The background is a vibrant yellow. It is decorated with several abstract geometric shapes in shades of blue, teal, and white. These include circles, semi-circles, and rounded rectangular shapes, some of which are layered or overlapping. The shapes are scattered across the page, creating a modern and dynamic visual effect.

Chapter 03

Consideration of Reasonable Alternatives

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3. Consideration of Reasonable Alternatives

3.1 Environmental Impact Assessment Directive requirements

Article 5(1)(d) of Directive 2011/92/EU as amended by Directive 2014/52/EU (“the EIA Directive”) requires that an Environmental Impact Assessment Report (EIAR) contains ‘a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and the main reasons for the option chosen, taking into account the effects of the project on the environment’.

In addition, Annex IV to the EIA Directive, provides that the EIA shall include:

“A description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons selecting the chosen option, including a comparison of the environmental effects’

In addition, given the proposed road development for which approval is sought in this instance, section 50(2)(b)(iv) of the Roads Act 1993, as amended (“the Roads Act”) states that that the EIAR shall contain the following information:

‘...a description of the reasonable alternatives studied by the road authority or the Authority, as the case may be, which are relevant to the proposed road development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the proposed road development on the environment’

Section 50(2)(b)(vi) of the Roads Act also requires that “any additional information specified in Annex IV [quoted above] that is relevant to the specific characteristics of the particular proposed road development or type of proposed road development and to the environmental features likely to be affected” also be included in the EIAR.

Accordingly, this Chapter of the EIAR describes the reasonable alternatives studied and the main reasons for the selection of the proposed Templeogue / Rathfarnham to City Centre Core Bus Corridor Scheme (hereafter referred to as the “Proposed Scheme”) taking into account the effects on the environment.

It considers the alternatives at three levels:

- Strategic Alternatives;
- Route Alternatives; and
- Design Alternatives.

The reasonable alternatives studied which are relevant to the Proposed Scheme and its specific characteristics are described in the subsequent sections of this chapter.

3.2 Strategic Alternatives

3.2.1 Overview of the GDA Transport Strategy 2016 – 2035 and the new GDA Transport Strategy 2022 – 2042

The Transport Strategy for the Greater Dublin Area 2022-2042 (Transport Strategy) replaces the prior transport strategy for the period 2016 to 2035.

That prior transport strategy set out to contribute to the economic, social, and cultural progress of the Greater Dublin Area (GDA) by providing for the efficient, effective, and sustainable movement of people and goods. In other words, it was about making the Dublin region a better place for people who live and work there, and for those who visit.

It did that by providing a framework for the planning and delivery of transport infrastructure and services in the GDA. It has also provided a transport planning policy around which other agencies involved in land use planning, environmental protection, and delivery of other infrastructure such as housing, water, and power, could align their own investment priorities.

It has been an essential component, along with investment programmes in other sectors, for the development of the GDA which covers the counties of Dublin, Meath, Kildare, and Wicklow.

Major projects provided for in the prior strategy included BusConnects Dublin which the Proposed Scheme is a key component of.

Under the Dublin Transport Authority Act 2008, the National Transport Authority (NTA) must review its transport strategy every 6 years. Arising from the review of the 2016 plan, an updated strategy has been developed which sets out the framework for investment in transport infrastructure and services over the next two decades to 2042.

Since the prior transport strategy was approved by government in 2016, the NTA, along with the Councils, other transport delivery agencies and transport operators, have worked to build and develop that strategy's projects and proposals.

With respect to BusConnects Dublin, work was commenced 2017. It is a multi-faceted programme comprising several elements of which the Core Bus Corridors (CBCs) which will provide approximately 230km of bus priority and approximately 200km of cycle routes.

It is the largest ever investment programme on the bus network to deliver high levels of bus priority on all the main corridors to not only support and significantly improve the operation of bus services now and into the future. It but is proofed for resilience to enable the operation for more frequent services as required. The Proposed Scheme is a fundamental element of this ongoing work.

The challenges outlined in the GDA Transport Strategy 2016 - 2035 and identified need for BusConnects Dublin as determined in the preparation of that prior strategy remain, and the evidence from the detailed corridor studies undertaken in the preparation of the prior strategy is still valid and robust. These studies are set out in section 3.2.2.

3.2.2 GDA Transport Strategy 2016 -2035

The prior GDA Transport Strategy 2016-2035 was prepared by the NTA pursuant to Section 12 of the Dublin Transport Authority Act 2008 and approved by the Minister for Transport, Tourism and Sport in February 2016 in accordance with sub-section 12(13) of that Act.

The prior GDA Transport Strategy provided a comprehensive framework to guide the development of transport across the Greater Dublin Region over the period of that strategy. Careful consideration was undertaken of the transport requirements across the seven counties of the GDA, and the prior GDA Transport Strategy then formulated the appropriate transport responses to those requirements.

Various studies and reports were undertaken in the development of the prior GDA Transport Strategy, including:

- Area-based studies covering the GDA area;
- Demand Management Study;
- Core Bus Network Study;
- Park & Ride Study;
- Transport Modelling Analysis; and
- Environmental reports.

Specifically, a Strategic Environmental Assessment (SEA) was undertaken on the prior GDA Transport Strategy (NTA 2016). As set out in the Environmental Report, in respect of which the SEA of the prior GDA Transport Strategy was undertaken, a number of reasonable alternative strategies were devised and assessed, taking into

account the objectives and the geographical scope of the strategy. The provisions of the prior GDA Transport Strategy (including bus-based transport modes), were evaluated for potential significant effects, and measures integrated into the prior Strategy on foot of SEA recommendations in order to ensure that potential adverse effects were mitigated. In considering the alternative modes on a corridor basis, the environmental assessment undertaken considered that bus-based projects could contribute towards facilitating the achievement of Ireland's greenhouse gas emission targets in terms of emissions per passenger per kilometre.

In addition to direct studies and analyses undertaken as part of the strategy preparation work, the prior GDA Transport Strategy also took into account prior reports and plans in relation to transport provision. These prior studies included, *inter alia*, the following:

- GDA Cycle Network Plan (2013);
- Bus Rapid Transit – Core Network Report (2012);
- Fingal / North Dublin Transport Study (2015);
- Review of the DART Expansion Programme (2015);
- Various prior Luas studies (including Line B2 (Bray), Line D1 (Finglas), Line F1, and F2 (Lucan and Liberties), and Line E (2008)); and
- Analysis carried for a 2011 Draft Transport Strategy.

Given the importance of bus transport as the main public transport mode for the overall region, the delivery of an efficient and reliable bus system formed an important element of the prior GDA Transport Strategy, integrated appropriately with the other transport modes. As Dublin is a low-density city with a large geographic footprint, there are few areas with the size and concentration of population necessary to support rail based public transport, and the bus system remains essential to serve the needs of much of the region.

The bus system has continued to remain an essential element of the public transport infrastructure since the publication of the prior GDA Transport Strategy and is a key element of the new Transport Strategy 2022-2042. The bus system in the Dublin metropolitan area carried 159 million passengers in 2019 (the last full year before the COVID-19 pandemic), compared with 48 million passengers on Luas and 36 million passengers on the DART and rail commuter services over the same year. Converting to percentage figures, the bus system accounts for 65% of public transport passenger journeys in the Dublin region, roughly two thirds of all public transport passengers, with Luas carrying 20% and DART and commuter rail services delivering the remaining 15%.

The most recent published figures for 2022 have shown that public transport passenger numbers are largely recovered to pre-pandemic levels. The figures presented that across the public transport network are 98% of pre-pandemic levels. Specifically, Dublin city area bus services carried 12.7m in November 2022, compared to 12.9m in November 2019 representing a 99% recovery.

The area-based studies referenced above provided an appraisal of existing and future land use and travel patterns, including identifying trends and issues, within eight transport corridors as presented in Image 3.1 (Figure 3.8 in the GDA Transport Strategy 2016-2035). These corridors were also divided into Outer Hinterland, Outer Metropolitan, and Inner Metropolitan areas in terms of character.

Through the work undertaken in the preparation of the prior GDA Transport Strategy, including its supporting studies, various alternatives to deal with the transport needs which are intended to be addressed by the Proposed Scheme were identified and considered. These are set out in the subsequent sections.

3.2.3 'Do Nothing' Alternative

The prior GDA Transport Strategy was developed as the economy was emerging from the post 2008 economic downturn. In turn, the prior GDA Transport Strategy set out a number of key challenges and opportunities within the GDA:

- Suburbanisation and the spread of population, employment and other land uses has continued;
- Arising from the above trend, the mode share of car use continues to increase;
- Car ownership – a key determinant of car use – is likely to increase further, up to saturation levels;
- Cycling has increased significantly in numbers and in mode share;
- Recovery is occurring in public transport use, but not in its mode share;
- Encouraging non-car use for trips to education is a significant challenge;
- There is no spare capacity on the M50 Motorway;
- Protecting and enhancing access to the ports and Dublin Airport is a strategic priority; and
- Current economic growth will mean that within the next few years, overall levels of travel demand are likely to exceed the travel demand experienced in 2006 and 2007 prior to the downturn.

Congestion throughout the GDA was particularly high with the number of cars on the road increasing and significant daily traffic delays. Without intervention, potential impacts could worsen for the region including:

- Continued growth of traffic congestion;
- Impacts on the ability of the region to grow economically due to increased congestion;
- Longer journey times and increased travel stress will diminish quality of life; and
- Environmental emissions targets will not be met.

Ultimately, few areas within the GDA have the size and concentration of population to support rail-based public transport. For most transport corridors in Dublin, bus transport represents the most appropriate transport solution.

In terms of the out-workings of a strategic "Do Nothing" Alternative, it should be noted that, currently, the bus network is characterised by discontinuity, whereby corridors have dedicated bus lanes along less than one third of their lengths on average which means that for most of the journey, buses and cyclists are competing for space with general traffic and are negatively affected by the increasing levels of congestion. This lack of segregated space for different road users results in delayed buses and unreliable journey times for passengers. Issues related to frequency, reliability and a complex network have persisted for many years and will continue to do so without further intervention. In the absence of enhanced frequencies, journey time and reliability the ability to attract new passengers is limited, particularly from private car and also impacts on the ability of the bus network to retain passengers and acts as a demotivator to travel by bus. Within the extents of the Templeogue / Rathfarnham to City Centre Core Bus Corridor Scheme, bus lanes are currently provided on approximately 15% and 45% of route outbound and inbound routes respectively of which significant portions of the route are shared with cyclists and or parking lanes, which can in turn impact on bus reliability.

Adopting a Do Nothing approach to infrastructure improvements, would be likely to result in an exacerbation of the problems arising from discontinuity – such as delayed buses and unreliable journey times. The capacity and potential of the public transport system would remain restricted by the existing deficient and inconsistent provision of bus lanes and the resulting sub-standard levels of bus priority and journey-time reliability. As such, in addition to the continuation of issues relating to existing bus services, future bus services, including the Bus Network Redesign currently being implemented as part of the wider BusConnects Programme, would also suffer from the same lack of journey-time reliability. This would severely impact the attractiveness of public transport as an alternative to private car usage for those who need to travel to/from various locations along the route of the Proposed Scheme.

In addition, without the provision of safe cycling infrastructure, intended as part of the Proposed Scheme, there would also continue to be an insufficient level of safe segregated provision for cyclists who currently, or in the future would be attracted to use the route of the Proposed Scheme. Whilst, in the “Do Nothing” Alternative, ongoing improvements may be provided along the route of the existing corridor extents, this is likely to be piecemeal and disconnected without the wide-strategic benefits to be derived from the Proposed Scheme.

In addition, with the “Do Nothing” Alternative, there would not be significant strategic investment in improvements to the pedestrian environment. Rather, improvements would be limited to relatively limited interventions, for example, ongoing maintenance of existing footpaths and adjacent public spaces. The “Do Nothing” Alternative would not result in improvements to encourage more journeys generally at a local level by active travel, including connecting to and from bus stops for all pedestrians, and in particular improving facilities for the mobility and visually impaired.

For all of these reasons, and having regard to these environmental considerations in particular, a Do Nothing alternative is not considered to be a viable reasonable alternative relative to the outcomes which can be realised by the Templeogue / Rathfarnham to City Centre Core Bus Corridor Scheme.

3.2.4 Bus Rapid Transit (BRT) Alternative

Bus Rapid Transit (BRT) has emerged in recent years as an effective, cost efficient and high-quality public transport system. As BRT is a relatively new mode of transport there are various definitions and interpretations as to what BRT comprises and there are many different forms of BRT systems in operation worldwide. Definitions of BRT range from a Quality Bus Corridor (QBC) to being a fully guided, fully segregated bus system.

A Bus Rapid Transit (BRT) – Core Network Report, prepared in 2012 (NTA 2012) at feasibility study level, investigated the demand, technical, environmental, and economic feasibility of a proposed core BRT network. The feasibility study recommended that further and more detailed work should proceed on two cross city corridors, one of which being the Clongriffin to Tallaght which is pertinent to the Proposed Scheme.

Prior to the completion of these studies, the prior GDA Transport Strategy identified the development of a number of Core Bus Corridors as BRT schemes. These BRT routes formed part of the overall Core Bus Corridor network set out in the prior GDA Transport Strategy. As design and planning work progressed on the Core Bus Corridors, it became clear that the level of differentiation between the BRT corridors and the other Core Bus Corridors would, ultimately, be limited, and that all the corridors should be developed to a consistent standard, providing a more integrated, legible and coherent overall bus system.

By way of illustration of the similarities, all of the Core Bus Corridors are proposed to be developed to provide a high level of priority for the bus vehicles, which is an essential component of a BRT system. Integrated, cashless ticketing systems are planned under the overall BusConnects Programme, delivering the type of functionality often required for a BRT system. While different type vehicles are used around the world on BRT schemes, the longer routes present in Dublin, due to the low density nature of the city, favours the use of double deck vehicles on both BRT and conventional bus corridors, given the better ratio of seated to standing passengers on such vehicles.

Accordingly, it is intended that all of the Core Bus Corridor Infrastructure Works, including the Proposed Scheme, will be developed to provide a BRT level of service, rather than establishing a separate mode on some corridors. Consequently, the Proposed Scheme as a separate BRT mode was not progressed given the limited differentiation from the Core Bus Corridors and the advantages identified above of a unified integrated bus system.

Environmentally the BRT option compared to the Core Bus Corridor proposal would be more impactful in terms of construction impacts, including flora and fauna, heritage, air and noise. BRT typically requires continuous unbroken physical lane infrastructure to achieve high-priority. This would involve significantly more landtake and potentially involve demolition of buildings at pinch-points. In the case of the Core Bus Corridor proposals bus-priority can be achieved through short lengths at pinch-points by the use of signal-control priority.

3.2.5 Light Rail Alternative

The appropriate type of public transport provision in any particular case is predominately determined by the likely quantum of passenger demand along the particular public transport route.

For urban transport systems, bus-based transport is the appropriate public transport mode for passenger demand levels of up to about 4,000 passengers per hour per direction. (UITP 2009). Light rail provision would generally be appropriate to cater for passenger demand of between 3,500 and about 7,000 passengers per hour per direction. Passenger demand levels above 7,000 passengers per hour per direction would generally be catered for by heavy rail or metro modes, which would usually be expected to serve a number of major origins or destinations along a particular corridor. In the case of both the bus and light rail modes, higher levels of passenger demand than the above stated figures can be accommodated under specific conditions.

The development of the prior GDA Transport Strategy considered the likely public transport passenger demand levels across the region using the NTA's transport model. That consideration also took into account the other studies referenced above, in addition to studies that had been carried out to investigate a potential light rail scheme within the area of this corridor. Likely passenger flows were identified to be within the capacity of bus transport, without reaching the quantum of passenger demand which would support the provision of higher capacity rail solutions.

Section 3.2.2 set out various studies undertaken for the prior GDA Transport Strategy. Arising from these studies and the specific assessment and transport modelling work undertaken for the prior Strategy, it was concluded that a bus-based transport system would be the proposed public transport solution in the corridor of the Proposed Scheme. It was considered that there would be insufficient demand to justify the provision of an additional light rail alternative above what is proposed above, particularly given the low to medium density nature of development in this corridor.

Similar to BRT, environmentally the light rail option compared to the Core Bus Corridor proposal would be more impactful in terms of construction impacts, including flora and fauna, heritage, air and noise. Light rail requires continuous unbroken physical lane infrastructure to achieve high-priority. This would involve significantly more land take and potentially involve demolition of buildings at pinch-points. In the case of the Core Bus Corridor proposals bus-priority can be achieved through short lengths at pinch-points by the use of signal-control priority.

3.2.6 Metro Alternative

As highlighted above, when considering the appropriate transport systems to meet the expected transport demand, metro systems are a higher capacity form of light rail, generally designed for peak hour passenger numbers exceeding about 7,000 passengers per hour per direction, and often catering for multiples of that level.

Given the consideration of light rail provision, and the level of likely public passenger use along this overall corridor assessed in the transport modelling work, the development of the prior GDA Transport Strategy identified that a metro solution would not be economically justified within the area covered by this corridor. Accordingly, it was concluded that a high-quality bus-based transport system would be part of the proposed public transport solution in the corridor of the Proposed Scheme.

Environmentally the metro option compared to the Core Bus Corridor proposal would be more impactful in terms of construction impacts, including flora and fauna, heritage, air and noise. Metro systems require unbroken physical lane infrastructure to achieve high-priority. This would involve significantly more land take and potentially involve demolition of buildings at pinch-points. In the case of the Core Bus Corridor proposals bus-priority can be achieved through short lengths at pinch-points by the use of signal-control priority.

3.2.7 Heavy Rail Alternative

Commuter heavy rail systems are generally designed for high levels of passenger demand, usually designed to carry in excess of 10,000 passengers per hour per direction. Where a surface corridor does not already exist in a built-up urban area, there are major challenges in creating sufficient surface space for such provision, requiring large amounts of property acquisition and building demolition.

For those reasons, new heavy rail projects running at surface level are rarely developed in built-up urban areas. Instead, underground rail links, including metro schemes, are deployed to avoid the severe impacts that would accompany a new surface rail line. Environmentally the heavy rail option compared to the CBC proposal would be more impactful in terms of construction impacts, including flora and fauna, heritage, air and noise. Heavy rail requires unbroken physical lane infrastructure to achieve high-priority. This would involve significantly more land take and potentially involve demolition of buildings at pinch-points.

The appropriate locations for new heavy rail provision were carefully considered in the development of the prior GDA Transport Strategy. Having regard to the level of likely public passenger use (demand) along the overall corridor of the Proposed Scheme assessed in the transport modelling work, the development of the prior GDA Transport Strategy did not consider that a new heavy rail solution would be required along this corridor and would not be economically justifiable.

In relation to underground provision, this was considered as part of the metro analysis, given the similarity of underground heavy rail and underground metro schemes. Similar to the metro considerations, the provision of an underground heavy rail solution would not remove the need for additional infrastructure to serve the residual bus needs of the area covered by the Proposed Scheme, nor would it obviate the need to develop the cycling infrastructure required along the route of the Proposed Scheme.

There is no existing heavy rail route within the area covered by the Proposed Scheme for which an upgrade could be considered.

3.2.8 Demand Management Alternative

One of the primary aims of the prior GDA Transport Strategy was to significantly reduce demand for travel by private vehicles, particularly during the commuter peaks, and to encourage use of walking, cycling and public transport. One of the mechanisms to achieve such reduction of private vehicle use is the use of measures to discourage travel by car – i.e. demand management.

Demand management can take many different forms from restricting car movement or car access through regulatory signage and access prohibitions, to parking restrictions, to fiscal measures such as tolls, road pricing, congestion charging, fuel/vehicle surcharges and similar. All of these approaches discourage car use through physical means or by adding additional costs to car use such that it becomes more expensive and alternative modes become more attractive. A key success factor of demand management is greater use of alternative travel modes, in particular public transport.

However, in the case of Dublin, the existing public transport system does not currently have sufficient capacity to cater for large volumes of additional users. In the case of the bus system, the increasing levels of traffic congestion over recent years prior to the COVID-19 pandemic added to bus delays and meant that additional bus fleet and driver resources had been utilised simply to maintain existing timetables, rather than adding overall additional capacity. The objective of the prior GDA Transport Strategy was to significantly increase the capacity, and subsequent use, of the public transport system, focusing on the overall BusConnects Programme in the case of the bus system, the DART+ Programme in the case of heavy rail, and the Luas/Metro programme in the case of light rail.

Congestion is a significant contributor to GHG emissions and the related negative environmental impacts associated with poor air quality, noise levels, and related health and quality of life consequences. Demand management measures need to be associated with positive environmental benefits that can be achieved when commuters change modes to high-quality public transport, walking, and cycling that can help reduce GHG emissions and bring associated health benefits. The objective of the prior GDA Transport Strategy to significantly increase the capacity, and subsequent use of these alternative modes requires that the necessary physical infrastructure is necessary to deliver the efficiencies to make the mode-shift attractive and environmentally beneficial.

In advance of a significant uplift in overall public transport capacity in the Dublin metropolitan area, the implementation of major demand management measures across that area would be unsuccessful. Effectively constraining people from making journeys by car and requiring them to use other modes, without those modes

having the necessary capacity to cater for such transfer, would not deliver an effective overall transport system. Instead, the capacity of the public transport system needs to be built up in advance of, or in conjunction with, the introduction of major demand management measures in the Dublin metropolitan area. This is especially true in the case of the bus system where a major increase in bus capacity through measures such as the Proposed Scheme would be required for the successful implementation of large scale demand management initiatives.

While the foregoing addresses the dependency of demand management measures on public transport capacity, it is equally correct that the provision of greatly enhanced cycling facilities will also be required to cater for the anticipated increase in cycling numbers, both in the absence of demand management measures and, even more so, with the implementation of such measures. Demand management initiatives by themselves will not deliver the level of segregated cycling infrastructure required to support the growth in that mode. Consequently, the progression of demand management proposals will not secure the enhanced safe cycling infrastructure envisaged under the Proposed Scheme.

Accordingly, the implementation of demand management measures would not remove the need for additional infrastructure to serve the bus transport needs of the corridor covered by the Proposed Scheme, nor would it obviate the need to develop the cycling infrastructure required along the route of the Proposed Scheme.

3.2.9 Technological Alternatives

Technological advances have opened up new areas of potential in the delivery of transport infrastructure. Driverless trains and smart highways are two examples. Some of these initiatives, such as driverless trains, are now in use. Technological advancements relating to car use have the potential to improve road safety by reducing potential for driver error and with the use of global positioning systems to be guided to the most efficient route. A shift to electric vehicles will help reduce GHG emissions, but road space is limited and three typical cars (electric or otherwise) still take the same road space for up to 12 occupants that a typical double-deck bus requires to carry up to 90 occupants. The environmental impact of continuing to build more road space for low-occupancy vehicles is unsustainable from both the construction environmental impact and operational environmental impact perspectives. Despite advancements in road-user technology road congestion is not reducing as populations grow, and old inner-city areas of Dublin do not have space to add more car lanes.

The shift to hybrid and ultimately electric buses will reduce both noise and air quality impacts. The evolution of bike-share schemes and advancements in electric bike technology means that cycling is increasing in attractiveness and for longer distances. This attractiveness is only for the few however if cycling infrastructure in the form of safe segregated facilities is not available.

While road construction is costly and has a negative GHG impact there are little advancements in construction technology that present any viable alternatives when conversion of road infrastructure involves reconfiguration of lanes for bus priority, safer segregated cycle tracks and improved pedestrian facilities, or even more significantly for rail-related infrastructure. Road right-of-way space is still shared with multiple underground and overhead utilities that may require to be relocated, and road materials require to be resilient to minimise maintenance frequencies.

Ultimately, however, alternatives have to be able to accomplish the objectives of the project in a satisfactory manner, and should also be feasible including in terms of technology and other relevant criteria. In this context, there is no evidence that such developments will displace the need for mass transit, which is essential to the operation of a modern city. Accordingly, the need to improve the overall bus system will still remain.

Overall, while certain technological advances do provide new opportunities in the transport area, particularly in the area of information provision, they do not yet provide viable alternatives to the core need to provide for the movement of more people by non-car modes, including the provision of safe, segregated cycling facilities. Accordingly, there are no viable technological alternatives to meet the transport needs of this sector of the city.

3.3 Route Alternatives

Following on from the strategic alternatives considered earlier, this Section sets out the route alternatives which were considered as part of the process to establish the Proposed Scheme. Development of the Proposed Scheme has evolved in the following stages:

- 1) **Feasibility and Options Reports**, which were associated with the Proposed Scheme (Rathfarnham to City Centre Core Bus Corridor (CBC) Feasibility Study and Options Assessment Report and Terenure to Tallaght CBC Feasibility Study and Options Assessment Report), were prepared in 2017 and set out the initial route options and concluded with the identification of the Emerging Preferred Route;
- 2) A first round of non-statutory **Public Consultation** was undertaken on the Emerging Preferred Route from 23 January 2019 to 30 April 2019;
- 3) **Development of Draft Preferred Route Option** (April 2019 to March 2020). Informed by feedback from the first round of public consultation, stakeholder engagement and the availability of additional design information, the design of the Emerging Preferred Route evolved with further alternatives considered;
- 4) A second round of non-statutory **Public Consultation** was undertaken on the Draft Preferred Route Option from 4 March 2020 to 17 April 2020. Due to the introduction of COVID-19 restrictions, some planned in-person information events were cancelled, leading to a decision to hold a third consultation later in the year;
- 5) Further development of an updated **Draft Preferred Route Option** was undertaken subsequent to the second round of public consultation, which took account of submissions received, continuing stakeholder engagement and additional design information;
- 6) A third round of non-statutory **Public Consultation** was undertaken on the updated Draft Preferred Route Option from 4 November 2020 to 16 December 2020; and
- 7) Finalisation of the **Preferred Route Option**. Informed by feedback from the overall public consultation process, continuing stakeholder engagement and the availability of additional design information, the Preferred Route Option, being the Proposed Scheme, was finalised.

Alternative route options have been considered in a number of areas during the iterative design of the Proposed Scheme, such as optimising the road layout in constrained locations including Rathfarnham Road, Rathgar Road, Rathmines Road Lower and Templeogue Road. The iterative development of the Proposed Scheme has also been informed by a review of feedback and new information received during each stage of public consultation and as data, such as topographical surveys, transport and environmental information was collected and assessed. In addition, the potential for climate impact was considered in all phases of the design process for the Proposed Scheme. As the design progressed climate was indirectly affected in a positive way by refining the design at each stage through reducing the physical footprint of the scheme coupled with the inclusion of technological bus priority measures.

Key environmental aspects have been considered during the examination of reasonable alternatives in the development of the Preferred Route Option for the Proposed Scheme. Environmental specialists have been involved in the iteration of key aspects of the Proposed Scheme with the engineering design team.

The following key environmental aspects were considered:

- **Archaeological, Architectural and Cultural Heritage** – there is the potential for impacts on archaeological, architectural and cultural heritage when providing CBC infrastructure. The assessment had regard to Recorded Monuments and Protected Structures (RMPs), Sites of Archaeological or Cultural Heritage and on buildings listed on the National Inventory of Architectural Heritage adjacent to the corridor;
- **Flora and Fauna** - The provision of the CBC could have negative impacts on flora and fauna, for example, through construction of new infrastructure through green field sites;
- **Soils and Geology** - 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;

- **Hydrology** - The provision of CBC infrastructure may include aspects (for example structures) with the potential to impact on hydrology;
- **Landscape and Visual** - 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;
- **Noise, Vibration and Air** - Provision of CBC infrastructure (e.g., the construction activities), has the potential to negatively impact on noise, vibration and air quality along a scheme. For example, through construction works;
- **Land Use and the Built Environment** - This criterion assesses the impact of each option on land use character, and measured impacts which would prevent land from achieving its intended use, for example through land acquisition, removal of parking spaces or severance of land; and
- **Climate** – Construction works involve negative GHG emissions impacts, while operational efficiencies of public transport, walking and cycling through modal shift from car usage has the potential to reduce GHG impacts.

3.3.1 Initial High-Level Route Alternatives

The Feasibility and Options Reports identified feasible options along the corridor, assessed these options and arrived at an Emerging Preferred Route. Two reports were published for the Proposed Scheme; the Rathfarnham to City Centre Core Bus Corridor CBC Feasibility Study and Options Assessment Report and the Tallaght to Terenure Core Bus Corridor CBC Feasibility Study and Options Assessment Report. These Reports formed the basis for the first phase of public consultation. A summary of the process is described below.

The Feasibility and Options Reports used a two-stage assessment process to determine the Emerging Preferred Route, comprising:

- Stage 1 – an initial high-level route options assessment, or ‘sifting’ process, which appraised routes in terms of ability to achieve scheme objectives and whether they could be practically delivered. The assessment included consideration of the potential high level environmental constraints as well as other indicators such as land take (particularly the impact on residential front gardens); and
- Stage 2 - Routes which passed the Stage 1 assessment were taken forward to a more detailed qualitative and quantitative assessment. All route options that progressed to this stage were compared against one another using a detailed Multi-Criteria Analysis in accordance with the Department of Transport Document ‘Common Appraisal Framework for Transport Projects and Programmes’.

The study area for the Tallaght to Terenure corridor comprised of two main sections;

- Section 1 examined feasible route options from the N81/M50 interchange to the Springfield Avenue/Templeville Road corridor.
- Section 2 examined feasible route options from the Springfield Avenue/Templeville Road corridor to Terenure Road West.

At the start of the Stage 1 assessment, an initial ‘spider’s web’ of potential route options (consisting of 16 individual links), that could accommodate a Core Bus Corridor was identified for each study area section as shown in Image 3.2 (extracted from the Feasibility Study and Options Assessment Report).

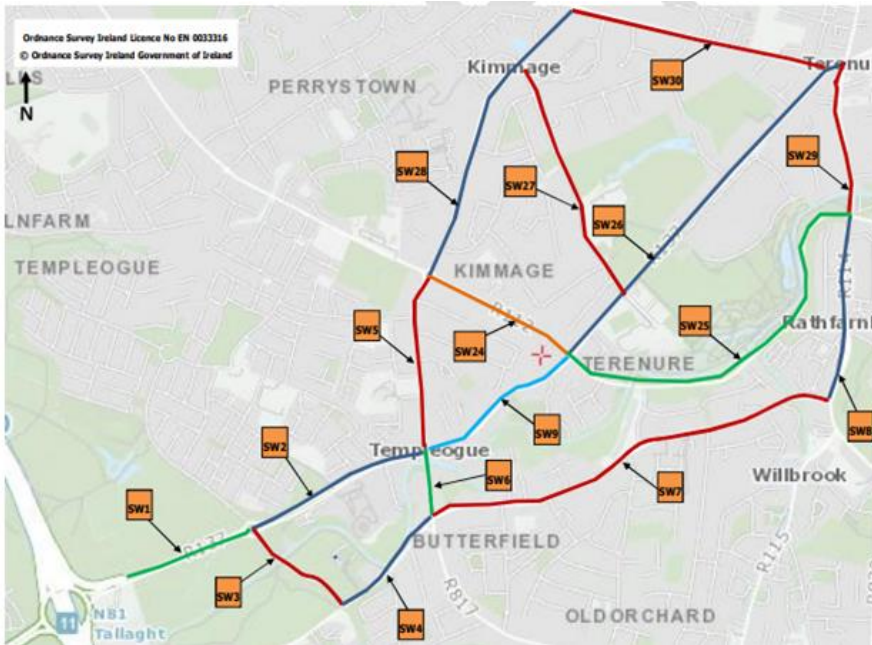


Image 3.2: Spider's Web of Route Options extracted from 'Terenure to Tallaght CBC Feasibility Study and Options Assessment Report'

The study area for the Rathfarnham to City Centre corridor comprised of three main sections:

- Section 1 examined feasible route options from Taylors Lane and Grange Road to the River Dodder.
- Section 2 examined feasible route options from the River Dodder to the Grand Canal.
- Section 3 examined feasible route options from the Grand Canal to the River Liffey.

At the start of the Stage 1 assessment, an initial 'spider's web' of potential route options (consisting of 104 individual links), that could accommodate a Core Bus Corridor was identified for each study area section as shown in Image 3.3 (extracted from the Feasibility Study and Options Assessment Report).



Image 3.3: Spider's Web of Route Options extracted from 'Rathfarnham to City Centre Core Bus Corridor CBC Feasibility Study and Options Assessment Report'

The initial 'spider's web' was narrowed down using a high level qualitative method based on professional judgement and a general appreciation for existing physical conditions / constraints within the study area. This exercise examined and assessed technically feasible route options, based upon specific objectives. In addition to being assessed on their individual merits, routes were also assessed relative to each other, enabling some routes to be ruled out if more suitable alternatives existed.

The Stage 1 assessment considered engineering constraints, high-level environmental constraints and an analysis of population catchments. Numerous links forming part of the 'spider's web' were not brought forward to the Stage 2 assessment due to space constraints, lack of appropriate adjacent linkages to form a coherent end-to-end route, unsuitability of particular routes, in addition to other factors. For example along Rathgar Avenue the route is a narrow single carriageway 2 lane road with the building lines of residential and commercial properties in close proximity to the carriageway along much of this section and limited potential to widen the existing carriageway.

Arising from consideration of the various permutations possible in respect of the "spider's web", a reduced number of coherent end-to-end options were identified for specific sections for further assessment. In arriving at these

options, those links which failed the initial sifting stage were removed as well as those links that were disconnected and could not clearly form part of the end-to-end options.

The options associated with the Tallaght to Terenure corridor Sections 1 and 2 are presented in Image 3.4 and Image 3.5 respectively, while the options associated with Rathfarnham to City Centre corridor Sections 1, 2 and 3 are presented in Image 3.6, Image 3.7 and Image 3.8 respectively.

As noted in the Rathfarnham to City Centre Core Bus Corridor CBC Feasibility Study and Options Assessment Report, it was determined that the route being assessed should stop at the junction of Nutgrove Avenue and Grange Road, as south of this point generally there are three principal routes between Marley Park and the Dodder crossing namely via Stone Mason's Way, Grange Road and Ballyboden Road which currently carry less frequent bus services and which converge at Nutgrove Avenue in the vicinity of the junction with Grange Road.



Image 3.4: Route Options from Initial Sift of Section 1 of the Tallaght to Terenure Corridor

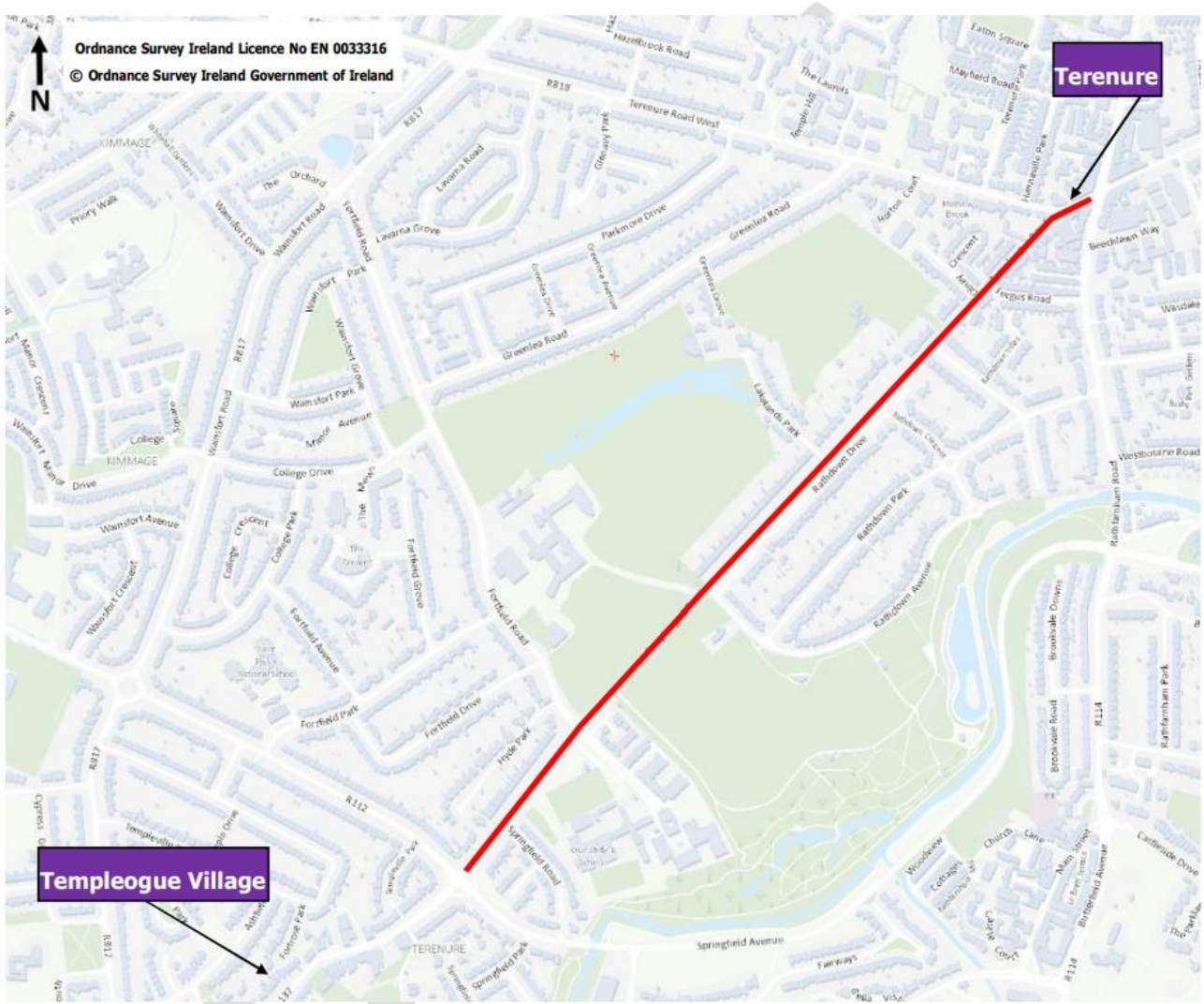


Image 3.5: Route Options from Initial Sift of Section 2 of the Tallaght to Terenure Corridor

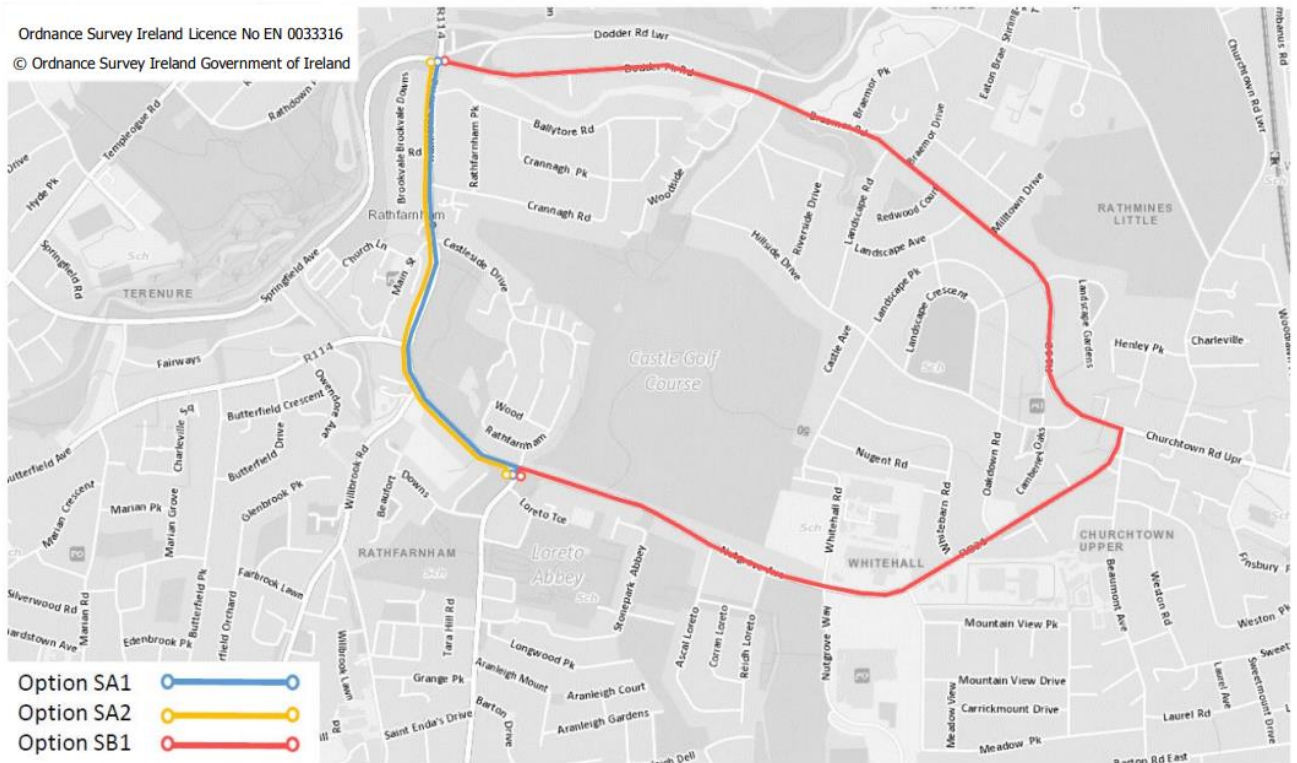


Image 3.6: Route Options from Initial Sift of Section 1 of the Rathfarnham to City Centre Corridor

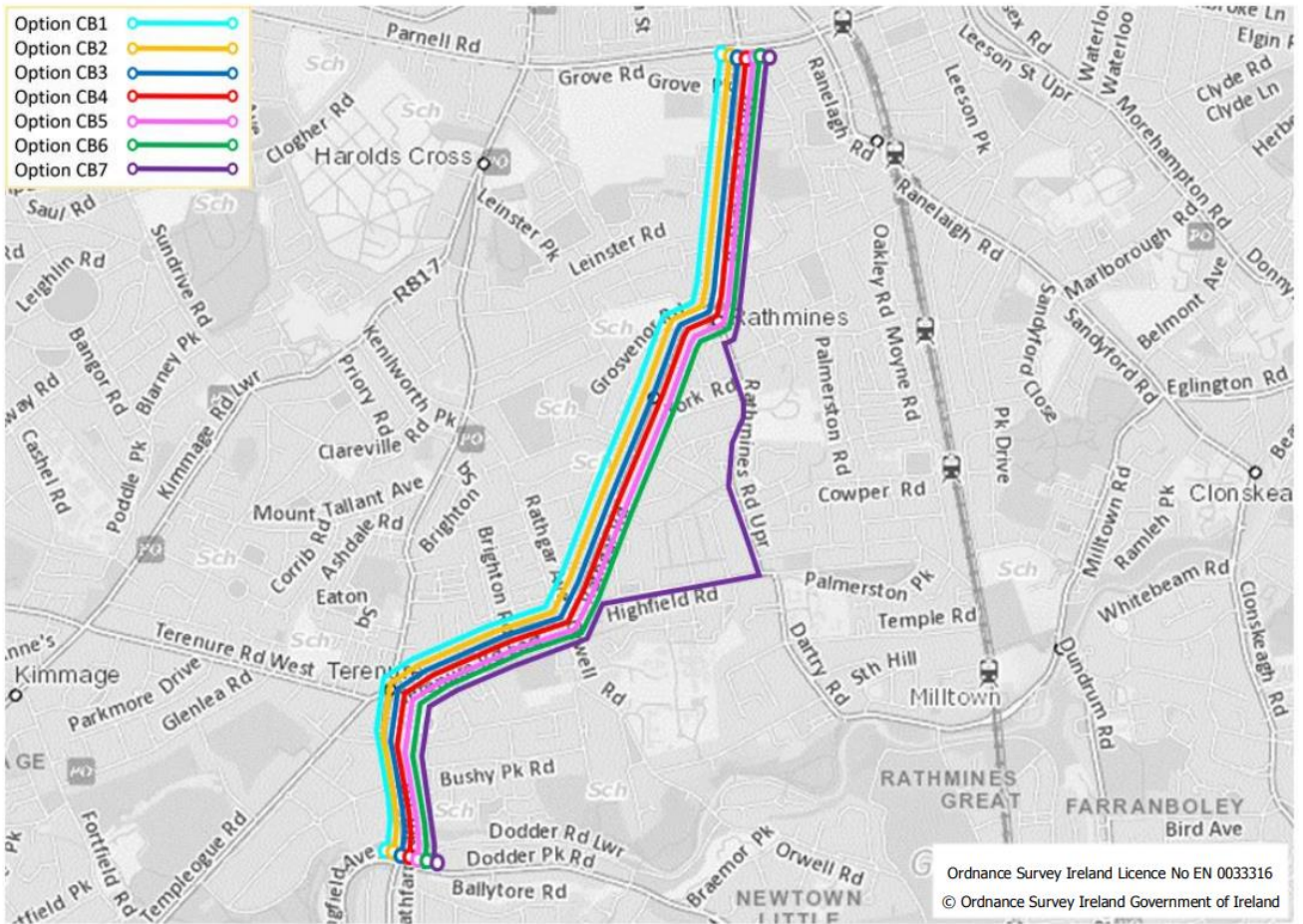


Image 3.7: Route Options from Initial Sift of Section 2 of the Rathfarnham to City Centre Corridor



Image 3.8: Route Options from Initial Sift of Section 3 of the Rathfarnham to City Centre Corridor

3.3.2 Stage 2 – Route Options Assessment

Following completion of Stage 1 initial appraisal, the remaining reasonable alternative options were progressed to Stage 2 of the assessment process. This process involved a more detailed qualitative and quantitative assessment using criteria established to compare the route options.

The indicative scheme for each route option was progressed to a multi-criteria assessment. The 'Common Appraisal Framework for Transport Projects and Programmes' published by the Department of Transport, Tourism and Sport (DTTAS), March 2016, requires schemes to undergo a 'Multi-Criteria Analysis' (MCA) which evaluated the route options under the assessment criteria set out below:

1. Economy;
2. Integration;
3. Accessibility & Social Inclusion;
4. Safety; and
5. Environment.

Under each headline criterion, a set of sub-criteria were used to comparatively evaluate the options. For the Environment criterion the following sub-criteria were considered in the assessment to inform the Emerging Preferred Route:

- **Archaeological, Architectural and Cultural Heritage** – there is the potential for impacts on archaeological, architectural and cultural heritage environment when providing CBC infrastructure. The assessment had regard to RMPs, Sites of Archaeological or Cultural Heritage and on buildings listed on the National Inventory of Architectural Heritage along or adjacent to the corridor;
- **Flora and Fauna** - The provision of CBC infrastructure could have negative impacts on flora and fauna, for example, through construction of new infrastructure through green field sites. These impacts were compared for each scheme under this criterion;
- **Soils and Geology** - Construction of infrastructure necessary for the provision of CBC infrastructure has the potential to impact on soils and geology. For example, through land acquisition and ground excavation. These considerations were compared for each scheme under this criterion;
- **Hydrology** - The provision of CBC infrastructure has the potential to impact on surface water bodies as a result of land-take (with particular emphasis on floodplains and flood zones). Any such impacts were considered for each scheme under this criterion;
- **Landscape and Visual** - Provision of CBC infrastructure has the potential to impact on the townscape/streetscape as well as 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 were compared and any negative effects considered under this criterion;
- **Air Quality** - The provision of CBC infrastructure has the potential to impact the air quality along the route. These effects were compared for each scheme option under this criterion in relation to the volumes of traffic and on whether the road is moving closer to a sensitive receptor, for example road widening or new realignment;
- **Noise & Vibration** - Provision of CBC infrastructure (e.g., the construction activities), has the potential to negatively impact on noise and vibration along a scheme. These effects were compared for each scheme option under this criterion. The impact was quantified in relation to the volumes of traffic and on whether the road is moving closer to a sensitive receptor, for example road widening or new realignment; and
- **Land Use Character** - The provision of CBC infrastructure has the potential to impact on land use character through land-take, severance or reduction of viability which prevents or reduces it from being used for its intended use.

Route options were compared based on a five-point scale, ranging from having significant advantages to having significant disadvantages over other route options. Route options could also be considered neutral when no apparent advantages or disadvantages are identified across all scheme options. **Route Options Route**

3.3.2.1 Tallaght to Terenure Corridor: Route Option Assessment

The Stage 2 Assessment for the Tallaght to Terenure scheme followed the same two sections as per the Stage 1 assessment.

3.3.2.1.1 Section 1: Route Options Assessment

Following the Stage 1 sifting process, only one viable route option for Section 1 remained. This route is presented in Image 3.9.



Image 3.9: Section 1 Route Options extracted from ‘Terenure to Tallaght Core Bus Corridor CBC Feasibility Study and Options Assessment Report’

Due to a number of existing constraints within Templeogue Village, (i.e. the section of Templeogue Road between the Cypress Grove Road/ Old Bridge Road junction and the Springfield Avenue / Templeville Road junction), it required specific consideration which enabled the identification of alternative scheme options (5 no.) for this subsection. A Multi Criteria Analysis was undertaken on these alternative scheme options in order to determine the most appropriate scheme for this section of Templeogue Road. These options, which all follow the same route, are briefly summarised below.

- Option S1-1 would consist of providing an inbound bus gate on Templeogue Road at the Cypress Grove Road / Old Bridge Road junction. From the bus gate, an inbound bus lane would be provided along Templeogue Road. Between the Templeogue Road/Riverside Cottages junction and the Springfield Avenue/Templeville Road junction two-way general traffic would be permitted. An outbound bus lane would be provided from the Springfield Avenue/Templeville Road junction. This bus lane would terminate after a distance of approximately 140m at new bus priority signals on Templeogue Road, after which buses would be required to merge into the adjacent general vehicle traffic lane. An outbound bus lane would be provided approximately 120m in advance of the Cypress Grove Road/Old Bridge Road junction. Cycle lanes would be provided along each side of the carriageway throughout this section.
- Option S1-2 would consist of providing an inbound bus gate on Templeogue Road at the Cypress Grove Road / Old Bridge Road junction. From the bus gate, an inbound general traffic lane would be provided along Templeogue Road where buses would share with local access traffic. From the Templeogue Road/Riverside Cottages junction an inbound bus lane would be provided. An outbound bus lane would be provided from the Springfield Avenue/Templeville Road junction. This bus lane would terminate after a distance of approximately 140m at new bus priority signals on Templeogue Road, after which buses would be required to merge into the adjacent general vehicle traffic lane. An outbound bus lane would be provided approximately 120m in advance of the Cypress Grove Road/Old Bridge Road junction. Cycle lanes would be provided along each side of the carriageway throughout this section.
- Option S1-3 would consist of providing an inbound bus gate on Templeogue Road at the Cypress Grove Road / Old Bridge Road junction. From the bus gate, an inbound bus lane would be provided along Templeogue Road. Between the Templeogue Road/Riverside Cottages junction and the Springfield Ave/Templeville Road junction two-way general traffic would be permitted. An outbound bus lane would be provided from the Springfield Ave/Templeville Road junction. This bus lane would terminate after a

distance of approximately 140m at new bus priority signals on Templeogue Road, after which buses would be required to merge into the adjacent general vehicle traffic lane. An outbound bus lane would be provided approximately 120m in advance of the Cypress Grove Road/Old Bridge Road junction. Cycle lanes would be provided along each side of the carriageway between the Templeogue Road/Riverside Cottages junction and the Springfield Ave/Templeville Road junction. Between the Templeogue Road/Riverside Cottages junction and the Cypress Grove Road/Old Bridge Road junction an alternative route for cyclists would be provided via Old Bridge Road - Butterfield Ave - Kilvere – Dodder Greenway – Riverside Cottages.

- Option S1-4 would consist of providing an inbound bus gate on Templeogue Road at the Cypress Grove Road / Old Bridge Road junction. From the bus gate, an inbound general traffic lane would be provided along Templeogue Road where buses would share with local access traffic. From the Templeogue Road/Riverside Cottages junction an inbound bus lane would be provided. Between the Templeogue Road/Riverside Cottages junction and the Springfield Avenue/Templeville Road junction two-way general traffic would be permitted. An outbound bus lane would be provided from the Springfield Avenue/Templeville Road junction. This bus lane would terminate after a distance of approximately 140m at new bus priority signals on Templeogue Road, after which buses would be required to merge into the adjacent general vehicle traffic lane. An outbound bus lane would be provided approximately 120m in advance of the Cypress Grove Road/Old Bridge Road junction. Cycle lanes would be provided along each side of the carriageway between the Templeogue Road/Riverside Cottages junction and the Springfield Avenue/Templeville Road junction. Between the Templeogue Road/Riverside Cottages junction and the Cypress Grove Road/Old Bridge Road junction cyclists would be able to divert onto an alternative route via Old Bridge Road - Butterfield Ave - Kilvere – Dodder Greenway – Riverside Cottages.
- Option S1-5 would consist of providing continuous bus lanes in each direction along Templeogue Road between the Cypress Grove Road/Old Bridge Road junction and the Springfield Avenue / Templeville Road junction. Cycle lanes would be provided along each side of the carriageway on the approaches to/from Templeogue Road/Cypress Grove Road/Old Bridge Road junction and the Templeogue Road/Springfield Avenue /Templeville Road junction. The inbound cycle lane would terminate approximately 70m northeast of the Templeogue Road/Cypress Grove Road/Old Bridge Road junction after which cyclists would join the adjacent bus lane. Cyclists would continue in the inbound bus lane for approximately 300m, where they would then be provided with a segregated cycle track. This cycle track would continue for approximately 135m where it would then merge with a shared pedestrian/cycle track for a distance of 70m (approx.). An on-road cycle lane would then be provided up to and through the junction. Outbound from the Templeogue Road/Springfield Avenue / Templeville Road junction there would be a cycle lane provided for approximately 95m. Cyclists would then continue in the outbound bus lane until a cycle lane would be provided approximately 100m from the Templeogue Road/Cypress Grove Road/Old Bridge Road junction.

A multi-criteria assessment of all scheme options was undertaken. The assessment sub-criteria which were differentiators between scheme options included Capital Cost, Transport Reliability and Quality, Cycle Network Integration, Traffic Network Integration, Road Safety, Archaeology and Cultural Heritage and Land Use Character.

Under the Economy criteria, options S1-3 and S1-4 performed marginally better than other options in terms of Capital Cost, due to the lower land acquisition costs associated with these options. Option S1-5 performed significantly better than other options in terms of Transport Quality and Reliability due to the fact that full bus priority would be provided in both the inbound and outbound directions under this option, whereas other options relied on shared access with general traffic or bus priority signalling to provide bus priority.

Under the Integration criteria, Options S1-1 and S1-2 performed significantly better than other options as online cycle facilities were provided throughout the extent of these options, while other options would provide offline facilities. Option S1-5 performed significantly better than other options in relation to Traffic Network Integration due to the fact that two-way general traffic would be permitted along the route, while all other options proposed to restrict traffic along the route.

In terms of Road Safety, Option S1-5 was found to have significant benefits over other options as it was proposed to segregate buses from general traffic throughout this section, thereby reducing the likelihood for bus/general traffic and cyclist/general traffic incidents.

As mentioned previously each route option was evaluated using a multi-criteria assessment with one of the primary criteria being 'Environment', under which there was a number of sub-criteria which each route option was considered against comparatively.

In terms of potential Archaeological, Cultural Heritage and Architectural Heritage impacts, options S1-1, S1-2 and S1-5 were considered to have significant advantages over the other options as they would avoid any interaction with Riverside Cottages which is an architectural conservation area.

With regard to Flora and Fauna, options S1-1, S1-2 and S1-5 were considered to have significant advantages over the other options as they would impact on fewer trees due to the fact that these routes did not include the alternative cycle route along the River Dodder.

All five route options were considered neutral when compared against one another under the Soils and Geology sub-criterion, given none presented any appreciable impacts.

All five route options were considered neutral when compared against one another under the Hydrology sub-criterion, given none presented any appreciable impacts.

With regard to Landscape and Visual, it was considered that all five route options were considered neutral when compared against one another as while options S1-1, S1-2 and S1-5 would require more road widening and impact on tree lines on Templeogue Road, Options S1-3 and S1-4 would have additional impacts due to the provision of a cycle route through Riverside Cottages and along the route of the Dodder Greenway.

With regard to Air Quality, it was considered that all five route options were considered neutral when compared against one another given that in each option there is already existing vehicular and bus traffic, and each would have an equivalent level of road widening.

With regard to Noise and Vibration, it was considered that all five route options were considered neutral when compared against one another given that in each option there is already existing vehicular and bus traffic, and each would have an equivalent level of road widening.

With regard to Land Use Character, it was considered that all five route options were considered neutral when compared against one another given that in each option there would be no impact on the viability of the intended land use of the land proposed to be acquired.

Option S1-5 was identified as having significant benefits over other options in relation to Transport Reliability and Quality, Traffic Network Integration, Road Safety, Archaeology and Cultural Heritage and Land Use Character. Option S1-5 was therefore identified as the preferred option for this section and was brought forward into the Emerging Preferred Route.

3.3.2.1.2 Section 2: Route Options Assessment

Following the Stage 1 sifting process, only one viable route option for Section 2 remained. This route is presented in Image 3.10.

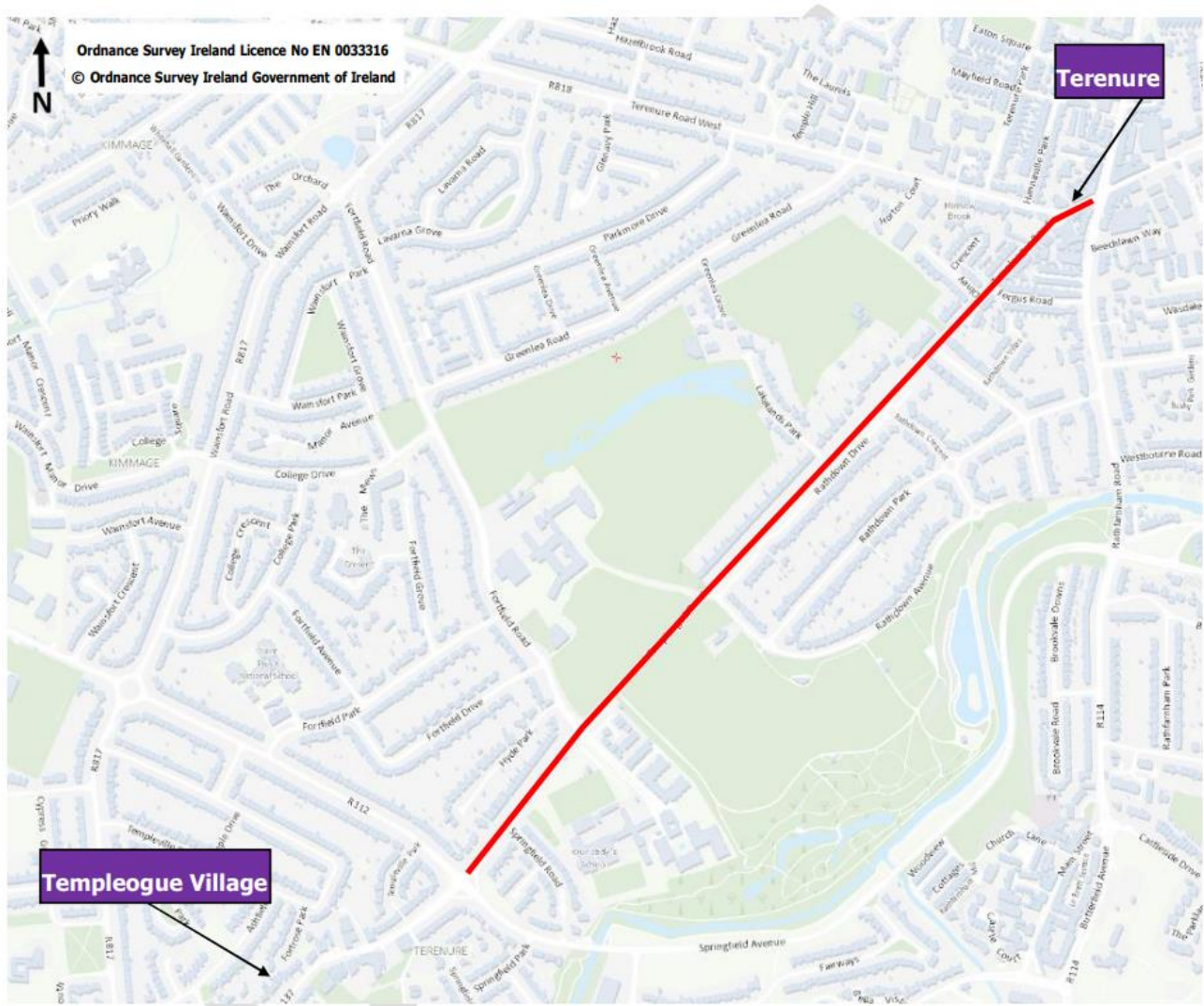


Image 3.10: Section 2 Route Options extracted from ‘Terenure to Tallaght Core Bus Corridor CBC Feasibility Study and Options Assessment Report’

Due to a number of existing constraints, the section of Templeogue Road between the Fortfield Road/Templeogue Road junction and the Terenure Road East/Templeogue Road junction, required specific consideration which required the identification of alternative scheme options (12 no.) for this section. An MCA was undertaken on these alternative scheme options in order to determine the most appropriate scheme for this section of Templeogue Road. These options, which all follow the same route, are briefly summarised below.

- Option S2-1 would consist of providing continuous bus lanes in each direction along Templeogue Road from the Fortfield Road/Templeogue Road junction to Templeogue Road/Terenure Road West junction. Segregated cycle facilities would be provided along each side of Templeogue Road between Fortfield Road/Templeogue Road junction and the Terenure Road West/Templeogue Road junction.
- Option S2-2 would consist of providing bus lanes in each direction from Fortfield Road/Templeogue Road junction to Templeogue Road/Terenure Road West with the exception of a 50m section of Templeogue Road approaching Rathdown Park. Segregated cycle facilities would be provided along each side of the Templeogue Road between Fortfield Road/Templeogue Road junction and the Terenure Road West/Templeogue Road. A bus gate would be implemented on Templeogue Road at Rathdown Park/Templeogue Road junction and Terenure Road West/Templeogue Road junction to ensure only buses and cyclists are permitted, local access traffic would share with buses in the proposed bus lanes.

- Option S2-3 would consist of providing continuous bus lanes in each direction along Templeogue Road from the Fortfield Road/Templeogue Road junction to Templeogue Road/Terenure Road West junction. Segregated cycle facilities would be provided along each side of the Templeogue Road between Fortfield Road/Templeogue Road junction and the Terenure Road West/Templeogue Road junction. A bus gate would be implemented on Templeogue Road at Rathdown Avenue/Templeogue Road junction and Terenure Road West/Templeogue Road junction to ensure only buses and cyclists are permitted, local access traffic would share with buses in the proposed bus lanes.
- Option S2-4 would consist of providing bus lanes in each direction along Templeogue Road from the Fortfield Road/Templeogue Road junction to the Rathdown Park/Templeogue junction. An inbound bus lane would be provided on Rathdown Park and then connecting with the Rathfarnham CBC on Rathfarnham Road. An outbound bus lane would be provided on Fergus Road connecting Rathfarnham Road to Templeogue Road. From the Fergus Road/Templeogue Road junction to Rathdown Park/Templeogue Road junction outbound buses will share with general traffic in the general traffic lane. Cycle lanes would be provided along each side of Templeogue Road between Fortfield Road/Templeogue Road junction and the Terenure Road West/Templeogue Road junction.
- Option S2-5 would consist of providing continuous bus lanes in each direction along Templeogue Road from the Fortfield Road/Templeogue Road junction to Templeogue Road/Terenure Road West junction. Segregated cycle facilities would be provided along each side of Templeogue Road between Fortfield Road and Lakelands Park. Between Lakelands Park/Templeogue Road junction and Terenure Road West/Templeogue Road junction cyclists would be able to divert onto an alternative route via Lakelands Park – Greenlea Grove – Greenlea Road – Terenure Road West.
- Option S2-6 would consist of providing continuous bus lanes in each direction along Templeogue Road from the Fortfield Road/Templeogue Road junction to Templeogue Road/Terenure Road West junction. The outbound general traffic lane on Templeogue Road from Rathdown Park to Terenure Cross would be removed to reduce the required land acquisition on residential properties approaching Terenure Cross. Segregated cycle facilities would be provided along each side of Templeogue Road between Fortfield Road and Lakelands Park. Between Lakelands Park/Templeogue Road junction and Terenure Road West/Templeogue Road junction cyclists would be able to divert onto an alternative route via Lakelands Park – Greenlea Grove – Greenlea Road – Terenure Road West.
- Option S2-7 would consist of providing continuous bus lanes in each direction along Templeogue Road from the Fortfield Road/Templeogue Road junction to Templeogue Road/Terenure Road West junction. The inbound general traffic lane on Templeogue Road from Rathdown Park to Terenure Cross would be removed to reduce the required land acquisition on residential properties approaching Terenure Cross. Segregated cycle facilities would be provided along each side of Templeogue Road between Fortfield Road and Lakelands Park. Between Lakelands Park/Templeogue Road junction and Terenure Road West/Templeogue Road junction cyclists would be able to divert onto an alternative route via Lakelands Park – Greenlea Grove – Greenlea Road – Terenure Road West.
- Option S2-8 would consist of providing continuous bus lanes in each direction along Templeogue Road from the Fortfield Road/Templeogue Road junction to Templeogue Road/Terenure Road West junction. A bus gate would be implemented on Templeogue Road to ensure only buses and cyclists would be permitted entry from the Fortfield Road/Templeogue Road junction to Terenure Road West/Templeogue Road junction. Between the aforementioned bus gates, local access traffic would share with buses in the proposed bus lanes. Segregated cycle facilities would be provided along each side of Templeogue Road between Fortfield Road and Lakelands Park.
- Option S2-9 would consist of providing bus lanes in each direction for the majority of the route along Templeogue Road, with the exception of a 300m section of Templeogue Road from Rathdown Park to Terenure Cross where an outbound bus lane would not be provided. The inbound general traffic lane on Templeogue Road from Rathdown Park to Terenure Cross would be removed to reduce the required land acquisition on residential properties approaching Terenure Cross. A bus gate would be implemented on Templeogue Road to ensure only inbound (north-eastbound) buses and cyclists would be permitted entry from Springfield Avenue/Templeogue Road junction to Rathdown Park (Local access would be

permitted). Segregated cycle facilities would be provided along each side of Templeogue Road between Fortfield Road and Lakelands Park. Between Lakelands Park/Templeogue Road junction and Terenure Road West/Templeogue Road cyclists would be able to divert onto an alternative route via Lakelands Park – Greenlea Grove – Greenlea Road – Terenure Road West.

- Option S2-10 would consist of providing an outbound bus lane along Templeogue Road from Rathdown Park to Fortfield Road. An inbound bus lane would be provided along from Rathdown Park/Templeogue Road junction to Terenure Road West/Templeogue Road junction. A bus gate would be implemented on Templeogue Road to ensure only inbound (north-eastbound) buses and cyclists would be permitted entry from the Springfield Avenue/Templeogue Road junction to Rathdown Park/Templeogue junction (Local access would be permitted). No inbound traffic lane would be provided between the Fortfield Road/Templeogue Road junction and the Rathdown Park/Templeogue junction (Local access would be permitted). Outbound cycle facilities would be provided along Templeogue Road from Terenure Cross to Rathdown Park. Between the Lakelands Park/Templeogue Road junction and the Terenure Road West/Templeogue Road junction cyclists would be able to divert onto an alternative route via Lakelands Park – Greenlea Grove – Greenlea Road – Terenure Road West. The removal of the inbound general traffic lane is proposed on Templeogue Road from Rathdown Park to Terenure Cross to reduce the required land acquisition on residential properties approaching Terenure Cross.
- Option S2-11 would consist of providing bus lanes in each direction for the majority of the route along Templeogue Road, with the exception of a 300m section of Templeogue Road from Rathdown Park to Terenure Cross where an outbound bus lane would not be provided. The removal of the inbound general traffic lane is proposed on Templeogue Road from Rathdown Park to Terenure Cross to reduce the required land acquisition on residential properties approaching Terenure Cross. A bus gate would be implemented on Templeogue Road to ensure only inbound (north-eastbound) buses and cyclists would be permitted entry from Springfield Avenue/Templeogue Road junction to Rathdown Park (Local access would be permitted). Outbound cycle facilities provided along Templeogue Road from Terenure Cross to Rathdown Park. Between Lakelands Park/Templeogue Road junction and Terenure Road West/Templeogue Road cyclists would be able to divert onto an alternative route via Lakelands Park – Greenlea Grove – Greenlea Road – Terenure Road West.
- Option S2-12 would consist of providing an outbound bus lane along Templeogue Road from Rathdown Park to Springfield Avenue. An inbound bus lane would be provided between the Olney Grove/Templeogue Road junction and the Terenure Road West/Templeogue Road junction. A bus gate would be implemented on Templeogue Road to ensure only inbound (north-eastbound) buses and cyclists would be permitted entry from Springfield Avenue/Templeogue Road junction to Rathdown Park/Templeogue junction (Local access would be permitted). No inbound traffic lane would be provided between the Fortfield Road/Templeogue Road junction and Rathdown Park/Templeogue junction (Local access would be permitted). A two-way cycle route would be provided through Bushy Park adjacent to Templeogue Road. A shared/mixed street would be provided along Rathdown Drive. Segregated cycle facilities would be provided in the outbound direction from the Terenure Road West/Templeogue Road junction to Rathdown Drive pedestrian access/new proposed Toucan crossing. The inbound general traffic lane on Templeogue Road would be removed from Olney Grove to Terenure Cross, to reduce the required land acquisition on residential properties approaching Terenure Cross.

A multi-criteria assessment of all scheme options was undertaken. The assessment sub-criteria which were differentiators between scheme options included Capital Cost, Transport Reliability and Quality, Residential Population and Employment Catchments, Cycle Network Integration, Traffic Network Integration, Key Trip Attractors, Road Safety, Pedestrian Safety, Flora and Fauna, Landscape and Visual, Air Quality, Noise and Vibration and Land Use Character.

Under the Economy criteria, Options S2-10, S2-11 and S2-12 all performed significantly better than other options due to the lower infrastructure costs and land acquisition costs associated with these options. In terms of Transport Quality and Reliability, Options S2-1, S2-3 and S2-5 to S2-8 all performed significantly better than other options as full bus priority would be provided along the corridor with these options.

Under the Integration criteria, all options performed marginally better than Option S2-4 due to the fact that Option S2-4 would serve a smaller residential and employment catchment due to its routing along Fergus Road. Options S2-1 to S2-4 and S2-8 performed significantly better than other options in terms of Cycling Integration due to the fact that the proposed cycle route is adjacent to the CBC along Templeogue Road. In terms of Traffic Network Integration, Option S2-1, S2-4 and S2-5 performed significantly better than other options due to the fact that they would have little to no impact on existing traffic movements.

Under the Accessibility and Social inclusion criteria, Option S2-4 scored marginally lower than all other options due to its routing along Fergus Road.

In terms of Road Safety, Options S2-4, S2-20 and S2-12 performed marginally worse than other options due to the fact that fully segregated bus lanes were not proposed along the entire section. In terms of Pedestrian Safety, Options S2-11 and S2-12 performed marginally worse than all other options as no footpath would be provided on the eastern side of Templeogue Road from Fortfield Road to Rathdown Park.

As mentioned previously each route option was evaluated using a multi-criteria assessment with one of the primary criteria being 'Environment', under which there was a number of sub-criteria which each route option was considered against comparatively.

All 12 route options were considered neutral when compared against one another under the Archaeological, Cultural Heritage and Architectural Heritage impacts sub-criterion, given none presented any appreciable impacts.

With regard to Flora and Fauna, options S2-12 was considered to have significant advantages over the other options as it would not impact on any existing trees along the route, whereas all other options had varying degrees of impact on existing trees.

All 12 route options were considered neutral when compared against one another under the Soils and Geology sub-criterion, given none presented any appreciable impacts.

All four route options were considered neutral when compared against one another under the Hydrology sub-criterion, given none presented any appreciable impacts.

With regard to Landscape and Visual, it was considered that options S2-10, S2-11 and S2-12 had significant advantages over other options due to the fact that property acquisition would be minimised under these options.

With regard to Air Quality, it was considered that options S2-10, S2-11 and S2-12 had significant advantages over other options due to the fact that residential access only would be permitted on Templeogue Road, due to the proposed bus gate. It was noted that these options would also minimise the number of vehicles rerouting to residential roads such as Rathdown Park.

With regard to Noise and Vibration, it was considered that options S2-10, S2-11 and S2-12 had significant advantages over other options due to the fact that residential access only would be permitted on Templeogue Road, due to the proposed bus gate. It was noted that these options would also minimise the number of vehicles rerouting to residential roads such as Rathdown Park.

With regard to Land Use Character, it was considered that option S2-4 had significant advantages over other route options due to the greater impacts that other options would have on the accessibility to the businesses in Terenure Village.

Option S2-12 was identified as having significant benefits over other options in relation to Capital Cost, Flora and Fauna, Landscape and Visual, Air Quality and Noise and Vibration. Option S2-12 was therefore identified as the preferred option for this section and was brought forward into the Emerging Preferred Route.

3.3.2.2 Rathfarnham to City Centre Corridor: Route Options Assessment

The Stage 2 Assessment for the Rathfarnham to City Centre scheme followed the same three sections as per the Stage 1 assessment.

3.3.2.2.1 Section 1: Route Options Assessment

Following the Stage 1 sifting process, three viable route options for Section 1 were taken forward for assessment and further refinement:

- Route Option SA1: A route option via Grange Road and Rathfarnham Road;
- Route Option SA2: A route option via Grange Road and Rathfarnham Road with a parallel cycle route via Rathfarnham Wood and Castleside Drive;
- Route Option SB1: A route option via Nutgrove Avenue, Nutgrove Way, Braemor Road and Dodder Park Road.

These routes are presented in Image 3.11.

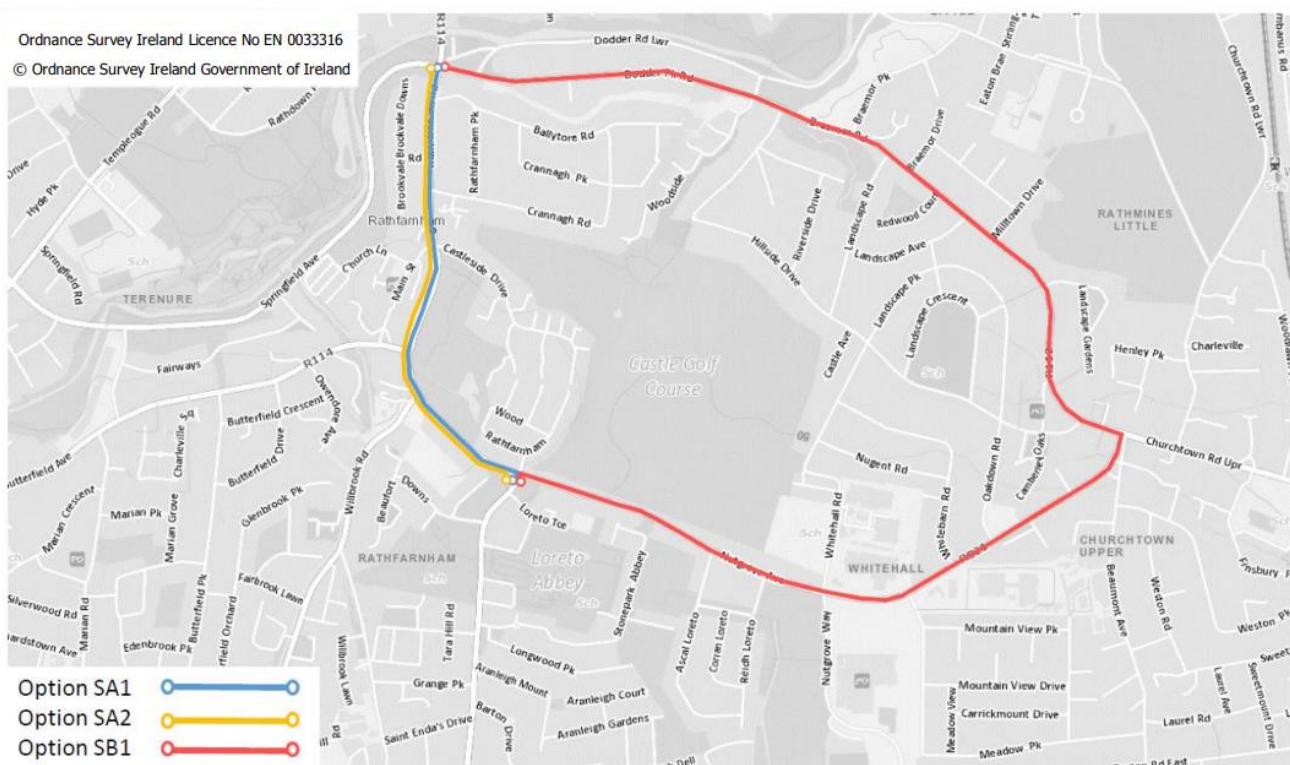


Image 3.11: Section 1 Route Options extracted from 'Rathfarnham to City Core Bus Corridor CBC Feasibility Study and Options Assessment Report'

Within Option SB1, there are two constrained locations which required specific consideration. These scheme subsections were brought through an initial assessment to determine the optimum layout for these areas to be included in the principle route options listed above. These sub-sections are described below and are presented in Image 3.12.

- Sub-section NAR - Nutgrove Avenue from Grange Road junction travelling southeast (inbound) towards Nutgrove Shopping Centre; and
- Sub-section NAC - Nutgrove Avenue travelling northeast (inbound) towards Churchtown from Nutgrove Way junction.

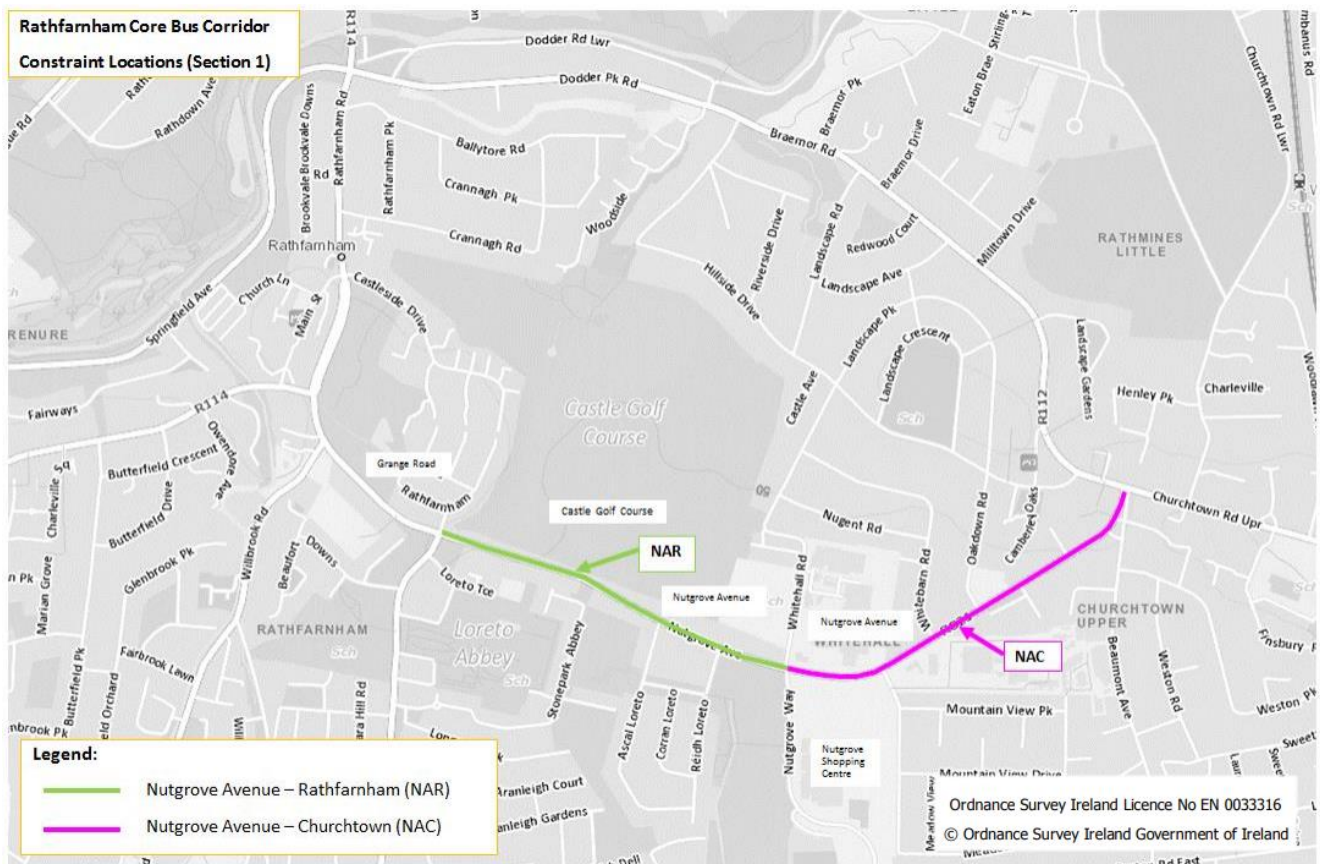


Image 3.12: Section 1 constrained sub-sections extracted from 'Rathfarnham to City Core Bus Corridor CBC Feasibility Study and Options Assessment Report'

A multicriteria assessment was carried out within each of these two sub-sections, as detailed below.

3.3.2.2.1.1 Sub-section NAC

There were two scheme options (NAC1 & NAC2) considered for the section along Nutgrove Avenue between Nutgrove Way and Braemor Road/Churchtown Road Upper which are discussed below:

- Sub-option NAC1 would include the provision of segregated bus facilities in conjunction with two-way traffic for the entire length of Nutgrove Avenue. Segregated cycle facilities would be provided by way of a separate route for cyclists via Whitehall Road connecting to cycle facilities on Braemor Road (with the exception of Landscape Park and Landscape Avenue); and
- Sub-option NAC2 would include the provision of segregated bus facilities in conjunction with one-way traffic for the entire length of Nutgrove Avenue. Segregated cycle facilities would be provided on Nutgrove Avenue.

A multi-criteria assessment of all scheme options was undertaken. The assessment sub-criteria which were differentiators between scheme options included Capital Cost, Cycle Network Integration, Traffic Network Integration, Landscape and Visual, Air Quality, Noise and Vibration and Land Use Character. Sub-option NAC1 was identified as having significant benefits over sub-option NAC2 in relation to Traffic Network Integration and Land Use Character, and some benefits over NAC2 in relation to Landscape and Visual, Air Quality and Noise and Vibration. Following a detailed MCA, sub-option NAC1 was identified as the preferred sub-option for this sub-section and was brought forward for assessment as part of Option SB1.

3.3.2.2.1.2 Sub-section NAC

There are two scheme sub-options (NAR1 & NAR2) considered for the section along Nutgrove Avenue between Grange Road and Nutgrove Way which are discussed below.

- Sub-option NAR1: This route sub-option would include the provision of continuous bus priority in both directions. Segregated cycle facilities would be provided via parallel route through the Castle Golf Club & the Good Shepherd school lands; and
- Sub-option NAR2: The route sub-option would include the provision of continuous bus priority in both directions. Segregated cycle facilities would be provided for cyclists via Rathfarnham Wood, The Castlelands and Castleside Drive before connecting to the proposed cycle facilities on Rathfarnham Road.

A multi-criteria assessment of all scheme options was undertaken. The assessment sub-criteria which were differentiators between scheme sub-options included Capital Cost, Cycle Network Integration, Flora and Fauna, Landscape and Visual, and Land Use Character. Option NAR2 was identified as having significant benefits over sub-option NAR1 in relation to Capital Cost, and some benefits over NAR1 in relation to Flora and Fauna, Landscape and Visual and Land Use Character. Following a detailed MCA, Option NAR2 was identified as the preferred option for this sub-section and was brought forward for assessment as part of Option SB1.

Following the assessment of the two constrained sub-sections as outlined above, an MCA was undertaken of the principal route options along this section of the scheme, in order to determine the most appropriate scheme for this section of the Proposed Scheme. These options are briefly summarised below:

- Option SA1 would involve the provision of segregated bus lanes between Grange Road/Nutgrove Avenue junction to the Dodder River crossing at Pearse Bridge. Segregated cycle facilities would be provided along the CBC route on Grange Road and Rathfarnham Road to just north of the Rathfarnham Main Street junction. A parallel cycle route would be provided via Brookvale Downs;
- Option SA2 would involve the provision of segregated bus lanes between Grange Road/Nutgrove Avenue junction to the Dodder River crossing at Pearse Bridge. Segregated cycle facilities would be provided along the CBC route on Grange Road and Rathfarnham Road to just north of the Rathfarnham Main Street junction. A parallel cycle route would be provided via Rathfarnham Wood, Castleside Drive and Brookvale Downs; and
- Option SB1 would involve the provision of segregated bus lanes between Grange Road/Nutgrove Avenue junction to Dodder Park Road/Rathfarnham Road junction via Churchtown. Segregated parallel cycle routes would be provided along Rathfarnham Wood/Castleside Drive and via Whitehall Road/Landscape Park.

A multi-criteria assessment of all scheme options was undertaken. The assessment sub-criteria which were differentiators between scheme options included Capital Cost, Transport Reliability and Quality, Residential Population and Employment Catchments, Cycle Network Integration, Traffic Network Integration, Key Trip Attractors, Deprived Geographic Areas, Road Safety, Archaeology & Cultural Heritage, Architectural Heritage, Flora and Fauna, Landscape and Visual, Air Quality, Noise and Vibration and Land Use Character.

Under the Economy criteria, Option SA2 performed significantly better than other options in terms of capital cost. This is due to the significantly higher infrastructure cost associated with Option SB1 and the higher land acquisition cost associated with Option SA1. In terms of Transport Quality and Reliability, Option SB1 performs significantly worse than other options due to the significant additional length of this route.

Under the Integration criteria, in terms of Residential Populations and Employment Catchments, Options SA1 and SA2 performed marginally worse better than Option SB1 which extends west towards the existing residential areas of Nutgrove & Churchtown, increasing the residential and employment catchments. Route option SA1 performed significantly better than the other options in terms of Cycle Network Integration as it would include segregated cycle facilities along the majority of the CBC route (Primary/Secondary Route 01 GDA CNP) while

SA2 and SB1 provide separate segregated cycle routes. Under Traffic Network Integration, Options SA1 and SA2 performed marginally better than Option SB1 due to the larger envisaged impact on traffic capacity at junctions along the route associated with the reallocation of traffic lanes to bus lanes.

Route option SB1 performed marginally better than other options under the Accessibility and Social Inclusion criteria as the route generally serves more trip attractors along its lengthier route as well as areas with a lower Deprivation index.

In terms of Road Safety, Option Sa1 and SA2 performed marginally better than Option SB1 as these options would have a requirement for less right turning movements.

As mentioned previously each route option was evaluated using a multi-criteria assessment with one of the primary criteria being 'Environment', under which there was a number of sub-criteria which each route option was considered against comparatively.

With regard to Archaeology and Cultural Heritage, options SA1 and SA2 were considered to have moderate advantages over option SB1 due to the fact that fewer recorded monuments of site of archaeological and cultural heritage merit were identified within the assessment area.

With regard to Architectural heritage, option SB1 was considered to have moderate advantages over the other options due to the fact that fewer protected structures were identified within the assessment area.

With regard to Flora and Fauna, options SA2 was considered to have moderate advantages over the other options as it would impact on fewer existing trees along the route.

All three route options were considered neutral when compared against one another under the Soils, Geology and Hydrology sub-criterion, given none presented any appreciable impacts.

With regard to Landscape and Visual, it was considered that option SA2 had moderate advantages over other options as this option had no appreciable impacts, while other options had moderate impacts.

With regard to Air Quality, it was considered that option SA2 had moderate advantages over other options as this option had no appreciable impacts, while other options had moderate impacts.

With regard to Noise and Vibration, it was considered that option SA2 had moderate advantages over other options as this option had no appreciable impacts, while other options had moderate impacts.

With regard to Land Use Character, it was considered that option SA2 had moderate advantages over other route options due to the greater impacts that other options would have due to land acquisition on Nutgrove Road in the case of Option SB1 and the impact on Rathfarnham Castle in the case of option SA1.

Option SA1 was identified as having significant benefits over other options in relation to Transport Quality and Reliability and Cycle Network Integration. Option SA1 was therefore identified as the preferred option for this section and was brought forward into the Emerging Preferred Route.

3.3.2.2.2 Section 2: Route Options Assessment

Following the Stage 1 sifting process, seven viable route options for Section 2 were taken forward for assessment and further refinement:

- Route Option CB1 - A route option via Rathfarnham Road, Terenure Road East, Rathgar Road, Rathmines Road Lower (Inbound traffic only on Rathgar Road, Outbound traffic only Rathmines Road);
- Route Option CB2 - A route option via Rathfarnham Road, Terenure Road East, Rathgar Road, Rathmines Road Lower (Inbound traffic only on Rathgar and Rathmines Road);

- Route Option CB3 - A route option via Rathfarnham Road, Terenure Road East, Rathgar Road, Rathmines Road Lower (Outbound traffic only on Rathgar and Rathmines Road);
- Route Option CB4 - A route option via Rathfarnham Road, Terenure Road East, Rathgar Road, Rathmines Road Lower (Parallel cycle route via Charleville Road, Grosvenor Lodge and Cathal Brugha Barracks);
- Route Option CB5 - A route option via Rathfarnham Road, Terenure Road East, Rathgar Road, Rathmines Road Lower (Inbound bus lane provided on Rathmines Road Lower from Rathmines Road Upper to Military Road junction and outbound bus lane provided from Grove Road to Military Road junction);
- Route Option CB6 - A route option via Rathfarnham Road, Terenure Road East, Rathgar Road, Rathmines Road Lower (Outbound traffic only on Rathmines Road Lower); and
- Route Option CB7 - A route option via Rathfarnham Road, Terenure Road East, Rathgar Road, Rathmines Road Lower (Bus lanes via Highfield Road/Rathmines Road Upper) (Parallel cycle route).

These routes are presented in Image 3.13.

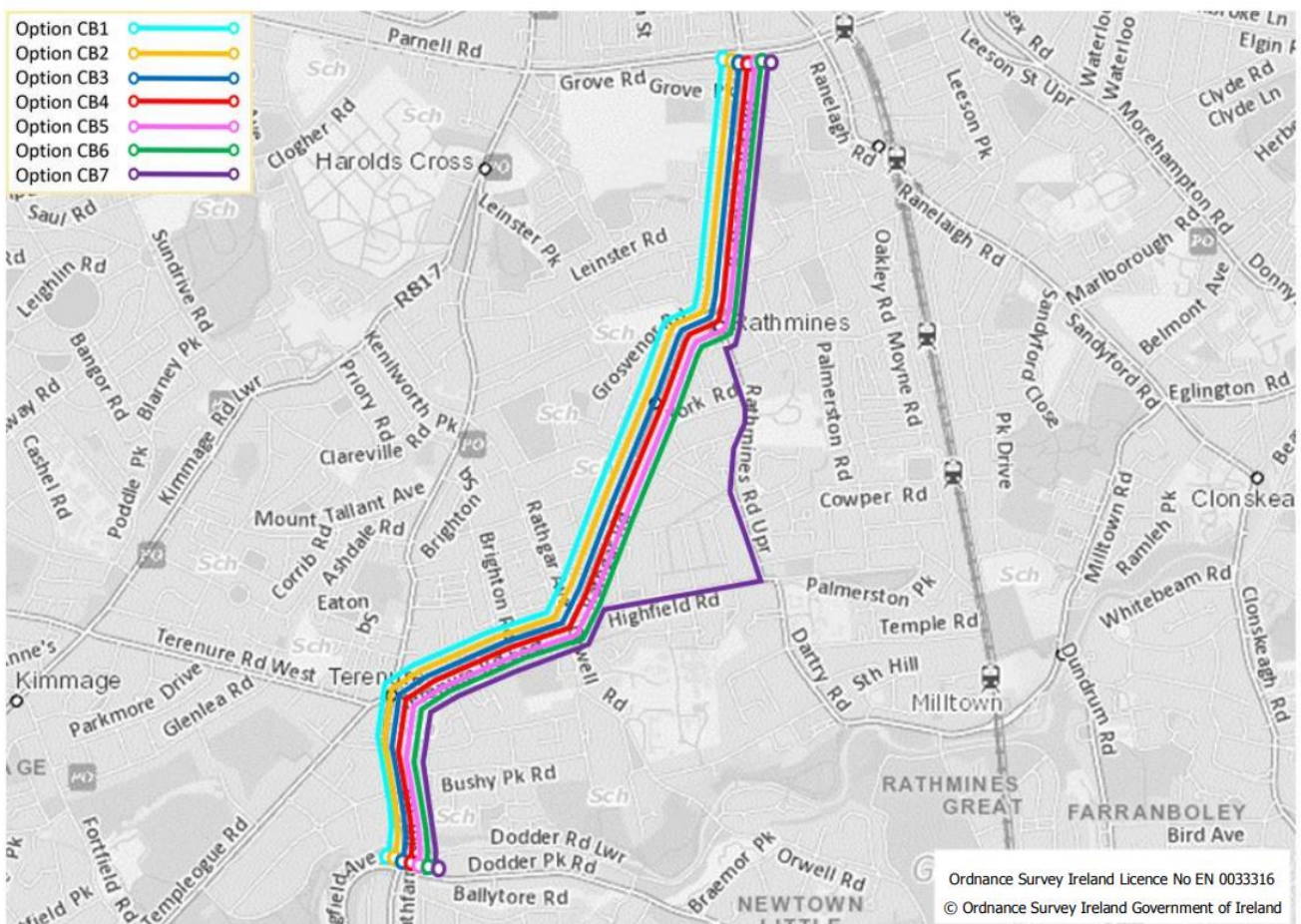


Image 3.13: Section 2 Route Options extracted from 'Rathfarnham to City Core Bus Corridor CBC Feasibility Study and Options Assessment Report'

Within the aforementioned route options, there were two constrained locations which required specific consideration. These constrained locations were brought through an initial assessment to determine the optimum layout for these areas to be included in the principal route options listed above. These constrained locations are as follows:

- Terenure Village to Rathgar Village – TVR, as indicated on Image 3.14 below; and
- Cycle Route options between Bushy Park Road junction and Grand Canal – as indicated on Image 3.15 below.

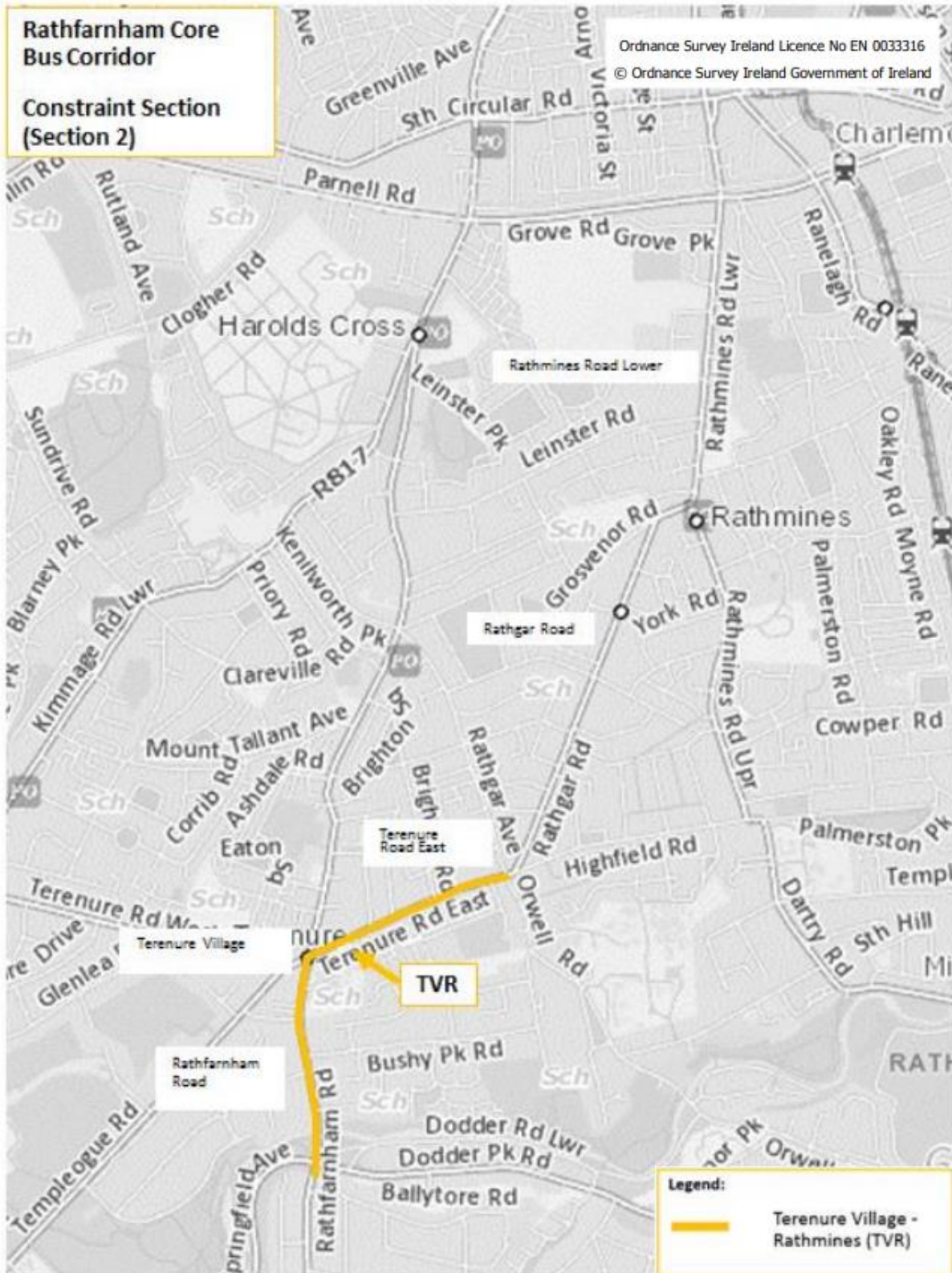


Image 3.14: Section 2 constrained sub-section from Terenure Village to Rathgar Village extracted from 'Rathfarnham to City Core Bus Corridor CBC Feasibility Study and Options Assessment Report'

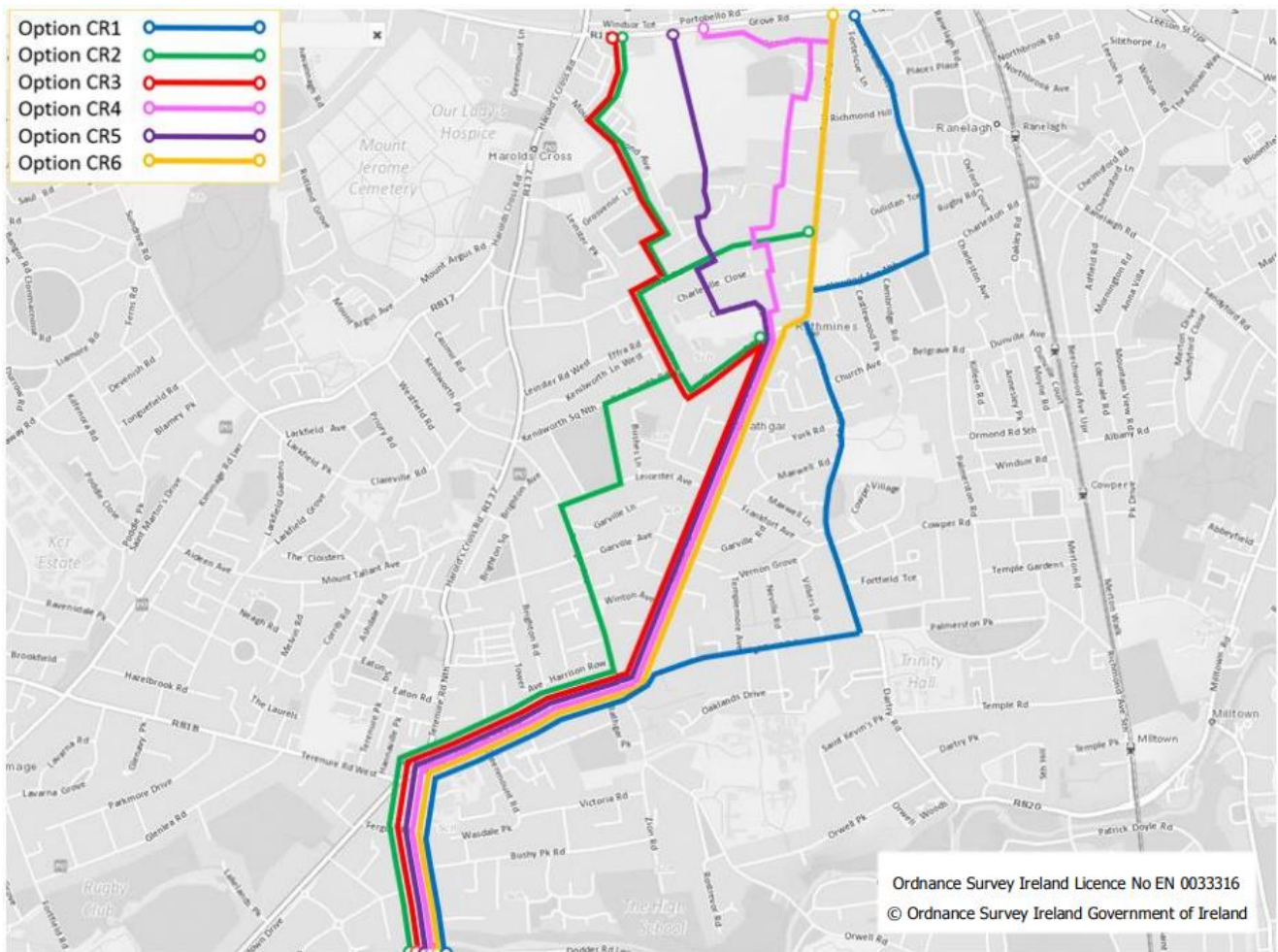


Image 3.15: Section 2 constrained sub-section Parallel Cycle Route Options between the Dodder Crossing and the Grand Canal extracted from ‘Rathfarnham to City Core Bus Corridor CBC Feasibility Study and Options Assessment Report’

A multi-criteria assessment was carried out within each of these two sub-sections, as detailed below.

3.3.2.2.2.1 Sub-section - Terenure Village to Rathgar Village

There were eight scheme sub-options (TVR1 to TVR8) considered for the section along Rathfarnham Road and Terenure Road East to Rathgar Village which are discussed below.

- Sub-option TVR1: This route sub-option would include the provision of segregated bus facilities along Rathfarnham Road and Terenure Road East with the exception of a 100m section at Terenure Cross where an inbound bus lane would not be provided and a short section on Rathfarnham Road between Pearse Bridge and Bushy Park Road junction, where an outbound bus lane would not be provided. Segregated cycle facilities would be provided on Bushy Park Road and Orwell Road;
- Sub-option TVR2: This route sub-option would include the provision of segregated bus facilities along Rathfarnham Road and Terenure Road East. This would require the removal of one of the general traffic lanes in the outbound direction. A 3m wide two-way cycle bridge would be provided on the western side of Pearse bridge. Segregated cycle facilities would be provided on Bushy Park Road and Orwell Road;
- Sub-option TVR3: This route sub-option would include the provision of segregated bus facilities along Rathfarnham Road and Terenure Road East in both directions with the exception of a 100m section of Terenure Road East at Terenure Cross where an inbound bus lane would not be provided. Segregated cycle facilities would be provided along the CBC route on Rathfarnham Road and Terenure Road East (with the exception of a 270m section from Terenure Cross to Ferrard Road and a 20m section east of Rathgar Village);

- Sub-option TVR4: This route sub-option would include the provision of segregated bus facilities along Rathfarnham Road and Terenure Road East, with the exception of a 100m section at Terenure Cross where an inbound bus lane would not be provided. A cycle bridge across the River Dodder (to the west of Pearse Bridge) is proposed, to provide a parallel cycle route from Brookvale Downs to Rathdown Park. Segregated cycle facilities would also be provided in both directions on Bushy Park Road, Zion Road and Orwell Road;
- Sub-option TVR5: This route sub-option would include the provision of segregated bus facilities along Rathfarnham Road and Terenure Road East, with the exception of a 100m section at Terenure Cross where an inbound bus lane would not be provided. A cycle bridge across the River Dodder (to the east of Pearse Bridge) is proposed to provide a parallel cycle route from the Dodder Greenway to Riversdale Avenue. Segregated cycle facilities would also be provided in both directions on Bushy Park Road, Zion Road and Orwell Road;
- Sub-option TVR6: This route sub-option would include the provision of segregated bus facilities along Rathfarnham Road and Terenure Road East, with the exception of a 100m section at Terenure Cross where an inbound bus lane would not be provided. A cycle bridge across the River Dodder (to the east of Pearse Bridge) is proposed to provide a parallel cycle route from the Dodder Greenway to Laurelton. Segregated cycle facilities would also be provided in both directions on Bushy Park Road, Zion Road and Orwell Road;
- Sub-option TVR7: This route sub-option would include the provision of segregated bus facilities along Rathfarnham Road and Terenure Road East, with the exception of a 100m section at Terenure Cross where an inbound bus lane would not be provided. Segregated cycle facilities would be provided on a route via the Dodder Greenway, through Orwell Park and along Orwell Road to Rathgar Village; and
- Sub-option TVR8: This route sub-option would include the provision of continuous bus priority in both directions but with different routes for the northbound (Bushy Park Road/Orwell Road) and southbound (Terenure Road/Rathfarnham Road), with the exception of the section on Rathfarnham Road from Westbourne Road junction to Bushy Park Road junction where bus priority signalling is proposed in the outbound direction at this pinch point. Segregated cycle facilities would also be split in terms of direction. These facilities would be provided in the opposite direction to the bus facilities on Bushy Park Road/Terenure Road East. There is also a 100m section of Terenure Road East at Terenure Cross where the inbound cycle lane would not be provided

The assessment sub-criteria which were differentiators between scheme sub-options included Capital Cost, Transport Quality and Reliability, Residential Population and Employment Catchments, Cycle Network Integration, Traffic Network Integration, Key Trip Attractors, Road Safety, Architectural Heritage, Flora and Fauna, Landscape and Visual, Air Quality, Noise and Vibration and Land Use Character. Sub-option TVR3 was identified as having significant benefits over other sub-options in relation to Cycle Network Integration and Traffic Network Integration, and some benefits over other sub-options with respect to Flora and Fauna, Landscape and Visual, Air Quality, Noise and Vibration and Land Use Character. Following an MCA, sub-option TVR3 was identified as the preferred option for this sub-section and was brought forward for assessment as part of the principal route options.

3.3.2.2.2.2 Sub-section - Parallel Cycle Route Options between the Dodder Crossing and the Grand Canal

There were six scheme sub-options (CR1 to CR6) considered for the section between the Bushy Park junction on Rathfarnham Road to the Grand Canal Crossing via Rathmines Village which are discussed below.

- Sub-option CR1: This route sub-option would include the provision of a cycle route via Rathfarnham Road, Terenure Road East, Highfield Road, Rathmines Road Upper, Castlewood Avenue and Mount Pleasant Avenue. The route would also include a new cycle bridge crossing the Grand Canal;
- Sub-option CR2: This route sub-option would include the provision of a cycle route via Rathfarnham Road, Terenure Road East, Rathgar Avenue, Kenilworth Square, Grosvenor Square, Mount Drummond Avenue, and O'Hara Avenue. The route would also include a new cycle bridge crossing the Grand Canal;

- Sub-option CR3: This route sub-option would include the provision of a cycle route via Rathfarnham Road, Terenure Road East, Rathgar Road, Grosvenor Road, Grosvenor Square, Mount Drummond Avenue, and O'Hara Avenue. The route would also include a new cycle bridge crossing the Grand Canal;
- Sub-option CR4: This route sub-option would include the provision of a cycle route via Terenure Road East, Rathgar Road, Charleville Road, Wynnefield Road, Prince Arthur Terrace, Leinster Square, Louis Lane, Ardee Road, Lissenfield, and Grove Park. The route would also include a new cycle bridge crossing the Grand Canal;
- Sub-option CR5: This route sub-option would include the provision of a cycle route via Terenure Road East, Rathgar Road, Charleville Road, Grosvenor Lodge and Cathal Brugha Barracks. The route would also include a new cycle bridge crossing the Grand Canal; and
- Sub-option CR6: This route sub-option would include the provision of a cycle route via Terenure Road East, Rathgar Road and Rathmines Road Lower. Due to width constraints on La Touche Bridge a new cycle bridge is proposed to the west of the bridge, connecting with Martin Street.

A specific set of criteria were used to assess the relative merits of each of the cycle routes outlined above. The 'Five Needs of a Cyclist' outlined in the National Cycle Manual Guidelines along with Capital Cost and Environmental Impacts were the criteria used to compare the cycle routes. Further detail on the assessment methodology relating to alternative cycle facilities is included in Table 3.1.

The assessment sub-criteria which were differentiators between scheme sub-options included Capital Cost, Road Safety, Coherence, Directness, Attractiveness, Comfort, and Environment. Sub-option CR5 was identified as having significant benefits over other sub-options in relation to Attractiveness and Comfort, and some benefits over other sub-options in relation to Road Safety, Coherence and Directness. Following an MCA, sub-option CR5 was identified as the preferred option for this sub-section and was brought forward for assessment as part of the principal route options.

Following the assessment of the two constrained sub-sections as outlined above, an MCA has been undertaken of the principal route options along this section of the scheme in order to determine the most appropriate scheme for this section of the Proposed Scheme. These options are briefly summarised below.

- Option CB1 would include the provision of segregated bus facilities between the Dodder River crossing at Pearse Bridge and the Grand Canal crossing at La Touche Bridge (with exception of a 100m section at Terenure Cross and a 70m section along Rathmines Road Lower between Rathmines Road Upper and Castlewood Avenue). Outbound traffic would be removed from Rathgar Road and, inbound traffic would be removed from Rathmines Road. Segregated cycle facilities would be provided along the majority of the CBC route;
- Option CB2 would include the provision of segregated bus facilities between the Dodder River crossing at Pearse Bridge and the Grand Canal crossing at La Touche Bridge (with exception of a 100m section at Terenure Cross and a 70m section along Rathmines Road Lower between Rathmines Road Upper and Castlewood Avenue). Outbound traffic would be removed from Rathgar Road and Rathmines Road. Segregated cycle facilities would be provided along the majority of the CBC route;
- Option CB3 would include the provision of segregated bus facilities between the Dodder River crossing at Pearse Bridge and the Grand Canal crossing at La Touche Bridge (with exception of a 100m section at Terenure Cross and a 70m section along Rathmines Road Lower between Rathmines Road Upper and Castlewood Avenue). Inbound traffic would be removed from Rathgar Road and Rathmines Road. Segregated cycle facilities would be provided along the majority of the CBC route;
- Option CB4 would include the provision of segregated bus facilities between the Dodder River crossing at Pearse Bridge and the Grand Canal crossing at La Touche Bridge (with exception of a 100m section at Terenure Cross). It is proposed to provide segregated cycle facilities on Rathfarnham Road, Terenure Road East and Rathgar Road. Cyclists would be catered for via a parallel cycle route along Charleville Road, Grosvenor Lodge and Cathal Brugha Barracks;

- Option CB5 would include the provision of segregated bus facilities between the Dodder River crossing at Pearse Bridge and Rathmines Village (with exception of a 100m section at Terenure Cross). An inbound bus lane would be provided on Rathmines Road Lower from Rathmines Road Upper to the Military Road junction, whilst an outbound bus lane provided from Grove Road to the Military Road junction. Segregated cycle facilities would be provided along the majority of the CBC route;
- Option CB6 would include the provision of segregated bus facilities between the Dodder River crossing at Pearse Bridge and the Grand Canal crossing at La Touche Bridge (with exception of a 100m section at Terenure Cross). It is proposed to remove general traffic in the northbound (inbound) direction along Rathmines Road Lower between Castlewood Avenue and Grove Road. It is also proposed to provide segregated cycle facilities along the majority of the CBC route; and
- Option CB7 would include the provision of segregated bus facilities between the Dodder River crossing at Pearse Bridge and the Grand Canal crossing at La Touche Bridge (with exception of a 100m section at Terenure Cross). This option would be routed via Highfield Road and Rathmines Road Upper. It is proposed to provide segregated cycle facilities along Rathfarnham Road and Terenure Road East. Cyclists would also be catered for via parallel cycle routes via Rathgar Road, Charleville Road, Grosvenor Lodge and Cathal Brugha Barracks.

The assessment sub-criteria which were differentiators between scheme options included Capital Cost, Transport Reliability and Quality, Residential Population and Employment Catchments, Cycle Network Integration, Traffic Network Integration, Key Trip Attractors, Road Safety, Architectural Heritage, Flora and Fauna, Landscape and Visual and Land Use Character.

Under the Economy criterion, in terms of Capital Cost, Options CB1, CB2 and CB3 performed marginally better than the other options due to the reduced requirement for land acquisition for these options. In terms of Transport Quality and Reliability Options CB4 and CB6 performed significantly better than other options due to the fact that full priority would be provided along the majority of the route.

In terms of Integration, Option CB7 performed marginally better than all other options in relation to Residential Population and Employment Catchments due to the alternative routing for buses along Highfield Road and Rathmines Road Upper. In relation to Cycling Integration, Option CB1, CB2, CB3 and CB5 performed significantly better than other options due to the fact that these routes provide online cycling facilities along the entire route corridor. In relation to Traffic Network Integration, Options CB1, CB2 & CB3 perform significantly worse than other options as they provide for only one-way traffic on Rathmines Road and Rathgar Road which would have a significant traffic impact in terms of movement restrictions and increased traffic/congestion on Rathmines Road.

In terms of 'Road Safety', Options CB4 and CB6 performed marginally better than other options as these options have fewer junctions than other options.

As mentioned previously each route option was evaluated using a multi-criteria assessment with one of the primary criteria being 'Environment', under which there was a number of sub-criteria which each route option was considered against comparatively.

- All seven route options were considered neutral when compared against one another under the Archaeology and Cultural Heritage sub-criterion, given none presented any appreciable impacts.
- With regard to Architectural heritage, options CB1, CB2, CB3 and CB7 were considered to have moderate advantages over the other options due to the fact that other options require more significant impacts on the curtilage of protected structures on Rathgar Road.
- With regard to Flora and Fauna, options CB1, CB2, CB3 were considered to have moderate advantages over the other options as these options would impact on fewer existing trees along the route.
- All three route options were considered neutral when compared against one another under the Soils, Geology and Hydrology sub-criterion, given none presented any appreciable impacts.

- With regard to Landscape and Visual, it was considered that options CB1, CB2 and CB3 had moderate advantages over other options as options CB4, CB5 and CB6 require more significant impacts on adjacent properties on Rathgar Road and option CB7 would require significant re-engineering of Highfield Road to provide bus lanes.
- All seven route options were considered neutral when compared against one another under the Air Quality criterion.
- All seven route options were considered neutral when compared against one another under the Noise and Vibration criterion.
- With regard to Land Use Character, it was considered that options CB4 and CB5 had significant advantages over other route options due to the greater impacts that other options would have on access to the commercial amenities within Rathmines Village and the residential properties on Rathgar Road.

Option CB4 was identified as having significant benefits over other options in relation to Transport Quality and Reliability, Traffic Network Integration, Road Safety and Land Use Character. Option CB4 was therefore identified as the preferred option for this section and was brought forward into the Emerging Preferred Route.

It is noted that subsequent to the preparation of the 'Rathfarnham to City Centre Core Bus Corridor CBC Feasibility Study and Options Assessment Report', it was decided that an option which provided online bus and cycle lanes along the route and one-way traffic outbound through Rathmines should be given further consideration. As a result, both Option CB4 and Option CB6 were presented for consideration by the public in the first non-statutory public consultation.

3.3.2.2.3 Section 3: Route Options Assessment

Following the Stage 1 sifting process, two viable route options for Section 3 were taken forward for assessment and further refinement:

- Option CC1- A route option via Richmond Street, Camden Street and Wexford Street; and
- Option CC2 - A route option via Richmond Street, South Circular Road, Clanbrassil Street and New Street South.

These routes are presented in Image 3.16.



Image 3.16: Section 3 Route Options extracted from 'Rathfarnham to City Core Bus Corridor CBC Feasibility Study and Options Assessment Report'

An MCA has been undertaken of the principal route options along this section of the scheme in order to determine the most appropriate scheme for this section of the Proposed Scheme. These options are briefly summarised below.

- Route Option CC1 would include the provision of segregated bus facilities along Richmond St/Camden St/Wexford St between La Touche Bridge/Richmond Street South and Wexford Street/Kevin Street Lower junction (with the exception of a 75m section of Richmond Street and a 60m section of Wexford Street). Cyclists would be catered for via a parallel cycle route along Martin Street/Heytesbury Street/Bride Street; and
- Route Option CC2 would include the provision of segregated bus facilities along Richmond Street/South Circular Road/Clanbrassil Street/Patrick Street between La Touche Bridge/Richmond Street South and New Street South/Kevin Street Upper junction (with the exception of a 75m section of Richmond Street). Cyclists would be catered for via a parallel cycle route along Grove Road (existing cycle facilities)/Longwood Avenue/Emorville Avenue and would reconnect with the CBC route at Lombard Street West.

The assessment sub-criteria which were differentiators between scheme options included Capital Cost, Transport Reliability and Quality, Residential Population and Employment Catchments, Cycle Network Integration, Traffic

Network Integration, Key Trip Attractors, Deprived Geographic Areas, Road Safety, Pedestrians Safety, Flora and Fauna and Landscape and Visual.

Under the Economy criterion, in terms of Capital Cost, Option CC1 performed marginally better than Option CC2 due to lower infrastructure costs and the fact that no land acquisition would be required. In terms of Transport Quality and Reliability Option CC1 also performed better due to the reduced length of this option compared to Option CC2.

In terms of Integration, Route option CC2 performed marginally better than Option CC1 in terms of Residential Population and Employment Catchments. Under Cycling Integration, Option CC1 provide a separate cycle facility along the Heytesbury which aligns with Primary route 9 and therefore performed marginally better than Option CC2. Option CC1 was ranked lower in terms of 'Traffic Integration' due to the removal of on street parking and loading bays along the entire Camden Street/Wexford Street/George's Street route.

Under the Accessibility and Social Inclusion criterion, Route option CC1 was ranked higher under the Key Trip Attractors sub-criterion because it generally serves more trip attractors along its route, while Option CC2 was ranked marginally higher in relation to Deprived Geographical Areas.

The main differentiator in terms of Road Safety is that option CC1 has fewer junctions and turning movements compared to option CC2 and therefore performed marginally better under this criterion.

As mentioned previously each route option was evaluated using a multi-criteria assessment with one of the primary criteria being 'Environment', under which there was a number of sub-criteria which each route option was considered against comparatively.

- Both route options were considered neutral when compared against one another under the Archaeology and Cultural Heritage sub-criterion, given neither option presented any appreciable impacts.
- Both route options were considered neutral when compared against one another under the Architectural heritage criterion, as neither option presented any appreciable impacts.
- With regard to Flora and Fauna, option CC1 was considered to have moderate advantages over option CC2 as this option would have no impact on trees along the route.
- Both route options were considered neutral when compared against one another under the Soils, Geology and Hydrology sub-criterion, as neither option presented any appreciable impacts.
- With regard to Landscape and Visual, it was considered that option CC1 had moderate advantages over option CC2 as this option had no appreciable impact under this criterion.
- Both route options were considered neutral when compared against one another under the Air Quality criterion, as neither option presented any appreciable impacts.
- Both route options were considered neutral when compared against one another under the Noise and Vibration criterion, as neither option presented any appreciable impacts.
- Both route options were considered neutral when compared against one another under the Land Use Character criterion, as neither option presented any appreciable impacts.

Option CC1 was identified as having moderate benefits over other options in relation to Capital Cost, Transport Quality and Reliability, Cycle Network Integration, Key Trip Attractors, Road Safety, Pedestrians Safety, Flora and Fauna and Landscape and Visual. Option CC1 was therefore identified as the preferred option for this section and was brought forward into the Emerging Preferred Route.

Subsequent to the preparation of the 'Rathfarnham to City Centre Core Bus Corridor CBC Feasibility Study and Options Assessment Report', it was decided that an option which provided online bus and cycle lanes through Rathmines should be given further consideration. North of the Grand Canal, this option proposed bus lanes in

each direction for the majority of the length, one-way outbound traffic between Harrington Street and the canal, and online cycle lanes between Harrington Street and the canal. As a result, both Option CC1 and a further option were presented for consideration by the public in the first non-statutory public consultation.

3.3.3 Cycling Options

Consideration of alternative cycling route options was fundamental in the process of defining the Emerging Preferred Route. In general, the Emerging Preferred Route aligns with primary Cycle Routes 9A and 10 and secondary Cycle Routes 9B, S04 and 10 on the Greater Dublin Area Cycle Network Plan. In addition, the Proposed Scheme intersects with three other primary cycle routes, namely Route SO1/N10 (the Grand Canal Greenway), Route 8 and Route 7 as well as with the Dodder Greenway.

During the Emerging Preferred Route stage, identification of alternative cycle routes separate to the core bus corridor emerging preferred route was considered appropriate for this scheme, as documented in the earlier sections of this chapter. Further cycle options were considered during the development of the Preferred Route Option as outlined later in this Chapter.

Where cycle facility options have been comparatively assessed in order to determine the preferred option for a cycle route, the assessment was based on a methodology that assesses options using the 'Five Needs of a Cyclist' outlined in the National Cycle Manual Guidelines together with Capital Cost and Environmental Impacts. The cycle route options were assessed using the criteria and rationale presented in Table 3.1.

Table 3.1: Alternative Cycle Route Assessment Criteria

Appraisal Criteria	Rationale
1. Capital Cost	<ul style="list-style-type: none"> Capital cost estimates consist of both the indicative infrastructure cost estimate and land acquisition costs. The cycle route infrastructure cost examines the practicality and extent of works required to accommodate cycle route infrastructure along route options. This criterion evaluates the likely costs associated with land acquisition and associated boundary/accommodation works for each route option. The assessment takes consideration of: <ul style="list-style-type: none"> The number of adjacent public/commercial/ residential/industrial properties, from which land acquisition would be required as well as the extent (area) of land acquisition likely to be necessary; and The costs associated with boundary/accommodation works.
2. Road Safety	<ul style="list-style-type: none"> For the purposes of comparing route options, the extent of segregation and the number of junctions along the route has been used as a proxy for road safety. The number of junctions is effectively a measure of the number of potential conflicts on the route and therefore a measure of the potential for a collision. The type of movement required by the cyclist at junctions on the route is also considered with routes where turning movements (either left or right) are required being assigned a lower ranking in terms of safety. The quality of cycle provision practically achievable on route options has been assessed. For comparison purposes, the highest level of practical cycle provision achievable on each route has been determined and compared between route options.
3. Coherence	<ul style="list-style-type: none"> This criterion considers whether a route option forms part of the GDA Cycle Network Plan, with routes where CBC and designated Cycle Routes overlap given a higher designation in terms of benefits arising where cycle infrastructure can be provided as part of a proposed CBC scheme. In some instances, however it may be more appropriate to provide a parallel cycle track off the CBC route. Consideration is also given to cycle routes

	intersecting with the CBC route. The cycle route should also link the main origin and destination zones along the CBC route.
4. Directness	<ul style="list-style-type: none"> For the purposes of comparing route options, the number of junctions, length of the route and the number of detours and gaps from the CBC has been used as a proxy for directness.
5. Attractiveness	<ul style="list-style-type: none"> The cycling environment along the route should be pleasant and interesting. Monotony and lack of points of interest along the cycle route are unattractive to cyclists. Cycle routes should also be adequately lit so as not to deter evening and night-time use.
6. Comfort	<ul style="list-style-type: none"> The quality of cycle provision practically achievable on route options has been assessed. For comparison purposes, the highest level of practical cycle provision achievable on each route has been determined and compared between route options.
7. Environmental	<ul style="list-style-type: none"> The provision of segregated cycle tracks has the potential to impact on the archaeological, architectural and cultural heritage environment. At this stage of the assessment process, a conservative approach has been adopted in assessing the potential for impact and this is further described below. The provision of segregated cycle tracks has the potential to impact on flora and fauna, the townscape/streetscape along the route and on the land use character through land-take, severance or reduction of viability which prevents or reduces it from being used for its intended use.

3.3.4 Emerging Preferred Route

Informed by the appraisal of options described in earlier section, the Emerging Preferred Routes were identified. As previously mentioned, the Proposed Scheme previously comprised of two Core Bus Corridors, the Tallaght to Terenure Core Bus Corridor and The Rathfarnham to City Centre Core Bus Corridor and were summarised as follows:

'The Tallaght to Terenure Core Bus Corridor commences on the R137 Tallaght Road, east of the M50 interchange. From here, the CBC is routed via the R137 along Tallaght Road and Templeogue Road, through Templeogue village, to Terenure Cross, where it joins the Rathfarnham Core Bus Corridor. Priority for buses is provided along the entire route, consisting primarily of dedicated bus lanes in both directions, with alternative measures proposed at particularly constrained locations.' and

'The Rathfarnham Core Bus Corridor commences on the R821 Grange Road at the junction with Nutgrove Avenue, and is routed along the R821 Grange Road, the R115 Rathfarnham Road, the R114 Rathfarnham Road, Terenure Road East, Rathgar Road, Rathmines Road Lower, Richmond Street South, Camden Street Upper and Lower and Wexford Street as far as the junction with the R110 at Kevin Street Lower and Cuffe Street where priority bus lanes end. From Cuffe Street to Dame Street along Redmonds Hill, Aungier Street, and South Great George's Street the route will involve a traffic lane and a cycle track in both directions where it will join the prevailing traffic management regime in the city centre.'

A non-statutory public consultation on this Emerging Preferred Route was undertaken from 23 January 2019 to 30 April 2019, providing feedback which was then meaningfully considered in the further development of the scheme proposal.

3.4 Design Alternatives

3.4.1 Development of the Draft Preferred Route Option

Following the completion of the public consultation process in relation to the Emerging Preferred Route, various amendments were made to the scheme proposals to address a number of the issues raised in submissions, including incorporating suggestions and recommendations from local residents, community groups and

stakeholders, and/or arising from the availability of additional information. These amendments were incorporated into the designs and informed a draft Preferred Route Option.

Additional design development took account of:

- New and updated topographical survey information;
- Output from engagement and consultation activities on the Emerging Preferred Route and draft Preferred Route Option proposals;
- Further design development and options assessment; and
- Changes in the extent of the scheme.

Where substantial revisions had been made to the design since the publication of the Emerging Preferred Route, options were assessed using MCA to determine the Preferred Route Option. The MCA assessed any newly developed options against the previously identified Emerging Preferred Route. The methodology and MCA used were consistent with that carried out during the initial route optioneering work (including consideration of the relevant environmental aspects), which informed the identification of the Emerging Preferred Route.

3.4.1.1 Alternatives Considered at Draft PRO Stage

The main alternatives considered within these three sections during the development of the draft Preferred Route Option are set out in the following sections.

3.4.1.1.1 Templeogue Road between Cypress Grove Road and Springfield Avenue

The EPR Option proposal within Templeogue Village required land acquisition within Templeogue Village as well as reducing the available public realm space and impacting on a number of parking spaces within the village. Feedback received from numerous submissions from the public, as well as through public consultation events, highlighted the potential impact of the proposed scheme on local businesses as well as on the character of the village. As such, alternative options for bus priority through this scheme section were explored.

At the draft Preferred Route Option stage, two options were assessed, as follows:

- Option TG1: Dedicated bus lanes provided through Templeogue Village. This option is a version of the EPR, refined slightly to reflect issues identified upon review of the topographical survey; and
- Option TG2: Bus priority traffic signals provided on either side of Templeogue Village, with signal-controlled priority provided through the village. The scheme would tie into the Templeogue Village Initiative (approved SDCC Part VIII proposal) within Templeogue Village.

Option TG2 – the provision of bus priority traffic signals provided on either side of Templeogue Village, with signal-controlled priority provided through the village - was identified as the preferred option as it best aligned with the objectives for the Proposed Scheme and would minimise the impact on the village of Templeogue through the use of bus priority traffic signals to provide virtual bus priority over a short distance. This option would provide bus priority, provide connectivity with the GDA Cycle Network Plan and meets the desirable Proposed Scheme cross-section where practicable.

In terms of the sub-criteria under the Environment criterion, the preferred option performed marginally better than option TG1 in terms of Landscape and Visual as fewer properties would be impacted by Option TG2. In terms of Air Quality and Noise & Vibration, the preferred option again performed better than Option TG1 as less road widening was proposed. With respect to Land Use Character the preferred option performed better than Option TG1 due to the fact that no parking spaces were proposed to be removed in Templeogue Village under Option TG2.

It is noted that other options were also considered in the area but were not carried forward to the MCA for the reasons briefly outlined below:

- A sub-option of the above was also considered between Cypress Grove Avenue and Templeogue Village which sought to minimise the impact on properties on this section. This option proposed curtailing the

inbound bus lane at Cypress Grove Avenue, and re-commencing it at the north-eastern side of Templeogue Village. However, it was considered that this distance (~500m) was too much to give guaranteed bus priority through use of bus priority signals. Furthermore, this proposal would provide no facility for cyclists, even through a shared bus/cycle lane, meaning cyclists would have to share with general traffic. As this option provides both poorer facilities for buses and cyclists, it was considered that this option would not be in line with the objectives of the scheme and as such, this option was not considered any further.

- An additional option considered curtailing the inbound bus lane at Cypress Grove Avenue, and re-commencing it after Ashfield Place. However, while the bus priority signal would be more manageable under this option, no cycle facility would be provided between Cypress Grove Road Avenue and Ashfield Place meaning cyclists would have to share with general traffic. It was considered that this option would not be in line with the objectives of the scheme and as such, this option was not considered any further.
- A final option was considered which reduced the length of outbound bus lane on approach to Cypress Grove Road from 145m to 75m to minimise impact on properties on the northern side of Templeogue Road in this area. Given the reduced length of bus lane in advance of the stop line, combined with the need to control queuing on approach to this junction both at Ashfield Place and on the north eastern side of Templeogue Village, it was considered that virtual priority for buses would be difficult to achieve at this junction and as such this option was not considered any further at this point. It is noted however, that this option was reconsidered at a later stage in combination with other improvements locally. See section 3.4.3.1 for further details.

For the portion of the Proposed Scheme which relates to Rathfarnham to City Centre, the main alternatives considered during the development of the draft PRO consisted of the following:

3.4.1.1.2 Grange Road to Rathdown Park

The EPR Option proposal within this section of the scheme included a proposed connection for cyclists to Brookvale Downs via a narrow laneway between an existing residential property and a petrol station. While it was proposed as part of the EPR Option to widen a section of this laneway, it is noted from a review of the topographical survey that this would require demolition of one or other of these buildings to accommodate a two-way cycle route as well as accommodating pedestrians. Concerns relating to the proposal from the public were coupled with the delivery of a compromised and potentially unattractive route for cyclists. As such, alternative cycle route options were explored in this area in determining the draft PRO.

Furthermore, based on a review of the topographical survey, it became more evident that a number of properties along Rathfarnham Road, between Brookvale Road and Dodder Park Road, as well as north of the Dodder, between Dodder Park Road and Rathdown Park, currently have steep driveways in excess of current standards. As part of the public consultation, the issue of compliance with Part M of the Building Regulations was highlighted. It was considered, that with the level of land acquisition proposed as part of the EPR Option, existing driveways would be made much steeper than they currently are and would not be compliant with the Regulations without substantial mitigation. As such, alternative design solutions were therefore explored in this area in determining the draft PRO.

3.4.1.1.2.1 Initial Assessment of Parallel Cycle Route Options

Within this section of the CBC route, Rathfarnham Road is particularly constrained in terms of the available width. As such, this section of the route was brought through an initial assessment to determine the optimum alternative cycle route for this section.

In developing options for alternative cycle routes, it became evident that some options being considered would require a new pedestrian and cyclist bridge crossing the River Dodder. Two potential bridge sites were identified within this general location. In order to rationalise the number of parallel cycle route options to be assessed, an initial assessment of two potential bridge locations within this area was undertaken. The preferred bridge option was then incorporated into end-to-end parallel cycle route options for comparative assessment.

A bespoke MCA methodology was developed to consider the merits of each bridge option. This methodology allows a high-level comparative assessment of these bridge options to be carried out based on the following criteria:

- Cost;
- Constructability and engineering constraints;
- Cycle connectivity;
- Impact on private property;
- Impact on flora & fauna; and
- Landscape & visual impacts.

The locations of the two bridge options developed are indicated in Image 3.17 and the options are briefly summarised below.

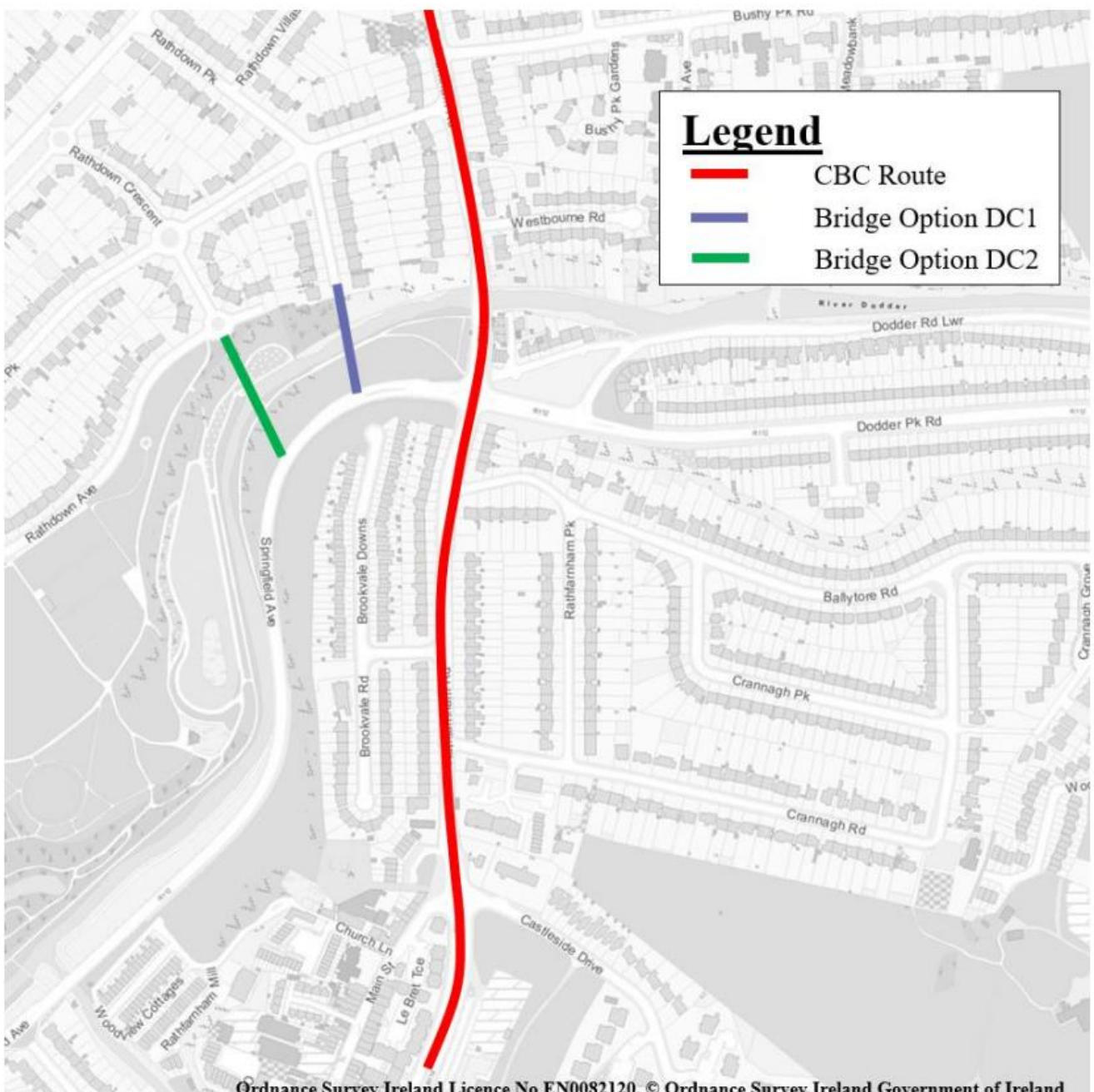


Image 3.17: Section 3 Route Options extracted from 'Rathfarnham to City Core Bus Corridor CBC Feasibility Study and Options Assessment Report'

- Bridge Option DC1 consists of providing a pedestrian and cyclist bridge spanning the river Dodder linking from Springfield Avenue to Rathdown Park; and
- Bridge Option DC2 consists of providing a pedestrian and cyclist bridge spanning the river Dodder linking from Springfield Avenue to Rathdown Crescent.

Bridge Option DC1 was found to be the preferred option for the provision of a pedestrian and cyclists bridge in this location as it was the more easily constructable option due to the reduced span compared to Option DC2 and it provided better cycling connectivity thus best aligning with the objectives of the Proposed Scheme.

In terms of the Environmental criteria, the preferred option performed better than Option DC2 in relation to Flora and Fauna as it would impact on fewer mature trees along the River Dodder. Both options performed equally under the Landscape and Visual criterion as they would have similar levels of impact. This bridge option was brought forward and incorporated into end-to-end parallel cycle route options where appropriate.

Following the identification of the preferred bridge option, as outlined above, 10 alternative parallel cycle route options were developed along this section of the Proposed Scheme. These options are briefly summarised below:

- Option PC1 (EPR Option) – Parallel cycle route via Brookvale Downs using laneway north of Texaco Station and crossing River Dodder via a new boardwalk at Pearse Bridge;
- Option PC2 - Parallel cycle route via Brookvale Downs using laneway north of Texaco Station and crossing River Dodder via a new pedestrian/cycle bridge to Rathdown Park;
- Option PC3 - Parallel cycle route via Brookvale Downs using Brookvale Road and crossing the River Dodder via a new boardwalk at Pearse Bridge;
- Option PC4 - Parallel cycle route via Brookvale Downs using Brookvale Road and crossing River Dodder via a new pedestrian/cycle bridge to Rathdown Park;
- Option PC5 - Parallel cycle route along Butterfield Avenue and the Owendoher River connecting to the Dodder Greenway and crossing the River Dodder via a new boardwalk at Pearse Bridge;
- Option PC6 - Parallel cycle route along Butterfield Avenue and Owendoher River connecting to the Dodder Greenway and a new bridge to Rathdown Park;
- Option PC7 - Parallel cycle route along St Mary's Avenue and the Owendoher River connecting to the Dodder Greenway and a new boardwalk via a new boardwalk at Pearse Bridge;
- Option PC8 - Parallel cycle route along St Mary's Avenue and the Owendoher River connecting to the Dodder Greenway and new bridge to Rathdown Park;
- Option PC9 - Parallel cycle route along Butterfield Avenue and the Owendoher River connecting to Bushy Park utilising the proposed Dodder Greenway bridge; and
- Option PC10 - Parallel cycle route along St Mary's Avenue and the Owendoher River connecting to Bushy Park utilising the proposed Dodder Greenway bridge.

These options were comparatively assessed in order to determine the draft preferred route option for a parallel cycle route in this section. This assessment was based on the same methodology presented in the 'Rathfarnham to City Centre Core Bus Corridor CBC Feasibility Study and Options Assessment Report' for cycle route options considered in Rathgar/Rathmines. Further detail on the assessment methodology and criteria used in the assessment of these alternative cycle facilities is included in Section 3.3.3 and Table 3.1.

The assessment sub-criteria which were differentiators between scheme sub-options included Capital Cost, Road Safety, Coherence, Directness, Attractiveness, Comfort, and Environmental. Sub-option PC8 was identified as having significant benefits over other sub-options in relation to Road Safety and Attractiveness. Following a detailed MCA, sub-option PC8 was identified as the preferred option for this sub-section and was brought forward for assessment as part of the principal route options.

3.4.1.1.2.2 Grange Road to Rathdown Park - Principal Route Options

Following the initial assessment of Parallel Cycle Route options, a number of principal route options for the delivery of the CBC scheme from Grange Road to Rathdown Park were developed. These are briefly described below:

- Option RF1: Two bus lanes and two general traffic lanes provided on Rathfarnham Road south of the Dodder with cyclists diverted to Brookvale Downs. Two bus lanes, two general traffic lanes and two cycle tracks provided on Rathfarnham Road north of the Dodder. This option is a version of the EPR Option, refined to reflect issues identified upon review of the topographical survey, namely the existing steep driveway gradients on Rathfarnham Road;
- Option RF2: Two bus lanes and two general traffic lanes provided on Rathfarnham Road south of the Dodder with cyclists diverted to the draft preferred parallel route as identified during the initial assessment of parallel cycle route options of the route selection process;
- Option RF3: One-way inbound general traffic on Rathfarnham Road between Castleside Drive and Dodder Park Road with two bus lanes and online cycle tracks on the CBC. A combination of bus lanes and signal controlled priority two general traffic lanes and two cycle tracks provided north of the Dodder;
- Option RF4: One-way inbound general traffic on Rathfarnham Road between Castleside Drive and Dodder Park Road with two bus lanes on the CBC with cyclists diverted to the draft preferred parallel route as identified during the initial assessment of parallel cycle route options of the route selection process;
- Option RF5: A combination of bus lanes and signal controlled priority provided on Rathfarnham Road south of the Dodder, with two-way general traffic and online cycle tracks on the CBC. A combination of bus lanes and signal controlled priority, two general traffic lanes and two cycle tracks provided north of the Dodder; and
- Option RF6: A combination of bus lanes and signal controlled priority provided on Rathfarnham Road south of the Dodder, with two-way general traffic and with cyclists diverted to the draft preferred parallel route as identified during the initial assessment of parallel cycle route options of the route selection process.

Option RF2 – the provision of two bus lanes and two general traffic lanes Rathfarnham Road south of the Dodder with cyclists diverted to the draft preferred parallel route - was identified as the preferred option as it best aligned with the objectives for the Proposed Scheme by providing full physical bus priority throughout the section and minimising the impact on residential properties with steep existing driveways on Rathfarnham Road through the provision of an alternative cycle route linking to Rathdown Park. This option would provide bus priority, and while cycle facilities would not be provided along a short section of the CBC, the proposal included an attractive and safe alternative.

In terms of the sub-criteria under the Environment criterion, the preferred option performed marginally better than other options in terms of Archaeology and Cultural Heritage as fewer recorded monuments were present in the study area. In terms of Architectural Heritage, the preferred option again performed better than other options fewer protected structures would be impacted. In terms of flora and fauna the preferred option performed significantly worse than other options due to the impacts on existing trees along the river Dodder. In terms of Landscape and Visual, the preferred option performed slightly worse than other options due to the impacts associated with the construction of a new bridge over the river Dodder. In terms of Air Quality and Noise and vibration the preferred

option performed marginally worse than other options due to the fact that traffic would not be redirected from the CBC. In terms of land Use Character, the preferred option performed equally to other options.

Notwithstanding that the preferred option scored marginally lower under the environmental criteria compared to Option RF3 (and equal to the other options) it was taken forward as on balance, it best met the Proposed Scheme objectives when compared to the other options.

It is noted that a number of other options were also considered in the area but were not carried forward for the reasons briefly outlined below:

- Option of a bus gate along Rathfarnham Road between Castleside Drive and Dodder Park Road. This option was not considered feasible as through traffic would be required to undertake a diversion of up to 2km to continue beyond the bus gate, resulting in a route almost four times as long when compared to the most direct route. Similarly, local access for residents along Rathfarnham Road could be increased by up to 2.5km resulting in a route almost 10 times as long for some residents compared to the most direct route. This diversion length was considered to be too disruptive in this area and as such a bus gate at this location was not considered further.
- Option of a bus gate along Rathfarnham Road between Dodder Park Road and Rathdown Park. This option was not considered feasible as through traffic would be required to undertake a diversion of up to 3km to continue beyond the bus gate, resulting in a route almost six times as long when compared to the most direct route. Similarly, local access for residents along Rathfarnham Road could be increased by up to 2.5km resulting in a route over 10 times as long for some residents compared to the most direct route. Furthermore, the proposal to provide an inbound bus gate along Templeogue Road (where physical space is not available for other options) as part of the Tallaght to Terenure CBC would further restrict inbound traffic movements in this area. For these reasons, this option was not considered feasible.

3.4.1.1.3 Terenure to Grosvenor Road

The EPR Option within this section of the Proposed Scheme proposed to provide bus and traffic lanes in each direction along Terenure Road East, except for a short section between Terenure Cross and Aldi where only an outbound bus lane was proposed. Cycle lanes were proposed in each direction between Ferrard Road and Rathgar Avenue, but none were proposed between Terenure Cross and Ferrard Road. It was highlighted through the public consultation process that this proposal impacted on several properties with heritage value, including the loss of mature trees from within these properties. Additionally, a review of the EPR Option proposals against the detailed topographical survey showed that it was not possible to provide a bus lane and two traffic lanes on Terenure Road East immediately to the east of Rathfarnham Road. On Rathgar Road the EPR Option proposed bus lanes, traffic lanes and cycle tracks in each direction along Rathgar Road. This would result in impact on heritage properties along the length of Rathgar Road as well as the loss of trees from within these properties. These impacts were noted as being of concern to many local residents during the public consultation. Alternative design solutions were therefore explored in this area in determining a draft PRO.

At the draft Preferred Route Option stage, five options were assessed, as follows:

- Option RG1: Option RG1 would provide a general traffic lane in each direction along the entirety of this route section, as well as dedicated bus lanes and cycle tracks along the CBC for the majority of the route section. Under this option, bus lanes and cycle tracks would not be provided over a short section of Terenure Road East immediately east of Terenure Cross where bus priority would be managed through signalling. This option is a version of the EPR Option, refined to reflect issues identified upon review of the topographical survey;
- Option RG2: Option RG2 would provide a general traffic lane in each direction on Terenure Road East as well as bus lanes in each direction. Under this option, bus lanes would not be provided over a short section of Terenure Road East immediately east of Terenure Cross where bus priority would be managed through signal controlled priority. No cycle facilities would be provided on Terenure Road East under this option. Additional cycle facilities would be provided on Terenure Road North and Harold's Cross Road, linking to the Kimmage to City Centre CBC, and providing an alternative route for cyclists travelling

towards the city which would otherwise use Terenure Road East. Additional secondary cycle facilities would also be provided on Bushy Park Road, Wasdale Park, Wasdale Grove, Victoria Road, Zion Road and Orwell Road, linking back to the CBC at Rathgar Village to provide some level of service for east-west cyclists. A one-way inbound traffic arrangement would be provided on Rathgar Road, with outbound traffic diverted to alternative routes. 1.5m wide cycle tracks would be provided along Rathgar Road;

- Option RG3: Option RG3 would provide a general traffic lane in each direction on Terenure Road East as well as bus lanes and cycle tracks in each direction. Under this option, bus lanes and cycle tracks would not be provided over a short section of Terenure Road East immediately east of Terenure Cross where bus priority would be managed through signalling. A one-way inbound traffic arrangement would be provided on Rathgar Road, with outbound traffic diverted to alternative routes. 2.0m wide cycle tracks would be provided along Rathgar Road;
- Option RG4: Option RG4 would provide a general traffic lane in each direction on Terenure Road East as well as bus lanes in each direction. Under this option, bus lanes would not be provided over a short section of Terenure Road East immediately east of Terenure Cross where bus priority would be managed through signal controlled priority. No cycle facilities would be provided on Terenure Road East under this option. Additional cycle facilities would be provided on Terenure Road North and Harold's Cross Road, linking to the Kimmage to City Centre CBC, and providing an alternative route for cyclists travelling towards the city which would otherwise use Terenure Road East. Additional cycle facilities would also be provided on Bushy Park Road, Wasdale Park, Wasdale Grove, Victoria Road, Zion Road and Orwell Road, linking back to the CBC at Rathgar Village to provide some level of service for east-west cyclists. A two-way general traffic arrangement would be provided on Rathgar Road. An inbound bus lane would be provided between Highfield Road and Frankfort Avenue, while north of this point inbound bus priority would be managed through signal controlled bus priority. An outbound bus lane would be provided between Grosvenor Road and Frankfort Avenue, while south of this point outbound bus priority would be managed through signal controlled bus priority. 1.5m wide cycle tracks would be provided along Rathgar Road; and
- Option RG5: Option RG5 would provide a general traffic lane in each direction on Terenure Road East as well as bus lanes and cycle tracks in each direction. Under this option, bus lanes and cycle tracks would not be provided over a short section of Terenure Road East immediately east of Terenure Cross where bus priority would be managed through signalling. A two-way general traffic arrangement would be provided on Rathgar Road. An inbound bus lane would be provided between Highfield Road and Frankfort Avenue, while north of this point inbound bus priority would be managed through signal controlled bus priority. An outbound bus lane would be provided between Grosvenor Road and Frankfort Avenue, while south of this point outbound bus priority would be managed through signal controlled bus priority. 2.0m wide cycle tracks would be provided along Rathgar Road.

Option RG2 – the provision of bus lanes and general traffic lanes on Terenure Road East, a one-way outbound regime on Rathgar Road and alternative cycle facilities on Terenure Road North/Harold's Cross Road and Bushy Park Road, Wasdale Park, Wasdale Grove, Victoria Road, Zion Road and Orwell Road - was identified as the preferred option as it best aligned with the objectives for the Proposed Scheme by providing full physical bus priority throughout the majority of this section and would minimise the impact the curtilage of protected structures and private gardens and trees on Terenure Road East and Rathgar Road through the provision of alternative cycle routes. This option would provide bus priority, and while cycle facilities would not be provided along a section of the CBC, the proposal included an attractive and safe alternative.

In terms of the sub-criteria under the Environment criterion, the preferred option performed significantly better than other options in terms of Architectural Heritage as fewer protected structures would be impacted. In terms of Flora and Fauna the preferred option performed significantly better than other options due to the reduced impacts on existing trees along Rathgar Road. In terms of Landscape and Visual, the preferred option performed significantly better than other options due to the reduced impacts on adjacent residential properties. In terms of Air Quality and Noise and vibration the preferred option performed marginally better than other options due to the fact that traffic would be redirected from the CBC. In terms of Land Use Character the preferred option performed marginally worse than other options due to the fact that a number of car parking spaces would be removed to facilitate the alternative cycle facility on Terenure Road North/Harold's Cross Road.

A number of other options were also considered in the area but were not carried forward for the reasons briefly outlined below:

- Option of a bus gate along Terenure Road East between Rathfarnham Road and Rathgar Road. This option was not considered feasible due to the orbital traffic movement function of Terenure Road East and the lack of an alternative route for east-west traffic movements. In addition, a bus gate at this location was not considered feasible in combination with scheme proposals for a bus gate within Rathmines Village, which is considered a more appropriate location given the inability to introduce other bus priority measures on this road section.
- Option of a bus gate along Rathgar Road. A bus gate on Rathgar Road was not considered feasible in combination with scheme proposals for a bus gate within Rathmines Village, which is considered a more appropriate location given the inability to introduce other bus priority measures on this road section. Furthermore, the permeable nature of the surrounding road network would make it difficult to mitigate against vehicular traffic bypassing the bus gate, whilst also maintaining vehicular access to these areas for residents.
- Option of the CBC following Harold's Cross Road and connecting to the Kimmage to City Centre CBC. The primary reason that this option has not been progressed is the significantly stronger demand for bus along the Rathgar Road / Rathmines Road when compared to Harold's Cross Road. This route corridor serves the urban village of Rathmines, which is a significant trip attractor on southern side of the city. The strength of the high demand for bus in Rathmines compared to Harold's Cross Road is clearly evident from the extracts from the Dublin Area Bus Network Redesign Revised Proposal (October 2019) presented in Image 3.18 and Image 3.19. The patronage shown in Image 3.18 is based on existing bus services.

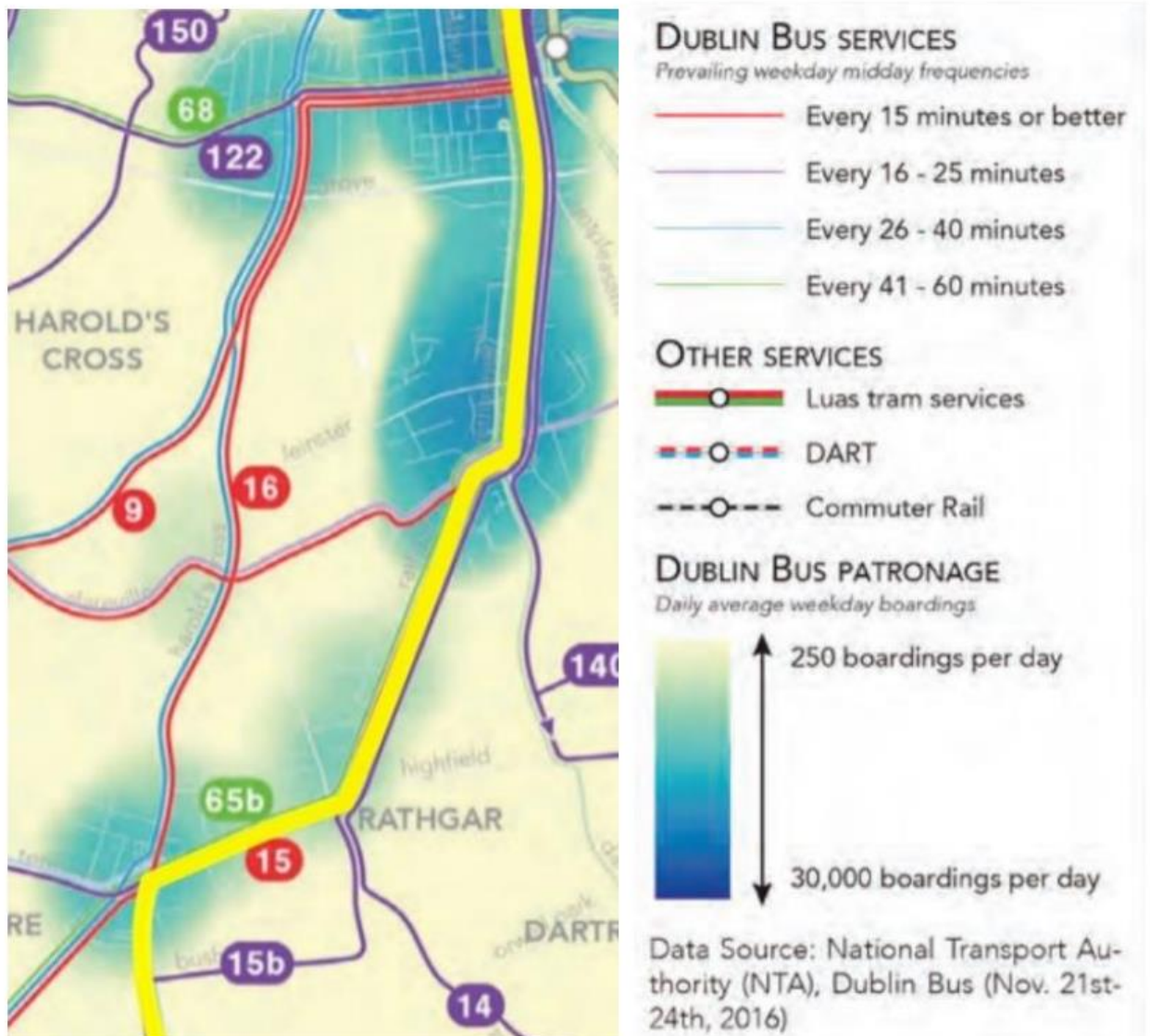


Image 3.18: Average Daily Bus Patronage – Heatmap from ‘Dublin Area Bus Network Redesign Revised Proposal (October 2019)’ – the CBC highlighted yellow.

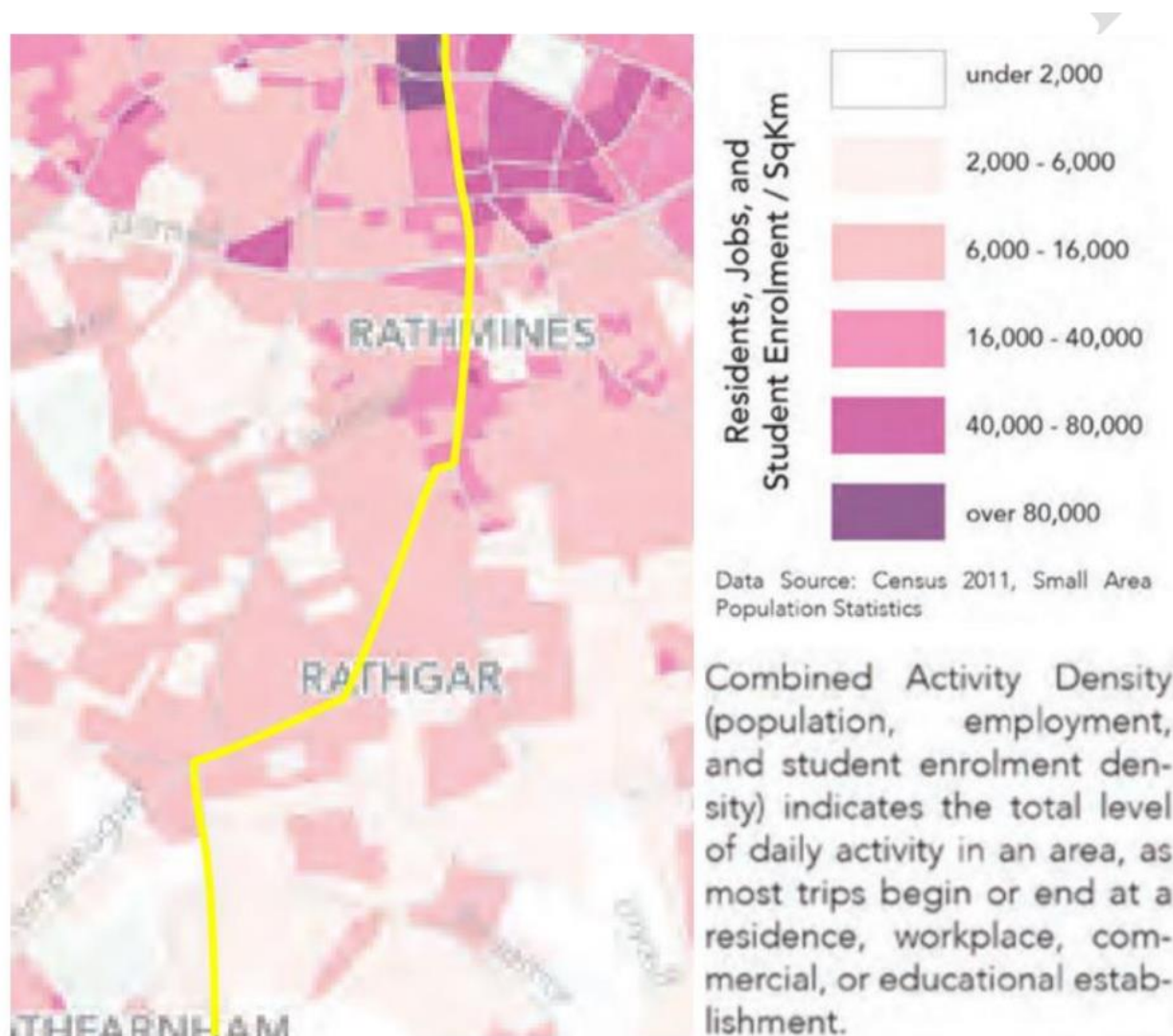


Image 3.19: Combined Activity Density Map from 'Dublin Area Bus Network Redesign Revised Proposal (October 2019)' – the CBC highlighted yellow

3.4.1.1.4 Rathmines to Grand Canal

As noted in Section 3.3.2.2.2, the EPR Option identified two potential options for Rathmines Village, both taken forward to public consultation and for more detailed assessment as part of this process. Option A proposed keeping cyclists on Rathmines Road Lower with bus lanes provided in each direction and only a single traffic lane to accommodate outbound traffic. Option B proposed diverting cyclists to an alternative cycle route to the west of Rathmines Road Lower with bus and traffic lanes provided in each direction along Rathmines Road Lower. The responses to the public consultation showed a clear preference for Option A on the basis that the cycle route proposed in Option B was indirect and unattractive compared to Option A. However, a review of Option A showed that this option would require reductions to footpath width along Rathmines Road Lower that could impact on the public realm within Rathmines Village. More detailed alternative design solutions have therefore been explored in this area in determining a draft PRO.

These options are briefly outlined below:

- Option RM1: Two Bus lanes, one outbound traffic lane and two 1.5m wide cycle tracks through Rathmines Village. (Previously EPR Option A);

- Option RM2: Two Bus lanes and two general traffic lanes through Rathmines Village with an alternative offline cycle route provided. The offline route commences by directing cyclists down Charleville Road and Wynnefield Road. It is proposed to run a cycleway access through Wynnefield Park connecting to Prince Arthur Terrace and on to Leinster Square. The cycle route would cross Leinster Road and down Louis Lane through a proposed entry point to the lands at the rear of DIT Conservatory of Music and Drama into William Park and Ardee Road. The proposed cycleway would then cross Military Road and across the sports ground in front of St. Mary's College Rathmines Senior School. The cycle lane would then be routed through Cathal Brugha Barracks around the boundary with the Lissenfield Development and the rear of the Grove Park properties. The proposed cycle route then crosses Grove Road onto a new canal crossing and continues on other streets to the city centre. (Previously EPR Option B); and
- Option RM3: Two general traffic lanes and two 2m wide cycle tracks through Rathmines Village with a bus gate located between Richmond Hill and Military Road.

Option RM3 – the provision of two general traffic lanes and two 2m wide cycle tracks through Rathmines Village with a bus gate located between Richmond Hill and Military Road – was identified as the preferred option as it best aligned with the objectives for the Proposed Scheme by providing the appropriate level of bus priority and fully segregated cycle tracks throughout this section of the Proposed Scheme, while acknowledging the urban village function of Rathmines Village through proposed footpath widening.

In terms of the sub-criteria under the Environment criterion, the preferred option performed marginally better than other options in terms of Flora and Fauna due to the reduced impacts on trees along Rathmines Road. In terms of Air Quality and Noise and vibration the preferred option performed marginally better than other options due to the fact that traffic would be redirected away from the CBC. The preferred option performed equally to other options under all other environmental criteria.

3.4.1.1.5 Grand Canal to Christchurch Place

The previous MCA undertaken determined that a route along Richmond Street, Camden Street and Wexford Street was the EPR Option. The EPR Option proposed that Camden Street/Wexford Street between Harrington Street and Cuffe Street would be upgraded to include bus lanes in each direction along its length except for a short section on Wexford Street where only an inbound bus lane would be provided. No cycle tracks were proposed in this area and the published drawings stated that 'Additional cycle facilities along Camden Street (secondary cycle route 10) to be considered as part of next design development stage'. More detailed alternative design solutions have therefore been explored in this area in determining a draft PRO.

These options are briefly outlined below:

- Option CS1: Option CS1 would consist of providing a traffic lane in each direction along the entirety of this scheme section, as well as dedicated bus lanes in each direction, with the exception of a short section between Cuffe Street and Montague Street where no outbound bus lane would be provided. No dedicated cycle facilities would be provided along the CBC under this option (previously EPR Option A);
- Option CS2: Option CS2 would consist of providing a traffic lane in each direction along the entirety of this scheme section, as well as dedicated bus lanes in each direction, with the exception of a short section between Cuffe Street and Montague Street where no outbound bus lane would be provided. A parallel cycle route would be provided along Martin Street, Lennox Street, Stamer Street, Heytesbury Street and New Bride Street (previously EPR Option B); and
- Option CS3: Option CS3 would consist of a one-way outbound traffic arrangement on Camden Street and Wexford Street in this section, with inbound traffic diverted to Harcourt Street. 1.5m wide cycle tracks would be provided along the CBC, as well as dedicated bus lanes in each direction, with the exception of a short section between Cuffe Street and Montague Street where no outbound bus lane would be provided.

Option CS3 – a one-way outbound traffic arrangement on Camden Street and Wexford Street with online bus lanes and cycle tracks in this section, with inbound traffic diverted to Harcourt Street - was identified as the

preferred option as it best aligned with the objectives for the Proposed Scheme by providing physical bus priority and fully segregated cycle tracks throughout the majority of this section of the Proposed Scheme.

In terms of the sub-criteria under the Environment criterion, the preferred option performed marginally better than other options in terms of Air Quality and Noise and vibration the preferred option performed marginally better than other options due to the fact that traffic would be redirected from the CBC. The preferred option performed equally to other options under all other criteria.

3.4.2 Consideration following Draft Preferred Route Option Consultation (March 2020)

The draft Preferred Route Option was published in March 2020 and a second round of public consultation occurred between 4 March 2020 to 17 April 2020. Due to COVID-19 restrictions in mid-March, the planned Public Information Events were impacted. There was a total of 93 submissions received during this second round of public consultation

A number of changes to the design were made based on feedback received during the second round of public consultation and dialogue with stakeholders. However, the changes made to the draft Preferred Route Option were relatively small scale and no further option assessments using the MCA described in Section 3.3.2 were required.

These key changes for the Proposed Scheme implemented in the design of the Updated Draft PRO include:

For the portion of the Proposed Scheme relating to the Tallaght to Terenure Core Bus Corridor:

- Minor amendments to the two-way cycle track crossing on the northern arm of the Wellington lane/Templeogue Road junction to provide a more direct cycle crossing; and
- The relocation or removal of bus stops to achieve better spacing between the stops and to ensure stops are located in the most appropriate place for the surrounding communities.

For the portion of the Proposed Scheme relating to the Rathfarnham to City Centre Core Bus Corridor:

- The Nutgrove Avenue/Grange Road junction was redesigned to provide kerb protection for cyclists;
- The Rathfarnham Road/Butterfield Avenue junction was redesigned to provide kerb protection for cyclists. This resulted in the removal of a general traffic lane on Butterfield Avenue;
- The provision of a two-way cycle track on the northern side of the Rathfarnham Road/Dodder Park Road junction, to align with Dodder Greenway proposals;
- Realignment on Rathfarnham Road between Rathdown Park and Bushy Park Road to minimise impacts on adjacent properties in this location;
- The provision of an east-west connection for cyclists between R114 Rathfarnham Road and R114 Rathgar Road using a route along Bushy Park Road, Wasdale Grove, Zion Road and Orwell Road;
- The redesign of the Terenure Cross junction to provide direct pedestrian crossings and to minimise traffic island widths;
- The provision of a new pedestrian crossing between Ferrard Road and Brighton Road;
- The redesign of the Highfield Road/Rathgar Road junction to remove the existing traffic slip lane, provide a revised loading arrangement and provide opportunity for enhanced public realm in this location;
- The provision of a new pedestrian crossing between Wesley Road and Winton Avenue;
- The redesign of the Rathgar Avenue/Grosvenor Road junction to provide kerb protection for cyclists;
- The provision of a mini-roundabout and a formalised set down area on Military Road at St. Mary's College to facilitate school drop-off;
- The positioning of the Bus Gate in Rathmines just north of Richmond Hill, instead of south of it, and the closure of Mountpleasant Avenue Lower to traffic;
- The closure of Mountpleasant Avenue Lower to general traffic through the provision of kerb build outs. It is noted that cyclists would still be permitted to access Mountpleasant Avenue Lower;

- The removal of the left turn general traffic lane on the northern arm of the Camden Street Lower/Cuffe Street junction;
- The location of cycle facilities behind car parking or loading bays to improve cyclist safety; and
- The relocation or removal of bus stops to achieve better spacing between the stops and to ensure stops are located in the most appropriate place for the surrounding communities.

3.4.3 Further Consideration following Updated Draft Preferred Route Option Consultation (November 2020)

The third round of public consultation on the updated draft Preferred Route Option took place from the 04 November to 16 December 2020 and was held virtually due to the continuing effect of the COVID-19 pandemic and associated restrictions. There was a total of 1,543 submissions received during this round of public consultation.

Arising from the feedback received during this consultation process, a number of changes to the design were made based on feedback received during the third round of public consultation and dialogue with stakeholders. The changes made to the draft PRO in two specific locations required further options assessments using the MCA described in Section **Error! Reference source not found.**. The additional options assessment carried out are summarised below.

3.4.3.1 Templeogue Road between Cypress Grove Road and Springfield Avenue

Following feedback received as part of the public consultation and further traffic assessment, an additional option was developed for consideration within this section to minimise the impact on properties to the north of Templeogue Road. This additional option, which was assessed against the two options assessed at draft PRO development stage (described in section 3.3.5.2.1), is described below:

- Option TG3: Bus priority traffic signals provided on either side of Templeogue Village, with signal-controlled priority provided through the village. The scheme would tie into the Templeogue Village Initiative (approved SDCC Part VIII proposal) within Templeogue Village. Outbound bus lane curtailed at Cypress Grove Road Junction to minimise land acquisition. Equivalent vehicular queuing space provided in advance of Cypress Grove Road for general traffic compared to TG2 through amendments to the adjacent service road, thereby providing similar level of bus priority to the draft PRO but with less impacts.

Option TG3 – Bus priority traffic signals provided on either side of Templeogue Village, with signal-controlled priority provided through the village and outbound bus lane curtailed at Cypress Grove Road junction - was identified as the preferred option as it best aligned with the objectives for the Proposed Scheme by providing physical bus priority and fully segregated cycle tracks throughout the majority of this section of the Proposed Scheme while minimising impacts on adjacent properties.

In terms of the sub-criteria under the Environment criterion, the main criterion under which Option TG3 performed better than the draft PRO was Flora and Fauna, as fewer trees would be impacted under this option. Option TG3 also had advantages over the draft PRO in terms of capital costs due to the reduced extent of land acquisition required.

3.4.3.2 Grange Road to Rathdown Park

Following feedback received as part of the public consultation in addition to further environmental constraints identified through further environmental investigations, additional assessment was considered warranted for this section of the Proposed Scheme. Furthermore, between Brookvale Road and Dodder Park Road, the cross-section is particularly constrained. Widening into properties within this section of the scheme would require the road to be raised in order to maintain driveway gradients at existing grades, which is a requirement of Part M Building Regulations. The potential impacts of the construction works would include:

- Potential temporary closure of vehicular access to some properties during construction works;

- Potential need to undertake significant utility works including raising of manhole covers/gullies, and potentially utility ducts;
- Potential temporary closure of Rathfarnham Road to traffic during construction to facilitate works; and
- Extended construction period when compared to sections where works are less complex.

Upon review, the collective and individual impact of the required construction works were not considered to be practicably feasible due to significant disruption caused by the unique construction works required to deliver this option. Alternative design solutions have therefore been explored in this area in determining the PRO.

Based on the above a number of additional options were developed for consideration within this section. Given the significant changes to options explored within this section of the scheme at this stage, the assessment is described in its totality below. It is noted that the northern extent of the study area for this section was extended to Terenure Cross to allow for a more comprehensive assessment of scheme options along Rathfarnham Road.

The options assessed are briefly described below:

- Option RF1: Two bus lanes and two general traffic lanes provided on Rathfarnham Road south of Brookvale Road with cyclists diverted to Brookvale Downs. Between Brookvale Road and the River Dodder, two general traffic lanes and an inbound bus lane would be provided with outbound bus priority being maintained through use of signal-controlled priority. Two bus lanes, two general traffic lanes and two 1.5m wide cycle tracks provided on Rathfarnham Road north of the River Dodder as far as Terenure Cross. This option is a version of the EPR Option, refined to reflect issues identified upon review of the topographical survey, namely the existing steep driveway gradients on Rathfarnham Road;
- Option RF2: Two bus lanes and two general traffic lanes provided on Rathfarnham Road south of Brookvale Road with cyclists diverted to the preferred parallel route as identified during the initial assessment of parallel cycle route options of the route selection process. Between Brookvale Road and the River Dodder, two general traffic lanes and an inbound bus lane would be provided with outbound bus priority being maintained through use of signal-controlled priority. Two bus lanes, two general traffic lanes on Rathfarnham Road north of the River Dodder as far as Terenure Cross with two 1.5m wide cycle tracks provided north of Rathdown Park where the parallel cycle route re-joins the CBC;
- Option RF3: A combination of bus lanes and signal-controlled priority, with two general traffic lanes and two 1.5m wide cycle tracks provided on Rathfarnham Road between Main Street Rathfarnham and Bushy Park Road. The inbound cycle track would be curtailed for a short section (c.270m) from the Texaco station to c. 100m in advance of the junction with Dodder Park Road. For this short section, cyclists would use the bus lane. Two bus lanes, two general traffic lanes and two 1.5m wide cycle tracks provided on Rathfarnham Road between Bushy Park Road and Terenure Cross;
- Option RF4: An inbound bus lane, two general traffic lanes and two 1.5m wide cycle tracks provided on Rathfarnham Road between Main Street Rathfarnham and Bushy Park Road. The inbound cycle track would be curtailed for a short section (c.270m) from the Texaco station to c. 100m in advance of the junction with Dodder Park Road. For this short section, cyclists would use the bus lane. Two bus lanes, two general traffic lanes and two 1.5m wide cycle tracks provided on Rathfarnham Road between Bushy Park Road and Terenure Cross;
- Option RF5: An inbound bus lane, two general traffic lanes and two 1.5m wide cycle tracks provided on Rathfarnham Road south of the River Dodder. A combination of bus lanes and signal-controlled priority, with two general traffic lanes and two 1.5m wide cycle tracks provided on Rathfarnham Road between the River Dodder and Bushy Park Road. The inbound cycle track would be curtailed for a short section (c.270m) from the Texaco station to c. 100m in advance of the junction with Dodder Park Road. For this short section, cyclists would use the bus lane. Two bus lanes, two general traffic lanes and two 1.5m wide cycle tracks provided on Rathfarnham Road between Bushy Park Road and Terenure Cross;
- Option RF6: A combination of bus lanes and signal-controlled priority, with two general traffic lanes and two 1.5m wide cycle tracks provided on Rathfarnham Road south of the River Dodder. The inbound cycle track would be curtailed for a short section (c.270m) from the Texaco station to c. 100m in advance of the junction with Dodder Park Road. For this short section, cyclists would use the bus lane.

An inbound bus lane, two general traffic lanes and two 1.5m wide cycle tracks provided on Rathfarnham Road between the River Dodder and Bushy Park Road. Two bus lanes, two general traffic lanes and two 1.5m wide cycle tracks provided on Rathfarnham Road between Bushy Park Road and Terenure Cross;

- Option RF7: An inbound bus lane, two general traffic lanes and two 1.5m wide cycle tracks provided on Rathfarnham Road between Main Street Rathfarnham and Terenure Cross. The inbound cycle track would be curtailed for a short section (c.270m) from the Texaco station to c. 100m in advance of the junction with Dodder Park Road. For this short section, cyclists would use the bus lane. An outbound bus gate provided on Rathfarnham Road, north of Dodder Park Road;
- Option RF8: One-way inbound general traffic, two bus lanes and two 1.5m wide cycle tracks on Rathfarnham Road south of the River Dodder. The inbound cycle track would be curtailed for a short section (c.270m) from the Texaco station to c. 100m in advance of the junction with Dodder Park Road. For this short section, cyclists would use the bus lane. A combination of bus lanes and signal-controlled priority, with two general traffic lanes and two 1.5m wide cycle tracks provided on Rathfarnham Road between the River Dodder and Bushy Park Road. Two bus lanes, two general traffic lanes and two 1.5m wide cycle tracks provided on Rathfarnham Road between Bushy Park Road and Terenure Cross; and
- Option RF9: One-way inbound general traffic and two bus lanes provided on Rathfarnham Road south of the River Dodder. Two bus lanes and two general traffic lanes provided on Rathfarnham Road between the River Dodder and Bushy Park Road. Cyclists diverted to the preferred parallel route as identified during the initial assessment of parallel cycle route options of the route selection process. Two bus lanes, two general traffic lanes and two 1.5m wide cycle tracks provided on Rathfarnham Road between Bushy Park Road and Terenure Cross.

Option RF5 - an inbound bus lane, two general traffic lanes and two 1.5m wide cycle tracks provided on Rathfarnham Road south of the River Dodder. A combination of bus lanes and signal-controlled priority, with two general traffic lanes and two 1.5m wide cycle tracks provided on Rathfarnham Road between the River Dodder and Bushy Park Road. Two bus lanes, two general traffic lanes and two 1.5m wide cycle tracks provided on Rathfarnham Road between Bushy Park Road and Terenure Cross - was identified as the preferred option as it best aligned with the objectives for the Proposed Scheme by balancing the provision of physical bus priority and segregated cycle with engineering and construction constraints.

In terms of the sub-criteria under the Environment criterion, Option RF5 performed marginally better than other options in terms of Archaeology and Cultural Heritage due to fact that this option would not impact on Pearse Bridge. In terms of Architectural Heritage, RF5 performed marginally better than other options as it would not impact on Pearse Bridge or Rathfarnham War Memorial Hall. Option RF5 performed significantly better than other options under the Flora and Fauna criterion due to the significantly fewer number of trees impacted. In terms of Landscape and Visual, Option RF5 performed significantly better than other options due to the impacts associated with the construction of a new bridge crossing the River Dodder. In terms of Air Quality and Noise and Vibration, Option RF5 performed marginally worse than other options due to the fact that traffic is not diverted from the main CBC. Under all other criteria, Option RF5 performed equally to the other options.

In addition to the above MCA's, a number of minor changes to the design were made based on feedback received during the second round of public consultation and dialogue with stakeholders. These changes made to the draft Preferred Route Option were relatively small scale and no further option assessments using the MCA described in Section 3.3.2 were required.

These key changes for the Proposed Scheme implemented in the design of the Updated Draft PRO include:

For the portion of the Proposed Scheme relating to the Tallaght to Terenure Core Bus Corridor:

- The redesign of the Wellington Road/Templogue Road junction to better align with proposals for the Wellington Lane cycle scheme, and the Dodder Greenway Phase 6;
- The conservation of the freestanding arch on Templogue Road and its incorporation into the Proposed Scheme through the provision of high quality paving, feature lighting and the provision of a footpath behind the arch, allowing for segregated cycle facilities to be provided on the carriageway side of the arch;

- The widening of the existing toucan crossings at Cheeverstown;
- The realignment of the carriageway north of the Templeogue Road/Springfield Avenue junction to avoid landtake from adjacent properties;
- The redesign of the Fortfield Road/Templeogue Road junction to avoid impacting on adjacent properties;
- The realignment of the two-way cycle track within bushy Park to provide improved cycle facilities within this section; and
- The formalisation of an existing dirt path within the green space adjacent to Rathdown Drive to avoid impacts on trees within this area.

For the portion of the Proposed Scheme relating to the Rathfarnham to City Centre Core Bus Corridor:

- At the junction of Grange Road and Nutgrove Avenue, the scheme was extended slightly to tie into an existing cycle track;
- At the junction of Grange Road and Nutgrove Avenue, the existing right turn general traffic lane which was proposed to be removed from the western arm of the junction, was reintroduced;
- The redesign of the Rathfarnham Road/Willbrook Road junction to provide kerb protection for cyclists;
- The redesign of the Rathfarnham Road/Castleside Drive junction to provide kerb protection for cyclists;
- The redesign of the Rathfarnham Road/Dodder Park Road junction to provide kerb protection for cyclists;
- The provision of a westbound cycle track on Bushy Park Road from Wasdale Park to Rathfarnham Road;
- The relocation of the proposed pedestrian crossing on Terenure Road East, closer to Brighton Road;
- The provision of a new toucan crossing on the northern arm of the junction between Highfield Road and Rathgar Road;
- The relocation of the proposed pedestrian crossing on Rathgar Road to just south of Wesley Road;
- The provision of a one-way signalised shuttle system on Mountpleasant Avenue Upper between Richmond Hill and Richmond Place to facilitate safe two-way traffic on this section;
- The removal of the outbound bus lane on Richmond Street South between Richmond Place South and La Touche Bridge and the provision of a high-quality turning facility for cyclists to connect to the Grand Canal cycleway;
- The closure of Lennox Street to general traffic through the provision of planter build outs. It is noted that cyclists would still be permitted to access Lennox Street;
- The reintroduction of the left turn from Harcourt Road onto Richmond Street South;
- The redesign of the Harrington Street/Richmond Street South junction to provide kerb protection for cyclists;
- The removal of one general traffic lane on Camden Street Upper;
- The relocation of the existing pedestrian crossing and the reorganisation of parking and loading bays on Camden Street Lower; and
- The redesign of the Camden Street Lower/Cuffe Street junction to provide kerb protection for cyclists.

3.4.4 Specific Design Alternatives

No major scheme design alternatives were considered to the Proposed Scheme following the draft Preferred Route Option consultation. However, specific design alternatives which required a further level of consideration either in micro-location or in design form included the following:

- The proposed reconstruction of Rathfarnham Castle Wall; and
- The conservation of Templeogue Arch.

3.4.4.1 Proposed Reconstruction of Rathfarnham Castle Wall

In order to accommodate the proposed bus and cycle lanes on Grange Road and Rathfarnham Road, both temporary and permanent land-take on the east side of the Proposed Scheme where it meets Rathfarnham Castle Park. Consultations were undertaken with SDCC, OPW, Department of Housing, Local Government and Heritage regarding the need for encroachment into the Rathfarnham Castle Demesne and the removal, set back and replacement of the existing boundary wall.

One of the items discussed during the consultation was the consideration as to what would be the most appropriate wall type and finish to form the realigned and replaced boundary wall. During consultations, the DCHG highlighted that the Castle and Park are surviving fragments of a demesne landscape and suggested that BusConnects look at the overall integrity and preservation of the existing wall and also look at the form of the original boundary wall as this could inform the appearance of the new wall. The DCHG also suggested that other demesne treatments in the locality such as Marley Park should be investigated for comparison. Therefore, in order to inform the decision making a visual survey was undertaken by the BusConnects Infrastructure team, to identify other surviving features (if any), of Rathfarnham Castle Demesne in the surrounding locality.

The following design options were assessed:

- Option 1 would involve the installation of a new granite-faced wall circa 2.5m high (internally constructed of concrete blockwork). At the existing pedestrian gate, a low stone wall and rail would be installed, and the stone gateway reinstated. At the Castle entrance, the existing modern steel railings were to be retained to maintain views of the Castle;
- Option 1a was a variation of Option 1 whereby the internal face of the wall would be rendered, replicating the existing internal face which is understated and would also be lower in cost terms than double facing the wall in granite. Rendering the inside face of the boundary wall in lime render would also serve to disguise the concrete construction of the wall and to provide a layer of weathering; and
- Option 2 would involve the installation of a 2.8m high wall with a rounded capping detail. This is consistent with the existing wall and together with the proposed landscape treatment will provide the necessary buffer between the proposed scheme and the Castle and its Demesne and maintains and enhances the sense of enclosure. Externally, the wall will be faced in fielded and panelled roughcast render (which will avoid visible expansion joints in the wall), while internally, the wall will be faced in lime render.

Option 2 is considered to have architectural heritage benefits when compared to Option 1 and Option 1a. Option 2 is considered to be in keeping with the demesne landscape, the surrounding streetscape and with similar boundary treatments in the locality and will perform better than the other options in this regard. Therefore, Option 2 has been included in the final Proposed Route Option.

3.4.4.2 Conservation of Templeogue Arch

There is an existing freestanding stone arch adjacent Templeogue Road which is a national monument. The arch is currently overgrown with vegetation and closed off to the public realm with fencing. The Proposed Scheme passes in close proximity to this arch and an existing pinch point exists on the scheme in this location whereby pedestrians and cyclists share over a short distance.

The following design options were assessed:

- Option 1 (EPR Option) would consist of retaining the shared space arrangement in front of the arch and leaving the arch closed off from the general public;
- Option 2 would consist of conserving the arch and opening it up to the public realm, providing a new curved footpath behind the arch and a segregated cycle track on the carriageway side of the arch. Enhanced paving, feature lighting and planting would be installed to improve the public realm in the vicinity of the arch;

- Option 3 would consist of conserving the arch and opening it up to the public realm, providing a new more direct footpath behind the arch and a segregated cycle track on the carriageway side of the arch. Enhanced paving, feature lighting and planting would be installed to improve the public realm in the vicinity of the arch;
- Option 4 would consist of conserving the arch and opening it up to the public realm, providing a new more direct footpath through the arch and a segregated cycle track on the carriageway side of the arch. Enhanced paving, feature lighting and planting would be installed to improve the public realm in the vicinity of the arch. This option would require the removal of a section of the wingwall of the arch closest to the carriageway; and
- Option 4a would consist of conserving the arch and opening it up to the public realm, providing a new more direct footpath through the arch and a segregated cycle track on the carriageway side of the arch. Enhanced paving, feature lighting and planting would be installed to improve the public realm in the vicinity of the arch. This option would require the removal of a section of the wingwall of the arch furthest from the carriageway.

Option 3 is considered to have a number of benefits when compared to the other options. Option 3 would open the arch up to the public realm and does not require the removal of any portions of the arch. It also provides segregated walking and cycling facilities with the most direct route for pedestrians, with limited impact on existing trees. Therefore, Option 3 has been included in the final Proposed Route Option.

3.5 Conclusion

The Proposed Scheme has been the subject of a systematic and comprehensive assessment of reasonable alternatives during the course of its development, informed by extensive engagement with residents, businesses, the local authority and other interested stakeholders, public representatives and the general public.

As described in this Chapter, a significant range of alternatives have been considered at three levels:

- Strategic alternatives, particularly with regard to the GDA Transport Strategy;
- Route alternatives; and
- Design alternatives, incorporating detailed local level design development.

The assessment of alternatives took account of environmental impacts, alongside other relevant factors including the economy, safety and accessibility, at appropriate stages.

It is considered that the examination of alternatives presented in this Chapter meets and exceeds the requirements of the EIA Directive and Section 50(1)(iv) of the Roads Act (as amended), which states that an EIAR must contain '*a description of the reasonable alternatives studied by the road authority or the Authority, as the case may be, which are relevant to the proposed road development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the proposed road development on the environment*'.

The Proposed Scheme is described Chapter 4 (Proposed Scheme Description).

3.6 References

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Directives and legislation

Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment

Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment

S.I. No. 279/2019 - European Union (Roads Act 1993) (Environmental Impact Assessment) (Amendment) Regulations 2019

S.I. No. 296/2018 – European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018