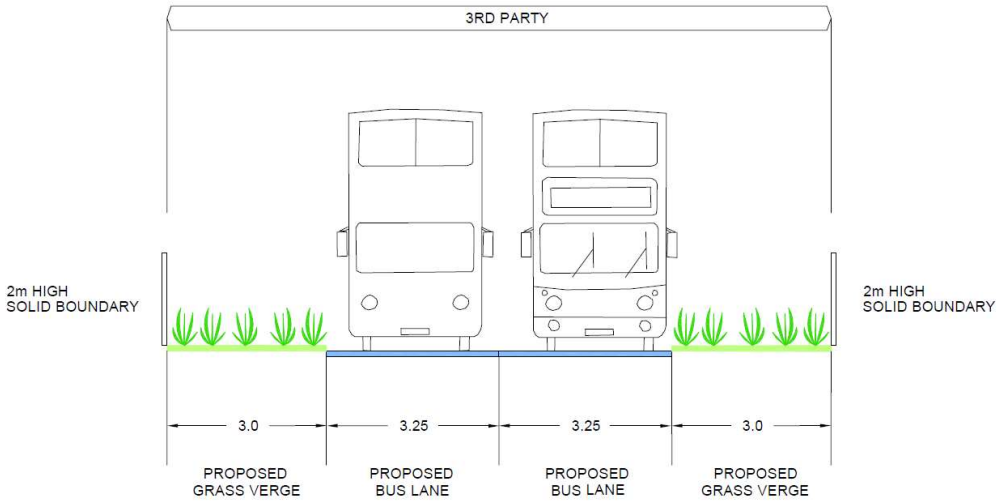


Figure 6.24 Cross Section B-B

On the southbound approach to the Loughlinstown Roundabout road widening would be required to extend the bus lane to and around the eastern side of the roundabout. This would require realignment of the existing road to provide clearance for buses under the existing footbridge. It is proposed to provide a dedicated bus lane on the northbound approach to the Wyattville junction. This would require reconfiguration of the existing Cherrywood Road signalised junction, as well as amending the existing service road running parallel to the N11 into a one-way northbound only route, with access from the north re-routed via Loughlinstown roundabout. A dedicated northbound cycle lane would be provided linking the Rathmichael Manor/Loughlinstown Hospital area to the existing segregated cycle facilities further north via shared use of the service road.

6.2.5 Route Option 2D

Route Description

Route 2D is presented in Figure 6.25 and described in text following.

Figure 6.25 Route Option 2D

Inbound: Route 2D would commence at the Wilford junction and runs via the Dublin Road through Shankill Village to Loughlinstown roundabout and north to Wyattville. A bus-gate would be provided at Shankill Village with general traffic routed to the west of the village via a new link road.

Outbound: The outbound route would follow the same route as the inbound routing.

Stops: A total of 10 bus stops would likely be provided in each direction.

Indicative Scheme Design

Figure 6.26 illustrates the indicative scheme design for this route option as well as the location of indicative cross-sections.

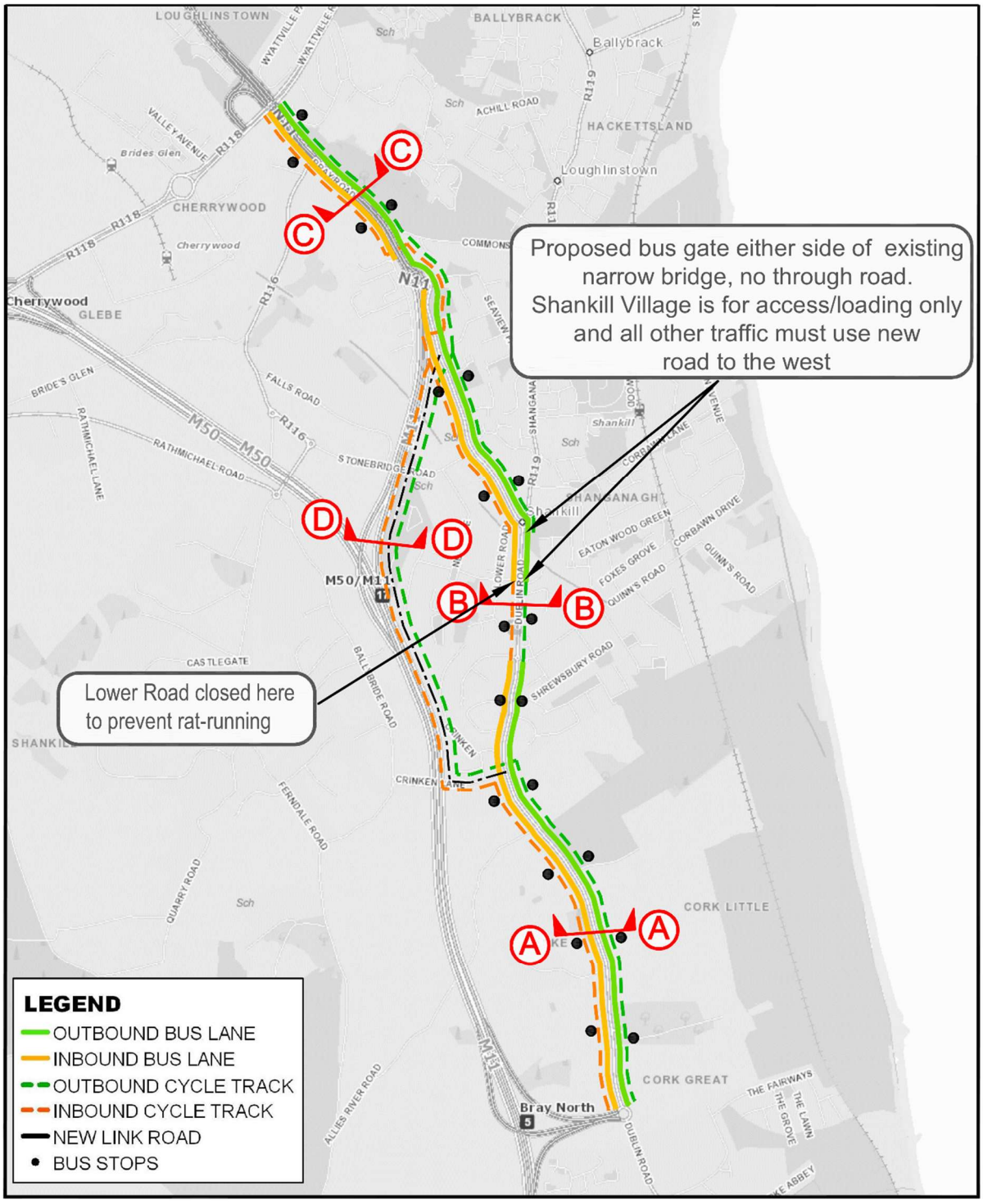


Figure 6.26 Route Option 2D Indicative Scheme Design

This option comprises construction of a new link road to the west of Shankill Village running parallel to the M11. Through-traffic would be diverted via this new route and a bus-only gate facilitating access through Shankill Village for buses, cyclists and pedestrians only.

Scheme 2D would commence at the Wilford junction which would be upgraded to signalised junction to provide bus priority.

Extensive road widening and land acquisition in the form of agricultural and amenity lands, as well as portions of gardens, would be required to provide bus and cycle lanes in both directions on Dublin Road between Wilford junction and Crinken Lane, residential off-street parking will not be affected. To the south of Shankill Village. This would result in the removal of many significant mature trees as well as impacting on walls and boundaries of architectural heritage significance. This route option would also incorporate a new signalised junction servicing the Woodbrook/Shanganagh LAP lands. A cross-section on the R119 Dublin Road is presented in

Figure 6.27.

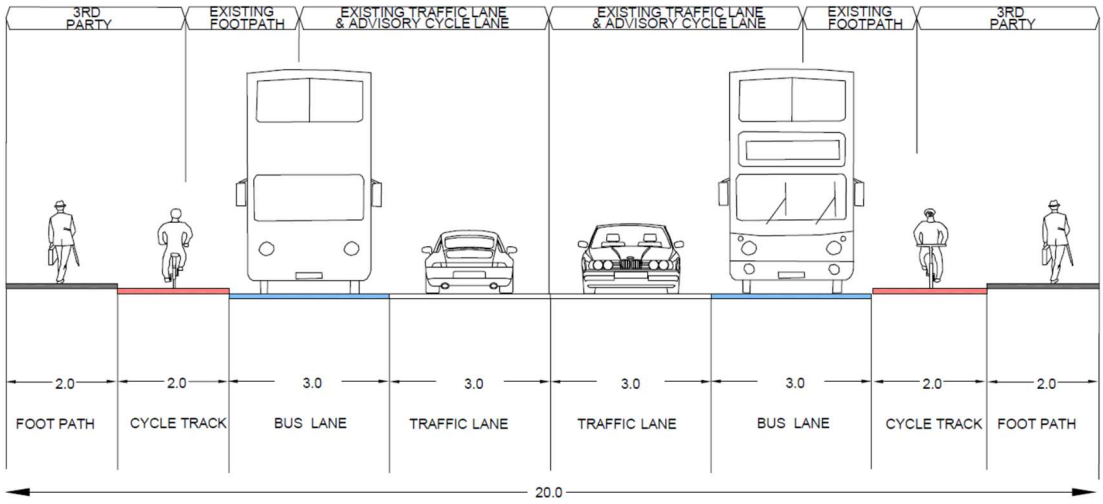


Figure 6.27 Cross Section A-A

Road widening and land acquisition in the form of portions of gardens and open green space, including removal of trees and boundary walls, would be required between the Crinken lane and Quinn's Road junctions to provide bus lanes in both directions, residential off-street parking will not be affected. Through-traffic would be diverted onto a new link road to the west of Shankill and therefore it is assumed that separate cycle facilities would not be required along this section of the Dublin Road.

Through the provision of a bus gate between the Lower Road and St. Anne's junctions and the diversion of through-traffic onto the link road to the west it is assumed that bus lanes through the village would not be required. It is not possible to provide bus lanes in both directions for the full extents through Shankill Village due to geometrical constraints and building lines. The St. Anne's Roundabout would be upgraded to a signalised junction which would facilitate the bus gate immediately to the south and improve pedestrian and cyclist provision. A cross-section on the R119 Dublin Road at Shankill Village is presented in Figure 6.28.

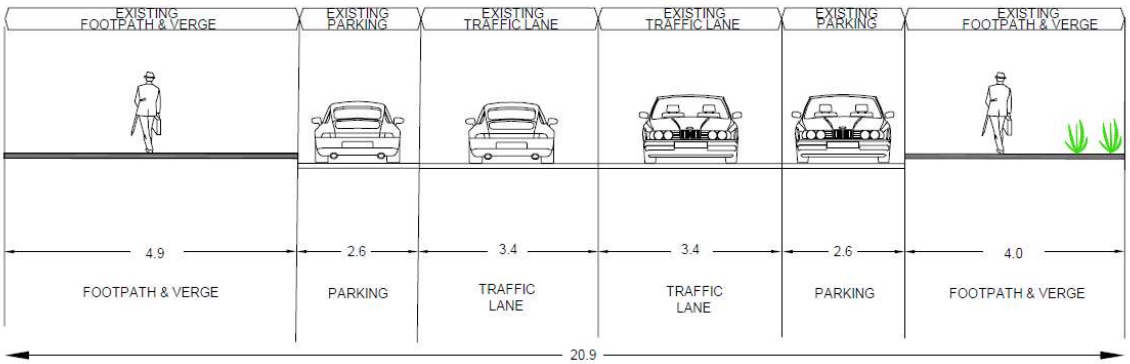


Figure 6.28 Cross Section B-B

Given the relatively high volumes of traffic between the R119 Shanganagh Road and the R837 Dublin Road, and the likely increase in traffic volumes making this manoeuvre due to the bus gate at Shankill, it is considered that dedicated bus lanes would be required along the R837 Dublin Road.

Road widening between the Shanganagh Road junction and St. Anne's Resource centre to the north would be required to provide bus lanes and shared footpath/cycle paths along this section. This would require land take from public green space and portions of gardens but residential off-street parking would not be affected. Land take would also be required from the grounds of St Anne's Church and their car park would need to be reconfigured in order to retain the same number of car parking spaces.

This option proposes to widen the Dublin Road between St. Anne's Resource Centre and Loughlinstown Roundabout to accommodate bus lanes in both directions. To facilitate this land take would be required, including portions of private gardens and open space, residential off-street parking will not be affected. Cycle lanes would also be provided in each direction for the majority of this section, apart from on the northbound approach where cyclists will be crossed to the two-way cycle track on the eastern side of the road to enable them to safely bypass the Loughlinstown Roundabout before re-joining two-way cycle facilities on the N11. This would include an upgrade of the existing signal controlled junction at Stonebridge Road to provide priority for buses. Retaining structures would be required along sections of this route to provide for road widening.

On the southbound approach to the Loughlinstown Roundabout road widening would be required to extend the bus lane to and around the eastern side of the roundabout. This would require realignment of the existing road to provide clearance for buses under the existing footbridge. It is proposed to provide a dedicated bus lane on the northbound approach to the Wyattville junction. This would require reconfiguration of the existing Cherrywood Road signalised junction, as well as amending the existing service road running parallel to the N11 into a one-way northbound only route, with access from the north re-routed via Loughlinstown roundabout. A dedicated northbound cycle lane would be provided linking the Rathmichael Manor/Loughlinstown Hospital area to the existing segregated cycle facilities further north via shared use of the service road. A cross-section on the N11 is presented in Figure 6.29.

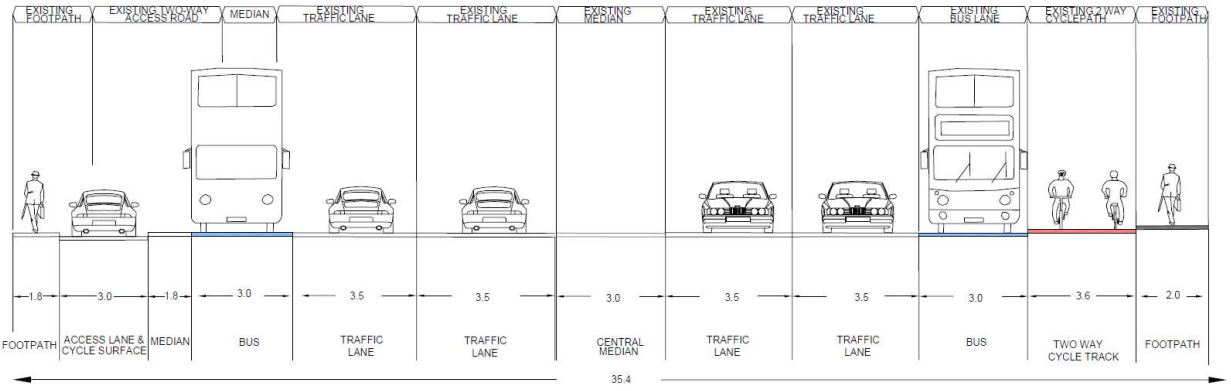


Figure 6.29 Cross Section C-C

The alternative link road for general traffic would be provided running parallel to the M11, running to the west of Mountain View. The route travels to the west of Stonebridge Grove before rising to intersect with Stonebridge Road at grade. The route continues north running parallel to the M11 before joining the R837 Dublin Road to the south of Loughlinstown Roundabout via a proposed signalised junction. This option would require land take, including private lands and portions of gardens, residential off-street parking will not be affected. This includes woodland, treelines and grass verge along the entire route. Construction of this section would require removal of trees and hedgerows which currently provide visual and noise

screening for the M11. Replacement noise and visual mitigation would be incorporated into the proposed scheme. Retaining structures would be required along sections of this route. A cross-section on the new link road is presented in Figure 6.30.

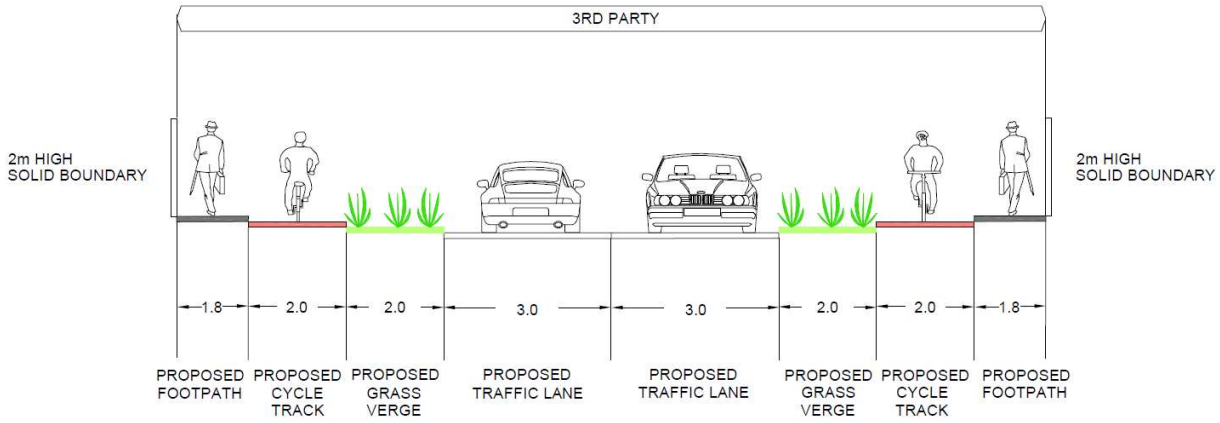


Figure 6.30 Cross Section D-D

6.2.6 Route Option 2E

Route Description

Route 2E is presented in Figure 6.21 and described in text following.

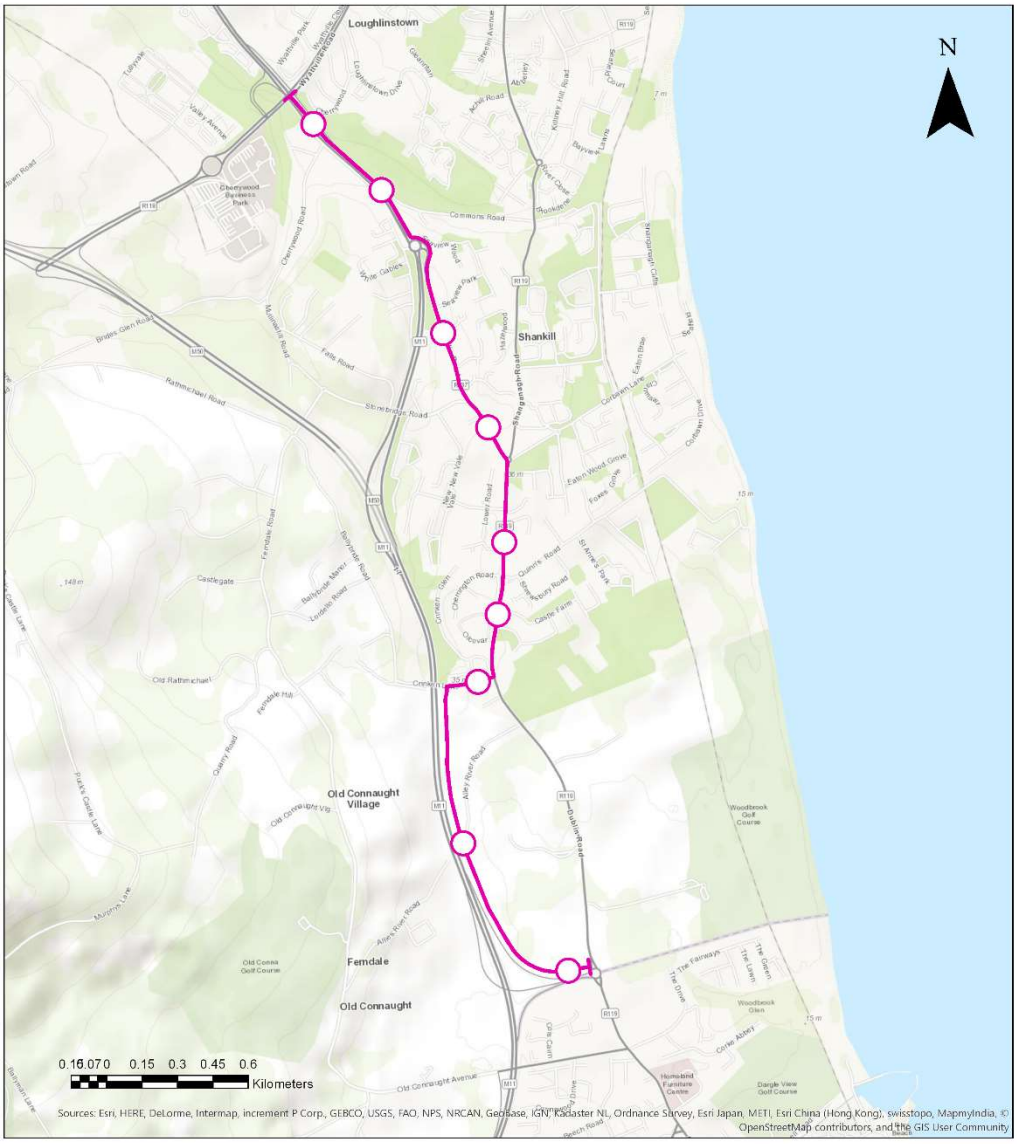


Figure 6.31 Route Option 2E

Inbound: Route 2E would commence at the Wilford junction and run east of and parallel to the M11 along a dedicated bus route, the bus turns onto Crinken Lane to join the Dublin Road and continue north through Shankill Village to the Loughlinstown Roundabout. From here the bus continues north along the N11 to reach the junction with Wyatteville Road.

Outbound: The outbound route would follow the same route as the inbound route.

Stops: A total of 8 bus stop would likely be provided in each direction.

Indicative Scheme Design

Figure 6.22 illustrates the indicative scheme design for this route option as well as the location of indicative cross-sections.

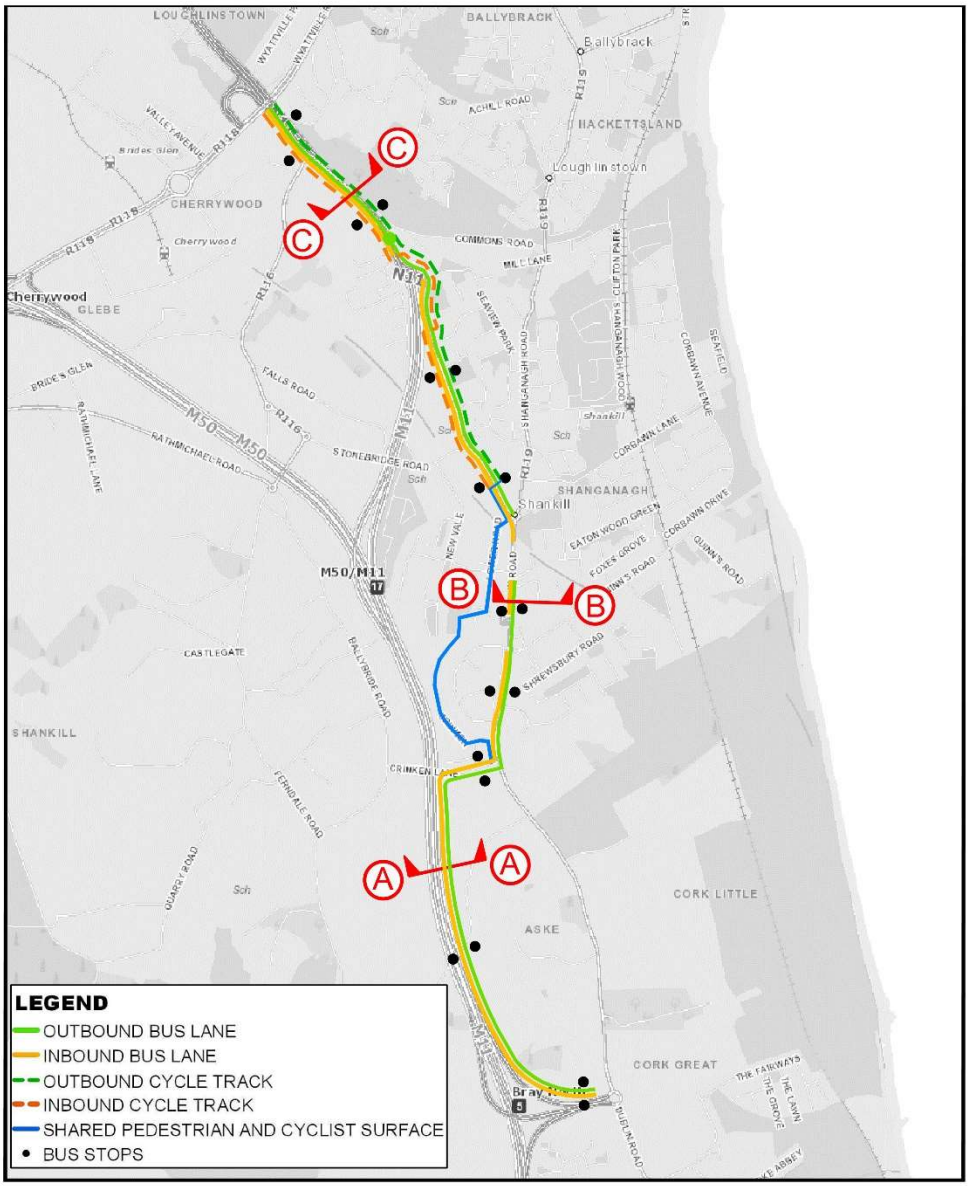


Figure 6.32 Route Option 2E Indicative Scheme Design

Scheme 2E would commence at the Wilford junction which would be upgraded to a signalised junction to provide bus priority. The route option would then travel north along a dedicated bus route crossing Allies River Road at grade, a cross section of this new road can be seen in Figure 6.32. The route would

continue north and rises to intersect Crinken Lane at grade. Crinken Lane would be widened to accommodate bus lanes in both directions.

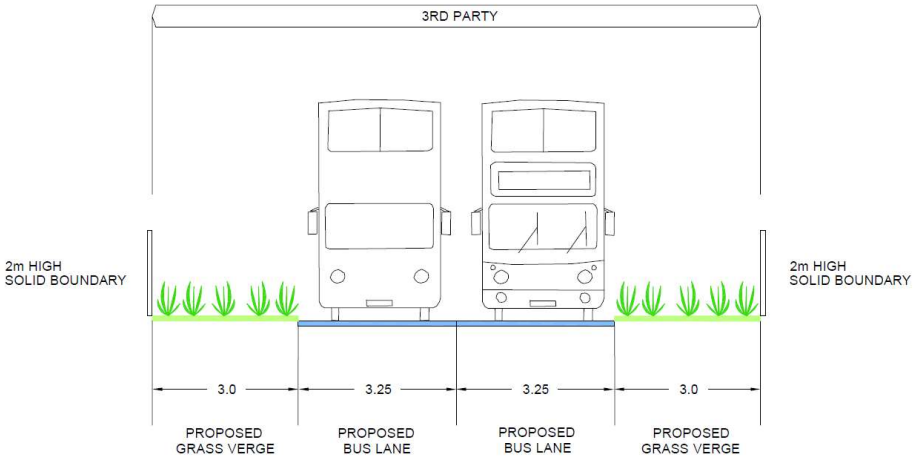


Figure 6.32 Cross Section A-A

Road widening and land acquisition in the form of portions of gardens and open green space, including trees and boundaries, would be required between the Crinken Lane and Quinn's Road junctions to provide bus lanes in both directions, residential off-street parking would not be affected. This route option includes an off-line cycle route to the west of the village which follows along Beech Road, Mountain View, and either Assumpta Park or Stonebridge Close, onto Lower Road and connects to Dublin Road. It would generally comprise cyclists sharing low volume, low speed roads. This cycle route would require land take in the form of private gardens.

It is proposed to upgrade the Quinn's Road roundabout to a signalised junction to improve pedestrian provision and also to incorporate traffic management measures to provide priority for northbound buses towards Shankill Village.

From Crinken Lane to Quin's Road junction it is proposed to widen the road to provide dedicated bus lanes in each direction. From here geometrical constraints mean that it is not practical to provide continuous bus lanes in both directions. Continuous bus lanes are proposed through Shankill Village for southbound buses and two sets of traffic lights and a length of northbound bus lane through the village would be used as part of a queue relocation system to provide priority for northbound buses. To the north of Shankill Village there is a narrow bridge over the old railway line and widening of this bridge is restricted by buildings on either side. For this 180m section buses would be required to merge with general traffic. A cross-section on the Dublin Road in Shankill Village is presented in Figure 6.19.

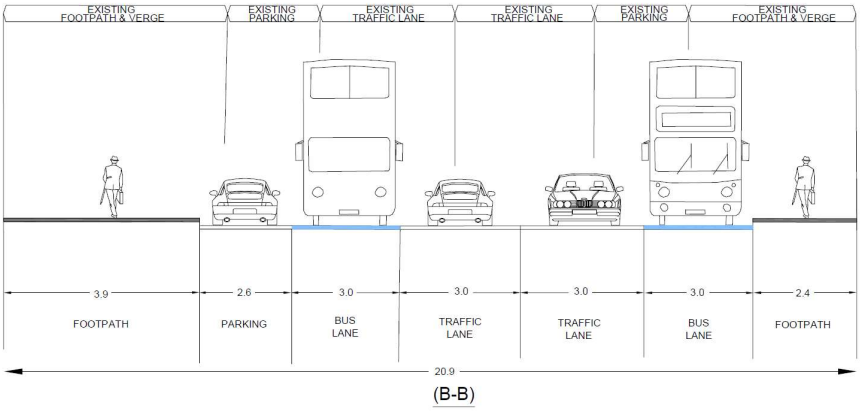


Figure 6.34 Cross Section B-B

Road widening between the Shanganagh Road junction and St. Anne's Resource centre to the north would be required to provide bus lanes and shared footpath/cycle paths along this section. This would require land take public green space and portions of gardens, residential off-street parking will not be affected. Land take would also be required from the grounds of St Anne's Church and their car park would need to be reconfigured in order to retain the same number of car parking spaces.

This option proposes to widen the Dublin Road between St. Anne's Resource Centre and Loughlinstown Roundabout to accommodate bus lanes in both directions. To facilitate this land take would be required, including portions of private gardens and open space. Cycle lanes would also be provided in each direction for the majority of this section, apart from on the northbound approach where cyclists would be crossed to the two-way cycle track on the eastern side of the road to enable them to safely bypass the Loughlinstown Roundabout before re-joining two-way cycle facilities on the N11. This would include an upgrade of the existing signal controlled junction at Stonebridge Road to provide priority for buses. Retaining structures would be required along sections of this route to provide for road widening.

On the southbound approach to the Loughlinstown Roundabout road widening would be required to extend the bus lane to and around the eastern side of the roundabout. This would require realignment of the existing road to provide clearance for buses under the existing footbridge. It is proposed to provide a dedicated bus lane on the northbound approach to the Wyattville junction. This would require reconfiguration of the existing Cherrywood Road signalised junction, as well as amending the existing service road running parallel to the N11 into a one-way northbound only route, with access from the north re-routed via Loughlinstown roundabout. A dedicated northbound cycle lane would be provided linking the Rathmichael Manor/Loughlinstown Hospital area to the existing segregated cycle facilities further north via shared use of the service road. A cross-section on the N11 is presented in Figure 6.20.

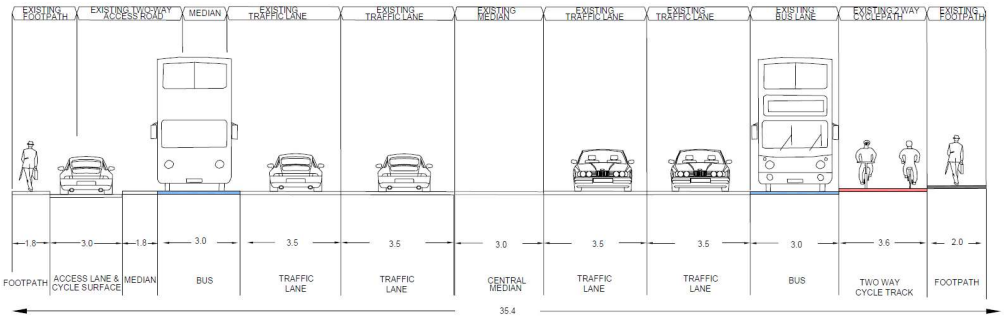


Figure 6.35 Cross Section C-C

6.2.7 Route Options Assessment

Details of the 'Stage 2' route options assessment undertaken for Section 2 are presented in **Appendix A**.

A summary of the ranking of route options against the scheme sub-criteria is presented in Table 6.6 below.

Table 6.6 Section 2 Route Options Assessment Summary (Sub-Criteria)

Assessment Criteria	Sub-Criteria	2A	2B	2C	2D	2E
Economy	Capital Cost					
	Journey-time reliability and quality of service					
Integration	Land Use Integration					
	Residential Population and Employment Catchments					
	Transport Network Integration					
	Cyclists and pedestrian Integration					
Accessibility and Social Inclusion	High volume trip attractors					
	Deprived Geographic Areas					
Safety	Road Safety					
Environment	Archaeological, Architectural and Cultural Heritage					
	Flora and Fauna					
	Soils and Geology					
	Hydrology					
	Landscape and visual					
	Noise, Vibration and Air					
	Land Use and the Built Environment					

In terms of Economy there are differences in the capital cost of each of the five schemes. Scheme 2A requires construction of a dedicated bus route including new retaining structures and junctions, and would require land take. Scheme 2B involves extensive widening of existing roads whilst Scheme 2C and 2E requires a combination of widening along the R119 Dublin Road and provision of a new dedicated bus link alongside the M11. Schemes 2B and 2C which utilise more existing roads compare slightly more favourably to Scheme 2A. Scheme 2D will require both extensive widening of existing roads and construction of a new link road and is therefore considered least favourably in terms of costs.

Scheme 2A, which provides dedicated bus lanes and priority at junctions, would result in significantly increased journey time reliability in comparison to Schemes 2B, 2D and 2E which incorporate traffic management measures to provide bus priority. Scheme 2C, incorporates a shorter section of dedicated bus route and is therefore slightly less preferable to Scheme 2A but slightly more preferable to Schemes 2B and 2D.

In terms of Integration Schemes 2A and 2E score comparatively worse than the alternative routes for Land Use Integration as they passes to the west of the area of the proposed Woodbrook-Shanganagh LAP. Schemes 2B, 2C, 2D run directly adjacent to this area and so score similarly on this category.

In terms of Population Catchment, Schemes 2B, 2D and 2E run through Shankill village and therefore serve a higher population than Schemes 2A and 2C which pass to the west.

In terms of Transport Network Integration Schemes 2B, 2C and 2E are considered more favourable as they pass close to either Shankill DART station and/or the proposed Woodbrook DART station and Park and Ride facility. Schemes 2A, 2C and 2E will also travel along a route identified as the proposed Luas line extension objective in the DLRCC 2016-2022 Development Plan. Route 2A is less favourable in comparison to Routes 2B and 2C as is passes west of Shankill and Woodbrook DART stations. Scheme 2D is considered least favourable, as the provision of a bus gate would result in significant diversion lengths and disruption for local traffic.

In terms of Cycle & Pedestrian Integration, Schemes 2B and 2D provide segregated cycle facilities for the most part, with an alternative cycle route to the west of Shankill for Scheme 2B and shared running for cyclists through the bus-gate for Scheme 2D. The sections of Schemes 2A, 2C and 2E running on dedicated bus routes would not include cycle facilities.

In terms of Accessibility & Social Inclusion Schemes 2B, 2D and 2E are considered favourable as they directly serve more high-volume trip attractors (Shankill Village) and deprived geographical areas while Schemes 2A and 2C pass further to the west.

In terms of Safety Scheme, 2A and parts of 2C and 2E provide a safe dedicated bus-only route and would reduce the number of buses using the Dublin Road. The integration of the bus-only route at the Wilford junction for option 2A and 2E would likely be complex. Widening of the carriageway for Routes 2B, 2C, 2D and 2E could result in increased vehicle speeds on the Dublin Road however, and provision of bus lanes through Shankill Village will result in wider crossing distances for pedestrians. On balance there is little to differentiate between the schemes in terms of Safety and as such score equally.

In terms of Environment Scheme 2A offers significant advantages over other schemes as the loss of immature woodland along the M11 is considered to be less significant when compared to the loss of stone boundary walls, tree lines, hedgerows and a large number of mature trees along the Dublin Road which are included within the Dun Laoghaire Rathdown County Development Plan 2016-2022 under the objective 'to protect and preserve trees and woodlands'. The land take required for Scheme 2A is also considered to be from lower amenity land than that required for the other schemes and this scheme will have no impact on Shankill Village. Scheme 2D is considered the least favourable as it combines all the negative environmental impacts of both Schemes 2B and 2C.

6.3 Conclusion – Study Area Section 2 Analysis

A summary of the assessment and a relative ranking for each of the five assessment criteria is shown in Table 6.7.

Table 6.7 Route Options Assessment Summary (Main Criteria)

Assessment Criteria	2A	2B	2C	2D	2E
Economy					
Integration					
Accessibility and Social Inclusion					
Safety					
Environment					

Based on the assessments above it has been determined that while not the most favourable from an environment perspective Scheme 2B offers the preferred route option for the following reasons:

- It has the lowest capital cost of the five schemes
- It has significant benefits in terms of integration, accessibility and social inclusion as it serves the catchment of Shankill, integrates with the DART and provides continuous cycle facilities
- While not the most preferable of the schemes under journey time reliability, it would still deliver a high level of service for bus passengers
- In terms of safety, the five schemes are considered equal

Scheme 2B is identified as the preferred option for Section 1 and is brought forward into the Emerging Preferred Route as described in Chapter 8.

Scheme 2A is the next preferred as it offers the best journey time reliability and has significant environmental benefits compared to the other schemes, however it has significant disbenefits in terms of integration.

6.4 Loughlinstown Roundabout Options Assessment

All of the route options for Section 2 pass through the Loughlinstown Roundabout. This section of the assessment process specifically looks at options for upgrading the roundabout to provide improved priority for buses in order to best meet the scheme objectives.

The options identified include:

- Option 1 - Retaining the priority controlled roundabout configuration (as existing) and providing a dedicated southbound bus lane running on the eastern side of the roundabout.
- Option 2 – As per Option 1, with the addition of a signalised pedestrian crossing of the N11 to the north of the roundabout.
- Option 3 – Upgrading the priority controlled roundabout to a signal controlled roundabout, with the exception of the minor Rathmichael Manor arm which would be retained as a priority controlled arm.

6.4.1 Loughlinstown Roundabout Option 1

Option 1 is presented in Figure 6.36 and described in text following.

Figure 6.36 Loughlinstown Roundabout Option 1

This option proposes retaining the existing priority controlled roundabout configuration and providing a dedicated southbound bus lane running on the eastern side of the roundabout. A physical barrier, such as kerbing, between the southbound bus lane and roundabout circulatory, would enable southbound buses to move through the roundabout unopposed. This would require locally realigning the N11 arm to achieve the cross section required under the footbridge. On the northbound approach, a bus lane would be provided to the roundabout, with buses having to yield priority to traffic on the circulatory as normal. All other approach arms would remain unchanged.

6.4.2 Loughlinstown Roundabout Option 2

Option 2 is presented in Figure 6.37 and described in text following.

Figure 6.37 Loughlinstown Roundabout Option 2

Similar to Option 1 this option proposes retaining the existing priority controlled roundabout configuration and providing a dedicated southbound bus lane running on the eastern side of the roundabout. A physical barrier, such as kerbing, between the southbound bus lane and roundabout circulatory, would enable southbound buses to move through the roundabout unopposed. This would require locally realigning the N11 arm to achieve the cross section required under the footbridge. On the northbound approach, a bus lane would be provided to the roundabout, with buses having to yield priority to traffic on the circulatory as normal. A signalised pedestrian crossing would be provided to the north of the roundabout, the benefit of which would include enhanced provision for pedestrians as they would not be forced to use the circuitous route across the footbridge, but also increased opportunity for northbound traffic, including buses, to enter the roundabout when the crossing is called, particularly in the evening peak when southbound movements between the N11 and M11 are particularly heavy and delay northbound buses entering the roundabout.

6.4.3 Loughlinstown Roundabout Option 3

Option 3 is presented in Figure 6.38 and described in text following.

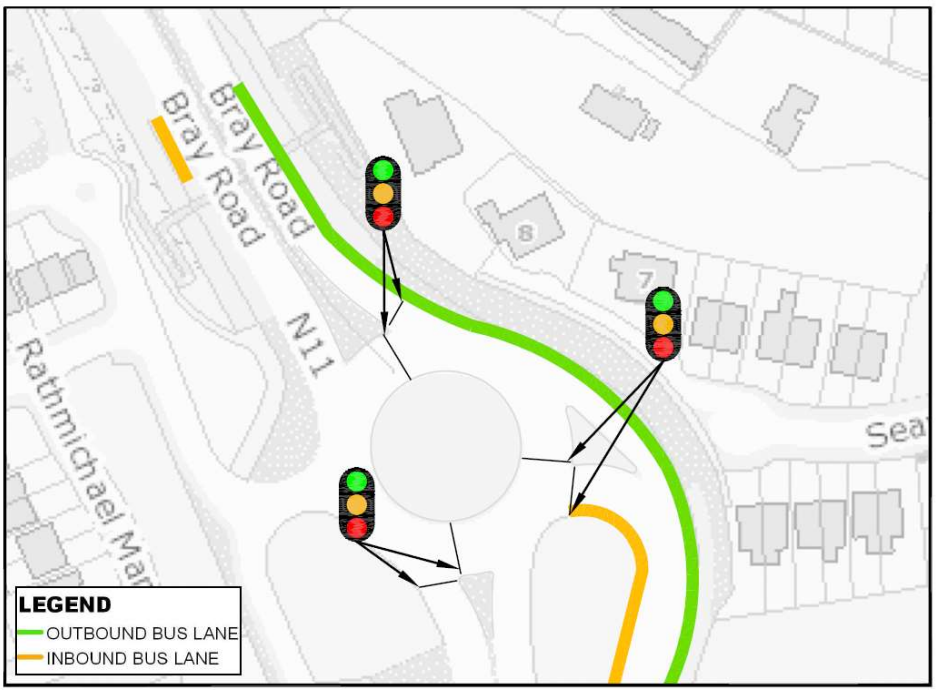


Figure 6.38 Loughlinstown Roundabout Option 3

This option proposes to upgrade the priority controlled roundabout to a signal controlled roundabout, with the exception of the minor Rathmichael Manor arm which would be retained as a priority controlled arm. Similar to Options 1 and 2 this option proposes providing a dedicated southbound bus lane running on the eastern side of the roundabout. A physical barrier, such as kerbing, between the southbound bus lane and roundabout circulatory, would enable southbound buses to move through the roundabout unopposed. This would require locally realigning the N11 arm to achieve the cross section required under the footbridge. On the northbound approach a bus lane would be provided to the roundabout.

Signal controlling the roundabout would provide increased priority for northbound buses, particularly in the evening peak when southbound movements between the N11 and M11 are particularly heavy and currently delay northbound buses entering the roundabout.

6.4.4 Loughlinstown Roundabout Option Assessment

Details of the Stage 2 options assessment undertaken for Loughlinstown Roundabout are presented in Appendix A.

A summary of the ranking of route options against the scheme sub-criteria is presented in Table 6.8 below.

Table 6.8 Loughlinstown Roundabout Options Assessment Summary (Sub-Criteria)

Assessment Criteria	Sub-Criteria	Option 1	Option 2	Option 3
Economy	Capital Cost			
	Journey-time reliability and consistency			
Integration	Land Use Integration			
	Residential Population and Employment Catchments			
	Transport Network Integration			
	Cyclists and pedestrian Integration			
Accessibility and Social Inclusion	High volume trip attractors			
	Deprived Geographic Areas			
Safety	Road Safety			
Environment	Archaeological, Architectural and Cultural Heritage			
	Flora and Fauna			
	Soils and Geology			
	Hydrology			
	Landscape and visual			
	Noise, Vibration and Air			
	Land Use and the Built Environment			

In terms of capital cost Options 1 and 2 are slightly preferable, with a higher cost associated with signalising the roundabout for Option 3. Option 2 which provides a signalised pedestrian crossing is preferable in terms of Cyclists and Pedestrian Integration. The results of the traffic modelling assessment demonstrated that Option 3 provides improved priority for buses whilst also reducing average journey times for other traffic. Option 3 is therefore preferable in terms of both journey-time reliability and transport network integration. In addition, the signalised option would remove the requirement for motorists to yield at the roundabout and this would lead to a decreased risk of collisions and so it scores higher on the “Safety” criterion.

Option 3 for Loughlinstown roundabout is therefore brought forward as part of the emerging preferred route.

7 STUDY AREA SECTION 3 – LOUGHLINSTOWN TO UCD

7.1 Stage 1: Route Options Assessment – Sifting Stage

This section outlines the options development process for Section 3 of the study area (Loughlinstown to UCD).

All roads within the study area are assessed on a high level for their ability to form part of a CBC. Route options are ruled out at this stage if they could clearly not form part of a CBC.

The 'spider's web' of links remaining after this initial phase is then progressed to Stage 1 for further analysis. The links brought forward are shown in Figure 7.1.

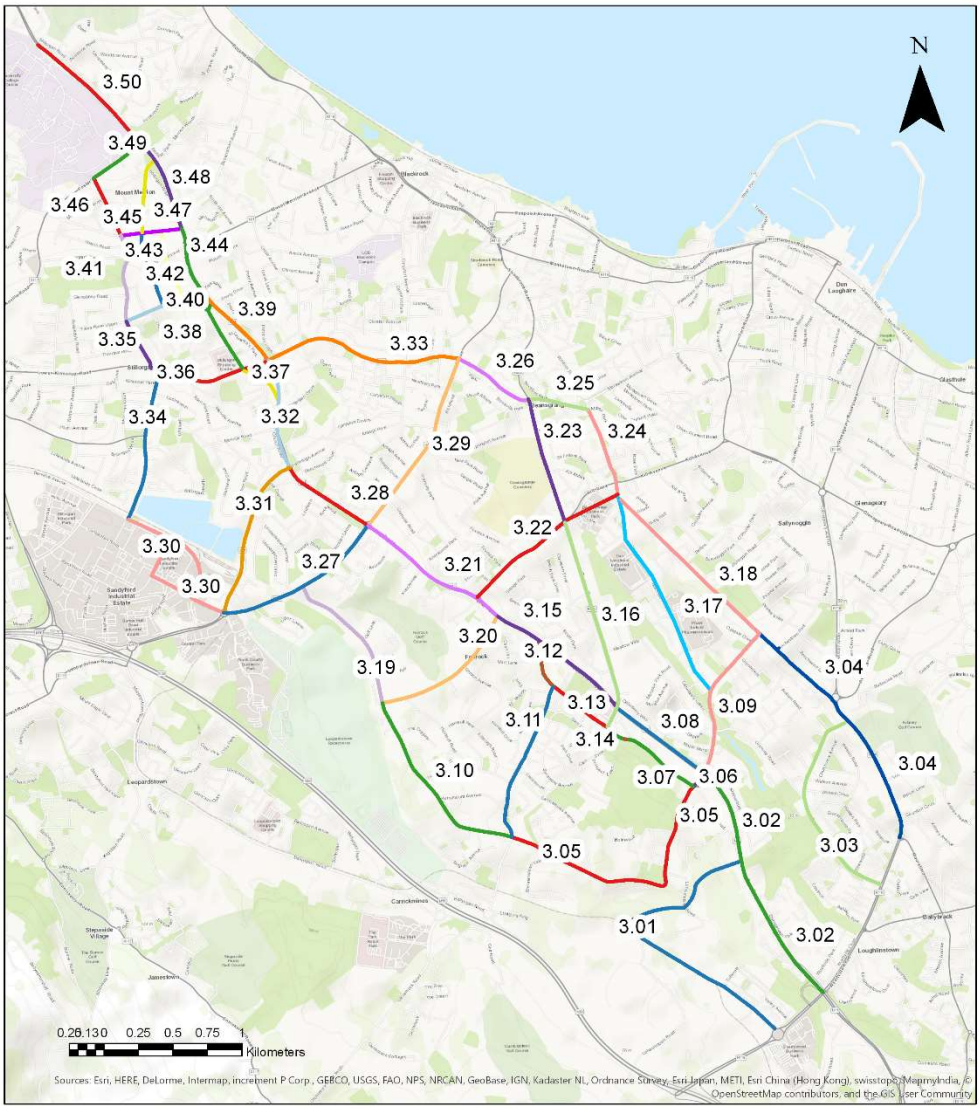


Figure 7.1 Section 3 Route Options – Loughlinstown to UCD

A summary of the Stage 1 is presented in Table 7.1 following.

Table 7.1 Section 3 Stage 1 Route Option Assessment (Sifting)Summary

Link Option No.	Road Name(s)	Comments	Pass / Fail
3.01	Proposed Road	Proposed road linking Cherrywood Strategic Development Zone, between a proposed junction with the N11 at Kilbogget and the Cherrywood Link Road. Construction of this link road would require land take from green fields as well as the purchase of a property adjacent to the N11. No cycle routes proposed by the GDA Cycle Network Plan run along this link. It is anticipated that facilities for buses could be provided on this link. While this link could serve the future population of the Cherrywood SDZ this link is not considered viable as any route options using this link would be circuitous in their route and this development will be well served by the Luas.	Fail
3.02	N11	This route consists of two vehicle lanes and one bus lane in each direction. Raised adjacent shared cycle tracks are provided on both sides of the road. The roadway width is 30m at the narrowest point including a grassed central median which has an approximate width of 8m. The overall reservation is in excess of 40m. Primary cycle route 12A of the GDA Cycle Network Plan runs along this link. Construction is feasible and this route forms part of an existing quality bus corridor and therefore passes the initial sift.	Pass
3.03	Churchview Road	This road provides an alternative route from Wyattville Road to Church Road. The road has one all-vehicle lane in each direction, as well as on road parallel parking on one side for the majority of the link. The road has an average carriageway width of 8.5m and an overall reservation of approximately 17m. Land take would require the removal of front and side gardens, trees, car parking spaces and green spaces. Secondary cycle route 13G of the GDA Cycle Network Plan runs along this link. This link fails as the scale of the works and the extent of the land take required would be excessive. In addition, there is a viable and more direct alternative route formed by links 3.04 & 2.14.	Fail
3.04	Church Road, Rochestown Avenue	This link stretches from the Johnstown Road to the Church Road junction adjacent to Killiney Golf Course. Rochestown Avenue consists of one all-vehicle lane in each direction with provision for right hand turning. Church Road, after the Graduate Roundabout, consists of one all-vehicle lane in each direction becoming two vehicle lanes in each direction, approaching Wyattville Road. The carriageway width at the narrowest location is 9m. Secondary cycle routes 13D and 13C of the GDA Cycle Network Plan run along parts of this link. In order to provide dedicates bus lanes, land take would require the removal of green spaces and portions of front gardens along Rochestown Avenue. Land take from front gardens or reassignment of road space could be used to provide bus lanes on Church Road. Development of this link	Pass

		would require the removal of trees located in the verge on either side of the road at various locations. This link has potential for the construction of a CBC and therefore passes the initial sift.	
3.05	Brennanstown Road	Located between Old Bray Road and Cornelscourt Hill Road. This road provides one all-vehicle lane in each direction. The carriageway width is approximately 6m at its narrowest location with an overall reservation of approximately 10m. A feeder cycle route as shown in the GDA Cycle Network Plan runs along a section of this link. Provision of dedicated bus lanes would require road widening and land take in the form of portions of front gardens and residential properties. A very large number of potentially significant trees would need to be removed. In addition, there is a low population density along this link and any CBC routes using it would be circuitous in nature. This link fails as the initial sift for the reasons outlined above.	Fail
3.06	Johnstown Road	Between the N11 and Cabinteely Village. The road width at its narrowest location is approximately 9m. A feeder cycle route as shown in the GDA Cycle Network Plan runs along a section of this link. In order to provide dedicated bus lanes, the land take would involve numerous properties adjacent to the Johnstown Road as well as front and side gardens. This link fails as the scale of the works and the extent of the land take required would be excessive.	Fail
3.07	Old Bray Road	Section between Clonkeen Road and Johnstown Road. This road consists of one all-vehicle lane in both directions. The road has a width of 7m at its narrowest point. No cycle routes proposed by the GDA Cycle Network Plan run along this link. Provision of dedicated bus lanes would require land take in the form of front gardens and green space from Cabinteely Park, on-street parking would also need to be removed along the link. There is a pinch point to the south of the link where provision of bus priority would require the acquisition of several properties. This link fails as the scale of the works and the extent of the land take required would be excessive.	Fail
3.08	N11	Continues on from link 3.02 Stillorgan Dual Carriageway. This road consists of two all-vehicle lanes and one bus lane in each direction. Raised adjacent shared cycle tracks are provided on both sides of the road. The roadway is in excess of 28m at the narrowest point including a grassed central median (5.0m). The overall reservation is in excess of 40m. It's unlikely that land take would be required to provide a CBC. Primary cycle route 12A of the GDA Cycle Network Plan runs along this link. Construction is feasible and this route forms part of an existing quality bus corridor and therefore passes the initial sift.	Pass

3.09	Johnstown Road	Between the N11 and Rochestown Avenue. This section of the road consists of one all-vehicle lane in each direction with provision made for right hand turns. The road has an overall reservation of 17m at its narrowest location Secondary cycle routes 13D and 13H of the GDA Cycle Network Plan run along this link. Development of this route would require the removal of trees on both sides of the road at various locations. Land take would mostly be from green spaces although some front gardens would also be affected. This link is suitable for the construction of a CBC and therefore passes the initial sift.	Pass
3.10	Brighton Road	Located between Brennanstown Road and Westminster Road. This road provides one all-vehicle lane in each direction. The carriageway width is approximately 6m at its narrowest location with an overall reservation of approximately 10m. No cycle routes proposed by the GDA Cycle Network Plan run along this link. Provision of dedicated bus lanes would require land take in the form of front gardens and several residential properties. This link fails as the scale of the works and the extent of the land take required would be excessive.	Fail
3.11	Cornelscourt Hill Road	Between Brighton Road and the Old Bray Road. The road consists of one all-vehicle lane in each direction. The carriageway width is approximately 7m at its narrowest location with an overall reservation of approximately 25m. Provision of dedicated bus lanes would require land take in the form of front/side gardens in places, as well as removal of trees from Kerrymount Green to Brennanstown Road. A feeder cycle route as shown in the GDA Cycle Network Plan runs along this link. Construction of CBC infrastructure is feasible on this link and so it passes the initial sift	Pass
3.12	Old Bray Road	Between Cornelscourt Hill Road and the N11. The carriageway width is 6.5m at its narrowest location with an overall reservation of approximately 12m. A feeder cycle route as shown in the GDA Cycle Network Plan runs along this link. Provision of dedicated bus lanes would require land take in the form of parking spaces and green spaces. There is a narrow section through Cornelscourt Village where the acquisition of several residences or commercial buildings would be required to provide bus priority. This link fails as the scale of the works and the extent of the land take required would be excessive.	Fail
3.13	Old Bray Road	Between Cornelscourt Hill Road and Clonkeen Road. This link consists of one all-vehicle lane in each direction. The road has a width of approximately 7m at its narrowest point. No cycle routes proposed by the GDA Cycle Network Plan run along this link. Provision of dedicated bus lanes would require land take in the form of front gardens along the whole length of the link. It is likely that residential parking in several of these gardens would be affected and it would be difficult to find suitable alternative parking	Fail

		This link fails as the scale of the works and the extent of the land take required would be excessive.	
3.14	Clonkeen Road	From N11 to Old Bray Road. This link consists of two all-vehicle lanes in each direction. There is a footpath and grass verge on each side. The average carriageway width is 14m and the reservation width is 27m. No cycle routes proposed by the GDA Cycle Network Plan run along this link. CBC could be constructed by using the existing grass verge or reassigning the existing road space Although construction is feasible this link fails the initial sift as any route option using this link would also need to use either link 3.13 or 3.07 (Old Bray Road) both of which have failed the initial sift as the scale of the works and the extent of the land take required would be excessive.	Fail
3.15	N11	Continues on from link 3.08 Stillorgan Dual Carriageway. This link consists of two all-vehicle lanes and one bus lane in each direction. Raised adjacent shared cycle tracks are provided on both sides of the road. The roadway is in excess of 27m at the narrowest point including a grassed central median (2.0m). The overall reservation is in excess of 37m. It's unlikely that land take would be required to provide a CBC. Primary cycle route 12A of the GDA Cycle Network Plan runs along this link. Construction is feasible and this route forms part of an existing quality bus corridor and therefore passes the initial sift.	Pass
3.16	Clonkeen Road	Between the N11 and Kill Lane. The road consists of one all-vehicle lane in each direction. The carriageway width is approximately 9m at its narrowest location with an overall reservation of 16m. Secondary cycle route 13C of the GDA Cycle Network Plan runs along this link. Provision of dedicated bus lanes in both directions would require land take in the form of greenspace and undesignated car parking. Development of this link would require the removal of trees on both sides of the road. Construction of CBC infrastructure is feasible on this link and so it passes the initial sift	Pass
3.17	Pottery Road	This road has been recently upgraded, it consists of one all-vehicle lane in each direction as well as segregated cycling/pedestrian facilities. The carriageway width is approximately 10m at its narrowest location and the total reservation is approximately 16m. In order to provide dedicated bus lanes land take would be required from green spaces, front/side gardens and car park spaces. Secondary cycle route 13H of the GDA Cycle Network Plan runs along this link. This link has potential for the construction of a CBC and therefore passes the initial sift.	Pass

3.18	Rochestown Avenue	Located between the junction with Johnstown Road and Kill Avenue. The road consists of one all-vehicle lane in each direction. There is a pinch point at the junction with Kill Ave where the carriageway width is approximately 7m with an overall reservation of 10m. Secondary cycle route 13D of the GDA Cycle Network Plan runs along this link. Development of this route would require the removal of trees on both sides of the road. Provision of dedicated bus lanes in both directions would require land take in the form of greenspace and front gardens. This route links 3.04 and 3.24 to form a coherent route along the East of the study area. This link has potential for the construction of a CBC and therefore passes the initial sift.	Pass
3.19	Torquay Road	Between Leopardstown and Brighton Road. This road provides one all-vehicle lane in each direction. The road has a total reservation of 10m, at its narrowest location. No cycle routes proposed by the GDA Cycle Network Plan run along this link. Provision of dedicated bus lanes would require significant road widening and land take in the form of front gardens for the whole length of the link, in addition there is low population density along this route. This link fails as the scale of the works and the extent of the land take required would be excessive.	Fail
3.20	Westminster Road	Between the N11 and Torquay road. This road consists of one all-vehicle lane in each direction. The carriageway width is approximately 7m, with a reservation of 11m at the narrowest location. A feeder cycle route as shown in the GDA Cycle Network Plan runs along this link. Provision of dedicated bus lanes would require significant road widening and land take in the form of front gardens for the whole length of the link, in addition there is low population density along this route. This link fails as the scale of the works and the extent of the land take required would be excessive.	Fail
3.21	N11	Directly follows Link 3.15. This link consists of two vehicle lanes and one bus lane in each direction. The roadway is approximately 26m wide at its narrowest location, including a central grass median. The overall reservation is approximately 40m. It's highly unlikely that any land take would be required to provide a CBC. Development of this route would require the removal of trees. Primary cycle route 12 of the GDA Cycle Network Plan runs along this link. Construction is feasible and this route forms part of an existing quality bus corridor and therefore passes the initial sift.	Pass

3.22	Kill Lane	Between the N11 Stillorgan Road and Kill Avenue. This road consists of one all-vehicle lane in both directions. The road has a reservation width of 16m at the narrowest point. The carriage width is approximately 10m at this location. Secondary cycle route S06 of the GDA Cycle Network Plan runs along part of this link. Provision of dedicated bus lanes in both directions would require land take in the form of front gardens and greenspace. Development of this route would require the removal of trees in verges and front gardens Construction of CBC infrastructure is feasible on this link and so it passes the initial sift	Pass
3.23	Deans Grange Road	Between Stillorgan Park Road and Kill Lane. This road provides one all-vehicle lane in each direction. The carriageway is approximately 9m wide with an overall road reservation of 13m at the narrowest point. Secondary cycle route 13C of the GDA Cycle Network Plan runs along this link. There are numerous dwellings on this road and a large cemetery. There is a narrow section alongside Deansgrange Cemetery where provision of bus lanes would require purchase of a row of residential houses or encroachment into the cemetery. This link fails as the scale of the works and the extent of the land take required would be excessive and road widening is severely constrained by the cemetery.	Fail
3.24	Abbey Road	Between Kill Lane and the Abbey Road roundabout. This link consists of one all-vehicle lane in each direction with provision for right turning vehicles. The road widens upon approaching the roundabout junction. Secondary cycle route 13H of the GDA Cycle Network Plan runs along this link. The road has a reservation width of 16m at the narrowest point. Development of this route would require the removal of trees. Provision of dedicated bus lanes would require land take from front gardens. The large roundabout to the north would likely need to be converted to a signalised junction. Road widening is limited at Baker's Corner junction as building lines are close to the street and traffic management measures would be required to provide bus priority here This link has potential for the construction of a CBC and therefore passes the initial sift.	Pass
3.25	Stradbrook Close	Linking the Abbey Road junction to Brookville Park. This road consists of one all-vehicle lane in both directions. The road has a carriageway width of 10m and a reservation width of 20m at the narrowest point. Primary cycle route S05 of the GDA Cycle Network Plan runs along this link. Development of this route would require the removal of trees but would not require any private land take. This link has potential for the construction of a CBC and therefore passes the initial sift.	Pass

3.26	Rowanbyrn Road	Between the eastern end of Newtownpark Avenue and Deans Grange Road. This link consists of one all-vehicle lane in each direction. The road widens after the turn off for Rowanbyrn in the south bound direction, into a 2+1 carriageway as far as Deans Grange Road. The road has a reservation width of 20m at the narrowest point. Primary cycle route S05 of the GDA Cycle Network Plan runs along this link. Road widening to provide dedicated bus lanes would require land take from gardens in places and also from Newpark school. An outbuilding associated with the Newpark Sports complex would be affected by the works This link has potential for the construction of a CBC and therefore passes the initial sift.	Pass
3.27	Leopardstown Road	Between the N11 and Burton Hall Road. This link consists of one all-vehicle lane in each direction with provision for right turning vehicles. The eastbound lane increases to three lanes on approach to the N11. The carriageway is approximately 10m wide at its narrowest location and has a reservation of 17m. Secondary cycle route S06 of the GDA Cycle Network Plan runs along this link. Provision of dedicated bus lanes would require land take from some front gardens in places. Development of this route would require the removal of trees on both sides of the road at various locations. This link has potential for the construction of a CBC and therefore passes the initial sift.	Pass
3.28	N11	Directly follows Link 3.21. This link consists of two all-vehicle lanes and one bus lane in each direction. Raised adjacent shared cycle tracks are provided on both sides of the road. The carriageway is approximately 26m wide at its narrowest location, including a grass central median. The overall reservation is approximately 40m. It's highly unlikely that any land take would be required to provide a CBC. Primary cycle route 12 of the GDA Cycle Network Plan runs along this link. Construction is feasible and this route forms part of an existing quality bus corridor and therefore passes the initial sift.	Pass
3.29	Newtown Park Avenue	Between the N11 Stillorgan Road and Fleurville Road. This link consists of one all-vehicle lane in each direction. The road has a reservation width of 15m at the narrowest point. Secondary cycle route S06 of the GDA Cycle Network Plan runs along this link. Provision of dedicated bus lanes would require land take in the form of front gardens along the whole length of the link. Residential parking may be affected in some of these gardens and it would be difficult to find suitable alternative parking. Development of this route would require the removal of trees on both sides of the road. There is a pinch point at the northern end of the link and providing bus priority here would require purchase of buildings and/or turning movement restrictions. This link fails as the scale of the works and the extent of the land take required would be excessive.	Fail

3.30	Burton Hall Road and Blackthorn Avenue	Burton Hall Road has a carriageway width of 7m at its narrowest location. There is a significant footpath and grass verge on both sides of the road with a total reservation of 23m. Provision of a dedicated bus lane would require minimal land take in the form of the grass verge on both sides of the road. Development of this link would require the removal of trees on both sides of the road. Secondary cycle route S06 of the GDA Cycle Network Plan runs along most of this link. The rest of the link runs along a feeder cycle route. . Blackthorn Avenue has a carriage width of 8.9m at its narrowest location. The road consists of two one-way all-vehicle lanes travelling southbound only to Burton Hall Road. Sandyford Luas line runs adjacent to Blackthorn Avenue. Development of this route would require the removal of trees on this road across from the Luas line. Provision of a dedicated bus lane would require minimal land take in the form of the grass verge on both sides of the road. Blackthorn Road links Burton Hall Road to Blackthorn Avenue. Traffic flows in both directions on a 2+1 road becoming a 3+1 road at the junction with Blackthorn Avenue. It is 9m wide at its narrowest location. Prior to Carmanhall Junction, heading northbound, there is a grass verge and footpath providing a combined width of 11m. Development of this route would require the removal of trees on both sides of the road. Provision of dedicated bus lanes would require minimal land take on all three roads. This link is suitable for the construction of a CBC and therefore passes the initial sift.	Pass
3.31	Brewery Road	Between the N11 and Leopardstown Road. This link consists of one all-vehicle lane in each direction. The eastbound lane increases to two lanes on approach to Leopardstown Avenue and three lanes on the approach to the N11. The carriageway width is approximately 10m wide at its narrowest location, with a total reservation of approximately 16m. Secondary cycle route S06 of the GDA Cycle Network Plan runs along this link. Although construction is feasible with land take, this link fails the initial sift as it could only form part of circuitous routes when combined with adjoining links.	Fail
3.32	N11	Continues on from link 3.28 Stillorgan Dual Carriageway. The N11 (Stillorgan Road) consists of two all-vehicle lanes and one bus lane in each direction. Raised adjacent shared cycle tracks are provided on both sides of the road. The carriageway width is 26m at the narrowest point including a grassed central median (4.5m). The overall reservation is in excess of 30m. It's unlikely that land take would be required to provide a CBC. Primary cycle route 12 of the GDA Cycle Network Plan runs along this link. Construction is feasible and this route forms part of an existing quality bus corridor and therefore passes the initial sift.	Pass

3.33	Stillorgan Park Road, Fleurville, Annaville Terrace	Stillorgan Park Road consists of one all-vehicle lane in each direction. There is a wide central median throughout the link which provides for right turning vehicles. The road has a reservation width of 20m at the narrowest point. Primary cycle route S05 of the GDA Cycle Network Plan runs along this link. Development of this section would require the removal of trees on both sides of the road at various locations and some land take There is a significant pinch point on Fleurville where building lines are close to the street for a 140m length. Widening of the road to provide dedicated bus and cycle lanes would require the purchase of three houses here. Alternative schemes could involve a cyclist detour and/or traffic management measures This link passes the initial sift despite the significant constraints as it provides a direct link between Link 3.26 (Rowanbyrn) and Link 3.39 (N11) and facilitates a number of viable route options to the east of the study area.	Pass
3.34	Kilmacud Road Upper, St Raphael's Road	The southern end of the link consists of two all-vehicle lanes and a bus lane in the outbound direction and one all-vehicle lane in the inbound direction. This southern end of the road has a reservation of 25m. Secondary cycle route S06 of the GDA Cycle Network Plan runs along this link. The northern end of the link consists of one all-vehicle lane in the outbound direction and one vehicle and one bus lane in the inbound direction. This end of the road has a reservation of 16.5m at its narrowest point. Provision of dedicated bus lanes in both directions would require minor land take (removal of front gardens and greenspace). This link has potential for the construction of a CBC and therefore passes the initial sift.	Pass
3.35	South Avenue	The road consists of one all-vehicle lane in each direction with a total carriageway width of 7m and a reservation of 18m. Development of this link would require the removal of trees on both sides of the road at various locations. Provision of dedicated bus lanes would require a minimal amount of land take (front gardens) to provide a CBC. Primary cycle route S05 of the GDA Cycle Network Plan runs along part of this link. A feeder cycle route runs along the rest of the link. This link has potential for the construction of a CBC and therefore passes the initial sift	Pass
3.36	Lower Kilmacud Road	From the N11 Stillorgan Road to South Avenue. The western end of the link consists of one all-vehicle lane in each direction and has a reservation width of 15m. Provision of dedicated bus lanes in both directions would require land take from front gardens. The eastern end of the route consists of two wide all-vehicle lanes in each direction. The eastern end has a reservation width of 20m and would not require land take for bus priority lanes. Development of this route would require the removal of trees, on green sites near to Stillorgan Shopping Centre. Primary cycle route S05 of the GDA Cycle Network Plan runs along this link. Restrictions on right turning movements would likely be required. This link has potential for the construction of a CBC and therefore passes the initial sift.	Pass

3.37	The Hill	Between the N11 and Lower Kilmacud Road. The southern end of the road is one way coming off the N11 (inbound only). The northern end of the road consists of one all-vehicle lane in each direction. The road has a reservation of 12m. There is designated on-street parking on the eastern side of the road. The provision of a dedicated bus lane in the northbound direction would require land take (removal of front gardens and car parking). It is unfeasible to provide an outbound bus priority lane due to the one-way road layout exiting the N11. No cycle routes proposed by the GDA Cycle Network Plan run along this link. This link fails the initial sift as it is not feasible to provide a northbound bus lane	Fail
3.38	Old Dublin Road	From Lower Kilmacud Road to the N11 Stillorgan Road. The northern end of the link consists of one all-vehicle lane in each direction. It has a narrow reservation width of 11m. Provision of dedicated bus lanes would require a large amount of land take from Oatlands College, Stillorgan College of Further Education and adjacent properties. The southern end of the road consists of three outbound vehicle lanes and one inbound vehicle lane. No cycle routes proposed by the GDA Cycle Network Plan run along this link. Provision of dedicated bus lanes would require some land take from gardens. This link has potential for the construction of a CBC and therefore passes the initial sift.	Pass
3.39	N11	Directly follows Link 3.32. This route consists of two vehicle lanes and one bus lane in each direction. Raised adjacent shared cycle tracks are provided on both sides of the road. The roadway is 22m at the narrowest point including a grassed central median (4.5m). The overall reservation is in excess of 28m. It's unlikely that land take would be required to provide a CBC. Primary cycle route 12 of the GDA Cycle Network Plan runs along this link. Construction is feasible and this route forms part of an existing quality bus corridor and therefore passes the initial sift.	Pass
3.40	Trees Road Lower	From the Stillorgan Road to South Avenue. This road consists of one all-vehicle lane in each direction. The carriageway is approximately 11m wide with an overall roadway reservation of 15m at the narrowest point. No cycle routes proposed by the GDA Cycle Network Plan run along this link. Provision of dedicated bus lanes would require significant land take from removal of front gardens. There are on-street residential car parking spaces along the majority of the road and these would need to be removed. A number of gardens along this link would also be reduced to the extent that parking would no longer be possible, and it would prove difficult to find suitable alternative parking. This link fails as the scale of the works and the extent of the impact on residential parking is considered excessive	Fail

3.41	South Avenue	Between Greenfield Road and Trees Road Lower. The southern end of the section has a total reservation of 18m and will only require minor land take. A feeder cycle route as shown in the GDA Cycle Network Plan runs along this link. Development of this route would require the removal of trees on both sides of the road with a large number of trees located across from the Church of St Therese. The northern end of the road consists of one all-vehicle lane in each direction with a total carriageway width of 6.5m and a reservation of 10.6m. Provision of dedicated bus lanes would require land take in the form of greenspace from Deer Park. This link has potential for the construction of a CBC and therefore passes the initial sift.	Pass
3.42	The Rise	The road consists of one all-vehicle lane in each direction. The carriageway width is 11m with undesignated residential parking on both sides of the road. No cycle routes proposed by the GDA Cycle Network Plan run along this link. The overall reservation is 15.5m wide. Provision of dedicated bus lanes would require land take in the form of front/side gardens. There are on-street residential car parking spaces along the majority of the road and these would need to be removed. A number of gardens along this link would also be reduced to the extent that parking would no longer be possible, and it would prove difficult to find suitable alternative parking. This link fails as the scale of the works and the extent of the impact on residential parking is considered excessive	Fail
3.43	Sycamore Road	The road consists of one all-vehicle lane in each direction. The carriageway width is 10.2m with undesignated residential parking on both sides of the road. The overall reservation is 15m wide at its narrowest point. No cycle routes proposed by the GDA Cycle Network Plan run along this link. Provision of dedicated bus lanes would require land take in the form of car parking spaces and front gardens. The removal of mini roundabouts and small sections of greenspace would also be required. There are on-street residential car parking spaces along the majority of the road and these would need to be removed. A number of gardens along this link would also be reduced to the extent that parking would no longer be possible, and it would prove difficult to find suitable alternative parking. This link fails as the scale of the works and the extent of the impact on residential parking is considered excessive	Fail
3.44	N11	Directly follows link 3.39. This route consists of two vehicle lanes and one bus lane in each direction. Raised adjacent cycle tracks and footpaths are provided on both sides of the road. The carriageway is 24m at the narrowest point including a grassed central median. The overall reservation is in excess of 33m. It's unlikely that land take would be required to provide a CBC. Primary cycle route 12 of the GDA Cycle Network Plan runs along this link. Construction is feasible and this route forms part of an existing quality bus corridor and therefore passes the initial sift.	Pass

3.45	Greenfield Road	From the Stillorgan Road to North Avenue. This road consists of one all-vehicle lane in each direction. The eastbound lane increases to two lanes on the approach to the Stillorgan Road junction. The carriageway is approximately 10m wide and an overall roadway reservation of 15m at the narrowest point. There are undesignated car parking spaces along both sides of the road. The road only provides local access and does not provide access to the N11. No cycle routes proposed by the GDA Cycle Network Plan run along this link. Provision of dedicated bus lanes would require land take from front gardens as well as greenspace at the eastern end to provide access to the Stillorgan road. It would also result in the removal of a large amount of residential car parking spaces This link is a cul de sac and would require land take and construction of a new junction with the N11 to convert to a connected bus route. This link fails as the scale of the works and impact on residential parking required would be excessive.	Fail
3.46	North Avenue	Between Greenfield Road and Foster's Avenue. The road consists of one all-vehicle lane in each direction. The northern section between St. Thomas Road and Foster's Avenue has a carriageway width of 7m and an overall reservation of 11m. Provision of dedicated bus lanes would require land take from front gardens or implementation of traffic management measures to provide bus priority. Between St. Thomas Road and Greenfield Road, the overall road reservation widens out to 26m, with 5m lanes separated by a 4m wide central reserve. There is undesignated on-street parking on both sides of the road. Development of this route would require the removal of trees on both sides of the road and/or along the central median on North Avenue. A feeder cycle route as shown in the GDA Cycle Network Plan runs along this link. This link has potential for the construction of a CBC and therefore passes the initial sift.	Pass
3.47	The Rise	Consists of one all-vehicle lane in each direction. The carriageway width is 10m with undesignated residential parking on both sides of the road. The overall reservation is 14m wide. Provision of dedicated bus lanes would require land take in the form of front/side gardens. No cycle routes proposed by the GDA Cycle Network Plan run along this link. As a number of the driveways are short, and there is no space for re-designation of parking spaces, this route fails the initial sift.	Fail
3.48	N11	Directly follows Section 3.44. This link consists of two all-vehicle lanes and one bus lane in each direction. Raised adjacent cycle tracks and footpaths are provided on both sides of the road. The roadway is 26m at the narrowest point including a grassed central median. The overall reservation is in excess of 37m. It's unlikely that land take would be required to provide a CBC. Primary cycle route 12 of the GDA Cycle Network Plan runs along this link. Construction is feasible and this route forms part of an existing quality bus corridor and therefore passes the initial sift.	Pass

3.49	Foster's Avenue	From North Avenue to the N11. This link consists of one all-vehicle lane in each direction. The eastbound lane increases to two lanes on the approach to the Stillorgan Road junction. The carriageway is approximately 7.5m wide with an overall roadway reservation of 20m at the narrowest point. Development of this route would require the removal of trees on both sides of the road at various locations. Primary cycle route S04 of the GDA Cycle Network Plan runs along this link. This link has potential for the construction of a CBC and therefore passes the initial sift.	Pass
3.50	N11	Stillorgan Road directly adjacent the UCD campus. This link consists of two all-vehicle lanes and one bus lane in each direction. Raised adjacent cycle tracks and footpaths are provided on both sides of the road. The roadway is 26m at the narrowest point including a grassed central median. Primary cycle route 12 of the GDA Cycle Network Plan runs along this link. Construction is feasible and this route forms part of an existing quality bus corridor and therefore passes the initial sift.	Pass

Following the Stage 1, 29 of the 50 route options assessed passed the initial sifting stage and are progressed to the next assessment stage. These route options are presented in Figure 7.2.

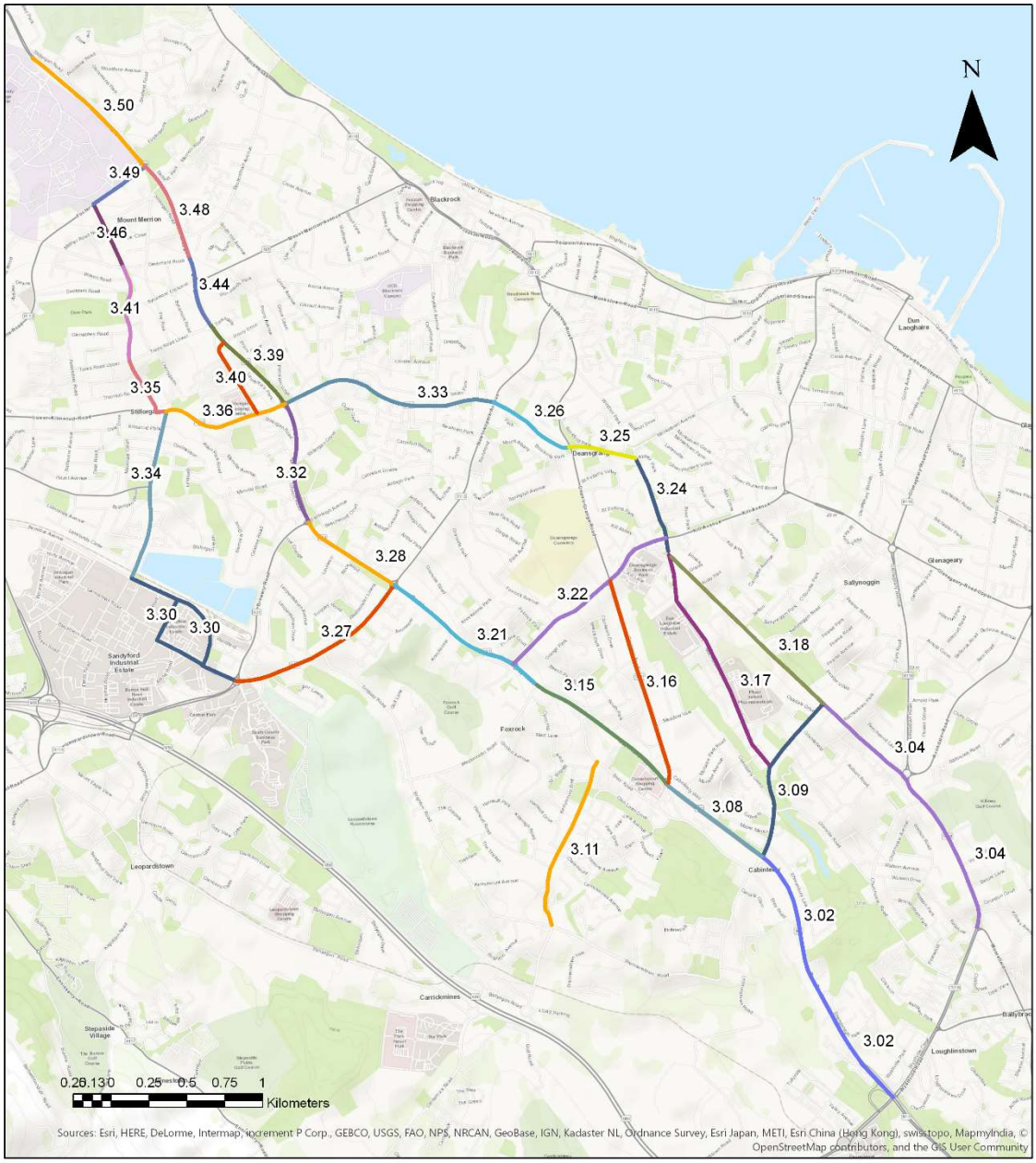


Figure 7.2 Section 3 Route Options Remaining After Stage 1 Assessment

7.2 Stage 2 – Route Options Assessment

7.2.1 Introduction

Following the Stage 1 assessment the remaining 29 routes were assembled together to form four viable route options for Section 3, these are shown in Figure 7.3.

- Route 3A – which would run along the N11 between Wyattville Road and Leopardstown Road before routing through the Sandyford Industrial Estate, Mount Merrion and onto the N11 via Fosters Avenue to its termination at UCD.

- Route 3B – which would run along the N11 for the full extent between Wyattville Road and UCD.

- Route 3C – which would run along the N11 between Wyattville Road and Johnstown Road before routing via Pottery Road, Abbey Road, Rowanbyrn, Fleurville and Stillorgan Park Road before re-joining the N11. The bus would then continue along the N11 until it reaches UCD.

- Route 3D - which would run via Wyattville Road (Link 2.16 from Section 2), Church Road, Rochestown Ave, Abbey Road, Brookville Park, Rowanbyrn, Annavile Terrace, Fleurville and Stillorgan Park Road before joining the N11, the bus would then continue along the N11 until it reaches UCD (This route uses link 2.16 which passed the initial sift in Section 2).

The following Links passed the initial sift but did not form part of any of the route options brought forward to the Stage 2 Assessment; Links 3.11, 3.16, 3.22, 3.36, 3.40 and the northern half of 3.09. This is either because they could not form part of a continuous route or that they could only form part of routes that would be circuitous in their nature when compared to the four route options discussed above.

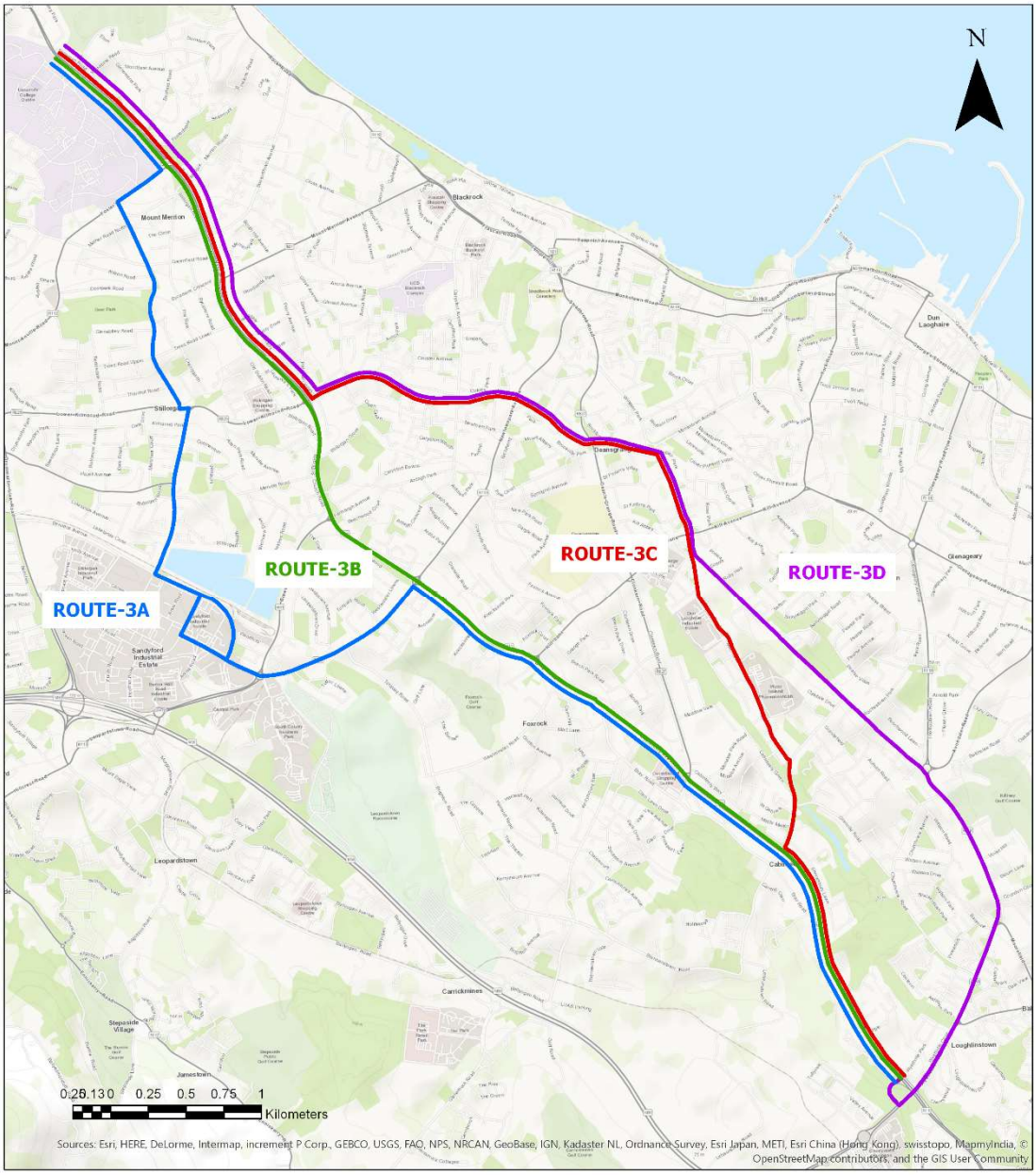


Figure 7.3 Section 3 Route Options

7.2.2 Route Option 3A – N11/Sandyford/Mount Merrion

Route Description

Route 3A is presented in Figure 7.4 and described in text following.

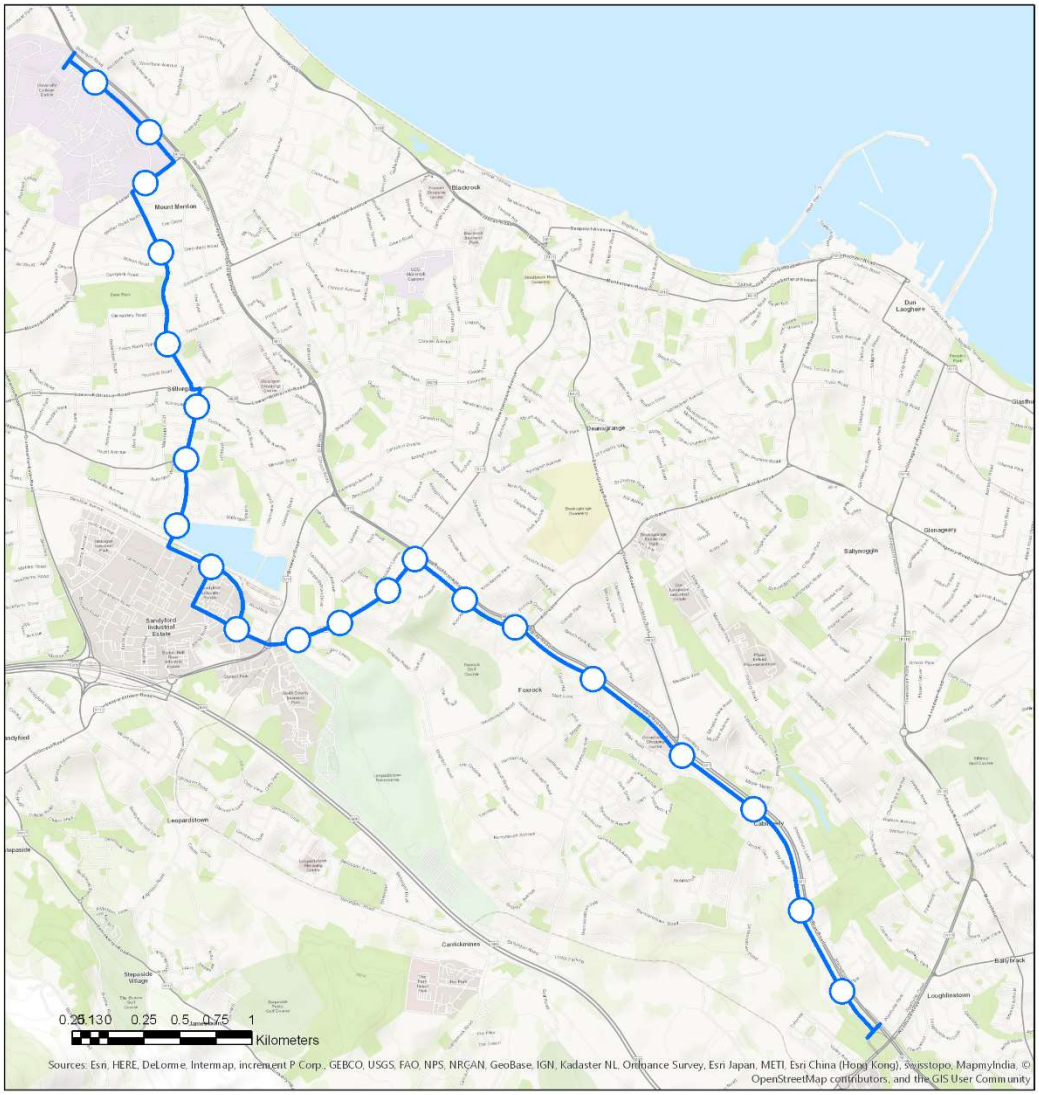


Figure 7.4 Route Option 3A

Inbound: Scheme 3A would begin at the junction of Wyattville road and the N11. The bus would then continue up the N11 for 4.8 km until it takes a left turn onto Leopardstown Road, the bus would then continue along Burton Hall Rd, Blackthorn Ave, St Raphael's Road, South Ave, North Ave and Foster's Ave before it re-joins the N11 and the scheme terminates outside of UCD.

Outbound: The outbound buses would follow the same route as inbound with the exception of Sandyford Industrial Estate where they would follow the one-way routing on Blackthorn Ave rather than Burton Hall Road.

Stops: A total of 23 bus stops would likely be provided in each direction along this route option.

Indicative Scheme Layout

Figure 7.5 illustrates the indicative scheme design for this route option as well as location of indicative cross-sections.

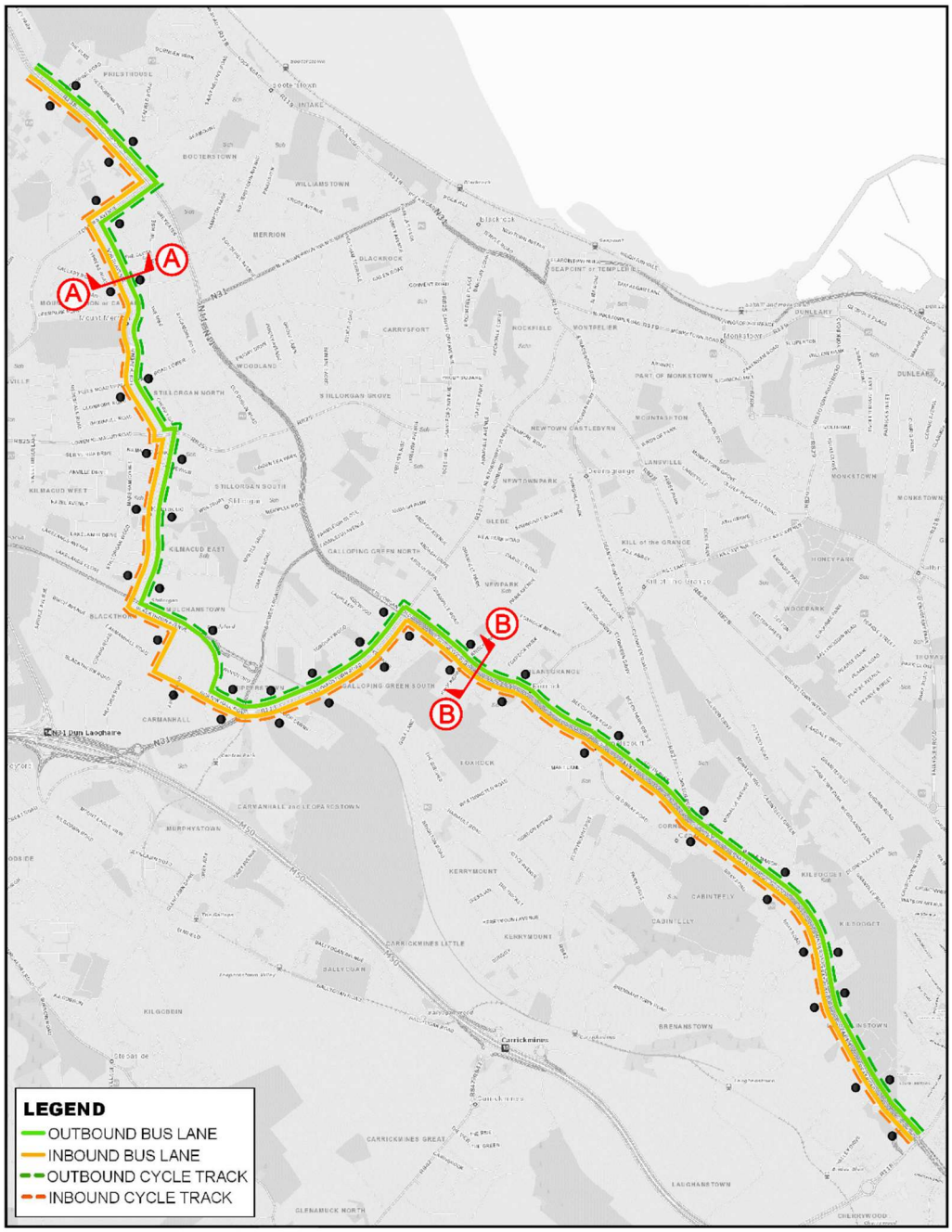
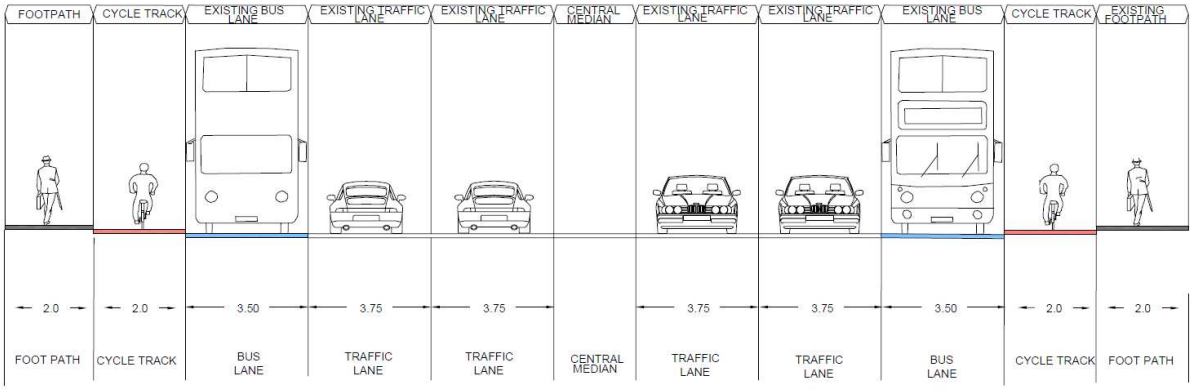


Figure 7.5 Route 3A Indicative Scheme Design

The N11 currently provides dedicated bus lanes between Wyattville Road and Leopardstown Road, segregated cycle tracks and footpaths are also provided along most this section. It is proposed to provide continuous footpath and cycle tracks along the route and upgrade and enhance existing facilities where required. This would include provision of footpaths parallel to the N11 between the Old Bray Road (south of Cabinteely) and Westminster Road junctions, where pedestrians are currently forced to share with cyclists or use alternative, and sometime circuitous, off-line routes. It is proposed to provide upgrades to signal controlled crossings at junctions along this section to facilitate right-turning cyclists as well as providing new toucan crossings at Cornelscourt and Knocksinna to improve pedestrian and cycle integration.



(B-B)

Figure 7.6 Section B-B

The majority of Leopardstown Road has three lanes (alternating two lanes in one direction), it is assumed one of these lanes would be converted to a bus lane. Road widening with land take from portions of front gardens and public green spaces would still be required on Leopardstown Road to provide dedicated bus and cycle lanes in both directions, residential off-street parking will not be affected. Development of this route would require the removal of trees on both sides of the road at various locations. Secondary cycle route S06 of the GDA Cycle Network Plan runs along this link.

Provision of a dedicated bus lane along Burton Hall Road and Blackthorn Avenue would require minimal land take in the form of the grass verge on both sides of the road. Development of this link would require the removal of trees on both sides of the road.

An outbound bus lane is provided along the majority of St. Raphael's Road and one of the two inbound lanes would be converted to a bus lane with minimal land take required. Similarly, an inbound bus lane is provided along Kilmacud Road Upper and land take in the form of portions of front and side gardens would be required to provide dedicated bus and cycle lanes in both directions, residential off-street parking will not be affected.

Land take in the form of front gardens would be required along South Avenue and also along North Avenue where greenspace and lands from the Mount Merrion Business Centre and St. Teresa's school, including a number of trees on both side of the route, would also be required. On-street parking would be removed but residential off-street parking would not be affected

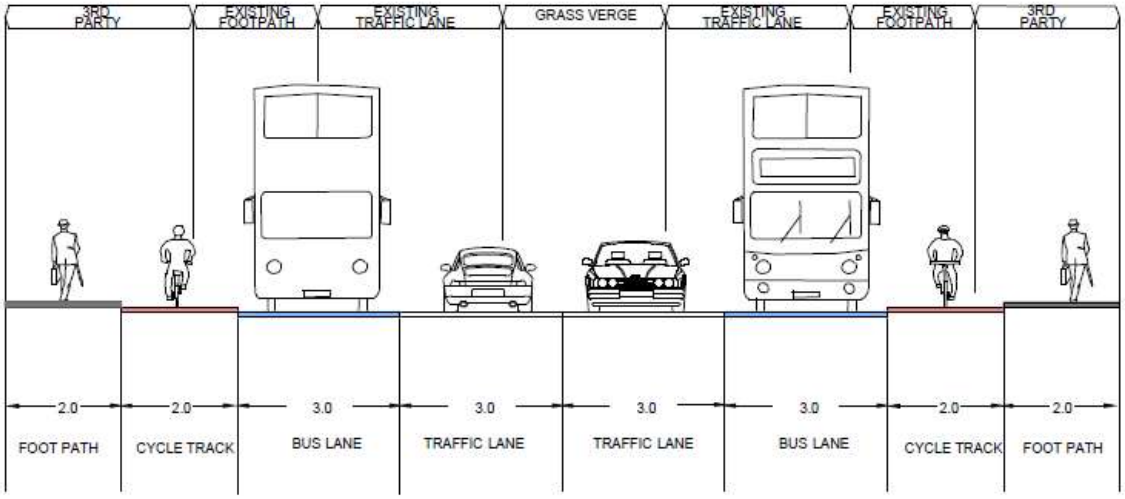


Figure 7.7 Section A-A

The northern section of North Avenue would require land acquisition in the form of portions of front gardens to provided dedicated bus and cycle lanes. On the wider southern section, provision of bus and cycle lanes would require the removal of on-street parking and trees on both sides of the road and/or along the central median, residential off-street parking will not be affected.

Provision of dedicated bus and cycle lanes along Foster's Avenue would require the removal of grass verges and trees on both sides of the road at various locations. Between Foster's Avenue and UCD buses would use the existing bus lanes. Works would be limited to upgrading of bus stops where required and provision of a new stop on the UCD flyover off-ramp, as well as enhancing footpath and cycle facilities on the western side of the route which would require some land take and removal of hedgerows in UCD.

7.2.3 Route Option 3B – N11

Route Description

Route 3B is presented in Figure 7.8 and described in text following.

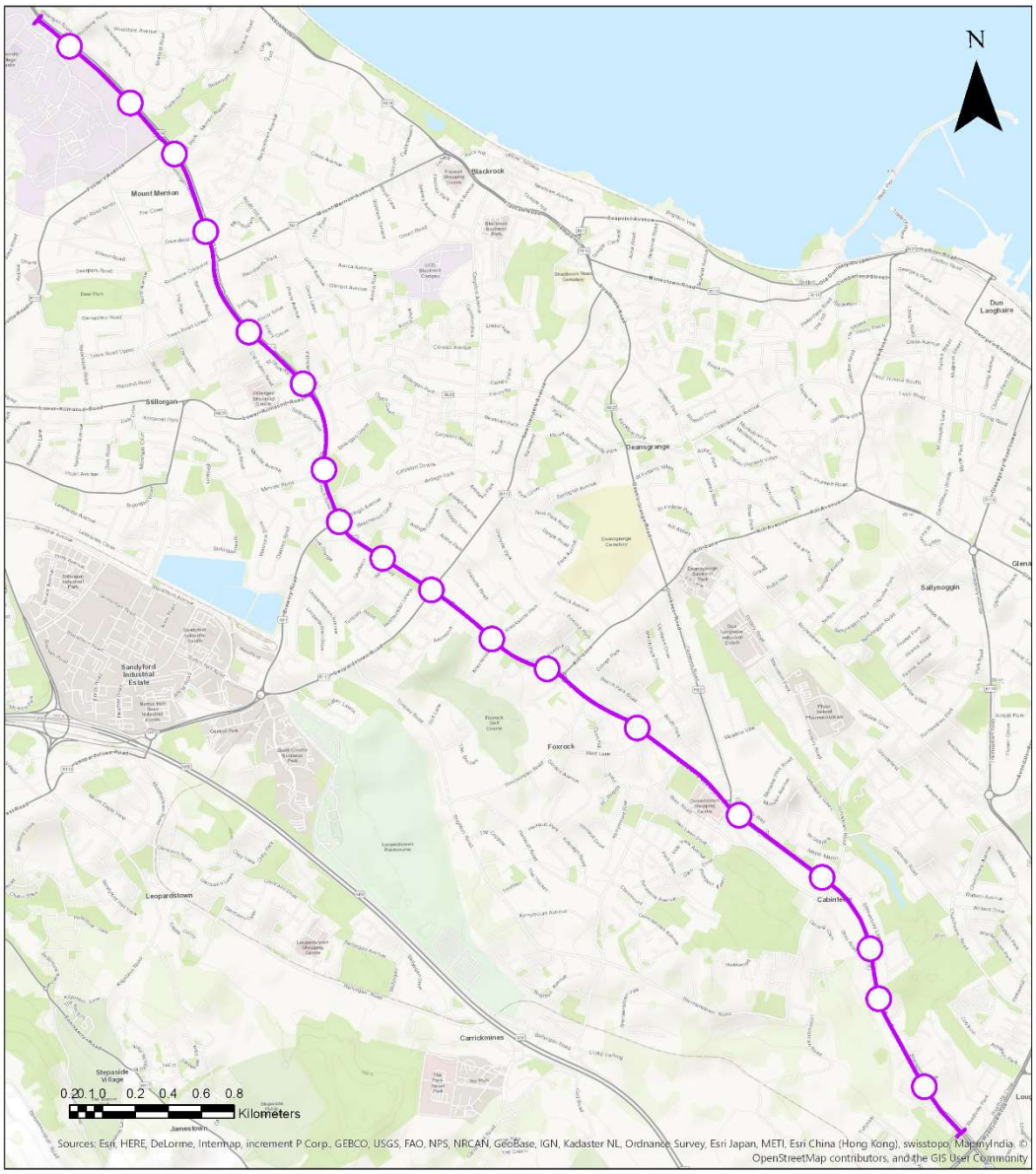


Figure 7.8 Route Option 3B

Inbound: Scheme 3B would begin at the junction of Wyattville Road and the N11. The bus would then continue along the N11 for 9.2 km until it terminates outside of UCD.

Outbound: The outbound buses would follow same route as inbound.

Stops: A total of 19 bus stops would likely be provided in each direction along this route option.

Indicative Scheme Design

Figure 7.9 illustrates the indicative scheme design for this route option as well as the location of an indicative cross-section.

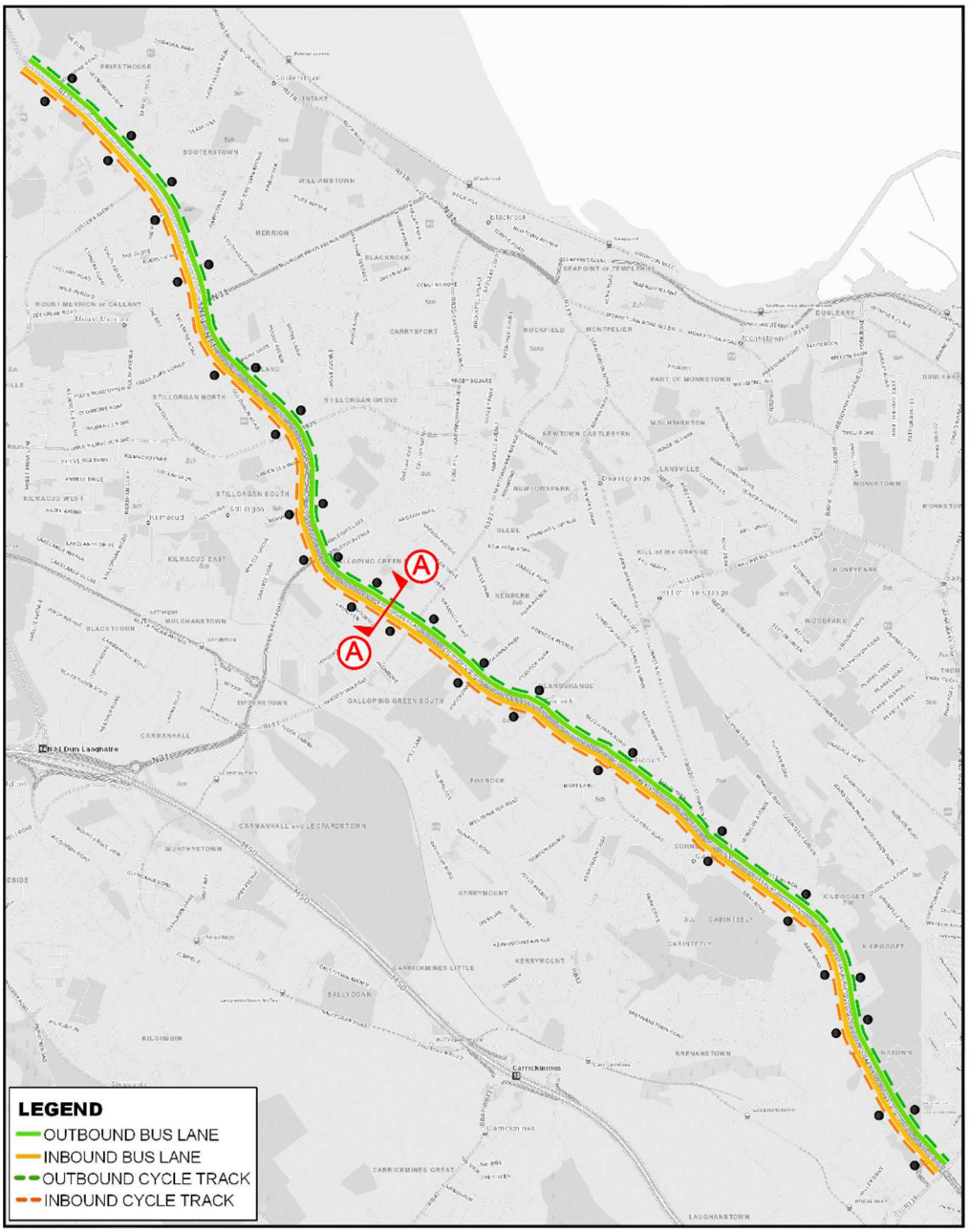


Figure 7.9 Route Option 3B Indicative Scheme Design

Between Wyattville Road junction and UCD there are currently bus lanes in each direction, segregated cycle tracks and footpaths are provided along most this section. It is proposed to provide continuous footpaths and cycle tracks along the route and to upgrade and enhance existing facilities where required. This includes provision of footpaths parallel to the N11 between the Old Bray Road (south of Cabinteely) and Westminster Road junction and The Hill and Trees Road, where pedestrians are currently forced to share with cyclists or use alternative, and sometime circuitous, off-line routes.

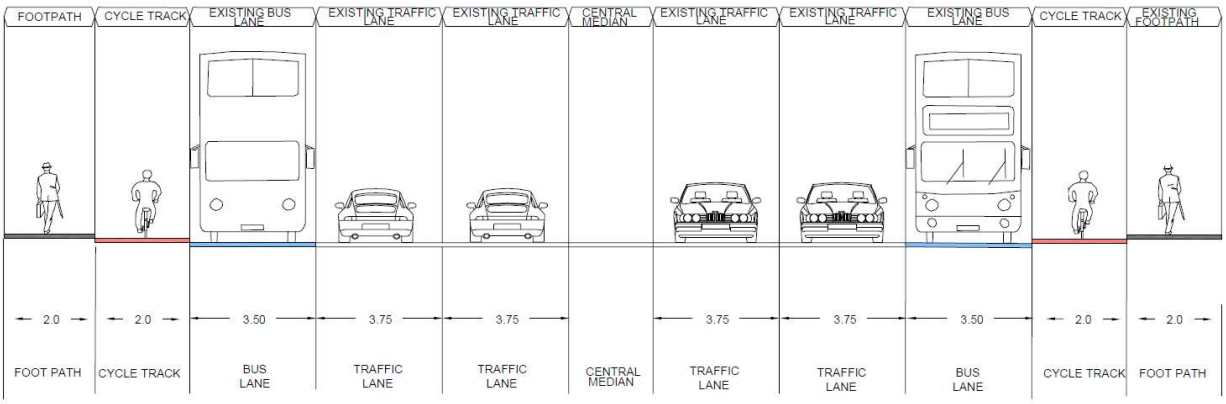


Figure 7.10 Section A-A

It is proposed to provide upgrades to signal controlled crossings at junctions throughout to facilitate right-turning cyclists as well as providing new toucan crossings at Cornelscourt and Knocksinna to improve pedestrian and cycle integration.

It is proposed to upgrade bus stops to mitigate pedestrian and cyclist conflicts throughout, as well as providing Real Time Passenger Information (RTPI) and shelters where required. It is also proposed to provide recessed bus bays where possible to reduce delays to buses. A number of bus stops will be relocated to improve safety where required or, where bus stops are currently provided in close proximity, rationalised to reduce delays to buses. This includes bus stops adjacent Sycamore Crescent where conflicts arise between cyclists and pedestrians due to insufficient widths, with the existing inbound bus stop relocated to adjacent Greenfield Road. Land take in the form of portions of gardens will be required to provide adequate footpaths and cycle tracks between the junctions of Trees Road and Greenfield Road. Proposed upgrades to the Leopardstown Road and Foster's Avenue junctions include reconfiguring left-slip lanes to minimise queuing vehicles obstructing bus lanes and providing enhanced facilities for straight-ahead cyclists, with the upgrade to Foster's Avenue requiring the relocation of the inbound bus stop to the south of the footbridge at Bellfield Park.

It is proposed to provide bus stops on the northbound off-ramp at UCD as well as enhancing footpath and cycle facilities on the western side of the route which would require land take from the verge on the UCD side of the off-ramp. This will facilitate interchange with the proposed UCD to Blanchardstown Bus Rapid Transit (BRT) as well as facilitating buses continuing into the city along the N11 or turning back southbound via the UCD flyover.

7.2.4 Route Option 3C – N11/Pottery Road/Abbey Road/Stillorgan Park Road

Route Description

Route 3C is presented in Figure 7.11 and described in the text following.

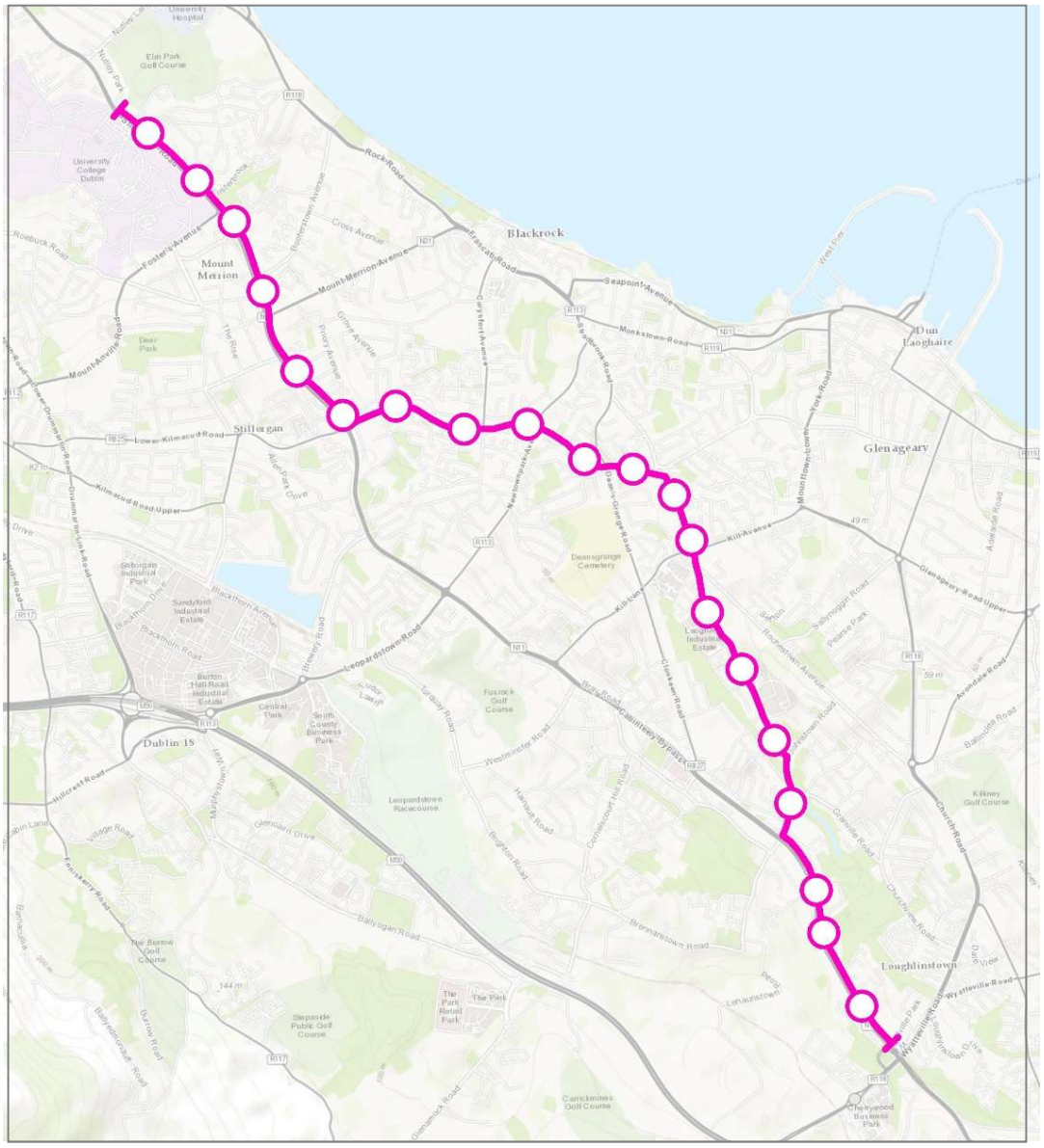


Figure 7.11 Route Option 3C

Inbound: Scheme 3C would begin at the junction of Wyattville Road and the N11. The bus would then continue up the N11 for 2 km until it takes a right turn onto Johnstown Road. The bus would then continue along Pottery Road, Abbey Road, Brookville Park, Rowanbyrn, Annaville Terrace, Fleurville and Stillorgan Park Road before re-joining the N11. The bus would then continue along the N11 until it reaches UCD.

Outbound: The outbound buses would follow same route as inbound.

Stops: A total of 21 bus stops would likely be provided in each direction along this route option.

Indicative Scheme Design

Figure 7.12 illustrates the indicative scheme design for this route option as well as location of indicative cross-sections.

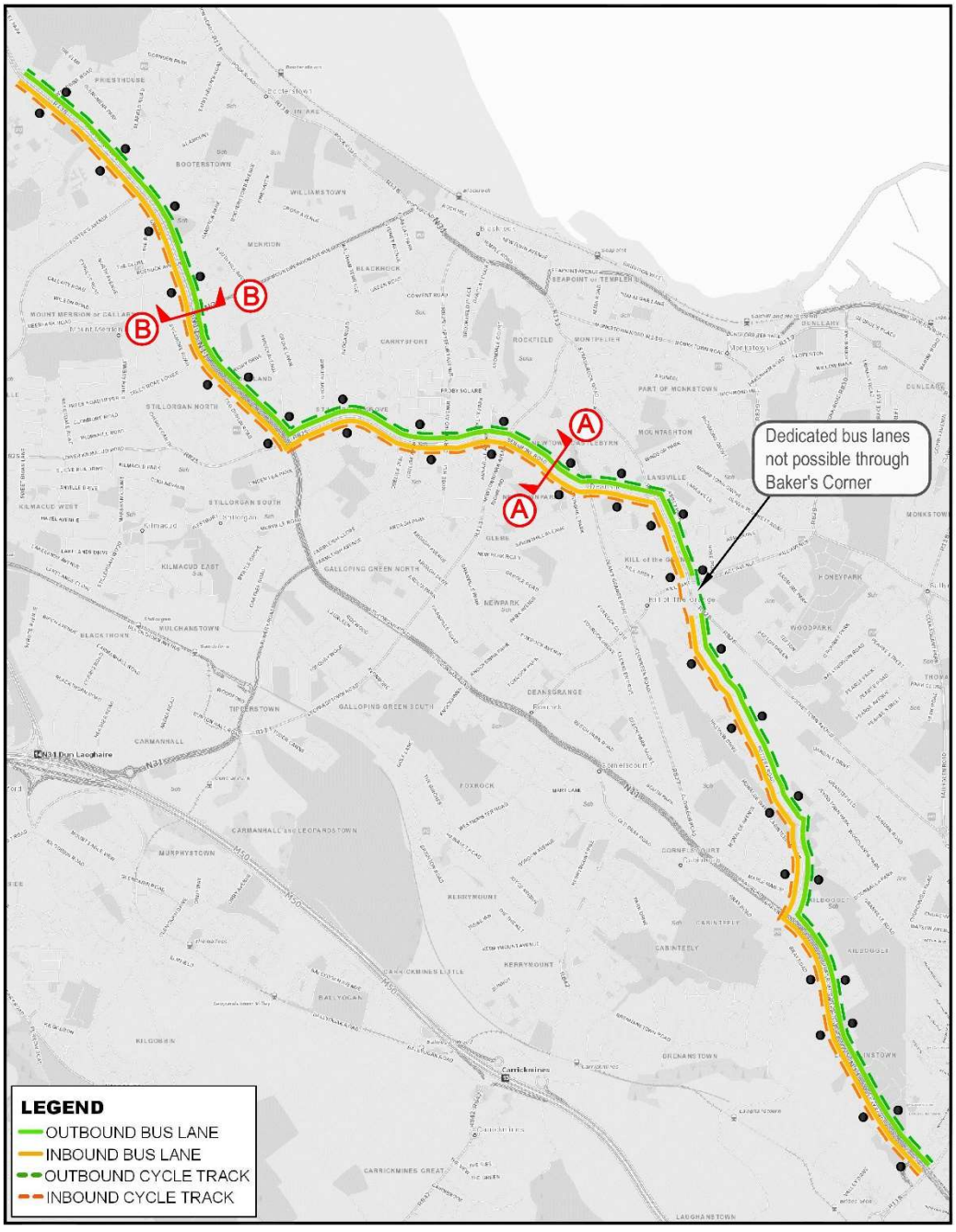


Figure 7.12 Route Option 3C Indicative Scheme Design

The N11 currently provides dedicated bus lanes between Wyattville Road and Johnstown Road, segregated cycle tracks and footpaths are also provided along most this section. Due to the confined space, dedicated bus lanes cannot be provided for a short section by Baker's Corner junction. Road widening with land take from portions of front gardens and public green spaces will be required along Johnstown Road, Pottery Road, Abbey Road and Stillorgan Park Road, including acquisition of four properties, residential off-street parking will not be affected.

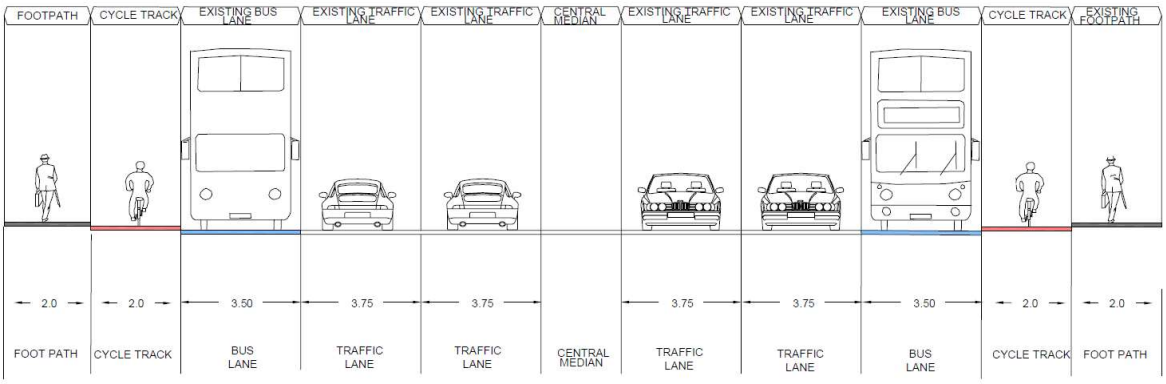


Figure 7.13 Section B-B

Segregated cycle paths are provided along Pottery Road however road widening and land take would be required from green spaces, portions of front/side gardens, on-street car park spaces and lands associated with commercial/industrial premises, residential off-street parking will not be affected. Provision of dedicated bus lanes and cycle lanes are not possible on approaches to and through Baker's Corner due to geometrical constraints.

Provision of dedicated bus and cycle lanes along Abbey Road and on to the junction with Deansgrange Road would require land take in the form of grass verges and portions of front gardens including the removal of trees, residential off-street parking would not be affected. Bus lanes would be provided in both directions along Brookville Drive, however widening of Rowanbyrn, Annaville Terrace and Fleurville would require land take in the form of portions of front and rear gardens, as well as open space from a sports ground, residential off-street parking would not be affected. This would also require removal of trees and require acquisition of three residential properties as well as a building associated with Newpark School's sport complex to achieve the required cross section.

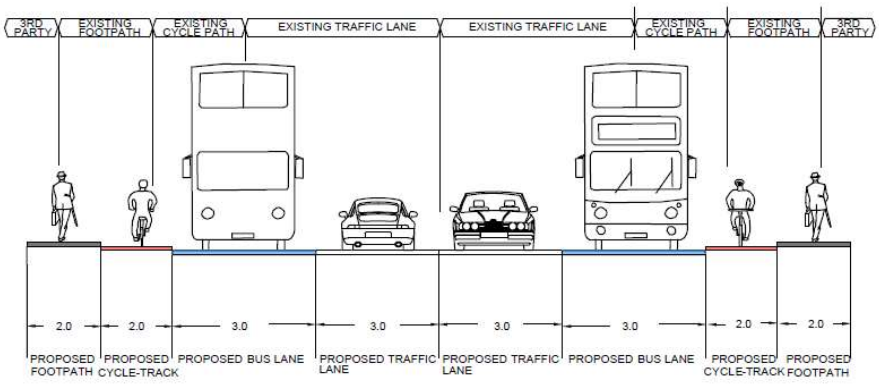


Figure 7.14 Section A-A

There is a wide central median along Stillorgan Park Road between Carysfort Avenue and the N11 which provides for right turning vehicles which could be reallocated to provide bus and cycle lanes. Notwithstanding this, widening of this link would require land take from portions of gardens, grass verges and the removal of trees on both sides of the road at various locations to provide the required cross section, residential off-street parking would not be affected.

From Stillorgan to UCD the route would use the existing bus and cycle lanes provided along the N11. Proposed upgrades to the Foster's Avenue junction include reconfiguring left-slip lanes to minimise queuing vehicles obstructing bus lanes and providing enhanced facilities for straight-ahead cyclists. Land take in the form of portions of gardens would be required to provide adequate footpaths and cycle tracks between the junctions of Trees Road and Greenfield Road. Localised widening would also be required at bus bays and pinch points to provide the required cross section, residential off-street parking would not be affected.

7.2.5 Route Option 3D – N11/Wyattville Road/ Rochestown Avenue/Abbey Road/Stillorgan Park Road

Route Description

Route 3D is presented in Figure 7.15 and described in text following.

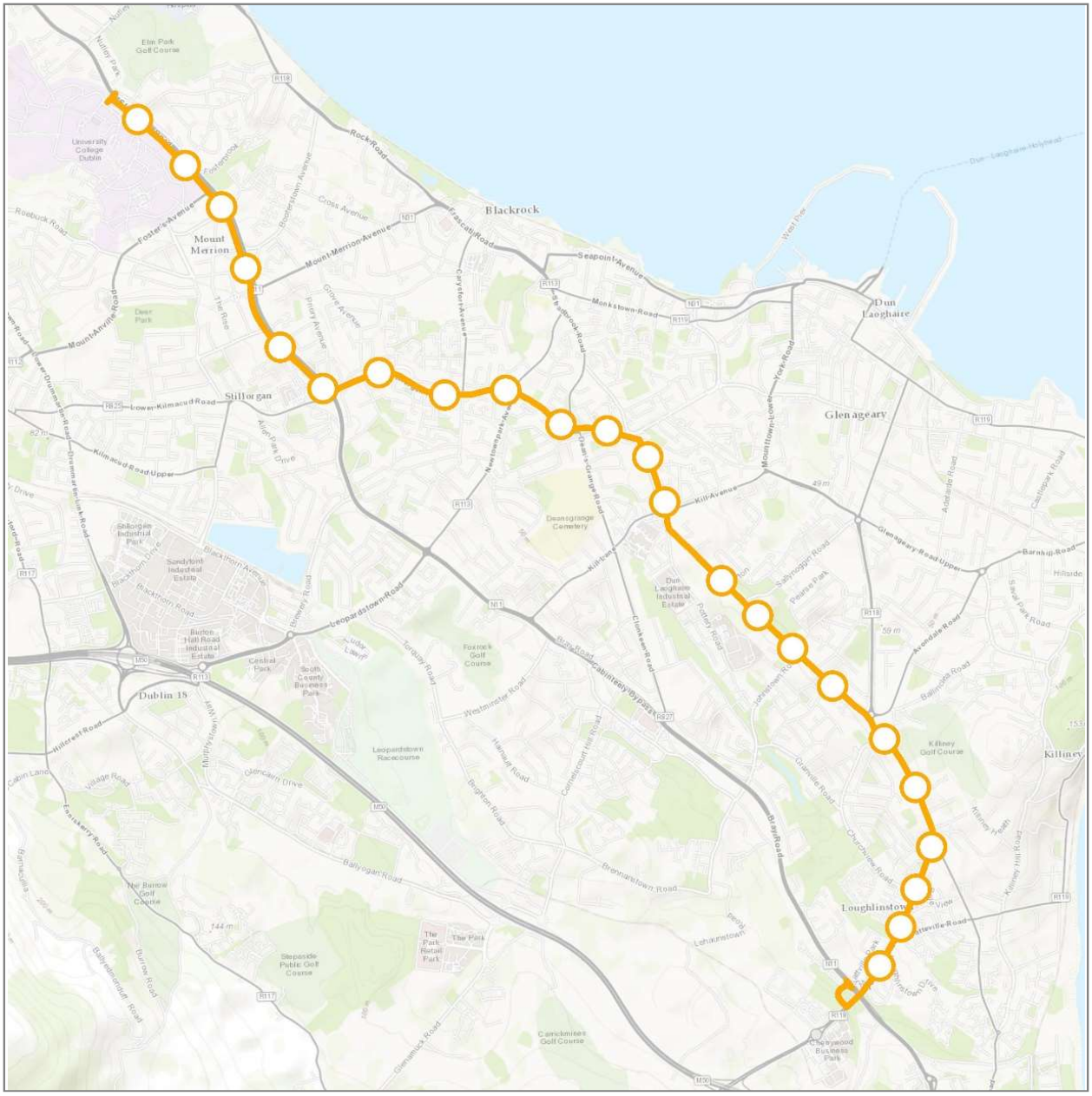


Figure 7.15 Route Option 3D

Inbound: Scheme 3D would begin at the junction of Wyattville Road and the N11. The bus would travel along Wyattville Road and continue onto Church Road, Rochestown Ave, Abbey Road, Brookville Park, Rowanbyrn, Annaville Terrace, Fleurville and Stillorgan Park Road before joining the N11, the bus would then continue along the N11 until it reaches UCD.

Outbound: The outbound buses would follow the same route as inbound.

Stops: A total of 23 bus stops would likely be provided in each direction along this route option.

Indicative Scheme Design

Figure 7.16 illustrates the indicative scheme design for this route option as well as the location of indicative cross-sections.

Figure 7.16 Route Option 3D Indicative Scheme Design

Along Wyattville Road one of the existing traffic lanes in each direction would be reallocated to bus lanes, with localised road widening into the central median and/or verges to provide cycle lanes. Similarly, along Church Road dedicated bus and cycle lanes would be provided by widening into the grass verges, with localised land take from portions of front gardens required to provide the required cross section in places, residential off-street parking would not be affected.

Widening would be required along Rochestown Avenue on both sides with land take required from portions of gardens, green spaces and verges, as well as car parking associated with the Supervalu/Graduate premises, agricultural and amenity lands, and parking and open space frontage of the National Rehabilitation Centre. Widening would result in removal of trees along the route. It is also likely that

acquisition of the filling station south of the Pottery Road junction would be required to provide the required cross section, residential off-street parking would not be affected.

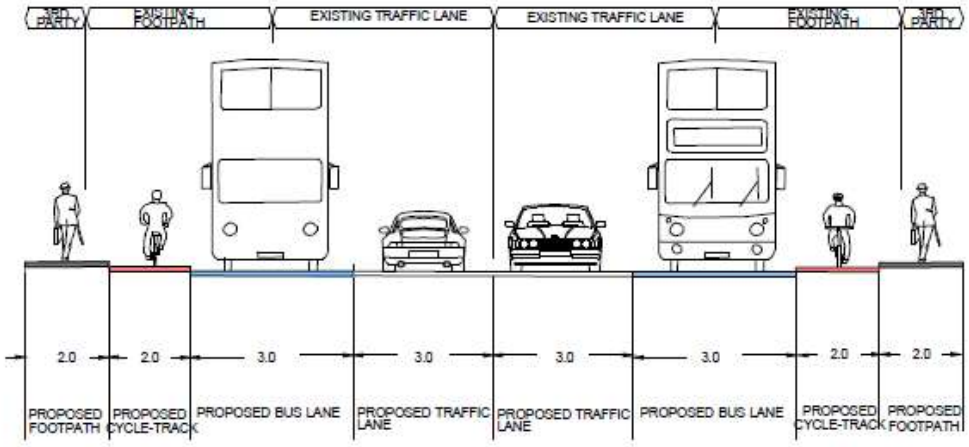


Figure 7.17 Cross Section A-A

Provision of dedicated bus and cycle lanes along Abbey Road and on to the junction with Deansgrange Road would require land take in the form of grass verges and portions of front gardens including the removal of trees. Bus lanes are provided in both directions along Brookville Drive, however widening of Rowanbyrn, Annaville Terrace and Fleurville would require land take in the form of portions of front and rear gardens, as well as open space from a sports ground to provided dedicated bus and cycle lanes. This would also require removal of trees and acquisition of three residential properties as well as a building associated with Newpark School's sport complex to achieve the required cross section, residential off-street parking would not be affected.

There is a wide central median along Stillorgan Park Road between Carysfort Avenue and the N11 which provides for right turning vehicles which would be reallocated to provide bus and cycle lanes. Notwithstanding this, widening of this link would require land take in the form of portions of gardens, grass verges and the removal of trees on both sides of the road at various locations, residential off-street parking would not be affected.

From Stillorgan to UCD the route would use the existing bus and cycle lanes provided along the N11. Proposed upgrades to the Foster's Avenue junction include reconfiguring left-slip lanes to minimise queuing vehicles obstructing bus lanes and providing enhanced facilities for straight-ahead cyclists. Land take in the form of portions of gardens would be required to provide adequate footpath and cycle track widths between the junctions of Trees Road and Greenfield Road. Localised widening would also be required at bus bays and pinch points to provide the required cross section. Residential off-street parking would not be affected

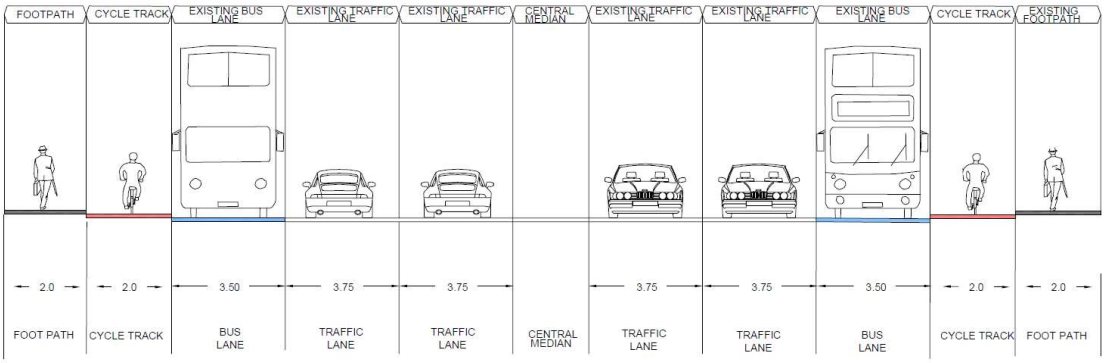


Figure 7.18 Cross Section B-B

7.2.6 Route Options Assessment

Details of the 'Stage 2' route options assessment undertaken for Section 3 are presented in **Appendix A**.

A summary of the ranking of route options against the scheme sub-criteria is presented in Table 7.2 following.

Table 7.2 Route Options Assessment Summary (Sub-Criteria)

Assessment Criteria	Sub-Criteria	3A	3B	3C	3D
Economy	Capital Cost				
	Journey-time reliability and consistency				
Integration	Land Use Integration				
	Residential Population and Employment Catchments				
	Transport Network Integration				
	Cyclists and pedestrian Integration				
Accessibility and Social Inclusion	High volume trip attractors				
	Deprived Geographic Areas				
Safety	Road Safety				
Environment	Archaeological, Architectural and Cultural Heritage				
	Flora and Fauna				
	Soils and Geology				
	Hydrology				
	Landscape and visual				
	Noise, Vibration and Air				
	Land Use and the Built Environment				

In terms of Economy route options which travel along the N11 are determined to be comparatively more favourable than alternatives, with Scheme 3B scoring very highly in comparison to other options. This is mainly due to the wide road reservation, existing bus lanes and the shorter route length. It also provides the most direct route with the highest provision of dedicated bus lanes and hence is move favourable in terms of journey time reliability and consistency.

In terms of Integration Scheme 3A is most favourable in comparison to alternatives as it links with the Green Luas line at the Sandyford and Stillorgan stops, it also serves a higher employment catchment by passing close to Sandyford Industrial Estate.

In terms of Accessibility and Social Inclusion Scheme 3A serves a slightly higher number of key trip attractors by passing close to Sandyford Industrial Estate, so this route is both considered favourable in comparison to the alternatives.

Scheme 3B travels on the N11 and would involve no turning movements for the buses and so is considered more favourable than the alternatives in terms of “Safety”.

In terms of Environment routes along the N11 are considered favourable over alternatives, this is due to the significantly lower land take and construction works that would be required due to the existing bus lanes and road reservation.

7.3 Conclusions - Study Area Section 3 Analysis

A summary of the assessment and a relative ranking for each of the five assessment criteria is shown below in Table 7.3.

Table 7.3 Route Options Assessment Summary (Main Criteria)

Assessment Criteria	3A	3B	3C	3D
Economy				
Integration				
Accessibility and Social Inclusion				
Safety				
Environment				

Based on the assessments above it has been determined that Scheme 3B offers the preferred route option for the following reasons

- It has a comparably lower capital cost than other options.
- It has lower and more reliable journey times.
- It is consistent with, and delivers part of the GDA cycle network.
- It has a comparably lower impact on the environment than other options.
- It is a safer bus route due to it requiring comparably fewer bus turning movements.

Scheme 3B was identified as the preferred option for Section 3 and is brought forward into the Emerging Preferred Route as described in Section 8.

8 PROPOSED SCHEME

8.1 Introduction

Sections 5 to 7 of this report presented an appraisal of all route options considered for each of the three study area sections. Following this appraisal, preferred route sections are combined to form an end-to-end Emerging Preferred Route. This section of the report presents and describes the emerging preferred route identified and the concept scheme design. Concept scheme design drawings are included in in Volume 3 of this report.

8.2 Emerging Preferred Route

The Emerging Preferred Route is presented in Figure 8.1 and is described in this section in the Bray to UCD direction.

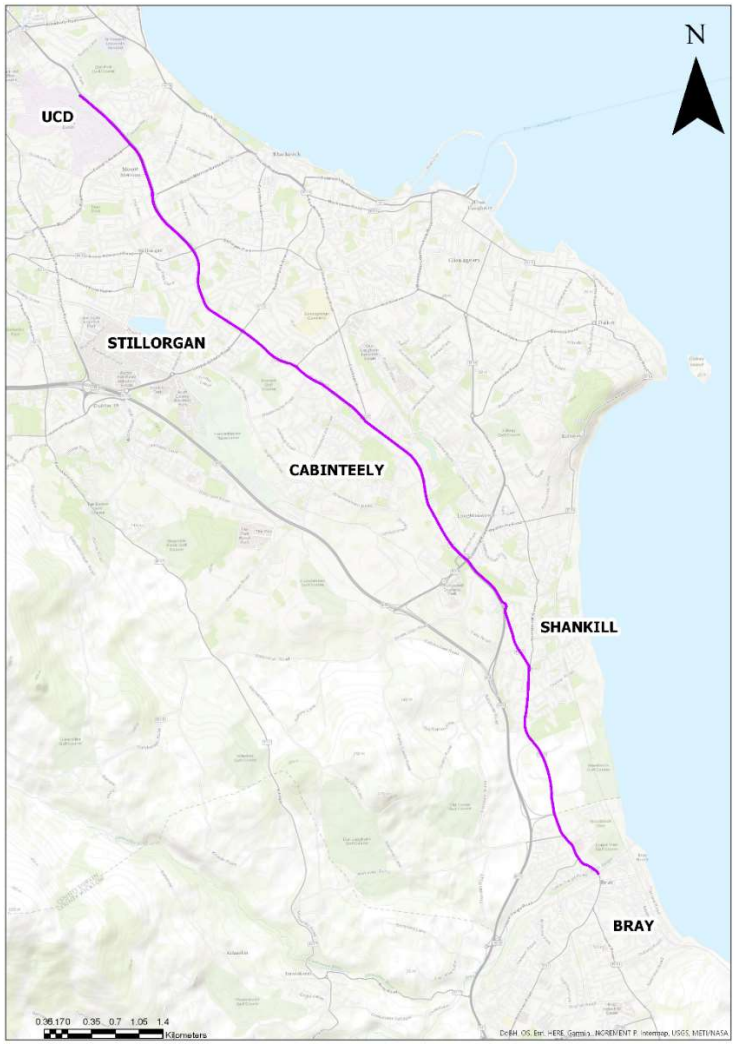


Figure 8.1 Emerging Preferred Route

The route commences in Bray north of the Fran O'Toole (Dargle River) bridge and runs along Castle Street and Dublin Road to the Wilford junction and then follows the R119 (Dublin Road) between Wilford junction and Shankill, before turning north west to follow the R837 (Dublin Road) between Shankill and the Loughlinstown roundabout. From the Loughlinstown roundabout the emerging preferred route follows the existing N11 to its termination at the UCD flyover.

Outbound services running along the CBC would take the same route to return to Bray.

8.3 Concept Scheme Design

The emerging preferred scheme described herein details the on-street infrastructure necessary to provide continuous priority for bus movements along the corridor. The route is described in a Bray to UCD (inbound) direction.

8.3.1 Section 1 Bray to Bray North

Length of Scheme Section: 1.35km

Indicative Infrastructure Cost: €4 million - €5 million

Indicative Land Acquisition Cost: €10 million

Total Indicative Cost of Scheme Section: €14million - €15 million

The CBC commences on Castle Street to the north of the Fran O'Toole bridge over the River Dargle. It is proposed to provide pedestrians bridges on the both sides of the existing bridge and this will allow southbound bus lanes to reach the Seapoint Road junction and to provide dedicated cycle lanes in both directions. An existing bus lane is provided in the southbound direction on Castle Street, between the St. Cronan's Road and Dwyer Road junctions, and in the northbound direction between the St. Cronan's Road and Upper Dargle Road junctions, it is proposed to widen Castle Street to accommodate bus and cycle lanes in both directions. To facilitate this land take, including car parking, would be required from the Castle Street Shopping Centre, the Dargle Centre and adjoining commercial areas to the north and south, as well as parts of gardens and land from St. Philomena's School.

It is proposed to widen Dublin Road to accommodate bus and cycle lanes in each direction for its full length from Castle Street to the Wilford junction. This will include upgrades to the existing signal controlled junctions of Upper Dargle Road, Old Connaught Avenue/Corke Abbey Avenue as well as incorporating the proposed signal controlled junction servicing St. Philomena's School which is under construction at the time of writing. To facilitate this land take would be required. This would include private lands to the south and east of the existing Wilford junction including a cottage, a service station (Topaz), as well as sections of front gardens on Dublin Road between Windsor Motors and the Old Connaught Avenue and private lands along the existing frontages of Windsor Motors, the old Bray Yarns complex, and St. Philomena's School. A significant mature tree which is subject to a tree preservation order will need to be removed from the grounds of St Philomena's School

It is proposed to upgrade the Wilford roundabout to a signalised junction which would enhance priority for buses and improve pedestrian and cyclist provision.

It is proposed to upgrade bus stops to mitigate pedestrian and cyclist conflicts throughout, as well as providing Real Time Passenger Information (RTPI) and shelters where required.

8.3.2 Section 2 Bray North to Loughlinstown

Length of Scheme Section: 4.2km

Indicative Infrastructure Cost: €10 million - €12 million

Indicative Land Acquisition Cost: €14 million

Total Indicative Cost of Scheme Section: €24million - €26 million

Road widening will be required to provide bus and cycle lanes in both directions on the Dublin Road between Wilford junction and Crinken Lane, to the south of Shankill Village. This will require land take from agricultural land and portions of gardens and the removal of a large number of significant mature trees and stone boundary walls. A new signalised junction servicing the Woodbrook/Shanganagh LAP lands will be incorporated.

Due to geometrical constraints through Shankill Village, it is not considered practical to provide dedicated cycle facilities through this section. An alternative route to the west of the village is proposed for cyclists, this would generally comprise cyclists sharing low traffic volume, low speed roads. This route, which follows along Beech Road, Mountain View and Stonebridge Close, onto Lower Road and connecting to Dublin Road via a proposed access ramp. Construction of this route option will require land take from portions of private gardens.

From Crinken Lane to Quin's Road junction it is proposed to widen the road to provide dedicated bus lanes in each direction. From here geometrical constraints mean that it is not practical to provide continuous bus lanes in both directions. For southbound buses continuous bus lanes are proposed through Shankill Village. For northbound buses two sets of traffic lights and a length of northbound bus lane through the village are proposed as part of a queue relocation system to provide priority. To the north of Shankill Village there is a narrow bridge over the old railway line and widening of this bridge is restricted by buildings on either side. For this 180m section, buses would be required to merge with general traffic. Land take from portions of front gardens will be required along this section.

It is proposed to upgrade the Quinn's Road roundabout to a signalised junction to improve pedestrian provision and to incorporate measures to provide priority for buses in both directions. It is also proposed to upgrade the roundabout at St Anne's Church to a signalised junction and a northbound bus lane would be provided on the approach to this junction from Shankill Village to ensure priority for buses in both directions at the junction.

Road widening is proposed to provide bus lanes, footpaths and cycle paths along the section between this new junction at St Anne's Church and the Loughlinstown Roundabout. This will include upgrading the existing signal controlled junction at Stonebridge Road. On the northbound approach to the Loughlinstown roundabout cyclists will cross over to the two-way cycle track on the eastern side of the road to enable them to safely bypass the Loughlinstown Roundabout before re-joining two-way cycle facilities on the N11. This will require land take from gardens along the whole length and removal of trees, residential off-street parking will not be affected. Land take would also be required from the grounds of St Anne's Church and the car park would need to be reconfigured in order to retain the same number of car parking spaces.

It is proposed to partially signalise the Loughlinstown Roundabout to reduce overall delays for all users and to provide enhanced journey time reliability to buses. On the southbound approach to the roundabout road realignment will be required to extend the bus lane to and around the eastern side of the roundabout and to provide clearance for buses under the existing footbridge. It is proposed to provide a dedicated bus lane on the northbound approach to the Wyattville junction. This will require reconfiguration of the existing Cherrywood Road signalised junction, as well as amending the existing service road running parallel to the N11 into a one-way northbound only route.

It is proposed to upgrade bus stops to mitigate pedestrian and cyclist conflicts throughout, as well as providing Real Time Passenger Information (RTPI) and shelters where required.

8.3.3 Section 3 Loughlinstown to UCD

Length of Scheme Section: 9.2km

Indicative Infrastructure Cost: €9 million - €11 million

Indicative Land Acquisition Cost: €2 million

Total Indicative Cost of Scheme Section: €11million - €13 million

This section has existing good quality bus provision throughout and so the extent of the works required is less than in Sections 1 & 2. The majority of the works proposed in this section involve upgrading pedestrian and cyclist facilities. This includes amendments to existing junction layouts to improve bus priority and enhance pedestrian and cycle facilities. Footpaths will be provided parallel to the N11 in the locations where pedestrians are currently forced to share with cyclists or use alternative, and sometime circuitous, off-line routes. It is proposed to upgrade bus stops to mitigate pedestrian and cyclist conflicts throughout, as well as providing Real Time Passenger Information (RTPI) and shelters where required. In general, indented bus bays (bus lay-byes) have been provided where practicable.

It is proposed to indent the existing bus bay by St Laurence College and this will require land take locally, it is also proposed provide a pedestrian link to improve permeability to Shanganagh Vale here. The design will incorporate a new junction connecting to the Cherrywood SDZ close to Kilgobbet Grove which is under construction at the time of writing. New footpaths are proposed along either side of the N11 between Old Bray Road (south of Cabinteely) and Westminster Road junction. This will require widening into existing verges and removal of trees.

The junction at Clonkeen Road will be upgraded to provide an additional pedestrian crossing, this will require the reconfiguration of the existing traffic islands. Land take will be required at this junction to indent bus bays on both sides of the road. Some land take will be required at Johnstown Road junction to ensure pedestrians can pass around the back of the existing bus stops and avoid conflict with cyclists. A new toucan crossing is proposed to allow bus passengers and cyclists to cross at Westminster Road junction. To facilitate this the U-turning will be removed, motorists wishing to make this U-turn can make the manoeuvre at the next junction instead. Land take will be required here to indent the outbound bus bay.

The junction at Kill Lane will be upgraded and the left turn slip onto the N11 removed. Land take will be required to indent bus bays on both sides of the road here. A new Toucan crossing is proposed at near the Knocksinna junction to allow bus passengers and cyclists to cross the road, land take will be required here to indent bus bays on both sides of the road.

The junction at Leopardstown Road will be upgraded to improve pedestrian and cycle facilities. Land take will be required to extend the existing inbound left turn lane and to indent the inbound bus bay. The junction at Brewery Road will also be upgraded to enhance pedestrian and cyclist facilities, this will require construction of a new retaining wall in places to allow widening of the inbound cycle lane. Land take will be required to indent the outbound bus bay here and at the nearby bus stop at St John of Gods. It is proposed to provide new footpaths to increase pedestrian connectivity on both sides of the road along the N11 between the junctions of The Hill and Trees Road Lower, this will require widening into existing verges and removal of trees.

A significant upgrade to the junction at Lower Kilmacud Road is proposed to improve pedestrian and cyclist facilities. Three of the four left turn slips will be removed, and wider pedestrian refuges will be provided as

well as enhanced cycle facilities. This will require the realignment of the N11 on both approaches to the junction.

The junctions at Priory Drive and Trees Road Lower will be upgraded with the left turn slips onto the N11 removed. Land take will be required from potions of gardens on the western side of the road at the junction with Mount Merrion Avenue, this will allow continuous cycle facilities to be provided inbound and reduce conflict with pedestrians.

Several bus stops will be relocated to improve safety between Trees Road Lower and Foster's Avenue, where bus stops are currently provided in close proximity, their rationalisation will also reduce delays to buses. This includes the bus stop adjacent to Sycamore Crescent where conflicts arise between cyclists and pedestrians due to insufficient widths, with the existing inbound bus stop relocated to adjacent Greenfield Road. The existing inbound bus stop at the Foster's Ave junction will be relocated 130m to the south.

It is proposed to set back the existing concrete barrier at the footbridge near Colaiste Eoin, this will allow for the provision of continuous outbound bus and cycle lanes under the bridge. Proposed upgrades to the Foster's Avenue junctions include providing a dedicated left turn lane outside the bus lane to reduce delays caused by queuing vehicles obstructing the bus and also providing enhanced facilities for straight-ahead cyclists.

Land take will be required from UCD in places to indent two bus bays and to widen existing cycle tracks. A new pedestrian link to UCD is proposed close to the Seafield Road junction. It is proposed to provide bus stops on the northbound off-ramp at UCD. This will facilitate interchange with the proposed UCD to Blanchardstown Bus Rapid Transit (BRT) as well as facilitating buses continuing into the city along the N11 or turning back southbound via the UCD flyover.

8.4 Summary

8.4.1 Infrastructure Provision

The emerging preferred route measures approximately 14.5 km in total. Along the emerging preferred route existing bus infrastructure is provided along approximately 69% (10km) in the inbound direction and 69% (10.1km) in the outbound direction.

The emerging preferred scheme would improve this provision to approximately 97% (14.1km) for the inbound direction and 98% (14.2km) in the outbound direction. Queue relocation systems are provided through Shankill Village which will give buses enhanced priority in the areas where it is not practicable to provide dedicated bus lanes. In addition, improvements to cycle infrastructure along the emerging preferred route, which incorporates primary routes 12 and 12A, would increase the overall provision to 13.35km (92%) in each direction, with an alternative off-line cycle route provided for the section without cycle facilities.

8.4.2 Cost Estimates

A high-level cost estimate for has been prepared based on the concept design drawings. According to this estimate the proposed CBC infrastructure cost is anticipated to be in the region of €45m-€55m.

8.4.3 Journey Time Benefits

Through the provision of increased bus priority infrastructure, the proposed scheme would improve the overall journey time for buses as well as the journey time reliability. A review of the existing journey time data for buses illustrates the issues that will be addressed by the proposed scheme.

The following graphs show the existing journey time and bus speed data for the section of the 145 bus route which overlaps with the emerging preferred route (between Quinsborough Road, Bray & UCD). The information presented in these graphs has been taken from the automatic vehicle location system on the Dublin Bus fleet and the journey times are inclusive of dwell times at stops. Figure 8.2 presents the average journey time over certain time periods during a normal weekday for the inbound and outbound directions.

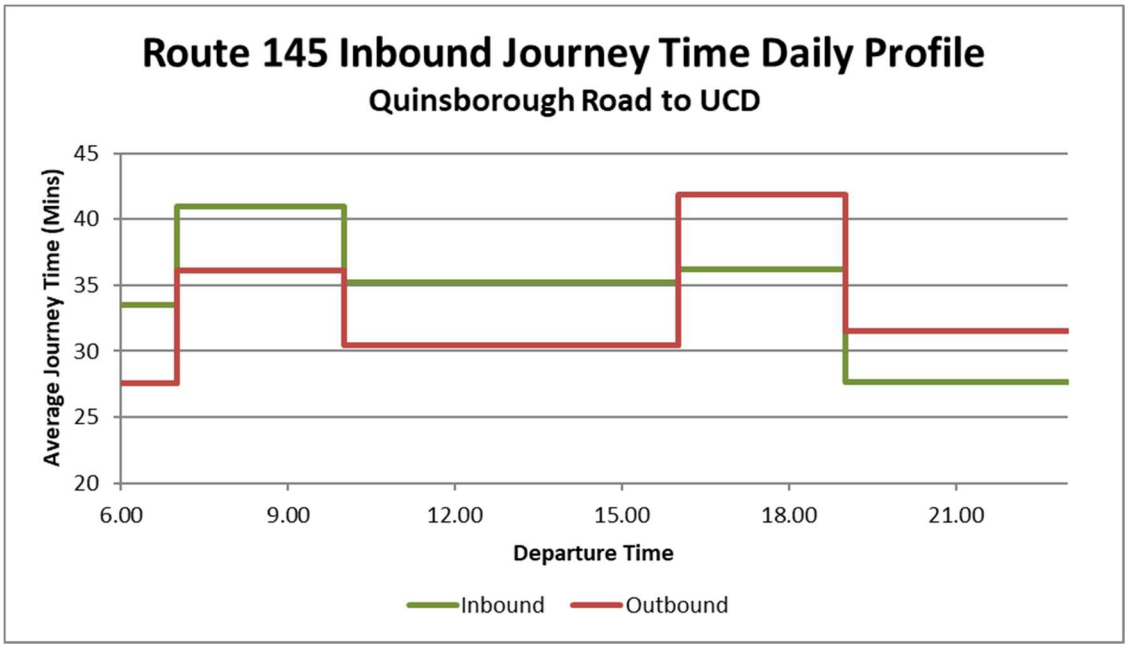


Figure 8.2 Existing Average Journey Times

The graphs presented in Figure 8.3 and Figure 8.4 show the current issues with journey time reliability along the route. Journey times during the core hours of bus operation (0:700-19:00) are observed to vary between 35 minutes and 41 minutes inbound and between 30 minutes and 42 minutes outbound. The variation in journey times is most likely due to the lack of bus priority on sections of the route as well as boarding times at stops which are high due to the requirement for each passenger to interact with the driver.

The journey times outside of these hours, when traffic volumes are lower, are more reflective of the journey times which could be achieved by a combination of improved bus priority, better enforcement of bus lanes and cashless fares.

After 19:00 in the evening the average journey time reduces to 28 minutes inbound and 32 minutes outbound. Similarly, before 07:00 in the morning journey times reduce to 34 minutes inbound and 28 minutes outbound. The variance in journey time is in the order of 13 minutes inbound and 14 minutes outbound depending on the time of departure.

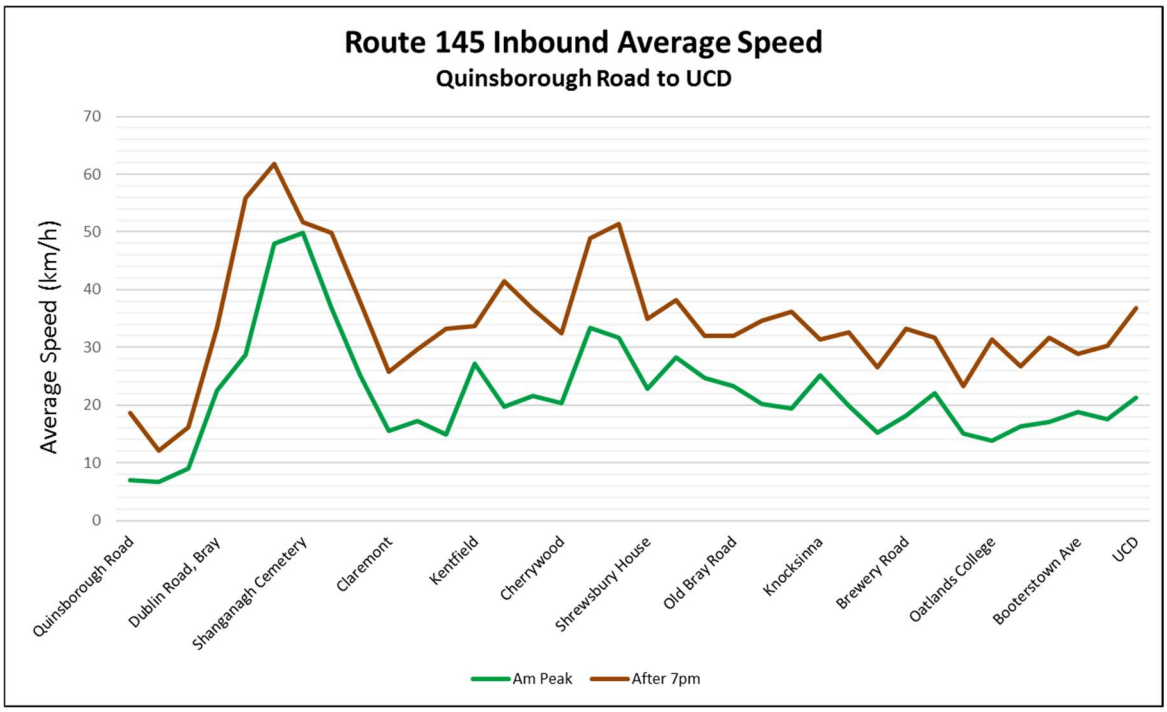


Figure 8.3 Existing Inbound Average Speed

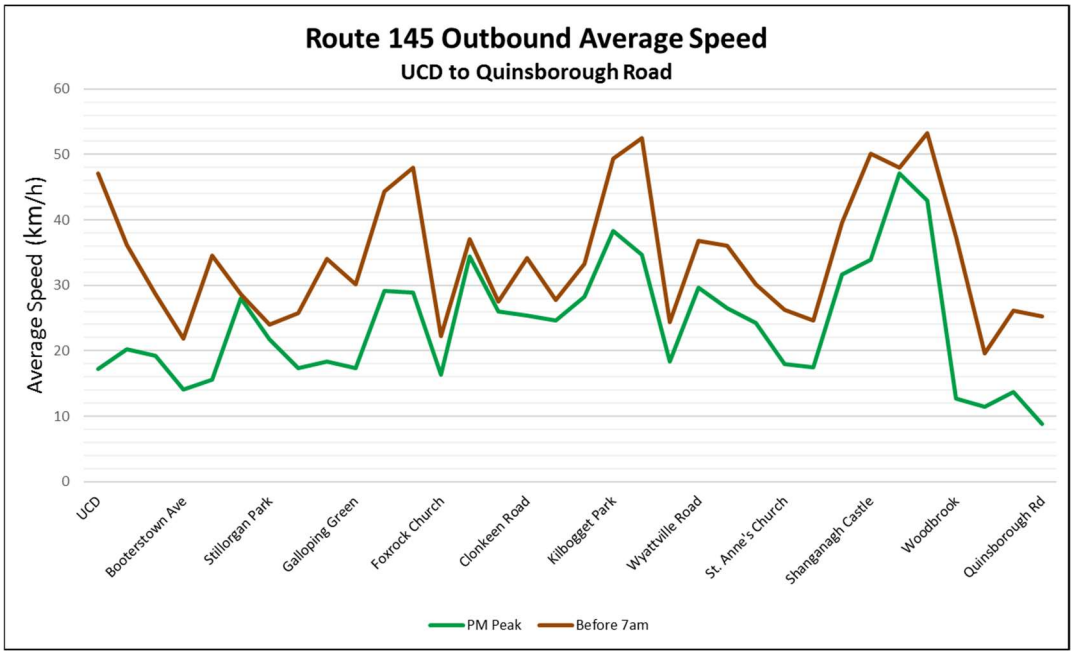


Figure 8.4 Existing Outbound Average Speed

Looking at both the inbound and outbound data, it can be seen that the average speed for buses along the route is higher during off-peak times, in uncongested conditions compared to the higher speeds attained by the bus during the off-peak times. This further illustrates the benefits improved bus priority will bring to buses operating along the proposed route.

Based on the above, a conclusion can be drawn that by improving the provision of bus lanes along the route (coupled with the introduction of cashless fares) the risk of journey time turbulence to buses would be reduced, allowing the buses to move along the route quicker and with more consistent journey times. The extent of these benefits will be confirmed and quantified at the next design stage.

9 NEXT STEPS

This report has identified an emerging preferred route for the bus infrastructure along this Core Bus Corridor for which a concept design has been developed.

The next project stage (The development of a Preliminary Design) will further refine and update the initial concept design along the route. Further account will be taken of likely public transport service levels, particularly the bus service patterns and any changes to the overall bus network which may arise from the separate bus network review process. The proposals will be amended, if and as required, to integrate any resultant changes. The Preliminary Design will define the final practically achievable scheme for the CBC, considering more detailed studies of constraints, impacts and environmental assessment required at a local level.

Prior to finalisation of the CBC scheme design, a public consultation process will be undertaken, with inputs and feedback received incorporated where practical and appropriate to do so.

This Preliminary Design will form the basis of the planning consent process for the scheme, which will require a development consent application to be made directly to An Bord Pleanála, due to the nature and extent of the proposed works.