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Galway City Council

Project:

BusConnects Galway: Dublin Road

Report:

Preliminary Business Case

BARRY TRANSPORTATION

egis GROUP

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SECTION 1: INTRODUCTION

1.1 Background

Barry Transportation has been appointed by Galway City Council to prepare a Preliminary Business Case (PBC) for the BusConnects Galway: Dublin Road project in line with the Department of Public Expenditure and Reform's Infrastructure Guidelines (December 2023) and the Department of Transport's Transport Appraisal Framework (TAF) (June 2023)[1].

The PBC has been developed utilising assumptions and parameters in line with guidance from the National Transport Authority (NTA) and the Department of Transport (DoT).

1.2 Purpose of the Report

The purpose of this report is to demonstrate the appraisal that has been carried out as part of Phase 3 of the NTA Project Approval Guidelines. This Preliminary Business Case will demonstrate the justification for investing in the BusConnects Galway: Dublin Road project and:

- Confirm the case for investment;
- Demonstrate:
  - The option development and assessment processes;
  - A recommendation for a preferred option;
  - A cost estimation and economic appraisal to demonstrate the value for money and return on investment of the preferred option; and
  - The management of the Preferred Option's potential impacts.
- Details how the Preferred Option will deliver opportunities and how the objectives will be achieved through investment;
- Identify risks; and
- Briefly describe implementation and operations and the monitoring and evaluations processes.

1.3 Structure of the Report

The report follows the recommended Strategic Appraisal Report structure contained within the Department of Transport – Transport Appraisal Framework Module 4[2] and the Department of Public Expenditure and Reform's Infrastructure Guidelines - Strategic Assessment and Preliminary Business Case.

1. Introduction;
2. Project Context;
3. Project Rationale;

[1] It is important to note that this project began before the Transport Appraisal Framework and the Infrastructure Guidelines were published. Therefore, some documents and reports that feed into this Preliminary Business Case have been undertaken using the previous Common Appraisal Framework and Public Spend Code (December 2019). Throughout this report it is clearly noted when this is the case and the steps taken to align with the new TAF and Infrastructure Guidelines.

[2] This also aligns with the Infrastructure Guidelines: Strategic Assessment and Preliminary Business Case - 4e7da363-b0b4-431a-99e7-a41c1399c8db.pdf (www.gov.ie)

4. Strategic Alignment & Policy Context;
5. Lessons Learned;
6. Demand Analysis;
7. Options Development and Selection;
8. The Preferred Option;
9. Climate and Environmental performance;
10. Cost Projection;
11. Financial Appraisal;
12. Risk Identification;
13. Implementation and Operation;
14. Monitoring and Evaluation; and
15. Conclusions and Recommendations.

SECTION 2: PROJECT CONTEXT

2.1 BusConnects

The BusConnects programme is a key part of the Government's polices to improve public transport and address climate change in Ireland's major urban centres, including Dublin, Cork, Limerick, Galway and Waterford. The BusConnects programme includes nine initiatives:

- Redesigning the bus network;
- Building new bus corridors and cycle lanes;
- Implementing a state-of-the-art ticketing system;
- Implementing a cashless payment system;
- Introducing a simple fare structure;
- New bus livery;
- New bus stops and shelters;
- New Park & Ride sites in key locations; and
- Transitioning to a new zero emissions bus fleet.

Figure 2-1 shows the extensive network for the Galway BusConnects programme of which Dublin Road is a major transport link providing direct access to the city. On completion of the BusConnects Galway: Dublin Road project several Government Policy and local plans[3] will be informed, the project will also encourage the community to shift transport modes by providing frequent and reliable bus services, segregated and safe active mode facilities, improving access to jobs and education. This will combat traffic congestion and reduce carbon emissions.

Figure 2-1: Galway Network Map[4]

The overall aim of BusConnects Galway: Dublin Road is to deliver efficient, safe, and integrated sustainable transport options from the west of Bohermore to Roscam which aligns with the strategic aim of the Galway Transport Strategy.

[3] Climate Action Plan 2024, Galway Transport Strategy, Galway City Council Development Plan, amongst others

[4] https://busconnects.ie/wp-content/uploads/2023/04/Galway-Draft-New-Network-Report-20230423-high-resolution.pdf

2.2 Study Area

The BusConnects Galway: Dublin Road study area is located in Galway City and extends along Dublin Road from the Martin Junction in the east to the Moneenageisha Junction in the west. The total distance is approximately 4.0km and includes areas such as Roscam, Doughiska, Murrough, Renmore, Merlin Park, Liosbán/Bohermore and Wellpark. This road is a primary east-west arterial route into Galway City centre for both commuters and tourists. It runs adjacent to the Atlantic Technological University, Merlin Park Hospital, Bon Secours Hospital and several schools and other amenities, as shown in Figure 2-2.

Section 1 represents the area to the west of the Skerrit Roundabout which generally has more urban characteristic, with a higher density of accesses, housing, and services along the route. Section 2 represents Skerrit Roundabout which is surrounded by housing and commercial developments with urban characteristics. To the east of the Skerrit roundabout, Section 3, is more rural, with a lower density of accesses, houses, and services.

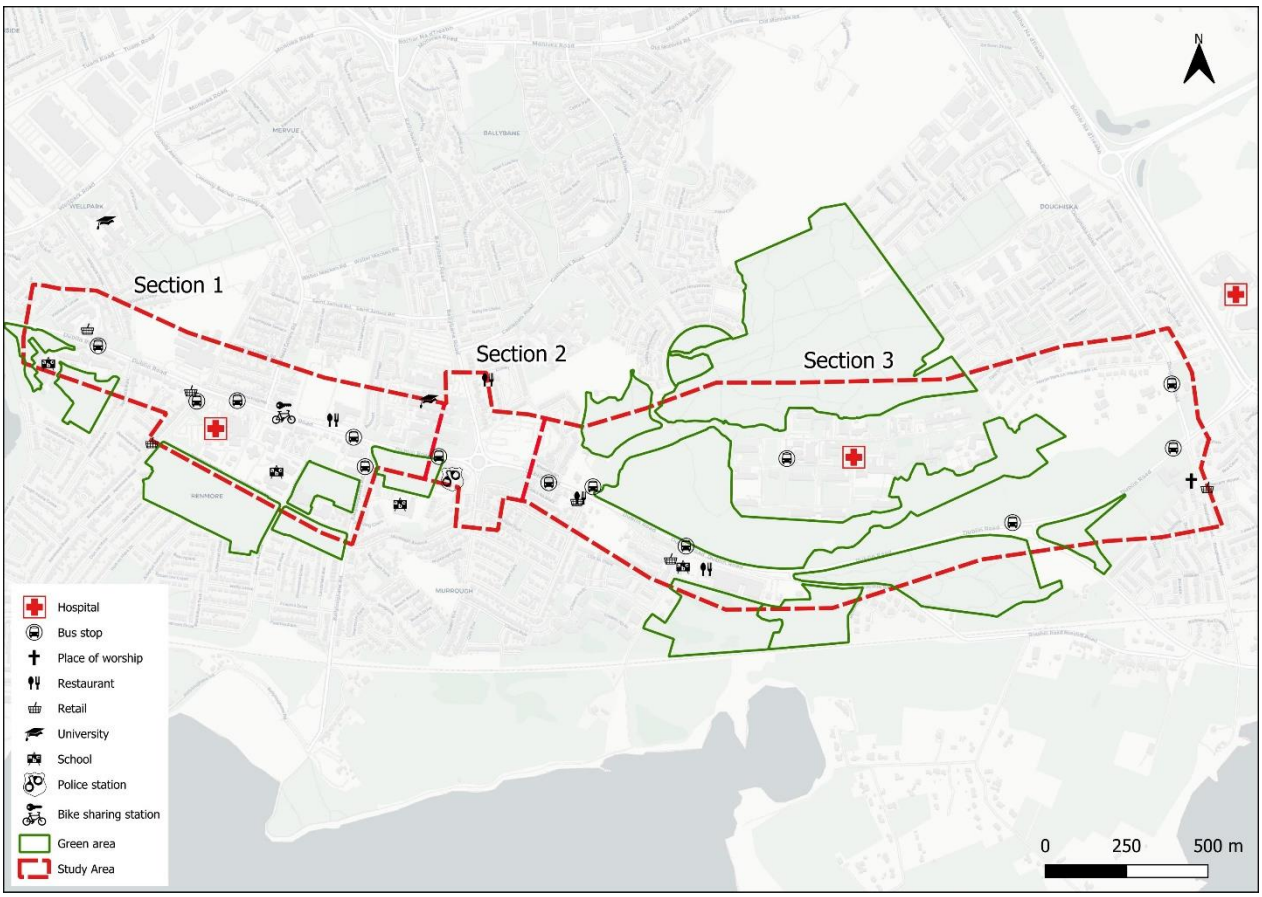


Figure 2-2: BusConnects Galway: Dublin Road Scheme Area

2.3 Transport Context

In terms of transport infrastructure, throughout the length of the existing Dublin Road there is changing cross sections. The level of infrastructure varies along the route for the different road users as shown in **Figure 2-3**. Each road section is discussed in more detail in this section of the report. For more detailed information about infrastructure along Dublin Road within the study area refer to Chapter 6 (Traffic Transport) of the EIAR.

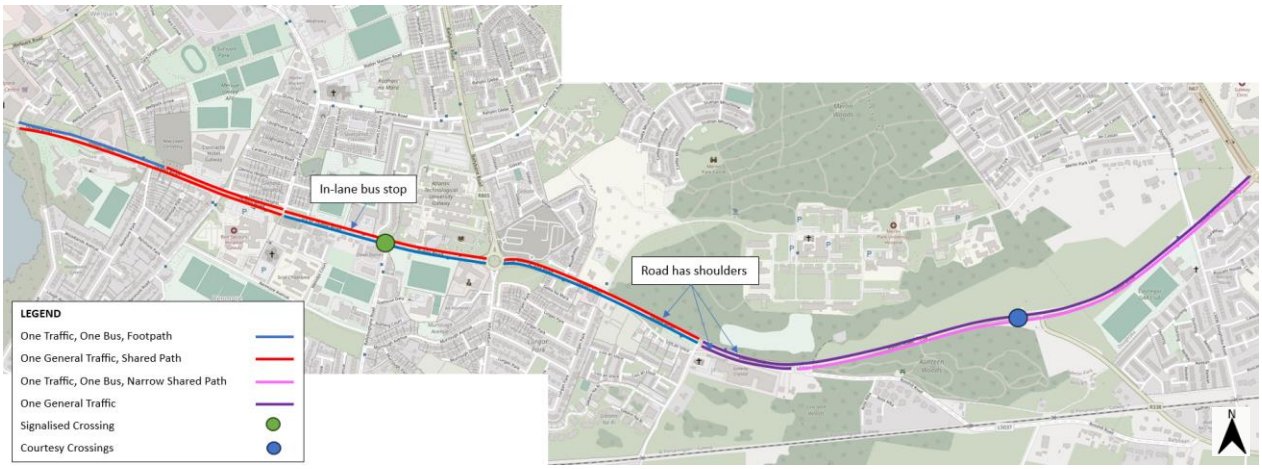


Figure 2-3: Dublin Road Lane Configuration

Generally, Dublin Road has good connections for motorised road users and footpath provisions along most of the route. Extensive bus routes are operational within the study area. Dublin Road is serviced by several city bus routes including the 402, 404 and 409 operated by Bus Éireann. In addition to these Bus Éireann Expressway services, Citylink, Aircoach and many private coach operators use this arterial route to access the city centre bus station and Eyre Square in Galway city centre. The bus stop outside Atlantic Technological University also serves many of these routes including routes to Ballina, Dublin, Limerick, Cork, Sligo and Derry. The red box in Figure 2-4 shows the proximity of the community to bus stops – shown in orange is the community that must walk further than 400m to a bus stop.

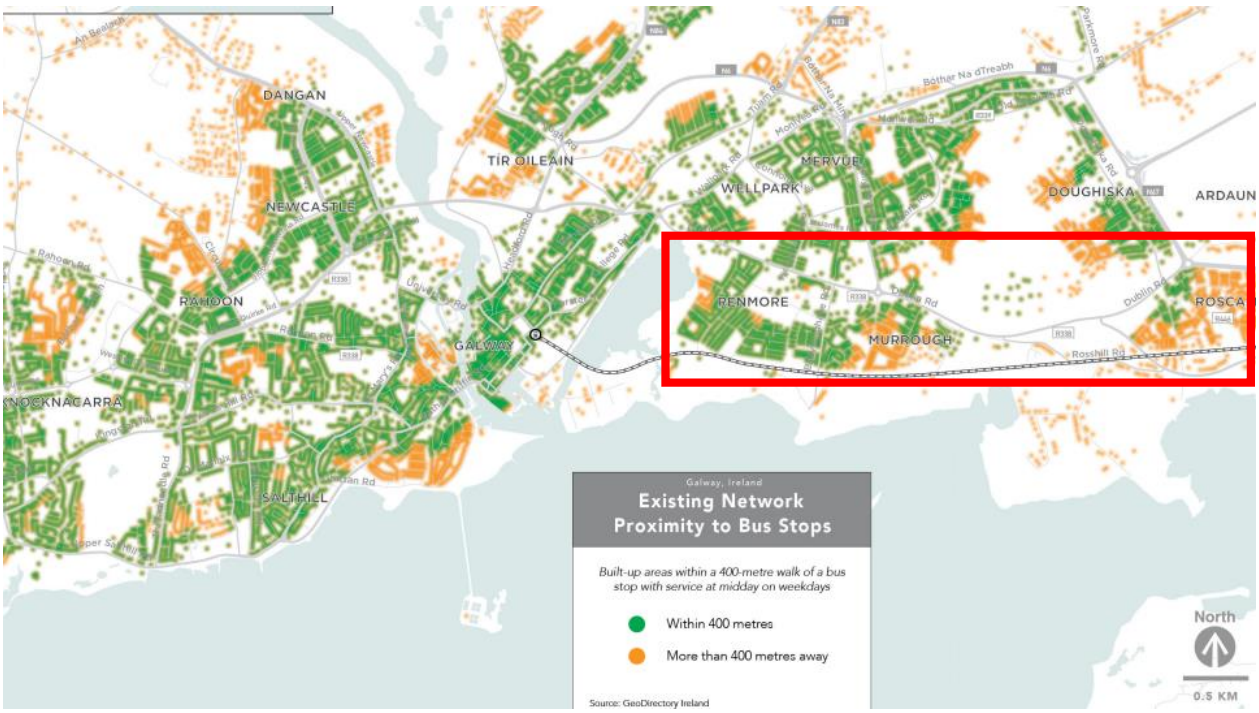


Figure 2-4: Existing Network Proximity to Bus Stops[4]

2.3.1 Section 1 – West of Skerrit Roundabout

The general cross section to the west of Renmore Road consists of an eastbound bus lane and traffic lanes in both directions. To the east of Renmore Road the bus lane changes direction to a westbound direction. There are right turning lanes on the approach to several side roads. The general cross section is

approximately 16m wide including footpaths. On the southern side, the route is bounded by public & private greenspace, Bon Secours Hospital Car Park, and private front gardens / driveways, on the northern side it is bounded by a mix of public and private greenspace. There are no existing cycle facilities present along the route. Pedestrian footpaths are provided on both sides of the road for the full length of this section, and signalised crossings are provided across Dublin Road at junctions with Renmore Road, at Michael Collins Road, and east of the entrance to Belmont. The side roads of Renmore, Michael Collins and the entrance to Galway Hospice Foundation also have signalised crossings, all other side road crossings are uncontrolled.

2.3.2 Section 2 - Skerrit Roundabout

This junction lies between Section 1 and Section 3 of the study area. It is currently an uncontrolled roundabout with 4 arms, there are 2 approach lanes on each arm. There are wide turning radii and clear sight lines which allow traffic to go round the roundabout at relatively high speeds. There is no cycle provision or signalised pedestrian crossings provided, although uncontrolled pedestrian crossing points are present at each arm.

2.3.3 Section 3 - East of Skerrit Roundabout

The general cross section of this portion of the route consists of a westbound bus lane and traffic lanes in both directions. The general cross section is approximately 16m boundary to boundary including the footpath, the narrow hard shoulder and grass verges. The route is generally bounded by greenspace to both sides, and a stone wall on the south adjacent to the woodland. The route is lined by trees on both sides, particularly between Coast Road and Doughiska Road. Currently there are no cycle facilities present along the route. Pedestrian footpaths are provided for the full length of the route on the south side of the road carriageway, on the north of the road carriageway the footpath is dropped between Galway Crystal and Doughiska. Signalised crossings are provided across Dublin Road at the junction with Murrough Road, Coast Road and Doughiska, signalised crossings are also provided across the side roads of those junctions.

2.4 Demographics and Socioeconomics

2.4.1 Population

Galway City is a major urban centre located on the river Corrib, where it enters Galway Bay. It has a population of approximately 84,000[5] people and a target growth of 50 - 60% by 2040 in accordance with the National Development Plan.

2.4.2 Employment

Galway City is the major services and shopping centre for the surrounding region and is one of the largest catchment areas of any city in Ireland with a number of large multinational employers located in the area.

In April 2022, 39,000 people were working in Galway City and almost 86,000 people worked in Galway County[5]. On a regional basis the NPF 2040 scenario targets a growth of an additional 115,000 people in employment in the Northern and Western Region. It is anticipated that Galway as a key regional employment base, located centrally along the Atlantic Economic Corridor will support many of these future jobs, providing employment for the targeted population.

[5] Census Local Statistics interactive mapping app | CSO Ireland

2.4.3 Socioeconomics

The Pobal HP Deprivation Index for the Electoral Districts within the study area includes areas which vary from 'Extremely Disadvantaged' to 'Affluent', as shown in Figure 2-5[6]. As highlighted in the BusConnects Galway Report[4] affluent people travel more, on average, because they have money to spend but affluent people are also more likely to own their own cars or pay to hire a car. Therefore, affluent areas can generate high public transport patronage, but only if the service is convenient.

People with lesser means tend to travel less on average and are less likely to own cars. They have a greater incentive to use public transport rather than buy their own private vehicle or hire a car. High deprivation areas can therefore be places where public transport is socially important and significantly necessary, even if few people live in the area. High deprivation areas that are also have high residential density are almost always areas of high patronage.

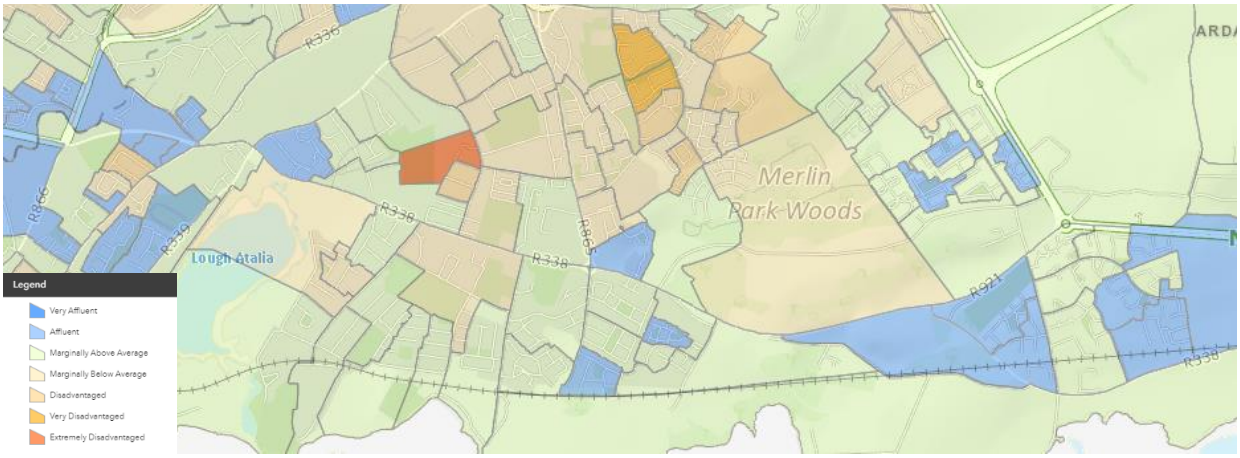


Figure 2-5: Socioeconomics along Study Area

Census 2022 data showed that 71% of commuters[7] in Galway County still travel to work by car, with roughly 20% using active travel and 10% using public transport. Similarly, primary, and secondary students travel to school predominantly by car, with 20% using buses and 20% travelling by active modes, while tertiary students have an almost equal mode spilt when travelling to school.

2.5 Future Growth Areas

The Galway City Council City Development Plan 2023-2029 has identified areas of growth around the city. The red box in Figure 2-6 shows the sites identified as Undeveloped R Zoned Lands, Regeneration and Opportunity Sites within the study area.

[6] Pobal HP Deprivation Indices
[7] Press Statement Census 2022 Results Profile 7 – Employment, Occupations and Commuting Galway – CSO – Central Statistics Office

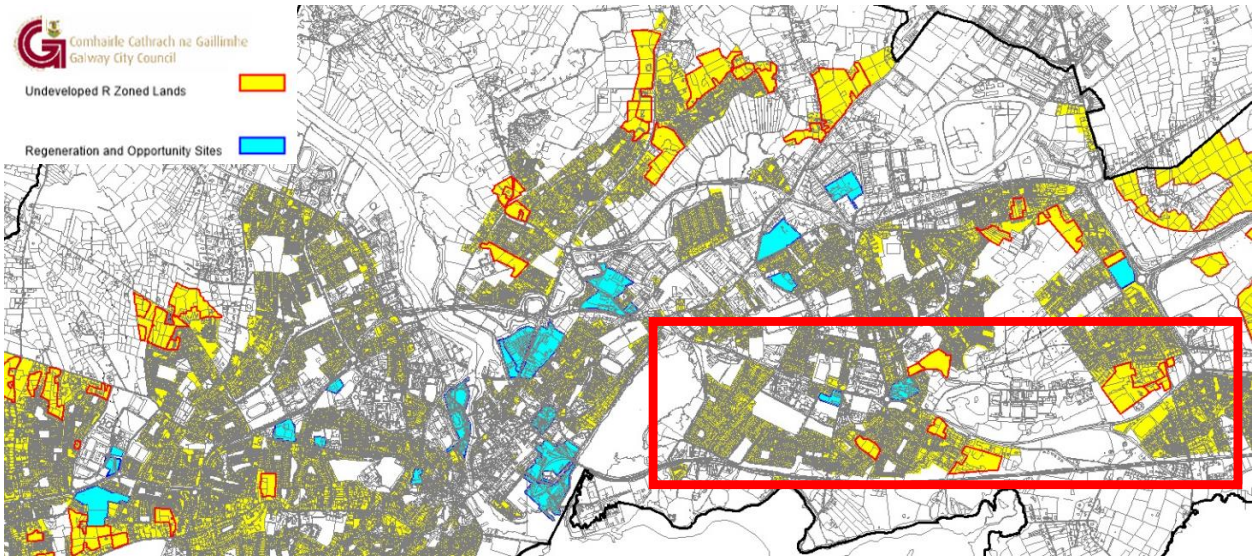


Figure 2-6: Built-up footprint, Residential Zoning (undeveloped lands within red boundaries) and Regeneration and Opportunity Sites[8]

Corrib Great Southern Regeneration Site is one of the identified sites and will have a 2.7-hectare land allocation along Dublin Road at the Skerrit Roundabout. This site has the potential for significant redevelopment for a mix of land uses including residential to meet the housing targets for the city.

Another site is the former Dawn Dairies Opportunity Site, which is a 1.38-hectare site located along Dublin Road at the junction with the Ballyloughane Road. This site has the potential for redevelopment for high density housing. Other potential sites are detailed in the Galway City Council City Development Plan 2023-2029.

2.6 Non-Statutory Public Consultations

2.6.1 First Non-Statutory Public Consultation Summary

Galway City Council previously outlined an emerging preferred route for the provision of a multimodal transport corridor on Dublin Road. This emerging preferred route was taken to a non-statutory public consultation in October 2020.

GCC carried out a 12-week non-statutory public consultation event between 8th October 2020 to 7th January 2021. Due to the COVID-19 restrictions in place throughout that period the event was carried out online on a website and a virtual consultation room with route maps and brochures available to download. Postal submissions and telephone enquiries were also invited and promoted via a leaflet letter drop.

As a non-statutory consultation has no legal status, the consultation was carried out to seek views from those likely to be interested in or affected by the proposals, which could then be considered in the decision-making process and the design going forward. This was the first formal public and stakeholder consultation on the project. In total 168 submissions were received. The 1st non-statutory public consultation findings

8 galwaycity.ie/gccfiles/?r=/download&path=L0RlcGFydG1lbnRzL1BsYW5uaW5nL0RldmVsb3BtZW50IFBsYW4vMjAyMy0yMDI5L0Fkb3B0ZWQgUGxhbi9HYWx3YxkgQ2l0eSBEZXZlbG9wbWVudCBQbGFuIFdyaXR0ZW4gU3RhdGVtZW50IDIwMjMgLSAyMDI5LnBkZg%3D%3D

and responses are summarised below. More detail on the first public consultation can be found in Appendix A: BusConnects Galway: Dublin Road 1st Non-Statutory Public Consultation Report (less appendices).

In general, stakeholders acknowledged and supported the need for improvements along the Dublin Road in terms of amenity value, traffic congestion and improvement of bus services. Allowance for bus and cycle/pedestrian infrastructure was broadly welcomed to decrease dependence on cars thus reducing traffic, fuel consumption, cost, and emissions. One hundred respondents (60% of overall respondents) expressed their overall support for the scheme.

Although the overall support for the scheme was positive, some issues were raised in relation to:

- Environmental concerns - 50%
- Access points along the route - 22%
- Social and amenity issues - 26%

Suggestions for specific locations along the corridor were received, namely Rosshill Road Junction, Belmont / Flannery`s / Galwegian`s Entrance, Skerritt Roundabout / ATU, Woodhaven and Wellpark. These suggestions included requests for:

- Segregated facilities by mode;
- Increased frequency of pedestrian crossing along the corridor;
- More footpaths and pedestrian facilities at recreational areas such as Rosshill Park Woods;
- Limiting impact on existing green spaces; and
- Closer considerations of accessways along the corridor.

Since the consultation, significant changes in design and procurement guidance prompted a review of the proposed design, to ensure compliance with current 'good practice'. These changes to documentation included updates to the Public Spending Code, revised design guidance on layouts for bus corridors, and revised National Transport Authority Project Approval Guidelines in June 2023, which replaced the Common Appraisal Framework (CAF) with the Transport Appraisal Framework (TAF).

However, the non-statutory consultation and comments received provided valuable insights into the community preferences. The latest option selection process was performed in May 2023, adopting an updated design which incorporated the feedback from the consultation. It should be noted that the options selection process on which the consultation was based was undertaken using the CAF, as the TAF was not yet released[9].

2.6.2 Second Non-Statutory Public Consultation Summary

Feedback on the updated Emerging Preferred Route, which resulted from this PBC, was sought as part of the second non-statutory public consultation on the BusConnects Galway: Dublin Road proposals on the 13th of January 2023, for 4 weeks. The purpose of the consultation was to invite feedback, questions, and support for the Emerging Preferred Route, to help inform the scheme design as it proceeds to the planning consent process.

[9] There is a strong alignment between the CAF and TAF assessment criteria and therefore redoing the options selection process will add little value at this stage of the project. More information on the alignment is provided in section 3.6.

In total, 103 stakeholder responses were received, after consolidating duplicates submitted on different platforms, the number of submissions totalled to 91.

In general, stakeholders acknowledged and supported the need for improvements along the Dublin Road in terms of amenity value, traffic congestion and improvement of bus services. Allowance for bus and cycle/pedestrian infrastructure was broadly welcomed to decrease dependence on cars thus reducing traffic, fuel consumption, cost, and emissions.

Respondents raised 177 distinct issues relating to the proposal. 69% of these were related to the engineering aspects of which the most of these were regarding the lane widths and the junction/signalling arrangements. 17% of the issues raised were in relation to safety and 14% were in relation to the environmental elements of the scheme. A few of the common suggestions are listed below:

- Widen/extend footway/cycleway facility;
- Provide physical separation between cycleways and traffic lanes;
- Use forgiving kerbs;
- Use raised crossings at junctions;
- Extend no parking lines;
- Remove trees and keep the cycleway route in line;
- Change to a Cyclops type junction;
- Improve connection for cyclists;
- Preserve the existing trees on both sides;
- Retain more green area;
- Extend bus stops;
- Increase bus parking lengths to accommodate more buses with three spaces at ATU; and
- Provide guard rails at bus stops for waiting passengers.

More detail on the second public consultation can be found in Appendix A: BusConnects Galway: Dublin Road 2nd Non-Statutory Public Consultation Report (less appendices).

SECTION 3: RATIONALE

The purpose of this section is to:

- Outline the proposed scheme;
- Identify the key opportunities and constraints to be addressed;
- Identify the key investment drivers, including the benefits that are sought; and
- Confirm the need for investment in the BusConnects Galway: Dublin Road

3.1 The Scheme

The Galway bus network has evolved slowly with the growth of the city. In 2016 the Galway Transport Strategy identified improvements to the urban bus network which were partially implemented in the years since. Considering Galway's targeted growth and national efforts to reduce transportation associated carbon emissions, there is an urgent need to re-evaluate and re-invest in bus services in Galway. As part of this the BusConnects Galway: Dublin Road project has been proposed.

The BusConnects Galway: Dublin Road project is proposed to provide a dedicated bus corridor, with segregated and continuous walking and cycling facilities along Dublin Road to align with national mode shift 2030 targets.

The overall aim of BusConnects Galway: Dublin Road is to provide enhanced walking, cycling and bus infrastructure which will deliver efficient, safe, and integrated sustainable transport from the west of Bohermore to Roscam which aligns with the strategic aim of the Galway Transport Strategy.

3.2 Constraints

There are several features in the natural and built environment within the study area which constrain scheme options. These have been considered within the scheme assessment process and include:

- Planned and committed developments including Ardaun, Doughiska and the new development adjacent to the junction with Coast Road;
- Public transport & public transport infrastructure including existing bus stop locations, and Galway City Bus Services;
- Trees and other natural and ecological features;
- Architectural, archaeological and heritage sites and features, including Lynch's Stone;
- Protected structures adjacent to the route;
- Existing urban and sub-urban roads, street networks and accesses to private properties & estates; and
- Limited availability of land in urban and suburban areas.

3.3 Opportunities

There are many opportunities within the study area to create a corridor that communities can interact with, by providing more opportunities for social engagement, physical activity, and connectivity between communities through integrated and diverse transport solutions that cater for different demographics and needs, while taking care of the planet.

Unfortunately, as previously shown, the existing Dublin Road corridor does not currently provide this experience to road users. The current lane configuration of Dublin Road between Martin Junction and Moneenageisha Junction is hostile with insufficient public transport and active mode infrastructure and therefore is forcing modes to mix, creating a less reliable corridor with reduced safety.

3.3.1 Opportunity 1 – Provide a dedicated bus corridor along Dublin Road, that will improve bus travel times and reliability, public transport connectivity and mode shift.

A slow, unreliable bus service is not appealing for users and does not make travel by bus an attractive option. Currently Dublin Road has bus lanes along portions of the route in one direction at a time, which are shared with cyclists and merge with general traffic at points along the corridor, reducing the efficiency of these lanes. Since the bus lanes are not continuous along the length of the corridor, travel times are increased by buses waiting to merge with adjacent traffic or slowed by cyclists in the lane.

Travel Times and Reliability

Automatic Vehicle Location (AVL) systems are required for service control of buses, communications with drivers, and the current generation of real-time information for on-street displays, websites, and mobile apps. The information recorded by AVL is also central to the tracking of operational performance by following metrics on routes such as punctuality (journey times) and stops serviced. Therefore, by taking a sample of this AVL dataset, insights into the average journey times for various services including their reliability are available.

A sample was taken for a bus route in the month of November in 2022 between two stops which correspond to the start and end points of the Proposed Scheme.

The data was analysed for the average weekday in November 2022 for both inbound and outbound services and a profile across the 6:00 – 24:00 period was generated. The figures below show the average planned running time (blue), the average actual running time (green) and the percentage of buses reaching the 2nd stop within this time (dashed lines).

For the inbound services, the AVL data shows that overall actual journey times are close to the planned ones, with some degree of variability occurring around 12:30. and 20:00. For the outbound services, the AVL data shows a moderate degree of variability in journey times during the morning peak and from midday onwards with the peak occurring around 16:30.

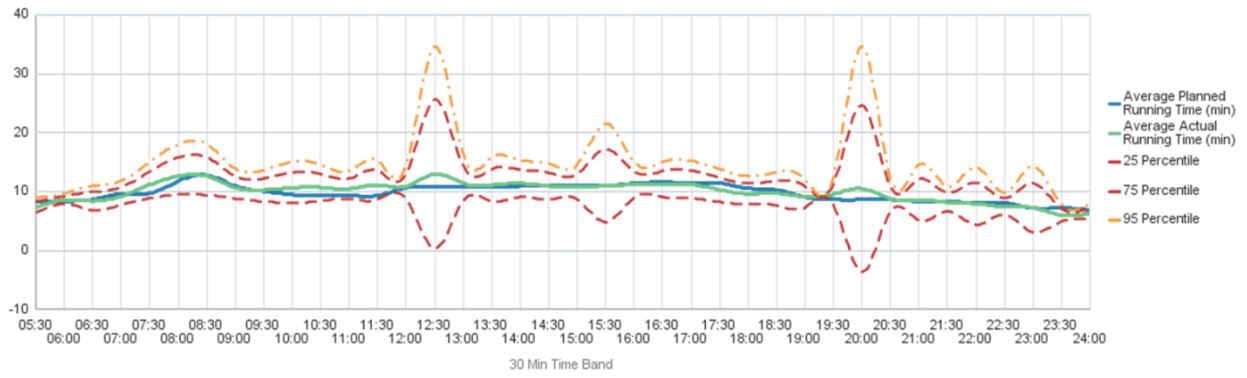


Figure 3-1: Average Weekday Bus Journey Time Profile (Inbound Services)

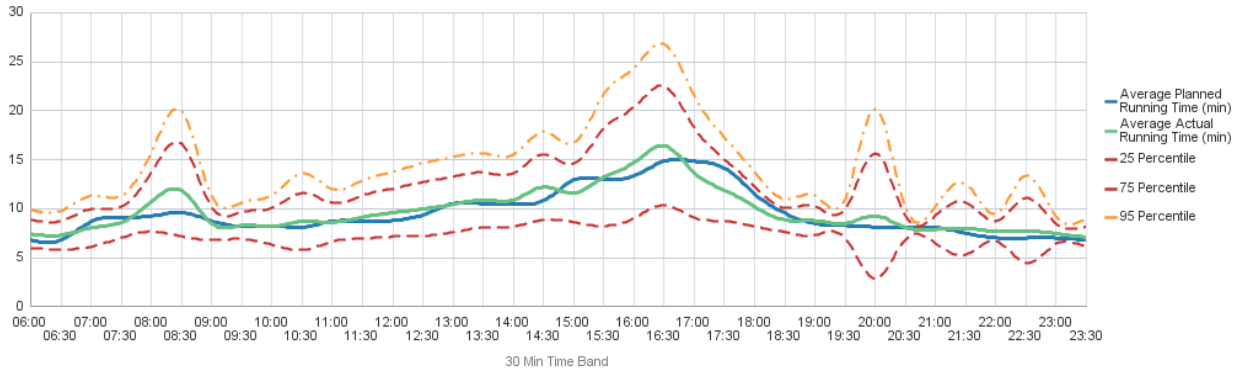


Figure 3-2: Average Weekday Bus Journey Time Profile (Outbound Services)

Google maps was also used to capture the peak and off-peak travel times[10] for buses along Dublin Road between 19 and 23 February 2024. Two routes were investigated:

1. Route 1: Residential to University, i.e. Roscam to the University of Galway
2. Route 2: Residential to Hospital, i.e. Middle Street (Galway City Centre) to Blackrock Clinic

The results presented in Table 3-1 shows that during the AM peak, travel time by buses could be reduced by up to 11 minutes, while travel times could be reduced by up to 14 minutes during the PM peak if buses had dedicated lanes.

Table 3-1: Bus travel time in minutes

Peak	Route 1: Residential to University		Route 2: Residential to Hospital	
	Travel Time Range			
AM	37	53	26	37
INTER	38	43	26	34
PM	41	54	37	48

Interaction with other road users contributes to long travel times and poor reliability for buses along Dublin Road. The bus infrastructure constraints provide Galway City with the opportunity to improve the attractiveness of buses and therefore potential mode shift, contributing to national climate change targets by providing a priority corridor for buses.

By improving efficiency along the bus corridor, bus operators are provided with opportunities to add services which improve connectivity between cities within and around Galway, thereby supporting the sustainable growth of Galway City.

Galway Transport Strategy

The Galway Transport Strategy identifies the need for investment in bus infrastructure along Dublin Road. This infrastructure includes:

[10] It is important to note that Dublin Road experiences high travel times throughout the day, suggesting that the off-peak travel time saving presented above are conservative.

- Bus lane inbound on approach to Moneenageisha Cross;
- Extension of existing bus lane outbound as far as Skerrit Roundabout;
- Bus lanes on both sides of the southern extremity of Doughiska Road, providing bus priority through the junction with the old Dublin Road; and
- Bus priority at new entrance to hospital from the Old Dublin Road.

The expected infrastructure aligns with the proposed scheme. The BusConnects Galway: Dublin Road scheme will also achieve several strategic objectives set out in the Galway Transport Strategy, namely:

- Safety – to achieve a safer environment for all transport modes and facilitate a healthier lifestyle.
- Environment – to encourage better integration of transport and urban form, thereby minimising harmful transport emissions.
- Integration – to provide for integration of transport modes and land use planning and policies.
- Accessibility and social inclusion – to improve multimodal accessibility and provide for a socially-inclusive transport network.

3.3.2 Opportunity 2 – Provide continuous and segregated walking and cycling facilities along Dublin Road that will improve safety, amenities and mode shift

Climate change and sustainable transport is at the forefront of policy, standards and road user aspirations as seen from the non-statutory public consultation for this project; hence active travel is becoming a more popular transport mode globally. In Ireland the Climate Action Plan is driving transport infrastructure changes with increasing investment in safe and efficient walking and cycling facilities.

Amenities

The Non-Statutory Public Consultation, detailed in section 2.6.1 shows that the community surrounding Dublin Road strongly support segregated facilities by mode, increased number of pedestrian crossings, increased number of footpaths and pedestrian facilities at recreational areas.

Safety

Currently, the active mode facilities along Dublin Road with shared bus and cycling lanes and discontinuous footpaths are not inviting mode shift moreover creating a safety and efficiency concern. The national safety statistics for 2023 shows fatalities involving vulnerable users increased by 6% since 2022[11]. National crash trends between 2018 and 2022 for walking[12] and cycling[13] showed:

- 163 pedestrians were fatally injured, and 1,383 pedestrians were seriously injured during this time;
- Pedestrians represented 23% of fatalities and 20% of serious injuries;
- 61% of fatal collision with pedestrians involved cars;
- 41 cyclists and 1,327 cyclists were fatally and seriously injured, respectively;
- Almost two-thirds of cyclist fatalities occurred on higher speed rural roads; and
- Most cyclist fatalities involved collisions with another vehicle 73%.

[11] https://www.rsa.ie/docs/default-source/road-safety/r2---statistics/provisional-reviews/infographic-of-fatalities-1-january-to-31-december-2023.pdf?Status=Master&sfvrsn=b04931b6_5
[12] Cyclist fatalities and serious injuries (rsa.ie)
[13] Cyclist fatalities and serious injuries (rsa.ie)

These trends show the national need for safer facilities for active modes of transport.

To understand crash trends within the study area National Crash data between 2009 to 2016[14] was analysed. The data showed that 60 crashes occurred over the 8-year period, with:

- 25% of crashes involving pedestrians.
- 13% of crashes involving buses and minibus.
- 8% of crashes involving cyclists.

These numbers show clearly the need for better walking and cycling infrastructure for road users and presents a huge opportunity for Galway City to encourage mode shift and create a better connected community. By providing segregated, continuous facilities with frequent and safe crossing points for walking and cycling the opportunity is presented to provide the community with heathier transport options while contributing to national climate change targets.

Galway Transport Strategy

The scheme will assist in achieving many of the strategic objectives, like **Safety** and the surrounding **Environment,** through the implementation of segregated active mode facilities and will also improve **Integration** through additional crossing points**,** while improving multimodal **Accessibility.**

The Galway Transport Strategy identifies the need for investment in active mode infrastructure, some of which will be along Dublin Road and will include:

- A two-way segregated cycleway on the southern side of the road in the vicinity of Moneenageisha, crossing the Old Dublin Road and continuing along the northern side of the road as far as the current entrance to Merlin Park Hospital aligning with the proposed scheme.

3.4 Scheme Objectives

A total of 6 scheme objectives have been identified for the BusConnects Galway: Dublin Road project under the TAF criteria and are outlined in Table 3-2. Key Performance Indicators (KPIs) have been identified for each objective making them SMART. These KPIs outline the target objectives, some of which will be used to monitor and evaluate the performance of the scheme once delivered.

Table 3-2: Scheme Objectives and KPIs

TAF Criteria	Objective	KPIs
Transport User and Other Economic Impacts	Enhance and support sustainable growth of Galway City through the provision of a continuous high-quality multi-modal corridor which will improve bus journey times and reliability along R338 Dublin Road.	**Bus travel times** Reduce travel times by up to 10 minutes in 2028
Social Impacts	Enable local opportunities for active modes in communities by improving and segregating walking and cycling facilities which will help increase physical activity.	**Walking and cycling demand** Increase walking and cycling demand by up to 8% by 2028
Accessibility Impacts	Improve access to all services and outdoor areas, e.g., Merlin Park Woods, Ballyloughane Beach, along R338	**Number of pedestrian crossings** Increase by up to 50% by 2028

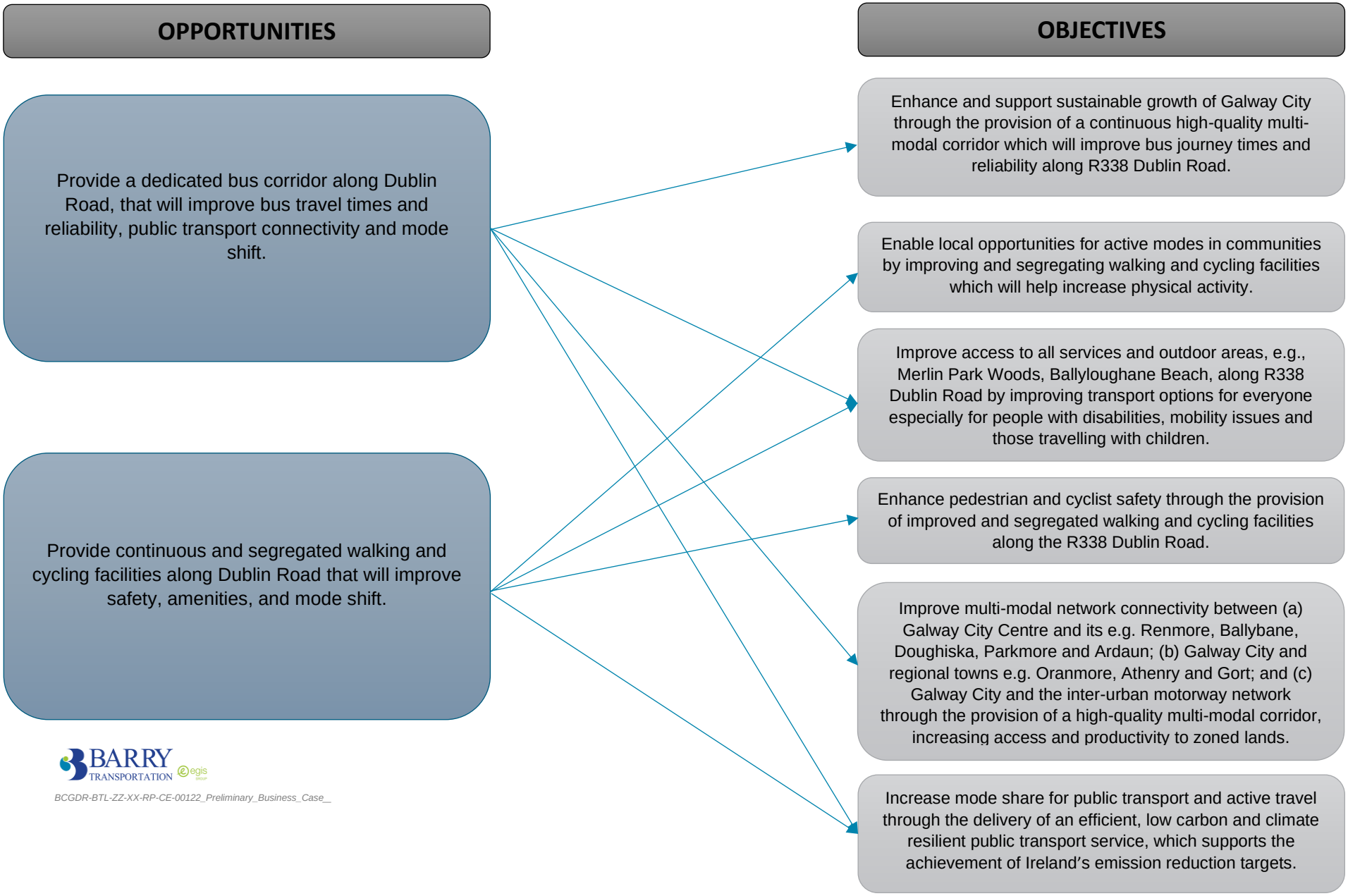
[14] More recent data about crashes on regional roads are not publicly available. The trends for the study area report here may have changed if mitigation measures have been implemented on site following 2016.

	Dublin Road by improving transport options for everyone especially for people with disabilities, mobility issues and those travelling with children.	**Number of bus stops** Increase by up to 50% by 2028
Safety Impacts	Enhance pedestrian and cyclist safety through the provision of improved and segregated walking and cycling facilities along the R338 Dublin Road.	**Length of segregated cycling facilities** Increase by up to 4km in both directions by 2028
		Length of segregated walking facilities Increase by up to 3km by 2028
		Number of Crashes Reduce deaths and serious injury crashes by up to 50% by 2030[15]
Land Use Impacts	Improve multi-modal network connectivity between (a) Galway City Centre and its e.g. Renmore, Ballybane, Doughiska, Parkmore and Ardaun; (b) Galway City and regional towns e.g. Oranmore, Athenry and Gort; and (c) Galway City and the inter-urban motorway network through the provision of a high-quality multi-modal corridor, increasing access and productivity to zoned lands	**Cycle facilities integration.** Provide cycle facility connections to at least 6 other proposed cycling facilities by 2043
Climate Change Impacts	Increase mode share for public transport and active travel through the delivery of an efficient, low carbon and climate resilient public transport service, which supports the achievement of Ireland's emission reduction targets.	**Total vehicle km travelled (pcu-km)** Reduce emissions by reducing the pcu-km by 750pcu-km in Galway in 2028
		Bus patronage Increase peak hour bus patronage along the corridor by up to 20% in 2028

It is acknowledged that some of these objectives will only be clearly recognised once a complete network is in place, for example the full benefits of the cycleways will only be recognised once the Galway City cycle network/CycleConnects is implemented improving connectivity across the city.

[15] Aligns with National Vision Zero targets – gov – New Ten-Year Government Road Safety Strategy Launched – first step to 'Vision Zero' (www.gov.ie)

Figure 3-3: Alignment of Opportunities and Objectives



3.5 Project Benefits

Six project benefits have also been identified which will be delivered by the proposed scheme. The benefits will fall under four of the TAF criteria and are outlined below.

3.5.1 Transport User Benefits and Other Economic Impacts

- Economically efficient scheme, with an option that delivers value for money (i.e. positive CBA).

3.5.2 Safety Impacts

- Alignment with the hierarchy of users as outlined in policy wherein the safety of pedestrians and cyclists are considered first; and
- Complement the Governments Road Safety Strategy.

3.5.3 Land Use Integration

- Compatibility with land use objectives as set out in regional and local land use plans.

3.5.4 Local Environment Impacts

- Improved environment in the context of noise and air quality along the R338 Dublin Road; and
- Minimised environmental impact including minimising the private land take required for the scheme.

3.6 Assessment Criteria

The criteria, against which the scheme will be assessed, are defined in terms of the TAF criteria.

It is important to note that this project began before the Transport Appraisal Framework was published. Therefore, some assessments, including the options selection assessments have been undertaken using the previous Common Appraisal Framework criteria. This is not expected to change the outcomes of the options selection assessments, since the CAF and TAF criteria coherently map against each other as shown in Table 3-3.

Table 3-3: Correlation between the TAF and CAF criteria

TAF Criteria	CAF Criteria
Transport User and Other Economic Impacts	Economy
Accessibility Impacts	Accessibility and Social Inclusion
Social Impacts	Accessibility and Social Inclusion
Land Use Impacts	Integration
Safety Impacts	Safety
Climate Change Impacts	Environment
Local Environment Impacts.	Physical Activity

SECTION 4: STRATEGIC ALIGNMENT

4.1 Overview

The need for BusConnects Galway: Dublin Road is consistent or in line with the following National, Regional and Local policy documents.

International Policy Context:

- United Nations Sustainable Development Goals

European Policy Context:

- EU Transport White Paper 6
- European Union Green Deal

National Policy Context:

- National Planning Framework - Project Ireland 2040;
- National Development Plan 2021-2030 - Project Ireland 2040;
- National Investment Framework for Transport in Ireland;
- National Sustainable Mobility Policy 2022-2030;
- National Sustainable Mobility Policy Action Plan 2022-2025;
- Road Safety Authority Road Safety Strategy 2021-2030; and
- Climate Action Plan 2024.

Regional Policy Context:

- CycleConnects;
- BusConnects; and
- Regional Spatial and Economic Strategy - Northern and Western Region.

Local Policy Context:

- Galway City Development Plan 2023 – 2029;
- Galway Transport Strategy; and
- Galway Metropolitan Area Strategic Plan (In Progress).

4.2 International Policy Context:

4.2.1 United Nations Sustainable Development Goals[16]

The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 Sustainable Development Goals (SDGs), which are an urgent call for action by both developed and developing countries - in a global partnership.

[16] https://www.undp.org/sustainable-development-goals

Figure 4-1: Relevant UN Sustainable Development Goals

The BusConnects Galway: Dublin Road project, as a multi-modal, sustainable transport corridor, is aligned with the overarching goal of sustainable development and will directly contribute to 6 of the 17 SDGs. The scheme will align with these goals by promoting a modal shift to active travel and public transport (SDG 3), improve access to quality employment for commuters from the suburbs with reduced journey times and improved journey time reliability (SDG 8), improving the public realm by upgrading and improving public infrastructure with new and improved quality bus corridors and active travel facilities (SDG 9), promoting a modal shift to sustainable modes of public transport for a cleaner and more environmentally conscious city (SDG 11), reducing harmful greenhouse gas emissions by reducing private vehicle numbers and with the transition of the bus fleet to hybrid and zero emission vehicles (SDG 13), and improvements to the visual and social amenities of the city by providing quality and timely public transport links from the surrounding areas to Galway city centre and the regional transport hubs of Ceannt Train Station and Galway Bus station (SDG 15).

4.3 European Policy Context:

4.3.1 EU Transport White Paper 6[17]

The European Union Transport White Paper 6 (2011) focused on the reduction of emissions from transport and established a series of target actions for Member States, including supporting increasing demand for mobility whilst meeting the 60% emission reduction target.

In Ireland, between 1990 and 2016, transport emissions increased by 139% with road transport increasing by 145%. Nearly 20% of Ireland's greenhouse gas emissions come from transport and account for the largest share of energy use. Transport emissions have been the fastest growing source of Ireland's greenhouse gas emissions in recent years.

The Environmental Protection Agency (EPA) projects that without intervention transport sector emissions will increase by 11.3% over the period 2020 to 2035.

Therefore, essential interventions are needed to shift Ireland onto a low carbon ethos as it manages an increasing population and increased demand for housing, employment, and transport infrastructure. Investing in quality bus corridors will promote a modal shift from private car use to public transport and active modes of travel. The investment will also reduce private vehicle numbers on our country's national and regional road networks in both urban and rural settings. By encouraging this modal shift, transportation emissions will be reduced. In addition, journey times and journey time reliability will improve due to reduced traffic on road networks.

Reductions in private vehicle numbers on the road network reduces potential conflicts with pedestrians and cyclists on the network improving safety road user safety.

[17] White paper on transport – Publications Office of the EU (europa.eu)

4.3.2 European Union Green Deal[18]

The EU aims to be climate neutral in 2050. The European Green Deal (2019) provides an action plan to achieve this by boosting the efficient use of resources by moving to a clean, circular economy, restoring biodiversity, and mitigating pollution.

The plan outlines investments needed and financing tools available and explains how to ensure a just and inclusive transition. For the transport sector, the EU Green Deal targets the roll out of "cleaner, cheaper and healthier forms of private and public transport".

The BusConnects Galway: Dublin Road project will contribute to achieving this by increasing the availability of buses on the network with cheaper fares for customers using Leap Card compared to traditional cash fares. The implementation of next generation ticketing technology will streamline the process and align with the cheaper forms of public transport objective of this EU policy. The transition to hybrid and zero emissions bus fleets currently underway by TFI will align with the cleaner forms of public transport objective of this EU policy. Additionally, the implementation of segregated cycleways and upgraded pedestrian facilities will provide commuters with more sustainable and affordable private transport options, contributing to cleaner, cheaper and healthier transport solutions.

4.4 National Policy Context:

4.4.1 National Planning Framework - Project Ireland 2040[19]

The National Planning Framework (NPF) was published in 2018 and provides a framework to guide public and private investment, and to create and promote opportunities, while protecting and enhancing the environment. The NPF sets out the Government's high-level strategic plan for shaping the future growth and development of Ireland out to the year 2040. Its overarching visions are to:

- Develop a new, region-focused strategy for managing growth;
- Linking this to a new 10-year investment plan, the Project Ireland 2040 National Development Plan 2021 – 2030;
- Using state lands for certain strategic purposes;
- Supporting this with strengthened, more environmentally focused planning at local level; and
- Backing the framework up in law with an Independent Office of the Planning Regulator.

The purpose of the NPF is to enable all parts of Ireland, whether rural or urban, to successfully accommodate growth and change. The NPF's focus is to facilitate a shift towards Ireland's regions and cities other than Dublin, while also recognising Dublin's ongoing key role. Under the framework three regional assemblies have been identified: Eastern & Midland, Northern & Western and Southern. Each of the assemblies is illustrated in Figure 4-2 below.

[18] The European Green Deal – European Commission (europa.eu)

[19] gov – Project Ireland 2040 National Planning Framework (www.gov.ie)

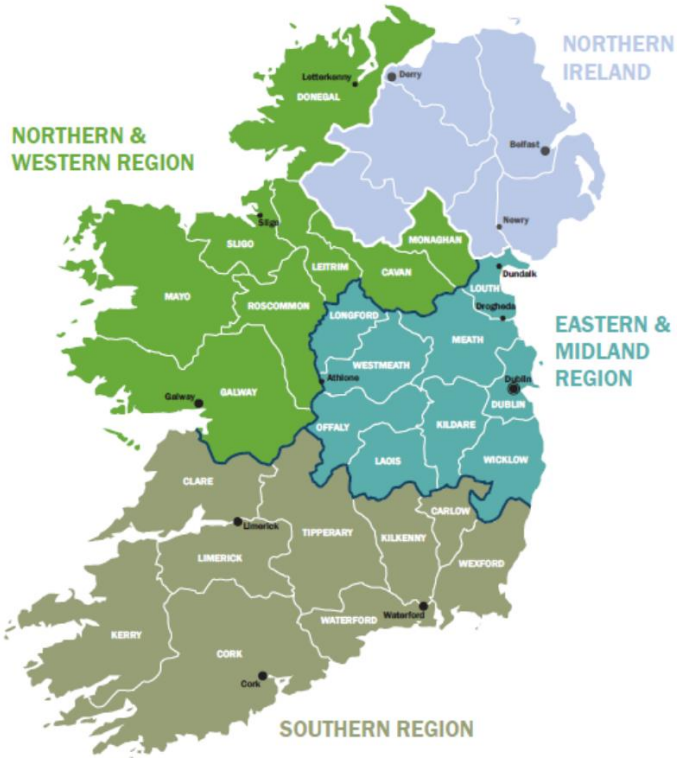


Figure 4-2 NPF Configuration of the Regional Assemblies in Ireland

The NPF identifies 10 National Strategic Outcomes, as illustrated in, Figure 4-3: National Strategic Outcomes which are the shared goals and benefits for every community across the country.

Figure 4-3: National Strategic Outcomes

Improved road infrastructure for vulnerable road users will support the National Strategic Outcomes as follows:

Compact Growth – NS01

This involves managing the sustainable growth of cities, towns, and villages to create more attractive places where people can live and work. Provision of an improved bus corridor and active travel facilities on the Dublin Road will enhance the attractiveness, viability, and vibrancy of settlements as a means of achieving more sustainable patterns and forms of development.

Enhanced Regional Accessibility – NS02

Linked to compact growth is enhanced accessibility between centres of population which will enable these population centres to activate unrecognised potential. Galway City is located on the Atlantic Economic Corridor which seeks to lead the transformation of the Atlantic economy. The provision of an improved bus corridor and active travel facilities on the Dublin Road will improve journey times and accessibility as well as ensuring safer journeys with reducing the mix of heavy traffic and pedestrians/cyclists.

Strengthened Rural Economics and Communities – NS03

This involves retaining and strengthening rural economies and communities to ensure that the countryside remains as a living and working community. The provision of an improved bus corridor and active travel facilities on the Dublin Road will ensure access to critical services such as education, healthcare and employment for the rural communities located to the south of Galway City.

Sustainable Mobility – NS04

This is the provision of safe active travel infrastructure such as segregated cycling and walking facilities which will encourage walking and cycling within the area. It will improve the infrastructure for leisure, recreational and commuter users by providing a safe and comfortable route. Furthermore, it will meet climate action objectives by providing viable alternatives to using motorised modes and particularly reducing private car travel.

A Strong Economy, supported by Enterprise, Innovation and Skills – NS05

This involves creating places that can foster innovation and enterprise, thereby attracting talent and investment. It also calls for high quality digital connectivity. The construction of an improved bus corridor and active travel facilities on the Dublin Road enables increased connectivity which can attract and retain talent and investment. It would also increase economic activity within the local areas along the route.

Enhanced Amenity and Heritage – NS07

This will ensure the city can offer a good quality of life through a well-designed public realm which includes public spaces, parks, and streets, as well as recreational infrastructure. It also includes activity-based tourism such as blueways, greenways and peatways.

Access to Quality Childcare, Education and Health Services – NS10

Compact smart growth in urban areas combined with strong and stable rural communities will enable the provision of a range of childcare, education, and health services. The provision of an improved bus corridor and active travel facilities on the Dublin Road will improve access to childcare, education and health services along the route corridor and the wider community.

The National Planning Framework also identifies several key growth enablers for Galway City. These include:

- Provision of a Citywide public transport network, with enhanced accessibility between existing and proposed residential areas and the City Centre, third level institutions and the employment areas to the east of the city;
- Improving access and sustainable transport links to, and integration with, the existing employment areas to the east of the City at Parkmore, Ballybrit and Mervue; and
- Development of a strategic cycleway network with a number of high-capacity flagship routes.

4.4.2 National Development Plan – 2021 – 2030[20]

The National Development Plan 2021 - 2030 was published in 2021 as an early update to the 2018 National Development Plan. The 2018 National Development Plan was published along with the National Planning Framework as part of Project Ireland 2040. The 2018 National Development Plan was developed to drive Irelands long term economic, environmental, and social progress across all parts of the country over the next two decades and underpins the successful implementation of the new National Planning Framework. The updated National Development Plan 2021 – 2030 extends the funding available to support all sectors and regions in Ireland. It will guide national, regional, and local planning investment decisions over the coming decade. It also illustrates the commitment to reforming how public investment is planned and delivered. This will be done through a decisive shift to integrated regional investment plans and stronger co-ordination of sectoral strategies.

The National Development Plan provides €156 billion, which will underpin the National Planning Framework and drive its implementation over the next ten years. This will ensure accessibility between key urban centres of population and their regions which will include the Northern and Western Regions. It will also ensure rural areas are strengthened and rural contribution is harnessed as a major part of Ireland's strategic development. This funding will allow for the development and upgrading of existing and new public transport infrastructure. The BusConnects Galway: Dublin Road scheme will deliver quality bus corridors along the length of the scheme to provide the area with a dedicated, reliable, and efficient bus services, connecting the surrounding areas to the city centre. In accordance with sustainable urban development best practices this will improve the accessibility and social inclusion of the suburban region through which this scheme will run.

In terms of active travel, €360 million is being committed to the development of walking and cycling infrastructure all over Ireland over the next 10 years. Active travel facilities will be improved where required and new facilities installed in areas along the scheme route where infrastructure is lacking. This will improve the opportunities for users to walk or cycle for work, education of leisure within the scheme area and beyond as it ties into existing and proposed schemes in the immediate and wider areas.

4.4.3 National Investment Framework for Transport in Ireland (NIFTI)[21]

The National Investment Framework for Transport in Ireland (NIFTI) is the Department of Transports contribution to Project Ireland 2040. This document provides the framework to prioritise future investment in the land transport network to support the delivery of the National Strategic Outcomes identified in the NPF. The following four priorities are noted in terms of investment:

[20] gov – National Development Plan 2021-2030 (www.gov.ie)

[21] gov – National Investment Framework for Transport in Ireland (NIFTI) (www.gov.ie)

Figure 4-4: NIFTI Investment Priorities

NIFTI states that the use of the most sustainable travel modes should be utilised to facilitate Mobility of People and Goods in Urban Areas. It states that measures must be designed with the needs of a diverse range of users in mind so that sustainable mobility alternatives are accessible to all residents of urban areas.

In terms of Enhanced Regional and Rural Connectivity, the NIFTI states that measures should be implemented to ensure access to jobs, leisure, and public services and in particular for people living in rural areas.

According to NIFTI, investment in sustainable modes so that transport users have safe, accessible, reliable, and efficient alternatives to the private car which will result in decarbonisation of the transport sector whilst also catering for growing populations.

NIFTI acknowledges that Protection and Renewal of assets includes both steady state maintenance of existing infrastructure as well as improvements to ensure safety and increase accessibility.

BusConnects Galway: Dublin Road will support the objectives of the NIFTI providing access to critical services such as education, healthcare, and employment for the community within the Galway City area. As well as, providing safe, comfortable, and reliable public transport infrastructure that will encourage public transport use within the area.

Under the NIFTI Modal Hierarchy, sustainable modes, starting with active travel (walking, wheeling, and cycling) and then public transport, should be considered first before less sustainable modes such as the private car. The modal hierarchy is illustrated in Figure 4-5 following:

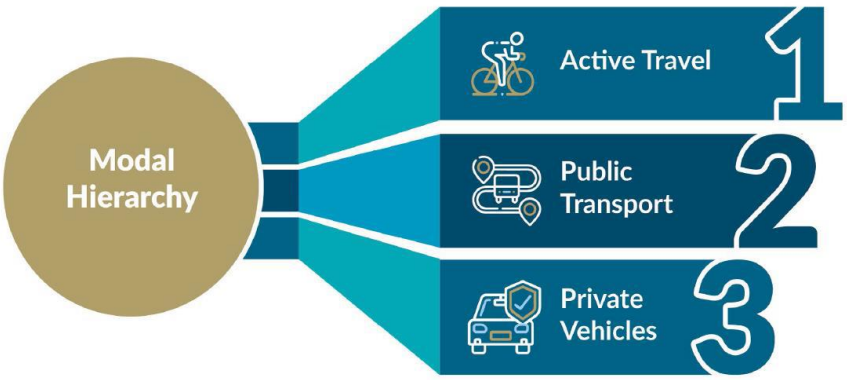


Figure 4-5: NIFTI Modal Hierarchy

BusConnects Galway: Dublin Road will support the modal hierarchy of the NIFTI. The provision of active travel and public transport facilities would ensure that active travel and public transport modes become viable alternatives to private vehicles.

Under the NIFTI Intervention Hierarchy, illustrated in Figure 4-6 following, protecting and renewing the existing transport network through maintenance should, where possible, be the first solution considered when assessing potential project options, followed by maximising the value of the network through optimising its use. Interventions to improve existing infrastructure will then be considered after these two categories have been assessed as inappropriate given the identified project objectives, and before the final possibility of outright new infrastructure.

Figure 4-6: NIFTI Intervention Hierarchy

It is anticipated that BusConnects Galway: Dublin Road will align with the “optimise and improve” tiers of the intervention hierarchy of the NIFTI.

4.4.4 National Sustainable Mobility Policy[22]

The policy sets out a strategic framework to 2030 for active travel and public transport to support Ireland’s overall requirement to achieve a 51% reduction in carbon emissions by the end of this decade.

[22] gov – National Sustainable Mobility Policy (www.gov.ie)

The policy sets a target to deliver at least 500,000 additional daily active travel and public transport trips which will be supported through expanding public transport availability and infrastructure across the country, including quality bus corridors and ensuring that new sustainable mobility infrastructure meets the highest safety standards.

This policy is underpinned by three main principles, supported by ten core goals as set out in the policy:

Table 4-1: National Sustainable Mobility Policy Principles and Goals

Principles	Goals
Safe and Green Mobility	1. Improve mobility safety
	2. Decarbonise public transport
	3. Expand availability of sustainable mobility in metropolitan areas
	5. Encourage people to choose sustainable mobility over the private car
People Focused Mobility	6. Take a whole of journey approach to mobility, promoting inclusive access for all
	7. Design infrastructure according to Universal Design Principles and the Hierarchy of Road Users model
	8. Promote sustainable mobility through research and citizen engagement
Better Integrated Mobility	9. Better integrate land use and transport planning at all levels
	10. Promote smart and integrated mobility through innovative technologies and development of appropriate regulation

BusConnects Galway: Dublin Road will directly align with goals 1,2, 3, 4, 5, 6, 7, 8, 9 and 10 of the NSMP. It will align by reducing safety risks for vulnerable road users, pedestrians and cyclists, particularly at junctions, increase the availability of buses and improve journey time reliability and make public transport and active travel more inclusive and safer for all road users, with the segregated cycleways engaging more of the public. The objectives of this scheme, particularly Integration, Environment and Safety run directly parallel to the goals of the NSMP. It is important to note that goal 4 is already achieved along Dublin Road with CityLink operating along this route and bus stops catering for national trips.

4.4.5 RSA Road Safety Strategy 2021 – 2030[23]

The Road Safety Authority (RSA) Road Safety Strategy 2021 - 2030, sets out targets to be achieved in terms of road safety in Ireland as well as policy to achieve these targets. At the core of the 2021–2030 strategy is the aim to achieve Vision Zero in Ireland by 2050.The primary target of the 2021 – 2030 strategy is:

"*To reduce road deaths and serious injuries by 50% by 2030.*"

The plan sets out strategies for engineering and infrastructure in terms of the benefits that reduce collisions. The plan acknowledges that there is a substantial difference in fatal and serious injury risks across different modes of travel and are higher for pedestrians and cyclists and recognises the importance of providing safe and healthy modes of travel from societal, environmental and health perspectives. The

[23] Ireland's Government Road Safety Strategy 2021 – 2030 (rsa.ie)

plan also sets forth a particular emphasis on the reduction of road deaths and improvements to road safety in an urban environment.

The strategy sets out 50 high-impact actions for Phase 1 under each of the seven Safe System priority intervention areas. The Safe and Healthy Modes of Travel priority states:

- Develop a National Cycle Network plan for interurban rural cycling and walking, and an implementation plan for delivery in Phases 2 & 3;
- Continue to implement an active travel infrastructure scheme for local authorities; and
- Encourage modal shift to support environmental, safety and health objectives.

By improving public transport provision along the Dublin Road and improving junction safety and safety of pedestrians and cyclists along the route, this scheme would support and complement this RSA strategy.

4.4.6 Climate Action Plan 2024[24]

The Climate Action Plan 2024 sets out a major programme for change in response to reducing Ireland's greenhouse gas emissions. The plan aims to achieve a 51% reduction in overall greenhouse gas emissions by 2030 and to reach net-zero emissions by no later 2050. It is envisaged that these proposals will also have associated positive economic and societal benefits, including cleaner air, warmer homes, and a more sustainable economy in the longer term.

The Climate Action Plan makes a commitment to delivering an additional 500,000 public transport and active travel journeys daily by 2035. BusConnects Galway: Dublin Road will support this objective by increasing the number of active travel and public transport users along the entirety of the route. The implementation of this scheme will increase the frequency and the availability of buses along the route. With the increased availability of comfortable, safe, and cheap buses a modal shift to public transport and active travel from private vehicles will be achieved, thus delivering on the target of an additional 500,000 daily public transport and active travel trips. By capitalising on the ongoing bus fleet transition from traditional diesel-powered buses to hybrid and zero emission buses now and into the future, the harmful greenhouse emissions of the transport fleet will be reduced. This is in line with the target set out in the Climate Action Plan which sets an emissions reduction target from the transport sector of at least 51% by 2030.

4.5 Regional Planning Context

4.5.1 CycleConnects[25]

CycleConnects is a pioneering initiative aimed at fostering sustainable mobility and enhancing community connectivity through the promotion of cycling infrastructure and culture. In an era characterized by growing concerns over environmental sustainability, urban congestion, and public health, the adoption of cycling as a mode of transportation holds significant promise. This abstract presents an overview of the CycleConnects program, its objectives, key components, and anticipated impacts.

At its core, CycleConnects seeks to create a network of interconnected cycling routes that link urban and suburban areas, residential neighbourhoods, commercial districts, and recreational spaces. By investing in dedicated bike lanes, shared pathways, and bike-friendly infrastructure, the program aims to improve safety, accessibility, and convenience for cyclists of all ages and abilities. Additionally, CycleConnects

[24] gov – Climate Action Plan 2024 (www.gov.ie)
[25] CycleConnects – Ireland's Cycle Network – Active Travel – National Transport

places a strong emphasis on community engagement and collaboration, involving local residents, businesses, advocacy groups, and government agencies in the planning, implementation, and maintenance of cycling initiatives.

The benefits of CycleConnects extend beyond mere transportation efficiency. By promoting cycling as a viable alternative to motorized vehicles, the program contributes to reducing carbon emissions, alleviating traffic congestion, and mitigating the adverse effects of sedentary lifestyles. Furthermore, CycleConnects fosters a sense of community cohesion by creating opportunities for social interaction, recreation, and active living. Through organized events, educational programs, and outreach efforts, CycleConnects seeks to cultivate a culture of cycling that transcends individual behaviour and fosters a collective commitment to sustainable mobility.

Key components of the CycleConnects program include:

- Infrastructure Development: Designing and implementing a network of cycling lanes, paths, and facilities that prioritize safety and accessibility for cyclists;
- Community Engagement: Engaging stakeholders through public forums, workshops, and participatory planning processes to ensure that cycling initiatives reflect the needs and preferences of local communities;
- Promotion and Education: Launching public awareness campaigns, educational workshops, and outreach events to promote cycling as a healthy, eco-friendly mode of transportation;
- Policy Advocacy: Advocating for policies and regulations that support cycling infrastructure development, such as zoning ordinances, transportation funding, and urban planning initiatives; and
- Monitoring and Evaluation: Establishing mechanisms for monitoring the effectiveness and impact of cycling initiatives, including ridership data, safety records, and community feedback.

Through the collective efforts of government agencies, community organizations, businesses, and residents, CycleConnects aims to transform cities and towns into vibrant, bike-friendly environments that prioritize sustainability, health, and community well-being. By fostering a culture of cycling and active transportation, CycleConnects represents a bold step towards creating more liveable, inclusive, and environmentally resilient communities. The BusConnects Galway: Dublin Road Scheme directly supports this policy initiative by providing dedicated segregated active travel infrastructure along this route.

4.5.2 BusConnects[26]

In response to the evolving needs of urban transportation systems, the BusConnects initiative has emerged as a transformative approach to enhancing mobility, reducing congestion, and improving public transit efficiency. This abstract provides an overview of the BusConnects program, focusing on its core principles, methodologies, and anticipated impacts, with a particular emphasis on the optimization of bus routes within urban areas.

BusConnects represents a holistic strategy to modernize and streamline bus services, addressing longstanding challenges such as irregular schedules, inefficient routes, and inadequate infrastructure. Central to the initiative is the optimization of bus routes through data-driven analysis, stakeholder engagement, and innovative planning techniques. By reimagining existing routes, introducing high-

[26] BusConnects – National Transport

frequency corridors, and integrating complementary modes of transportation, BusConnects aims to create a seamless and reliable transit network that meets the diverse needs of urban commuters.

Key components of the BusConnects route optimization strategy include:

- Data Analysis and Modelling: Utilizing advanced data analytics and modelling techniques to assess current ridership patterns, travel demand, and service gaps, enabling informed decision-making in route planning and optimization;
- Stakeholder Engagement: Engaging with stakeholders, including commuters, residents, businesses, and advocacy groups, to gather feedback, identify priorities, and ensure that route changes are responsive to community needs and preferences;
- Network Redesign: Redefining bus routes, schedules, and stops to improve connectivity, reduce travel times, and enhance accessibility to key destinations, such as employment centers, educational institutions, and residential areas;
- Integration with Other Modes: Integrating bus services with other modes of transportation, such as cycling infrastructure, pedestrian pathways, and rail transit, to create a seamless, multimodal transit network that offers commuters greater flexibility and convenience; and
- Technology and Innovation: Leveraging technological innovations, such as real-time passenger information systems, mobile ticketing, and intelligent traffic management, to enhance the efficiency, reliability, and user experience of bus services.

Through the implementation of BusConnects route optimization strategies, cities can anticipate several potential benefits, including reduced congestion, shorter travel times, improved air quality, and enhanced social equity. By prioritizing the needs of public transit users and leveraging data-driven insights, BusConnects represents a proactive approach to urban mobility planning that aligns with broader sustainability goals and promotes inclusive economic development.

In conclusion, the BusConnects initiative offers a compelling model for urban transit reform, demonstrating the potential for strategic route optimization to enhance the effectiveness and accessibility of public transportation systems. As cities continue to grapple with the challenges of urbanization and mobility, BusConnects serves as a beacon of innovation and collaboration, driving positive change in the way people move within and between urban areas.

4.5.3 Regional Spatial and Economic Strategy - Northern and Western Region[27]

The Regional Spatial and Economic Strategy (RSES) for the Northern and Western Region came into effect on 24th January 2020. The document is positioned as an implementing strategy for the NPF, supporting the programme for change set out in Project Ireland 2040.The primary focus of the plan is on the Metropolitan Area Strategic Plan for Galway, prepared as part of this plan, which provides a framework for development plans and investment prioritisation over the plan period. As part of this development plan and investment prioritisation, optimising the bus network and fleet to deliver a quality, efficient and reliable bus service to serve the needs of the community for leisure, education and employment related travel.

The plan acknowledges the need to significantly improve the integration of Land-use and Transport Planning across the region in order to facilitate compact growth. To achieve this, the implementation of the Galway Transport Strategy is identified as an objective of the Galway Metropolitan Area Strategic Plan. The implementation of a city-wide bus strategy and by improving the level of infrastructure along the

[27] RSES | Northern and Western Regional Assembly (nwra.ie)

network a comprehensive transportation plan suitable for current and future growth of the population and the city in a sustainable and managed manner.

BusConnects Galway: Dublin Road aligns with Growth Ambitions 3, and 4 as well as aligning with the All-Island Cohesion aim. This will be achieved by investing in quality bus corridors along the scheme length to create a vibrant and connected city in alignment with the scheme objectives, in particular Integration.

4.6 Local Planning Context

4.6.1 Metropolitan Area Strategic Plan[28]

The National Planning Framework (NPF) includes a national planning objective NPO 67 to prepare a Metropolitan Area Strategic Plan (MASP) for Galway through the Regional Spatial and Economic Strategy (RSES) process.

The Metropolitan Area Strategic Plan will have a pivotal function in the development of the Northern and Western region, ensuring capacity to accommodate significant population and employment growth as set out in the NPF and RSES.

The BusConnects and CycleConnects projects align with this document as the MASP will ensure:

- Compact growth and consolidation with the Metropolitan settlements;
- Aligning growth with existing and emerging public transport infrastructure and services, together with a focus of ensuring '10 minute' walkable settlements; and
- Improve bicycle parking at key destinations and near bus stops /interchanges.

4.6.2 Galway City Development Plan 2023-2029[29]

The Galway City Development Plan 2023-2029 sets out Galway City Council's policies and objectives to guide the sustainable development of the City over the lifetime of the Plan to 2029. It provides an integrated, coherent spatial framework which has been prepared following extensive consultation with members of the public, statutory bodies and relevant stakeholders.

The Plan includes specific transport objectives for cycling, public transport, and traffic and road network. These objectives are:

- Facilitate cycling on the proposed BusConnects Routes where appropriate including on the proposed Cross-City Link;
- Support the Galway Transport Strategy proposals for a primary cycle network to facilitate safe and convenient medium distance journeys; and
- Improve bicycle parking at key destinations and near bus stops /interchanges.

Sustainable Mobility

- Facilitate cycling on the proposed BusConnects Routes where appropriate including on the proposed Cross-City Link;

[28] https://www.galway.ie/en/media/1.0%20Galway%20Metropolitan%20Area_0.pdf

[29] GalwayCity – Galway City Development Plan 2023 – 2029

- Support the Galway Transport Strategy proposals for a primary cycle network to facilitate safe and convenient medium distance journeys; and
- Improve bicycle parking at key destinations and near bus stops /interchanges.

Public Transport

- Support the implementation of BusConnects Galway and the overall bus transport network which will include for a high frequency cross-city network of services and all associated infrastructural requirements, traffic management and priority arrangements;
- Promote the availability of the city bus network including the priority measures for use by the national, regional and tour bus services;
- Promote access to public transport services for those attending primary and post primary schools in consultation with the Department of Education and Skills; and
- Support the modal change to public transport under the Galway Transport Strategy (GTS) through modal change targets for walking, cycling, and public transport within the lifetime of the City Development Plan.

Traffic and Road Network

- Support the proposals in the Galway Transport Strategy for design interventions, revised traffic management arrangements and priority arrangements for walking, cycling and public transport on the road network;
- Implement improvements on the general road network, including new links and junction revisions where needed in the interest of safety and convenience; and
- Implement best practice in road and street design as set out in the Design Manual for Urban Roads and Streets (2013) as updated (2019).

4.6.3 Galway Transport Strategy[30]

The Galway Transport Strategy, published in 2016, sets out a series of proposed actions and measures for implementation. These measures cover infrastructural, operational, and transport policy requirements.

The Galway Transport Strategy is a key part of facilitating Galway's growth as a city both physically and economically, whilst creating the potential for improvements of the urban environment. Walking, cycling, bus, rail, road, and traffic management measures are included in the Galway Transport Strategy, as well as mobility management proposals to reduce reliance on private motorised transport and hence increase the use of sustainable travel modes.

The Galway Transport Strategy identified proposals for Public Transport Infrastructure and Cycle Infrastructure within Galway City. Specific proposals for the R338 Dublin Road in relation to public transport, cycling, and pedestrian infrastructure include the provision of bus lanes along the full length of the road, provision of cycling facilities, and improvements and upgrades to footpaths and pedestrian crossings.

The implementation of the proposals set out in the Galway Transport Strategy will result in positive outcomes for Galway. The benefits highlighted in the Galway Transport Strategy are listed as follows:

- Future-proofing the city to ensure that Galway can continue to grow as an economic and cultural centre in the West of Ireland;
- Facilitating new transport infrastructure including BusConnects and walking and cycling routes;

[30] GalwayCity – Galway Transport Strategy

- Improved efficiency of the overall transport network, facilitating a greater degree of access to the city;
- Improve environment, urban realm, and ambience – enhancing the streetscape, reducing noise and air pollution (including CO_2 emissions), and freeing up more space where people can walk, shop, socialise, and enjoy the city; and
- Tourism, commercial, and retail benefits – additional transport capacity for shoppers and visitors accessing the city centre and tourist locations such as the Galway Racecourse.

4.6.4 Galway Metropolitan Area Transport Strategy

Galway Metropolitan Area Transport Strategy (GMATS)[31] is intended to provide a long-term strategic planning framework for the delivery of transport and the integrated development of transport infrastructure and services in the Galway Metropolitan Area (GMA).

A key principle of GMATS is to reduce dependency on the private car within the GMA, while increasing the appeal of sustainable transport options. Another fundamental principle of the Strategy is to support the future growth of the GMA through the supply of an efficient transport network.

Supporting measures have an important role to play in providing a future transport network that matches up to these principles. GMATS is committed to adopting and integrating the BusConnects and CycleConnects proposals into its framework, laying the foundation for achieving cycling and public transport objectives.

[31] The GMATS was not available at the time of compiling this report.

SECTION 5: LESSONS LEARNED

Many of the projects within the BusConnects programme are at various stages of the project life cycle making it the ideal portfolio of work from which to extract lessons learned. Two projects within the Dublin County programme have received successful planning approvals, these are:

- BusConnects Dublin – Liffey Valley to City Centre; and
- BusConnects Dublin - Clongriffin to City Centre

In addition to the above, the Major Projects Advisory Group (MPAG) has done an assessment of the BusConnects: Dublin Preliminary Business Case, which also provides useful information that has to be incorporated into the BusConnects Galway: Dublin Road project.

5.1 BusConnects: Dublin

The BusConnects: Dublin PBC was reviewed by the MPAG at the start of 2022, with the MPAG report issued in February 2022 detailing findings. The report stated the following findings and recommendations that should be applied to the BusConnects Galway: Dublin Road PBC:

- Provide as detailed costing information as possible and keep the cost process transparent to aid decision making and future reviews of cost; and
- Provide detailed demand forecast to allow for reviews at later stages.

5.2 BusConnects Dublin: Liffey Valley to City Centre and Clongriffin to City Centre

The BusConnects Dublin – Liffey Valley to City Centre[32] and Clongriffin to City Centre[33] Board Orders and CPO submissions were used to identify comments raised that should be used as lessons learned for this project. These are:

- Engage with planning authority to provisionally determine locations for cycle parking stands and bus spots throughout the scheme;
- Connections to key nodes and destinations such as schools, etc, are included as part of scheme;
- Engage with members of the public at early stages in the project and keep landowners updated with progress and significant amendments to design, including impacts on access/egress, traffic redistribution and bus lane operational hours;
- Outline property impacts on drawings;
- Engage key stakeholders like hospitals, schools or places of education along the corridor to discuss site specific implications of project; and
- Engage with utility providers at early stage.

5.3 General Lessons Learned

The project team had general lessons learnt from other recent projects which were:

[32] Home – BusConnects Dublin – Liffey Valley to City Centre (liffeyvalleyscheme.ie)
[33] Home – BusConnects Dublin – Clongriffin to City Centre (clongriffinscheme.ie)

- Ensure archaeological testing undertaken at early stage;
- Ensure adequate Site Investigation (SI) is carried out;
- Provide adequate area within the Land Made Available (LMA) to undertake accommodation works; and
- Wayfinding considered early in the design process.

SECTION 6: DEMAND ANALYSIS

This section presents the methodology and subsequent analysis pertaining to the demand analysis undertaken for the proposed BusConnects Galway: Dublin Road. Three beneficiary groups were identified for the purpose of this analysis. These three groups were analysed to form the demand for the active mode scheme that is proposed. The beneficiary groups identified are as follows:

- Commuting – residents within a defined catchment that travel to work by active modes and bus;
- Education – school/college aged residents within a defined catchment travelling to school/college by active modes and bus; and
- Leisure – residents within a defined catchment undertaking leisure activities by active modes and bus;

6.1 Methodology

6.1.1 Existing Demand

Commuting and Education

A preliminary demand analysis for the proposed scheme was developed utilising data on commuting by mode from the Census (2022)[34] at a Small Area Population Statistics (SAPs) level. The Dublin Road from the Martin Junction in the east to the Moneenageisha Junction in the west was taken as the starting point for identifying the catchment area for the proposed scheme. A 500-metre corridor was applied to the Galway-Dublin Road and geospatial analysis was then undertaken to gather data on the number of individuals utilising public transport, walking, and cycling to work for SAPs that fell within the 500-metre corridor. This subsequently formed the preliminary non-motorised user demand for the scheme.

Leisure

Local leisure-based trips were estimated utilising population data from Census (2022) at a Small Area Population Statistics (SAPs) level and the leisure-based transport assumptions contained within TII PAG Unit 13.0 - Appraisal of Active Modes. The Dublin Road from the Martin Junction in the east to the Moneenageisha Junction in the west was taken as the starting point for identifying the catchment area for the proposed scheme. A 500-metre corridor was applied to the Galway-Dublin Road and geospatial analysis was then undertaken to gather population data for SAPs that fell within the 500-metre corridor. This then formed the preliminary non-motorised user demand for the scheme. Based on CSO, QNHS Sports Module 2013, TII PAG Unit 13.0 - Appraisal of Active Modes estimates that the average number of daily trips per 100 people is 37 walking, and 5 cycling. Applying these respective daily trip rates to the total population within the study area establishes the baseline demand for domestic leisure trips for both walking and cycling.

Bus Journeys – Other Purposes

Whilst there is no data available for the existing number of bus passengers utilising the bus for non-commuting or education purposes, data is available within the CSO Statistical Yearbook, 2020 for the overall purpose of journeys nationwide. The following trip purposes were identified:

[34] Note: Previous Demand Analysis undertaken for this scheme was based upon Census 2016 results as these were the most current at that time. Census 2022 results have been published recently and as such have been utilised for the demand analysis in this report as they are the most up to date data available.

- Commuting – 23.6%;
- Shopping – 21.3%;
- Companion/Escort – 20.0%;
- Visiting Friends/Family – 10.4%; and
- Entertainment/Sports/Leisure – 9.3%.

A preliminary demand analysis for the proposed scheme was developed utilising data on commuting by mode from the Census (2022) at a Small Area Population Statistics (SAPs) level. The Dublin Road from the Martin Junction in the east to the Moneenageisha Junction in the west was taken as the starting point for identifying the catchment area for the proposed scheme. A 500-metre corridor was applied to the Galway-Dublin Road and geospatial analysis was then undertaken to gather data on the number of individuals utilising public transport to work for SAPs that fell within the 500-metre corridor. Assuming that 50% individuals utilised the bus for all other trip purposes, an estimate of bus journeys for other purposes was produced.

6.1.2 Future Demand

The Galway Metropolitan Area Strategic Plan (MASP) was prepared as part of the Regional Spatial and Economic Strategy (RSES) for the Northern and Western Region and is positioned as an implementing strategy for the National Planning Framework, supporting the programme for change set out in Project Ireland 2040.

The Galway MASP identifies the current population of Galway City as 79,900 and has set a target of a minimum of a 50% increase in population by 2040.

For the preliminary demand analysis, it has been assumed that this target population increase will occur in each Small Area population (SAP) within the study area. Additionally, it has been assumed that the existing modal split is retained in the future. This is a conservative estimate of public transport and active travel users.

6.2 Preliminary Demand Analysis

6.2.1 Existing Demand

There are 47 SAPs[35] that fall within a 500m zone of the BusConnects Galway: Dublin Road route. The Census (2022) data obtained for these SAPs is summarised in Table 6-1 following.

Table 6-1: Population and Travel Characteristics of SAPs Within Study Area

Number of Small Areas	Total population	On foot to work	Bike to work	Public Transport to Work	Walk to Education	Cycle to Education	Public Transport to Education
47	13,579	755	259	647	804	66	590

[35] The size of the SAPs have changed between 2016 and 2022.

Commuting

Heatmaps illustrating the number of residents within each SAP that commute to work by foot are presented in Figure 6-1 in, by bicycle are presented in Figure 6-2 and by public transport in Figure 6-3 following.

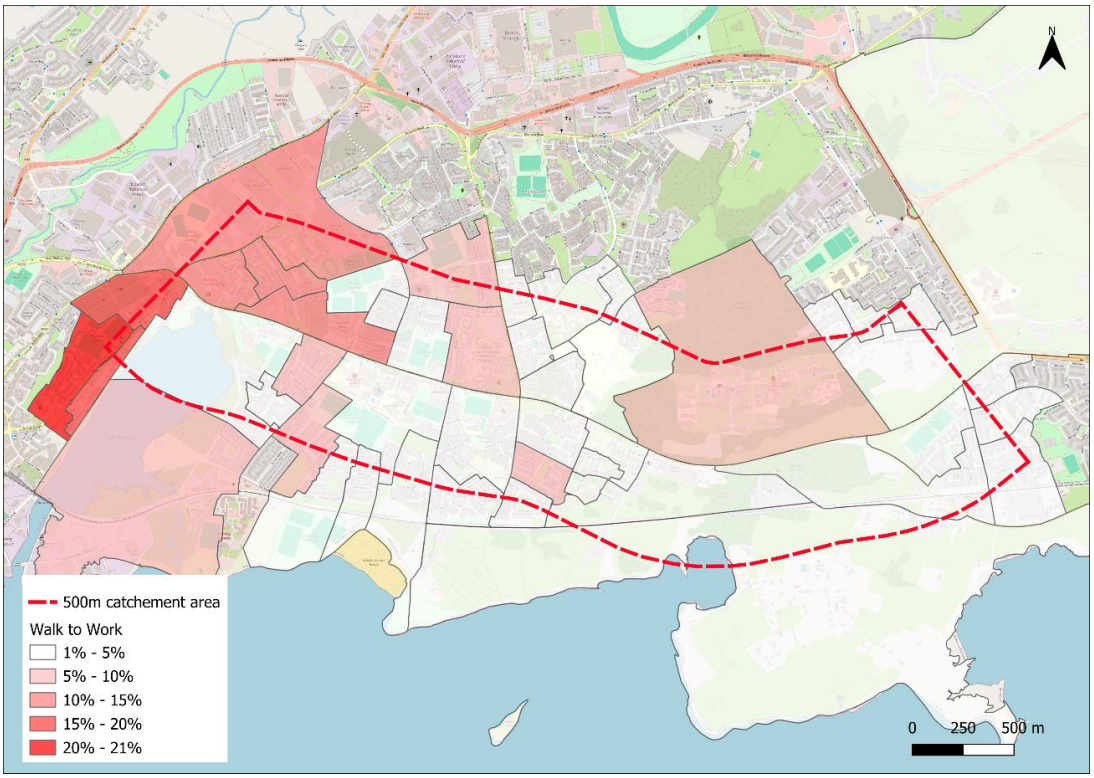


Figure 6-1: SAP Heatmap – On Foot to Work

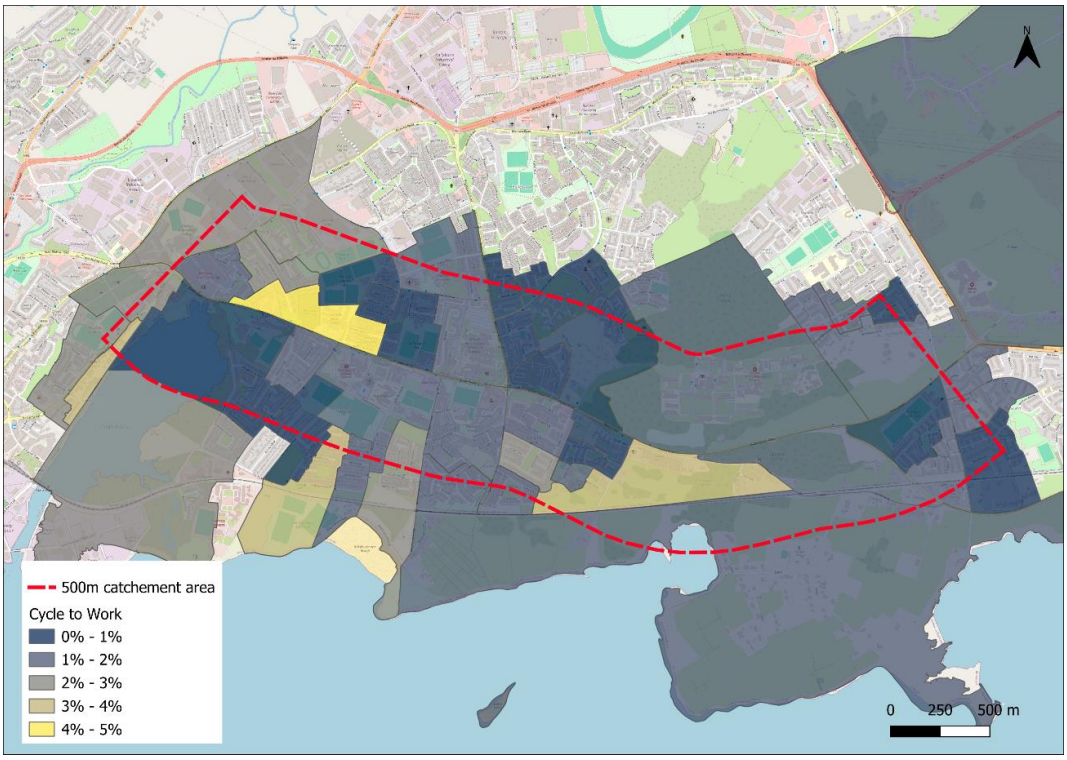


Figure 6-2: SAP Heatmap – Cycle to Work

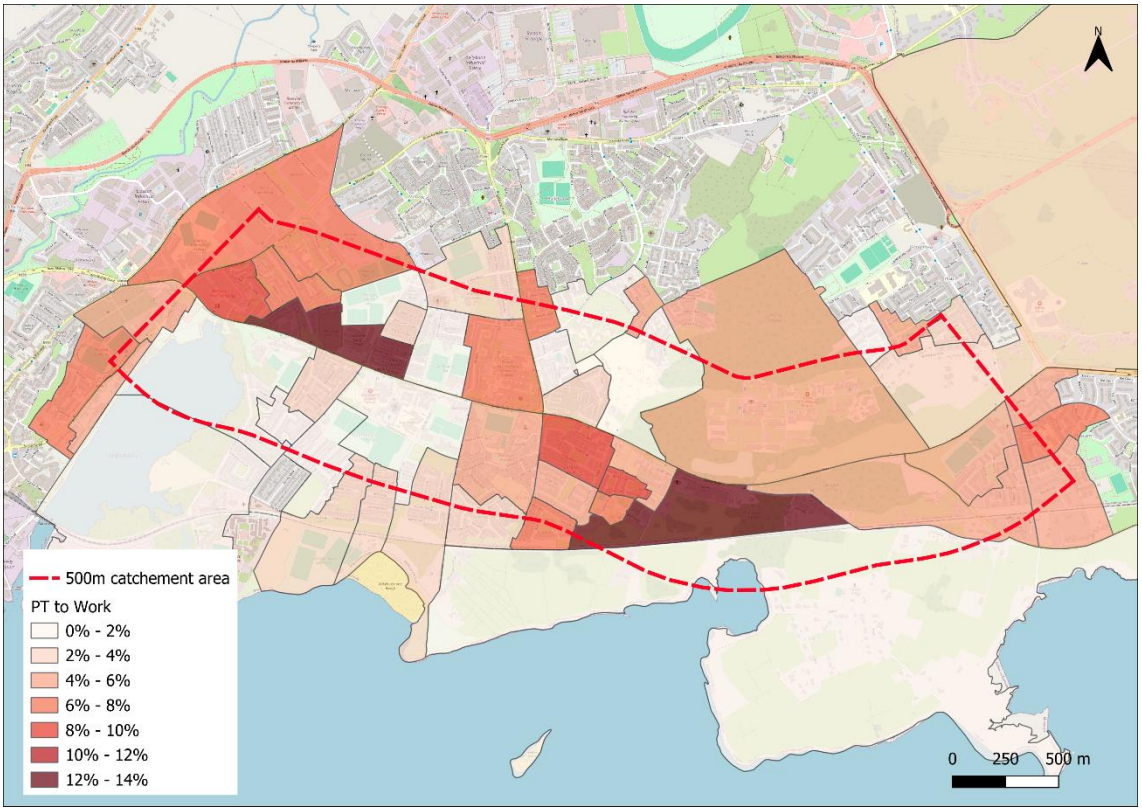


Figure 6-3: SAP Heatmap - Public Transport to Work

Based on the geospatial analysis on the catchment area for the proposed scheme it was determined that 755 individuals walk to work, 259 individuals cycle to work and 647 individuals avail of public transport to get to work. Assuming that each individual makes a return trip using the same travel mode, it was determined that total number of daily walking trips for commuting is 1,510 the total number of daily cycling trips for commuting is 518 and the total number of public transport trips for commuting is 1,294 within the study area.

Education

Heatmaps illustrating the number of residents within each SAP that commute for education purposes by foot are presented in Figure 6-4, by bicycle are presented in Figure 6-5 and by public transport in Figure 6-6 following.

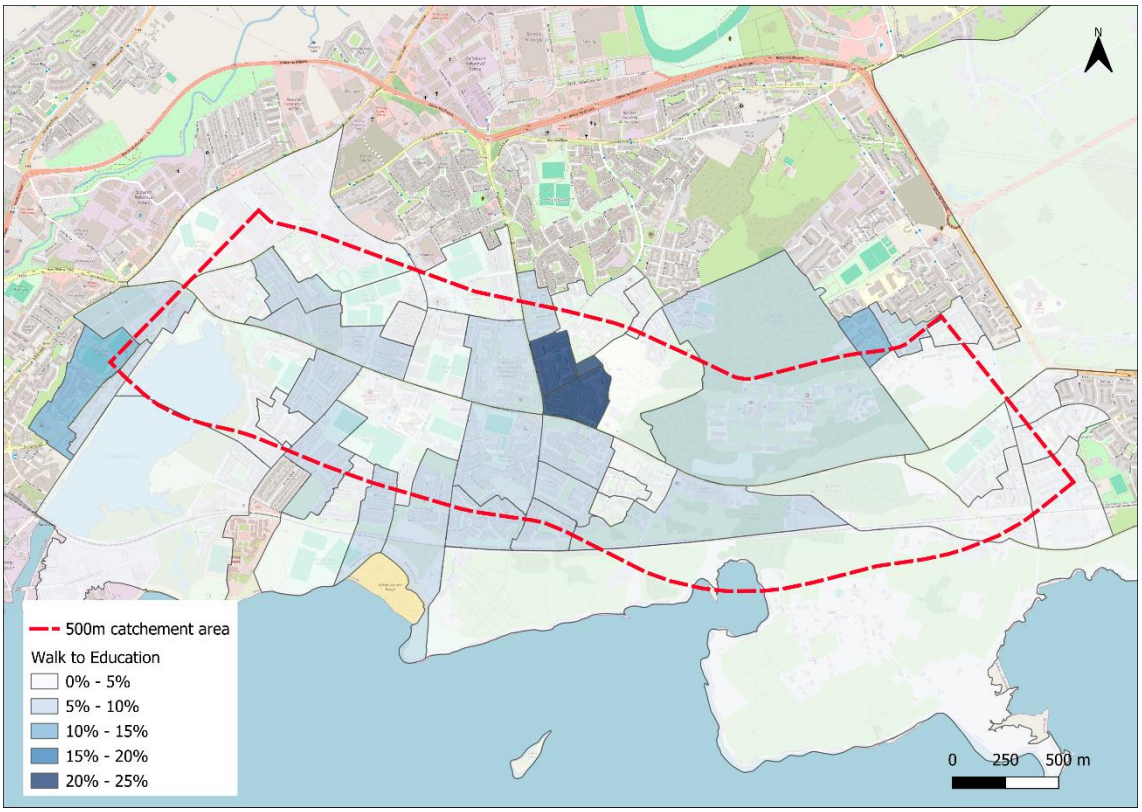


Figure 6-4: SAP Heatmap – On Foot to Education

Figure 6-5: SAP Heatmap – Cycle to Education

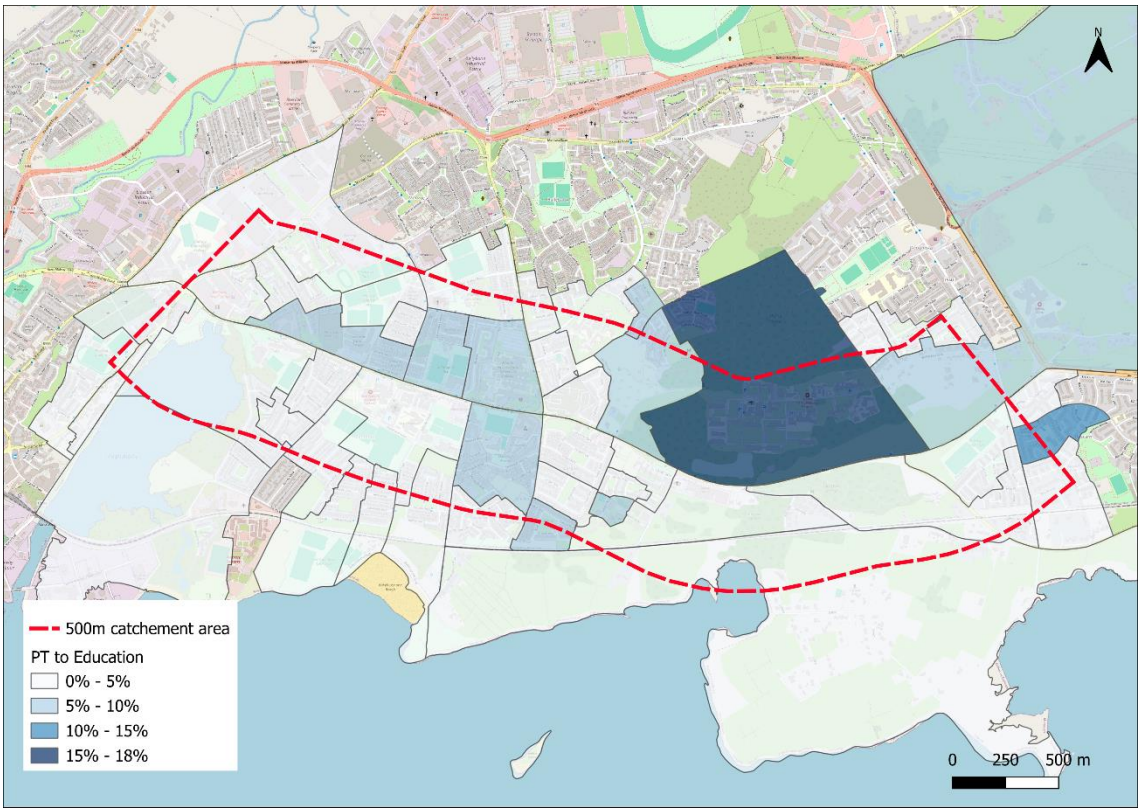


Figure 6-6: SAP Heatmap - Public Transport to Education

Based on the geospatial analysis on the catchment area for the proposed scheme it was determined that 804 individuals walk to their places of education, 66 individuals cycle to their places of education and 590 individuals' avail of public transport to get to their place of education. Assuming that each individual makes a return trip using the same travel mode, it was determined that total number of daily walking trips to places of education is 1,608, the total number of daily cycling trips to places of education is 132 and the total number of public transport trips to education is 1,180 within the study area.

Leisure

The derived demand for leisure purposes is summarised in Table 6-2 below.

Table 6-2: Estimated Daily Leisure Trips by Pedestrians and Cyclists

Journey Purpose - Leisure	Value
Total Population Within Catchment	13,579
Number of Trips Undertaken by Pedestrians for Leisure per 100 People	37
Total Daily Trips Undertaken by Pedestrians for Leisure	5,024
Number of Trips Undertaken by Cyclists for Leisure per 100 People	5
Total Daily Trips Undertaken by Cyclists for Leisure	**679**

Based on the geospatial analysis on the catchment area for the proposed scheme it was determined that a total of 5,024 daily leisure trips would be undertaken by pedestrians and a total of 679 daily leisure trips would be undertaken by cyclists.

Bus Journeys – Other Purposes

The derived demand for bus journeys – other purposes is summarised in Table 6-2 below.

Table 6-3: Estimated Daily Bus Journeys – Other Purposes

Journey Purpose - Leisure	Value
Number Commuting Journeys by Bus	647
Daily Percentage of Trips for Commuting Purposes	23.6%
Number of Journeys by Bus Commuters for Other Purposes	2,095
Assumed Percentage of Bus Commuters Utilising Bus for Other Journey Purposes	50%
Total Daily Trips by Bus for Other Purposes	**1,048**

Based on the geospatial analysis on the catchment area for the proposed scheme it was determined that a total of 970 daily trips for other purposes would be undertaken by people who utilise the bus for commuting.

6.2.2 Existing Demand Analysis Summary

The preliminary demand analysis was based on existing demand within the study area and is summarised in Table 6-4, Table 6-5 and Table 6-6 following. These tables demonstrate that there is currently a low uptake of active travel and public transport in the study area. The proposed BusConnects Galway: Dublin Road route will improve the available active travel and public transport infrastructure and encourage more activity-based commuting, enhancing pedestrian and cyclist safety through the provision of a safe route for non-motorised road users and enabling local opportunities for walking and cycling activity.

Table 6-4: Estimated Daily Pedestrian Demand

Journey Purpose	Value
Number Commuting to Work	755
Number Commuting to School/College	804
Number Leisure Trips	5,024
Total Pedestrian Demand	**6,583**

Table 6-5: Estimated Daily Cyclist Demand

Journey Purpose	Value
Number Commuting to Work	259
Number Commuting to School/College	66
Number Leisure Trips	679
Total Cycling Demand	**1,004**

Table 6-6: Estimated Daily Bus Demand

Journey Purpose	Value
Number Commuting to Work	647
Number Commuting to School/College	590
Bus Journeys – Other Purposes	1,048
Total Bus Demand	**2,285**

6.2.3 Future Demand

The future demand for walking, cycling and public transport based on the 50% target population increase as contained within the Galway MASP and assuming the existing modal split is retained in the future is summarised in Table 6-7: Estimated Daily Pedestrian, Cyclist and Bus Demand Table 6-7.

Table 6-7: Estimated Daily Pedestrian, Cyclist and Bus Demand

Journey Purpose	Pedestrians		Cyclists		Buses	
	2022 Value	2040 Value	2022 Value	2040 Value	2022 Value	2040 Value
Number Commuting to Work	755	1,133	259	389	647	971
Number Commuting to School/College	804	1,206	66	99	590	885
Number Leisure Trips	5,024	7,536	679	1019	1,048	1572
Total Demand	**6,583**	**9,875**	**1,004**	**1,506**	**2,285**	**3,428**

6.2.4 Forecast Demand

Transport Modelling

Transport modelling was undertaken as part of this PBC. The purpose of the modelling was to input into the option evaluation process and support the EIAR. The modelling methodology can be summarised as follows:

- Modelling was based on the NTA's Regional Modelling System (RMS). RMS comprises of five regional transport models covering the Republic of Ireland and centred on the five main cities of Dublin, Cork, Galway, Limerick, and Waterford;
- The National Demand and Forecasting Model estimated the travel demand generated by, and attracted to, every Census Small Area (CSA) daily. The level of demand was related to characteristics such as population, number of employees, educational establishments, and other land-use data. Trip ends were then used by Regional Models to create travel demand matrices for the internal area of each of the Regional Models;
- The West Regional Model (WRM), which is centred around Galway City and covers County Galway, has been used to support the demand modelling and forecasting for the modelling and appraisal of the Galway Dublin Road scheme;
- A Highway Local Area Model (LAM) has been developed, calibrated, and validated for the base (2022), opening year (2028) and two forecast years (2043 and 2058);
- The 'end-to-end' Corridor Micro-simulation model was developed to assist in the operational validation of the scheme designs and to provide visualisation of scheme operability along with impacts and benefits;
- Modelling was done for three scenarios (Base Year, Do Minimum and Do Something); and

- Further information on the model development can be found in Appendix B - Galway Dublin Road BusConnects VISSIM Model Report and Appendix C – Modelling Report.

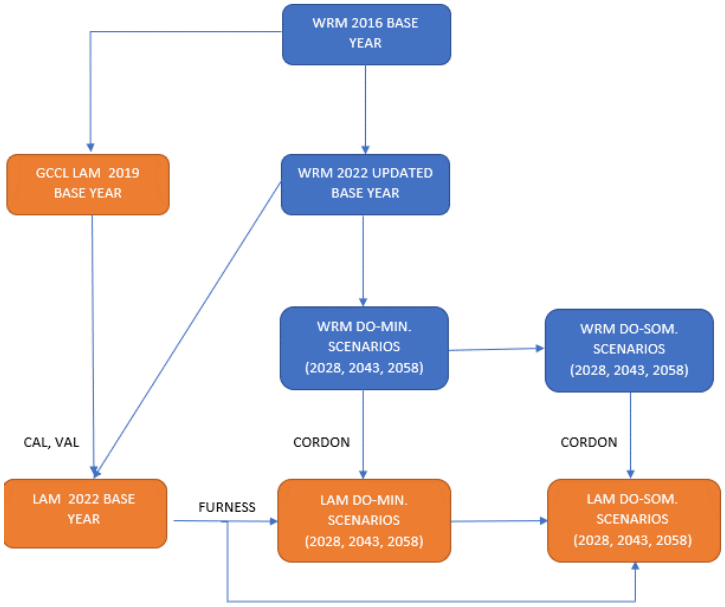


Figure 6-7: Modelling Process Overview

Forecast

Land use forecasts were prepared by the NTA for the years required to test this scheme in the microsimulation model i.e. Base year, opening year, design year, and horizon year (2022, 2028, 2043, and 2058).

The NTA provided forecasts of population, employment, and education data by Census Small Area (CSA) for the standard reference years of 2024 and 2040. To derive the required modelling years (2022, 2028, 2043, and 2058) linear interpolation between these NTA planning sheets and the 2016 Census-based planning sheet was undertaken. The National Demand Forecasting Model was then used to convert planning data forecasts to trip forecasts (in total productions and attractions per zone) for input to the WRM.

The transport demand changes for the 2028 and 2043 years used travel demand forecasting from the WRM and accounts for planned growth contained with the NPF. The NPF recognises that Galway, as one of Ireland's five biggest cities, will play an important role in driving the economy. This showed Galway City will increase from 89,000 in 2022 to 99,000 in 2028, 124,000 in 2043, and 148,000 in 2058. This is a 67% increase in the period 2022 to 2058 or an average 1.4% p.a. The forecast also showed jobs will increase by around 60% between 2022 and 2058 (average 1.3% p.a.)

Demands should be reviewed at the next assessment stage once more data is available.

SECTION 7: OPTIONS DEVELOPMENT AND SELECTION

7.1 Overview

In general terms, alternatives have been defined as a specific transport mode (road, rail, bus, air etc.) or demand management proposal (fiscal, control, ITS measures etc.) which could address the needs along the route. Options are defined as the specific road-based options that may be developed.

The options and alternatives which have been assessed align with the requirements outlined within the Common Appraisal Framework. As noted previously, the CAF was utilised since this assessment was undertaken prior to the release of the TAF. The CAF states that a Do-Nothing or Do-Minimum and a minimum of three, but preferably at least five Do-Something options should be assessed at the preliminary appraisal stage. However, the CAF also acknowledged that for some schemes, a large number of Do-Something options may be available and in order to keep the appraisal process manageable, it may be appropriate to adopt an approach which subjects a large number of options to a preliminary appraisal (sifting process), before subjecting a smaller number to a more complete appraisal.

Therefore, a sifting process of the long list of options was undertaken, while a detailed assessment using a Multicriteria Analysis was undertaken for the short list of options.

The following sub-sections identifies the alternatives and options utilised and details the adopted methodology for the appraisal.

7.2 Assessment Methodology

7.2.1 NIFTI Analysis

Under the NIFTI Modal Hierarchy, sustainable modes, starting with active travel (walking, wheeling and cycling) and then public transport, should be considered first before less sustainable modes such as the private car. As this scheme will improve transport options across multiple sustainable transport modes (bus, walking, cycling) it was not considered appropriate to examine different transport modes.

Additionally, it was not considered appropriate to consider alternatives in terms of investment in a different corridor as this scheme has been identified as an investment priority in the Galway Transport Strategy (which assessed investment in transport corridors across the city).

A range of alternatives, which includes only active travel or public transport modes, infrastructure, regulatory and demand management alternatives have been considered and discussed and the justification for their exclusion outlined in the Phase 1 Preliminary Project Brief.

7.2.2 Route Selection – Spiders Web process

Links identified as part of the route selection - spider's web process underwent a high-level qualitative assessment based on professional judgement and an assessment of existing physical conditions/constraints within the study area. This was based on a desktop study, using available data, scheme objectives, expected cost and/or impact to achieve the objectives (e.g. excessive land-take).

All potential links in the area were assessed for its suitability to be used as the main multi-modal transport corridor route. The assessment focused on engineering constraints such as, geometrical constraints, high level environmental constraints and population/employment densities. Various assessment indicators were used including, land take, existing bus and cycle facilities, junction configuration and surrounding land use, amongst others.

Links that did not address the scheme objectives or were considered "un-deliverable" were not progressed to the sifting process.

7.2.3 Sifting Process

A long list of options was developed by building on the work undertaken during the Strategic Assessment Report (SAR). The development of the long list of options was done to a higher level of detail than in the SAR, these were assessed, and un-suitable options were discounted at this stage.

This high-level assessment of all long list options was undertaken using the assessment criteria below:

- Impact on wider road network;
- Ability of the option to improve the bus journey times and reliability between the Moneenageisha Junction and the Martin Junction;
- Pedestrian and cyclist quality of service and safety;
- Potential cost and difficulty to deliver; and
- Potential negative impacts (requirement for land take, removal of on-street parking, impact on the environment, impact on biodiversity etc).

The options that could meet the scheme objectives were progressed to the Stage 2 MCA assessment.

7.2.4 MCA Process

The short list of options was compared against one another using the Multi-Criteria Analysis process in accordance with the Department of Transport Document "Common Appraisal Framework for Transport Projects and Programmes"

Each option was assessed against the scheme objectives using the criteria and measure identified in Table 7-1. The short list of options was then ranked to identify the emerging Preferred Route Option.

In accordance with the CAF, the multi-criteria analysis considered Economy; Integration; Accessibility and Social Inclusion; Safety and Environment. The 'Physical Activity' criterion was not assessed as a standalone criterion but was captured under the Pedestrian and Cyclist Integration criteria. The assessment criteria are detailed below:

Table 7-1: MCA Assessment Criteria

Assessment Criteria		Measures
1	**Economy**	1.a. Capital Cost
		1.b. Bus Journey-time and Reliability
2	**Integration**	2.a. Land Use Integration
		2.b. Transport Network Integration
		2.c. Cyclists Integration
		2.d Pedestrian Integration
3	**Accessibility and Social Inclusion**	3.a. Vulnerable Groups
4	**Safety**	4. Road Safety
5	**Environment**	5.a. Archaeological, Architectural and Cultural Heritage
		5.b Biodiversity
		5.c Soils and Geology
		5.d. Landscape and visual
		5.e. Noise, Vibration and Air
		5.f. Land Use and the Built Environment
		5.g Climate and Carbon

The short list of options was assessed for each assessment criterion and compared relative to each other on a five-point scale, shown below.

Table 7-2: MCA comparative advantage/disadvantage colour ranking table

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

7.3 Long List

7.3.1 Route Options

An initial 'spiders-web' of potential route options that could form part of a multi-modal transport corridor were identified for each section in the study area. This 'spider's-web' of route options was chosen with reference to the multi-modal transport corridor system characteristics and in order to meet the scheme objectives.

Initial route options identified took cognisance of the physical constraints and opportunities present and integration with other public transport modes. Of particular relevance in developing the potential routes was the facilitation of efficient and reliable bus journey times and the accommodation of bus lane priority along the routes being investigated.

Any road carrying an existing Galway City 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. Three routes were identified and assessed as shown in Figure 7-1.

Figure 7-1: Route Options

LO1 - Regional Road: This regional road had clear benefits compared to the other two links, the route is designated as a bus route, generally there is sufficient space to provide bus lanes and cycle tracks while maintaining existing traffic lanes. It is surrounded by green space except for a few private parking spaces and properties. The link also caters for a high volume of traffic. Therefore, this route was passed.

LO2 - Urban / Residential: The second link has uncontrolled street parking which may cause delays to passing buses, there are two schools located on the link which would be used for pick and drop off during school hours and may cause heavy traffic as it is not a designated or planned bus route. Land take of 5m

would be required to provide dedicated bus lanes while maintaining two-way traffic, which would also impact the on-street parking and trees. Also, any bus using this route would have to make an additional 4 turning movements. Therefore, this route was failed.

LO3 - Hospital access road and residential road: The route between Dublin Road and the hospital is highlighted as a bus route in the Galway City Development Plan 2023-2029, as is Doughiska Road, however Merlin Park Lane is not designated as a bus route in this plan, at its narrowest the road is 5-6m wide and bound by private properties on either side. To provide dedicated bus lanes and footpaths while maintaining two-way traffic would require land take of 10m. Merlin Park Lane is residential with a significant number of trees and hedgerow's, widening the road would have a significant impact on the properties and the natural heritage. Any bus using this link would have to make an additional 3 turning movements. Therefore, this route was failed.

7.3.2 Longlist of Options and Alternatives

The next step in the options selection process was the development and assessment of a long list of options. Table 7-3 presents the longlist of the potential options and alternatives considered for the project.

Table 7-3: Summary of Options and Alternatives

Option/Alternative	Description
Do-Nothing Option	Routine maintenance without any junction improvement works or upgrade to cater for future traffic and safety demands.
Do-Minimum Option	The provision of committed developments as well as the provision of on-line cycle lanes on existing carriageways and speed reducing traffic management measures.
Do-Something Option	A total of 18 interventions were considered for achieving the scheme objectives

Phase 1 saw the consideration of Do-Nothing, Do-Minimum and Do-Something options which align with Tier 1 – 'Active Travel' of the NIFTI Modal Hierarchy.

The objectives listed in Section 3.4 were used to guide the identification of public transport and active travel options.

Do-Nothing

This option involved routine maintenance without the provision of any non-motorised road user facilities or dedicated public transport infrastructure to cater for future traffic. This option aligns with Tier 1 – 'Maintain' of the NIFTI Intervention Hierarchy.

This option will not enhance public transport journey times or reliability, will not enhance pedestrian and cyclist safety, will not encourage increased numbers of active travel or public transport commuters, will not integrate with other planned cycle and bus routes in the Galway City area, and will not enable local opportunities for walking and cycling activity.

It is therefore considered that the Do-Nothing option does not provide a solution in accordance with the scheme objectives.

Do-Minimum

The Do-Minimum Option included the transportation services and facilities that are committed within the appraisal period. It also included the maintenance of existing facilities and services in the study area and the continuation of transportation policies. The Do-Minimum option comprised provision of on-line cycle

lanes on existing carriageways and speed reducing traffic management measures. This option aligns with Tier 3 – 'Improve' of the NIFTI Intervention Hierarchy.

The outcomes from the Do Minimum Option will not enhance public transport journey times or reliability, will not enhance pedestrian and cyclist safety, will not encourage increased numbers of active travel or public transport commuters, will not integrate with other planned cycle and bus routes in the Galway City area, and will not enable local opportunities for walking and cycling activity.

It is therefore considered the Do-Minimum option does not provide a solution in accordance with scheme objectives.

Do-Something

A comprehensive list of options has been developed within the study area. This comprised of the construction of new bus corridors and active travel infrastructure through the reallocation of road space on existing roads and through the acquisition of public land along stretches of the road where pinch points occur. All of these measures align with either Tier 1 – 'Active Travel' and/or Tier 2 – 'Public Transport' of the NIFTI Modal Hierarchy and align with Tier 1 to Tier 4 of the NIFTI Intervention Hierarchy, depending on the route considered.

As part of the comprehensive review, consideration was given to other projects approved and/or under development within the study area. These included but were not limited to Ballyloughane Road / Renmore Avenue Active Travel / Traffic Calming Measures and Doughiksa Road (South) Cycle Network / Traffic Calming Project.

Table 7-4 shows the list of potential "Do Something" options, which were created for the main trip generators and attractors for both commuting and leisure purposes along the length of the route. This informed the locations of key infrastructure such as bus corridors, cycle lanes and bus stops.

Table 7-4: Do Something options and NIFTI Alignment

Section 1 - West of Skerrit Roundabout Options (all options have a footpath and cycle lane on both sides of the road)	**MCA Progression**	**Modal Hierarchy**	**Intervention Hierarchy**
Option 1: Bus lane and general traffic lane in both directions for full length of route.	Passed	Tier 1 and 2	Tier 3 and 4
Option 2: Westbound general vehicular traffic diverted around Renmore Road and Renmore Avenue in westbound direction only, signals control traffic re-joining Dublin Road and give bus priority by on the remaining corridor by doing so.	Passed	Tier 1 and 2	Tier 3 and 4
Option 3: Bus lanes on one side of the road at any one time (similar to the existing layout), generally placed on approach to junctions where there is queuing. General traffic lane in both directions.	Failed	Tier 1 and 2	Tier 3 and 4
Option 4: Bus lanes in both directions but drops the westbound bus lane either side of Renmore Road junction to reduce the road widening needed. The bus would enter the general traffic lane for this section using a yellow box. This is the option that was previously bought forward to public consultation in 2020.	Passed	Tier 1 and 2	Tier 3 and 4
Section 1 Renmore Road Options	**MCA Progression**	**Modal Hierarchy**	**Intervention Hierarchy**
Option 1: Full build, dedicated bus lanes provided in both directions for whole length, right turn lane provided on Dublin Road for traffic queuing to turn into Renmore.	Passed	Tier 1 and 2	Tier 3 and 4

Option 2: Full build except westbound bus lane dropped for 30m after junction, buses get their own signal to allow them to pass through the junction.	Failed	Tier 1 and 2	Tier 3 and 4
Option 3: Full build except no dedicated right turn lane provided on Dublin Road.	Passed	Tier 1 and 2	Tier 3 and 4
Option 4: Westbound bus lane dropped for 30m after junction, and no dedicated right turn lane provided on Dublin Road for traffic queuing to turn into Renmore.	Failed	Tier 1 and 2	Tier 3 and 4
Option 5: Both westbound and eastbound bus lanes dropped on approach to the junction and no dedicated right turn lane provided on Dublin Road for traffic queuing to turn into Renmore.	Failed	Tier 1 and 2	Tier 3 and 4
Section 1 Ballyloughane Road / Belmont Options	**MCA Progression**	**Modal Hierarchy**	**Intervention Hierarchy**
Option 1: Keep as it currently is but with bus lanes in both directions	Passed	Tier 1 and 2	Tier 3 and 4
Option 2A: Signalise, with the Belmont and Ballyloughane Road junctions remaining staggered, with a right turn lane provided. The existing entrance to Flannery's Hotel and Galwegians Rugby Club on Dublin Road remains in place. The entrance to Flannery's Hotel and Galwegians Rugby Club is moved to access via Belmont.	Passed	Tier 1 and 2	Tier 3 and 4
Option 2B: Signalise, with the Belmont and Ballyloughane Road junctions remaining staggered, with a right turn lane provided. The existing entrance to Flannery's Hotel and Galwegians Rugby Club on Dublin Road remains in place.	Passed	Tier 1 and 2	Tier 3 and 4
Option 3A: Signalise, bring the Belmont to meet Dublin Road directly across from Ballyloughane Road so that there is just one junction with 4 arms. Right turn lane provided for general traffic. The entrance to Flannery's Hotel and Galwegians Rugby Club is moved to access via Belmont.	Passed	Tier 1 and 2	Tier 3 and 4
Option 3B: Signalise, bring the Belmont to meet Dublin Road directly across from Ballyloughane Road so that there is just one junction with 4 arms. Right turn lane provided for general traffic. The existing entrance to Flannery's Hotel and Galwegians Rugby Club on Dublin Road remains in place.	Passed	Tier 1 and 2	Tier 3 and 4
Section 2: Skerrit Roundabout Options	**MCA Progression**	**Modal Hierarchy**	**Intervention Hierarchy**
Option 1: Rebuild as signalised junction as per BusConnects Guidance	Passed	Tier 2	Tier 2
Option 2[36]: Keep as roundabout and have signalised toucan crossings provided on every arm, on approach to the junction in either direction on Dublin Road one of the traffic lanes is converted to a bus lane.	Passed	Tier 1 and 2	Tier 2

[36] Note that L02 above failed during the Route Options (for buses) analysis as a bus corridor due to space limitations, however Option 2 discussed in Table 7-4 and Table 7-5 consider a potential passenger vehicle route diverted to Renmore Avenue in a westbound direction. Option 2 is essentially a variation of Bus Route Option L01, in which buses travel along Dublin Road and westbound vehicles travel along Renmore Avenue.

Option 3: Convert the Skerrit Roundabout to a "Cyclops" style junction.	Passed	Tier 1 and 2	Tier 3 and 4
Option 4: Convert the Skerritt Roundabout to a "Dutch style" roundabout to make it safer for active travel users. General traffic will yield to buses and pedestrians under this option. Provide dedicated one-way cycle lanes in both directions.	Failed	Tier 1 and 2	Tier 3 and 4
Option 5: Provide an active travel over bridge for the Skerritt Roundabout.	Failed	Tier 1	Tier 3 and 4
Option 6: Provide an active travel underbridge for the Skerritt Roundabout.	Failed	Tier 1	Tier 3 and 4
Section 3 - East of Skerrit Roundabout Option	**MCA Progression**	**Modal Hierarchy**	**Intervention Hierarchy**
Option 1: Footpaths and cycle tracks provided adjacent to the road carriageway for the length of the route.	Passed	Tier 1 and 2	Tier 3 and 4
Option 2: Cycle tracks on both sides and a footpath on the southern side of the road provided adjacent to the carriageway for the length of the route. Footpath on northern side of route provided only where there is currently footpath provision, this includes where there are accesses and bus stops, appropriate crossings would be provided to maintain all access.	Failed	Tier 1 and 2	Tier 3 and 4
Option 3: Westbound cycle track and footpath provided adjacent to the carriageway on south of road. Eastbound cycle track and footpath provided away from road carriageway through greenspace to the north of the route.	Passed	Tier 1 and 2	Tier 3 and 4
Option 4: Two-way cycle track provided offline through greenspace on the northern side of carriageway. Footpaths provided adjacent to the carriageway in both directions.	Passed	Tier 1 and 2	Tier 3 and 4
Option 5: Footpaths and cycle tracks provided adjacent to the road carriageway for the length of the route.	Failed	Tier 1	Tier 3 and 4
Option 6A: Cycle tracks either side of the road and a footpath on the southern side of the road adjacent to carriageway for length of route. Footpath on northern side of route provided only where there is currently footpath provision, this includes where there are accesses and bus stops, appropriate crossings would be provided to maintain all access.	Failed	Tier 1	Tier 3 and 4
Option 6B: Same as 6A except traffic signals used to move traffic queuing at Doughiska to queue at Coast Road junction instead, same length of eastbound bus lane provided overall, reduces impact on trees adjacent to carriageway.	Failed	Tier 1	Tier 3
Option 6C: Same as 6A except eastbound cycle track provided outside row of trees to north of carriageway between Coast Road and Doughiska.	Failed	Tier 1	Tier 3
Option 6D: Same as 6A except westbound cycle track and footpath provided outside of row of trees to south of carriageway between Coast Road and Doughiska.	Failed	Tier 1	Tier 3
Option 7: Westbound cycle track and footpath provided adjacent to the carriageway on southern side of the road. Eastbound cycle track and footpath provided away from road carriageway through greenspace to the north of the route.	Failed	Tier 1	Tier 3 and 4
Option 8: Two-way cycle track provided offline through greenspace on the northern side of carriageway. Footpaths provided adjacent to the carriageway in both directions.	Failed	Tier 1	Tier 3 and 4
Option 9: Footpaths and cycle tracks provided adjacent to the road carriageway between Skerrit Roundabout and Coast Road. From Coast Road to Doughiska Junction a 2-way cycle track is provided to the north of the row of trees that line the carriageway. Bus lanes provided in both directions for full length of route.	Passed	Tier 1 and 2	Tier 3 or 4

The options that were passed will enhance public transport journey times and reliability, enhance pedestrian and cyclist safety, encourage increased numbers of active travel or public transport commuters, integrate with other planned cycle and bus routes in the Galway City area, and enable local opportunities for walking and cycling activity. However, it should be noted that each option achieves the scheme objectives to various levels. More details about the assessment can be found in Appendix D: Phase 2 – Concept Development and Option Selection.

7.4 Short List

This section describes the MCA assessment performed on the options that passed the Route Selection and Long List assessments. All route options have been assessed using the methodology described in Section 7.2.

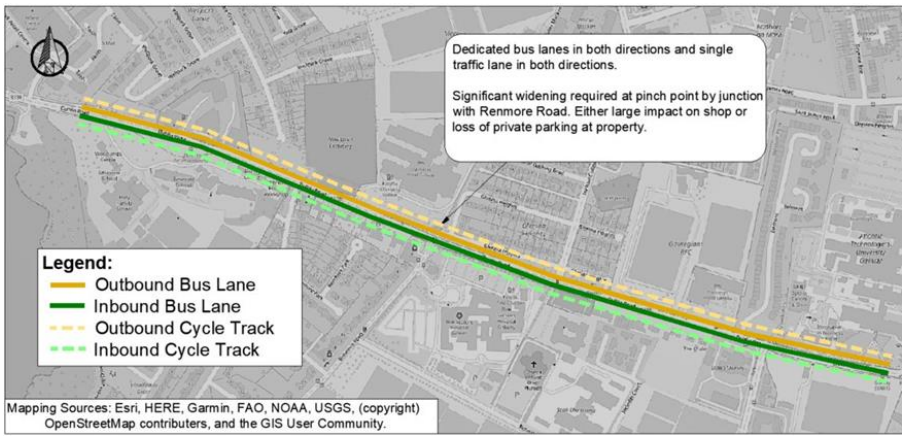
Section 1 of the study area and the Section 1 sub sections are assessed first, then Section 2 - Skerrit Junction and finally Section 3.

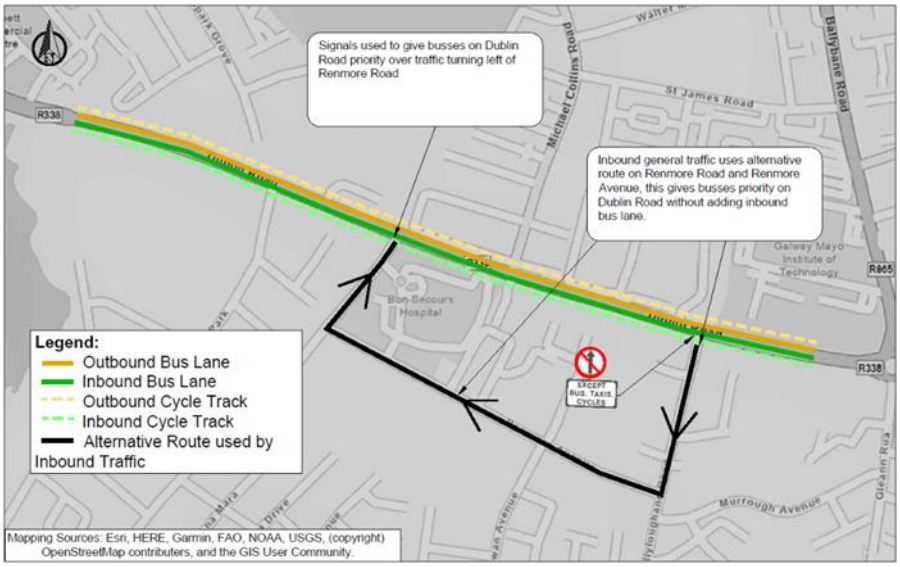
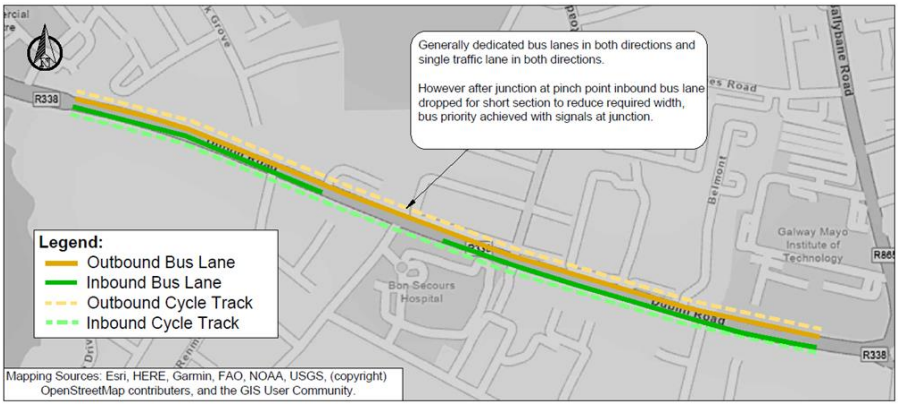
A transport and accessibility assessment (TAA) was undertaken for the short list of options and can be found in Appendix E

7.4.1 Section 1 – West of Skerrit Roundabout

Three route options for the general cross section were developed for this section. These route options all follow Dublin Road, starting 120m east of Sáilín and finishing at the approach to Skerrit Roundabout. All options use the same route, the difference is in the cross section provided, all options have a footpath and cycle lane on both sides of the road.

Table 7-5: Section 1 – West of Skerrit Roundabout Options

Option	Indicative Scheme Design
Option 1 Bus lane and one traffic lane in both directions for full length of route. Segregated cycle lanes and footpaths along the length of route. Solid lines indicate bus lanes and dashed lines indicate cycle lanes.	

Option 2 Bus lanes on Dublin Road in both directions. Westbound traffic diverted around Renmore Road and Renmore Avenue – this will allow bus priority on Dublin Road with minimal land requirements. Signals control re-joining traffic on Dublin Road with bus priority[36]. Segregated cycle lanes and footpaths along the length of route. Solid lines indicate bus lanes and dashed lines indicate cycle lanes.	
Option 4 Bus lanes in both directions. Westbound bus drops lane either side of Renmore Road. Buses merge with general traffic lane for this section using a yellow box. Single traffic lanes in each direction and segregated cycle lanes and footpaths along the length of route. Solid lines indicate bus lanes and dashed lines indicate cycle lanes.	

MCA Results

The MCA showed that in terms of 'Economy' Options 1 & 4 will generally have a 3m wider cross section when compared to Option 2 and will therefore have a slightly higher capital cost. Option 4 drops the westbound lane for approx. 120m and has a narrower cross section than Option 1 for a period, and therefore performs slightly better than Option 1 for cost.

In terms of Bus Journey Time and Reliability, Option 1 has dedicated bus lanes provided for the length of the route and will have faster journey times during peak hours when compared to Option 4 which drops the bus lane meaning buses would have to mix with general traffic for 120m. Option 2 requires the

westbound traffic and westbound buses to cross over each other in 2 locations, this can be managed using signals to give bus priority, however it is likely these extra crossings would still cause bus delays, meaning Option 2 performs worse for Bus Journey Time and Reliability.

Regarding 'Integration', all options perform equally for Land Use Integration as the land use of the area is not largely affected. In terms of Transport Integration, Option 1 is likely to provide the highest level of service for general traffic by preventing merging movements and will allow buses and traffic to run on the same signal phase. Option 2 performed the worst as traffic will have to detour, with two extra crossings likely to negatively impact the westbound capacity. In terms of pedestrian integration and cyclist integration all options score equally as each will have the same level of provision for pedestrians and cyclists.

In terms of Accessibility and Social Inclusion, all options will follow the same route and have the same pedestrian provision so scores equally.

Regarding 'Road Safety' Option 2 performed worse than the other options as it will divert traffic on Dublin Road around the residential areas in Renmore and past local schools.

In terms of 'Environment', Option 2 will require 3m less widening than other options and will retain more of the greenspace present along the corridor and therefore performed slightly better than Options 1 & 4 for the Landscape and Visual criterion. Option 2 performed poorly for noise vibration and air quality as it will bring heavy traffic onto residential roads and closer to Scoil Chaitríona which is a sensitive receptor, Option 4 performed slightly better than Option 1 for this criterion as it has a reduced cross section at the pinch point with Renmore Road, therefore keeping traffic further from sensitive receptors.

In terms of Climate and Carbon the routes that provide the best level of service for public transport, pedestrians, and cyclists would encourage the biggest shift away from cars to lower carbon transport modes score, as Option 1 will provide the best level of service for buses and therefore performed best for this criterion, followed by Option 4, and then Option 2. A summary of the ranking of options against the scheme criteria is presented in Table 7-6.

Table 7-6: MCA Summary: Section 1 – West of Skerrit Roundabout

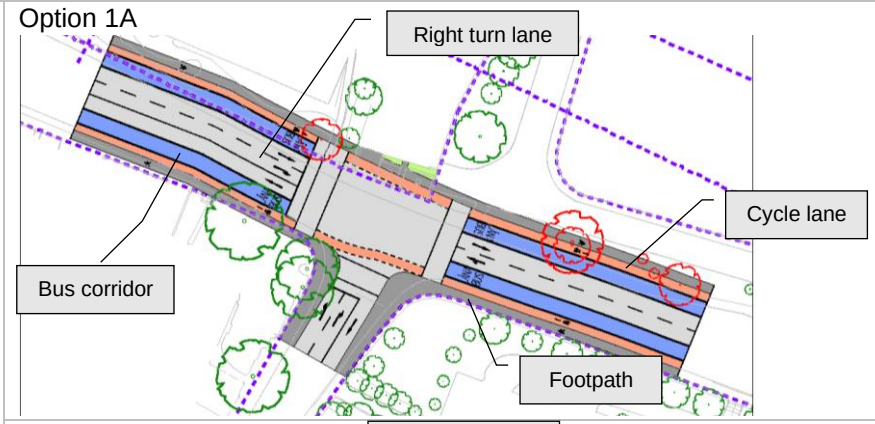
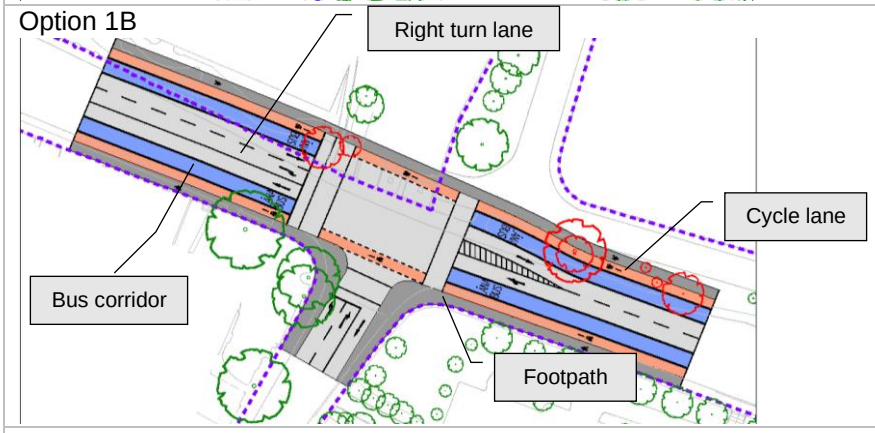
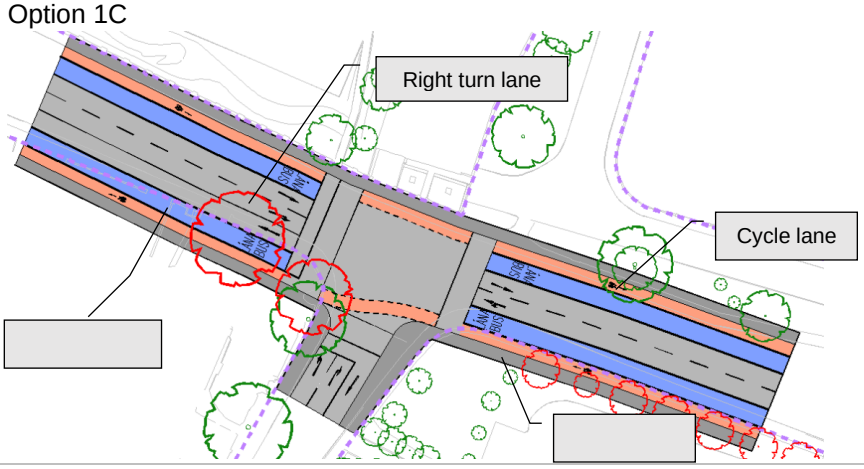
Assessment Criteria	Option 1	Option 2	Option 4
Economy			
Integration			
Accessibility and Social Inclusion			
Safety			
Environment			

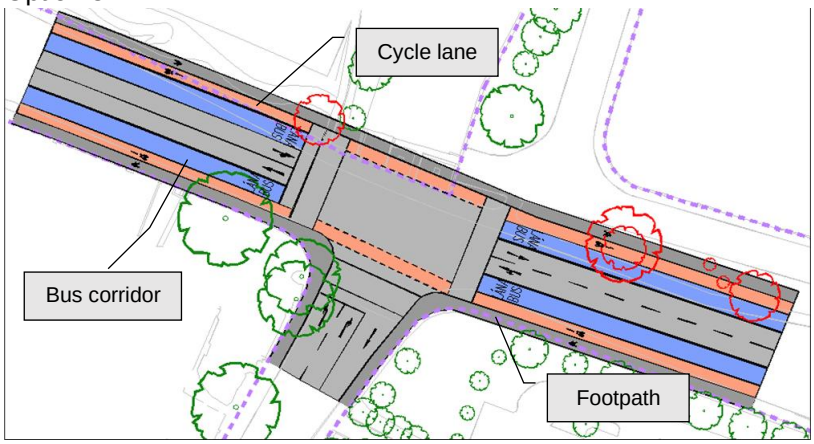
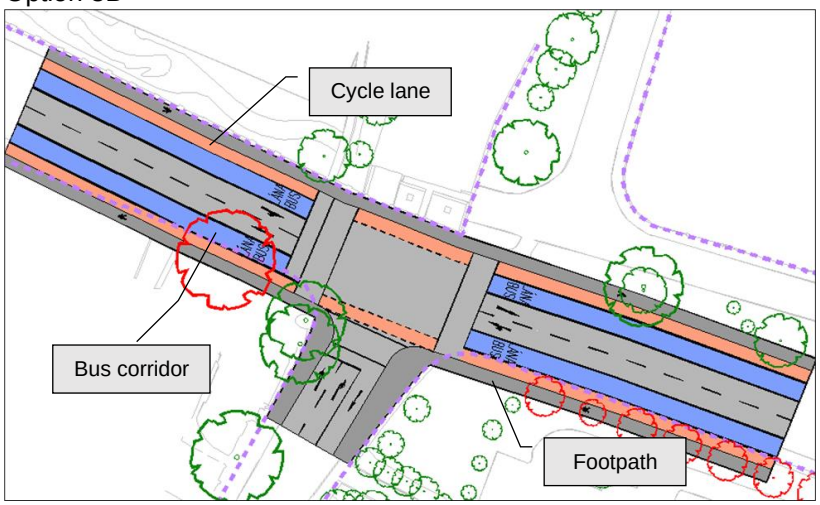
Based on the assessments Option 1 was recommended as the preferred option as it will provide the highest overall ranking against the scheme objectives.

7.4.2 Section 1 – Renmore Road / Dublin Road Junction Sub Assessment

This signalised junction is located to the west of Bon Secours Hospital where Renmore Road meets Dublin Road. The options assessed for this junction all have dedicated and protected cycle lanes and footpaths in both directions and signalised pedestrian crossings for each arm of the junction.

Table 7-7: Section 1 – Renmore Road / Dublin Road Junction Options

Option	Indicative Scheme Design
Options 1A, 1B & 1C: Full build, dedicated bus lanes provided in both directions for whole length (indicated by blue lanes), right turn lane provided on Dublin Road for traffic queuing to turn into Renmore. The difference between the options lies in which side of the road is affected by land take. The segregated cycle lanes are indicated in orange and the footpaths in dark grey.	Option 1A  Option 1B  Option 1C 

Option	Indicative Scheme Design
Option 3A & 3B: Full build except no dedicated right turn lane provided on Dublin Road. The difference between the options lies in which side of the road is affected by land take. The dedicated bus corridors are indicated in blue, the segregated cycle lanes are indicated in orange and the footpaths in dark grey.	Option 3A  Option 3B 

MCA Results

The MCA showed that in terms of 'Economy' Options 1A, 1B & 1C will have wider cross sections, require more land take, and therefore will cost more to construct than Options 3A & 3B. Option 1B would require purchasing and demolishing the property of 18 Dublin Road and therefore has the largest capital cost.

In terms of journey time and reliability for buses, all provide continuous dedicated bus lanes, however as Options 3A and 3B will not provide a dedicated right turn lane for general traffic the junction capacity would be reduced slightly reducing the level of bus priority, therefore Options 1A, 1B and 1C will perform best for these criteria.

Regarding 'Integration', Options 1A, 1B & 1C performed better than Options 3A & 3B for transport integration due to the provision of a right turn movement for general traffic entering Renmore from Dublin Road. In terms of Accessibility and Social Inclusion, all options will follow the same route and have the same layout for pedestrians so score equally for this criterion. Regarding 'Road Safety' all options will perform equally.

In terms of 'Environment', generally there will be no large impacts for Archaeological, Architectural and Cultural Heritage, Soil and Geology across these options, meaning that all options scored equally for these

criteria. In terms of Biodiversity Options 3A & 3B performed slightly better as the narrower cross sections will impact less on potential habitats.

In terms of Landscape and Visual Options 1A & 1C will require a wider road cross section and therefore impact the trees outside Duggan's Spar, and the greenspace in Merlin Park hospital. Option 1B would involve demolition of 18 Dublin Road so also performed worse for this criterion than Options 3A & 3B.

In terms of noise and vibration, the options that bring vehicles closer to properties, particularly 18 Dublin Road which is only set back 5m from the road, and the properties to the west of Duggan's Spar, perform worse. This means Options 1A, 1C & 3A performed worse than Options 1B and 3B for this criterion.

In terms of Land Use and the Built Environment, Option 1B will involve the demolition of 18 Dublin Road. Option 1C will take a significant amount of the Duggan's Spar car park and the front gardens / driveways of the properties to the west of Duggan's Spar, therefore these options performed worst for this criterion. Option 1A will also impact property gardens to the north and the car parking to the south, but this impact will be less severe than that of the Options 1B & 1C. Options 3A & 3B have a lower impact overall as a result of their narrower cross section so scored best for this criterion.

In terms of Climate and Carbon, options that provide the best level of provision for buses would encourage the largest modal shift towards low carbon forms of travel so performed best for this criterion. The exception to this is Option 1B which will require the demolition of a house, due to the embodied carbon associated with the demolition of a house this option performed poorly for climate and carbon. Overall Options 1A & 1C perform better than Options 1B, 3A & 3B for Climate and Carbon.

Assessment Criteria	Option 1A	Option 1B	Option 1C	Option 3A	Option 3B
Economy					
Integration					
Accessibility and Social Inclusion					
Safety					
Environment					

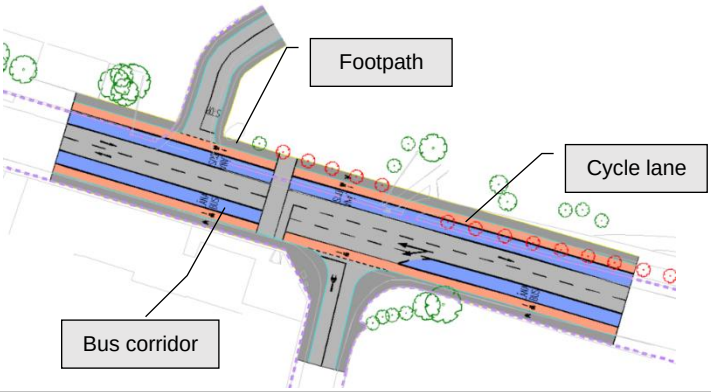
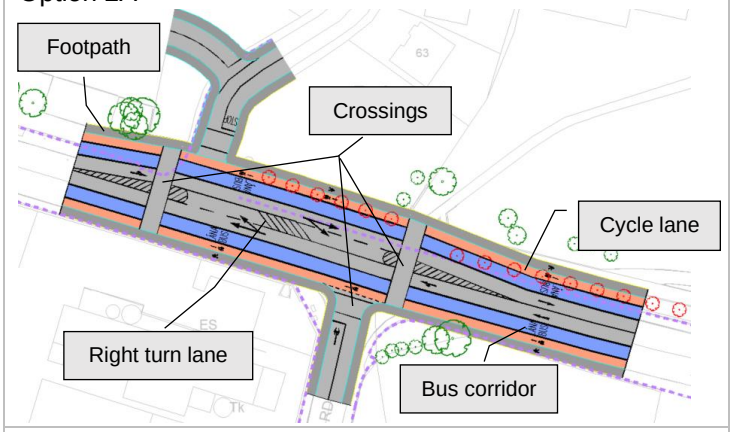
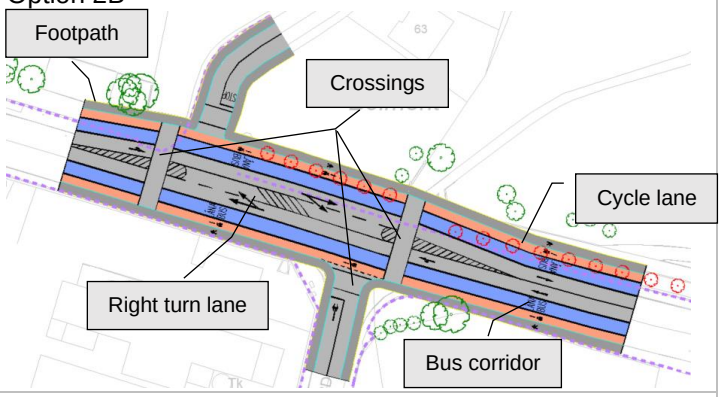
Overall Options 1A, 1B & 1C were preferable to Options 3A & 3B. These options will provide a faster and more reliable service for buses and have a significantly lower impact on the traffic network than Options 3A & 3B. Based on the assessments Option 1A was recommended as the preferred option.

7.4.3 Section 1 – Ballyloughane Road / Belmont / Dublin Road Junction Sub Assessment

These two un-signalised junctions are located where Ballyloughane Road and Belmont meet the Dublin Road and are currently staggered approx. 35m apart. This assessment included options to incorporate access to these properties with that of Belmont.

For all options, dedicated bus lanes and protected cycle lanes will be provided in both directions. Pedestrian footpaths will also be provided on both sides of the road.

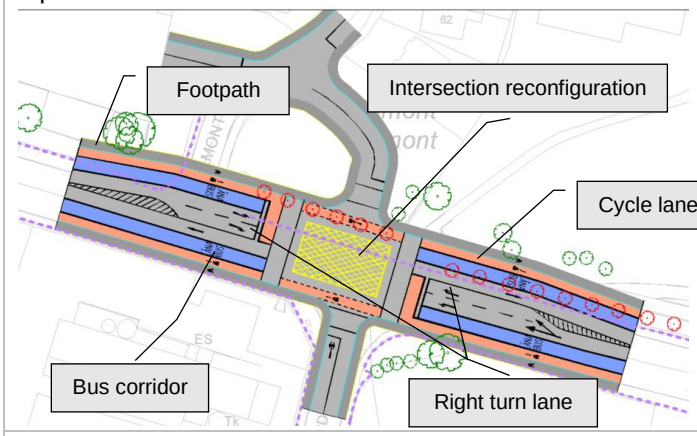
Table 7-8: Section 1 – Ballyloughane Road / Belmont / Dublin Road Junction Options

Option	Indicative Scheme Design
Option 1 Keep the layout as it currently is but with bus lanes (indicated in blue) and cycle lanes (indicated in orange) in both directions.	
Option 2A & 2B: Signalise, with the Belmont and Ballyloughane Road junctions remaining staggered, with a right turn lane provided, indicated in image. The existing crossing point will be relocated more east, and additional crossings point will be added west of the intersection and across Ballyloughane Road. The dedicated bus corridors are indicated in blue, the segregated cycle lanes are indicated in orange and the footpaths in dark grey.	Option 2A  Option 2B 

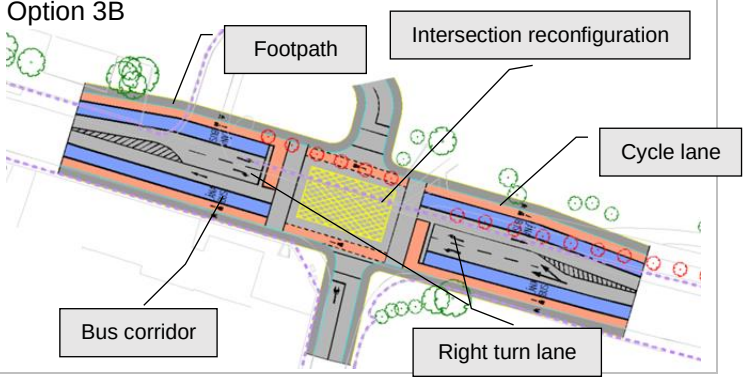
Option 3A & 3B: Signalise, bring the Belmont to meet Dublin Road directly across from Ballyloughane Road so that there is just one junction with 4 arms. Right turn lane provided for general traffic. Add right turn lanes on Dublin Road and pedestrian crossings across each arm of the intersection.

The dedicated bus corridors are indicated in blue, the segregated cycle lanes are indicated in orange and the footpaths in dark grey

Option 3A



Option 3B



MCA Results

The MCA showed that in terms of 'Economy' Option 1 will require the least construction work as it will not involve realigning Belmont junction and will have the narrowest cross section, and the lowest capital cost. Options 2A & 2B will have a wider cross section but will not require realigning the junction so performed in the middle. Options 3A & 3B which require both re-aligning the junction and more widening performed worst for capital cost.

Regarding Bus Journey Time and Reliability, the options that signalise and keep the junctions separate are likely to have a longer wait time overall for buses given the two sets of signals that the buses may have to stop at.

Regarding 'Integration', Options 2A & 2B performed the worst for transport integration as the junction will be signalised and staggered, bringing the junctions together and signalising will likely provide a more efficient layout for general traffic. All options will have the same route and similar provision for cyclists so performed equally for Cyclist Integration. In terms of Pedestrian Integration, Option 1 performed the worst as it will not provide signalised crossings across the side road. This will also result in Option 1 performing the worst for Accessibility and Social Inclusion.

Regarding 'Road Safety', Options 3A & 3B will bring the junctions together and provide a simpler and more standard road layout than Options 2A & 2B and therefore performed better for road. Option 1 will not provide a signalised junction and therefore performed the worst for this criterion. Options 3A and 2A move the accesses to Galwegians Rugby Club and Flannery's Hotel to Belmont, and therefore will have a slight safety advantage over the other options in this respect and will reduce the number of potential conflicts between cyclists and pedestrians on Dublin Road and cars accessing these areas.

In terms of 'Environment', all options will require the set back of the stone wall to the north of the carriageway so perform equally for the Archaeological, Architectural and Cultural Heritage criterion. In

terms of Biodiversity, Soil and Geology, all options would require some widening and minimal or similar impact, therefore scoring equally for these criteria. Options 2A and 3A which move the entrance of Flannery's Hotel to Belmont would require converting more of the greenspace by Belmont into road, and therefore preformed worse for Landscape and Visual than other options. Options 2A & 3A would also attract more traffic up Belmont Road and closer to residents therefore these options performed slightly worse for noise vibration and air quality.

In terms of Land use and The Built Environment, Options 1, 2B & 3B will keep the existing entrances to Flannery's Hotel and Galwegians Rugby Club, based on the previous public consultation performed this is preferred by stakeholders at both properties. Furthermore, the residents of Belmont preferred this solution as it maintained more of the greenspace. For these reasons Options 1, 2B & 3B performed best for this criterion.

In terms of climate and carbon, the options that provide the highest level of service for buses, cyclists and pedestrians would encourage a shift towards lower transport forms of travel. For this reason, Options 3A & 3B performed best, Option 3B performed best as it will require slightly less widening so will have less embodied carbon.

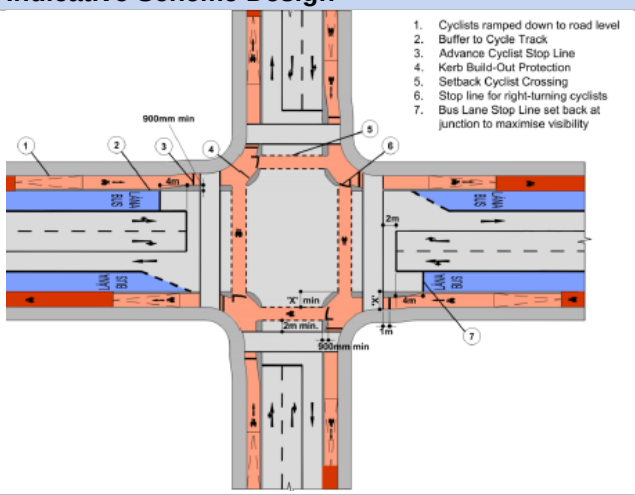
Assessment Criteria	Option 1	Option 2A	Option 2B	Option 3A	Option 3B
Economy					
Integration					
Accessibility and Social Inclusion					
Safety					
Environment					

Based on the assessments Option 3B was recommended as the preferred option as it will provide the highest overall ranking against the scheme objectives while having a smaller impact on the Flannery's Hotel, the residents of Belmont, and Galwegians Rugby Club than Option 3A.

7.4.4 Section 2 –Skerrit Roundabout

The Skerrit Roundabout junction starts 75m west of the roundabout and finishes 75m east of the roundabout. The options considered for this section of the network are described in Table 7-9.

Table 7-9: Section 2 –Skerrit Roundabout Options

Option	Indicative Scheme Design
Option 1: Rebuild as signalised junction as per BusConnects Guidance. The dedicated bus corridors are indicated in blue, the segregated cycle lanes are indicated in orange and the footpaths in dark grey.	

Option 2: Keep as roundabout and add signalised toucan crossings provided on every arm, indicated by orange blocks on each arm.	
Option 3: Rebuild as signalised "Cyclops" style junction. The intersection will include right turn traffic lanes, bus lanes which become left turn lanes close to the intersection, single through lane for general traffic, with dedicated bus lanes on the departure. Cycle lanes and footpaths will be segregated on both sides on the road. The dedicated bus corridors are indicated in blue, the segregated cycle lanes are indicated in orange and the footpaths in dark grey.	

MCA Results

The MCA showed that in terms of 'Economy' Options 1 & 3 will cost more to implement than Option 2. However, Options 1 & 3 performed better for bus journey time and reliability as it will allow buses to get to the stop line of the junction in both directions and the signals can be controlled to give buses priority through the junction, this would not be possible for Option 2.

Regarding 'Integration', Options 1 & 3 performed better for pedestrian and cyclist integration as it offers a more direct route, furthermore Option 3 performed better for cyclist integration than Option 1 because it will allow cyclists to cross on a separate signal phase, meaning Option 3 performed best overall for Integration.

In terms of Accessibility and Social Inclusion, as Options 1 & 3 will provide a more direct route for pedestrians and are likely to serve vulnerable groups better.

Regarding 'Road Safety' Options 1 & 3 performed better for this criterion. This is because the crossing locations for cyclists and pedestrians will be provided on the direct user desire lines. For Option 2 the crossings will be set back from the junction which may encourage cyclists and pedestrians to cross at locations that are not controlled. Signalising the junction would also improve the safety for general traffic. Furthermore Option 3 will have cyclists on a separate signal phase to general traffic, meaning that it performed better for road safety than Option 1.

In terms of 'Environment' Options 1 & 3 scored slightly worse for biodiversity as it will require the removal of some greenspace in the centre of the roundabout, however this effect will likely be minimal. Options 1 & 3 scored slightly better for Landscape and Visual these options will have less land take for roads/hard surface and will allow for greater useable green/open space. Options 1 & 3 also scored slightly worse for noise vibration and Air Quality as lower traffic speeds associated with the signalised junction may cause an increase in local traffic related emissions. Options 1 & 3 will provide a better service for buses and active travel users, encouraging modal shift towards lower carbon travel and will therefore perform better for Climate and Carbon. On balance all option score neutral for the 'Environment' criteria.

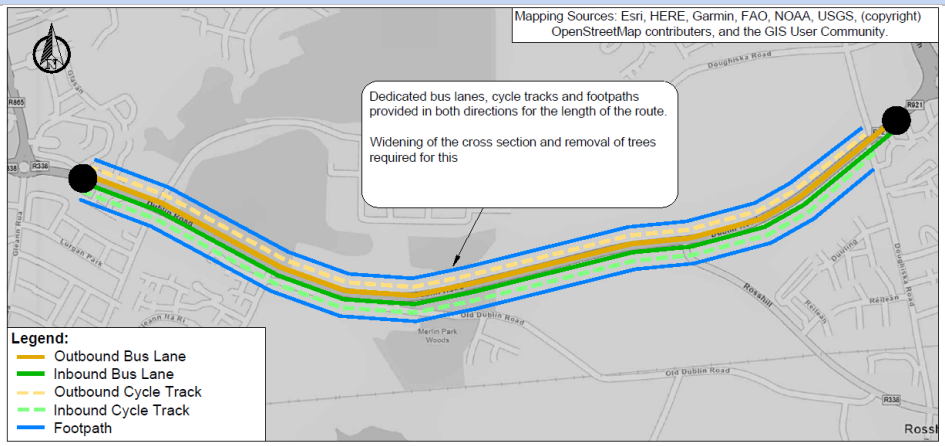
Assessment Criteria	Option 1	Option 2	Option 3
Economy			
Integration			
Accessibility and Social Inclusion			
Safety			
Environment			

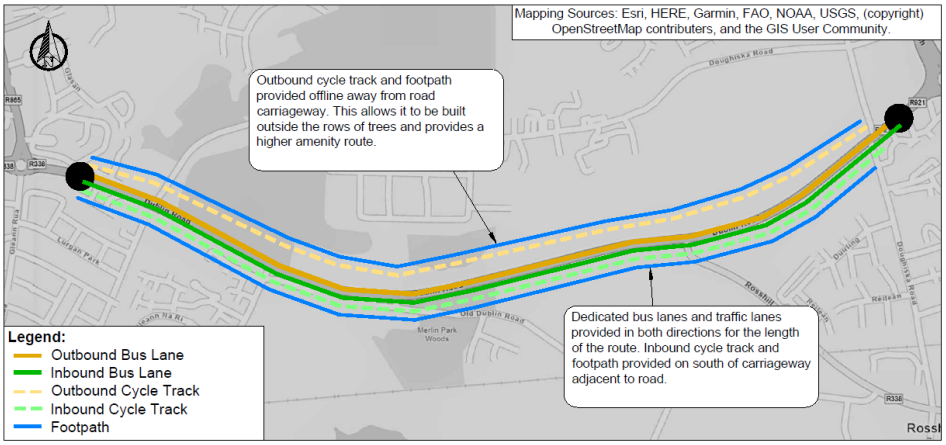
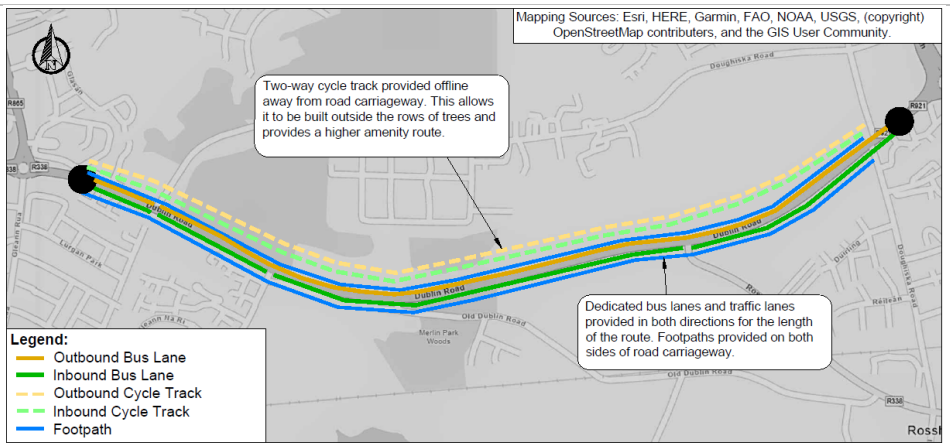
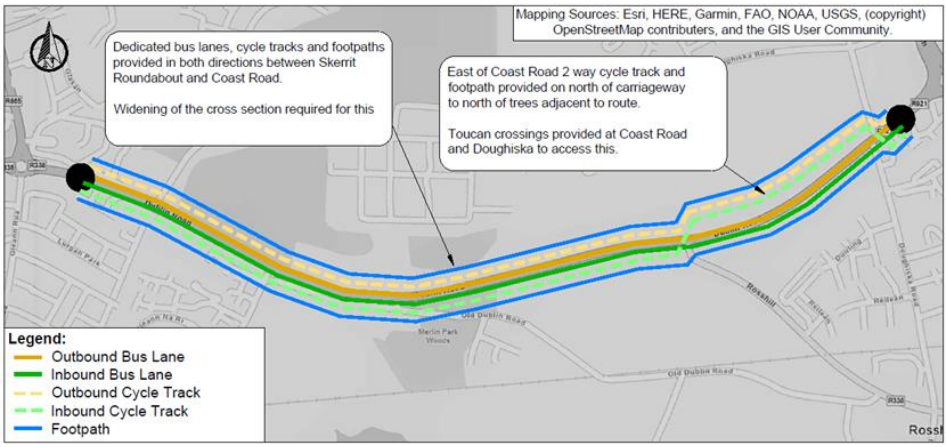
Based on the assessments Option 3 was recommended as the preferred option.

7.4.5 Section 3 – East of Skerrit Roundabout

All route options start 75m east of Skerrit Roundabout and finish at Doughiska Road Junction where the project ties in with the Martin Junction upgrade. Four options were considered, all will have dedicated bus lanes and 2-way general traffic lanes for the length of the route.

Table 7-10: Section 3 – East of Skerrit Roundabout Options

Option	Indicative Scheme Design
Option 1: Footpaths and cycle tracks provided adjacent to the road carriageway for the length of the route.	

Option 3: Inbound cycle track and footpath provided adjacent to the carriageway on south of road. Outbound cycle track and footpath provided away from road carriageway through greenspace to the north of the route.	
Option 4: Two-way cycle track provided offline through greenspace on the northern side of carriageway. Footpaths provided adjacent to the carriageway in both directions.	
Option 9: Footpaths and cycle tracks on both sides of the road between Skerrit Roundabout and Coast Road. From Coast Road to Doughiska Junction a 2-way cycle track is provided to the north of the row of trees that line the carriageway. Bus lanes provided in both directions for full length of route.	

MCA Results

The MCA showed that in terms of 'Economy' all options will require a similar level of works, and all options will require land take. Options 3, 4 & 9 will have a footpath or cycle track placed offline to the north of the carriageway meaning more land take may be required than with Option 1, however Option 1 will require extensive mitigation tree planting, so on balance all options are likely to have a similar capital cost and score equally for this criterion. In terms of Bus Journey Time and Reliability, all options have the same level of provision for buses and were considered equal.

Regarding 'Integration', no changes in the land use of the area are anticipated by any of the options meaning all perform equally for the Land Use Integration criterion. All options propose the same provision for buses and general traffic, meaning all perform equally for Residential and Employment Catchment and Transport Integration. For cyclist integration the options 1& 3 will have cyclists on either side of the road and will provide better connectivity and a more direct route so performed better than Option 4. Option 9 will also have cyclists on either side of the road for most of the route, then a 2-way cycle track to the north of the route just between Coast Road and Doughiska Junction, and therefore scored in the middle for cyclist integration. In terms of Pedestrian Integration, all options will provide footpaths on both sides of the carriageway for the length of the scheme, and therefore performed equally for this criterion.

In terms of Accessibility and Social Inclusion, all options will follow the same route so scored equally.

Regarding 'Road Safety' Option 4 performed worse than the other options, as these options will either have footpaths and cycle tracks adjacent to the road carriageway improving visibility to other road users and increasing the perceived safety, or proposed mitigation measures to thin the trees to allow visibility between the road carriageway and the footpath / cycle track, as well as lighting proposed on any offline route. Option 4 would therefore have worse visibility between the road and users of the cycle track, meaning there is less perceived safety and a higher chance of anti-social behaviour.

In terms of 'Environment', all options perform equally requiring setting back of the stone wall to the north of the carriageway, however this would be replaced like for like with minimal Archaeological, Architectural and Cultural Heritage impacts all options perform equally for this criterion. In terms of Biodiversity, Options 1, 3 & 4 all impact the trees to the north of the carriageway to a larger extent than Option 9, so perform worse for this reason. In terms of landscape and visual Option 9 performed best as it will require the least extensive tree felling and therefore maintains the existing landscape. All other environmental criteria performed equally for all options.

Assessment Criteria	Option 1	Option 3	Option 4	Option 9
Economy				
Integration				
Accessibility and Social Inclusion				
Safety				
Environment				

Based on the assessments above Option 9 was recommended as the preferred option as it performed well despite performing slightly worse for Cyclist Integration than Options 1 & 3. This was because it performed significantly better for the environmental criteria than Options 1, 3 & 4.

7.5 Options Sensitivity Testing

This project relied on the MCA as the main appraisal tool, as most of the criteria could only be assessed qualitatively, with cost and transport measures (travel time/cost) being the only quantitative criteria.

Therefore, sensitivity testing using the Cost Benefit Analysis (CBA) would not provide outputs that would aid in decision making. The CBA would skew results in favour of transport benefits alone. In addition, the assessment of short list of options was done by section or junction and not by route making this method of sensitivity testing difficult.

Therefore, the sensitivity testing of the short-listed options was undertaken on the MCA results. In this case, sensitivity of the short list of options was assessed by varying the importance of criteria to determine if the preferred section/junction option would change. This methodology was chosen since several short list options shared relatively similar scores[37].

To test sensitivities a range of scenarios varying criteria importance were applied to the MCA scores. These scenarios were developed to reflect national priorities and policies, the scheme objectives, and the overall objectives of the BusConnects projects. The sensitivity scenarios tested were:

- **Scenario A** – Numerical representation of the short list scores
- **Scenario B** – 50% weighted towards the Economy criterion, the other 50% equally distributed to remaining criteria.
- **Scenario C** – 25% each weighted towards the Accessibility and Social and Environmental criteria, the other 50% equally distributed to remaining criteria.
- **Scenario D** - 50% weighted towards the Environmental criterion, the other 50% equally distributed to remaining criteria.

The Project Team applied numerical percentages to the scenarios and a rudimentary numerical value to the scoring colours, these are shown in Table 7-11 and Table 7-12 respectively.

Table 7-11: Sensitivity Test Scenarios

Assessment Criteria	Scenario A	Scenario B	Scenario C	Scenario D
Economy	20%	50%	12.5%	12.5%
Integration	20%	12.5%	12.5%	12.5%
Accessibility and Social	20%	12.5%	25%	12.5%
safety	20%	12.5%	12.5%	12.5%
Environmental	20%	12.5%	25%	50%

Table 7-12: Numerical Values

Colour	Description
	2
	1
	0
	-1
	-2

Table 7-13 shows the results from the sensitivity test. Overall, the sensitivity tests typically align with the short list scores (Scenario A), with the exception of Scenario D which places emphasis on the Environmental criteria for the Section 1 – West of Skerrit Roundabout and Section 1 - Renmore Road/ Dublin Road intersection. Therefore, the options selected during the short-listing process, highlighted in red remained.

[37] Transport Appraisal Framework Appraisal Guidelines for Capital Investments in Transport Module 7 - 66dec974-288e-4c60-bc2e-826f16bf04e8.pdf (www.gov.ie) – Paragraph 7.8.9

Table 7-13: Sensitivity Results

West of Skerrit Roundabout	1	2	4
Scenario A	1	-1	0.8
Scenario B	1.375	-1	0.875
Scenario C	0.625	-0.75	0.625
Scenario D	0.635	-1.005	0.88

Renmore Road/ Dublin Road	1a	1b	1c	3a	3b
Scenario A	0.4	-0.2	0.2	-0.4	-0.4
Scenario B	0.625	-0.5	0.5	-0.625	-0.25
Scenario C	0.125	-0.375	-0.125	-0.125	-0.125
Scenario D	-0.12	-0.88	-0.62	0.12	0.12

Ballyloughane Road/Belmont/Dublin Road	1	2a	2b	3a	3b
Scenario A	-0.2	-0.2	0	0.6	0.8
Scenario B	0.25	-0.5	-0.375	0.75	0.75
Scenario C	-0.25	-0.125	0.25	0.375	0.75
Scenario D	-0.12	-0.505	0.37	0.005	0.88

Skerrit Roundabout	1	2	3
Scenario A	0.4	-0.8	0.8
Scenario B	0.25	-0.5	0.5
Scenario C	0.375	-0.875	0.875
Scenario D	0.25	-0.875	0.875

East of Skerrit Roundabout	1	3	4	9
Scenario A	0	0	-0.8	0.6
Scenario B	0	0	-0.5	0.375
Scenario C	-0.25	-0.25	-0.75	0.625
Scenario D	0	0	-0.75	1.125

SECTION 8: THE PREFERRED ROUTE OPTION

The BusConnects Galway: Dublin Road scheme starts east of Moneenageisha Junction where it ties into the BusConnects Galway: Cross City Link proposals and follows Dublin Road as far as the Doughiska Junction. Table 8-1 shows the preferred option by section.

Table 8-1: Preferred Option

Section	Preferred Option	Description
Section 1 - West of Skerrit Roundabout	Option 1	Bus lane and one traffic lane in both directions for full length of route. Segregated cycle lanes and footpaths along the length of route.
Section 1 – Renmore Road / Dublin Road Junction	Option 1A	Full build, dedicated bus lanes provided in both directions for whole length (indicated by blue lanes), right turn lane provided on Dublin Road for traffic queuing to turn into Renmore. The difference between the options lies in which side of the road is affected by land take.
Section 1 – Ballyloughane Road / Belmont / Dublin Road Junction	Option 3B	Signalise, bring the Belmont to meet Dublin Road directly across from Ballyloughane Road so that there is just one junction with 4 arms. Right turn lane provided for general traffic. Add right turn lanes on Dublin Road and pedestrian crossings across each arm of the intersection.
Section 2 –Skerrit Roundabout	Option 3	Rebuild as signalised “Cyclops” style junction - The intersection will include right turn traffic lanes, bus lanes which become left turn lanes close to the intersection, single through lane for general traffic, with dedicated bus lanes on the departure. Cycle lanes and footpaths will be segregated on both sides on the road.
Section 3 - East of Skerrit Roundabout	Option 9	Footpaths and cycle tracks on both sides of the road between Skerrit Roundabout and Coast Road. From Coast Road to Doughiska Junction a 2-way cycle track is provided to the north of the row of trees that line the carriageway. Bus lanes provided in both directions for full length of route.

The preferred option will have dedicated bus lanes, segregated cycle lanes and footpaths on either side of the road for the full length of the route. Dublin Road will remain two-way for general traffic. All major junctions along the route will be upgraded to signalised junctions with pedestrian and cyclist provision, including the Skerrit Roundabout.

Further details of the proposed route can be seen in the general arrangement drawings provided in Appendix F.

8.1 Section 1

8.1.1 Bus Provision and General Vehicular Impacts

Starting from Moneenageisha Junction there will be a dedicated bus lane in each direction for the length of the section, these will tie into the proposals for the Cross City link scheme at the west and the upgraded Skerritt Junction at the east. The proposed changes to the bus stop infrastructure along this section of road are outlined in Table 8-2 below.

A traffic lane in each direction will continue to be provided for the length of the scheme. The junctions at Renmore Road and Michael Collins Road will remain signalised, and the junction with Belmont will be re-aligned to join Dublin Road opposite Ballyloughane Road and this location will be signalised. At each of these junctions right turn lanes will be provided for general traffic. Right turn lanes for general traffic will not provide for priority-controlled junctions and accesses.

Table 8-2: Changes in Bus Infrastructure

Inbound / Outbound	Bus Stop Name / No.	Chainage	Location	Retained / Relocated / Removed / New	Existing Facilities	Proposed Facilities	Reason for moving / locating stop
Outbound	Proposed new stop	0+010	50m southeast of the Sáilín Road/ Dublin Road junction	New	N/A	Bus shelter with seating & facilities to incorporate RTPI	Catchment of eastbound passengers from Wellpark Centre
Inbound	Brothers of Charity No. 522961	0+185	50m west of Brothers of Charity entrance	Retained	Bus Shelter, Seating, RTPI	Bus shelter with seating & facilities to incorporate RTPI	N/A
Outbound	Renmore Park No. 522701	0+320	30m north-west of Renmore Park/ Dublin Road junction	Retained	Bus Shelter, Seating, Paper timetable	Bus shelter with seating & facilities to incorporate RTPI	N/A
Outbound	Glenina Heights No. 524131	0+675	75m east of the Renmore Road/ Dublin Road junction	Retained	Bus Shelter, Seating, Paper timetable	Bus shelter with seating & facilities to incorporate RTPI	N/A
Inbound	Glenina Heights, No. 524351	0+750	60mwest of the Galway Hospice/ Dublin Road junction	Retained	Bus Shelter, Seating, Paper timetable	Bus shelter with seating & facilities to incorporate RTPI	N/A
Outbound	Galwegians RFC No. 524141	1+035	30m west of Belmont/ Dublin Road junction	Retained	Bus Shelter, No seating, Paper timetable	Bus shelter with seating & facilities to incorporate RTPI	N/A
Inbound	Dublin Road (Dawn Dairies)	1+075	50m west of the Ballyloughane	Retained	Bus Stop, Pole,	Bus shelter with seating & facilities to	N/A

Inbound / Outbound	Bus Stop Name / No.	Chainage	Location	Retained / Relocated / Removed / New	Existing Facilities	Proposed Facilities	Reason for moving / locating stop
	No. 524341		Road/ Dublin Rod junction		Pater timetable	incorporate RTPI	
Inbound	Proposed new stop	1+240	115m east of the Ballyloughane Road/ Dublin Rod junction	New	N/A	Bus shelter with seating & facilities to incorporate RTPI	Enhanced bus services provided from intercity routes and private operators/ Catchment of westbound passengers from ATU Galway City
Inbound	Proposed new stop	1+270	125m east of the Ballyloughane Road/ Dublin Rod junction	New	N/A	Bus shelter with seating & facilities to incorporate RTPI	Enhanced bus services provided from intercity routes and private operators / Catchment of westbound passengers from ATU Galway City
Inbound	GMIT No. 522811	1+310	75m west of Galway Garda Regional & Divisional HQ access	Retained	Bus shelter, No seating, Paper timetable	Bus shelter with seating & facilities to incorporate RTPI	N/A
Outbound	Proposed new stop	1+320	120m west of Skerrit Roundabout	New	N/A	Bus shelter with seating & facilities to incorporate RTPI	Enhanced bus services provided from intercity routes and private operators/ Catchment of westbound passengers from ATU Galway City
Outbound	Proposed new stop	1+350	100m west of Skerrit Roundabout	New	N/A	Bus shelter with seating & facilities to incorporate RTPI	Enhanced bus services provided from intercity routes and private

Inbound / Outbound	Bus Stop Name / No.	Chainage	Location	Retained / Relocated / Removed / New	Existing Facilities	Proposed Facilities	Reason for moving / locating stop
							operators/ Catchment of westbound passengers from ATU Galway City
Outbound	GMIT No. 522811	1+400	85m west of Skerrit Roundabout	Retained	Bus Shelter, Seating, Paper timetable	Bus shelter with seating & facilities to incorporate RTPI	N/A

8.1.2 Cycling Provision

Segregated cycle lanes will be provided on either side of the road for the full length of the section. These will tie into the proposals for the Cross City link scheme at the western end and tie into the proposals for Skerritt Junction at the eastern end of Section 1.

The key cycling improvements along this section of road can be summarised as follows:

- 2m two-way segregated cycle tracks on each side of the road between the start of the Proposed Scheme and the R338 Dublin Road/Access Road to Belmont/Ballyloughane Road junction and Skerrit Roundabout;
- The provision would be 2.0m except for through the pinch point west of the junction at Renmore Road where the widths will be reduced to 1.8m to reduce the impacts of widening there;
- Protected junctions will be provided at all signalised junction locations (Renmore Road, Michael Collins Road and Ballyloughane & the re-aligned Belmont); and
- Proposed toucan crossing approximately 150m west of the Skerrit Roundabout junction.

8.1.3 Pedestrian Provision

Pedestrian footpaths will be provided on both sides of the road for the length of the scheme. Along the scheme the crossing distances have been reduced for pedestrians crossing side roads where possible, and the radii of kerbs will be reduced to slow the speeds of vehicles turning onto side roads. The key infrastructural changes to the pedestrian link along this section of road are the following:

- Raised junction treatments, to prioritise pedestrian movements at junctions, added to the majority of minor arms/ accesses at unsignalised junctions, reducing vehicle speeds;
- Existing footpath widened adjacent to the Connaught Hotel access;
- Signalised crossings across Dublin Road will be maintained and an additional signalised crossing has been provided opposite Atlantic Technological University (ATU) Galway Campus;
- Upgrade of the eastern and western pelican crossings to toucan crossings at the Dublin Road/ Renmore Road signalised junction;
- Upgrade of the eastern and western pelican crossings to toucan crossings at the Dublin Road/ Michael Collins Road signalised junction;
- Addition of a northern arm at the Dublin Road/ Ballyloughane Road signalised junction to connect to Belmont;
- Proposed toucan crossing approximately 150m west of the Skerrit Roundabout junction; and

- Upgrade of Skerritt Roundabout to a four-arm signalised "Cyclops" style junction, with signals on all arms.

8.1.4 Land Use

Widening will be required along the length Dublin Road in this section of the scheme. This will require up to 6m from adjacent lands, and would impact on the following locations:

- Greenspace and paved area outside of Brothers of Charity Services Galway;
- Greenspace by Wellpark Grove;
- Parking area in front of DPL;
- Greenspace in The Connacht Hotel Car Park;
- Garden and driveway of 18 Dublin Road;
- Approximately 3 parking spaces outside of Duggan's Spar;
- Public Greenspace south of Glenina Heights;
- Greenspace by Galwegians Rugby Football Club;
- Greenspace in Flannery's Hotel Car Park;
- Industrial area to the west of Ballyloughane Road;
- Greenspace in Belmont;
- Gaelscoil Dara sports field; and
- Greenspace outside of ATU Galway Campus.

8.2 Skerrit Roundabout

Skerrit Roundabout will be upgraded to a signalised "Cyclops" style junction, with bus lanes on approach to the arms on Dublin Road. Cycle provision will be present on all arms of the junction. Footpaths and pedestrian crossings will be present on and across all arms of the junction.

8.3 Section 3

8.3.1 Bus Provision and General Vehicular Impacts

From the Skerrit Junction there will be a dedicated bus lane in each direction for the length of the section, these would tie into the as built Martin Junction to the east. The proposed changes to the bus stop infrastructure along this road section are outlined in Table 8-3 below.

A traffic lane in each direction will continue to be provided for the length of the scheme. The junctions at Murrough, Coast Road and Doughiska will remain signalised, and the junction at the access to Merlin Park Hospital and at Rosshill Road would be signalised. At each of these junctions right turn lanes will be provided for general traffic. Right turn lanes for general traffic will not be provided for uncontrolled junctions and accesses.

Table 8-3: Changes in Bus Infrastructure

Inbound / Outbound	Bus Stop Name / No.	Chainage	Location	Retained / Relocated / Removed / New	Existing Facilities	Proposed Facilities	Reason for moving / locating stop
Inbound	Dublin Road (Opp. Woodhaven) No. 522831	1+705	30m west of Merlin Gate/ Dublin	Retained	Bus Shelter, No seating,	Bus shelter with seating & facilities to	N/A

Inbound / Outbound	Bus Stop Name / No.	Chainage	Location	Retained / Relocated / Removed / New	Existing Facilities	Proposed Facilities	Reason for moving / locating stop
			Road junction		Paper timetable	incorporate RTPI	
Outbound	Proposed new stop	1+790	30m west of entrance to Merlin Park University Hospital	New	N/A	Bus shelter with seating & facilities to incorporate RTPI	New bus stop to correspond with westbound bus stop/due to enhances number of services.
Inbound	Dublin Road (Kingsvalley Hotel) No. 524331	2+100	50m west of Merlin Park Lane/ Dublin Road junction	Retained	Bus shelter, Seating, Paper timetable	Bus shelter with seating & facilities to incorporate RTPI	N/A
Outbound	Galway Crystal No. 524151	2+135	100m east of Merlin Park Lane/ Dublin Road junction	Relocated 120m west, opposite existing westbound stop	Bus shelter, No seating, Paper timetable	Bus shelter with seating & facilities to incorporate RTPI	Closer to existing pedestrian crossing
Outbound	Coast Road Junction No. 524171	3+350	70m west of Coast Road/ Dublin Road Junction	Relocated 125m east of the existing stop	Bus Pole, No paper timetable	Bus shelter with seating & facilities to incorporate RTPI	Moved away from private property entrance/ better alignment with new pedestrian crossings
Inbound	Proposed new stop	3+350	50m east of Coast Road/ Dublin Road junction	New	N/A	Bus shelter with seating & facilities to incorporate RTPI	There is a 1.6km distance between current westbound stops/ alignment with new pedestrian crossings
Inbound	Dublin Road (Castlegar Complex) No. 524321	3+720	60m west of Doughiska Road/ Dublin Road junction	Retained	Bus Shelter, Seating, RTPI	Bus shelter with seating & facilities to incorporate RTPI	N/A
Outbound	Castlegar GAA Club No. 524181	3+760	40m west of Doughiska Road/ Dublin	Retained	Bus Pole, No paper timetable	Bus shelter with seating & facilities to	N/A

Inbound / Outbound	Bus Stop Name / No.	Chainage	Location	Retained / Relocated / Removed / New	Existing Facilities	Proposed Facilities	Reason for moving / locating stop
			Road junction			incorporate RTPI	

8.3.2 Cycling Provision

Segregated cycle lanes will be provided on either side of the road between Skerrit Roundabout and Coast Road, from Coast Road to Martin Junction a 2-way cycle track will be provided on the north side of the carriageway only, north of the row of trees present there. This cycle track will tie into the proposals for the Martin Junction at the eastern end.

The key cycling improvements along this section of road can be summarised as follows:

- 2m two-way segregated cycle tracks on each side of the road between Skerritt Roundabout and the R336 Dublin Road/Coast Road junction;
- 2m two-way segregated cycle tracks on the northern side of the road between the R338 Dublin Road/Coast Road junction and the R338 Dublin Road/Doughiska Road junction;
- The cycling provision would be 2m wide when provided on either side of the road, and a total of 3m wide when 2 way between Coast Road and Martin Junction;
- Off-shoot segregated westbound cycle lane on the R338 Dublin Road, linking to Coast Road; and
- Protected junctions will be provided at all signalised junction locations (Merlin Park Hospital access road, Murrough Road, Coast Road and Rosshill.

8.3.3 Pedestrian Provision

Pedestrian footpaths will be provided on both sides of the road for the length of the scheme. Along the scheme the crossing distances have been reduced for pedestrians crossing side roads where possible, and the radii of kerbs will be reduced to slow the speeds of vehicles turning onto side roads.

The key infrastructural changes to the pedestrian link along this section of road are the following:

- Raised junction treatments, to prioritise pedestrian movements at junctions, added to the majority of minor arms/ accesses at unsignalised junctions, reducing vehicle speeds;
- Extended/ additional footpaths to a minimum of 2m wide across the whole section;
- Signalised crossings across Dublin Road will be maintained;
- New pedestrian crossings will be provided on all arms of the new signalised junctions at Merlin Park Hospital and Rosshill Road;
- Additional crossings on the Dublin Road arms of the Coast Road junction will also be provided;
- An additional pedestrian crossing will also be provided on the eastern arm of the Doughiska Junction;
- Upgrade of the Dublin Road/ Rosshill Road junction to a three-arm signalised junction, with signals on all arms;
- Upgrade of signalised crossings on all arms of the Dublin Road/ Coast Road junction to toucan crossings; and
- Upgrade of Skerritt Roundabout to a four-arm signalised “Cyclops” style junction, with signals on all arms.

8.3.4 Land Use

Widening will be required along the length Dublin Road in this section of the scheme. This would require up to 9.5m from adjacent lands, and would impact on the following locations:

- Greenspace to the north of the carriageway to the east of Skerrit Roundabout;
- Greenspace outside Woodhaven Estate, note that here the boundary wall would be set back to have the full carriageway and footpaths & cycle paths outside of the boundary wall; and
- Greenspace to the north of the carriageway through Merlin Park Meadows.

8.4 NIFTI Assessment

The preferred option will align with either Tier 1 – 'Active Travel' and Tier 2 – 'Public Transport' of the NIFTI Modal Hierarchy as it will provide new cycling infrastructure, new and improved pedestrian infrastructure and will repurpose general traffic lanes for bus lanes. As a result, the preferred option will align with Tier 3 and Tier 4 of the NIFTI Intervention Hierarchy.

A NIFTI analysis of the preferred option was undertaken using the NIFTI Assessment table[38] and shows the likely impact of the scheme, any mitigations and associated scoring. This can be seen in Table 8-4

[38] gov – Transport Appraisal Framework (TAF) (www.gov.ie) – NIFTI Assessment template (Module 4)

Table 8-4: Preferred Option NIFTI Assessment

	Decarbonisation	Protection and Renewal	Enhanced Regional and Rural Connectivity	Mobility of People and Goods in Urban Areas
Factors to consider and discuss when assigning scores	-Degree to which an option promotes modal shift to sustainable transport modes -Support adoption of EVs and LEVs -Reduce travel demand for private passenger vehicles Improve quality of the local environment	-Deliver safety improvements to the existing network -Deliver accessibility improvements to the existing network -Maintain/improve capacity of inter-urban transport networks -Address infrastructure vulnerability to an identified risk such as those arising from climate change	-Improve journey time and reliability between urban centres -Increase access to jobs, services, and leisure, in rural and regional areas -Improve freight access to markets and ports/airports	-Reduce congestion in urban areas -Enable the efficient movement of people in urban areas -Enable the efficient movement goods in urban areas -Enable compact growth and reduce the need for need to travel
Preferred Option				
Impact Description	• The preferred option will deliver a priority corridor resulting in mode shift from private vehicles to buses. • The preferred option will also deliver segregated cycling lanes along the length of the corridor, providing the community with safe alternative mode choices. • The increase corridor cross section will impact green space along the corridor slightly reducing local environment	• Segregated walking and cycling facilities introduced by the preferred option will improve safety for vulnerable users along the corridor. • The preferred option will also provide addition crossing points along the corridor providing safer connections between communities and facilities. • Providing a bus corridor will also improve the safety of motorised transport by remove conflict points at merges.	• The modelling of the preferred option showed that there will be at least a 5-minute improvement in bus travel times along the study area • The dedicated bus corridor along this busy bus corridor that caters for several local and regional bus trips will be more efficient improving the connections between cities. • The additional active mode facilities outside The Meadows and Rosshill Park Woods will increase access to leisure	• The preferred option provides segregated infrastructure for all user types, increasing travel choices for the community, likely to lead to reduced congestion by enabling mode shift. • The priority bus corridor will enable the efficient movement of people by buses. • The segregated cycle facilities will enable the efficient movement of people by active modes. • Road capacity will be reprioritised from private vehicles to buses and active modes, likely to result in less efficient travel by cars.
Impact Score	**Positive**	**High Positive**	**High Positive**	**Positive**
Mitigation Description	Impacted trees will be relocated to other green areas and new green areas along the corridor will be provided where possible Additional pedestrian crossing points along the corridor will improve the connection between communities and other areas improving the local environment	None	None	None
Impact After Mitigation	**High Positive**	**High Positive**	**High Positive**	**Positive**

SECTION 9: CLIMATE AND ENVIRONMENTAL PERFORMANCE

9.1 Overall Climate and Environmental Performance

The overall climate and environmental performance of the short list of options were assessed during the MCA process. The MCA used various measures to assess different criteria, including climate and environmental performance, with relevant criteria shown in Table 9-1.

Table 9-1: Assessment Criteria and associated m

Assessment Criteria		Measures
2	**Integration**	2.a. Land Use Integration
		2.b. Transport Network Integration
		2.c. Cyclists Integration
		2.d Pedestrian Integration
3	**Accessibility and Social Inclusion**	3.a. Vulnerable Groups
5	**Environment**	5.a. Archaeological, Architectural and Cultural Heritage
		5.b Biodiversity
		5.c Soils and Geology
		5.d. Landscape and visual
		5.e. Noise, Vibration and Air
		5.f. Land Use and the Built Environment
		5.g Climate and Carbon

The climate and environmental performance of the options is described in section 7.2.4 and 7.4. A comprehensive analysis of scheme impacts is outlined in the Chapter 6 (Traffic Transport) of the EIAR.

9.2 Modelling Results

The scheme will result in mode shift from private vehicles to more carbon friendly modes such as buses and active modes, travel time saving for buses and an overall reduction in vehicle kilometres travelled. All of which will result in a reduction in CO2 emissions.

A summary of the relevant modelling results for the Do Minimum and Do Something scenarios are presented in the sections below. For further information on the microsimulation model, see the Galway Dublin Road BusConnects VISSIM Model Report see Appendix B and Appendix C.

9.2.1 Trips and Mode Shares

In order to understand the benefit of the Proposed Scheme with regards to the Movement of People following the implementation of the proposed infrastructure measures, a quantitative People Movement assessment has been undertaken using outputs from the NTA WRM and LAM and comparing the Do Minimum and Do Something peak hour scenarios for each forecast year (2028, 2043).

The assessment of People Movement includes the following metrics:

The average number of people moved by each transport mode (i.e., Car, Bus, Walking and Cycling) along the corridor in the eastbound and westbound direction. This metric is compared for the Do Minimum and Do Something scenarios in the AM and PM peak hours for each forecast year (2028, 2043). This metric provides an estimate of the modal share changes along the route as a result of the Proposed Scheme measures; and People Movement by Bus:

- AM and PM peak hour Bus Passenger Loadings along the Proposed Scheme for each forecast year (2028, 2043); and
- Total Passengers Boarding Buses on bus routes that use any part of the Proposed Scheme for each forecast year (2028, 2043).

Peak Hour People Movement along the Proposed Scheme

To determine the impact that the Proposed Scheme has on modal share in the study area as a result of its implementation, the weighted average number of people moved by each mode (Car, Bus, Active Modes) was extracted from the WRM / LAM. The analysis compares the Do Minimum and Do Something scenarios both in the eastbound and westbound direction in the AM and PM peak hours (8-9am, 5-6pm) for each forecast year (2028, 2043).

As outlined previously, the same demographic assumptions (population, employment levels) are included in both the Do Minimum and Do Something scenarios. The bus network and frequency assumptions are also the same in both scenarios and are in line with the network proposals. It is acknowledged, therefore, that the assessment is conservative in terms of the relative increase in the level of people movement that is predicted in the Do Something scenario.

The contents of Table 9-2: outline the difference in modal split between the Do Minimum and Do Something scenarios for general traffic and sustainable modes in both directions during the AM and PM Peak Hour. The results indicate during the AM sustainable modes will increase by 5 to 8% in 2028, while during the PM sustainable modes will increase by 7 to 20%.

Table 9-2: Mode Shift of 2028 Peak Hour: Westbound and Eastbound

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Hourly Trip	Modal Split (%)	Hourly Trips	Modal Split (%)	Hourly Trips	Difference (%)
Westbound	AM	General Traffic	817	64%	854	63%	36	4%
		Sustainable Modes Total	470	36%	508	37%	38	8%
Eastbound		General Traffic	669	75%	616	73%	-53	-8%
		Sustainable Modes Total	222	25%	231	27%	9	4%
Westbound	PM	General Traffic	665	78%	631	76%	-34	-5%
		Sustainable Modes Total	191	22%	204	24%	13	7%
Eastbound		General Traffic	801	72%	824	69%	23	3%
		Sustainable Modes Total	305	28%	365	31%	60	20%

The contents of Table 9-2 outline the difference in modal split between the Do Minimum and Do Something scenarios for general traffic and sustainable modes in both directions during the AM and PM Peak Hour. The results indicate during the AM sustainable modes will increase by 2 to 9% in 2043, while during the PM sustainable modes will increase by 6 to 23%.

Table 9-3: Mode Shift of 2043 Peak Hour: Westbound and Eastbound

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Hourly Trip	Modal Split (%)	Hourly Trips	Modal Split (%)	Hourly Trips	Difference (%)
Westbound	AM	General Traffic	636	48%	629	46%	-7	-1%

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Hourly Trip	Modal Split (%)	Hourly Trips	Modal Split (%)	Hourly Trips	Difference (%)
		Sustainable Modes Total	677	52%	739	54%	62	9%
Eastbound		General Traffic	523	65%	571	67%	48	9%
		Sustainable Modes Total	279	35%	286	33%	7	2%
Westbound	PM	General Traffic	556	68%	580	68%	24	4%
		Sustainable Modes Total	257	32%	272	32%	15	6%
Eastbound		General Traffic	866	68%	874	64%	8	1%
		Sustainable Modes Total	398	32%	491	36%	93	23%

The assessment showed increases in sustainable modes in both 2028 and 2043 as a result of the proposed scheme. Public transport will have the biggest increases in the eastbound direction along the corridor, particularly in the PM, given the volume of flows which use the corridor to exit the city and given there is no existing bus lane in this direction.

Despite the general growth in traffic levels between 2028 and 2043, traffic along the corridor is generally either reducing or increasing at marginal levels. Sustainable modes on the other hand see an increase between 2028 and 2043. This shows that car trips – unlike public transport, walking and cycling - do not grow in line with population. Therefore, the scheme will provide a substantial opportunity for growth of sustainable modes whilst discouraging car usage along the corridor.

Bus Boardings

An additional assessment was undertaken to compare the Do Minimum and Do Something total passengers boarding on bus routes that will use any part of the Proposed Scheme in both 2028 and 2043 forecast years. The results for the 2028 Opening Year scenario are indicated in Table 9-4:

Table 9-4: 2028 Peak Hour Bus Boardings on Routes using the Proposed Scheme

Time Period	Do Minimum (no. of boardings)	Do Something (no. of boardings)	Difference in no. of boardings	Difference (%)
AM	1264	1402	138	11%
PM	1139	1354	215	19%

The contents of Table 9-4: show that there will be a 11% increase in people boarding bus routes which use the Proposed Scheme during the AM Peak Hour. This represents an addition of 138 passengers in the AM Peak hour. In the PM Peak hour, there will be a 19% increase in people boarding bus routes which use the Proposed Scheme, representing an additional 215 passengers.

The comparison results for the 2043 scenario are indicated in Table 9-5:

Table 9-5: 2043 Peak Hour Bus Boardings on Routes using the Proposed Scheme

Time Period	Do Minimum (no. of boardings)	Do Something (no. of boardings)	Difference in no. of boardings	Difference (%)
AM	1788	1992	204	11%
PM	1383	1709	326	24%

The contents of Table 9-5: shows that there will be an 11% increase in people boarding bus routes which use the Proposed Scheme during the AM Peak Hour. This represents an addition of 204 passengers in the

AM Peak hour. In the PM Peak hour, there will be a 24% increase in people boarding bus routes which use the Proposed Scheme, representing an additional 326 passengers.

9.2.2 Public Transport Journey Times

The figures below show the average journey times across the full length of the corridor in the AM and PM peaks in 2028.

It should be noted that additional bus priority measures, on top of the proposed bus lanes, were coded in the microsimulation models, such as signal priority for buses at signalised junctions. This key assumption was included following consultation with the National Transport Authority and Galway City Council, and aligns with the Bus Connects Galway – Dublin Road scheme. This enabled buses to avoid waiting at the stop line and thus travel through the junction faster.

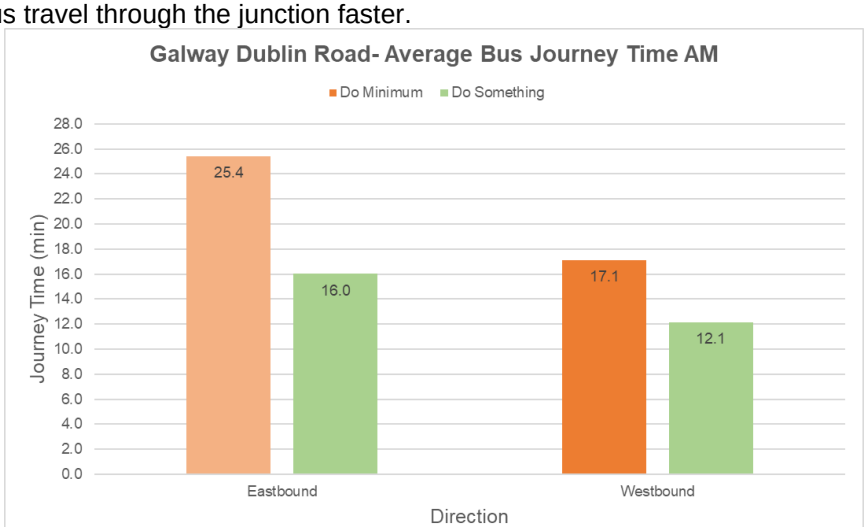


Figure 9-1: Average Bus Journey Times – AM Peak

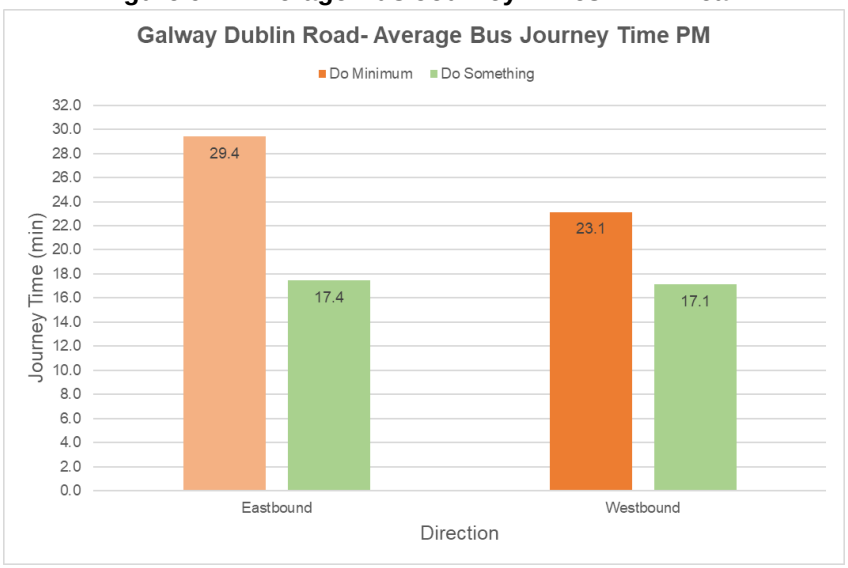


Figure 9-2: Average Bus Journey Times – PM Peak

The results show that the Do Something scenario will have a lower average bus journey times in both directions and both peaks when compared to the Do Minimum scenario. In the eastbound direction, there will be a decrease of 8 minutes in the AM peak and 12 minutes in the PM peak. This is due to a combination of the inclusion of bus lane is the eastbound direction and signal priority for buses at signalised junctions. In the direction, there will be a decrease of 5 minutes in AM peak and 6 minutes in the PM peak.

These results will contribute to National Climate targets and will reduce travel emissions that would have resulted from prolonged waiting times or congestion delays.

9.2.3 LAM Modelling Results

High level network performance indicators for the LAM network were extracted for all modelled scenarios in the AM, Inter-peak and PM peak hours and are presented in Table 9-6. It is important to note that the results presented cover the full LAM network, therefore the impact of transport scenarios along the Dublin Road corridor may be viewed as relatively marginal in consideration of the entire network.

Overall, the AM over-capacity queues show a ranging from 5% to 20% between the Do Something and the Do Minimum, when compared by year, while the PM shows a decrease for the 2028 scenario of approximately 8%, with an increase of between 2%-5% in 2043.

There will be a slight decrease in total travel distance between the Do Something and Do Minimum. Considering that these results are for the full model network, the scheme will result in a positive impact on climate and the environment.

Table 9-6: Local Area Model – Network Performance Indicators

Scenario	Time Period	Over Capacity Queues [pcu-hrs]	Total Travel Distance [pcu-km]	Time Period	Over Capacity Queues [pcu-hrs]	Total Travel Distance [pcu-km]
2022 BASE YEAR	**AM**	176	148,892	**PM**	174	147,869
2028 DO MIN	**AM**	1,004	163,667	**PM**	665	162,865
2028 DO SOM	**AM**	896	162,711	**PM**	614	162,135
2043 DO MIN	**AM**	2,406	192,128	**PM**	1,344	188,317
2043 DO SOM	**AM**	2,185	191,855	**PM**	1,411	188,279
2043 DO MIN (With GCRR)	**AM**	540	226,668	**PM**	1,158	222,309
2043 DO SOM (With GCRR)	**AM**	427	225,465	**PM**	1.177	222,823

SECTION 10: COST PROJECTION

10.1 Cost Range

The Preliminary Project Construction Cost Estimate is approximately €64million (including VAT), therefore it is anticipated that the project will fall within Band 3 (> €10 million) Projects cost range defined within the NTA's Project Approval Guidelines. This cost estimate is based on the development of a per kilometre rate using NTAs Schedule of Rates as well as Galway City Councils and Barry Transportations experience of similar schemes which includes Demolition, Enabling Works, and New Works.

In accordance with Section 6 and 7 of the NTA Cost Management Guidelines, the following cost calculators have been completed and are provided in Appendix G:

- The Contingency Calculator: 001_B123_CC (Band 3-Phase 3)-GBCDR_P01
- Cost Estimate Calculator: 014_B23_PCE (Band 3-Phase 3)-GBCDR_P01

Cost assessments for all short list of option was undertaken and is detailed in Appendix H.

10.2 Cost Sensitivity

A sensitivity analysis has been carried out to provide a range of costs with an upper and lower boundary. Sensitivity has been carried out using two parameters as the basis for analysis:

- Contingency
- Inflation

The cost calculated using the NTA Cost Estimate Calculator is the P50. A P50 cost estimate is an estimate where there is a 50% probability that the final cost will be at or below the stated cost figure. The two parameters described above the will be used to determine the P30 and P80 estimates, a 30% and 80% probability of the final cost being at or below the stated cost figure.

Table 10-1 shows that the P30, P50 and P80 have a less than 10% difference between each probability estimate. More detailed probability estimates will be undertaken in Phase 5.

Table 10-1: Cost Sensitivity

Estimate	Contingency	Amount (€ million)	Inflation	Amount (€ million)	Total (€ million)
P30	30% (Lower range - NTA Contingency Calculator)	€ 10,5	12% (P50-1%)	€ 3,8	€ 59,4
P50	41% (Calculated using the NTA Contingency Calculator)	€ 14,5	13%	€ 4,1	€ 64,3
P80	50% (Upper range - NTA Contingency Calculator)	€ 17,8	14% (P50+1%)	€ 4,4	€ 68,5

10.3 Affordability Assessment

The Exchequer transport allocation is guided by priorities and recommendations from the NIFTI. This framework ensures that future transport investment aligns with the National Strategic Outcomes within the National Planning Framework. The strategic outcomes that the proposed scheme aligns with are:

- Compact Growth.
- Sustainable Mobility.
- A Strong Economy, supported by Enterprise, Innovation and Skills.
- Enhanced Amenity and Heritage; and
- Transition to a Low Carbon and Climate Resilient Society.

The NDP has set out a public capital investment programme of €35 billion from the period 2021 to 2030 with €360 million allocated annually from the period 2021 to 2025 for active travel schemes. In addition, included in the NDP is a €200 million investment in Bus Connects strategy for Galway. This investment will help support the delivery of significant levels of new and improved walking and cycling facilities by 2025 and public transport infrastructure by 2030.

10.4 Cost Peer Review

Chandler KBS undertook an external independent cost estimate. The costs identified and the full report can be found in Appendix I.

SECTION 11: FINANCIAL APPRAISAL

The preferred option has been considered further in terms of financial appraisal, affordability, risks and sensitivity testing.

11.1 Revenues

BusConnects Galway: Dublin Road will result in higher bus passenger numbers and, therefore, higher fare revenues. These revenues are exempt of VAT. An estimate of the fare revenue impact of the Preferred Option has been calculated using data extracted from the modelling on changes in passenger boardings in the AM and PM peaks. An assumed average fare of €0.7 is taken as a base to reflect the impact of period tickets and concessionary fares. A rate of inflation of 2% per annum is applied to future fares.

11.2 Operational Costs

BusConnects Galway: Dublin Road will result in significant journey time savings for the bus network. Bus journey times are directly linked to the peak vehicle requirement, and consequently, the operational costs of the network. The Operational Costs included in Table 11-2 include provisions for the operation and maintenance of the physical infrastructure along the Dublin Road, including the provision of traffic signalling, public lighting, road and cycleway maintenance, road sweeping and storm water treatment. The predicted operational costs per year is estimated at a total of €498k per annum, these figures are based on estimates provided in the Preliminary Business Case for the Bus Connects Galway Cross City Route. Using data extracted from the model, an estimation has been made of the savings in peak vehicle requirement both in terms of the average operational cost of a bus in the network and the capital cost of fleet replacement. The estimates indicate a reduction in operational costs of the order of 10%. Table 11-1 shows the breakdown of operational and maintenance costs for the scheme. The operational and rehabilitation costs have been split equally for the purposes of this report.

Table 11-1: Operational and Maintenance costs

Costs	2030-2039	2040-2052	Operational Cost Impacts
Maintenance	693,000.00	924,000.00	1,617,000.00
Operational	2,146,000.00	2,861,333.33	5,007,333.33
Rehabilitation	2,146,000.00	2,861,333.33	5,007,333.33
Renewals	-	-	-
Total	**4,985,000.00**	**6,646,666.67**	**11,631,666.67**

11.3 Capital and Maintenance Costs

Costs have been developed in line with the Public Spending Code (December 2019), as these guidelines were not updated in December 2023 under the Infrastructure Guidelines, recommendations for financial appraisal analysis. No residual value of built assets was considered within the analysis presented at this Preliminary Business Case Stage. The level of maintenance costs for the scheme is of a similar order of magnitude to the Do-Minimum scenario and are not included in the assessment presented below. For the purposes of the financial appraisal, costs are presented in nominal terms excluding VAT.

The operational costs of the scheme, primarily from storm water management for the scheme total €77k per annum, as shown in Table 11-1. These costs have been taken into account for the purposes of the Cost Benefit Analysis.

11.4 Affordability

The PSC[39] requires an assessment of affordability setting out total investment required, timing of costs and ongoing operation and maintenance impacts**.** Table **11-2** sets out the envelope of total investment required, timing of costs and ongoing operation and maintenance costs, providing details of the profile of Nominal Costs including VAT and net expenditure from 2022 to 2052. It is noted that VAT is considered a transfer cost as it would be offset on an overall Exchequer basis, however it has been included to the totals in the table below, along with the construction contingency and inflation costs as recommended by NTA. The construction cost breakdown is shown in Appendix G.

Table 11-2: Financial Performance (Nominal prices, including VAT) (€, million)

Year	Capital Cost	Fare Revenue Impacts	Operational Cost Impacts	NET Expenditure
2022	0.352	0	0	(0.352)
2023	0.662	0	0	(0.662)
2024-2025	2.597	0	0	(2.597)
2026-2029	61.851	0	0	(61.851)
2030-2039	0	0.024	4.985	(4.961)
2040-2052	0	0.051	6.647	(6.596)
Total	**65.462**	**0.075**	**11.632**	**(77.019)**

*2024-2025 cost includes PBC closeout and Preparation and Administration + associated VAT costs
*2026-2029 cost includes Construction, Traffic Management, Land and Property, Adjustments and VAT costs

The assessment shows that the scheme has an overall impact on the Exchequer. Note should also be taken of the wider economic benefits described below. Consideration of funding application timings will be undertaken at the next stage of the project; however, it is expected that the DoT will be funding this project via the NTA Public Transport Investment Programme and will therefore be subject to the PAG gateway approvals and availability of funding.

11.5 Wider Economic Benefits

There are a number of benefits arising from the scheme that are not quantified and monetised within this Preliminary Business Case. Of particular note is the benefits of the significantly improved urban realm. Improvements to the urban realm are likely to result in positive economic impacts for users, businesses in Galway and the Exchequer through a number of means including:

- Higher footfall linked to higher activity in the local economy;
- Potential for events and on-street activities such as Christmas Markets, festivals;
- Potential to include for Sustainable Urban Drainage and reduce costs of climate adaptation measures that might otherwise be required;
- Wider socio-economic effects.

[39] The Financial analysis methodology and guidelines have not changed under the Infrastructure Guideline updated in 2023.

There have been a number of international studies examining the impact, rational and benefits of the reallocation of road space to sustainable modes and urban realm improvements. The challenges of appraising the benefits of the improved urban area are widely acknowledged. The benefits arising from the urban realm improvements, additional to those represented in this Preliminary Business Case, can be explored as the project progresses to Final Business Case whilst being cognisant of the need for proportionate effort in the appraisal. A case study based approach may be the most appropriate to support an efficient appraisal process.

SECTION 12: COST BENEFIT ANALYSIS

12.1 Overview

A report was completed detailing the Cost Benefit Analysis for the BusConnects Galway: Dublin Road project in-line with the Public Spending Code (December 2019), as these guidelines were not updated in December 2023 under the Infrastructure Guidelines, and has been appended to this report, Appendix J.

The CBA assessment was undertaken using the TUBA v1.9.14 cost benefit analysis programme. The economic parameters file used was updated to reflect the latest parameters set out in TAF Module 8 – Detailed Guidance on Appraisal Parameters[40]. This resulted in changes to the Values of Time for different purposes, fuel consumption parameters, fuel costs, non-fuel operating costs and ensuring that all monetary values presented were in 2016 prices, amongst other parameters from TII's PAG Unit 6.11 (March 2021). The discount rate of 4% was also applied for appraisal years 1-30 and 3.5% used for years 31-60, as per the PSC[41].

The overall estimated cost of the Dublin Road scheme is €64,311,011, made up of the following components:

Table 12-1: Preferred Option Cost Estimate

Item	Cost Estimate
Construction Costs	€27,897,768
Preparation and Administration Costs	€2,000,000
Traffic Management Related Costs	€1,394,888
Land and Property Costs	€7,130,168
Inflation	€4,068,045
Contingency	€14,497,887
Per Cent Art Scheme	€353,607
Total Costs (Cumulative)	€57,342,364
Add VAT	€6,968,646
Total Costs (Including VAT)	**€64,311,011**

[40] 1a7ff966-44cf-4aed-b1a0-bc9c746d294a.pdf (www.gov.ie)

[41] The CBA methodology and guidelines have not changed under the Infrastructure Guideline updated in 2023.

12.2 Monetised Scheme Impacts

In-line with TAF, all monetised impacts were discounted to 2016 prices and values. The impacts were also calculated over a 60-year period to account for the residual value. For major transport schemes, the residual value is a measure of the net present value of the infrastructure over a specified period beyond the 30-year appraisal period. For all major national transport projects, a residual value period of 30 years is commonly applied based on the guidance outlined in TAF.

A two-tiered modelling approach was used to estimate the benefits of the Dublin Road scheme and the relationship between the two and the details around the modelling can be found in the CBA report. Public Transport Benefits were derived directly from the NTA Western Regional Model (WRM) and general traffic benefits were derived from the project Local Area Model (LAM) with road demand provided from the WRM.

TUBA is the main software package used to estimate the user impacts associated with the Dublin Road Scheme. TUBA took demand, journey time and travel distance information from the WRM and LAM for each future year, vehicle type and journey purpose; for each time period; and calculated travel time saving benefits. It did this by comparing the travel times in the 'Do-Minimum' or without scheme scenario with those in the 'Do-Something' with scheme scenario. It then applied monetary values (known as Values of Time - VoT) to derive the monetary benefits of those time savings. These monetary values are standard for appraisals within Ireland and are provided by TAF. In addition to journey time savings, TUBA also calculated impacts on Vehicle Operating Costs (VOC), revenues (e.g. tolls, public transport fares and other charges) and tax revenues.

Details about annualisation factors, sectoring impacts, active mode benefits and journey time benefits can be found in the CBA report.

12.3 Results Summary

The core assumptions used in the economic appraisal were:

- Price Base Year: Price base year and present value year of 2016 as defined in the DoT TAF;
- Residual Value: Standard appraisal period of 30 years with a residual value period of a further 30 years;
- Discount Rate: Discount rate of 4.0% for 30 years from current year, 3.5% for years 31-60 and 3.0% thereafter;
- Shadow Price of Public Funds: When the government raises funds through taxation, it can introduce economic distortions: taxes such as VAT or income tax raising the price paid for goods and services, which can discourage economic activity that would have otherwise occurred. In-line with the PSC and CAF, a shadow price factor of 1.3 has been applied for public funds in the appraisal.
- Shadow Price of Labour: Spending on some projects, particularly when they are located in an area with high rates of unemployment, can have a stimulus effect; creating jobs and reducing the number of people claiming social welfare payments. As of June 2023, PSC and TAF guidance indicate that those involved in the preparation of economic appraisals in the transport sector should use 100% as the shadow price of labour. As such, a shadow price factor of 1 has been applied for labour in this appraisal.

The benefits of the proposed scheme is outlined in Table 12-2. It should be noted that the results include all journey time impacts for transport users, including those less than 5 minutes.

Table 12-2: Cost Benefit Analysis Summary – Core Scenario

Measure	Benefits (€000's)
Public Transport Benefits	70,007

Road Benefits	-29,185
Active Mode Benefits	3,559
Indirect Tax Revenues	-2,174
Reliability Benefits	17,871
Present Value of Benefits (PVB)	60,078
Investment Costs	46,483
Operational Costs	997
Present Value of Costs (PVC)	47,480
Net Present Value (NPV)	12,598
Benefit to Cost Ratio (BCR)	**1.27**

12.4 Sensitivity Tests

Standard practice in undertaking assessments of transport projects requires that a number of demand scenarios are generated to provide a range of appraisal results. Each scenario is offering a different assessment of the future by comparing a “Do Minimum” development scenario with a “Do Something” (also known as with scheme) scenario. This allows for a more robust understanding of the likely impacts of the Dublin Road scheme. As such four demand related sensitivity scenarios have been assessed and are as follows:

- +10%;
- +20%;
- -10%;
- -20%; and
- with the N6 Galway City Ring Road (GCRR)

These sensitivity scenarios are related to the demand growth using the corridor i.e. for the +10% scenario, a 10% growth is applied to the number of additional bus passengers (difference between Do Minimum and core Do Something scenario), to assess the impact of a rise in passengers using the corridor. The same approach was used as part of the active travel benefits calculation using the TEAMs tool and during the journey time reliability calculations (for public transport users), whereby the demand growth was either reduced or increased. As part of the road benefits calculations, the overall demand was factored up or down, to test higher and lower levels of traffic in the study area. The results of each of these tests were passed through TUBA to inform the CBA.

Cost sensitivity scenarios were also tested whereby the cost of the scheme was increased by 10% and 20%, on the core scenario.

Table 12-3: Cost Benefit Analysis Summary – € '000

	CORE	DEMAND -10%	DEMAND -20%	DEMAND +10%	DEMAND +20%	COSTS +10%	COSTS +20%	WITH GCRR
Public Transport Benefits	70,007	63,025	56,378	76,989	83,636	70,007	70,007	65,271
Road Benefits	-29,185	-26,567	-23,950	-31,805	-34,422	-29,185	-29,185	-41,129
Active Mode Benefits	3,559	3,517	3,476	3,601	3,643	3,559	3,559	3,559
Indirect Tax Revenues	-2,174	-1,955	-1,735	-2,394	-2,614	-2,174	-2,174	94
Reliability Benefits	17,871	17,714	17,556	18,027	18,185	17,871	17,871	17,871
Present Value of Benefits (PVB)	60,078	55,734	51,725	64,418	68,428	60,078	60,078	45,666
Investment Costs	46,483	46,483	46,483	46,483	46,483	51,131	46,483	46,483
Operational Costs	997	997	997	997	997	1,097	997	997
Present Value of Costs (PVC)	47,480	47,480	47,480	47,480	47,480	52,228	56,976	47,480
Net Present Value (NPV)	12,598	8,254	4,245	16,938	20,948	7,850	3,102	-1,814
Benefit to Cost Ratio (BCR)	**1.27**	**1.17**	**1.09**	**1.36**	**1.44**	**1.15**	**1.05**	**0.96**

SECTION 13: RISK IDENTIFICATION

13.1 Overview

Consideration has been given to cost, risk and value guidelines as detailed in the NTA's Cost Management Guidelines (CMG) for delivery of the proposed scheme. A Project Execution Plan (PEP) has been prepared and will be updated as required. This will clearly set out the Cost, Risk and Value Management procedures for the scheme.

The PEP is the core document for managing a project and states the procedures and policies for Project delivery. This includes information on computer software standards, documentation systems, Project reporting, meeting frequencies and approval procedures. There are also requirements for a Decision Register and a Risk Register. The risk register is maintained and regularly updated with risks that can potentially impact on the successful project delivery. This requirement is in addition to the phase specific risk evaluation processes outlined in the CMG. The risk register contains a description of each identified risk, a rating for each risk based on a matrix system, the risk owner and the risk control and mitigation strategies.

Cost, Risk and Value Management Procedures for Phase 1 (Scope and Purpose) to Phase 5 (Detailed Design and Procurement) are illustrated in Table 13-1. Which identifies some of the main deliverables and processes involved in each.

Table 13-1: Cost, Risk and Value Management Procedures

	Cost Management	Risk Management	Value Management
Phase 1 – Scope and Purpose	Grant Application Cost Estimate	Contingency Quantification	Value Decisions Tracking Register
Phase 2 – Concept Development and Option Selection	Option Comparison Cost Estimates	Risk Management Meetings	Value Decisions Tracking Register
	Feasibility Working Cost Estimate for Preferred Option	Contingency Quantification	
Phase 3 – Preliminary Design	Preliminary Cost Estimate	Risk Management Meetings	Value Decisions Tracking Register
	Prepare Whole Life Cost Analysis	Quantitative Risk Assessment	Value Management Meetings
		Contingency Quantification	
Phase 4 – Statutory Processes	Updated Preliminary Cost Estimate	Risk Management Meetings	Value Decisions Tracking Register
		Quantitative Risk Assessment	Value Management Meetings
		Contingency Quantification	
Phase 5 – Detailed	Preparation of Pre-Tender Cost Estimate	Risk Management Meetings	Value Decisions Tracking Register

Design and Procurement	Development of Commercial Tender Documents	Quantitative Risk Assessment	Value Management Meetings
	Commercial Assessment of Tender Returns	Contingency Quantification	
	Preparation of Total Project Cost Estimate		

During Phase 6 (Construction), much emphasis is placed on cost, risk and value management. Following on from the work undertaken in Phase 5 the Value Engineering Opportunities and Project Risks will be reassessed. Risk monitoring and management will be an item on the agenda of construction meetings. Following these meetings, the Quantified Risk Register will be updated by Galway City Council's representative. This report informs how risks will be managed during construction.

Galway City Council's representative will also maintain and prepare a Construction Phase Financial Dashboard and Financial Reports which are to be updated monthly until the Final Account is agreed.

13.2 Risks and Mitigation Measures

13.2.1 General Risks

There are funding and policy risks associated with the proposed scheme at the Phase 1 of the NTA project lifecycle. These risks have been increased with the increase in inflation, slower economic growth and possible recession and their subsequent potential effects on governments plans, policies and spending. Technical meetings at Phase 1 would be organised where identification of Initial Risks, Strategic Risks and key constraints would occur. As well as this, Strategic planning and Overall Risk Profiling would take place.

The time taken from the original inception of this project to commencement of construction could be a significant length of time, resulting in a risk of inflation; however, this risk will be included in the cost estimate calculator. Regular meetings of key government bodies need to occur to combat the risk of changes to government policy, design standards and funding priorities during this timeframe.

There is the risk of amendments to the Galway City Development Plan with rezoning of land which could lead to increases in land valuation, which adds to risk of inadequate funding being available. This combined with a possible economic downturn sees the potential for reduced funding for active travel schemes, particularly outside of the country's main urban centres.

13.2.2 Project Management Risks

Decision making can on occasion be fragmented across a number of organisations at central government and local government level with the array of policies and procedures contributing to delays which can significantly increase the costs of projects. Again, regular communication is of key importance to minimise any negative impact and delay. The sooner a government body is made aware of a policy/standard change, the better capable they are of absorbing any negative effects that may be triggered.

13.2.3 Environmental Risks

The network of sites designated or proposed for designation across Ireland and Europe under the Habitats and Birds Directives is known as the Natura 2000 Network. This network includes Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), as well as sites that are proposed for designation as SACs or SPAs. The sites are also known as Natura 2000 sites or European Sites.

The designated European sites (Natura 2000) located within an approximate 15km zone of influence of the area, comprise the Inner Galway Bay SPA (Site code: 004031), Cregganna Marsh SPA (Site Code 004142), Rahasane Turlough SPA (Site code 004089), Ardrahan Grassland SAC (Site code 002244), Castletaylor Complex SAC (Site code 000242), Lough Fingall Complex SAC (Site code 000606), East Burren Complex SAC (Site code 001926), Moneen Mountain SAC (Site code 000054), Black Head-Poulsallagh Comple SAC (000020), Connemara Bog Complex SAC (Site code 002034), Ross Lake and Woods SAC (Site code 001312), Galway Bay Complex SAC (Site code 000268) and Lough Corrib SAC (Site code. 000297).

Natural Heritage Areas (NHAs) and proposed Natural Heritage Areas (pNHAs) are sites that are designated or proposed for designation under the Wildlife (Amendment) Act 2000. These are sites that are of national importance, and generally support a range of habitats, plant and animal species and, in some cases, geological features.

There are 14 proposed Natural Heritage Areas (pNHA) within an approximate 15km zone of influence of the proposed development.

An analysis of the proposed Natural Heritage Areas and designated Natural Heritage Areas in terms of their role in supporting the species using Natura 2000 sites will be required. The assessment of these supporting roles can relate to mobile fauna such as mammals and birds which may use pNHAs and NHAs as “steppingstones” between Natura 2000 sites.

Article 10 of the Habitats Directive and the Habitats Regulations 2011 place a high degree of importance on such non-Natura 2000 areas as features that connect the Natura 2000 network. Features such as ponds, woodlands, important hedgerows along with waterways e.g., River Corrib, Galway Bay and Lough Atalia. An Appropriate Assessment Screening will be required initially to assess the impacts on Natura 2000 sites.

Clarinbridge / Kinvara Bay and Aughinish Bay located approximately 13km south of the scheme were designated as Shellfish Areas under the EU Shellfish Water Directive 2006/113/EC. The four Shellfish Areas are hydrologically connected to the proposed scheme Galway Bay and the River Corrib.

Ramsar sites are wetlands of international importance, designated under the Ramsar Convention. Inner Galway Bay is a Ramsar site and a SPA under the E.U. Birds Directive. Galway Bay is an internationally important wetland site with part of the site is Wildfowl Sanctuary. Galway Bay is a large, sheltered bay system, with several intertidal inlets and small low islands composed of glacial deposits.

There are 5 Long Established Ancient Woodlands within an approximate 15km of the proposed development. These include Lavally, Cregballymore, Furbough, Shannawoneen Wood and Cuildermot Wood.

The river Corrib was designated as a Salmonid River under the EU Council Directive 2006/44/EC (Freshwater Fish Directive) within the study area. Species of fish found along the river include Brook and Sea Lamprey (Lampetra planeri and Petromyzon marinus), Brown Trout (Salmo truta), European Eel (Anguilla anuguilla) and Atlantic Salmon (Salmo salar). Additionally, Dipper (Cinclus hibernicus), Grey Wagtail (Matacilla cinerea), Grey Heron (Andea cinerea), Comorant (Phalacrocorax carbo), Peregrine Falcon (Falco peregrinus), Otter (Lutra lutra) and bats and seals are known to occur along the city centre waterway. Invasive species such as Japanese Knotweed (Fallopia japonica), Himalayan Balsam (Impatiens glandulifera) and others have also gained a foothold in the riverine environment.

There are a significant number of protected monuments and structures within the proposed scheme study area from both the National Inventory of Architectural Heritage (NIAH) and the Archaeological Survey of Ireland (ASI).

The hydrogeological environment of the proposed scheme varies from 'Extreme/ Rock at or near Surface or Karst', 'High' to 'Moderate' groundwater vulnerability. The bedrock aquifer in the proposed scheme area consists of Regionally Important Aquifer – Karstified (diffuse). The potential impacts of the scheme on the hydrogeological environment in areas of cuttings and/or drainage outfalls will need to be further assessed.

The Galway City Development Plan 2023 - 2029 defines areas of scenic value in the city and outlines objectives in relation to the preservation of landscape and visual assets. A total of eleven Architectural Conservation Areas (ACA's) described in the Galway City Development Plan 2023 – 2029 are located within an approximate 15km zone of influence of the study area. Additionally, there are a number of views and prospects identified in the Development Plan of special amenity value to the city. The preservation of landscape and visual assets will require careful consideration as the project progresses.

13.2.4 Strategic Risks

The scheme objectives have been set using SMART (Specific, Measurable, Achievable, Relevant and Timely) criteria. However, there is a risk of the project not achieving some of these stated objectives. This risk can be minimised by ensuring that scheme objectives are updated to take account of all external and internal developments at appropriate stages throughout the project lifecycle.

Demand forecasts for an active travel scheme are based on the best available information however there remains a risk that these forecasts over-estimate the likely pedestrian, cyclist and public transport demand. This risk can be minimised by ensuring that robust demand forecasts are developed which include an examination of both low growth and high growth scenarios.

13.2.5 Risk Summary

A review into the risks and mitigation measures associated with the Planning and Design of the BusConnects Galway: Dublin Road was undertaken and are presented in Table 13-2. The complete risk register can be found in Appendix K.

Table 13-2: Planning & Design Risks and Mitigation Measures

Risk	Mitigation Measures
General Risks	
Changes in availability of funding for the scheme	Ensure regular meetings between the Sponsoring Agency and the Approving Agency to review and monitor costs and budgets
Inflationary pressure impacting construction costs and availability of funding	Ensure regular meetings between the Sponsoring Agency and the Approving Agency to review and monitor costs and budgets
Changes in National Policy or Design Standards	Ensure regular meetings with key bodies
Rezoning of land required for the scheme	Ensure potential corridors are identified early and regular meetings are held with Galway City Council Planning Department
Changes to the strategic aims of the Galway Transport Strategy	Ensure continued correspondence with Galway City Council, Galway County council and the National Transport Authority
Dated survey information such as topographical survey	Procurement of high resolution orthophotography and early identification of survey gaps
Delay on utility diversions	Engage with utility providers at early stage
Unchartered services	Undertake a GPR survey at the outset

There is a risk that commercial property on the Dublin Road that is not directly impacted by the CPO process may be indirectly impacted, which will be compensable.	Engagement with affected stakeholders to mitigate and minimise the risks posed
NTA design guidance documents not yet published	Liaise with NTA on proposed technical arrangements.
Public opposition to scheme design	Advertise the 2nd Non-Statutory Public Consultation locally. Engage with the public to clearly understand concerns. Undertake a full review of feedback from the 1st Non-Statutory Public Consultation including environmental concerns, access concerns and concerns on the impact on amenity areas
Project Management Risks	
Delays in decision making across multiple organisations	Ensure regular meetings with key bodies
Misalignment of programme with that of other adjoining projects such as Galway BusConnects Cross City Link	Adoption of an accelerated programme
Environmental Risks	
Changes in design required due to archaeological sites	Ensure sufficient archaeological testing undertaken
Delays to environmental surveys	Early engagement with specialists and early procurement of survey work
Unforeseen environmental impacts may result from final changes to alignment design	Review environmental requirements during detailed design and when implementing any design changes
Environmental requirements due to seasonal restrictions on construction may impact on programme	Include environmental requirements in works requirements
Review potential impacts upon designated European sites (Natura 2000) and need for Appropriate Assessment	Review impact on hydrogeological environment
Potential impacts on watercourse and AFAs	Seasonal constraints for ecological surveys
Presence of contaminated ground	Early review of historic land use and scheduling of testing as part of site investigation scope
Strategic Risks	
Project not achieving its economic objective of enhancing and supporting sustainable growth of Galway City through the provision of a continuous high-quality multi-modal corridor.	Throughout the project lifecycle, track the economic benefits and lessons learnt from other BusConnects schemes. Key focus on cost benefit analysis through Phases 3 and 4.
Project not achieving its safety objective of enhancing pedestrian and cyclist safety through the provision of improved and segregated walking and cycling facilities along the R338 Dublin Road.	Engagement of Road Safety Auditor at an early stage to advise on potential safety risks. Provision of cyclist protection at emerging preferred route stage.
Project not achieving its integration objective of improving multi-modal network connectivity.	Adherence to current and future NTA technical guidance. Incorporation of the Ballybane, Ballyloughane and Doughiska South cycle schemes. Integration of GMIT proposals.

Project not achieving its environmental objective of increasing modal share for public transport and active travel modes.	Detailed multi-modal traffic modelling incorporating case studies from other projects.
Project not achieving its accessibility, social inclusion, and physical activity objectives of improving access to all services and outdoor areas along R338 Dublin Road and enabling local opportunities for walking and cycling activity.	Specific accessibility / connectivity review of access to all services and outdoor areas, e.g., Merlin Park Woods, Ballyloughane Beach, along R338 Dublin Road at each phase of the project.
Over-estimation of pedestrian, cyclist and public transport demand	Ensure robust demand forecasts are developed which include a low growth and high growth scenarios
Underestimation of capital works cost	Track costs of other BusConnects projects in consultation with NTA.

SECTION 14: IMPLEMENTATION AND OPERATION

14.1 Procurement Overview

The section provides a summary of the procurement strategy and contracting plan for the implementation of the BusConnects Galway: Dublin Road Scheme. The full Procurement Strategy can be found in Appendix L.

The design work already completed, construction work required, and contract length and price were primary considerations in identifying the 'best fit' procurement route and implementation requirements to ensure project success and mitigate future risks.

14.1.1 Methodology

The following methodology was applied to the procurement selection process:

1. **Corridor packages** – a MCA was undertaken to determine if the scheme should be awarded to a single contractor for the full 4km length or divided into three sections awarding each section to a different contractor. The assessment considered risks such as value for money, market participation, etc and is outlined in section 14.2.1
2. **Scope of Works** – a MCA was undertaken to determine if the construction work should be separated into its components and thereby be procured as a single package or multiple packages and is outlined in section 14.2.2
3. **Contract Type** – a three step approach has been used to determine the appropriate contract type and is outlined in section 14.2.3
    a. Step 1 – Sifting Process - ruled out contract types that did not align with the scheme due to contract cost, programme, type of work or project. PW, NEC and FIDIC contracts were considered.
    b. Step 2 – Suitability Assessment - was done on the remaining contracts to understand appropriateness based on the contract description, the project programme and work completed to date on the scheme and the associated design risks.
    c. Step 3 – Risk Assessment and MCA - was undertaken for the remaining contract types. An initial risk assessment was undertaken to understand how the different contracts would manage risks, six risk where included. Thereafter, an MCA was undertaken using five criteria associated with contracts including value for money and risk management.
4. **Procurement Tender Process** – a MCA assessment was undertaken to understand the risks associated with three procurement procedures: Open, Restricted and Framework and is outlined in section 14.3

14.1.2 Traffic Light System

The following traffic light systems were used for the MCA and risk assessments:

Table 14-1: MCA Scoring System

Colour	Risk
Green	Advantages when compared to other options
Amber	Neutral when compared to other options
Red	Disadvantages when compared to other options

Table 14-2: Risk Scoring System

Colour	Risk
Green	Risk is adequately managed. Residual risk is low and is expected to have positive impact on the outcome
Amber	Risk is partially managed. Residual risk remains to be actively managed
Red	Risk is not adequately managed. Significant risk remains and may negatively impact outcomes

14.2 Procurement Options Assessment

The different procurement option assessments are summarised in the next two sections. The detailed MCA and risk assessments can be found in Appendix L.

14.2.1 Corridor Packages

To determine if the scheme should be procured as a single corridor or three sections a MCA was undertaken using the traffic light system shown in Table 14-1. The different scheme configurations were analysed using the following key criteria:

- Value for Money;
- Market Capacity;
- Market Participation;
- Inflation;
- Limitations on supply of materials & resources;
- Tie-in; and
- Quality

Table 14-3: Assessment of Scheme Configuration

Corridor	Value for Money	Market Capacity	Market Participation	Mat & res supply	Tie-in	Quality	Over-all
Single							
Split into 3							

The assessment showed that a single contract will perform better in terms of value for money, market participation and material and resource supply, along with reduced risk at construction limits and an increased likelihood of quality consistency along the corridor.

14.2.2 Scope of Works Contract Configuration

Enabling Works, Traffic Management, and the Main Contract could each be procured separately for the scheme. This section analyses the different procurement packages that could be put to market and the likely outcomes.

There are two likely combinations of contract activities for this scheme:

1. **Two contracts** – a. Enabling works b. Main contract and traffic management.
2. **One contract** – One combined contract for all elements, site investigations and slit trenching, enabling works, traffic management and main contract.

The two scope of work configurations were analysed using the following criteria:

- Value for Money;
- Programme;
- Market Capacity;
- Market Participation;
- Price Inflation; and
- Limitations on supply of materials & resources

The criteria were assessed using the traffic light system shown in Table 14-1.

Table 14-4: Assessment of Contract Configuration

Corridor	Value for Money	Programme	Market Capacity	Market Participation	Price Inflation	Mat & resources supply	Overall
Two							
One							

The assessment of risk showed that procurement under a single contract is the most favourable as it will provide better value for money, limit risk to the programme and limit the risk on materials and resource supply.

14.2.3 Contract Type

Design Approach

The choice of contract dictates the risk allocation between the parties. Under Employer-designed contracts, the Employer bears the majority of the risk, whereas under design and build contracts, the Contractor bears more of the risk.

It is important for this decision to be informed by the work completed to date during Phase 3 of the BusConnects Galway: Dublin Road scheme. A large amount of design work has been undertaken, which includes:

- Site Investigation;
- Fence and Boundary;
- Geometric designs - General arrangements;
- Utilities identification and relocation;
- Stormwater;
- Pump Station;
- Attenuation;
- Wastewater;
- Street Lighting;
- Retaining Walls; and
- Land Acquisition

In addition, the following investigations have been undertaken:

- Ground Conditions;
- Environmental Impacts Assessment;
- Structural Assessments;
- Drainage, Hydrology and Flood Risk;
- Landscape and Urban Realm; and
- Lighting

Overview

The type of contract selected determines the level of integration of design and construction for a given project and should support the main project objectives in terms of risk allocation, delivery, programme, cost and quality of the finished product.

The following three step approach to determine the appropriate contract type was undertaken:

- Step 1 – Sifting Process ruled out contract types that did not align with the scheme due to contract cost, programme, type of work or project. PW, NEC and FIDIC contracts were considered.
- Step 2 – Suitability Assessment - was done on the remaining contracts to understand appropriateness based on the contract description, the work completed to date on the scheme and the associated design risks.
- Step 3 – Risk Assessment and MCA - was undertaken for the remaining contract types. An initial risk assessment was undertaken to understand how the different contracts would manage risks, six risk where included. Thereafter, an MCA was undertaken using five criteria associated with contracts including value for money and risk management.

Step 1 - Sifting Process

The Sifting Process ruled out contract types that did not align with the scheme due to contract cost, programme, type of work or project. Eleven Public Works (PW), seven NEC and seven Fidic contracts were considered. Contracts were then ruled out based on value thresholds or type of contract work.

Based on the sifting process the following contracts were taken forward to the suitability assessment:

- PW-CF3,
- PW-CF4,
- PW-CF10,
- Option A/B
- Option C/D
- The Red Book
- The Yellow Book

Step 2 - Suitability Assessment

A suitability assessment for the remaining contract types was undertaken to understand contract appropriateness for the BusConnects Galway: Dublin Road Scheme based on the contract, the work completed to date on the scheme and the associated design risks.

The assessment showed that based on the amount of design and investigation work already completed for the BusConnects Galway: Dublin Road scheme the employer design contract types would provide the best value for money, as the contractor designed contracts may induce delays caused by redesign with limited benefits. Therefore, the following three contract types could provide a suitable procurement solution for this scheme, namely:

- PW-CF3,
- Option Type C or D (Target Cost)
- The Red Book

Table 14-5: Suitability Assessment

Contract	Suitability
PW-CF3 – Employer designed	Yes, High level of design and investigation completed. GCC have a good understanding of project requirements which will align with this contract type – reducing risk.

	Typical contract that will be attractive to the market.
PW-CF4 – Contractors designed	No, Redesign at this stage will delay the project with little value add. Increased risk that redesign may trigger new EIAR.
PW-CF10 – Early Collaboration	No, Design advanced past the point for this contract type to value add. It is recommended for high value and complex projects.
NEC - Type A/B	No, This is not a commonly used contract which requires an NEC trained PM. It offers no notable benefits when compared to the PW-CF3 which is much more familiar to the market.
NEC - Type C/D	Yes, The pain/gain nature will incentivise contractor to find solutions limiting the risk of budget overrun. Although this contract isn't widely used, it is the preferred contract for the BusConnects Dublin making it more attractive to the market.
FIDIC - Red Book	Yes, High level of design and investigation completed making this contract attractive. GCC have a good understanding of project requirements which will align with this contract type – reducing risk.
FIDIC - Yellow Book	No, Redesign at this stage will delay the project with little value add. Increased risk that redesign may trigger new EIAR.

Step 3 – Risk Assessment and MCA

Step three was undertaken in two stages which involved a risk assessment and MCA for the remaining contract types.

Stage one – Risk Assessment

The MCA considered several criteria, including risk management. Since risk management covers several potential risks including those listed below, an initial risk assessment was undertaken to understand how the different contracts would manage these risks.

- Unforeseen Ground Conditions;
- Unforeseen Utilities;
- Interface with other Strategic Infrastructure Projects;
- Unforeseen Traffic Management Challenge (TM);
- Delayed Access to CPO Lands; and
- Unforeseen Landscaping Issues

These risks were analysed using the traffic light system shown in Table 14-2.

Table 14-6: Risk Management by Contract Type

Colour	Ground Conditions	Utilities	Interface	TM	CPO Land	Landscape	Overall
PW-CF3,							
NEC C/D							
Fidic - Red							

Overall, the NEC Type C/D contract will provide better risk management, due to the pain/gain contract mechanism and collaborative framework for managing the project, promoting teamwork and open

communication between parties, limiting risk. The pain/gain mechanism promotes solution driven behaviour towards unforeseen ground conditions and utilities.

The risk of interacting with other projects is limited since the are no planned projects in the area, the traffic management risk will be controlled as part of the contract and the landscape risk is low due to the level of design already undertaken. Making the risk for these criteria the same across the contract types. Delays in CPO land access is a residual risk for all contract types.

Stage two - MCA

Thereafter, a MCA was undertaken using five criteria associated with contracts:

- Value for money;
- Risk management;
- Contract Administration;
- Market Interest; and
- Change management and collaboration.

These risks were analysed using the traffic light system shown in Table 14-1.

Table 14-7: Contract Type MCA

Colour	Value for money	Risk Management	Contract Administration	Market Interest	Change manage and collab	Overall
PW-CF3,						
NEC C/D						
Fidic - Red						

Overall, both NEC and PW are viable contract options. These will be discussed with GCC/NTA to determine the best contract type to use for the procurement of this project. This will be reviewed in more detail during Phase 5: Detailed Design and Procurement.

The assessment showed that the PW-CF3 (Traditional) is a well-known, widely used contract type in Ireland with well understood contract administration and will attract a reasonable amount of interest from the market. However, this contract offers no advantages in terms of value for money or risk management and does not have a strong mechanism to manage change.

The NEC type C/D contract will provide the best value for money as a result of the pain/gain contract mechanism which will encourage contractor to limit increases to the Target Cost and programme overrun. This contract will also offer benefits in risk management, with a better mechanism to manage change than the other contract types. However, the contract type is not common in the Irish market and may not be attractive as it requires a NEC PM which may not be readily available.

The Fidic contract would have no advantages over the other contract types, requires a Fidic Engineer to manage the contract (market availability is unknown) and does not have a strong mechanism to manage change.

14.3 Procurement Tender Process

Three tender processes are available for the works procurement namely, open tender, restricted tender and framework agreement. Table 14-8 shows the assessment carried out for the different procurement procedures using the traffic light system shown in Table 14-1Table 14-2.

The Irish construction industry market capacity is currently strained due to the large amount of construction work on the go and being procured, this will remain the case regardless of contract type. Delivery quality will be mandated by the condition of contract which will stipulate the minimum acceptable delivery. Therefore, these categories scored the same regardless of the procurement procedure adopted. The differences in value for money and market participation are explained in the table.

Table 14-8: Procurement Process MCA

Colour	Value for money	Market Capacity	Market Participation	Delivery Quality	Overall
Open					
Restricted					
Framework Agreement					

The assessment shows that an Open Tender procedure will be the most suited procurement process for the BusConnects Galway: Dublin Road scheme. In terms of the Restricted Tender, it is acknowledged that it is possible that pre-qualification could be progressed during the final weeks of the design completion, the timelines would then be more comparable to an Open Tender, with a shorter assessment process for the main tender than the Open Tender. However, the two-stage process may be a deterrent in the current market and has therefore not been progressed.

A framework agreement could be a viable procurement procedure if a BusConnects programme is established and all BusConnects projects across the country are procured under a single framework. This is to be investigated in Phase 5.

Assuming that the BusConnects Galway: Dublin Road scheme will be procured alone via an open tender procedure, it is expected that the NTA tender process will be applied to this project. Based on the Public Procurement Procedures[42] document on the NTA site this project will require a formal tendering process advertised on eTenders and linked to OJEU, since the BusConnects Galway: Dublin Road project is estimated at greater than €215,000.

This procurement process will typically require:

Figure 14-1: Tender Timescales

Task	Duration
Publication/ contract notice	30 days
Approval of tender documents	3 weeks
Tender Period OJEU	4-12 weeks
Tender Evaluation	4 weeks
Standstill Period Appointment recommendation	2 weeks
NTA Board Approval	4 weeks

[42] Procedure Template - with Instructions (nationaltransport.ie)

Contract Award Notice Execute Contract Documents and Contractor Mobilisation	4 weeks

The above sequence of tasks represents the minimum procurement time. In plotting the programme for any scheme, the programme milestones are:

- Completion of detailed design/Tender Documents;
- Advertising of tender;
- Appointment of contractor; and
- Commencement of construction.

14.4 Implementation Timescales

A programme for the Proposed Scheme is provided in Chapter 5 (Construction) of the EIAR. It is expected that construction will commence in 2026, subject to funding and approval. The construction works are anticipated to take approximately 24 months. However, the construction duration could potentially be reduced with additional resources. The appointed contractor will be responsible for determining the final programme.

An estimated programme for the Proposed Scheme is provided in Table 14-9. It is envisaged that Skerritt Junction will be constructed during summer months insofar as possible in order to minimise traffic disruption.

Table 14-9: Construction Programme for the Proposed Scheme

Section	Duration (Months)	Months																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Section 1	13																								
Section 2	6																								
Section 3	11																								

14.5 Clarifications & Recommendation

The following clarifications are required to be addressed during the development of the Detailed Business Case (NTA Project Phase 5): -

- Clarify/ confirm that funding arrangements are in place;
- Clarify/confirm that a Prior Information Notice can be published;
- Confirm members of the “Board” in accordance with NTA and GCC recommendations; and
- Programme to tender is critical and therefore, programme monitoring and responses from client and sanctioning authorities are required in accordance with programme.

The following recommendations are proposed: -

- Due to the size and length of the scheme works, the project should be a single contract for the complete construction works to minimise risks associated with quality, value for money and at contraction limits;
- Based on the assessments undertaken NEC Type C/D and PW – CF3 are both viable contract options; These will be discussed with GCC/NTA to determine the best contract type to use for the procurement of this project;
- The PW-CF3 (Traditional) is a well-known, streamlining contract administration and will attract a reasonable amount of interest from the market. However, this contract offers no advantages in terms of value for money or risk management and does not have a strong mechanism to manage change;
- The NEC type C/D contract will provide the best value for money due to the pain/gain contract mechanism, and will also offer benefits in risk management, with a better mechanism to manage

change than the other contract types. However, the contract type is not common in the Irish market and may not be attractive as it requires a NEC PM which may not be readily available;

- When considering the BusConnects Galway: Dublin Road scheme as a standalone project an Open Tender process is likely to attract the most market appetite and provide the best value for money limiting the upfront paperwork;
- However, BusConnects has projects across the country and could be procured under a framework;
- During Phase 5 - Detailed Design and Procurement an industry day must be arranged to understand the appetite of the market for the project and to understand the availability of NEC PMs; and
- This procurement strategy is a live document and will be updated and reviewed during Phase 5 – to refine and identify the preferred procurement option.

SECTION 15: GOVERNANCE

15.1 Introduction

This chapter sets out the high-level governance plan for the delivery of the BusConnects Galway: Dublin Road project. The Infrastructure Guidelines requires there to be a Sponsoring Agency, Accounting Officer and Approving Authority for the appraisal and delivery of public investment projects:

- the Sponsoring Agency "*has primary responsibility for evaluating, planning and managing public investment projects";*
- The Accounting Officer is responsible "*to ensure that these guidelines are adopted";* and
- the Approving Authority is "*the Department funding the programme/ project*"[43].

In the execution of their roles, the Accounting Officer and Approving Authority share a wide range of responsibilities, including for the assessment, evaluation, planning and management of public investment.

In the case of BusConnects Galway, the following agencies are acting in respect of the aforementioned roles:

- Sponsoring Agency – Galway City Council – Infrastructure Development and Planning Department;
- Accounting Officer – Secretary General or other; and
- Approving Authority – National Transport Authority – Transport Planning and Investment

The establishment of a BusConnects Galway Programme Board is to be advised, following the completion of the Strategic Review of the Galway Transport Strategy (Galway Metropolitan Area Transport Strategy). At present, two BusConnects Projects (which align to both the current Galway Transport Strategy and the future Galway Metropolitan Area Transport Strategy) are being progressed:

- BusConnects Galway - Cross City Link; and
- BusConnects Galway - Dublin Road

15.2 Governance Roles

In respect to the delivery of the BusConnects Galway Dublin Road Scheme, the following roles and responsibilities are noted:

Table 15-1: Governance Roles

Roles	Responsibilities
Sponsoring Agency	Galway City Council - Infrastructure Development & Planning Department
Accounting Officer	Secretary General or Other
Approving Authority	National Transport Authority
NTA Senior Programme Coordinator	Colin Brandsma
NTA Programme Coordinator	John Rooney
GCC Project Manager (NTA Phase 1 to 4)	Michael Lally

[43] DPER, 2023, 'Infrastructure Guidelines - Section 2 – Governance

Design Consultations (NTA Phase 1 to 4)	Barry Transportation
GCC Project Manager (NTA Phase 5 to 7)	TBC
Design Consultations (NTA Phase 5 to 7)	TBC

15.2.1 Sponsoring Agency

The Sponsoring Agency for the project is the Infrastructure Development & Planning Department of Galway City Council. GCC's Infrastructure Development and Planning Department hold responsibility for the day-to-day management of the project, including the management of consultants. Oversight and design support will be provided from National Transport Authority across the Transport Investment and Planning, Public Transport Services and Transport Technology Departments of the NTA.

15.2.2 Accounting Officer

The role of the Accounting Officer has been identified within the Infrastructure Guidelines. The Accounting Officer is responsible to ensure that the guidelines are adopted and sits in parallel with the Approving Authority.

15.2.3 Approving Authority

The National Transport Authority is the Approving Authority for the project. The formation of a Programme Board for the wider BusConnects Galway Programme is to be advised, following the finalisation and adoption of the strategic review of the Galway Transport Strategy (Galway Metropolitan Area Transport Strategy). The Approving Authority consists of senior NTA personnel, chaired by the Chief Executive of the NTA, and are separate to the Sponsoring Agency personnel.

15.2.4 NTA Programme/Project Coordinator

A Senior Programme/Project Coordinator is in place for the project, who monitors the status and timing of the project, manages whole-of-project risk, ensures the appropriate assurance processes are in place and facilitates collaboration and knowledge exchange. The Programme/Project Coordinator will meet frequently with Project Directors and Managers providing a forum for the management of project interdependencies. Risks, schedule dependencies and knowledge share happen at these meetings. The Programme coordinator in agreement with the Project Director then escalates material risks and issues to the Board for decision making and reporting purposes.

If a BusConnects Galway Programme is developed at a later stage, this will be a key integration function.

15.2.5 NTA Board

The NTA Board has an important role to play in approving certain matters. Such matters include the approval of commencement of design / planning phases, Compulsory Purchase Orders, public consultations, statutory planning consents and the issuance of tender documentation. Additionally, the following contracts need to be approved by the NTA Board in advance of execution by the Chief Executive:

- Non-works contracts in excess of €2.0 million (excluding VAT);
- Works contracts in excess of €5 million (excluding VAT); and
- All public private partnership contracts.

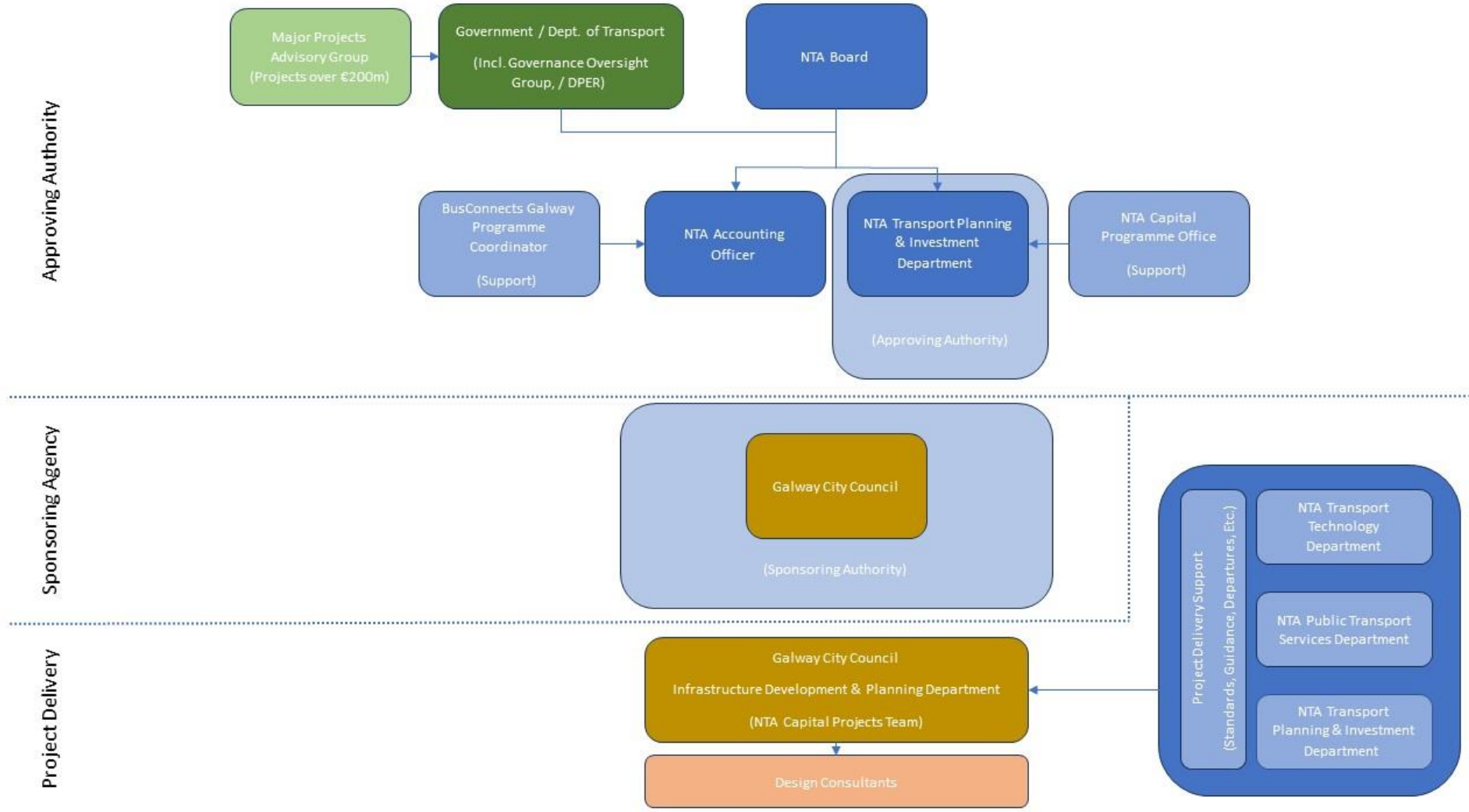
Accordingly, a number of approvals will be required from the NTA Board at various stages throughout the BusConnects Galway programme.

15.2.6 Government/ DoT/ DPER

DoT is the parent department to the NTA and has the responsibility to ensure that procedures are in place to ensure compliance with the Infrastructure Guidelines. It is the responsibility of the department to facilitate seeking Government approval for projects estimated to cost over €100 million. To support Government in this approval role and to ensure careful and comprehensive oversight of major projects and programmes, DoT was mandated by Government to establish two oversight groups - one of them in relation to the bus investment programme (including all BusConnects programmes). In relation to BusConnects, DPER has the role to conduct technical reviews of Assessment Reports and Business Cases for projects estimated to cost over €100 million.

An overview of the BusConnects Galway governance structure is set out in Figure 15-1 below.

Figure 15-1: BusConnects Galway: Dublin Road Governance Structure Overview



15.3 Project Communication

This section outlines the project communication and engagement methods that will be put in place. Galway City Council as the sponsoring agencies will ensure that formal and informal communication channels are established as an early project management task The purpose of the engagement structure is to assist in building effective relationships, to keep all parties fully informed of progress, and to deal with issues as they arise in a timely manner.

Figure 15-2: Project Communication

Agency	Objective	Medium	Frequency
NTA Programme Coordinator	Monitor project status, manage risks. Key integration with Project Directors and Managers	In person/ MS teams	Monthly
NTA Board	Project status update and provide the required approvals	In person/ MS teams	Monthly
Progress Meetings: Approving and Sponsoring Agencies	Track progress, expenditure, and risk. Discuss key design changes and key project milestones	In person/ MS teams	Monthly
Design Meetings: Sponsoring Agency and Design Team	Design development, option consideration, emerging designs, stakeholder impacts and key risks	In person/ MS teams	Weekly
Advisory Group Meeting	Updates on stakeholder impacts, changes to design, risk, or cost. Provide advice on design.	In person/ MS teams	Monthly
Project Partners	Informed about Programme status including cost, risks and issues.	In person/ MS teams	Monthly

15.4 Project Tools

The following tools will be used by the BusConnects Galway: Dublin Road project team throughout each stage of the project.

Figure 15-3: Project Tools

Tool	Description
SharePoint	Will be used to host the Programme Team site and to file the Programme documentation.
MS Projects	Will be used for planning and tracking of progress of deliverables.
MS Teams	To sustainably host project meetings
MS delivery packages	Prepare consultation material, create diagrams, analyse data and report findings
Auto Cad/Civil 3D	Will be used to provide detailed designs

15.5 Stakeholder Engagement

Building on the successful stakeholder engagement already undertaken for this project, it is expected that another round of Non-Statutory Public Consultation will be undertaken during Phase 5 – Detailed Design and Procurement stage of the project. This will effectively communicate updates of the proposed new scheme, such as benefits, design changes or changes in programme. This will ensure changes are well managed and the project is progressed as planned.

SECTION 16: MONITORING AND EVALUATING

16.1 Introduction

This section sets out an overview of the Monitoring and Evaluation ("M+E") activities that will be required for the BusConnects Galway – Dublin Road scheme, to ensure the project delivers against objectives and provides value for money. The Monitoring and Evaluation plan will evolve through the development of the project but at this stage it is possible to set the framework for the monitoring and evaluation framework.

16.2 Monitoring and Evaluation Requirements

The Infrastructure Guidelines[44] sets out the guidelines for the monitoring and evaluation of capital investment projects. Fundamental to this is the requirement for ongoing and routine monitoring through which to determine:

- The extent to which a project is on track to achieve its objectives;
- The extent to which the ex-ante appraisal assumptions and forecasts were accurate;
- How results/impacts have materialised through time; and
- Lessons learnt.

Following the Infrastructure Guidelines there will also be a requirement for a Project Completion Report[45]. The core requirements will be:

- The basis on which the project was undertaken proved correct;
- The business case and management procedures were satisfactory;
- The operational performance and initial benefits have been realised; and
- The conclusions that can be drawn which are applicable to other projects, to the ongoing.

The monitoring and evaluation plan has been designed to ensure that the relevant evidence will be available to permit the above activities to be undertaken robustly, whilst also seeking to maximise learning within the BusConnects Galway – Dublin Road project.

Infrastructure Guidelines also states that an Intervention Logic Map is a useful tool for mapping the links between inputs, outputs, results and impacts of the programme. An initial logic map has been prepared for BusConnects Galway – Dublin Road project and kpi is shown in Figure 16-1

[44] DPER, 2023 – Infrastructure Guidelines
[45] DPER, 2023 – Infrastructure Guidelines: Post Completion Review and Benefit Realisation.

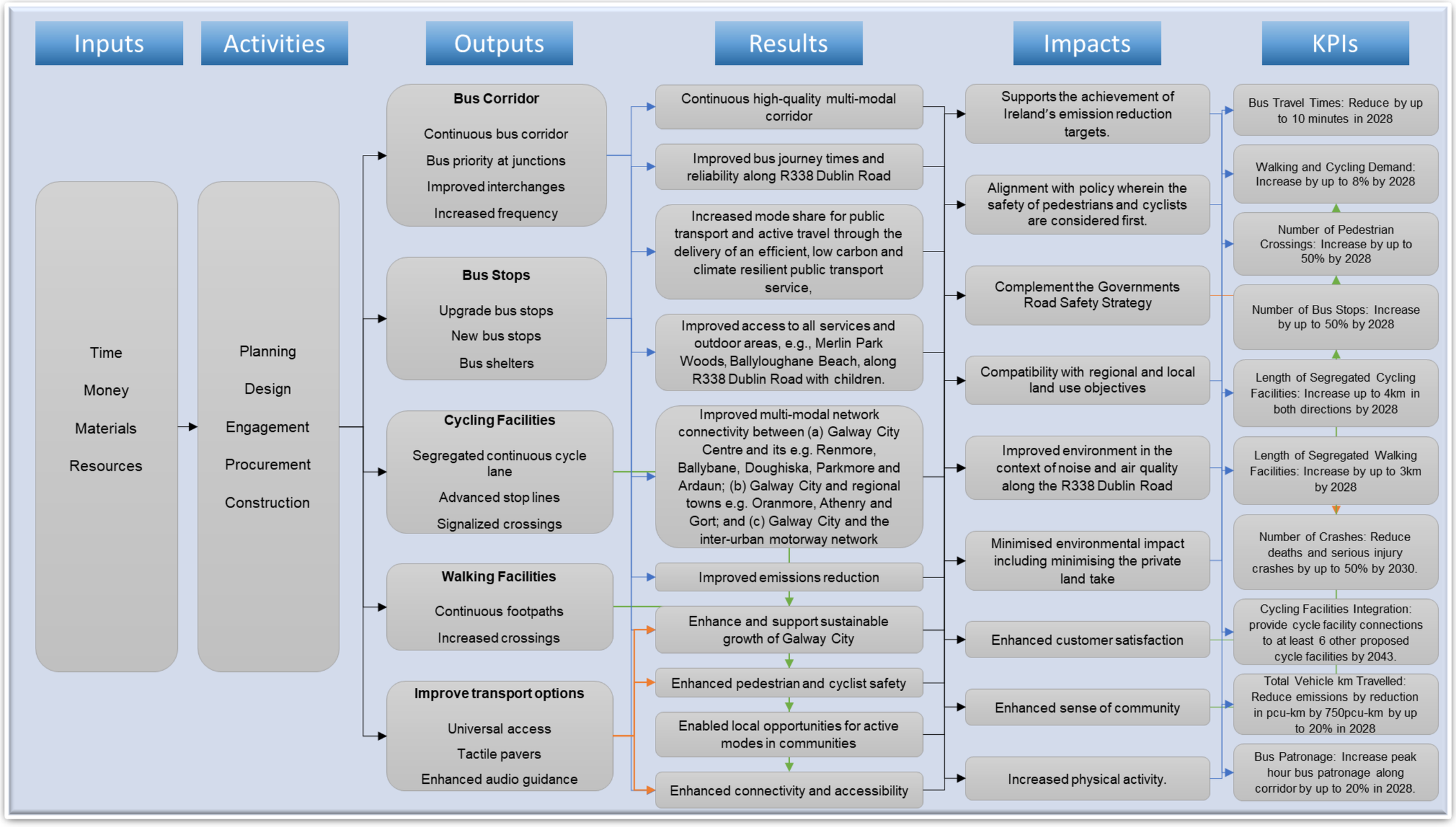


Figure 16-1: BusConnects Galway: Dublin Road - Intervention Logic Map

16.3 Monitoring and Evaluation Plan

The Monitoring and Evaluation plan will evolve through the development of the project but at this stage it is possible to set the framework for the monitoring and evaluation framework. The following KPIs were derived from the scheme objectives and benefits and will be monitored and evaluated to determine the performance of the scheme. The table identifies the measures, data and sources, responsible agency and when data will be captured.

Table 16-1: Monitoring and Evaluation of the scheme

Objective	KPIs	Data	Data Source	Resp. Agency	Baseline Evaluation date	KPI Evaluation date
Enhance and support sustainable growth of Galway City through the provision of a continuous high-quality multi-modal corridor which will improve bus journey times and reliability along R338 Dublin Road.	Bus Travel times along corridor	Travel times	TomTom/ Automatic vehicle location (AVL) data	GCC	1 year before construction	1 year after opening
Enable local opportunities for active modes in communities by improving and segregating walking and cycling facilities which will help increase physical activity. Improve access to all services and outdoor areas, along R338 Dublin Road by improving transport options	Demand along corridor	Active mode demands	Onsite surveys/ counters	GCC	1 year before construction	1 year after opening
Improve multi-modal network connectivity through the provision of a high-quality multi-modal corridor, increasing access and productivity to zoned lands	Continuous connections with other cycling routes	GIS Maps showing cycle infrastructure	GCC GIS team	GCC	Opening year	Every 5 years after opening until 2043
Enhance pedestrian and cyclist safety through the provision of improved and segregated walking and cycling facilities along the R338 Dublin Road.	Vulnerable user Crashes along corridor	Number of crashes	Road Safety Authority (RSA)	GCC	1 year before construction	1 year after opening
Increase mode share for public transport and active travel through the delivery of an efficient, low carbon and climate resilient public transport service, which supports the achievement of Ireland's emission reduction targets.	Vehicle km travel along corridor	Vehicle kilometres by vehicle type	Central Stat Office (CSO)	GCC	1 year before construction	1 year after opening
	Bus patronage along corridor	Bus patronage by stop	Bus Eireann	GCC	1 year before construction	1 year after opening
	Noise and air quality along corridor	Noise and air quality	Onsite surveys	GCC	1 year before construction	1 year after opening

SECTION 17: CONCLUSIONS AND NEXT STEPS

The BusConnects Galway: Dublin Road project is located in Galway City with a total distance of approximately 4.0km. The project will provide a dedicated bus corridor, with segregated and continuous walking and cycling facilities along Dublin Road to align with national mode shift 2030 targets.

From Transport User, Safety, Accessibility, Social, Land Use, Climate Change and Environmental perspectives, BusConnects Galway: Dublin Road Scheme is an important project for Galway and the Western Region.

The Preferred Option will provide connectivity for commuters, pedestrians and cyclists along the route. The option will also provide safety, while having the least impact on vehicular traffic along this strategic route. The Preferred Option will provide:

- The provision of quality dedicated bus corridors along the length of the scheme;
- The provision segregated continuous active travel facilities;
- Upgrades at major junctions/ roundabouts along the route to better facilitate pedestrian/cyclist facilities and universal access;
- The introduction of traffic signals, where appropriate shall provide greater control over traffic and pedestrian movements;
- Provision of further pedestrian and cycling crossings at identified desire lines along the route will be achieved, reducing the potential for crossing conflicts; and
- Upgraded active travel facilities which will improve safety and encourage greater modal shift to more sustainable modes of transport for users of the corridor.

It is recommended that the scheme proceed to the next project stage (Planning, Project Phase 4 of the NTA Project Approval Guidelines, December 2020 and 2024), which will further refine and update the design along the route.

The next steps for this PBC are as follows:

- NTA to determine if a peer review is required. The external independent peer review will be undertaken by a NTA chosen body;
- To seek approval from NTA and CPO;
- Commence with detailed design;
- Confirm funding;
- Confirm Procurement Strategy; and
- Seek confirmation of the project Governance

Appendix A: Non-Statutory Public Consultation Report

Appendix B: BusConnects Galway VISSIM Model Report

Appendix C: Modelling Report

Appendix D: Options Assessment Report

Appendix E: Transport and Accessibility Appraisal (TAA)

Appendix F General Arrangement

Appendix G: Cost Calculators and Preliminary Cost Estimate – Preferred Option

Appendix H: Option Comparison Cost Estimate

Appendix I: External Independent Cost Review

Appendix J: Cost Benefit Analysis Report

Appendix K: Risk Register

Appendix L: Procurement Strategy