Appendix F
Route Selection Report

Appendix F: Route Selection Report for Clongriffin to City Centre Core Bus Corridor

The Clongriffin to City Centre CBC Route Selection Report is available on the NTA BusConnects Website, it can be accessed by clicking the links below:

- Clongriffin to City Centre CBC - Route Selection Report

  https://busconnects.ie/media/1382/clongriffin-to-city-centre-cbc-route-selection-report.pdf

- Clongriffin to City Centre CBC - Concept Design Drawings

  https://busconnects.ie/media/1381/clongriffin-to-city-centre-cbc-concept-design-drawings.pdf

- Appendix A - MCA Tables

  https://busconnects.ie/media/1378/appendix-a-mca-tables.pdf

- Appendix C - Technical Note on Junctions

  https://busconnects.ie/media/1379/appendix-c-technical-note-on-junctions.pdf

- Appendix D - Junction modelling report

  https://busconnects.ie/media/1380/appendix-d-junction-modelling-report.pdf

The above documents can also be found in the following locations:
https://busconnects.ie/initiatives/core-bus-corridor-background-information/technical-documents/

National Transport Authority

Clongriffin to City Centre CBC

Route Selection Report

CH2M Barry

18/04/2018

Document Control Sheet

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EXECUTIVE SUMMARY

General

CH2M Barry were appointed by the National Transport Authority to undertake the Feasibility and Options Report for the Clongriffin to City Centre CBC as identified in the Draft Transport Strategy for the Greater Dublin Area (2016-2035). This report details the route selection process for the Clongriffin to City Centre Core Bus Corridor Scheme, which is designed to full core bus corridor standards.

Scheme Objectives

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

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

The Study Area

The Clongriffin to City Centre Bus Corridor Study Area runs from Clongriffin to the City Centre O'Connell Bridge - Eden Quay Junction. The study area was generally developed to include the main trip generators between the City Centre and Clongriffin either side of the central spine formed by the existing R105 & R107 route. The study area lies within the administrative area of Dublin City Council.

Route Options Assessment Process

A two-stage options assessment process was adopted.

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

This assessment stage focused on high-level engineering and environmental constraints, comprising a desk study supplemented with site visits. The purpose of this assessment stage was to determine which route options were the most viable and should be considered for further detailed assessment. Following this any links which were disconnected or could not clearly form part of a CBC route were removed. The Preliminary

Route Assessment was then used to remove some route options that could be clearly demonstrated to be inferior to an adjacent viable route option.

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

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

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

The Emerging Preferred Route

Based on the results of the analysis carried out as described in this report, an Emerging Preferred Route has been identified, as illustrated in Figure 0.1 and is described in the following paragraphs and in detail in Chapter 7.

Southbound: The emerging preferred route starts outside Clongriffin DART station, from here the bus travels along Clongriffin Main Street, including some parts that are not yet constructed to join the Malahide Road. The bus then continues south along the Malahide Road for 5.6 km until it reaches the junction with Marino Mart. Here the bus takes a right and continues straight along Marino Mart, Fairview, Annesley Bridge Road, North Strand Road and Amiens Street. The southbound bus circulates around the Custom House by travelling along Memorial Road and Custom House Quay

Northbound: The northbound route would follow the same route as the southbound routing except that it travels around the opposite side of the Custom House on Beresford Place.

Figure 0.1 Emerging Preferred Route

Concept Scheme Design

Bus lanes will be provided for the entire length of the scheme. Bus lanes will be constructed along Clongriffin Main Street in accordance with the LAP, these have already been constructed in some locations. A new junction will be constructed where Clongriffin Main Street meets Malahide Road and signals will provide priority for buses using the CBC route. Works on the junction with the R139 will allow for bus priority to be provided at the signals and increase provision for cyclists and pedestrians.

Further south along the Malahide Road existing bus lanes will be used and segregated cycle lanes will be provided by using existing verge space or by reducing the width of the median where appropriate. All signalised junctions along this route will be upgraded to provide enhanced bus priority and pedestrian/cycle facilities. The existing roundabouts at Artane and at Priorswood Road junctions will be upgraded to signalised junctions. Some commercial parking north of the junction with Kilmore Road will be affected, along with land take from gardens which would result in a reduction in parking capacity in approximately 10 gardens; parking for at least one car will still be possible in all of these gardens.

The Malahide Road will be widened to provide bus lanes on the sections where they do not currently exist, and new segregated cycle lanes will be provided for the whole length. Malahide Road is constrained for the section between Brian Road and Clontarf Road junctions, here cyclists in both directions will be diverted along Haverty Road and Brian Road. Southbound cyclists will be required to cross the road twice and two new toucan crossings will need to be introduced.

The section from Marino Mart along North Strand Road and Amiens Street as far as the Foley Street junction would generally follow the Clontarf to City Centre Cycle Scheme plans, which provides cycle and bus lanes in both directions. On-street parking/loading will be affected in places although it will be retained wherever feasible.

There is a pinch point on Amiens Street from the Foley Street to Sherriff Street junctions as the route passes under the DART bridge. The available cross section is limited in this section by the large piers supporting the bridge. Traffic signals will be used to hold northbound traffic in advance of the bridge and provide priority for northbound buses, dedicated bus lanes will be provided for southbound buses. Southbound cyclists will pass around the back of the piers with the construction of a new retaining wall and setting back of the existing railings. Northbound cyclists will have a dedicated cycle track on the inside of the existing piers, the existing parking/loading/taxi bay to the north of the bridge will be removed.

On Amiens Street, a southbound traffic lane will be removed for the section from Sheriff Street to the existing taxi rank outside Connolly Station and also from Store Street to Custom House Quay. A northbound traffic lane will be removed from Foley Street junction to the Beresford Place junction. The additional road space will be allocated to bus/cycle lanes and to increase the width of footpaths as this is a busy pedestrian area which currently has poor pedestrian facilities.

The existing taxi rank outside Connolly will be relocated to Harbourmaster Place. The existing time plated parking/loading in the northbound bus lane on Amiens Street will be removed.

Around the Custom House one lane of traffic will be removed from Memorial Place to allow for a southbound bus lane and one lane from the south-western side of Beresford Place which currently continues to Gardiner Street will be removed to allow for a continuous northbound bus lane. A two-way cycle route will be provided along the north quays in accordance with the Liffey Cycle Scheme.

Cost Estimate

A high-level cost estimate has been prepared based on the concept design for the scheme, which includes a number of assumptions regarding the scheme details. The estimated scheme infrastructure cost, which includes land acquisition and construction costs, is anticipated to be in the order of € 45-50 m.

Journey Time Benefits

Current journey times for the Dublin Bus 15 route, for the section which follows the emerging preferred route from Clongriffin to City Centre, can be seen to vary by as much as 60 % when comparing average peak and off-peak journey times. The variation in journey times is significantly more pronounced on the sections of the route which do not currently have dedicated bus lanes.

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

The journey times outside of peak hours, when traffic volumes are lower, are likely to be reflective of the journey times which could be achieved by a combination of improved bus priority, better enforcement of bus lanes and cashless fares. The current off-peak journey times average between 37 and 23 minutes.

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

Next Steps

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

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

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

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

1 INTRODUCTION & BACKGROUND

1.1 Preamble

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

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

The Clongriffin to City Centre Corridor Study Area runs from Clongriffin DART station to the City Centre at the O'Connell Bridge - Eden Quay Junction. The corridor is within the administrative area of Dublin City Council. The Radial Core Bus Network as identified in the GDA Transport Strategy is illustrated in Figure 1.1, with the Clongriffin to City Centre CBC highlighted. This report presents the results of the various studies and surveys undertaken, details all feasible scheme options, reports on the option assessment process and proposes an Emerging Preferred Route.

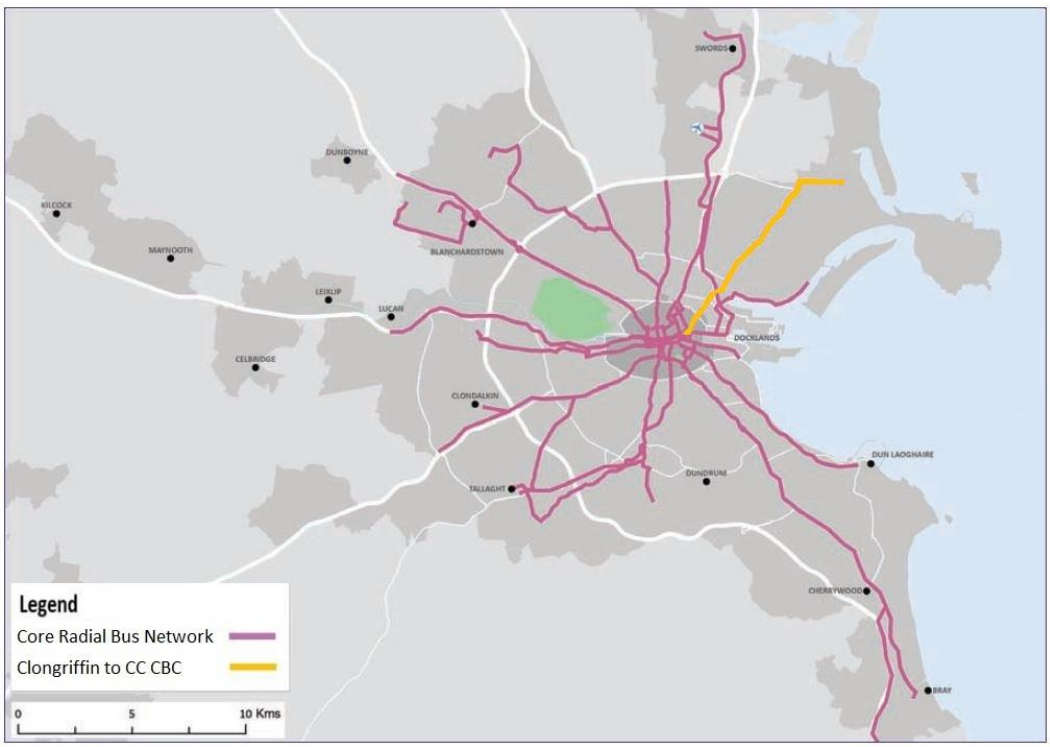


Figure 1.1 Radial Core Bus Networks

1.2 Report Structure

This report is structured as follows:

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

- **Chapter 3** – In this chapter, the study area for the Clongriffin to City Centre CBC is detailed and divided into two distinct sections. Scheme specific constraints and opportunities are discussed. The integration of the scheme with existing and planned transport networks is considered, along with considerations of the scheme for other road users.

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

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

- **Chapters 5 & 6** – These chapters detail the Emerging Preferred Route selection process, for Sections 1 and 2 respectively, through Options Assessment Stage 1 and Stage 2 analysis.

- **Chapter 7** – This chapter gives the overall conclusions of the scheme options assessment process and identifies and describes the Emerging Preferred Route.

- **Chapter 8** – This chapter details the "next steps" in the delivery of the project.

2 TRANSPORT CONTEXT & SCHEME OBJECTIVES

2.1 Introduction

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

2.2 Transport Strategy for the Greater Dublin Area 2016-2035

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

Of these identified bus corridors, the ones relevant to this Clongriffin to City Centre CBC are:

- Clongriffin – Artane – Fairview;
- Ringsend – Pearse St
- Clongriffin to Tallaght BRT

2.3 Integrated Implementation Plan 2013-2018

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

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

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

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

2.4 Greater Dublin Area Cycle Network Plan

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

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

2.5 Development Plan, Local Area Plans and Strategic Development Zones

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

- General Plans
  - Transport Strategy for the Greater Dublin Area 2016-2035
  - The Dublin City Development Plan 2016-2022
  - The Clongriffin-Belmayne (North Fringe) Local Area Plan 2012-2018
  - Dublin City Centre Transport Study (2016)
  - Bus Rapid Transit Core Dublin Network (2012)
  - Fairview Marino Local Environment Improvement Plan 2014-2017
  - Georges Quay Local Area Plan 2012
- Transport Schemes
  - LUAS Cross City
  - Swords to City Centre BRT
  - Dublin Bus Network Redesign
  - DART Underground
  - Proposed Metro North
  - CBC Ringsend
- Cycling
  - GDA Cycle Network Plan
  - Liffey Cycle Scheme
  - Royal Canal Greenway
  - Clontarf to City Centre Cycle Route

2.6 CBC Concept

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

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

2.7 Objectives of CBCs

The National Transport Authority (NTA) have identified the following objectives for the Clongriffin to City Centre CBC:

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

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

2.8 Design Principles

2.8.1 Cross Sections

The following widths for the various components of the route cross section are assumed, dependent upon available width:

- 3.0m to 3.25m CBC lane
- 2.0m Footpath
- 1.75m to 2.5m Cycle Track
- 3.0m to 3.25m traffic lane
- 2.8m minimum for turning lanes

The cross-sections used for individual route options are detailed within the scheme descriptions discussed in Chapters 5 & 6.

2.8.2 Bus Stops

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

3 STUDY AREA

3.1 Introduction

In this chapter, the study area for the Clongriffin to City Centre CBC is detailed. Scheme specific constraints and opportunities within the Study Area are discussed, and the potential for integration of the scheme with existing and planned transport networks is considered, along with considerations of the scheme for other road users.

3.2 Study Area

The Clongriffin to City Centre Core Bus Corridor Study Area runs from Clongriffin to the City Centre at Custom House Quay. The study area was generally developed to include the main trip generators between the City Centre and Clongriffin either side of the central spine formed by the existing Malahide Road (R107) route as illustrated in Figure 3.1. The study area lies within the administrative area of Dublin City Council.

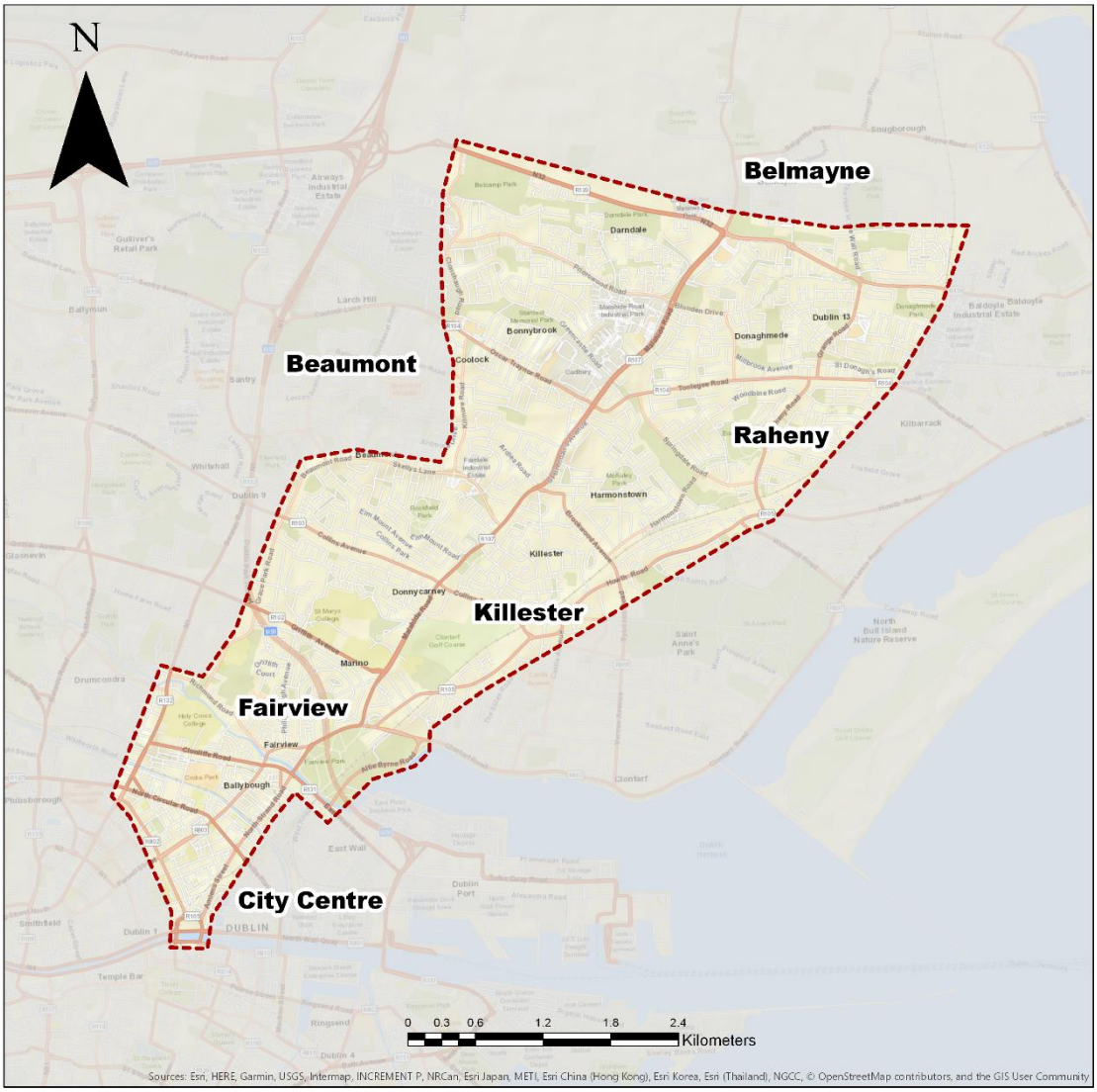


Figure 3.1 Study Area

The Study Area was split into two smaller sections, as shown by **Figure 3.2** below:

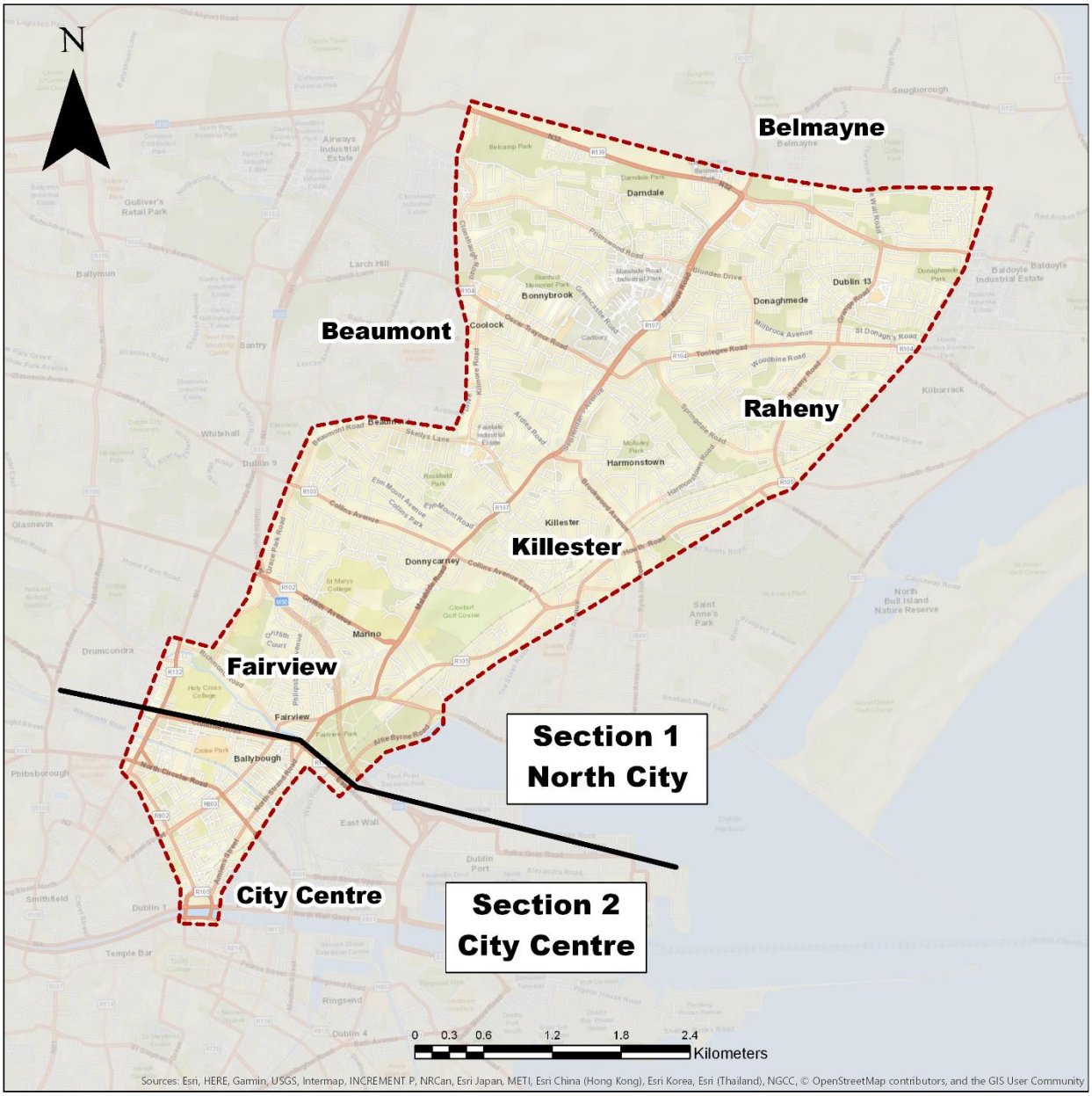


Figure 3.2 Study Area Sections

The southern terminus for the CBC is identified as O'Connell Bridge, as it can be reasonably assumed to represent Dublin City Centre, with a terminus at this location serving the main trip attracters associated with the city centre area. Any routes which terminate on here can travel along the Quays to connect to another outbound CBC.

The Northern Terminus location is discussed and assessed later in Chapter 5.1

3.3 Physical Constraints & Opportunities

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

- River Liffey, River Tolka and The Royal Canal (limited options for crossing restricts design options)
- Public transport infrastructure such as DART, LUAS, Dublin Bus and Irish Rail
- Planned and committed developments including Belmayne/Clongriffin LAP
- Trees and other natural and ecological features including rivers and streams
- Architectural, archaeological and heritage sites and features
- Protected structures adjacent to the route
- Existing urban and sub-urban roads and street networks
- Limited availability of land in urban and suburban areas.

3.4 Integration with Existing and Proposed Public Transport Network

An objective of the Clongriffin to City Centre CBC is to improve interchange between different modes of transport within the study area, including current transport infrastructure and future transport plans. Route options within the study area have been developed, in as far as is practical, to enhance interchange with these existing and future transport services which include:

- DART stations
- Existing Dublin Bus services at numerous locations along the route.
- LUAS
- Greater Dublin Area Cycle Network Plan (GDACNP)
- Future public transport proposals such as DART Interconnector and Metro North

3.5 Compatibility with Other Road Users

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

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

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

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

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

4 ASSESSMENT METHODOLOGY

4.1 Introduction

This chapter of the report details the methodology that was used as part of the Clongriffin to City Centre CBC Route Options Assessment. This methodology seeks to determine the optimum route and scheme design for this CBC. It assessed and compared alternative options under various criteria including a comparison of the environmental effects.

4.2 Assessment Process

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

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

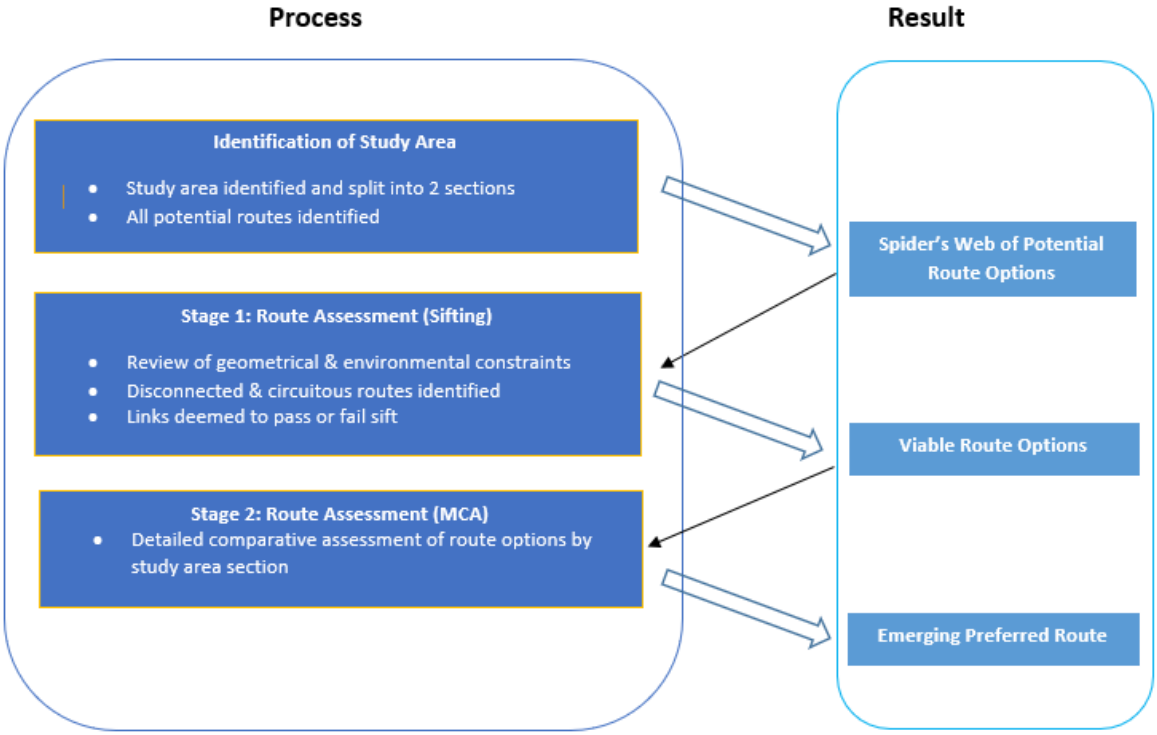


Figure 4.1 Assessment Process

4.3 Stage 1: Route Options Assessment

4.3.1 Spiders Web Development

An initial 'spiders-web' of potential route options that could possibly accommodate a CBC service was identified for each study area section. This 'spider's-web' of route options was chosen with reference to the CBC system characteristics and in order to meet the scheme objectives.

Initial route options identified also took cognisance of the physical constraints and opportunities present and the ability to integrate with other public transport modes. Of particular relevance in developing the spider's-web was the potential for the road or route sections to facilitate fast and reliable journey times and thereby be able to practically accommodate CBC lane priority.

Any road carrying an existing Dublin Bus service as well as any other plausible routes were included in the spider's web. Cul-de-sacs and narrow residential roads were discounted at this stage. This was an iterative process and after completing each stage it was often necessary to revisit the previous stages to ensure the logic and decision-making process remained consistent, and it was also necessary to occasionally look forward to ensure that no viable route options were discounted.

4.3.2 Sifting Process

All links identified as part of the spider's web underwent a high-level qualitative assessment based on professional judgement and general appreciation for existing physical conditions/ constraints within the study area. This was based on a desktop study, using data collected in the data collection process and site visits. This exercise identified links that would either not achieve the scheme objectives or would be subject to significant cost and/or impact to achieve these objectives (e.g. excessive land-take).

This assessment stage focused on engineering constraints together with a desktop study, identifying geometrical constraints, high level environmental constraints and population/employment densities. Assessment indicators used were as follows:

- land take assessment, in particular impacts on residential front gardens,
- pinch points along the link,
- presence of existing bus lanes and cycle facilities,
- junctions and their ability to accommodate measures to enhance bus priority,
- functionality of the street – impact on-street parking and loading, availability,
- high level environmental constraints,
- high level population and employment catchment analysis,
- high level integration with the land use and transport plans

Links that did not address the scheme objectives or were considered "un-deliverable" were deemed to fail the first sifting stage and were not progressed. Links that did meet the objectives and could be delivered were brought forward to the next stage.

Following is the list of data collected and considered for the Sift Assessment:

- Background Mapping OS Tiles
- Central Statistics Office (CSO) Data
- RAPID Areas & Deprived Geographic Index (Source: https://www.pobal.ie.)
- Environmental information (Source: http://map.geohive.ie)
- LUAS Cross City Drawings
- Swords to City Centre & Blanchardstown to UCD BRT General Arrangement drawings
- Land Use Zones & SDZs part of Development Plans & Local Area Plans
- AVL Data for relevant bus routes
- AVL Journey Time Variance Data
- General Arrangement drawings for Greenhills, Rathfarnham & Ringsend CBCs
- Dublin City Council City Centre Traffic Management Scheme Proposals
- Greater Dublin Area Cycle Network Plan

4.3.3 Removal of Disconnected Links

In this step, links that were disconnected or could clearly not form part of a Clongriffin to City Centre CBC route were discounted.

4.3.4 Preliminary Route Assessment

Following the Sift the remaining links were assembled into longer route options that span each study area section. Route options were assessed against the study objectives under the following criteria:

- Route length & directness
- Number of junctions
- Number of turning movements
- Level of bus priority practically achievable
- Potential negative impacts (requirement for land take, removal of on-street parking, etc)
- Requirement for split running (route options where inbound and outbound bus routes are separated by a large distance are not desirable)
- Walking distance to major trip attractors and areas of high residential/employment density

Based on these criteria, if a route option is shown to be considerably less favourable than an adjacent viable route option then it is discounted at this stage.

4.4 Stage 2: Multi Criteria Analysis

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”

Each scheme was comparatively assessed against the study objectives using the KPIs and method of measurements identified below. The scheme options were then ranked accordingly in order to identify the Emerging Preferred Route Option.

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

The assessment criteria are detailed below in the table following:

Table 4.1 Assessment Criteria

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

4.4.1 Economy

4.4.1.1 Capital Cost (1.a.)

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

1.a.i Indicative Infrastructure Cost Estimate

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

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

Corridor sections (between junctions)

Construction cost estimates for corridor sections (between junctions) have been categorised as minor, or major. Minor works have been assumed where significant road widening is not anticipated, for example along sections of a route where bus and cycle infrastructure is already provided, or along sections where significant widening is geometrically constrained. For all other sections requiring significant road widening major works have been assumed.

A further detailed assessment has been carried out for all the roads falling under major works and specific units cost rates have been worked out for the majority of the roads, which is detailed in Table 4.3.

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

Table 4.2 Cost Per Km Assumptions

Construction Category	Construction Works Assumptions	Cost Rate (€/km)
Minor	Minor Works: • Local improvements to bus lanes; • New sections of paths where necessary; • New sections of cycle paths where necessary; • New or upgraded bus stops where necessary, including provision of Real Time Passenger Information (RTPI) and bus shelters;	€750,000

	• Kerb improvement locally (removal and replacement); • Footpath improvement locally (breaking out/additional concrete) including tactile paving and dished kerbs • Road resurfacing locally (milling/reinstatement or overlay) • Road markings (non-destructive removal of existing road markings): and • Signage (removal/relocation/replacement of existing and/or installation of new)	
Major	Roadway widening (including boundary works): • General site clearance (street furniture removal/relocation, etc); • Services protection /relocation/ diversion (power supply, communications, water, gas); • Drainage works (removal of and installation of new drainage systems); • New or upgraded bus stops where necessary, including provision of Real Time Passenger Information (RTPI) and bus shelters; • Earthworks (embankment treatments, retaining walls, slopes regrading, etc); • Pavement full depth reconstruction; • Kerbs footways and paved areas (removal and new); • Road markings (non-destructive removal of existing road markings, new road markings); • Signage (removal /relocation /replacement of existing and/or installation of new); • Road lighting (replacement, cabling, ducting); • Landscaping works (top soiling, fence, trees relocation, hedges, road margins Re-grading etc); • Property boundary reinstatement works (walls, gates, driveways landscaping etc).	€3,750,000
Major	New Construction in green field site (including boundary works): • General site clearance • Services protection /relocation/ diversion; • Drainage works (installation of new drainage systems); • New bus stops where necessary, including provision of Real Time Passenger Information (RTPI) and bus shelters; • Earthworks (embankment treatments, retaining walls, slopes regrading, etc); • Pavement full depth construction; • Kerbs footways and paved areas; • Road markings • Signage • Road lighting • Landscaping works (top soiling, fence, trees, hedges etc);	€4,200,000

	• Property boundary works (walls, gates, driveways landscaping etc).	
Major	Partially completed road works (Including boundary works): • Drainage works (any outstanding works); • New bus stops where necessary, including provision of Real Time Passenger Information (RTPI) and bus shelters; • Earthworks (embankment treatments, retaining walls, slopes regrading, etc); • Pavement full depth construction; • Kerbs footways and paved areas; • Road markings • Signage • Road lighting • Landscaping works (top soiling, fence, trees, hedges etc); • Property boundary works (walls, • gates, driveways landscaping etc). • Property boundary reinstatement works (walls, gates, driveways landscaping etc).	€2,000,000

Table 4.3 Cost Per Km Assumptions for Cycle route

Description	Cost per km
Offline Cycle route along Fairview (signing and lining)	€800,000

The likely scale of construction works required at junctions have been identified for each route and categorised as minor, moderate, major or extensively major as per **Table 4.4** below.

Table 4.4 Junction Cost Assumptions

Construction Category	Construction Works Assumptions	Cost Rate (€/km)
Minor	Minor Works: Modifications to existing signal controlled junctions to: • introduce bus priority (i.e. changing method of control, etc), without significant alteration to their existing geometry and layout: • Road markings (non-destructive removal of existing road markings, new road markings); • Anti-skid surface; • Signage (removal/relocation/replacement of existing and/or installation of new); • Dished kerbs and tactile paving; • Additional signal poles/heads; • Modifications to the signal controller and associated traffic signal installation works (including electrical); and • Additional loop detectors.	€97,500
Moderate	Upgrading existing minor/major junctions to signal control junctions, without significant alteration to their existing geometry and layout (excluding boundary works): • Kerbs improvement locally (removal and new); • Footpaths improvement locally (breaking out and new); • Road markings (non-destructive removal of existing road markings, new road markings); • Signage (removal/relocation/replacement of existing and/or installation of new); • Anti-skid surface; • Dished kerbs and tactile paving; • New signal poles/heads; • New traffic signals ducting, cabling and chambers; • New signal controller and associated traffic signal installation works (including electrical); • New loop detectors; • Services protection/relocation/diversion (power supply, communications); • Limited earthworks; • Localised pavement reconstruction; and • Localised road lighting improvements (relocation, cabling, ducting).	€325,000

Major	Significant modifications to existing signal controlled junctions including upgrading of roundabouts to signal controlled junctions, including: • General site clearance (street furniture removal/relocation, etc); • Services protection/relocation/diversion (power supply, communications cables, water, gas); • Drainage works (removal of and installation of new drainage systems); • Earthworks (embankment treatments retaining walls, slopes re-grading, etc); • Pavement full depth reconstruction; • Kerbs footways and paved areas (removal and new); • Road markings (non-destructive removal of existing, new road markings); • Anti-skid surface; • Signage (removal/relocation/replacement of existing and/or installation of new); • Dished kerbs and tactile paving; • Signal poles/heads, traffic signals ducting, cabling and chambers; • Signal controller and installation works (incl. electrical); • Loop detectors; • Localised Road lighting (replacement, cabling, ducting); • Landscaping works (top soiling, fence, trees, hedges, margins re-grading, etc); and; • Property boundary reinstatement works (walls, gates, driveways landscaping etc).	€650,000
Extensively Major	Significant modifications to very large and/or typical complex existing signal controlled junctions including upgrading of roundabouts to signal controlled junctions, including: • General site clearance (street furniture removal/relocation, etc); • Services protection/relocation/diversion (power supply, communications cables, water, gas); • Drainage works (removal of and installation of new drainage systems); • Earthworks (embankment treatments retaining walls, slopes re-grading, etc); • Pavement full depth reconstruction; • Kerbs footways and paved areas (removal and new); • Road markings (non-destructive removal of existing, new road markings); • Anti-skid surface; • Signage (removal/relocation/replacement of existing and/or installation of new); • Dished kerbs and tactile paving;	€1,150,000

	• Signal poles/heads, traffic signals ducting, cabling and chambers; • Signal controller and installation works (incl. electrical); • Loop detectors; • Localised Road lighting (replacement, cabling, ducting); • Landscaping works (top soiling, fence, trees, hedges, margins re-grading, etc); and; • Property boundary reinstatement works (walls, gates, driveways landscaping etc).	

4.4.2 Land Acquisition Cost Estimate (1.a.ii)

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

In this assessment, land is defined as either public or private. Public land is considered to be the space between road boundaries and any also any public open space. For this analysis, it is assumed that there is no cost associated with the acquisition of public land. The identification of land acquisition is based on available Ordnance Survey mapping only and as such is approximate.

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

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

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

- **Journey time** savings for public transport services (including the CBC) on the scheme. These are achieved through the enhancement and implementation of dedicated bus lanes and priority along the route, upgrading of road sections, removal of pinch points and redesign of existing bus stops. Journey times for each route option have been compared by calculating the estimated journey time between common start and end points. The following assumptions have been made in the calculations of overall journey time:
  - Buses proceed at an assumed top speed (50kph) unless they are delayed
  - Buses are delayed when they stop at bus stops to pick up passengers, the length of delay is based on the available patronage data for each stop.
  - Buses are delayed at junctions, the length of delay is based on the type of junction
  - Buses are delayed when they are required to share congested lanes with general traffic. The length of delays is based on available queue length information and automatic vehicle location data from Dublin Bus.

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

4.4.4 Integration (2)

4.4.4.1 Land Use Integration (2.a.)

This criterion assesses how a scheme would integrate with any planned developments in the catchment area and also how it might enhance the economic opportunities of an area. This criterion includes how a scheme fits into local area plans or any other objectives in area / county policies.

4.4.4.2 Residential Population and Employment Catchments (2.b.)

The current residential and employment population within a particular walking route distance of each of the CBC stops is calculated in order to determine the number of potential users for each scheme option. To assess the potential population and employment catchments the walking distance from bus stop locations along each route was analysed using the network analyst module of ArcGIS to create walk time isochrones from each stop. The distances to the stops correlate to walk times of 5, 10 and 15min intervals and were estimated based on an average walking speed of 5kph. The population and employment within the isochrones was then calculated based on planning data received from the NTA at CSO small area level. Where just a portion of a small area fell within the walking catchments the portion of the population/employment within walking distance was estimated proportionally based on area. See sample catchment map **Figure 4.2** below.

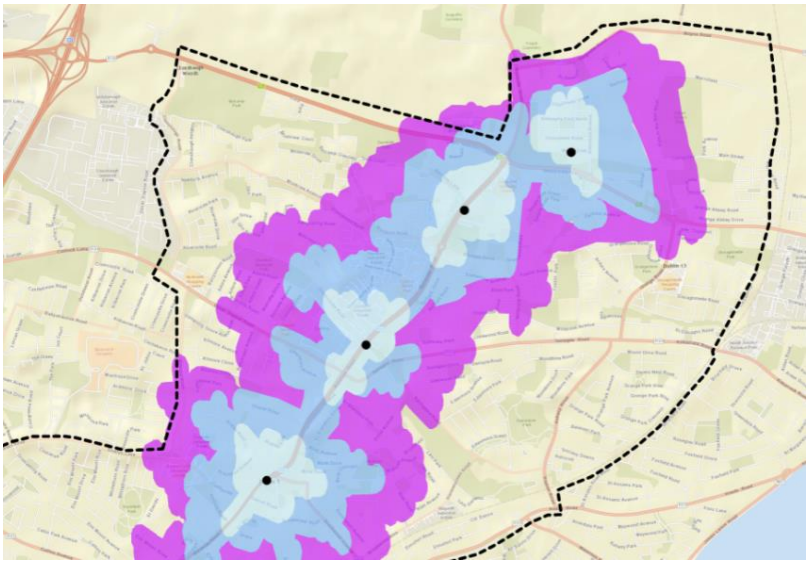


Figure 4.2 Sample bus stop catchment map with walking isochrones shown at 5/10/15 minute intervals

4.4.4.3 Transport Network Integration (2.c.)

Under this criterion, integration with wider public transport links are assessed and compared for each scheme. These include transport modes such as LUAS, DART, railway and public and private bus operators. The potential for interchange facilities such as safe walking areas, cycle parking areas, etc. are also assessed under this criterion. Where a potential CBC route shares a route with another public transport route over a significant distance this was seen as a negative under this criterion.

4.4.4.4 Traffic Network Integration (2.d.)

A comparative assessment of the expected traffic impact of each route option was undertaken based on professional judgement and understanding of traffic conditions in the Study Area. This represents a high-level assessment of the traffic impact of the route options considered in the Stage 2 MCA.

The anticipated traffic impact expected to be incurred by motorists using private vehicles as a result of the different route options will be assessed. The disadvantages experienced by motorists in respect of reduced junction capacity and restricted movements will be considered.

4.4.4.5 Cyclists and Pedestrian Integration (2.e.)

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

4.4.5 Accessibility & Social Inclusion (3)

4.4.5.1 High volume trip attractors (3.a.)

Trip attractors within a 15-minute walk from stops along a scheme are compared in order to determine schemes which would generate demand for buses along the CBC (in addition to residential and employment populations). Key trip attractors such as schools, universities, retail and commercial centres, hospitals and employment centres are considered in this analysis.

4.4.5.2 Deprived Geographic Areas (3.b.)

The potential of each scheme to impact on any deprived areas is assessed and compared under this criterion. RAPID (Revitalising Areas by Planning, Investment and Development) areas as well as the Geographic Deprivation Index of areas alongside a given route was used as a measure for this criterion.

4.4.6 Safety (4)

Under this criterion, the number of junctions along each scheme, as an approximate measure for the potential for collisions, are compared. In addition, the number of turn movements are compared, as these can also potentially lead to lower safety conditions along the scheme. Differentials in traffic speeds along a route are also assessed under this criterion as a high relative speed difference between transport modes may result in an increased road safety risk. This criterion also assesses the proximity of stops to pedestrian crossings and the width of footpaths along routes to the bus stops along a scheme as a means of assessing pedestrian safety.

4.4.7 Environment (5)

4.4.7.1 Archaeological, Architectural and Cultural Heritage (5.a)

Effects on cultural heritage can be considered in terms of impacts on below ground archaeological remains, historic buildings (individual and areas), and historic landscapes and parks. The construction, presence and operation of transport infrastructure can impact directly on such cultural heritage resources through physical impacts resulting from direct loss or damage, or indirectly through changes in setting, noise and vibration levels, air quality, and water levels.

Provision of a CBC has the potential for impacts on archaeological, architectural and cultural heritage. Potential impacts of each scheme on Recorded Monuments and Protected Structures (RMPs) within 50m of the corridor are assessed and compared. Potential impacts on Sites of Archaeological or Cultural Heritage and on buildings listed on the National Inventory of Architectural Heritage are also assessed and compared under this criterion.

4.4.7.2 Flora and Fauna (5.b.)

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

4.4.7.3 Soils and Geology (5.c.)

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

4.4.7.4 Hydrology (5.d.)

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

4.4.7.5 Landscape and visual (5.e.)

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

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

- land use zonings (amenity, open space, recreation, sport)
- protected views and prospects
- Recreation Access Routes / Designated Walk Ways
- Tree Preservation Orders (TPO) and tree preservation/protection objectives
- the location of Protected Structures
- the location of sites on the Record of Monuments and Places (including Areas of Archaeological Potential)
- the designation of Architectural and candidate Architectural Conservation Areas (ACA)

4.4.7.6 Noise, Vibration and Air (5.f.)

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

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

This criterion assesses the impact of each scheme option on land use character, and measures impacts which prevent land from achieving its intended use, for example through land acquisition, removal of parking spaces or severance of land.

4.4.8 Scheme Options Summary Table

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

Each route is given a comparative score (advantage/disadvantage) on a 5-point scale for each of the criteria listed in Table 4.1. below.

Table 4.5 MCA comparative advantage/disadvantage colour ranking table

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

NOTE: Where all options assessed are considered comparatively equal in terms of advantage/disadvantage they all ranked as neutral

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

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

4.5 Terminus Assessment

A multi-criteria analysis is also used to determine the optimum location for the northern terminus. Potential options for a terminus location were compared against one another using 3-point scale under a number of criteria. Each location was comparatively assessed against the study objectives using the KPIs and method of measurements identified below. The terminus options were then ranked accordingly in order to identify the preferred terminus location.

The assessment criteria are detailed in Table 4.6 below:

Table 4.6 - Terminus Assessment Criteria

Transport Integration	Public Transport Network Integration - Interchange with rail, DART, LUAS, other BRT and bus services
Surrounding Area	Integration with any planned developments in the surrounding area including local area plans or any other objectives in area / county policies
	High level comparison of population and employment calculation
Bus/Cycle Priority	Ability to achieve full bus and cycle priority on approach to the terminus
	Sufficient availability of space for layover of 2-3 buses along the road.
	Provide opportunity for park & ride for the bus users
Environmental	High level comparison of potential environmental impacts

The colour ranking scale used is shown below in Table 4.7

Table 4.7 - Ranking scale used for terminus assessment

Colour	Description
	Some Advantage over other options
	Neutral compared to other options
	Some Disadvantage over other options

5 STUDY AREA SECTION 1 – NORTH CITY

5.1 Northern Terminus Location

The two possible northern terminus locations considered are shown in **Figure 5.1** below.

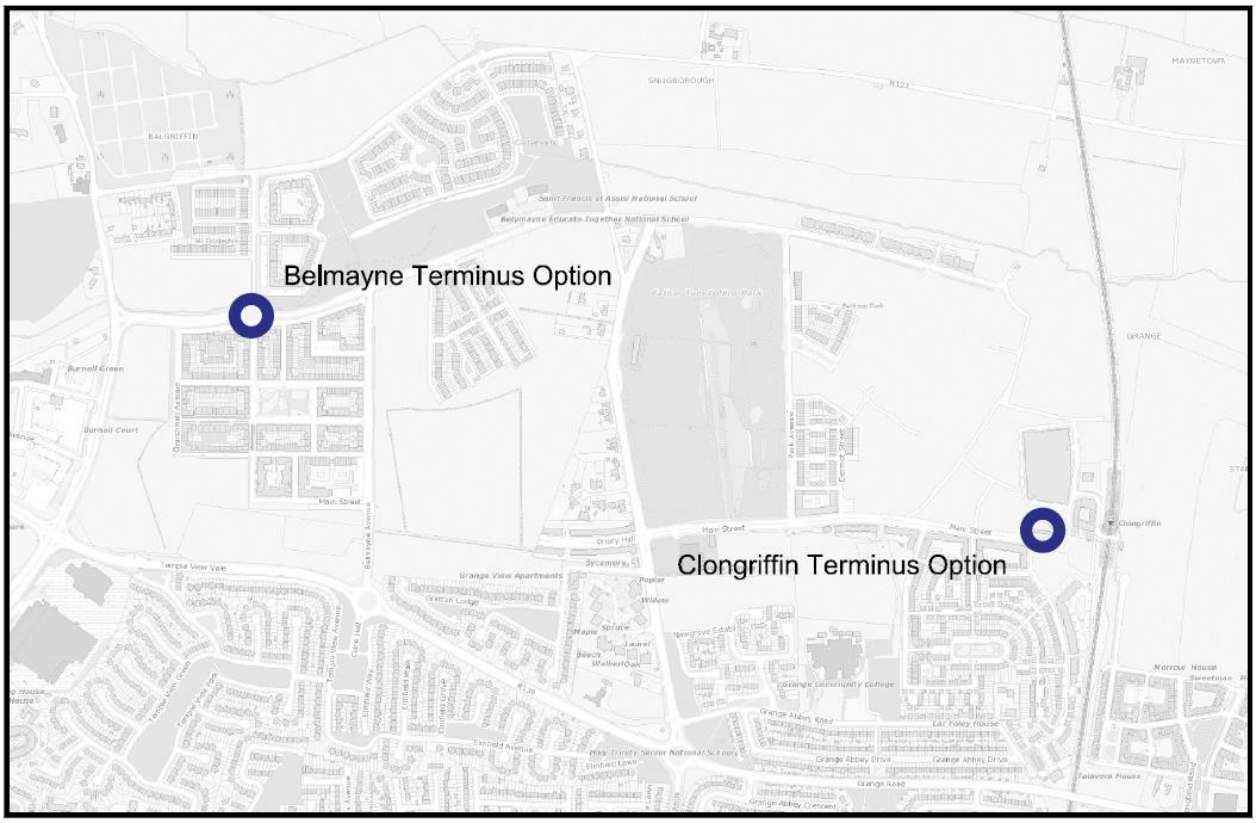


Figure 5.1 Northern Terminus Locations

5.1.1 Belmayne Terminus Option

This location was the preferred terminus of the indicative Swiftway study, located at the northern end of Belmayne. The proposed terminus stops would be along the Belmayne Road, with the roundabout being used to turn around. This option serves the Belmayne area to the south, along with new developments to the north, east and southwest. The downsides of this option are that it does not serve the DART, or most the Clongriffin area.

5.1.2 Clongriffin Terminus Option

This option uses the existing bus turnaround at Station Square in Clongriffin. Integration with other public transport modes was a key criterion in identifying a terminus location, this location best integrates with the DART service as passengers could easily interchange here. In addition to this there is a suitable turnaround facility, an existing park and ride facility and selection of this location would facilitate the completion of Clongriffin Main Street in accordance with the Clongriffin/Belmayne LAP. There is only one viable approach route to this terminus and all routes considered at a later stage will approach the terminus via Clongriffin Main Street, this approach road has existing bus lanes and segregated cycle lanes.

5.1.3 Option Assessment

Table 5.1 Northern Terminus Options Assessment Summary

Criteria	Belmayne	Clongriffin
Transport Integration	Only links with existing bus routes along Malahide Road.	Links with Clongriffin DART station and existing bus routes along Main Street.
Surrounding Area	Serves Belmayne and future planned development.	Serves Clongriffin and future planned development.
Bus/Cycle Priority	Could achieve full bus and cycle priority on approach.	Could achieve full bus and cycle priority on approach.
Space and Facilities	There is space for bus stops along Belmayne Road. Low amount of facilities nearby.	There is space for bus stops around Station Square. Park and Ride facilities, and commercial properties.
Environment	Options are considered equal under this criterion	Options are considered equal under this criterion

Based on the above MCA table, Station Square in Clongriffin is the preferred northern terminus location due to the link with the DART station, and better facilities nearby.

5.2 Stage 1: Route Options Assessment

This chapter outlines the options development process for Section 1 of the Study Area (North City).

All roads within Section 1 of the study area are assessed on a high level for their ability to form part of the CBC route. Route options are ruled out at this stage if they can clearly not form part of a CBC. The 'spider's web' of potential route options remaining after this initial phase was then progressed to Stage 1 Route Options Assessment ('sifting stage') for further analysis. The links which are subject to sifting are shown in **Figure 5.2**

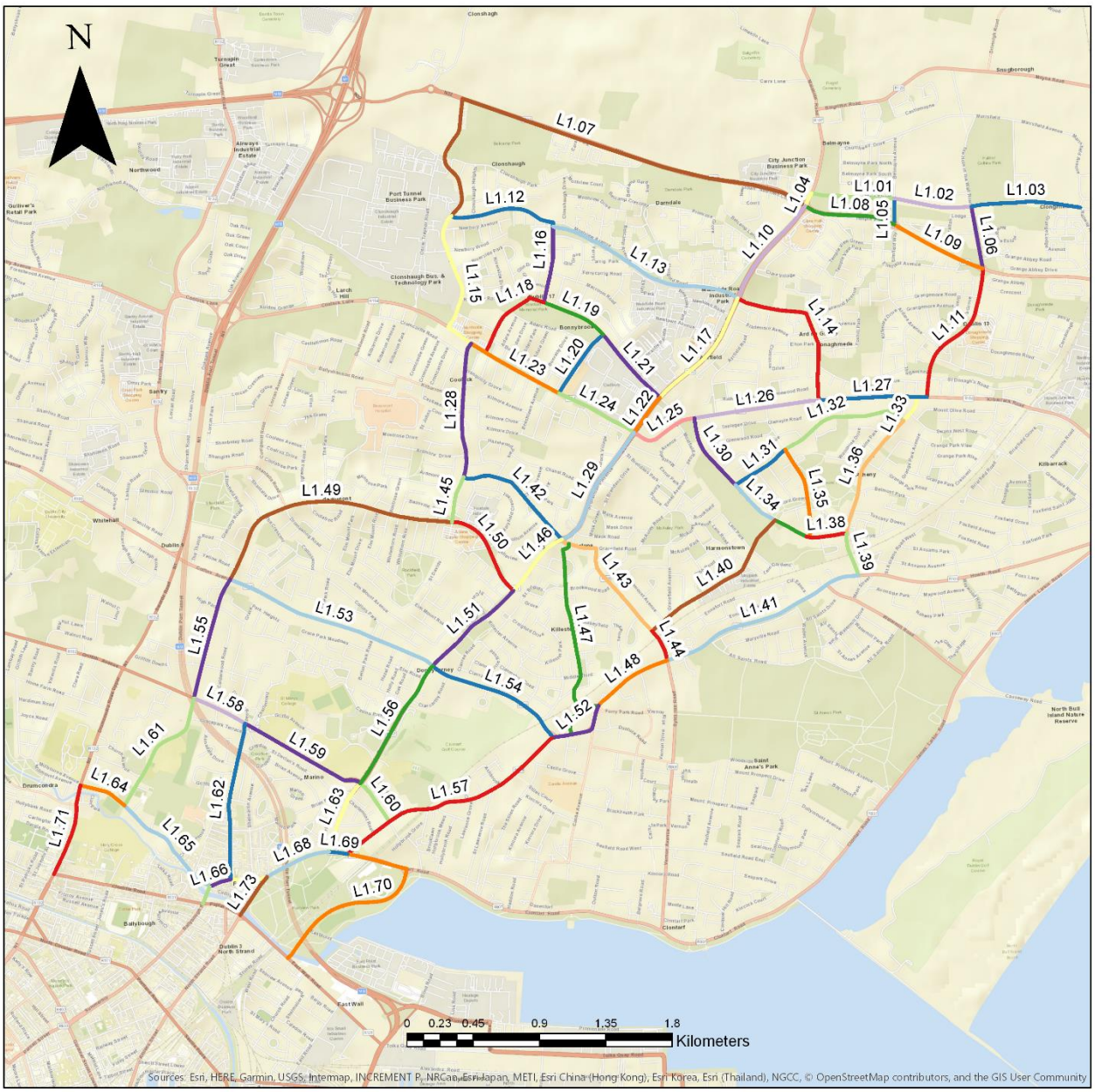


Figure 5.2 Section 1 Route Options

A summary of the Stage 1 route options assessment ('sifting') process is presented below,

Table 5.2 - Section 1 Route Option Assessment Stage 1

Link No.	Road Characteristics	Comments	Pass / Fail
L1.01	Urban	Clongriffin Main Street, as identified in the North Fringe LAP. This road has been partially completed and the remaining section requires construction through a green field site. This road is not part of the GDA CNP. This road is wide, and would not need any land take to provide dedicated bus lanes. This is considered a viable route option for this CBC.	Pass
L1.02	Urban / Residential	Clongriffin Main Street as identified in the North Fringe LAP. This road has been partially completed but is not currently open to traffic. This road is not part of the GDA CNP. This road is wide, and would not need any land take to provide dedicated bus lanes. This is considered a viable route option for this CBC.	Pass
L1.03	Urban	Clongriffin Main Street. One all vehicle lane in each direction and bus lanes in each direction. This road is not part of the GDA CNP, and has no cycle facilities. The eastern end of this link contains a looped section of road that links to the identified terminus at Clongriffin DART Station. Existing bus lanes could be used by a CBC and This is considered a viable route option for this CBC.	Pass
L1.04	Urban/ Regional	Malahide Road. Two all vehicle lanes in each direction, with a central tree lined verge & turning lane at junctions. This link is a primary route on the GDA CNP, and has off street cycle facilities along its length. It is a wide road, with no land take required to provide dedicated bus lanes. This is considered a viable route option for this CBC.	Pass
L1.05	Regional	Belmayne Avenue. One all vehicle lane in each direction. This link is not on the GDA CNP route and has no cycle facilities. There is roadside parking along one side. This is a wide road, and no land take would be required to provide dedicated bus lanes. This is considered a viable route option for this CBC.	Pass
L1.06	Regional	The Hole in The Wall Road. One all vehicle lane in each direction, and a bus lane in each direction. This road is not part of the GDA CNP, but has a southbound off-road cycle lane, northbound cyclists share the bus lane. This road is wide and already has bus lanes which could be used by a CBC. This is considered a viable route option for this CBC.	Pass
L1.07	Regional	R139 & Clonshaugh Road. The R139 portion of this link has one all vehicle lane in each direction, and a bus lane in each direction. The Clonshaugh road has one all vehicle lane in each direction. This link is not on the GDA CNP route and has no cycle facilities. The Clonshaugh Road would need to be widened to provide bus priority, and would require land take on the southern end. This is considered a viable route option for this CBC.	Pass
L1.08	Regional	R139. One all vehicle lane in each direction, and a bus lane in each direction with a central verge and turning lanes at junctions. This is a secondary route on the GDA CNP, but has no cycle facilities at present. Reallocating space from the hatched median or grass	Pass

		verges could allow for cycle facilities. This is considered a viable route option for this CBC.	
L1.09	Regional	R139. One all vehicle lane in each direction, and a bus lane in each direction with a central verge and turning lanes at junctions. This is a secondary route on the GDA CNP, but has no cycle facilities at present. Reallocating space from the hatched median or grass verges could allow for cycle facilities. This is considered a viable route option for this CBC.	Pass
L1.10	Regional / Urban	Malahide Road. Two all vehicle lanes in each direction and bus lanes in both directions, with a tree lined verge and turning lanes at the junctions. This link is a primary route on the GDA CNP, and has on-road cycle lanes in both directions. This is considered a viable route option for this CBC.	Pass
L1.11	Urban	Grange Road. One all vehicle lane in each direction, with a central verge and turning lanes along parts of the road. This link is a primary route on the GDA CNP, but has no cycle facilities other than at the northern roundabout. The road could be widened to provide dedicated bus lanes by using existing green space and some isolated land take from gardens at the southern end. This is considered a viable route option for this CBC.	Pass
L1.12	Residential	Clonshaugh Avenue. Small residential road with on street parking and residential access along both sides. This link forms part of a GDA CNP feeder route and there are currently no cycle facilities provided. This route has significant on-street parking, and direct driveway access along the entirety of the route. This is not considered a viable route option for this CBC.	Fail
L1.13	Regional / Residential	Priorswood Road. One all vehicle lane in both directions. This link forms part of a GDA CNP feeder route and there are currently no cycle facilities provided. This road is unrestricted, with open green space either side which could be used to widen the road to provide dedicated bus lanes. This is considered a viable route option for this CBC.	Pass
L1.14	Residential	Blunden Drive, Millbrook Road. Small residential road with on street parking and residential accesses along both sides. This link forms part of a GDA CNP feeder route and there are currently no cycle facilities provided. Land take from gardens and removal of on-street parking would be required to provide dedicated bus lanes. In addition, private accesses along the length of the road would lead to journey time delays for buses. For these reasons, this is not considered a viable route option for this CBC.	Fail
L1.15	Industrial / Residential	Clonshaugh Road & Oscar Traynor Road. One all vehicle lane in both directions. This is a small road, with residential access on the eastern side, and mostly green space & industrial areas on the western side which could be used for road widening. This is considered a viable route option for this CBC.	Pass

L1.16	Residential	Glin Road. Small residential road with on street parking and residential accesses along both sides. This link forms part of a GDA CNP feeder route and there are currently no cycle facilities provided. Road widening to provide dedicated bus lanes would require purchase of large areas of gardens along this route and this is not considered feasible. This is not considered a viable route option for this CBC.	Fail
L1.17	Regional / Urban	Malahide Road. One all vehicle lane in both directions and bus lanes in both directions, with a tree lined verge and turning lanes at the junctions. This link is a primary route on the GDA CNP, and has on-road cycle lanes in both directions. This is considered a viable route option for this CBC.	Pass
L1.18	Residential	Barryscourt Road. One all vehicle lane in each direction. This link forms part of a GDA CNP feeder route and there are currently no cycle facilities provided. The southern end has on street parking and residential accesses. Road widening to provide bus lanes could be achieved by mostly using adjacent green space. At the southern end of the link some land take from car parking spaces at the Northside Shopping Centre would be required. This is considered a viable route option for this CBC.	Pass
L1.19	Residential	Greencastle Road. Small residential road, with on street parking and residential accesses on the northern side, with parkland on the southern side. This link forms part of a GDA CNP feeder route and there are currently no cycle facilities provided. Road widening to provided dedicated bus lanes would require land take from Memorial Park or from gardens. Land take from the park may be feasible and This is considered a viable route option for this CBC.	Pass
L1.20	Residential / Urban	Coolock Drive. This is a residential and commercial street, with on street parking on both sides, and residential access along one side. Land take from gardens or from commercial parking would be needed in places to provide bus priority along this link. Construction of CBC infrastructure is feasible, and This is considered a viable route option for this CBC.	Pass
L1.21	Residential	Greencastle Road. Small residential road, with on street parking and residential access on the northern side, with parkland on the southern side. This link forms part of a GDA CNP feeder route and there are currently no cycle facilities provided. There is scope to widen the road to provide dedicated bus lanes using existing verge space and adjacent green space to the south.	Pass
L1.22	Regional / Urban	Malahide Road. One all vehicle lane in both directions and bus lanes in both directions, with a tree lined verge and turning lanes at the junctions. This link is a primary route on the GDA CNP, and has on-road cycle lanes in both directions. This is considered a viable route option for this CBC.	Pass
L1.23	Urban	Oscar Traynor Road. One way all vehicle lanes in both directions, with a central verge and turning lanes at the junctions. It is a secondary route on the GDA CNP, but has no cycle facilities at present. There are wide grass verges either side which could be used to provide dedicated bus lanes. This is considered a viable route option for this CBC.	Pass

L1.24	Urban	Oscar Traynor Road. One way all vehicle lanes in both directions, with a central verge and turning lanes at the junctions. It is a secondary route on the GDA CNP, but has no cycle facilities. There are wide grass verges either side which could be used to provide dedicated bus lanes. This is considered a viable route option for this CBC.	Pass
L1.25	Residential	Tonlegee Road. One way all vehicle lane in both directions. It is a secondary route on the GDA CNP, but has no cycle facilities. This route has wide tree lined verges and residential accesses on both sides. Some land take from gardens may be required to provide dedicated bus lanes. This route connects the viable routes L 1.39 & L 1.42. This is considered a viable route option for this CBC.	Pass
L1.26	Residential	Tonlegee Road. One way all vehicle lane in both directions. It is a secondary route on the GDA CNP, but has no cycle facilities. This route has wide tree lined verges and residential accesses on both sides. Dedicated bus lanes could be provided by widening into the verges. This is considered a viable route option for this CBC.	Pass
L1.27	Residential	Tonlegee Road. One way all vehicle lane in both directions. It is a secondary route on the GDA CNP, but has no cycle facilities. This route has wide tree lined verges and residential accesses on both sides. Dedicated bus lanes could be provided by widening into the verges. This is considered a viable route option for this CBC.	Pass
L1.28	Residential / Urban	Kilmore Road. One all vehicle lane in both directions. It is a secondary route on the GDA CNP, but has no cycle facilities. This is a current bus route with wide tree lined verges and residential accesses on both sides. Removing existing grass verges and land take from gardens would be required in places to widen the road to provide dedicated bus lanes. This link connects viable links at Oscar Traynor Road and Kilmore Road to create a route that serves Beaumount Hospital. This is considered a viable route option for this CBC.	Pass
L1.29	Regional / Urban	Malahide Road. One all vehicle lane in both directions and bus lanes in both directions, with a tree lined verge and turning lanes at the junctions. This link is a primary route on the GDA CNP, and has on-road cycle lanes in both directions. This is considered a viable route option for this CBC.	Pass
L1.30	Residential	Springdale Road. One all vehicle lane in both directions. On street parking and residential access on one side, parkland on the other. It is not on the GDA CNP, and has no cycle facilities. It is a wide road, with potential for further widening into the parkland to provide dedicated bus lanes. This is considered a viable route option for this CBC.	Pass
L1.31	Residential	Edenmore Park. Residential road with traffic calming ramps, on street parking and residential access on both sides. It is not on the GDA CNP, and has no cycle facilities. This link would require land take along the majority of its length from gardens and commercial parking spaces. This route option is not considered feasible owing to on-street parking, direct driveway access and restricted cross-section in places which would require significant property acquisition. Without land take, shared running would significantly	Fail

		impact the reliable operation of the CBC system. This is not considered a viable route option for this CBC.	
L1.32	Urban / Residential	Woodbine Road. Residential and commercial road with traffic calming ramps, on street parking and residential access on both sides. It is not on the GDA CNP, and has no cycle facilities. This link would require land take along the majority of its length from gardens. This route option is not considered feasible owing to restricted cross-section in places which would require significant property acquisition. Without land take, shared running would significantly impact the reliable operation of the CBC system. This is not considered a viable route option for this CBC.	Fail
L1.33	Residential	Raheny Road. One wide all traffic lane in both directions, opening into two lanes on the northern end. There is residential access on the western side of the road, and parkland / fire station grounds on the eastern side. The road would require some land take from gardens in order to provide bus priority. This route option is not considered feasible owing to on-street parking, direct driveway access and restricted cross-section in places which would require significant property acquisition. Without land take, shared running would significantly impact the reliable operation of the CBC system. This is not considered a viable route option for this CBC.	Fail
L1.34	Residential	Springdale Road. One all vehicle lane in both directions. On street parking and residential access on one side, parkland on the other. It is not on the GDA CNP, and has no cycle facilities. It is a wide road, with potential for further widening into the parkland. This is considered a viable route option for this CBC.	Pass
L1.35	Residential	Edenmore Crescent. Wide residential road with residential access on the western side, and parkland on the eastern side. It is not part of the GDA CNP, and has no cycle facilities. The road could be widened to provide dedicated bus lanes using existing verge space. This is considered a viable route option for this CBC.	Pass
L1.36	Residential	Raheny Road. Wide residential road with residential access on both sides. It is a primary route on the GDA CNP, but has no cycle facilities. Although the road is wide and has grass verges, it would likely require some garden land take at the northern end. This is considered a viable route option for this CBC.	Pass
L1.37	Residential	Springdale Road. Wide residential road with residential access on one side. This route is not on the GDA CNP. There is a wide verge on the southern end which would allow for some widening, but there may be land take required from gardens to provide dedicated bus lanes. This is considered a viable route option for this CBC.	Pass
L1.38	Residential	Springdale Road. Small road with on street parking and residential access on both sides. This link is not on the GDA CNP. This road would require land take from gardens along its whole length to provide dedicated bus lanes. This is not considered a viable route option for this CBC.	Fail

L1.39	Urban	Station Road. One all vehicle lane in both directions. This is a narrow road with properties on either side, widening of the road to provide bus priority would involve significant land take. There is an existing narrow bridge crossing over the DART line which would also require major construction works. It is a primary route on the GDA CNP, but has no cycle facilities. This is not considered a viable route option for this CBC.	Fail
L1.40	Residential / Urban	Brookwood Rise & Harmonstown Road. One all vehicle lane in both directions. Harmonstown Road is lined by residential access on the northern side, the southern side is industrial/ commercial land. Brookwood Rise has residential access on both sides. This route would require land take from gardens along the majority of the route. This is not considered a viable route option for this CBC.	Fail
L1.41	Residential / Urban	Howth Road. Wide road with one all vehicle lane in each direction, bus lanes in places, and a central verge with turning lanes at the junctions. This is a primary route on the GDA CNP. Road widening to provide bus and cycle lanes could be provided by using existing green space to the east, although many potentially significant trees would be affected. This is considered a viable route option for this CBC.	Pass
L1.42	Residential	Ardlea Road. Small road with residential access, and roadside parking on both sides. This is a secondary route on the GDA CNP, but has no cycle facilities. This road would require land take from gardens from the majority of its length as well as removal of on-street parking in order to provide dedicated bus lanes. This is not considered a viable route option for this CBC.	Fail
L1.43	Residential	Gracefield Road & Brookwood Avenue. This link is a wide residential road, with tree lined verges on both sides. It would require minimal land take to provide dedicated bus lanes. This is a secondary route on the GDA CNP, but has no cycle facilities at present. Providing bus lanes on this link is feasible and This is considered a viable route option for this CBC.	Pass
L1.44	Residential	Brookwood Avenue. This link is a residential road, with tree lined verges on both sides. This is a secondary route on the GDA CNP, but has no cycle facilities at present. Road widening to provide CBC infrastructure would require removal of a number of potentially significant trees and would require land take from gardens. There is a pinch point at the bridge over the railway tracks, which would require reconstruction of the bridge. The scale of the construction works to get bus priority over this DART crossing are considered excessive. This is not considered a viable route option for this CBC.	Fail
L1.45	Residential / Urban	Kilmore Road. One all vehicle lane in both directions. It is a secondary route on the GDA CNP, but has no cycle facilities. This is a current bus route with wide tree lined verges and residential accesses on both sides. Removing existing grass verges and some isolated land take from gardens would be required to widen the road to provide dedicated bus lanes. This link connects viable links at Oscar Traynor Road and Kilmore Road to create a route that serves Beaumount Hospital. This is considered a viable route option for this CBC.	Pass

L1.46	Residential / Urban	Malahide Road. One all vehicle lane in both directions and bus lanes in both directions. This link is a primary route on the GDA CNP, and has on-road cycle lanes in both directions. This is considered a viable route option for this CBC.	Pass
L1.47	Residential	St Brigid's Road & Abbeyfield. Small residential road with on street parking and residential accesses on both sides. This link forms part of a GDA CNP feeder route and there are currently no cycle facilities provided. Road widening to provide CBC infrastructure would require land take from gardens along the majority of its route, although some sections could be achieved using adjacent green space. This is not considered a viable route option for this CBC.	Fail
L1.48	Residential / Urban	Howth Road. One all vehicle lane in both directions, with a bus lane in the southbound direction, and an on-road cycle lane in the northbound direction. This link is a primary route on the GDA CNP. Land take would be required from gardens to provide dedicated bus lanes along the majority of this link. This route closely follows the DART line which is seen as a negative. This is not considered a viable route option for this CBC.	Fail
L1.49	Residential	Beaumont Road. One all vehicle lane in both directions. This is a secondary route on the GDA CNP and has cycle lanes in both directions. Land take from gardens would be required for road widening to provide dedicated bus lanes along a 1km section on the western part of this link. This is not considered a viable route option for this CBC.	Fail
L1.50	Residential / Urban	Kilmore Road. One all vehicle lane in both directions. This is a secondary route on the GDA CNP and has cycle lanes in both directions. This link is mostly lined by green space and so would require no land take to provide bus priority. This is considered a viable route option for this CBC.	Pass
L1.51	Residential / Urban	Malahide Road. One all vehicle lane in both directions and bus lanes in both directions. This link is a primary route on the GDA CNP, but has no cycle lanes. This is considered a viable route option for this CBC.	Pass
L1.52	Residential / Urban	Howth Road. One all vehicle lane in both directions, with a bus lane in the southbound direction, and a cycle lane in the northbound direction. There are residential accesses along both sides of the road. This link is a primary route on the GDA CNP. Land take would be required from gardens to provide dedicated bus lanes. This route closely matches the route of the DART line and would result in a doubling up of services. This route option is not considered feasible owing to similarity to the DART line and restricted cross-section in places which would require significant property acquisition. Without land take, shared running would significantly impact the reliable operation of the CBC system. This is not considered a viable route option for this CBC.	Fail
L1.53	Residential	Collins Avenue. Mostly residential road with on street parking and residential access on both sides. It is a primary route on the GDA CNP, but has no cycle facilities at present. Provision of CBC infrastructure would require land take from gardens along 1.5km of its length to provide dedicated bus and cycle lanes. This would	Fail

		affect over 100 properties and would also impact on residential parking. This is not considered a viable route option for this CBC.	
L1.54	Residential	Collins Avenue East. Residential road with on street parking and residential accesses on both sides. It is a primary route on the GDA CNP, but has no cycle facilities. Construction of CBC infrastructure would require significant land take from gardens to provide dedicated bus lanes, this would result in the complete removal of residential parking in several gardens along the route. This is not considered a viable route option for this CBC.	Fail
L1.55	Residential	Grace Park Road. One all vehicle lane in both directions. This road has residential accesses along the eastern side. A wall runs along the western side, beyond which is green space. Road widening to provide dedicated bus lanes could be done using this green space. It is a secondary route on the GDA CNP, but has no cycle facilities. This is considered a viable route option for this CBC.	Pass
L1.56	Residential / Urban	Malahide Road. One all vehicle lane in both directions and bus lanes in both directions, with a tree lined verge and turning lanes at the junctions. This link is a primary route on the GDA CNP, and has on-road cycle lanes in both directions. This is considered a viable route option for this CBC.	Pass
L1.57	Residential	Howth Road. One all vehicle lane in both directions, with a southbound bus lane for a small stretch. This link is a primary route on the GDA CNP and has on-road cycle lanes in both directions. Land take would be required from gardens along the whole length of the route to provide dedicated bus lanes. In addition, there is a pinch point under the DART line and 200m to the north where houses are close to the road on both sides, shared running would be required here and this would significantly delay buses. This is not considered a viable route option for this CBC.	Fail
L1.58	Residential	Griffith Avenue. One wide all vehicle lane in both directions. This link is a primary route on the GDA CNP, but has no cycle facilities. This link would require no land take to provide dedicated bus lanes but would require removal of a large number of potentially sensitive medium sized trees from either side of the road. This is considered a viable route option for this CBC.	Pass
L1.59	Residential	Griffith Avenue. One wide all vehicle lane in both directions. This link is a primary route on the GDA CNP, but has no cycle facilities. This link would require no land take to provide dedicated bus lanes but would require removal of a large number of potentially sensitive medium sized trees from either side of the road. This is considered a viable route option for this CBC.	Pass
L1.60	Residential	Copeland Avenue. One all vehicle lane in each direction with on-street parking on both sides. This is a quite residential street with a 3.5T weight restriction. Construction of CBC infrastructure would involve land take from gardens for the length of the road and would result in the removal of residential parking from many gardens. This is not considered a viable route option for this CBC.	Fail

L1.61	Residential / Urban	Grace Park Road. One wide all vehicle lane in both directions. This link is a secondary route on the GDA CNP, but has no cycle facilities. It would require significant land take from gardens along much of its length to provide dedicated bus lanes, and would require houses to be removed at certain pinch points. This is not considered a viable route option for this CBC.	Fail
L1.62	Residential	Philipsburg Avenue. Small residential road with on street parking and residential access on both sides. This link forms part of a GDA CNP feeder route and there are currently no cycle facilities provided. This link would require land take from gardens along the majority of its length to provide dedicated bus lanes. This is not considered a viable route option for this CBC.	Fail
L1.63	Residential / Urban	Malahide Road. One all vehicle lane in both directions and a bus lane in the southbound direction. This link is a primary route on the GDA CNP, and has a cycle lane in the northbound direction. This section is narrower than the rest of the Malahide Road and land take or traffic management changes would be required to get both cyclists and bus priority. This route connects the favourable route options of the Malahide Road to Marino Mart (L1.80) and onwards into the city centre. This is considered a viable route option for this CBC.	Pass
L1.64	Residential / Urban	Richmond Road. This is a small residential road, lined by terraced houses with on street parking on one side. The terraced houses have very small front gardens so there is no room for land take. It is a secondary route on the GDA CNP, but has no cycle facilities. This is not considered a viable route option for this CBC.	Fail
L1.65	Residential / Industrial	Richmond Road. The northern end of this link is lined by terraced houses with on street parking on one side. The terraced houses have very small front gardens so there is no room for land take. The rest of this link is lined by Tolka Park and industrial lands to the south, with residential and commercial land to the north. There is little room for land take along much of the link. This is not considered a viable route option for this CBC.	Fail
L1.66	Urban	Fairview Strand. One all vehicle lane in both directions, lined by terraced housing with small gardens. This is a secondary route on the GDA CNP but has no cycle facilities. There is very little room for land take as building lines are close to the street. This is not considered a viable route option for this CBC.	Fail
L1.67	Urban	Fairview Strand. One all vehicle lane in both directions with on street parking and lined by terraced housing with small gardens. This is a secondary route on the GDA CNP but has no cycle facilities. There is very little room for land take as building lines are close to the street. This is not considered a viable route option for this CBC.	Fail
L1.68	Urban	Fairview & Marino Mart. Two all vehicle lanes in both directions, with bus lanes in both directions. This is a primary route on the GDA CNP, and there is an on-road cycle lane northbound. This is considered a viable route option for this CBC.	Pass
L1.69	Urban	Clontarf Road. Two all vehicle lanes in both directions with a small central verge and an inbound bus lane. This is a primary route on	Pass

		the GDA CNP, and there is an on-road cycle lane in both directions. This is considered a viable route option for this CBC.	
L1.70	Urban	Clontarf Road & Alfie Bryne Road. The Clontarf Road has two all vehicle lanes in both directions with a central verge and a bus lane eastbound. The Alfie Byrne Road has one all vehicle lane in both directions. This link is a secondary route on the GDA CNP, with cycle facilities in both directions. There is potential to widen the road to provide dedicated bus lanes using adjacent green space. This is considered a viable route option for this CBC.	Pass
L1.71	Residential / urban	Drumcondra Road Lower. The northern end has one all vehicle lane in both directions with bus lanes in both directions. The southern end has two all vehicle lanes in each direction, with a bus lane in the southbound direction, and a cycle lane in the northbound direction This is a primary route of the GDS CNP and has cycle facilities. This road is on the route of the Swords to Dublin CBC and would result in bunching of services. This is not considered a viable route option for this CBC.	Fail
L1.72	Urban	Luke Kelly Bridge. Two all vehicle lanes in each direction with a central turning lane. This is a secondary route on the GDA CNP, but has no cycle facilities. It would be feasible to accommodate CBC and Cycle lanes along the bridge. This is considered a viable route option for this CBC.	Pass
L1.73	Urban	Annesley Bridge Road. Two all vehicle lanes northbound, one all vehicle lane southbound, with bus lanes in both directions. This is a primary route on the GDA CNP and has a cycle lane in the northbound direction. This is considered a viable route option for this CBC.	Pass

The outcome of the sift can be seen in the **Figure 5.3** Links shown in red failed the sift and those in blue passed.

Figure 5.3 Section 1 Sifting Process Step 1

5.2.1 Removal of Disconnected Links

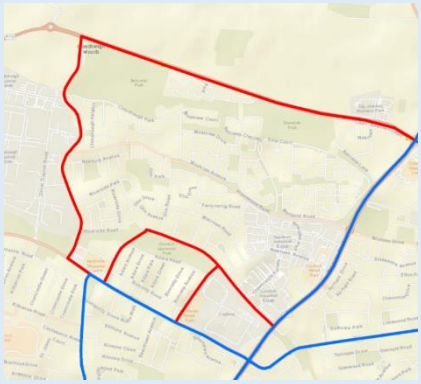
The links shown in red are disconnected and could not clearly form part of a Clongriffin to City Centre CBC route and have not been considered further.

Figure 5.4 Section 1 Sifting Process Step 2

5.2.2 Preliminary Route Assessment

A summary of the Preliminary Route Assessment process is presented in Table 5.3 below

Table 5.3 - Section 1 Preliminary Route Assessment

Road Names	Comments	Map
R139, Clonshaugh Road, Greencastle Road, Barryscourt Road, Coolock Drive	All route options using these roads have routes which are circuitous in nature and would lead to longer journey times when compared to the adjacent route options with two-way bus movements on Oscar Traynor Road and Kilmore Road, or on Malahide Road. These routes would also require buses to pass through a higher number of junctions and make more turning movements. For these reasons, these route options are not considered further	

The outcome of the Preliminary Route Assessment can be seen below in **Figure 5.5**. The links shown in red have failed those shown in blue have passed.

Figure 5.5 Section 1 Sifting Process Step 3

5.2.3 Section 1 – Sifting Conclusion

Following the Stage 1 sift, 35 of the 88 links assessed passed the initial sifting stage and were progressed to the next assessment stage. These links are presented in Figure 5.6.

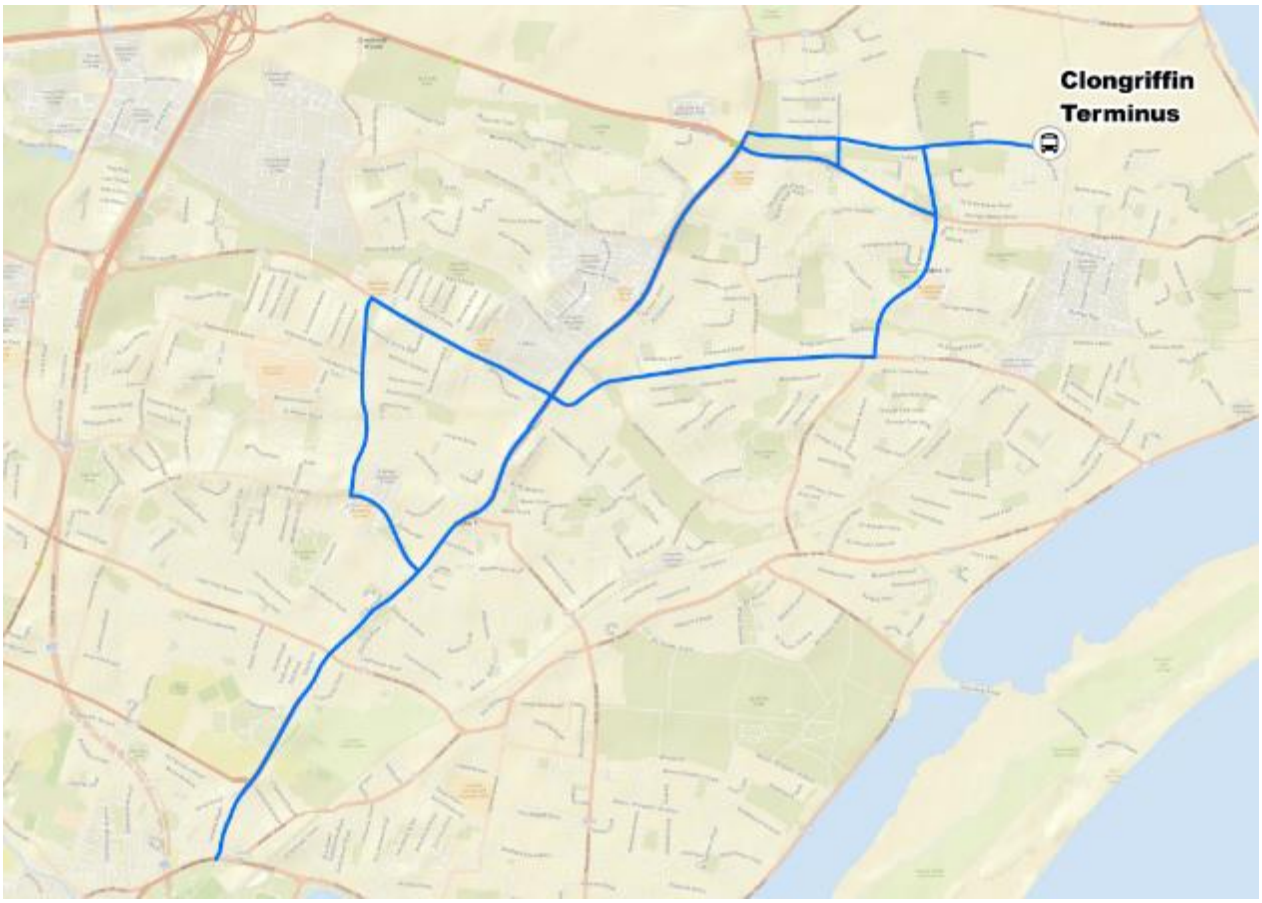


Figure 5.6 Section 1 Route Options Remaining After Stage 1 Assessment

5.3 Stage 2: Route Options Assessment - Belmayne/Clongriffin

5.3.1 Introduction

Following the Stage 1 sifting process the nine remaining links in this section are assembled together to form three viable route options for Section 1, as follows:

- Route Option 1: Using the Clongriffin Main Street
- Route Option 2: Using new Clongriffin Main Street, Belmayne Ave and the R139
- Route Option 3: Using the Hole in the Wall Road, and the R139

The terminus for both these routes for consideration in the Stage 2 Assessment is the Clongriffin DART Station.

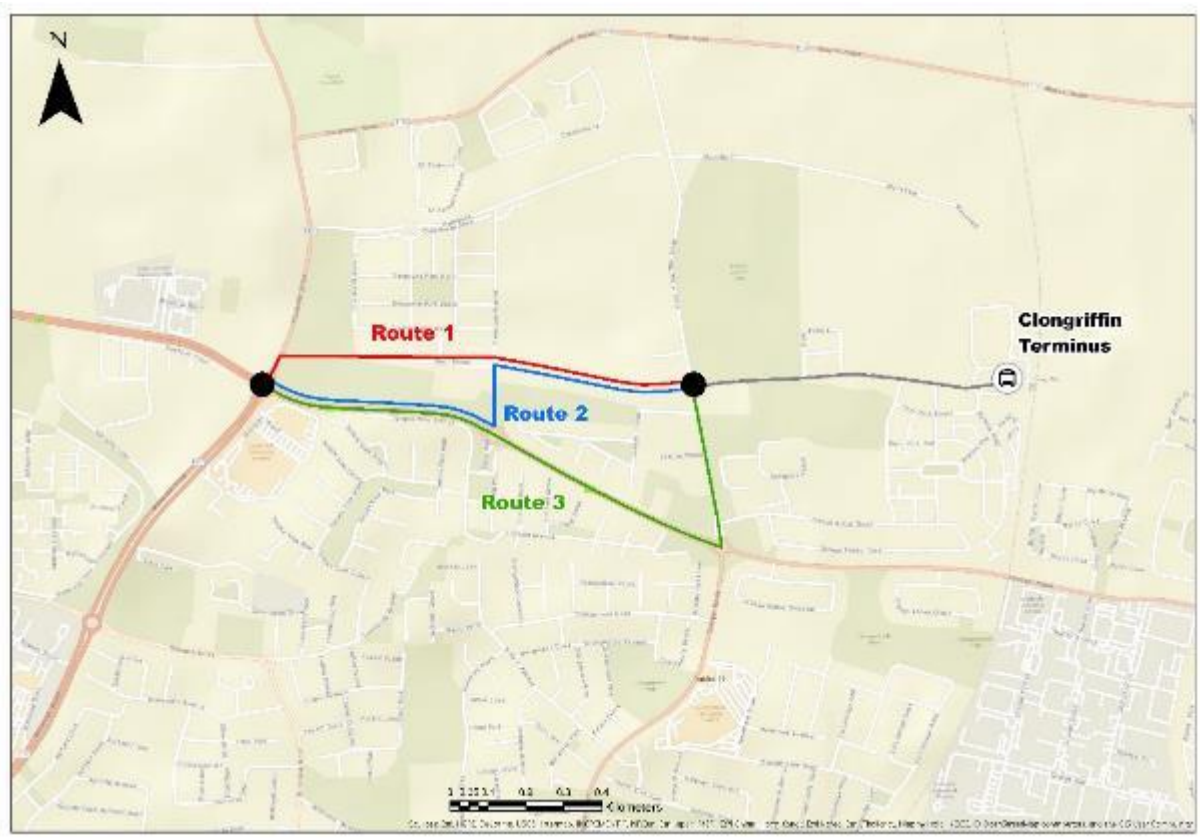


Figure 5.7 Section 1 (Belmayne/Clongriffin) Route Options

5.3.2 Route Option 1

Route Description

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

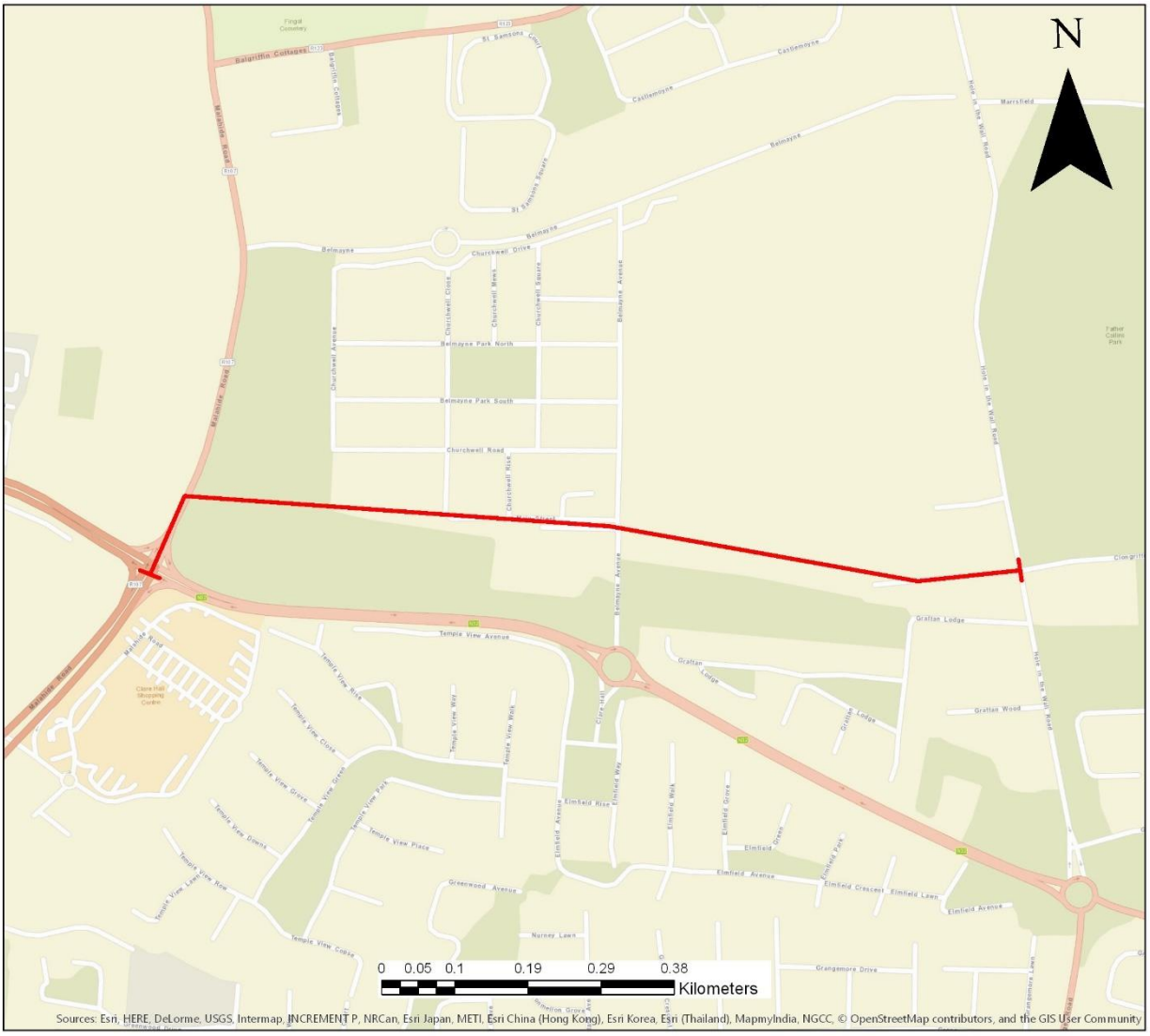


Figure 5.8 Route Option 1

Southbound: Route Option 1 would commence at the junction of Hole in the Wall Road and Clongriffin Main Street, from here the bus travels along Clongriffin Main Street, including some parts that are not yet constructed to join the Malahide Road and continue south to the junction of R139/R107 by Clarehall Shopping Centre

Northbound: The northbound route would follow the same route as the southbound routing.

Route Option 1 Indicative Scheme Design

Figure 5.9 illustrates the indicative scheme design for Route Option 1 as well as the location of an indicative cross-section.

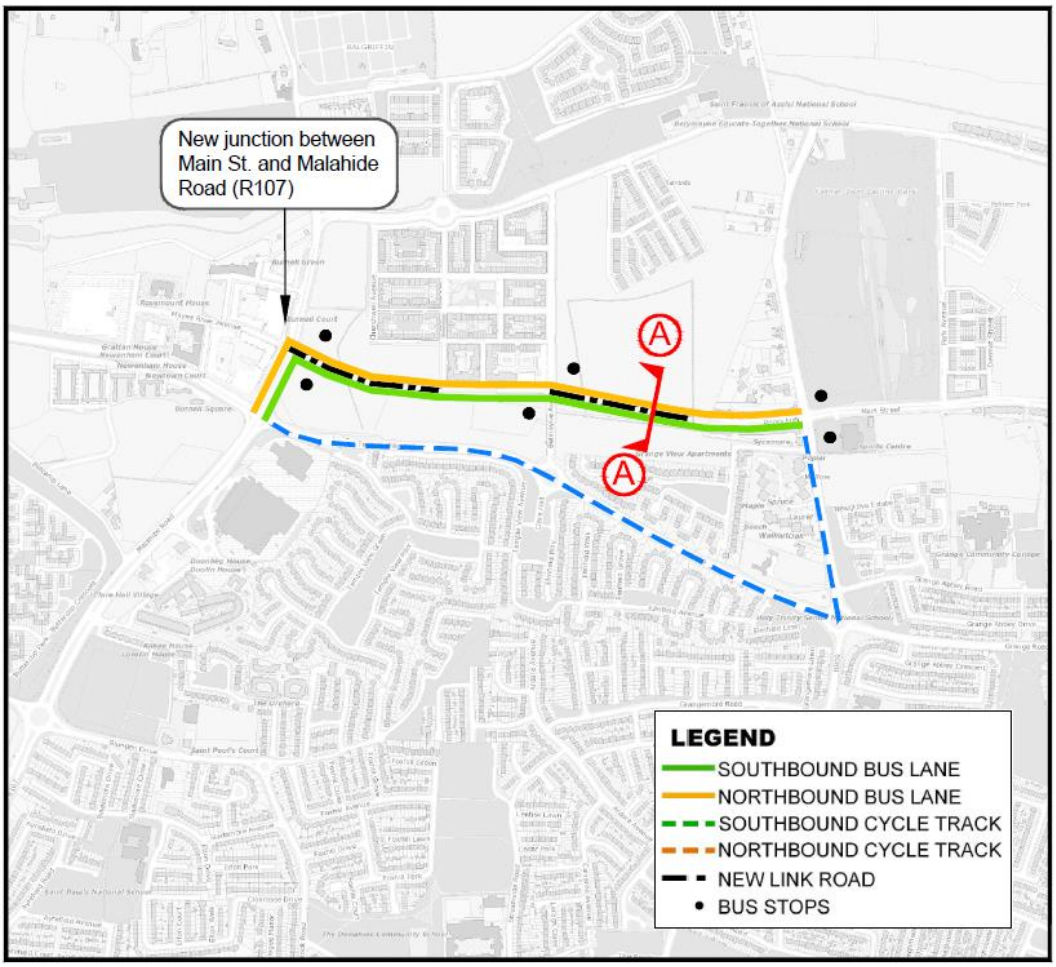


Figure 5.9 Route Option 1 Indicative Scheme Design

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

Bus lanes will be provided for the entire length of the scheme. Clongriffin Main Street is not on the GDA cycle network plan and so it is suggested that cyclists use the secondary cycle route along the R139 and Hole in the Wall Road. Existing bus lanes will be used Clongriffin Main Street and the two sections yet to be completed will be built in accordance with the LAP. A new bus only junction will be constructed where Main Street meets Malahide Road and signals will provide priority for buses using the CBC route. Road widening and realignment will be required to provide bus lanes on the Malahide Road section.

Northbound buses on Malahide Road will move to the right-hand lane in advance of the junction with the R139 as this will allow them to pass through the junction and more easily make the right turn onto Clongriffin Main Street. Both of these junctions will be upgraded to provide enhanced pedestrian and cyclist facilities.

A cross-section on Clongriffin Main Street is presented in Figure 5.10.

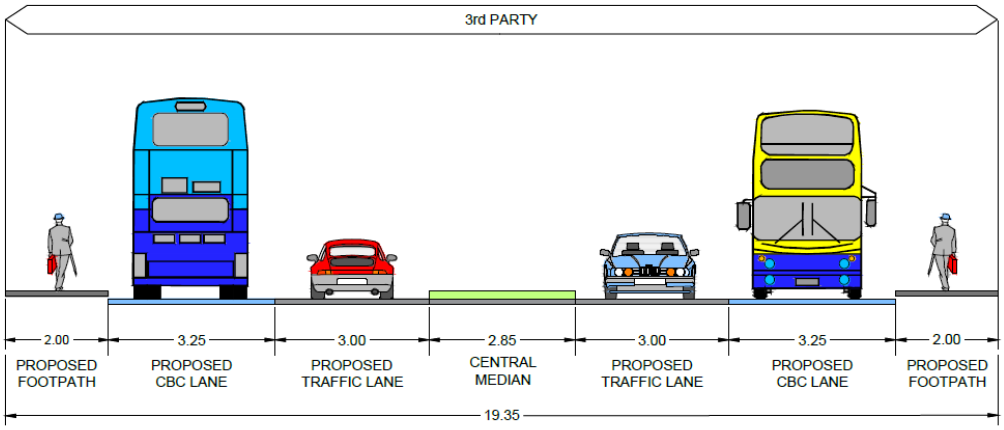


Figure 5.10 Cross Section A-A

5.3.3 Route Option 2

Route Description

Route Option 2 is presented in Figure 5.11 and described as follows.

Figure 5.11 Route Option 2

Southbound: Option 2 would commence at the junction of Hole in the Wall Road and Clongriffin Main Street, from here the bus travels along Clongriffin Main Street, including some parts that are not yet completed to turn onto Belmayne Avenue and then R139 to reach the junction of R139/R107 by Clarehall Shopping Centre.

Northbound: The northbound route would follow the same route as the southbound routing.

Route Option 2 Indicative Scheme Design

Figure 5.12 illustrates the indicative scheme design for Route Option 2 as well as the location of indicative cross-sections.

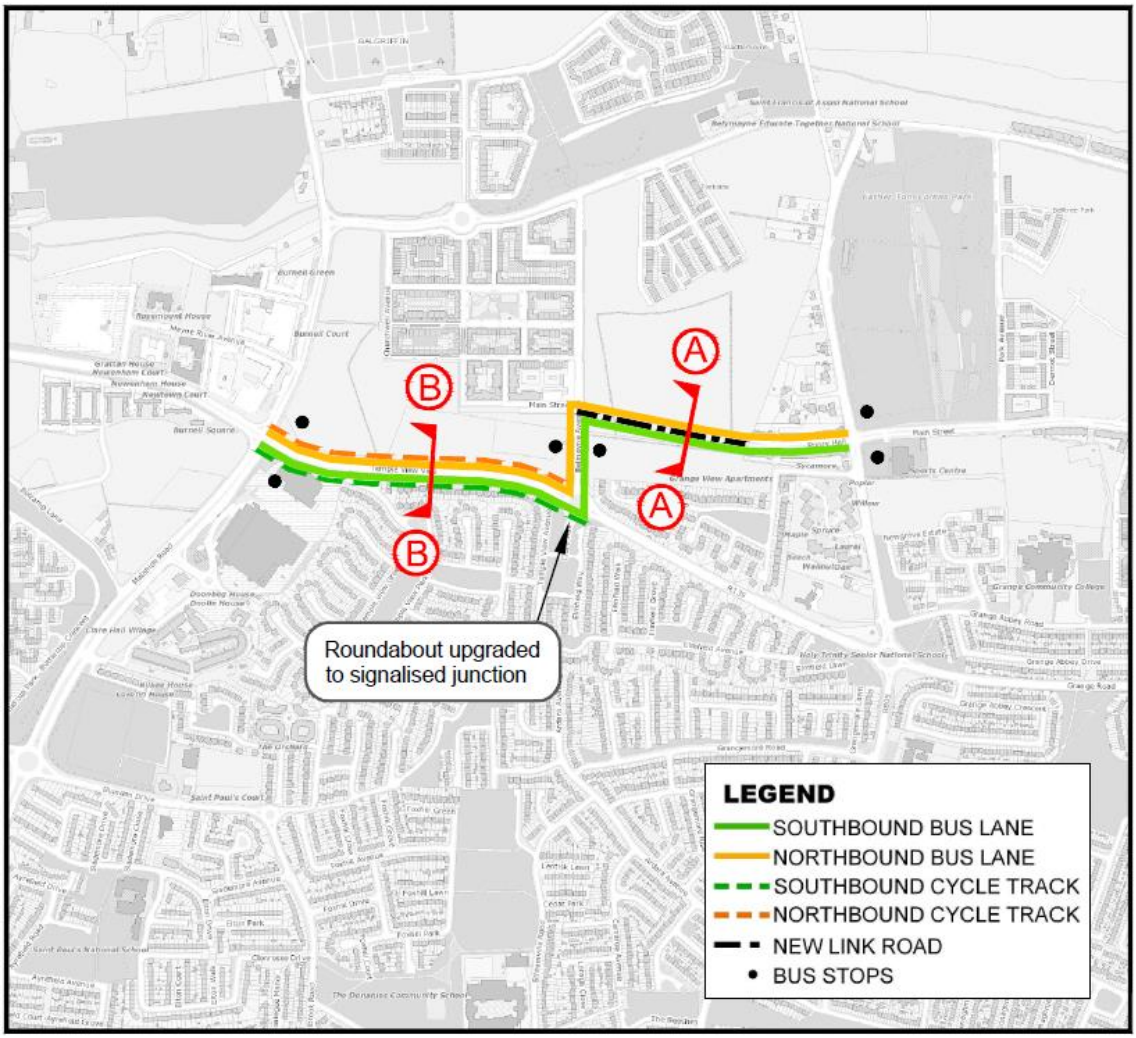


Figure 5.12 Route Option 2 Indicative Scheme Design

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

Bus and cycle lanes will be provided along the R139. Bus lanes will be constructed along Clongriffin Main Street in accordance with the LAP, these have already been constructed in some locations. The signals at the junction of Belmayne Avenue/Clongriffin Main Street will be adjusted to provide priority to the CBC. Belmayne Avenue will be widened locally to provide bus lanes. The existing roundabout at the junction with the R139 will be converted to a signalised junction in order to provide bus priority and pedestrian/cyclist facilities. There are existing bus lanes along the R139 although construction works will be required to provide cycle lanes here.

Northbound buses on Malahide Road will move to the right-hand lane in advance of the junction with the R139 as this will allow them to easily make the right turn onto the R139. This junction will also be upgraded to provide enhanced pedestrian and cyclist facilities.

A cross-section on Clongriffin Main Street is presented in Figure 5.13.

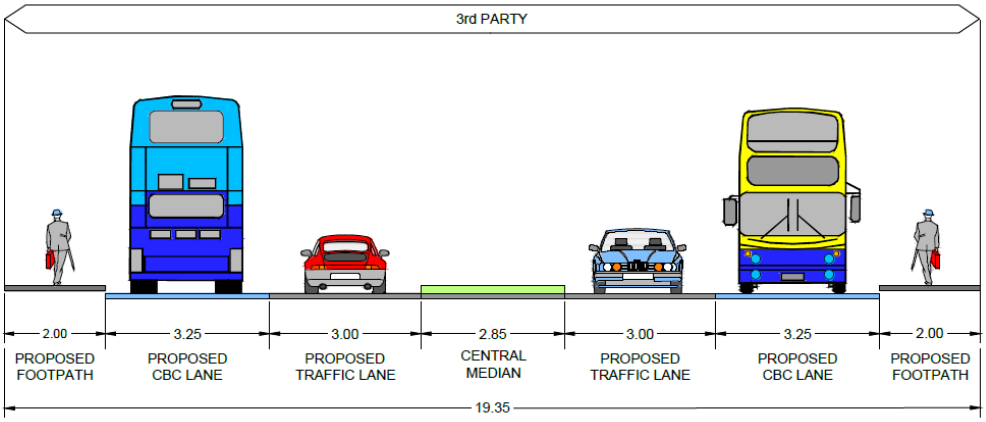


Figure 5.13 Cross Section A-A

A cross-section on the R139 is presented in Figure 5.14.

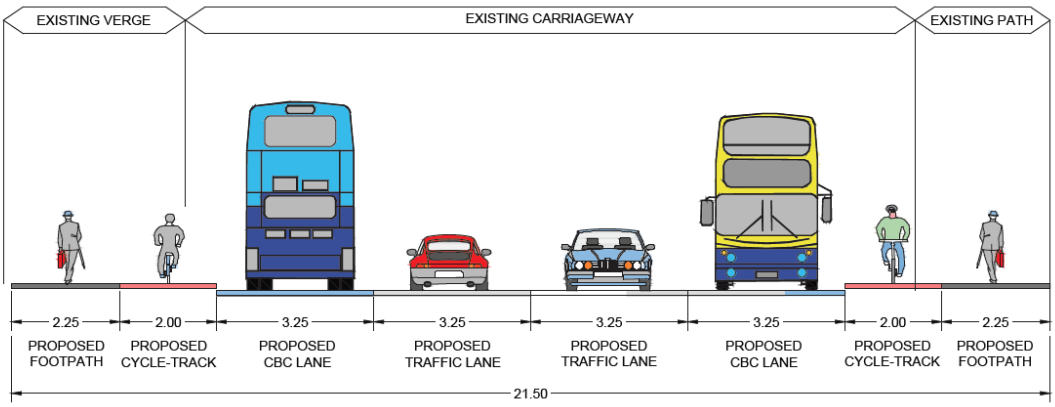


Figure 5.14 Cross Section B-B

5.3.4 Route Option 3

Route Description

Route Option 3 is presented in Figure 5.15 and described as follows.

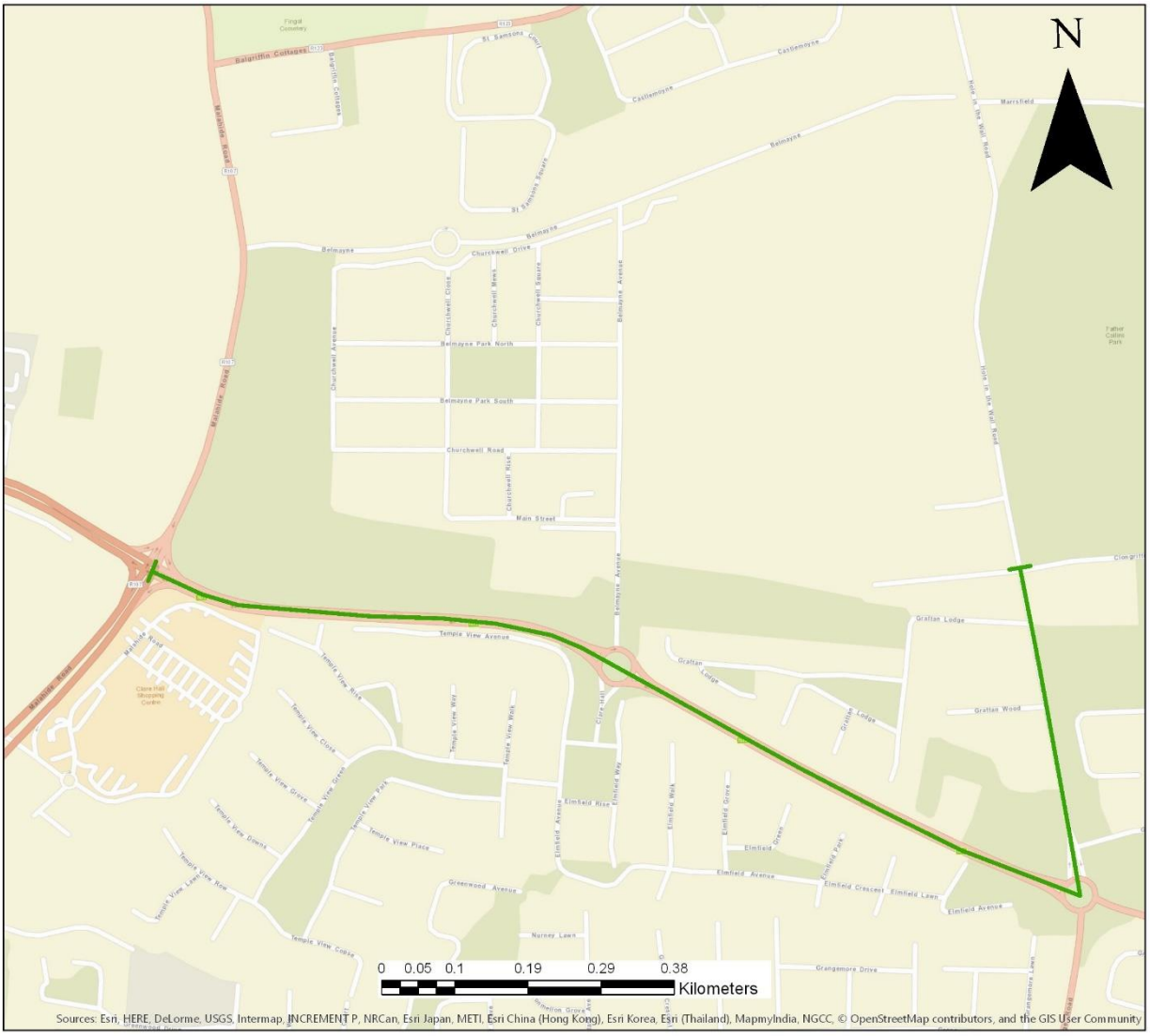


Figure 5.15 Route Option 3

Southbound: Option 3 would commence at the junction of Hole in the Wall Road and Clongriffin Main Street, from here the bus travels along the Hole in The Wall Road and then R139 to reach the junction of R139/R107 by Clarehall Shopping Centre.

Northbound: The northbound route would follow the same route as the southbound routing.

Indicative Scheme Design

Figure 5.16 illustrates the indicative scheme design for Route Option 3 as well as the location of an indicative cross-section.

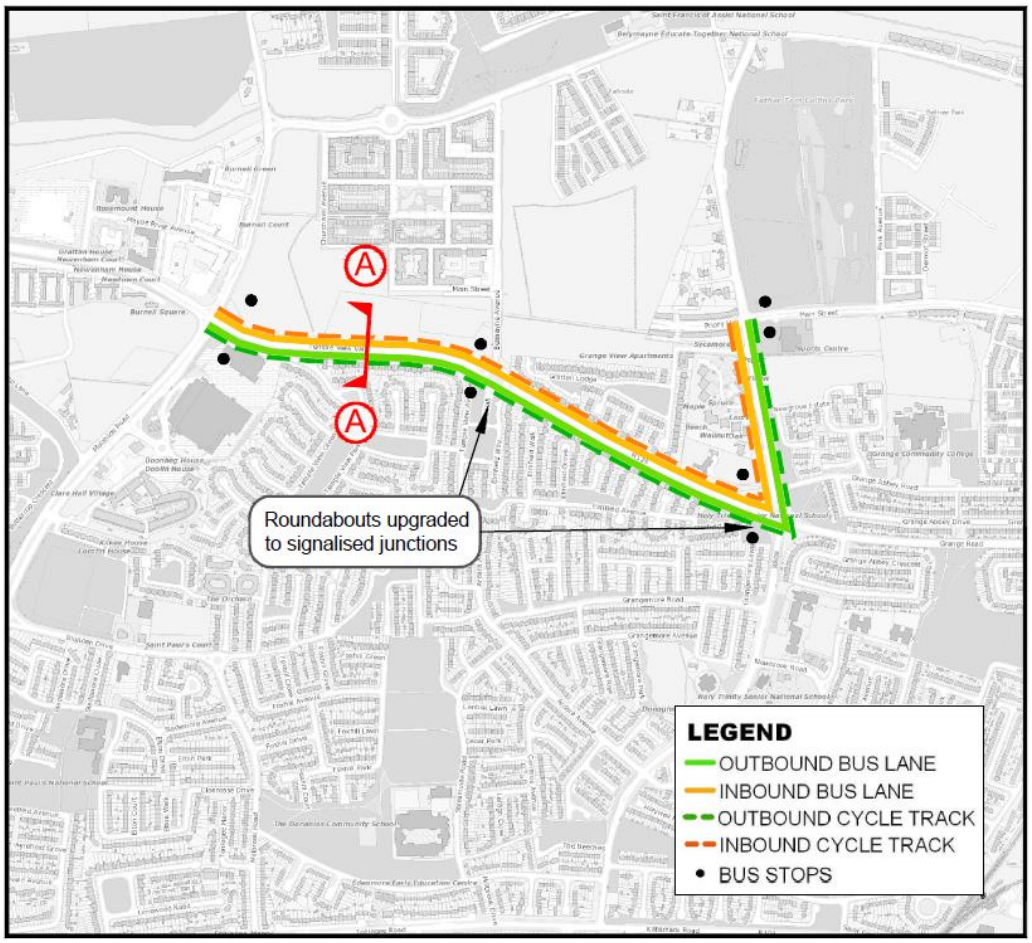


Figure 5.16 Route Option 3 Indicative Scheme Design

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

The Hole in the Wall Road will be widened locally to provide bus and cycle lanes where they do not already exist. The two existing roundabouts on the R139 will be converted to signalised junctions in order to provide bus priority and pedestrian/cyclist facilities. There are existing bus lanes along the R139 although construction works will be required to provide cycle lanes here and some land take from portions of back gardens would be required on the eastern end of this road.

Northbound buses on Malahide Road will move to the right-hand lane in advance of the junction with the R139 as this will allow them to easily make the right turn onto the R139. This junction will also be upgraded to provide enhanced pedestrian and cyclist facilities.

A cross-section on the R139 is presented in Figure 5.17

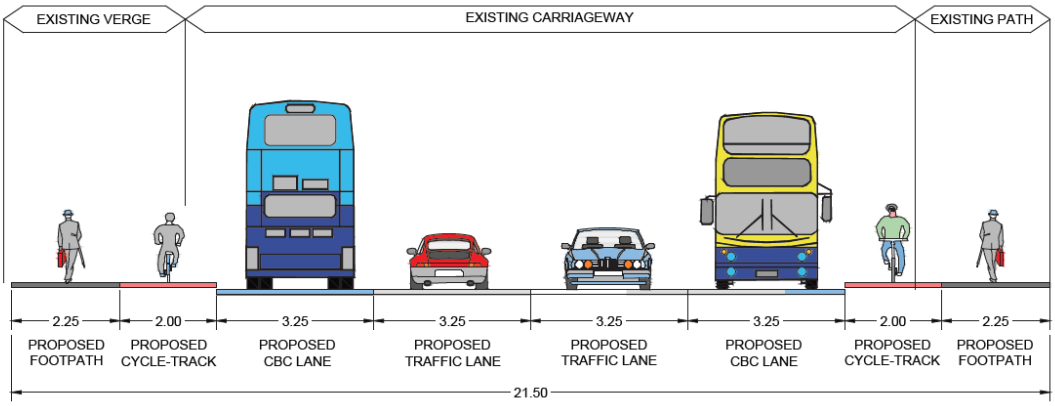


Figure 5.17 Cross Section A-A

5.3.5 Route Options Assessment

Details of the 'Stage 2' route options assessment undertaken for the Clongriffin to City Centre CBC are presented in Appendix A.

A summary of the ranking of route options against the scheme sub-criteria is presented in Table 5.4 below.

Table 5.4 Route Options Assessment Summary (Sub-Criteria)

Assessment Criteria	Sub-Criteria	Route 1	Route 2	Route 3
Economy	Capital Cost			
	Journey-time reliability and consistency			
Integration	Land Use Integration			
	Population and Employment Catchments			
	Public Transport Integration			
	Traffic Network Integration			
	Cyclists and pedestrian Integration			
Accessibility and Social Inclusion	High Volume Trip Attractors			
	Deprived Geographic Areas & Areas Underserved by Public Transport			
Safety	Road Safety			
Environment	Archaeological, Architectural and Cultural Heritage			
	Flora and Fauna			
	Soils and Geology			
	Hydrology			
	Landscape and visual			
	Noise and Vibration			
	Air Quality			
	Land Use and the Built Environment			

In terms of "Capital Cost" Route 1 and 2 have lower capital cost as they involve less construction work and only minor modifications would be required for the already completed parts of Clongriffin Main Street. Route 3 is the most expensive as it the longest route and involves road widening and land take from gardens on the eastern section of the R139.

All routes provide full bus priority however the longer length of Route 3 would result in slightly longer journey times and so it scores worse on this criterion.

Route 1 would facilitate the full completion of Clongriffin Main St as per the Belmayne/Clongriffin LAP and so scores best on the "Land Use Integration Criteria".

Route 3 scores best on the “Residential & Employment Catchment” criterion as it better serves the existing housing estates to the south. It should be noted however that these figures do not include the residents who will be housed in the planned Clongriffin/Belmayne LAP which will be better served by Routes 1 and 2

Route 3 scores best under “Pedestrian & Cycle Integration” as it is fully on a GDA CNP secondary route and cycle lanes would be provided.

Route 3 involves some land take from portions of back gardens along the R139 and so scores worst on the “Landscape & Visual” criterion

5.3.6 Conclusion

A summary of the assessment and a relative ranking for each of the five assessment criteria is shown below in **Table 5.5**

Table 5.5 Route Options Assessment Summary (Main Criteria)

Assessment Criteria	Route 1	Route 2	Route 3
Economy			
Integration			
Accessibility and Social Inclusion			
Safety			
Environment			

Based on the assessments above it has been determined that Route 1 offers the preferred route option for the following reasons:

- It has a lower capital cost than other schemes
- It has a faster and more reliable journey time than Route 3
- It facilitates the full completion of Clongriffin Main Street in accordance with the LAP
- It is more favourable under the Environmental criterion than Route 3

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

5.4 Stage 2: Route Options Assessment - Clongriffin to Artane

5.4.1 Introduction

Following the Stage 1 sifting process the 18 remaining links in this section are assembled together to form four viable route options for Section 1, as follows:

- Route Option 1: Using Kilmore Road
- Route Option 2: Using Malahide Road
- Route Option 3: Using Tonlegee Road and Howth Road.
- Route Option 4: Using Kilmore Road, Tonlegee Road and Howth Road

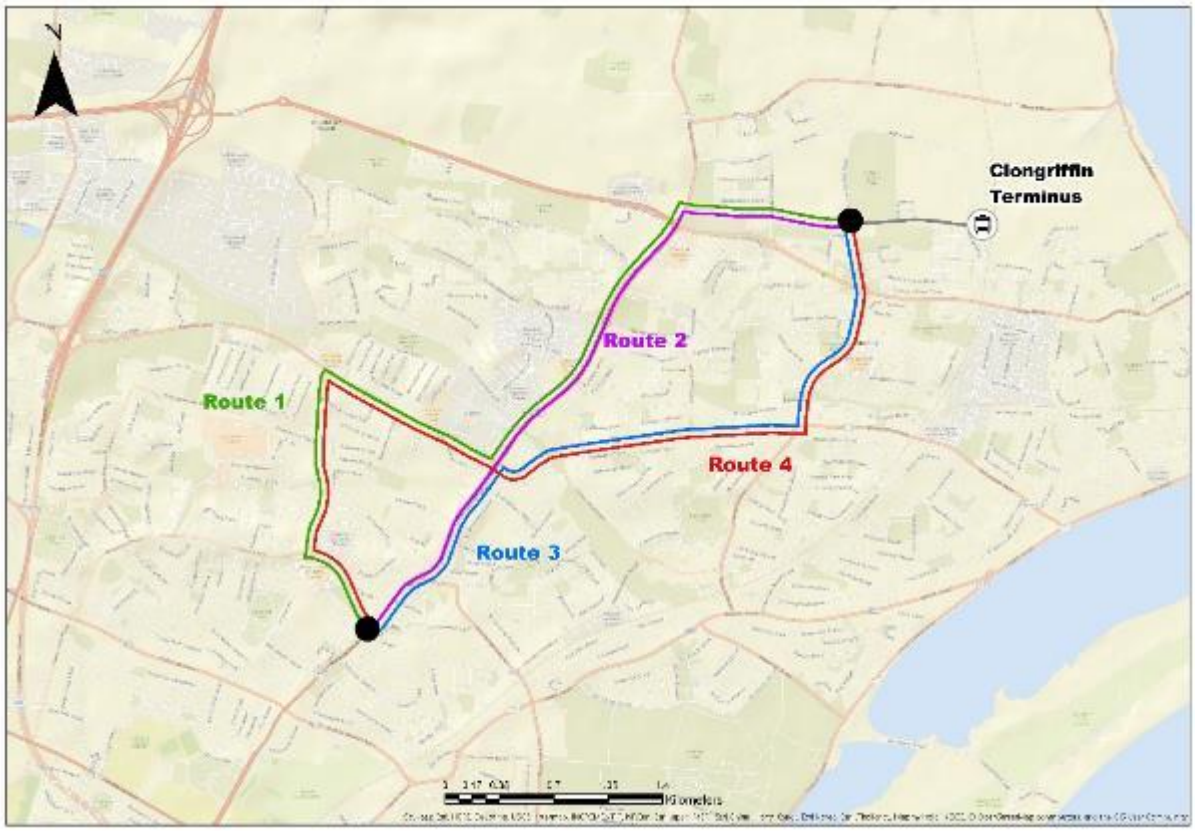


Figure 5.18 Section 1 (Clongriffin to Artane) Route Options

5.4.2 Route Option 1

Route Description

Route 1 is presented in Figure 5.19 and described as follows.

Figure 5.19 Route Option 1

Southbound: Route 1 would commence at the junction of Hole in the Wall Road and Clongriffin Main Street, from here the bus travels along Clongriffin Main Street, including some parts that are not yet constructed to join the Malahide Road. The bus continues south and turns right onto Oscar Traynor Road and travels via Kilmore Road to return to the Malahide Road.

Northbound: The northbound route would follow the same route as the southbound routing.

Route Option 1 Indicative Scheme Design

Figure 5.20 illustrates the indicative scheme design for route Option 1 as well as location of indicative cross-sections.

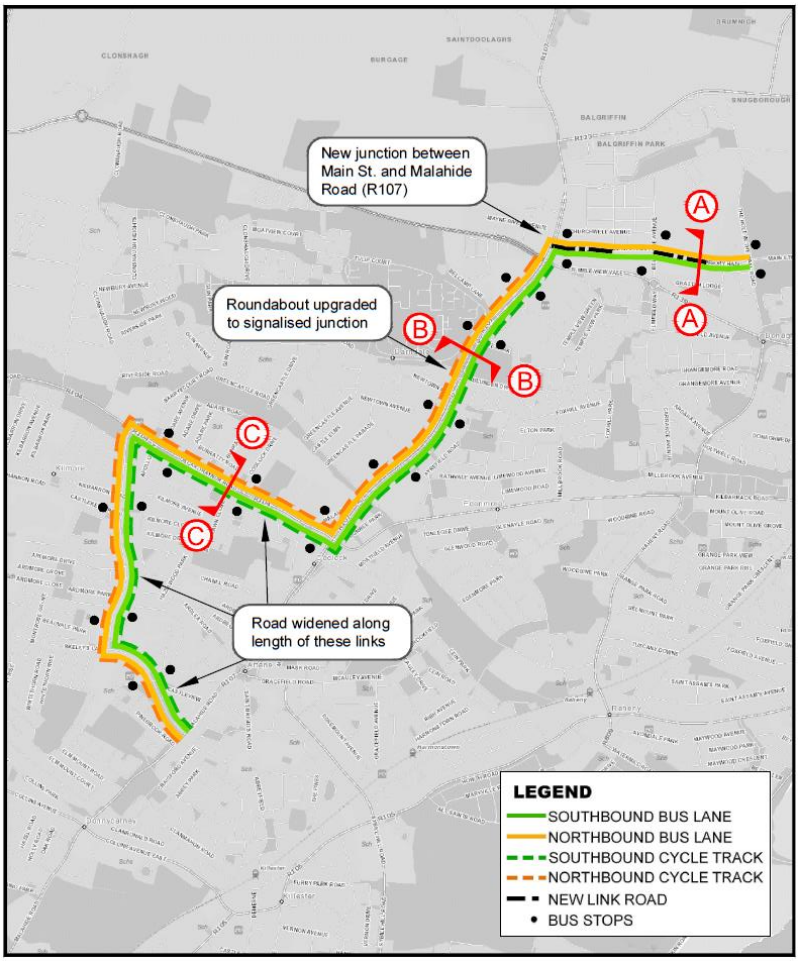


Figure 5.20 Route Option 1 Indicative Scheme Design

Bus Stops: A total of 13 bus stops would be provided in each direction along this route option.

Bus lanes will be provided for the length of the scheme. Segregated cycle lanes will be provided for the entire route south of the Northern Cross junction. Bus lanes will be constructed along Clongriffin Main Street in accordance with the LAP, these have already been constructed in some locations. A new bus only junction will be constructed where Clongriffin Main Street meets Malahide Road and signals will provide priority for buses using the CBC route. Road widening and realignment will be required to provide bus lanes on the Malahide Road section where they do not currently exist.

Further south along the Malahide Road existing bus lanes will be used by the CBC and segregated cycle lanes will be provided by using existing verge space or by reducing the width of the median where appropriate. All signalised junctions along this route will be upgraded to provide enhanced bus priority and pedestrian/cycle facilities. The existing roundabout at Priorswood Road junction will be upgraded to a signalised junction.

Oscar Traynor Road and Kilmore Road will be widened using verge/green space on either side of the road to provide bus and cycle lanes. Land take from gardens will be required in places along Kilmore Road and the cross section has been reduced in these areas, to minimise the extent of the land take.

A cross-section on Clongriffin Main Street is presented in Figure 5.21.

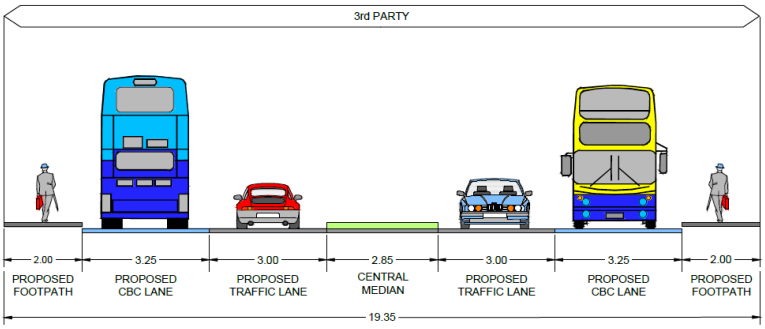


Figure 5.21 Cross Section A-A

A cross-section on Malahide Road is presented in Figure 5.22.

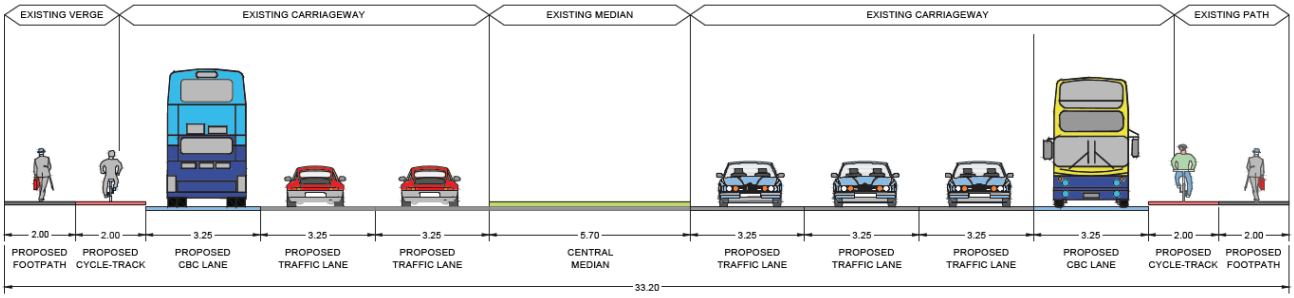


Figure 5.22 Cross Section B-B

A cross-section on Oscar Traynor Road is presented in Figure 5.23

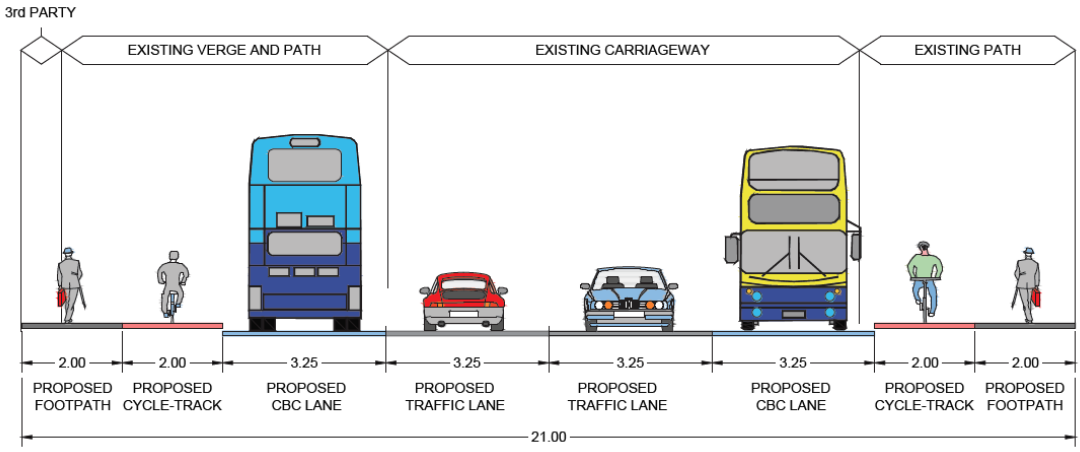


Figure 5.23 - Cross Section C-C

5.4.3 Route Option 2

Route Description

Route Option 2 is presented in Figure 5.24 and described as follows.

Figure 5.24 Route Option 2

Southbound: Route 2 would at the junction of Hole in the Wall Road and Clongriffin Main Street, from here the bus travels along Clongriffin Main Street, including some parts that are not yet constructed to join the Malahide Road. From here the bus continues south along the Malahide Road until it reaches the junction with Kilmore Road.

Northbound: The northbound route would follow the same route as the southbound routing.

Indicative Scheme Design

Figure 5.25 illustrates the indicative scheme design for Route Option 2 as well as the location of indicative cross-sections.

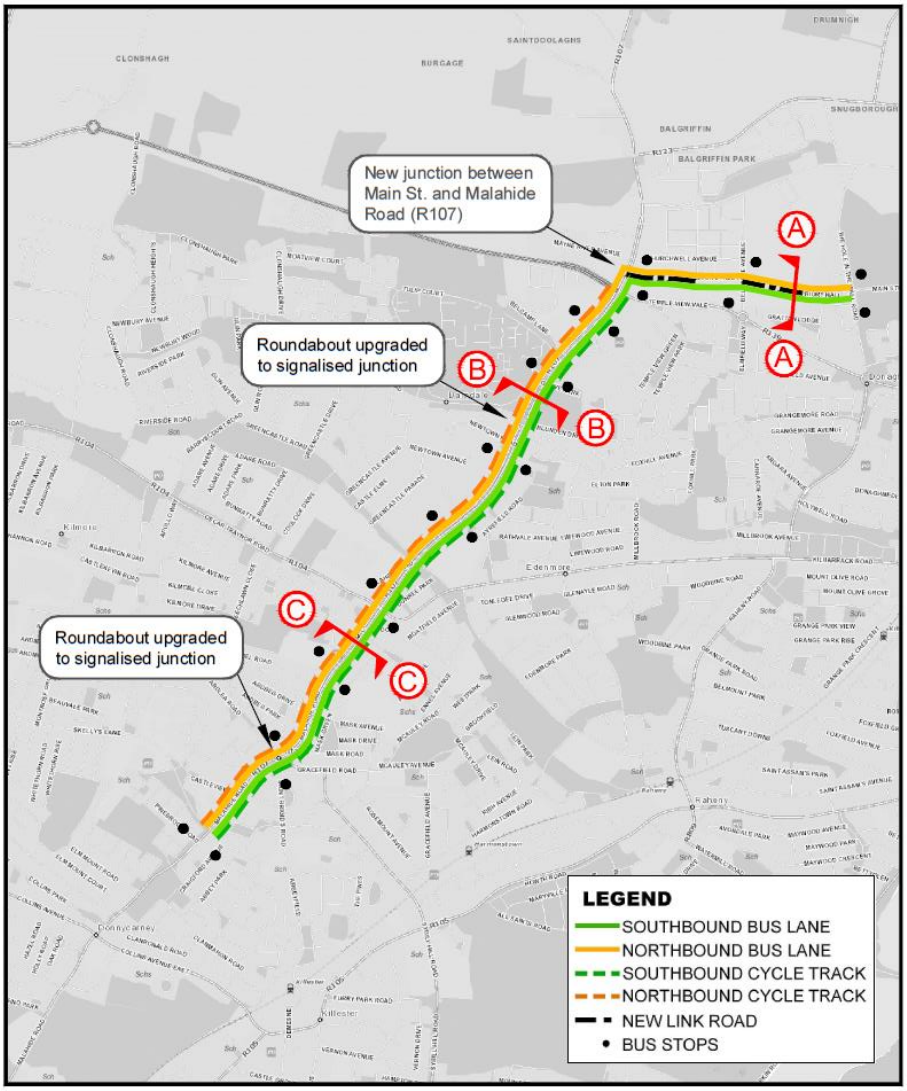


Figure 5.25 Route Option 2 Indicative Scheme Design

Bus Stops: A total of 11 bus stops would be provided in each direction along this route option.

Bus lanes will be provided for the entire length of the scheme. Segregated cycle lanes will be provided for the entire route south of the Northern Cross junction. Bus lanes will be constructed along Clongriffin Main Street in accordance with the LAP, these have already been constructed in some locations. A new bus only junction will be constructed where Clongriffin Main Street meets Malahide Road and signals will provide priority for buses using the CBC route. Road widening and realignment will be required to provide bus lanes on the Malahide Road section where they do not currently exist.

Further south along the Malahide Road existing bus lanes will be used by the CBC and segregated cycle lanes will be provided by using existing verge space or by reducing the width of the median where appropriate. All signalised junctions along this route will be upgraded to provide enhanced bus priority and pedestrian/cycle facilities. The existing roundabouts at Artane and at Priorswood Road junction will be upgraded to signalised junctions. Some commercial parking north of the junction with Kilmore Road will be

affected. Some land take from portions of 10 gardens north of Kilmore Road would also be required, residential parking in these gardens will still be possible.

A cross-section on Clongriffin Main Street is presented in Figure 5.26

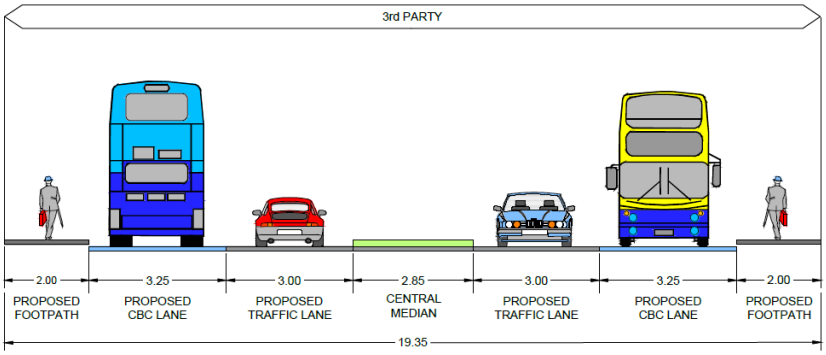


Figure 5.26 Cross Section A-A

A cross-section on Malahide Road is presented in Figure 5.27

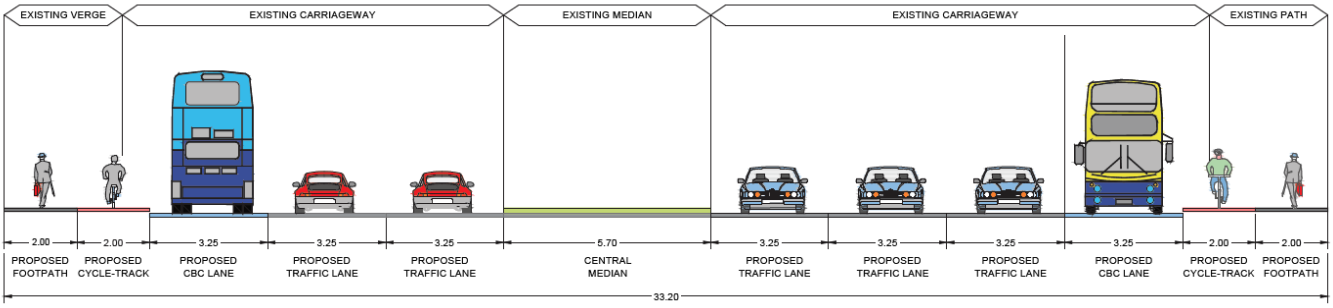


Figure 5.27 Cross Section B-B

A second cross-section further along Malahide Road is presented in Figure 5.28

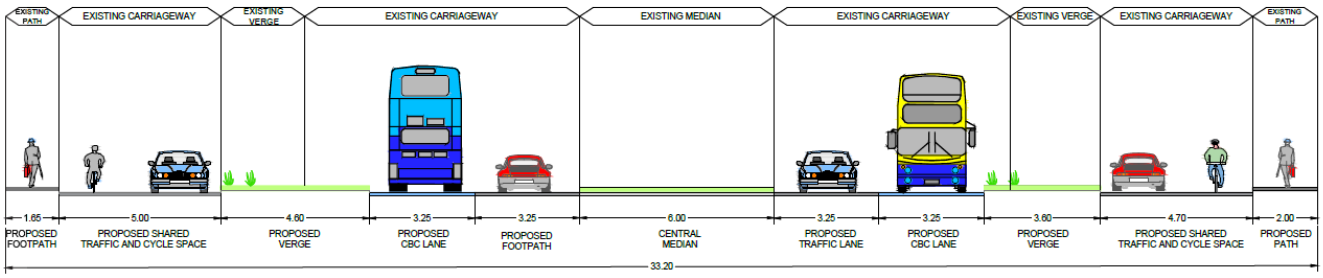


Figure 5.28 - Cross Section C-C

5.4.4 Route Option 3

Route Description

Route Option 3 is presented in Figure 5.29 and described as follows.

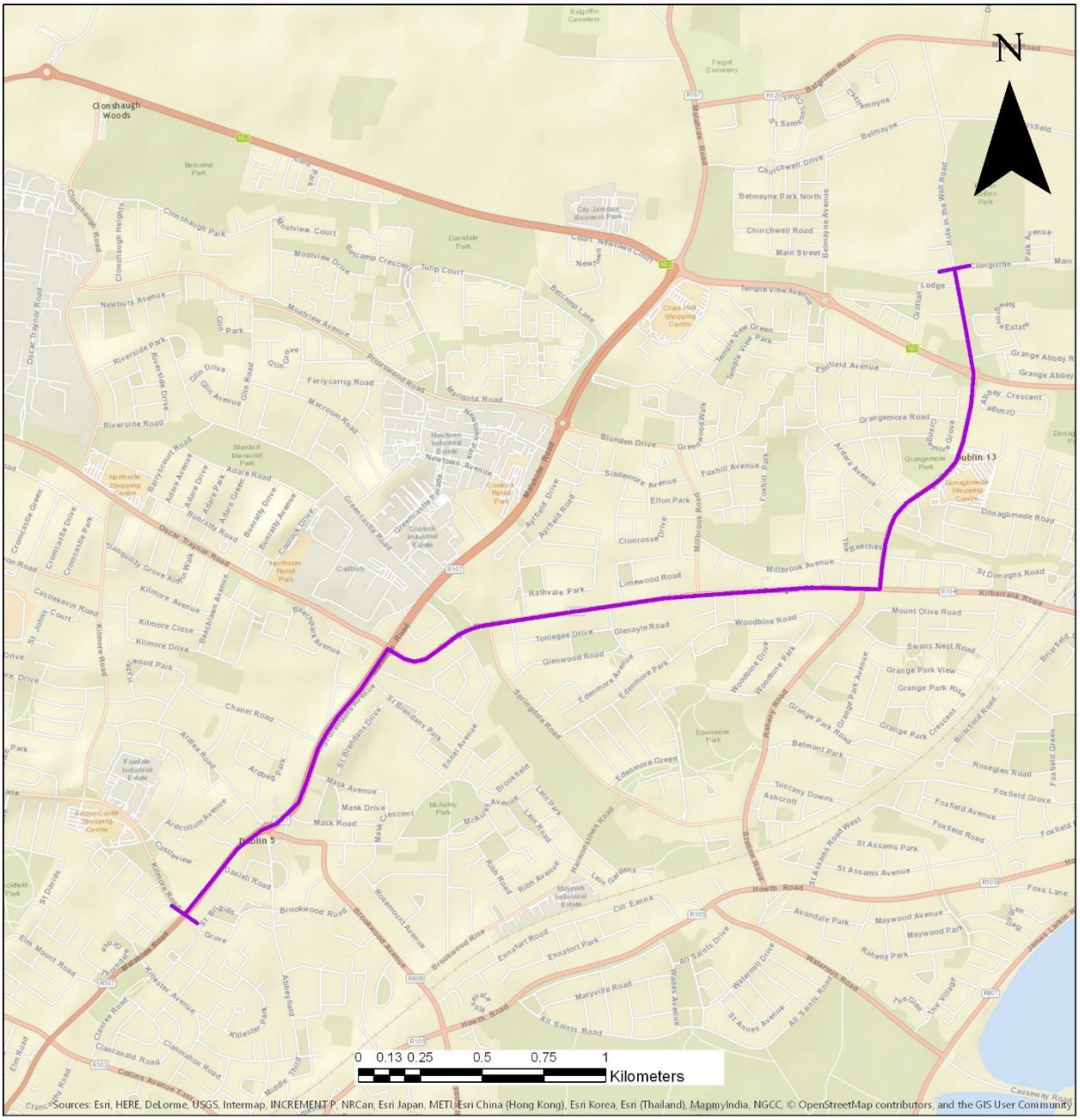


Figure 5.29 Route Option 3

Southbound: Route 3 would commence at the junction of Hole in the Wall Road and Clongriffin Main Street, from here the bus travels along Hole in the Wall Road, Grange Road and Tonlegee Road to reach the Malahide Road, form here the bus continues south along the Malahide Road until it reaches the junction with Kilmore Road.

Northbound: The northbound route would follow the same route as the southbound routing.

Indicative Scheme Design

Figure 5.30 illustrates the indicative scheme design for Route Option 3 as well as the location of indicative cross-sections.

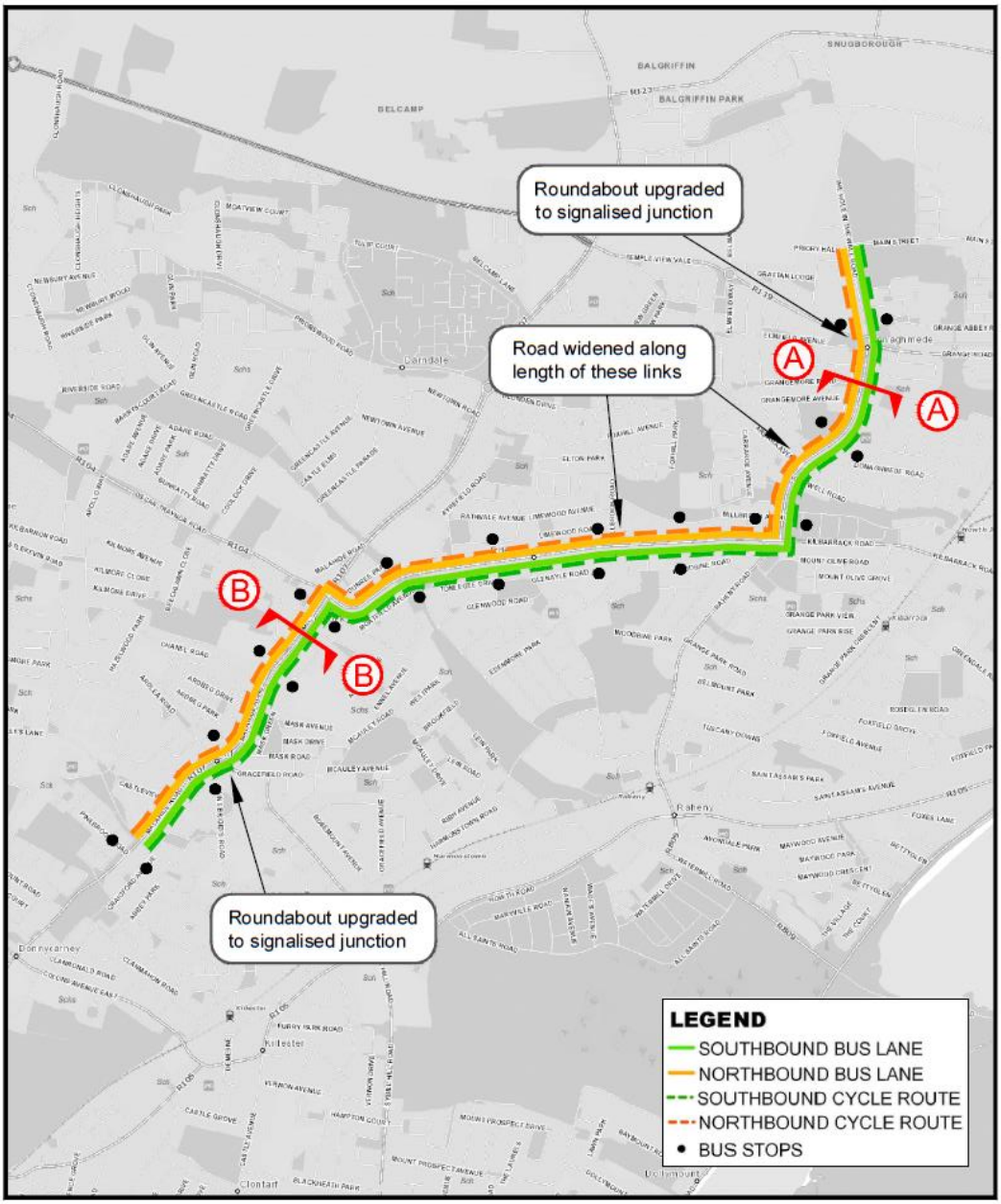


Figure 5.30 Route Option 3 Indicative Scheme Design

Bus Stops: A total of 11 bus stops would be provided in each direction along this route option.

Bus and segregated cycle lanes will be provided for the entire length of the scheme. The Hole in the Wall Road will be widened locally to provide bus and cycle lanes where they do not already exist. The existing roundabout at the R139 junction will be converted to a signalised crossroads. Significant road widening would be required on Grange Road and Tonlegee Road, this can mostly be achieved by using green space either side of the road however land take would be required from portions of front gardens along the western half of Tonlegee Road, the cross section would be reduced here to minimise land-take from gardens.

Along the Malahide Road existing bus lanes will be used by the CBC and segregated cycle lanes will be provided by using existing verge space or by reducing the width of the median where appropriate. All

signalised junctions along this route will be upgraded to provide enhanced bus priority and pedestrian/cycle facilities. The existing roundabout at Artane will be upgraded to a signalised junction. Some parking north of the junction with Kilmore Road will be affected. Some commercial parking north of the junction with Kilmore Road will be affected. Some land take from portions of 10 gardens north of Kilmore Road would also be required, residential parking in these gardens will still be possible.

A cross-section on Grange Road is presented in Figure 5.31

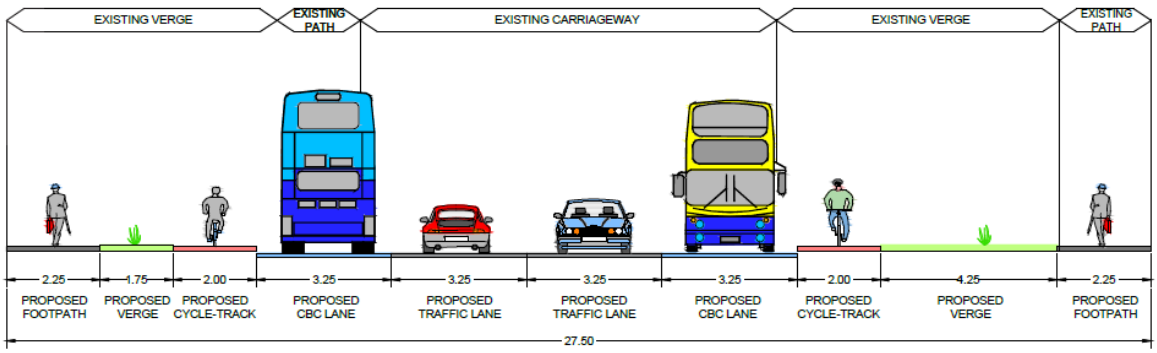


Figure 5.31 Cross Section A-A

A cross-section on Malahide Road is presented in Figure 5.32

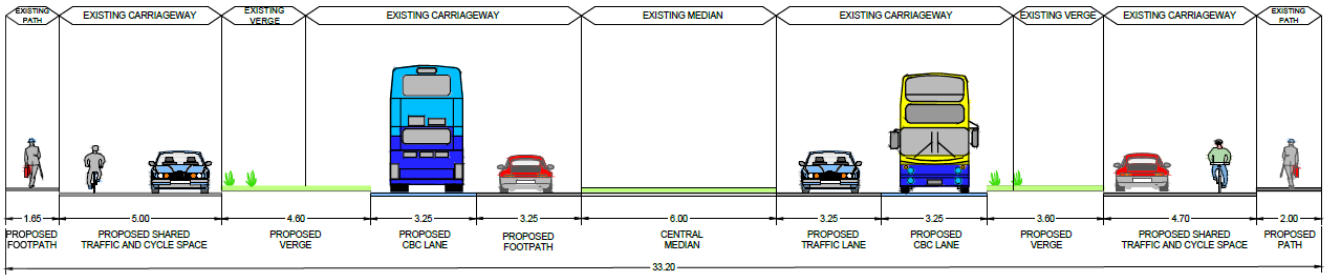


Figure 5.32 Cross Section B-B

5.4.5 Route Option 4

Route Description

Route Option 4 is presented in Figure 5.33 and described as follows.

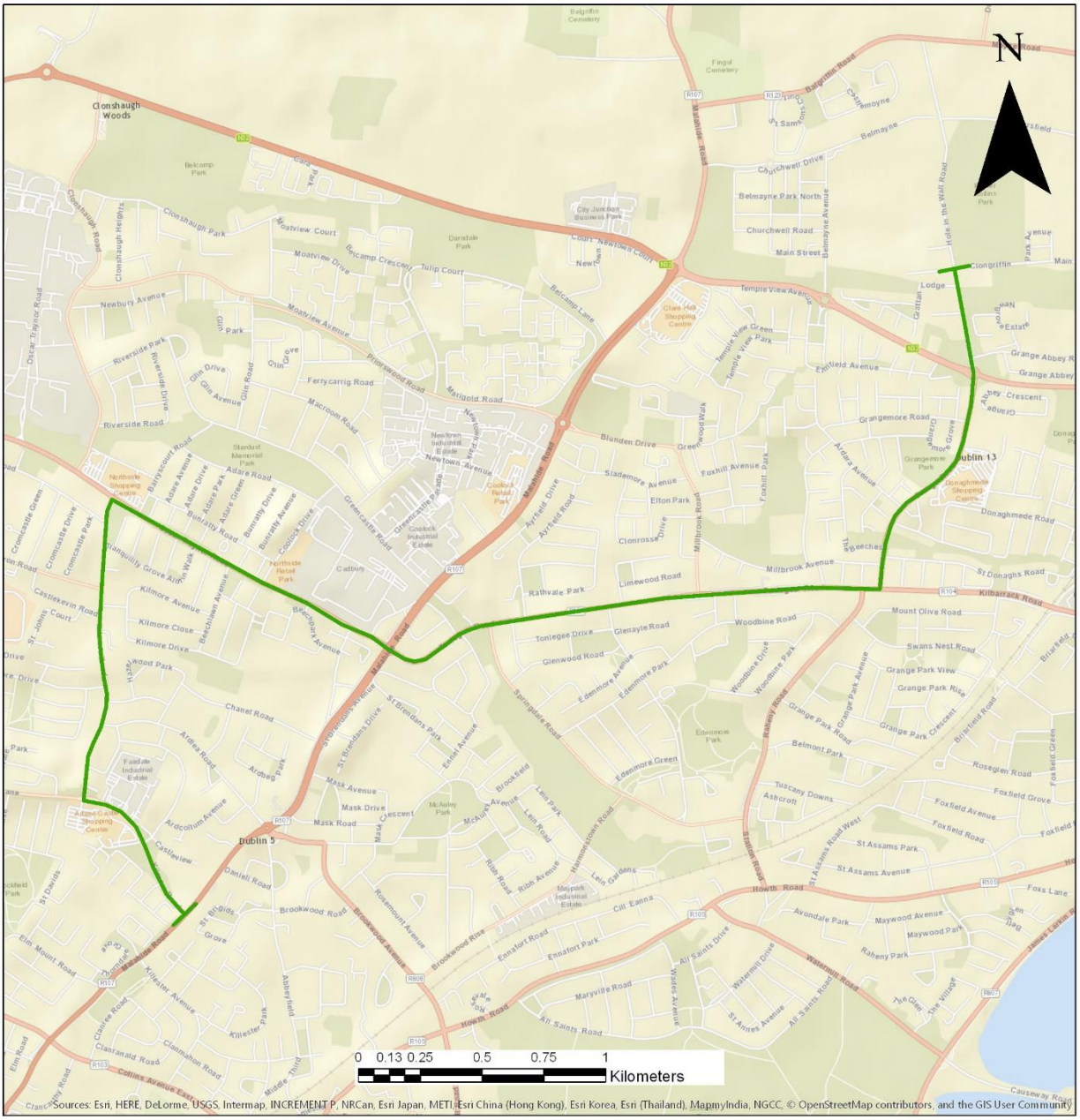


Figure 5.33 Route Option 4

Southbound: Route 4 would commence at the junction of Hole in the Wall Road and Clongriffin Main Street, from here the bus travels along Hole in the Wall Road, Grange Road, Tonlegee Road, Oscar Traynor Road and Kilmore Road to reach the junction with the Malahide Road.

Northbound: The northbound route would follow the same route as the southbound routing.

Indicative Scheme Design

Figure 5.34 illustrates the indicative scheme design for Route Option 4 as well as the location of indicative cross-sections.

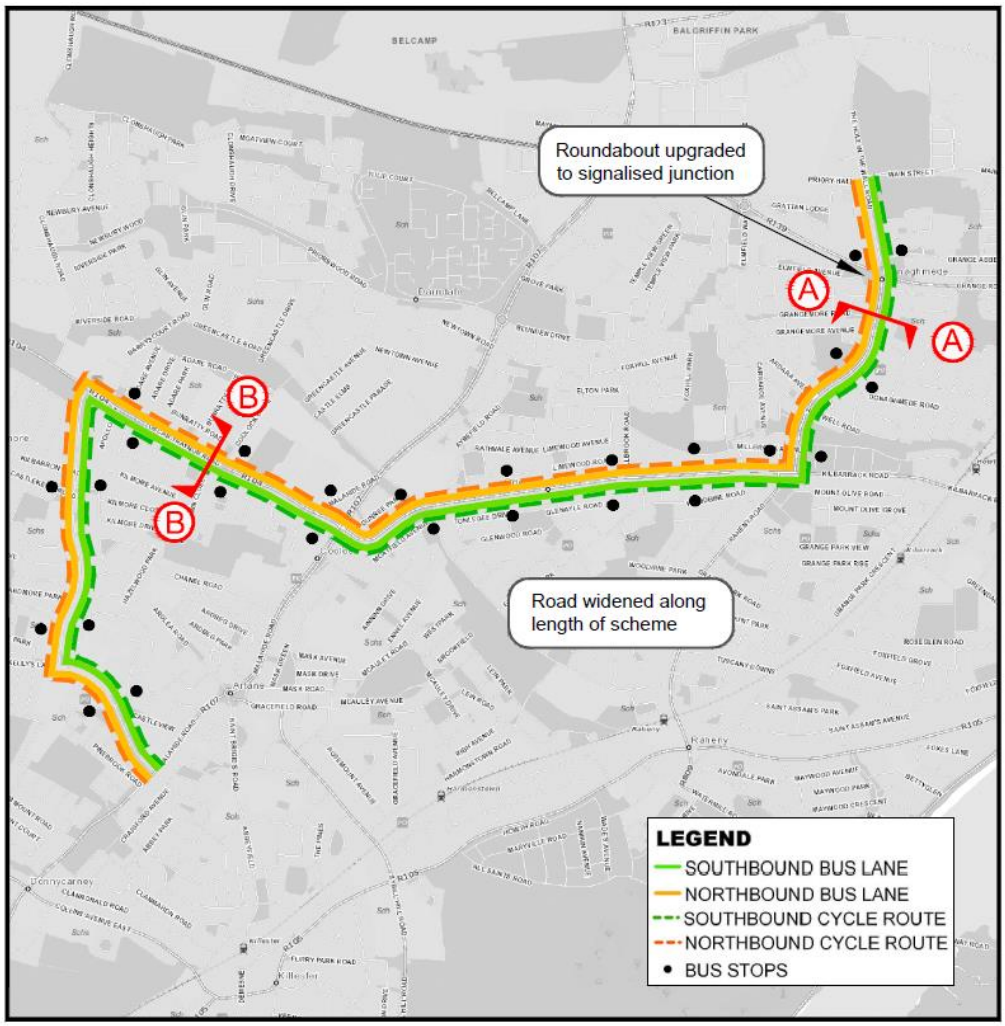


Figure 5.34 Route Option 4 Indicative Scheme Design

Bus Stops: A total of 13 bus stops would be provided in each direction along this route option.

Bus and segregated cycle lanes will be provided for the entire length of the scheme. The Hole in the Wall Road will be widened locally to provide bus and cycle lanes where they do not already exist. The existing roundabout at the R139 junction will be converted to a signalised crossroads. Significant road widening would be required on Grange Road and Tonlegee Road, this can mostly be achieved by using green space either side of the road however land take would be required from front gardens along the western half of Tonlegee Road. Cross section is minimised here to reduce land-take from gardens.

Oscar Traynor Road and Kilmore Road will be widened using verge/green space on either side of the road to provide bus and cycle lanes. Land take from gardens will be required in places along Kilmore Road and the cross section has been reduced in these areas to avoid properties, with narrower cycle lanes and no grass verge proposed. All signalised junctions along this route will be upgraded to provide enhanced bus priority and pedestrian/cycle facilities.

A cross-section on Grange Road is presented in Figure 5.35.

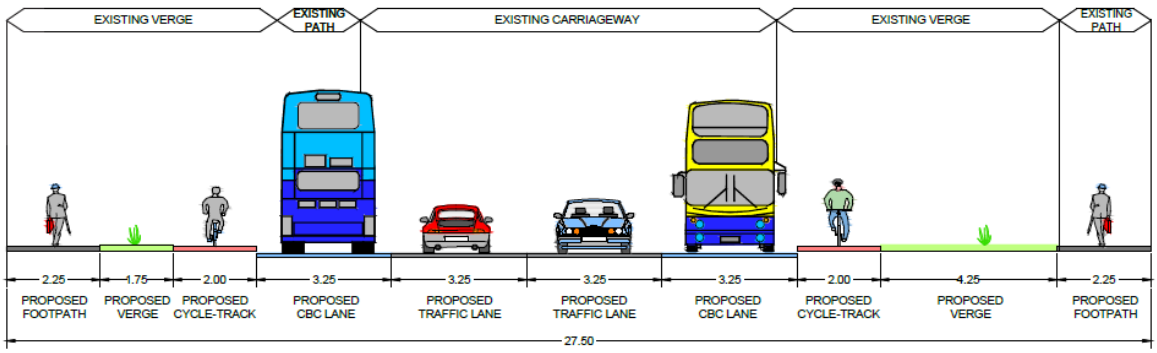


Figure 5.35 Cross Section A-A

A cross-section on Oscar Traynor Road is presented in Figure 5.36

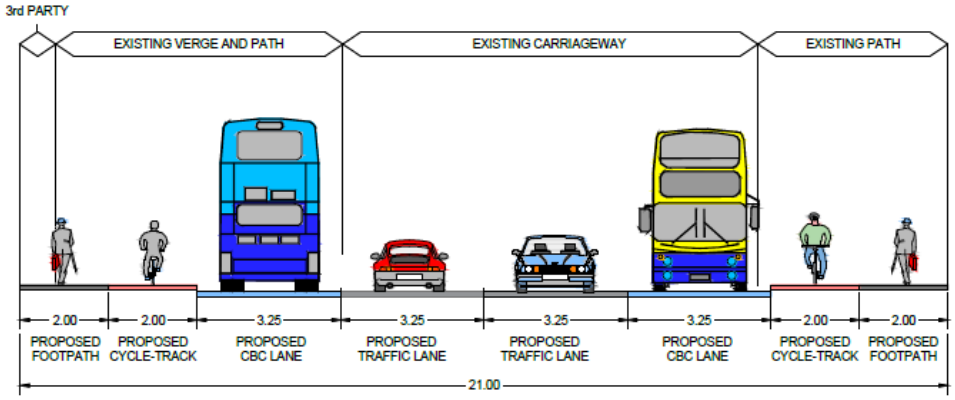


Figure 5.36 Cross Section B-B

5.4.6 Route Options Assessment

Details of the 'Stage 2' route options assessment undertaken for the Clongriffin to City Centre CBC are presented in **Appendix A**.

A summary of the ranking of route options against the scheme sub-criteria is presented in Table 5.6 below.

Table 5.6 Route Options Assessment Summary (Sub-Criteria)

Assessment Criteria	Sub-Criteria	Route 1	Route 2	Route 3	Route 4
Economy	Capital Cost				
	Journey-time reliability and consistency				
Integration	Land Use Integration				
	Population and Employment Catchments				
	Public Transport Integration				
	Traffic Network Integration				
	Cyclists and pedestrian Integration				
Accessibility and Social Inclusion	High Volume Trip Attractors				
	Deprived Geographic Areas & Areas Underserved by Public Transport				
Safety	Road Safety				
Environment	Archaeological, Architectural and Cultural Heritage				
	Flora and Fauna				
	Soils and Geology				
	Hydrology				
	Landscape and visual				
	Noise and Vibration				
	Air Quality				
	Land Use and the Built Environment				

In terms of "Economy" route options which travel along the Malahide Road are determined to be comparatively more favourable than alternatives, with Route 2 scoring higher in comparison to other options. This is mainly due to the wide road reservation, existing bus lanes and the shorter route length. It also provides the most direct route and hence is move favourable in terms of "Journey Time Reliability and Consistency".

In terms of Integration, Routes 1 and 2 would facilitate the completion of Clongriffin Main Street and so score higher in the "Land Use Integration" criterion. Routes 1 and 4 are longer and pass through areas of slightly higher population density and so score higher on the "Population and Employment Catchment" criterion. As comparatively fewer new bus lanes and interventions at junctions would be required for Route 2 it scores better on the "Traffic Network Integration" criterion. Route 2 would provide cycle lanes for a longer length of a GDA CNP primary route and so scores higher in terms of "Cycle and Pedestrian Integration"

In terms of “Accessibility and Social Inclusion” Route 4 serves a slightly higher number of key trip attractors by passing closer to more schools and shopping centres, Routes 1 and 2 better serve the deprived areas around Darndale and so score higher on the “Deprived Geographic Areas” criterion.

Route 2 would involve fewer turning movements for the buses and so is considered more favourable than the alternatives in terms of “Safety”.

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

5.4.7 Conclusion

A summary of the assessment and a relative ranking for each of the five assessment criteria is shown below in **Table 5.7**

Table 5.7 Route Options Assessment Summary (Main Criteria)

Assessment Criteria	Route 1	Route 2	Route 3	Route 4
Economy				
Integration				
Accessibility and Social inclusion				
Safety				
Environment				

Based on the assessments above it has been determined that Route 2 offers the preferred route option for the following reasons:

- It has a significantly lower capital cost than other routes
- It has a faster and more reliable journey time than other routes
- It scores better on Safety than other routes
- It is significantly more favourable under the Environmental criterion than other routes

Route 2 is identified as the preferred option for this section and is brought forward into the Emerging Preferred Route as described in Chapter 8.

5.5 Common Section – Malahide Road (Kilmore Road to Griffith Ave)

5.5.1 Introduction

Following the Stage 1 sifting process the three remaining links are assembled together to form only one viable route option for this section.

Route Description

The preferred route option is presented in **Figure 5.37** and described as follows.

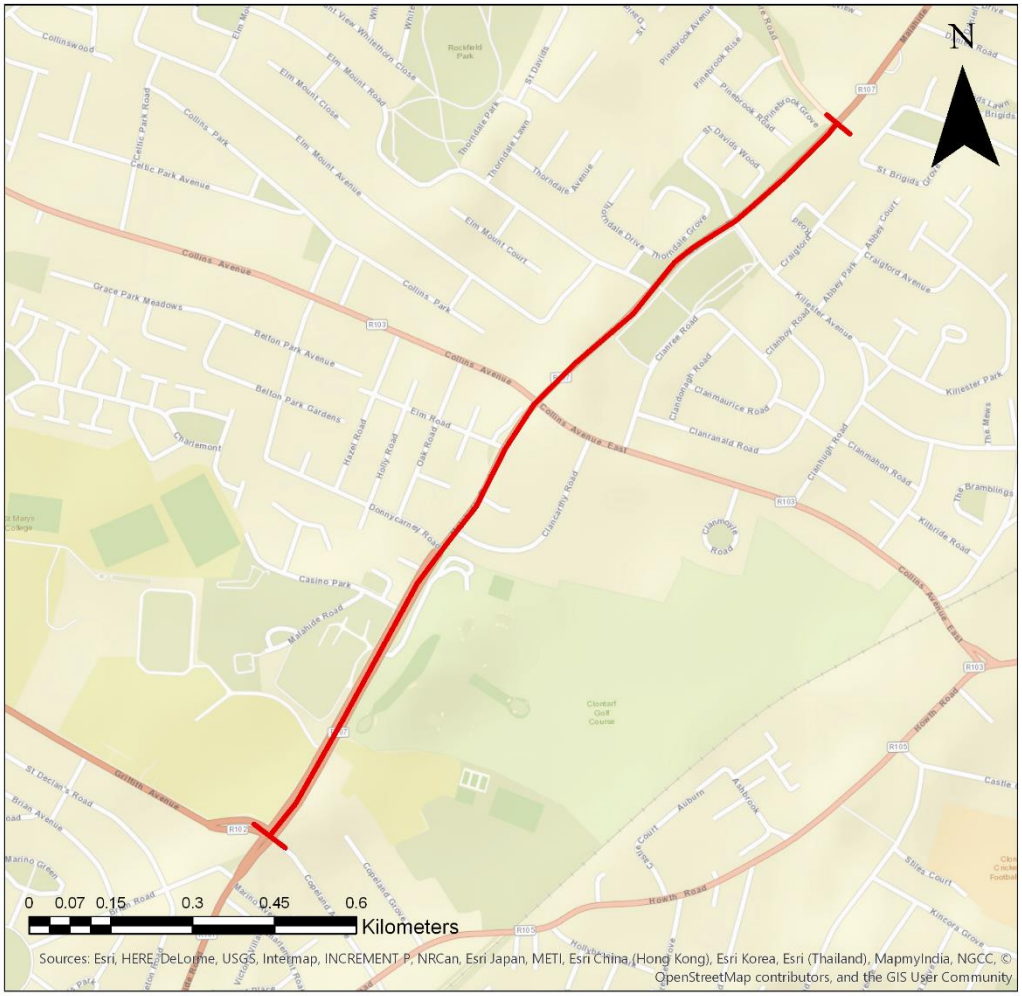


Figure 5.37 Section 1 (Kimore Rd to Griffith Ave) Route Option

Southbound: All routes would commence at the junction of Malahide Road and Kilmore Road, from here the bus travels along the Malahide Road until it reaches the junction with Griffith Avenue.

Northbound: The northbound route would follow the same route as the southbound routing.

Indicative Scheme Design

Figure 5.38 illustrates the indicative scheme design as well as the location of indicative cross-sections.

Figure 5.38 Indicative Scheme Design

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

Bus lanes and segregated cycle lanes will be provided for the entire length of the scheme. The Malahide Road will be widened to provide bus lanes on the sections where they do not currently exist, and new segregated cycle lanes will be provided for the whole length. Road widening can mostly be facilitated with land take from public green areas, parks, playing fields of Ardscoil Ris and land from Clontarf Golf Club. However, land take from portions of front gardens would be required either side of the junction with Collins Avenue. In these sections, the cross section will be reduced to minimise land take as no suitable alternate

cycle routes were found. The section between Elm Road and Donnycarney Road is particularly constrained and over this section the widths of the cycle tracks have been reduced to 1.5m each in order to balance the need for residential parking and cycle safety.

Approximately 15 gardens south of Collins Avenue junction will be affected. Parking capacity in these gardens will be reduced, but parking will still be available in the gardens. All junctions will be upgraded to provide bus priority and enhanced pedestrian/cyclist facilities.

A cross-section on Malahide Road in the most constrained section is presented in Figure 5.39

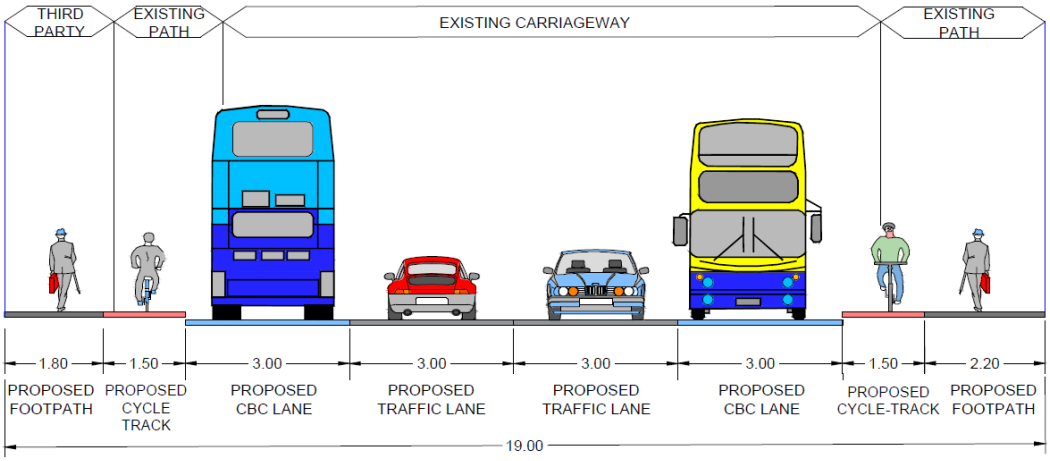


Figure 5.39 Cross Section A-A

A second cross-section further along Malahide Road is presented in Figure 5.40

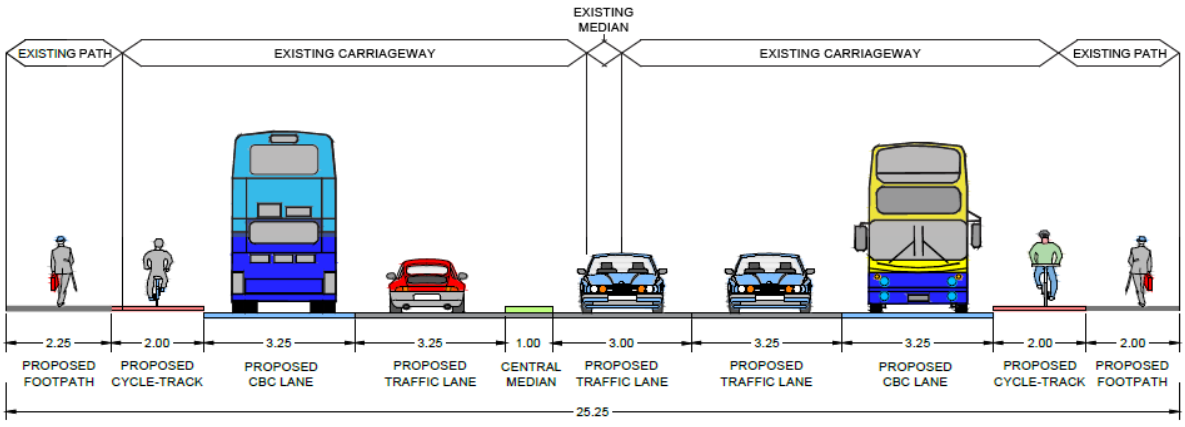


Figure 5.40 Cross Section B-B

5.6 Stage 2: Route Options Assessment - Malahide Road (Griffith Avenue to Clontarf Road)

5.6.1 Introduction

Following the Stage 1 sifting process the three remaining links are assembled together to form only one viable route option for this section. However, as this section is particularly constrained, four Scheme Options have been developed to mitigate the impacts on residents along the most constrained section, which is the southern end of Malahide Road as it approaches Marino Mart. It was not considered feasible to provide dedicated bus, cycle and traffic lanes in both directions through this section, as this would mean all parking in a number of residents' gardens would be removed and no suitable alternative could be found.

Route Description

All Schemes follow the same route as presented in **Figure 5.41** and described as follows.

Figure 5.41 Section 1 (Griffith Ave to Clontarf Rd) Route Option

Southbound: All routes would commence at the junction of Malahide Road and Griffith Avenue, from here the bus travels along the Malahide Road until it reaches the junction with Clontarf Road. The bus then turns right onto Marino Mart and continues along Annesley Bridge Road to reach Annesley Bridge

Northbound: The northbound route would follow the same route as the southbound routing.

5.6.2 Scheme Option 1 - Indicative Scheme Design

Figure 5.42 illustrates the indicative scheme design for Route Option 4 as well as the location of indicative cross-sections.

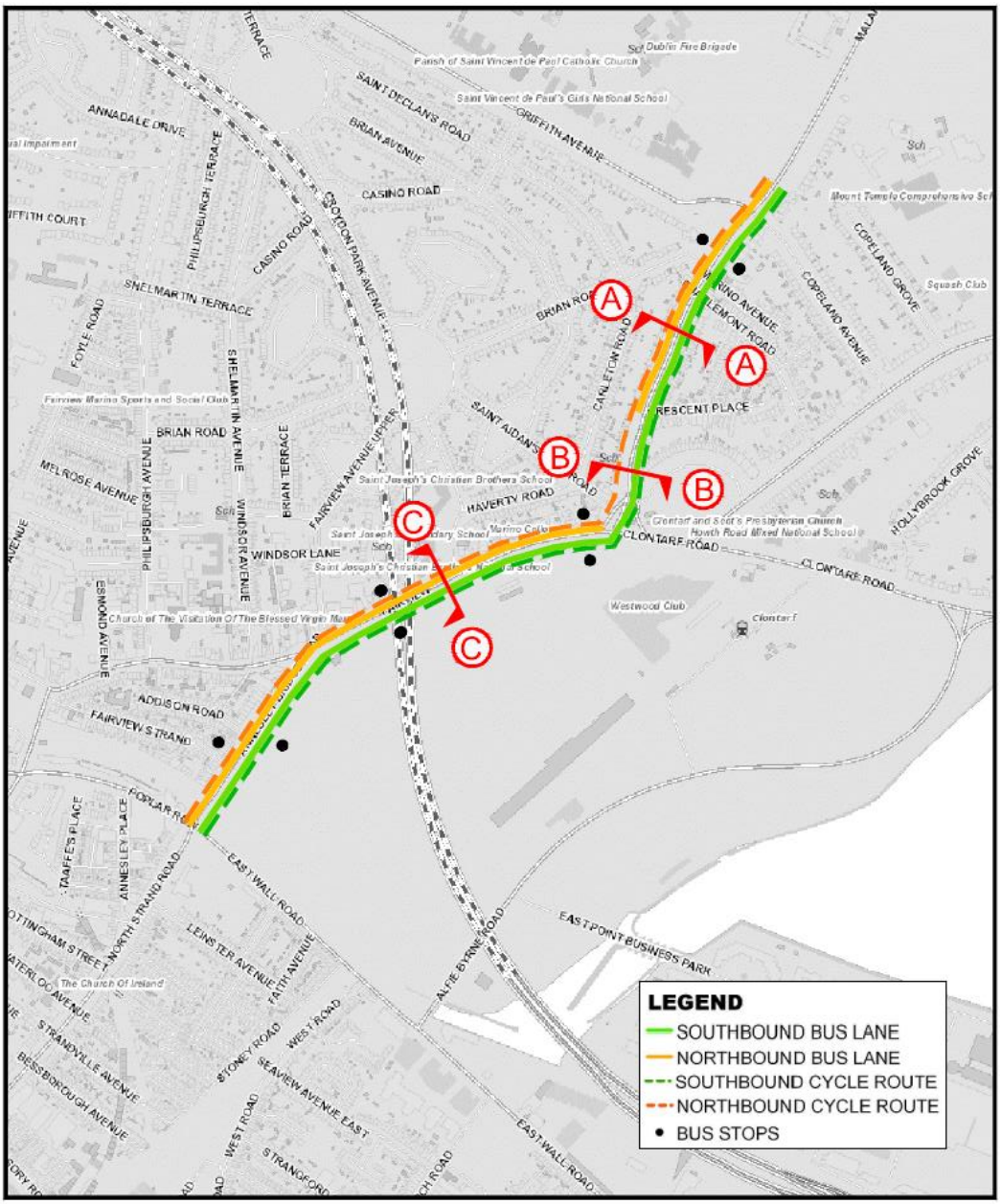


Figure 5.42 Route Option 2 Indicative Scheme Design

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

Scheme 1 provides bus and cycle lanes in both directions through with the exception that northbound buses would be required to share a lane with traffic for a 200m length at the southern end of Malahide Road. Land take would be required from portions of front gardens of residential properties to achieve this and the cross section and lane widths have been reduced in order to keep land take to a minimum.

No northbound bus lane is provided until after the most constrained section at the southern end of Malahide Road has been passed. A dedicated bus signal would be provided for left turning buses on Marino Mart. The queue length data from the junction at Collins Avenue indicates that the maximum queue length stretched back 130 metres in the PM peak, and so delays for buses on this shared section should not be

too significant. The required land take would reduce the parking capacity in 12 gardens although at least one parking space would remain in each garden. There is currently 75 metres of off-peak commercial parking in the southbound bus lane, this will be removed as part of all schemes.

The section along Marino Mart and Annesley Bridge Road will be the same for all four schemes and will be in accordance with the Clontarf to City Centre Cycle Scheme, which provides bus priority and segregated cycle facilities in both directions. This scheme favours removing a lane of inbound traffic on Marino Mart over the removal of some trees in the footpath alongside Fairview Park. This lane removal also facilitates the provision of cycle lanes through the pinch point where the road passes under the existing pedestrian footbridge. On-street parking and loading will be affected but will be maintained wherever practical.

The junction at Malahide Road/Clontarf Road will be upgraded and a lane of southbound traffic will be removed, this will affect the capacity of the junction. The junction with Fairview Strand will also be upgraded to provide enhanced pedestrian and cyclist facilities.

A cross-section on Malahide Road is presented in Figure 5.43.

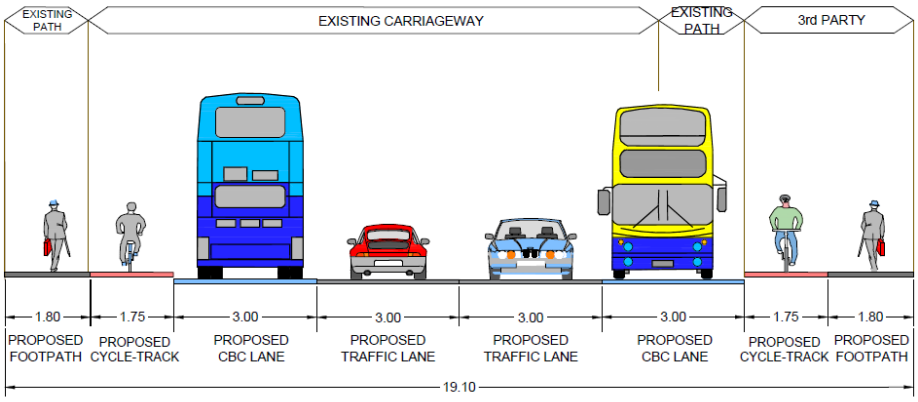


Figure 5.43 Cross Section A-A

A cross-section on Malahide Road at the section without a northbound bus lane is presented in Figure 5.44

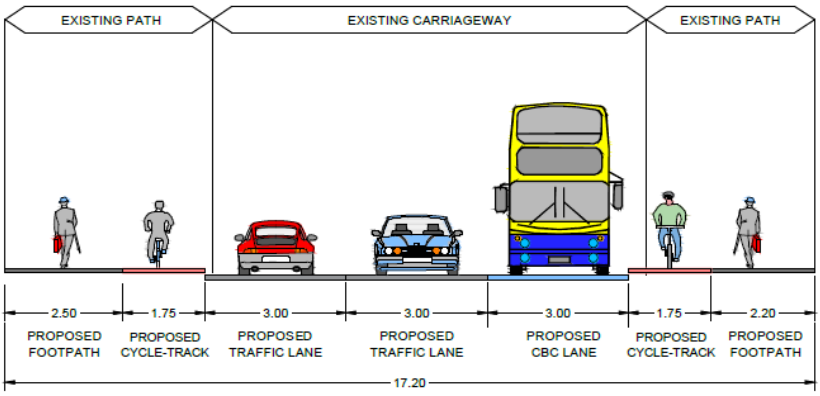


Figure 5.44 Cross Section B-B

A cross-section on Marino Mart is presented in **Figure 5.45**

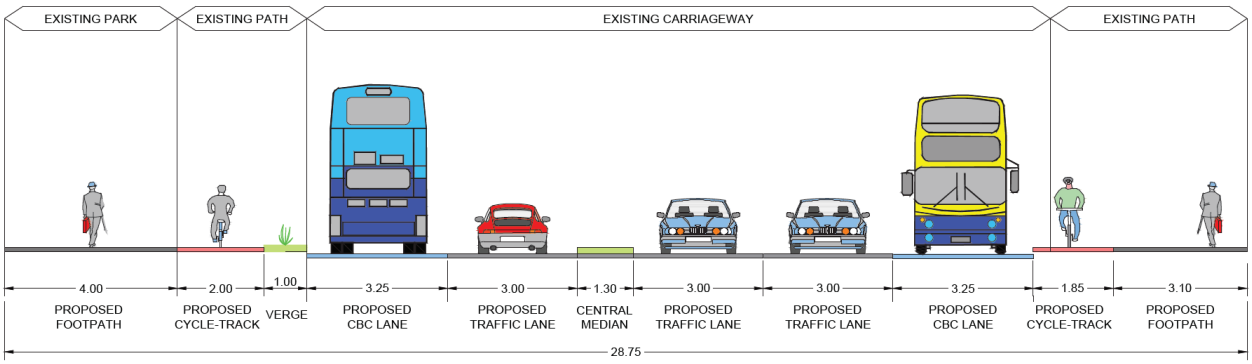


Figure 5.45 Cross Section C-C

5.6.3 Scheme Option 2 - Indicative Scheme Design

Figure 5.46 illustrates the indicative scheme design for Route Option 2 as well as the location of indicative cross-sections.

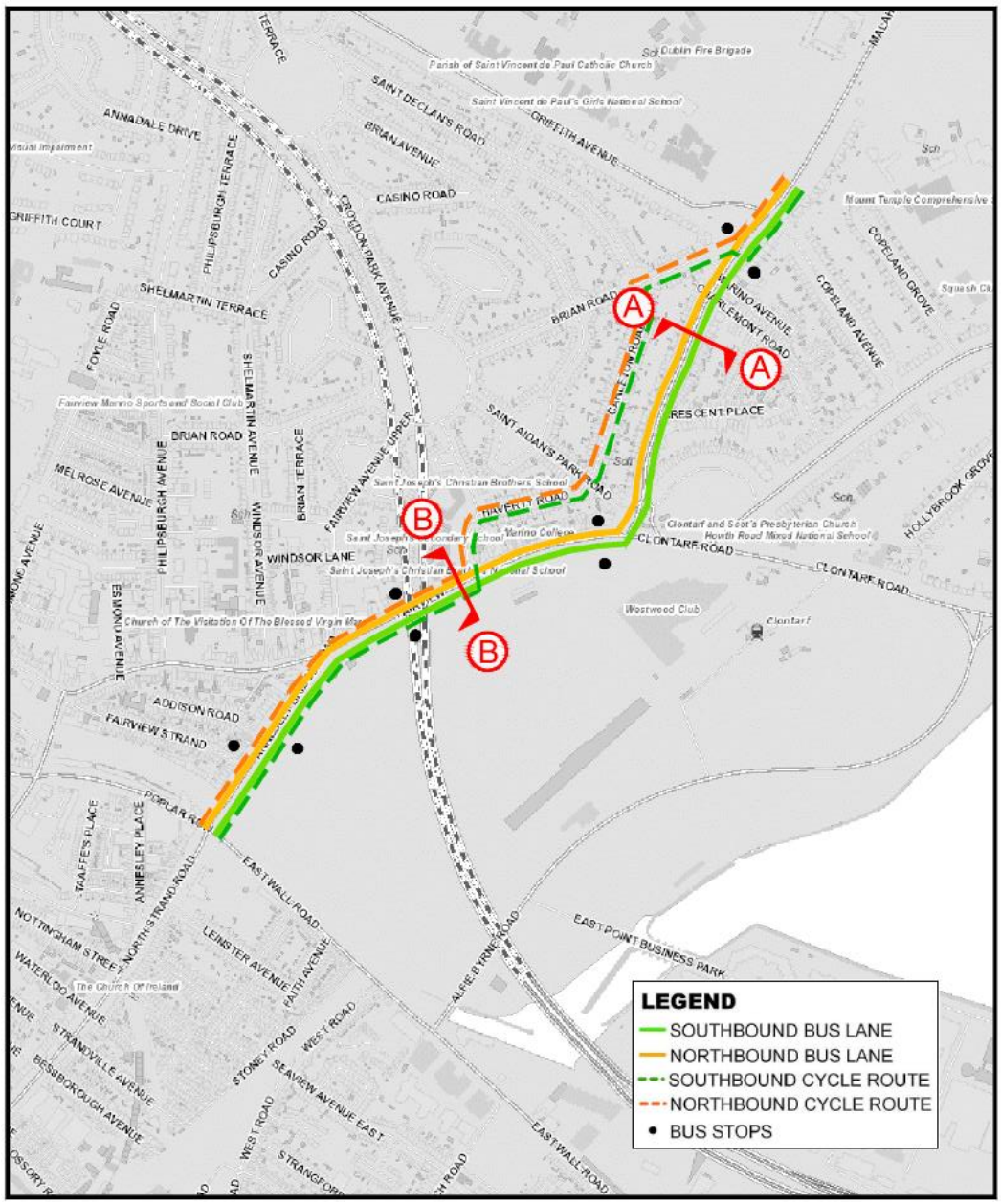


Figure 5.46 Route Option 4 Indicative Scheme Design

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

This scheme is similar to Scheme 1 except that cyclists in both directions would be diverted along Haverty Road and Brian Road and this would allow continuous bus lanes to be provided in both directions. Southbound cyclists would be required to cross the road twice and two new toucan crossings would need to be introduced. It is likely many southbound cyclists would continue to use Malahide Road, and this may delay buses, although cyclists will be travelling downhill for this section.

This scheme has a cross section of 15.6m and as a result only 3 gardens would have their parking capacity reduced and parking would remain possible in all gardens where residents currently park.

A cross-section on Malahide Road is presented in Figure 5.47

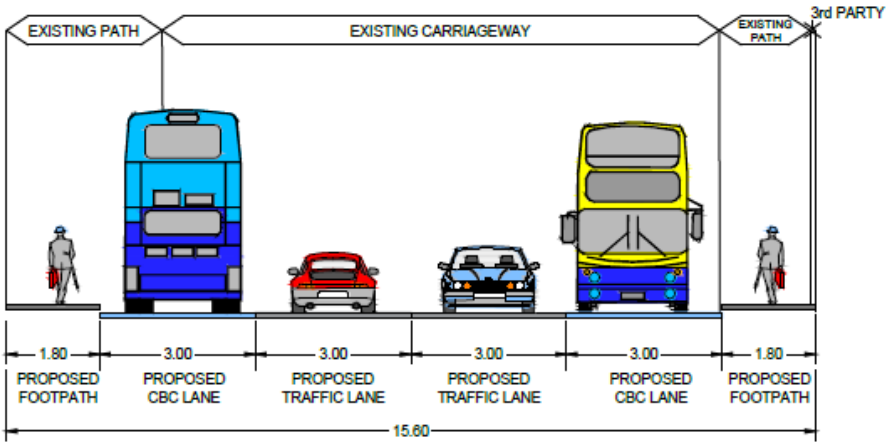


Figure 5.47 Cross Section A-A

A cross-section on Marino Mart is presented in Figure 5.48

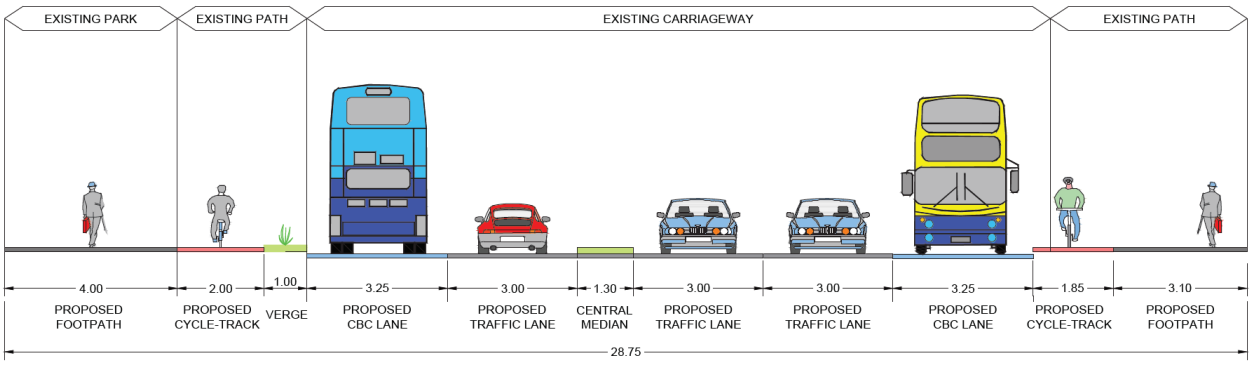


Figure 5.48 Cross Section B-B

5.6.4 Scheme Option 3 - Indicative Scheme Design

Figure 5.59 illustrates the indicative scheme design for Option 3 as well as the location of indicative cross-sections.

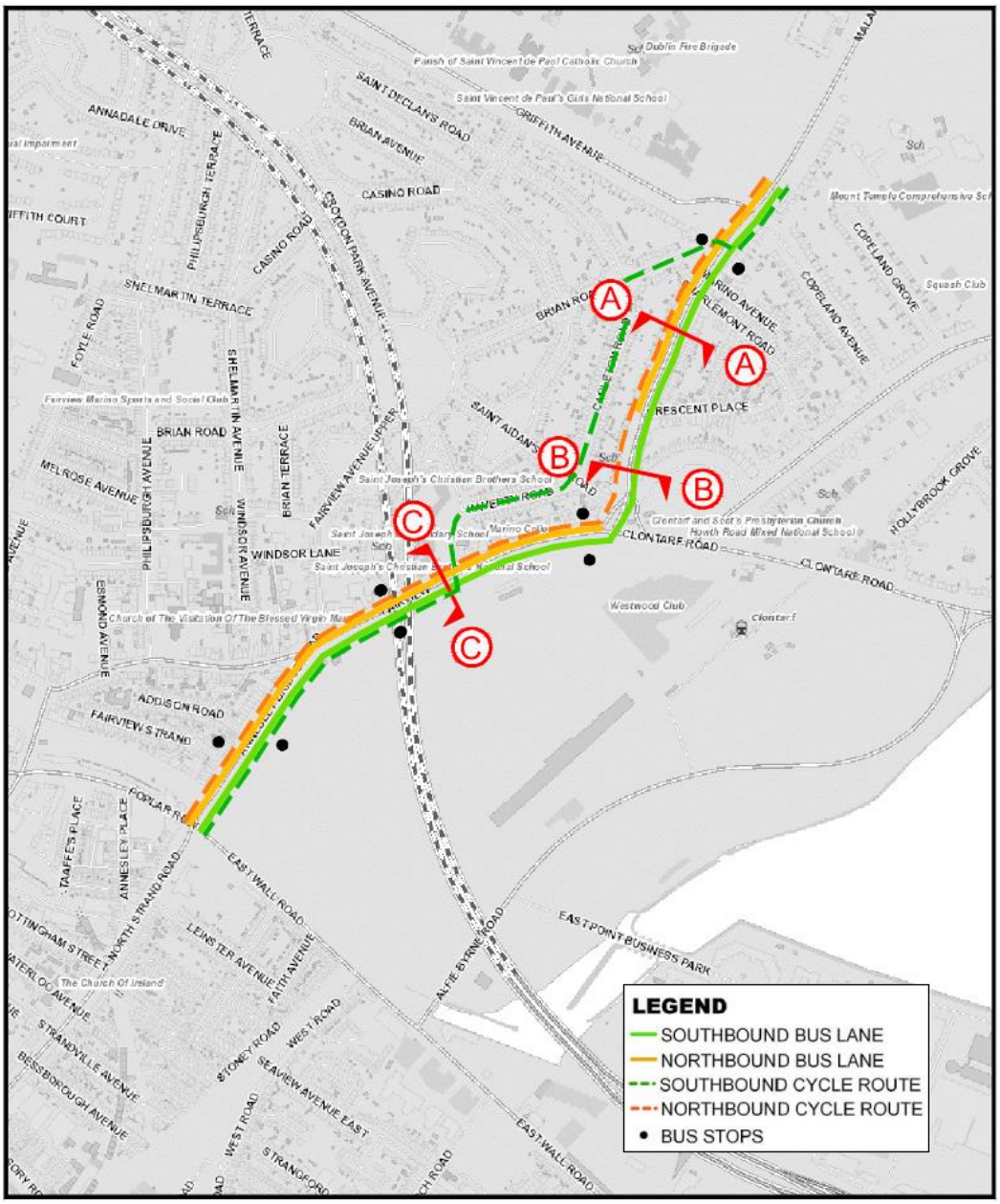


Figure 5.49 Route Option 3 Indicative Scheme Design

This scheme is similar to Scheme 1 except that southbound cyclists would be diverted along Haverty Road and Brian Road. Southbound cyclists would be required to cross the road twice and two new toucan crossings would need to be introduced. It is likely many southbound cyclists would continue to use Malahide Road, and this may delay buses although cyclists will be travelling downhill for this section. Again, no northbound bus lane is provided until after the most constrained section at the southern end of Malahide Road has been passed.

This scheme has cross sections of 14.35m and 17.35m, land take would be required from the eastern side of the road only. Parking capacity would be reduced but would remain possible in these gardens.

A cross-section on Malahide Road is presented in Figure 5.50

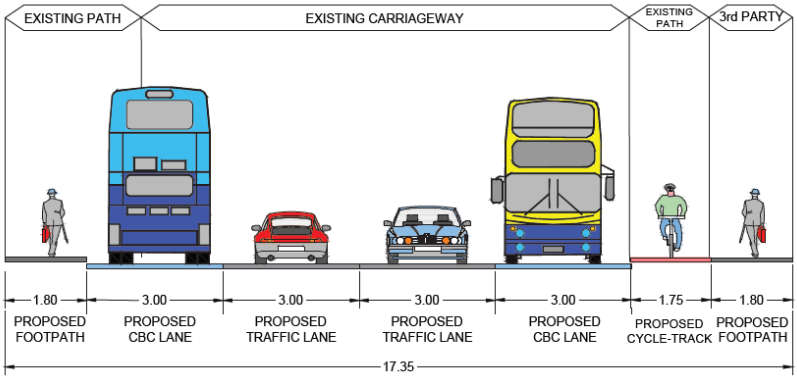


Figure 5.50 Cross Section A-A

A cross-section on Malahide Road is presented in Figure 5.51

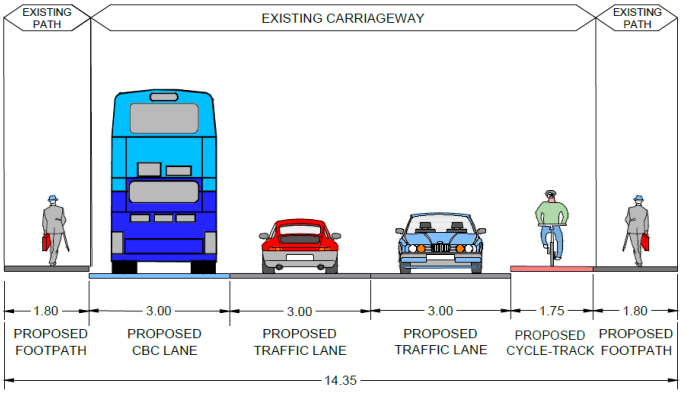


Figure 5.51 Cross Section B-B

A cross-section on Marino Mart is presented in Figure 5.52

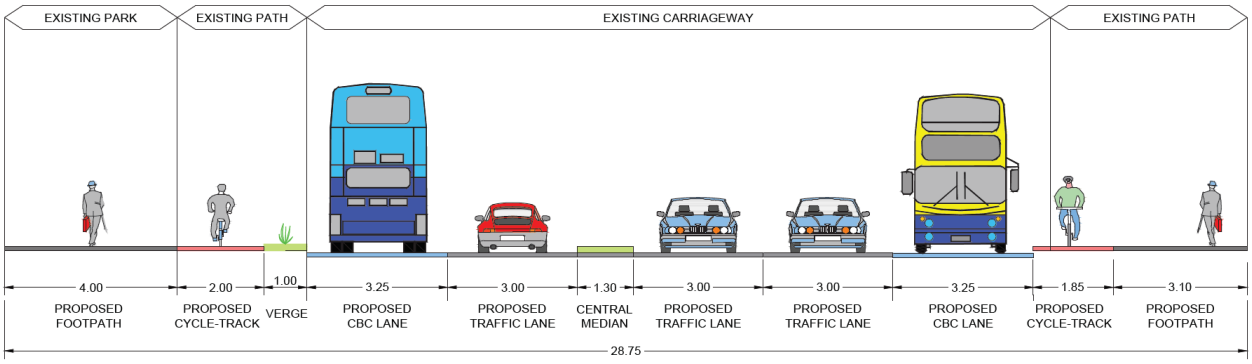


Figure 5.52 Cross Section C-C

5.6.5 Scheme Option 4 - Indicative Scheme Design

Figure 5.53 illustrates the indicative scheme design for Option 4 as well as the location of indicative cross-sections.

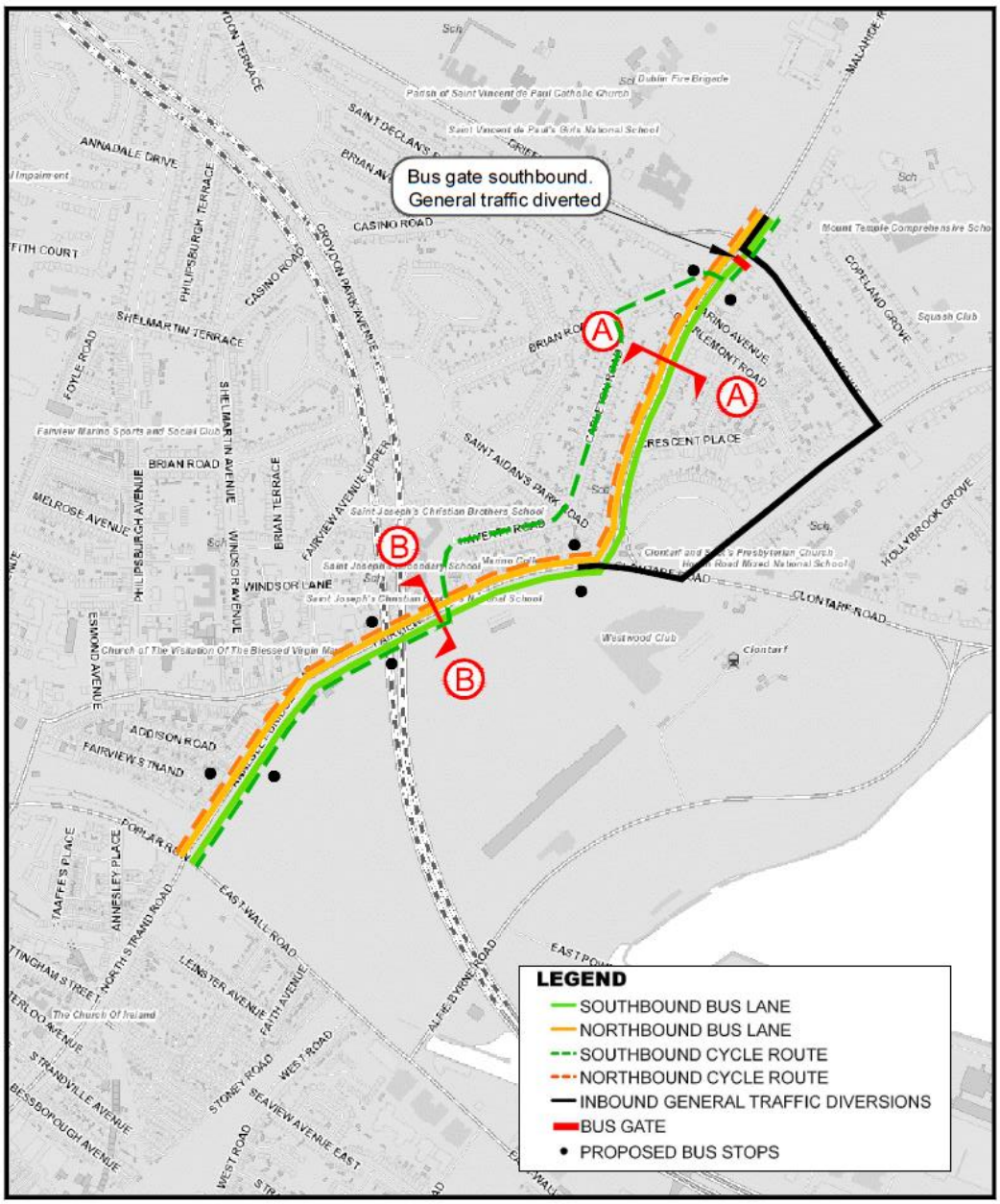


Figure 5.53 Route Option 4 Indicative Scheme Design

For scheme 4 southbound motorists would be diverted via Copeland Avenue and Howth Road as shown in Figure 5.46. Again, southbound cyclists would be diverted and would be required to cross the road twice at two new toucan crossing. It is likely many southbound cyclists would continue to use Malahide Road, and this may delay buses although cyclists will be travelling downhill for this section. The cross section chosen for this scheme would fit within the existing road reserve and no land take would be required.

On-street parking would be removed from one side of Copeland Avenue to provide wider traffic lanes as the volume of traffic using this road would increase greatly. The junctions at both ends of Copeland Avenue as well as the junction at the southern end of Howth Road would be upgraded to suit the new traffic flows.

A cross-section on Malahide Road is presented in Figure 5.54

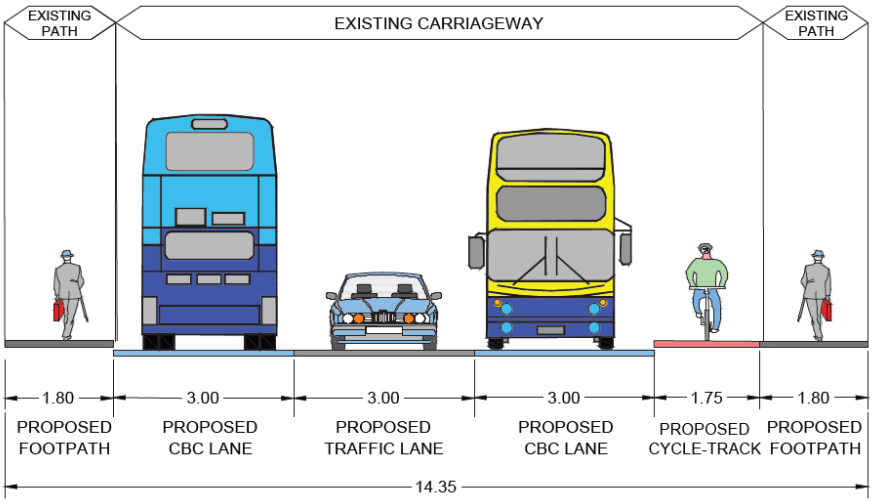


Figure 5.54 Cross Section A-A

A cross-section on Marino Mart is presented in Figure 5.55

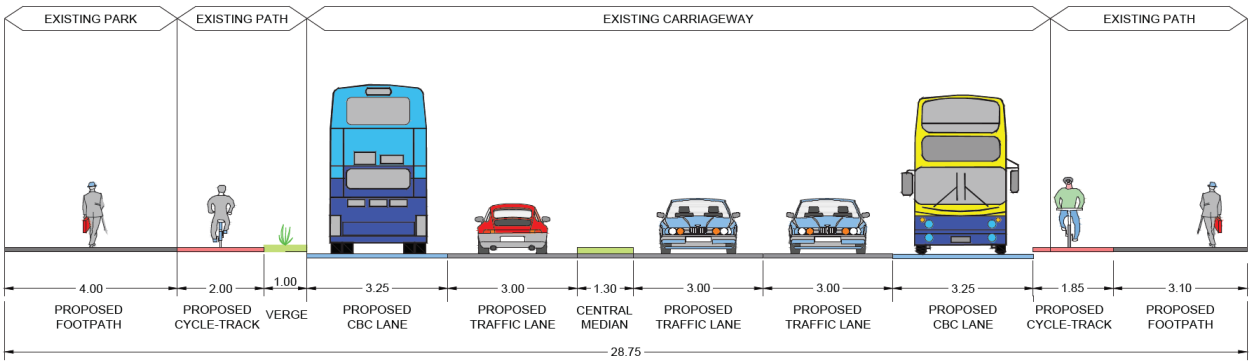


Figure 5.55 Cross Section B-B

5.6.6 Route Options Assessment

Details of the 'Stage 2' route options assessment undertaken for the Clongriffin to City Centre CBC are presented in **Appendix A**.

A summary of the ranking of route options against the scheme sub-criteria is presented in Table 5.8 below.

Table 5.8 Route Options Assessment Summary (Sub-Criteria)

Assessment Criteria	Sub-Criteria	Scheme 1	Scheme 2	Scheme 3	Scheme 4
Economy	Capital Cost				
	Journey-time reliability and consistency				
Integration	Land Use Integration				
	Population and Employment Catchments				
	Public Transport Integration				
	Traffic Network Integration				
	Cyclists and pedestrian Integration				
Accessibility and Social Inclusion	High Volume Trip Attractors				
	Deprived Geographic Areas & Areas Underserved by Public Transport				
Safety	Road Safety				
Environment	Archaeological, Architectural and Cultural Heritage				
	Flora and Fauna				
	Soils and Geology				
	Hydrology				
	Landscape and visual				
	Noise and Vibration				
	Air Quality				
	Land Use and the Built Environment				

In terms of "Capital Cost" Scheme 1 has the widest cross section to construct and the highest amount of land take from gardens and so scores worst. Scheme 3 has a narrower cross section, Scheme 4 requires no land take but has extra lengths of road and junction works associated with the diversion route and Scheme 2 has a narrow cross section with limited land take, and so all three of these schemes rank higher on this criterion.

In terms of "Journey Time Reliability and Consistency", all schemes would provide a good level of bus priority. On some schemes buses could be delayed as they would be required to share lanes with cyclists while on other schemes northbound buses are required to share a lane with general traffic over a 200m section where queueing is not expected. On balance all schemes are considered equal under this criterion

Scheme 1 would provide dedicated cycle tracks on Malahide Road in both directions and so ranks highest on "Cyclist and Pedestrian Integration". Schemes 3 and 4 would provide cycle facilities in one direction while Scheme 2 would have none.

In terms of “Environment”, the main determining factor between Schemes 1, 2 and 3 is the amount of private land take required on Malahide Road. Scheme 1 requires the most, followed by Scheme 3 and then Scheme 2 and they are ranked accordingly. The exception being under the “Flora & Fauna” criterion where land take on the western side of the road is the deciding factor and so Scheme 2 scores worse than Scheme 3.

Scheme 4 does not require any land take from gardens or protected structures along Malahide Road and so scores well under the “Landscape & Visual”, “Flora & Fauna”, “Soils & Geology” and “Archaeological, Architectural & Cultural Heritage” criteria. However, the increase in traffic using Copeland Avenue and removal of on-street parking means it scores poorly under the “Land Use & the Built Environment”, “Air Quality” and “Noise and Vibration” criteria.

5.6.7 Conclusion

A summary of the assessment and a relative ranking for each of the four assessment criteria is shown below in **Table 5.9**

Table 5.9 Route Options Assessment Summary (Main Criteria)

Assessment Criteria	Scheme 1	Scheme 2	Scheme 3	Scheme 4
Economy				
Integration				
Accessibility and Social Inclusion				
Safety				
Environment				

Based on the assessments above it has been determined that Scheme 2 offers the preferred route option for the following reasons:

- It has a lower capital cost than other options
- It provides dedicated bus lanes in both directions and so the journey time reliability will be good
- It is more favourable under the Environmental criterion than other options

Scheme 2 is identified as the preferred option for this section and is brought forward into the Emerging Preferred Route as described in Chapter 8, Scheme 3 is the next preferred.

6 STUDY AREA SECTION 2 – CITY CENTRE

6.1 Stage 1: Route Options Assessment

This chapter outlines the options development process for Section 2 of the Study Area (City Centre). All roads within Section 2 of the study area are assessed on a high level for their ability to form part of the CBC route. Route options are ruled out at this stage if they can clearly not form part of a CBC.

The 'spider's web' of potential route options remaining after this initial phase was then progressed to Stage 1 Route Options Assessment ('sifting stage') for further analysis. The links which are subject to sifting are shown in **Figure 6.1**.

The southern terminus for the CBC is identified as O'Connell Bridge, as it can be reasonably assumed to represent Dublin City Centre, with a terminus at this location serving the main trip attracters associated with the city centre area. Any routes which terminate here can also travel along the Quays to connect to another radial CBC.

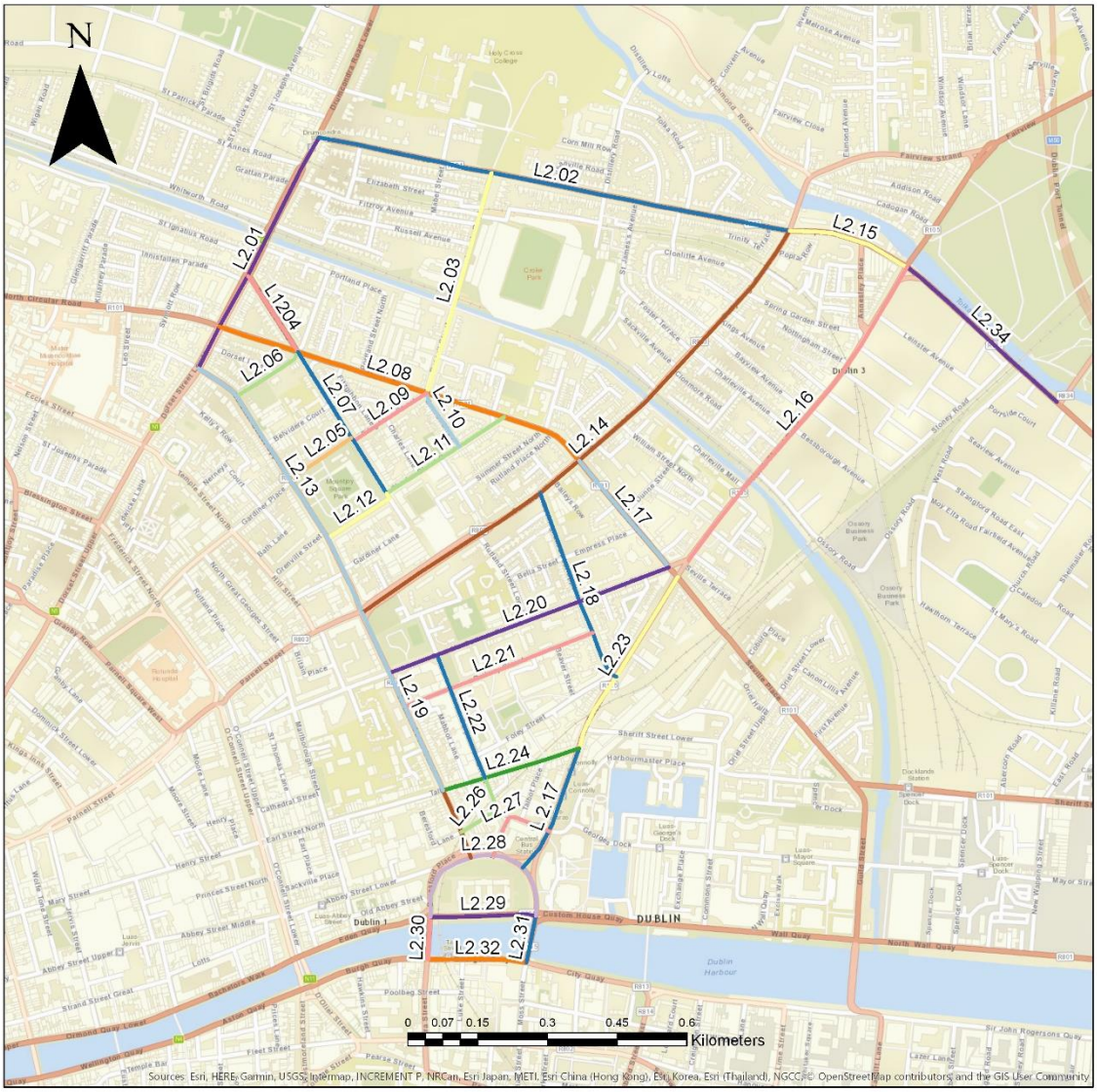


Figure 6.1 Section 1 Route Options City Centre

A summary of the Stage 1 route options assessment ('sifting') process is presented in Table 6.1

Table 6.1 – Section 2 Route Options Assessment Stage 1

Link No.	Road Characteristics	Comments	Pass / Fail
L 2.01	Regional	Dorset Street Upper/ Bolton Street. Two all vehicle lane in each direction from Capel Street to Dominic Street., one all vehicle lane in each direction for the remainder. There is a bus lane northbound from Granby Row to Frederick Street. This route is part of a GDA CNP primary route, cyclists are required to share the bus lanes at present. There will be a crossing of the Luas Cross City line at the junction with Dominic Street. There is potential to provide bus lanes in the locations they don't already exist by the removal of a lane of general traffic. This is considered a viable route option for this CBC.	Pass
L 2.02	Urban, on-street parking	Clonliffe Road. 1 all vehicle lane in each direction with residential on-street parking. This link forms part of a GDA CNP primary and secondary routes, there are no cycle facilities provided at present. There is potential to widen the road but this would require removing on-street residential parking and purchase of front gardens. This is not considered a viable route option for this CBC.	Fail
L 2.03	Urban, on-street parking	Jones Road, Russel Street. One all vehicle lane in each direction with on-street residential parking. This route forms part of a GDA CNP primary route, there are no cycle facilities provided at present. There is limited potential to widen the road as building lines are close to the street. Provision of CBC infrastructure is not feasible. This is not considered a viable route option for this CBC.	Fail
L 2.04	Residential, on-street parking	Belvedere Road. One all vehicle lane in each direction with on-street residential parking. This route forms part of a GDA CNP secondary route, there are on-road advisory cycle lanes provided at present. There is potential to widen the road with the removal of parking but terraced houses with basement entrances mean that no land take from front gardens is feasible. Dedicated bus lanes cannot be provided through this link and so This is not considered a viable route option for this CBC.	Fail
L 2.05	Urban, on-street parking	Mountjoy Square North. Two all vehicle lanes in each direction with on-street parking on one side. This link forms part of a GDA CNP primary route and there are no cycle facilities at present. There is potential to provide dedicated CBC lanes with removal of on-street parking and reallocation of road space. This is considered a viable route option for this CBC.	Pass
L 2.06	Residential, on-street parking	Sherrard Street. One all vehicle lane in each direction with residential on-street parking. This link is not part of the GDA CNP network and no cycle facilities are provided. This is a narrow residential street and is not suitable for CBC lanes. This is not considered a viable route option for this CBC.	Fail
L 2.07	Residential, on-street parking	Belvedere Road, Mountjoy Square East. There is one all vehicle lane in each direction with residential on-street parking. This link is not part of the GDA CNP network and no cycling facilities are provided. CBC lanes could be provided with the removal of on-street parking. This is considered a viable route option for this CBC.	Pass

L 2.08	Urban, on-street parking	North Circular Road, Portland Row. North Circular Road. One all vehicle lane in each direction with on-street residential parking. This link is part of a GDA CNP secondary route and there on-road cycle lanes provided at present. Widening of the road to provide bus lanes would require the removal of a large amount of on-street parking and the removal of trees lining the street. While constructing CBC infrastructure is feasible, the impact on residential parking is considered too severe. This is not considered a viable route option for this CBC.	Fail
L 2.09	Residential, on-street parking	Fitzgibbon Street. One all vehicle lane in each direction with on-street parking reserved for Garda vehicles from Fitzgibbon Street Station. This link forms part of a GDA CNP primary route, there are no cycling facilities provided at present. There is potential to accommodate CBC with the removal of Garda parking spaces. This is considered a viable route option for this CBC.	Pass
L 2.10	Residential, on-street parking	Emmet Street. One all vehicle lane northbound only with on-street parking. This link does not form part of the GDA CNP network and there are no cycling facilities provided at present. This is a narrow one-way residential road and is unsuitable for a CBC. This is not considered a viable route option for this CBC.	Fail
L 2.11	Residential, on-street parking	Charles Street Great. One all vehicle lane in each direction with on-street residential parking. This link does not form part of the GDA CNP network and there are no cycling facilities provided. There is potential to provide CBC lanes with the removal of on-street parking. This is considered a viable route option for this CBC.	Pass
L 2.12	Urban, on-street parking	Mountjoy Square South. One all vehicle lane in each direction with on-street parking on both sides. This link does not form part of the GDA CNP network and there are no cycling facilities provided. Dedicated bus lanes could be provided in both directions with removal of on-street parking and reallocation of road space. This is considered a viable route option for this CBC.	Pass
L 2.13	Urban, on-street parking	Gardiner Street Middle & Upper, Mountjoy Square West. Two all vehicle lanes in each direction with partial northbound bus lane. This link does not form part of the GDA CNP and there are no cycling facilities provided. There is potential to provide CBC lanes in both directions with removal of on street parking, reallocation of road space and some land take from front gardens. This is considered a viable route option for this CBC.	Pass
L 2.14	Urban, on-street parking	Summerhill, Ballybough Road. Two all vehicle lanes in each direction with some on-street parking. This link forms part of a GDA CNP primary route and there are no cycling facilities provided at present. There is limited potential to widen the roadway, but a CBC could be accommodated by removing on-street parking and one general traffic lane in each direction. This is considered a viable route option for this CBC.	Pass
L 2.15	Urban, on-street parking	Poplar Row. One all vehicle lane in each direction on the eastern side of the link and two all vehicle lanes in each direction on the western side. This link forms part of a GDA CNP secondary route, there are no cycle facilities provided at present. The eastern portion is too narrow to fir general traffic and CBC lanes. This is not considered a viable route option for this CBC.	Fail
L 2.16	Urban	North Strand Road. One all vehicle lane and one bus lane in each direction. This link forms part of a GDA CNP secondary route and there are no cycling facilities provided at present. Existing bus lanes can cater for a CBC. This is considered a viable route option for this CBC.	Pass

L 2.17	Urban, on-street parking	North Circular Road, Portland Row. North Circular Road. One all vehicle lane in each direction with on-street residential parking. This link is part of a GDA CNP secondary route and there on-road cycle lanes provided at present. Widening of the road to provide bus lanes would require the removal of a large amount of on-street parking and the removal of trees lining the street. While constructing CBC infrastructure is feasible, the impact on residential parking is considered too severe. This is not considered a viable route option for this CBC.	Fail
L 2.18	Urban, on-street parking	Buckingham Street. Two all vehicle lanes in northbound only, on-street residential parking on both sides. This link does not form part of the GDA CNP network and there are no cycle facilities provided. Dedicated BRT lanes could be provided in both directions by removing on-street parking and reallocation of road space. This is considered a viable route option for this CBC.	Pass
L 2.19	Urban, on-street parking	Gardiner Street Lower. Two all vehicle lanes in each direction with on-street parking on one side off peak. This link does not form part the GDA CNP network and there are on-road advisory cycle lanes provided. Dedicated CBC lanes could be provided by reallocating road space and removing of on-street parking. This is considered a viable route option for this CBC.	Pass
L 2.20	Urban, on-street parking	Sean McDermott Street Lower. One all-vehicle lane in each direction with some on-street parking. This route forms part of a GDA CNP secondary route and there are no cycling facilities provided at present. Dedicated CBC lanes could be provided with the removal of on-street parking and reallocation of road space. This is considered a viable route option for this CBC.	Pass
L 2.21	Urban, on-street parking	Railway Street. One all vehicle lane in each direction. This link does not form part of the GDA CNP network and there are no cycle facilities provided. The road becomes very narrow on the eastern end and as a result this road is unsuitable for a CBC. This is not considered a viable route option for this CBC.	Fail
L 2.22	Urban. On-street parking	Gloucester Place Lower, James Joyce Street. One all vehicle lane in each direction, the section south of Foley Street junction is one-way only northbound. This link forms part of a GDA CNP secondary route and there are no cycle facilities at present. This link is too narrow for the provision of dedicated CBC lanes. This is not considered a viable route option for this CBC.	Fail
L 2.23	Urban, on-street parking	Amien Street. Two all vehicle lanes in each direction for the southern section, one all vehicle lane and one bus lane in each direction for the northern section. This link forms part of a GDA CNP primary route and there are no cycling facilities provided at present. Dedicated bus lanes could be provided where they do not exist by removing a general traffic lane in each direction. This is considered a viable route option for this CBC.	Pass
L 2.24	Urban	Talbot Street. One all vehicle lane westbound only. This link does not form part of the GDA CNP network and there are no cycle facilities provided. Street is traffic calmed with parking, loading, bike parking and a Dublin Bikes stand on the street. This is also a busy pedestrian and shopping street. Dedicated CBC lanes cannot be provided on this link. This is not considered a viable route option for this CBC.	Fail
L 2.25	Urban	Gardiner Street Lower. Two all vehicle lanes in each direction with on-street parking on one side off peak. This link does not form part the GDA CNP network and there are on-road advisory cycle lanes provided. Dedicated CBC lanes could be provided by reallocating road space and removing of on-street parking. This is considered a viable route option for this CBC.	Pass

L 2.26	Urban	Frenchman's Lane. One all vehicle lane northbound only. This link does not form part of the GDA CNP network and there are no cycle facilities provided. This is a narrow lane with no potential for widening and is unsuitable for a CBC. This is not considered a viable route option for this CBC.	Fail
L 2.27	Urban	Store Street. One Luas line in each direction and one all vehicle lane in a westbound only direction. This links forms part of a GDA CNP secondary route and there are no cycle facilities provided at present. This link is busy with Luas, bus, taxi movements and there is insufficient space to provide dedicated CBC lanes without negatively affecting the level of service of the Luas. This is not considered a viable route option for this CBC.	Fail
L 2.28	Urban	Amien St. two all vehicle lanes and one bus lane in each direction north of Store St junction, two all vehicle lanes northbound and three southbound south of Store St junction. This link forms part of a GDA CNP primary route and there are no cycling facilities provided at present. The Amien St area between Connolly station and Busarus is under review as part of the Dublin City Transport Study. Existing bus lanes can cater for a BRT, shared running may be required on approach to Beresford Place. This is a viable route option.	Pass
L 2.29	Urban	Beresford Place. Three to four all vehicle lanes in a clockwise gyratory system. One Luas line in each direction passes to the north and the road passes under a DART bridge. This link does not form part of the GDA CNP network and no cycle facilities are provided. The traffic using this link is expected to drop significantly if the DCC transport study proposals are put in place at Eden Quay, this will allow for a full redesign of the traffic layout of this junction to make it more suitable for pedestrians, cyclists and public transport. This is considered a viable route option for this CBC.	Pass
L 2.30	Urban	Custom House Quay. Two all vehicle lanes eastbound only and one contra flow bus lane. This route forms part of a GDA CNP primary route and there are on road cycle lanes. Dedicated bus lanes could be provided eastbound by removing a lane of general traffic. This is considered a viable route option for this CBC.	Pass
L 2.31	Bridge	Butt Bridge. Four all vehicle lanes northbound only. This link does not form part of the GDA CNP network and no cycle facilities are provided. Dedicated bus lanes could be provided by removing one of the general traffic lanes. This is considered a viable route option for this CBC.	Pass
L 2.32	Bridge	Memorial Bridge. Four all vehicle lanes southbound only. This link forms part of a GDA CNP primary route, there are on road cycle lanes southbound and off road northbound. A dedicated bus lane could be provided by removing one of the general traffic lanes. This is considered a viable route option for this CBC.	Pass
L 2.33	Urban, on-street parking	R105, George's Quay, from junction with Moss Street to Junction with Tara Street. This section has a bridge at either end, with Butt bridge off the junction with Tara Street. There are two lanes of one-way traffic (running east) and a bus lane along this section of road. There is on-street parking and a taxi rank on the River Liffey side. There are also several bus stops inset off the bus lane on the south side of the road. There is a cycle lane along all of this section of road. Road widening could be achieved by using the on-street parking, taxi-ranks and in-set bus stops, although this potential is reduced near the junction with Tara Street where the taxi rank ends. This section comes under the Dublin City Centre Transport Study, Pedestrian Network / Public Realm proposal number 9 "South Quays (George's Quay to Essex Quay) – Additional bus lane and bus stops". There are no GDA CNP routes along this section.	Pass, one-way only

		This is a viable route option as bus priority could be provided by using the existing bus lane and enhanced further by removing a lane of general traffic in accordance with DCC plans.	
L 2.34	Urban, on-street parking	East Wall Road. 1 all vehicle lane in each direction with residential on-street parking. This link forms part of a GDA CNP secondary route, there are no cycle facilities provided at present. There is minimal potential to widen the road by removing on-street parking or purchase of front gardens. There is an existing narrow crossing under the DART line. There is insufficient width to provide dedicated BRT lanes and so this is not considered a viable route option	Fail

The outcome of the sift can be seen in the **Figure 6.2**. Links shown in red failed the sift and those in blue passed.

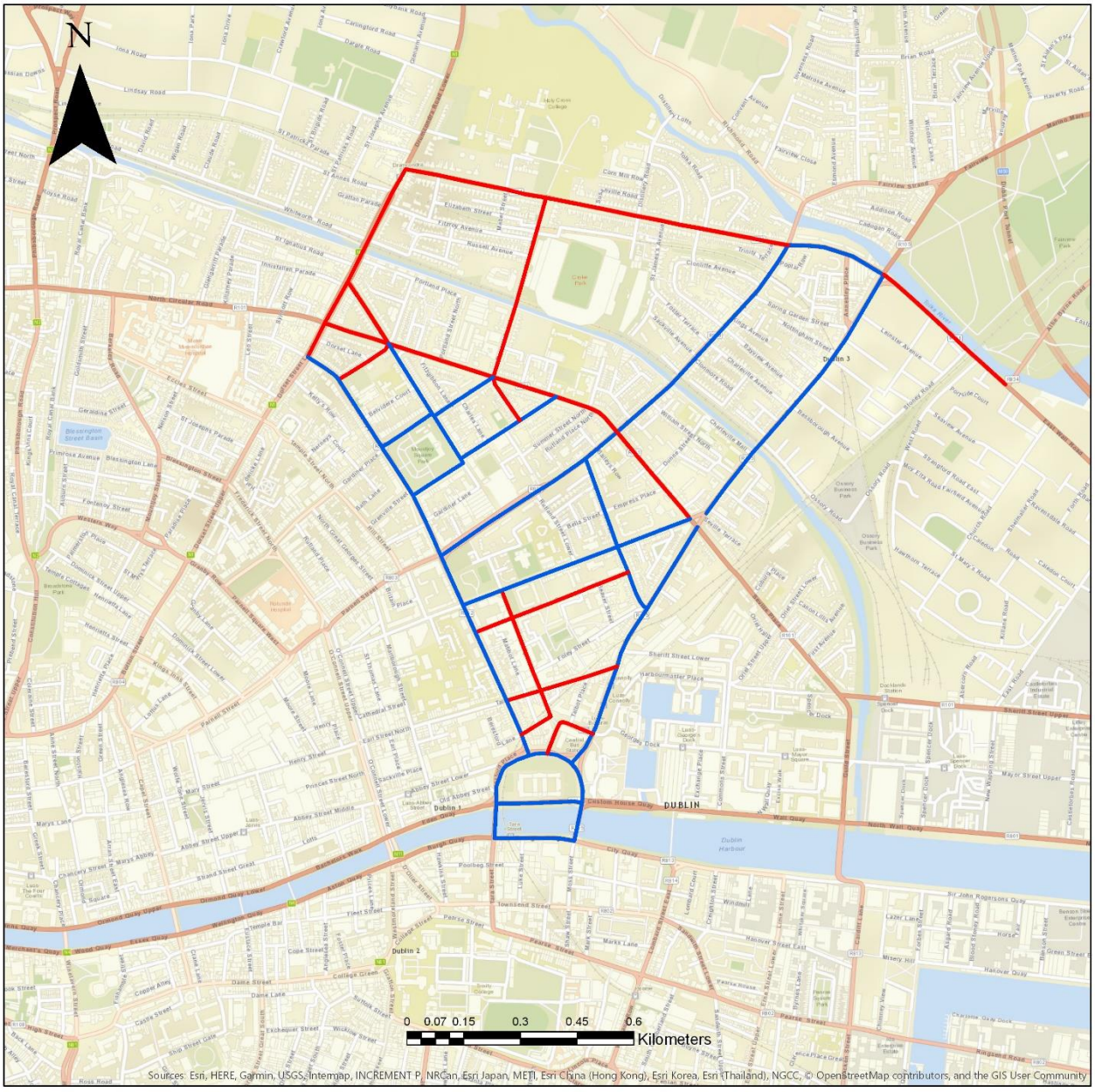


Figure 6.2 Section 2 Sifting Process Step 1

6.1.1 Removal of Disconnected Links

The links shown in red are disconnected and could not clearly form part of a Clongriffin to City Centre CBC route and have been removed at this stage.

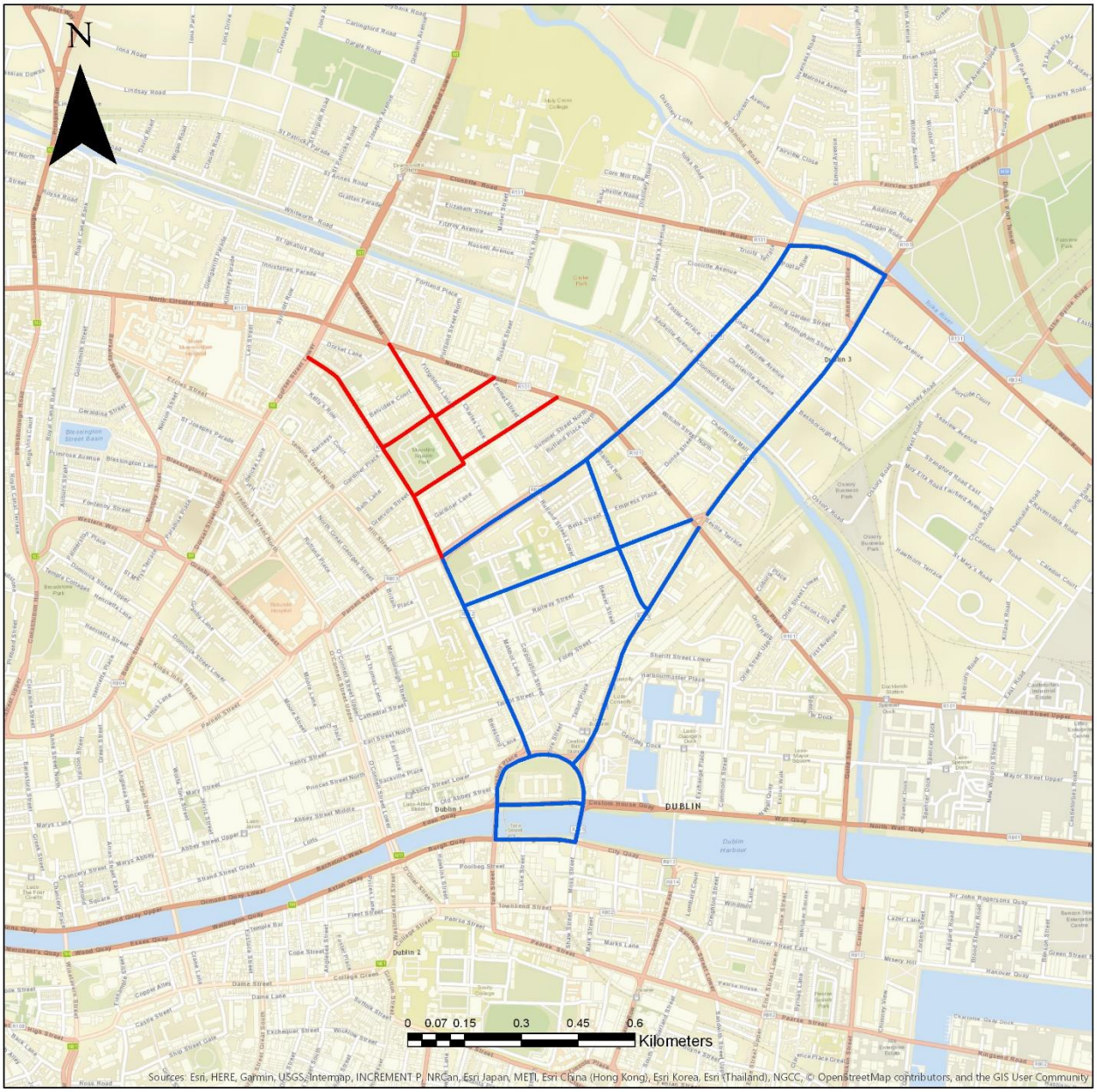
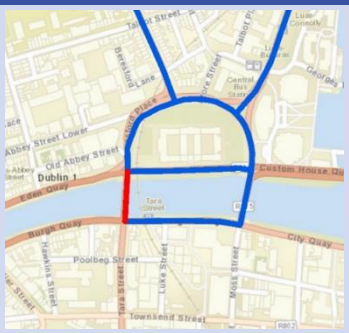


Figure 6.3 Section 2 Sifting Process Step 2

6.1.2 Preliminary Route Assessment

A summary of the Preliminary Route Assessment process is presented below in Table 6.2,

Table 6.2 - Section 2 Preliminary Route Assessment

Road Names	Comments	Map
Butt Bridge	While providing bus lanes on this bridge is feasible by reallocating road space it would require the introduction of a contra-flow bus lane on either Butt Bridge or the South Quays. Other similar routes using O'Connell, Rosie Hackett or Talbot Bridge would not require the introduction of a new contra-flow lane and would be less disruptive to general traffic. For this reason, this route option is not considered further	
Buckingham Street	The route option using Buckingham Street is circuitous in nature and would lead to longer journey times when compared to the adjacent route option with two-way bus movements on North Strand Road. This route would also require buses to pass through a higher number of junctions and make more turning movements. For these reasons, this route option is not considered further	

The outcome of the Preliminary Route Assessment can be seen below. The links shown in red have failed those in blue have passed.

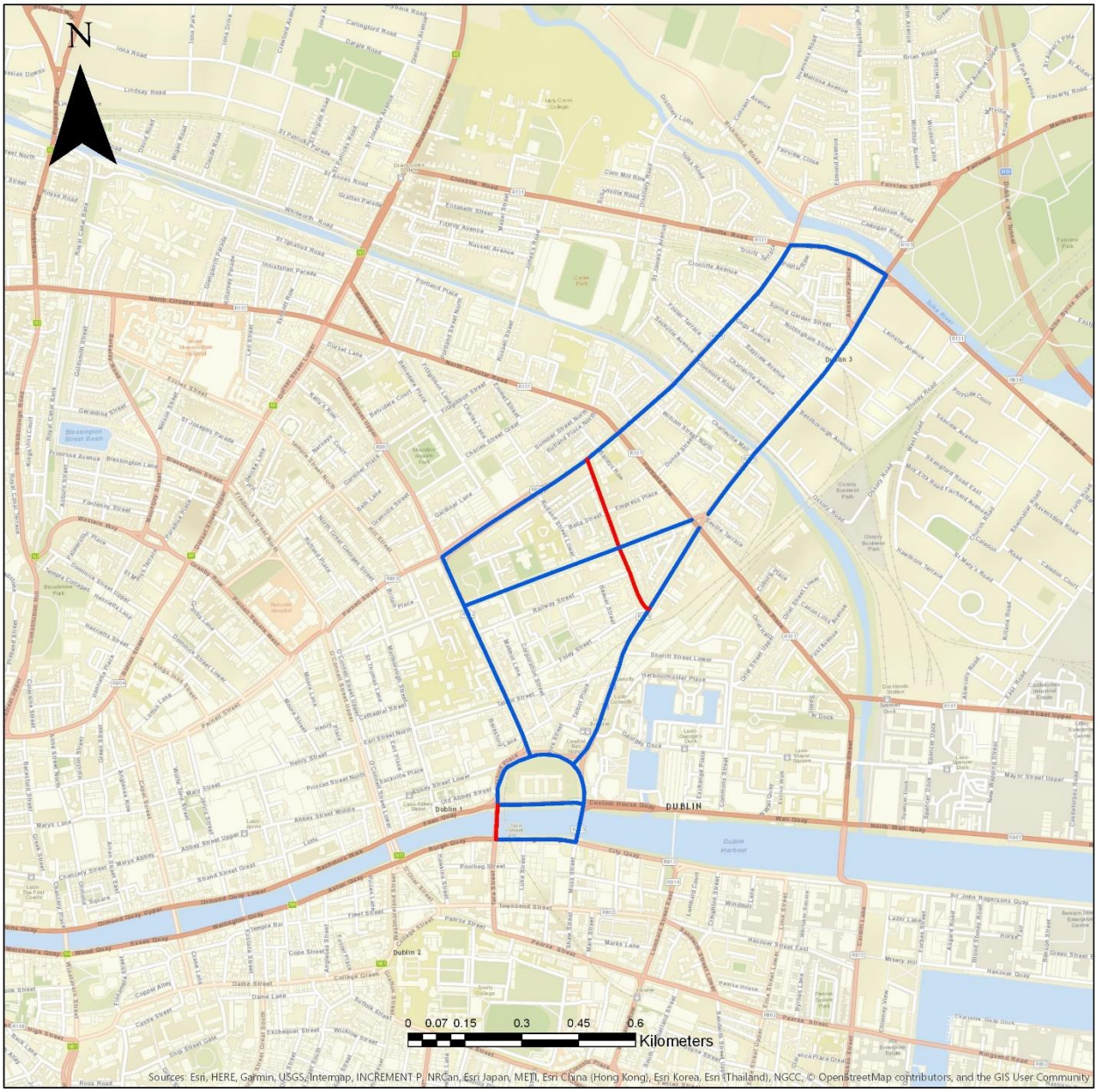


Figure 6.4 Section 2 Sifting Process Step 3

6.1.3 Sifting Conclusion

Following the Stage 1 sift, 16 of the 68 links assessed passed the initial sifting stage and were progressed to the next assessment stage. These links are presented in **Figure 6.5**.

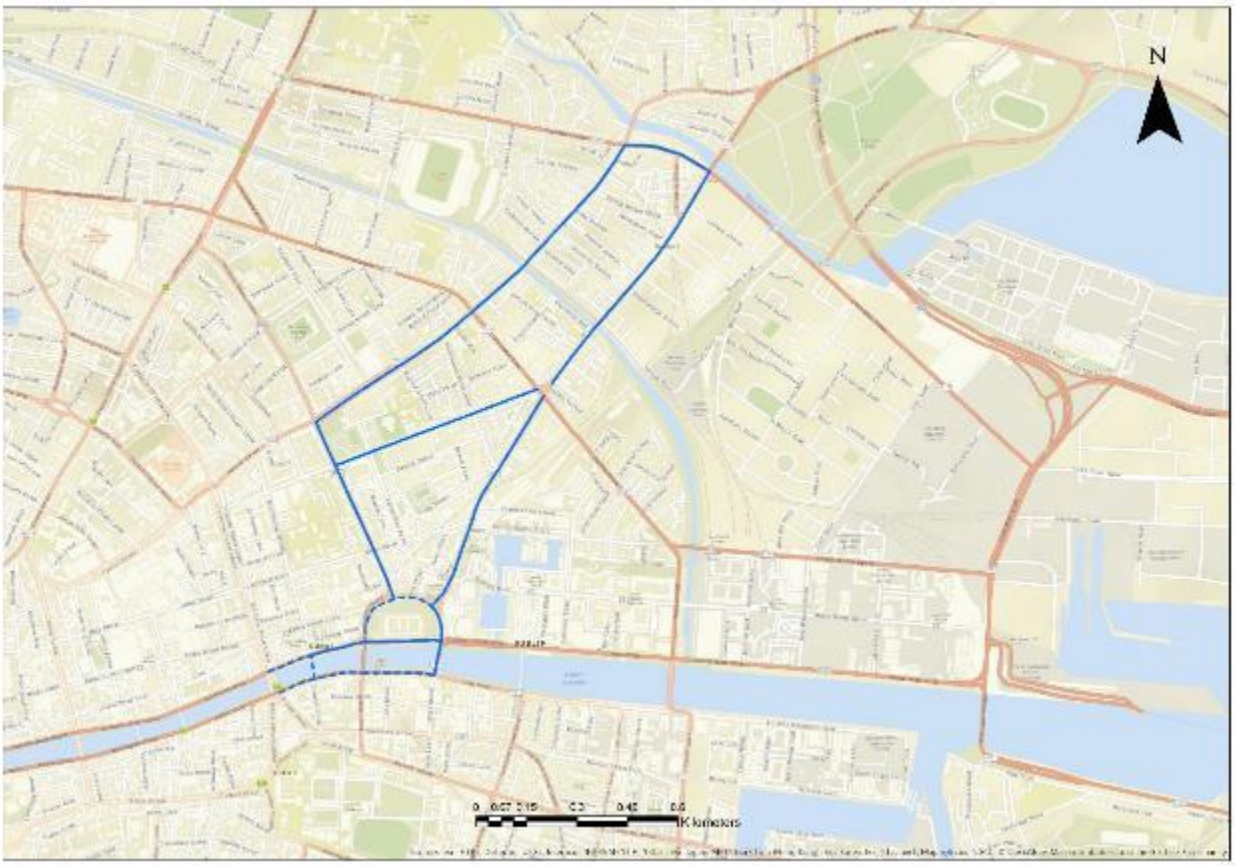


Figure 6.5 Section 1 Route Options Remaining After Stage 1 Assessment

6.2 Stage 2: Route Options Assessment - Annesley Bridge to Custom House

6.2.1 Introduction

Following the Stage 1 sifting process the nine remaining links in this section are assembled together to form three viable route options for Section 1, as follows:

- Route Option 1: Using Ballybough Road, Summerhill & Gardiner Street
- Route Option 2: Using North Strand Road, Sean McDermott Street and Gardiner Street
- Route Option 3: Using North Strand Road & Amiens Street

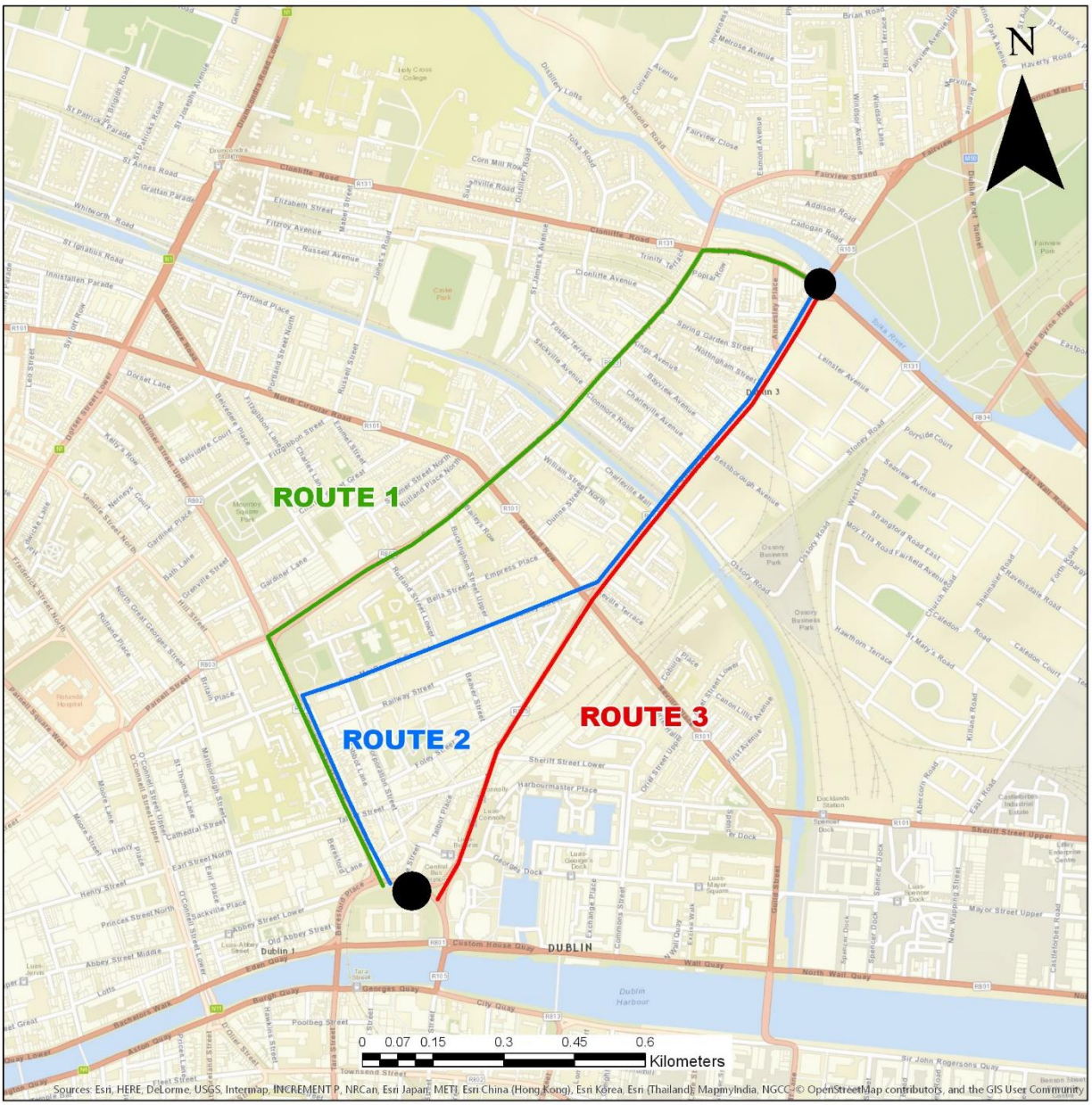


Figure 6.6 Section 2 Route Options

6.2.2 Route Option 1

Route Description

Route Option 1 is presented in Figure 6.7 and described as follows.

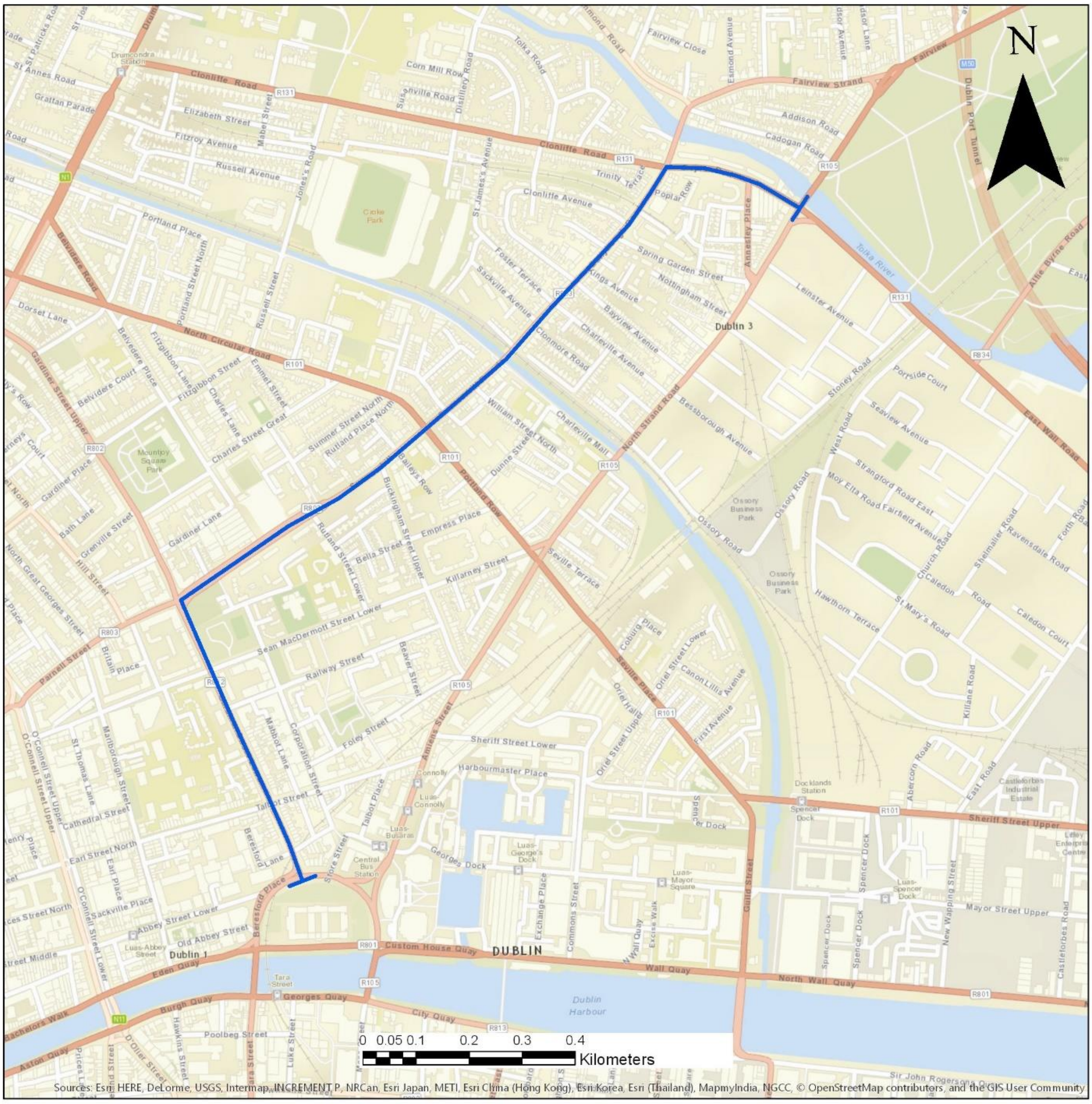


Figure 6.7 Route Option 1

Southbound: Route 1 commences at the junction of Annesley Bridge Road and Poplar Row, from here the bus travels west along Poplar Row The bus then turns left onto Ballybough Road/Summerhill Parade and then turns left onto Gardiner Street.

Northbound: The northbound route follows the same route as the southbound routing.

Indicative Scheme Design

Figure 6.8 illustrates the indicative scheme design for route Option 1 as well as location of indicative cross-sections.

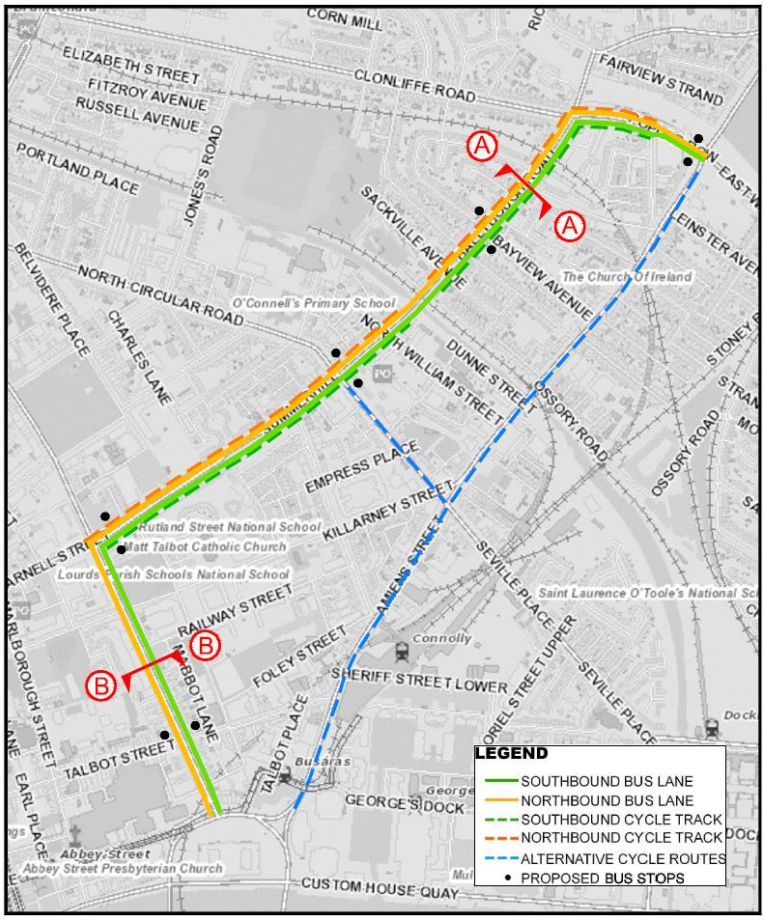


Figure 6.8 Route Option 1 Indicative Scheme Design

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

The narrow section of Poplar Row between Annesley Bridge Road and Annesley Place would be converted to bus only, with general traffic being diverted along Annesley Place. The remaining section of Poplar Row, Ballybough Road and Summerhill Parade would have bus and traffic lanes in both directions. The restricted space available means that cycle lanes would not be provided through two pinch points and cyclists would be required to share the bus lane. On-street parallel parking, both formal and informal, along the majority of Summerhill Parade would be affected, although there are sections along the road where parking can be retained. Gardiner Street is not wide enough to accommodate cycle lanes, so alternate routes along Amiens Street are proposed, although Gardiner Street does not form part of the GDA CNP network.

All junctions along this route would be upgraded to provide bus priority and enhanced pedestrian/cyclist facilities.

A cross-section on Ballybough Road is presented in Figure 6.9

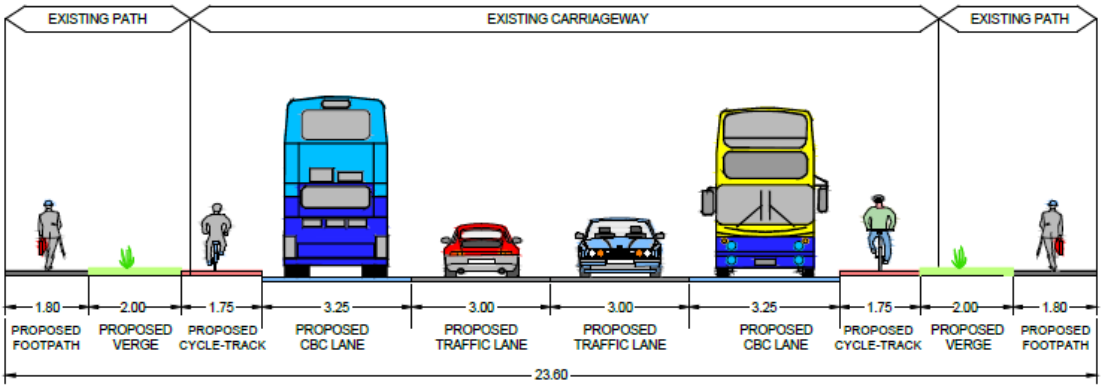


Figure 6.9 Cross Section A-A

A cross-section on Gardiner Street is presented in Figure 6.10

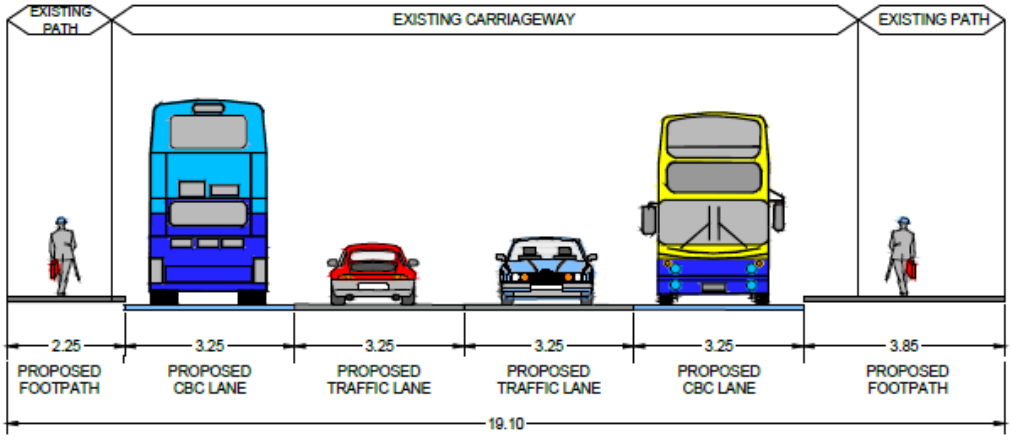


Figure 6.10 Cross Section B-B

6.2.3 Route Option 2

Route Description

Route Option 2 is presented in Figure 6.11 and described as follows.

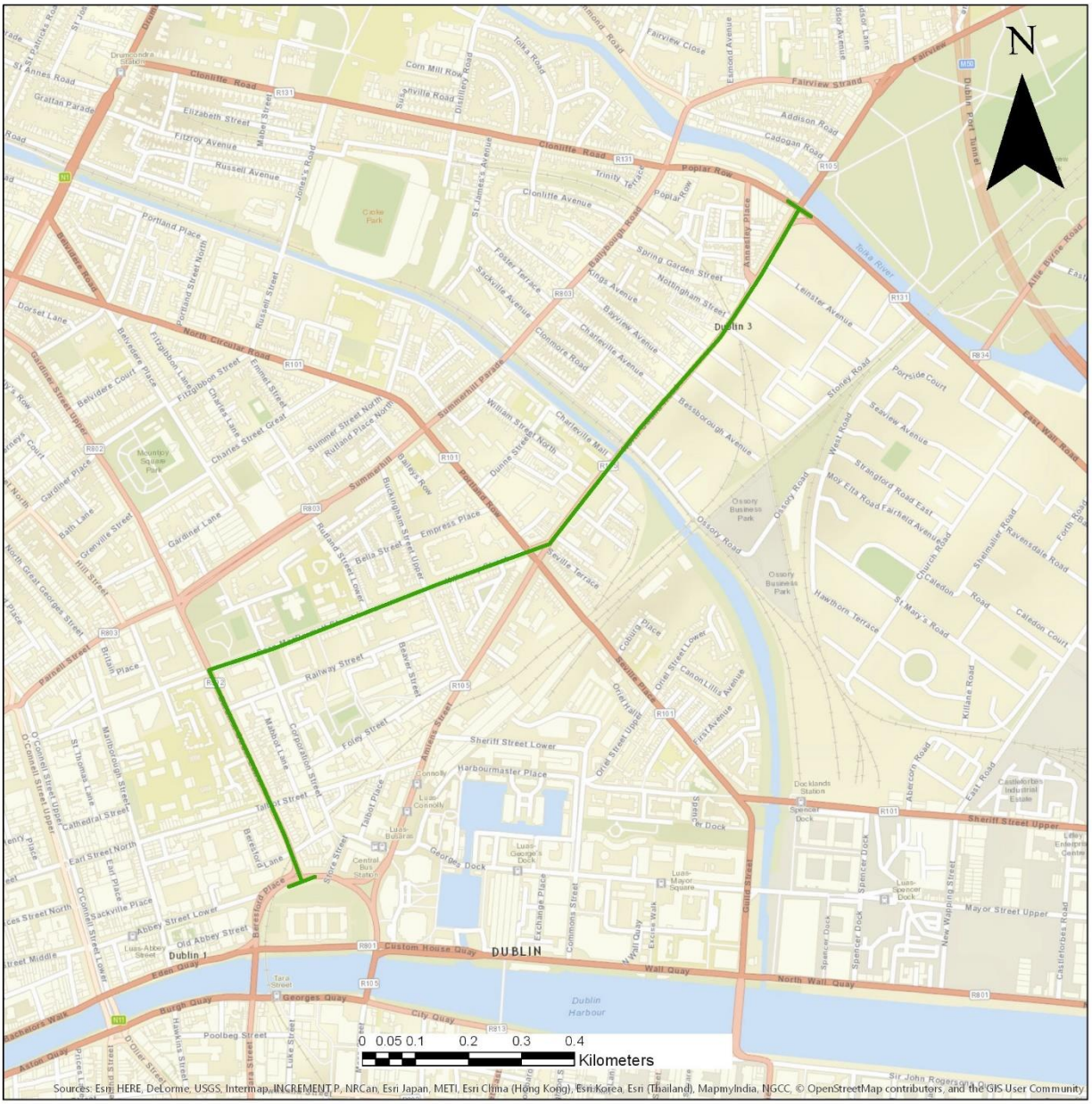


Figure 6.11 Route Option 2

Southbound: Route Option 2 would commence at the junction of Annesley Bridge Road and Poplar Row, from here the bus travels south along North Strand Road, turning onto Killarney Street/Sean MacDermott Street and then onto Gardiner Street.

Northbound: The northbound route follows the same route as the southbound routing.

Indicative Scheme Design

Figure 6.12 illustrates the indicative scheme design for Route Option 2 as well as the location of indicative cross-sections.

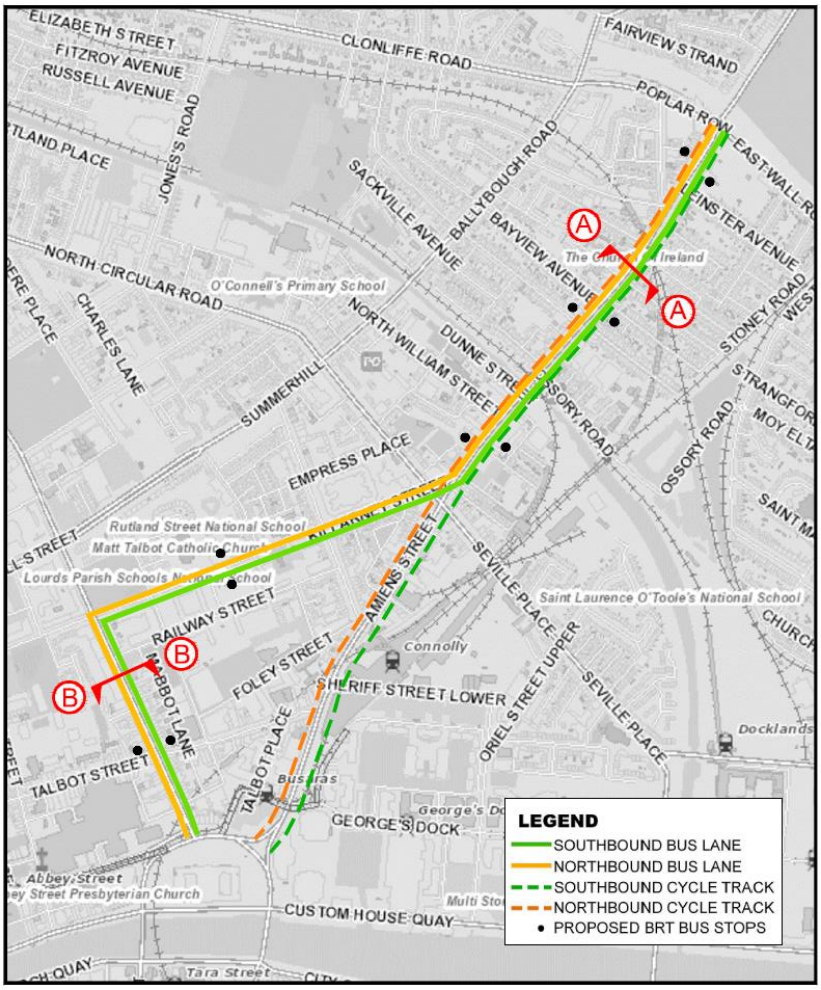


Figure 6.12 Route Option 2 Indicative Scheme Design

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

The portion of North Strand Road would generally follow the Clontarf to City Centre Cycle Scheme plans, which provides cycle and bus lanes in both directions. The section on Killarney Street/ Sean MacDermott Street would require the removal of parking spaces either side of the 600 metre length of road.

It is not feasible to provide cycles lanes along Killarney Street/Sean MacDermott Street and Gardiner Street as building lines are too close to the street on either side. The suggested diversion is along Amiens Street, which is a primary route on the Cycle Network Plan.

All junctions along this route would be upgraded to provide bus priority and enhanced pedestrian/cyclist facilities.

A cross-section on North Strand Road is presented in Figure 6.13

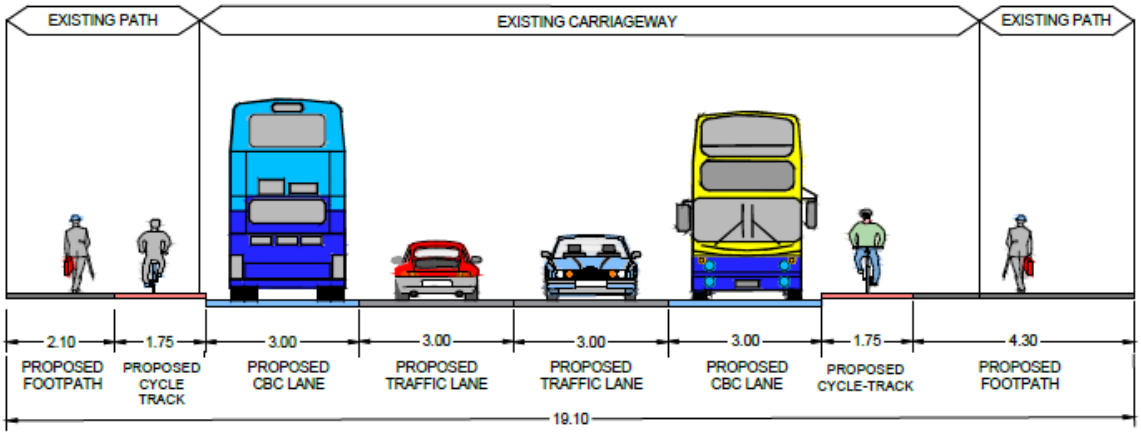


Figure 6.13 Cross Section A-A

A cross-section on Gardiner Street is presented in Figure 6.14

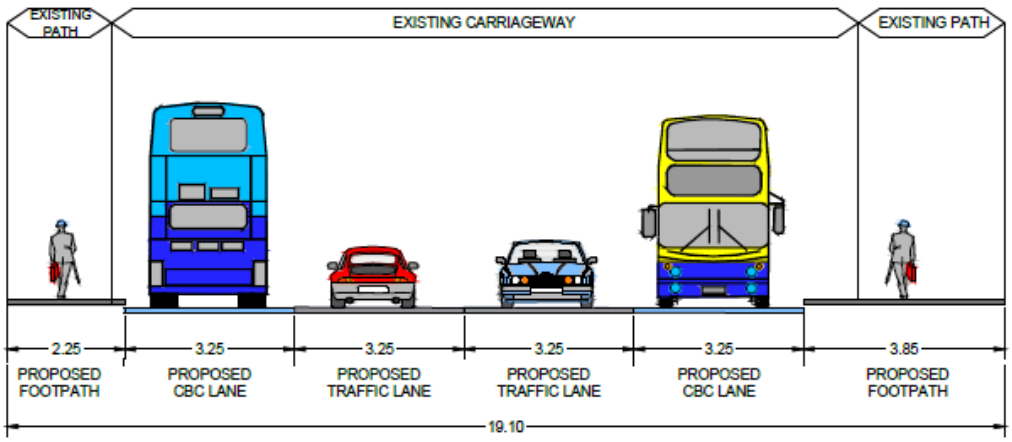


Figure 6.14 Cross Section B-B

6.2.4 Route Option 3

Route Description

Route Option 3 is presented in Figure 6.15 and described as follows.

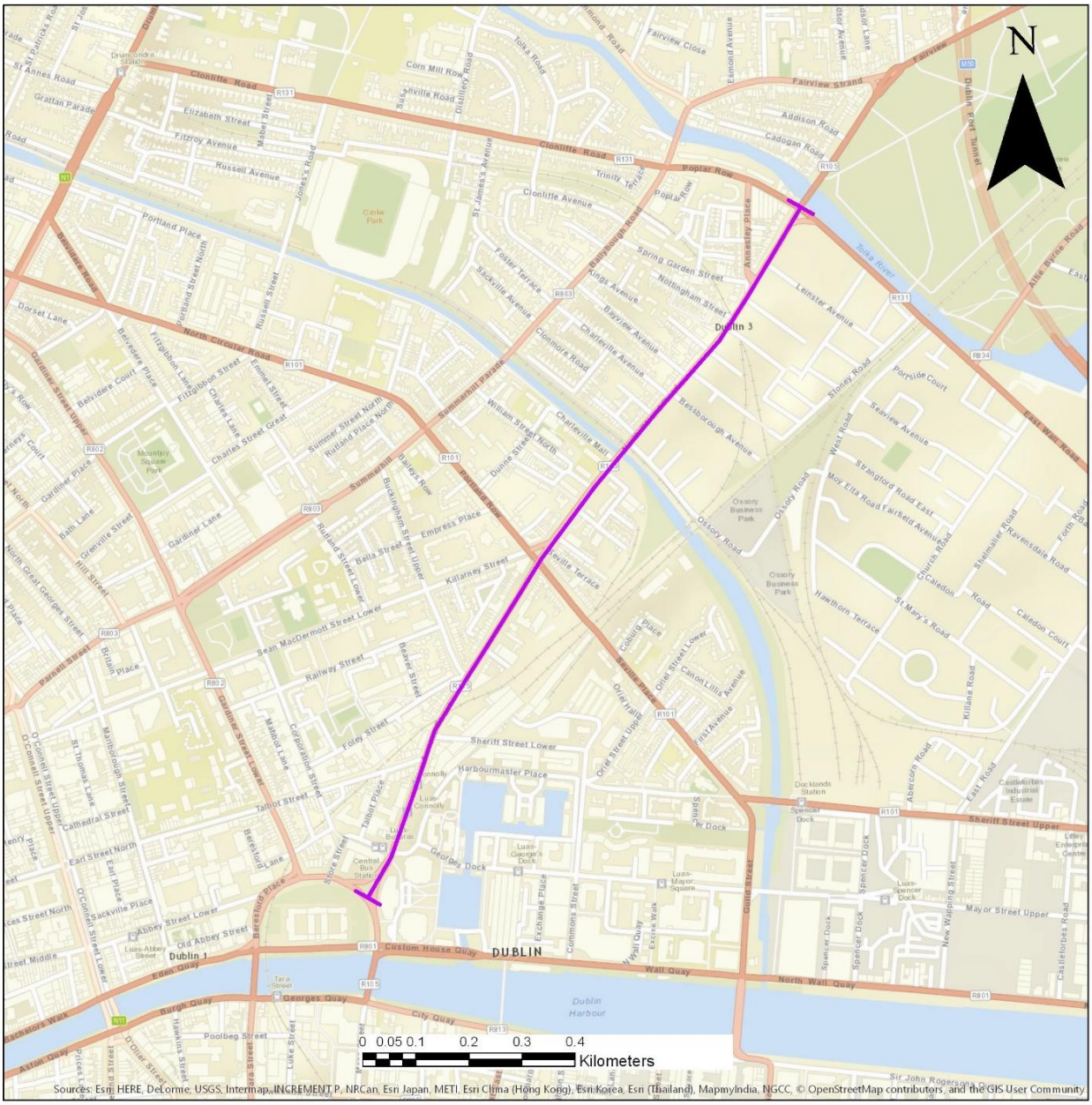


Figure 6.15 Route Option 3

Southbound: Route Option 3 would commence at the junction of Annesley Bridge Road and Poplar Row, from here the bus travels south along North Strand Road/Amiens Street.

Northbound: The northbound route follows the same route as the southbound routing.

Indicative Scheme Design

Figure 6.16 illustrates the indicative scheme design for Route Option 3 as well as the location of indicative cross-sections.

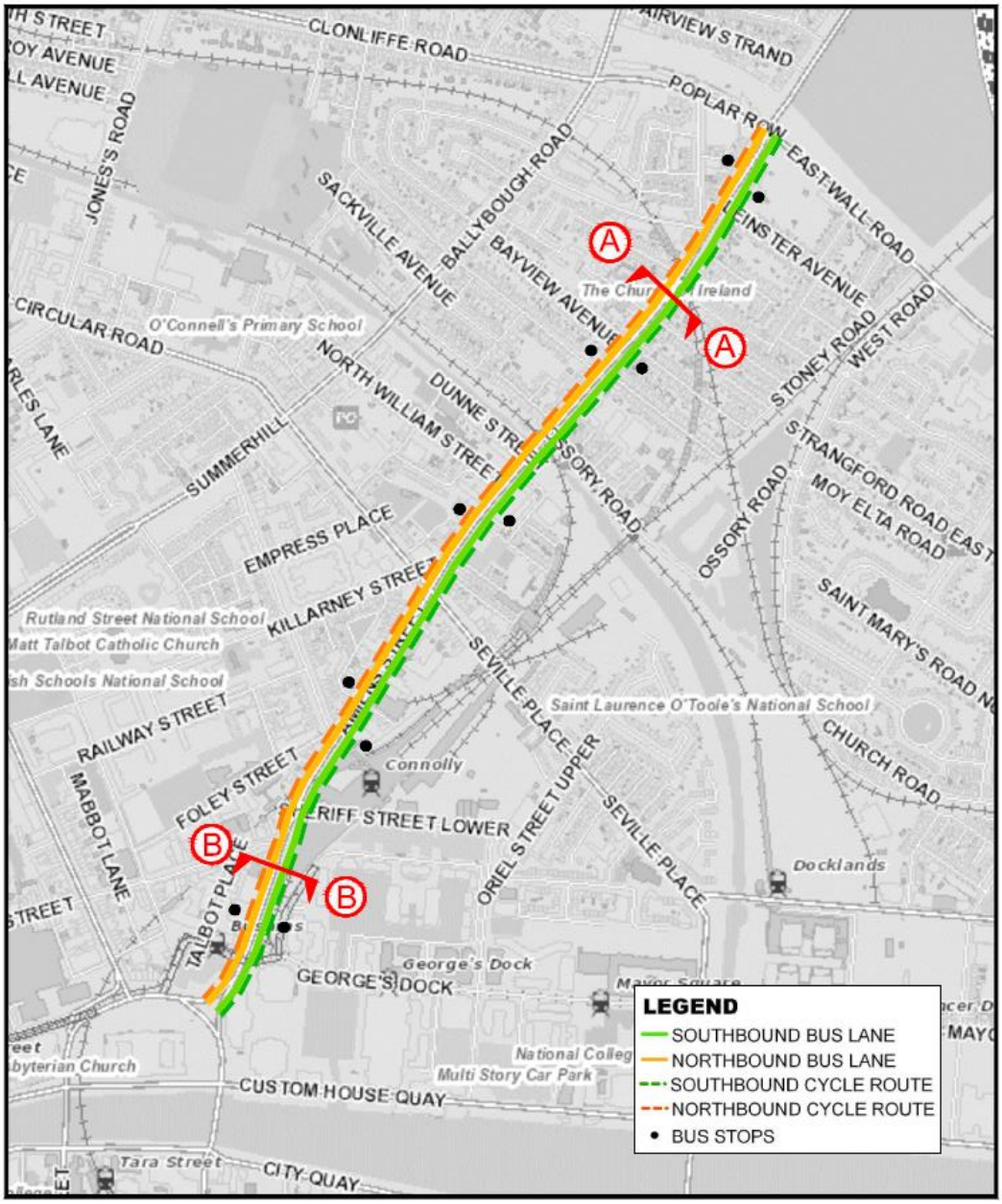


Figure 6.16 Route Option 3 Indicative Scheme Design

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

The portion of North Strand Road/Amiens Street as far as the Foley Street junction would generally follow the Clontarf to City Centre Cycle Scheme plans, which provides for cycle and bus lanes in both directions. On-street parking/loading will be affected in places although will be retained wherever feasible, footpath widths would be reduced in a number of places.

There is a pinch point from Foley Street to Sherriff Street as the route passes under the existing DART bridge. Dedicated bus lanes would be provided for inbound buses and a traffic signal would be used to provide priority for outbound buses along this short section.

An inbound traffic lane would be removed for the section from Sheriff Street to the existing taxi rank outside Connolly Station and also from Store Street to Custom House Quay. An outbound traffic lane would be removed from Foley Street junction to the Beresford Place junction. The additional road space will be allocated to bus/cycle lanes and to increase the width of footpaths as this is a busy pedestrian area which currently has poor pedestrian facilities.

The existing taxi rank outside Connolly Station would be relocated to Harbourmaster Place. The existing time plated parking/loading in the northbound bus lane on Amiens Street would be removed.

A cross-section on North Strand Road is presented in Figure 6.17

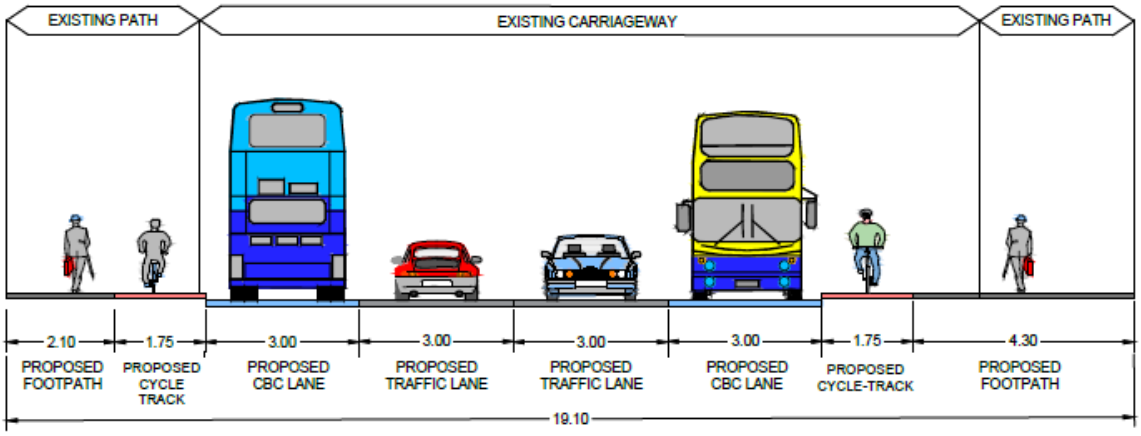


Figure 6.17 Cross Section A-A

A cross-section on Amiens Street is presented in Figure 6.18.

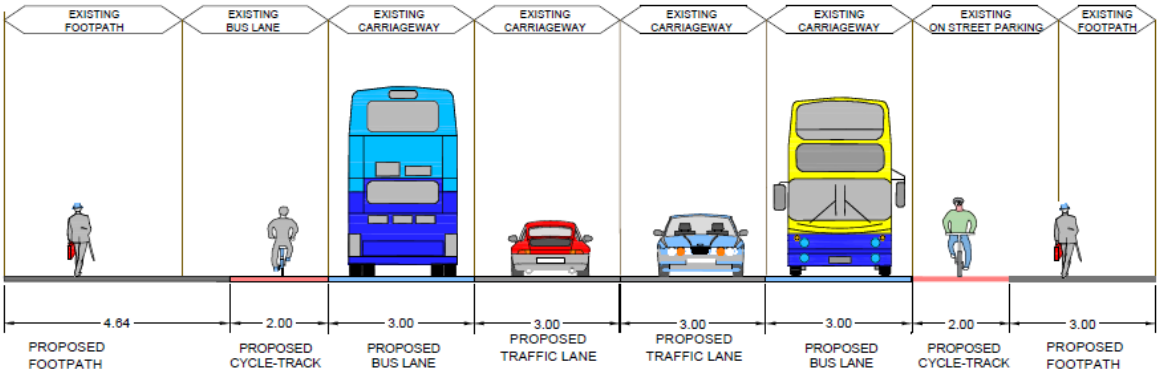


Figure 6.18 Cross Section B-B

6.2.5 Route Options Assessment

Details of the 'Stage 2' route options assessment undertaken for the Annesley Bridge to Custom House CBC are presented in Appendix A.

A summary of the ranking of route options against the scheme sub-criteria is presented in Table 6.3 below.

Table 6.3 Route Options Assessment Summary (Sub-Criteria)

Assessment Criteria	Sub-Criteria	Route 1	Route 2	Route 3
Economy	Capital Cost			
	Journey-time reliability and consistency			
Integration	Land Use Integration			
	Population and Employment Catchments			
	Public Transport Integration			
	Transport Network Integration			
	Cyclists and pedestrian Integration			
Accessibility and Social Inclusion	High Volume Trip Attractors			
	Deprived Geographic Areas & Areas Underserved by Public Transport			
Safety	Road Safety			
Environment	Archaeological, Architectural and Cultural Heritage			
	Flora and Fauna			
	Soils and Geology			
	Hydrology			
	Landscape and visual			
	Noise and Vibration			
	Air Quality			
	Land Use and the Built Environment			

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

In terms of "Integration", Route 1 is longer and passes through areas of slightly higher population density and so scores higher on the "Population and Employment Catchment" criterion. Route 3 would provide new cycle lanes for a GDA CNP primary route along with wider footpaths on Amiens St and so scores significantly higher in terms of "Cycle and Pedestrian Integration". Route 3 directly serves Connolly Station and the IFSC and scores higher on "Public Transport Integration" and "High Volume Trip Attractors". Route 1 better serves

the more deprived areas along Summerhill / Ballybough Road and so scores higher on the "Deprived Geographic Areas" criterion.

All options are considered equal in terms of "Safety".

In terms of "Environment" all routes are equal under most sub-criteria. Route 3 is considered favourable as it would have less of an impact on parking and has the potential to improve the public realm on Amiens Street.

6.2.6 Conclusion

A summary of the assessment and a relative ranking for each of the five assessment criteria is shown below in **Table 6.4**

Table 6.4 Route Options Assessment Summary (Main Criteria)

Assessment Criteria	Route 1	Route 2	Route 3
Economy			
Integration			
Accessibility and Social Inclusion			
Safety			
Environment			

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

- It has a lower capital cost than other routes
- It has a faster and more reliable journey time than other routes
- It integrates with Connolly Station, serves the IFSC and completes a primary route in the GDA CNP
- It is more favourable under the Environmental criterion than other routes

Route 3 is identified as the preferred option for this section and is brought forward into the Emerging Preferred Route as described in Chapter 8.

6.3 Stage 2: Route Options Assessment – Custom House to Liffey

6.3.1 Introduction

Following the Stage 2 sifting process, the five remaining links in this section are assembled together to form two viable route options in each direction. The locations of these route options are shown in **Figure 6.19** below. The terminus for these routes for consideration in the Stage 2 Assessment is Talbot Bridge, two separate termini are possible for the southbound option, on either side of the bridge, due to the current traffic arrangement on the city quays.

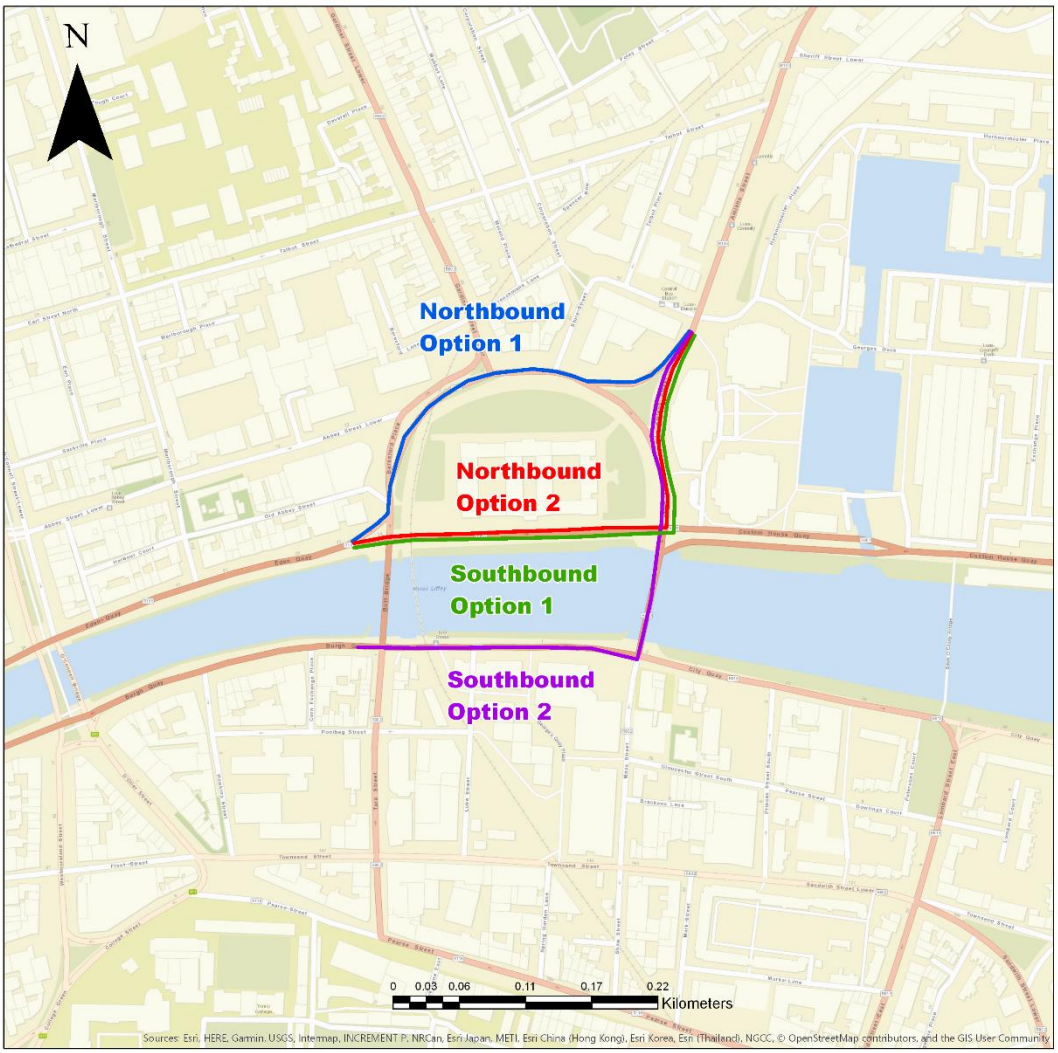


Figure 6.19 Section 1 (Clongriffin to Artane) Route Options

These northbound and southbound route options combine to form 4 potential CBC routes:

- Route Option 1 – Southbound Option 1 and Northbound Option 2
- Route Option 2 – Southbound Option 1 and Northbound Option 1
- Route Option 3 – Southbound Option 2 and Northbound Option 2
- Route Option 4 – Southbound Option 2 and Northbound Option 1

6.3.2 Route Option 1

Route Description

Southbound: Starting on Amiens Street, this route travels south onto Memorial Road before turning right onto the contraflow bus lane along Custom House Quay.

Northbound: This route starts on Eden Quay travelling east before turning left onto a contraflow lane on Memorial Road, then travelling north up Amiens Street.

Route Option 1 Indicative Scheme Design

Figure 6.20 illustrates the indicative scheme design for Route Option 1 as well as location of an indicative cross-section.

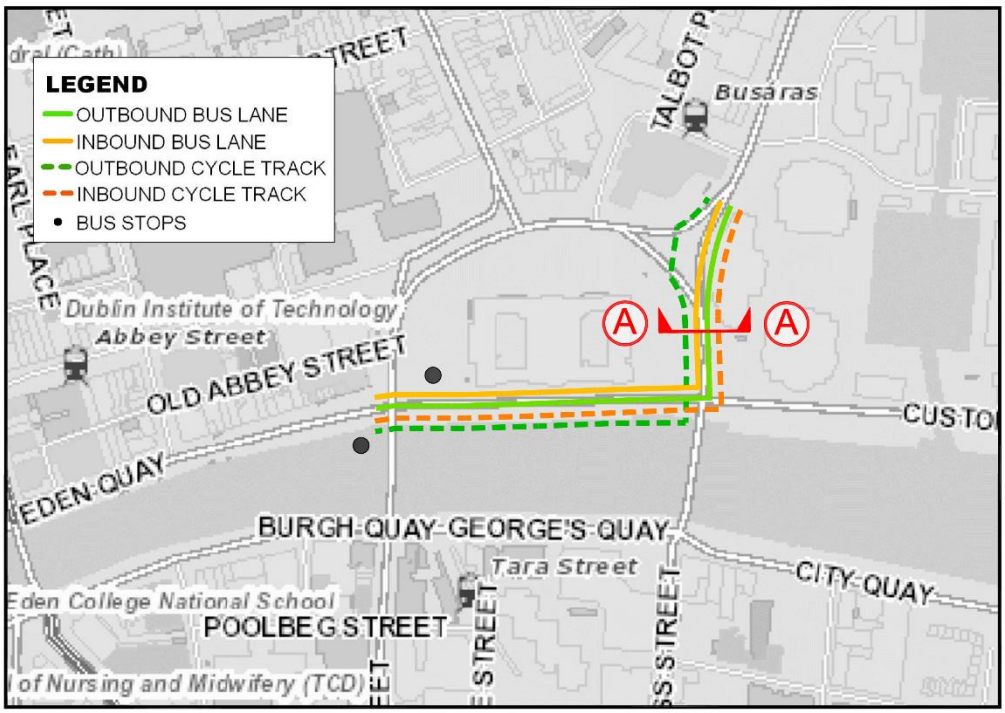


Figure 6.20 Route Option 1 Indicative Scheme Design

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

This scheme proposes the introduction of a northbound contraflow lane using the westernmost lane of Memorial Road, with the southbound bus lane immediately east of it. The remaining two lanes would be used for general traffic heading straight onto Talbot Bridge and turning left onto Custom House Quay. A bus only pre-signal would be provided at the traffic lights at the end of Amiens Street to allow southbound buses to move over to the right-hand land lane on Memorial Road

Cyclists would use a two-way segregated cycle path along the north side of the river in accordance with the Liffey Cycle Scheme.

A cross-section on Memorial Road is presented in Figure 6.21

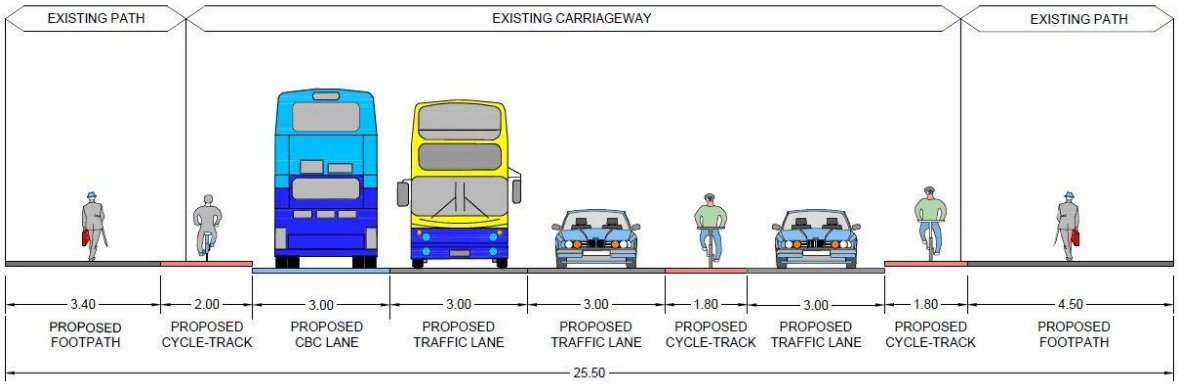


Figure 6.21 Cross Section A-A

6.3.3 Route Option 2

Route Description

Southbound: Starting on Amiens Street, this route travels south onto Memorial Road before turning right onto the contraflow bus lane along Custom House Quay.

Northbound: This route starts on Eden Quay travelling east before turning left onto Beresford Place then travelling north up Amiens Street.

Indicative Scheme Design

Figure 6.22 illustrates the indicative scheme design for Route Option 2 as well as the location of an indicative cross-section.

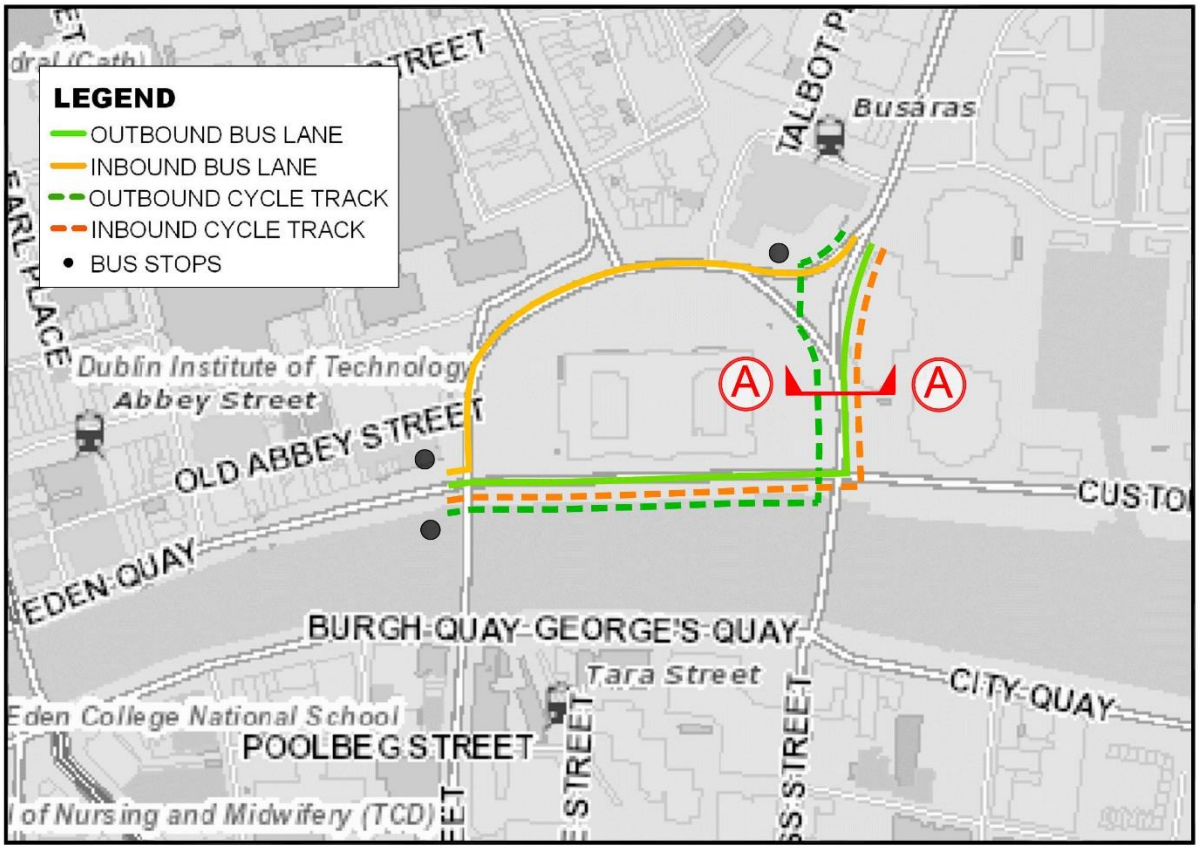


Figure 6.22 Route Option 2 Indicative Scheme Design

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

In this scheme, the southbound bus lane would occupy the westernmost lane on Memorial Road, leaving three lanes for southbound general traffic. Around Beresford Place, the second lane from the left would be converted to a bus lane. In order to avoid weaving conflicts, the bus would be given a green light to turn left from Eden Quay before general traffic. The bus lane would follow the southern side of the LUAS tracks around the north of Beresford Place. This would require reconfiguration of traffic islands and Gardiner Street Lower would be reduced to one lane for northbound general traffic.

Cyclists would use a two-way segregated cycle path along the north side of the river in accordance with the Liffey Cycle Scheme.

A cross-section on Memorial Road. is presented in Figure 6.23

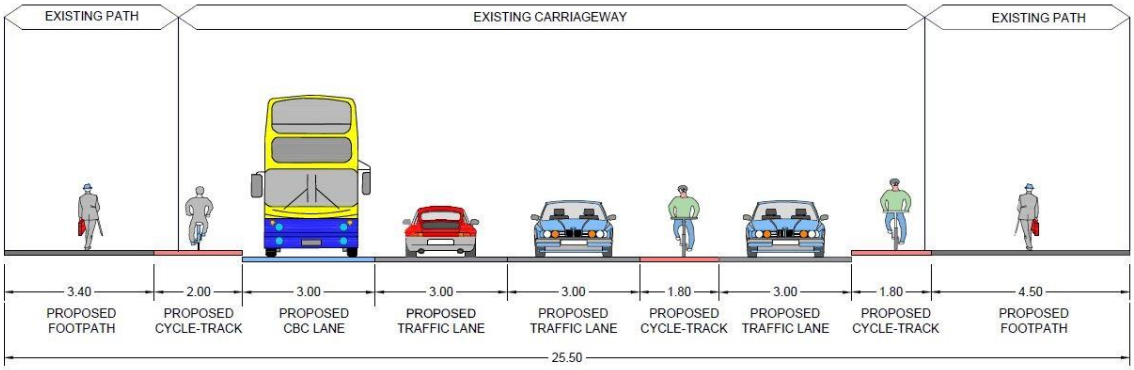


Figure 6.23 Cross Section A-A

6.3.4 Route Option 3

Route Description

Southbound: Starting on Amiens Street, this route travels south onto Memorial Road and crosses Talbot Bridge before turning right onto Georges Quay, and continuing west.

Northbound: This route starts on Eden Quay travelling east before turning left onto a contraflow lane on Memorial Road, then travelling north up Amiens Street.

Indicative Scheme Design

Figure 5.22 illustrates the indicative scheme design for Route Option 3 as well as the location of an indicative cross-section.

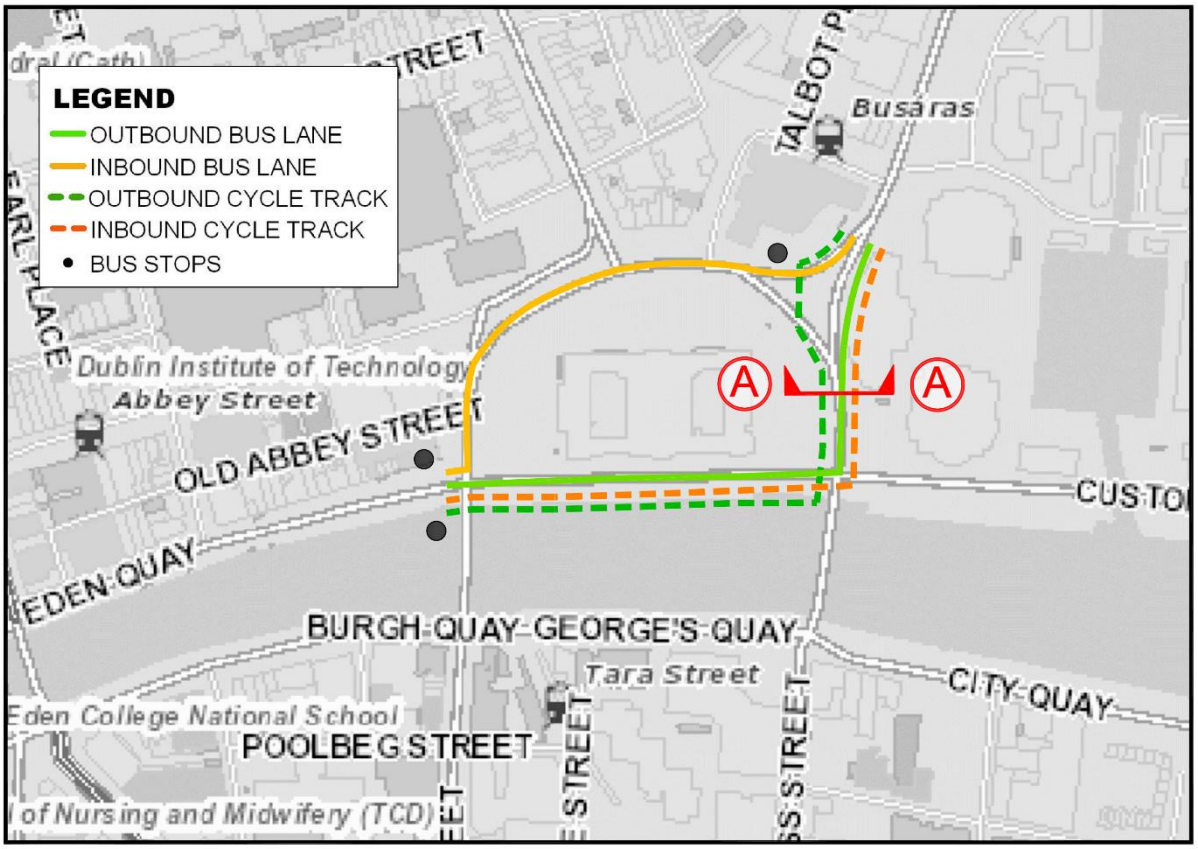


Figure 6.24 Route Option 3 Indicative Scheme Design

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

This is largely similar to Route Option 1, however the southbound route crosses Talbot Bridge, with the bus lane occupying the second lane from the west. This route then uses one of the two existing bus lanes along the South Quays.

A cross-section on Memorial Road is presented in Figure 6.25:

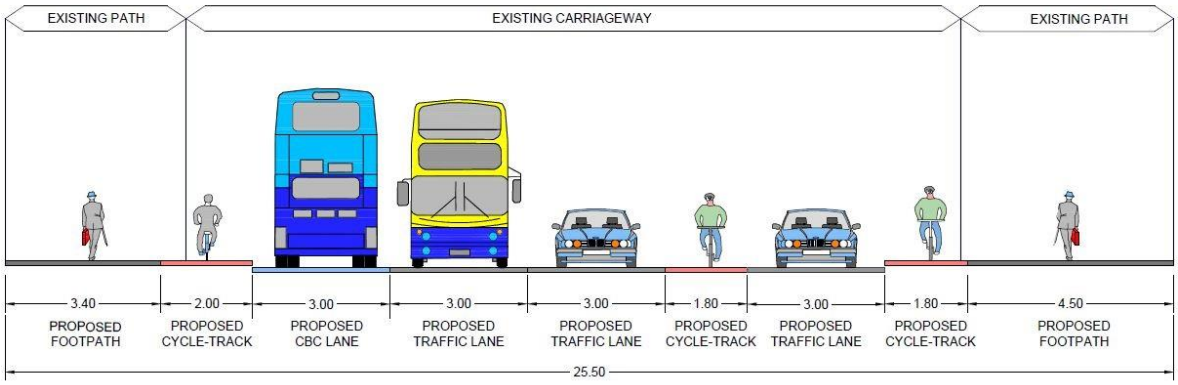


Figure 6.25 Cross Section A-A

Route Option 4

Route Description

Southbound: Starting on Amiens Street, this route travels south onto Memorial Road and crosses Talbot Bridge before turning right onto Georges Quay, and continues west.

Northbound: This route starts on Eden Quay travelling east before turning left onto Beresford Place then travelling north up Amiens Street.

Indicative Scheme Design

Figure 6.26 illustrates the indicative scheme design for Route Option 4 as well as the location of an indicative cross-section.

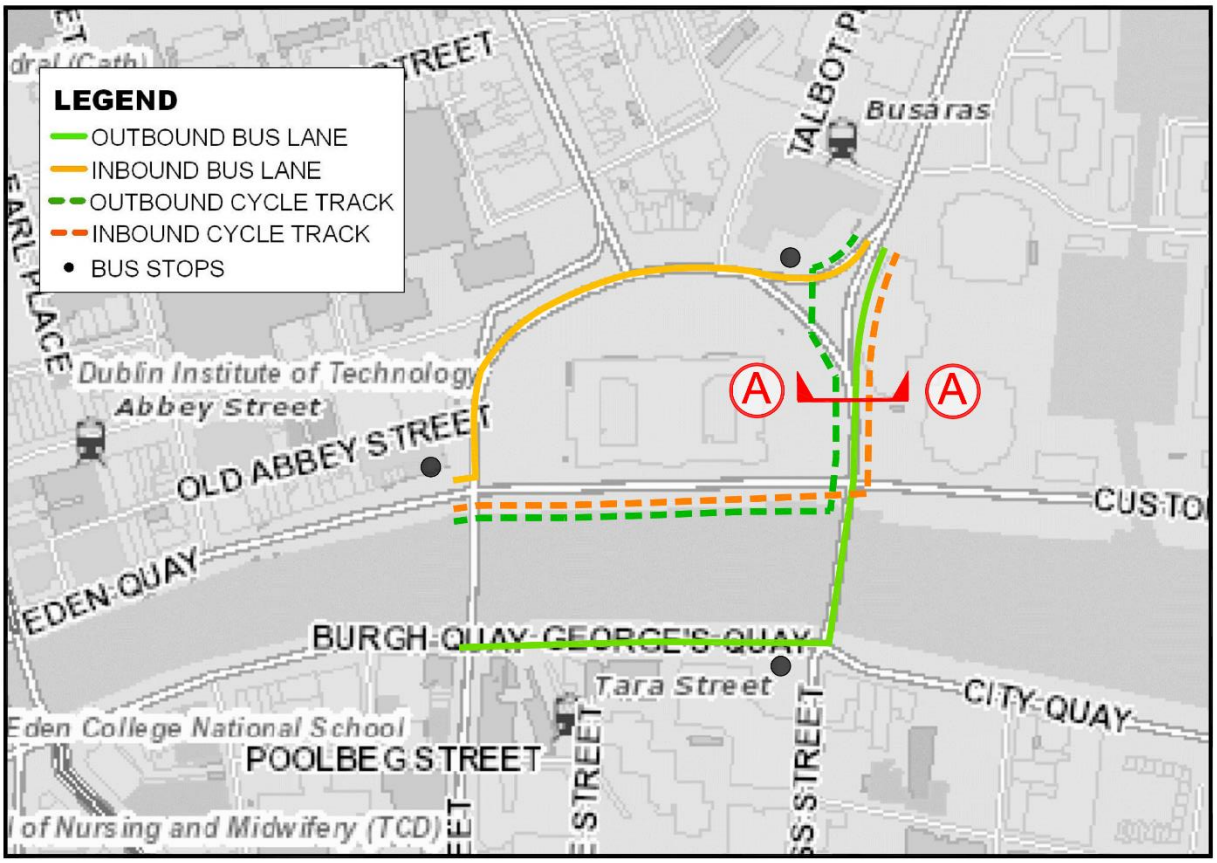


Figure 6.26 Route Option 4 Indicative Scheme Design

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

This is largely similar to Route Option 2, however the southbound route crosses Talbot Bridge, with the bus lane occupying the second lane from the west. This route then uses one of the two existing bus lanes along the South Quays.

A cross-section on Memorial Road is presented in Figure 6.27

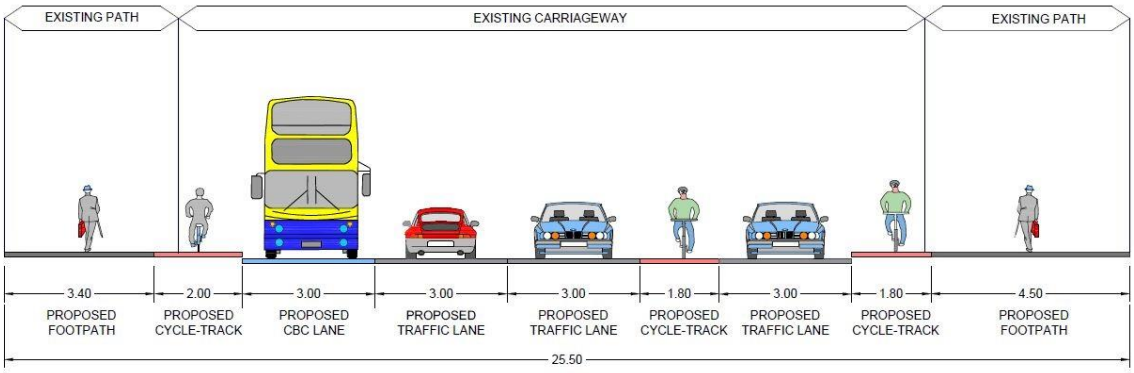


Figure 6.27 Cross Section A-A

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6.3.5 Route Options Assessment

Details of the 'Stage 2' route options assessment undertaken for the Custom House to Liffey section are presented in **Appendix A**.

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

Table 6.5 Route Options Assessment Summary (Sub-Criteria)

Assessment Criteria	Sub-Criteria	Route 1	Route 2	Route 3	Route 4
Economy	Capital Cost				
	Journey-time reliability and consistency				
Integration	Land Use Integration				
	Population and Employment Catchments				
	Public Transport Integration				
	Traffic Network Integration				
	Cyclists and pedestrian Integration				
Accessibility and Social Inclusion	High Volume Trip Attractors				
	Deprived Geographic Areas & Areas Underserved by Public Transport				
Safety	Road Safety				
Environment	Archaeological, Architectural and Cultural Heritage				
	Flora and Fauna				
	Soils and Geology				
	Hydrology				
	Landscape and visual				
	Noise and Vibration				
	Air Quality				
	Land Use and the Built Environment				

In terms of "Journey Time Reliability and Consistency" southbound routes which use Talbot Memorial Bridge are considered less favourable. This is because right turning traffic on the bridge would be required to weave across a bus lane and this turbulence may cause journey time delays. Buses using Custom House Quay would not experience these delays.

In terms of "Traffic Network Integration" northbound routes which use the contra-flow lane on Memorial Road are considered less favourable. This contra flow lane would reduce Memorial Road to two lanes southbound and reduce the capacity of the junction. The alternative of northbound buses using Beresford Place is considered to have a lesser impact on general traffic.

6.3.6 Conclusion

A summary of the assessment and a relative ranking for each of the five assessment criteria is shown below in **Table 6.6**

Assessment Criteria	Route 1	Route 2	Route 3	Route 4
Economy				
Integration				
Accessibility and Social inclusion				
Safety				
Environment				

Table 6.6 Route Options Assessment Summary (Main Criteria)

Based on the assessments above it has been determined that Route 2 offers the preferred route option for the following reasons:

- It would disrupt general traffic less than Options 1 and 4
- The bus would experience less turbulence and therefore have better journey time reliability than Options 3 and 4

Route 2 is identified as the preferred option for this section and is brought forward into the Emerging Preferred Route as described in Chapter 8.

It is noted however, that there is little to differentiate between options in this section and that depending on the outcomes of other city centre studies it may be more appropriate to select a different route option. The next preferred is Route Option 4. While this option would have slightly less bus priority it would avoid the potential conflict between inbound buses and the two-way cycle track along the North Quays at the proposed bus stops.

7 PROPOSED SCHEME

7.1 Introduction

Chapters 5 and 6 of this report presented an appraisal of all route options considered for study area Sections 1 and 2 respectively. Following this appraisal, preferred route sections are combined to form an end-to-end Emerging Preferred Route. This chapter of the report presents and describes the emerging preferred route identified and the concept scheme design. Concept scheme design drawings are included in Volume 3 of this report.

7.2 Emerging Preferred Route

The Emerging Preferred Route is presented in Figure 7.1 below:

Figure 7.1 Emerging Preferred Route

Southbound: The emerging preferred route starts outside Clongriffin DART station, from here the bus travels along Clongriffin Main Street, including some parts that are not yet constructed to join the Malahide Road. The bus then continues south along the Malahide Road for 5.6 km until it reaches the junction with Marino Mart. Here the bus takes a right and continues straight along Marino Mart, Fairview, Annesley Bridge Road, North Strand Road and Amiens Street. The southbound bus circulates around the Custom House by travelling along Memorial Road and Custom House Quay

Northbound: The northbound route would follow the same route as the southbound routing except that it travels around the opposite side of the Custom House on Beresford Place.

7.3 Concept Scheme Design

Bus lanes will be constructed along Clongriffin Main Street in accordance with the LAP, these have already been constructed in some locations. A new bus only junction will be constructed where Clongriffin Main Street meets Malahide Road and signals will provide priority for buses using the CBC route. Works on the junction with the R139 will allow for bus priority to be provided at the signals and enhance facilities for cyclists and pedestrians.

Further south along the Malahide Road existing bus lanes will be used and segregated cycle lanes will be provided by using existing verge space or by reducing the width of the median where appropriate. All signalised junctions along this route will be upgraded to provide enhanced bus priority and pedestrian/cycle facilities. The existing roundabouts at Artane and at Priorswood Road junctions will be upgraded to signalised junctions. Some commercial parking north of the junction with Kilmore Road will be affected, along with land take from gardens which would result in a reduction in parking capacity in approximately 10 gardens. Although parking for at least one car will still be possible in all of these gardens.

The Malahide Road will be widened to provide bus lanes on the sections where they do not currently exist, and new segregated cycle lanes will be provided for the whole length. Road widening can mostly be facilitated with land take from public green areas, parks, playing fields of Ardscoil Ris and land from Clontarf Golf Club. However, some land take from portions of front gardens would be required either side of the junction with Collins Avenue. In these sections, the cross section will be reduced to minimise land take. Approximately 15 gardens south of Collins Avenue junction will be affected. Parking capacity in these gardens will be reduced, but parking will still be available.

Malahide Road is constrained for the section between Brian Road and Clontarf Road junctions, here cyclists in both directions will be diverted along Haverty Road and Brian Road. Southbound cyclists will be required to cross the road twice and two new toucan crossings will need to be introduced.

The portion of North Strand Road/Amiens Street as far as the Foley Street junction would generally follow the Clontarf to City Centre Cycle Scheme plans, which provides cycle and bus lanes in both directions. On-street parking/loading will be affected in places although will be retained wherever feasible. Footpath widths will be reduced in a number of places

There is a pinch point on Amiens Street from Foley Street to Sherriff Street junctions as the route passes under the existing DART bridge. The available cross section is limited in this section by the large piers supporting the existing DART bridge. Traffic signals will be used to hold northbound traffic in advance of the bridge and provide priority for northbound buses, dedicated bus lanes will be provided for southbound buses. Southbound cyclists will pass around the back of the piers with the construction of a new retaining wall and setting back of the existing railings. Northbound cyclists will have a dedicated cycle track on the inside of the existing piers, the existing parking/loading/taxi bay to the north of the bridge will be removed.

On Amiens Street a southbound traffic lane will be removed for the section from Sheriff Street to the existing taxi rank outside Connolly Station and also from Store Street to Custom House Quay. A northbound traffic lane will be removed from Foley Street junction to the Beresford Place junction. The additional road space will be allocated to bus/cycle lanes and to increase the width of footpaths as this is a busy pedestrian area which currently has poor pedestrian facilities.

The existing taxi rank outside Connolly will be relocated to Harbourmaster Place. The existing time plated parking/loading in the northbound bus lane on Amiens Street will be removed.

Around the Custom House one lane of traffic will be removed from Memorial Road to allow for a southbound bus lane and one lane from the south-western side of Beresford Place which currently continues to Gardiner Street will be removed to allow for a continuous northbound bus lane. A two-way cycle route will be provided along the north quays in accordance with the Liffey Cycle Scheme.

7.4 Cost Estimate

A high-level cost estimate for has been prepared based on the concept design drawings. According to this estimate the proposed CBC infrastructure cost is anticipated to be in the region of **€45m-€50m**.

A further breakdown of the costs is shown below:

7.4.1 Section 1 – North City

Length of Scheme Section: 8 km

Indicative Infrastructure Cost: € 35.5 million

Indicative Land Acquisition Cost: €2.5 million

Total Indicative Cost of Scheme Section: €38 million

7.4.2 Section 2 – City Centre

Length of Scheme Section: 2.4 km

Indicative Infrastructure Cost: € 10 million

Indicative Land Acquisition Cost: € 0 million

Total Indicative Cost of Scheme Section: €10 million

7.4.3 Total

Length of Scheme Section: 10.4 km

Indicative Infrastructure Cost: € 45.5 million

Indicative Land Acquisition Cost: € 2.5 million

Total Indicative Cost of Scheme Section: € 48 million

7.5 Summary

7.5.1 Infrastructure Provision

The emerging preferred route measures approximately 10.4 km in total. Along the emerging preferred route currently bus infrastructure is provided for 9.1 km in the inbound and 8.8 km in the outbound direction.

The emerging preferred scheme would improve this provision to the entire length (10.4 km) for the inbound and outbound directions, with the exception of a 60m section where outbound buses get priority by means of a “virtual bus lane” which would be kept clear by traffic signals.

In addition, improvements to cycle infrastructure along the emerging preferred route would increase the overall provision to 9.9 km (95 %) in each direction, with an off-route cycle track provided for the section without cycle facilities.

7.5.2 Journey Time Benefits

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

The following graphs show the existing journey time and bus speed data for the section of the Dublin Bus 15 bus route which overlaps with the emerging preferred route (between Clongriffin DART station and Eden Quay). The information presented in these graphs has been taken from the automatic vehicle location system on the Dublin Bus fleet and the journey times are inclusive of dwell times at stops. Figure 7.2 & 7.3 present the average journey time variation during a normal weekday for the inbound and outbound directions.

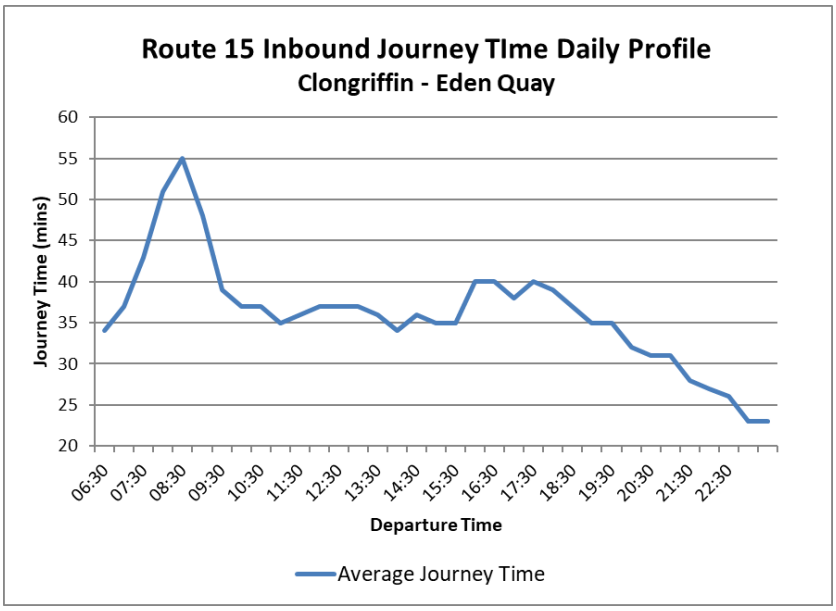


Figure 7.1 Existing Inbound Average Journey Times

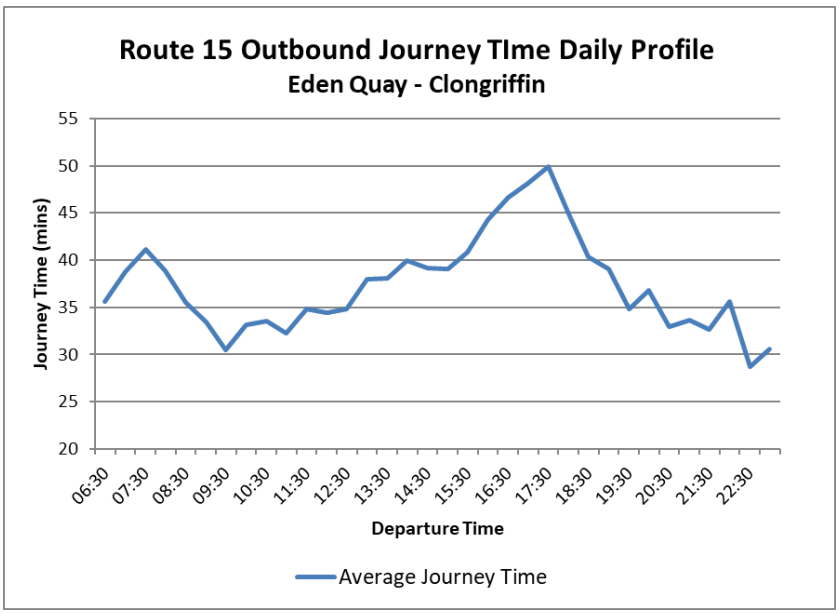


Figure 7.2 Existing Outbound Average Journey Times

The graphs presented in Figure 7.1 and Figure 7.2 show the current issues with journey time reliability along the route. Journey times during the core hours of bus operation (07:00 – 19:00) are observed to vary between 55 and 35 minutes inbound and between 50 and 31 minutes outbound. The variation in journey times is most likely due to the lack of bus priority on sections of the route as well as boarding times at stops which are high due to the requirement for each passenger to interact with the driver.

As such, the journey times outside of these hours, when traffic volumes are lower, are more reflective of the journey times which could be achieved by a combination of improved bus priority, better enforcement of bus lanes and cashless fares. Outside of the core hours of operation the average journey time is observed to reduce to between 37 and 23 minutes inbound and between 37 and 29 minutes outbound. For inbound and outbound journeys both the average journey time as well as the variance between the upper and lower limits are seen to reduce

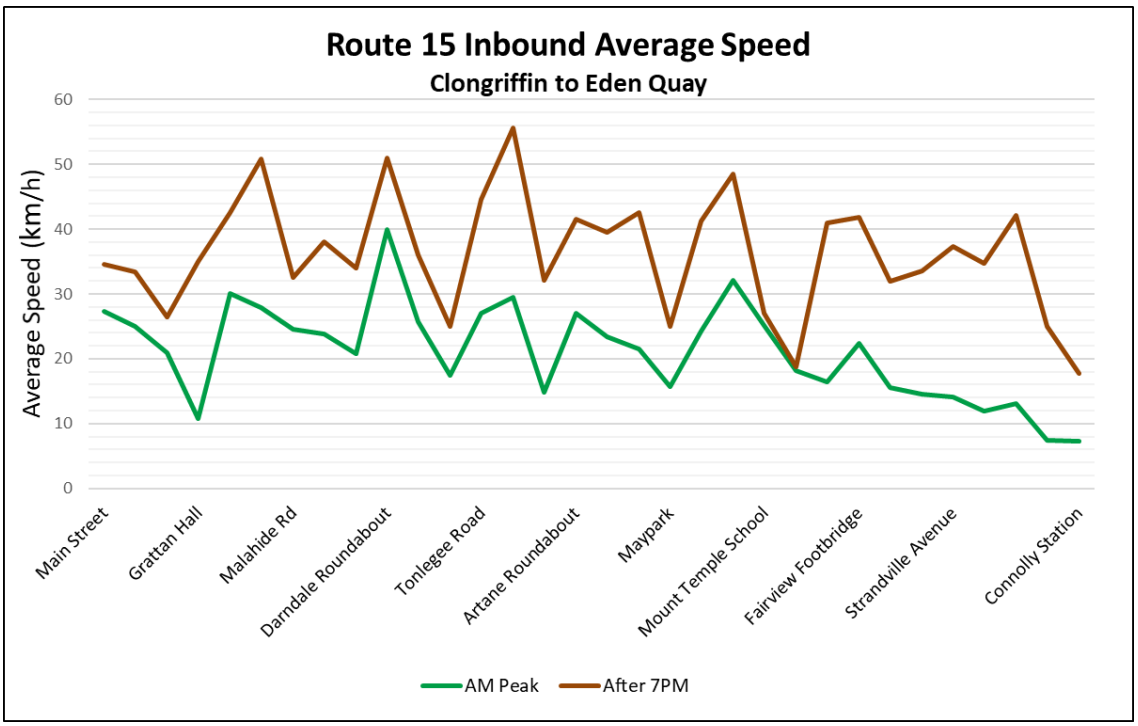


Figure 7.3 Existing Inbound Average Speed

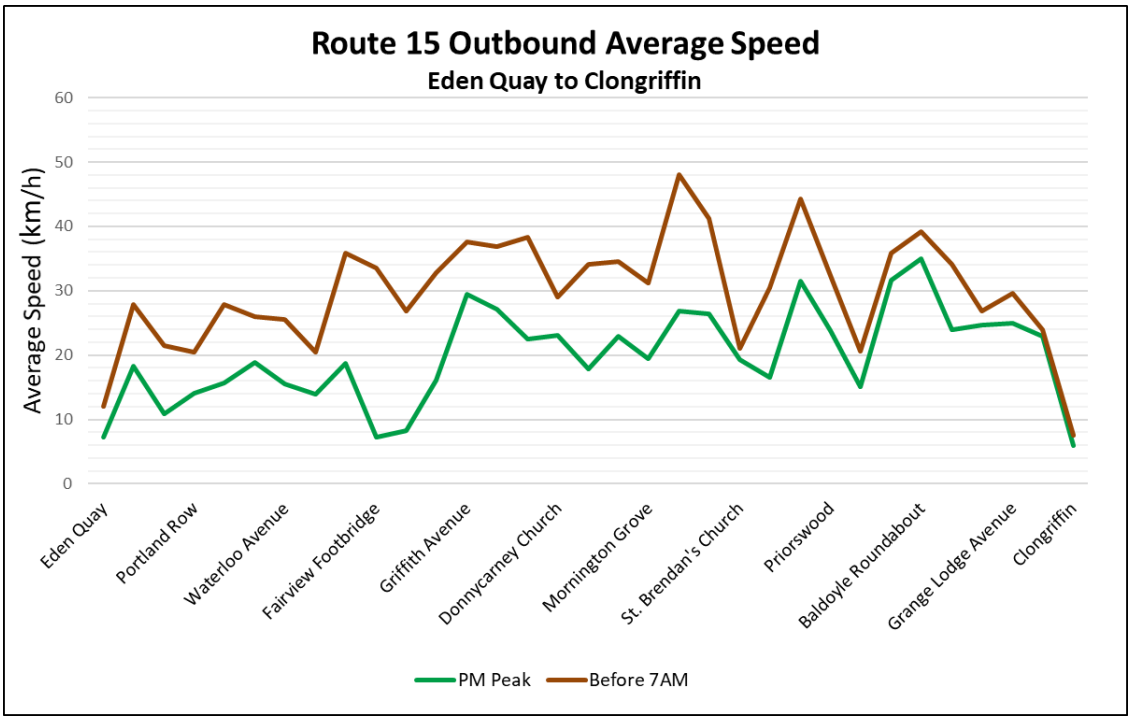


Figure 7.4 Existing Outbound Average Speed

The benefits can also be seen by comparing the existing average link speeds along the route during peak and off-peak periods as shown in Figure 7.3 and Figure 7.4 (these exclude dwell times at bus stops). Looking at both the inbound and outbound data, it can be seen that the average speed for buses along the route is higher during off-peak times, in uncongested conditions compared to the lower speeds attained by the bus during the peak times. This further illustrates the benefits improved bus priority will bring to buses operating along the proposed route.

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

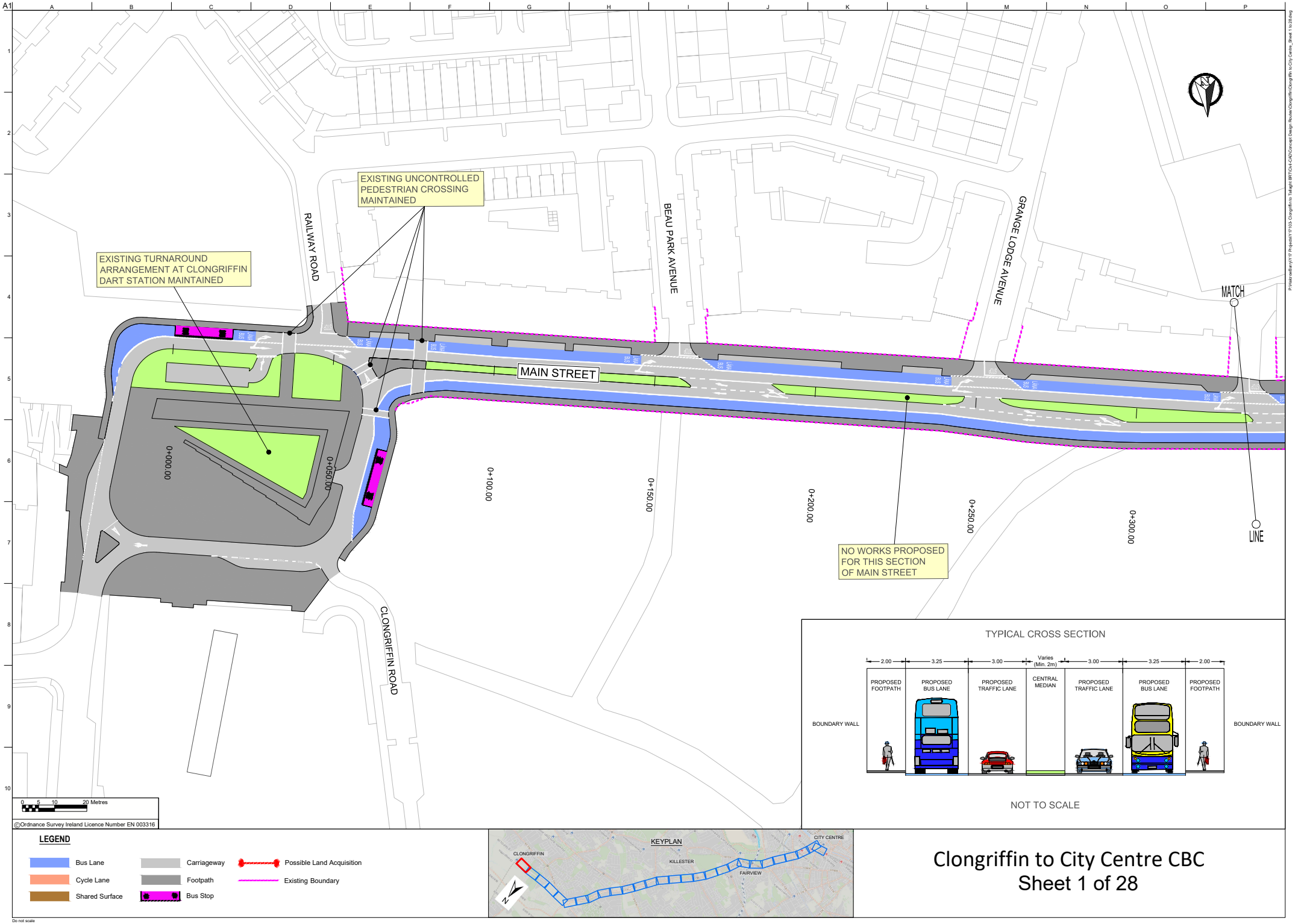
8 NEXT STEPS

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

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

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

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


EXISTING UNCONTROLLED PEDESTRIAN CROSSING MAINTAINED
EXISTING TURNAROUND ARRANGEMENT AT CLONGRIFFIN DART STATION MAINTAINED
RAILWAY ROAD
BEAU PARK AVENUE
GRANGE LODGE AVENUE
MAIN STREET
MATCH
LINE
NO WORKS PROPOSED FOR THIS SECTION OF MAIN STREET
CLONGRIFFIN ROAD
0+000.00
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0+150.00
0+200.00
0+250.00
0+300.00
TYPICAL CROSS SECTION
2.00
3.25
3.00
Varies (Min. 2m)
3.00
3.25
2.00
PROPOSED FOOTPATH
PROPOSED BUS LANE
PROPOSED TRAFFIC LANE
CENTRAL MEDIAN
PROPOSED TRAFFIC LANE
PROPOSED BUS LANE
PROPOSED FOOTPATH
BOUNDARY WALL
BOUNDARY WALL
NOT TO SCALE
0 5 10 20 Metres
©Ordnance Survey Ireland Licence Number EN 003316
LEGEND
Bus Lane
Cycle Lane
Shared Surface
Carriageway
Footpath
Bus Stop
Possible Land Acquisition
Existing Boundary
KEYPLAN
CLONGRIFFIN
KILLESTER
FAIRVIEW
CITY CENTRE
Clongriffin to City Centre CBC
Sheet 1 of 28
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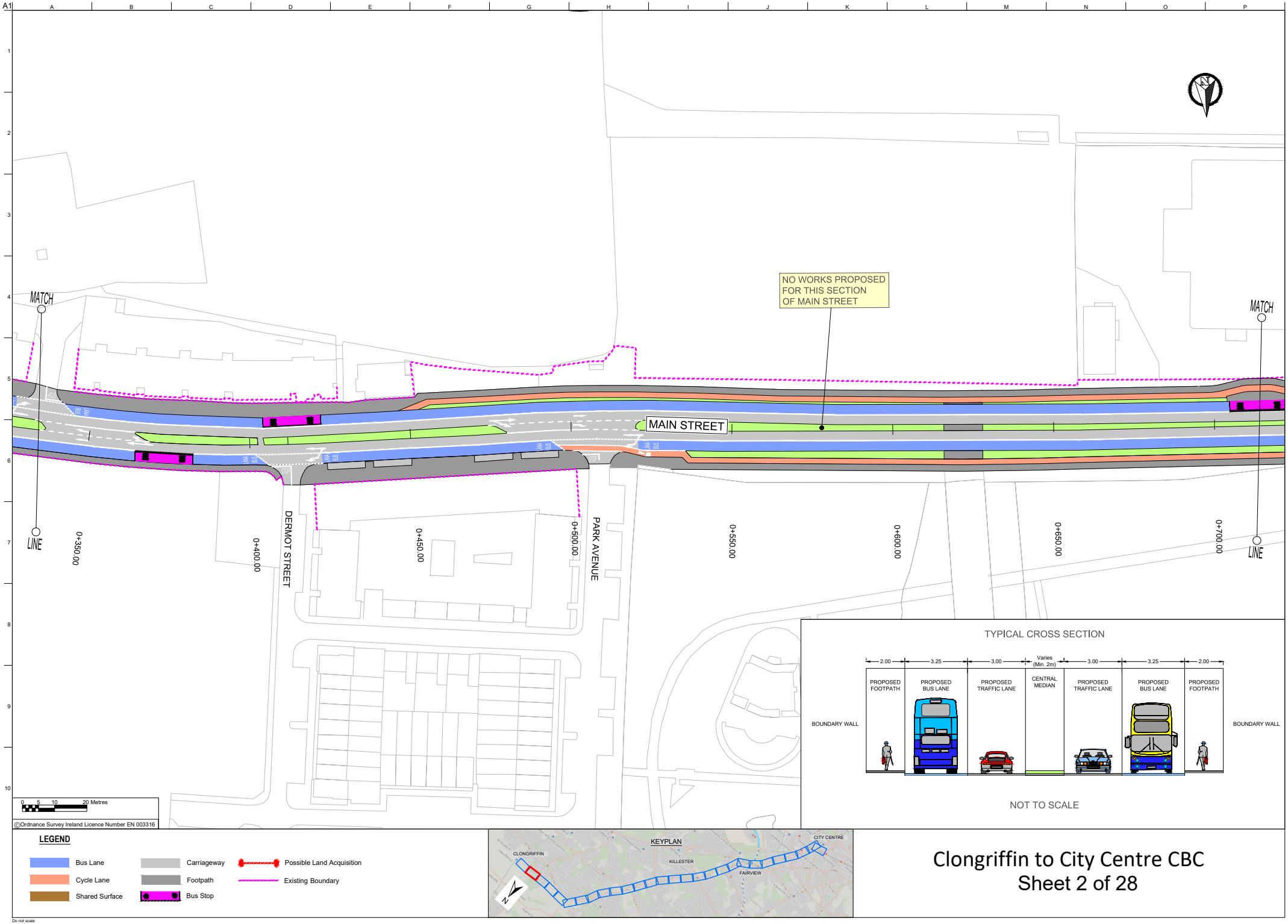
MATCH
LINE
NO WORKS PROPOSED FOR THIS SECTION OF MAIN STREET
MAIN STREET
MATCH
LINE
0+350.00
0+400.00
DERMOT STREET
0+450.00
0+500.00
PARK AVENUE
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CITY CENTRE
Clongriffin to City Centre CBC
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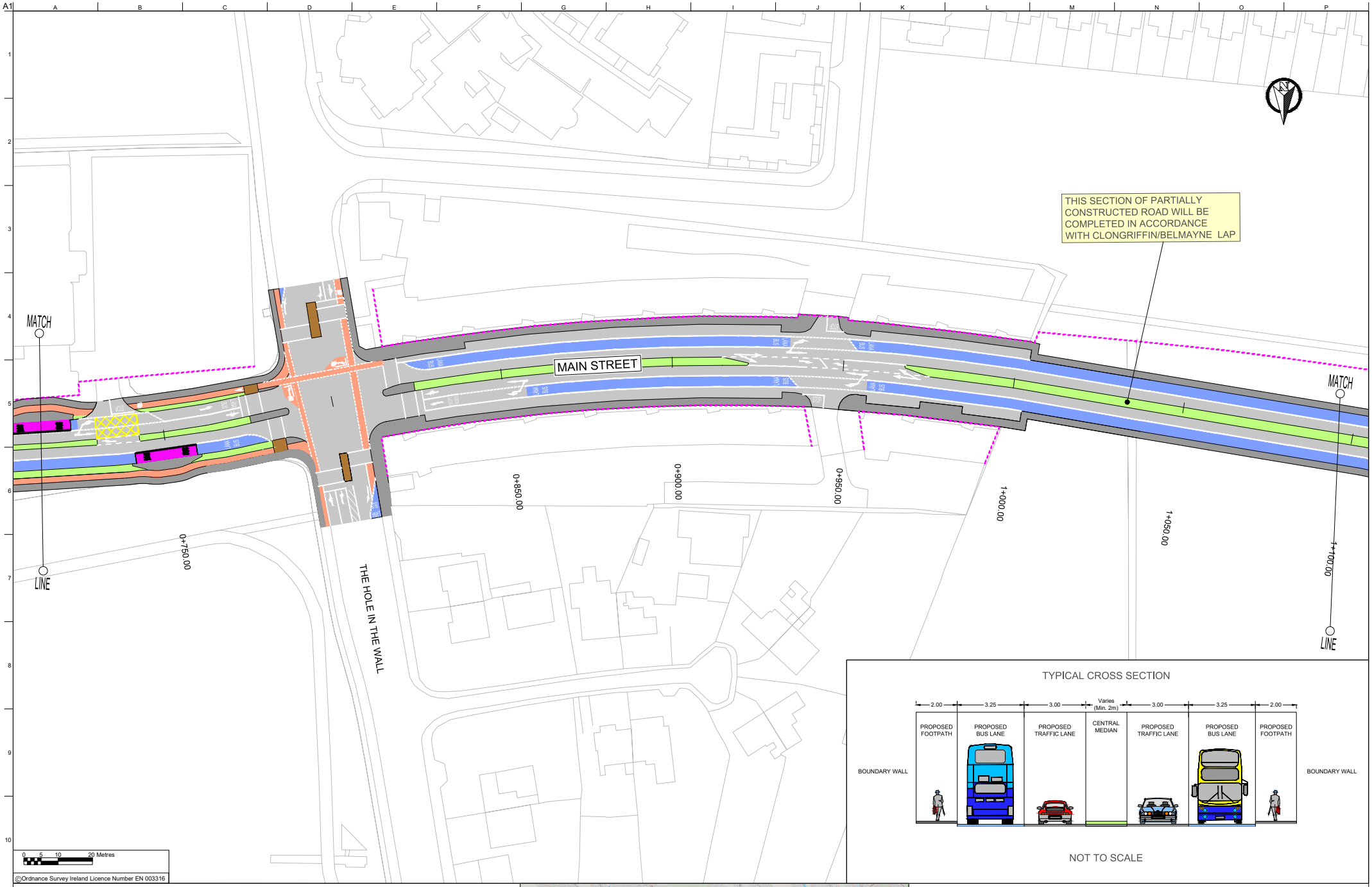
MATCH
LINE
MAIN STREET
THIS SECTION OF PARTIALLY CONSTRUCTED ROAD WILL BE COMPLETED IN ACCORDANCE WITH CLONGRIFFIN/BELMAYNE LAP
MATCH
LINE
0+750.00
THE HOLE IN THE WALL
0+850.00
0+900.00
0+950.00
1+000.00
1+050.00
1+100.00
TYPICAL CROSS SECTION
2.00
3.25
3.00
Varies (Min. 2m)
3.00
3.25
2.00
PROPOSED FOOTPATH
PROPOSED BUS LANE
PROPOSED TRAFFIC LANE
CENTRAL MEDIAN
PROPOSED TRAFFIC LANE
PROPOSED BUS LANE
PROPOSED FOOTPATH
BOUNDARY WALL
BOUNDARY WALL
NOT TO SCALE
0 5 10 20 Metres
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LEGEND
Bus Lane
Cycle Lane
Shared Surface
Carriageway
Footpath
Bus Stop
Possible Land Acquisition
Existing Boundary
KEYPLAN
CLONGRIFFIN
KILLESTER
FAIRVIEW
CITY CENTRE
Clongriffin to City Centre CBC
Sheet 3 of 28
Do not scale

THIS SECTION OF PARTIALLY CONSTRUCTED ROAD WILL BE COMPLETED IN ACCORDANCE WITH CLONGRIFFIN/BELMAYNE LAP

MATCH LINE

MAIN STREET

1+100.00

1+150.00

1+200.00

1+250.00

1+300.00

BELMAYNE AVENUE

1+350.00

1+400.00

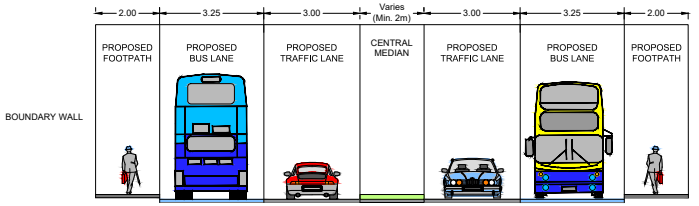
1+450.00

CHURCHWELL RISE

MATCH LINE

JUNCTION UPGRADED TO SIGNALISED CROSSROADS TO PROVIDE BUS PRIORITY AND ENHANCED PEDESTRIAN FACILITIES

TYPICAL CROSS SECTION



NOT TO SCALE

0 5 10 20 Metres

LEGEND

- Bus Lane
- Cycle Lane
- Shared Surface
- Carriageway
- Footpath
- Bus Stop
- Possible Land Acquisition
- Existing Boundary

KEYPLAN

Clongriffin to City Centre CBC
Sheet 4 of 28

Do not scale

THIS SECTION OF PARTIALLY CONSTRUCTED ROAD WILL BE COMPLETED IN ACCORDANCE WITH CLONGRIFFIN/BELMAYNE LAP

NEW ROAD CONSTRUCTED HERE IN ACCORDANCE WITH CLONGRIFFIN/BELMAYNE LAP

TURNAROUND AT THE END OF MAIN STREET TO BE BUILT IN ACCORDANCE WITH CLONGRIFFIN/BELMAYNE LAP

MATCH LINE

MAIN STREET

CHURCHWELL RISE

1+500.00

1+550.00

1+600.00

1+650.00

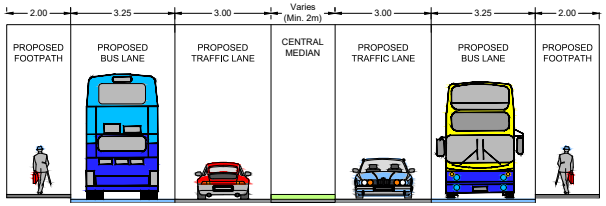
1+700.00

1+750.00

MATCH

0 5 10 20 Metres

TYPICAL CROSS SECTION



NOT TO SCALE

LEGEND

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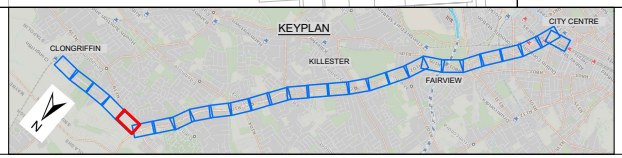
- Cycle Lane
- Shared Surface
- Carriageway
- Footpath
- Bus Stop
- Possible Land Acquisition
- Existing Boundary



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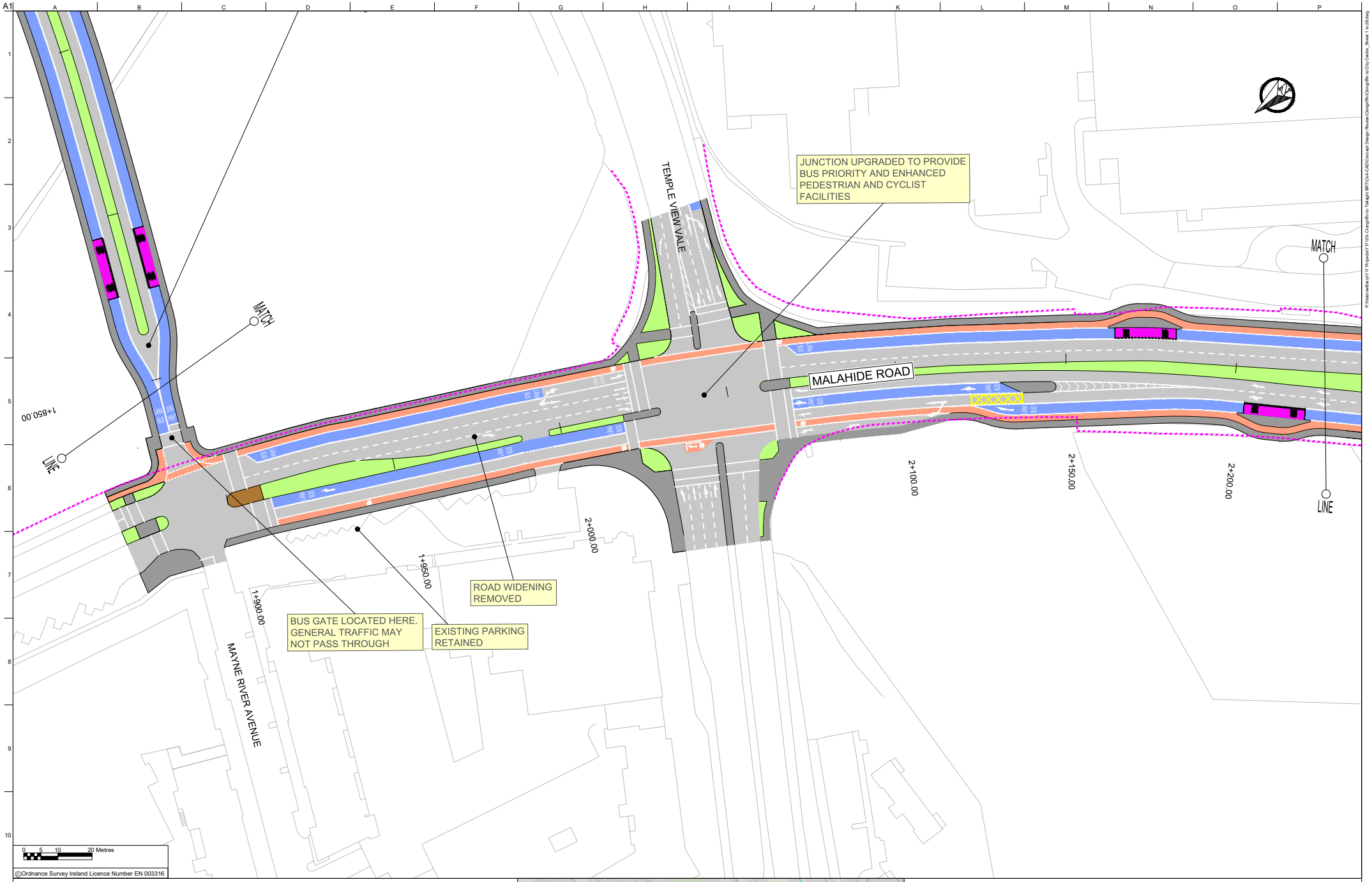

Clongriffin to City Centre CBC
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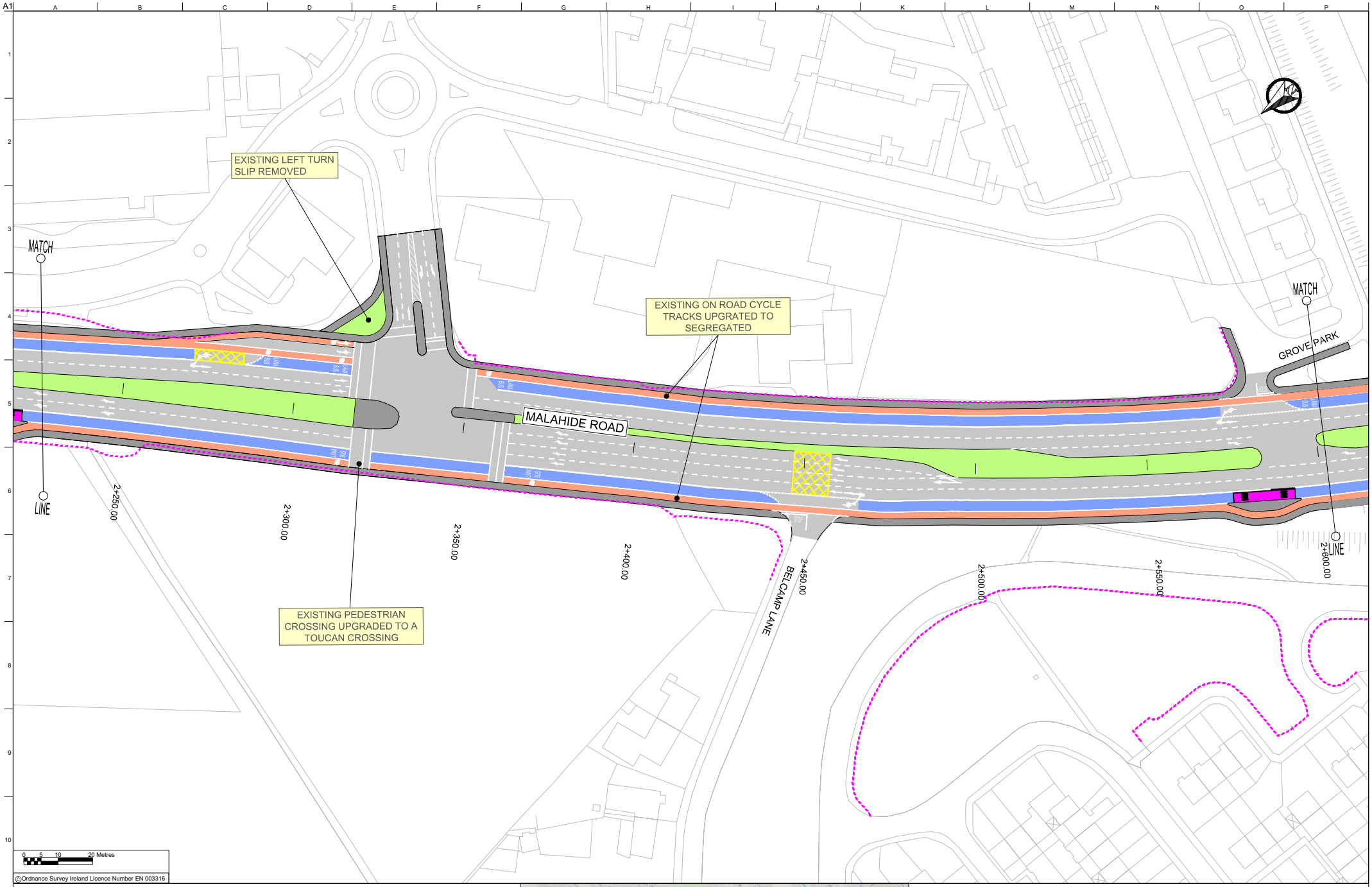

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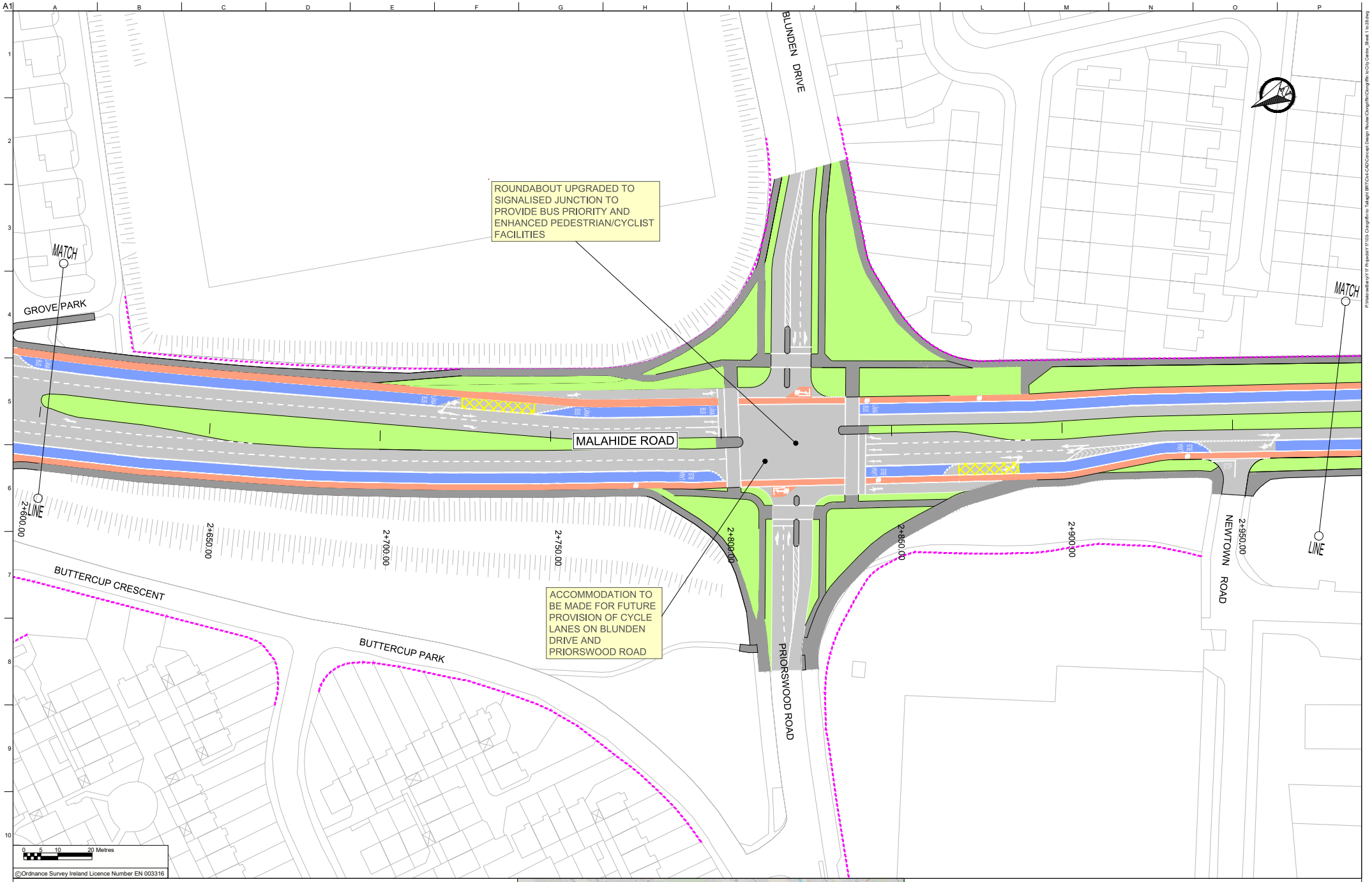

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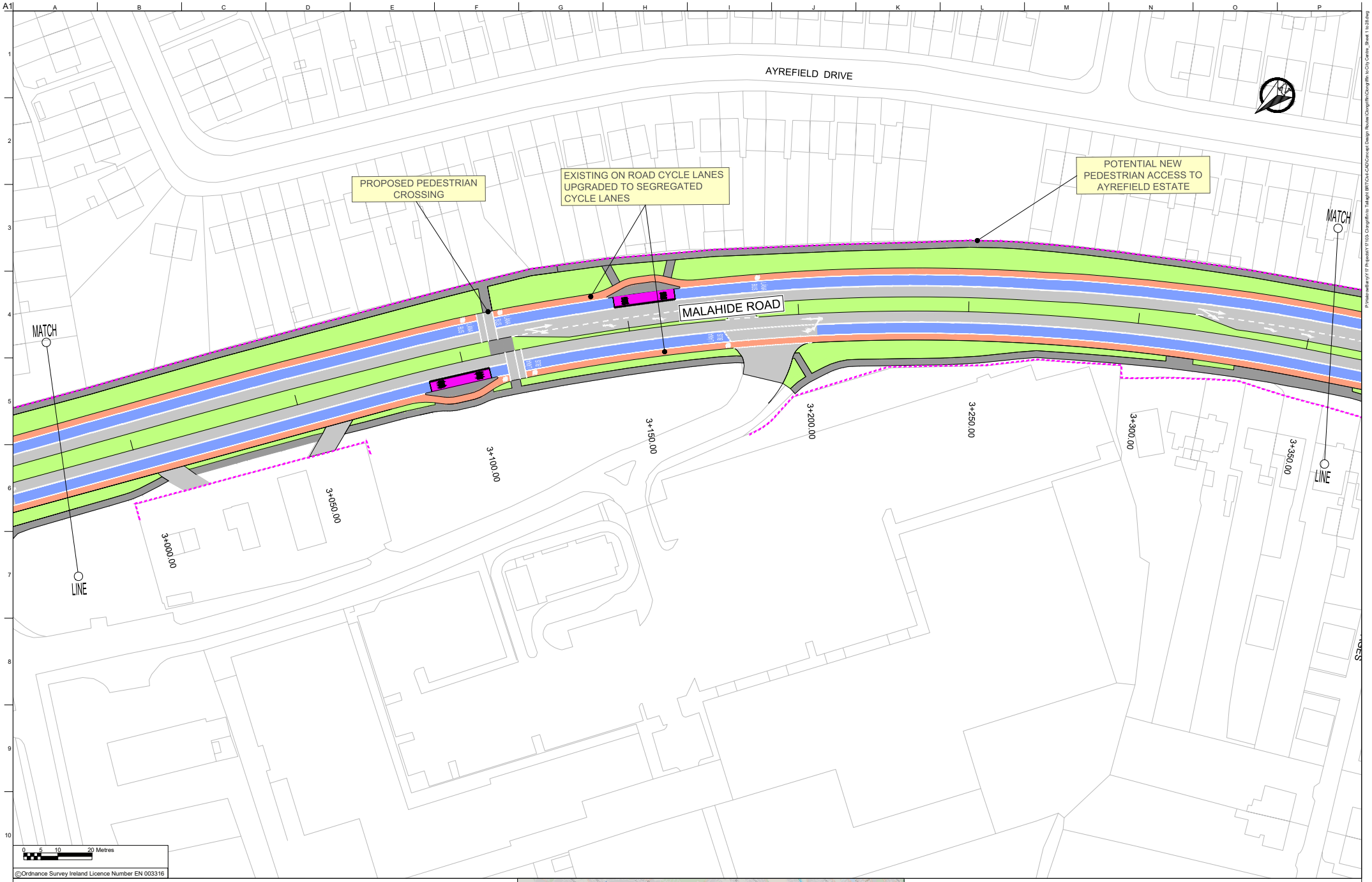
AYREFIELD DRIVE
PROPOSED PEDESTRIAN CROSSING
EXISTING ON ROAD CYCLE LANES UPGRADED TO SEGREGATED CYCLE LANES
POTENTIAL NEW PEDESTRIAN ACCESS TO AYREFIELD ESTATE
MALAHIDE ROAD
MATCH
LINE
MATCH
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3+000.00
3+050.00
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3+200.00
3+250.00
3+300.00
3+350.00
0 5 10 20 Metres
©Ordnance Survey Ireland Licence Number EN 003316
LEGEND
Bus Lane
Cycle Lane
Shared Surface
Carriageway
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Bus Stop
Possible Land Acquisition
Existing Boundary
KEYPLAN
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CITY CENTRE
Clongriffin to City Centre CBC
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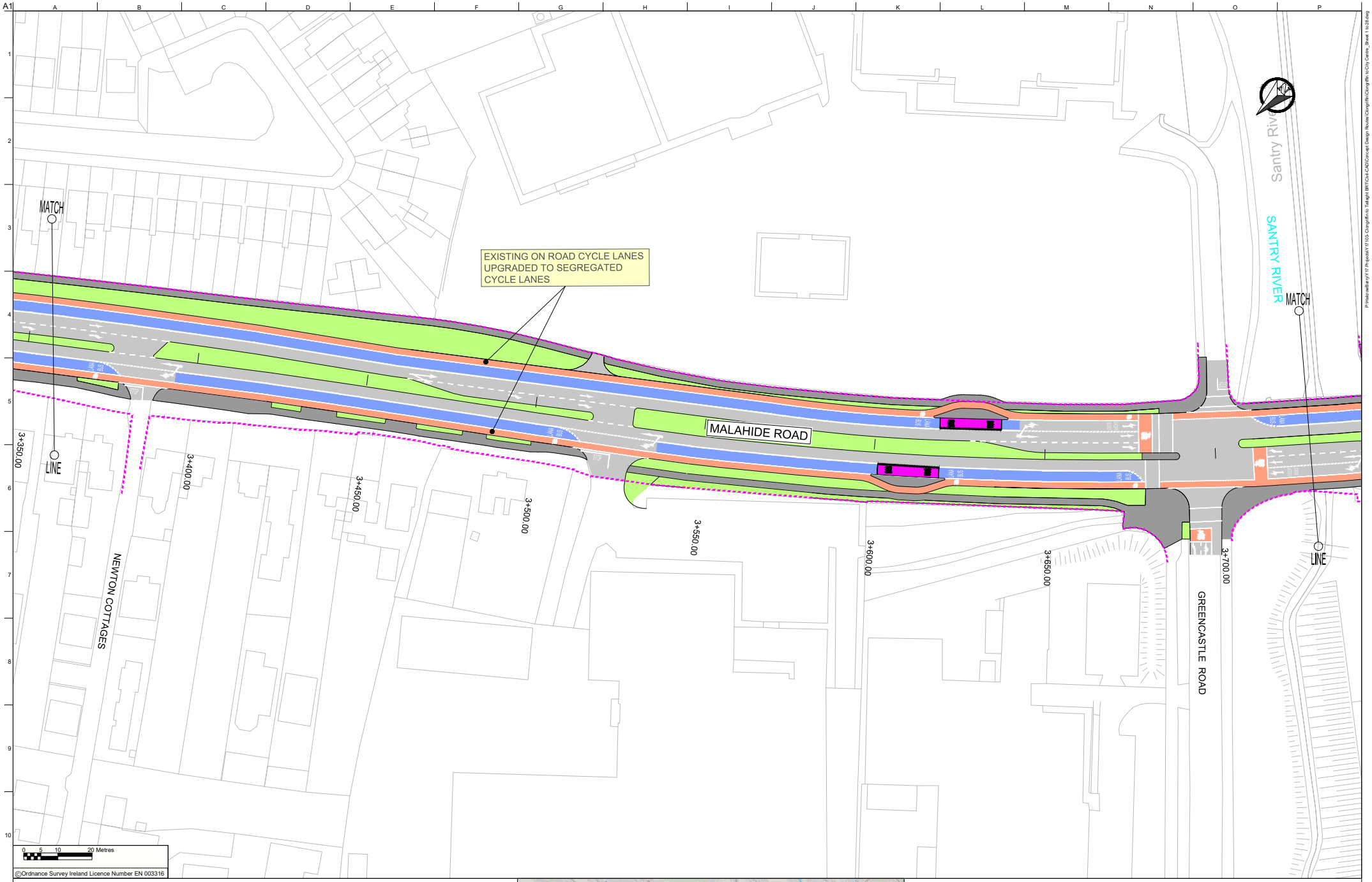

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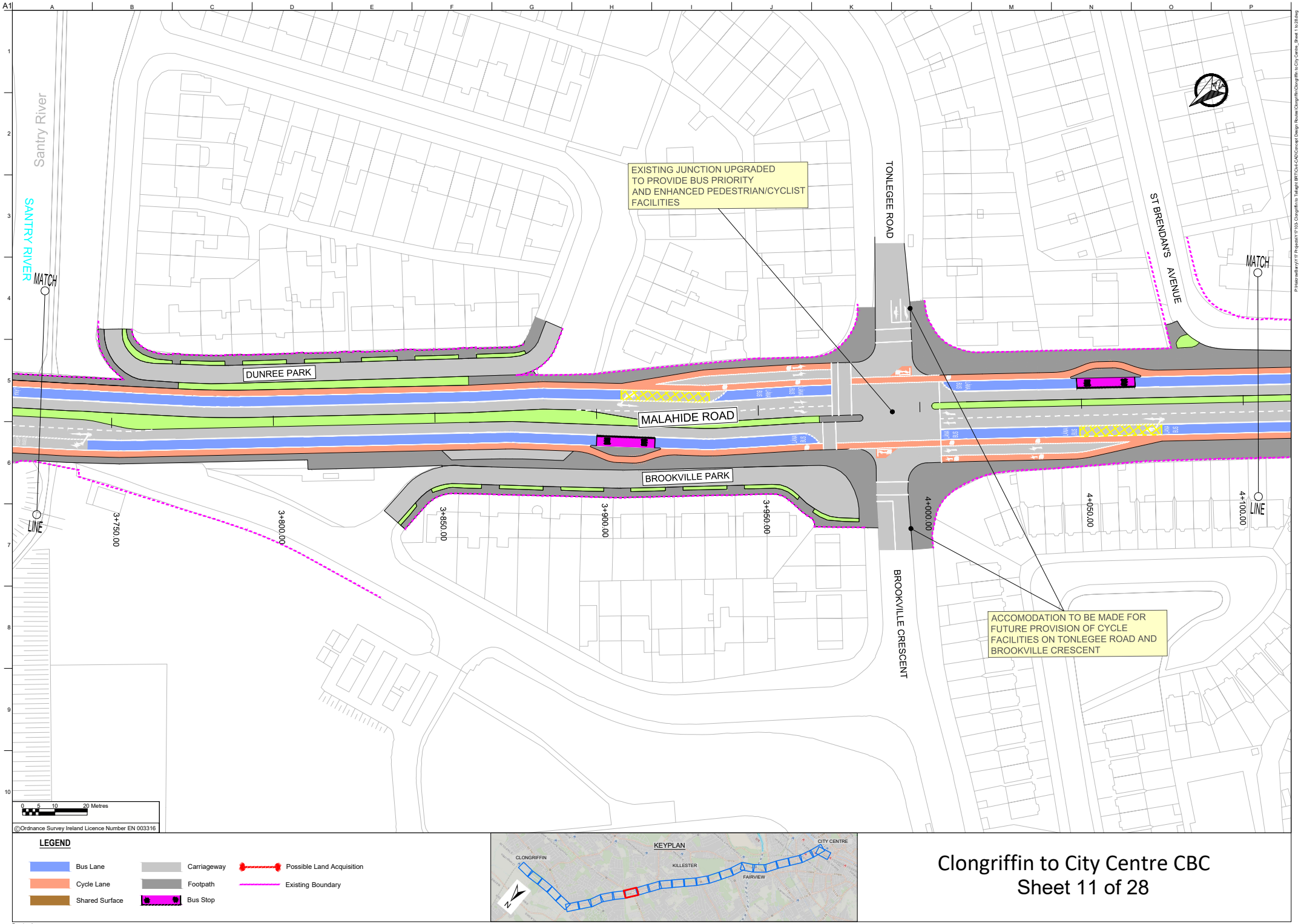

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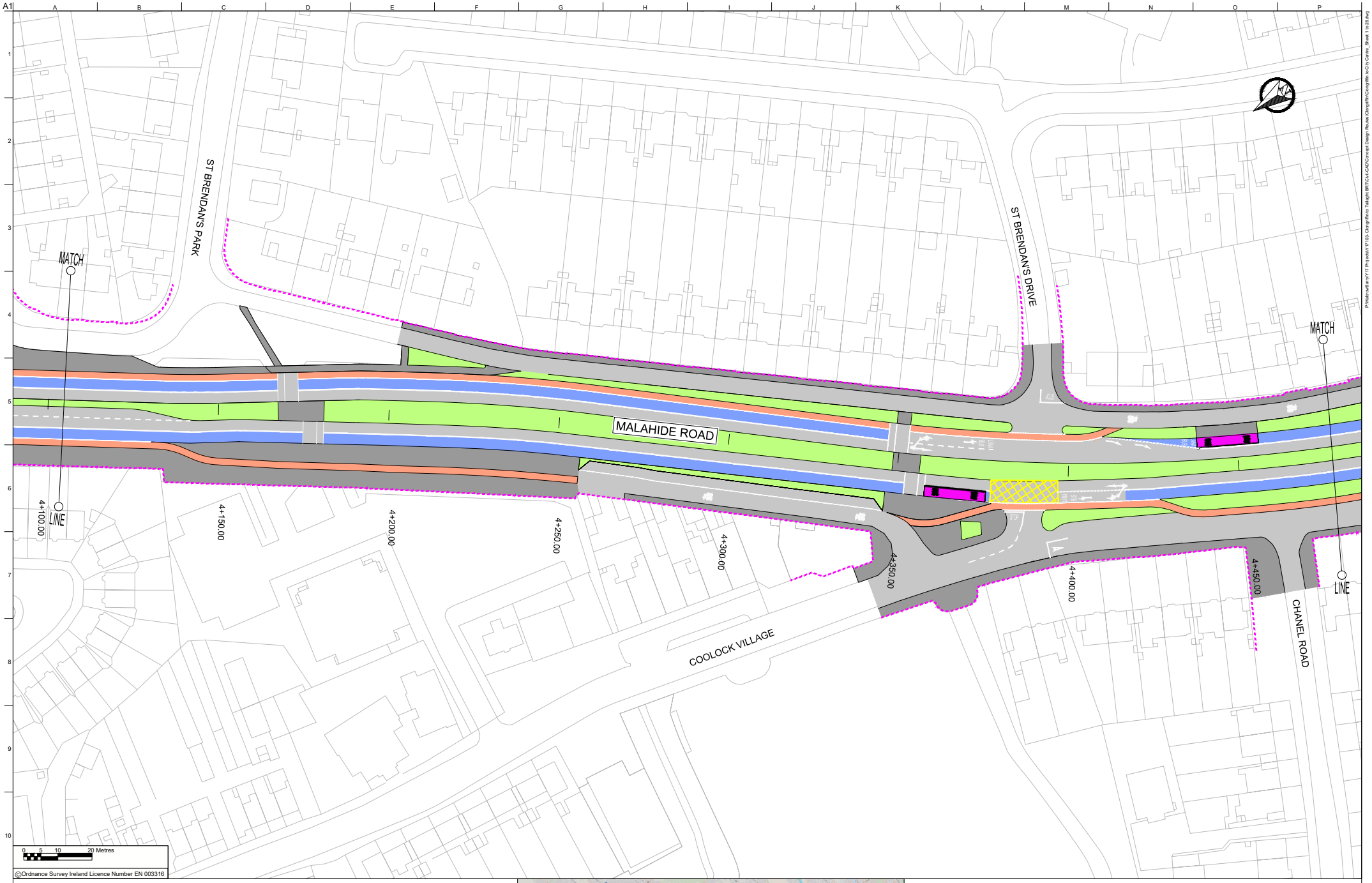

Clongriffin to City Centre CBC
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MASK AVENUE
MASK ROAD
GRACEFIELD ROAD
ST BRENDAN'S AVENUE
MALAHIDE ROAD
BROOKVILLE PARK
MOUNT DILLON COURT
CHANEL ROAD
ARDLEA ROAD
MATCH
LINE
MATCH
LINE
4+500.00
4+550.00
4+600.00
4+650.00
4+700.00
4+750.00
4+800.00
4+850.00
0 5 10 20 Metres
©Ordnance Survey Ireland Licence Number EN 003316
LEGEND
Bus Lane
Cycle Lane
Shared Surface
Carriageway
Footpath
Bus Stop
Possible Land Acquisition
Existing Boundary
KEYPLAN
CLONGRIFFIN
KILLESTER
FAIRVIEW
CITY CENTRE
Clongriffin to City Centre CBC
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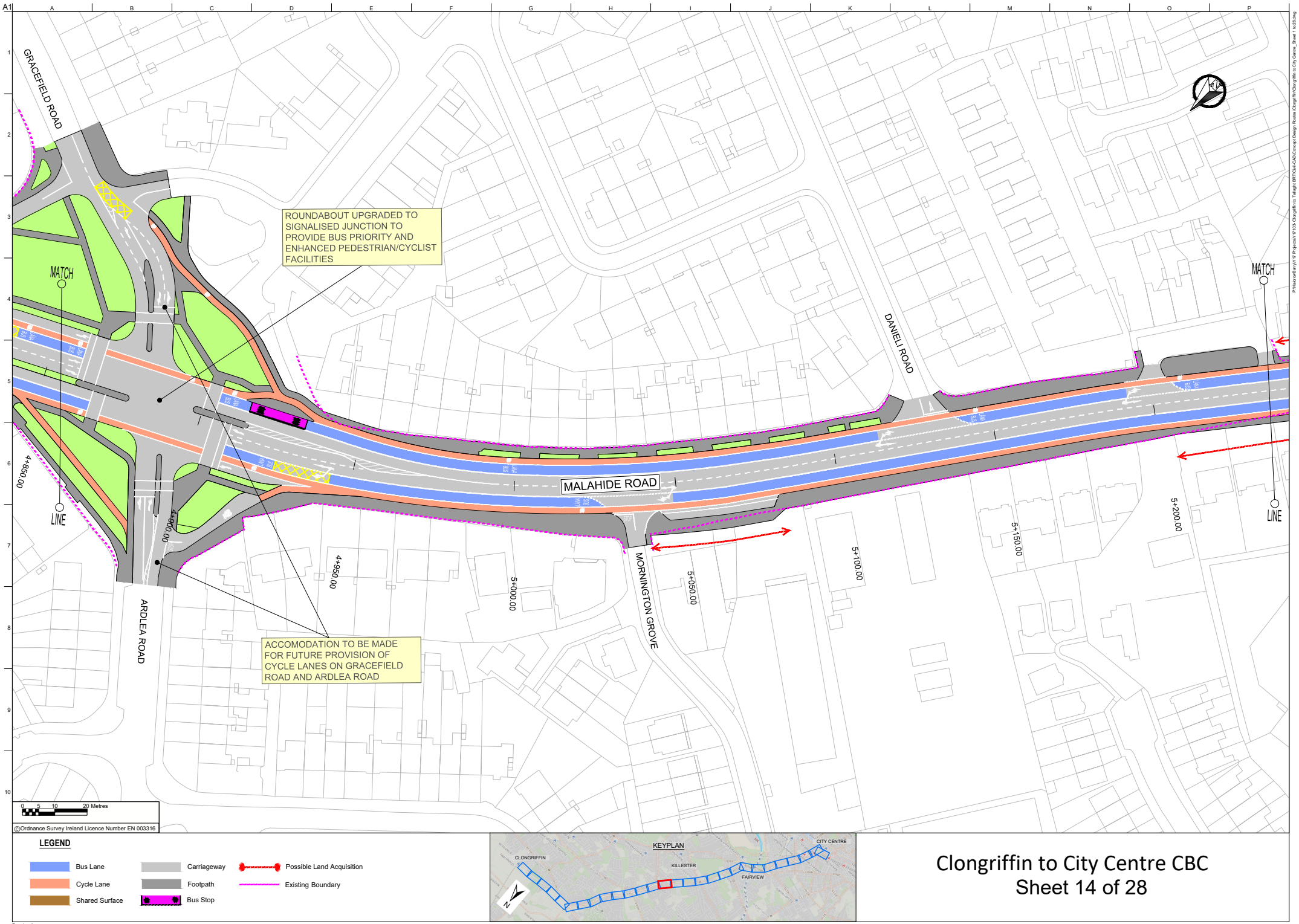

Clongriffin to City Centre CBC
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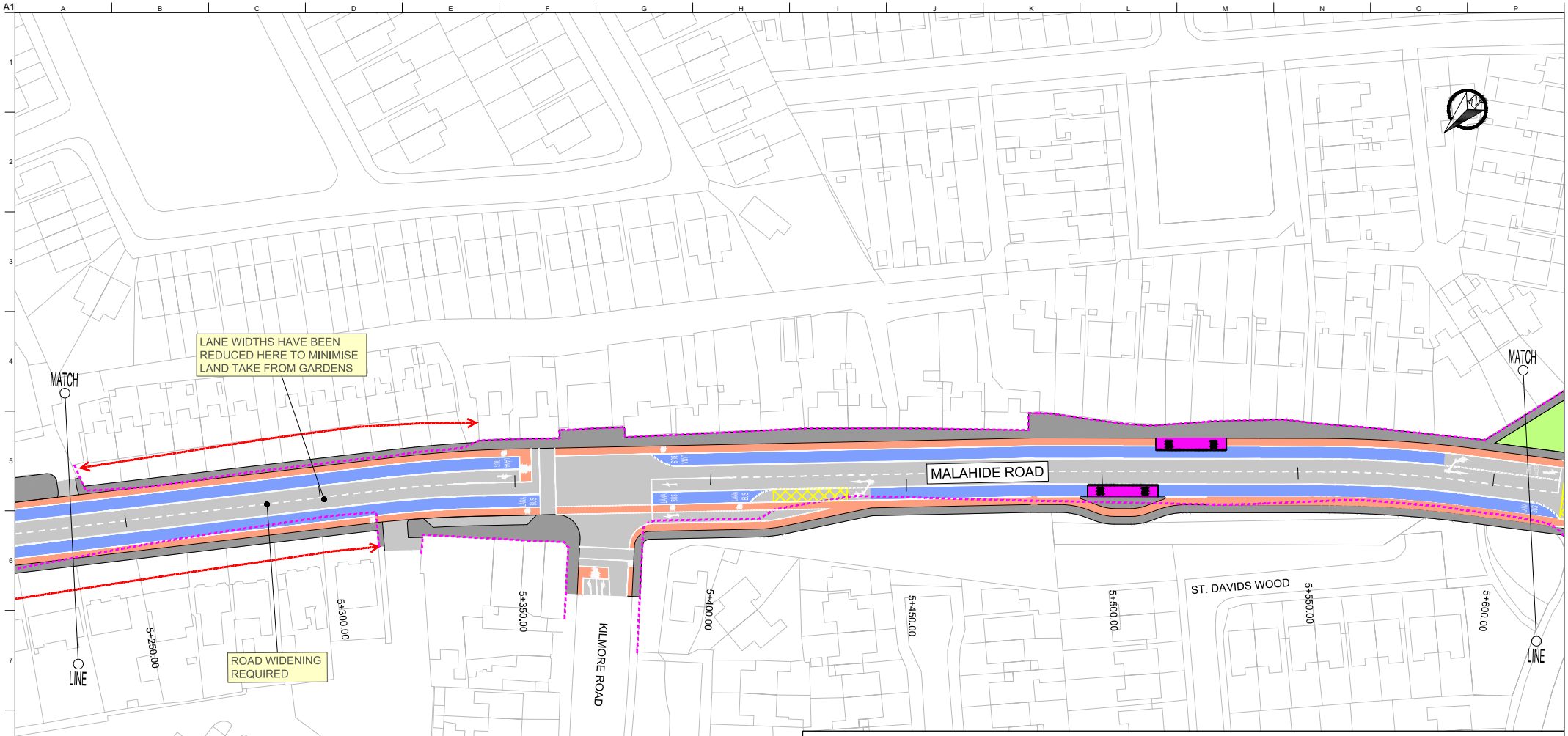
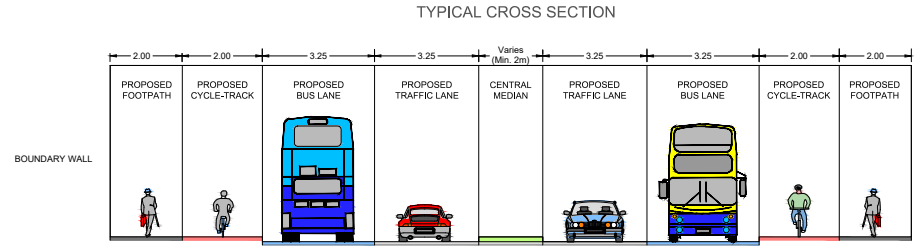
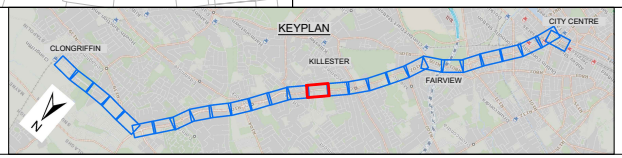




0 5 10 20 Metres

LEGEND

- Bus Lane
- Cycle Lane
- Shared Surface
- Carriageway
- Footpath
- Bus Stop
- Possible Land Acquisition
- Existing Boundary



Clongriffin to City Centre CBC
Sheet 15 of 28

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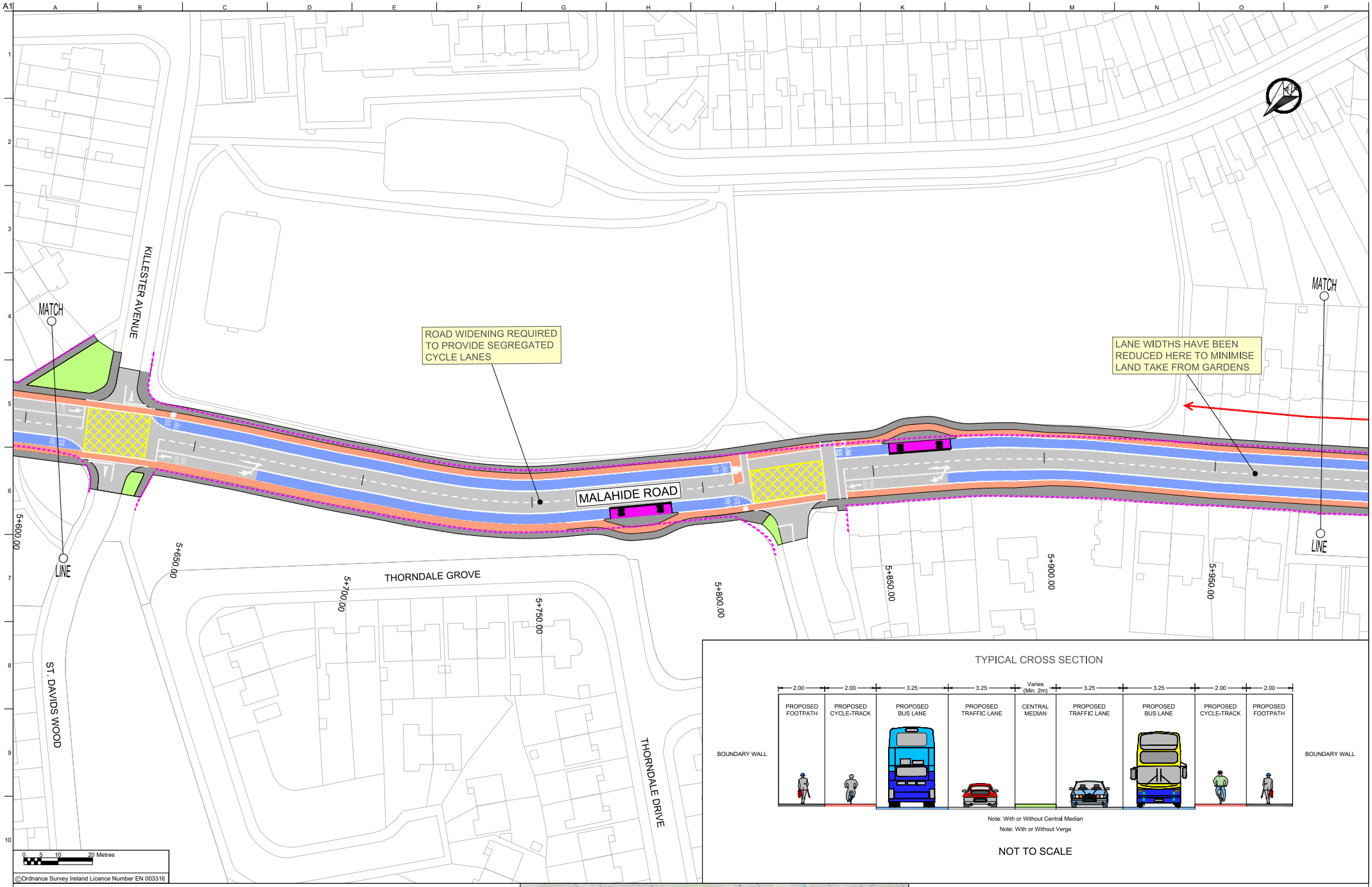


TYPICAL CROSS SECTION

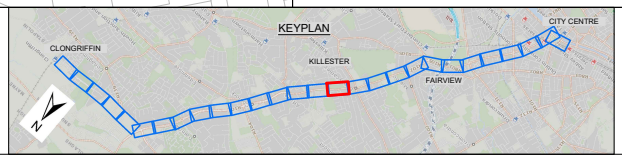
Note: With or Without Central Median

Note: With or Without Verge

NOT TO SCALE

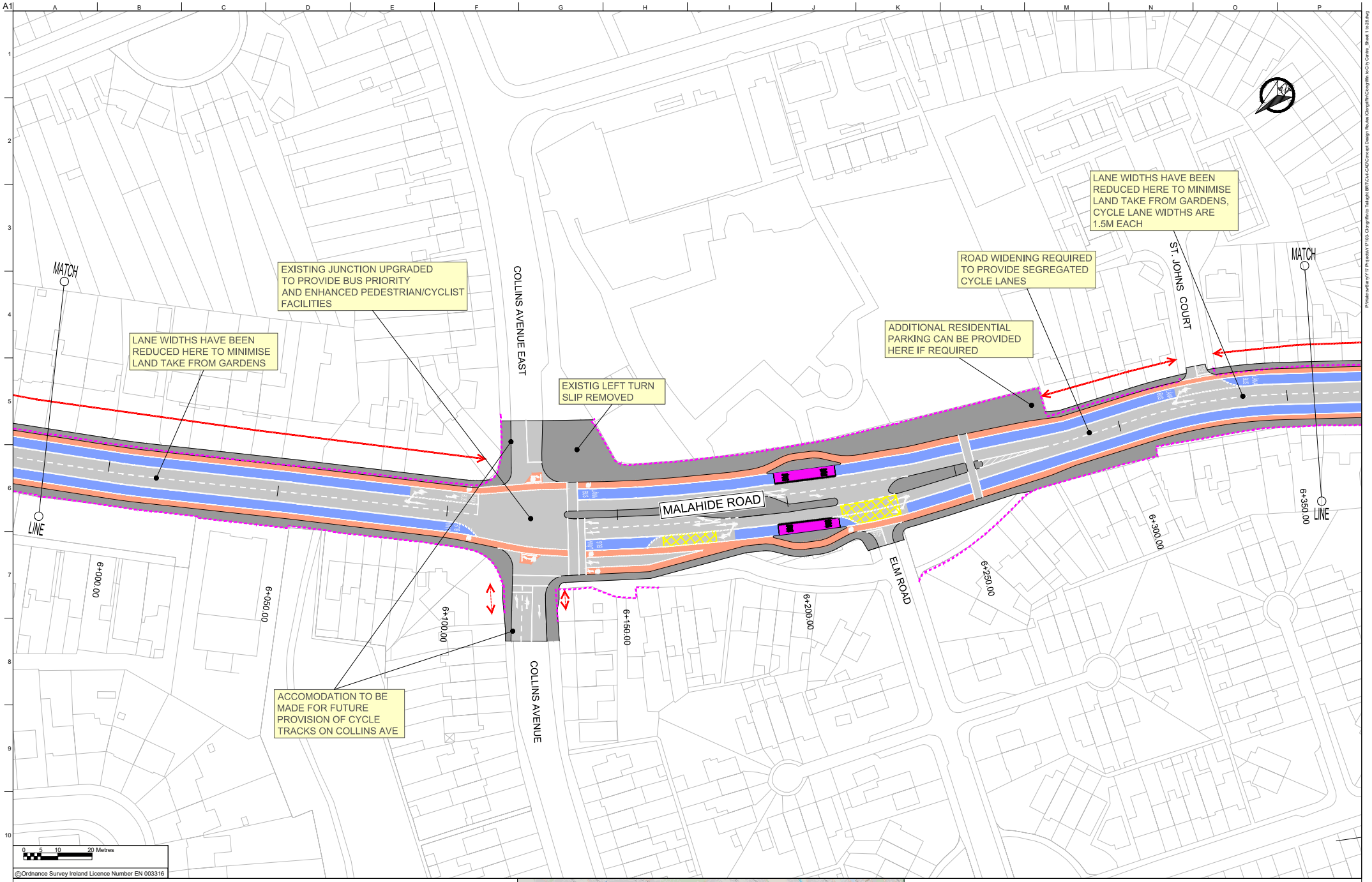
LEGEND

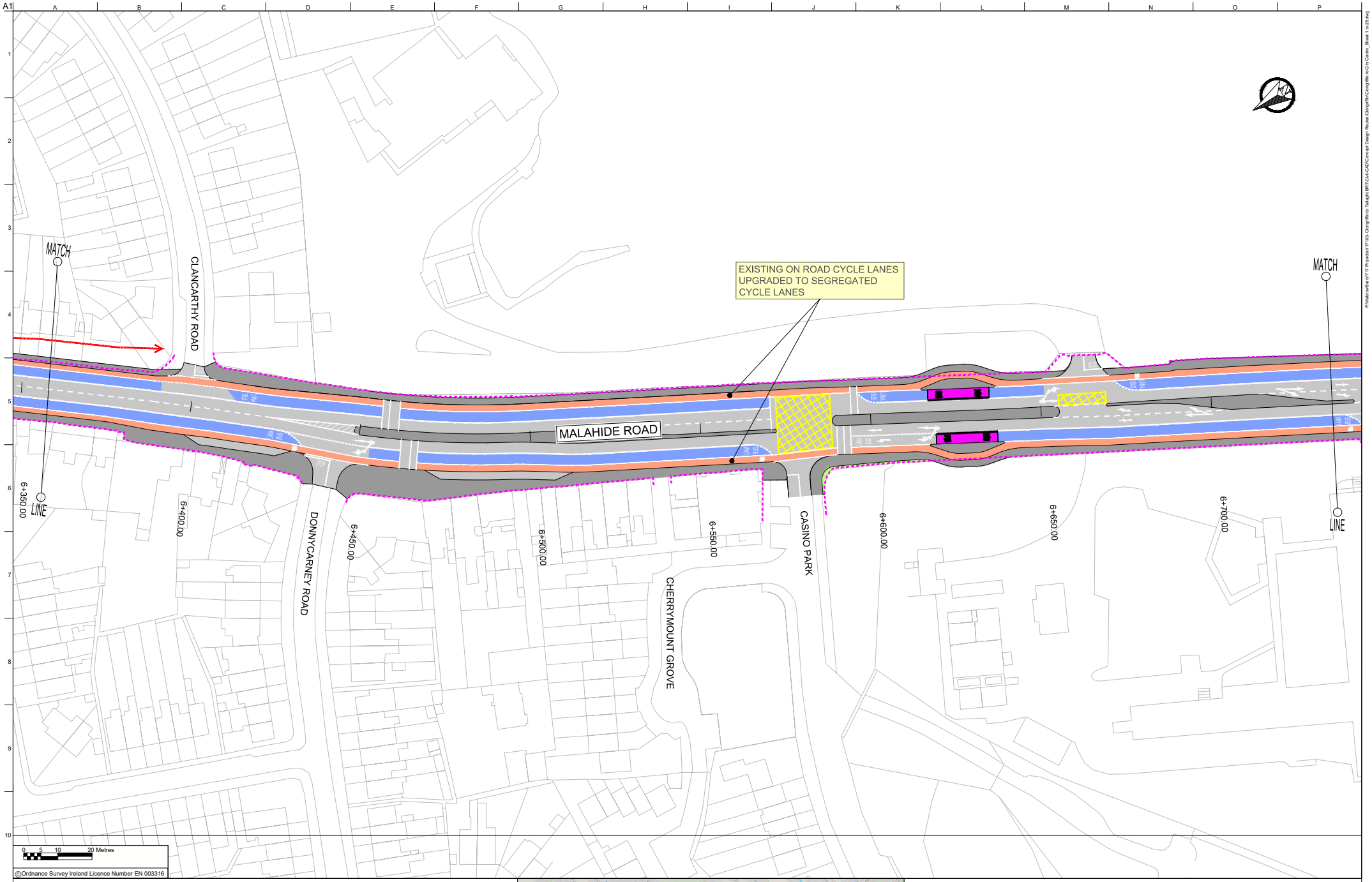
- Bus Lane
- Cycle Lane
- Shared Surface
- Carriageway
- Footpath
- Bus Stop
- Possible Land Acquisition
- Existing Boundary



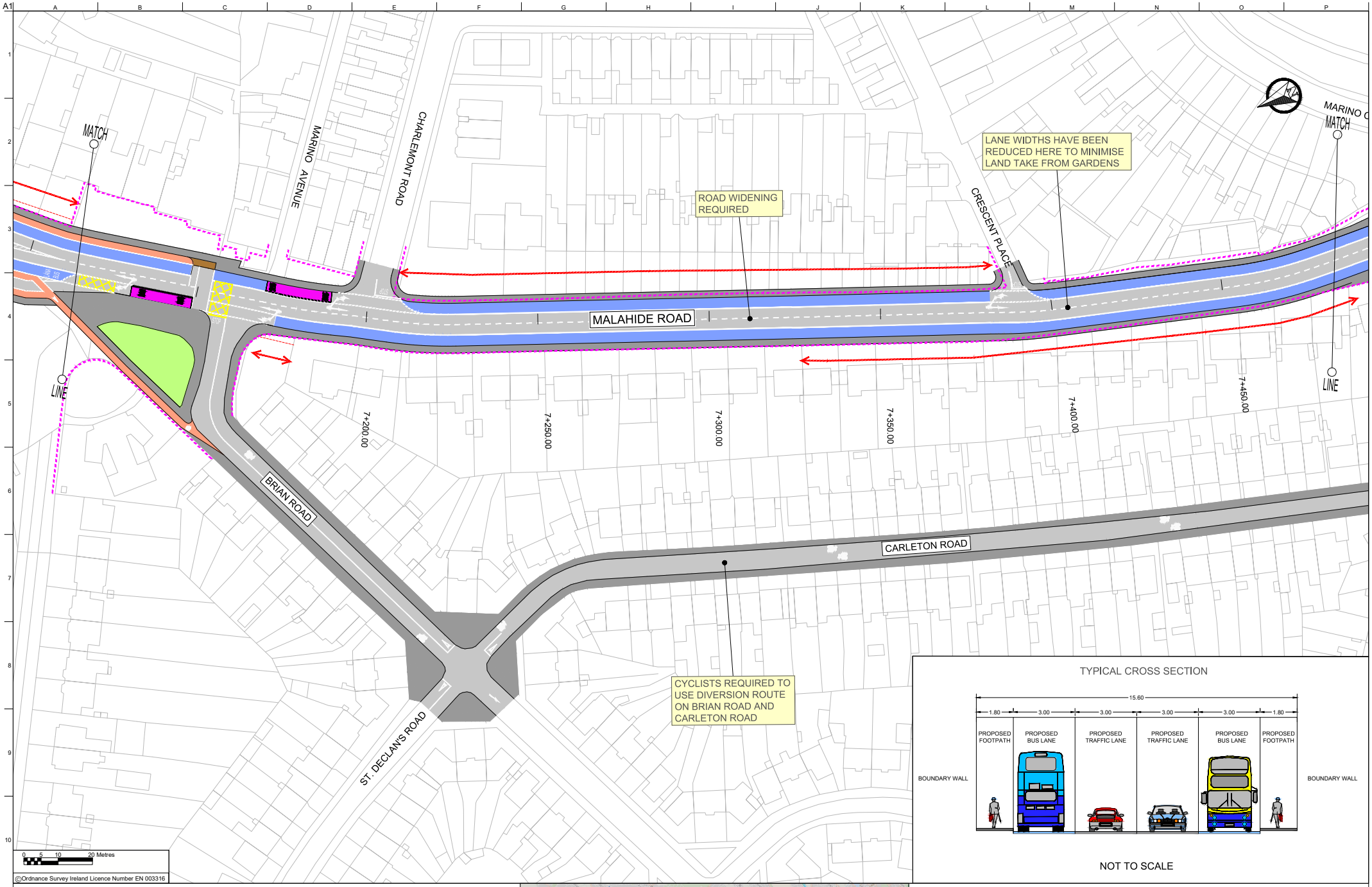
Clongriffin to City Centre CBC
Sheet 16 of 28

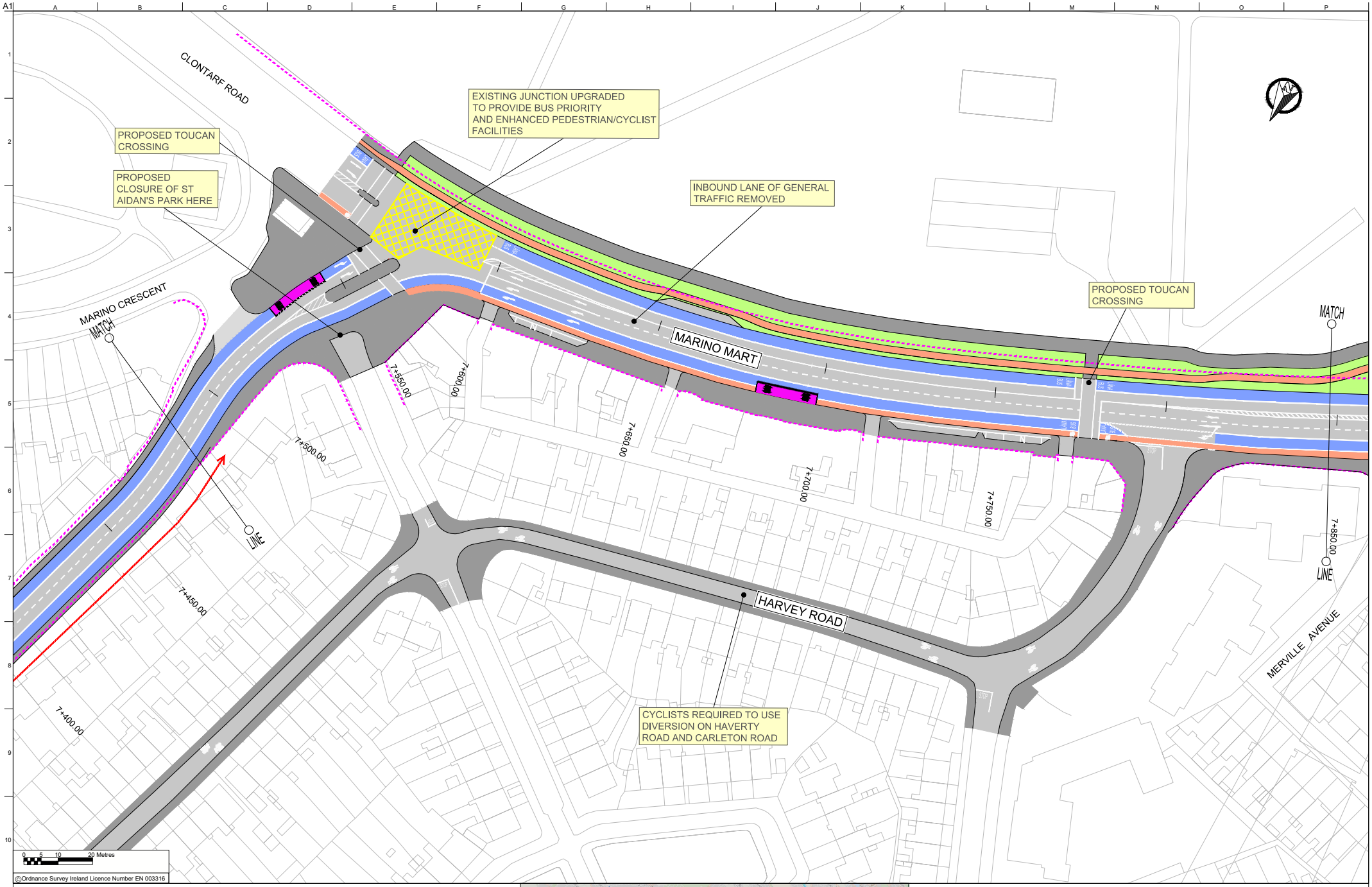
Do not scale


MATCH
LINE
EXISTING JUNCTION UPGRADED TO PROVIDE BUS PRIORITY AND ENHANCED PEDESTRIAN/CYCLIST FACILITIES
LANE WIDTHS HAVE BEEN REDUCED HERE TO MINIMISE LAND TAKE FROM GARDENS
COLLINS AVENUE EAST
EXISTIG LEFT TURN SLIP REMOVED
ROAD WIDENING REQUIRED TO PROVIDE SEGREGATED CYCLE LANES
ADDITIONAL RESIDENTIAL PARKING CAN BE PROVIDED HERE IF REQUIRED
LANE WIDTHS HAVE BEEN REDUCED HERE TO MINIMISE LAND TAKE FROM GARDENS, CYCLE LANE WIDTHS ARE 1.5M EACH
ST. JOHNS COURT
MALAHIDE ROAD
ELM ROAD
COLLINS AVENUE
ACCOMODATION TO BE MADE FOR FUTURE PROVISION OF CYCLE TRACKS ON COLLINS AVE
6+000.00
6+050.00
6+100.00
6+150.00
6+200.00
6+250.00
6+300.00
6+350.00
0 5 10 20 Metres
©Ordnance Survey Ireland Licence Number EN 003316
LEGEND
Bus Lane
Cycle Lane
Shared Surface
Carriageway
Footpath
Bus Stop
Possible Land Acquisition
Existing Boundary
KEYPLAN
CLONGRIFFIN
KILLESTER
FAIRVIEW
CITY CENTRE
Clongriffin to City Centre CBC
Sheet 17 of 28
Do not scale


MATCH
LINE
CLANCARTHY ROAD
EXISTING ON ROAD CYCLE LANES
UPGRADED TO SEGREGATED
CYCLE LANES
MALAHIDE ROAD
MATCH
LINE
6+350.00
6+400.00
DONNYCARNEY ROAD
6+450.00
6+500.00
6+550.00
CHERRYMOUNT GROVE
CASINO PARK
6+600.00
6+650.00
6+700.00
0 5 10 20 Metres
©Ordnance Survey Ireland Licence Number EN 003316
LEGEND
Bus Lane
Cycle Lane
Shared Surface
Carriageway
Footpath
Bus Stop
Possible Land Acquisition
Existing Boundary
KEYPLAN
CLONGRIFFIN
KILLESTER
FAIRVIEW
CITY CENTRE
Clongriffin to City Centre CBC
Sheet 18 of 28
Do not scale


MATCH
LINE
MALAHIDE ROAD
COPELAND AVENUE
GRIFFITH AVENUE
6+750.00
6+800.00
6+850.00
6+900.00
6+950.00
7+000.00
7+050.00
7+100.00
0 5 10 20 Metres
©Ordnance Survey Ireland Licence Number EN 003316
LEGEND
Bus Lane
Cycle Lane
Shared Surface
Carriageway
Footpath
Bus Stop
Possible Land Acquisition
Existing Boundary
KEYPLAN
CLONGRIFFIN
KILLESTER
FAIRVIEW
CITY CENTRE
Clongriffin to City Centre CBC
Sheet 19 of 28
Do not scale


MATCH
MARINO AVENUE
CHARLEMONT ROAD
ROAD WIDENING REQUIRED
LANE WIDTHS HAVE BEEN REDUCED HERE TO MINIMISE LAND TAKE FROM GARDENS
CRESCENT PLACE
MARINO C
MATCH
MALAHIDE ROAD
LINE
LINE
7+200.00
7+250.00
7+300.00
7+350.00
7+400.00
7+450.00
BRIAN ROAD
CARLETON ROAD
ST. DECLAN'S ROAD
CYCLISTS REQUIRED TO USE DIVERSION ROUTE ON BRIAN ROAD AND CARLETON ROAD
0 5 10 20 Metres
©Ordnance Survey Ireland Licence Number EN 003316
LEGEND
Bus Lane
Cycle Lane
Shared Surface
Carriageway
Footpath
Bus Stop
Possible Land Acquisition
Existing Boundary
KEYPLAN
CLONGRIFFIN
KILLESTER
FAIRVIEW
CITY CENTRE
TYPICAL CROSS SECTION
15.60
1.80
3.00
3.00
3.00
3.00
1.80
PROPOSED FOOTPATH
PROPOSED BUS LANE
PROPOSED TRAFFIC LANE
PROPOSED TRAFFIC LANE
PROPOSED BUS LANE
PROPOSED FOOTPATH
BOUNDARY WALL
BOUNDARY WALL
NOT TO SCALE
Clongriffin to City Centre CBC
Sheet 20 of 28



Clongriffin to City Centre CBC
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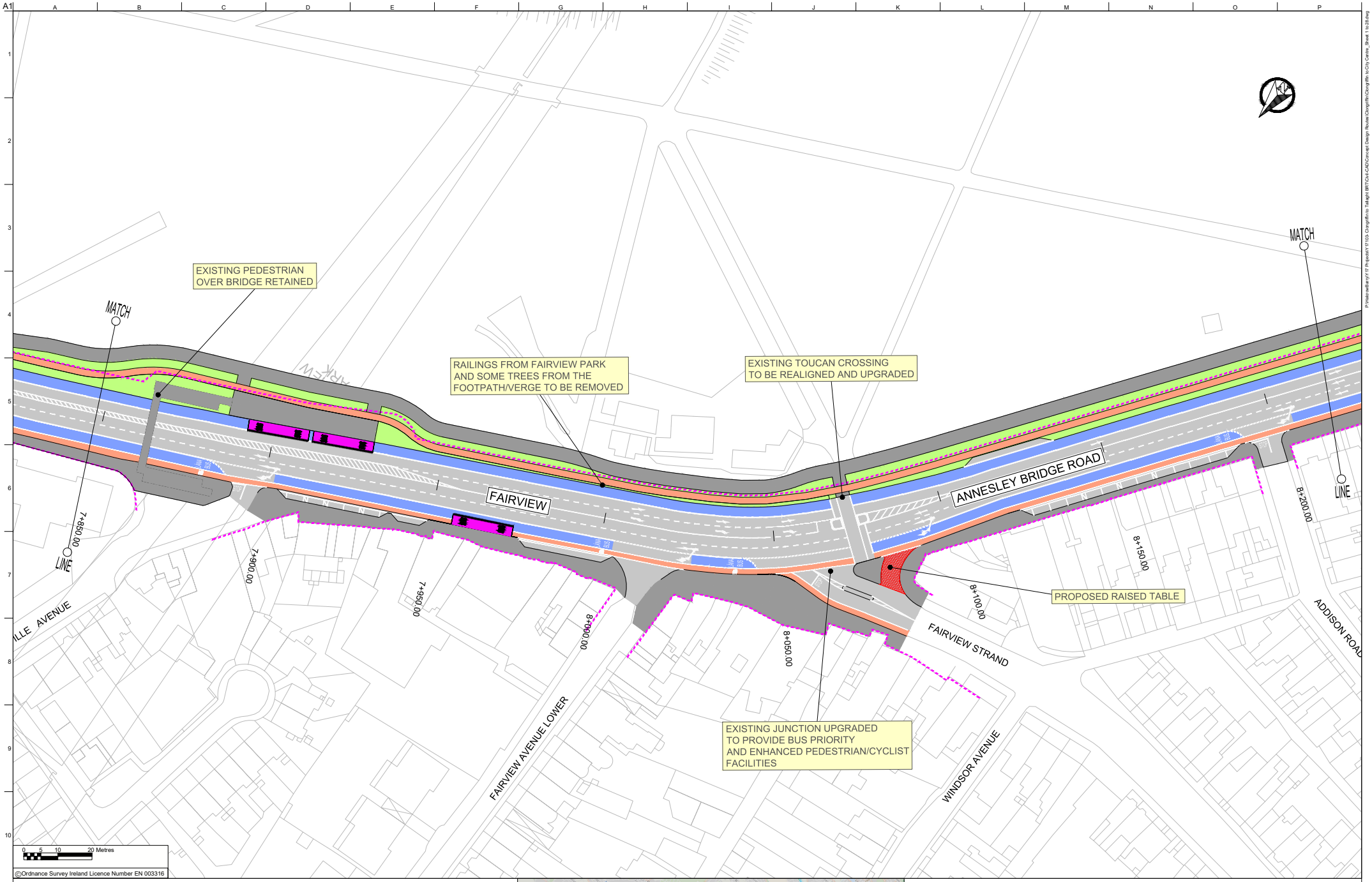

Clongriffin to City Centre CBC
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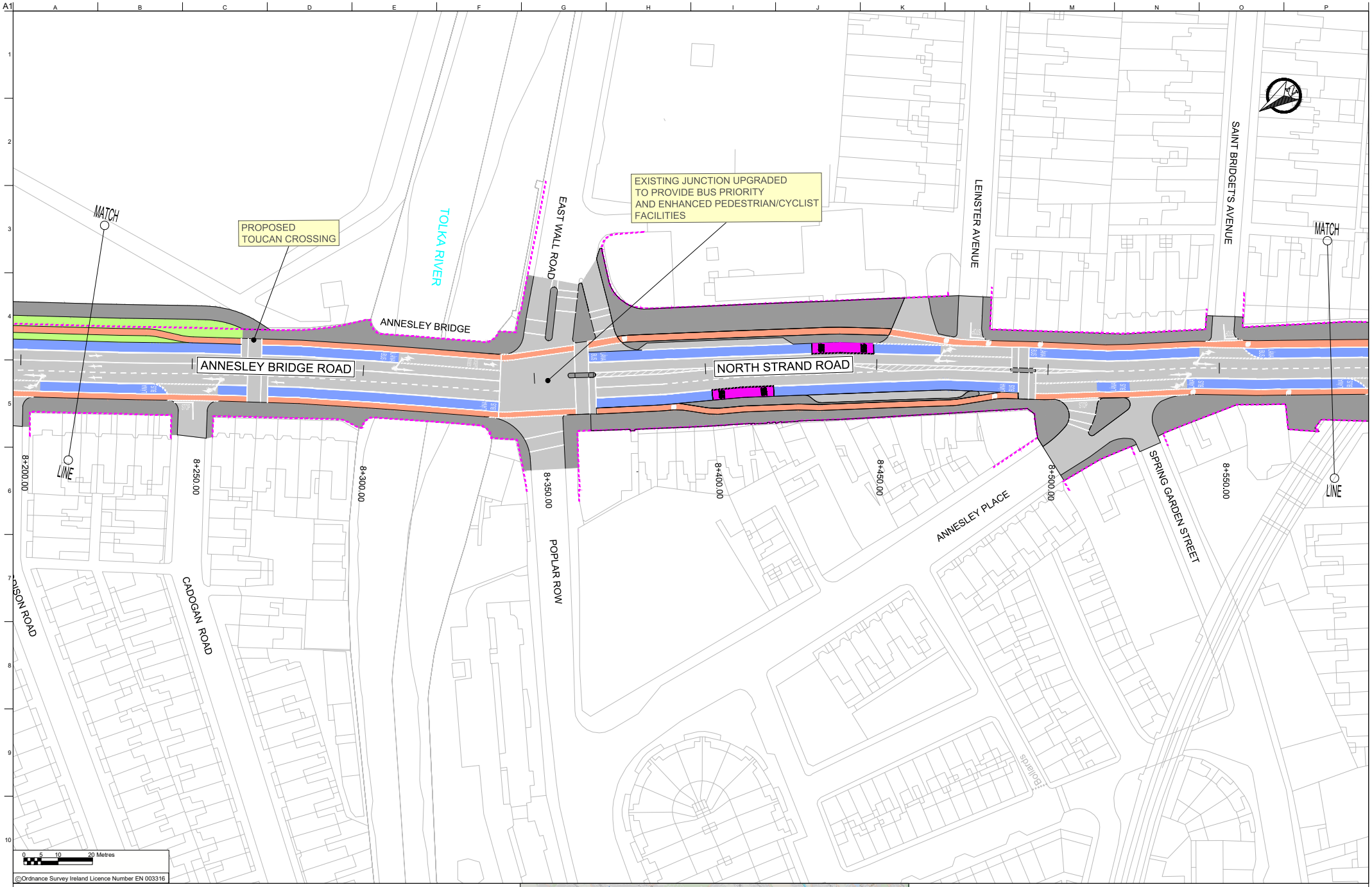
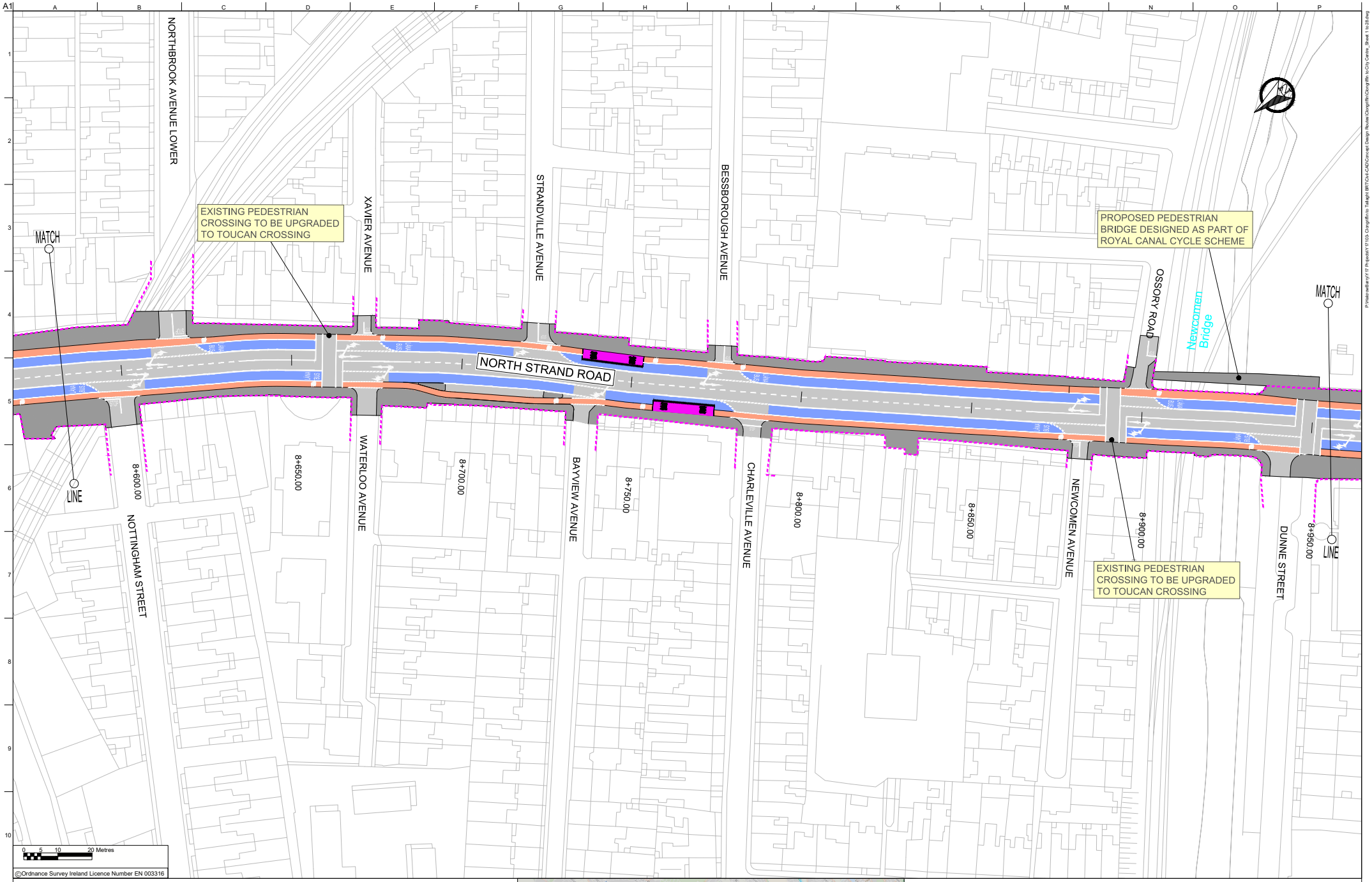

MATCH
PROPOSED
TOUCAN CROSSING
TOLKA RIVER
EAST WALL ROAD
EXISTING JUNCTION UPGRADED
TO PROVIDE BUS PRIORITY
AND ENHANCED PEDESTRIAN/CYCLIST
FACILITIES
LEINSTER AVENUE
SAINT BRIDGET'S AVENUE
MATCH
ANNESLEY BRIDGE
ANNESLEY BRIDGE ROAD
NORTH STRAND ROAD
LINE
8+200.00
8+250.00
8+300.00
8+350.00
8+400.00
8+450.00
8+500.00
8+550.00
ANNESLEY PLACE
SPRING GARDEN STREET
LINE
POPLAR ROW
CADOGAN ROAD
0 5 10 20 Metres
©Ordnance Survey Ireland Licence Number EN 003316
LEGEND
Bus Lane
Cycle Lane
Shared Surface
Carriageway
Footpath
Bus Stop
Possible Land Acquisition
Existing Boundary
KEYPLAN
CLONGRIFFIN
KILLESTER
FAIRVIEW
CITY CENTRE
Clongriffin to City Centre CBC
Sheet 23 of 28
Do not scale



Clongriffin to City Centre CBC
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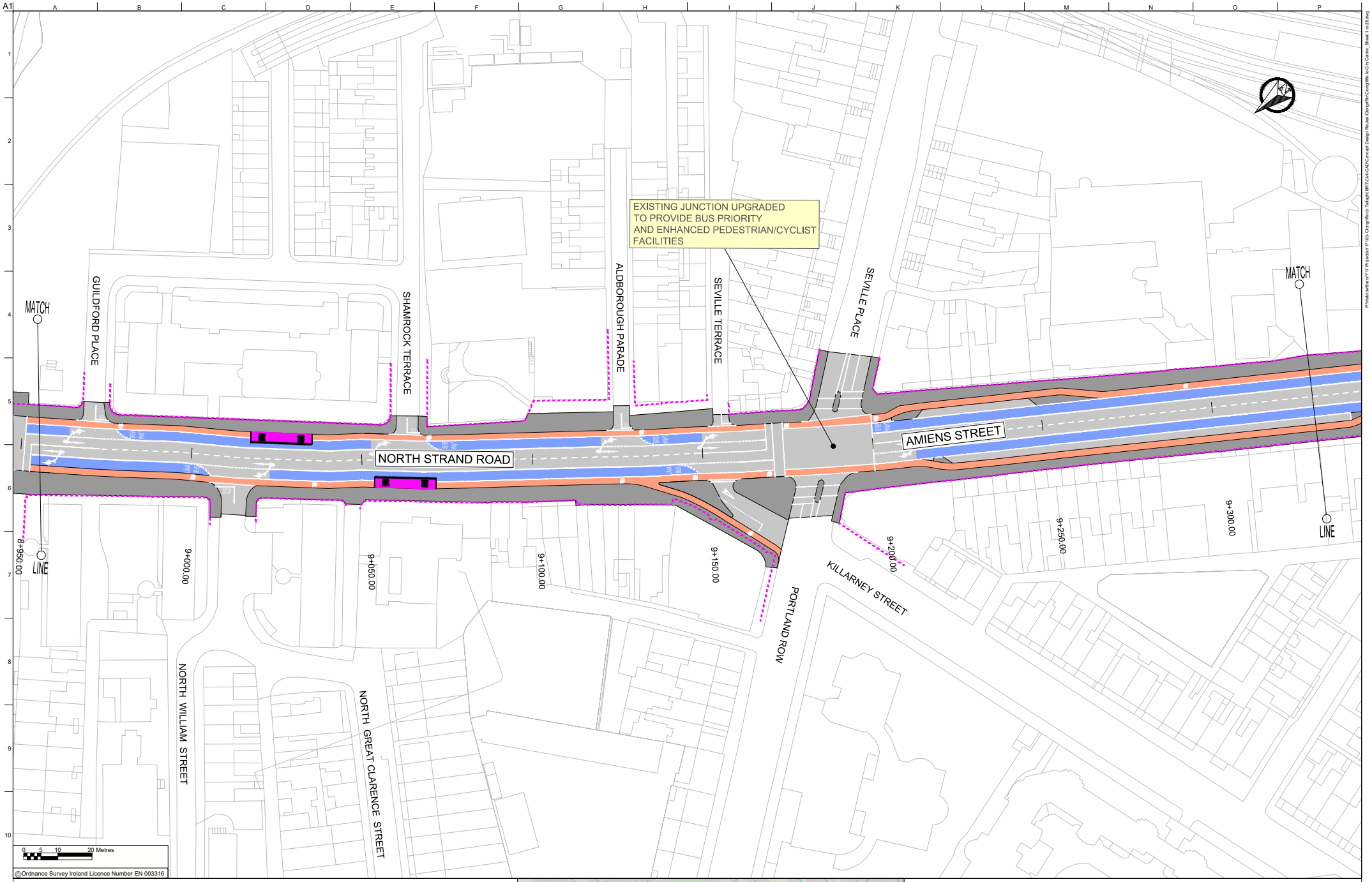
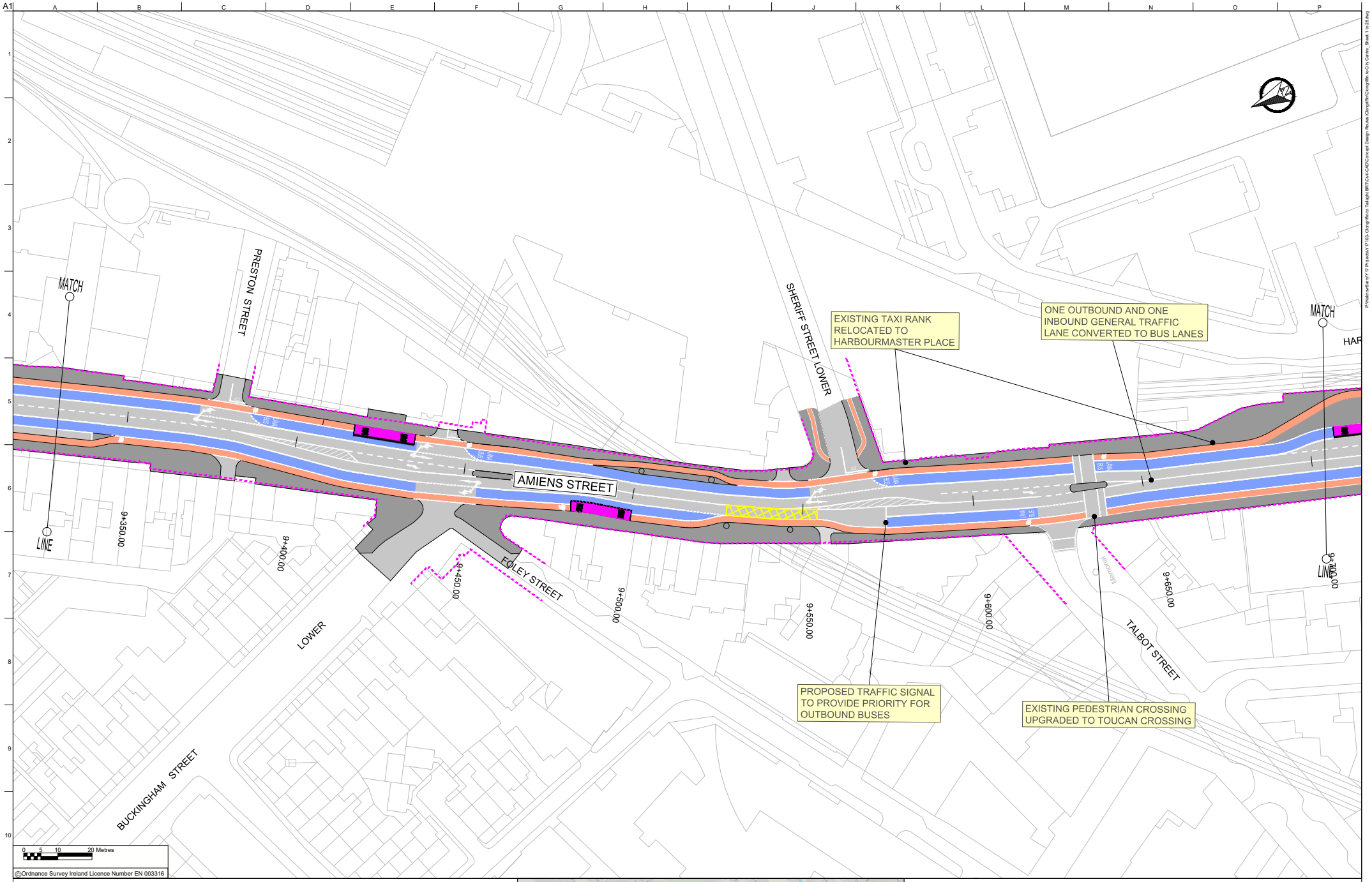

EXISTING JUNCTION UPGRADED
TO PROVIDE BUS PRIORITY
AND ENHANCED PEDESTRIAN/CYCLIST
FACILITIES
MATCH
LINE
GUILDFORD PLACE
SHAMROCK TERRACE
ALDBOROUGH PARADE
SEVILLE TERRACE
SEVILLE PLACE
NORTH STRAND ROAD
AMIENS STREET
8+960.00
9+000.00
9+050.00
9+100.00
9+150.00
9+200.00
9+250.00
9+300.00
KILLARNEY STREET
PORTLAND ROW
NORTH WILLIAM STREET
NORTH GREAT CLARENCE STREET
0 5 10 20 Metres
©Ordnance Survey Ireland Licence Number EN 003316
LEGEND
Bus Lane
Cycle Lane
Shared Surface
Carriageway
Footpath
Bus Stop
Possible Land Acquisition
Existing Boundary
KEYPLAN
CLONGRIFFIN
KILLESTER
FAIRVIEW
CITY CENTRE
Clongriffin to City Centre CBC
Sheet 25 of 28
Do not scale



Clongriffin to City Centre CBC
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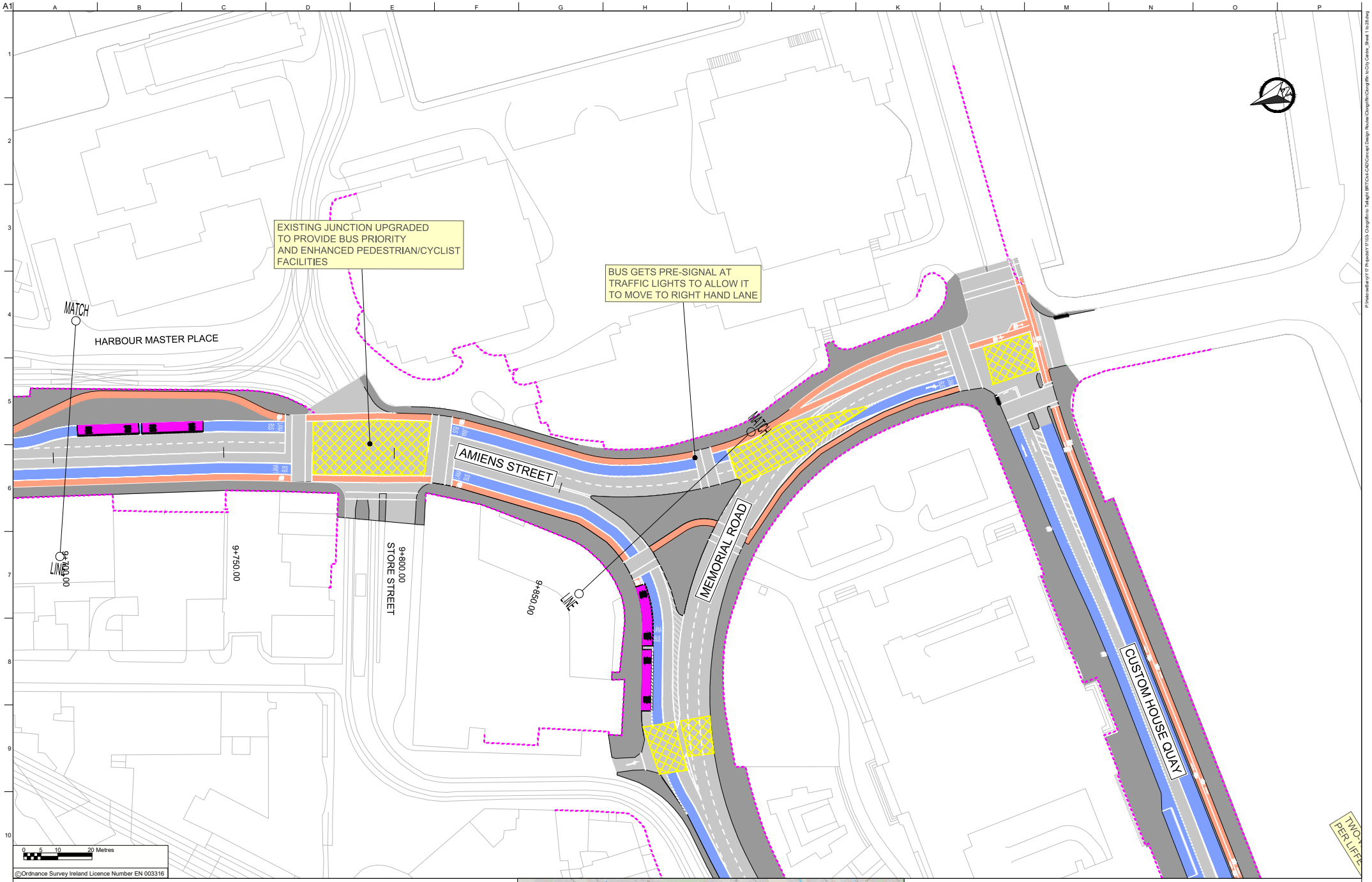
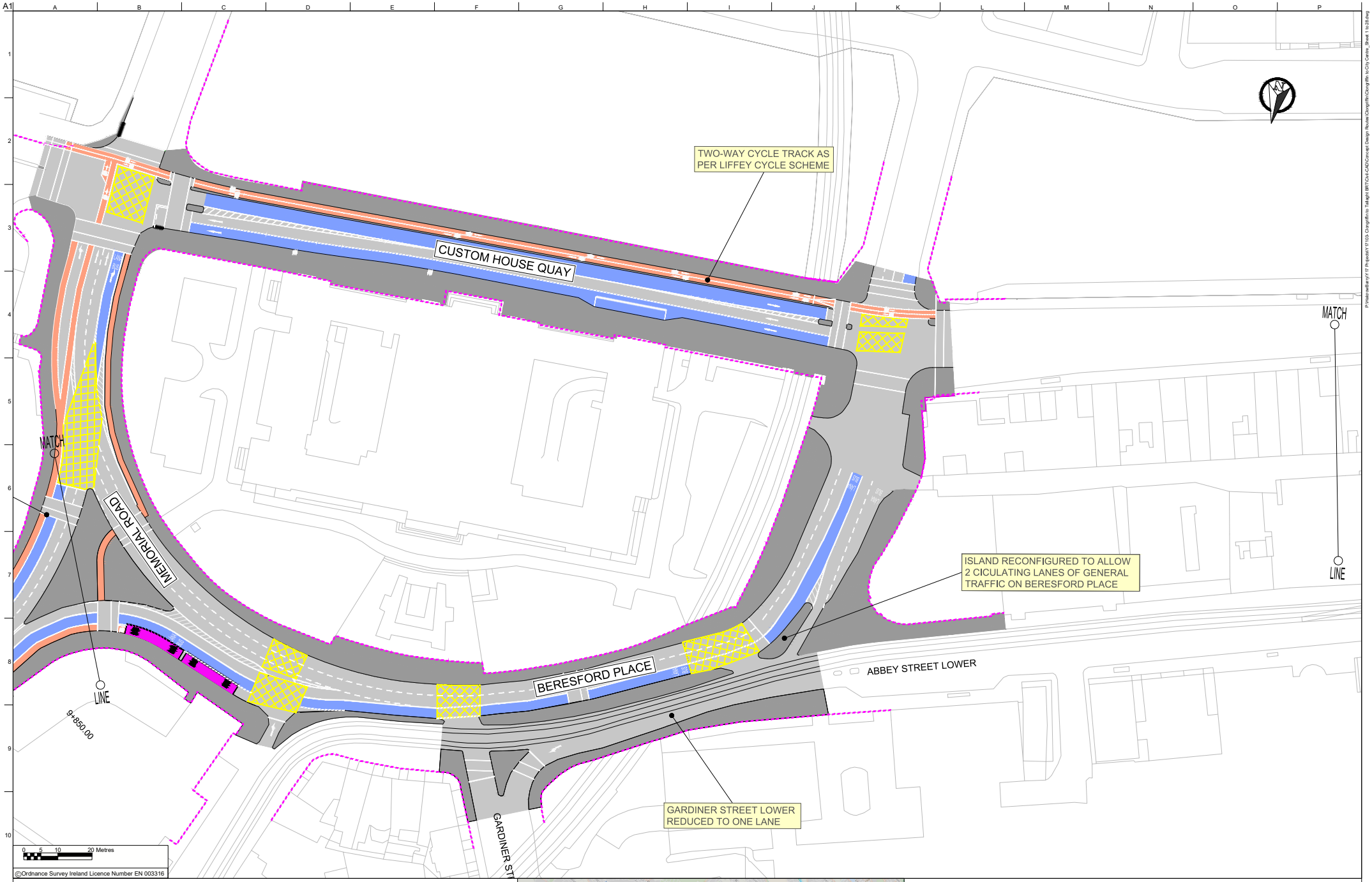

EXISTING JUNCTION UPGRADED
TO PROVIDE BUS PRIORITY
AND ENHANCED PEDESTRIAN/CYCLIST
FACILITIES
BUS GETS PRE-SIGNAL AT
TRAFFIC LIGHTS TO ALLOW IT
TO MOVE TO RIGHT HAND LANE
MATCH
HARBOUR MASTER PLACE
AMIENS STREET
MEMORIAL ROAD
CUSTOM HOUSE QUAY
STORE STREET
9+700.00
9+750.00
9+800.00
9+850.00
LINE
0 5 10 20 Metres
©Ordnance Survey Ireland Licence Number EN 003316
LEGEND
Bus Lane
Cycle Lane
Shared Surface
Carriageway
Footpath
Bus Stop
Possible Land Acquisition
Existing Boundary
KEYPLAN
CLONGRIFFIN
KILLESTER
FAIRVIEW
CITY CENTRE
Clongriffin to City Centre CBC
Sheet 27 of 28
Do not scale


TWO-WAY CYCLE TRACK AS PER LIFFEY CYCLE SCHEME
CUSTOM HOUSE QUAY
MATCH
LINE
MEMORIAL ROAD
BERESFORD PLACE
ISLAND RECONFIGURED TO ALLOW 2 CICULATING LANES OF GENERAL TRAFFIC ON BERESFORD PLACE
ABBEY STREET LOWER
GARDINER STREET LOWER REDUCED TO ONE LANE
GARDINER ST
9+850.00
0 5 10 20 Metres
©Ordnance Survey Ireland Licence Number EN 003316
LEGEND
Bus Lane
Cycle Lane
Shared Surface
Carriageway
Footpath
Bus Stop
Possible Land Acquisition
Existing Boundary
KEYPLAN
CLONGRIFFIN
KILLESTER
FAIRVIEW
CITY CENTRE
Clongriffin to City Centre CBC
Sheet 28 of 28
Do not scale

Stage 2			Section 1 - Clongriffin/Belmayne MCA		
Assessment Criteria	**Sub-Criteria**		**Route 1**	**Route 2**	**Route 3**
Economy	Capital Cost		**Total - €3.8M** **Cost per KM - €3.2M** *Indicative Scheme Infrastructure Works Cost - €3.8M* *Private Land Costs - €0M*	**Total - €4.6M** **Cost per KM - €3.5M** *Indicative Scheme Infrastructure Works Cost - €4.6M* *Private Land Costs - €0M*	**Total - €7.6M** **Cost per KM - €4.4 M** *Indicative Scheme Infrastructure Works Cost - €6.9M* *Private Land Costs - €0.7M*
	Rank				
	Journey-time reliability and quality of service		This scheme has a total length of 1.2 km and from initial journey time calculations, would take an average of **3-3.5 mins.** Full bus priority is provided and so the reliability of these journey times would be good	This scheme has a total length of 1.3 km and from initial journey time calculations, would take an average of **3-3.5 mins.** Full bus priority is provided and so the reliability of these journey times would be good	This scheme has a total length of 1.7 km and from initial journey time calculations, would take an average of **3.5-4 mins.** Full bus priority is provided and so the reliability of these journey times would be good
	Rank				
Integration	Land Use Integration		Would facilitate the full completion of the Clongriffin Main St. from Malahide Rd. to Clongriffin as outlined in the North Fringe LAP	Would only facilitate the partial completion of the Clongriffin Main St. between Belmayne and Clongriffin as outlined in the North Fringe LAP	Would not facilitate the completion of Clongriffin Main St.
	Rank				
	Residential Catchment (10 Mins)		14123	14653	17030
	Employment Catchment (10 Mins)		1620	1623	2226
	Total residential and employment (10 mins)		15744* *Development planned in Belmayne/Clongriffin that will likely increase figures for this scheme	16276* *Development planned in Belmayne/Clongriffin that will likely increase figures for this scheme	19255
	Rank				
	Public Transport Integration		Integrates with other Dublin Bus services	Integrates with other Dublin Bus services	Integrates with other Dublin Bus services
	Traffic Network Integration		Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion
	Rank				
	Cyclists and pedestrian Integration		Cyclists would be diverted along R139	Cycle lanes would be provided along the R139 portion of the scheme	Full cyclist integration can be achieved through this scheme.
	Rank				
Accessibility and Social Inclusion	High Volume Trip Attractors (Education, Health, Commercial, Retail, Leisure)		Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion
	Rank				
	Deprived Geographic Areas & Areas Underserved by Public Transport		Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion
	Rank				
Safety	Road Safety		Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion
	Rank				
	Archaeological, Architectural and Cultural Heritage	Zones of Archaeological Protection	None	None	Traverses zone of archaeological potential (ZAP) for Grange Abbey, National Monument (NM) No. 605. The abbey church & graveyard (RMP DU015-069) are located on north side of Grange Road, adjacent the route.
		Record of Monument and Places (RMP)	No RMP sites in proximity	No RMP sites in proximity	Potential that features associated with Grange Abbey might extend into the road, albeit heavily truncated or indeed removed by subsequent road development.
		Protected Structures	No RPS / NIAH sites in proximity	No RPS / NIAH sites in proximity	No RPS / NIAH sites in proximity
		Summary	Greenfield archaeological potential where new western section of link road is proposed & in area of road widening	Greenfield archaeological potential in area of road widening	Potential that features associated with Grange Abbey (National Monument) might extend into the road, albeit heavily truncated or indeed removed by subsequent road development. Greenfield archaeological potential in area of road widening, especially given relative proximity to Grange Abbey
	Rank				

Flora and Fauna	EU Sites	There is no apparent hydrological connectivity to European Sites of Conservation of Importance downstream of this route option in Dublin Bay.	There is no apparent hydrological connectivity to European Sites of Conservation of Importance downstream of this route option in Dublin Bay.	There is no apparent hydrological connectivity to European Sites of Conservation of Importance downstream of this route option in Dublin Bay.
	Ecological Land Take	Land-take is expected to result in the loss of green space and derelict ground along the proposed route option including an area of Clongriffin Main Street currently under construction (along the proposed new bus and cycle lanes) as well as amenity areas along sections of Route Option 1.	Land-take is expected to result in the loss of road verge, recently planted trees and derelict or built ground along Belmayne Avenue as well as derelict ground along sections of this option.	Land-take would result in the loss of road verge and curtilage (garden frontage, predominantly recently planted trees and hedging) along the Hole in the Wall Road.
	Areas of high ecological values	There are few areas of ecological interest along Clongriffin Main Street including a section connecting to the Malahide Road, currently under construction, much of this route option comprises built-on ground. Loss of areas with a high ecological value will be minimal along much the extent of this route option.	The route option would impinge on few areas of ecological potential or connectivity. Land-take may include loss of recently planted streetscape trees and road verge along Belmayne Avenue and a long a section of the R139 with low ecological value.	Land-take would include the loss of margins of amenity areas. There are few areas of ecological interest which will be impacted by this route option, according to AutoCAD maps.
	Salmonid Watercourses	A single waterbody includes the man-made lake in Father Collins Park, which should not be impacted along this route option.	No waterbodies occur along this route option.	No waterbodies occur along this route option.
	Invaseive Species	Buddleja davidii (medium impact IAS) occurs in an area under construction on Clongriffin Main Street. Record obtained from the NBDC indicate that the high impact species Greylag Geese occur in the vicinity of the site.	No invasive plant species were recorded along this route option.	No invasive plant species were recorded along this route option.
	NBDC Records	Records of the following protected species were identified in the NBDC database along this scheme option including: Common Kingfisher (Annex I), Northern Shoveler (Annex II), Teal (Annex II), Wigeon (Annex II), Mallard (Annex II), Pink-footed Goose (Annex II), Short-eared Owl (Annex II), Tufted Duck (Annex II), Greater Scaup (Annex II), Common Goldeneye (Annex II), Long-tailed Duck (Annex II), Whooper Swan (Annex II), Little Egret (Annex I), Common Coot (Annex II), Curlew (Annex II), Meadow Barley (Flora Protection Order, 2015) and Petalwort (Annex II).	Records of the following protected species were identified in the NBDC database along this scheme option including: Common Kingfisher (Annex I), Northern Shoveler (Annex II), Teal (Annex II), Wigeon (Annex II), Mallard (Annex II), Pink-footed Goose (Annex II), Short-eared Owl (Annex II), Tufted Duck (Annex II), Greater Scaup (Annex II), Common Goldeneye (Annex II), Long-tailed Duck (Annex II), Whooper Swan (Annex II), Little Egret (Annex I), Common Coot (Annex II), Curlew (Annex II), Ruf (Annex II), Marsh Fritillary (Annex II), Meadow Barley (Flora Protection Order, 2015), Petalwort (Annex II), Otter (Annex II) and Badger (Wildlife Acts 1976-2012).	Records of the following protected species were identified in the NBDC database along this scheme option including: Common Kingfisher (Annex I), Northern Shoveler (Annex II), Teal (Annex II), Wigeon (Annex II), Mallard (Annex II), Pink-footed Goose (Annex II), Short-eared Owl (Annex II), Tufted Duck (Annex II), Greater Scaup (Annex II), Common Goldeneye (Annex II), Long-tailed Duck (Annex II), Whooper Swan (Annex II), Little Egret (Annex I), Common Coot (Annex II), Curlew (Annex II), Ruf (Annex II), Marsh Fritillary (Annex II), Meadow Barley (Flora Protection Order, 2015), Petalwort (Annex II), Otter (Annex II) and Badger (Wildlife Acts 1976-2012).
	Summary	Overall, impacts from the construction of bus and cycle lanes along stretches of this route option are expected to be low.	Overall, impacts from the construction of bus and cycle lanes along stretches of this route option are expected to be low.	Overall, impacts from the construction of bus and cycle lanes along stretches of this route option are expected to be low.
Rank				
Soils and Geology	Groundwater Vulnerability	According to the GSI GeoUrban Viewer, the groundwater vulnerability code is "L". As such groundwater vulnerability is assessed as low through the proposed route option.	According to the GSI GeoUrban Viewer, the groundwater vulnerability code is ranked as Low (L). As such groundwater vulnerability is assessed as low through the proposed route option.	According to the GSI GeoUrban Viewer, the groundwater vulnerability code is ranked as Low (L). As such groundwater vulnerability is assessed as low through the proposed route option.
	Bedrock Geology	According to the GSI GeoUrban Viewer, the Bedrock Geology 100k comprises of the Malahide Formation, that is Argillaceous bioclastic limestone, shale.	According to the GSI GeoUrban Viewer, the Bedrock Geology (100k series) comprises of the Malahide Formation comprising Argillaceous bioclastic limestone and shale.	According to the GSI GeoUrban Viewer, the Bedrock Geology (100k series) comprises of the Malahide Formation comprising Argillaceous bioclastic limestone and shale.
	Bedrock Aquifer	According to the GSI GeoUrban Viewer, the bedrock aquifer beneath the area is classified as "LI", that is a locally important aquifer which is described as bedrock which is moderately productive only in local zones.	According to the GSI GeoUrban Viewer, the bedrock aquifer beneath the area is classified as Locally Important (LI), which describes bedrock which is moderately productive only in local zones.	According to the GSI GeoUrban Viewer, the bedrock aquifer beneath the area is classified as Locally Important (LI), which describes bedrock which is moderately productive only in local zones.
	Geological Heritage Site	According to the GSI GeoUrban Viewer, the groundwater Teagasc Soils include "Till derived chiefly from limestone" (TLs) belonging to Soil Group "Grey Brown Podzolics, Brown Earths (medium-high base status)" and "Surface water Gleys, Ground water Gleys". There is also some "Made ground".	According to the GSI GeoUrban Viewer, the Teagasc Soils include "Till derived chiefly from limestone" (TLs) belonging to Soil Group "Grey Brown Podzolics, Brown Earths(medium-high base status)" and "Surface water Gleys, Ground water Gleys".	According to the GSI GeoUrban Viewer, the Teagasc Soils include "Till derived chiefly from limestone" (TLs) belonging to Soil Group "Grey Brown Podzolics, Brown Earths(medium-high base status)" and "Surface water Gleys, Ground water Gleys". There is also some "Made ground".
	Industrial Emissions Directive (IED)/Intergrated Pollution Control (IPC) facilities (potential contamination)	According to the GSI Geological Heritage viewer, there are no geological heritage sites along the route.	According to the GSI Geological Heritage viewer, there are no geological heritage sites along the route.	According to the GSI Geological Heritage viewer, there are no geological heritage sites along the route.
	Soils	According to the EPA Envision viewer, there are no licenced waste, IED or IPC facilities along this route option.	According to the EPA Envision viewer, there are no licenced waste, IED or IPC facilities along this route option.	According to the EPA Envision viewer, there are no licenced waste, IED or IPC facilities along this route option.
	Landtake and geology	A large extent of the proposed north and southbound bus lanes include existing infrastructure. Disturbance to soils and geology during the construction phase of the proposed project is expected to be minimal.	The widening of parts of Belmayne Avenue to accommodate both the south and northbound bus routes may implicate impacts to existing soil.	The widening of parts of the Hole in the Wall Road to accommodate both the south and northbound bus routes may implicate impacts to existing soil.
	Summary	Although use of existing road infrastructure is proposed for this route option, road widening and realignment may implicate some impacts on soil and geology at localised pinch points.	Localised construction works to accommodate bus and cycle lanes along this route option are proposed with some potential impacts on soil and geology at localised pinch points.	Localised construction works to accommodate bus and cycle lanes along this route option are proposed with some potential impacts on soil and geology at localised pinch points.
		Overall, there is a low risk of impacts to soil and geology from the proposed Route Option 1.	Overall, there is a low risk of impacts to soil and geology from the proposed Route Option 2.	Overall, there is a low risk of impacts to soil and geology from the proposed Route Option 3.
Rank				

Environment		Fluvial Areas of flood risk (AEP 10%)	Tidal flooding is not predicted to occur along this Scheme option (refer to pre-liminary Flood Risk Assessment CFRAMs maps, Ref: 2019 / Map / 257 / A).	Tidal flooding is not predicted to occur along this Scheme option (refer to pre-liminary Flood Risk Assessment CFRAMs maps, Ref: 2019 / Map / 257 / A).	Tidal flooding is not predicted to occur along this Scheme option (refer to pre-liminary Flood Risk Assessment CFRAMs maps, Ref: 2019 / Map / 257 / A).
		Fluvial Areas of flood risk (AEP 1%)	''There is a 1% AEP (1 in 100 year Annual Exceedance Potential) risk of Fluvial flooding at the Malahide Road junction with a road currently under construction (refer to pre-liminary Flood Risk Assessment CFRAMs maps, Ref: 2019 / Map / 257 / A).	'There is a 1% AEP (1 in 100 year Annual Exceedance Potential) risk of Fluvial flooding at the Malahide Road junction with a road currently under construction (refer to pre-liminary Flood Risk Assessment CFRAMs maps, Ref: 2019 / Map / 257 / A).	'There is a 1% AEP (1 in 100 year Annual Exceedance Potential) risk of Fluvial flooding at the Malahide Road junction with a road currently under construction (refer to pre-liminary Flood Risk Assessment CFRAMs maps, Ref: 2019 / Map / 257 / A).
		Flood Managmement Plans	There is also a risk of a (1 in 1000 year extreme flood event) along Clongriffin Main Street.	There is also a risk of a (1 in 1000 year extreme flood event) along Clongriffin Main Street.	There is also a risk of a (1 in 1000 year extreme flood event) along Clongriffin Main Street.

Hydrology	Pluvial Flood Risk (AEP 10%)	There is a 1% AEP (1 in 100 year Annual Exceedance Potential) risk of Pluvial flooding occurring at numerous point locations in extreme rainfall events, particularly along Main Street in Clongriffen (refer to pre-liminary Flood Risk Assessment CFRAMs maps, Ref: 2019 / Map / 257 / A).	There is a 1% AEP (1 in 100 year Annual Exceedance Potential) risk of Pluvial flooding occurring at numerous point locations in extreme rainfall events, particularly along Main Street in Clongriffen (refer to pre-liminary Flood Risk Assessment CFRAMs maps, Ref: 2019 / Map / 257 / A).	There is a 1% AEP (1 in 100 year Annual Exceedance Potential) risk of Pluvial flooding occurring at numerous point locations in extreme rainfall events, particularly along Main Street in Clongriffen (refer to pre-liminary Flood Risk Assessment CFRAMs maps, Ref: 2019 / Map / 257 / A).
	OPW National Flood Hazards Map	The OPW National Flood Hazard Mapping web site was consulted. Historic flood events have been recorded close to this proposed route option (River Mayne and Grange Road). However, no flood events are known to have occurred along the proposed bus and cycle lanes.	The OPW National Flood Hazard Mapping web site notes historic flood events recorded close to this proposed route option (River Mayne and Grange Road). However, no flood events are known to have occurred along the proposed bus and cycle lanes.	The OPW National Flood Hazard Mapping web site notes historic flood events to the north and east of this proposed route option (River Mayne and Grange Road - R809). However, no flood events are known to have occurred along the proposed bus and cycle lanes.
	Summary	Overall, there is a low risk of fluvial flooding with a higher risk of pluvial flooding occurring along localised sections of this Route Option 1.	Overall, there is a low risk of fluvial flooding with a higher risk of localised pluvial flooding occurring along localised sections of this Route Option 2.	Overall, there is a low risk of fluvial flooding with a higher risk of localised pluvial flooding occurring along localised sections of this Route Option 3.
Rank				
Landscape and visual		Low impact to all streets on this route Widening of the R107 would result in removal of street trees from the eastern side	Low impact to all streets on this route Widening of the R139 would result in removal of street trees from the southern side	Low impact to all streets on this route Medium visual impact to properties on R139 as land take is required from a number of back gardens Widening of the R139 would result in removal of street trees from the southern side
Rank				
Noise and Vibration	Qualitiative noise assessment	There will be some instances where the proposed scheme will result in traffic being relocated closer to receptors due to road widening. Should traffic be moved closer to receptors (or traffic volumes increase), there may be an increase in noise.	There will be some instances where the proposed scheme will result in traffic being relocated closer to receptors due to road widening. Should traffic be moved closer to receptors (or traffic volumes increase), there may be an increase in noise.	There will be some instances where the proposed scheme will result in traffic being relocated closer to receptors due to road widening. Should traffic be moved closer to receptors (or traffic volumes increase), there may be an increase in noise.
	Geodriectory (Building types)	A review of An Post Geodirectory data indicated that Building use along the route option is predominately residential.	A review of An Post Geodirectory data indicated that Building use along the route option is predominately residential.	A review of An Post Geodirectory data indicated that Building use along the route option is predominately residential.
	Sensitive Receptors	Other than residential properties along the scheme option, there are no other noise sensitive properties that meets the EPA definition of a noise sensitive location.	Other than residential properties along the scheme option, there are no other noise sensitive properties that meets the EPA definition of a noise sensitive location.	Other than residential properties along the scheme option, there are no other noise sensitive properties that meets the EPA definition of a noise sensitive location.
	New Road Construciton	The route option will involve the construction of 2 new links which will lead to construction noise impacts.	The route option will involve the construction of 1 new link which will lead to construction noise impacts.	The route option involves the construction of no new links. The option is based on existing road links.
	Land take	There will be some instances of public land acquisition for the construction of the link road to join the Malahide Road and also areas along the R139/R107 to the Clarehall Shopping Centre	There will be some instances of public land acquisition. 'Belmayne Avenue will be widened locally to provide bus and cycle lanes. The existing roundabout at the junction with the R139 will be converted to a signalised junction. There are existing bus lanes along the R139 although construction works will be required to provide cycle lanes here.	There will be some instances of public and private land acquisition. The two existing roundabouts on the R139 will be converted to signalised junctions. There are existing bus lanes along the R139 although construction works will be required to provide cycle lanes here.
	Summary	The route option has the potential for both positive and negative impacts to the existing noise environment. There are no major issues that have the potential to give rise to significant impacts.	The route option has the potential for both positive and negative impacts to the existing noise environment. There are no major issues that have the potential to give rise to significant impacts.	The route option has the potential for both positive and negative impacts to the existing noise environment. There are no major issues that have the potential to give rise to significant impacts.
Rank				
Air Quality	Qualitiative noise assessment	There will be some instances where the proposed scheme will result in traffic being relocated closer to receptors due to road widening. Should traffic be moved closer to receptors (or traffic volumes increase), there may be an increase in pollutant concentrations.	There will be some instances where the proposed scheme will result in traffic being relocated closer to receptors due to road widening. Should traffic be moved closer to receptors (or traffic volumes increase), there may be an increase in pollutant concentrations.	There will be some instances where the proposed scheme will result in traffic being relocated closer to receptors due to road widening. Should traffic be moved closer to receptors (or traffic volumes increase), there may be an increase in pollutant concentrations.
	Geodriectory (Building types)	A review of An Post Geodirectory data indicated that Building use along the route option is predominately residential.	A review of An Post Geodirectory data indicated that Building use along the route option is predominately residential.	A review of An Post Geodirectory data indicated that Building use along the route option is predominately residential.
	Requirements for demolition	Other than residential properties along the scheme option, there are no other noise sensitive properties that meets the EPA definition of a noise sensitive location.	Other than residential properties along the scheme option, there are no other noise sensitive properties that meets the EPA definition of a noise sensitive location.	Other than residential properties along the scheme option, there are no other noise sensitive properties that meets the EPA definition of a noise sensitive location.
	New Road Construciton	The route option will involve the construction of 2 new links which will lead to construction air quality impacts such as dust generation.	The route option will involve the construction of 1 new link which will lead to construction noise impacts.	The route option involves the construction of no new links. The option is based on existing road links.
	Land take	There will be some instances of public land acquisition for the construction of the link road to join the Malahide Road and also areas along the R139/R107 to the Clarehall Shopping Centre	There will be some instances of public land acquisition. 'Belmayne Avenue will be widened locally to provide bus and cycle lanes. The existing roundabout at the junction with the R139 will be converted to a signalised junction. There are existing bus lanes along the R139 although construction works will be required to provide cycle lanes here.	There will be some instances of public and private land acquisition. The two existing roundabouts on the R139 will be converted to signalised junctions. There are existing bus lanes along the R139 although construction works will be required to provide cycle lanes here.

		Summary	The route option has the potential for both positive and negative impacts to air quality. There are no major issues that have the potential to give rise to significant impacts.	The route option has the potential for both positive and negative impacts to air quality. There are no major issues that have the potential to give rise to significant impacts.	The route option has the potential for both positive and negative impacts to air quality. There are no major issues that have the potential to give rise to significant impacts.
	Rank				
	Land Use and Built Environment		No car parking spaces removed Options considered equal under this criterion	No car parking spaces removed Options considered equal under this criterion	No car parking spaces removed Options considered equal under this criterion
	Rank				

Stage 2		Section 1 - Main MCA			
Assessment Criteria	**Sub-Criteria**	**Route 1**	**Route 2**	**Route 3**	**Route 4**
Economy	Capital Cost	**Total - €38M** **Cost per KM - €5.9M** *Indicative Scheme Infrastructure Works Cost - €30.5M* *Private Land Costs - €7.5M*	**Total - €22.7M** **Cost per KM - €5.3M** *Indicative Scheme Infrastructure Works Cost - €20.7M* *Private Land Costs - €2M*	**Total - €31M** **Cost per KM - €6.5M** *Indicative Scheme Infrastructure Works Cost - €23.8M* *Private Land Costs - €7.2M*	**Total - €43.5M** **Cost per KM - €6.5M** *Indicative Scheme Infrastructure Works Cost - €32M* *Private Land Costs - €11.5M*
	Rank				
	Journey-time reliability and quality of service	This scheme has a total length of 6.4 km and from initial journey time calculations, would take an average of **15-16 mins.** Residential accesses along parts of Kilmore Road would likely hinder reliability.	This scheme has a total length of 4.3 km and from initial journey time calculations, would take an average of **10-11 mins.** Full bus priority is provided and so the reliability of these journey times would be good	This scheme has a total length of 4.7 km and from initial journey time calculations, would take an average of **11-12 mins.** Residential accesses along length of Tonlegee Road would likely hinder reliability.	This scheme has a total length of 6.7 km and from initial journey time calculations, would take an average of **16-17 mins.** Residential accesses along length of Tonlegee Road would likely hinder reliability.
	Rank				
Integration	Land Use Integration	Would allow for the Clongriffin 'Main Street' to be completed, as outlined in the North Fringe LAP, aiding in the planned development of the area. Will integrate with the proposed deelopment of the Balgrffin and Clongriffin Town Centre.	Would allow for the Clongriffin 'Main Street' to be completed, as outlined in the North Fringe LAP, aiding in the planned development of the area. Will integrate with the proposed deelopment of the Balgrffin and Clongriffin Town Centre.	Would not facilitate the construction of Clongriffin Main Street. Does not integrate with the North Fringe LAP to the same extent as Routes 1 and 2	Would not facilitate the construction of Clongriffin Main Street. Does not integrate with the North Fringe LAP to the same extent as Routes 1 and 2
	Rank				
	Residential Catchment				
	400m (5 mins)	8387	4965	6283	9705
	800m (10 mins)	23506	18529	22218	27195
	1200m (15 mins)	42729	38086	42039	46682
	Employment Catchment				
	400m (5 mins)	2100	1183	1060	1977
	800m (10 mins)	6154	3721	2886	5319
	1200m (15 mins)	9359	6116	5366	8609
	Total residential and employment (10 mins)	29660	22250	25104	32514
	Rank				
	Public Transport Integration	This section follows that of a number of existing bus serves. Likely to result in rationalisation/ modification of existing Dublin Bus services operating in the area. Integrates with the DART line.	This section follows that of a number of existing bus serves. Likely to result in rationalisation/ modification of existing Dublin Bus services operating in the area. Integrates with the DART line.	This section follows that of a number of existing bus serves. Likely to result in rationalisation/ modification of existing Dublin Bus services operating in the area. Integrates with the DART line.	This section follows that of a number of existing bus serves. Likely to result in rationalisation/ modification of existing Dublin Bus services operating in the area. Integrates with the DART line.
	Traffic Network Integration	Kilmore Road and Oscar Traynor Road will have greater impact due to CBC operations	Malahide Road already has bus lanes in operation and no major impact noted due to CBC operations.	Grange Road/ Tongglee Road will have greater impact due to CBC operations	Kilmore Road and Oscar Traynor Road will have greater impact due to CBC operations
	Rank				
	Cyclists and pedestrian Integration	The Malahide Road is a Primary Route in the GDA cycle Network Plan. The diversion from Malahide road is identified as a Secondary Route in the GDA cycle Network Plan. Currently, no cycling facilities exist. The road would be upgraded to provide segregated cycle tracks in both directions	The Malahide Road is a Primary Route in the GDA cycle Network Plan. The route mostly contains advisory cycle lanes, which would be upgraded to segregated cycle lanes along the whole route.	The section of this route along Grande Rd and Tonlegee Rd isidentified as a Secondary Route in the GDA cycle Network Plan. Currently, no cycling facilities exist. The road would be upgraded to provide segregated cycle tracks in both directions. The Malahide Road is a Primary Route in the GDA cycle Network Plan. The route mostly contains a cycle lane within the bus lane, which would be upgraded to segregated cycle lanes along the whole route.	The length of this route is identified as a Secondary Route in the GDA cycle Network Plan. Currently, no cycling facilities exist. The road would be upgraded to provide segregated cycle tracks in both directions
	Rank				
Accessibility and Social Inclusion	High Volume Trip Attractors (Education, Health, Commercial, Retail, Leisure)	Belmayne Clare Hall Shopping Centre Odeon/Leisureplex Coolock Malahide road Industrial Park Northside Shopping Centre Beaumont Hospital Artane Castle Shopping Centre	Belmayne Clare Hall Shopping Centre Odeon/Leisureplex Colock Malahide road Industrial Park	Donaghmede Shopping Centre, Donaghmede Park, Donahies Community School, Church of Holy Trinity Donaghmede, Gragemore Park Odeon/Leisureplex Coolock, Holy Trinity Primary School, St Kevins Junior Primary School, Grange Community College, Ardscoil La Sallee School, baldoyle Industrian Area	Donaghmede Shopping Centre, Donaghmede Park, Donahies Community School, Church of Holy Trinity Donaghmede, Gragemore Park Odeon/Leisureplex Coolock, Holy Trinity Primary School, St Kevins Junior Primary School, Grange Community College, Ardscoil La Sallee School, baldoyle Industrian Area Northside Shopping Centre Beaumont Hospital Artane Castle Shopping Centre
	Rank				
	Deprived Geographic Areas & Areas Underserved by Public Transport	Serves Kilmore and Darndale RAPID areas. Serves areas with a higher deprivation indexs than routes 3 & 4	Serves Kilmore and Darndale RAPID areas. Serves areas with a higher deprivation indexs than routes 3 & 4	Serves RAPID areas at Edemore and Kilbarrack. However, these areas are compartively smaller than those served by routes 1 and 2. Serves areas with lower deprivation indexs than routes 1 & 2	Serves Kilmore and Darndale RAPID areas. Also, serves RAPID areas at Edemore and Kilbarrack. However, these areas are compartively smaller than those served by routes 1 and 2 .Serves areas with a lower deprivation indexs than routes 1 & 2
	Rank				

Stage 2			Section 1 - Main MCA			
Assessment Criteria	**Sub-Criteria**		**Route 1**	**Route 2**	**Route 3**	**Route 4**
Safety	Road Safety		5 Turning Movements 10 Major Junctions 16 Minor / Moderate Junctions	1 Turning Movement 10 Major Junctions	3 Turning Movements 8 Major Junctions 14 Minor / Moderate Junctions	4 Turning Movements 9 Major Junctions 14 Minor / Moderate Junctions
	Rank					
	Archaeological, Architectural and Cultural Heritage	Record of Monument and Places (RMP)	-	-	Proximity to National Monument No. 605. The abbey church & graveyard (RMP DU015-069) are located on north side of Grange Rd, adjacent the route. Road widening proposed along this section.	Proximity to National Monument No. 605. The abbey church & graveyard (RMP DU015-069) are located on north side of Grange Rd, adjacent the route. Road widening proposed along this section.
			Road widening at Kilmore Rd will directly affect 3 RMP sites (castle, church & graveyard, DU014-073001 to -073003).	-	Road widening at Tonlegee Rd will directly affect 1 RMP site (ecclesiastical enclosure, DU015-076001). Also proximity to 4 others associated with it (church, graveyard, mill & cross; DU015-076002 to -076005). .	Road widening at Tonlegee Rd will directly affect 1 RMP site (ecclesiastical enclosure, DU015-076001). Also proximity to 4 others associated with it (church, graveyard, mill & cross; DU015-076002 to -076005). Road widening at Kilmore Rd will directly affect 3 RMP sites (castle, church & graveyard, DU014-073001 to -073003). Also potential that features associated with the RMP sites might extend into the road, albeit heavily truncated or indeed removed by subsequent road development.
			Vicinity of 1 RMP site in Coolock (mound DU015-074).	Vicinity of 1 RMP site in Coolock (mound DU015-074).	Vicinity of holy well (RMP DU015-075), on NW side of Tonlegee Rd.	Vicinity of 1 RMP site in Coolock (mound DU015-074). Vicinity of holy well (RMP DU015-075), on NW side of Tonlegee Rd.
		Protected Structures	3 protected structures adjacent route (Woodville Ho. on Kilmore Rd, Milestone on Malahide Rd / Belcamp Ln, & Moat at Fry-Cadbury Factory). Road-widening will directly affect surviving boundary wall associated with Woodville House. No road-widening proposed at other two locations.	1 protected structure adjacent route (Milestone on Malahide Rd / Belcamp Ln). No road-widening proposed at this location.	No protected structures adjacent route.	1 protected structure adjacent route (Woodville Ho. on Kilmore Rd). Road-widening will directly affect surviving boundary wall associated with Woodville House.
		Archeological Conservation Areas	No ACAs.	No ACAs.	No ACAs	No ACAs.
		Summary	Road widening at Kilmore Rd will directly affect 3 RMP sites (castle, church & graveyard). Also potential that features associated with the RMP sites might extend into the road, albeit heavily truncated or indeed removed by subsequent road development. Road-widening will directly affect surviving boundary wall associated with Woodville House (protected structure).	No RMP sites in proximity & no protected structures directly affected.	Road widening at Tonlegee Rd will directly affect 1 RMP site (ecclesiastical enclosure). There is also potential that features associated with the ecclesiastical sites, on Grange Rd (National Monument) and Tonlegee Rd (RMP), might extend into the road, albeit heavily truncated or indeed removed by subsequent road development. The site on Tonlegee Rd includes an ecclesiastical enclosure; such enclosures can be extensive and can contain associated elements outside of the inner sanctum that holds the church & burial ground. No protected structures affected.	Road widening will directly affect 4 RMP sites (ecclesiastical enclosure at Tonlegee Rd, & castle, church & graveyard at Kilmore Rd). There is also potential that features associated with the ecclesiastical sites, on Grange Rd (National Monument) and Tonlegee Rd (RMP), might extend into the road, albeit heavily truncated or indeed removed by subsequent road development. The site on Tonlegee Rd includes an ecclesiastical enclosure; such enclosures can be extensive and can contain associated elements outside of the inner sanctum that holds the church & burial ground. Road-widening will directly affect surviving boundary wall associated with Woodville House (protected structure).
	Rank					
	Flora and Fauna	EU Sites	European Sites of Conservation of Importance downstream of this route option in Dublin Bay (potential connectivity via watercourses - River Santry).	'European Sites of Conservation of Importance downstream of this route option in Dublin Bay (potential connectivity via watercourses - River Santry).	'European Sites of Conservation of Importance downstream of this route option in Dublin Bay (potential connectivity via watercourses - River Santry).	'European Sites of Conservation of Importance downstream of this route option in Dublin Bay (potential connectivity via watercourses - River Santry).
		Ecological Land Take	Land-take is expected to result in loss of some mature trees through the route - green space of parkland and roadside verges comprising planted trees and mature tree lines, particularly Land-take is expected to result in loss of some mature trees through the route - green space of parkland and roadside verges comprising planted trees and mature tree lines, particularly along Kilmore Road in private grounds as well as amenity areas along sections of this route option.	Land-take is expected to result in loss of scattered mature trees within and alongside the route along the Malahide Road, where fringes of amenity grassland/parkland, roadside verges and central median including planted trees would be impacted.	Land-take is expected to result in loss of scattered mature trees within and alongside the route along the Malahide Road, where fringes of amenity grassland/parkland, roadside verges and central median including planted trees would be impacted.	Land-take is expected to result in loss of some mature trees throughout the route - green space of parkland, roadside verges including planted trees and mature tree lines, particularly along Grange Road and Oscar Traynor Road of this route option as well as fringes of amenity areas.
		Areas of high ecological values	Areas of ecological interest occur along sections of the route option, including the intersection of the R107 with the Santry River as well as parts of the Kilmore Road. Potential impacts on foraging, roosting and/or nesting species of birds and bats.	Areas of ecological interest are limited along this route option, including the Sentry River intersection. Low potential for impacts on foraging, roosting and/or nesting species of birds and bats.	Areas of ecological interest are limited along this route option, a number of discrete areas comprising tree copses/linear treeline feature occur along Grange Road. Low potential for impacts on foraging, roosting and/or nesting species of birds and bats.	Areas of ecological interest occur along sections of the route option, include a number of discrete areas comprising tree copses and linear treeline features of mature trees along Grange Road and Kilmore Road. Potential impacts on foraging, roosting and/or nesting species of birds and bats.
		Salmonid Watercourses	The water quality status of the River Santry is ranked as "poor" upstream of the R107 and is of "unassigned" status where the R107 intersects the river. The Santry River is also characterised as "at risk". (refer to EPA maps, River Waterbody, WFD Status 2010-2015; River Waterbodies Risk).	The water quality status of the River Santry is ranked as "poor" upstream of the R107 and is of "unassigned" status where the R107 intersects the river. The Santry River is also characterised as "at risk". (refer to EPA maps, River Waterbody, WFD Status 2010-2015).	The water quality status of the River Santry is ranked as "poor" upstream of Tonlegee Road and is of "unassigned" status where Tonlegee Road intersects the river. The Santry River is also characterised as "at risk". (refer to EPA maps, River Waterbody, WFD Status 2010-2015).	The water quality status of the River Santry is ranked as "poor" upstream of Tonlegee Road and is of "unassigned" status where Tonlegee Road intersects the river. The Santry River is also characterised as "at risk". (refer to EPA maps, River Waterbody, WFD Status 2010-2015).
		Salmonid Watercourses	The Santry River is not designated as a salmonid river (refer to the First Schedule of S.I. No. 293/1988 - European Communities (Quality of Salmonid Waters) Regulations, 1988).	The Santry River is not designated as a salmonid river (refer to the First Schedule of S.I. No. 293/1988 - European Communities (Quality of Salmonid Waters) Regulations, 1988).	The Santry River is not designated as a salmonid river (refer to the First Schedule of S.I. No. 293/1988 - European Communities (Quality of Salmonid Waters) Regulations, 1988).	The Santry River is not designated as a salmonid river (refer to the First Schedule of S.I. No. 293/1988 - European Communities (Quality of Salmonid Waters) Regulations, 1988).

Stage 2			Section 1 - Main MCA			
Assessment Criteria	**Sub-Criteria**		**Route 1**	**Route 2**	**Route 3**	**Route 4**
Environment		NBDC Records	Watercourses along this route include the Santry River which is not envisaged to be impacted along this route option.	Watercourses along this route include the Santry River which is not envisaged to be impacted along this route option.	Watercourses along this route include the Santry River which is not envisaged to be impacted along this route option.	Watercourses along this route include the Santry River which is not envisaged to be impacted along this route option.
		Invaseive Species	A number of invasive plant species are identified from NBDC databases or were recorded, mostly common medium impact species such as *Buddleja davidii* .	No invasive plant species were recorded along this route option.	No invasive plant species were recorded along this route option.	A number of invasive plant species are identified from NBDC databases or were recorded, mostly common medium impact species such as *Buddleja davidii* .
		Summary	Some impacts are envisaged to flora and fauna along this route option including loss of mature trees and areas of potential faunal connectivity.	Overall, while some impacts are envisaged to flora and fauna along this route option, comparatively less disturbance and/or loss of features/supporting habitat expected relative to route options 1 and 4.	Overall, while some impacts are envisaged to flora and fauna along this route option, comparatively less disturbance and/or loss of features/supporting habitat expected relative to route options 1 and 4.	Impacts to flora and fauna are expected to be greatest along this route option owing to the considerable loss of areas of high ecological value and connectivity.
	Rank					
	Soils and Geology	Groundwater Vulnerability	According to the GSI GeoUrban Viewer, the groundwater vulnerability codes are Low (L) and locally High (H) or Extreme (X). As such groundwater vulnerability is assessed as low through a vast extent of this main route option. Small areas of high or extreme groundwater vulnerability also occur along stretches of this main scheme option.	According to the GSI GeoUrban Viewer, the groundwater vulnerability codes are Low (L) and locally High (H) or Extreme (X). As such groundwater vulnerability is assessed as low through a vast extent of this main route option. There are areas of high or extreme groundwater vulnerability occur beneath 'Made' ground.	According to the GSI GeoUrban Viewer, the groundwater vulnerability codes are Low (L). As such groundwater vulnerability is assessed as low through the proposed main route option.	According to the GSI GeoUrban Viewer, the groundwater vulnerability codes are Low (L). As such groundwater vulnerability is assessed as low through the proposed main route option.
		Bedrock Geology	According to the GSI GeoUrban Viewer, the Bedrock Geology 100k predominantly comprises of the Malahide Formation, that is Argillaceous bioclastic limestone, shale. There southern extent of this main route option traverses Calcareous shale, limestone conglomerate of the Tober Colleen Formation and Dark Limestone and Shale ('calp) of the Lucan Formation.	According to the GSI GeoUrban Viewer, the Bedrock Geology (100k Series) predominantly comprises of the Malahide Formation, that is Argillaceous bioclastic limestone, shale. There southern extent of this main route option is characterised by Calp of the Lucan Formation - dark grey to black limestone & shale Calcareous shale, limestone conglomerate of the Tober Colleen Formation and Dark Limestone and Shale of the Lucan Formation.	According to the GSI GeoUrban Viewer, the Bedrock Geology (100k Series) predominantly comprises of the Malahide Formation, that is Argillaceous bioclastic limestone, shale. There southern extent of this main route option is characterised by Calcareous shale, limestone conglomerate of the Tober Colleen Formation and by Calp - Dark Limestone and Shale of the Lucan Formation as well as Dark grey to black limestone & shale also of the Lucan Formation.	According to the GSI GeoUrban Viewer, the Bedrock Geology 100k predominantly comprises of the Malahide Formation, that is Argillaceous bioclastic limestone, shale. There southern extent of this main route option traverses Calcareous shale, limestone conglomerate of the Tober Colleen Formation and by Calp - Dark Limestone and Shale of the Lucan Formation as well as Dark grey to black limestone & shale also of the Lucan Formation.
		Bedrock Aquifer	According to the GSI GeoUrban Viewer, the bedrock aquifer beneath the area is classified as Locally Important (LI), which describes bedrock which is moderately productive only in local zones.	According to the GSI GeoUrban Viewer, the bedrock aquifer beneath the area is classified as Locally Important (LI), which describes bedrock which is moderately productive only in local zones.	According to the GSI GeoUrban Viewer, the bedrock aquifer beneath the area is classified as Locally Important (LI), which describes bedrock which is moderately productive only in local zones.	According to the GSI GeoUrban Viewer, the bedrock aquifer beneath the area is classified as Locally Important (LI), which describes bedrock which is moderately productive only in local zones.
		Geological Heritage Site	According to the GSI GeoUrban Viewer, a considerable area of the proposed main route option will run along 'Made' ground. Alluvial soils are present under a culverted stretch of the Santry River associated with the Malahide Road.	According to the GSI GeoUrban Viewer, a considerable area of the proposed main route option will run along 'Made' ground. Alluvial soils run under a culverted stretch of the Santry River associated with the Malahide Road.	According to the GSI GeoUrban Viewer, a considerable area of the proposed route option will run along 'Made' ground. Alluvial mineral soil is associated the Santry River which intersects the Malahide Road and Tonlegee Road, alluvial soils also occur through a largely culverted unnamed stream through Grange Road.	According to the GSI GeoUrban Viewer, a considerable area of the proposed route option will run along 'Made' ground. Alluvial mineral soil is associated the Santry River which intersects the Malahide Road and Tonlegee Road, alluvial soils also occur through a largely culverted unnamed stream through Grange Road.
		Industrial Emissions Directive (IED)/Intergrated Pollution Control (IPC) facilities (potential contamination)	According to the GSI Geological Heritage viewer, there are no geological heritage sites along the route.	According to the GSI Geological Heritage viewer, there are no geological heritage sites along the route.	According to the GSI Geological Heritage viewer, there are no geological heritage sites along the route.	According to the GSI Geological Heritage viewer, there are no geological heritage sites along the route.
		Soils	According to the EPA Envision viewer, there are no licenced waste, IED or IPC facilities along this route option.	According to the EPA Envision viewer, there are no licenced waste, IED or IPC facilities along this route option.	According to the EPA Envision viewer, there are no licenced waste, IED or IPC facilities along this route option.	According to the EPA Envision viewer, there are no licenced waste, IED or IPC facilities along this route option.
		Landtake and geology	Land-take of considerable curtilage and green space is proposed along much of this scheme option. Although, much of the proposed bus lanes and cycle lanes would largely use existing infrastructure, considerable disturbance of soils would be expected.	Land-take of some curtilage and green space is proposed along much of this scheme option. Although, much of the proposed bus lanes and cycle lanes would largely use existing infrastructure, some disturbance of soils would be expected.	Land-take of significant curtilage and green space is proposed along much of this scheme option. The proposed scheme option would implicate loss of curtilage particularly along Tonlegee Road, significant disturbance of soils would be expected.	Land-take of significant curtilage and green space is proposed along much of this scheme option. The proposed scheme option would implicate loss of curtilage particularly along Tonlegee Road, Oscar Traynor Road and Kilmore Road, significant disturbance of soils would be expected.
		Summary	Overall, construction of priority northbound and southbound bus lanes along this main scheme option would implicate extensive disturbance of soils and thus considerable impacts to soil and geology.	Overall, construction of priority northbound and southbound bus lanes along this main scheme option would implicate local disturbance of soils and thus localised impacts to soil and geology.	Overall, construction of priority northbound and southbound bus lanes along this main scheme option would implicate significant disturbance of soils and thus significant impacts to soil and geology.	Overall, construction of priority northbound and southbound bus lanes along this main scheme option would implicate significant disturbance of soils and thus significant impacts to soil and geology.
			Overall, some disturbance to soil and geology is expected for Main Route Option 1 assocaited with the area of land take. There is an assocaited risk of impacts to soil and geology.	Overall, disturbance to soil and geology is expected to be lowest for Main Route Option 2 associated with the comparatively lower area of land take. The risk of impacts to soil and geology is expected to be low.	Overall, some disturbance to soil and geology is expected for Main Route Option 3 assocaited with the area of land take. There is an assocaited risk of impacts to soil and geology.	Overall, disturbance to soil and geology is expected to be most significant for Main Route Option 4 assocaited with the high area of land take. The risk of impacts to soil and geology is expected to be significant.
	Rank					
		OPW National Flood Hazards Map	According to the OPW National Flood Hazard Maps, historic flood events have occurred close to the northern stretches of this main route option and recurring flooding close to the R107 intersection with Collins Road East, associated with the Mayne and Naniken Rivers.	According to the OPW National Flood Hazard Maps, historic flood events have occurred close to the northern stretches of this main route option and recurring flooding close to the R107 intersection with Collins Road East, associated with the Mayne and Naniken Rivers.	According to the OPW National Flood Hazard Maps, recurring flooding occurs close to the R107 intersection with Collins Road East, associated with the Naniken River.	According to the OPW National Flood Hazard Maps, there have been no records of historic flooding along the extent of this main route option.

Stage 2			Section 1 - Main MCA			
Assessment Criteria	**Sub-Criteria**		**Route 1**	**Route 2**	**Route 3**	**Route 4**
	Hydrology	Fluvial Areas of flood risk (AEP 10%)	There is a 10% risk of a (1 in 10 year extreme flood event) - (1% Annual Exceedance Potential - Fluvial flooding) occurring along the Santry River at Tonlegee Road and the Malahide Road (R107) (refer to pre-liminary Flood Risk Assessment CFRAMs maps, Ref: 2019 / Map / 238 / A).	There is a 10% risk of a (1 in 10 year extreme flood event) - (1% Annual Exceedance Potential - Fluvial flooding) occurring along Santry River along the Malahide Road (R107) (refer to pre-liminary Flood Risk Assessment CFRAMs maps, Ref: 2019 / Map / 238 / A).	There is 10% risk of a (1 in 10 year extreme flood event) - (1% Annual Exceedance Potential - Fluvial flooding) occurring from the Santry River which intersects the R107 and Tonlegee Road (refer to pre-liminary Flood Risk Assessment CFRAMs maps, Ref: 2019 / Map / 238 / A).	There is 10% risk of a (1 in 10 year extreme flood event) - (1% Annual Exceedance Potential - Fluvial flooding) occurring from the Santry River which intersects the R107 and Tonlegee Road (refer to pre-liminary Flood Risk Assessment CFRAMs maps, Ref: 2019 / Map / 238 / A).
		Fluvial Areas of flood risk (AEP 1%)	There is a risk of a (1 in 100 year extreme flood event) at the R107/ Clongriffin Main Street intersection (under construction) and where the R107 traverses the Santry River (refer to pre-liminary Flood Risk Assessment CFRAMs maps, Ref: 2019 / Map / 238 / A).	There is a risk of a (1 in 100 year extreme flood event) (1% Annual Exceedance Potential - Fluvial flooding) at the R107/ Clongriffin Main Street intersection (under construction) and where the R107 traverses the Santry River (refer to pre-liminary Flood Risk Assessment CFRAMs maps, Ref: 2019 / Map / 238 / A).	There is a risk of a (1 in 100 year extreme flood event) (1% Annual Exceedance Potential - Fluvial flooding) at the R107/ Clongriffin Main Street intersection (under construction) and where Tonlegee Road traverses the Santry River (refer to pre-liminary Flood Risk Assessment CFRAMs maps, Ref: 2019 / Map / 238 / A).	There is a risk of a (1 in 100 year extreme flood event) (1% Annual Exceedance Potential - Fluvial flooding) at the R107/ Clongriffin Main Street intersection (under construction) and where Tonlegee Road traverses the Santry River (refer to pre-liminary Flood Risk Assessment CFRAMs maps, Ref: 2019 / Map / 238 / A).
		Pluvial Flood Risk (AEP 10%)	Pluvial flooding is at risk of occurring (10% AEP) at numerous point locations in extreme rainfall events, particularly along Clongriffin Main Street, Oscar Traynor Road, Kilmore Road and points along the R107.	Pluvial flooding is at risk of occurring at numerous point locations in extreme rainfall events, particularly along Clongriffin Main Street and points along the R107.	Pluvial flooding is at risk of occurring at numerous point locations in extreme rainfall events along the R107.	Pluvial flooding is at risk of occurring at numerous point locations in extreme rainfall events, particularly along Oscar Traynor Road and Kilmore Road.
		Summary	Overall, there is a 10% risk of a (1 in 10 year extreme flood event - AEP) risk of fluvial flooding occurring at two points along the Sentry River. There is also a considerable risk of pluvial flooding (10% AEP) occurring at multiple points of Main Route Option 1.	Overall, there is a 10% risk of a (1 in 10 year extreme flood event - AEP) risk of fluvial flooding occurring at one point along the Santry River. There is also a risk of pluvial flooding (10% AEP) occurring primarily along the northern stretches of Main Route Option 2.	Overall, there is a 10% risk of a (1 in 10 year extreme flood event - AEP) risk of fluvial flooding occurring at one point along the Santry River. There is also a risk of pluvial flooding (10% AEP) occurring particularly on Grange Road and the west of Tonlegee Road of Main Route Option 3.	Overall, there is a 10% risk of a (1 in 10 year extreme flood event - AEP) risk of fluvial flooding occurring at one point along the Santry River. There is also a risk of pluvial flooding (10% AEP) occurring particularly on Oscar Traynor Road, Klmore Road, Grange Road and the west of Tonlegee Road of Main Route Option 4.
	Rank					
	Landscape and visual		No protected views or trees are located along the route. The prrotected structures Woodville House and the ruins near Pinebrook Rise are located along the route but these will not be impacted upon by the works Visual impact on properties: Potential High Impact on properties along Grange Road and Tongalee Road due to road widening and removal of grass verges and trees. A new road will be constructed through a greenfield site to facilitate the construction of Clongriffin Main St	No protected views, trees or structures are located along the route Makes use of the existing Malahide Road corridor with no particular landscape or visual sensitivities. The majority of the proposed scheme will utilise the existing bus lanes/facilities. A new road will be constructed through a greenfield site to facilitate the construction of Clongriffin Main St	No protected views or trees are located along the route. The prrotected structures Church of St John the Evangalist is located along the route but it will not be impacted upon by the works Visual impact on properties: Potential High Impact on properties along Oscar Traynor Road and Kilmore Road due to road widening and removal of grass verges and trees	No protected views or trees are located along the route. The prrotected structures Woodville House, the ruins near Pinebrook Rise and the Church of St John the Evangalist are located along the route but these will not be impacted upon by the works Visual impact on properties: Potential High Impact on properties along Grange Road, Tongalee Road, Oscar Traynor Road and Kilmore Road due to road widening and removal of grass verges and trees
	Rank					
	Noise and Vibration	Qualitiative noise assessment	There will be some instances where the proposed scheme will result in traffic being relocated closer to receptors due to road widening. Should traffic be moved closer to receptors (or traffic volumes increase), there may be an increase in noise.	There will be some instances where the proposed scheme will result in traffic being relocated closer to receptors due to road widening. Should traffic be moved closer to receptors (or traffic volumes increase), there may be an increase in noise.	There will be some instances where the proposed scheme will result in traffic being relocated closer to receptors due to road widening. Should traffic be moved closer to receptors (or traffic volumes increase), there may be an increase in noise.	There will be some instances where the proposed scheme will result in traffic being relocated closer to receptors due to road widening. Should traffic be moved closer to receptors (or traffic volumes increase), there may be an increase in noise.
		Geodriectory (Building types)	A review of An Post Geodirectory data indicated that Building use along the route option is predominately residential.	A review of An Post Geodirectory data indicated that Building use along the route option is predominately residential.	A review of An Post Geodirectory data indicated that Building use along the route option is predominately residential.	A review of An Post Geodirectory data indicated that Building use along the route option is predominately residential.
		Sensitive Receptors	The route option will involve the construction of 2 new links which will lead to construction noise impacts.	The route option will involve the construction of 2 new links which will lead to construction noise impacts.	The route option involves the construction of no new links. The option is based on existing road links.	The route option involves the construction of no new links. The option is based on existing road links.
		New Road Construciton	There will be some instances of public land acquisition for the construction of the link roads and for the road widening and realignment works for the provision of bus lanes on the Malahide Road. In addition, Oscar Traynor Road (Public land acquistion) and Kilmore Road (both public and private land acquisition) will be widened using verge/green space on either side of the road to provide bus and cycle lanes. Land take from gardens will be required in places along Kilmore Road	There will be some instances of public land acquisition for the construction of the link roads and for the road widening and realignment works for the provision of bus lanes on the Malahide Road.	There will be some instances of public and private land acquisition which will be required for significant road widening on Grange Road and Tonlegee Road. Land take would be required from front gardens along the western half of Tonlegee Road.	'There will be some instances of public and private land acquisition which will be required for significant road widening on Grange Road and Tonlegee Road. Land take would be required from front gardens along the western half of Tonlegee Road. In addition, Oscar Traynor Road (Public land acqustion) and Kilmore Road (both public and private land acquisition) will be widened using verge/green space on either side of the road to provide bus and cycle lanes. Land take from gardens will be required in places along Kilmore Road
		Land take	Land-acquisition would include: - 70 gardens would be affected - 50 garden parking spaces - 50 on-street spaces and 30 commercial parking spaces would be removed.	Land-acquisition would include: - 20 gardens would be affected - 50 on-street residential parking spaces would be removed.	Land-acquisition would: - approximately 150 gardens on Tonlegee Road - None would have parking spaces removed - considerable acquisition of green space.	Land-acquisition would: - Approximately 200 gardens affected - 50 garden parking spaces, 50 on-street spaces, 30 commercial spaces removed - considerable acquisition of green space.
		Summary	The route option has the potential for both positive and negative impacts to the existing noise environment. There is construction of 2 new links and some considerable land take.	The route option has the potential for both positive and negative impacts to the existing noise environment. There is construction of 2 new links, however of all the options, this has the lowest no. of properties garden being affected.	The route option has the potential for both positive and negative impacts to the existing noise environment. This has some considerable land take.	The route option has the potential for both positive and negative impacts to the existing noise environment. This has the highest number of properties garden being affected of all the route options,
	Rank					

Stage 2			Section 1 - Main MCA			
Assessment Criteria	**Sub-Criteria**		**Route 1**	**Route 2**	**Route 3**	**Route 4**
	Air Quality	Qualitiative noise assessment	There will be some instances where the proposed scheme will result in traffic being relocated closer to receptors due to road widening. Should traffic be moved closer to receptors (or traffic volumes increase), there may be an increase in pollutant concentrations.	There will be some instances where the proposed scheme will result in traffic being relocated closer to receptors due to road widening. Should traffic be moved closer to receptors (or traffic volumes increase), there may be an increase in pollutant concentrations.	There will be some instances where the proposed scheme will result in traffic being relocated closer to receptors due to road widening. Should traffic be moved closer to receptors (or traffic volumes increase), there may be an increase in pollutant concentrations.	There will be some instances where the proposed scheme will result in traffic being relocated closer to receptors due to road widening. Should traffic be moved closer to receptors (or traffic volumes increase), there may be an increase in pollutant concentrations.
		Geodriectory (Building types)	A review of An Post Geodirectory data indicated that Building use along the route option is predominately residential.	A review of An Post Geodirectory data indicated that Building use along the route option is predominately residential.	A review of An Post Geodirectory data indicated that Building use along the route option is predominately residential.	A review of An Post Geodirectory data indicated that Building use along the route option is predominately residential.
		Sensitive Receptors	The route option will involve the construction of 2 new links which will lead to construction air quality impacts mainly dust generation.	'The route option will involve the construction of 2 new links which will lead to construction air quality impacts mainly dust generation.	The route option involves the construction of no new links. The option is based on existing road links.	The route option involves the construction of no new links. The option is based on existing road links.
		New Road Construciton	There will be some instances of public land acquisition for the construction of the link roads and for the road widening and realignment works for the provision of bus lanes on the Malahide Road. In addition, Oscar Traynor Road (Public land acquistion) and Kilmore Road (both public and private land acquisition) will be widened using verge/green space on either side of the road to provide bus and cycle lanes. Land take from gardens will be required in places along Kilmore Road	There will be some instances of public land acquisition for the construction of the link roads and for the road widening and realignment works for the provision of bus lanes on the Malahide Road.	There will be some instances of public and private land acquisition which will be required for significant road widening on Grange Road and Tonlegee Road. Land take would be required from front gardens along the western half of Tonlegee Road.	'There will be some instances of public and private land acquisition which will be required for significant road widening on Grange Road and Tonlegee Road. Land take would be required from front gardens along the western half of Tonlegee Road. In addition, Oscar Traynor Road (Public land acquistion) and Kilmore Road (both public and private land acquisition) will be widened using verge/green space on either side of the road to provide bus and cycle lanes. Land take from gardens will be required in places along Kilmore Road
		Land take	Land-acquisition would include: - 70 gardens would be affected - 50 garden parking spaces - 50 on-street spaces and 30 commercial parking spaces would be removed.	Land-acquisition would include: - 20 gardens would be affected - 50 on-street residential parking spaces would be removed.	Land-acquisition would: - approximately 150 gardens on Tonlegee Road - None would have parking spaces removed - considerable acquisition of green space.	Land-acquisition would: - Approximately 200 gardens affected - 50 garden parking spaces, 50 on-street spaces, 30 commercial spaces removed - considerable acquisition of green space.
		Summary	The route option has the potential for both positive and negative impacts to the existing air quality environment. There is construction of 2 new links and some considerable land take.	The route option has the potential for both positive and negative impacts to the existing air quality environment. There is construction of 2 new links, however of all the options, this has the lowest no. of properties garden being affected.	The route option has the potential for both positive and negative impacts to the existing air quality environment. This has some considerable land take.	The route option has the potential for both positive and negative impacts to the existing air quality environment. This has the highest number of properties garden being affected of all the route options,
	Rank					
	Land Use and Built Environment		Lan Use Amenity, Open Space, Recreational/Sports: Potential medium impact to open spaces along Kilmore Road **Parking Removed:** '51 On-Street Residential 31 Commercial 47 Garden Parking	'Lan Use Amenity, Open Space, Recreational/Sports: The scheme makes use of the existing Malahide Road corridor. The majority of the proposed scheme will utilise the existing bus lanes/facilities. Some removal of green space is required to complete the missing section of Clongriffin Main St Low impact on existing land use character and built environment **Parking Removed:** 8 Gardens will have parking capacity reduced. Commercial parking in front of Goblet Pub will be reduced.	Lan Use Amenity, Open Space, Recreational/Sports: Potential medium impact to open spaces along Grangemore Park and by Santry River **Parking Removed:** 8 Gardens will have parking capacity reduced. Commercial parking in front of Goblet Pub will be reduced.	Lan Use Amenity, Open Space, Recreational/Sports: Potential medium impact to open spaces along Kilmore Road, Grangemore Park and by Santry River **Parking Removed:** 51 On-Street Residential 31 Commercial 47 Garden Parking
	Rank					

Stage 2			CBC1 - Fairview MCA			
Assessment Criteria	**Sub-Criteria**		**Scheme 1**	**Scheme 2**	**Scheme 3**	**Scheme 4**
Economy	Capital Cost		**Total - €3.6M** **Cost per KM - €8M** *Indicative Scheme Infrastructure Works Cost - €2.2 M* *Private Land Costs - €1.4M*	**Total - €2.4M** **Cost per KM - €5.25M** *Indicative Scheme Infrastructure Works Cost - €1.9M* *Private Land Costs - €0.5M*	**Total - € 2.9 M** **Cost per KM - € 6.25M** *Indicative Scheme Infrastructure Works Cost - €2 M* *Private Land Costs - €0.9M*	**Total - € 2.5M** **Cost per KM - €8M** *Indicative Scheme Infrastructure Works Cost - €2.5 M* *Private Land Costs - € 0 M*
	Rank					
	Journey-time reliability and quality of service		Continious south bound bus lanes, northbound bus lanes start 180m north of junction with Marino Mart. Cycle lanes provided in both directions. Northbound buses must share with general traffic for a 180m section, buses could be delayed here although traffic count data indicates that there is no queueing at this section	Continuous bus lanes in both directions. No cycle lanes provided, cyclists detour via Haverty Road or share the bus lane. It is likely some cyclists will continue to cycle in the bus lane and this may delay buses	Continious south bound bus lanes, northbound bus lanes start 180m north of junction with Marino Mart. Cycle lanes provided northbound Northbound buses must share with general traffic for a 180m section, buses could be delayed here although traffic count data indicates that there is no queueing at this section. Buses must share lane with southbound cyclists, delays should be minimal as this section is downhill for cyclists	Continious northbound bus and cycle lane Buses must share lane with southbound cyclists, delays should be minimal as this section is downhill for cyclists
	Rank					
Integration	Land Use Integration		Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion
	Rank					
	Total residential and employment (10 Mins)		Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion
	Rank					
	Public Transport Integration		Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion
	Rank					
	Traffic Network Integration		No traffic diversions as part of this option	No traffic diversions as part of this option	No traffic diversions as part of this option	This option involves rerouting all inbound traffic via Copeland Avenue and Howth Road. This will likely have a significant impact on journey times for general traffic
	Rank					
	Cyclists and pedestrian Integration		Cycle lanes provided in both directions for whole length	Cyclists in both directions diverted around Haverty/Carleton Rd or share the bus lanes	Northbound cycle lane provided, southbound cyclists share the bus lane or divert via Hegarty Road	Northbound cycle lane provided, southbound cyclists share the bus lane or divert via Hegarty Road
	Rank					
Accessibility and Social Inclusion	High Volume Trip Attractors (Education, Health, Commercial, Retail, Leisure)		Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion
	Rank					
	Deprived Geographic Areas & Areas Underserved by Public Transport		Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion
	Rank					
Safety	Road Safety		Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion
	Rank					
	Archaeological, Architectural and Cultural Heritage	Zone of Archaeological Potential (ZAP)	Traverses ZAP around Fairview Park (RMP DU018-067), related to burial site on N side of Clontarf Rd.	Traverses ZAP around Fairview Park (RMP DU018-067), related to burial site on N side of Clontarf Rd.	Traverses ZAP around Fairview Park (RMP DU018-067), related to burial site on N side of Clontarf Rd.	Traverses ZAP around Fairview Park (RMP DU018-067), related to burial site on N side of Clontarf Rd.
		Record of Monument and Places (RMP)	3 protected structures adjacent route (62 & 64 Malahide Road, 1 Marino Crescent).	3 protected structures adjacent route (62 & 64 Malahide Road, 1 Marino Crescent).	3 protected structures adjacent route (62 & 64 Malahide Road, 1 Marino Crescent).	3 protected structures adjacent route (62 & 64 Malahide Road, 1 Marino Crescent).
		Archaeological Conservation Areas	Adjacent Marino Casino ACA. As the route follows an existing road in a suburban environment, the ACA will be unaffected.	Adjacent Marino Casino ACA. As the route follows an existing road in a suburban environment, the ACA will be unaffected.	Adjacent Marino Casino ACA. As the route follows an existing road in a suburban environment, the ACA will be unaffected.	Adjacent Marino Casino ACA. As the route follows an existing road in a suburban environment, the ACA will be unaffected.
		Summary	It is possible that additional burials might be uncovered within the RMP ZAP for Fairview Park, though again, any surviving features are likely to have been disturbed by the existing road. The boundaries of 2 protected structures on Malahide Rd (62 & 64) may be affected by road widening.	It is possible that additional burials might be uncovered within the RMP ZAP for Fairview Park, though again, any surviving features are likely to have been disturbed by the existing road. No protected structures directly affected.	It is possible that additional burials might be uncovered within the RMP ZAP for Fairview Park, though again, any surviving features are likely to have been disturbed by the existing road. The boundaries of 2 protected structures on Malahide Rd (62 & 64) may be affected by road widening.	It is possible that additional burials might be uncovered within the RMP ZAP for Fairview Park, though again, any surviving features are likely to have been disturbed by the existing road. No protected structures directly affected.
	Rank					
	Flora and Fauna	EU Sites	There are no European or Nationally designated Sites of Conservation of Importance downstream of this route option in Dublin Bay.	There are no European or Nationally designated Sites of Conservation of Importance downstream of this route option in Dublin Bay.	There are no European or Nationally designated Sites of Conservation of Importance downstream of this route option in Dublin Bay.	There are no European or Nationally designated Sites of Conservation of Importance downstream of this route option in Dublin Bay.
		Ecological Land Take	Land take will be greatest along this scheme and will include loss of garden frontage including planted trees and other planted recreational features. Garden frontage will be impacted on both sides of the scheme.	Land-take will result in the loss of garden frontage resulting in impacts on flora and fauna. Although, a lower number of private gardens would be impacted than scheme 2.	Land-take will result in the loss of garden frontage resulting along the southbound bus and cycle lanes low impacts envisaged to ecological features along this scheme with minimal impacts expected to flora and fauna.	The proposed bus corridor would utilise existing infrastructure with no impact on ecological features along this scheme with minimal impacts expected to flora and fauna.
		Areas of high ecological values	The route option would impinge on areas of low ecological potential or connectivity primarily along the southern end of the Malahide Road with low impacts to flora and fauna. Few semi-mature trees will be impacted along this scheme with generally low ecological potential for foraging and breeding birds or foraging bats.	The route option would impinge on garden frontage which is of low ecological potential or connectivity for foraging and breeding birds or foraging bats with low impacts to flora and fauna.	Ecological supporting features along this scheme primarily include planted semi-mature trees and planted recreational features. Thus, impacts to ecological supporting features is expected to be low.	Ecological supporting features are not envisaged to be impacted along this scheme.
		Riparian environment	There are no watercourses through this stretch of the Malahide Road.	There are no watercourses through this stretch of the Malahide Road.	There are no watercourses through this stretch of the Malahide Road.	There are no watercourses through this stretch of the Malahide Road.

	Flora and Fauna	Invaseve Species	Records for a number of medium impact invasive alien species have been obtained from the National Biodiversity Database. Three-cornered Garlic, Buddleja and Traveller's Joy are noted to occur along this scheme.	Records for a number of medium impact invasive alien species have been obtained from the National Biodiversity Database. Three-cornered Garlic, Buddleja and Traveller's Joy are noted to occur along this scheme.	Records for a number of medium impact invasive alien species have been obtained from the National Biodiversity Database. Three-cornered Garlic, Buddleja and Traveller's Joy are noted to occur along this scheme.	Records for a number of medium impact invasive alien species have been obtained from the National Biodiversity Database. Three-cornered Garlic, Buddleja and Traveller's Joy are noted to occur along this scheme.
		Protected Species	Records for a number of protected species have been obtained from the National Biodiversity Database. Bird species recorded along the scheme include Mallard (Annex II), Hen Harrier (Annex I), Rock Pigeon (Annex II), Common Wood Pigeon (Annex II), Mediterranean Gull (Annex II),	Records for a number of protected species have been obtained from the National Biodiversity Database. Bird species recorded along the scheme include Mallard (Annex II), Hen Harrier (Annex I), Rock Pigeon (Annex II), Common Wood Pigeon (Annex II), Mediterranean Gull (Annex II),	Records for a number of protected species have been obtained from the National Biodiversity Database. Bird species recorded along the scheme include Mallard (Annex II), Hen Harrier (Annex I), Rock Pigeon (Annex II), Common Wood Pigeon (Annex II), Mediterranean Gull (Annex II),	Records for a number of protected species have been obtained from the National Biodiversity Database. Bird species recorded along the scheme include Mallard (Annex II), Hen Harrier (Annex I), Rock Pigeon (Annex II), Common Wood Pigeon (Annex II), Mediterranean Gull (Annex II),
		Summary	Minor impacts to flora and fauna are expected along this scheme.	Minor impacts to flora and fauna are expected along this scheme.	Minor impacts to flora and fauna are expected along this scheme, however lower than 2 and 4 due to reduced land take on the eastern side.	No impacts to flora and fauna would be expected through this scheme, slight advantage over other options.
	Rank					
	Soils and Geology	Groundwater Vulnerability	According to the GSI GeoUrban Viewer, the groundwater vulnerability code is predominately Moderate (M). As such groundwater vulnerability is assessed as moderate.	According to the GSI GeoUrban Viewer, the groundwater vulnerability code is predominately Moderate (M). As such groundwater vulnerability is assessed as moderate.	According to the GSI GeoUrban Viewer, the groundwater vulnerability code is predominately Moderate (M). As such groundwater vulnerability is assessed as moderate.	According to the GSI GeoUrban Viewer, the groundwater vulnerability code is predominately Moderate (M). As such groundwater vulnerability is assessed as moderate.
		Bedrock Geology	According to the GSI GeoUrban Viewer, the Bedrock Geology (100k Series) is characterised by Calp of the Lucan Formation - Dark limestone & shale.	According to the GSI GeoUrban Viewer, the Bedrock Geology (100k Series) is characterised by Calp of the Lucan Formation - Dark limestone & shale.	According to the GSI GeoUrban Viewer, the Bedrock Geology (100k Series) is characterised by Calp of the Lucan Formation - Dark limestone & shale.	According to the GSI GeoUrban Viewer, the Bedrock Geology (100k Series) is characterised by Calp of the Lucan Formation - Dark limestone & shale.
		Bedrock Aquifer	According to the GSI GeoUrban Viewer, the bedrock aquifer beneath the area is classified as Locally Important (LI), that is a locally important aquifer which is described as bedrock which is moderately productive only in local zones.	According to the GSI GeoUrban Viewer, the bedrock aquifer beneath the area is classified as Locally Important (LI), that is a locally important aquifer which is described as bedrock which is moderately productive only in local zones.	According to the GSI GeoUrban Viewer, the bedrock aquifer beneath the area is classified as Locally Important (LI), that is a locally important aquifer which is described as bedrock which is moderately productive only in local zones.	According to the GSI GeoUrban Viewer, the bedrock aquifer beneath the area is classified as Locally Important (LI), that is a locally important aquifer which is described as bedrock which is moderately productive only in local zones.
		Geological Heritage Site	According to the GSI GeoUrban Viewer, the groundwater Teagasc Soils consist predominately of "Made ground".	According to the GSI GeoUrban Viewer, the groundwater Teagasc Soils consist predominately of "Made ground".	According to the GSI GeoUrban Viewer, the groundwater Teagasc Soils consist predominately of "Made ground".	According to the GSI GeoUrban Viewer, the groundwater Teagasc Soils consist predominately of "Made ground".
		Industrial Emissions Directive (IED)/Intergrated Pollution Control (IPC) facilities (potential	According to the GSI Geological Heritage viewer and EPA GIS data, there are no geological heritage sites along the route.	According to the GSI Geological Heritage viewer and EPA GIS data, there are no geological heritage sites along the route.	According to the GSI Geological Heritage viewer and EPA GIS data, there are no geological heritage sites along the route.	According to the GSI Geological Heritage viewer and EPA GIS data, there are no geological heritage sites along the route.
		Soils	According to the EPA Envision viewer, there are no licenced waste, IED or IPC facilities along this route option.	According to the EPA Envision viewer, there are no licenced waste, IED or IPC facilities along this route option.	According to the EPA Envision viewer, there are no licenced waste, IED or IPC facilities along this route option.	According to the EPA Envision viewer, there are no licenced waste, IED or IPC facilities along this route option.
		Landtake and geology	Land take from this scheme would implicate minor impacts to soils and geology over predominantly built ground	Land take from this scheme would implicate minor impacts to soils and geology over predominantly built ground	Land take from this scheme would implicate minor impacts to soils and geology over predominantly built ground	Land take is not envisaged through this scheme option with no impacts expected on soils and geology.
		Summary	Land take along this scheme would result in minor impacts to soils and geology.	Land take along this scheme would result in minor impacts to soils and geology.	Land take along this scheme would result in minor impacts to soils and geology, and land take is less that Schemes 2 and 4	Land take is not expected along this scheme with no impacts to soils and geology expected.
	Rank					
	Hydrology	Fluvial Areas of flood risk (AEP 10%)	Flood Risk Assessment CFRAMs maps are not available for the southern extent of the Malahide Road.	Flood Risk Assessment CFRAMs maps are not available for the southern extent of the Malahide Road.	Flood Risk Assessment CFRAMs maps are not available for the southern extent of the Malahide Road.	Flood Risk Assessment CFRAMs maps are not available for the southern extent of the Malahide Road.
		Fluvial Areas of flood risk (AEP 1%)	Flood Risk Assessment CFRAMs maps are not available for the southern extent of the Malahide Road.	Flood Risk Assessment CFRAMs maps are not available for the southern extent of the Malahide Road.	Flood Risk Assessment CFRAMs maps are not available for the southern extent of the Malahide Road.	Flood Risk Assessment CFRAMs maps are not available for the southern extent of the Malahide Road.
		Flood Managmement Plans	Flood Risk Assessment CFRAMs maps are not available for the southern extent of the Malahide Road.	Flood Risk Assessment CFRAMs maps are not available for the southern extent of the Malahide Road.	Flood Risk Assessment CFRAMs maps are not available for the southern extent of the Malahide Road.	Flood Risk Assessment CFRAMs maps are not available for the southern extent of the Malahide Road.
		OPW National Flood Hazards Map	The OPW National Flood Hazard Mapping web site was consulted. Historic flood events have been recorded along Fairview Park associated with the tidal reaches of the River Tolka close to the south of the scheme.	The OPW National Flood Hazard Mapping web site was consulted. Historic flood events have been recorded along Fairview Park associated with the tidal reaches of the River Tolka close to the south of the scheme.	The OPW National Flood Hazard Mapping web site was consulted. Historic flood events have been recorded along Fairview Park associated with the tidal reaches of the River Tolka close to the south of the scheme.	The OPW National Flood Hazard Mapping web site was consulted. Historic flood events have been recorded along Fairview Park associated with the tidal reaches of the River Tolka close to the south of the scheme.
		Pluvial Flood Risk (AEP 10%)	There is a 1 in 10 year risk of pluvial flooding (10% Annual Exceedance Potential AEP) along a considerable area of this scheme (Refer to: Map number E09DCC_EXPCD_F0_02).	There is a 1 in 10 year risk of pluvial flooding (10% Annual Exceedance Potential AEP) along a considerable area of this scheme (Refer to: Map number E09DCC_EXPCD_F0_02).	There is a 1 in 10 year risk of pluvial flooding (10% Annual Exceedance Potential AEP) along a considerable area of this scheme (Refer to: Map number E09DCC_EXPCD_F0_02).	There is a 1 in 10 year risk of pluvial flooding (10% Annual Exceedance Potential AEP) along a considerable area of this scheme (Refer to: Map number E09DCC_EXPCD_F0_02).
		CFRAMS	Flooding is a risk through the extent of this scheme option. However, CFRAMs maps are not available to assess the potential risk of future flood events. The River Tolka which is located to the south of this scheme is highlighted as an area prone to tidal flooding. Fluvial flooding may also occur along the extent of bus and cycle lanes (10% AEP).	Flooding is a risk through the extent of this scheme option. However, CFRAMs maps are not available to assess the potential risk of future flood events. The River Tolka which is located to the south of this scheme is highlighted as an area prone to tidal flooding. Fluvial flooding may also occur along the extent of bus and cycle lanes (10% AEP).	Flooding is a risk through the extent of this scheme option. However, CFRAMs maps are not available to assess the potential risk of future flood events. The River Tolka which is located to the south of this scheme is highlighted as an area prone to tidal flooding. Fluvial flooding may also occur along the extent of bus and cycle lanes (10% AEP).	Flooding is a risk through the extent of this scheme option. However, CFRAMs maps are not available to assess the potential risk of future flood events. The River Tolka which is located to the south of this scheme is highlighted as an area prone to tidal flooding. Fluvial flooding may also occur along the extent of bus and cycle lanes (10% AEP).
		Summary	Overall, there is high risk of pluvial flooding along this scheme while there increased risk of tidal flooding from the River Tolka.	Overall, there is high risk of pluvial flooding along this scheme while there increased risk of tidal flooding from the River Tolka.	Overall, there is high risk of pluvial flooding along this scheme while there increased risk of tidal flooding from the River Tolka.	Overall, there is high risk of pluvial flooding along this scheme while there increased risk of tidal flooding from the River Tolka.
	Rank					
Environment	Landscape and visual		**Tree Protection/Preservation**: Low/Medium Impact: Removal of small trees/hedges from private land required **Lanscape Impact on Protected Structures:** Little/No Impact **Landscape Impact on Architectural Conservation:** Potential Low/Medium. Impact to ralings of protected buildings **Visual Impact on Properties:** Potential Medium Impact - Impact to some properties on Malahide Road **Impact on Streetscape/Townscape**: Med Impact to Malahide Road	**Tree Protection/Preservation**:Low Impact: Removal of small trees/hedges from private land required **Lanscape Impact on Protected Structures:** Little/No Impact **Landscape Impact on Architectural Conservation:** Little/No Impact **Visual Impact on Properties:** Potential Low Impact - Minor impact to some properties on Malahide Road **Impact on Streetscape/Townscape**: Low Impact to Malahide Road	**Tree Protection/Preservation**:Low Impact: Removal of small trees/hedges from private land required **Lanscape Impact on Protected Structures:** Little/No Impact **Landscape Impact on Architectural Conservation:** Potential Low/Medium. Impact to ralings of protected buildings **Visual Impact on Properties:** Potential Low/Medium Impact - Minor impact to some properties on Malahide Road **Impact on Streetscape/Townscape**: Low/Medium Impact to Malahide Road	**Tree Protection/Preservation**: Little/ No Impact **Lanscape Impact on Protected Structures:** Little/No Impact **Landscape Impact on Architectural Conservation:** Little/No Impact **Visual Impact on Properties:** Little/No Impact **Impact on Streetscape/Townscape**: Little/No Impact
	Rank					

Noise and Vibration	Qualitiative noise assessment	There will be some instances where the proposed scheme will result in traffic being relocated closer to sensitive receptors due to road widening. Should traffic be moved closer to sensitive receptors (or traffic volumes increase), there may be an increase in noise.	There will be some instances where the proposed scheme will result in traffic being relocated closer to sensitive receptors due to road widening. Should traffic be moved closer to sensitive receptors (or traffic volumes increase), there may be an increase in noise.	There will be some instances where the proposed scheme will result in traffic being relocated closer to sensitive receptors due to road widening on the eastern side, bus lanes on both sides of the roads would increase noise at sensitive receptors compared to option 6. Should traffic be moved closer to sensitive receptors (or traffic volumes increase), there may be an increase in noise.	The bus lane on the western side of the carriageway may result in an increase in noise for the sensitive receptor to the west of the scheme. Diversion of traffic down Copeland Avenue is expected to result in significant increases in noise.
	Geodriectory (Building types)	A review of An Post Geodirectory data indicated that Building use along the Malahide Road is predominately residential. There is some commercial building use at the northern end of the scheme between the junction of Copeland Avenue and Charlemont Road. The southern end of Malahide Road between the junction of Crescent Place and Marino Crescent is predominately commercial and with some both residential & commercial use. Building use along the section at Fairview Park is predominately commercial, while building use along Annesley Bridge Road is predominately residential.	A review of An Post Geodirectory data indicated that Building use along the Malahide Road is predominately residential. There is some commercial building use at the northern end of the scheme between the junction of Copeland Avenue and Charlemont Road. The southern end of Malahide Road between the junction of Crescent Place and Marino Crescent is predominately commercial and with some both residential & commercial use. Building use along the section at Fairview Park is predominately commercial, while building use along Annesley Bridge Road is predominately residential.	A review of An Post Geodirectory data indicated that Building use along the Malahide Road is predominately residential. There is some commercial building use at the northern end of the scheme between the junction of Copeland Avenue and Charlemont Road. The southern end of Malahide Road between the junction of Crescent Place and Marino Crescent is predominately commercial and with some both residential & commercial use. Building use along the section at Fairview Park is predominately commercial, while building use along Annesley Bridge Road is predominately residential.	A review of An Post Geodirectory data indicated that Building use along the Malahide Road is predominately residential. There is some commercial building use at the northern end of the scheme between the junction of Copeland Avenue and Charlemont Road. The southern end of Malahide Road between the junction of Crescent Place and Marino Crescent is predominately commercial and with some both residential & commercial use. Building use along the section at Fairview Park is predominately commercial, while building use along Annesley Bridge Road is predominately residential.
	Sensitive Receptors	There is one Creche (25 Malahide Rd), 2 educational establishments (Mario College, St. Joseph's CBS Secondary School) and 1 place of worship (Fairview hall), and 1 area of high amenity (Fairview Park) along the scheme option that meets the EPA definition of a noise sensitive location.	There is one Creche (25 Malahide Rd), 2 educational establishments (Mario College, St. Joseph's CBS Secondary School) and 1 place of worship (Fairview hall), and 1 area of high amenity (Fairview Park) along the scheme option that meets the EPA definition of a noise sensitive location.	There is one Creche (25 Malahide Rd), 2 educational establishments (Mario College, St. Joseph's CBS Secondary School) and 1 place of worship (Fairview hall), and 1 area of high amenity (Fairview Park) along the scheme option that meets the EPA definition of a noise sensitive location.	There is one Creche (25 Malahide Rd), 2 educational establishments (Mario College, St. Joseph's CBS Secondary School) and 1 place of worship (Fairview hall), and 1 area of high amenity (Fairview Park) along the scheme option that meets the EPA definition of a noise sensitive location.
	Land take	There will be some instances of private land acquisition along the Malahide Road. In addition, there will be some instances of public land acquision along the Malahide Road and along the R105 at Fairview Park	There will be some instances of private land acquisition along the Malahide Road. In addition, there will be some instances of public land acquisition along the Malahide Road and along the R105 at Fairview Park	There will be some instances of private land acquisition along the Malahide Road. In addition, there will be some instances of public land acquisition along the Malahide Road and along the R105 at Fairview Park	There will be no instances of private land acquisition along the Malahide Road. In addition, there will be some instances of public land acquisition along the Malahide Road and along the R105 at Fairview Park
	Summary	The route option has the potential for both positive and negative impacts to the existing noise environment. There are no major issues that have the potential to give rise to significant impacts.	The route option has the potential for both positive and negative impacts to the existing noise environment. There are no major issues that have the potential to give rise to significant impacts.	The route option has the potential for both positive and negative impacts to the existing noise environment. There are no major issues that have the potential to give rise to significant impacts.	Signifcant disadvantge due to the diversion of traffic down copeland avenue
Rank					
Air Quality	Qualitiative noise assessment	There will be some instances where the proposed scheme will result in traffic being relocated closer to sensitive receptors due to road widening. Should traffic be moved closer to sensitive receptors (or traffic volumes increase), there may be an increase in pollutant concentrations.	There will be some instances where the proposed scheme will result in traffic being relocated closer to sensitive receptors due to road widening. Should traffic be moved closer to sensitive receptors (or traffic volumes increase), there may be an increase in pollutant concentrations.	There will be some instances where the proposed scheme will result in traffic being relocated closer to sensitive receptors due to road widening on the eastern side, bus lanes on both sides of the roads would increase pollution concentrations at sensitive receptors compared to option 6. Where traffic is moved closer to sensitive receptors (or traffic volumes increase) at the eastern side, there may be an increase in pollution concentrations.	The bus lane on the western side of the carriageway may result in an increase in pollution concentrations for the sensitive receptor to the west of the scheme. Diversion of traffic down Copeland Avenue is expected to result in significant increases in pollution concentrations.
	Geodriectory (Building types)	A review of An Post Geodirectory data indicated that Building use along the Malahide Road is predominately residential. There is some commercial building use at the northern end of the scheme between the junction of Copeland Avenue and Claremont Road. The southern end of Malahide Road between the junction of Crescent Place and Marino Crescent is predominately commercial and with some both residential & commercial use. Building use along the section at Fairview Park is predominately commercial, while building use along Annesley Bridge Road is predominately residential.	A review of An Post Geodirectory data indicated that Building use along the Malahide Road is predominately residential. There is some commercial building use at the northern end of the scheme between the junction of Copeland Avenue and Claremont Road. The southern end of Malahide Road between the junction of Crescent Place and Marino Crescent is predominately commerical and with some both residential & commercial use. Building use along the section at Fairview Park is predominately commercial, while building use along Annesley Bridge Road is predominately residential.	A review of An Post Geodirectory data indicated that Building use along the Malahide Road is predominately residential. There is some commercial building use at the northern end of the scheme between the junction of Copeland Avenue and Claremont Road. The southern end of Malahide Road between the junction of Crescent Place and Marino Crescent is predominately commerical and with some both residential & commercial use. Building use along the section at Fairview Park is predominately commercial, while building use along Annesley Bridge Road is predominately residential.	A review of An Post Geodirectory data indicated that Building use along the Malahide Road is predominately residential. There is some commercial building use at the northern end of the scheme between the junction of Copeland Avenue and Claremont Road. The southern end of Malahide Road between the junction of Crescent Place and Marino Crescent is predominately commerical and with some both residential & commercial use. Building use along the section at Fairview Park is predominately commercial, while building use along Annesley Bridge Road is predominately residential.
	Sensitive Receptors	There is one Creche (25 Malahide Rd), 2 educational establishments (Mario College, St. Joseph's CBS Secondary School) and 1 place of worship (Fairview hall), and 1 area of high amenity (Fairview Park) along the scheme option that meets the EPA definition of a noise sensitive location.	There is one Creche (25 Malahide Rd), 2 educational establishments (Mario College, St. Joseph's CBS Secondary School) and 1 place of worship (Fairview hall), and 1 area of high amenity (Fairview Park) along the scheme option that meets the EPA definition of a noise sensitive location.	There is one Creche (25 Malahide Rd), 2 educational establishments (Mario College, St. Joseph's CBS Secondary School) and 1 place of worship (Fairview hall), and 1 area of high amenity (Fairview Park) along the scheme option that meets the EPA definition of a noise sensitive location.	There is one Creche (25 Malahide Rd), 2 educational establishments (Mario College, St. Joseph's CBS Secondary School) and 1 place of worship (Fairview hall), and 1 area of high amenity (Fairview Park) along the scheme option that meets the EPA definition of a noise sensitive location.
	Land take	There will be some instances of private land acquisition along the Malahide Road. In addition, there will be some instances of public land acquistion along the Malahide Road and along the R105 at Fairview Park	There will be some instances of private land acquisition along the Malahide Road. In addition, there will be some instances of public land acquistion along the Malahide Road and along the R105 at Fairview Park	There will be some instances of private land acquisition along the Malahide Road. In addition, there will be some instances of public land acquistion along the Malahide Road and along the R105 at Fairview Park	There will be no instances of private land acquisition along the Malahide Road. In addition, there will be some instances of public land acquistion along the Malahide Road and along the R105 at Fairview Park
	Summary	The route option has the potential for both positive and negative impacts to air quality. There are no major issues that have the potential to give rise to significant impacts.	The route option has the potential for both positive and negative impacts to air quality. There are no major issues that have the potential to give rise to significant impacts.	The route option has the potential for both positive and negative impacts to air quality. There are no major issues that have the potential to give rise to significant impacts.	Signifcant disadvantge due to the diversion of traffic down copeland avenue
Rank					
Land Use and Built Environment		Land acquisition will be highest along this scheme and will impact garden frontage along both sides of the Malahide Road. Private parking within front gardens may also be removed with no alternative on-street parking available along both sides of Malahide Road. Positive impacts will include the provision of north and southbound cycle lanes. There would likely be changes to traffic management structures with potentially increased volumes of general traffic along southern sections of the Malahide Road.	Land acquisition will impact garden frontage along both sides of this scheme. Land acquisition is expected to be reduced in comparison to scheme 2. Car parking in private gardens will not be impacted. Cycle lanes will also be diverted through alternative routes. There would likely be changes to traffic management structures with potentially increased volumes of general traffic along southern sections of the Malahide Road.	Land-aquisition will include impacts to garden frontage along the eastern side of the scheme to an undisclosed nubner of private properties. Land-changes along this scheme would primarily impact traffic management structures with no impact to existing infrastructure or garden frontage proposed. Residential and on-street car parking is not envisaged to impacted. Cycle lanes will be provided northbound with diverted cycles lane southbound (not shown on drawings). Buses would primarily utilise designated lanes although, northbound buses would share a section with general traffic.	Land-changes along this scheme would primarily impact traffic management structures with no impact to existing infrastructure or garden frontage proposed. On-street car parking would be removed along Copeland Avenue. Cycle lanes would be provided northbound with diverted cycle lanes expected to be constructed southbound. General traffic would be diverted along Copeland Avenue with increases in traffic volumes resulting significant traffic congestion.

		Overall, considerable changes to land-use including land-acquisition are expected along this scheme.	Overall, low changes to land-use are expected on both sides of this scheme with a number of private residents expected to be impacted through loss of garden frontage.	Overall, some impacts to land-use are expected along this scheme. Although, impacts to traffic management structures and potential increases in traffic volumes are likely.	Overall, considerable impacts to traffic management structures are expected with considerable changes to traffic volumes along Copeland Avenue.
	Rank				

Stage 2		Section 2 - Annesley Bridge to Custom House		
Assessment Criteria	**Sub-Criteria**	**Route 1**	**Route 2**	**Route 3**
Economy	Capital Cost	**Total - €10.3M** **Cost per KM - €4.7M** *Indicative Scheme Infrastructure Works Cost - €10.3M* *Private Land Costs - €0M*	**Total - €9.6M** **Cost per KM - €4.6M** *Indicative Scheme Infrastructure Works Cost - €9.6M* *Private Land Costs - €0M*	**Total - €8M** **Cost per KM - €4.4M** *Indicative Scheme Infrastructure Works Cost - €7.9M* *Private Land Costs - €0M*
	Rank			
	Journey-time reliability and quality of service	This scheme has a total length of 2.2 km and from initial journey time calculations, would take an average of **10-11 mins.** Full bus priority is provided and so the reliability of these journey times would be good	This scheme has a total length of 2.1 km and from initial journey time calculations, would take an average of **9-10 mins.** Full bus priority is provided and so the reliability of these journey times would be good	This scheme has a total length of 1.8 km and from initial journey time calculations, would take an average of **7-8 mins.** Full bus priority is provided and so the reliability of these journey times would be good
	Rank			
Integration	Land Use Integration	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion
	Rank			
	Residential Catchment (10 Mins)	44397	37878	33337
	Employment Catchment (10 Mins)	58630	53825	49883
	Total residential and employment (10 Mins)	103028	91703	83220
	Rank			
	Public Transport Integration	Does not integrate as well with Connolly Station	Does not integrate as well with Connolly Station	This route integrates better with National Rail, DART, and Bus Services at Connolly Station
	Transport Network Integration	One lane on Ballbough/Summerhill in either direction will be converted to a bus lane. A portion of Poplar Row will be converted to a bus only section and traffic will have to detour via Annesley Pl	New bus only right turn onto Killarney Place would impact on 5 Lamps junction. Some section sof traffic lanes on Gardiner St required	Some sections of traffic lanes will be converted to bus lanes on Amiens St
	Rank			
	Cyclists and pedestrian Integration	Ballybough Road is a secondary cycle route. Interrupted cycle lanes will be provided along Ballybough Rd, No Cycling Provided along Gardnier St	Killarney St and Sean McDermott St are secondary cyle routes, Amien St is a primary cycle route. Cycle lanes not provided on Killarney St, Sean MacDermott St Lower, and Garnier St. Diversion along Amiens St	Amiens St is a primary cycle route. New segregated cycle lanes will be provided in both directions. Footpaths on Amiens St will be widened.
	Rank			
Accessibility and Social Inclusion	High Volume Trip Attractors (Education, Health, Commercial, Retail, Leisure)	Croke Park, O'Connell Secondary School, DIT Mountjoy & Cathal Brugha, Talbot St Area	Marino College of Further Education, DIT Cathal Brugha, Talbot St Area, Our Lady of Lourdes Church	Marino College of Further Education, Connelly Station, IFSC
	Rank			
	Deprived Geographic Areas & Areas Underserved by Public Transport	Serves areas with a v high deprviation index scores along Ballybough/Summerhill	Does not serve as many areas with high deprivation index scores as option 1	Does not serve as many areas with high deprivation index scores as option 1
	Rank			
Safety	Road Safety	3 Turning Movements	2 Turning Movements	0 Turning Movements
	Rank			
	Record of Protected Monuments	1 RMP site on route (sea wall, DU018-020505). Potential that similar features might survive beneath the road, albeit heavily truncated or indeed removed by subsequent road development.	1 RMP site on route (sea wall, DU018-020505). Potential that similar features might survive beneath the road, albeit heavily truncated or indeed removed by subsequent road development.	1 RMP site on route (sea wall, DU018-020505).
		Proximity to 2 RMP sites (bridge & weir, DU018-022001 &-022002).	-	-

	Archaeological, Architectural and Cultural Heritage	Protected Structures	3 protected structures on route: Railway bridge (RPS 877), canal bridge (RPS 910), both on Ballybough Rd, & railway bridge (stone columns & arches) on Beresford Place (RPS 881).	2 protected structures on route: Railway bridge (RPS 888) on North Strand Rd, & railway bridge (stone columns & arches) on Beresford Place (RPS 881).	1 protected structure on route: Railway bridge (RPS 888) on North Strand Rd.
			75 protected structures immediately adjacent route, the majority of which are houses. Most notable is Custom House.	62 protected structures immediately adjacent route, the majority of which are houses. Most notable is Custom House.	39 protected structures immediately adjacent route, the majority of which are houses.
		Summary	*Summary of Constraints:* Potential that similar features might survive beneath the road in vicinty of RMP site (sea wall), albeit heavily truncated or indeed removed by subsequent road development. With regard to the numerous protected structures along the route, the CBC works will not extend beyond the existing road, though footpaths may need to be reduced in places. Given that the structures have clearly defined boundaries they are unlikely to be impacted as they can easily be avoided.	*Summary of Constraints:* Potential that similar features might survive beneath the road in vicinty of RMP site (sea wall), albeit heavily truncated or indeed removed by subsequent road development. With regard to the numerous protected structures along the route, the CBC works will not extend beyond the existing road, though footpaths may need to be reduced in places. Given that the structures have clearly defined boundaries they are unlikely to be impacted as they can easily be avoided.	*Summary of Constraints:* Potential that similar features might survive beneath the road in vicinty of RMP site (sea wall), albeit heavily truncated or indeed removed by subsequent road development. With regard to the numerous protected structures along the route, the CBC works will not extend beyond the existing road, though footpaths may need to be reduced in places. Given that the structures have clearly defined boundaries they are unlikely to be impacted as they can easily be avoided.
	Rank				
	Flora and Fauna	EU Sites	European Sites of Conservation of Importance downstream of this route option in Dublin Bay (potential connectivity via watercourses River Tolka and River Liffey).	European Sites of Conservation of Importance downstream of this route option in Dublin Bay (potential connectivity via watercourses River Tolka and River Liffey).	European Sites of Conservation of Importance downstream of this route option in Dublin Bay (potential connectivity via watercourses River Tolka and Grand Canal/River Liffey).
		Ecological Land Take	Land-take will be minimal along this route option with little impact to private or public grounds identified, other than the planted triangle at Memorial Road/Amiens Street/Beresford place.	Land-take will be minimal along this route option with little impact to private or public grounds identified, other than the planted triangle at Memorial Road/Amiens Street/Beresford place.	Land-take will be minimal along this route option with little impact to flora and fauna on private or public grounds identified
		Areas of high ecological values	Owing to the built-up nature of this sub-option, the route would not impinge on areas of ecological potential or connectivity. Minimal impacts on flora and fauna expected.	Owing to the built-up nature of this sub-option, the route would not impinge on areas of ecological potential or connectivity. Minimal impacts on flora and fauna expected.	Owing to the built-up nature of this sub-option, the route would not impinge on areas of ecological potential or connectivity. Minimal impacts on flora and fauna expected.
		Watercourses	Watercourses along this route include the Royal Canal, River Liffey and the River Tolka (estuarine influence in this stretch) which are not envisaged to be impacted along this route option.	Watercourses along this route include the Royal Canal, River Liffey and the River Tolka (estuarine influence in this stretch) which are not envisaged to be impacted along this route option.	Watercourses along this route include the Royal Canal and the River Tolka (estuarine influence in this stretch) which are not envisaged to be impacted along this route option.
		Areas of high ecological values	Nationally designated sites include Dublin Bay proposed National Heritage Area (pNHA 000206) which is downstream of the Annesley Road Bridge as part of the River Tolka and the Royal Canal pNHA (002103).	Nationally designated sites include Dublin Bay proposed National Heritage Area (pNHA 000206) which is downstream of the Annesley Road Bridge as part of the River Tolka and the Royal Canal pNHA (002103).	Nationally designated sites include Dublin Bay proposed National Heritage Area (pNHA 000206) which is downstream of the Annesley Road Bridge as part of the River Tolka and the Royal Canal pNHA (002103).
		Water Quality	'The water quality status of the River Tolka is ranked as "moderate" and is characterised as "at risk" as a transitional waterbody at Annesley Road Bridge. The water quality status of the River Liffey ('Liffey Estuary Upper') is ranked as at "moderate" and is characterised as "at risk" as a transitional waterbody at Custom House Quay. The water quality of the Royal Canal at Ballybough-Sommerhill Road is ranked as "good" (refer to the River Waterbody WFD Status 2010-2015; EPA Water Quality report).	The water quality status of the River Tolka is ranked as "moderate" and is characterised as "at risk" as a transitional waterbody at Annesley Road Bridge. The water quality status of the River Liffey ('Liffey Estuary Upper') is ranked as at "moderate" status and is characterised as "at risk" as a transitional waterbody at Custom House Quay. The water quality of the Royal Canal at Amiens Street is ranked as "good" (refer to the River Waterbody WFD Status 2010-2015; EPA Water Quality report).	'The water quality status of the River Tolka is ranked as "moderate" and is characterised as "at risk" as a transitional waterbody at Annesley Road Bridge. The water quality of the Royal Canal at Amiens Street is ranked as "good" (refer to the River Waterbody WFD Status 2010-2015; EPA Water Quality report).

Environment			The River Tolka and the River Liffey are not designated as salmonid rivers (refer to the First Schedule of S.I. No. 293/1988 - European Communities (Quality of Salmonid Waters) Regulations, 1988). There are records for both Trout and Salmon from both rivers however.	The River Tolka and the River Liffey are not designated as salmonid rivers (refer to the First Schedule of S.I. No. 293/1988 - European Communities (Quality of Salmonid Waters) Regulations, 1988). There are records for both Trout and Salmon from both rivers however.	The River Tolka and the River Liffey are not designated as salmonid rivers (refer to the First Schedule of S.I. No. 293/1988 - European Communities (Quality of Salmonid Waters) Regulations, 1988). There are records for both Trout and Salmon from both rivers however.
		Invaseive Species	A number of high impact invasive plant species were noted in close proximity to or within the route option. The presence of Giant Hogweed was noted immediately upstream and downstream of the River Tolka at Annesley Bridge Road, during walkover surveys. Medium impact plant species along the route include *Buddleja* .	A number of high impact invasive plant species were noted in close proximity to or within the route option. The presence of Giant Hogweed was noted immediately upstream and downstream of the River Tolka at Annesley Bridge Road, during walkover surveys. Medium impact plant species along the route include *Buddleja* .	A number of high impact invasive plant species were noted in close proximity to or within the route option. The presence of Giant Hogweed was noted immediately upstream and downstream of the River Tolka at Annesley Bridge Road, during walkover surveys. Medium impact plant species along the route include *Buddleja* .
		Summary	Owing to the built-up nature of this sub option routing, minimal impacts on flora and fauna are expected.	Owing to the built-up nature of this sub option routing, minimal impacts on flora and fauna are expected.	Owing to the built-up nature of this sub option routing, minimal impacts on flora and fauna are expected.
	Rank				
	Soils and Geology	Groundwater Vulnerability	According to the GSI GeoUrban Viewer, the groundwater vulnerability code is low (L). As such groundwater vulnerability is assessed as low through the proposed route option.	According to the GSI GeoUrban Viewer, the groundwater vulnerability code is Low (L). As such groundwater vulnerability is assessed as low through the proposed route option.	According to the GSI GeoUrban Viewer, the groundwater vulnerability code is Low (L). As such groundwater vulnerability is assessed as low through the proposed route option.
		Bedrock Geology	According to the GSI GeoUrban Viewer, the Bedrock Geology (100k Series) is characterised by Calp of the Lucan Formation - Dark limestone & shale (calp).	According to the GSI GeoUrban Viewer, the Bedrock Geology (100k Series) is characterised by Calp of the Lucan Formation - Dark limestone & shale.	According to the GSI GeoUrban Viewer, the Bedrock Geology (100k Series) is characterised by Calp of the Lucan Formation - Dark limestone & shale.
		Bedrock Aquifer	According to the GSI GeoUrban Viewer, the bedrock aquifer beneath the area is classified as Locally Important (LI) which describs as bedrock as moderately productive only in local zones.	According to the GSI GeoUrban Viewer, the bedrock aquifer beneath the area is classified as Locally Important (LI)which describes bedrock as moderately productive only in local zones.	According to the GSI GeoUrban Viewer, the bedrock aquifer beneath the area is classified as Locally Important (LI)which describes bedrock as moderately productive only in local zones.
			According to the GSI GeoUrban Viewer, the groundwater Teagasc Soils comprises of "Made ground".	According to the GSI GeoUrban Viewer, the groundwater Teagasc Soils comprises of "Made ground".	According to the GSI GeoUrban Viewer, the groundwater Teagasc Soils comprises of "Made ground".
		Soils	According to the GSI GeoUrban Viewer, the Bedrock Geology (100k Series) comprises of the Dark grey to black limestone & shale.	According to the GSI GeoUrban Viewer, the Bedrock Geology (100k Series) comprises of the Dark grey to black limestone & shale.	According to the GSI GeoUrban Viewer, the Bedrock Geology (100k Series) comprises of the Dark grey to black limestone & shale.
		Geological Heritage Site	According to the GSI Geological Heritage viewer, there are no geological heritage sites along the route.	According to the GSI Geological Heritage viewer, there are no geological heritage sites along the route.	According to the GSI Geological Heritage viewer, there are no geological heritage sites along the route.
		Industrial Emissions Directive (IED)/Intergrated Pollution Control (IPC) facilities (potential contamination)	According to the EPA Envision viewer, there are no licenced waste, IED or IPC facilities along this route option.	According to the EPA Envision viewer, there are no licenced waste, IED or IPC facilities along this route option.	According to the EPA Envision viewer, there are no licenced waste, IED or IPC facilities along this route option.
		Landtake and geology	Proposed bus and cycle lanes would use existing infrastructure with impacts to soil and geology expected to be minimal.	Proposed bus and cycle lanes would use existing infrastructure with impacts to soil and geology expected to be minimal.	Proposed bus and cycle lanes would use existing infrastructure with impacts to soil and geology expected to be minimal.
		Summary	Overall, impacts to soil and geology along route option 1 are expected to be minimal.	Overall, impacts to soil and geology along route option 2 are expected to be minimal.	Overall, impacts to soil and geology along route option 3 are expected to be minimal.
	Rank				
		Fluvial Areas of flood risk (AEP 1%)	There is a 1% AEP(1 in 100 year Annual Exceedance Potential) risk of Fluvial flooding along the River Tolka at Ballybough Road and Poplar Road (refer to pre-liminary Flood Risk Assessment CFRAMs maps Ref: 2019 / Map / 238 / A).	There is a 1% AEP(1 in 100 year Annual Exceedance Potential) risk of Fluvial flooding along the River Tolka at North Strand Road (refer to pre-liminary Flood Risk Assessment CFRAMs maps Ref: 2019 / Map / 238 / A).	There is a 1% AEP(1 in 100 year Annual Exceedance Potential) risk of Fluvial flooding along the River Tolka at North Strand Road (refer to pre-liminary Flood Risk Assessment CFRAMs maps Ref: 2019 / Map / 238 / A).

Hydrology	Pluvial Flood Risk (AEP 10%)	Pluvial flooding is at risk (10% AEP) of occurring at numerous point locations in extreme rainfall events, particularly through the northern section on this scheme option (refer to pre-liminary Flood Risk Assessment CFRAMs maps Ref: 2019 / Map / 238 / A).	Pluvial flooding is at risk (10% AEP) of occurring at numerous point locations in extreme rainfall events, particularly through the northern section on this scheme option (refer to pre-liminary Flood Risk Assessment CFRAMs maps Ref: 2019 / Map / 238 / A).	Pluvial flooding is at risk of occurring at numerous point locations in extreme rainfall events, particularly through the northern section on this scheme option (refer to pre-liminary Flood Risk Assessment CFRAMs maps Ref: 2019 / Map / 238 / A).
	OPW National Flood Hazards Map	The OPW National Flood Hazard Mapping web site was consulted. Historic flood events have been recorded along the northern end of this Route Option (Popular Row, North Strand Road & Ballybough Road), associated with the River Tolka. No Flood events are known to have occured along Summerhill Road, Gardiner Street, Beresford Place/Memorial Road and Custom House Quay.	The OPW National Flood Hazard Mapping web site was consulted. Historic flood events have been recorded along the northern end of this Route Option (Popular Row & North Strand Road), associated with the River Tolka. No Flood events are known to have occured along Killarney Street/Sean MacDermott Street, Gardiner Street, Beresford Place/Memorial Road and Custom House Quay.	The OPW National Flood Hazard Mapping web site was consulted. Historic flood events have been recorded along the northern end of this Route Option (Popular Row & North Strand Road), associated with the River Tolka. No Flood events are known to have occurred along Amien Street.
	Summary	Overall, there is a risk of fluvial associated with the River Tolka. There is a risk of coastal flooding along northern and southern ends of Route Option 1. There is a considerable risk of pluvial flooding (10% AEP) at localised points along proposed bus and cycle lanes.	Overall, there is a risk of fluvial associated with the River Tolka. There is a risk of coastal flooding at the northern and southern ends of Route Option 2. There is a considerable risk (10% AEP) of pluvial flooding at localised points along proposed bus and cycle lanes.	Overall, there is a risk of fluvial associated with the River Tolka. There is a risk of coastal flooding at the northern and southern ends of Route Option 3. There is a considerable risk (10% AEP) of pluvial flooding at localised points along proposed bus and cycle lanes.
Rank				
Landscape and visual		Impact on Streetscape: Potential low impact to all streets on this route Impact on protected structures/monuments: Several protected buildings/monuments along the route, the proposed works will not affect these locations	Impact on Streetscape: Potential low impact to Amiens St. Potential Medium/High Impact to Killarney St and Sean McDermott St Impact on protected structures/monuments: Several protected buildings/monuments along the route, the proposed works will not affect these locations although the junction around the 5 lamps moumnent would need to be rearranged to allow for bus movements	Impact on Streetscape: This scheme should have a positive impact on the streetscape of Amiens St with wider less cluttered footpaths provided and a narrower roadway in places.. Impact on protected structures/monuments: Several protected buildings/monuments along the route, the proposed works will not affect these locations
Rank				
Noise and Vibration	Qualitiative noise assessment	There will be some instances where the proposed scheme will result in traffic being relocated closer to receptors due to road widening. Should traffic be moved closer to receptors (or traffic volumes increase), there may be an increase in noise.	There will be some instances where the proposed scheme will result in traffic being relocated closer to receptors due to road widening. Should traffic be moved closer to receptors (or traffic volumes increase), there may be an increase in noise.	There will be some instances where the proposed scheme will result in traffic being relocated closer to receptors due to road widening. Should traffic be moved closer to receptors (or traffic volumes increase), there may be an increase in noise.
	Geodriectory (Building types)	A review of An Post Geodirectory data indicated that Building use is both residential and commercial along this route option.	A review of An Post Geodirectory data indicated that Building use is both residential and commercial along this route option, however the predominant use is residential.	A review of An Post Geodirectory data indicated that Building use is both residential and commercial along this route option, however the predominant use is residential along North Strand Road and commercial along Amiens Street.
	Summary	The route option has the potential for both positive and negative impacts to the existing noise environment. The route follows existing built up areas. There are no major issues that have the potential to give rise to significant impacts.	The route option has the potential for both positive and negative impacts to the existing noise environment. The route follows existing built up areas. There are no major issues that have the potential to give rise to significant impacts.	The route option has the potential for both positive and negative impacts to the existing noise environment. The route follows existing built up areas. There are no major issues that have the potential to give rise to significant impacts.
Rank				

	Air Quality	Qualitiative noise assessment	There will be some instances where the proposed scheme will result in traffic being relocated closer to receptors due to road widening. Should traffic be moved closer to receptors (or traffic volumes increase), there may be an increase in pollutant concentrations.	There will be some instances where the proposed scheme will result in traffic being relocated closer to receptors due to road widening. Should traffic be moved closer to receptors (or traffic volumes increase), there may be an increase in pollutant concentrations.	There will be some instances where the proposed scheme will result in traffic being relocated closer to receptors due to road widening. Should traffic be moved closer to receptors (or traffic volumes increase), there may be an increase in pollutant concentrations.
		Geodriectory (Building types)	A review of An Post Geodirectory data indicated that Building use is both residential and commercial along this route option.	A review of An Post Geodirectory data indicated that Building use is both residential and commercial along this route option, however the predominant use is residential.	A review of An Post Geodirectory data indicated that Building use is both residential and commercial along this route option, however the predominant use is residential along North Strand Road and commercial along Amiens Street.
		Summary	The route option has the potential for both positive and negative impacts to the existing air quality environment. The route follows existing built up areas. There are no major issues that have the potential to give rise to significant impacts.	The route option has the potential for both positive and negative impacts to the existing air quality environment. The route follows existing built up areas. There are no major issues that have the potential to give rise to significant impacts.	The route option has the potential for both positive and negative impacts to the existing air quality environment. The route follows existing built up areas. There are no major issues that have the potential to give rise to significant impacts.
	Rank				
	Land Use and Built Environment		Aproximately 60 On-Street Residential parking spaces removed. Approximately 30 On-Street Commercial parking spaces removed.	Aproximately 75 On-Street Residential parking spaces removed. Approximately 50 On-Street Commercial parking spaces removed.	Approximately 45 On-Street Commercial parking spaces removed.
	Rank				

Stage 2		Section 2 - Custom House & Quays			
Assessment Criteria	**Sub-Criteria**	**Route 1**	**Route 2**	**Route 3**	**Route 4**
Economy	Capital Cost	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion
	Rank				
	Journey-time reliability and quality of service	This scheme has a total length of 685m and from initial journey time calculations, would take an average of **3 -3.5 mins.** Full bus priority is provided.	This scheme has a total length of 675m and from initial journey time calculations, would take an average of **3-3.5 mins.** Full bus priority is provided	This scheme has a total length of 705m and from initial journey time calculations, would take an average of **4-4.5 mins.** Full bus priority is provided, however turbulence caused by weaving movements on Talbot Bridge could potentially delay buses as right turning vehicles will be required to cross the bus lane	This scheme has a total length of 695m and from initial journey time calculations, would take an average of **4-4.5mins.** Full bus priority is provided, however turbulence caused by weaving movements on Talbot Bridge could potentially delay buses as right turning vehicles will be required to cross the bus lane
	Rank				
Integration	Land Use Integration	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion
	Rank				
	Residential Catchment (10 mins)				
	Employment Catchment (10 mins)				
	Total residential and employment (10 mins)	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion
	Rank				
	Public Transport Integration	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion
	Traffic Network Integration	Two lanes of southbound general traffic from Memorial Place Removed	One lane of southbound general traffic from Memorial Place and one northbound lane from Beresford Place removed	Two lanes of southound general traffic from Memorial Place and one lane from Talbot Bridge removed.	Takes one lane of general traffic from Memorial Place, one lane from Beresford Place and one lane from Talbot Bridge.
	Rank				
	Cyclists and pedestrian Integration	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion
	Rank				
Accessibility and Social Inclusion	High Volume Trip Attractors (Education, Health, Commercial, Retail, Leisure)	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion
	Rank				
	Deprived Geographic Areas & Areas Underserved by Public Transport	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion
	Rank				
Safety	Road Safety	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion
	Rank				
Environment	Archaeological, Architectural and Cultural Heritage	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion
	Rank				
	Flora and Fauna	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion
	Rank				
	Soils and Geology	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion
	Rank				
	Hydrology	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion
	Rank				
	Landscape and visual	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion
	Rank				
	Noise and Vibration	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion
	Rank				
	Air Quality	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion
	Rank				
	Land Use and Built Environment	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion	Options considered equal under this criterion
	Rank				

TECHNICAL MEMORANDUM

CH2M Barry

Stage 2 – CBC 1 Clongriffin to City – Options Development - Junctions

PREPARED FOR:	National Transport Authority
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DATE:	08/12/2017
PROJECT NUMBER:	684784
REVISION NO.:	2
APPROVED BY:	Neil Davies

Options Development - Junctions

The technical note describes the approach and methodology for the junction development for CBC 1 - Clongriffin to City Centre (Custom House) and development and assessment of the design development options for the major junctions.

The general approach for junctions could be divided into three sections. The objective is to maintain consistency in the approach to junction design/ treatment and to avoid major variations, within each section.

- Main Street (Clongriffin Terminus to new junction at Malahide Road)
- Malahide Road (Junction with R139 to Fairview/ Marino Mart Junction)
- North Strand Road (Fairview/ Marino Mart Junction to Custom House)

Main Street (Clongriffin Terminus to the new junction at Malahide Road)

This section commences at the Clongriffin Terminus and runs through the Main Street and section of partially completed road and some parts of not yet completed section. Along the Main Street, it would be considered to adopt the current approach at the existing junctions and the new junctions forming part of the unfinished section.

The general approach for junction is as per **Sketch Option 1** i.e. maintain existing layout

- Single traffic lane and bus lane with cycle lane and footpath until the junction with Hole in the Wall Road and no cycle lane further on until junction with Malahide road.
- The single traffic lane combined with right turning traffic at the junction
- The left turning traffic merging into the bus lane and yellow box
- The left turning traffic change lane to the bus lane and provide an island at the cross-over of lane.
- The other roads at the junction as per existing

The junction at Malahide Road with the new junction forming part of unfinished section is described in detail in further sections.

Malahide Road (Junction with R139 to Fairview/ Marino Mart Junction)

This section commences at the junction with R139 and runs through the Malahide Road until the junction at Fairview/ Marino Mart.

The general approach for this section is to maintain online cycle lane along Malahide Road through all junctions. Online cycle lane will be maintained at the two roundabouts – Darndale Roundabout and Artane Roundabout.

The general approach for majority of the junctions along this section is to maintain a right turning lane and remove any free-flow left slip lane to comply with DMURS. This could be achieved by treating the left turning traffic at the signal with following option:

Where the left turning traffic volume is low and where there is land take constraint, the left turning traffic treated with the straight ahead lane, **as per Sketch Option 2.**

Where the left turning traffic volume is high and no land take constraint, provide left turning lane on the outside of the bus lane. The left turning traffic will change lane through the bus lane, yellow box and possibly traffic island provided, **as per Sketch Option 3.**

Where the left turning traffic volume is high and no land take constraint, provide left turning lane on the inside of the bus lane, **as per Sketch Option 4.** The bus lane will taper smoothly to the outer lane and will be given pre-signal. In a similar scenario, where left turning traffic is low, the left turning traffic could be given a flashing amber at the signal while bus is on green. This option has been discounted for further design.

However, in any particular junction if it is not possible to accommodate the above 2 options, then left turning traffic will be merged into the bus lane and maintain a right turning pocket where possible, **as per Sketch Option 1 or Option 5**. E.g. the following junction follows

The following junctions are considered in further detail in further sections:

1. Malahide Road/ R139 and the new junction with Main Road
2. Malahide Road junction with Clare Hall Shopping Centre
3. Malahide Road – Darndale Roundabout
4. Malahide Road – Artane Roundabout
5. Malahide Road – Fairview/ Marino Mart junction

North Strand Road (Fairview/ Marino Mart Junction to Custom House)

This section commences at the Malahide Road – Fairview/ Marino Mart junction and runs through Annesley Bridge, North Strand Road to the Custom House. Along this stretch it would be considered to adopt the current approach at the existing junctions. Also, majority of the junctions along this stretch are priority junctions and will be treated as existing. Most of the signalised junctions will follow the Sketch option 1, i.e. the left turning traffic merging into the bus lane or Sketch 5 i.e right turning lane and left turning traffic merging into the bus lane.

Options Development and Assessment – Major Junctions

The following junctions are considered in detail for further options development and assessment:

1. Malahide Road/ R139 and the new junction with Main Road
2. Malahide Road junction with Clare Hall Shopping Centre
3. Malahide Road – Darndale Roundabout
4. Malahide Road – Artane Roundabout
5. Malahide Road – Fairview/ Marino Mart junction

The section explains the advantages and disadvantages of each option, and recommends a preferred option.

Malahide Road/ R139 and the new junction with Main Road

Table 1: Junction Options and Recommendation

No	Option Description	Advantages	Disadvantages	Pass/Fail
1.	Bus on left side lane and bus gets a pre-signal at the first junction with R139 and enters the right turning lane onto the next junction with the Main Street. Layout as per Concept Design	Bus does not have to weave through traffic lanes. Bus lane separated from traffic lanes and so not delayed by traffic queues. Bus maintains left most lane and does not interfere with the left turning and/ or straight ahead traffic. Bus lane on the right lane at approach to the new junction with Main Street will give better junction efficiency.	Separate traffic signal phase required at Malahide Road/R139 junction for bus movements. 2 northbound traffic lanes narrowing to 1 lane at Malahide Rd/R139 junction may cause traffic congestion.	Pass (decision on modelling result)
2.	Bus moves on to the Right lane in advance of the first junction with R139 and subsequently enters the right turning lane onto the next junction with Main Street.	Less traffic signal phasing at Malahide Rd/R139 junction. Bus lane separated from traffic lanes at junctions.	Bus required to weave through traffic lanes and so may be delayed by traffic queuing at the junction ahead, unless a traffic signal is provided for the bus change lane. 2 northbound traffic lanes narrowing to 1 lane at Malahide Rd/R139 junction may cause traffic congestion.	Pass (decision on modelling result)
3.	Bus on left side lane and bus gets a pre-signal at the first junction. Dedicated bus lane (two way) at approach to the new junction with Main Street.	Bus does not have to weave through traffic lanes. Bus lane separated from traffic lanes and so not delayed by traffic queues.	Much greater costs for off-road bus lanes additional land take. Northbound bus lane diagonally crosses Malahide Road/R139 junction which may adversely impact the efficiency of the junction. Additional conflicts for cyclists and pedestrians.	Fail
4.	Bus on left side/ outside lane at the first junction with R139. Further on dedicated bus	Bus does not have to weave through traffic lanes.	Northbound bus lane diagonally crosses New Junction with Main Street which may adversely	Fail

No	Option Description	Advantages	Disadvantages	Pass/Fail
	lane on the left side/ outside lane and bus gets a signal at approach to the new junction.	Bus lane separated from traffic lanes and so not delayed by traffic queues.	impact the efficiency of the junction. Additional conflicts for cyclists and pedestrians.	

It is recommended that Option 1 is the preferred option. This option allows for a continuous dedicated bus lane, whilst allowing for minimal impact to the signalised junctions and cyclists and pedestrians.

Clare Hall Shopping Centre Junction Options

Table 2: Junction Options and Recommendation

No	Option	Advantages	Disadvantages	Pass/Fail
1.	Move the bus lane into the left turning pocket and the left turning lane inside of the bus lane. Bus and traffic (left and straight ahead) lanes to be controlled by traffic signals.	Bus and left turning traffic will be fully separated and there will be no conflict. Allows for buses to have priority at the junction. Improved crossing facility for cyclists and pedestrians.	Additional costs for removal of existing traffic island. Possible delays for left turning traffic.	Fail
2.	Maintain the left turning lane by realigning the slip lane to head straight to the STOP line at the signal. Left turning traffic will have signal control at the junction. Introduce left turning cycle lane and maintain the straight ahead cycle lane between the left turning lane and bus lane. Layout as per Concept Design	Improved crossing facility for cyclists and pedestrians. Cost effective, as minimal changes are required to the existing kerblines.	Left turning traffic will require lane change and could impact on bus traffic. Allowing for bus priority will be slightly reduced as traffic flows across the bus lane.	Pass
3.	Do nothing – maintain existing layout and introduce and signal at the left turning slip..	Cost effective, as no changes are required to the existing kerb lines. Free-flow traffic lane for left turning manoeuvres is maintained.	Lack of priority for buses. Left turning traffic could impact on bus traffic. Lack of cycle crossing facilities.	Fail

It is recommended that Option 2 is the preferred option. This option allows for the maximum bus priority at the junction as well as allowing for improved cycle facilities.

Fairview Marino Mart Junction Options

Table 3: Junction Options and Recommendation

No	Option	Advantages	Disadvantages	Pass/Fail
1.	In the northbound direction keep dedicated bus lane, and left turning and straight ahead in separate traffic lanes. Buses (going left to Malahide Road and straight to Clontarf Road) will be given a pre-signal at the junction. Southbound direction, one traffic lane and bus lane Cyclists will be diverted through Haverty Road and Brian Road.	Allows buses maximum priority at the junction. Left turning lane will cater 825 peak hour volume Straight ahead lane will cater 1417 peak hour volume, which is within the limits of lane capacity (1,600)	Additional costs for removal of existing traffic island. Possible delays for left turning traffic. Additional delays due to pre-signal for buses could impact overall efficiency of the junction	Fail
2.	As option 1, but bus will move into right most lane for straight ahead direction. Cyclists will be diverted through Haverty Road and Brian Road. Layout as per Concept Design	Improved crossing facility for cyclists and pedestrians. Cost effective, as minimal changes are required to the existing kerblines. Straight Bus movement as per existing	Left turning traffic could impact on bus traffic. Allowing for bus priority will be more difficult as traffic flows across the bus lane.	Pass
3.	As option 1, but traffic lanes will be left turning and straight ahead in left lane and straight ahead only in right lane. Cyclists will be diverted through Haverty Road and Brian Road.	Cost effective, as no changes are required to the existing kerblines. Free-flow traffic lane for left turning manoeuvres is maintained.	Lack of priority for buses. Left turning traffic could impact on bus traffic. Considering the traffic volumes, the left turning merged with 50% straight turning traffic will close the capacity of a single lane (expected 1540 peak volume close to 1,600)	Fail

It is recommended that Option 2 is the preferred option. This option allows for the maximum bus priority at the junction as well as allowing for improved cycle facilities.

Darndale Roundabout

Various design options have been explored for the Artane Roundabout and the preferred junction treatment has been adopted for the Darndale Roundabout to maintain consistency.

- Provide left turning lane on the inside of the bus lane, **as per Sketch Option 3.**
- Provide conventional on-road cycle lane through the junction.
- Maintain the existing off-road cycle lane and provide a link to connect to the off-road cycle crossing at the junction.

This option allows for optimum cycle and pedestrian facilities, whilst allowing for efficient BRT running through the junction. It also provides a clear and understandable junction layout.

Artane Junction

Table 4: Junction Options and Recommendation

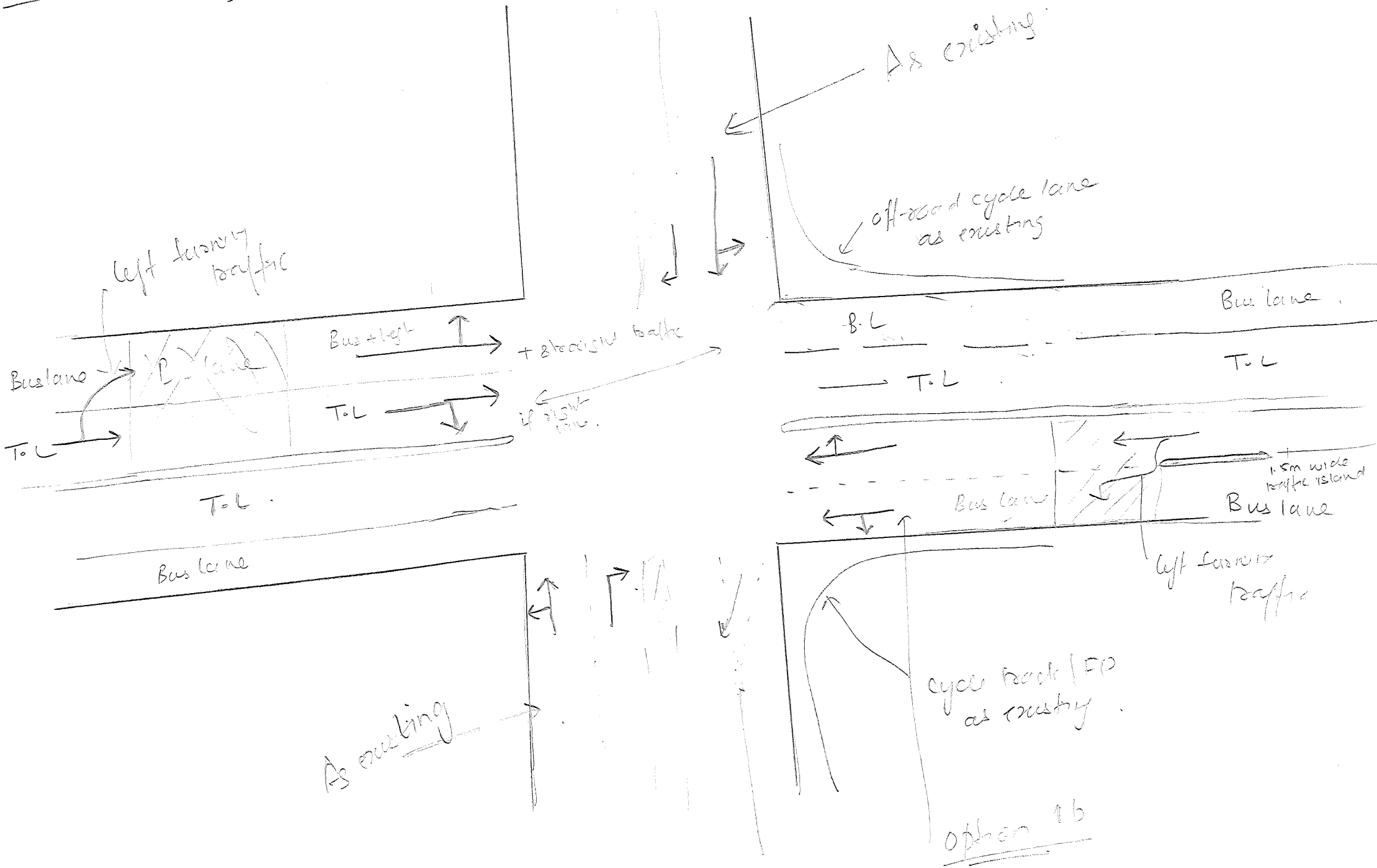
No	Option	Advantages	Disadvantages	Pass/Fail
1.	Signalised Junction – approach is to avoid left turning traffic conflict with the bus. Malahide Road Northbound - The left turning traffic going Northbound will be treated the signal - 3 lanes at the signal (left turning, straight and right turning) Malahide Road Southbound - The left turning traffic going Southbound will be treated the signal - 3 lanes at the signal (left turning, straight and right turning) Conventional On-road Cycle facilities Also maintain the off-road existing cycle lane and footpath Layout as per Concept Design	Allows for most efficient junction for road traffic and dealing with the left turning traffic thus giving bus priority. On road cycle tracks. Basic cycle and pedestrian crossing facilities. Separate cycle tracks for left turning cyclists follow the existing and like for like.	On-road cycle tracks provide segregation from road traffic but not BRT. Additional costs. Pedestrian and cyclist phases required for junction signalisation will make the junction less efficient for road traffic.	Pass
2.	Signalised Junction – approach is to avoid left turning traffic conflict with the bus. Malahide Road Northbound - The left turning traffic going Northbound will be treated the signal - 3 lanes at the signal (left turning, straight and right turning). Malahide Road Southbound - The left turning traffic going Southbound will be treated the signal - 3 lanes at the signal (left turning, straight and right turning) Off-road Cycle track with Zebra Crossings at the minor roads (Ardlea and Gracefield) and maintain the off-road existing cycle lane and footpath	Allows for most efficient junction for road traffic and dealing with the left turning traffic thus giving bus priority. Cyclists are fully segregated from vehicular traffic on Malahide Road. Reduced conflicts with BRT. Separate cycle tracks for left turning cyclists follow the existing and like for like.	Additional costs. Zebra crossings are not as safe as Toucan crossings for cyclists and pedestrians Zebra crossings located a short distance from signalised junction may cause confusion for vehicular traffic and unsafe for the pedestrians/ cyclists.	Fail
3.	Signalised Junction – approach is to avoid left turning traffic conflict with the bus. Malahide Road Northbound - The left turning traffic going Northbound will be treated the signal - 3 lanes at the signal (left turning, straight and right turning). Malahide Road Southbound - The left turning traffic going Southbound will be treated the signal - 3 lanes at the signal (left turning, straight and right turning) Off-road Cycle track with Toucan Crossings at the minor roads (Ardlea and Gracefield), close to the STOP line and integrated with the main signal at the junction.	Allows for most efficient junction for road traffic and dealing with the left turning traffic thus giving bus priority. Lower costs. Cyclists are fully segregated from vehicular traffic on Malahide Road. Reduced conflicts with BRT. Toucan phase can run concurrently with BRT phase if called. Separate cycle tracks for left turning cyclists follow	Additional costs. Pedestrian and cyclist phases required for junction signalisation will make the junction less efficient for road traffic.	Fail

No	Option	Advantages	Disadvantages	Pass/Fail
	Also maintain the off-road existing cycle lane and footpath	the existing and like for like.		
4.	Gyratory junction with BRT stop in middle of junction	Allows BRT optimum priority of other road users.	Least safe option for cyclists. Most expensive option. BRT stop in middle of gyratory provides awkward access for pedestrians.	Fail

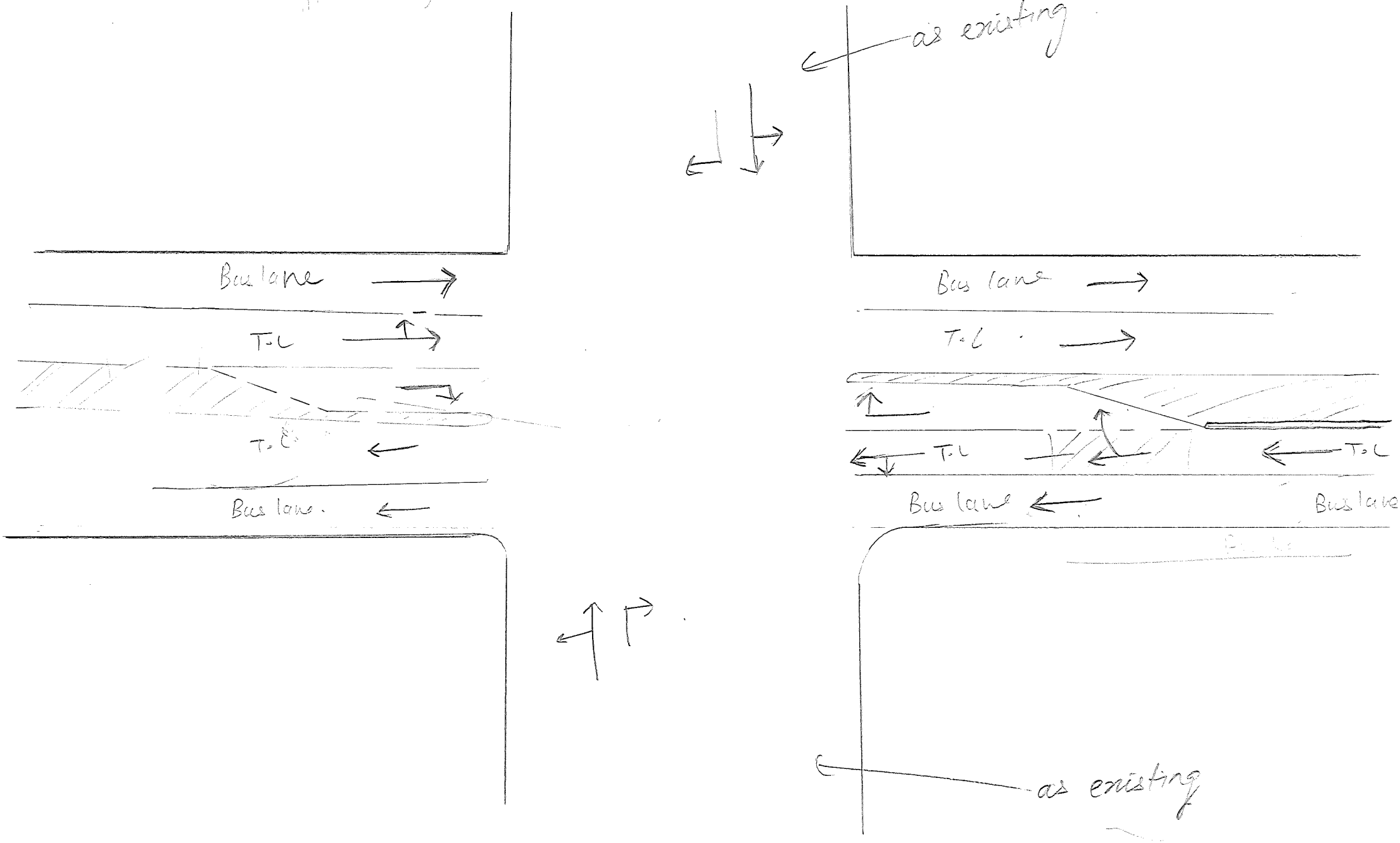
It is recommended that Option 1 is the preferred option. This option allows for optimum cycle and pedestrian facilities, whilst allowing for efficient BRT running through the junction. It also provides a clear and understandable junction layout.

Appendix A – Standard Sketches

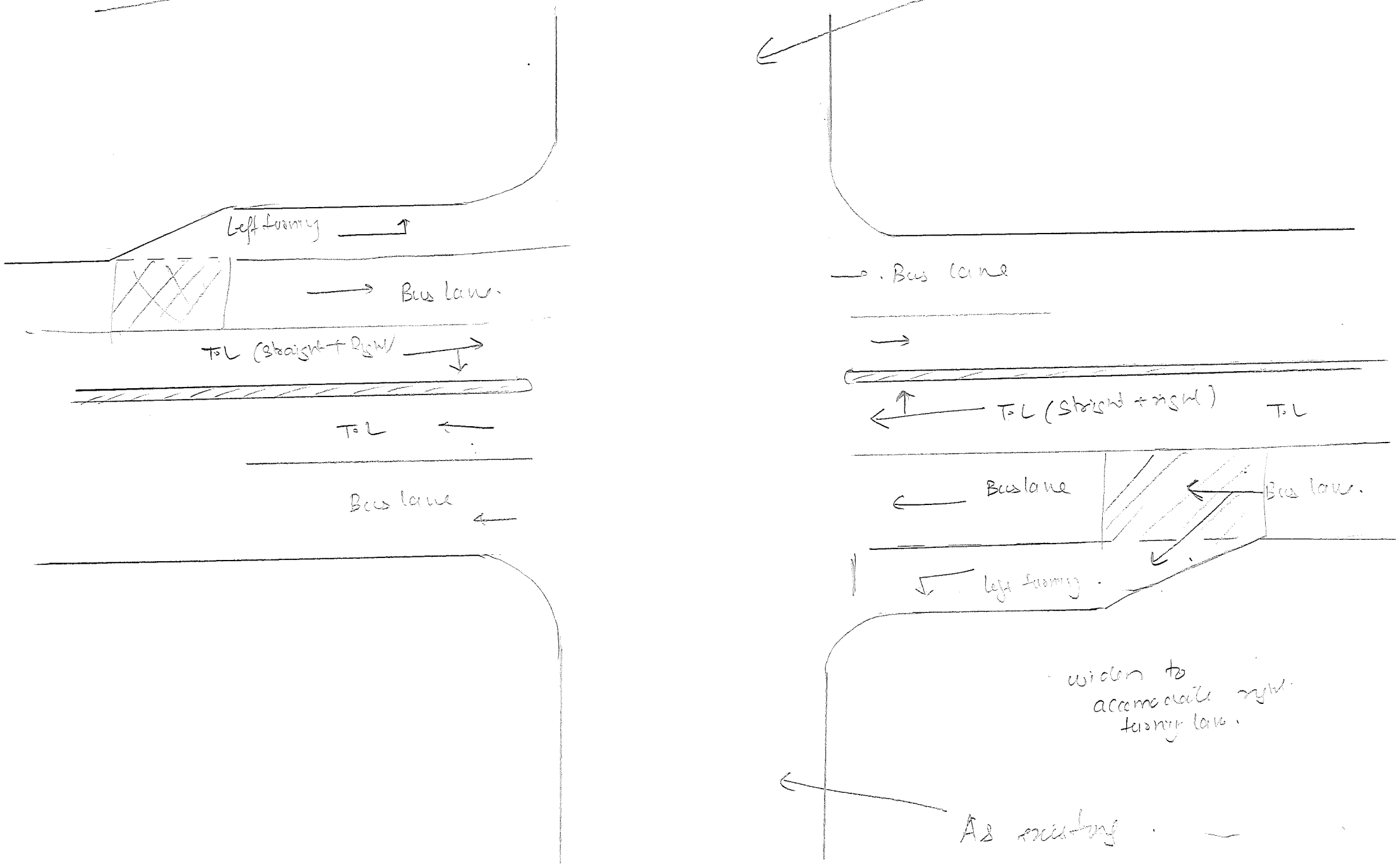
Option 1 : - Single traffic lane with right turning traffic
- Bus lane with left turning traffic



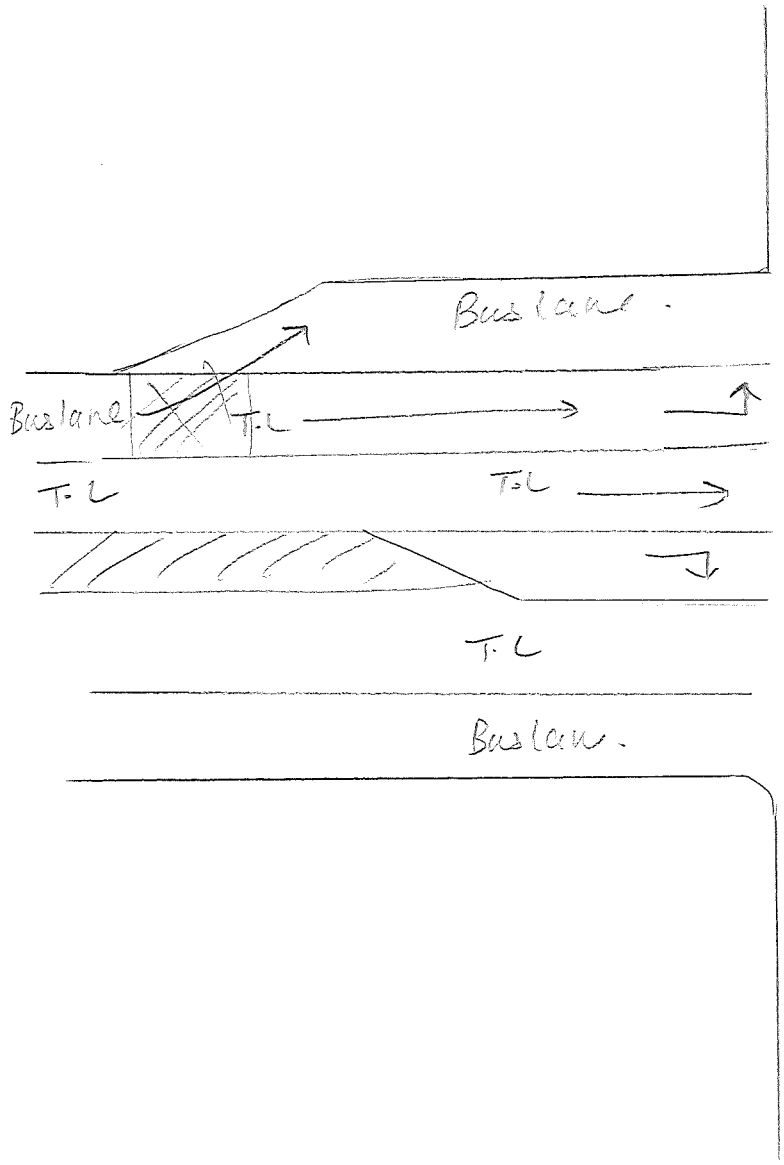
Option 2 : Single traffic lane + Bus Lane
- Right turning pocket
- Left turning traffic with straight ahead lane at Signal

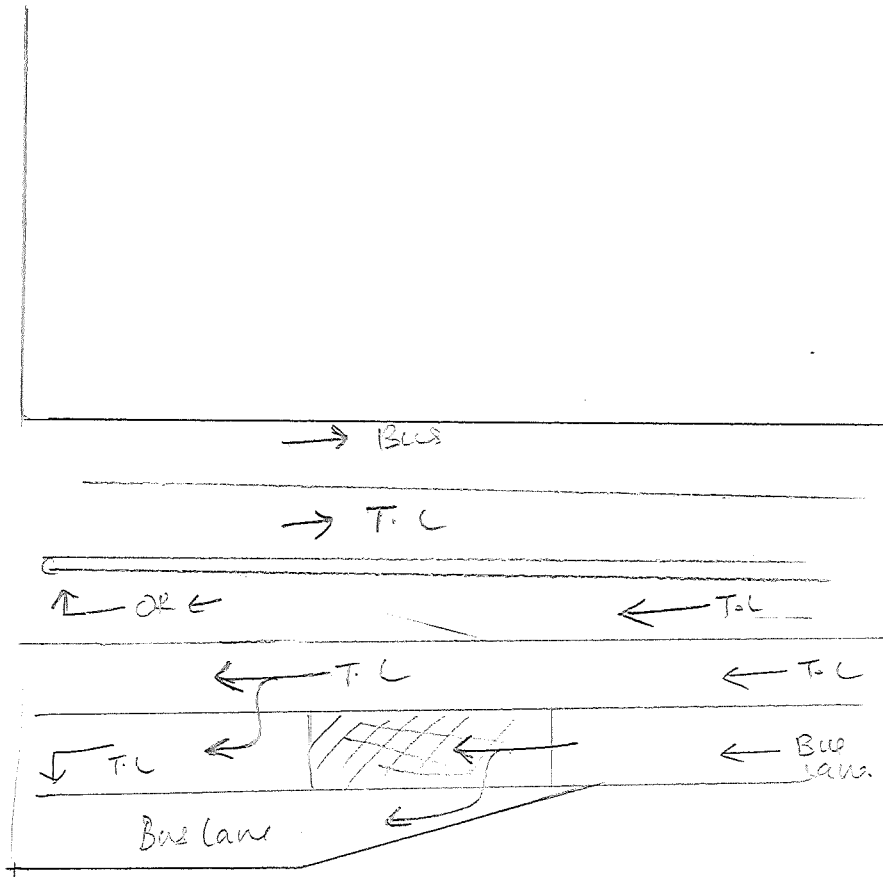


Option 3 : with left turning lane to be dealt at signal.

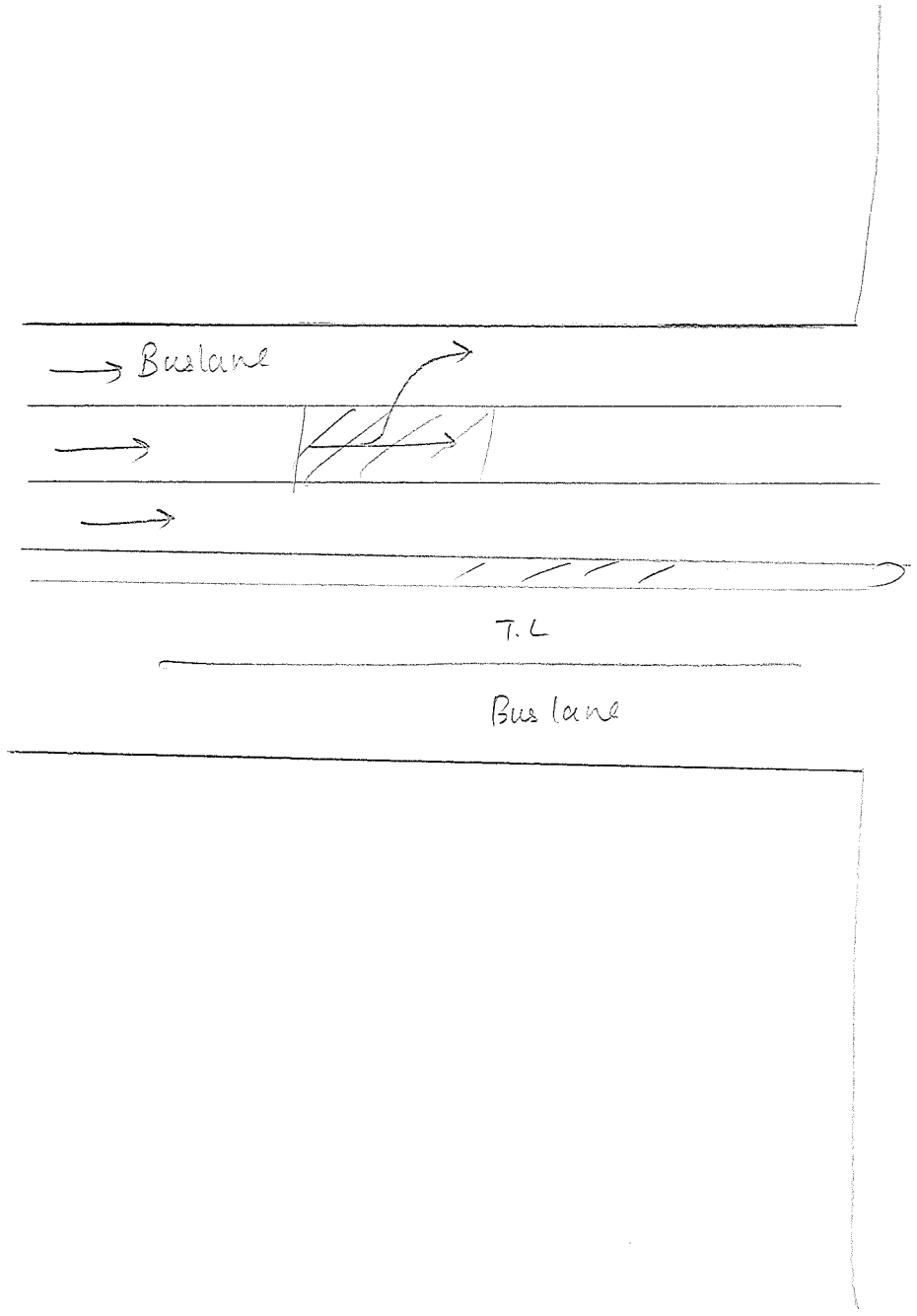


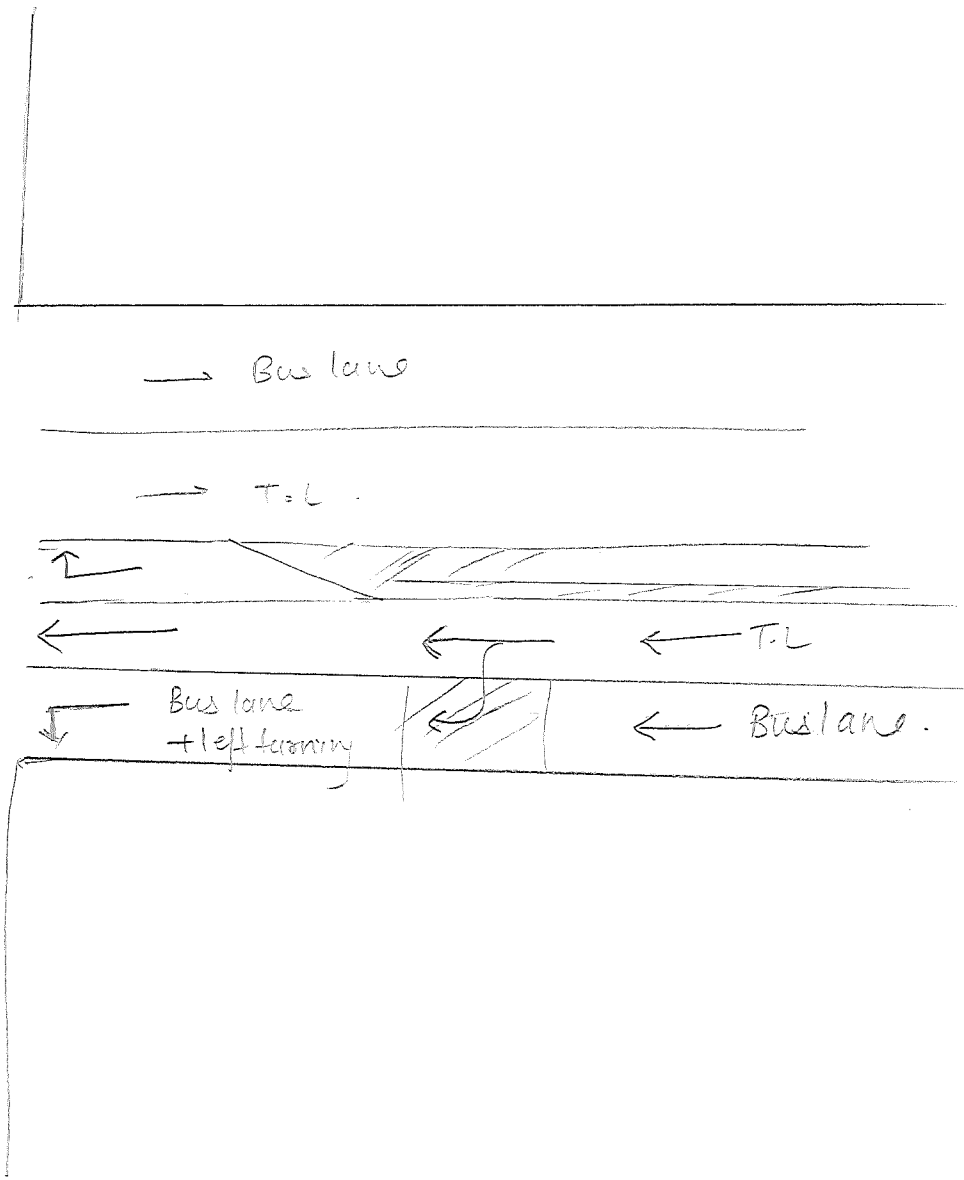
Option 4: Moving bus lane on the outside lane & left turning traffic on the inside lane



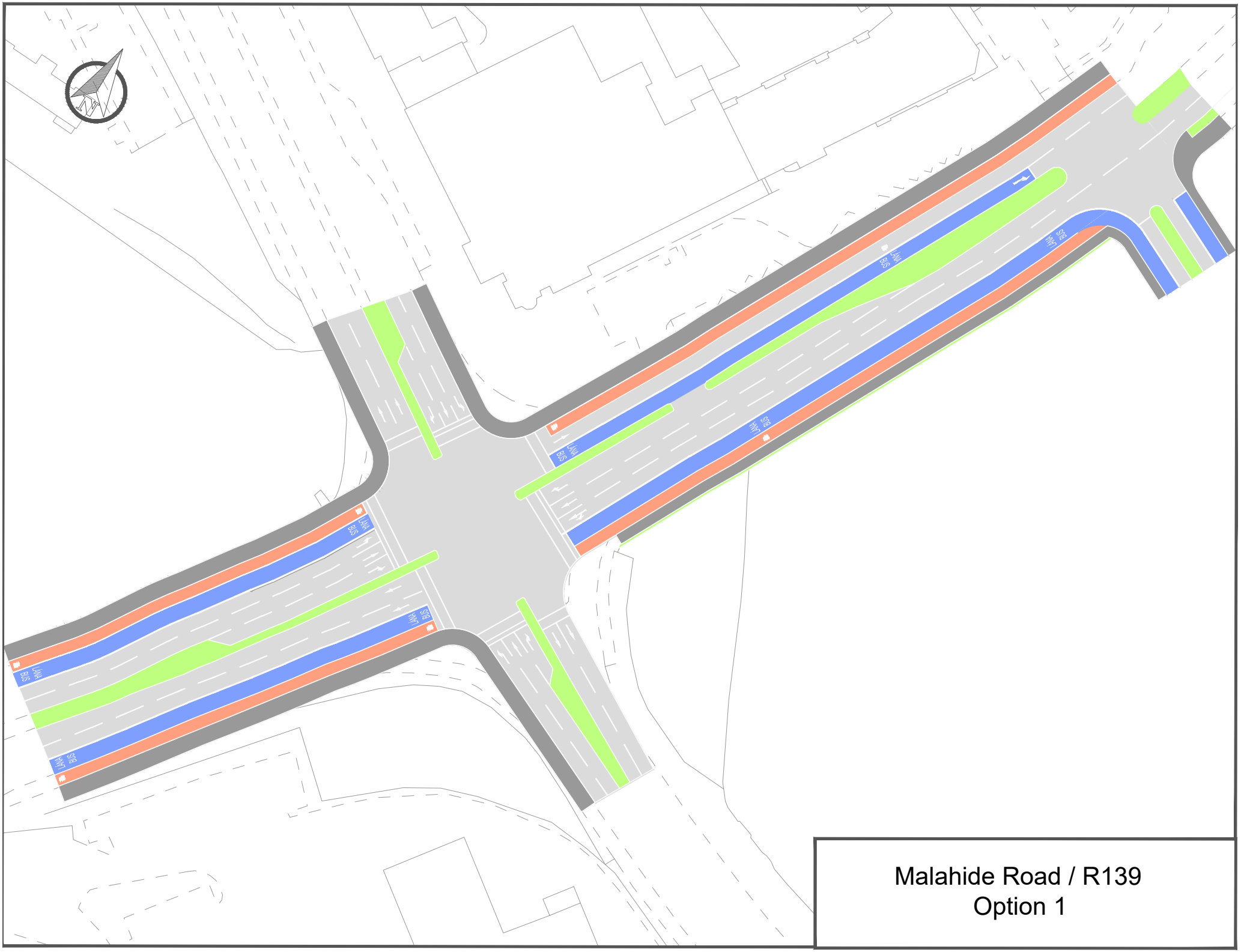


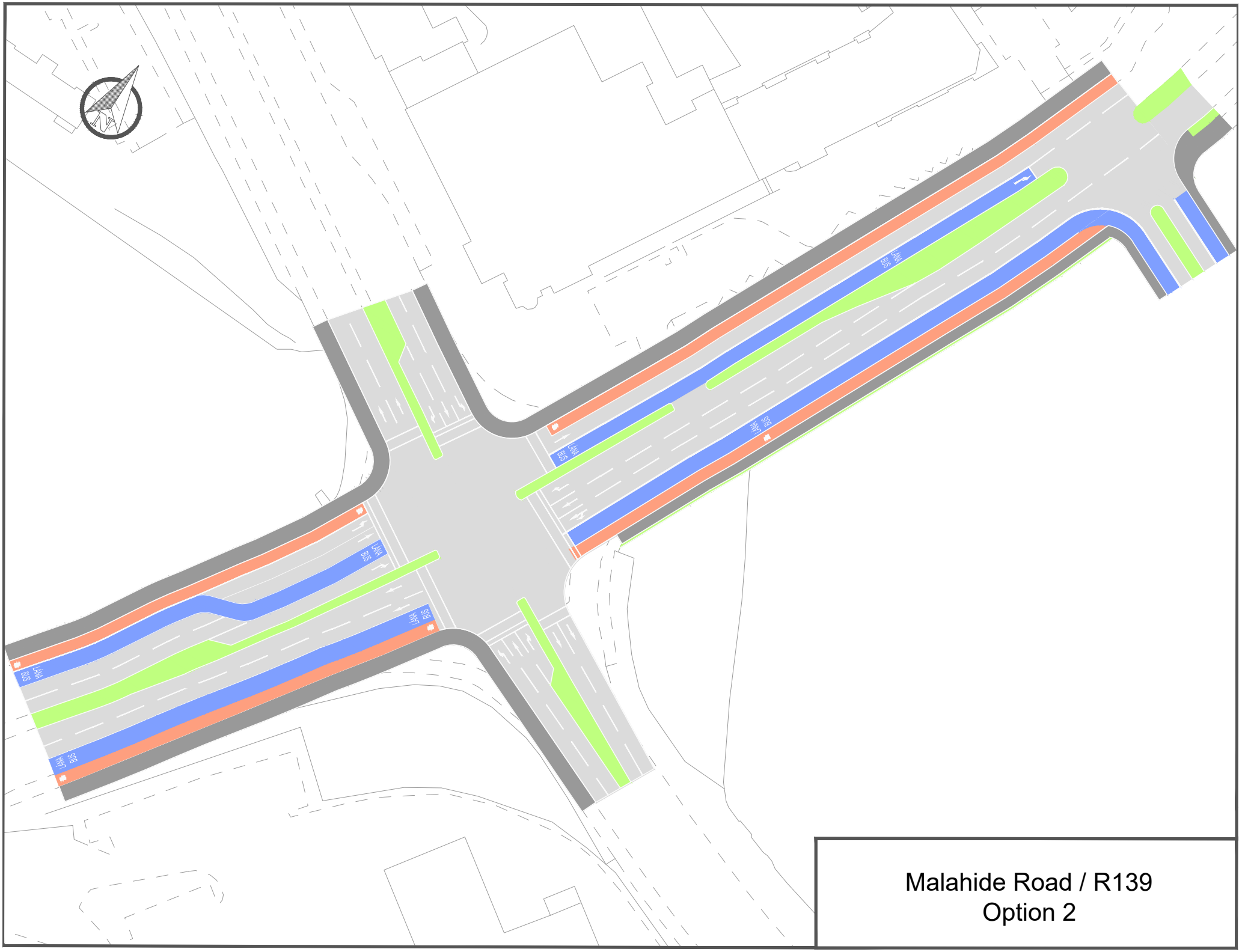
Option 5: Merging left turning baffle with bus lane (space constraint)
+ right turning pocket.



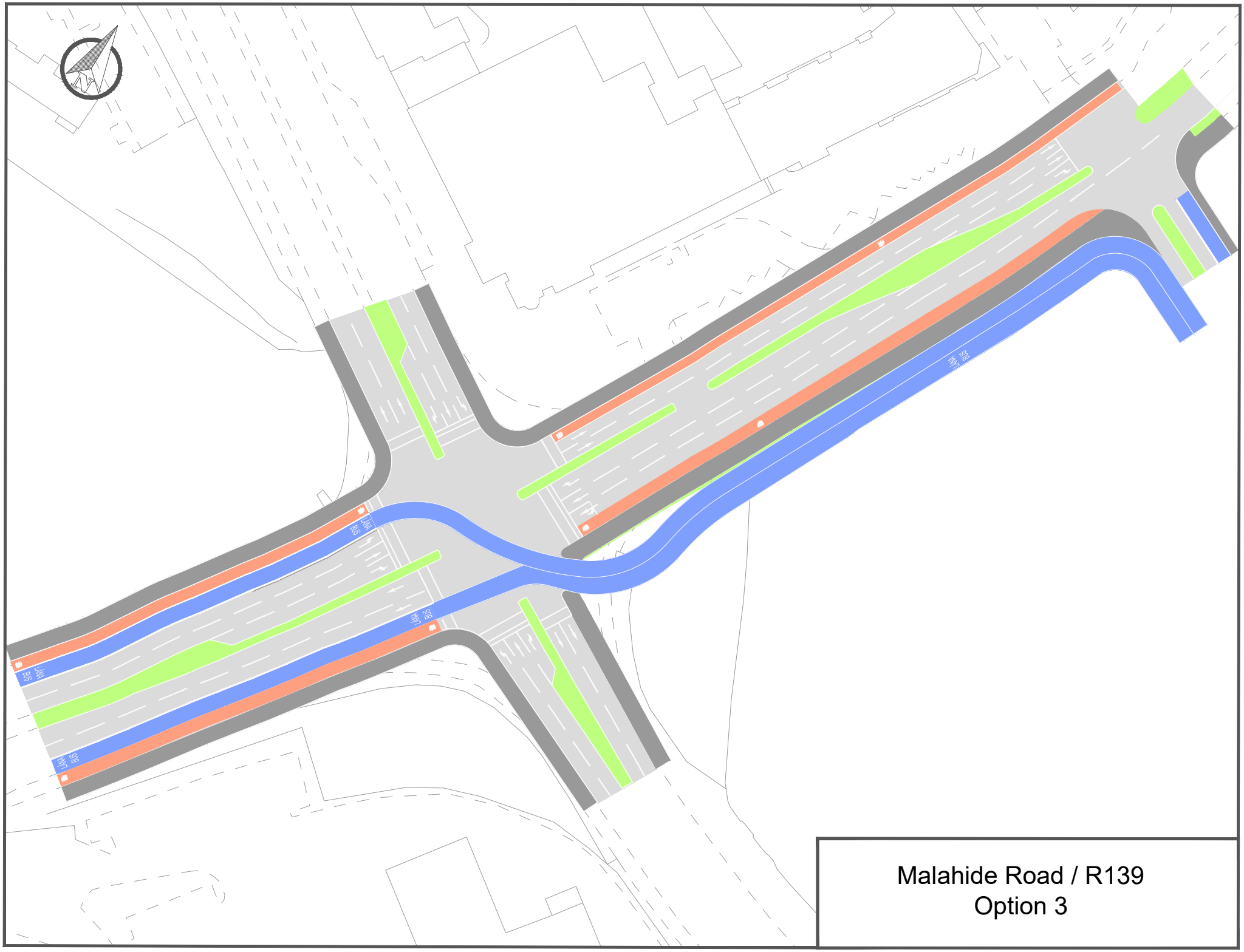


Appendix B – Design Layout for Major Junctions

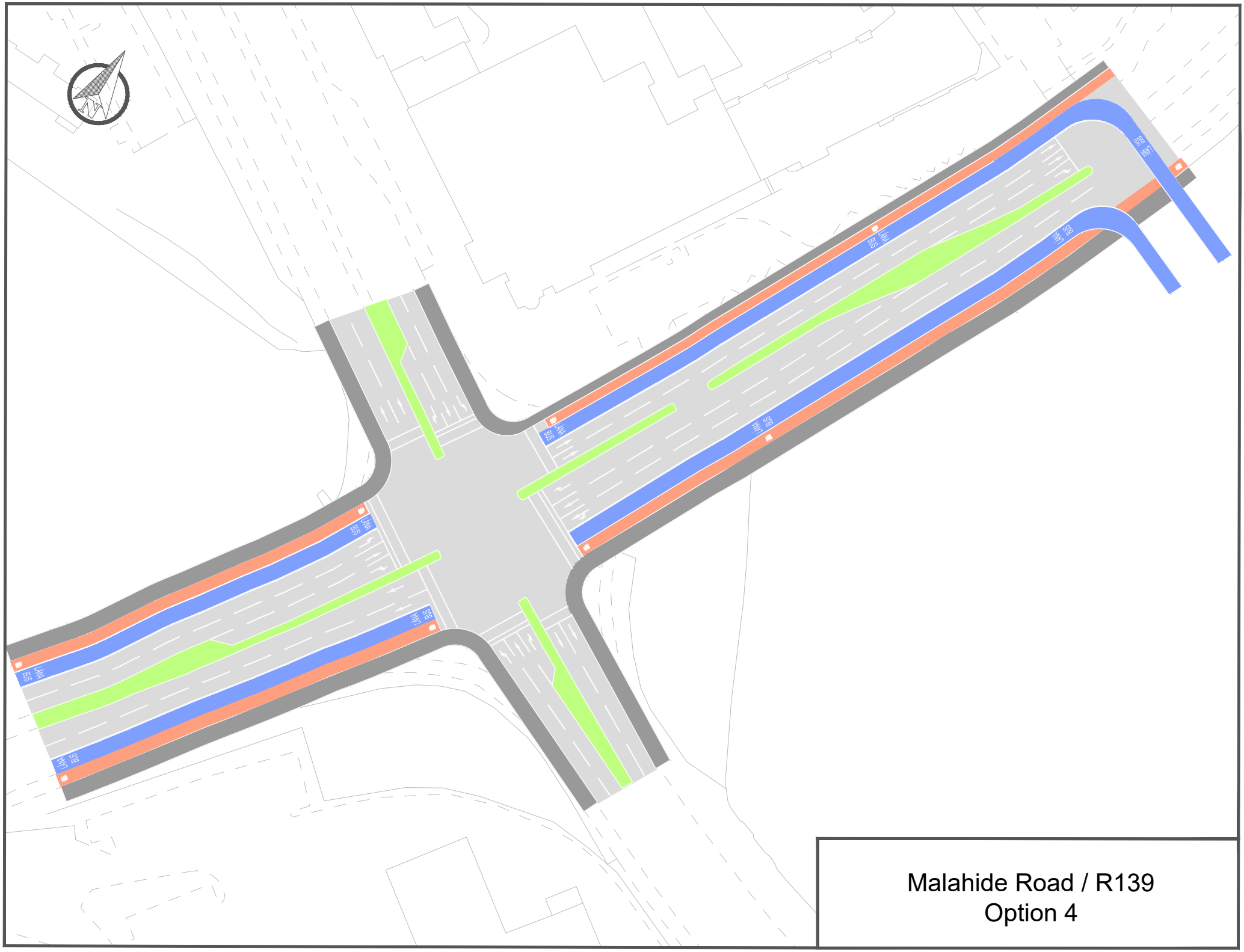

Malahide Road / R139
Option 1



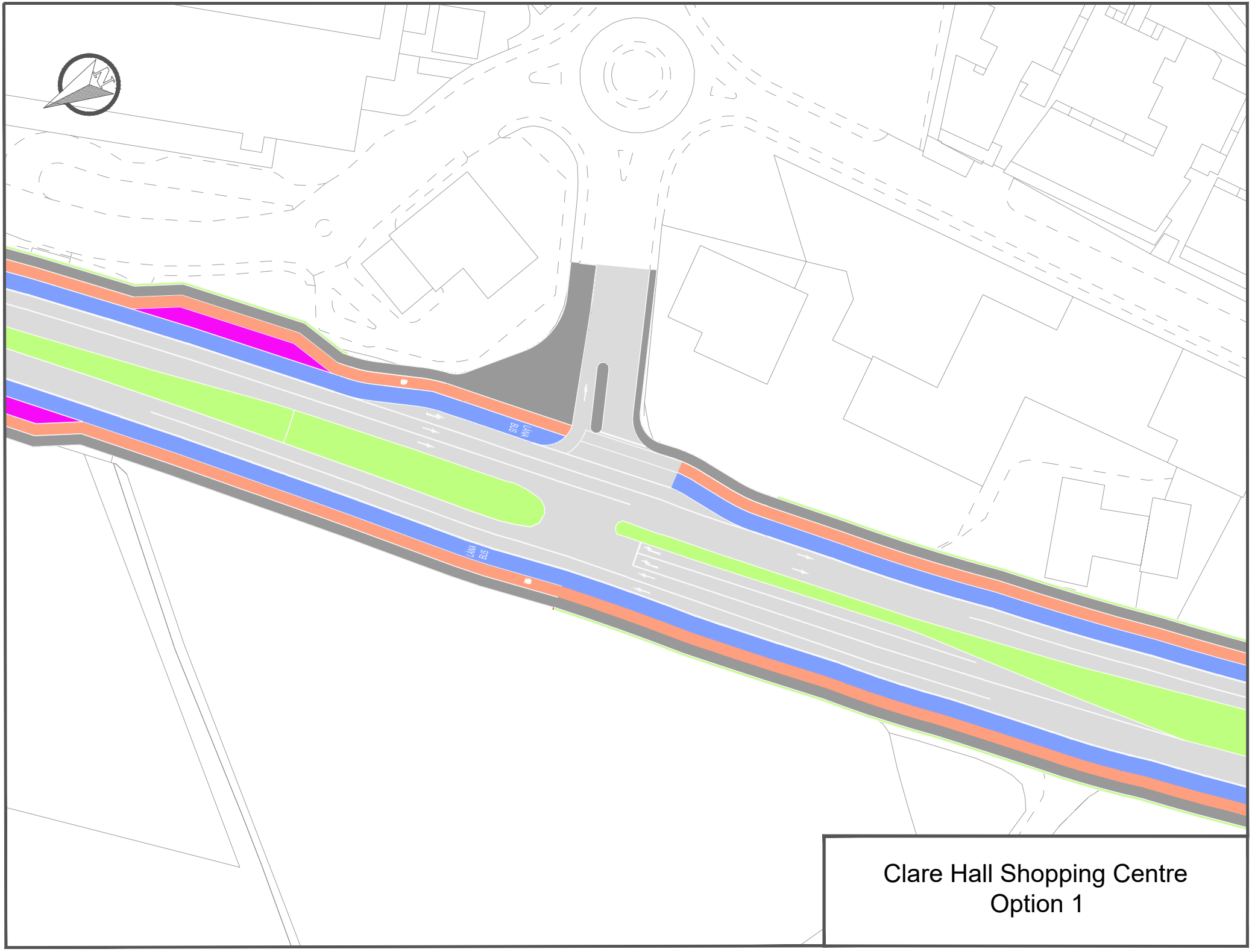
Malahide Road / R139
Option 2

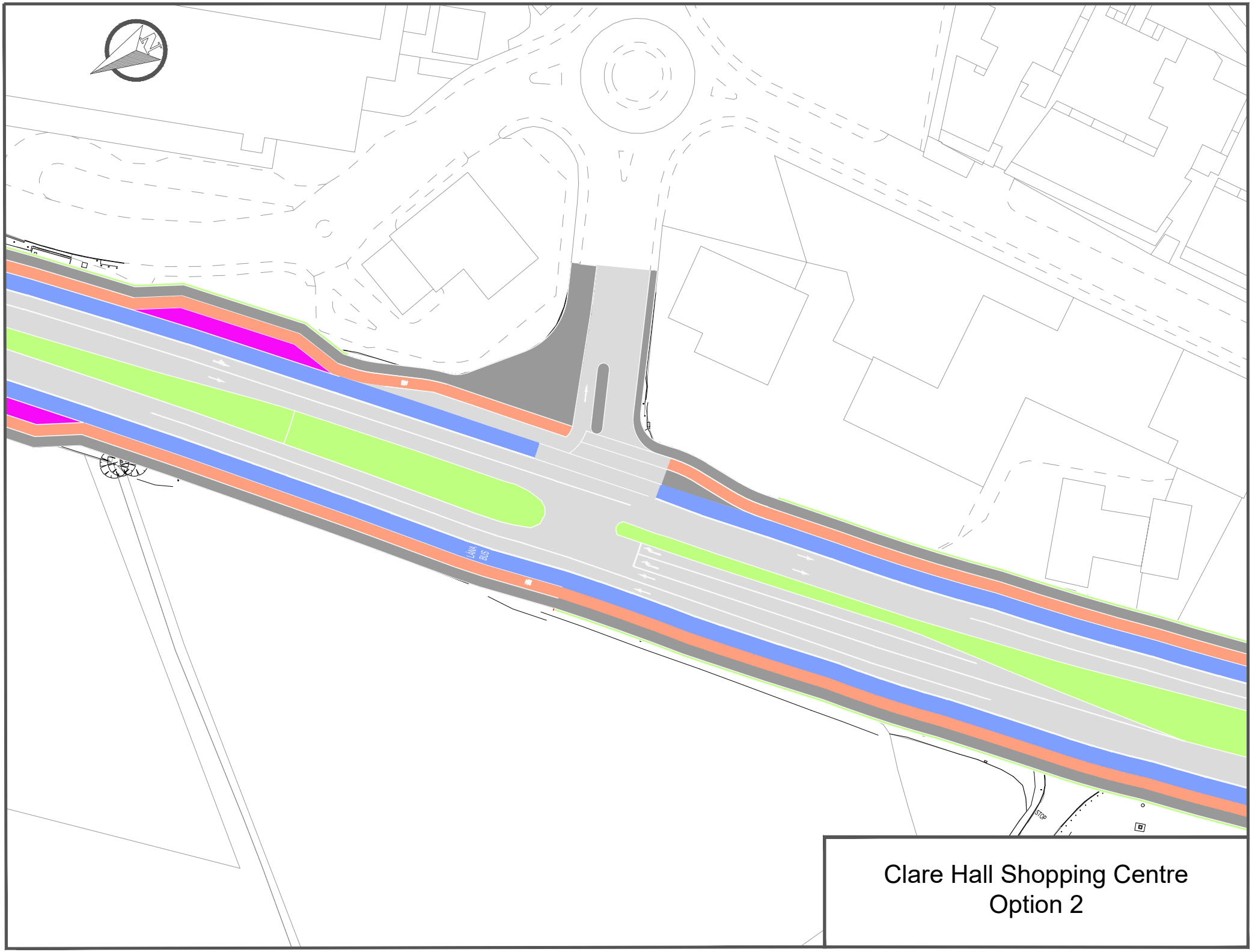


Malahide Road / R139
Option 3

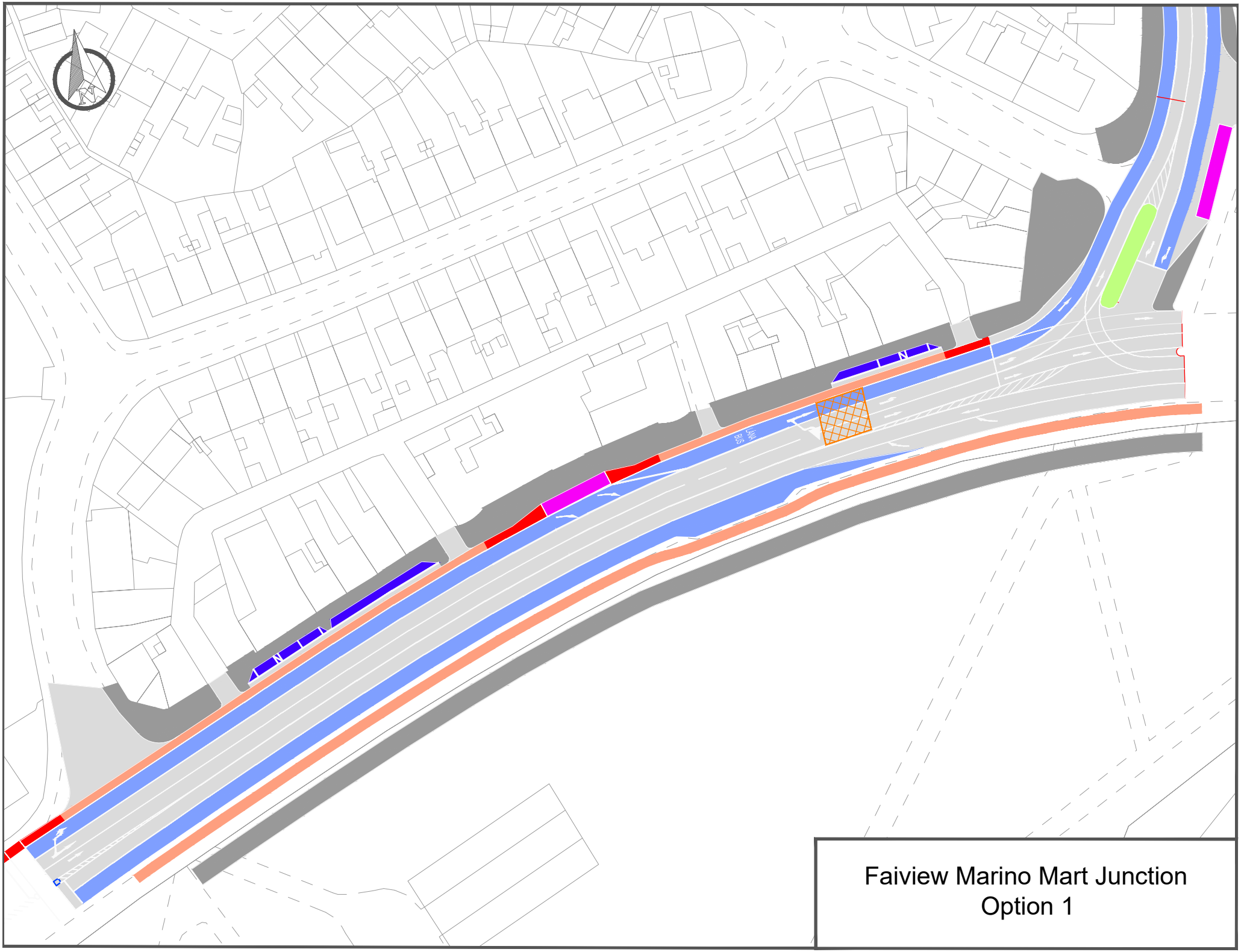


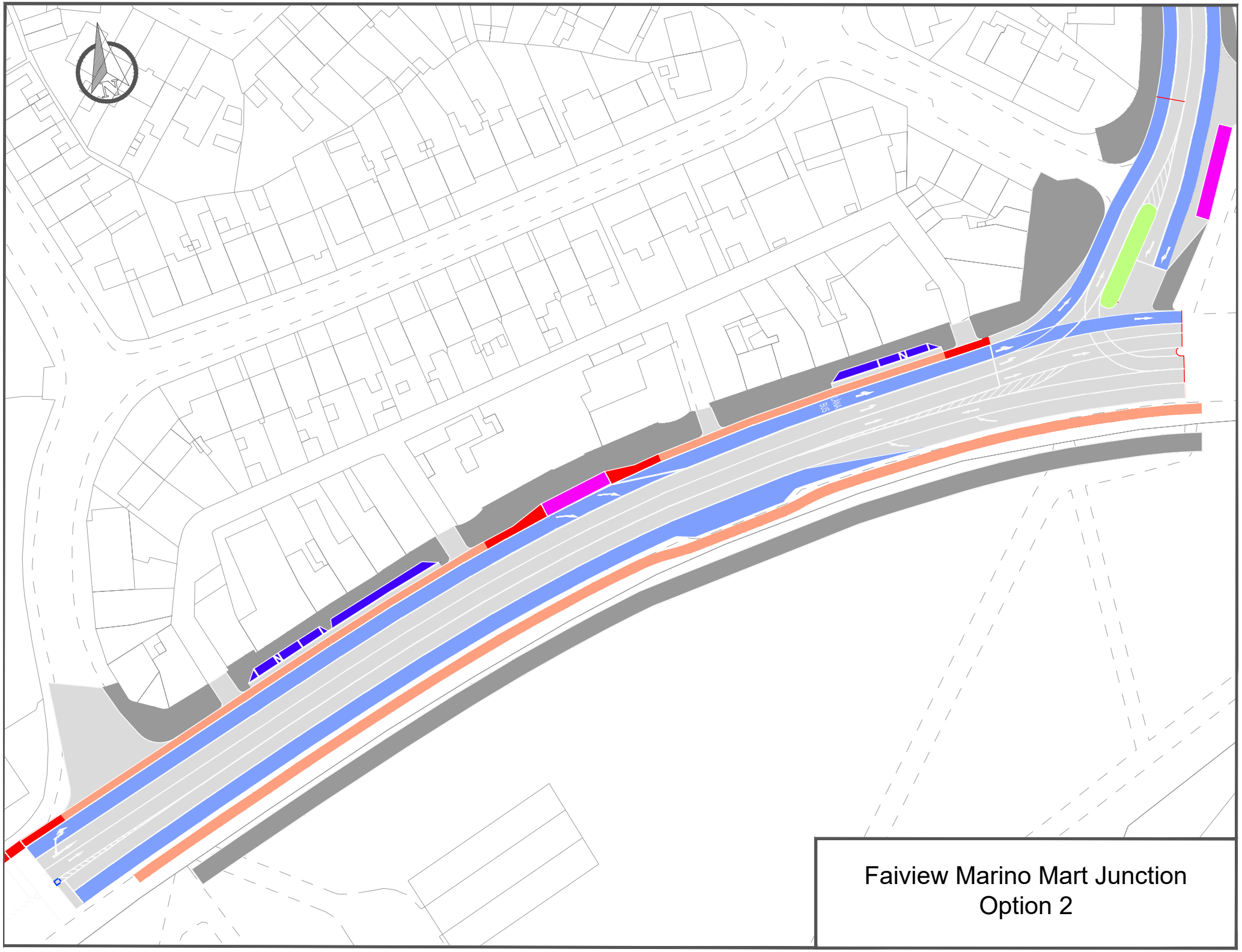
Malahide Road / R139
Option 4

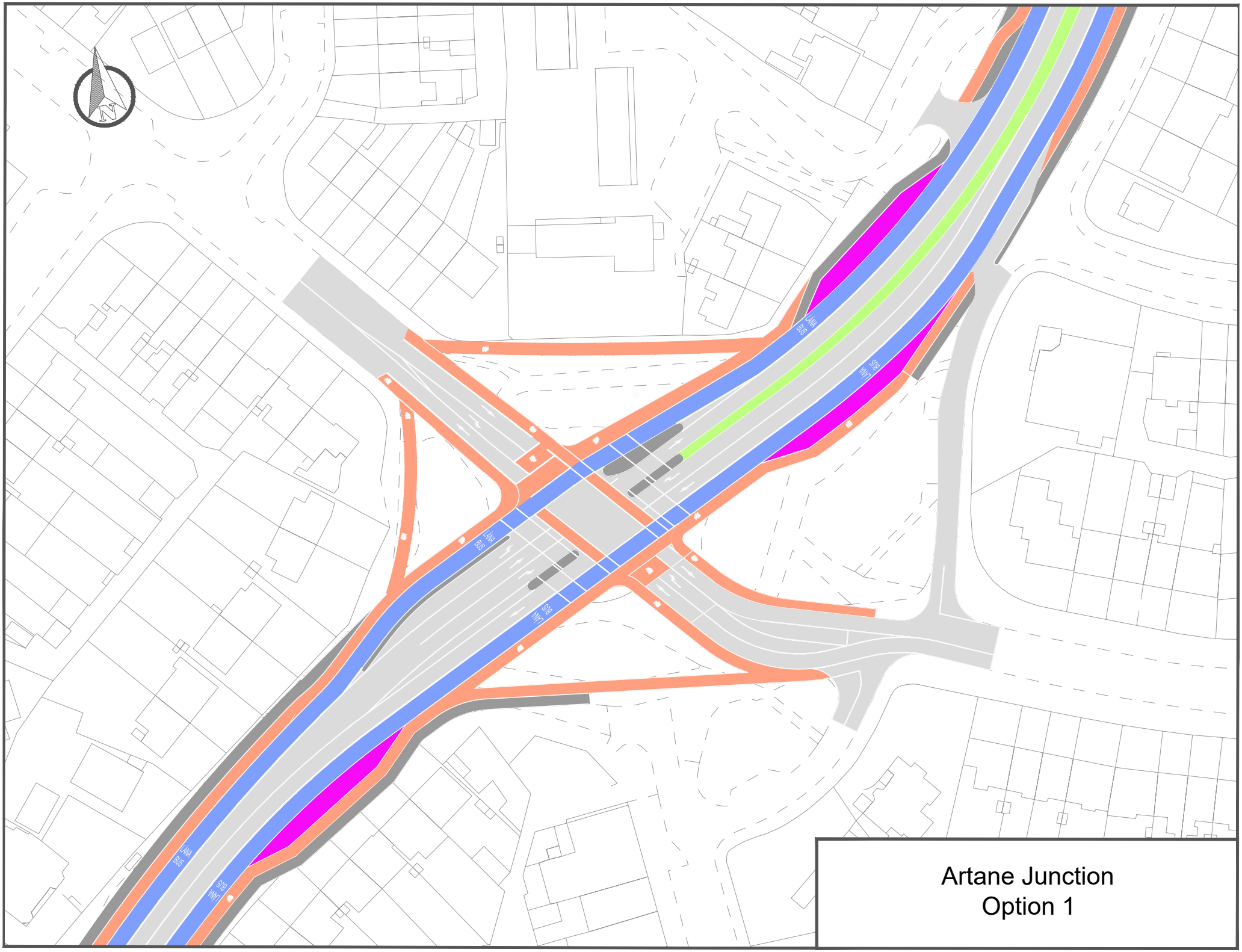

Clare Hall Shopping Centre
Option 1



Clare Hall Shopping Centre
Option 2


BUS LANE
Faiview Marino Mart Junction
Option 1


Faiview Marino Mart Junction
Option 2


Artane Junction
Option 1


LRM
BUS
LRM
BUS
LRM
BUS
LRM
BUS
Artane Junction
Option 2

Artane Junction
Option 3

Project:	Clongriffin to Tallaght BRT	**Date**	07 December 2017
Note	Traffic Modelling Assessment	**Ref**	TRANSYTCBC1
Author	James Thompson		

1 Introduction

1.1 Clongriffin to Tallaght BRT scheme is split into three sections. This report references CBC 1 - Clongriffin to City Centre (Custom House).

1.2 The purpose of this note is to summarise the results of preliminary junction assessments for the proposed route options. These preliminary assessments have been undertaken using an industry standard TRANSYT 15 software for signal controlled junction assessment.

1.3 The standard approach is to run the bus lane on the nearside lane except at junctions where there is a left turn flare for general traffic where the bus lane is in lane 2.

1.4 In a number of cases the bus lane replaces a general traffic lane which has visible impact on performance of the junction but a modal shift towards public transport is a driving factor for this scheme going forward.

1.5 Assessments have taken the day peak flows to model operation.
AM and PM peak flows can be tested when the design progresses and timings are derived from the results.

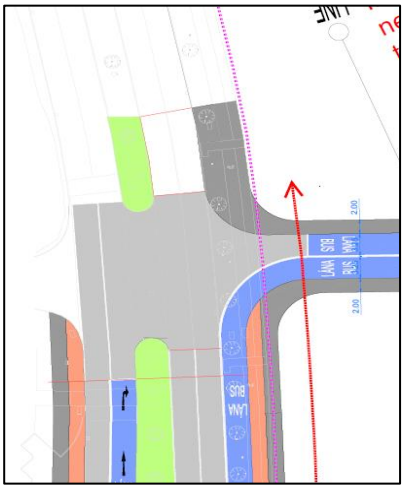
1.6 All junctions will be accessed and any recommendations will be provided in this report.

<table>
<tr><th>Model 1</th><th>Model 2</th><th>Model 3</th></tr>
<tr><td>Malahide Rd / Main St</td><td rowspan="4">Artane Roundabout (Ardlea Rd / Gracefield Rd)</td><td rowspan="2">Malahide Rd / Clontarf Rd (Marino Mart)</td></tr>
<tr><td>Malahide Rd / R139</td></tr>
<tr><td>Malahide Rd / Clarehall Shopping Centre</td><td rowspan="2">Fairview Rd / Fairview Strand</td></tr>
<tr><td>Malahide Rd / Blunden Dr.</td></tr>
</table>

1.7 This note will also highlight the sensitivity of junction performance to current traffic levels, thereby identifying any design decisions that should be considered in future design stages

1.8 The results will present the Degree of Saturation (DoS) for each lane, which is the measure of how much demand the lane is experiencing compared to its total capacity. The Mean Max Queue (MMQ) is an indication of the typical maximum queue lengths that will be seen for that lane. However, when an approach is heavily oversaturated the MMQ value can increase exponentially and should be treated with caution as it may not give a true representation. Finally, the Practical Reserve Capacity (PRC) for the entire junction, gives an indication on the spare capacity there is through the junction or if a negative number is returned how much over- capacity the junction is.

2 Malahide Rd / Main St

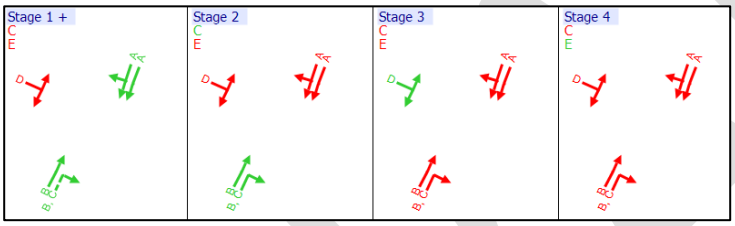


Currently:

- Priority T-Junction.
- Eastern Arm is new arm
- No Bus Lane currently through this junction.

2.1 Proposed Staging:

2.1.1 The proposed staging for the junction that has been taken forward in the modelling process is shown in the Figure below.



2.2 Flows

\	A	B	C	D	Total
A	0	0	1104	20	1124
B	0	0	0	0	0
C	762	0	0	0	762
D	15	0	15	0	30
Total	777	0	1119	20	-

Zones are allocated clockwise with the northern arm being zone A

2.3 Network Results:

2.3.1 A full analysis has been undertaken however for the purposes of this report only the Degree of Saturation and Mean Maximum Queue on each arm has been shown, to provide a quick understanding on the capacity of each arm and if there is any excessive queuing in the Peak period.

Arm	Lane	Peak		Reallocation of Downstream Lanes (See Junction 2 – for details)	
		Deg Sat (%)	Mean Max Queue (m)	Deg Sat (%)	Mean Max Queue (m)
Malahide Road Northbound	Nearside	58	6	37	6
	Offside (BUS)	2	6	5	0
Belgard Road Southbound	Nearside	235	960	34	25
	Offside	233	960	34	25
Bus Terminus (East Arm)	-	NA	NA	1	0
Access (West Arm)	-	4	6	23	6
PRC		-61		145%	

2.3.2 The reults above are with only stages 1 (mainline) and 3 (access) running. Stage 2 is proposed to operate under a call/cancel loop and only demand the stage if a bus is waiting to turn in traffic gaps, however this may change depending on the level of priority is anticipated for the bus in this section. Stage 4 is the pedestrian stage.

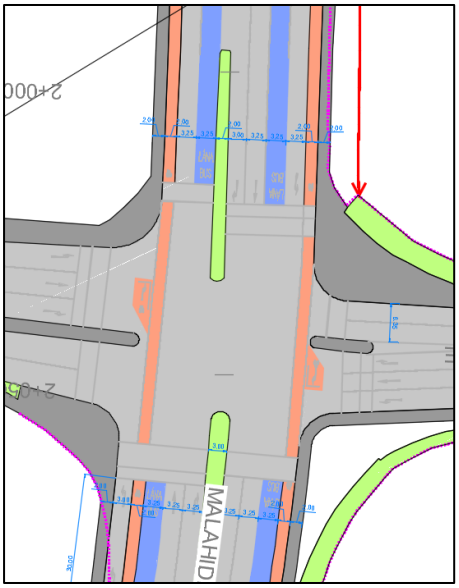
2.4 Recommendations:

2.4.1 Rather than have the offside bus lane the entire length of the lane to the upstream junction, we suggest that the lane starts half way up – this would reduce the need for a pre-signal at the upstream junction and have little impact to this junction.

2.5 Further Observations:

2.5.1 The bus corridor is intended to have free flowing conditions around the left turn (which would require a physical island to segregate from general traffic. However, the only conflict this has is with the pedestrian crossing on the southern arm. It is intended to have a stop line immediately after the turn, the forward visibility to the traffic signals here would be substandard and therefore it would be suggested that the stopline be moved to the east arm to achieve the required visibility. This would not change the operation as this could remain free flowing unless a pedestrian demand is placed.

3 Malahide Rd / R139

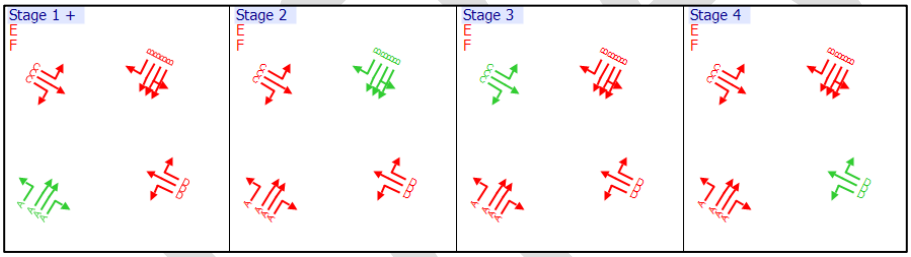


Currently:

- Three lanes at the stop line on the Northern, Southern and Western arms.
- Two lane approaches on the eastern arm.
- Each approach has additional flared left turn slip which gives way.

3.1 Proposed Staging:

3.1.1 The proposed staging for the junction that has been taken forward in the modelling process is shown in Figure below. Similar to the current arrangement each arm will operate separately due to the realatively high and similar turning movements and pedestrians can walk with traffic. Also by making the changes to the bus lanes and removing the need for a presignal a 4 stage operation can be used over a 5 stage operation. This is highlighted in the recommendations



3.2 Flows

\	A	B	C	D	Total
A	0	48	737	334	1119
B	63	0	350	701	1114
C	490	279	0	482	1251
D	230	628	470	0	1328
Total	783	955	1557	1517	-

Zones are allocated clockwise with the northern arm being zone A

3.3 Network Results:

3.3.1 A full analysis has been undertaken however for the purposes of this report only the Degree of Saturation and Mean Maximum Queue on each arm has been shown, to provide

a quick understanding on the capacity of each arm and if there is any excessive queuing in the peak period.

Arm	Lane	Peak		Results After Lane Reallocation		
		Deg Sat (%)	Mean Max Queue (m)	Lane	Deg Sat (%)	Mean Max Queue (m)
Malahide Northbound	Nearside Left	80	70	Nearside Left	87	70
	Lane 2 Ahead (BUS)	3	6	Lane 2 Ahead (BUS)	3	6
	Lane 3 Ahead	76	70	Lane 3 Ahead	82	70
	Offside Right	46	35	Offside Right	50	35
Malahide Southbound	Nearside – Left	15	10	Nearside –**BUS &** Left	14	10
	Lane 2 – Ahead (BUS)	1	6	Lane 2 – **Ahead**	85	70
	Lane 3 – Ahead	100	140	Lane 3 – Ahead	85	70
	Offside - Right	45	65	Offside - Right	88	65
Eastbound	Nearside – Left	50	40	Nearside –**Ahead &** Left	89	95
	Lane 2 – Ahead	113	340	Lane 2 – Ahead **& Right**	89	105
	Offside – Right	95	145	Offside – Right	89	95
Westbound	Nearside – Left	54	~2Km	Nearside – Left	91	950
	Lane 2 – Ahead	88		Lane 2 – Ahead	88	
	Offside - Right	9		Offside -**Ahead &** Right	85	
	Bottle Neck Approach	229		Bottle Neck Approach	142	
PRC		-61			-37	

3.3.2 The results show that the junction would benefit from lane reallocation as significant queuing would occur on the westbound approach. The reallocation reduces this queuing by over half but it should be noted that the Mean Max Queue could be exaggerated as the junction is over capacity.

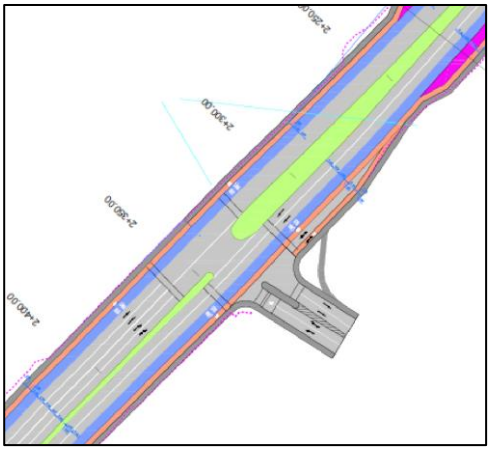
3.4 Recommendations:

3.4.1 Southbound movement would benefit from moving bus lane into nearside lane and allowing the small number of left turners to enter the bus lane.

3.4.2 It would be recommended to start the northbound exit bus lane closer to the downstream junction. This removes the requirement for a pre-signal, as the bus would not need to move from the nearside to offside lane until after exiting the junction rather than through the junction.

3.4.3 There is potential to reinstate left turn slips on eastern and western arms.

Malahide Rd / R139

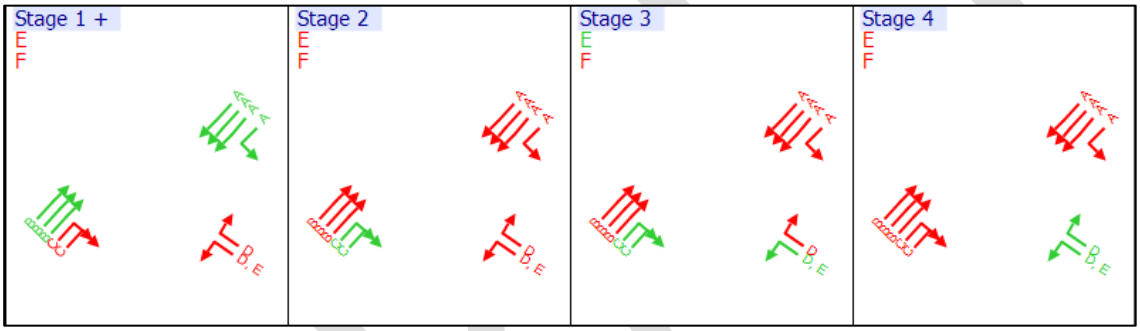


Currently

No design changes proposed.

3.5 Proposed Staging:

3.5.1 The proposed staging for the junction that has been taken forward in the modelling process is shown in the Figure below. This is similar to the current arrangement.



3.6 Flows

\	A	B	C	Total
A	0	50	1512	1562
B	52	0	12	64
C	1199	200	0	1399
Total	1251	250	1524	-

Zones are allocated clockwise with the northern arm being zone A

3.7 Network Results:

3.7.1 A full analysis has been undertaken however for the purposes of this report only the Degree of Saturation and Mean Maximum Queue on each arm has been shown, to provide a quick understanding on the capacity of each arm and if there is any excessive queuing in the Peak period.

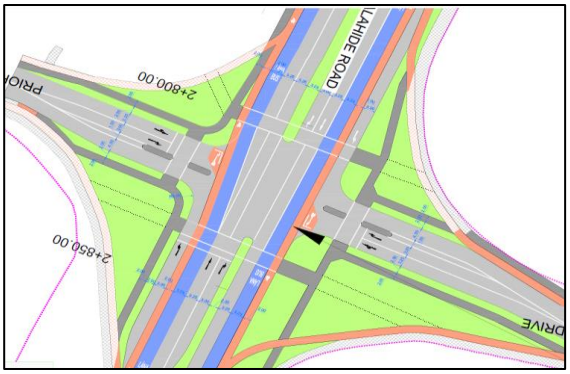
Arm	Lane	Peak	
		Deg Sat (%)	Mean Max Queue (m)
Malahide Rd Southbound	Nearside – Left	5	6
	Lane 2 BUS - Ahead	1	60
	Lane 3 – Ahead	60	55
	Offside – Ahead	64	70
Malahide Road Northbound	Nearside BUS - Ahead	1	6
	Lane 2 – Ahead	34	60
	Lane 3 – Ahead	31	60
	Lane 4 - Right	14	10
	Offside - Right	14	10
Tesco	Nearside – Left	2	6
	Offside - Right	40	10
PRC (%)		**40**	

3.7.2 The results indicate no issues with the junction

3.8 Recommendations:

3.8.1 No recommendations

Malahide Rd / Darndale

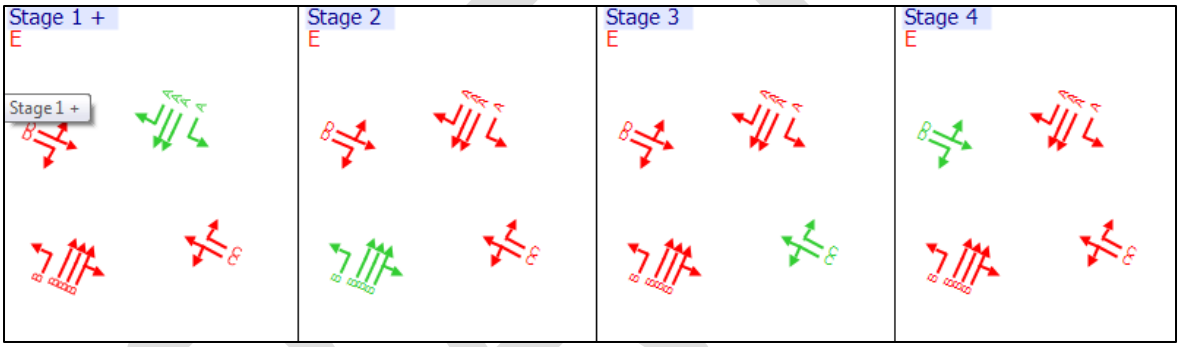


Currently.

- Unsignalised roundabout
- Two lane approaches on all arms
- Bus lanes on northern and southern arms – these terminate 100m before the junction to allow for increased capacity through the junction
- Northbound has additional left turn flare

3.9 Proposed Staging:

3.9.1 The proposed staging for the junction that has been taken forward in the modelling process as shown in the Figure below.



3.10 Flows

\	A	B	C	D	Total
A	0	374	850	300	1524
B	377	0	138	200	715
C	824	62	0	121	1007
D	197	172	170	0	539
Total	1398	608	1158	621	-

Zones are allocated clockwise with the northern arm being zone A

3.11 Network Results:

3.11.1 A full analysis has been undertaken however for the purposes of this report only the Degree of Saturation and Mean Maximum Queue on each arm has been shown, to provide a quick understanding on the capacity of each arm and if there is any excessive queuing in the Peak period.

Arm	Lane	Peak	
		Deg Sat (%)	Mean Max Queue (m)
Malahide Northbound	Nearside – Left	15	2Km
	Lane 2 – BUS Ahead	4	
	Lane 3 - Ahead	88	
	Offside - Right	7	
	Bottleneck Approach	290	
Malahide Southbound	Nearside – Left	59	60
	Lane 2 – Ahead	1	6
	Lane 3 – Ahead	113	425
	Offside – Right	45	50
Eastbound	Nearside – Ahead & Left	98	115
	Offside - Right	45	
Westbound	Nearside – Ahead & Left	72	250
	Offside - Right	81	
PRC		-69	

Lane	Peak	
	Deg Sat (%)	Mean Max Queue (m)
Nearside – Left	27	1.3Km
Lane 2 – BUS Ahead	4	
Lane 3 - Ahead	78	
Offside - **Ahead &** Right	87	
Bottleneck Approach	178	
Nearside – Left	59	60
Lane 2 – Ahead	1	6
Lane 3 – Ahead	113	425
Offside – Right	45	50
Nearside – Ahead & Left	100	275
Offside - Right	45	
Nearside – Ahead & Left	84	685
Offside - Right	96	
PRC	-49	

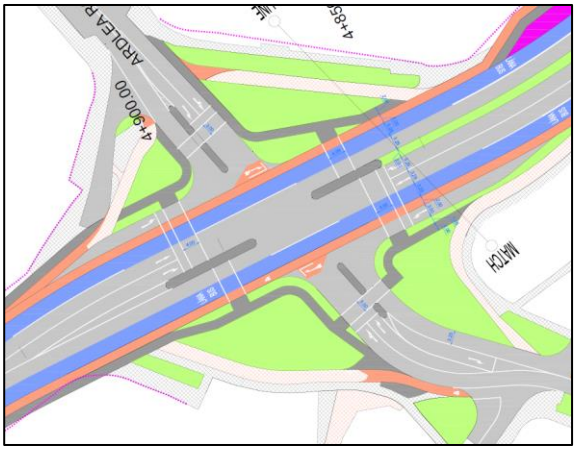
3.11.2 The results indicate significant queuing on the northbound approach. This is due to the bottle neck that occurs with 2 lanes (1 bus, 3 general) flaring into 4 lanes (1 bus, 3 general). The left ahead and right movements have high volume of traffic and therefore require the junction to operate each arm individually.

3.12 Recommendations:

3.12.1 There is currently only one ahead lane on the northbound approach however there are two exit lanes on this approach. The proposed cycle lane causes the alignment to be skewed and limits the progression of three vehicle lanes (1 bus and 2 general lanes) however if the cyclists were to be taken off road, cross at the crossing (which would require to be upgraded to a Toucan) then all 3 traffic lanes could progress.

3.12.2 Potential to introduce left turn slips on the east and western arms. This added capacity on these arms could provide extra green time to be allocated to this northern arm.

Artane X-Roads

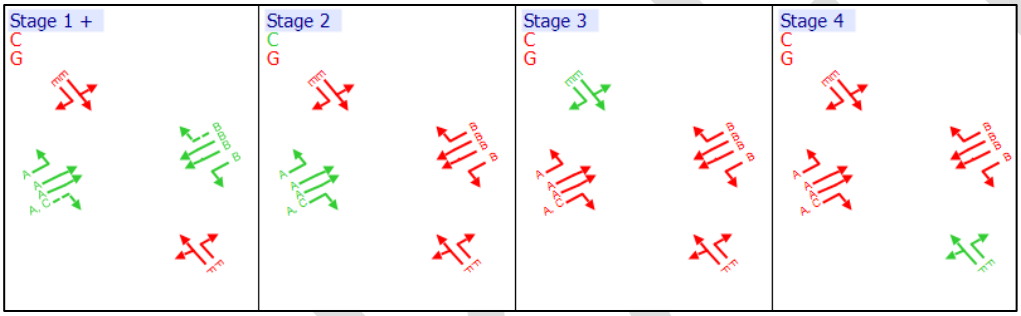


Currently

- Four-armed roundabout
- Uncontrolled
- Two lane approaches north and south
- Single lane approaches east and west with short flare (approx. 15m)

3.13 Proposed Staging:

3.13.1 The proposed staging for the junction that has been taken forward in the modelling process as shown in the Figure below.



3.14 Flows

\	A	B	C	D	Total
A	0	276	686	87	1049
B	277	0	66	253	596
C	581	182	0	106	869
D	75	331	50	0	456
Total	933	789	802	446	-

Zones are allocated clockwise with the northern arm being zone A

3.15 Network Results:

3.15.1 A full analysis has been undertaken however for the purposes of this report only the Degree of Saturation and Mean Maximum Queue on each arm has been shown, to provide a quick understanding on the capacity of each arm and if there is any excessive queuing in the Peak period.

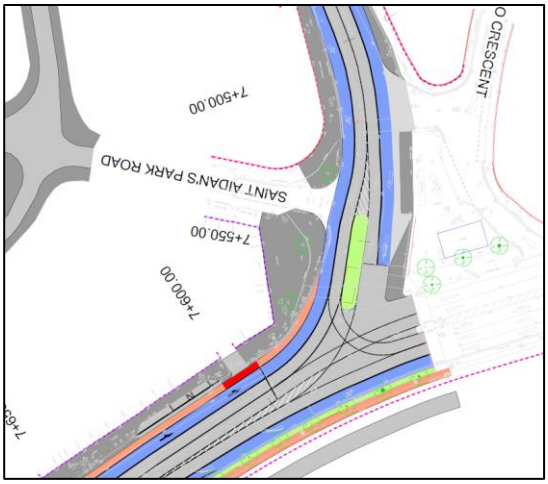
Arm	Lane	Peak	
		Deg Sat (%)	Mean Max Queue (m)
Malahide Northbound	Nearside- Left	14	100
	Lane 2 – BUS Ahead	2	
	Lane 3 – Ahead	62	
	Offside – Right	85	
Malahide Southbound	Nearside – Left	39	500
	Lane 2 – BUS Ahead	3	
	Lane 3 – Ahead	114	
	Offside- Right	87	
Ardlea Road Eastbound	Nearside – Left & Ahead	88	60
	Offside – Right	12	
Gracefield Westbound	Nearside – Left & Ahead	118	345
	Offside - Right	75	
PRC (%)		-24	

3.15.2 The results indicate a reasonable amount of queuing occurring on the northern and eastern arms. This junction requires to operate with each arm operating in its own stage.

3.16 Recommendations:

3.16.1 Limited recommendations with the downstream exits only having a single general traffic lane.

Malahide Rd / Fairview

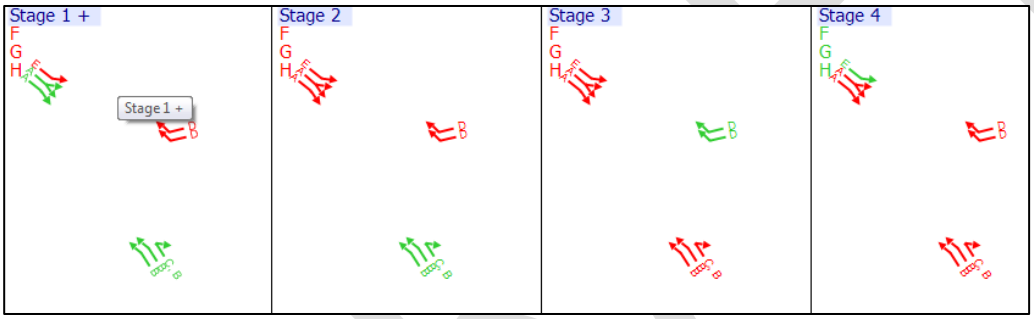


Currently

- Two lane approach southbound flaring to three lanes (2 general and 1 bus lane)
- 3 lanes east and westbound (2 general and 1 bus lane)
- Parking along northern side of Fairview Road

3.17 Proposed Staging:

3.17.1 The proposed staging for the junction that has been taken forward in the modelling process as shown in the Figure below.



3.18 Flows

\	A	B	C	Total
A	0	291	626	917
B	139	0	603	742
C	423	509	0	932
Total	562	800	1229	-

Zones are allocated clockwise with the northern arm being zone A

3.19 Network Results:

3.19.1 A full analysis has been undertaken however for the purposes of this report only the Degree of Saturation and Mean Maximum Queue on each arm has been shown, to provide a quick understanding on the capacity of each arm and if there is any excessive queuing in the Peak period.

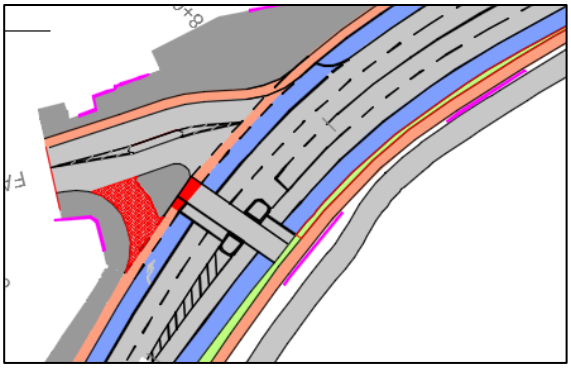
Arm	Lane	Peak	
		Deg Sat (%)	Mean Max Queue (m)
Malahide Southbound	Nearside BUS	3	6
	Offside	181	875
Eastbound	Nearside BUS	8	6
	Lane 2	87	75
	Offside	31	25
Westbound	Nearside BUS	1	6
	Lane 2	61	45
	Offside	15	15
PRC (%)		-50	

3.19.2 The results indicate that the southbound Malahide Road arm is causig the junction to be considerably over capacity. The current arrangement has three lanes southbound and continues with three lanes along Fairview. The removal of a general traffic lane across the entire stretch will have an impact on the performance of the network at this location.

3.20 Recommendations:

3.20.1 There may be potential to relocate the cycle lanes into the park, freeing up road space and retaining three lanes east and west bound.

Fairview Strand

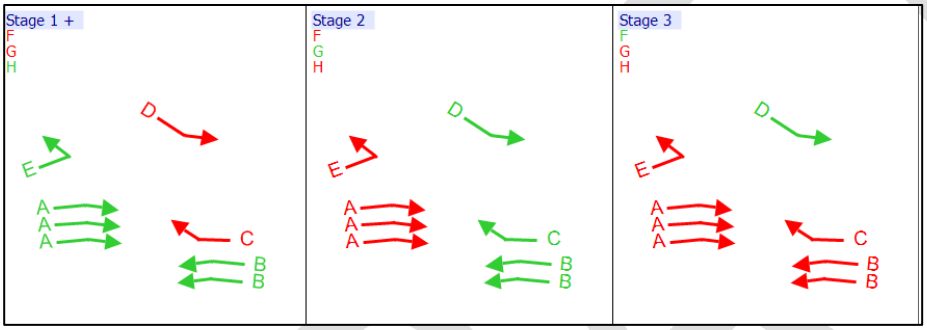


Currently

- Segregation island between the westbound traffic and the right turning traffic which will be removed.

3.21 Proposed Staging:

3.21.1 The proposed staging for the junction that has been taken forward in the modelling process as shown in the Figure below. Stage 3 is a demand dependent stage by the pedestrian



3.22 Flows

\	A	B	C	Total
A	0	869	389	1258
B	586	0	42	628
C	362	0	0	362
Total	948	869	431	-

Zones are allocated clockwise with the northern arm being zone A

3.23 Network Results:

3.23.1 A full analysis has been undertaken however for the purposes of this report only the Degree of Saturation and Mean Maximum Queue on each arm has been shown, to provide a quick understanding on the capacity of each arm and if there is any excessive queuing in the Peak period.

Arm	Lane	Peak	
		Deg Sat (%)	Mean Max Queue (m)
Fairview Eastbound	Nearside - BUS	1	6
	Lane 2 - Left & Ahead	38	40
	Offside – Ahead	38	40
Fairview Westbound	Nearside – BUS	1	6
	Lane 2 – Ahead	50	40
	Offside - Right	66	65
Fairview Strand (Southbound)	Nearside - Left	47	35
PRC (%)		35	

3.23.2 The results indicate that this junction should operate within capacity. The reduction in capacity does not seem to cause an issue at this junction but is causing issues at the upstream junction and creating a supressed demand on Malahide Road

TRANSYT OUTPUTS

TRANSYT 15

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Filename: 684784-HB-HGN-Z_ZZ_ZZZ_-M2-CH-0009
Path: c:\pw_workdir\lon002\thompsonda\dms46781
Report generation date: 08/12/2017 10:08:03

Network Diagrams

(untitled)
Cycletime 0s / 120s , Timesteps 119 / 120
Diagram produced using TRANSYT 15.5.1.7048

A1 - (untitled)
D1 - (untitled)*

Traffic Stream Results

Traffic Stream Results: Vehicle summary

Time Segment	Arm	Traffic Stream	Degree of saturation (%)	Practical reserve capacity (%)	Calculated flow entering (PCU/hr)	Calculated sat flow (PCU/hr)	Actual green (s (per cycle))	Mean Delay per Veh (s)	Mean max queue (PCU)	Utilised storage (%)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Performance Index (£ per hr)
08:00-09:00	39	4	92	-3	361	1733	26	83.36	13.65	134.46	118.58	4.94	123.52
	J	4	70	28	289	1824	26	50.24	8.22	80.57	57.33	2.97	60.30
		4-1	2	4171	9	1940	26	50.47	0.30	2.18	1.83	0.03	1.86
		4-2	175	-49	820	2080	26	799.77	191.83	1897.91	2585.67	25.61	2611.28
	J1 Access	1	23	288	30	1940	7	57.32	0.98	5.61	6.78	0.36	7.15
	J1 Bus EB	1	0	Unrestricted	10	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	J1 Bus WB	1	1	15218	10	1702	120	0.01	0.00	0.00	0.00	0.00	0.00
	J1 NB	1	37	145	618	1940	103	1.25	3.41	19.61	3.05	0.80	3.85
		2	5	1724	10	234	103	0.46	0.00	0.01	0.02	0.00	0.02
	J1 NB Exit	1	0	Unrestricted	617	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	J1 SB	1	34	165	562	1940	102	2.31	3.83	7.35	5.12	1.34	6.46
		2	34	166	562	1940	102	2.28	3.83	7.35	5.05	1.32	6.38
	J1 SB Exit	1	1	17360	10	1940	120	0.00	0.00	0.00	0.00	0.00	0.00
		2	28	223	1119	4020	120	0.17	0.05	0.22	0.76	0.00	0.76
	J1 WB Exit	1	2	4673	37	1940	120	0.02	0.00	0.00	0.00	0.00	0.00
	J2 - WB1	1	1	17360	10	1940	120	0.00	0.00	0.00	0.00	0.00	0.00
		2	130	-31	1114	1940	120	442.95	157.63	2705.32	1946.35	33.73	1980.08
	J2 EB	1	89	1	425	1845	30	69.75	16.75	431.77	116.93	6.17	123.10
		2	89	1	477	2071	30	67.12	18.45	475.62	126.30	6.81	133.10
		3	89	1	426	1847	30	69.99	16.81	433.46	117.61	6.19	123.80
	J2 EB EXIT	1	0	Unrestricted	869	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	J2 NB	1	3	3101	10	1940	21	31.13	0.21	0.88	1.23	0.02	1.25
		2	89	1	340	2080	21	114.40	14.36	82.58	153.21	5.33	158.54
		3	54	66	193	1940	21	85.86	6.76	38.90	65.48	2.54	68.02
	J2 NB EXIT	1	32	182	618	1940	120	0.49	6.06	33.91	1.19	0.25	1.44
		2	1	17360	10	1940	120	0.00	0.00	0.00	0.00	0.00	0.00
	J2 NB LEFT	1	94	-4	334	1940	21	203.20	22.14	127.30	267.70	8.15	275.85
	J2 SB	1	14	527	58	1940	24	41.97	1.58	11.67	9.60	0.51	10.11
		2	85	6	369	2080	24	66.24	12.54	92.78	96.29	4.53	100.82
		3	85	6	369	2080	24	66.24	12.54	93.16	96.29	4.53	100.82
		4	88	3	334	1829	24	73.05	11.47	84.76	96.24	4.26	100.50
	J2 SB EXIT	1	1	9390	18	1940	120	0.01	0.00	0.00	0.00	0.00	0.00
		2	39	133	1501	3880	120	0.29	0.12	0.17	1.73	0.00	1.73
	J2 WB	1	93	-3	280	1814	19	125.99	13.65	45.48	139.06	4.86	143.92
		2	88	2	306	2080	19	219.75	23.11	110.71	265.28	8.67	273.96
		3	88	2	283	1923	19	102.38	13.10	10.08	114.26	4.80	119.06
	J2 WB EXIT	1	0	Unrestricted	1208	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	J3 - SB	2	1	10972	9	1940	69	4.19	0.11	0.65	0.15	0.01	0.16
		3	60	50	729	2080	69	10.90	9.75	77.45	31.34	3.10	34.44
		4	64	40	729	1940	69	11.83	12.50	99.23	34.02	3.73	37.75

	J3 -1	1	0	18880	9	1940	120	0.00	0.00	0.00	0.00	0.00	0.00
		2	37	146	1470	4020	120	0.26	0.11	0.21	1.49	0.00	1.49
	J3 Entry	1	0	Unrestricted	194	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	J3 Exit	1	2	4025	12	1784	35	26.49	0.26	1.52	1.25	0.10	1.36
		2	40	128	52	1579	9	60.98	1.76	34.09	12.51	0.65	13.16
	J3 NB	1	1	9940	10	1940	68	16.90	0.14	0.64	0.67	0.01	0.68
		2	39	130	436	1940	68	9.72	3.54	16.09	16.73	1.33	18.06
		3	36	147	436	2080	68	9.49	3.51	15.99	16.34	1.32	17.65
		4	17	434	73	1852	27	33.47	2.06	9.38	9.61	0.78	10.39
		5	17	434	73	1852	27	33.47	2.06	9.34	9.61	0.78	10.39
	J3 NB Exit	1	1	17360	10	1940	120	0.00	0.00	0.00	0.00	0.00	0.00
		2	24	278	925	3880	120	0.15	0.04	0.13	0.53	0.00	0.53
	J3 NB-Exit	1	1	17360	10	1940	120	0.00	0.00	0.00	0.00	0.00	0.00
		2	107	-16	925	3880	120	174.05	63.85	139.09	634.87	26.60	661.47
	J3 SB Exit	4	0	18880	9	1940	120	0.00	0.00	0.00	0.00	0.00	0.00
		4-1	37	146	1470	4020	120	0.26	0.11	0.14	1.49	0.00	1.49
	J3 SB Left	1	5	1756	48	1704	69	7.47	0.32	0.91	1.42	0.12	1.54
	J4 EB	1	98	-9	369	1800	24	122.90	19.14	157.22	178.87	6.79	185.66
		3	45	102	170	1827	24	45.27	4.95	68.67	30.36	1.86	32.22
	J4 EB Exit	1	0	Unrestricted	570	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	J4 EB-1	1	28	216	539	1940	120	0.40	0.66	23.42	0.84	0.08	0.93
	J4 NB	2	3	3176	10	2080	20	41.39	0.28	2.87	1.63	0.03	1.66
		3	68	32	248	2080	20	73.71	6.51	93.97	72.10	2.44	74.54
		4	78	16	285	2095	20	79.18	7.97	113.41	89.11	2.98	92.09
	J4 NB Exit	1	1	17360	10	1940	120	0.00	0.00	0.00	0.00	0.00	0.00
		2	25	256	1018	4020	120	0.15	0.04	0.04	0.61	0.00	0.61
	J4 NB Left	1	24	278	73	1749	20	64.37	1.80	24.77	18.49	0.68	19.17
	J4 NB-1	1	1	17360	10	1940	120	0.00	0.00	0.00	0.00	0.00	0.00
		2	156	-42	606	1940	120	1259.07	220.73	1639.20	3010.30	28.45	3038.75
	J4 SB Exit	1	0	Unrestricted	9	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
		2	0	Unrestricted	757	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	J4 WB	1	74	21	291	1876	24	72.30	7.54	94.82	82.98	2.83	85.81
		2	84	7	325	1845	24	83.13	9.33	115.54	106.43	3.47	109.90
	J4 WB Exit	1	0	Unrestricted	534	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	J4 WB-1	1	116	-23	715	1940	120	298.56	66.06	1651.38	842.03	19.65	861.67

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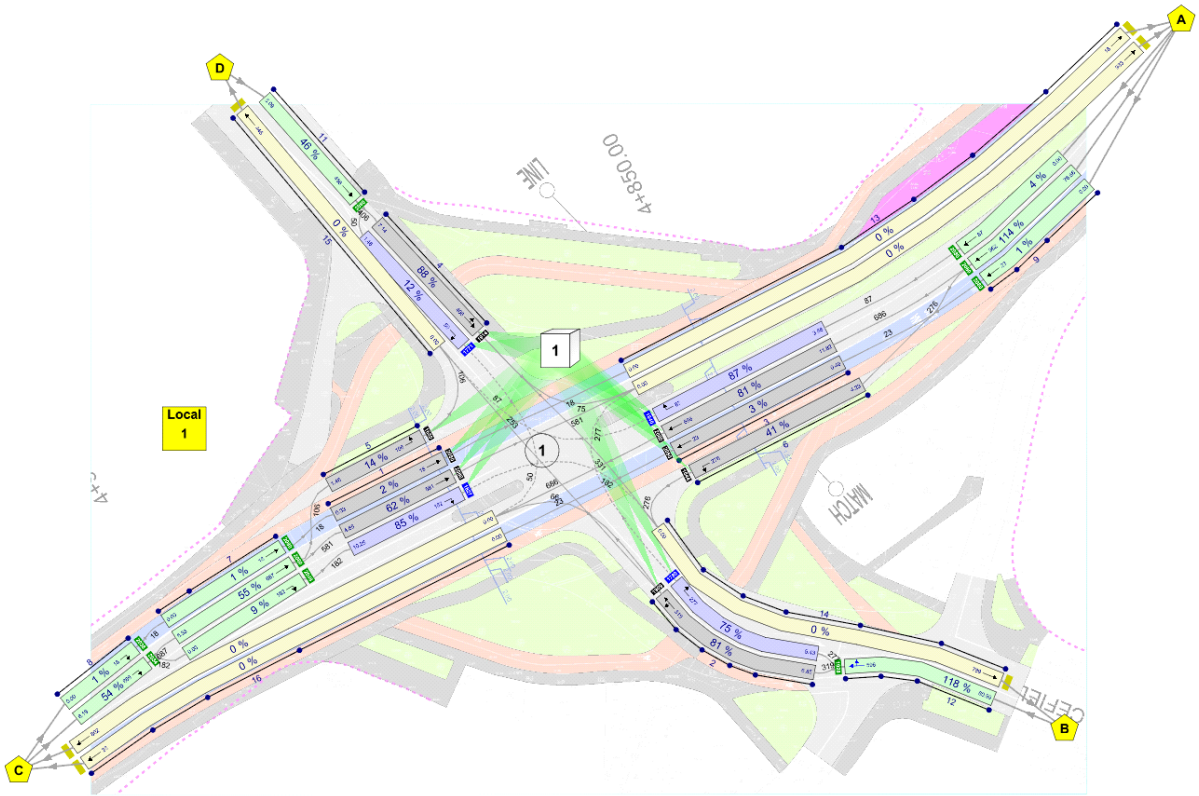
Report generation date: 08/12/2017 10:02:06

Network Diagrams



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Cycletime 0s / 120s , Timesteps 119 / 120
Diagram produced using TRANSYT 15.5.1.7048

Traffic Stream Results

Traffic Stream Results: Vehicle summary

Time Segment	Arm	Traffic Stream	Degree of saturation (%)	Practical reserve capacity (%)	Calculated flow entering (PCU/hr)	Calculated sat flow (PCU/hr)	Actual green (s (per cycle))	Mean Delay per Veh (s)	Mean max queue (PCU)	Utilised storage (%)	Weighted cost of delay (€ per hr)	Weighted cost of stops (€ per hr)	Performance Index (€ per hr)
08:00-09:00	1	1	2	4580	18	2080	53	18.46	0.33	4.40	1.31	0.03	1.34
		2	62	45	581	2080	53	15.86	4.85	90.12	36.35	1.82	38.18
		3	85	5	182	474	53	88.87	10.25	34.18	63.80	2.74	66.54
	2	1	81	12	269	1909	20	76.98	6.85	112.32	81.75	2.55	84.30
		2	75	20	234	1780	20	69.49	5.43	95.25	64.08	2.03	66.10
	3	1	3	2817	23	2080	42	25.10	0.49	3.46	2.28	0.05	2.32
		2	81	11	604	2080	42	47.56	11.82	115.58	113.33	4.43	117.76
		3	87	4	87	280	42	117.04	3.88	38.27	40.16	1.71	41.87
	4	1	88	3	406	1914	28	49.18	7.14	136.58	78.76	2.63	81.40
		2	12	670	50	1771	28	23.78	1.46	26.93	4.69	0.20	4.89
	5	1	14	534	106	1659	53	12.72	1.46	25.00	5.32	0.31	5.63
	6	1	41	118	243	1644	42	36.94	4.23	40.82	35.41	1.59	37.00
	7	1	1	10300	18	2080	120	0.01	0.00	0.00	0.00	0.00	0.00
		2	55	64	687	2080	120	10.95	5.33	106.67	29.68	4.14	33.82
		3	9	913	182	2048	120	0.09	0.00	0.08	0.06	0.00	0.06
	8	1	1	10090	18	2038	120	0.01	0.00	0.00	0.00	0.00	0.00
		2	54	66	869	2034	120	5.96	6.19	206.42	20.42	3.86	24.27
	9	1	1	8039	23	2080	120	0.01	0.00	0.00	0.00	0.00	0.00
		2	114	-21	962	2080	120	257.43	76.66	1916.55	976.82	25.25	1002.06
		3	4	2052	87	2080	120	0.04	0.00	0.02	0.01	0.00	0.01
	11	1	46	98	456	2080	120	21.78	3.09	77.13	39.18	1.16	40.34
	12	1	118	-24	596	1928	120	331.96	60.99	1219.79	780.40	16.85	797.25
	13	1	0	Unrestricted	18	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
		2	0	Unrestricted	890	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	14	1	0	Unrestricted	756	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	15	1	0	Unrestricted	407	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	16	1	0	Unrestricted	23	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
		2	0	Unrestricted	710	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00

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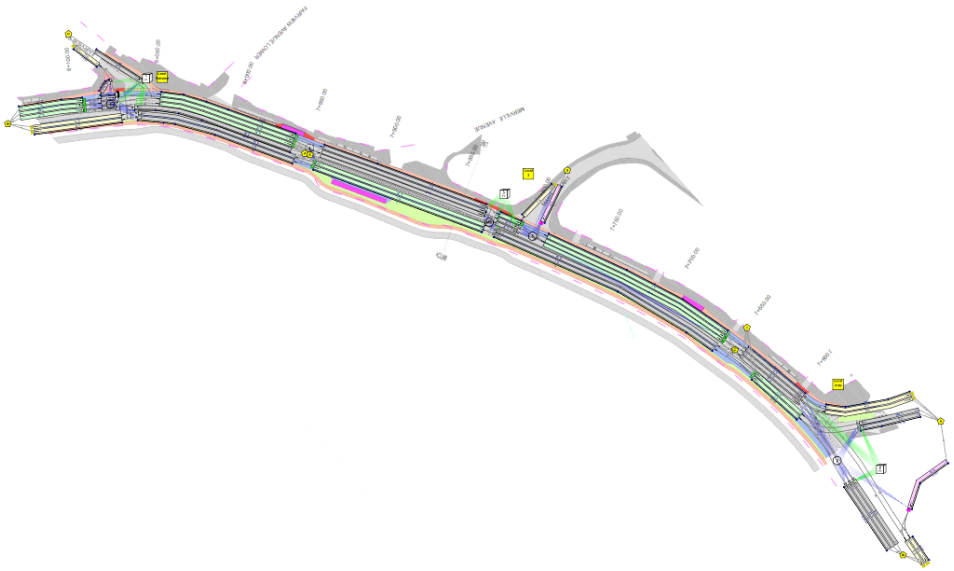
Report generation date: 08/12/2017 10:19:17

Network Diagrams



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Cycletime 0s / 120s , Timesteps 119 / 120
Diagram produced using TRANSYT 15.5.1.7048

Traffic Stream Results

Traffic Stream Results: Vehicle summary

Time Segment	Arm	Traffic Stream	Degree of saturation (%)	Practical reserve capacity (%)	Calculated flow entering (PCU/hr)	Calculated sat flow (PCU/hr)	Actual green (s (per cycle))	Mean Delay per Veh (s)	Mean max queue (PCU)	Utilised storage (%)	Weighted cost of delay (£ per hr)	Weighted cost of stops (£ per hr)	Performance Index (£ per hr)
08:00-09:00	18	1	1	13265	10	1800	98	2.24	0.06	0.21	0.09	0.01	0.09
		2	31	186	928	3600	98	1.42	4.00	8.92	5.20	1.48	6.68
	19	1	1	13265	10	1800	98	0.97	0.03	0.06	0.04	0.00	0.04
		2	64	41	948	1800	98	7.11	10.71	32.60	26.60	3.21	29.81
	20	1	1	16100	10	1800	120	0.01	0.00	0.00	0.00	0.00	0.00
		2	39	129	917	3600	120	6.71	9.36	18.39	24.26	3.66	27.93
	21	1	1	16100	10	1800	120	0.01	0.00	0.00	0.00	0.00	0.00
		2	53	71	948	1800	120	1.11	0.29	1.37	4.15	0.00	4.15
	22	1	2	3654	20	834	120	1.80	0.08	1.76	0.14	0.06	0.20
	23	1	0	Unrestricted	31	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	24	1	1	16100	10	1800	120	0.01	0.00	0.00	0.00	0.00	0.00
		2	32	179	480	1800	98	0.79	0.24	5.76	1.49	0.09	1.58
		3	30	198	449	1800	98	0.74	0.22	5.12	1.30	0.08	1.38
	BRT EB	1	0	18395	10	2055	120	0.00	0.00	0.00	0.00	0.00	0.00
		2	28	223	335	1800	120	8.21	3.95	56.31	10.85	1.49	12.34
		3	25	266	293	1800	120	8.06	3.45	49.42	9.31	1.30	10.61
	EB	1	1	7301	10	1935	50	20.15	0.19	3.84	0.79	0.02	0.81
		2	38	135	293	1800	50	17.58	3.02	83.50	20.32	1.13	21.46
		3	38	135	293	1800	50	17.59	3.02	83.52	20.33	1.13	21.46
	EB Exit	1	0	Unrestricted	401	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
		2	0	Unrestricted	401	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	Eastbound	1	8	980	10	1800	7	53.26	0.34	2.23	2.10	0.03	2.13
		2	87	4	678	1800	53	30.61	12.79	117.18	81.79	4.78	86.57
		3	31	186	255	1800	53	14.42	4.26	38.98	14.48	1.60	16.08
	Exit EB	1	0	18395	10	2055	120	0.00	0.00	0.00	0.00	0.00	0.00
		2	32	182	655	2055	120	0.41	0.07	0.39	1.06	0.00	1.06
		3	16	453	293	1800	120	0.19	0.02	0.08	0.22	0.00	0.22
	Exit NB	1	0	Unrestricted	431	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	Exit WB	1	1	8000	20	1800	120	0.01	0.00	0.00	0.00	0.00	0.00
		2	46	95	948	2055	120	0.75	0.20	1.34	2.80	0.00	2.80
	Giveway	1	34	166	292	864	120	9.43	3.10	44.31	10.86	1.82	12.67
	Left Slip	1	5	1861	42	1800	60	12.46	0.42	9.95	2.06	0.16	2.22
	NB Exit	1	0	Unrestricted	10	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
		2	0	Unrestricted	562	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	R107 SB	1	3	3005	10	1800	22	39.76	0.27	2.90	1.57	0.03	1.59
		2	181	-50	345	1800	22	1537.79	152.50	2267.54	2092.67	17.35	2110.02
	SB	1	47	90	362	1800	50	26.94	6.01	98.29	38.47	2.26	40.73
	WB	1	1	11915	10	1800	88	2.07	0.04	0.15	0.08	0.00	0.09
		2	50	79	670	1800	88	3.63	6.18	30.25	9.60	2.21	11.81
	WB Exit	1	0	Unrestricted	10	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
		2	0	Unrestricted	670	Unrestricted	120	0.00	0.00	0.00	0.00	0.00	0.00
	WB RT	1	66	35	389	1800	38	40.90	11.15	61.85	62.76	4.17	66.93
	Westbound	1	1	8810	10	1800	65	12.39	0.15	1.29	0.49	0.01	0.50
		2	61	48	603	1800	65	21.09	7.72	91.24	50.16	2.90	53.06
		3	15	497	139	1800	65	14.72	2.18	25.72	8.07	0.82	8.89

NTA

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National Transport Authority

National Transport Authority
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Dublin 2
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