Appendix A6.1
Transport Impact Assessment Report

Contents

Executive Summary

Introduction

The purpose of this document is to provide a comprehensive Transport Impact Assessment (TIA) of the proposed Bray to City Centre Core Bus Corridor Scheme (hereafter referred to as the Proposed Scheme). The TIA also informs Chapter 6 (Traffic & Transport) in Volume 2 of the Environmental Impact Assessment Report (EIAR) for the Proposed Scheme which has assessed the impacts and significance of those impacts in relation to the receiving environment of the Proposed Scheme.

The Proposed Scheme is being planned to enable and deliver efficient, safe and integrated sustainable transport movement along the corridor. To achieve this overall objective, the National Transport Authority (NTA) has identified the following objectives:

- Enhance the capacity and potential of the public transport system by improving bus speeds, reliability and punctuality through the provision of bus lanes and other measures to provide priority to bus movement over general traffic movements;
- Enhance the potential for cycling by providing safe infrastructure for cycling, segregated from general traffic wherever practicable;
- Enhance the potential for walking by improving the pedestrian infrastructure on the corridor;
- Support the delivery of an efficient, low carbon and climate resilient public transport service, which supports the achievement of Ireland's emission reduction targets;
- Enable compact growth, regeneration opportunities and more effective use of land in Dublin, for present and future generations, through the provision of safe and efficient sustainable transport networks;
- Improve accessibility to jobs, education and other social and economic opportunities through the provision of improved sustainable connectivity and integration with other public transport services; and
- Ensure that the public realm is carefully considered in the design and development of the transport infrastructure and seek to enhance key urban focal points where appropriate and feasible.

The planning and design of the Proposed Scheme has been guided by these aims and objectives, with the need for the Proposed Scheme described in detail in Chapter 2 (Need for the Proposed Scheme) in Volume 2 of the EIAR.

In line with the above objectives, this TIA is focused on the concept of the "movement of people" rather than the "movement of vehicles". The emphasis of the design philosophy is on maximising the capacity of the Proposed Scheme to move more people by sustainable modes whilst providing for the necessary movement of general traffic along it.

This TIA includes the comprehensive assessment of impacts and benefits of the Proposed Scheme covering all transport modes for both Construction and Operational Phases.

Scheme Description

The 18.5km Proposed Scheme, as described in detail in Chapter 4 (Proposed Scheme Description) in Volume 2 of the EIAR comprises the development of improved bus priority along the entire route, commencing at the junction of Leeson Street Lower and Earlsfort Terrace on St. Stephen's Green. It runs along Leeson Street Lower and Upper, and Sussex Road. It continues along Morehampton Road and Donnybrook Road, through Donnybrook Village and on to the Stillorgan Road, serving the UCD Interchange via the Stillorgan Road Overbridge at Belfield. It continues on the Stillorgan Road, which carries on to the Bray Road to Loughlinstown Roundabout. From Loughlinstown Roundabout it runs along the Dublin Road to St. Anne's Church and then continues south through Shankill village. It then passes through Wilford Junction and along the Dublin Road until it terminates on Castle Street in Bray, on the north side of the River Dargle crossing.

Throughout the Proposed Scheme bus stops will be enhanced to improve the overall journey experience for bus passengers while cycle facilities will be substantially improved with segregated cycle tracks provided along the links and protected junctions with enhanced signalling for cyclists provided at junctions.

Moreover, pedestrian facilities will be upgraded, and additional signalised crossings will be provided. In addition, urban realm works will be undertaken at key locations with higher quality materials, planting and street furniture provided to enhance the pedestrians experience.

Assessment Methodology

The assessment of the Proposed Scheme in relation to the baseline transport environment required a qualitative assessment of changes to the transport environment, as well as quantitative analysis undertaken using a suite of multi-modal transport modelling tools which have been developed for the Proposed Scheme Infrastructure Works.

The qualitative assessments are as follows:

- Pedestrian Infrastructure: The changes to the quality of the pedestrian infrastructure as a result of the Proposed Scheme;
- Cycling Infrastructure: The changes to the quality of the cycling infrastructure as a result of the Proposed Scheme;
- Bus Infrastructure: The changes to the quality of the bus infrastructure because of the Proposed Scheme; and
- Parking / Loading: The changes to the availability of parking and loading because of the Proposed Scheme.

The quantitative assessments are as follows:

- People Movement: An assessment has been carried out to determine the potential impact that the Proposed Scheme will have on projected volume of people moving along the corridor by sustainable modes during the Operational Phase only;
- Bus Performance Indicators: The changes to the projected operational efficiency for buses as a result of the Proposed Scheme;
- General Traffic: The direct and indirect impacts on general traffic using the Proposed Scheme and surrounding road network; and
- Network-Wide Performance Indicators: The strategic changes to queuing, total travel times, total travel distance and average network speed.

The changes between the Do Minimum and Do Something scenarios have been presented in either a positive, negative or negligible / neutral magnitude of impacts as a result of the Proposed Scheme, dependant on the assessment topic. A high, medium, low or negligible rating has been applied to each impact assessment to determine the Magnitude of Impact. Where appropriate, the changes in conditions between the Do Minimum and Do Something scenarios are outlined using a Level of Service (LoS) approach. This concept allows a straightforward comparison of two differing scenarios using a series of metrics specifically developed for this purpose.

Baseline Environment

A detailed review of the existing traffic and transport conditions within the redline boundary of the Proposed Scheme has been undertaken, specifically for pedestrian, cycling, bus services and priority measures, general traffic and parking / loading facilities. The baseline conditions have been informed by several site visits of the local environment, comprehensive traffic surveys, and a desktop review of the most recent aerial photography.

Cyclists must typically share space on bus lanes or general traffic lanes with only 47% of the route of the Proposed Scheme providing segregated cycle tracks

For the purpose of describing the Proposed Scheme it has been split into the following five sections:

- **Section 1** – Leeson Street to Donnybrook (Anglesea Road Junction);

- **Section 2** – Donnybrook (Anglesea Road Junction) to Loughlinstown Roundabout;
- **Section 3** – Loughlinstown Roundabout to Bray North (Wilford Roundabout); and
- **Section 4 –** Bray North (Wilford Roundabout) to Bray South (Fran O'Toole Bridge).

Section 1 of the Proposed Scheme commences at the Leeson Street Lower / R138 St. Stephens Green Junction. The route then comprises 2.6km of R138 Leeson Street Lower, R138 Leeson Street Upper, R138 Sussex Road, R138 Morehampton Road and R138 Donnybrook Road, ending at the R138 Donnybrook Road / R815 Anglesea Road Junction. Section 2 of the Proposed Scheme section commences at the R138 Donnybrook Road / R815 Anglesea Road Junction and extends south along the R138 Stillorgan Road, N11 Stillorgan Road, and N11 Bray Road, ending at Loughlinstown Roundabout.

The proposed UCD Interchange will be a new bus interchange facility along the CBC for coach and local bus services, at the gateway to the UCD campus adjacent to the Stillorgan Road flyover bridge. The UCD Interchange design, originally included in the Emerging Preferred Route Option, has been developed further in co-ordination with the UCD Future Campus

Section 3 of the Proposed Scheme begins at Loughlinstown Roundabout just south of the pedestrian bridge over the N11 and then extends to the south, along R837 Dublin Road and through Shankill Village, ending at the Wilford Roundabout.

Section 4 of the Proposed Scheme begins at the Wilford Roundabout and extends to the south along the R761 Dublin Road and into Bray via Castle Street, ending at Fran O'Toole Bridge.

Predicted Impacts

Construction Phase

The impacts during the construction phase are outlined in Table 0.1. During the construction phase, the Proposed Scheme will have temporary **Low Negative** impacts to pedestrian access, bus access and parking and loading whilst it will have **Medium Negative** and temporary impacts to cyclist access.

Substantial impacts due to general traffic redistribution away from the direct study area are not anticipated during the Construction Phase based on the intended nature of the progressive works along the corridor whereby traffic flows are generally to be maintained in both directions. There may be a requirement for some localised temporary lane closures for short durations of the daytime and night-time, which will involve consultation between the appointed contractor and relevant authorities. Access for general traffic to existing residential and commercial units immediately adjacent to the Proposed Scheme is to be accommodated throughout the Construction Phase. Therefore, the impact on general traffic redistribution is anticipated to be a **Medium Negative** and temporary impact due to the short-term nature of any restrictions.

The impact of construction traffic is anticipated to result in a temporary **Medium Negative** impact due to the low numbers of HGV vehicles anticipated which are and below the thresholds set out in the Transport Assessments Guidelines.

Table 0.1 Summary of Construction Phase Predicted Impacts

Assessment Topic	Effect	Predicted Impact
Pedestrian Access	Restrictions to pedestrians along Proposed Scheme.	Low Negative
Cycling Access	Restrictions to cyclists along Proposed Scheme	Medium Negative
Bus Access	Restrictions to public transport along Proposed Scheme.	Low Negative
Parking and Loading	Restrictions to parking / loading along Proposed Scheme.	Low Negative
General Traffic	Restrictions to general traffic along Proposed Scheme	Medium Negative
	Additional construction traffic flows upon surrounding road network	Medium Negative

Operational Phase

The Proposed Scheme will deliver positive impacts to the quality in terms of People Movement, pedestrian, cycling and bus infrastructure during the operational phase. These improvements will help to provide an attractive alternative to the private car and promote a modal shift to walking, cycling and public transport, allowing for greater capacity along the corridor to facilitate the sustainable movement of people.

Although it is recognised that there will be some negative impacts for general traffic and parking / loading availability, the Proposed Scheme will deliver strong positive impacts to the quality of pedestrian, cycling and bus infrastructure during the Operational Phase providing for enhanced levels of People Movement in line with the scheme objectives. These improvements will help to provide an attractive alternative to the private car and promote a modal shift to walking, cycling and public transport, allowing for greater capacity along the corridor to facilitate the sustainable movement of people as population and employment levels grow in the future.

Accordingly, it is concluded that the Proposed Scheme will deliver benefits from a sustainable transport point of view and will not result in a significant deterioration to the existing traffic conditions on the local road network during the operational phase, meeting the aim of the Proposed Scheme to provide enhanced walking, cycling and bus infrastructure, enabling and delivering efficient, safe, and integrated sustainable transport movement along the corridor.

The assessment demonstrates the following:

- **Pedestrian Infrastructure:** The Proposed Scheme consists of measures to enhance the existing pedestrian infrastructure along the direct study area. A Level of Service (LoS) junction assessment has been undertaken using a set of five criteria to determine the impact that the Proposed Scheme has for pedestrians. The assessments demonstrate in the Do Minimum scenario, 72% of the junctions assessed had LoS ratings of D or below, 23% had a C rating, 4% had a B rating and 1% had an A rating. In the Do Something scenario, i.e. following the development of the Proposed Scheme, 82% of the assessed junctions had the highest A / B LoS ratings, 16% had C ratings and 2% had D ratings. The improvements to the quality of the pedestrian infrastructure will be **Medium Positive** in all Sections along the Proposed Scheme and a **High Positive** at the proposed UCD Bus Interchange;
- **Cycling Infrastructure:** The Proposed Scheme also consists of measures to enhance the existing cycling infrastructure along the direct study area. A LoS assessment was undertaken using an adapted version of the NTA's National Cycle Manual Quality of Service (QoS) Evaluation criteria. The assessments demonstrate in the Do Minimum scenario, 15% of the route sections assessed had LoS ratings of D, 44% had a C rating, 37% had a B rating and 4% had an A rating.

  In the Do Something scenario, 4% of the assessed route sections had an A+ rating, 26% had an A rating, 52% had a B rating, 8% had C ratings and 11% had D ratings. The potential improvements to the quality of the cycling infrastructure will be **Low Positive** in Sections 1, 2 and 4 and **Negligible** in Section 3. A **High Positive** impact to cycling infrastructure is anticipated at the proposed UCD Bus Interchange;
- **Bus Infrastructure:** A qualitative impact assessment has been undertaken based on the provision of bus priority, pedestrian accessibility and changes to the bus stop facilities. The results of the assessment demonstrate that the improvements to the quality of the bus infrastructure will be **Medium Positive** in Sections 1 and 2 , **Low Positive** in Section 3 and a **High Positive** in Section 4. A **High Positive** impact to bus infrastructure is anticipated at the proposed UCD Bus Interchange;
- **Parking and Loading:** A qualitative impact assessment has been undertaken of the Proposed Scheme impacts on the existing parking and loading. The results of the assessment demonstrate that the changes to the parking and loading provision will result in an overall loss of 214 spaces (-94 spaces in Section 1, -84 spaces in Section 2 of which -82 spaces are proposed at the UCD Bus Interchange and -46 spaces in Section 4). Given the nature of the loss in parking and the availability of alternative spaces in the indirect study area, the impact is expected to be **Medium Negative** in Sections 1 and 4, **Low Negative** in Section 2 (including at the UCD bus interchange) and **Negligible** in Section 3;
- **People Movement:** Given the proposed amendments to the pedestrian, cycling, bus and parking / loading infrastructure outlined above, the Proposed Scheme will have greater capacity to facilitate movement of people travelling along the corridor. A quantitative impact assessment has been undertaken using outputs from the NTA's ERM and LAM, comparing the Do Minimum and Do Something peak hour scenarios for each forecast year (2028, 2043).

The results of the assessment demonstrate that there will be an increase in the number of people travelling along the Proposed Scheme by sustainable modes of 44% and 21% during the 2028 AM and PM Peak Hours respectively. During the 2043 scenario there will be an increase in the number of people travelling along the Proposed Scheme by sustainable modes of 26% and 18% during the AM and PM Peak Hours respectively.

The analysis also shows that there will be an increase of 9.3% and 8.9% in passengers boarding buses during the 2028 AM and PM Peak Hours respectively. During the 2043 scenario there will be an increase in 6.7% and 6.1% of passengers boarding buses during the AM and PM Peak Hours respectively. Overall, it is adjudged that the Proposed Scheme will have a **High Positive** on the sustainable movement of people along the corridor;

- **Bus Network Performance Indicators:** A micro-simulation modelling assessment has been developed and network performance indicators established for bus operations along the 'end to end' corridor. The results of the assessment demonstrate that the total bus journey times on all modelled bus services will improve by between 8% and 19% during the AM and PM Peak hours of the 2028 Opening Year and 2043 Design Year. Based on the AM and PM peak hours alone, this equates to approximately **10 hours of savings in 2028 and in 2043**, when compared to the Do Minimum combined across all buses. On an annual basis this equates to over 6,000 hours of bus vehicle savings in 2028 and in 2043, when considering weekday peak periods only. Journey time variation and reliability are shown to improve in all Do Something scenarios compared to the Do Minimum. Overall, it is anticipated that the improvements to the network performance indicators for bus users along the Proposed Scheme will be **High Positive**;
- **General Traffic Network Performance Indicators:** There will be an overall reduction in operational capacity for general traffic along the direct study area, given the proposed infrastructural changes to the existing road layout outlined above. This reduction in operational capacity for general traffic will create some level of traffic redistribution from the Proposed Scheme onto the surrounding road network.

  The LAM Opening Year 2028 model results were used to identify the impact in traffic flows between the Do Minimum and Do Something scenarios. A reduction in general traffic flows along a road link has been described as a positive impact to the environment. An increase in general traffic flows along a road link has been described as a negative impact to the environment. Reference has been given to TII's Traffic and Transport Assessment Guidelines as an indicator for best practice, to determine the key road links that require further traffic analysis due to the increase in traffic. Operational capacities were extracted from the LAM at the associated junctions of the key road links to identify the impact that the Proposed Scheme will have on the Volume / Capacity ratios. The results are presented in terms of the significance of the impact to the V / C ratio for each junction based on its sensitivity and magnitude of impact.

  The results of the assessment demonstrate that the surrounding road network has the capacity to accommodate the redistributed general traffic as a result of the Proposed Scheme. The majority of assessed junctions that required further traffic analysis have V / C ratios that are broadly similar before and after the Proposed Scheme implementation;
- **Network Wide Performance Indicators:** Given the impacts to the traffic conditions outlined above, there will be a knock-on effect to the operational efficiency of the road network beyond the direct and indirect study areas. A quantitative impact assessment has been undertaken using outputs from the NTA's ERM and LAM to determine the conditions to queuing, travel times, travel distances and network speeds during the Do Minimum and Do Something scenarios. The results of the assessment demonstrate that the impacts to the network performance indicators range between -2.2% to +6.3% and will therefore have a **Negligible impact**; and
- **Cumulative Summary:** In general, total trip demand (combining all transport modes) will increase into the future in line with population and employment growth. A greater share of the demand will be by sustainable modes (Public transport, Walking, Cycling).

  The analysis indicates that the 12 BusConnects Proposed Schemes in place, there will be a high positive impact on sustainable mode share. The schemes will prevent any increase in private car traffic within the study area and will instead result in a reduction in car trips below 2020 levels.

  In the 2028 Opening Year scenario, it is estimated that for people travelling within the 500m catchment area (including City Centre) there will be a 12% increase in public transport trips, 2% decrease in general traffic trips (i.e. motorists) and a 14% increase in cycling trips in the AM Peak Hour and a 12% increase in public transport, 3% decrease in general traffic and a 12% increase in cycling trips each day (7am-7pm). In the 2043 Design Year scenario, it is estimated that for people travelling within the 500m catchment area (including City Centre) there will be a 6% increase in public transport trips, 6% decrease

in general traffic trips (i.e. motorists) and a 10% increase in cycling trips in the morning peak hour and a 7% increase in public transport, 7% decrease in general traffic and a 11% increase in cycling trips each day (7am-7pm).

General traffic levels reduce more in 2043 than when compared to 2028 due to the increased level of additional non-bus public transport infrastructure and services (MetroLink, Luas extensions and DART+ from the GDA Strategy) in tandem with the road capacity reduction measures as part of the Proposed Scheme leading to increased usage on all public transport modes.

The modelling outputs for the 2028 Cumulative Opening Year scenario demonstrate that there is a high growth in bus patronage along all the Proposed Schemes in the AM Peak Hour. The bigger increases occur in the inbound direction on the Blanchardstown to City Centre, the Rathfarnham to City Centre and the Bray to City Centre schemes where the loadings reach more than 2,000 additional passengers per Hour compared to the Do Minimum scenario.

In the 2028 Opening Year AM Peak Hour scenario with the Proposed Schemes in place, there will be an estimated 10% more passenger boardings across all public transport services and 17% more boardings on bus services. In the 2028 Opening Year PM Peak Hour scenario with the Proposed Schemes in place, there will be an estimated 11% increase in total passengers boarding Public transport services and 18% more passengers boarding buses services.

In the 2043 Design Year AM and PM Peak Hour scenarios, increase in total passengers boarding all public transport services will be 7% and 8% respectively, and the increase in passengers boarding bus services will increase by 11% and 14% respectively.

Overall, the Proposed Schemes are expected to deliver a High Positive Cumulative Impact on People Movement by sustainable modes.

Summary and Conclusions

The Proposed Scheme, between Blanchardstown and the city centre, comprises the development of improved bus priority along the entire route This TIA provides a robust assessment of the scheme through qualitative assessment and quantitative analysis using a suite of multi-modal transport modelling tools.

During the Construction Phase, the Proposed Scheme will have **Low Negative** and temporary impacts to pedestrian access, bus access and parking and loading whilst it will have **Medium Negative** and temporary impacts to cyclist access. General traffic redistribution is not anticipated to be a significant issue during the construction phase, however there will be a requirement for some localised temporary road closures for short durations of the daytime and / or night-time. Therefore, the impact on general traffic redistribution is anticipated to be a **Medium Negative** and temporary impact. The impact of construction traffic is anticipated to result in a **Medium Negative** and temporary impact due to the low numbers of vehicles anticipated which are and below the thresholds set out in the Transport Assessments Guidelines.

During the Operational Phase, the Proposed Scheme will deliver positive impacts to the quality in terms of People Movement, pedestrian, cycling and bus infrastructure during the Operational Phase. These improvements will help to provide a more attractive alternative to the private car and promote a modal shift to walking, cycling and public transport, allowing for greater capacity along the corridor to facilitate the sustainable movement of people as population and employment levels grow in the future.

The Proposed Scheme will address sustainable mode transport infrastructure deficits while contributing to an overall integrated sustainable transport system as proposed in the GDA Transport Strategy. It will increase the effectiveness and attractiveness of bus services operating along the corridor and will result in more people availing of public transport due to the faster, more reliable journey times which the Proposed Scheme provides. This in turn will support the future increase to the capacity of the bus network and services operating along the corridor and thereby further increasing the attractiveness of public transport. In addition to this, the significant segregation and safety improvements to walking and cycling infrastructure that is a key feature of the Proposed Scheme will further maximise the movement of people travelling sustainably along the corridor. All of these changes combined will therefore cater for higher levels of future sustainable population and employment growth.

In the absence of the Proposed Scheme, bus services will be operating in a more congested environment, leading to higher journey times and lower reliability for bus journeys. This limits their

attractiveness to users which will lead to reduced levels of public transport use, making the bus system less resilient to higher levels of growth and leading to increased levels of car use and congestion. The absence of walking and cycling measures that the Proposed Scheme provides will also significantly limit the potential to grow those modes into the future.

On the whole, the Proposed Scheme will make a significant contribution to the overall aims of BusConnects, the GDA Transport Strategy and allow the city to grow sustainably into the future, which would not be possible in the absence of the Proposed Scheme

1. Introduction

This TIA presents a comprehensive review of the traffic and transport impacts associated with the Proposed Scheme, which has informed the production of Chapter 6 (Traffic & Transport) in Volume 2 of the EIAR. The TIA should be read in conjunction with this EIAR Chapter.

The Chapter describes the traffic and transport impacts in accordance with the requirements of the relevant Environmental Protection Agency's (EPA) guidance on the information to be contained in EIARs. To accompany this chapter, a Transport Impact Assessment (TIA) has been prepared. The TIA presents a comprehensive review of the traffic and transportation impacts associated with the Proposed Scheme, which has informed the production of this EIAR Traffic & Transport chapter. The TIA should be read in conjunction with Chapter 6 (Traffic & Transport) in Volume 2 of the EIAR.

The 18.5km Proposed Scheme, as described in detail in Chapter 4 (Proposed Scheme Description) in Volume 2 of the EIAR comprises the development of improved bus priority along the entire route, commencing at the junction of Leeson Street Lower and Earlsfort Terrace on St. Stephen's Green. It runs along Leeson Street Lower and Upper, and Sussex Road. It continues along Morehampton Road and Donnybrook Road, through Donnybrook Village and on to the Stillorgan Road, serving the UCD Interchange via the Stillorgan Road Overbridge at Belfield. It continues on the Stillorgan Road, which carries on to the Bray Road to Loughlinstown Roundabout. From Loughlinstown Roundabout it runs along the Dublin Road to St. Anne's Church and then continues south through Shankill village. It then passes through Wilford Junction and along the Dublin Road until it terminates on Castle Street in Bray, on the north side of the River Dargle crossing.

Throughout the Proposed Scheme bus stops will be enhanced to improve the overall journey experience for bus passengers while cycle facilities will be substantially improved with segregated cycle tracks provided along the links and protected junctions with enhanced signalling for cyclists provided at junctions.

Moreover, pedestrian facilities will be upgraded and additional signalised crossings will be provided. In addition, urban realm works will be undertaken at key locations with higher quality materials, planting and street furniture provided to enhance the pedestrian experience. Table 1.1 summarises the changes which will be made to the existing transport environment along the corridor as a result of the Proposed Scheme.

Table 1.1: Summary of Changes as a result of the Proposed Scheme

Total Length of Proposed Scheme	18.5km	
Bus Priority	**Existing (km)**	**Proposed Scheme (km)**
Bus Lanes		
Inbound	12.6	16.1
Outbound	12.8	17.1
Bus Priority through Traffic Management		
Inbound	0	2.3
Outbound	0	1.4
Total Bus Priority (both directions)	25.4	36.9 (+45%)
Bus Measures		
Proportion of Route with Bus Priority Measures	69%	99.6%
Cycle Facilities – Segregated		
Inbound	8.0	16.5
Outbound	9.4	16.9
Cyclist Facilities – Non-segregated		
Inbound	7.5	0.4
Outbound	7.4	0.0
Cyclist Facilities - Overall		
Total Cyclist Facilities (both directions)	32.3	33.8 (+5%)
Proportion Segregated (including Quiet Street Treatment)	47%	91%
Other Features		
Number of Pedestrian Signal Crossings	119	176
Number of Residential Properties with Land Acquisition	Not applicable	56

The Proposed Scheme is shown in a series of drawings which are contained in Volume 3 of the EIAR. The following drawings (listed in Table 1.2) should be read in conjunction with this TIA.

Table 1.2: List of Drawings

Drawing Series Number	Description
BCIDB-JAC-GEO_GA-0013_XX_00-DR-CR-9001	General Arrangement
BCIDB-JAC-ENV_LA-0013_IN_00-DR-LL-9001	UCD Bus Interchange General Arrangement
BCIDB-JAC-GEO_CS-0013_XX_00-DR-CR-9001	Typical Cross Sections
BCIDB-JAC-TSM_GA-0013_XX_00-DR-CR-9001	Traffic Signs and Road Markings
BCIDB-JAC-TSM_SJ-0013_XX_00-DR-TR-9001	Junction System Design

1.1 Aim and Objectives of the Proposed Scheme

The aim of the Proposed Scheme is to provide enhanced walking, cycling and bus infrastructure on this key access corridor in the Dublin region, which will enable and deliver efficient, safe, and integrated sustainable transport movement along the corridor. The objectives of the CBC Infrastructure Works, applicable to the Traffic and Transport assessment of the Proposed Scheme are to:

- Enhance the capacity and potential of the public transport system by improving bus speeds, reliability and punctuality through the provision of bus lanes and other measures to provide priority to bus movement over general traffic movements;
- Enhance the potential for cycling by providing safe infrastructure for cycling, segregated from general traffic wherever practicable;
- Enhance the potential for walking by improving the pedestrian infrastructure on the corridor;
- Support the delivery of an efficient, low carbon and climate resilient public transport service, which supports the achievement of Ireland's emission reduction targets;

- Enable compact growth, regeneration opportunities and more effective use of land in Dublin, for present and future generations, through the provision of safe and efficient sustainable transport networks;
- Improve accessibility to jobs, education and other social and economic opportunities through the provision of improved sustainable connectivity and integration with other public transport services; and
- Ensure that the public realm is carefully considered in the design and development of the transport infrastructure and seek to enhance key urban focal points where appropriate and feasible.

The planning and design of the Proposed Scheme has been guided by these aims and objectives.

1.1.0 People Movement

The aims and objectives outlined above are underpinned by the central concept and design philosophy of '***People Movement'.*** People Movement is the concept of the optimization of roadway space and / or the prioritisation of the movement of people over the movement of vehicles along the route and through the junctions along the Proposed Scheme. The aim being the reduction of journey times for higher person carrying capacity modes (bus, walking and cycling), which in turn provides significant efficiencies and benefits to users of the transport network and the environment.

A typical double-deck bus takes up the same road space as three standard cars but typically carries 50-100 times the number of passengers per vehicle. On average, a typical double-deck bus carries approximately 60-70 passengers making the bus typically 20 times more efficient in providing people movement capacity within the equivalent spatial area of three cars. These efficiency gains can provide a significant reduction in road network congestion where the equivalent car capacity would require 50 or more vehicles based on average occupancy levels. Consequently, by prioritising the movement of bus over cars, significantly more people can be transported along the limited road space available. Similarly, cyclists and pedestrians require significantly less roadway space than general traffic users to move safely and efficiently along the route. Making space for improved pedestrian infrastructure and segregated cycle tracks can significantly benefit these sustainable modes and encourage greater use of these modes.

With regards to this Transport Impact Assessment (TIA), People Movement is the key design philosophy and the Proposed Scheme impacts (both positive and negative) have been assessed on that basis.

1.1.1 Preliminary Design Guidelines

To support the 'People Movement' led approach to the design of the Proposed Scheme, the Preliminary Design Guidance Booklet for BusConnects Core Bus Corridors (PDGB) (NTA 2021)was developed. This guidance document was prepared to ensure that a consistent design approach was taken across the various BusConnects Schemes and that the objectives of the project are achieved. A 'People Movement' led design involves the prioritisation of people movement, focusing on maximising the throughput of sustainable modes (i.e. Walking, Cycling and Bus modes) in advance of the consideration and management of general vehicular traffic (private car) at junctions.

In support of this approach, a project specific People Movement at Signal Calculator (PMSC) was developed. The PMSC was applied at the initial design development stage, to provide an initial estimate of green time allocation for all movements at a typical junction, on the basis that sustainable mode movements should be accommodated foremost to maximise people movement with the remaining green time allocated to general traffic movements. The calculations were underpinned by:

- The number of buses required to be accommodated along the Proposed Scheme, as per the BusConnects Network Re-design proposals;
- The provision of a high Level of Service for cyclists at each junction along the Proposed Scheme; and
- The pedestrian crossing width and crossing timing requirements based on the provision of a high Level of Service for pedestrians at each junction along the Proposed Scheme.

The outputs of the calculator provided an initial estimate of the green times and vehicle capacity movements based on inputs and assumptions for each junction along the Proposed Scheme. The calculator provided an estimate of the People Movement for the junction in question (by mode) and was used to adjust proposals with a view to maximising the total person throughput at each junction along the Proposed Scheme during the iterative design process, described further below. Details on the development of junction designs along the Proposed Scheme are included in TIA Appendix 2 (Junction Design Report).

The People Movement Calculation and the identification of available general traffic capacity from this initial exercise was enhanced further by the Proposed Scheme Transport Models described in Section 4.3.

1.2 Iterative Design Process and Mitigation by Design

Throughout the development of the Preliminary Design for the Proposed Scheme there have been various design stages undertaken based on a common understanding of the maturity of the design at a given point in time. Part of this process, and the reason for developing a multi-tiered modelling framework (described in Section 4.3.1), was to ensure the environmental and transport impacts were mitigated to the greatest extent possible during design development and to enable information on potential impacts to be provided from the various Environmental Impact Assessment (EIA) and TIA disciplines back into the design process for consideration and inclusion in the proposals This resulted in mitigation being embedded into the design process by the consideration of potential environmental impacts throughout the Preliminary Design development. A multi-tiered modelling framework (described in Section 4.3.1) was developed to support this iterative design process,

Diagram 1.1 below illustrates this process whereby the emerging design for the Proposed Scheme have been tested using the transport models as part the iteration. The transport models provided an understanding of the benefits and impacts of the proposals (mode share changes, traffic redistribution, bus performance etc.) with traffic flow information also informing other environmental disciplines (such as Air Quality, Noise and Vibration, Climate etc.) which in turn allowed feedback of potential impacts into the design process to allow for changes and in turn mitigation to be embedded in the designs. The design process included physical changes (e.g., cycle lane widening) and adjustments to traffic signals including changes to staging, phasing and green times to limit traffic displacement to the greatest extent possible as well as traffic management arrangements and/or turn bans where appropriate. This ensured that any displaced traffic was kept to a minimum and was maintained on higher capacity roads, whilst continuing to meet scheme objectives along the Proposed Scheme.

The iterative process concluded when the design team were satisfied that the Proposed Scheme met its required objectives (maximising the people movement capacity of the Proposed Scheme) and that the environmental impacts and level of residual impacts were reduced to a minimum whilst ensuring the scheme objectives remained satisfied.

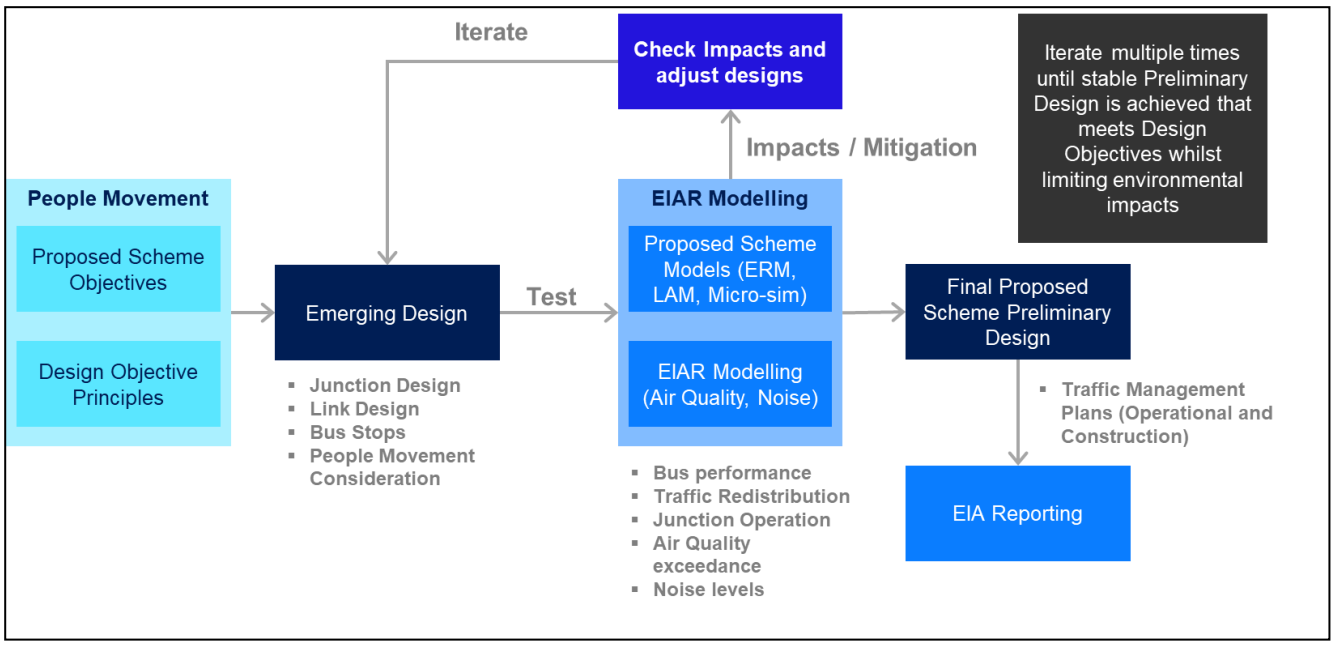

Diagram 1.1: Proposed Scheme Impact Assessment and Design Interaction

The impacts presented in this chapter are based on the final Preliminary Design for the Proposed Scheme which includes the embedded mitigation developed as part of the iterative design process described above.

1.3 Purpose and Structure of This Report

This TIA includes the comprehensive assessment of impacts and benefits of the Proposed Scheme covering all transport modes for both Construction and Operational Phases. The TIA also informs the Traffic and Transport chapter of the EIAR for the Proposed Scheme which assesses the impacts and significance of those impacts in relation to the receiving transport environment of the Proposed Scheme.

The traffic and transport impacts assessment have been undertaken in accordance with latest guidance, which includes the 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (EPA 2022), the 'Traffic and Transport Assessment Guidelines' (TII 2014), the National Cycle Manual (NTA 2011) and the UK Design Manual for Roads & Bridges (DMRB) Environmental assessment and monitoring (formerly HA 205/08, HD 48/08, IAN 125/15, and IAN 133/10), LA104 Revision 1 (Highways England, 2020).

The assessment of traffic and transport impacts and benefits of the Proposed Scheme considers the following transport receptors:

- Pedestrians / mobility impaired;
- Cyclists;
- Buses;
- General traffic; and
- On-street parking, off-street parking, loading, taxis.

In addition, the following modes of transport are considered as part of the modelling:

- Public Transport;
- Traffic including private car, taxis and goods vehicles;
- Walking; and
- Cycling.

The impact assessments have been carried out based on the following scenarios:

- **'Do Nothing'** – The 'Do Nothing' scenario represents the current baseline traffic and transport conditions of the direct and indirect study areas without the Proposed Scheme in place, which has been outlined in Section 5 (Baseline Environment). This scenario forms the reference case by which to compare the Proposed Scheme ('Do Something') for the qualitative assessments only;
- **'Do Minimum'** – The 'Do Minimum' scenario (Opening Year 2028, Design Year 2043) represents the likely traffic and transport conditions of the direct and indirect study areas including for any transportation schemes which have taken place, been approved or are planned for implementation, without the Proposed Scheme in place. This scenario forms the reference case by which to compare the Proposed Scheme ('Do Something') for the quantitative assessments. Further detail on the scheme and demand assumptions within this scenario are included further below in section 6.3; and
- **'Do Something'** – The 'Do Something' scenario represents the likely traffic and transport conditions of the direct and indirect study areas including for any transportation schemes which have taken place, been approved or are planned for implementation, with the Proposed Scheme in place (i.e. the Do Minimum scenario with the addition of the Proposed Scheme). The Do Something scenario has been broken into two phases:
    - **Construction Phase (Construction Year 2024)** – This phase represents the single worst-case period which will occur during the construction of the Proposed Scheme; and
    - **Operational Phase (Opening Year 2028, Design Year 2043)** – This phase represents when the Proposed Scheme is fully operational.

The remaining structure of the report is set out as follows:

- **Chapter 2 – Study Area**: This chapter sets out both the direct and indirect study areas of the TIA;
- **Chapter 3 – Policy Context**: This chapter sets details the policy context that the Proposed Scheme has been developed within;
- **Chapter 4 – Assessment Methodology**: This chapter sets out the proposed method of assessment for the quantitative and qualitative perspectives;
- **Chapter 5 – Baseline Environment**: This chapter will set out the baseline conditions against which the Proposed Scheme has been assessed;
- **Chapter 6 – Potential Impacts**: This chapter provides the assessment of the Proposed Scheme in both the Construction and the Operational Phase. It focusses on walking, cycling, bus, general traffic and parking and loading using the methods set out in Chapter 4. It considers both operational and construction scenarios;
- **Chapter 7 – Cumulative Assessment**: This chapter provides an assessment of the cumulative impact of the Proposed Scheme in conjunction with the other eleven Proposed Schemes within the BusConnects Dublin – Core Bus Corridor Infrastructure Works;
- **Chapter 8 – Summary and Conclusions**: This chapter provides a summary of the TIA and the conclusions which can be drawn from it; and
- **Chapter 9 – References**: contains the traffic and transport sources referred to within this chapter.

2. Study Area

The direct and indirect impacts have been considered with reference to the following study area extents (as shown in Diagram 2.1).

- **Direct Study Area** – The Proposed Scheme (i.e. the transport network within the red line boundary – the boundary of the physical works of the scheme); and
- **Indirect Study Area** – This is the area of influence the Proposed Scheme has on changing traffic volumes above a defined threshold with reference to TII's Traffic and Transport Assessment Guidelines (May 2014) (see Section 6.6.3 for further details on the threshold applied in relation to traffic volume changes used in the definition of the indirect study area).

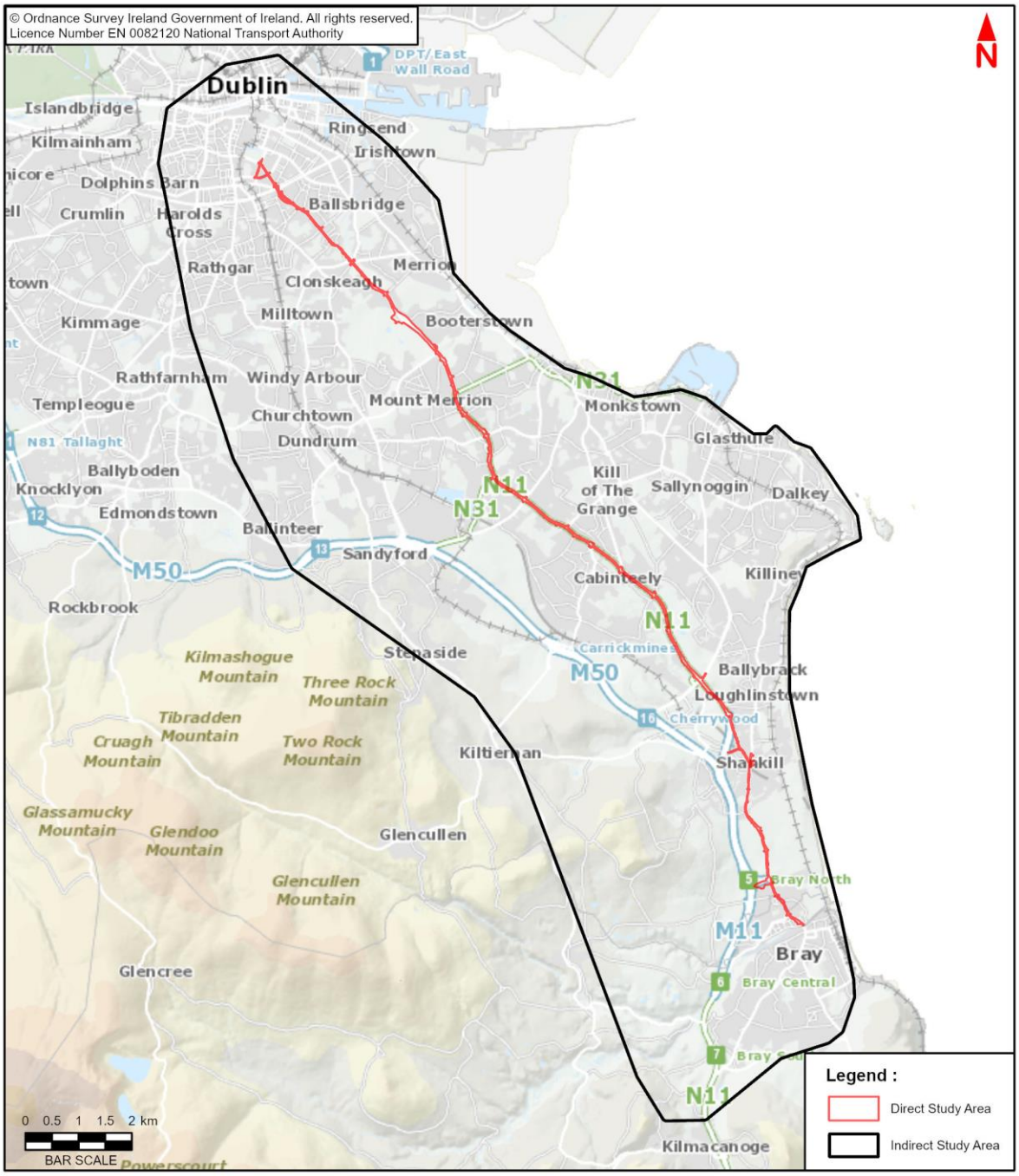

Diagram 2.1: Proposed Scheme Indirect Study Area

3. Policy Context

This chapter outlines the national, regional and local transport and planning policies applicable to the Proposed Scheme. Alignment of the Proposed Scheme with current planning policy at all levels is an important determining factor in planning decisions. Through this summary of policy, the following sections demonstrate that the Proposed Scheme has this alignment and thus is compliant with transport and planning policies.

3.1 National Guidelines

3.1.1 Traffic and Transport Assessment Guidelines

To determine the traffic and transport impact that the Proposed Scheme has in terms of an increase in general traffic flows on the direct and indirect study areas, a robust assessment has been undertaken, with reference to Transport Infrastructure Ireland's (TII) most recent Traffic and Transport Assessment Guidelines (TII 2014).

This document is considered best practice guidance for the assessment of transport impacts related to changes in traffic flows due to proposed developments and is an appropriate means of assessing the impact of general traffic trip redistribution on the surrounding road network.

According to Section 1.3 of the Traffic and Transport Assessment Guidelines (TII 2014):

> *'a Traffic and Transport Assessment is a comprehensive review of all the potential transport impacts of a proposed development or re-development, with an agreed plan to mitigate any adverse consequences.*

The guidelines aim to provide a framework to promote an integrated approach to development, ensuring that proposals promote more efficient use of investment in transportation infrastructure which reduces travel demand and promotes road safety and sustainable travel.

The guidelines aim to provide a framework to promote an integrated approach to development, ensuring that proposals promote more efficient use of investment in transportation infrastructure which reduces travel demand and promotes road safety and sustainable travel. The document is considered best practice guidance for the assessment of transport impacts related to changes in traffic flows due to proposed developments and is generally an appropriate means of assessing the traffic and transport impact of additional trips on the surrounding road network.

3.1.2 Design Manual for Urban Roads and Streets

The Design Manual for Urban Roads and Streets (DMURS) (DTTAS 2019) promotes an integrated street design approach within urban areas (i.e. cities, towns, and villages) focused on:

- Influence by the type of place in which the street is located; and
- Balancing the needs of all users.

A further aim of this Manual is to put well designed streets at the heart of sustainable communities to promote access by walking, cycling and public transport.

The principles, approaches and standards set out in this Manual apply to the design of all urban roads and streets (with a speed limit of 60 km/h or less), except: (a) Motorways (b) In exceptional circumstances, certain urban roads and streets with the written consent of Sanctioning Authorities.

The Manual is underpinned by a holistic design-led approach, predicated on a collaborative and consultative design process. There is specific recognition of the importance to create secure and connected places that work for all, characterized by creating new and existing streets as attractive places with high priority afforded to pedestrians and cyclists while balancing the need for appropriate vehicular access and movement.

To achieve a more place-based/integrated approach to road and street design, the following four core principles are promoted within the manual:

- Connected Networks - To support the creation of integrated street networks which promote higher levels of permeability and legibility for all users, and with emphasis on more sustainable forms of transport;
- Multi-Functional Streets - The promotion of multi-functional, place-based streets that balance the needs of all users within a self-regulating environment;
- Pedestrian Focus - The quality of the street is measured by the quality of the environment for the user hierarchy pedestrians considered first; and
- Multi-disciplinary Approach - Greater communication and co-operation between design professionals through the promotion of a plan-led, multidisciplinary approach to design.

3.1.3 Traffic Signs Manual

The Traffic Signs Manual (Department of Transport, 2019) promotes safety, health and welfare for road workers and users. The manual details the traffic signs which may be used on roads in Ireland, including sign layout, sign symbols, the circumstances in which they are required, and the associated rules for positioning them.

Of direct relevance to the assessment of traffic and transport impacts, Chapter 7 - Road Markings outlines the function of road markings, the legalities of road markings and the application of road markings on roads in Ireland. Chapter 8 - Temporary Traffic Measures and Signs for Roadworks outlines the application of temporary traffic management (TTM) at work sites on public roads; this chapter offers instructions and guidance to road users in relation to the use of TTM and outlines the signs to be used at roadworks.

3.1.4 Traffic Management Guidelines

The Traffic Management Guidelines (Department of Transport, 2019) provides guidance on a number of issues including, but not limited to, traffic planning, traffic calming and management, incorporation of speed restraint measures and the provision of suitably designed facilities for public transport users and vulnerable road users.

A core component of the Guidelines is rooted in decision making and balancing priorities, including those that are in conflict with one another. The Guidelines identifies common objectives to be addressed when managing the transport network:

- Environmental improvement;
- Congestion relief;
- Capacity improvement;
- Safety;
- Accessibility;
- Economic vitality; and
- Politics.

The Proposed Scheme has been designed and assessed with reference to the set of guidance documents listed throughout this section.

3.2 National Policy

3.2.0 National Planning Framework - Ireland 2040 Our Plan (NPF) (2018)

Project Ireland 2040 was launched by the Government in February 2018 and includes two elements:

- The National Planning Framework - Ireland 2040 Our Plan (NPF) (2018); and
- The National Development Plan (2018- 2027).

Project Ireland 2040 provides the framework for future development and investment in Ireland and is the overall Plan from which other, more detailed plans will take their lead, including city and county development plans and

regional strategies. The National Planning Framework (NPF) (Department of Housing, Local Government and Heritage, 2020) is a tool to assist the achievement of more effective regional development.

The NPF now represents the overarching national planning policy document, of direct relevance to the planning functions of regional and planning authorities, including An Bord Pleanála. The NPF is the successor to The National Spatial Strategy (NSS), published in November 2002 and has a statutory basis.

The NPF states that the key future growth enablers for Dublin include:

> *'...The development of an improved bus-based system, with better orbital connectivity and integration with other transport networks...'*
>
> *'...Delivery of the metropolitan cycle network set out in the Greater Dublin Area Cycle Network Plan inclusive of key commuter routes and urban greenways on the canal, river and coastal corridors.'*

It is a policy of the NPF (Objective 74) to secure the alignment of the NPF and the National Development Plan (NDP) through delivery of the National Strategic Outcomes. The BusConnects scheme is identified in National Strategic Outcome 4, 'Sustainable Mobility', which includes the delivery of:

> *'…key public transport objectives of the Transport Strategy for the Greater Dublin Area (2016-2035) by investing in projects such as New Metro Link, DART Expansion Programme, BusConnects in Dublin'.*

It also allows for the development of:

> *'a comprehensive network of safe cycling routes in metropolitan areas to address travel needs.'*

By enhancing travel by both public transport and active modes the Proposed Scheme accords with the National Planning Framework.

3.2.1 National Development Plan (NDP) (2021- 2030)

The National Development Plan (NDP) (2021- 2030) (Department of Public Expenditure and Reform, 2018) sets out the investment priorities that will underpin the implementation of the NPF, through a total investment of approximately €116 billion to ensure ongoing employment maintenance and creation, with appropriate regional development. This investment is also to provide clarity to the construction sector, allowing the industry to provide the capacity and capability required to deliver the Government's long-term investment plans.

The NDP illustrates the commitment to reforming how public investment is planned and delivered. This is being achieved through a shift to integrated regional investment plans, stronger co-ordination of sectoral strategies and more rigorous selection and appraisal of projects to secure value-for-money.

The NDP promotes the BusConnects proposals, of which the Proposed Scheme forms part, and requires improvements cycles networks such as those included in the scheme. Therefore, the Proposed Scheme is aligned with the NDP.

3.2.2 Draft National Investment Framework for Transport in Ireland (NIFTI) (2021)

The draft National Investment Framework for Transport in Ireland (NIFTI) (Department of Transport, 2021) was recently published by the Department of Transport for public consultation in March 2021. The purpose of the NIFTI is to support the delivery of the Project Ireland 2040 NPF and NDP by providing a strategic framework for future transport investment that is aligned with their spatial objectives and the National Strategic Outcomes (NSOs). The NIFTI has been developed to ensure decision making in land transport investment enables the NPF, supports the Climate Action Plan, and promotes positive social, environmental, and economic outcomes throughout Ireland. NIFTI establishes four investment priorities and objectives, of which new projects must align with at least one:

- Decarbonisation;
- Protection and Renewal;
- Mobility of People and Goods in Urban Areas; and

- Enhanced Regional and Rural Connectivity.

As outlined in this Chapter, the development of BusConnects is aligned with Project Ireland 2040, and by extension the NIFTI. The principle of the overall BusConnects programme aligns with at number least three of the NIFTI investment priorities, including; protecting and renewing Dublin's public transport network, enabling better mobility for people across the Dublin City-region, and supporting the decarbonization of Dublin's transport network.

3.2.3 Smarter Travel: A Sustainable Transport Future (2009 – 2020)

Smarter Travel: A Sustainable Transport Future (2009 – 2020) (Department of Transport, 2019) presents an overall policy framework for sustainable transport in Ireland. The policy sets out a vision, goals and targets to be achieved, and outlines 49 actions that form the basis for achieving a more sustainable transport future. The relevant parts of this policy to the BusConnects scheme are set out in Chapter 4 and 5, as follows:

> *Chapter 4: Actions to Encourage Smarter Travel: 'Action 4 - The delivery of public transport, cycling and promotion of more sustainable travel patterns generally in many existing urban centres can only be achieved through retrofitting. We will require local authorities to prepare plans to retrofit areas towards creating sustainable neighbourhoods so that walking and cycling can be the best options for local trips, for example to reach local facilities such as shops and schools.'*
>
> *Chapter 5: Actions to Deliver Alternative Ways of Travelling: 'Action 12 - Implement more radical bus priority and traffic management measures to improve the punctuality and reliability of bus services and to support more efficient use of bus fleets. This may involve making some urban streets car-free, creating tram-like priorities in others and making greater use of roads/hard shoulders by buses.'*

The Proposed Scheme will support these actions in providing improvements to pedestrian and cycle amenities along the proposed route, whilst also providing greater reliability for road-based public transport.

3.2.4 National Cycle Policy Framework

In support of the Smarter Travel Policy, the National Cycle Policy Framework (NCPF) (Department of Transport, 2009) was adopted by Government in 2009 and includes the following statements and commitments, as stated in the Executive Summary:

> *'The mission is to promote a strong cycling culture in Ireland. The vision is that all cities, towns, villages and rural areas will be bicycle friendly. Cycling will be a normal way to get about, especially for short trips. Cycling contributes to improved quality of life and quality of the public realm, a stronger economy and business environment, and an enhanced environment. A culture of cycling will have developed in Ireland to the extent that 10% of all trips will be by bike by 2020.'*

Objective 2 of the NCPF is to *'ensure that the urban road infrastructure (with the exception of motorways) is designed / retrofitted so as to be cyclist-friendly and that traffic management measures are also cyclist friendly.'* This involves junction treatment and traffic management, including combined bus and cycle priority measures.

The Proposed Scheme supports the objectives of the NCPF through the provision bus and cycle priority measures.

3.2.5 Statement of Strategy (2016 – 2019)

The Statement of Strategy (Department of Transport, Tourism and Sport (DTTAS), 2019) is the DTTAS's primary strategic plan and sets out the key priorities for the period 2016 – 2019. It details the Government's high-level goals and objectives, providing the framework for more detailed planning and individual performance management. The strategy mission is:

> *'to shape the safe and sustainable development of transport, tourism, and sport, to support economic growth and social progress.'*

DTTAS's high level goal for land transport is:

> *'to best serve the needs of society and the economy through safe, sustainable and competitive transport networks and services.'*

This will be sought with an emphasis on:

- Safety;
- Enhancing services;
- Facilitating and promoting more sustainable forms of transport, including walking and cycling;
- Achieving value-for-money; and
- Promoting sound governance.

The Proposed Scheme will contribute to improved road safety through improvement works at key junctions and upgrades to the pedestrian and cyclist infrastructure along the proposed route. The Proposed Scheme will enhance bus, walking and cycling services which will, in turn, facilitate and promote travel by these modes.

3.2.6 Road Safety Strategy (2021 – 2030)

The Road Safety Strategy 2021– 2030 (RSA 2021) works towards achieving 'Vision Zero' which is to achieve the long term goal of eliminating deaths and serious injuries in road traffic collisions by 2050. The strategy '*involves the promotion of the safer modes (e.g., public transport, such as bus and rail travel), and the promotion and provision of safe road environments for otherwise healthy, active modes. This includes walking and cycling, where the risks of death and serious injury in the event of a collision are higher than for protected in-vehicle road users*.'

The Road Safety Strategy acknowledges that '*The promotion and increased uptake of public transport can greatly contribute to fatality and serious injury reductions over the course of the 2021-2023 strategy'*. It continues '*The substantial societal benefits of increased active travel (i.e. walking or cycling) must also be acknowledged in light of Ireland's climate objectives, including reduced emissions, traffic congestion and noise pollution, and increased physical activity and its related health benefits*.'

A key action of Phase 1 of the strategy, during the 2021 – 2025 period is to '*construct 1,000km of segregated walking and cycling facilities to provide safe cycling and walking arrangements for users of all ages'.*

The Proposed Scheme will provide the infrastructure necessary to facilitate a public transport network which the Strategy acknowledges is a 'safer mode' of travel.

The Proposed scheme will contribute to improved road safety through improvement works at junctions and upgrades to the pedestrian and cycling infrastructure along the route. The Proposed Scheme provides for significant additional segregation between active travel users and the public road to help enhance safety.

3.2.7 Building on Recovery: Infrastructure and Capital Investment (2016-2021)

The Capital Plan (Department of Public Expenditure and Reform, 2015) presented the findings of a Government-wide review of infrastructure and capital investment policy and outlined the Government's commitment to ensuring that the country's stock of infrastructure is capable of facilitating economic growth. The plan identifies the need to improve public transport facilities noting:

> *'It is therefore essential that road, rail and public transport networks are developed and maintained to the standard required to ensure the safe and efficient movement of people and freight. In addition, getting people out of cars and onto public transport has a key role to play in reducing Ireland's carbon emissions, by providing a viable, less polluting alternative to car and road transport for many journeys.'*

The transport capital allocation in the plan is largely framed by the recommendations and priorities set out in the 2015 Department of Transport, Tourism and Sport (DTTaS) Strategic Investment Framework for Land Transport, which centre on:

- Maintaining and renewing the strategically important elements of the existing land transport system;

- Addressing urban congestion; and
- Maximize the contribution of land transport networks to our national development.

The Capital Plan key objective is to provide €3.6 billion of Public Transport Investment including further upgrading of Quality Bus Corridors. The Proposed Scheme is consistent with these recommendations, priorities and objectives as set out in the DTTAS investment framework, and the Capital Plan.

3.2.8 The Sustainable Development Goals National Implementation Plan (2018 – 2020)

In September 2015, 'Transforming Our World, the 2030 Agenda for Sustainable Development (the 2030 Agenda)' was adopted by all 193 Members States of the United Nations (UN).

The 2030 Agenda aims to deliver a more sustainable, prosperous, and peaceful future for the entire world, and sets out a framework for how to achieve this by 2030. This framework is made up of 17 Sustainable Development Goals (SDGs) which cover the social, economic and environmental requirements for a sustainable future which are shown in Diagram 3.1.

Diagram 3.1: The 17 Sustainable Development Goals

The Sustainable Development Goals National Implementation Plan (Department of the Environment, Climate and Communications, 2018) is in direct response to the 2030 Agenda for Sustainable Development and provides a whole-of-government approach to implement the 17 Sustainable Development Goals (SDGs) above.

The Plan also sets out 19 specific actions to implement over the duration of this first SDG National Implementation Plan. The BusConnects scheme aligns with Goals 9 and 11 as they include the following targets:

> *'Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation: Target 9.1: Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human wellbeing, with a focus on affordable and equitable access for all.'*
>
> *'Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable: By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.'*

The above goals align with the aim of the Proposed Scheme and the BusConnects proposals overall.

3.2.9 Climate Action Plan

The Climate Action Plan (CAP) 2023 (Government of Ireland 2023) is the second update to Irelands CAP 2019 and was launched on 21 December 2022. The 2023 CAP sets out the sectoral emissions ceilings and the implementation of carbon budgets. The CAP is a roadmap to deliver a halving of Irelands emissions by 2030.

The transport sector has an aim of a 50% reduction in emissions by 2030. The 'Avoid' (reduce or avoid the need for travel – land use planning), 'Shift' (Shift to more environmentally friendly modes – public transport, active travel), 'Improve' (Improve the energy efficiency of vehicle technology- vehicle efficiency, clean fuels) approach has been adopted to help achieve these targets. CAP 2021 targets have been updated to include '*a 20% reduction in total vehicle kilometres, a reduction in fuel usage, and significant increases to sustainable transport trips and modal share'*

Section 15.2.2 'Recalibration of the Decarbonisation Pathway for Transport' states that the NTA Modelling team revalidated and recalibrated the decarbonisation pathway for CAP21. It goes on to say that this exercise *'identified additional measures to delivering 50% emissions abatement by 2030.'* It further outlines that: *'The range of measures modelled includes known public transport schemes as set out in the National Development Plan (NDP);* (inter alia) *further acceleration of road space reallocation towards public and active travel modes; car-free urban centres'.*

Section 15.3.3 '*Avoid and Shift'* sets out the following:

> *'Greater prioritisation and reallocation of existing road space towards public transport and active travel will be a key supporting element for the new DMS. This already forms a crucial element of the BusConnects programme in each of our five cities. It is also a key recommendation from the OECD's Redesigning Ireland's Transport for Net Zero report.'*

Section 15.3.3 '*Shift'* outlines the following in regard to '*Major Public Transport Infrastructure Programme':*

> '*Key milestones have already been achieved on major infrastructural projects, including BusConnects in each of our 5 cities and the Greater Dublin Area's DART+ Programme and Metrolink, which will continue to be progressed through public consultations and the planning systems.'*

Table 15.7 *'Key Actions to Deliver Abatement in Transport for the Period 2023-2025'* includes under the measure *'Major Public Transport Infrastructure Programme'* and the heading *'Shift'* (inter alia) '*Advance BusConnects programme in 5 cities'* under the actions for 2023, 2024 and 2025.

The delivery of the Proposed Scheme will provide the transport infrastructure required to deliver sustainable transport options that will support the key actions set out in the Climate Action Plan 2023. The Proposed Scheme will expand, enhance and connect to pedestrian and cycle networks and will assist in facilitating modal shift. It is clear that the targets set out within CAP 2023 are closely linked to the delivery of key transport infrastructure projects, such as the BusConnects Programme and therefore the Proposed Scheme.

3.3 Regional Policy

3.3.0 Transport Strategy for the Greater Dublin Area (2022 – 2042)

The Transport Strategy for the Greater Dublin Area 2022-2042 (NTA 2022) (hereafter described as the GDA) was published for consultation on the 9 November 2021. It was adopted in January 2023 and replaces the previous Transport Strategy for the Greater Dublin Area 2016-2035. The overall aim of the strategy is '*To provide a sustainable, accessible and effective transport system for the Greater Dublin Area which meets the region's climate change requirements, serves the needs of urban and rural communities, and supports the regional economy'.* A key focus of the strategy is to enable increased use of other transport modes to meet environmental, economic and social objectives related to emissions, congestion and car dependency. It sets a clear direction towards a 50% reduction in CO_2 emissions within the GDA area by 2030.

Section 1 'Introduction' reaffirms that '*Investment in bus priority and bus service improvements – BusConnects Dublin'* is a '*Major Project provided for in the strategy'*.

The NTA priorities are set out, as follows:

1. 'Priority 1. '*Undertake strategic transport planning seeking the optimal alignment of land use and transport policy and practice, enabling an increased proportion of travel by sustainable transport modes'*;
2. Priority 2. '*Promote the use of more sustainable modes of transport'*; and
3. Priority 3. '*Implement an effective infrastructure investment programme that delivers sustainable and public transport infrastructure in a cost effective manner*.'

Section 9.3 'International Gateways' comments that: '*This strategy incorporates MetroLink, BusConnects Dublin and demand management measures which will enhance and protect essential access to Dublin Airport, and ensure that it will operate in a sustainable fashion in terms of landside transport.*'

Section 9.4 'Design and Planning of Schemes' sets out: *'In designing and planning transport infrastructure schemes, it can be tempting for agencies, stakeholders and the public to focus on the one primary objective of the scheme, without giving due attention to the myriad other aspects which need to be considered and the wider benefits which may accrue. Examples of this include the step-change in the quality of the cycle network proposed as part of BusConnects Dublin'*

Section 9.5.2 'Major Interchange Facilities/Mobility Hubs' references that '*Under BusConnects Dublin, a number of interchanges are currently in development and as the DART+ and light rail projects currently being designed are progressed, additional facilities will be developed.'* It further comments that *'Dublin Airport also comprises a major interchange facility with multiple bus services converging at this location, as well as a major taxi facility. This interchange will be enhanced through the delivery of MetroLink and improved local and orbital bus services as part of BusConnects.'* It continues at section 9.5.3 in regard to *'Other Interchanges'* that *' With the introduction of significantly enhanced orbital bus services as part of BusConnects Dublin, it is anticipated that the role of interchange will increase*.'

There is added emphasis on the delivery of public transport, active travel and enhanced accessibility to sustainable modes of transport in the GDA, all of which the Proposed Scheme will help to deliver.

3.3.1 Greater Dublin Area Cycle Network Plan

The Greater Dublin Area Cycle Network Plan (National Transport Authority (NTA), 2013) was adopted by the NTA in early 2014 following a period of consultation with the public and various stakeholders. This plan forms the strategy for the implementation of a high quality, integrated cycle network for the Greater Dublin Area. This involved the expansion of the urban cycle network from 500km to 2,480km comprising a mixture of cycle tracks and lanes, cycle ways and infrastructure-free cycle routes in low traffic environments. Within the urban network, this would consist of a series of routes categorised as follows:

- **Primary**: Main cycle arteries that cross the urban area and carry most cycle traffic – target quality of service (QoS) of two abreast + overtaking width = 2.5m;
- **Secondary**: Link between principle cycle routes and local zones – target QoS of single file + overtaking width = 1.75m; and
- **Feeder:** Cycle routes within local zones and/or connection from zones to the network levels above.

During the course of the analysis carried out to identify the preferred core bus corridors for the BusConnects scheme, the provision of these cycle routes was considered at all stages. Therefore, as part of the analysis, any upgrading of infrastructure to provide bus priority also provides cycling infrastructure, where practical, to the appropriate level and quality of service (as defined by the NTA National Cycle Manual) required for primary and secondary cycle routes.

The revised GDACNP 2022 forms part of the GDA Transport Strategy (as adopted in January 2023) and is a component of the transport strategy.

The 2022 GDACNP is a review of the 2013 plan to ensure a fit for purpose cycle network for all users and trip types. The network comprises of the following routes:

- Primary;
- Secondary;
- Feeder;

- Greenway; and
- Inter-urban.

It aims for 322km of Primary cycle network, 1,060 Secondary cycle network and 954km of Greenway routes.

The Greater Dublin Area Transport Strategy 2022, sets out Measure CYC1 - GDA Cycle Network which outlines the following:

'It is the intention of the NTA and the local authorities to deliver a safe, comprehensive, attractive and legible cycle network in accordance with the updated Greater Dublin Area Cycle Network.'

By enhancing cycling facilities, the Proposed Scheme accords with the Greater Dublin Area Cycle Network Plan.

3.3.2 Regional Spatial and Economic Strategy for the Eastern and Midlands Region (2019-2031)

A Regional Spatial and Economic Strategy (RSES) is a strategic plan and investment framework to shape future growth and to better manage regional planning and economic development throughout the region.

The RSES (Eastern and Midland Regional Assembly, 2019) builds on the foundations of Government policy in Project Ireland 2040, which combines spatial planning with capital investment, and has been prepared from an extensive bottom up consultation process. It is an integrated cohesive policy document that provides a Spatial Strategy to manage future growth in the region. It identifies regional assets, opportunities and pressures and provides appropriate policy responses in the form of Regional Policy Objectives.

The region includes three subregions or Strategic Planning Areas (SPAs), namely the Midland, Eastern and Dublin SPAs, as shown in Diagram 3.2.

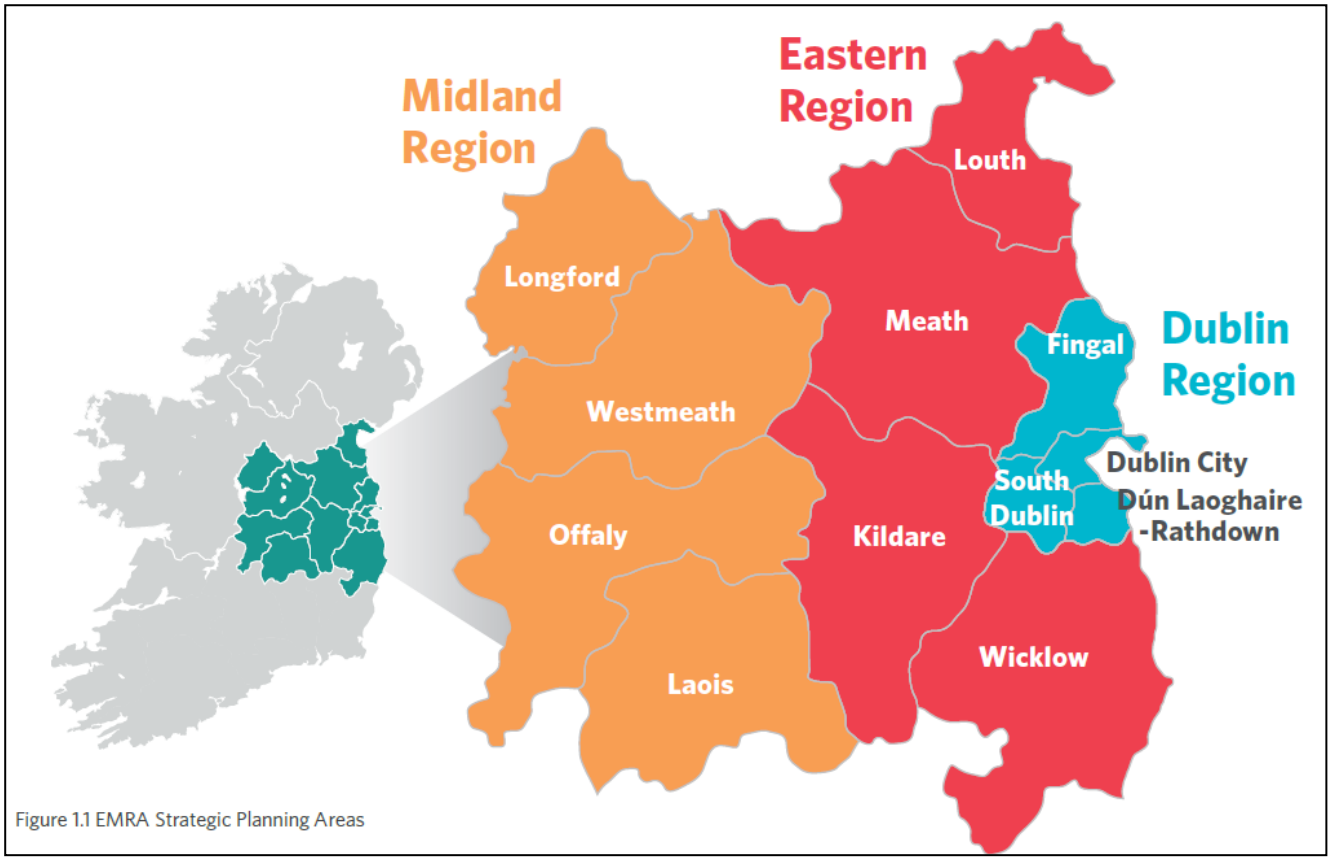

Diagram 3.2: RSES Planning Areas

Dublin City and suburbs is considered in the context of the Dublin Metropolitan Area Strategic Plan (MASP) and is dealt with in greater detail in Chapter 5 of the RSES. The principles underpinning the development of the MASP

include the effective integration of transport planning with spatial planning policies, from regional down to local level and the alignment of associated transport and infrastructure investment priorities. The national policy in metropolitan areas is to increase sustainability through greater alignment of land use and transport.

The RSES highlights the BusConnects scheme as a key transport infrastructure investment in the metropolitan area as set out in national policy. The MASP Sustainable Transport Regional Policy Objectives (RPO) are:

> *'RPO5.2: Support the delivery of key sustainable transport projects including Metrolink, DART and LUAS expansion programmes, BusConnects and the Greater Dublin Metropolitan Cycle Network and ensure that future development maximizes the efficiency and protects the strategic capacity of the metropolitan area transport network, existing and planned.'*
>
> *'RPO 8.9: The RSES supports delivery of the bus projects…subject to the outcome of appropriate environmental assessment and the planning process.'*

Table 3.1: Extract from RSES RPO8.9 – Bus Projects for the Region

Extract from RSES RPO8.9 (Table 8.3: Bus Projects for the Region)
Core Bus Corridors comprising 16 radial routes and 3 orbital routes in Dublin
Regional Bus Corridors connecting the major regional settlements to Dublin
Dublin Metropolitan Bus Network Review
Network reviews for the largest settlements across EMRA, with a view to providing local bus services
Review of bus services between settlements
Review of local bus services throughout EMRA, including services to small towns and villages and the rural transport programme
New interchange and bus hub facilities
New fare structures
Enhances passenger information
Improvements to bus waiting facilities
Integrated time tabling of bus and rail into a coherent national and regional network

The RSES highlights the wider BusConnects proposals as a project, given that the Proposed Scheme fall within this it can be considered to be aligned with it.

3.3.3 Dublin City Council Development Plan (2022 – 2028)

The 2022 – 2028 DCDP (DCC, 2022) was adopted on the 2nd of November 2022 and came into effect on the 14th of December, it guides how the city will develop to meet the needs of its residents, visitors and workers. The vision for the city is:

The vision of the DCDP is to establish champion compact city living, distinct character, a vibrant culture, and a diverse, smart, green, innovation-based economy. DCC aims to establish the city as one of Europe's most sustainable, dynamic, and resourceful city regions. The DCDP places sustainable transport as a core principle in the future development of the city:

> *'Within the next 10 years, Dublin will have an established international reputation as one of Europe's most sustainable, dynamic and resourceful city regions. Dublin, through the shared vision of its citizens and civic leaders, will be a beautiful, compact city, with a distinct character, a vibrant culture and a diverse, smart, green, innovation-based economy. It will be a socially inclusive city of urban neighbourhoods with excellent community and civic infrastructure based on the principles of the 15 minute city, all connected by an exemplary public transport, cycling and walking system and interwoven with a high quality bio-diverse, green space network. In short, the vision is for a capital city where people will seek to live, work, experience, invest and socialise, as a matter of choice.'*

In 'Translating the Core Strategy into Development Plan Policies and Objectives', the core strategy has the following supports:

'The Core Strategy will promote development and appropriate intensification along the routes of the three key public transport projects to be developed over the development plan period comprising Bus Connects (2021 – 2023)'

The DCDP recognises that increasing capacity on public transport including bus corridors is a means to promoting modal change and active travel.

Policy SMT1 Modal Shift and Compact Growth states ' *To continue to promote modal shift from private car use towards increased use of more sustainable forms of transport such as active mobility and public transport, and to work with the National Transport Authority (NTA), Transport Infrastructure Ireland (TII) and other transport agencies in progressing an integrated set of transport objectives to achieve compact growth.'*

Policy SMT16 Walking, Cycling and Active Travel states, ' *To prioritise the development of safe and connected walking and cycling facilities and prioritise a shift to active travel for people of all ages and abilities, in line with the city's mode share targets*.'

SMT22 goes on to state the support of delivering key sustainable transport projects such as BusConnects to help provide an integrated public transport network with efficient interchange between transport modes is key. It is therefore clear that BusConnects and the delivery of same is an important objective of the DCDP. The DCDP fully supports the BusConnects Programme of works and its policy/objectives are aligned with the Proposed Scheme. The Proposed Scheme will deliver the infrastructure necessary to provide a sustainable transport system, to support the enhancement and growth of the cycle and pedestrian network and achieve a modal shift.

3.3.4 Dublin City Centre Transport Study

The National Transport Authority (NTA) and Dublin City Council (DCC) published a set of proposals to enhance overall movement in Dublin City Centre and to improve the attractiveness of the city centre for shoppers, tourists, workers, and residents.

The Transport Study (DCC and NTA, 2016) has been developed as an input into the Dublin City Development Plan (DCDP) 2016-2022, and sets down a framework for how Dublin City's transport network can be redefined to cater for this increased demand, by better utilising the existing infrastructure available, and by moving towards a more sustainable and efficient use of the urban realm within the city centre.

The key objectives of the Transport Strategy are to:

1) Protect the investment that has been, and continues to be made in public transport across the city;
2) Guarantee the future development potential of the City Centre, and improve confidence in the ability of the City Centre to be the key focus of future investment;
3) Increase the capacity, reliability and use of public transport into and within the City Centre;
4) Improve the quality of service for cycling and walking, with particular emphasis on the 'core' City Centre;
5) Ensure that the city develops in a way which will provide a better living and working environment for residents and visitors alike; and
6) Provide an agreed framework for continued transport investment within the City Centre.

The Proposed Scheme directly contributes towards achieving Objectives 3 and 4 of the Transport Strategy.

3.4 Local Policy

3.4.0 Stillorgan Local Area Plan

The Stillorgan Local Area Plan 2018-2024 sets out Dún Laoghaire-Rathdown County Council's proposed policies and objectives for the redevelopment and renewal of the Stillorgan Local Area over the Plan period. The Local Area Plan has a relatively limited spatial area and is confined predominantly to the commercial/retail centre of Stillorgan.

As stated in the Plan Vision Statement, the Plan strategy is to "seek a transformative improvement in the quality of the urban realm where priority movement for pedestrians, cyclists and public transport will be ensured and the creation of a high quality age friendly environment will be a prerequisite. The influence and impact of the private car on the environs of the District Centre will be moderated."

Key objectives of the Stillorgan LAP are:

- To seek a comprehensive improvement in the public realm and the pedestrian/cycle environment supporting an Age Friendly Village environment; and
- To improve accessibility to Stillorgan in particular by promoting the use of public transport, walking and cycling.

Critically the LAP objective seeks to promote sustainable transport and maximise connectivity, permeability and ease of movement for active modes. To enable this the LAP outlines aims to provide high quality walking, cycling and bus infrastructure. This aligns with the goals of the Proposed Scheme.

3.4.1 Bray Municipal District Local Area Plan

The Bray Municipal District Local Area Plan 2018-2024 sets out Wicklow County Council's proposed framework that will guide the future sustainable development of the Bray Municipal District over the Plan period.

Key parameters for development of Bray are based on *"sustainability and developing the town in a manner that would generate the minimal number of car journeys and the maximum use of public transport."*

The infrastructure strategy for Bray Municipal District seeks to promote safe and accessible pedestrian, cycling and traffic routes and excellent public transport facilities. This aligns with the objectives of the Proposed Scheme.

3.4.2 Cherrywood Strategic Development Zone

Cherrywood was designated a Strategic Development Zone (SDZ) in May 2010. The Cherrywood SDZ comprise of approximately 360 hectares, which are located in the administrative area of Dún Laoghaire-Rathdown County Council. The eastern boundary of the Cherrywood SDZ Planning Scheme is immediately adjacent to the Proposed Scheme.

Key objectives within the Cherrywood SDZ Planning Scheme (objectives PI13 and PI14) outline aims to develop sustainable travel options, including segregated pedestrian / cycle routes, within and to the SDZ. As such, the Proposed Scheme supports the objectives set out in for the Cherrywood SDZ.

3.4.3 Woodbrook – Shanganagh Local Area Plan

The Woodbrook-Shanganagh Local Area Plan 2017-2023 came into effect on 1st August 2017. The LAP outlines growth opportunities across two parcels of land in Shanganagh-Woodbrook termed "Future Development Areas" and transport policies.

In terms of transport policies, the Woodbrook – Shanganagh LAP seeks to promote sustainable transport with new proposals meeting the needs of pedestrians, cyclists and public transport users. Additionally, the LAP seeks to co-operate with the relevant bodies on the Dublin Road Core Bus Corridor M11 / N11. The Proposed Scheme is therefore aligned with the objectives and aims of the with the goals of the Woodbrook-Shanganagh LAP.

3.5 Legislation

There is no legislation specifically relevant to this TIA.

4. Assessment Methodology

This chapter of the TIA details the methodologies used to assess the impacts of the Proposed Scheme on the baseline environment.

The assessment of the Proposed Scheme in relation to the baseline transport environment comprises a qualitative assessment of changes to the transport environment, as well as quantitative analysis undertaken using a suite of multi-modal transport modelling tools which have been developed for the Proposed Scheme.

The assessment of traffic and transport benefits and impacts of the Proposed Scheme requires an approach which can provide information on, for example, the mode share changes along the route, people movement by different modes of transport travelling along the corridor as well as traffic re-routing impacts on the surrounding road network. The approach requires an assessment of bus, pedestrian and cycle operations and bus reliability with a focus on the movement of people along the route.

The traffic and transport impact assessments have been undertaken in accordance with the 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (EPA 2022), the 'Traffic and Transport Assessment Guidelines' (TII 2014), the National Cycle Manual (NTA 2011) and the UK Design Manual for Roads & Bridges (DMRB) Environmental assessment and monitoring (formerly HA 205/08, HD 48/08, IAN 125/15, and IAN 133/10), LA104 Revision 1 (Highways England, 2020). A range of transport modelling tools which sit within the framework of the NTA's Eastern Regional Model (ERM) have been used.

Where possible a Level of Service (LoS) has been derived for each mode of travel. The benefits of this approach are outlined subsequently.

4.1 Data Collection and Collation

The TIA has two distinct parts, qualitative methods which consider the physical changes to transport networks and quantitative methods which are based upon traffic modelling. The following sections describe the data collection and collation for each method of assessment.

4.1.1 Qualitative Assessment Data Collection

This section discusses the data collection undertaken to inform the qualitative assessment metrics set out in Section 4.2 and Section 64.2.3.

4.1.1.1 Site Surveys

A walkover of the route of the Proposed Scheme was undertaken to ensure an up-to-date record of the existing environment was used to complete the qualitative assessment. The surveys focussed on the following aspects which are relevant to the assessment:

- Provision for the movement of pedestrians, cyclists and vehicles;
- Location of, and facilities at, bus stops; and
- Current parking and loading facilities.

These surveys were supplemented by specially commissioned aerial orthophotography along the full length of the Proposed Scheme.

4.1.1.2 Mapping Data

Three sources of mapping data have been used to inform the analysis, Ordnance Survey Mapping (OSM), NavStreets and OpenStreet Map.

OSM is created by Ordnance Survey Ireland which provides detailed mapping for a variety of uses. For the TIA OSM has been used to establish accurate road naming and the location of physical highway features.

NavStreets is a street-level GIS dataset which covers the Republic of Ireland, including the Greater Dublin Area. Two sets of data from this dataset have been used to inform the TIA:

- Road Network: Functional Class of each road link in the road network, which is a hierarchical classification of roads based on reality, used to determine a logical and efficient route for a traveller. The Functional Class information has been used to help inform the metrics for identifying the sensitivities of roads in the indirect study area.
- Points of Interest: NavStreets contains information on a wide range of "points of Interest". This has been referred to when identifying sensitive community receptors, such as schools, healthcare facilities, places of worship, retail clusters, etc, when determining how sensitive a particular location is to changes in terms of traffic and transport facilities.

OSM and NavStreets have been supplemented by OpenStreet Map which is an open source database of geographic data (i.e. Points of Interest, Land Use and Places of Worship). This has been used to further identify community facilities and open spaces in proximity to the Proposed Scheme.

4.1.2 Quantitative Assessment Data Collection

The following chapter provides an overview of the data collection exercise undertaken to facilitate the calibration and validation of the Local Area Model (LAM), Proposed Scheme micro-simulation and junction models. Existing data sources were reviewed to identify available traffic counts and locate gaps in observed information across the model area. This review was used to define a specification for additional counts which were commissioned for the area. The combination of new commissioned counts, and existing available information, provided a comprehensive dataset for calibration and validation.

This section discusses the data collection undertaken to inform the quantitative assessment metrics set out in Section 6.6.3.Further detail can be found in TIA Appendix 1 (Transport Modelling Report).

4.1.2.1 Existing Data Review (Gap Analysis)

A review of existing traffic survey data available for the model area was undertaken from the following sources:

- NTA Traffic Count Database: A mixture of Automatic Traffic Counts (ATC) and Junction Turning Counts (JTC) from previous studies covering a range of years; and
- TII Automatic Traffic Counters (ATCs): Permanent TII ATCs located on national strategic roads across the network with data publicly available online.

The NTA, Dublin City Council and the other local authorities undertake periodic counts within their administrative areas in connection with their own local schemes. These surveys are conducted throughout the year and a limited set of data was available within the area of the Proposed Scheme.

Information on bus passenger volumes was already available and included in the modelling process as part of the ERM base model calibration and validation, which includes the annual canal and M50 cordon counts as well as ticketing data.

4.1.2.2 Commissioned Traffic Survey Data

Due to the scale of the CBC Infrastructure Works, the Proposed Scheme required a full set of consistent updated traffic counts for a neutral period e.g. November / February when schools, colleges were in session. Traffic surveys were undertaken in November 2019 and February 2020 (Pre-Covid) with the surveyed counts used as inputs to the model calibration and validation process of the strategic model and micro-simulation model. The two types of counts used in the study are Junction Traffic Counts (JTCs) and Automatic Traffic Counts (ATCs).

The various components of traffic have different characteristics in terms of operating costs, growth and occupancy. The surveys used the most common vehicle categories, as defined in the COBA (Cost Benefit Analysis) Manual:

- Cars: Including taxis, estate cars, 'people carriers' and other passenger vehicles (for example, minibuses and camper vans) with a gross vehicle weight of less than 3.5 tonnes, normally ones which can accommodate not more than 15 seats. Three-wheeled cars, motor invalid carriages, Land

Rovers, Range Rovers and Jeeps and smaller ambulances are included. Cars towing caravans or trailers are counted as one vehicle unless included as a separate class;

- Light Goods Vehicles (LGV): Includes all goods vehicles up to 3.5 tonnes gross vehicle weight (goods vehicles over 3.5 tonnes have sideguards fitted between axles), including those towing a trailer or caravan. This includes all car delivery vans and those of the next larger carrying capacity such as transit vans. Included here are small pickup vans, three-wheeled goods vehicles, milk floats and pedestrian controlled motor vehicles. Most of this group is delivery vans of one type or another;
- Other Goods Vehicles (OGV 1): Includes all rigid vehicles over 3.5 tonnes gross vehicle weight with two or three axles. Also includes larger ambulances, tractors (without trailers), road rollers for tarmac pressing, box vans and similar large vans. A two or three axle motor tractive unit without a trailer is also included;
- Other Goods Vehicles (OGV 2): This category includes all rigid vehicles with four or more axles and all articulated vehicles. Also included in this class are OGV1 goods vehicles towing a caravan or trailer; and
- Buses and Coaches (PSV): Includes all public service vehicles and work buses with a gross vehicle weight of 3.5 tonnes or more, usually vehicles with more than 16 seats.

An overview of the commissioned data is provided Table 4.1.

Table 4.1: Survey Overview

Survey Type	Company	Number	Date
JTC	NATIONWIDE	59	Tue 19/11/2019, Thu 13/2/2020
ATC	NATIONWIDE	20	19/11/2019 - 26/11/2019, 2/2/2020 - 16/2/2020

The JTCs are 24-hour counts broken down into 15-minute segments over a full day. All main junctions along the Proposed Scheme have been included and provide information on the volume, and types of vehicles, making turning movements at each location. This data is utilised within the models to ensure that the flow of vehicles through the main junctions on the network is being represented accurately.

The ATCs were taken for an entire week. In some cases, the ATC counts were repeated for a second week to account for data-collection issues. The vehicle categories surveyed are motorcycles, cars, LGVs, OGV 1, OGV 2 and PSVs.

The ATC data provides information on:

- The daily and weekly profile of traffic within the study area of the Proposed Scheme; and
- Busiest time periods and locations of highest traffic demand on the network.

Summary information related to the JTCs and ATCs collected for the Proposed Scheme is shown in Section 5.25.2.

4.1.2.3 Road and Bus Journey Time Data

4.1.2.3.1 Bus Journey Time Data

Bus Journey time data for the Proposed Scheme was provided by the NTA from the Automatic Vehicle Location (AVL) dataset used to monitor bus performance. The data provides information on bus travel time and dwell times at existing bus stops and has been used to inform the development of the transport models used to assess the impacts of the Proposed Scheme.

4.1.2.3.2 TomTom Road Journey Time Data

Road Journey time data for the Proposed Scheme models has been sourced from TomTom, who calculate journey times using vehicle position data from GPS-enabled devices and provide this on a commercial basis to a number of different users. The NTA purchased a license to access the anonymised Custom Area Analysis dataset

through the TomTom TrafficStats portal. The NTA has an agreement with TomTom to provide travel time information covering six areas of Ireland and for certain categories of road.

Data is provided based on the area specified by the agreement; however, the date and time range of the data can be specified by the user. For the development of the strategic model and micro-simulation models the following query on the data was applied:

- 2019 weekdays (Monday to Thursday) from mid-January until end of November, excluding all bank holidays and days close to those dates.

The data is provided in the form of a GIS shapefile and accompanying travel time database file. The shapefile contains topographical details for each road segment, which is linked to the travel time database via a unique link ID. The database file then contains average and median travel time, average and median speed, the standard deviation for speed, the number of observations and percentile speeds ranging from 5 to 95 for each link.

4.1.2.3.3 TomTom Data Processing

In order to compare the journey times of specific links and routes between the TomTom data and the road assignment models, the two datasets were linked. After importing both the road assignment model and TomTom networks into the GIS environment, ensuring both datasets are in the same coordinate system, the selected routes were then linked using a spatial join functionality.

Before applying the data to the models, it was checked to ensure that it was fit for purpose. The review included checks of the number of observations that form the TomTom average and median times and checks of travel times against Google Maps travel times.

The TomTom Custom Area Analysis dataset was processed to provide observed journey times against which the strategic and micro-simulation models could be validated along the Proposed Scheme.

4.1.2.3.4 TomTom Data Application

The processed journey time data was used to validate the LAM and the micro-simulation models at an end-to-end travel time level, with intermediate segment travel times used to inform the calibration of both models. Further information about the journey time validation process can be found in TIA Appendix 1 (Transport Modelling Report).

4.2 Appraisal Method for the Assessment of Impacts

4.2.1 Overview

This Section provides an overview of the methodologies that have been used to assess the potential traffic and transport impacts of the Proposed Scheme during both the construction and Operational Phases. The assessments have been carried out as follows:

- Outlining the Assessment Topics; and
- Determining the Predicted Magnitude of Impacts.

Further detail on the assessment methodologies is provided in Section 6.

4.2.2 Outlining the Assessment Topics

The traffic and transportation impacts have been broken down into the following assessment topics for both the construction and Operational Phases:

- The qualitative assessments are as follows:
  - **Pedestrian Infrastructure**: The changes to the quality of the pedestrian infrastructure as a result of the Proposed Scheme;
  - **Cycling Infrastructure:** The changes to the quality of the cycling infrastructure as a result of the Proposed Scheme;

- **Bus Infrastructure:** The changes to the quality of the bus infrastructure as a result of the Proposed Scheme; and
- **Parking / Loading:** The changes to the availability of parking and loading as a result of the Proposed Scheme.

- The quantitative assessments are as follows:
  - **People Movement:** An assessment has been carried out to determine the potential impact that the Proposed Scheme will have on projected volume of people moving along the Proposed Scheme during the Operational Phase only;
  - **Bus Performance Indicators:** The changes to the projected operational efficiency for buses as a result of the Proposed Scheme;
  - **General Traffic:** The direct and indirect impacts that will occur for the general traffic conditions on the Proposed Scheme and surrounding road network; and
  - **Network-Wide Performance Indicators**: The strategic changes to queuing, total travel times, total travel distance and average network speed.

4.2.3 Determining the Predicted Magnitude of Impacts

The methodology used for determining the predicted magnitude of impacts has considered the traffic and transport conditions of the environment before and after the Proposed Scheme is in place.

The impact assessments have been carried out using the following scenarios:

- **Do Minimum** – This scenario represents the likely conditions of the road network with all major committed transportation schemes in place that will impact on the use of public transport and private car, without the Proposed Scheme; and
- **Do Something** – This scenario represents the likely conditions of the road network with all major committed transportation schemes in place that will impact on the use of public transport and private car, with the Proposed Scheme (i.e. the Do Minimum scenario with the addition of the Proposed Scheme). The Do Something scenario has been broken into two phases:
  - **Construction Phase (Construction Year 2024)** – This phase represents the single worst-case period which will occur during the construction of the Proposed Scheme; and
  - **Operational Phase (Opening Year 2028, Design Year 2043)** – This phase represents when the Proposed Scheme is fully operational.

The changes between the Do Minimum and Do Something scenarios have been presented in either a positive, negative or neutral magnitude of impacts as a result of the Proposed Scheme, depending on the assessment topic. A high, medium, low or negligible rating has been applied to each impact assessment to determine the Magnitude of Impact. Refer to Section 6 for further information on the methodology in applying these ratings for each assessment.

4.2.3.1 Level of Service Impact Assessment

To outline the changes in conditions between the Do Minimum and Do Something scenarios a Level of Service (LoS) approach has been developed for the impact assessments, where appropriate. This concept allows a straightforward comparison of two differing scenarios using a series of metrics specifically developed for this purpose.

The concept of LoS was originally developed in the United States' Transportation Research Board's (TRB) Highway Capacity Manual (TRB 2000). Under this concept, potential values for a performance measure are divided into six ranges, with each range assigned a letter grade ranging from "A" (highest quality) to "F" (lowest quality). LoS concepts are typically applied in the United States, as well as Australia and New Zealand, and have their basis in Highway Capacity Manual and, particularly for bus network assessments, in the Transit Capacity and Quality of Service Manual (TRB 2003).

LoS concepts are not target based or rigid in their application and bespoke versions are developed to suit the particular receiving environment of the scheme under consideration or the particular user problems that the scheme and/or project is seeking to address. A mix of quantitative and qualitative indicators can be used and

summarised as a LoS. The process enables integrated planning and decision making across all modes rather than any specific mode which can create a bias in the assessment process (e.g. focusing on Car Volume over Capacity (V/C). It is intended that the LoS framework for the Proposed Scheme will provide an easily understandable summary of the impact of each assessment topic.

4.2.3.2 Movement of People

To support the 'Objective' led approach to the design of junctions along the Proposed Scheme (i.e. with a focus on the movement of people rather than vehicles), a People Movement at Signal (PMS) Calculator has been developed from first principles based on TRL guidance1.

The 'Objective' led approach involves the prioritisation of people movement, focussing on maximising the throughput of sustainable modes (i.e. Walking, Cycling and Bus modes) in advance of the consideration and management of general vehicular traffic (private car) movements at junctions.

The PMS calculator was developed to provide an initial estimate of green time allocation for all movements at a typical junction, as proposed in the design guidelines used for the Proposed Scheme Infrastructure Works, on the basis that sustainable mode movements should be accommodated foremost to maximise people movement with the remaining green time allocated to general traffic movements. The calculations are underpinned by:

- The number of buses required to be accommodated along the Proposed Scheme;
- An estimate of Peak Hour cycling demand based on the provision of a high Level of Service for cyclists at each junction along the Proposed Scheme; and
- The pedestrian crossing width and crossing timing requirements based on the provision of a high Level of Service for pedestrians at each junction along the Proposed Scheme.

The PMS calculator is based on the junction arrangements as proposed in the design guidelines used for the Proposed Scheme Infrastructure Works, for both 3 and 4-arm variations. The outputs of the calculator provided the designer with an initial estimate of the green times and vehicle capacity movements based on designer inputs and assumptions for each junction along the Proposed Scheme. The calculator provided an estimate of the People Movement for the junction in question (by mode) and was used by the designer to adjust their proposals with a view to maximising the total person throughput at each junction along the Proposed Scheme.

The Movement of People Calculation and vehicular capacity from this initial exercise was enhanced further by the Proposed Scheme Transport Models described below.

4.3 Transport Modelling Methodology

A multi-tiered transport modelling approach has been adopted. The NTA's East Regional Model (ERM) was the primary modelling tool and provided the overarching information on forecast travel demand for each mode of transport. The ERM was supported by other modelling tools which provide more granular level traffic information and allow for detailed and refined modelling at a local network and junction level. For this purpose, a cordoned2 corridor-wide, road (motorised vehicle only) based Local Area Model (LAM) in combination with a multi-modal corridor micro-simulation model and local junction models have been used which work in tandem with the NTA's East Regional Model (ERM).

[1] UK – Department of Transport Research Report 67 - THE PREDICTION OF SATURATION FLOWS FOR ROAD JUNCTIONS CONTROLLED BY TRAFFIC SIGNALS https://trl.co.uk/sites/default/files/RR067.pdf

[3] Trips to/from ERM zones within a 500m distance from the Proposed Scheme to/from any destination

Through the multi-tiered transport modelling approach, the following modes of transport have been considered:

- Public Transport including inter-urban rail, suburban rail, DART, light rail (Luas), bus, and MetroLink;
- Traffic including private car, taxis and goods vehicles;
- Walking; and
- Cycling.

Further detail on the modelling can be found in TIA Appendix 1 (Transport Modelling Report) which details the model development, data inputs, calibration and validation and forecast model development for the suite of models used to support the assessment.

4.3.1 Proposed Scheme Transport Models

This Section sets out the various transport modelling tools that have been developed and used to inform the preparation of the TIA and Chapter 6 (Traffic and Transport) of the EIAR and has supported design decisions. The purpose of each tool is detailed and the use of the tool for each element of the Proposed Scheme is defined.

The modelling tools that have been developed do not work in isolation but instead work as a combined modelling system driven by the ERM as the primary source for multi-model demand and trip growth etc. which has been passed to the cordoned local area model, micro-simulation models and junctions models for the Proposed Scheme which have been refined and calibrated to represent local conditions to a greater level of detail then that contained within the ERM.

Importantly, no one tool can provide the full set of modelling data required to inform both the EIAR and TIA requirements and to support design iterations and decisions e.g. the ERM via the LAM has provided road traffic flow information (for example Annual Average Daily Traffic (AADT) and link speed data which has been used to inform Air Quality and Noise models).

The micro-simulation model is the most appropriate tool to provide the end-to-end bus journey times for the Proposed Scheme based on the detailed interaction of vehicle movements along the corridor. In addition, the LAM has been used directly for supporting design development decisions and to assist with an understanding of the implications of banned turns and potential trip redistribution away from the Proposed Scheme during both the Construction and Operational Phases.

4.3.1.1 Transport Modelling Hierarchy

There are four tiers of transport modelling which are used to assess the Proposed Scheme, and these are detailed below and shown graphically in Diagram 4.1.

- **Tier 1 (Strategic Level):** The NTA's East Regional Model (ERM) is the primary tool which has been used to undertake the strategic modelling of the Proposed Scheme and has provided the strategic multi-modal demand outputs for the proposed forecast years;
- **Tier 2 (Local Level):** A Local Area Model (LAM) has been developed to provide a more detailed understanding of traffic movement at a local level. The LAM is a subset model created from the ERM and contains a more refined road network model used to provide consistent road-based outputs to inform the TIA, EIA and junction design models. This includes information such as road network speed data and traffic redistribution impacts for the Operational Phase. The LAM also provides traffic flow information for the micro-simulation model and junction design models and has been used to support junction design and traffic management plan testing;
- **Tier 3 (Corridor Level):** A micro-simulation model of the full 'end to end' corridor has been developed for the Proposed Scheme. The primary role of the micro-simulation model has been to support the ongoing development of junction designs and traffic signal control strategies and to provide bus journey time information for the determination of benefits of the Proposed Scheme; and
- **Tier 4 (Junction Level):** Local junction models have been developed, for each junction along the Proposed Scheme to support local junction design development. These models are informed by the outputs from the above modelling tiers, as well as the junction designs which are, as discussed above, based on people movement prioritisation.

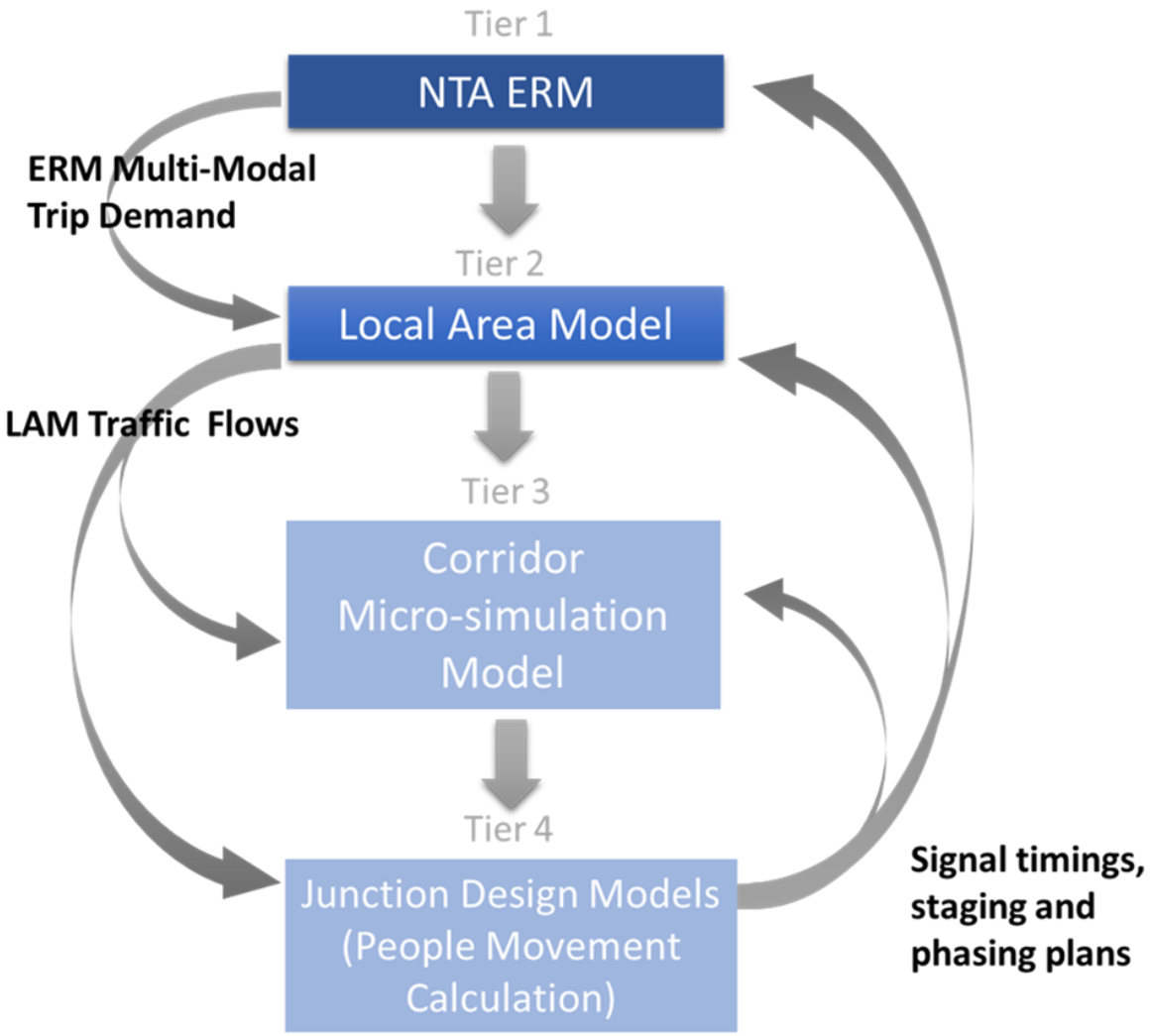

Diagram 4.1: Proposed Scheme Modelling Hierarchy

Further detail on the transport model development process, the traffic data inputs used, the calibration, validation and forecast model development for the suite of transport models can be found in the Transport Modelling Report, in TIA Appendix 1 (Transport Modelling Report) and TIA Appendix 2 (Junction Design Report) in Volume 4 of the EIAR.

The purpose of each of the modelling tools is summarised in Table 4.2.

Table 4.2: Modelling tool and purpose

Tool	Purpose	Inputs
NTA ERM	Forecast Multi-Modal demand impacts Proposed Scheme including both area wide and corridor level Mode share Policy assessment (e.g. demand management) Donor Network for LAM	NTA Forecast Planning Data (2020,2028,2043) Future year Proposed Scheme information (Traffic signal plans and timings
Local Area Model (LAM)	General Traffic Redistribution impacts Link Flows (AADTs) Link Speeds Junction turning flows Construction Strategy and Traffic Management measure testing Donor network for Proposed Scheme Micro-sim model	Traffic surveys Journey time data ERM forecast matrices Proposed Scheme designs Proposed Scheme Traffic signal plans and timings
Micro-simulation Model	Operational features Design validation Person delay measurement Bus journey times Queue formation Scheme visualisation	LAM demand matrices Proposed Scheme designs Proposed Scheme Traffic signal plans and timings
Junction Design Models / People Movement Calculation	Junction design tool Proposed Scheme signal plan and timing development People Movement Calculation	Junction Turning flows from LAM

The following sections describe in further detail each of the modelling tools used to inform this TIA and their role within the assessment of the Proposed Scheme.

4.3.1.2 NTA Regional Modelling System (RMS) and East Regional Model (ERM)

The East Regional Model is part of the NTA's Regional Modelling System (RMS) for Ireland that allows for the appraisal of a wide range of potential future transport and land use alternatives. The RMS comprises the National Demand Forecasting Model (NDFM); five large-scale, detailed, multi-modal regional transport models; and, a suite of Appraisal Modules. The five regional models comprising the RMS are focussed on the travel to-work areas for Dublin (represented by the aforementioned East Regional Model (ERM)), for Cork (represented by the South West Regional Model (SWRM)), for Limerick (represented by the Mid-West Regional Model (MWRM)), for Galway (represented by the West Regional Model (WRM)) and for Waterford (represented by the South East Regional Model (SERM)).

The key attributes of the five regional models include: full geographic coverage of each region, detailed representations of all major surface transport modes including active modes, road and public transport networks and services, and of travel demand for five time periods (AM, 2 Inter-Peaks, PM and Off-Peak). The RMS encompasses behavioural models calibrated to 2017 National Household Travel Survey data that predict changes in trip destination and mode choice in response to changing traffic conditions, transport provision and/or policies which influence the cost of travel.

4.3.1.2.1 Purpose of the RMS

The NTA uses the RMS to help inform decisions required during strategy development and to assess schemes and policy interventions that are undertaken as part of its remit. The RMS has been developed to provide the NTA with the means to undertake comparative appraisals of a wide range of potential future transport and land use options, and to provide evidence to assist in the decision-making process. Examples of how the RMS can assist the NTA include testing new public transport schemes by representing the scheme in the assignment networks, testing demand management measures by, for example, changing the cost of parking or number of parking spaces within the regional model or testing the impacts of new land use by changing the planning data assumptions within the NDFM.

The RMS includes the 2016 Census/POWSCAR and 2017 National Household Travel Survey (NHTS) data sets and the NTA has included a range of improvements to the main model components where identified and implemented. These improvements include improving and making changes to such elements as the NDFM, development of the Long-Distance Model, updated zoning, networks, and parking modules; best-practice discrete choice modelling using the NHTS and POWSCAR datasets to estimate the parameters of the behavioural models, improved model runtimes, and general model functionality improvements.

4.3.1.2.2 RMS Components

The NTA RMS comprises of the following three main components, namely:

- The National Demand Forecasting Model (NDFM);
- 5 Regional Models (including the ERM); and
- A suite of Appraisal Modules.

The NDFM takes input attributes such as land-use data, population etc., and estimates the total quantity of daily travel demand produced by, and attracted to, each of the 18,641 Census Small Areas in Ireland.

The ERM is a strategic multi-modal transport model representing travel by all the primary surface modes – including, walking and cycling (active modes), and travel by car, bus, rail, tram, light goods and heavy goods vehicles, and broadly covers the Leinster province of Ireland including the counties of Dublin, Wicklow, Kildare, Meath, Louth, Wexford, Carlow, Laois, Offaly, Westmeath, and Longford, plus Cavan and Monaghan.

The ERM is comprised of the following key elements:

- **Trip End Integration:** The Trip End Integration module converts the 24-hour trip ends output by the NDFM into the appropriate zone system and time period disaggregation for use in the Full Demand Model (FDM);
- **The Full Demand Model (FDM):** The FDM processes travel demand, carries out mode and destination choice, and outputs origin-destination travel matrices to the assignment models. The FDM and assignment models run iteratively until an equilibrium between travel demand and the cost of travel is achieved; and
- **Assignment Models:** The Road, Public Transport, and Active Modes assignment models receive the trip matrices produced by the FDM and assign them in their respective transport networks to determine route choice and the generalised cost for each origin and destination pair.

Destination and mode choice parameters within the ERM have been calibrated using two main sources: Census 2016 Place of Work, School or College - Census of Anonymised Records (2016 POWSCAR), and the Irish National Household Travel Survey (2017 NHTS).

4.3.1.2.3 The use of the ERM for the Proposed Scheme

The NTA's ERM is the most sophisticated modelling tool available for assessing complex multi-modal movements within an urban context. This provides a consistent framework for transport assessments. The ERM is the ideal tool to use as a basis for the assessment of the Proposed Scheme and to estimate its multi-modal impact. In addition, it provides the platform to forecast future trip demand and distribution.

The NTA ERM is, therefore, the primary high-level modelling tool for the strategic transport assessment of the Proposed Scheme and provides the sole source of multi-modal forecast trip / person demand for each of the scenarios assessed. The ERM provides the strategic impacts and benefits of the Proposed Scheme and the outputs from the ERM provide key inputs to the Transport Impact Assessments (TIA) and EIAR.

4.3.1.3 Local Area Model (LAM)

To support the detailed assessment of the Proposed Scheme a more disaggregate urban area traffic model, the Local Area Model (LAM) has been developed, as a cordoned model from the ERM, that could incorporate the most up-to-date traffic survey data. The LAM provides an appropriate level of detail required to inform the various disciplines and levels of decision making within the Proposed Scheme Infrastructure Works e.g. capturing the impact of redistribution of traffic on streets and roads not included within the strategic detail of the ERM.

The LAM is compatible with the ERM road network, being a direct extraction from the ERM road model, but with the addition of extra road network and zoning detail. The LAM is calibrated and validated with the most recent 2019/2020 traffic survey data and journey time information, which ensures that the model reflects 'on-the-ground' conditions for the Proposed Scheme in February 2020 (e.g. prior to COVID-19 restrictions).

The LAM which is a more refined version of the road network model component of the ERM has been used throughout the Proposed Scheme Infrastructure Works to provide all road-based outputs to inform the TIA, EIA and junction design models. i.e. AADTs, road network speed data, traffic re-distribution impacts during construction and operation of the Proposed Scheme. The LAM also provides traffic flow information for the corridor micro-simulation models and junction design models.

4.3.1.3.1 Count Data for Calibration and Validation

A full set of consistent updated traffic counts for a neutral period was completed for the Proposed Scheme. Traffic surveys were undertaken in February 2020 (Pre COVID- 19) with the surveyed counts used as inputs to the model calibration and validation process.

Private cars and taxis were aggregated as a single vehicle type for input to the LAM model. The OGV1 and OGV2 categories were also aggregated as HGVs. PSVs are modelled as fixed routes with a specific frequency in the model (as per timetabled services) and as such were not included in the model inputs. Separate input files were prepared for the following time periods.

- AM: 0800-0900;
- Lunch Time (LT): 1200-1300;
- School Run (SR): 1500-1600;
- PM: 1700-1800; and
- Off Peak (OP): 2000-2100.

The JTCs were merged into a 'flat format' database which permits the extraction of counts grouped by modelled hour (AM, LT, SR or PM) and modelled vehicle category (Car, LGV or HGV). Turn count records were given a unique movement identifier (AB, AC, AD etc). These identifiers were then associated with their respective nodes in the LAM. In some cases, there is a unique one-to-one relationship between the turn counts and the SATURN network as shown in Diagram 4.2.

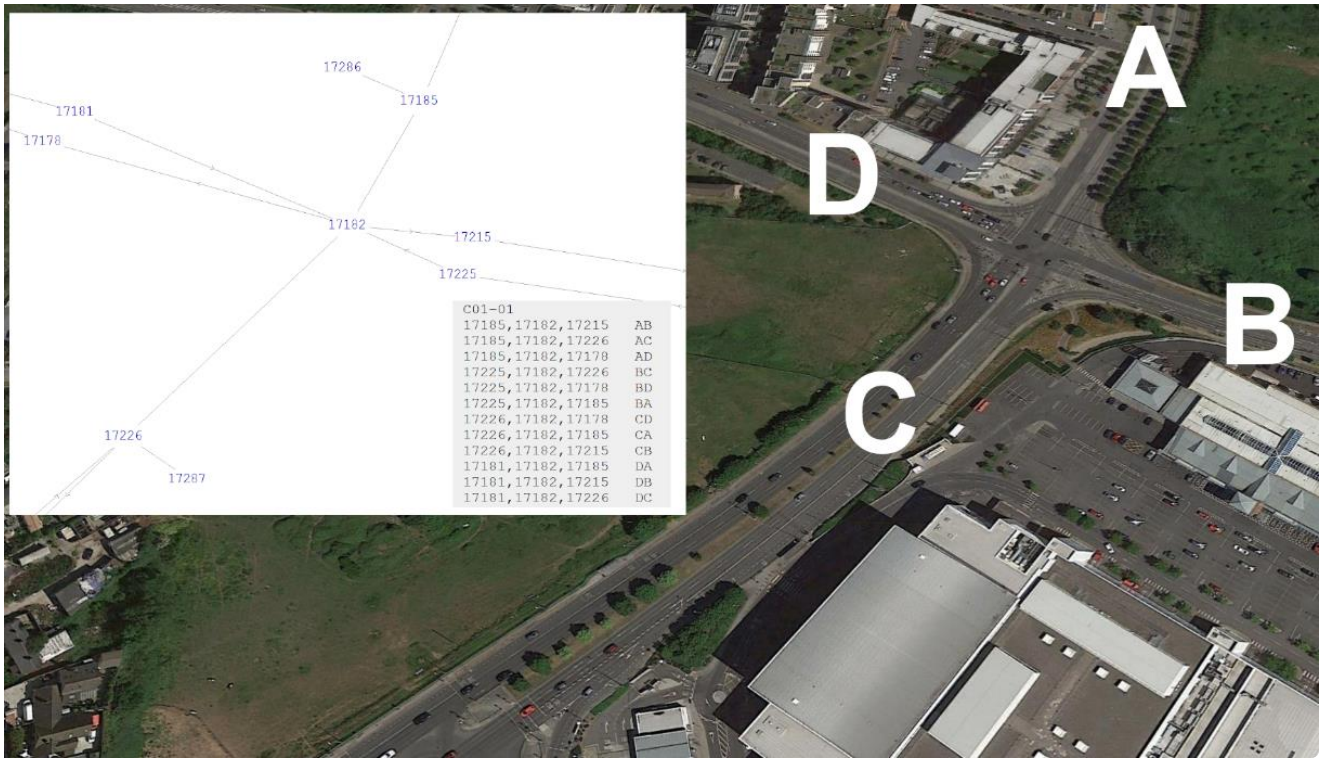

Diagram 4.2: Bus Connects LAM Node Matching (Junction C01-01)

The flows for complex junctions were obtained by combining certain turning movement flows, as shown in Diagram 4.3.

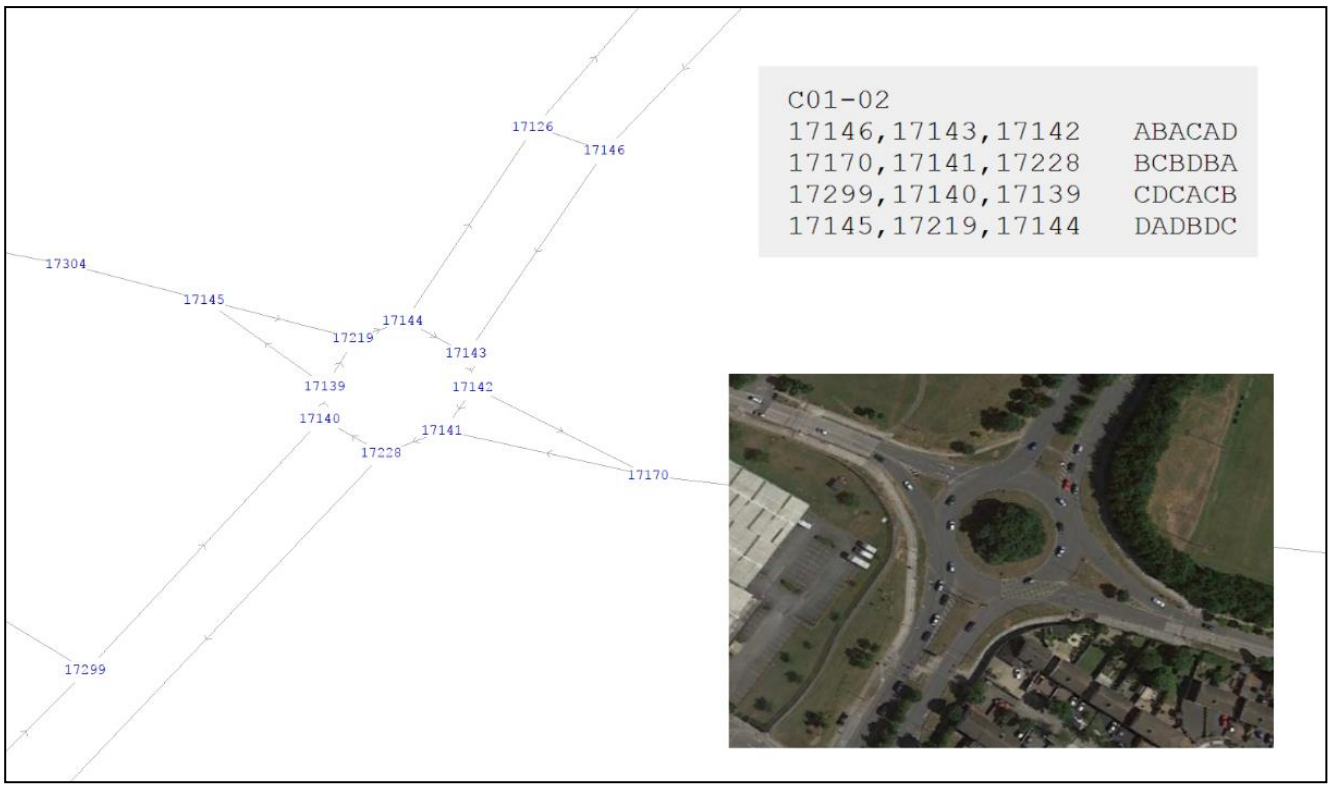

Diagram 4.3: Bus Connects LAM Node Matching (Junction C01-02)

4.3.1.4 Proposed Scheme Micro-Simulation Model

A micro-simulation model has been developed for the full continuous 'end-to-end' route of the Proposed Scheme. The 'end-to-end' corridor micro-simulation model has been developed to assist in the operational validation of the scheme designs and to provide visualisation of scheme operability along with its impacts and benefits.

The term 'end-to-end' refers to the point of model 'entry' (start of Proposed Scheme) to the point of model 'exit' (end of Proposed Scheme) rather than the actual bus service terminus points which, in most cases, lie outside of the modelled area. The modelling of the Proposed Scheme displays the differences in travel time for buses along the full length of the Proposed Scheme, including delay at individual locations.

The Proposed Scheme micro-simulation model network is shown in Diagram 4.4.

Diagram 4.4: Proposed Scheme Micro-simulation Model Network

4.3.1.4.1 Role of the Corridor Micro-Simulation Models

The Proposed Scheme micro-simulation model has provided key information on end-to-end bus and car journey times along the Proposed Scheme. The Proposed Scheme micro-simulation model is supplied traffic flow information from the LAM and uses consistent information from the junction design models, in terms of signal plans, green times, staging, phasing and offsets. 3D Visualisations of sections of the Proposed Scheme have been developed based on the 2D models to help visualise and demonstrate the benefits and impacts of the scheme to stakeholders.

Overall, the Proposed Scheme micro-simulation model has provided key transport metric inputs to the TIA in terms of operational features, vehicle interaction, person level delay and bus journey time and reliability performance.

4.3.1.5 Junction Design Models

The fourth tier of modelling in the modelling hierarchy to support the assessment of the Proposed Scheme comprises of the individual junction design models that have been developed for junctions along the Proposed Scheme. These junction design models are supplied with traffic flow information from the LAM and from the micro-simulation model for the Proposed Scheme. The LAM, Corridor Micro-simulation and local junction models contain consistent design, transport demand, signal phasing and staging information. Further information is contained in TIA Appendix 2 (Junction Design Report).

4.3.1.5.1 Role of the Junction Design Models

The junction design models have been used to inform junction design considerations as part of the formulation of the Preliminary Design for the Proposed Scheme. The junction models have been developed for standalone junction assessments and for combinations of secondary (off-line to Proposed Scheme) junctions. The junction models have been used in combination with the Proposed Scheme micro-simulation model at 'hot-spot' locations for operational testing and 'proof of concept' development of the preferred design.

The junction design models are important supporting design tools for analysis of the design proposals and have informed the development of signal plans and phasing at junctions along the Proposed Scheme. The junction models have been used to inform the LAM and Proposed Scheme micro-simulation model, with information such as design amendments, signal plans and timings being fed back in the iterative process where appropriate.

As part an iterative process, the resultant scheme designs were then re-modelled in the ERM, LAM and micro-simulation models to understand the strategic and corridor specific issues and inform the preparation of the TIAs and EIARs and the planning submission for the Proposed Scheme.

5. Baseline Environment

This Section provides an overview of the existing traffic and transport conditions within the redline boundary of the Proposed Scheme. The baseline conditions have been informed by several site visits of the local environment, comprehensive traffic surveys, and a desktop review of the most recent aerial photography.

Cyclists must typically share space on bus lanes or general traffic lanes with only 47% of the route of the Proposed Scheme providing segregated cycle tracks

5.1 Bus Journey Times

Currently bus lanes are available for 69% of the route of the Proposed Scheme, furthermore there are key sections of the current bus lanes that are not operational on a 24-hour basis while some are also shared with both formal and informal parking facilities and cyclists. An examination of Automatic Vehicle Location (AVL, collected by the NTA) data indicates that the current standard deviation for journey times of buses on the corridor is varies by up to 13 minutes. With any further increases in traffic levels, these issues are expected to be exacerbated.

While impacting upon bus passengers, longer and less reliable bus services also require operators to use additional buses to maintain headways to fill gaps created in the timetable.

Aligned to this, the remaining sections of unprioritised bus network can lead to bunching of buses which, in turn, means stops can become overcrowded, creating delays in boarding and alighting and the imbalanced use of bus capacity.

5.2 Traffic Count Data

5.2.1 Junction Turning Counts (JTCs)

Diagram 5.1 shows the locations of the 59 JTC counts and 20 ATC counts for the Proposed Scheme.

Summary information related to the JTC junctions is provided in Table 5.1. The busiest junction in the study area is the Stillorgan Road / Fosters Avenue junction (63,618 daily movements). The next busiest junctions are:

- Stillorgan Road / Leopardstown Road (62,183 daily movements)
- Stillorgan Road / Donnybrook Road (60,638 daily movements)
- Stillorgan Road / Mount Merrion Avenue (58,742 daily movements)
- Stillorgan Road / Kilmacud Road (58,193 daily movements)

The least busy junction in the study area is the Beechfield Avenue / Lidl junction with 4,834 daily movements.

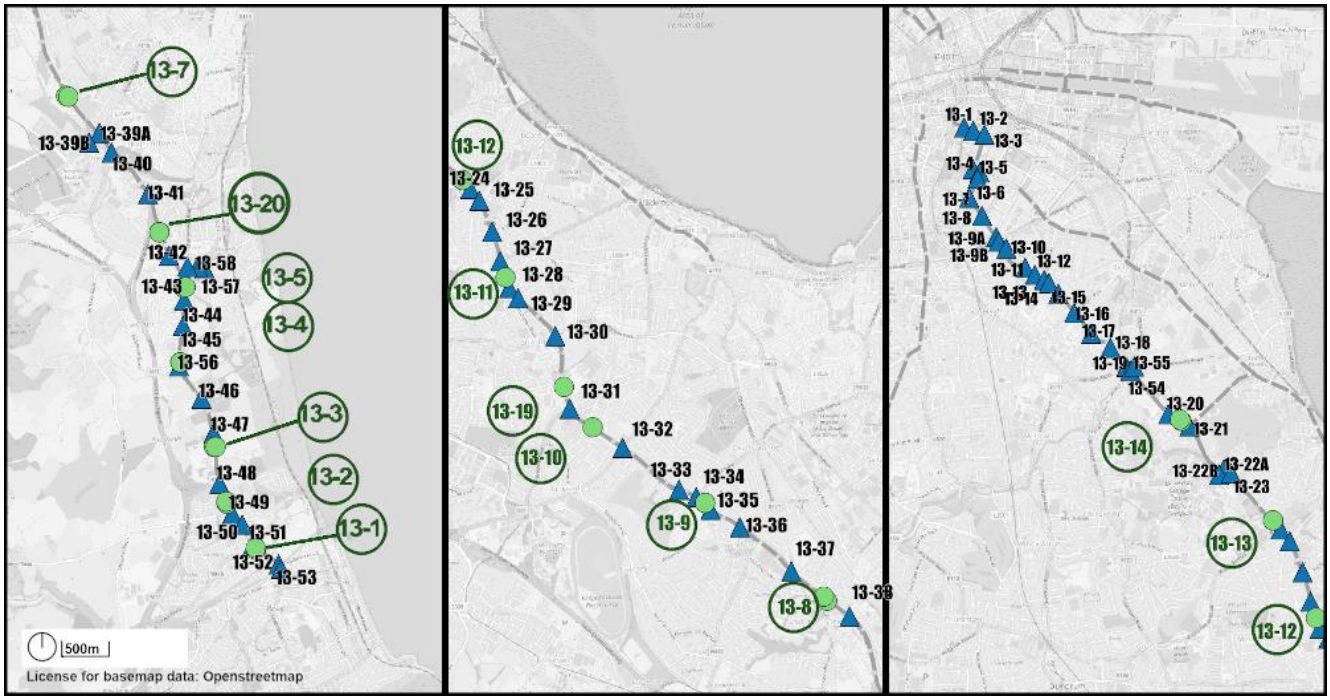

Diagram 5.1: ATC and JTC Traffic Count Locations (1)

Table 5.1: JTC Locations and Daily, AM and PM Movements

Junction Identifier	Junction Name	Type	Daily Movements (vehs)	AM Movements (vehs)	PM Movements (vehs)
13-1	Dawson Street/Nassau Street	Priority	6928	499	431
13-2	Nassau Street/South Frederick Street	Priority	9808	649	666
13-3	Nassau Street/Kildare Street	Signals	10713	714	772
13-4	Kildare Street/St Stephen's Green North	Signals	19584	1041	1275
13-5	St. Stephen's Green North/Merrion Row	Signals	31857	1885	1831
13-6	St. Stephen's Green North/Hume Street	Signals	27408	1818	1729
13-7	St Stephen's Green East/Leeson Street Lower	Signals	34465	2274	2246
13-8	Leeson Street Lower/Pembroke Street Upper	Signals	27398	1724	1670
13-9A	Leeson Street Lower/Fitzwilliam Place	Signals	35300	2316	2165
13-9B	Leeson Street Lower/Fitzwilliam Place	Signals	43938	3003	2775
13-10	Leeson Street Upper/Sussex Terrace	Signals	17714	932	1173
13-11	Leeson Street Upper/Burlington Road	Signals	31806	1904	2005
13-12	Leeson Street Upper/Appian Way	Signals	36706	2417	2297
13-13	Leeson Street Upper/Waterloo Road	Signals	38190	2576	2615
13-14	Leeson Street Upper/Wellington Plaza	Signals	35122	2424	2361
13-15	Morehampton Road/Bloomfield Avenue	Priority	32031	2112	2176
13-16	Morehampton Road/Herbert Park	Signals	36888	2579	2634
13-17	Donnybrook Road/Belmont Avenue	Priority	33934	2159	2415
13-18	Donnybrook Road/Rampart Lane	Priority	30367	1846	2134
13-19	Donnybrook Road/Stillorgan Road	Signals	38443	2459	2643
13-20	Stillorgan Road/Airfield Park	Signals	43772	2994	3125
13-21	Stillorgan Road/Nutley Lane	Signals	55587	4134	3971
13-22A	N11/UCD access slip 1	Signals	11954	878	1296
13-22B	N11/UCD access slip 1	Signals	14720	1509	903
13-23	Stillorgan Road/Woodbine Road Roundabout	Roundabout	8928	720	876
13-24	Stillorgan Road/Fosters Avenue	Signals	63618	4836	4279

Junction Identifier	Junction Name	Type	Daily Movements (vehs)	AM Movements (vehs)	PM Movements (vehs)
13-25	Stillorgan Road/St Thomas Road	Signals	56455	4366	3977
13-26	Stillorgan Road/Booterstown Avenue	Signals	57577	3920	4020
13-27	Stillorgan Road/Mount Merrion Avenue	Signals	58742	3973	4004
13-28	Stillorgan Road/Trees Road Lower	Signals	55118	3710	3881
13-29	Stillorgan Road/Dublin Road	Signals	53683	3533	3805
13-30	Stillorgan Road/Lower Kilmacud Road	Signals	58193	3772	4058
13-31	Stillorgan Road/Brewery Road	Signals	53578	3717	3847
13-32	Stillorgan Road/Leopardstown Road	Signals	62183	4665	4410
13-33	Stillorgan Road/Springfield Park	Signals	50753	3872	3671
13-34	Stillorgan Road/Kill Road	Signals	54788	4130	3927
13-35	Stillorgan Road/Westminster Road	Signals	39900	2898	2864
13-36	Stillorgan Road/Old Bray Road	Signals	36024	2581	2635
13-37	Bray Road/Clonkeen Road	Signals	46107	3511	3442
13-38	Bray Road/Johnstown Road	Signals	53480	4158	4057
13-39A	Bray Road/Wyattville Road	Signals	38824	3413	3036
13-39B	Bray Road/Wyattville Road	Signals	35396	3455	2712
13-40	Bray Road/Cherrywood Road	Signals	24255	2456	1470
13-41	Bray Road/Dublin Road	Roundabout	46851	3363	3830
13-42	Dublin Road/Stonebridge Road	Signals	14838	1131	1297
13-43	Dublin Road/Shanganagh Road	Roundabout	20709	1660	1710
13-44	Dublin Road/Cluain Na Gréine Court	Priority	13982	1063	1181
13-45	Dublin Road/Quinn's Road	Roundabout	14514	1130	1233
13-46	Dublin Road/Shanganagh Cemetery & Shankill FC Access	Priority	11092	916	844
13-47	Dublin Road/Woodbrook Downs	Priority	10320	900	814
13-48	Dublin Road/M11	Roundabout	25959	2030	1986
13-49	Dublin Road/Corke Abbey Avenue	Signals	27439	2001	1844
13-50	Dublin Road/Chapel Lane	Priority	21710	1498	1470
13-51	Dublin Road/Upper Dargle Road	Signals	23118	1353	1532
13-52	Castle Street/Ravenswell Road	Priority	23988	1683	1639
13-53	Main Street/The Maltings	Signals	24053	1683	1645
13-54	Donnybrook Road/Stillorgan Road	Signals	60638	4434	4141
13-55	Donnybrook Road/Stillorgan Road	Signals	27583	2306	1850
13-56	Dublin Road/Crinken Lane	Priority	11990	1030	935
13-57	Beechfield Manor/Corbawn Lane	Roundabout	6468	481	575
13-58	Beechfield Manor/LIDL	Priority	4834	257	479
13-59	Beechfield Manor/Shanganagh Road	Signals	13025	1175	1053

5.2.2 Automatic Turning Counts (ATCs)

Table 5.2 displays the ATCs collected for the Proposed Scheme, the locations of which are shown in Diagram 5.1. The highest ATC daily flows are on the N11 north of the Wyattville Link Road.

Table 5.2: ATC Locations and Daily, AM and PM Movements

ATC IDENTIFIER	ATC LOCATION	DIRECTION	Daily Movements (VEHS)	AM Movements (VEHS)	PM Movements (VEHS)
13.1A	Dublin Road south of Dargle Road	Northbound	9745	549	566
13.1B		Southbound	9093	519	611
13.2A	Dublin Road north of Old Connaught Avenue	Northbound	11430	976	618
13.2B		Southbound	9180	512	599
13.3A	Dublin Road north of St Brendan's College	Northbound	4656	425	265
13.3B		Southbound	5344	415	479
13.4A	Dublin Road north of Crinken Lane	Northbound	excluded	excluded	excluded
13.4B		Southbound	excluded	excluded	excluded
13.5A	Dublin Road south of Corbawn Lawn	Northbound	6551	631	336
13.5B		Southbound	7496	370	792
13.7 north	M11 north of Wyattville Link Road	Northbound	18702	1870	1032
13.7 south		Southbound	19163	969	1873
13.8 north	N11 north of Johnstown Road	Northbound	16577	1520	863
13.8 south		Southbound	17258	819	1665
13.9 north	N11 north of Westminster Road	Northbound	16784	1434	966
13.9 south		Southbound	16204	1020	1385
13.10 north	N11 north of Leopardstown Road	Northbound	15698	1202	894
13.11 north	N11 south of Merrion Avenue	Northbound	20040	1234	1163
13.12 north	N11 north of Fosters Avenue	Northbound	17461	1576	924
13.12 south		Southbound	20903	1138	1725
13.13A	N11 at RTE	Northbound	17417	1317	1025
13.13B		Southbound	16867	1012	1330
13.14A	N11 at Energia Park	Northbound	13052	705	898
13.14B		Southbound	12480	686	956
13.19 south	N11 north of Brewery Road	Southbound	20376	1277	1562
13.20A	Dublin Road south of Loughlinstown Roundabout	Northbound	5233	469	203
13.20B		Southbound	6711	334	752

5.3 Baseline Conditions

5.3.1 Overview

In describing the baseline conditions, the Proposed Scheme has been divided into four sections which are outlined as follows:

- Section 1 - Leeson Street to Donnybrook (Anglesea Road Junction);
- Section 2 - Donnybrook (Anglesea Road Junction) to Loughlinstown Roundabout;
- Section 3 - Loughlinstown Roundabout to Bray North (Wilford Roundabout); and
- Section 4 - Bray North (Wilford Roundabout) to Bray South (Fran O'Toole Bridge).

5.3.2 Section 1 - Leeson Street to Donnybrook (Anglesea Road Junction)

This Section outlines the baseline environment for walking, cycling, bus services, general traffic and parking / loading facilities along Section 1 of the Proposed Scheme, between R138 Leeson Street Lower and Anglesea Road.

This section commences at the Leeson Street Lower / R138 St. Stephens Green Junction. The route then comprises 2.6km of R138 Leeson Street Lower, R138 Leeson Street Upper, R138 Sussex Road, R138 Morehampton Road and R138 Donnybrook Road, ending at the R138 Donnybrook Road / R815 Anglesea Road Junction.

5.3.2.1 Pedestrian Infrastructure

Footpaths are provided on both sides of the carriageway for the entire length of Section 1, between the R138 Leeson Street Lower / R138 St. Stephens Green Junction and the R138 Donnybrook Road / R815 Anglesea Road Junction. The footpaths vary in width along Section 1 and generally measure between 2.0 and 3.0m, with some sections reaching up to 4.0m. Street lighting is provided throughout.

There are several controlled pedestrian crossings along Section 1 of the Proposed Scheme which benefit from tactile paving and dropped kerbs which can be found at the following locations:

- The four-arm junction R110 Saint Stephen's Green / R840 Earlsfort Terrace / R138 Saint Stephen's Green / R138 Leeson Street Lower provides signalised crossings on each arm. Two of the four-crossings are direct (south-eastern arm and south-western arm). Indirect crossings are provided on the north-eastern and north-western arms where a pedestrian refuge island is provided adjacent to the R110 Saint Stephen's Green to R138 Saint Stephen's Green slip lane. No guard rails are provided at the pedestrian refuge island;
- The pelican crossing across the R138 Leeson Street Lower provides a direct signalised crossing adjacent to the Institute of Education with a dropped kerbs;
- The four-arm R138 Leeson Street Lower / R138 Pembroke Street Upper / R811 Hatch Street Lower junction provides two signalised crossings. The signalised crossing on the eastern arm is direct whilst the signalised crossing on the south-eastern arm is indirect and consist of a pedestrian refuge island due to the length of the crossing;
- The four-arm R138 Leeson Street Lower / R811 Adelaide Road / R811 Fitzwilliam Place junction provides four signalised crossings. Two direct signalised crossings are provided on the eastern and western arms. Two signalised indirect crossings are provided on the northern and southern arms which are staggered with pedestrian refuge islands;
- The four-arm R138 Leeson Street Lower / R811 Adelaide Road / R138 Leeson Street Upper / R811 Wilton Terrace junction provides two signalised crossings on the eastern and southern arms. A direct crossing is in place across the eastern arm whilst a direct toucan crossing is in place on the southern arm;
- The four-arm junction R111 Mespil Road / R111 Grand Parade / R138 Leeson Street Upper / R138 Leeson Street Lower provides two signalised crossings. The two signalised pelican crossing are both direct with dropped kerbs;
- The three-arm junction R138 Sussex Road / R138 Leeson Street Upper / R138 Leeson Street Lower provides two signalised crossings. Two of the signalised crossing are indirect where both are staggered by a pedestrian refuge island;
- One signalised pelican crossing is provided across R138 Leeson Street Upper adjacent to Dartmouth Road;
- The three-arm junction R138 Sussex Road / R138 Leeson Street Upper / Burlington Road provides three direct signalised pelican crossings. All have dropped kerbs, although no rail barriers are provided;
- One signalised pelican crossing is provided across Appian Way Road, a left minor road from R138 Leeson Street Upper;
- The three-arm junction R138 Leeson Street Upper / Waterloo Road provides two signalised pelican crossings. One signalised crossing is direct across Waterloo Road and one signalised crossing is indirect across R138 Leeson Street Upper which is staggered by a pedestrian refuge island;
- The three-arm junction R138 Leeson Street Upper / Wellington Place provides two direct signalised pelican crossings for the slip road onto Wellington Place;
- One signalised pelican crossing is provided across R138 Morehampton Road. The crossing is indirect and staggered by a pedestrian refuge island;
- The four-arm junction R138 Morehampton Road / Marlborough Road / Herbert Park provides four signalised direct pelican crossings;

- One signalised direct pelican crossing is provided across R138 Morehampton Road adjacent to Fresh Food Store;
- The four-arm junction R138 Donnybrook Road / Belmont Avenue / Victoria Avenue provides one signalised pelican crossing. The crossing is stagged across Donnybrook Road by a pedestrian refuge island;
- The four-arm junction R138 Donnybrook Road / Rampart Lane / The Crescent provides one direct signalised pelican crossing from eastern bound to western bound; and
- The five-arm junction R138 Donnybrook Road / Eglinton Road / Beaver Row / R815 Anglesea Road provides two signalised junctions. Both signalised junctions are staggered by a pedestrian refuge crossing.

Further details of the baseline pedestrian facilities (i.e. routing, directness, accessibility, crossing and footpath widths) at each junction along Section 1 of the Proposed Scheme are included in TIA Appendix 4 (Pedestrian Infrastructure Assessment Section).

5.3.2.2 Cycling Infrastructure

Along Section 1, a range of cycle lanes are currently provided including mandatory cycle lanes, advisory cycle lanes, and combined bus and cycle lanes. A combination of southbound cycle lanes are provided for the whole of length of the section between the R138 Leeson Street Lower / R138 St. Stephens Green Junction to the R138 Donnybrook Road / R815 Anglesea Road Junction. Various northbound cycle lanes are provided along this section; except between R138 Leeson Street Upper / Waterloo Road Junction and R138 Leeson Street Upper / Appian Way Junction, a length of approximately 130m, where there are no dedicated northbound cycle facilities.

Combined cycle and bus lanes in this section are in operation between 07.00-19.00 Monday to Saturday, as signposted. All signalised junctions from St. Stephens Green to Anglesea Road require cyclists to share green time with vehicular traffic.

Cycle parking stands are provided at the following points along of the Proposed Scheme (inside the redline boundary):

- 4 Sheffield stands available located on St Stephens Green Terrace adjacent to St Stephen Arboretum (able to accommodate 8 bicycles);
- 3 Sheffield stands available located on Leeson Street Lower adjacent to Sugar Club (available to accommodate 6 bicycles);
- 10 Sheffield stands located on Leeson Street Upper outside The Leeson Lounge (available to accommodate 20 bicycles);
- 4 Sheffield stands located on Sussex Terrace outside The Sussex Terrace Restaurant (available to accommodate 8 bicycles);
- 10 Sheffield stands located on Morehampton Road outside AIB (available to accommodate 20 bicycles);
- 7 Sheffield stands located on Main Street outside Tesco (available to accommodate 14 bicycles); and
- 10 Sheffield stands located on Donnybrook Road outside Spar (available to accommodate 20 bicycles).

Additional cycle parking stands are provided at the following points in the vicinity of the Proposed Scheme, albeit, outside of the redline boundary:

- 13 Sheffield stands available located on St Stephens Green South adjacent to St Stephens Arboretum (able to accommodate 25 bicycles);
- 14 Sheffield stands available located on Hume Street adjacent to St Stephens Arboretum (able to accommodate 28 bicycles);
- 7 Sheffield stands available on Earlsfort Terrace adjacent to Earlsfort Plaza (able to accommodate 14 bicycles);
- 21 Sheffield stands located on Hatch Street Lower outside Café Sol (available to accommodate 42 bicycles);

- 4 Sheffield stands located on Hatch Street Upper outside Evershed (available to accommodate 8 bicycles);
- 4 Sheffield stands located on Adelaide Road outside Kiosk (available to accommodate 8 bicycles);
- 4 Sheffield stands located on Fitzwilliam Place outside Embassy of Latvia (available to accommodate 8 bicycles);
- 15 Sheffield stands located on Adelaide Road outside Eye and Ear Hospital (available to accommodate 30 bicycles);
- 6 Sheffield stands located on Leeson Street Upper outside Christ Church Leeson Park (available to accommodate 12 bicycles);
- 17 Sheffield stands located in Herbert Park (available to accommodate 34 bicycles; and
- 5 Sheffield stands located on Mount Eden Road (available to accommodate 10 bicycles).

5.3.2.3 Bus Infrastructure

5.3.2.3.0 Bus Priority Measures

Intermittent bus lanes are currently available along both sides of the carriageway between R138 Leeson Street Lower / R138 St. Stephens Green Junction to the R138 Donnybrook Road / R815 Anglesea Road Junction and are in operation 07:00 to 19:00, Monday to Sunday. Bus lanes are briefly discontinued across main junctions and at the following locations:

- Between the R138 Leeson Street Lower / R138 St. Stephens Green Junction and the pedestrian crossing approximately 20m north of the R138 Leeson Street Lower / Stable Lane Junction in the northbound direction for approximately 150m;
- Between the R138 Leeson Street Upper / Burlington Road Junction and R138 Leeson Street Upper / Wellington Place Junction in the northbound direction for approximately 320m;
- Between approximately 40m north of the R138 Morehampton Road / Herbert Park Junction and approximately 95m south of the R138 Morehampton Road / Herbert Park Junction in the northbound and southbound direction for approximately 150m;
- Between the R138 Morehampton Road / Auburn Avenue Junction and approximately 35m south of the R138 Donnybrook Road / Belmont Avenue Junction in the northbound direction for approximately 105m; and
- Between the R138 Morehampton Road / Auburn Avenue Junction and the R138 Donnybrook Road / R815 Anglesea Road Junction for approximately 650m.

5.3.2.3.1 Bus Stop Facilities

There are currently 19 bus / coach stops along Section 1 of the Proposed Scheme which include 10 inbound stops and nine outbound stops .

The inbound stops are as follows:

- Stop 786 on R138 Leeson Street Lower outside the Embassy of Malta. This is currently a shared bus and coach stop;
- Stop 909 on R138 Leeson Street Lower south of the junction with Leeson Close. This is currently a shared bus and coach stop;
- Stop 908 on R138 Leeson Street Upper adjacent to the junction with Sussex Road. This is currently a shared bus and coach stop;
- Stop 907 on R138 Leeson Street Upper outside St John Ambulance Ireland;
- Stop 906 on R138 Leeson Street Upper north of the junction with Appian Way. This is currently a shared bus and coach stop;
- Stop 777 on R138 Morehampton Road north of the junction with Bloomfield Avenue;
- Stop 776 on R138 Morehampton Road north of the junction with Morehampton Terrace. This is currently a shared bus and coach stop;
- Stop 776 on R138 Morehampton Road south of the junction with Mount Eden Road. This is currently a shared bus and coach stop;

- Stop 775 on R138 Donnybrook Road outside Donnybrook Garda Station; and
- Stop 773 on R138 Donnybrook Road adjacent to Energia Park. This is currently a shared bus and coach stop.

The outbound stops are:

- Stop 845 on R138 Leeson Street Lower south of the junction with Leeson Lane. This is currently a shared bus and coach stop;
- Stop 846 on R138 Leeson Street Lower north of the junction with Leeson Close. This is currently a shared bus and coach stop;
- Stop 847 on R138 Leeson Street Upper north of the junction with Sussex Road. This is currently a shared bus and coach stop;
- Stop 848 on R138 Sussex Road south of Clayton Hotel Burlington Road. This is currently a shared bus and coach stop;
- Stop 2795 on R138 Leeson Street Upper between Waterloo Lane and Waterloo Road;
- Stop 756 on R138 Morehampton Road south of Bloomfield Avenue. This is currently a shared bus and coach stop;
- Stop 757 on R138 Morehampton Road north of Brendan Road;
- Stop 758 on R138 Donnybrook Road north of Mulberry Lane; and
- Stop 759 on R138 Donnybrook Road outside Energia Park. This is currently a shared bus and coach stop.

Out of the 19 bus / coach stops, the following four stops are indented from the carriageway:

- Stop 847 (Leeson St. Upper);
- Stop 2795 (Leeson Village);
- Stop 776 (Morehampton Terrace); and
- Stop 773 (Donnybrook Road).

All other stops are situated inline within bus lanes. Currently, 14 of the 19 stops provide real-time information and 18 of the stops provide timetable information. Bus / coach stops along Section 1 have limited provision of shelters, seating and accessible kerbs as a minimum.

Table 5.3 shows the availability of bus stop facilities at the existing 19 stops along the Section 1 of the Proposed Scheme.

Table 5.3: Section 1 - Availability of Bus / Coach Stop Facilities (of a Total 19. Bus Stops)

Bus / Coach Stop Facility	Number of Bus / Coach Stops in Baseline with Facility	Percentage of Bus / Coach Stops in Baseline with Facility
RTPI	14	74%
Timetable Information	18	95%
Shelter	8	42%
Seating	6	32%
Accessible Kerbs	11	58%
Indented Drop Off Area	4	21%
Total Stops	**19**	

The bus / coach stops along Section 1 of the Proposed Scheme cater for 43 bus services. The services available from these stops are outlined in Table 5.4.

Table 5.4: Section 1 - Bus Service Frequency

Service	Route	Typical Service Frequency	
		Weekday	Weekend
2	Wexford - Dublin Airport	60 minutes	60 minutes
11	Wadelai Park - Sandyford Business District	20 minutes	30 minutes
37	Baggot St. / Wilton Terrace - Blanchardstown Centre	20 minutes	25 minutes
38	Burlington Rd. - Damastown	30 minutes	30 minutes
39	Burlington Rd. - Ongar	30 minutes	30 minutes
70	Burlington Rd. - Dunboyne	30 minutes	60 minutes
116	Parnell Sq. - Whitechurch	Once daily	No service
118	Kilternan - Eden Quay	Two times daily	No service
120	Parnell St. - Ashtown Rail Station	30 minutes	30 minutes
133	Wicklow - Bray – Dublin	60 minutes	60 minutes
145	Heuston Rail Station - Ballywaltrim	10 minutes	20 minutes
155	Ikea - Bray Rail Station	20 minutes	20 minutes
181	Dublin – Glendalough	Two times daily	Two times daily
533	Skerries – UCD	Once daily	No service
700	Dublin Airport - Dublin City Centre	30 minutes	30 minutes
740	Wexford - Dublin City & Airport	60 minutes	60 minutes
824	Portlaoise-Dublin	Once daily	No service
845	Birr – Dublin	Once daily	No service
847	Portumna – Dublin	Once daily	Once daily
904	Dundalk - Drogheda - UCD	Three times daily	Once daily
910	Bettystown - Laytown - UCD	Two times daily	No service
100x	Dundalk – Dublin	60 minutes	60 minutes
126u	Kildare – UCD	No service	Once daily
25x	UCD Belfield – Lucan	Two times daily	No service
32x	Malahide - UCD Belfield	Two times daily	No service
38a	Burlington Road - Damastown	30 minutes	30 minutes
38b	Burlington Road - Damastown (AM)	20 minutes	No service
38d	Burlington Road - Damastown	Once daily	No service
39a	UCD Belfield – Ongar	10 minutes	15 minutes
39x	Burlington Road - Ongar (PM)	15 minutes	No service
41x	UCD Belfield - Knocksedan	Once daily	No service
46a	Phoenix Park - Dún Laoghaire	8 minutes	10 minutes
46e	Blackrock Rail Station - Mountjoy Sq.	Two times daily	No service
51x	Dunawley - UCD Belfield	Once daily	No service
66x	UCD Belfield - Maynooth	Once daily	No service
67x	UCD Belfield - Celbridge (Salesian College)	Once daily	No service
740a	Arklow to Dublin via Wicklow	120 minutes	120 minutes
77x	Citywest - UCD Belfield	Once daily	No service
7b	Mountjoy Sq. - Shankill	Once daily	No service
7d	Mountjoy Sq. - Dalkey	Once daily	No service
84x	Hawkins Street - Newcastle / Kilcoole (PM)	Three times daily	No service
984n	Clearys - Kilcoole Monteith Park (120 min late night Fri-Sat)	No service	120 minutes
x2	Wexford - Dublin Airport	Once daily	Once daily

5.3.2.4 General Traffic

5.3.2.4.0 R138 Leeson Street Lower

The R138 Leeson Street Lower in Section 1 of the Proposed Scheme is approximately 550m in length and is a two-way single carriageway which is subject to a speed limit of 30km/h between the R138 Leeson Street Lower / R138 St. Stephens Green Junction and the R138 Leeson Street Lower / Fitzwilliam Place Junction. South of the R138 Leeson Street Lower / Fitzwilliam Place Junction, R138 Leeson Street Lower is subject to a 50km/h speed limit. It has a typical carriageway width of 15.0m and has a north-west to south-east straight alignment for 550m from the R138 Leeson Street Lower / St. Stephen's Green Junction to the R138 Leeson Street Upper / R111 Grand Parade Junction.

Between the R138 Leeson Street Lower / St. Stephen's Green Junction and the R138 Leeson Street Lower / Hatch Street Lower, in the northbound direction, there is a cycle lane and two traffic lanes: a general traffic lane and a bus lane which is present for approximately 150m in length before becoming a general traffic lane on the approach to the R138 Leeson Street Lower / St. Stephen's Green Junction. In the southbound direction a contraflow bus lane and contraflow cycle lane are present.

Between the R138 Leeson Street Lower / Hatch Street Lower Junction and the R138 Leeson Street Upper / R111 Grand Parade Junction there is one general traffic lane, a bus lane and an advisory cycle lane for northbound and southbound traffic. Bus lanes in this section are in operation between 07.00 and 19.00 from Monday to Saturday, as signposted.

The existing major junction arrangements along R138 Leeson Street Lower between St. Stephen's Green and the R111 Grand Parade are as follows:

- R138 Leeson Street Lower / St. Stephen's Green Junction
- R138 Leeson Street Lower / Hatch Street Lower Junction;
- R138 Leeson Street Lower / Fitzwilliam Place Junction; and
- R138 Leeson Street Lower / Wilton Terrace Junction.

R138 Leeson Street Lower / St. Stephen's Green four-arm signalised junction: This junction forms the beginning of Section 1 of the Proposed Scheme. There are controlled pedestrian crossings on all arms of the junction. The northern arm approach consists of a left turn-bus only lane, a cycle lane for straight-ahead cyclists and a straight-ahead bus lane. There is an advance stop line for cyclists on this approach. General traffic is not permitted on this approach. The cycle lane continues through the junction as an advisory cycle lane. The northern arm exit consists of one general traffic lane (for vehicles from R138 Leeson Street Lower) and one general traffic lane for vehicles from St Stephen's Green.

The south-eastern arm approach consists of a cycle lane delineated by cycle lane separators, a left-turn and straight ahead general traffic lane and a right-turn general traffic lane. The cycle lane continues through the junction as an advisory cycle lane. The south-eastern arm exit consists of a general traffic lane and a cycle lane.

The southern arm approach consists of an advisory cycle lane and a bus lane. General traffic is not permitted on this approach. The southern arm exit consists of an advisory cycle lane and a general traffic lane.

The western arm approach consists of a cycle lane and general traffic lane which permits access to the northern arm only. A cycle lane for straight-ahead cyclists is also provided. The western arm exit consists of an advisory cycle lane and two general traffic lanes.

The characteristics of this junction are shown below.

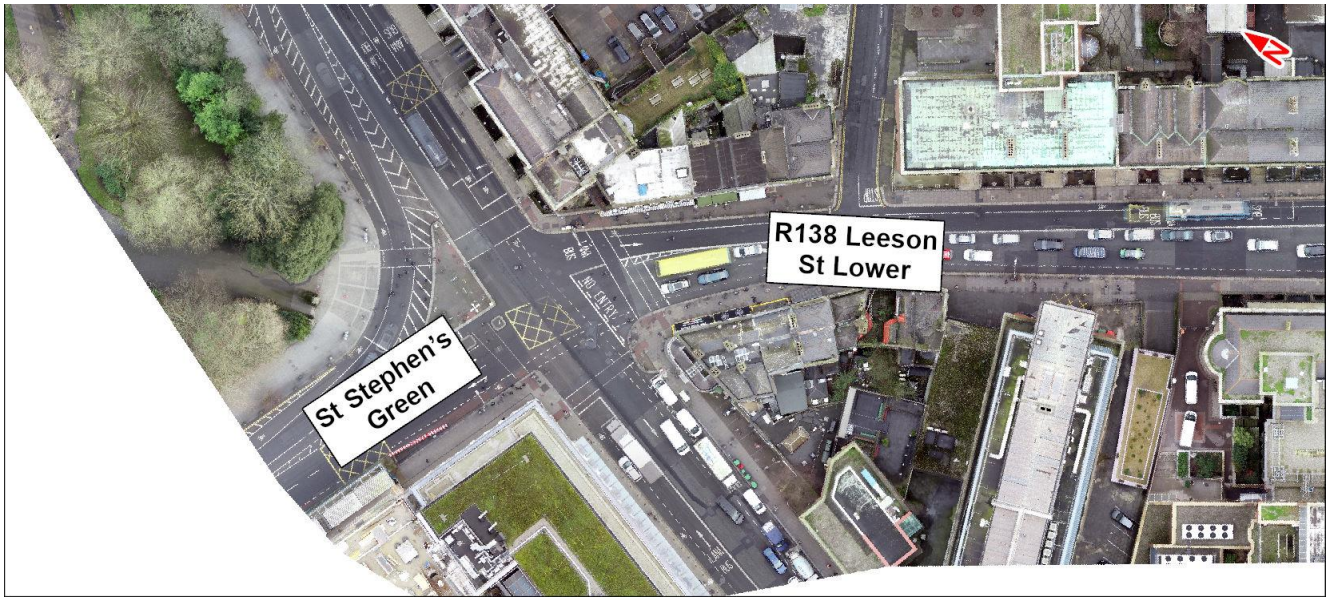

Image 5.1: R138 Leeson Street Lower / St. Stephen's Green Four-Arm Signalised Junction

R138 Leeson Street Lower / Hatch Street Lower four-arm signalised junction: This junction has signalised pedestrian crossings on the north-eastern and south-eastern arms. There is a traffic island in the centre of the junction, with refuge for the pedestrian crossing on the south-eastern arm. The traffic island also separates approaching and exiting traffic on the south-eastern, left-turn and right-turn traffic on the north-eastern arm, and prevents traffic from turning right from the south-western arm.

The north-eastern arm only permits traffic entering the junction. The approach of the north-eastern arm consists of a right-turn traffic lane, a right-turn combined bus and cycle lane which starts approximately 30m in advance of the junction, and a left-turn traffic lane. There is an advance stop line for cyclists on this approach.

The south-eastern arm approach consists of one advisory cycle lane, one bus lane, and one straight ahead traffic lane. The cycle lane extends straight ahead across the junction. Vehicles turning left are permitted in the nearside bus lane approximately 20m in advance of the junction.

The south-western arm is not signalised and consists of one approaching left-turn lane, and one exiting lane.

The north-western arm approach consists of a contraflow bus lane and a contraflow mandatory cycle lane. The cycle lane continues straight ahead across the junction as an advisory cycle lane. Two traffic lanes, one bus lane, and one advisory cycle lane are present exiting the north-western arm.

The characteristics of this junction are shown below.

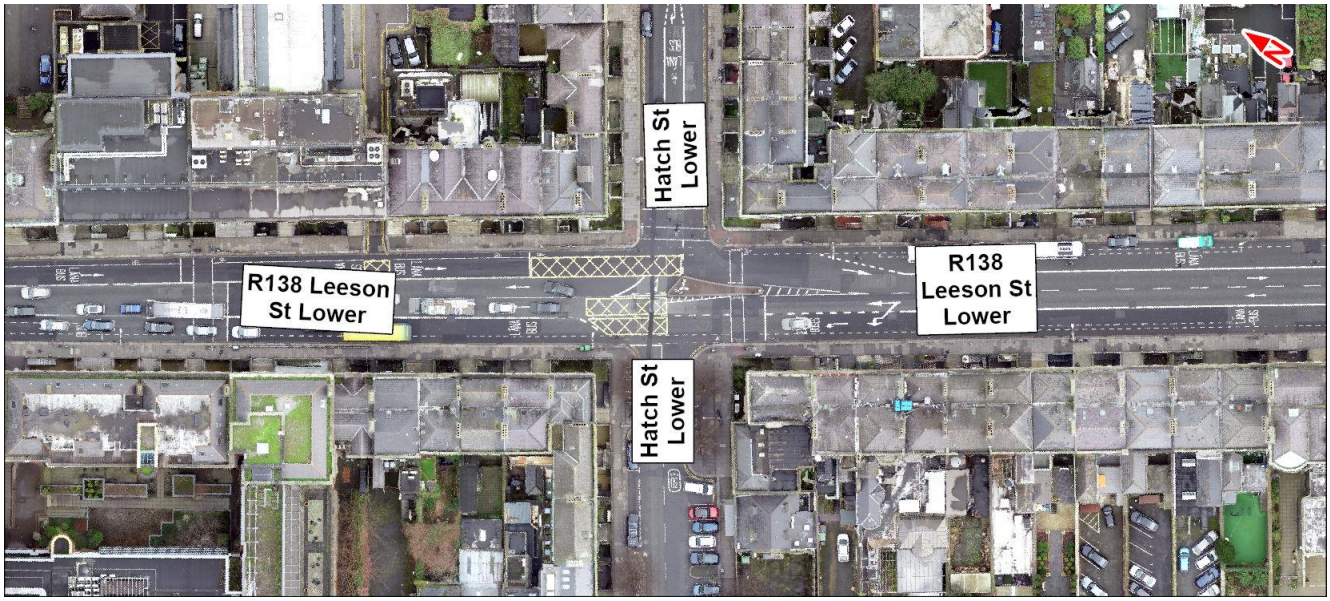

Image 5.2: R138 Leeson Street Lower / Hatch Street Lower Four-Arm Signalised Junction

R138 Leeson Street Lower / Fitzwilliam Place four-arm signalised junction: This junction has signalised pedestrian crossings on the north-western, north-eastern, and south-western arms. The crossings on the north-western and north-eastern arms are staggered.

The north-western arm approach consists of one advisory cycle lane, one bus lane, and one straight ahead traffic lane. Vehicles turning left are permitted into the bus lane approximately 30m in advance of the junction. The cycle lane extends straight ahead across the junction. The north-western arm exit consists of one traffic lane approximately 5.2m wide, and an advisory cycle lane.

The north-eastern arm approach consists of one advisory cycle lane, one left-turn traffic lane, and one straight-ahead and right-turn traffic lane. The north-eastern arm exit consists of two traffic lanes.

The south-eastern arm is short (approximately 30m length) due to the proximity of the next junction at Wilton Terrace. The south-eastern arm approach consists of one advisory cycle lane, one straight ahead and left-turn traffic lane, one straight-ahead traffic lane, and one right-turn lane. The cycle lane extends straight ahead across the junction. Vehicles from this approach are not permitted to turn left. The south-eastern arm exit consists of one advisory cycle lane and two traffic lanes. Vehicles turning left to Wilton Terrace are instructed to stay on the nearside traffic lane when exiting.

The south-western arm approach consists of one straight-ahead and left-turn traffic lane, and one straight-ahead and right-turn traffic lane. The south-western arm exit consists of one traffic lane.

The characteristics of this junction are shown below.

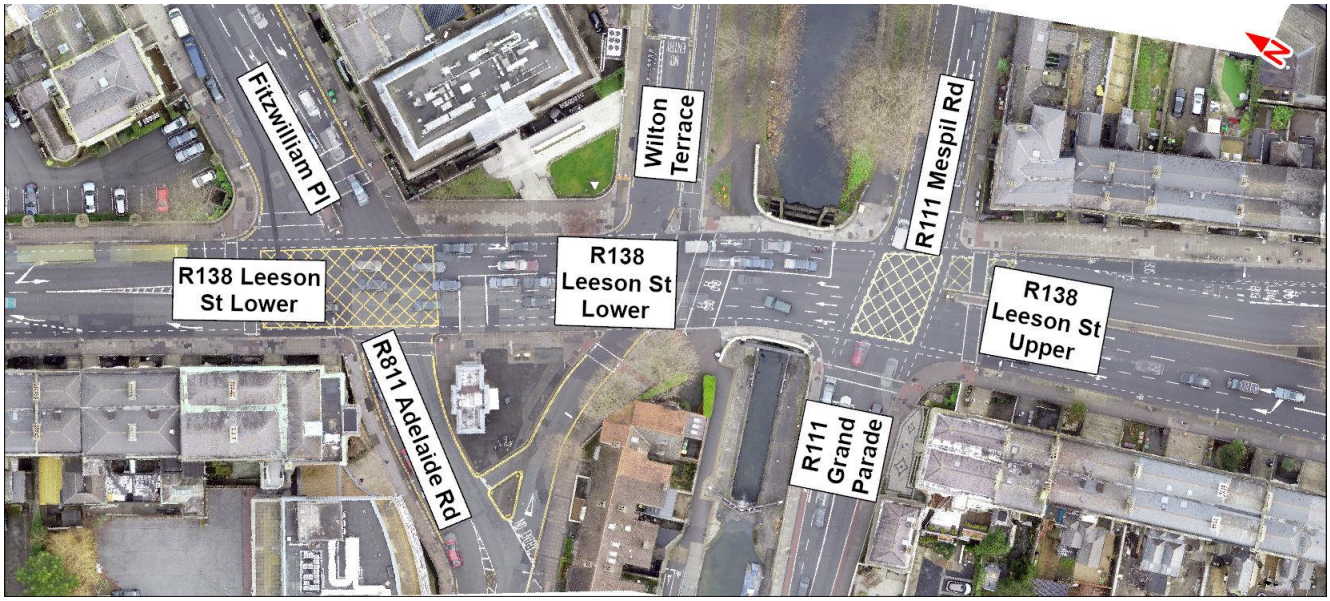

Image 5.3: R138 Leeson Street Lower / Fitzwilliam Place Four-arm Signalised Junction Arrangement

R138 Leeson Street Lower / Wilton Terrace four-arm signalised junction: This junction has signalised pedestrian crossing (pelican) on the south-western arm, and a toucan crossing on the south-eastern arm.

The north-western arm is short (approximately 30m length) due to the proximity to the R138 Leeson Street Upper / Fitzwilliam Place Junction. The north-western arm approach consists of one advisory cycle lane, one straight ahead and left-turn traffic lane, and one straight ahead traffic lane. The north-western arm exit consists of one advisory cycle lane, two straight ahead traffic lanes, and one right-turn traffic lane.

The north-eastern arm is exit-only for all vehicles, except bicycles. The north-eastern arm consists of one traffic lane, and one two-way cycle track along the Grand Canal. Cyclists approaching from the cycle track are given a separate cycle signal stage.

The south-eastern arm is short (approximately 25m length) due to the proximity of the next junction at R111 Grand Parade. This arm is the Eustace Bridge (Leeson Street Bridge) over the Grand Canal. The south-eastern arm approach consists of one advisory cycle lane, one left-turn and straight-ahead traffic lane, one straight-ahead traffic lane, and one right-turn lane for vehicles turning right at the R138 Leeson Street Lower / Fitzwilliam Place Junction. Vehicles from this approach are not permitted to turn right to Wilton Terrace. There is an advance stop line for cyclists at this approach. The south-eastern arm exit consists of one advisory cycle lane and two traffic lanes. Vehicles turning left to R111 Grand Parade are instructed to stay on the nearside traffic lane when exiting.

The south-western arm is exit only for all vehicles and consists of one traffic lane.

The characteristics of this junction are shown below.

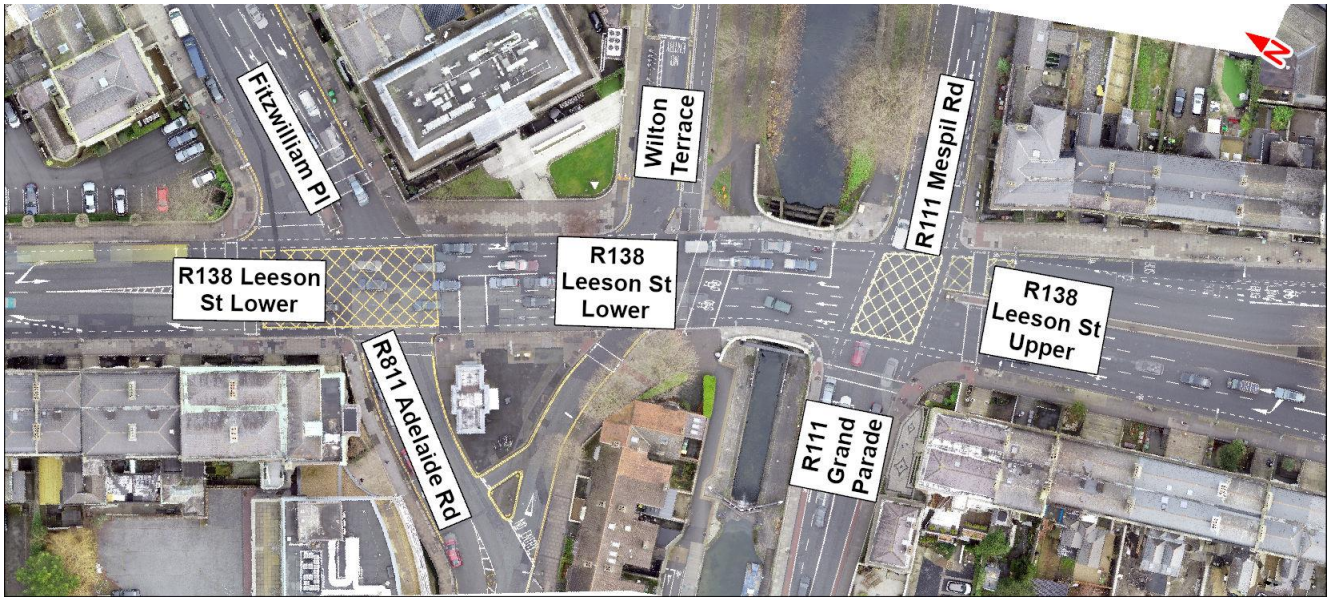

Image 5.4: R138 Leeson Street Lower / Wilton Terrace

5.3.2.4.1 R138 Leeson Street Upper & R138 Sussex Road Gyratory

R138 Leeson Street Upper and R138 Sussex Road (450m in length) are one-way single carriageways making up a gyratory. R138 Sussex Street is on the eastern side carrying southbound traffic, and R138 Leeson Street Upper on the western side carrying northbound traffic. Both travel in a north-west to south-east alignment for 450m from the R138 Leeson Street Upper / R111 Grand Parade Junction to the R138 Leeson Street Upper / Appian Way Junction. Both are subject to a speed limit of 50km/h.

R138 Leeson Street Upper has a typical carriageway width of approximately 12.5m, and R138 Sussex Road has a typical carriageway width of approximately 14.0m. They each consist of two general traffic lanes and one bus lane. Bus lanes in this section are in operation between 07.00 and 19.00 from Monday to Saturday.

Between R138 Leeson Street Upper / R111 Grand Parade Junction and the R138 Leeson Street Upper / Burlington Road Junction, the existing major junction arrangement is:

- R138 Leeson Street Upper / R111 Grand Parade Junction.

R138 Leeson Street Upper / R111 Grand Parade four-arm signalised junction: This junction has signalised pedestrian crossings (pelicans) on the south-eastern and south-western arms.

The north-western arm is short (approximately 25m) due to the proximity to the next junction at Wilton Terrace. This arm is the Eustace Bridge (Leeson Street Bridge) over the Grand Canal. The north-western arm approach consists of one advisory cycle lane, one straight-ahead and left-turn traffic lane, and one straight ahead traffic lane. The advisory cycle lane continues straight ahead across the junction. Vehicles from this approach are not permitted to turn right. The north-western arm exit consists of one advisory cycle lane and three traffic lanes.

The north-eastern arm approach consists of one straight-ahead traffic lane and one right-turn traffic lane. Vehicles from this approach are not permitted to turn left. There is an advance stop line for cyclists at this approach. An advisory cycle lane starts at the advance stop line and extends straight ahead across the junction. The north-eastern arm exit consists of one traffic lane.

The south-eastern arm approach consists of one straight-ahead and left-turn traffic lane, which replaces a bus lane approximately 45m in advance of the junction, and two straight-ahead traffic lanes. Vehicles from this approach are not permitted to turn right. The advisory cycle lane extends straight ahead across the junction. There is an advance stop line for cyclists at this approach. The south-eastern arm exit consists of one advisory cycle lane and two traffic lanes. There is a raised median separating the approach and exit lanes.

The south-western approach consists of one straight-ahead and left-turn flare of approximately 25m length, and one straight ahead traffic lane. Vehicles on this approach are not permitted to turn right. A mandatory cycle lane on this arm terminates approximately 12m in advance of the junction whilst an advisory cycle lane starts after the pedestrian crossing and extends straight ahead across the junction. The south-western exit consists of one mandatory cycle lane and one general traffic lane.

The characteristics of this junction are shown below.

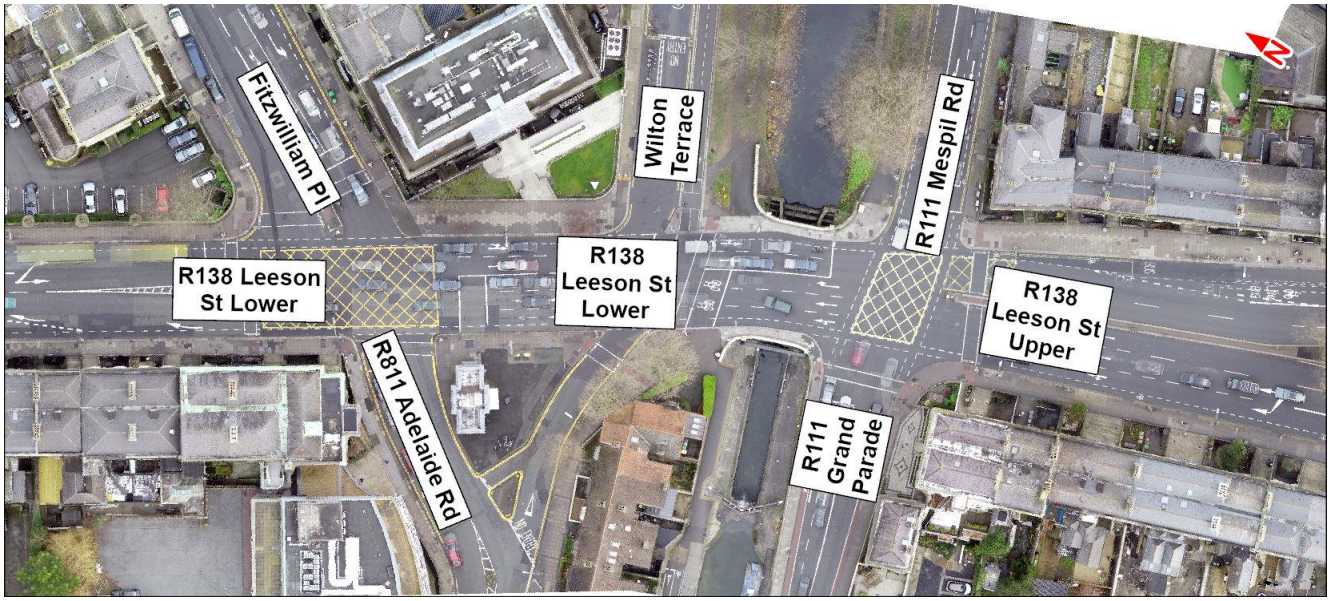

Image 5.5: R138 Leeson Street Upper / R111 Grand Parade Four-arm Signalised Junction

5.3.2.4.2 R138 Leeson Street Upper (Burlington Road to Wellington Place)

R138 Leeson Street Upper is a two-way single carriageway which is subject to a speed limit of 50km/h. It has a typical carriageway width of 16.5m and has a north-west to south-east alignment for 300m from the R138 Leeson Street Upper / Burlington Road Junction to the R138 Leeson Street Upper / Wellington Place Junction.

Between the R138 Leeson Street Upper / Burlington Road Junction and the R138 Leeson Street Upper / Appian Way Junction there are two northbound general traffic lanes and one northbound advisory cycle lane. In the southbound direction there are two general traffic lanes and a combined bus and cycle lane. Between the R138 Leeson Street Upper / Appian Way Junction and the R138 Leeson Street Upper / Wellington Place Junction there is a northbound advisory cycle and two northbound traffic lanes which flare to three for turning vehicles at the R138 Leeson Street Upper / Appian Way Junction and at the R138 Leeson Street Upper / Waterloo Road Junction. In the southbound direction between the R138 Leeson Street Upper / Appian Way Junction and the R138 Leeson Street Upper / Waterloo Road Junction there are three traffic lanes: a nearside general traffic lane for left-turning vehicles, a combined bus and cycle lane and an offside general traffic lane for ahead vehicles. Between the R138 Leeson Street Upper / Wellington Place Junction and the R138 Leeson Street Upper / Waterloo Road Junction there is one general traffic lane and one combined bus and cycle lane. The combined lanes are in operation between 07:00 and 19:00 from Monday to Saturday.

The existing major junction arrangements along R138 Leeson Street Upper from Burlington Road to Wellington Place are as follows:

- R138 Leeson Street Upper / Burlington Road Junction;
- R138 Leeson Street Upper / Appian Way Junction;
- R138 Leeson Street Upper / Waterloo Road Junction; and
- R138 Leeson Street Upper / Wellington Place Junction.

R138 Leeson Street Upper / Burlington Road three-arm signalised junction: This junction has a signalised pedestrian crossing (pelican) on the north-eastern and western (Sussex Road and Leeson Street Upper) arms.

The north-eastern arm approach consists of a single left turn only lane. The north-eastern arm exit consists of one traffic lane.

The south-eastern approach arm consists of one advisory cycle lane approximately 1.m wide and two straight-ahead general traffic lanes. The advisory cycle lane extends through the junction. Prior to the stop line, road markings in the left lane indicate a bus lane commences to the west of the junction. No right turn for general traffic to Burlington Road is permitted from this arm. The south-eastern arm exit consists of one combined bus and cycle lane and two general traffic lanes. Vehicles continuing ahead on R138 Leeson Street Upper are signed to the left general traffic lane whilst vehicles turning right to Appian Way are directed to the right-hand lane.

The western arm approach and exit is separated by residential and commercial properties. The approach arm consists of one advisory cycle lane, a left-turn lane which replaces a bus lane approximately 20m in advance of the junction, one straight-ahead lane, and one ahead and right-turn lane. The exit arm consists of one advisory cycle lane, one bus lane and two general traffic lanes.

The characteristics of this junction are shown below.

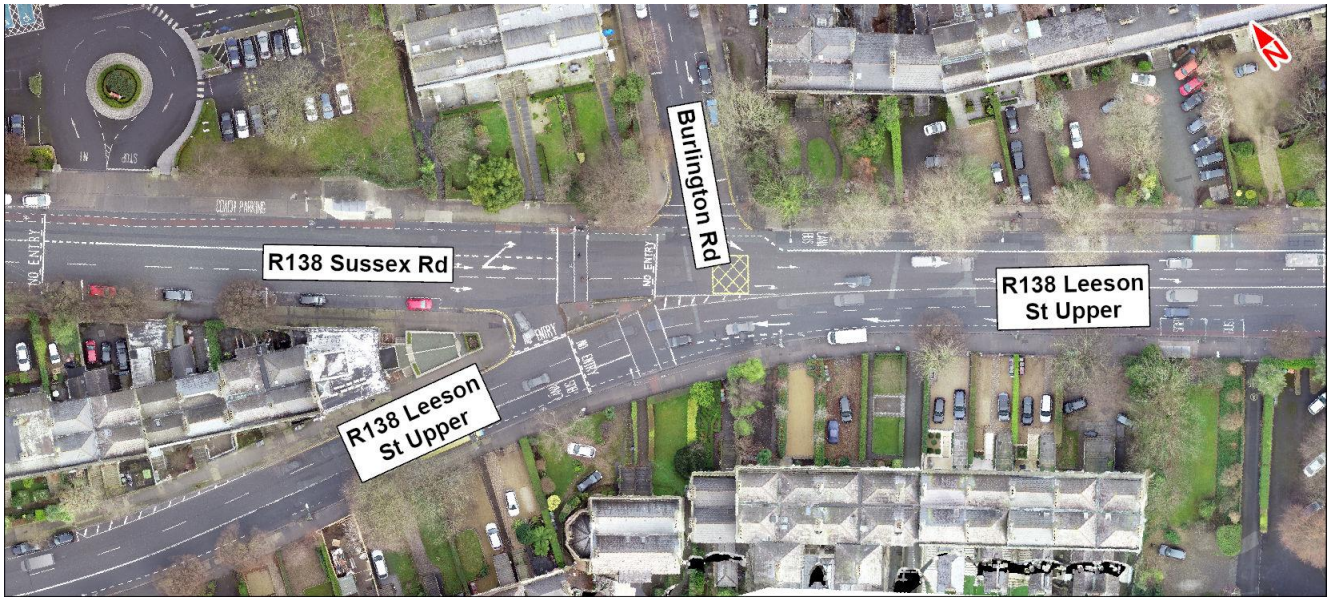

Image 5.6: R138 Leeson Street Upper / Burlington Road Signalised Junction

R138 Leeson Street Upper / Appian Way three-arm signalised junction: This junction has a signalised pedestrian crossing (pelican) on the south-western arm.

The north-western arm approach consists of a combined bus and cycle, a straight-ahead traffic lane, and a right-turn lane. There is an advanced stop line for cyclists. The north-western arm exit consists of a two general traffic lanes; the nearside general traffic becomes a combined bus and cycle lane approximately 15m north of the junction.

The south-eastern arm approach consists of a left-turn lane which replaces a cycle lane approximately 60m in advance of the junction, and two straight-ahead lanes. There is an advanced stop line for cyclists. The south-eastern arm exit consists of three traffic lanes: a nearside general traffic lane for left-turning vehicles at the subsequent junction, a combined bus and cycle lane and an offside general traffic lane. A pedestrian refuge island separates the approach and exit lanes on this arm.

The south-western arm approach consists of one left-turn lane and one right-turn lane. The south-western arm exit consists of one traffic lane.

The characteristics of this junction are shown below.

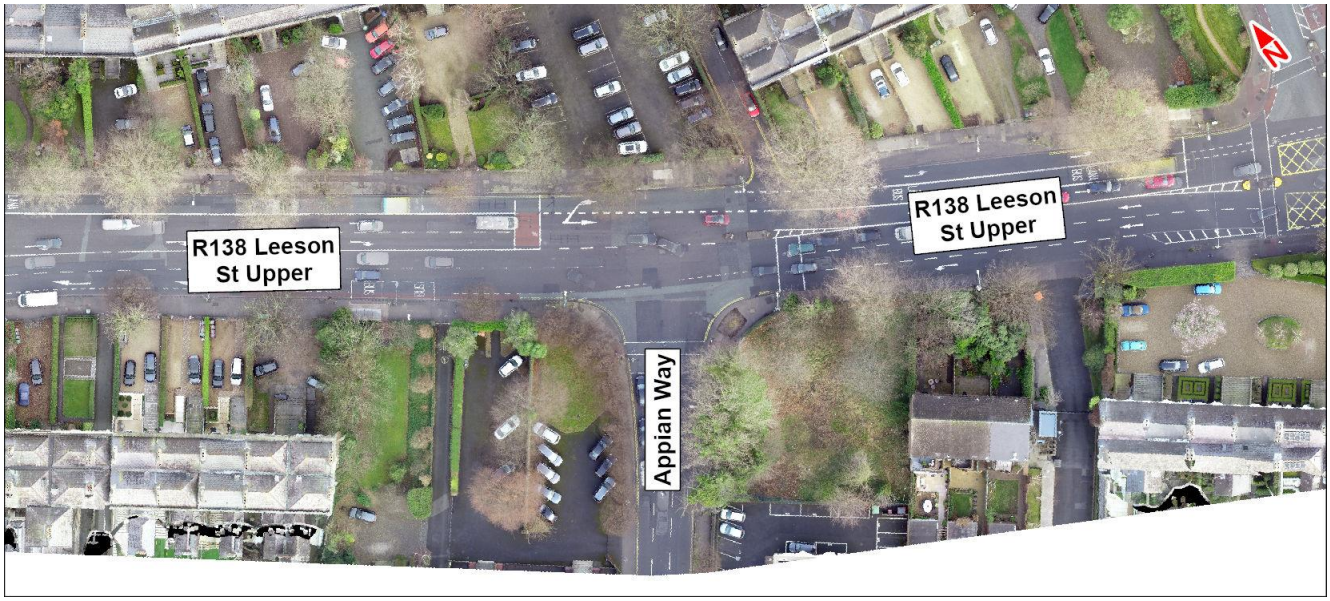

Image 5.7: R138 Leeson Street Upper / Appian Way Three-arm Signalised Junction

R138 Leeson Street Upper / Waterloo Road three-arm signalised junction: This junction has signalised pedestrian crossings (pelicans) on the north-western and north-eastern arms.

The north-western arm approach consists of a nearside general traffic lane, approximately 70m in length, for left-turning vehicles, a combined bus and cycle lane and an offside general traffic lane for straight-ahead vehicles. An advisory cycle lane (approximately 1.0m wide) starts ahead of the bus lane at the stop line and continues through the junction. For left-turning cyclists, an advisory cycle lane (approximately 1.3m wide) starts after the pedestrian crossing on this arm and continues to the north-eastern arm exit. The north-western arm exit consists of two traffic lanes, and a nearside mandatory cycle lane that terminates approximately 15m after the exit. A pedestrian refuge island separates the approach and exit lanes on this arm.

The north-eastern arm approach consists of one advisory cycle lane approximately 1.2m wide, one right-turn traffic lane, and one left-turn traffic lane which replaces a bus lane approximately 40m in advance of the junction. The north-eastern arm exit consists of one advisory cycle lane and one traffic lane. The advisory cycle extends from the pedestrian crossing on the north-western arm approach. There is an advanced stop line for cyclists at this approach. A pedestrian refuge island separates the approach and exit lanes on this arm.

The south-eastern arm is short (approximately 30m length) due to the proximity to the R138 Leeson Street Upper / Wellington Place Junction. The south-eastern arm approach consists of one advisory cycle lane, two straight-ahead traffic lanes, and one right-turn flare of approximately 30m. The advisory cycle lane continues across the junction. There is an advance stop line for cyclists at this approach. There is a turning box, for vehicles turning right, located after the stop line. The south-eastern arm exit consists of one advisory cycle lane, one bus lane, and one traffic lane. Vehicles turning left to Wellington Place are permitted to use the bus lane. A raised median separates the approach and exit lanes on this arm.

The characteristics of this junction are shown below.

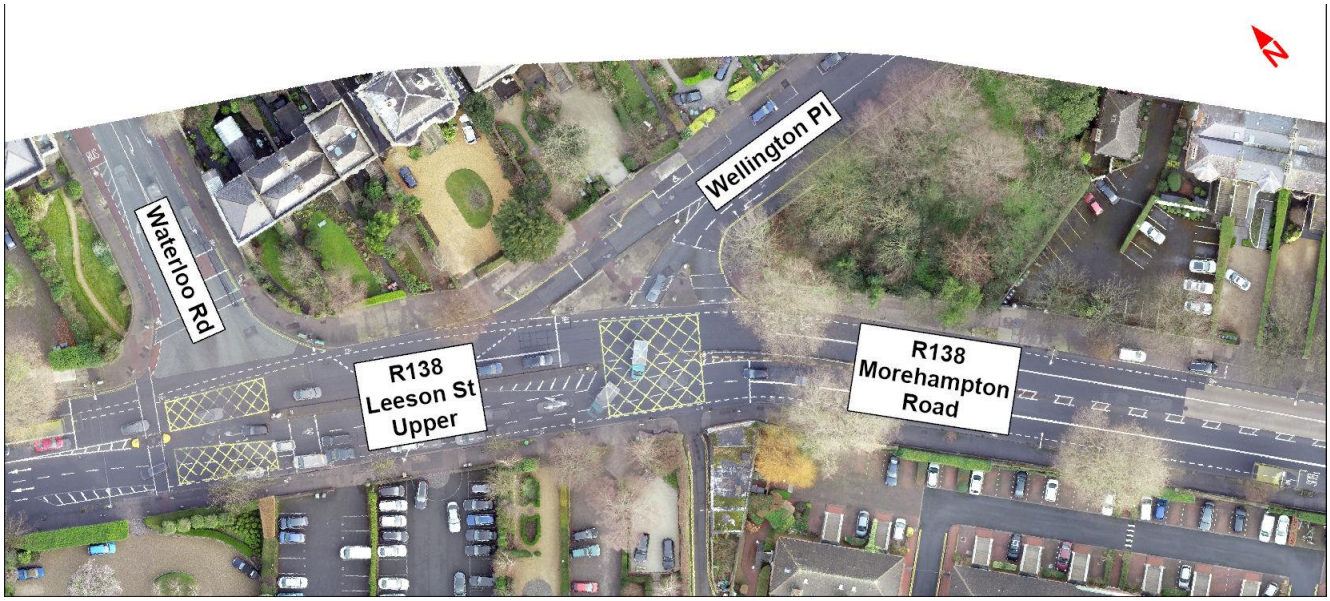

Image 5.8: R138 Leeson Street Upper / Waterloo Road Signalised T-Junction Arrangement

R138 Leeson Street Upper / Wellington Place three-arm signalised junction: This junction has a signalised pedestrian crossing (pelicans) on the north-eastern arm.

The north-western arm is short (approximately 30m length) due to the proximity of the next junction at Waterloo Road. The north-western arm approach consists of one advisory cycle lane, one bus lane which also admits left-turning vehicles, and one straight-ahead traffic lane. The advisory cycle lane continues straight ahead across the junction. The north-western arm exit consists of one advisory cycle lane and two traffic lanes. An offside right-turn flare starts approximately 3m after the exit. A raised median separates the approach and exit lanes on this arm.

The north-eastern arm approach consists of one right-turn traffic lane and one left-turn traffic lane, with a traffic island separating these two lanes. The north-eastern arm exit consists of one traffic lane. A kerbed traffic island separates the approach and exit lanes on this arm.

The south-eastern arm approach consists of one advisory cycle lane, one bus lane, and one straight-ahead traffic lane. Vehicles are not permitted to turn right at this approach. The south-eastern arm exit consists of one advisory cycle lane, one bus lane, and one traffic lane. A raised median separates the approach and exit lanes on this arm.

The characteristics of this junction are shown below.

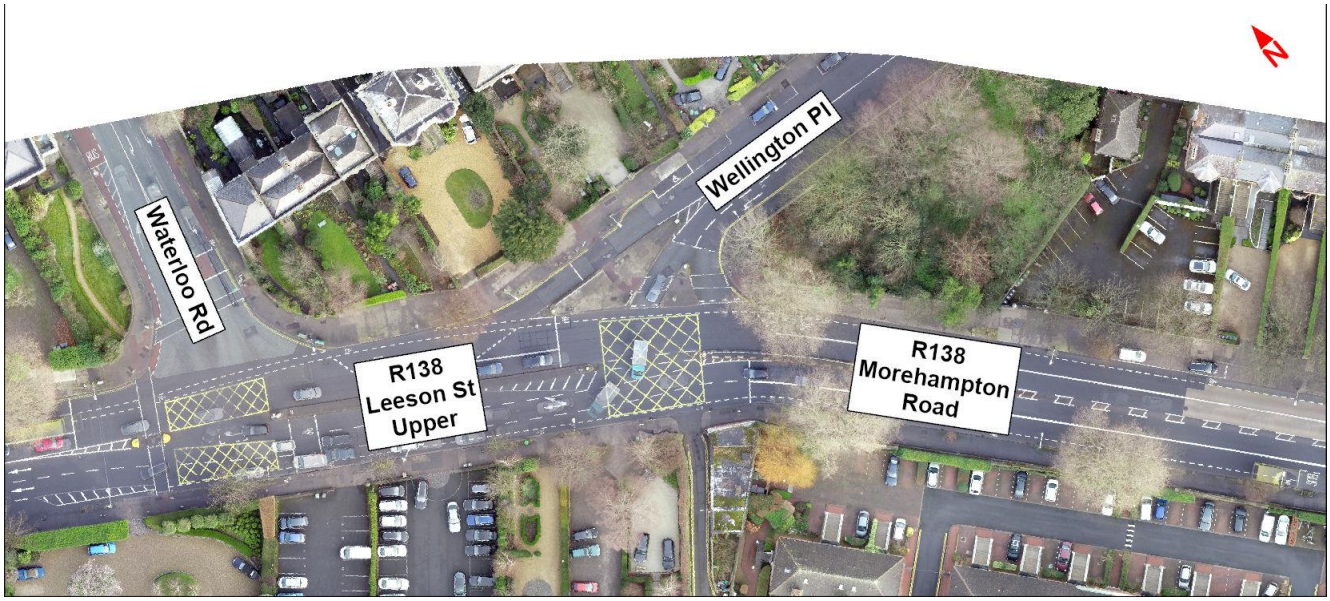

Image 5.9: R138 Leeson Street Upper / Wellington Place Three-arm Signalised Junction Arrangement

5.3.2.4.3 R138 Morehampton Road

R138 Morehampton Road is a two-way single carriageway which is subject to a speed limit of 50km/h. It has a typical carriageway width of 15.0m and has a north-west to south-east alignment for 700m from the R138 Leeson Street Upper / Wellington Place Junction to the R138 Donnybrook Road / Belmont Avenue Junction. In the northbound and southbound direction, R138 Morehampton Road consists of one general traffic lane, one bus lane and an advisory cycle lane. The bus lanes are in operation from 07:00 to 19:00 Monday to Saturday.

The existing major junction arrangements along R138 Morehampton Road from the R138 Leeson Street Upper / Wellington Place Junction to the R138 Donnybrook Road / Belmont Avenue Junction are as follows:

- R138 Morehampton Road / Bloomfield Avenue Junction; and
- R138 Morehampton Road / Herbert Park Junction.

R138 Morehampton Road / Bloomfield Avenue three-arm signalised junction: This junction has a signalised pedestrian crossing (pelican) on the south-eastern arm containing a traffic island refuge.

The north-western arm approach consists of one advisory cycle lane, one bus lane, and one straight-ahead and right-turn traffic lane. The cycle lane continues straight ahead across the junction. The north-western arm exit consists of one advisory cycle lane, one bus lane, and one traffic lane. A hatched median separates the approach and exit lanes on this arm.

The south-eastern arm approach consists of one advisory cycle lane, one bus lane, and one straight-ahead traffic lane. Vehicles turning left are permitted into the bus lane approximately 20m in advance of the junction. The south-eastern arm exit consists of one advisory cycle lane, one bus lane, and one traffic lane. A pedestrian refuge island separates the approach and exit lanes on this arm.

The south-western arm approach consists of one traffic lane which facilitates all movements. The south-western arm exit consists of one traffic lane. There are no road markings separating the approach and exit lanes on this arm. There is approximately 25m of street-parking on the approach to this junction along Bloomfield Avenue.

The characteristics of this junction are shown below.

Image 5.10: R138 Morehampton Road / Bloomfield Avenue Signalised T-Junction

R138 Morehampton Road / Herbert Park four-arm signalised junction: This junction has with signalised pedestrian crossings (pelicans) on all arms.

The north-western arm approach consists of one advisory cycle lane approximately 1.3m wide, one straight-ahead traffic lane, and one left-turn traffic lane which replaces a bus lane approximately 40m in advance of the junction. The cycle lane continues straight ahead across the junction. The north-western exit consists of one advisory cycle lane, and one traffic lane approximately 7.0m wide. A nearside bus lane starts approximately 50m after the exit.

The north-eastern arm approach consists of one traffic lane which facilitates all movements. The north-eastern arm exit consists of one traffic lane.

The south-eastern arm approach consists of one advisory cycle lane approximately 1.3m wide, one straight-ahead traffic lane, and one straight-ahead and left-turn lane which replaces a bus lane approximately 75m in advance of the junction. There is an advance stop line for cyclists on this approach. The south-eastern arm exit consists of one advisory cycle lane and two traffic lanes.

The south-western arm approach consists of one traffic lane which facilitates all movements. The south-western arm exit consists of one traffic lane.

The characteristics of this junction are shown below.

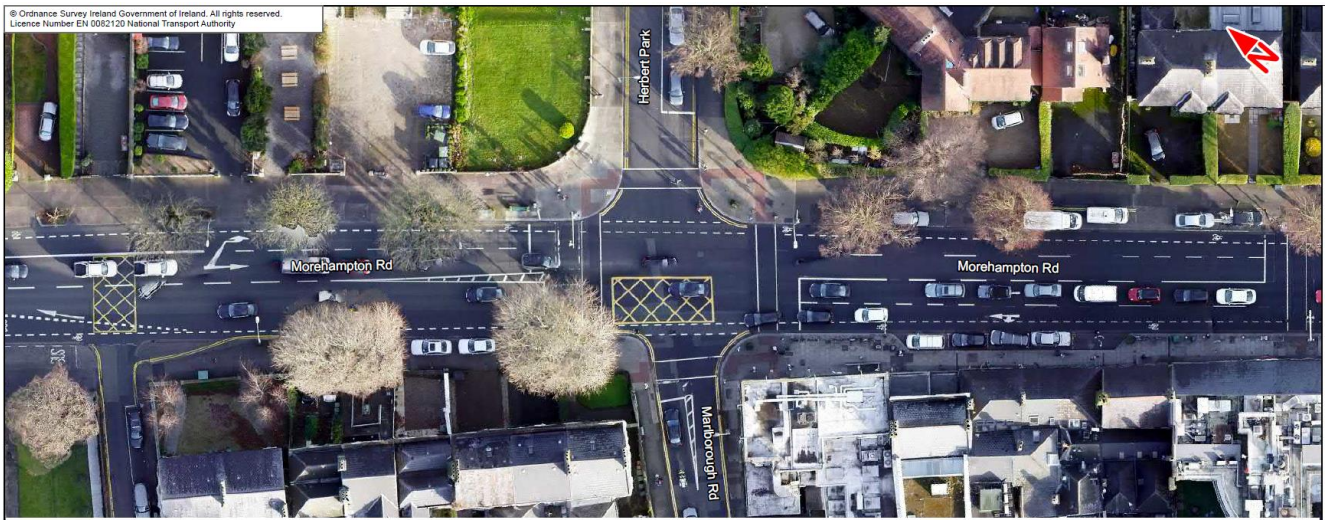

Image 5.11: R138 Morehampton Road / Marlborough Road Four-arm Signalised Junction

5.3.2.4.4 R138 Donnybrook Road (R138 Morehampton Road to R138 Stillorgan Road)

R138 Donnybrook Road is a two-way single carriageway which is subject to a speed limit of 50km/h. It has a typical carriageway width of 13.0m and has a north-west to south-east alignment for 580m from the R138 Donnybrook Road / Belmont Avenue Junction to the R138 Donnybrook Road / R815 Anglesea Road Junction.

Between the R138 Donnybrook Road / Belmont Avenue Junction and the R138 Donnybrook Road / R815 Anglesea Road Junction, the northbound carriageway predominately consists of one traffic lane, one bus lane and an advisory cycle lane. The exception to this is between the R138 Donnybrook Road / The Crescent Junction and the R138 Donnybrook Road / Brookvale Road Junction where the cycle lane is combined with the bus lane for approximately 230m. The bus lane is in operation from 07:00 to 19:00, Monday to Saturday. In the southbound direction, the carriageway has two traffic lanes and one advisory cycle lane.

The existing major junction arrangements along R138 Donnybrook Road from R138 Morehampton Road to Eglinton Terrace are as follows:

- R138 Donnybrook Road / Belmont Avenue Junction; and
- R138 Donnybrook Road / Eglinton Terrace Junction.

R138 Donnybrook Road / Belmont Avenue four-arm priority junction: This junction has a signalised pedestrian crossing (pelican) on the south-east arm with a pedestrian refuge island.

The north-western arm approach consists of one advisory cycle lane (approximately 1.3m wide), one straight-ahead and left-turn traffic lane, one straight-ahead and one right-turn flare approximately 30m in length. The cycle lane continues straight ahead across the junction. The north-western exit consists of one advisory cycle lane, and two traffic lanes.

The north-eastern arm approach consists of one traffic lane which facilitates all movements. The north-eastern arm exit consists of one traffic lane.

The south-eastern arm approach consists of one advisory cycle lane approximately 1.3m wide, one straight-ahead and right-turn traffic lane, and one combined bus and cycle lane. Left-turning vehicles are permitted to enter the bus lane. The south-eastern arm exit consists of one advisory cycle lane and two traffic lanes.

The south-western arm approach consists of one traffic lane which facilitates all movements. The south-western arm exit consists of one traffic lane. There is a pedestrian refuge island separating the approach and exit lanes on this arm.

The characteristics of this junction are shown below.

Image 5.12: R138 Donnybrook Road / Belmont Avenue Priority Junction

R138 Donnybrook Road / Eglinton Terrace three-arm priority junction: This junction has a yellow box marking in the centre. The north-western arm approach consists of one advisory cycle lane (approximately 1.3m wide) and two traffic lanes. The cycle lane continues straight ahead across the junction. The north-western exit consists of one traffic lane and ones combined bus and cycle lane.

The north-eastern arm consists of one combined approach and exit traffic lane approximately 2.8m wide which facilitates all movements. There is on-street parking along the northern side of the arm.

The south-eastern arm approach consists of one combined bus and cycle lane and one traffic lane. The south-eastern arm exit consists of one combined bus and cycle lane and one traffic lane.

The characteristics of this junction are shown below.

Image 5.13: R138 Donnybrook Road / Eglinton Terrace Priority T-Junction

R138 Donnybrook Road / Eglinton Road three-arm signalised junction: This junction has a yellow box marking in the centre. A signalised pedestrian crossing (pelican) is located on the on the south-western arm containing a traffic island refuge.

The south-eastern arm approach consists of a left turn general traffic, an advisory cycle lane (approximately 1.5m wide) and two straight-ahead traffic lanes. The cycle lane continues straight ahead across the junction. The south-eastern arm exit consists of three traffic lanes and an advisory cycle lane.

The south-western arm approach consists of a cycle lane, which terminates at the junction, and one general traffic lane. The south-western arm exit consists of one general traffic lane and an advisory cycle lane.

The north-western arm approach consists of an advisory cycle lane and three straight-ahead general traffic lanes. No right turn is permitted from this arm. The north-western arm exit consists of an advisory cycle lane and one general traffic lane, approximately 9.2m in width. Approximately 20m to the north of the junction, a bus lane commences.

The characteristics of this junction are shown below.

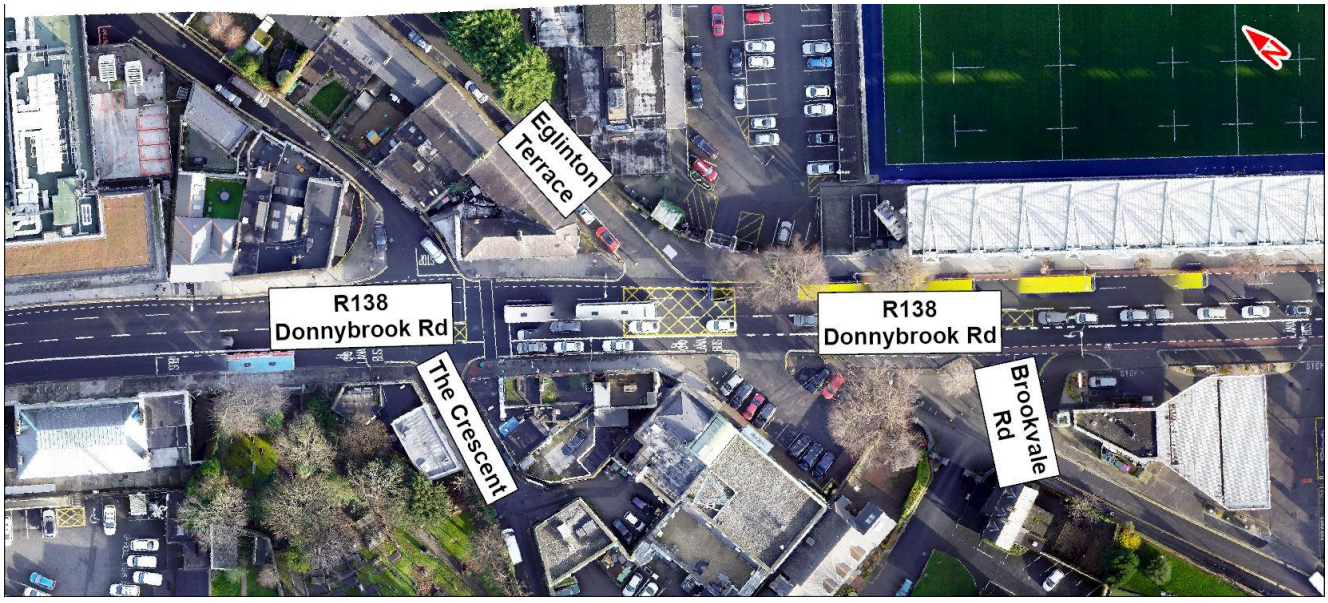

Image 5.14: R138 Donnybrook Road / Eglinton Road Three-arm Signalised Junction

5.3.2.5 Existing Parking / Loading

Along Section 1 of the Proposed Scheme there is a total of 258 existing parking / loading spaces. These comprise:

- 30 taxi parking spaces all of which are located along R138 Leeson Street Lower and R138 Sussex Road. Of the 30 taxi spaces, 17 are located on the R138 Leeson Street Upper northbound and southbound carriageways between Hatch Street Lower and Leeson Close and 13 are located on R138 Sussex Road southbound carriageway;
- 81 permit parking spaces, the majority (56) of which are located along R138 Leeson Street Upper and R138 Sussex Road between Grand Parade and Burlington Road. The remaining permit spaces are located on Hatch Street (three spaces), R138 Morehampton Road (21 spaces) between Wellington Place and Belmont Avenue and on R138 Donnybrook Road (one space) on the northbound carriageway opposite Donnybrook Stadium;
- 17 loading / unloading bays, of which eight bays are located on R138 Leeson Street and R138 Sussex Road between Grand Parade and Burlington Road, two are located on R138 Morehampton Road, five are located on R138 Donnybrook Road and two on Hatch Street;
- Four disabled spaces, of which one is located on the R138 Sussex Road southbound carriageway, one is located on Hatch Street, one is located on the R138 Morehampton Road northbound carriageway between Marlborough Road and Brendan Road and one is located on the R138 Donnybrook Road northbound carriageway north of The Crescent;
- 107 designated paid parking spaces, the majority (50 spaces) are located on Hatch Street. The remaining paid parking spaces are located along R138 Donnybrook Road (38 spaces), predominately between Brendan Road and The Crescent, on the R138 Morehampton Road northbound carriageway (17 spaces) between Marlborough Road and Brendan Road and on the R138 Sussex Road southbound carriageway (two spaces);
- Four informal parking spaces located on the R138 Morehampton Road southbound carriageway between Marlborough Road and Brendan Road; and
- 15 commercial (business) parking spaces these are located adjacent to R138 Donnybrook Road northbound carriageway between Eglinton Road and Brookvale Road and adjacent to R138 Donnybrook Road southbound carriageway between Mulberry Lane and The Crescent.

There are a number of side streets which can be used by local residents and visitors / businesses throughout this section. In total there are approximately 230 parking spaces on streets surrounding R138 Leeson Street Lower, R138 Sussex Street and R138 Leeson Street Upper, approximately 455 parking spaces on streets surrounding R138 Morehampton Road and approximately 229 parking spaces on streets surrounding R138 Donnybrook Road.

5.3.3 Section 2 – Donnybrook (Anglesea Road Junction) to Loughlinstown Roundabout

This Section outlines the baseline environment for walking, cycling, bus services, general traffic and parking / loading facilities along Section 2 of the Proposed Scheme, between the R138 Donnybrook Road / R815 Anglesea Road Junction and Loughlinstown Roundabout.

This section commences at the R138 Donnybrook Road / R815 Anglesea Road Junction and extends south along the R138 Stillorgan Road, N11 Stillorgan Road, and N11 Bray Road, ending at Loughlinstown Roundabout.

The proposed UCD Interchange will be a new bus interchange facility along the CBC for coach and local bus services, at the gateway to the UCD campus adjacent to the Stillorgan Road flyover bridge. The UCD Interchange design, originally included in the Emerging Preferred Route Option, has been developed further in co-ordination with the UCD Future Campus

5.3.3.0 Pedestrian Infrastructure

Footpaths are generally provided on both sides of the carriageway between Donnybrook (Anglesea Road Junction) and Loughlinstown Roundabout and generally are greater than 1.8m in width. Some sections of pedestrian routes deviate through adjacent residential areas, along local roads parallel to the Proposed Scheme, with no pedestrian facilities provided along the main route.

Along the full length of this section, R138 Donnybrook Road / R815 Anglesea Road Junction to Loughlinstown Roundabout, street lighting columns are situated along both sides of the carriageway, within close proximity to or at the back of the footpaths.

There are several pedestrian crossings along the R138 between the R138 Donnybrook Road / R815 Anglesea Road Junction and Loughlinstown Roundabout, both signalised and uncontrolled.

There are several controlled pedestrian crossings along Section 2 of the Proposed Scheme which benefit from tactile paving and dropped kerbs which can be found at the following locations:

- The five-arm R138 Donnybrook Road / R138 Stillorgan Road / Beaver Road / R185 Anglesea Road / R185 Ailesbury Road junction provides three indirect signalised crossings. Each crossing is staggered across each road by a pedestrian refuge island to allow traffic to pass;
- The four-arm R138 Stillorgan Road / Airfield Park junction provides three signalised crossings. Two crossings are direct across Airfield Park Road. One crossing south of Stillorgan Road is indirect and staggered by a pedestrian refuge island;
- The four-arm R138 Stillorgan Road / Greenfield Park / Nutley Lane junction provides one signalised crossing. The crossing is indirect and staggered by two pedestrian refuge islands;
- The six-arm R138 Stillorgan Road junction provides six direct signalised crossings;
- The three-arm R138 Stillorgan Road / R112 Foster's Avenue junction provides one signalised indirect crossing. The crossing is staggered across Francis Avenue by one pedestrian refuge island;
- The four-arm R138 Stillorgan Road / St. Thomas Road / Merrion Grove junction provides two signalised toucan crossings. One crossing is direct across St. Thomas Road and one crossing is indirect across Merrion Grove which is staggered by a pedestrian refuge island to allow traffic to pass through the slip road;
- The three-arm R138 Stillorgan Road / Booterstown Avenue junction provides two signalised crossings. Both crossings are indirect, one across Booterstown Avenue and one across Stillorgan Road where each crossing is staggered by a pedestrian refuge island;
- The four-arm N11 Stillorgan Road / N3 Mount Merrion Avenue / Sycamore Cress junction provides two indirect signalised toucan crossings across Stillorgan Road and Mount Merrion Avenue. Both crossings are staggered by one pedestrian refuge island;
- The four-arm N11 Stillorgan Road / Trees Road Lower / Priory Office Park / junction provides one indirect signalised crossings. A toucan crossing is staggered across Trees Road Lower by two pedestrian refuge islands;
- A mid link pelican crossing is staggered across N11 Stillorgan Road by one pedestrian refuge island;

- The four-arm N11 Stillorgan Road / Dublin Road / Priory Drive junction provides one indirect signalised crossing. A toucan crossing is staggered across Priory Office Park Road by two pedestrian refuge islands;
- The four-arm N11 Stillorgan Road / N31 Stillorgan Road / R825 Stillorgan Park Road / R825 Lower Kilmacud Road junction provides four indirect toucan crossings. A crossing is staggered across Stillorgan Road by three pedestrian refuge islands. A crossing is staggered across Stillorgan Park Road by three pedestrian refuge islands. A crossing is staggered across Stillorgan Road by three pedestrian refuge islands. A crossing is staggered across Lower Kilmacud Road by three pedestrian refuge islands;
- A signalised indirect toucan crossing across N11 Stillorgan Road / N31 Stillorgan Road is staggered by a pedestrian refuge island;
- The four-arm N11 Stillorgan Road / N31 Stillorgan Road / Farmleigh Avenue / N31 Brewery Road junction provides four signalised crossings. An indirect crossing is staggered across North of Stillorgan Road by two pedestrian refuge islands. An indirect crossing is staggered across Farmleigh Avenue by one pedestrian refuge island. There is a direct crossing across South of Stillorgan Road. There is an indirect crossing staggered across Brewery Road by two pedestrian refuge islands;
- A signalised indirect toucan crossing is staggered by a pedestrian refuge island across N31 Stillorgan Road and N11 Stillorgan Road;
- The four-arm N11 Stillorgan Road / R113 Leopardstown Road / R113 Newtownpark Avenue junction provides three indirect signalised toucan crossings. An indirect crossing across Stillorgan Road is staggered by three pedestrian refuge islands. An indirect crossing is staggered across both Leopardstown Road and Newtownpark Avenue by two pedestrian refuge islands;
- The three-arm N11 Stillorgan Road / Springfield Park junction provides an indirect toucan crossing which is staggered by a pedestrian refuge island;
- The three-arm N11 Stillorgan Road / R830 Kill Lane junction provides two indirect signalised toucan crossings. An indirect crossing across Kill Lane is staggered by three pedestrian refuge islands. An indirect crossing across Stillorgan Road is staggered by two pedestrian refuge islands;
- The three-arm N11 Stillorgan Road / Westminster Road junction provides two signalised toucan crossings. An indirect crossing across Stillorgan Road is staggered by a pedestrian refuge island and there is a direct crossing across Westminster Road;
- The three-arm N11 Stillorgan Road / R842 Bray Road junction provides two indirect toucan crossings. Both crossings are staggered across Stillorgan Road and Bray Road by two pedestrian refuge islands;
- The four-arm N11 Stillorgan Road / R827 Clonkeen Road junction provides an indirect toucan crossing which is staggered across Clonkeen Road by a pedestrian refuge island;
- The four-arm N11 Bray Road / Johnstown Road junction provides three indirect signalised toucan crossings Bray Road and Johnstown Road. All crossings are staggered by one pedestrian refuge island;
- A signalised indirect toucan crossing is staggered by one pedestrian refuge island across N11 Bray Road North of Circle K Centenary petrol station;
- The three-arm N11 Bray Road junction provides two indirect signalised toucan crossings. Both crossings are staggered across Bray Road by two pedestrian refuge islands;
- A signalised indirect toucan crossing is staggered by one pedestrian refuge island is across N11 Bray Road adjacent to Willow Park;
- The three-arm N11 Bray Road junction provides an indirect signalised toucan crossing which is staggered by a pedestrian refuge island;
- The four-arm N11 Bray Road / R118 Wyattville Road junction provides three signalised toucan crossings. Bray Road provides two direct toucan crossings. Wyattville Road provides an indirect crossing which is staggered by a pedestrian refuge island; and
- A signalised indirect toucan crossing across N11 Bray Road is staggered by three pedestrian refuge islands.

Additionally, there are pedestrian bridges at the following locations:

- R138 Stillorgan Road on the south-eastern arm of the R138 Stillorgan Road / Airfield Park Junction;

- R138 Stillorgan Road south-east of the Seafield Road (south of the Belfield Interchange);
- R138 Stillorgan Road on the south-eastern arm of the R138 Stillorgan Grove / Merrion Grove / The Rise Junction;
- N11 Stillorgan Road on the north-west arm of the N11 Stillorgan Road / R830 Kill Lane Junction;
- N11 Bray Road on the north-western arm of the N11 Bray Road / R827 Clonkeen Road Junction;
- N11 Bray Road on the south-eastern of the N11 Bray Road / Johnstown Road Junction; and
- N11 Bray Road approximately 50m north of Loughlinstown Roundabout.

Uncontrolled crossings across priority junctions at side roads benefit from dropped kerbs. The locations of the pedestrian crossings are illustrated in TIA Appendix 3 (Maps).

Further details of the baseline pedestrian facilities (i.e. routing, directness, accessibility, crossing and footpath widths) at each junction along Section 2 of the Proposed Scheme is included in TIA Appendix 4 (Pedestrian Infrastructure Assessment Section).

5.3.3.0.0 Pedestrian Infrastructure at Proposed UCD Bus Interchange

Pedestrian facilities are available at the existing UCD site:

- **UCD Belfield / Boundary Walk:** An off-road pedestrian footpath provides a circular link around the boundary of the UCD campus. Within the existing site, the off-road pedestrian footpath is approximately 2.0m in width and links the N11 Stillorgan Road UCD Entrance (southeast of the site), the R138 Stillorgan Road Bus Stop 768 (east of the site) and Woodview House and UCD Veterinary Hospital (northwest of the site). Along this pedestrian route there is currently one uncontrolled pedestrian crossing located on the N11 northbound on-ramp car park egress;
- **R138 Stillorgan Road Bus Stop 768 to UCD James Joyce Library:** A segregated pedestrian footpath, approximately 3.5 - 4.4m in width provides a link between the R138 Stillorgan Road Bus Stop 768 (east of the site), the existing UCD Veterinary Hospital car park and central campus (southwest of the site). Along this pedestrian route there are currently two uncontrolled zebra crossings located on the N11 Stillorgan Road car park egress and access; and
- **UCD Veterinary Hospital:** A pedestrian footpath, approximately 2.5m wide, runs adjacent to the north western side of the UCD Veterinary Hospital car park and provides access to the UCD School of Veterinary Medicine. To the north, the footpath, approximately 1.5m wide, links the existing car park directly with the UCD Veterinary Hospital entrance. Stair and ramp accesses are available at this location and connect with an uncontrolled zebra crossing linking the access with the car park.

5.3.3.1 Cycling Infrastructure

Along Section 2, a range of cycle facilities are currently provided including mandatory cycle lanes, advisory cycle lanes, combined bus and cycle lanes and cycle tracks. A combination of southbound cycle lanes / tracks are provided for the whole of length of the section between the R138 Donnybrook Road / R815 Anglesea Road Junction and Loughlinstown Roundabout. Various northbound cycle lanes are provided along the section with the exception of between Loughlinstown Roundabout and 90m south of the Wyattville Interchange overbridge, a length of approximately 880m, there are no dedicated northbound cycle facilities.

Cycle parking stands are provided at the following points along of the Proposed Scheme (inside the redline boundary):

- 24 Sheffield stands located on Stillorgan Road outside Belfield Bike Shop (available to accommodate 48 bicycles);
- 5 Sheffield stands located on Stillorgan Road adjacent to Seafield Road (available to accommodate 10 bicycles);
- 7 Sheffield stands located on Stillorgan Road adjacent to St Thomas Church (available to accommodate 14 bicycles);
- 4 Sheffield stands located on Stillorgan Road opposite Saint John of God Hospital (available to accommodate 8 bicycles);

- 6 Sheffield stands located on Stillorgan Road outside Stillorgan Park (available to accommodate 12 bicycles);
- 10 Sheffield stands located on Stillorgan Road outside Galloping Green Bus Stop (available to accommodate 20 bicycles); and
- 5 Sheffield stands located on Bray Road outside Saint Brigid's Church (available to accommodate 10 bicycles).

Additional cycle parking stands are provided at the following points in the vicinity of the Proposed Scheme, albeit, outside of the redline boundary:

- 6 Sheffield stands located on Nutley Road outside Tesco (available to accommodate 12 bicycles);
- 200 Sheffield stands located in James Joyce Library (available to accommodate 400 bicycles);
- 5 Sheffield stands located on Seafield Crescent outside Seafield Park (available to accommodate 10 bicycles);
- 6 Sheffield stands located on Woodbine Park outside Spar (available to accommodate 12 bicycles);
- 5 Sheffield stands located on The Close outside Supervalu (available to accommodate 10 bicycles);
- 5 Sheffield stands located on Old Dublin Road outside Oatlands College (available to accommodate 10 bicycles);
- 12 Sheffield stands located on Old Dublin Road outside Stillorgan College (available to accommodate 24 bicycles);
- 33 Sheffield stands located on Old Dublin Road outside Stillorgan Village Shopping Centre (available to accommodate 66 bicycles);
- 23 Sheffield stands located on Kilmacud Road Lower outside AIB (available to accommodate 46 bicycles);
- 13 Sheffield stands located on Kilmacud Road Lower outside EBS (available to accommodate 26 bicycles);
- 22 Sheffield stands located on Kilmacud Road Lower outside Stillorgan SC (available to accommodate 44 bicycles);
- 5 Sheffield stands located in Church of Our Lady Car Park outside Foxrock Parish (available to accommodate 10 bicycles);
- 10 Sheffield stands located on Old Bray Road outside AIB (available to accommodate 20 bicycles);
- 24 Sheffield stands located on Old Bray Road outside Cabinteely Park (available to accommodate 48 bicycles); and
- 25 Sheffield stands located in Cabinteely Park (available to accommodate 50 bicycles).

5.3.3.1.0 Cycling Infrastructure at Proposed UCD Bus Interchange

Cyclist access to the existing UCD site is available at two locations: via the main entrance to UCD, and via the R138 Stillorgan Road Bus Stop 768. At these locations, no dedicated cycle facilities are provided; however, all roads within the site are currently signed as shared space for vehicles, pedestrians, and cyclists.

To the south and west of the site there is no dedicated cycle infrastructure at accesses however all access roads to the site are designated as shared space.

5.3.3.2 Bus Infrastructure

5.3.3.2.0 Bus Priority Measures

Intermittent bus lanes are currently available along both sides of the carriageway along the R138 and N11 between Donnybrook (Anglesea Road) and Loughlinstown Roundabout. Bus lanes are in operation between 07.00 and 19.00 from Monday to Saturday along sections to the north of the N11 Stillorgan Road / Westminster Road Junction, and in operation 24 hours Monday to Sunday between the N11 Stillorgan Road / Westminster Road Junction and Loughlinstown Roundabout.

Bus lanes are briefly discontinued across main junctions and at the following locations:

- R138 Stillorgan Road on the northbound carriageway between the Belfield Interchange northbound off-slip and Belfield Interchange northbound on-slip (approximately 640m in length). Bus lanes are present on the on / off-slips;
- N11 Bray Road on the southbound carriageway between the Wyattville Interchange southbound off-slip and approximately 140m south of the Wyattville Interchange southbound on-slip (approximately 760m in length). Bus lanes are present on southbound on / off-slips; and
- N11 Bray Road on the northbound carriageway between the N11 Bray Road / Cherrywood Road Junction and Loughlinstown Roundabout (approximately 575m in length).

5.3.3.2.1 Bus Stop Facilities

There are currently 57 bus / coach stops along Section 2 of the Proposed Scheme, between Donnybrook (Anglesea Road Junction) and Loughlinstown Roundabout. The inbound stops are as follows:

- Stop 772 on R138 Stillorgan Road south of the junction with Anglesea Road. This is currently a shared bus and coach stop;
- Stop 771 on R138 Stillorgan Road outside Teresian School;
- Stop 770 on R138 Stillorgan Road south of the junction with Airfield Park. This is currently a shared bus and coach stop;
- Stop 769 on R138 Stillorgan Road outside Belfield Court;
- Stop 768 on R138 Stillorgan Road outside UCD on the Belfield Interchange northbound on-slip. This is currently a shared bus and coach stop;
- Stop 2084 on R138 Stillorgan Road adjacent to the junction with Seafield Road;
- Stop 2070 on R138 Stillorgan Road south of the junction with Foster's Avenue. This is currently a shared bus and coach stop;
- Stop 2069 on R138 Stillorgan Road north of the junction with Booterstown Avenue;
- Stop 2068 on R138 Stillorgan Road north of the junction with Mount Merrion Avenue;
- Stop 461 on N11 Stillorgan Road opposite the Talbot Hotel Stillorgan. This is currently a shared bus and coach stop;
- Stop 4728 on N11 Stillorgan Road north of the junction with Dublin Road;
- Stop 4727 on N11 Stillorgan Road north of the junction with R825 Lower Kilmacud Road. This is currently a shared bus and coach stop;
- Stop 2065 on N11 Stillorgan Road south of Stillorgan Grove;
- Stop 2064 on N11 Stillorgan Road north of the junction with N31 Brewery Road;
- Stop 2063 on N11 Stillorgan Road opposite the junction with Belmont Terrace. This is currently a shared bus and coach stop;
- Stop 2062 on N11 Stillorgan Road north of the junction with Leopardstown Road. This is currently a shared bus and coach stop;
- Stop 2061 on N11 Stillorgan Road north of the junction with Knocksinna. This is currently a shared bus and coach stop;
- Stop 2060 on N11 Stillorgan Road south of the junction with Springfield Park;
- Stop 3258 on N11 Stillorgan Road north of the junction with Westminster Road. This is currently a shared bus and coach stop;
- Stop 2996 on N11 Bray Road north of the junction with Bray Road (Cabinteely);
- Stop 5128 on N11 Bray Road south of the junction with R827 Clonkeen Road. This is currently a shared bus and coach stop;
- Stop 5127 on N11 Bray Road north of the junction with Johnstown Road. This is currently a shared bus and coach stop;
- Stop 3148 on N11 Bray Road south of the junction with Johnstown Road;
- Stop 3147 on N11 Bray Road south of the junction with Druids Glen Road;
- Stop 3146 on N11 Bray Road north of the junction with Willow Avenue;

- Stop 3145 on N11 Bray Road adjacent to the northbound Wyattville Link Road Interchange on-slip / off-slip. This is currently a shared bus and coach stop;
- Stop 3144 on N11 Bray Road north of the junction with R116 Cherrywood Road; and
- Stop 3143 on N11 Bray Road adjacent to St Columcille's Hospital. This is currently a shared bus and coach stop.

The outbound stops are:

- Stop 760 on R138 Stillorgan Road south of the junction with Anglesea Road. This is currently a shared bus and coach stop;
- Stop 761 on R138 Stillorgan Road outside Teresian School;
- Stop 762 on R138 Stillorgan Road south of the junction with Airfield Park. This is currently a shared bus and coach stop;
- Stop 763 on R138 Stillorgan Road north of Belfield Court;
- Stop 764 on R138 Stillorgan Road on the Belfield Interchange southbound off-slip. This is currently a shared bus and coach stop;
- Stop 2007 on R138 Stillorgan Road on the Belfield Interchange southbound on-slip. This is currently a shared bus and coach stop;
- Stop 2008 on R138 Stillorgan Road adjacent to Seafield Road;
- Stop 2009 on R138 Stillorgan Road south of the junction with Foster's Avenue. This is currently a shared bus and coach stop;
- Stop 2010 on R138 Stillorgan Road south of the junction with Booterstown Avenue;
- Stop 435 on N11 Stillorgan Road south of the junction with N31 Mount Merrion Avenue;
- Coach stop 435 on N11 Stillorgan Road north of Talbot Hotel Stillorgan;
- Stop 7353 on N11 Stillorgan Road north of the junction with Priory Drive;
- Stop 4571 on N11 Stillorgan Road south of the junction with R825 Lower Kilmacud Road. This is currently a shared bus and coach stop;
- Stop 2013 on N11 Stillorgan Road south of the junction with Stillorgan Grove;
- Stop 2014 on N11 Stillorgan Road south of the junction with N31 Brewery Road;
- Stop 4636 on N11 Stillorgan Road south of the junction with Beechwood Court. This is currently a shared bus and coach stop;
- Stop 2016 on N11 Stillorgan Road south of the junction with Leopardstown Road. This is currently a shared bus and coach stop;
- Stop 2015 on N11 Stillorgan Road south of the junction with Knocksinna;
- Stop 2017 on N11 Stillorgan Road north of the junction with R830 Kill Lane. This is currently a shared bus and coach stop;
- Stop 3259 on N11 Stillorgan Road south of the junction with R830 Kill Lane;
- Stop 7361 on N11 Bray Road south of the junction with Bray Road (Cabinteely). This is currently a shared bus and coach stop;
- Stop 7362 on N11 Bray Road south of the junction with R827 Clonkeen Road. This is currently a shared bus and coach stop;
- Stop 3129 on N11 Bray Road north of the junction with Johnstown Road. This is currently a shared bus and coach stop;
- Stop 3130 on N11 Bray Road north of the junction with Druids Glen Road;
- Stop 3131 on N11 Bray Road south of the junction with Druids Glen Road;
- Stop 3132 on N11 Bray Road north of the junction with Sunnyhill Park;
- Stop 3133 on N11 Bray Road north of the junction with Willow Avenue;
- Stop 3134 on N11 Bray Road on the Wyattville Link Road Interchange southbound on-slip. This is currently a shared bus and coach stop; and
- Stop 3135 on N11 Bray Road opposite St Columcille's Hospital. This is currently a shared bus and coach stop.

Out of the 57 bus stops, the following 14 stops are indented from the carriageway:

- RTÉ, stop 770;
- RTÉ, stop 762;
- St. Thomas Road, stop 2070;
- Laurence Park, stop 4727;
- Galloping Green, stop 2063;
- Newtownpark Avenue, stop 2062;
- Old Bray Road, stop 7361;
- Clonkeen Road, stop 7362;
- Clonkeen Road, stop 5128;
- Cabinteely Bypass, stop 3129;
- Cabinteely Bypass, stop 5127;
- Shrewsbury Lawn, stop 3148;
- Shrewsbury Lawn, stop 3130; and
- St. Columcille's Hospital, stop 3143.

The majority of the stops (51 out of 57) currently provide timetable information, shelter and seating whilst fewer stops have real time information available.

Table 5.5 shows the availability of bus stop facilities at the existing 57 stops along the Section 2 of the Proposed Scheme.

Table 5.5: Section 2 - Availability of Bus Stop Facilities (of a Total 57 Bus Stops)

Bus Stop Facility	Number of Bus Stops in Baseline with Facility	Percentage of Bus Stops in Baseline with Facility
RTPI	22	39%
Timetable Information	51	89%
Shelter	51	89%
Seating	51	89%
Accessible Kerbs	48	84%
Indented Drop Off Area	14	25%

The existing bus facilities along Section 2 of the Proposed Scheme are illustrated in TIA Appendix 3 (Maps)

The bus services which operate along Section 2 are outlined in Table 5.4 (33 services) and in Table 5.6 (an additional 17 services).

Table 5.6: Section 2 - Bus Service Frequency

Service	Route	Typical Service Frequency	
		Weekday	Weekend
17	Rialto - Blackrock	20 minutes	30 minutes
47	Poolbeg St. - Belarmine	50 minutes	60 minutes
63	Kilternan - Dun Laoghaire	30 minutes	30 minutes
75	Tallaght - Dun Laoghaire	30 minutes	30 minutes
84	Blackrock - Newcastle	60 minutes	70 minutes
111	Brides Glen - Kilbogget Pk	60 minutes	60 minutes
143	Sandyford Luas Stop - Southern Cross in Bray	Six times daily	No service
164	UCD - Sydney Parade DART	30 minutes (term time, peak period only)	No service
175	Citywest - Tallaght - Dundrum - UCD	30 minutes	60 minutes
180	Monaghan to UCD	Twice a day	Once a day
702	Dublin Airport - Greystones/Bray	60 minutes	60 minutes
27x	UCD Belfield - Clare Hall	Once a day	No service
63a	Kilternan - Dun Laoghaire	Once a day	No service
75a	Tallaght - Dun Laoghaire	Four times a day	Twice a day
84a	Blackrock - Newcastle	60 minutes	No service
84n	D'Olier St. - Greystones (120 min late night Fri-Sat)	No service	120 minutes
UCD06	Portarlington - UCD	Once daily	No service
2, 39, 116, 118, 120, 133, 145, 155, 181, 533, 700, 740, 824, 845, 847, 904, 910, 126u, 25x, 32x, 39a, 41x, 46a, 46e, 51x, 66x, 67x, 740-a, 77x, 7b, 7d, 84x, x2	See Table 5.4	See Table 5.4	See Table 5.4

5.3.3.3 General Traffic

This section of the R138 Stillorgan Road is a dual carriageway which is subject to a speed limit of 60km/h. It has a typical carriageway width of 24.0m and has a north-west to south-east straight alignment for 900m from the R138 Donnybrook Road / R815 Anglesea Road Junction to the R138 Stillorgan Road / Nutley Lane Junction.

For most of its length the carriageway has two traffic lanes and one combined bus and cycle lane in each direction. Bus lanes in this section are in operation between 07.00 and 19.00 from Monday to Saturday.

The existing major junction arrangements along R138 Stillorgan Road from the R138 Donnybrook Road / R815 Anglesea Road Junction to R138 Stillorgan Road / Nutley Lane Junction are as follows:

- R138 Donnybrook Road / R815 Anglesea Road Junction;
- R138 Stillorgan Road / Airfield Park; and
- R138 Stillorgan Road / Nutley Lane Junction.

R138 Donnybrook Road / R815 Anglesea Road four-arm signalised junction: The R138 Donnybrook Road / R815 Anglesea Road Junction is a four-arm signalised junction with signalised pedestrian crossings (pelicans) on the north-eastern, south-eastern, and south-western arms.

The north-western arm approach consists of two straight-ahead traffic lanes, a left-turn traffic lane, and an advisory cycle lane. The cycle lane continues straight ahead across the junction. Vehicles on this approach are not permitted to turn right. The north-western arm exit consists of three traffic lanes and one advisory cycle lane. Vehicles turning left to Eglinton Road are instructed to stay on the nearside traffic lane when exiting.

The north-eastern arm approach consists of one left-turn lane, one straight-ahead lanes, and two right-turn lane. There is a landscaped traffic island on this arm which separates opposing traffic flows and provides pedestrian crossing refuge. The Arthur Morrison Monument is located on this traffic island. The north-eastern arm exit consists of one traffic lane approximately 8.0m wide.

The south-eastern arm approach consists of one advisory cycle lane, one left-turn lane with an additional left-turn slip lane branching from it, two straight-ahead lanes, and one right-turn lane. The cycle lane continues straight ahead across the junction. A staggered pedestrian refuge island separates opposing traffic flows. The south-eastern arm exit consists of one advisory cycle lane and two traffic lanes. A combined bus and cycle lane starts approximately 30m after the exit.

The south-western arm approach consists of one left-turn and straight-ahead lane, one straight-ahead lane, and one offside bus lane for right-turning buses. Other vehicles on the approach are not permitted to turn right at this junction. The south-western exit arm of one traffic lane approximately 7.0m wide which narrows 70m west after the exit.

The characteristics of this junction are shown below.

Image 5.15: R138 Donnybrook Road / R815 Anglesea Road Junction Four-arm Signalised Junction Arrangement

R138 Stillorgan Road / Airfield Park four-arm signalised junction: The R138 Stillorgan Road / Airfield Park is a four-arm signalised junction with signalised pedestrian crossings (toucans) on the north-eastern, south-eastern, and south-western arms, and a pedestrian bridge across the south-eastern arm.

The north-western arm approach consists of a right-turn flare of approximately 60m length, two straight-ahead traffic lanes, a left-turn lane which replaces the nearside combined bus and cycle lane approximately 35m in advance of the junction, and a nearside advisory cycle lane which transitions from the adjacent cycle track approximately 20m in advance of the junction. The cycle lane continues straight ahead across the junction. The north-western arm exit consists of one advisory cycle lane, one combined bus and cycle lane, and two traffic lanes. There is a raised median which separates opposing traffic flows.

The north-eastern arm approach consists of one traffic lane which facilitates all movements. The north-eastern arm exit consists of one traffic lane.

The south-eastern arm approach consists of an advisory cycle lane, a combined bus and cycle lane which permits left-turning general traffic, two straight-ahead traffic lanes, and one right-turn flare of approximately 80m length. A traffic island separates the nearside shared lane from the other traffic lanes. An advisory cycle lane starts after the pedestrian crossing on the approach and extends straight ahead across the junction. The south-eastern arm exit consists of one mandatory cycle lane, a combined bus and cycle lane, and two traffic lanes. There is a pedestrian refuge island which separates opposing traffic flows.

The south-western arm approach consists of one traffic lane that facilitates all movements. The south-western arm exit consists of one traffic lane.

The characteristics of this junction are shown below.

Image 5.16: R138 Stillorgan Road / Airfield Park Four-arm Signalised Junction Arrangement

R138 Stillorgan Road / Nutley Lane Junction four-arm signalised junction: The R138 Stillorgan Road / Nutley Lane Junction is a four-arm signalised junction with signalised pedestrian crossings (pelicans) on the north-western and north-eastern arms.

The north-western arm approach consists of one left-turn slip lane of approximately 130m length, one mandatory cycle lane, one combined bus and cycle lane, two straight-ahead traffic lanes, and a right-turn flare of approximately 60m length. There is an advance stop line for cyclists. The cycle lane continues straight ahead across the junction. The north-western arm exit consists of one advisory cycle lane, one combined bus and cycle lane, and two traffic lanes. There is a pedestrian refugee island which separates opposing traffic flows.

The north-eastern arm approach consists of one left-turn slip and one straight-ahead and right-turn lane. The north-eastern arm exit consists of one traffic lane. A kerbed traffic island separates opposing traffic flows and provides pedestrian crossing refuge.

The south-eastern arm approach consists of one mandatory cycle lane, one left-turn flare that replaces the nearside combined bus and cycle lane of approximately 35m in advance of the junction, two straight-ahead lanes, and one right-turn lane. The cycle lane continues straight ahead across the junction. The south-eastern arm exit consists of two traffic lanes. A combined bus and cycle lane starts approximately 20m after the exit. There is a raised median which separates opposing traffic flows.

The south-western arm approach consists of one traffic lane which facilitates all movements. The south-western arm exit consists of one traffic lane.

The characteristics of this junction are shown below.

Image 5.17: R138 Stillorgan Road / Nutley Lane Four-arm Signalised Junction Arrangement (Source: OSI)

5.3.3.3.0 R138 Stillorgan Road (Nutley Lane to UCD Belfield)

This section of the R138 Stillorgan Road is a dual carriageway which is subject to a speed limit of 60km/h. It has a typical carriageway width of 26.0m and has a north-west to south-east straight alignment for 600m, from the R138 Stillorgan Road / Nutley Lane Junction to the Belfield Interchange.

In the northbound direction, for most of its length, the carriageway has three traffic lanes, one combined bus and cycle lane, and one mandatory cycle lane. In the southbound direction, for most of its length, the carriageway has two traffic lanes, one combined bus and cycle lane, and one mandatory cycle lane. The R138 Stillorgan Road main carriageway passes under a road bridge at the R138 Stillorgan Road / Belfield Interchange. Between the on-slips and off-slips at the UCD Belfield Interchange the southbound carriageway consists of two traffic lanes and one combined bus and cycle lane; the northbound carriageway consists of three traffic lanes and no dedicated bus lane. In the southbound and northbound directions, pedestrian routes and cycle tracks divert via the off-slips and on-slips. All on-slips and off-slips consist of one nearside bus lane and one traffic lane. Bus lanes in this section are in operation between 07.00 and 19.00 from Monday to Saturday.

The existing major junction arrangements along R138 Stillorgan Road from Nutley Lane to UCD Belfield are as follows:

- Belfield Interchange, Southbound Side Junction; and
- Belfield Interchange, Northbound Side Junction.

Belfield Interchange, Southbound Side three-arm signalised junction: The Belfield Interchange, Southbound Side Junction is a three-arm signalised junction with signalised pedestrian crossings on all arms (pelicans on north-western and south-western arms, toucan on south-eastern arm).

The north-western arm is entry only. The nearside approach consists of one straight-ahead lane and a right-turn lane. The nearside bus lane is briefly discontinued approximately 160m in advance of the junction.

The south-eastern arm is exit only. Its exit consists of two traffic lanes. A nearside bus lane starts approximately 65m after the exit.

The south-western arm approach consists of one mandatory cycle lane and two right-turn lanes. Vehicles on this approach are not permitted to turn left. The south-western arm exit consists of one mandatory cycle lane and two traffic lanes. This arm is the traffic bridge over the R138 Stillorgan Road and contains a raised median strip which separates opposing traffic flows.

The characteristics of this junction are shown below.

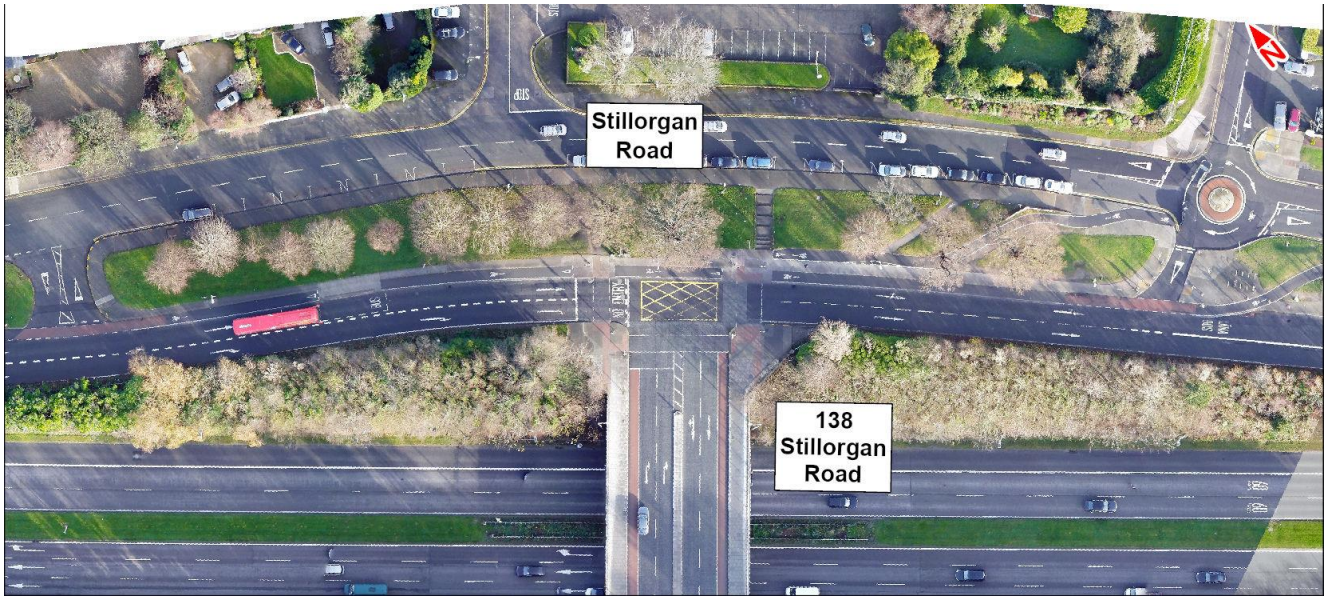

Image 5.18: Belfield Interchange, Southbound Side Three-arm Signalised Junction

Belfield Interchange, Northbound Side four-arm signalised junction: The Belfield Interchange, Northbound Side Junction is a four-arm signalised junction with signalised pedestrian crossings (pelicans) on the north-western, south-eastern and south-western arms.

The north-western arm is exit only; and consists of one advisory cycle lane and one traffic lane. A combined bus and cycle lane starts approximately 15m after the exit.

The north-eastern arm approach consists of one mandatory cycle lane, one straight-ahead lane, and one straight-ahead and right-turn lane. Vehicles on this approach are not permitted to turn left. The north-eastern arm exit consists of one mandatory cycle lane and two traffic lanes. This arm is the traffic bridge over the R138 Stillorgan Road and contains a raised median strip which separates opposing traffic flows.

The south-eastern arm is entry only. Its approach consists of one mandatory cycle lane, one left-turn lane which replaces the nearside combined bus and cycle lane approximately 35m in advance of the junction, and one straight-ahead and right-turn lane. The cycle lane continues straight ahead across the junction.

The south-western arm approach consists of one straight-ahead and left-turn lane. Vehicles on this approach are not permitted to turn right. The south-western arm exit consists of two traffic lanes. A traffic island on this arm separates opposing traffic flows. An additional left-turn slip lane for traffic from UCD (south-western arm) going to the dual-carriageway northbound on-ramp (north-western arm) is located approximately 70m to the north-west of the junction.

The characteristics of this junction are shown below.

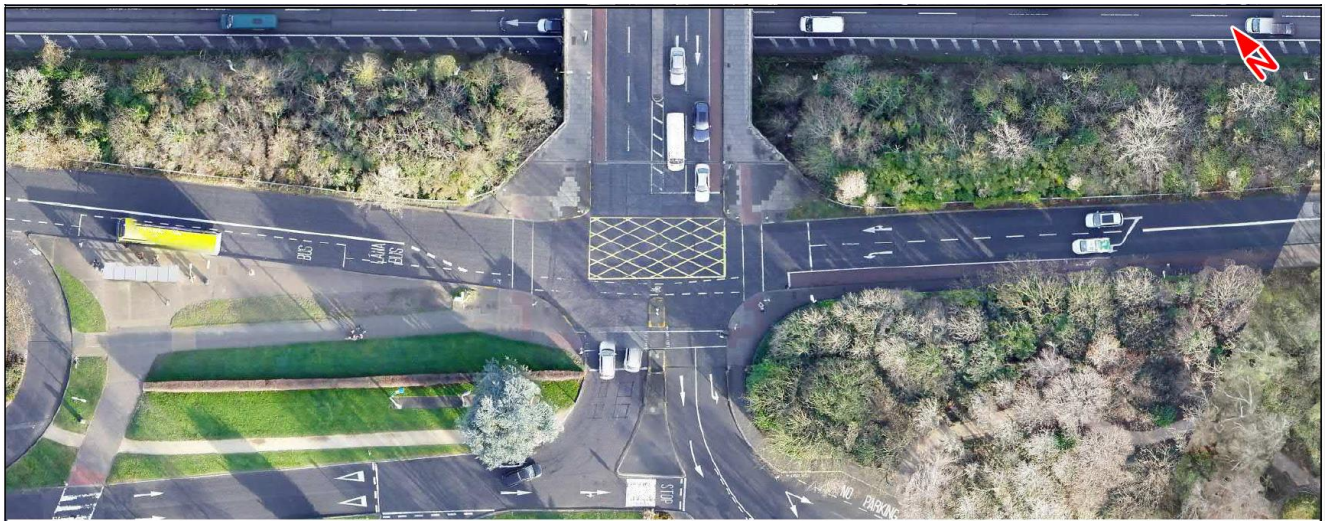

Image 5.19: Belfield Interchange, Northbound Side Four-arm Signalised Junction Arrangement

5.3.3.3.1 R138 Stillorgan Road and N11 Stillorgan Road (Belfield Interchange to R825 Lower Kilmacud Road)

This section of the R138 Stillorgan Road and N11 Stillorgan Road is a dual carriageway which is subject to a speed limit of 60km/h. It has a typical carriageway width of 26.0m and has a north-west to south-east alignment for 2.7km from the Belfield Interchange to the N11 Stillorgan Road / R825 Lower Kilmacud Road Junction.

For most of its length the carriageway has two traffic lanes and one combined bus and cycle lane in each direction. Bus lanes along this section are in operation between 07.00 and 19.00 from Monday to Saturday.

The existing major junction arrangements along R138 Stillorgan Road and N11 Stillorgan Road from the Belfield Interchange to the N11 Stillorgan Road / R825 Lower Kilmacud Road Junction are as follows:

- R138 Stillorgan Road / R112 Fosters Avenue Junction;
- R138 Stillorgan Road / Merrion Grove / The Rise Junction;
- R138 Stillorgan Road / Booterstown Avenue Junction;
- N11 Stillorgan Road / N31 Mount Merrion Avenue Junction;
- N11 Stillorgan Road / Trees Road Lower Junction;
- N11 Stillorgan Road / Priory Drive / Old Dublin Road Junction; and
- N11 Stillorgan Road / R825 Lower Kilmacud Road Junction.

R138 Stillorgan Road / R112 Fosters Avenue three-arm signalised junction: The R138 Stillorgan Road / R112 Fosters Avenue Junction is a three-arm signalised junction with a signalised pedestrian crossing (pelican) on the south-western arm.

The north-western arm approach consists of one combined bus and cycle lane, two straight-ahead traffic lanes, and a right-turn lane. The north-western arm exit consists of one combined bus and cycle lane, and two traffic lanes. There is a raised median which separates opposing traffic flows.

The south-eastern arm approach consists of a left-turn lane which replaces the nearside combined bus and cycle lane approximately 75m in advance of the junction, and two straight-ahead lanes. The south-eastern arm exit consists of one combined bus and cycle lane, and two traffic lanes. A right-turn flare for the junction to the south begins approximately 30m from the junction. This arm contains a raised median which separates opposing traffic flows.

The south-western arm approach consists of a left-turn slip and two right-turn lanes. The south-western arm exit consists of one traffic lane. This arm contains a traffic island which separates the left-turn slip from the other lanes.

The characteristics of this junction are shown below.

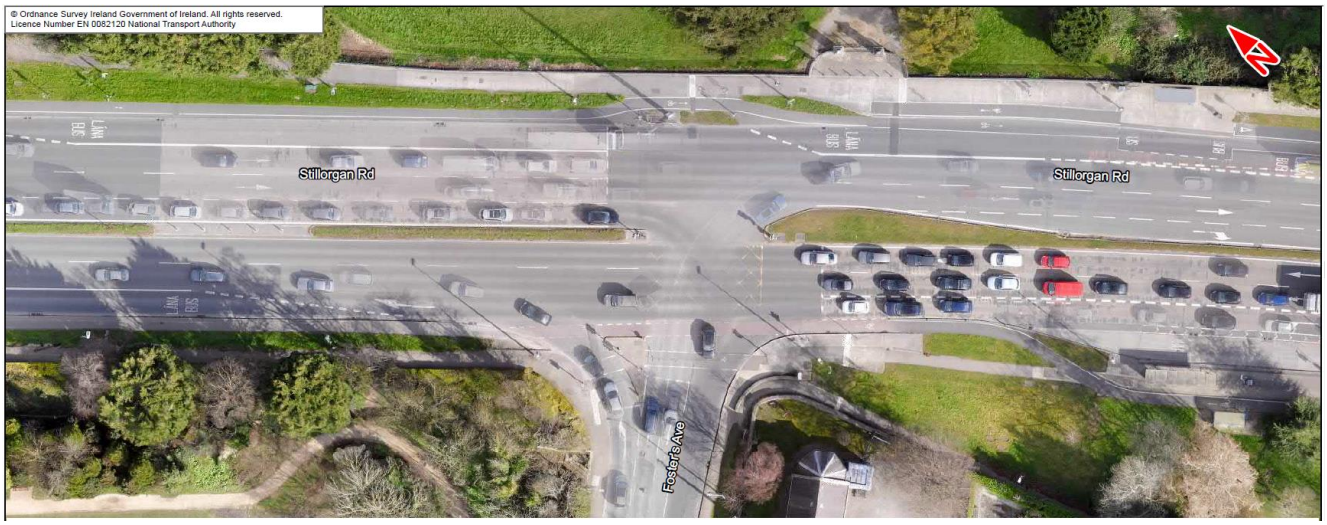

Image 5.20: R138 Stillorgan Road / R112 Fosters Avenue Three-arm Signalised Junction

R138 Stillorgan Road / Merrion Grove / The Rise four-arm signalised junction: The R138 Stillorgan Road / Merrion Grove / The Rise Junction is a four-arm signalised junction with signalised pedestrian crossings on the north-eastern arm and south-western arms, and a pedestrian bridge across the south-eastern arm.

The north-western arm approach consists of one left-turn slip, one mandatory cycle lane, one combined bus and cycle lane, two straight-ahead traffic lanes, and one right-turn flare of approximately 110m length. The north-western arm exit consists of two traffic lanes and a combined bus and cycle lane. There is a landscaped medium which separates opposing traffic flows.

The north-eastern arm approach consists of an advisory cycle lane and one traffic lane which facilitates all movements. There is an advance stop line for cyclists on the north-eastern arm approach. The north-eastern arm exit consists of one traffic lane. A kerbed traffic island which facilitates pedestrians separates the approach and exit lanes on this arm.

The south-eastern arm approach consists of one nearside combined bus and cycle lane which also permits left-turn traffic, two straight-ahead lanes, and one right-turn flare of approximately 85m length. The south-eastern arm exit consists of a mandatory cycle lane and three general traffic lanes. A combined bus and cycle lane replaces the nearside traffic lane approximately 55m after the exit. There is a landscaped medium which separates opposing traffic flows.

The south-western arm approach consists of one left-turn slip lane, one mandatory cycle lane which starts approximately 10m in advance of the junction, and one straight-ahead and right-turn lane. There is an advance stop line for cyclists on the south-western arm approach. The south-western arm exit consists of one general traffic lane measuring approximately 4.0m in width.

The characteristics of this junction are shown below.

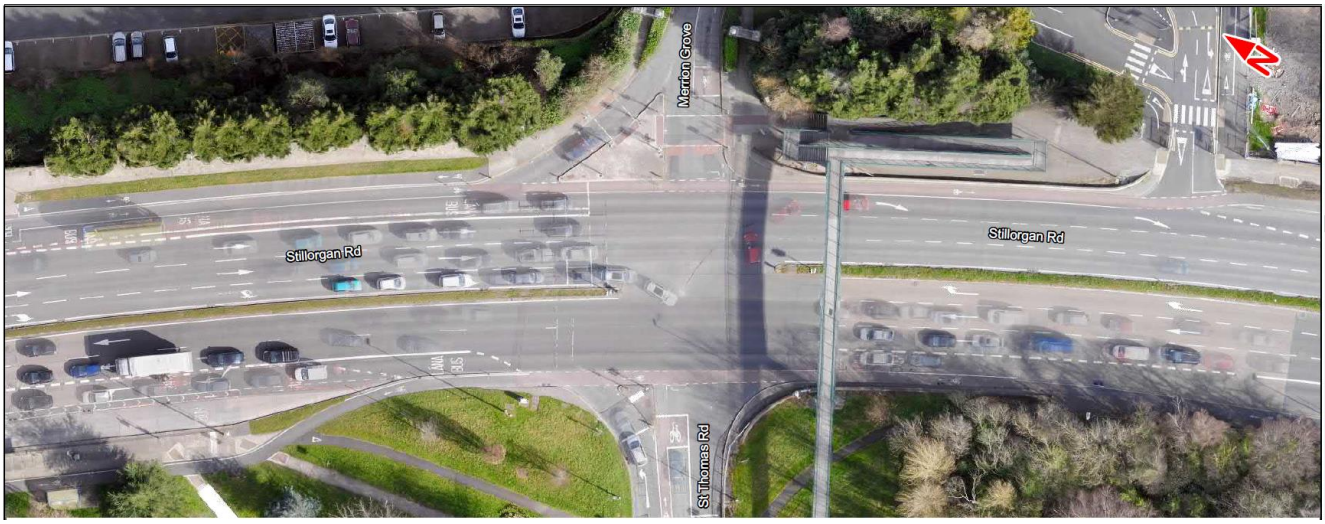

Image 5.21: R138 Stillorgan Road / Merrion Grove / The Rise Four-arm Signalised Junction

R138 Stillorgan Road / Booterstown Avenue three-arm signalised junction: The R138 Stillorgan Road / Booterstown Avenue Junction is a three-arm signalised junction with signalised pedestrian crossings (pelicans) on northern and eastern arms.

The northern arm approach consists of one left-turn slip, one advisory cycle lane, one combined bus and cycle lane, two straight-ahead traffic lanes, and a U-turn flare of approximately 30m length. The cycle lane continues straight ahead across the junction and leads to a cycle track on the southern arm exit. The northern arm exit consists of two traffic lanes with a total width of approximately 10.5m. A combined bus and cycle lane starts approximately 20m after the exit. This arm contains a traffic island and a raised median which separate opposing traffic flows.

The eastern arm approach consists of one left-turn slip and two right-turn lanes which split from a single lane approximately 25m in advance of the junction. The eastern arm exit consists of one traffic lane.

The southern arm approach consists of one combined bus and cycle lane, two straight-ahead lanes, and one right-turn flare of approximately 55m length. The southern arm exit consists of two traffic lanes. A combined bus and cycle lane starts approximately 25m after the exit. This arm contains a raised median which separates opposing traffic flows.

The characteristics of this junction are shown below.

Image 5.22: R138 Stillorgan Road / Booterstown Avenue Three-arm Signalised Junction

N11 Stillorgan Road / N31 Mount Merrion Avenue three-arm signalised junction: The N11 Stillorgan Road / N31 Mount Merrion Avenue Junction is a three-arm signalised junction with signalised pedestrian crossings (pelicans) on northern and eastern arms.

The northern arm approach consists of one left-turn slip lane approximately 40m length, one mandatory cycle lane, one combined bus and cycle lane, two straight-ahead traffic lanes, and a U-turn flare of approximately 20m length. The cycle lane continues straight ahead across the junction and leads to a cycle track on the southern arm exit. The northern arm exit consists of one combined bus and cycle lane, and two traffic lanes. This arm contains a traffic island and a raised median which separate opposing traffic flows.

The eastern arm approach consists of a left-turn and right-turn lane, and a right-turn only lane. The eastern arm exit consists of one traffic lane.

The southern arm approach consists of one bus lane, two straight-ahead lanes, and one right-turn flare of approximately 80m length. The southern arm exit consists of two traffic lanes. A combined bus and cycle lane which commences approximately 15m after the exit. This arm contains a raised median which separates opposing traffic flows.

The characteristics of this junction are shown below.

Image 5.23: N11 Stillorgan Road / N31 Mount Merrion Avenue Road Three-arm Signalised Junction

N11 Stillorgan Road / Trees Road Lower four-arm signalised junction: The N11 Stillorgan Road / Trees Road Lower Junction is a four-arm signalised junction with signalised pedestrian crossings on the north-eastern and south-western arms.

The north-western arm approach consists of one mandatory cycle lane, one left-turn lane which replaces the nearside combined bus and cycle lane approximately 45m in advance of the junction, two straight-ahead traffic lanes, and a right-turn flare of approximately 90m length. The cycle lane continues straight ahead across the junction. The north-western arm exit consists of two traffic lanes with a total width of approximately 9.0m. A combined bus and cycle lane starts approximately 15m after the exit. This arm contains a raised median which separates opposing traffic flows.

The north-eastern arm approach consists of one lane which facilitates all movements. The north-eastern arm exit consists of one traffic lane. This arm contains a traffic island which separates opposing traffic flows.

The south-eastern arm approach consists of one left-turn slip, one advisory cycle lane, one combined bus and cycle lane, two straight-ahead lanes, and one right-turn flare of approximately 30m length. An advisory cycle lane commences at the stop lane and continues straight ahead, across the junction and leads to a cycle track on the north-western arm exit. The south-eastern arm exit consists of one advisory cycle lane, one combined bus and cycle lane, and two traffic lanes. This arm contains a raised median which separates opposing traffic flows.

The south-western arm approach consists of a left-turn slip and a straight-ahead and right-turn lane. The south-western arm exit consists of one traffic lane. This arm contains a traffic island which separates opposing traffic flows.

The characteristics of this junction are shown below.

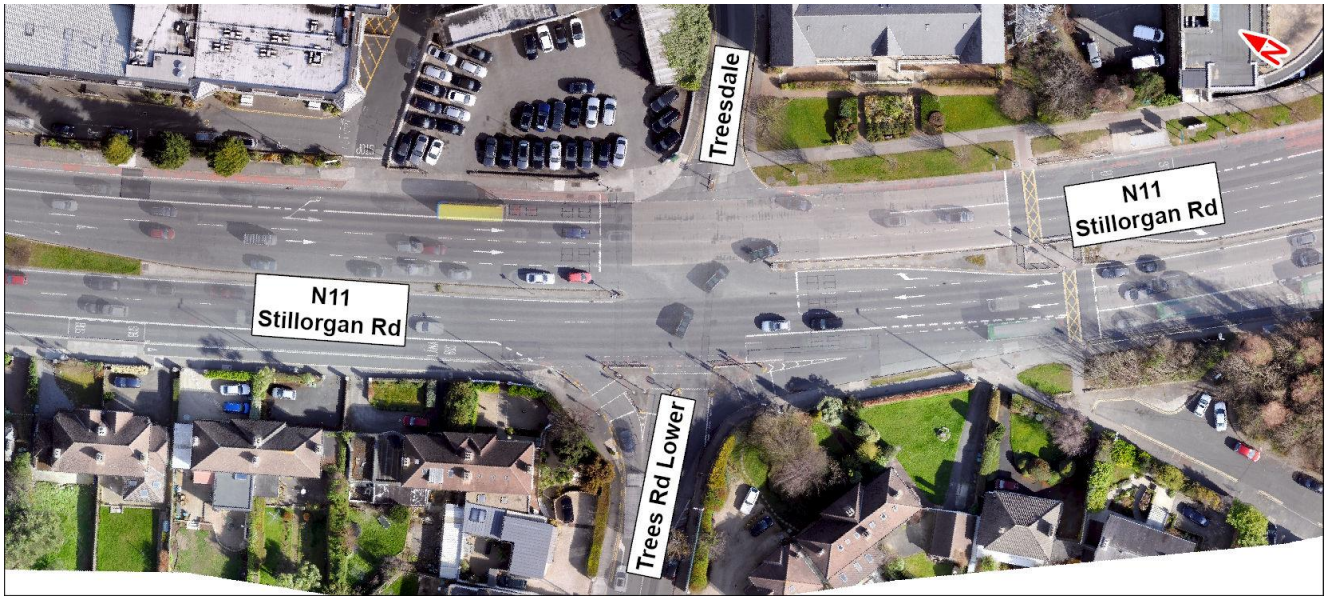

Image 5.24: N11 Stillorgan Road / Trees Road Lower Four-arm Signalised Junction

N11 Stillorgan Road / Priory Drive / Old Dublin Road four-arm signalised junction: The N11 Stillorgan Road / Priory Drive / Old Dublin Road Junction is a four-arm signalised junction with signalised pedestrian crossings (toucans) on the north-eastern arm.

The north-western arm approach consists of one left-turn slip, one advisory cycle lane, one combined bus and cycle lane, two straight-ahead traffic lanes, and a right-turn flare of approximately 50m length. The cycle lane continues straight ahead across the junction and leads to a pedestrian and cyclist shared facility at the south-eastern arm exit. This arm contains a raised median which separates opposing traffic flows.

The north-eastern arm approach consists of a straight-ahead and left-turn lane, and a right-turn lane. The north-eastern arm exit consists of one traffic lane. This arm contains a traffic island which separates opposing traffic flows.

The south-eastern arm approach consists of one left-turn slip, one advisory cycle lane, one combined bus and cycle lane, two straight-ahead lanes, and one right-turn flare of approximately 95m length. The cycle lane continues straight ahead across the junction. The south-eastern arm exit consists of two traffic lanes with a total width of approximately 11.0m. A combined bus and cycle lane starts approximately 15m after the exit. This arm contains a raised median which separates opposing traffic flows.

The south-western arm approach consists of a left-turn slip with two lanes, and a straight-ahead and right-turn lane. The south-western arm exit consists of one traffic lane. This arm contains a traffic island which separates opposing traffic flows.

The characteristics of this junction are shown below.

Image 5.25: N11 Stillorgan Road / Priory Drive / Old Dublin Road Four-arm Signalised Junction

N11 Stillorgan Road / R825 Lower Kilmacud Road four-arm signalised junction: The N11 Stillorgan Road / R825 Lower Kilmacud Road Junction is a four-arm signalised junction with signalised pedestrian crossings on all arms (staggered on north-western and south-eastern arms, pelicans on north-eastern arm, toucans on south-western arm).

The north-western arm approach consists of one left-turn slip, one advisory cycle lane, one combined bus and cycle lane, two straight-ahead traffic lanes, and a right-turn flare of approximately 100m length. The cycle lane continues straight ahead across the junction and leads to a cycle track on the south-eastern arm exit. The north-western arm exit consists of one combined bus and cycle lane, and two traffic lanes. This arm contains a traffic island and a raised median which separate opposing traffic flows.

The north-eastern arm approach consists of one left-turn slip, one straight-ahead lane, and one straight-ahead and right-turn lane. The north-eastern arm exit consists of one traffic lane. This arm contains a traffic island which separates opposing traffic flows.

The south-eastern arm approach consists of one left-turn slip, one combined bus and cycle lane, two straight-ahead lanes, and one right-turn flare of approximately 90m length. The south-eastern arm exit consists of two traffic lanes with a total width of approximately 11.0m. A combined bus and cycle lane starts approximately 50m after the exit. This arm contains a traffic island and a raised median which separate opposing traffic flows.

The south-western arm approach consists of one left-turn slip, one straight-ahead and right-turn lane, and one right-turn lane. The south-western arm exit consists of two traffic lanes. This arm contains a traffic island which separates opposing traffic flows.

The characteristics of this junction are shown below.

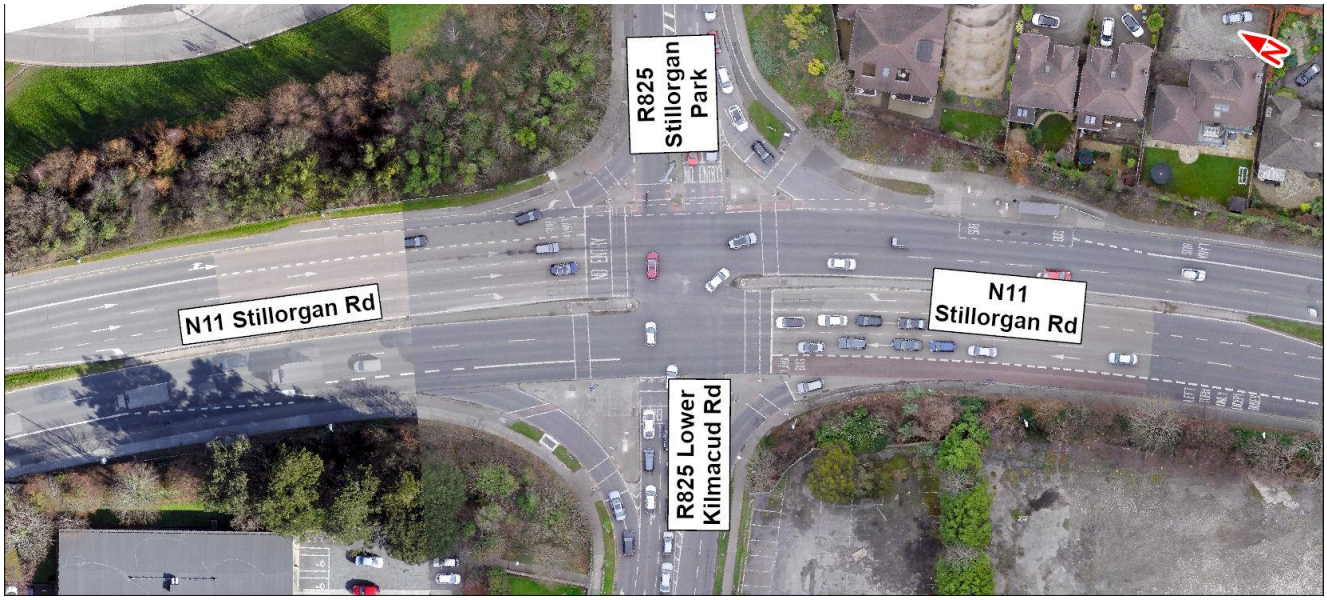

Image 5.26: N11 Stillorgan Road / R825 Lower Kilmacud Road Four-arm Junction

5.3.3.3.2 N11 Stillorgan Road and N11 Bray Road (Lower Kilmacud Road to Loughlinstown Roundabout)

This section of the N11 Stillorgan Road and N11 Bray Road is a dual carriageway. It is subject to a speed limit of 60km/h along the section north of the N11 Stillorgan Road / R830 Kill Lane Junction and 80km/h for general traffic and 60km/h for vehicles in the bus lane along the section south of the N11 Stillorgan Road / R830 Kill Lane Junction. The road has a typical carriageway width of 30.0m and has a north-west to south-east alignment for 7.2km from the N11 Stillorgan Road / R825 Lower Kilmacud Road Junction to Loughlinstown Roundabout.

For most of its length the carriageway has two traffic lanes and one bus lane in each direction. To the north of the N11 Stillorgan Road / Westminster Road Junction bus lanes are in operation between 07.00 and 19.00 from Monday to Saturday. Bus lanes between the N11 Stillorgan Road / Westminster Road Junction and Loughlinstown Roundabout are in operation 24 hours Monday to Sunday.

The existing major junction arrangements along the N11 Stillorgan Road from the N11 Stillorgan Road / R825 Lower Kilmacud Road Junction to Loughlinstown Roundabout are as follows:

- N11 Stillorgan Road / N31 Brewery Road Junction;
- N11 Stillorgan Road / R113 Leopardstown Road Junction;
- N11 Stillorgan Road / Springfield Park Junction;
- N11 Stillorgan Road / R830 Kill Lane Junction;
- N11 Stillorgan Road / Westminster Road Junction;
- N11 Bray Road / R842 Old Bray Road Junction;
- N11 Bray Road / R827 Clonkeen Road Junction;
- N11 Bray Road / Johnstown Road Junction;
- N11 Bray Road / Druids Glen Road;
- N11 Bray Road Southbound / Wyattville Link Road Interchange;
- N11 Bray Road / Wyattville Link Road on / off-slip (Northbound); and
- Loughlinstown Roundabout.

N11 Stillorgan Road / N31 Brewery Road four-arm signalised junction: The N11 Stillorgan Road / N31 Brewery Road Junction is a four-arm signalised junction with signalised pedestrian crossings (toucans) on the north-eastern, south-eastern, and south-western arms.

The north-western arm approach consists of one left-turn slip, one advisory cycle lane, one combined bus and cycle lane, two straight-ahead traffic lanes, and one right-turn flare of approximately 140m length. The cycle lane continues straight ahead across the junction. The north-western arm exit consists of one advisory cycle lane, and two traffic lanes with a total width of approximately 9.0m. A combined bus and cycle lane starts approximately 20m after the exit. This arm contains a raised median which separates opposing traffic flows.

The north-eastern arm approach consists of one lane which facilitates all movements, and a right-turn lane. The north-eastern arm exit consists of one traffic lane. This arm contains a traffic island which separates opposing traffic flows.

The south-eastern arm approach consists of one left-turn slip, one advisory cycle lane, one combined bus and cycle lane, two straight-ahead lanes, and one right-turn flare of approximately 110m. The cycle lane continues straight ahead across the junction. The south-eastern arm exit consists of one advisory cycle lane, and two traffic lanes with a total width of approximately 10.0m. A combined bus and cycle lane starts approximately 30m after the exit. This arm contains a traffic island which separates opposing traffic flows.

The south-western arm approach consists of one left-turn slip, one advisory cycle lane, one straight-ahead and right-turn lane, and one right-turn lane. The south-western arm exit consists of one traffic lane measuring approximately 5.2m wide. This arm contains a traffic island which separates opposing traffic flows.

The characteristics of this junction are shown below.

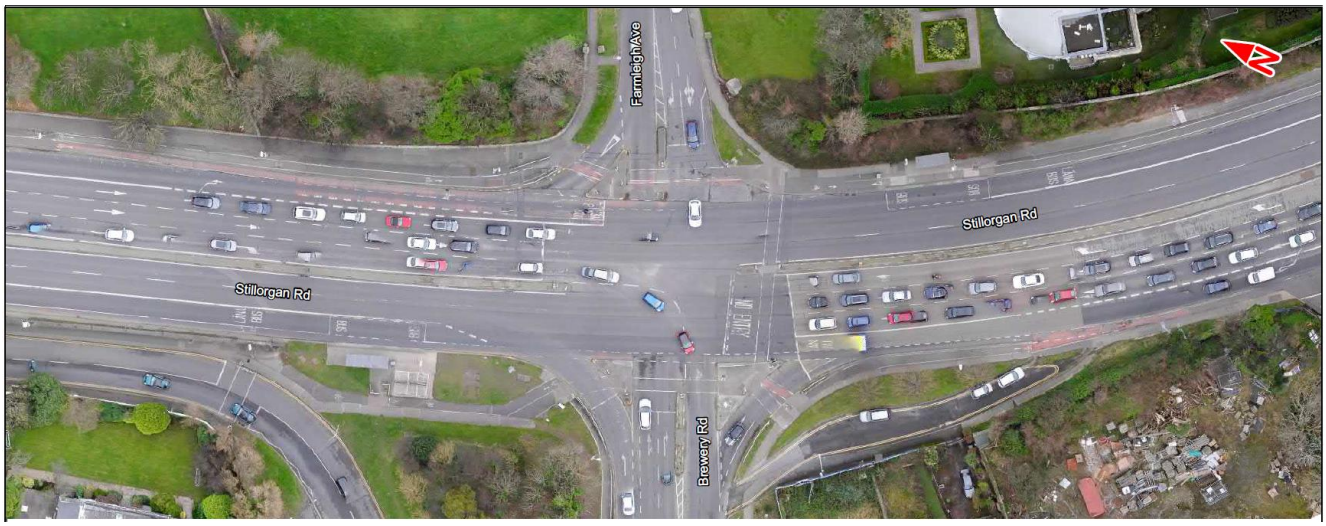

Image 5.27: N11 Stillorgan Road / N31 Brewery Road Four-arm Signalised Junction

N11 Stillorgan Road / R113 Leopardstown Road four-arm signalised junction: The N11 Stillorgan Road / R113 Leopardstown Road Junction is a four-arm signalised junction with signalised pedestrian crossings on the north-western, north-eastern and south-western arms (toucans, staggered on north-western arm).

The north-western arm approach consists of one left-turn slip and flare of approximately 70m length, one advisory cycle lane, one combined bus and cycle lane, two straight-ahead traffic lanes, and a right-turn flare of approximately 85m length. The north-western arm exit consists of one advisory cycle lane, and three traffic lanes. The nearside traffic lane becomes a combined bus and cycle lane approximately 60m after the exit. This arm contains a traffic island which separates opposing traffic flows.

The north-eastern arm approach consists of a left-turn slip with one traffic lane and one advisory cycle lane alongside it, one ahead advisory cycle lane, one straight-ahead lane, and one right-turn lane. The north-eastern arm exit consists of one traffic lane. This arm contains a traffic island which separates opposing traffic flows.

The south-eastern arm approach consists of one left-turn slip, one advisory cycle lane, one combined bus and cycle lane which also permits left-turning general traffic, two straight-ahead lanes, and one right-turn flare of approximately 80m. The south-eastern arm exit consists of two traffic lanes with a total width of approximately

10.0m. A combined bus and cycle lane starts approximately 20m after the exit. This arm contains a raised median which separates opposing traffic flows.

The south-western arm approach consists of one left-turn flare of approximately 50m length, one straight-ahead lane, and two right-turn lanes. The south-western arm exit consists of one traffic lane. This arm contains a traffic island which separates opposing traffic flows.

The characteristics of this junction are shown below.

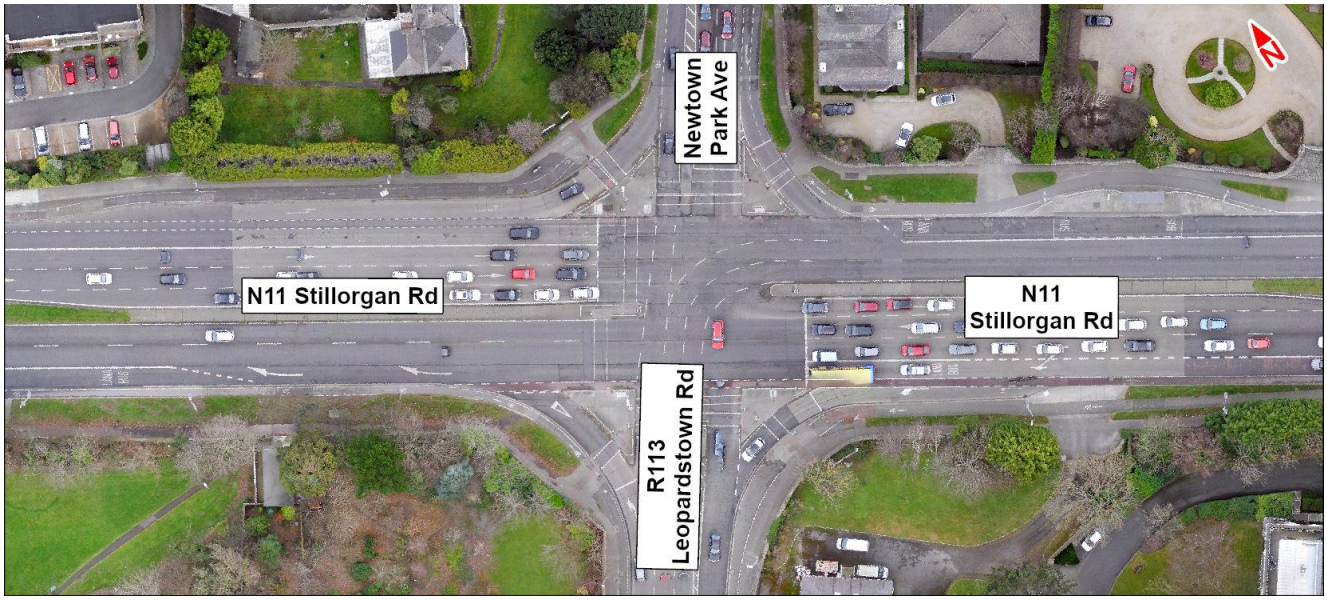

Image 5.28: N11 Stillorgan Road / R113 Leopardstown Road four-arm Signalised Junction

N11 Stillorgan Road / Springfield Park three-arm signalised junction: The N11 Stillorgan Road / Springfield Park Junction is a three-arm signalised junction with a signalised pedestrian crossing (pelican) on the south-western arm.

The north-western arm approach consists of one combined bus and cycle lane, two straight-ahead traffic lanes, and a right-turn flare of approximately 80m length. The north-western arm exit consists of one combined bus and cycle lane, and two traffic lanes. This arm contains a raised median which separates opposing traffic flows.

The south-eastern arm approach consists of a left-turn lane which replaces the nearside combined bus and cycle lane approximately 35m in advance of the junction, two straight-ahead lanes, and a U-turn flare of approximately 25m length. The south-eastern arm exit consists of one combined bus and cycle lane, and two traffic lanes. This arm contains a raised median which separates opposing traffic flows.

The south-western arm approach consists of a left-turn lane and a right-turn lane. The south-western arm exit consists of one traffic lane. This arm contains a traffic island which separates opposing traffic flows.

The characteristics of this junction are shown below.

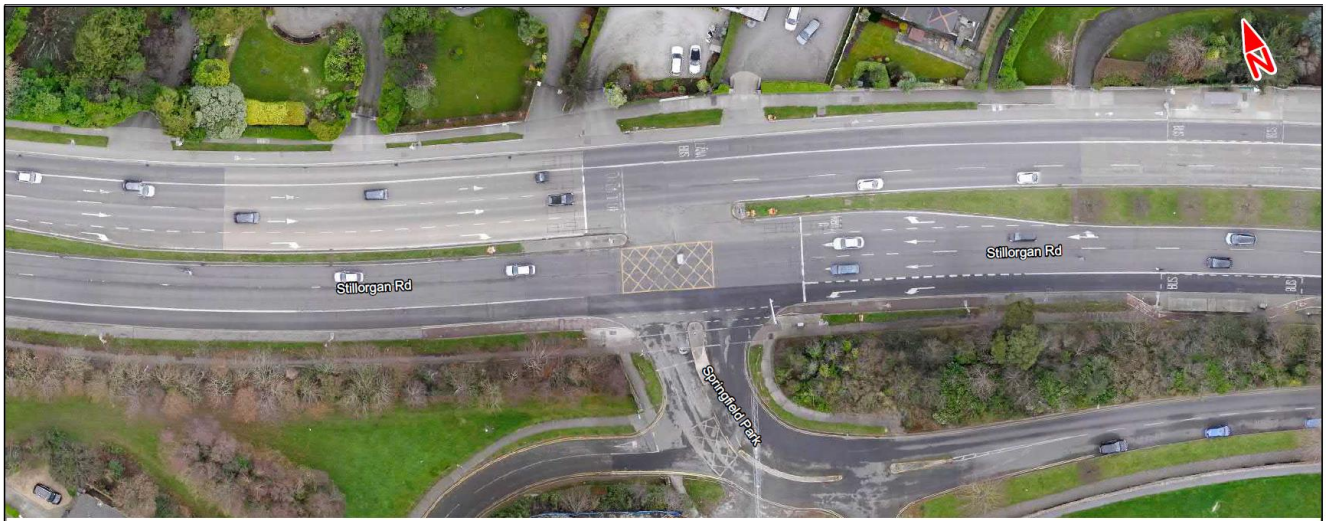

Image 5.29: N11 Stillorgan Road / Springfield Park Three-arm Signalised Junction

N11 Stillorgan Road / R830 Kill Lane three-arm signalised junction: The N11 Stillorgan Road / R830 Kill Lane Junction is a three-arm signalised junction with signalised pedestrian crossings (pelicans) on the north-eastern and south-eastern arms, and a pedestrian bridge on the north-western arm.

The north-western arm approach consists of one left-turn slip, one advisory cycle lane which transitions from a cycle track approximately 30m in advance of the junction, one combined bus and cycle lane which also permits general traffic accessing the left-turn slip, two straight-ahead traffic lanes, and a U-turn flare of approximately 10m. The cycle lane continues straight ahead across the junction and leads to the cycle track on the south-eastern arm exit. The north-western arm exit consists of one bus lane, and two traffic lanes. This arm contains a raised median which separates opposing traffic flows.

The north-eastern arm approach consists of a left-turn slip with one advisory cycle lane and one traffic lane, one advisory cycle lane (for right-turning cyclists) approximately 45m length, and two right-turn lanes. The north-eastern arm exit consists of one traffic lane. This arm contains a traffic island which separates opposing traffic flows.

The south-eastern arm approach consists of one bus lane, two straight-ahead lanes, and one right-turn flare of approximately 65m. The north-western arm exit consists of one combined bus and cycle lane, and two traffic lanes. This arm contains a traffic island which separates opposing traffic flows.

The characteristics of this junction are shown below.

Image 5.30: N11 Stillorgan Road / R830 Kill Lane Three-arm Signalised Junction

N11 Stillorgan Road / Westminster Road three-arm signalised junction: The N11 Stillorgan Road / Westminster Road Junction is a three-arm signalised junction with signalised pedestrian crossings (pelicans) on the north-western and south-western arms.

The north-western arm approach consists of a bus lane, two straight-ahead traffic lanes, and a right-turn flare of approximately 55m length. The north-western arm exit consists of one bus lane, and two traffic lanes. This arm contains a traffic island which separates opposing traffic flows.

The south-eastern arm approach consists of a mandatory cycle lane which transitions to a cycle track approximately on the north-western exit arm, , a left-turn lane which replaces the nearside bus lane approximately 40m in advance of the junction, two straight-ahead lanes, and a U-turn flare of approximately 30m length. The south-eastern arm exit consists of one bus lane, and two traffic lanes. This arm contains a raised median which separates opposing traffic flows.

The south-western arm approach consists of a left-turn lane and a right-turn lane. The south-western arm exit consists of one traffic lane. This arm contains a traffic island which separates opposing traffic flows.

The characteristics of this junction are shown below.

Image 5.31: N11 Stillorgan Road / Westminster Road Three-arm Signalised Junction

N11 Bray Road / R842 Old Bray Road four-arm signalised junction: The N11 Bray Road / R842 Old Bray Road Junction is a four-arm signalised junction with signalised pedestrian crossings (pelicans) on the south-eastern and south-western arms.

The north-western arm approach consists of one advisory cycle lane, one left-turn flare which replaces the nearside bus lane approximately 65m in advance of the junction, two straight-ahead traffic lanes, and a right-turn flare of approximately 85m length. The cycle lane continues straight ahead across the junction. The north-western arm exit consists of one advisory cycle lane, one bus lane, and two traffic lanes. This arm contains a raised median which separates opposing traffic flows.

The north-eastern arm consists of a single lane approximately 5.5m wide, for approaching and exit vehicles.

The south-eastern arm approach consists of one left-turn slip with an advisory cycle lane and a traffic lane, one straight-ahead cycle lane, one bus lane which permits left-turning traffic to the slip lane and two straight-ahead lanes. The cycle lane continues straight ahead across the junction. The south-eastern arm exit consists of one advisory cycle lane, one bus lane, and two traffic lanes. This arm contains a traffic island which separates opposing traffic flows.

The south-western arm approach consists of one left-turn slip with two traffic lanes, and one right-turn lane. There is an advance stop line for cyclists at this approach. The south-western arm exit consists of one advisory cycle lane and one traffic lane. This arm contains a traffic island which separates opposing traffic flows.

The characteristics of this junction are shown below.

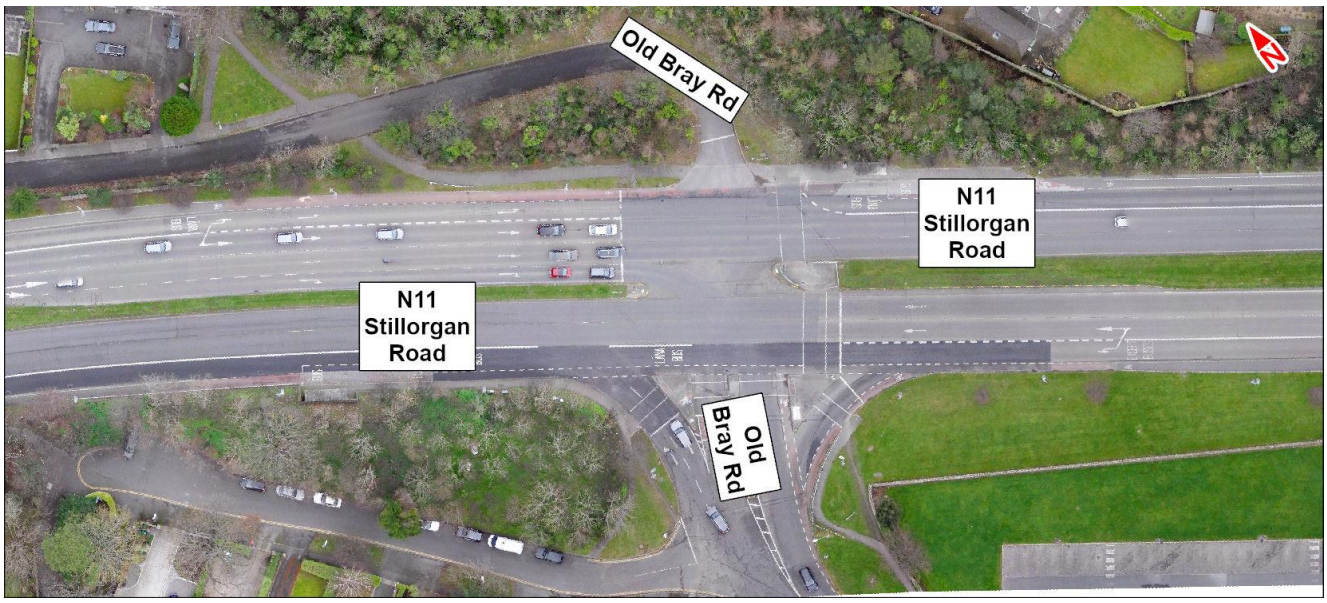

Image 5.32: N11 Bray Road / R842 Old Bray Road Four-arm Signalised Junction

N11 Bray Road / R827 Clonkeen Road four-arm signalised junction: The N11 Bray Road / R827 Clonkeen Road Junction is a four-arm signalised junction with signalised pedestrian crossings on the south-western arm. There is a pedestrian bridge on the north-western arm, located approximately 70m away from the junction.

The north-western arm approach consists of one left-turn slip with a mandatory cycle lane and a traffic lane, one bus lane which permits left-turning traffic to the slip lane, two straight-ahead traffic lanes, and a right-turn flare of approximately 55m length. An advisory cycle lane continues straight ahead across the junction. The north-western arm exit consists of one bus lane, and two traffic lanes. This arm contains a raised median which separates opposing traffic flows, and a traffic island which separates the offside right-turn lane from the adjacent straight-ahead lane on the approach.

The north-eastern arm approach consists of one advisory cycle lane, one left-turn lane, and one straight-ahead and right-turn lane. The cycle lane turns left and joins the advisory cycle lane on the south-eastern arm exit. There

is an advance stop line for cyclists on this approach. The north-eastern arm exit consists of one mandatory cycle lane and one traffic lane. This arm contains a raised median which separates opposing traffic flows.

The south-eastern arm approach consists of one left-turn slip, one advisory cycle lane, one bus lane which permits left-turning traffic to the slip lane, two straight-ahead lanes, and one right-turn flare of approximately 60m length. The cycle lane continues straight ahead across the junction to a cycle track on the north-western exit arm. The south-eastern arm exit consists of one advisory cycle lane, one bus lane, and two traffic lanes. This arm contains a raised median which separates opposing traffic flows, and traffic islands which separate the offside right-turn and the bus lane from the straight-ahead lanes on the approach.

The south-western arm approach consists of one advisory cycle which starts approximately 20m in advance of the junction, one traffic lane that facilitates movements in all directions, and a right-turn traffic lane. There is an advance stop line for cyclists on this approach. The south-western arm consists of one traffic lane. This arm contains a traffic island which separates opposing traffic flows.

The characteristics of this junction are shown below.

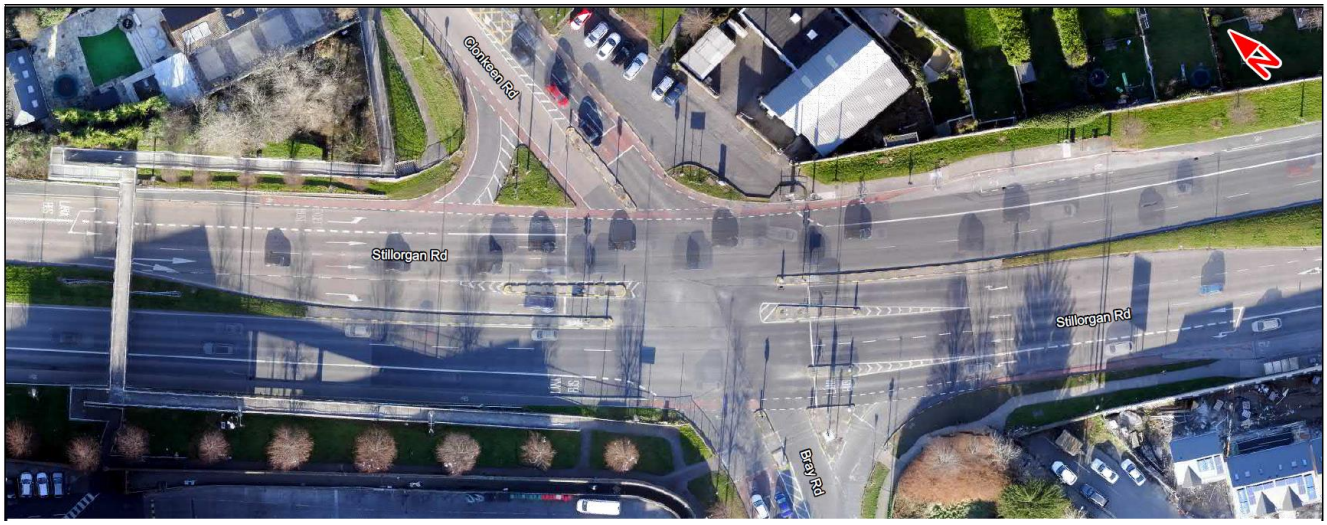

Image 5.33: N11 Bray Road / R827 Clonkeen Road Four-Arm Signalised Junction

N11 Bray Road / Johnstown Road four-arm signalised junction: The N11 Bray Road / Johnstown Road Junction is a four-arm signalised junction with signalised pedestrian crossings on the north-western, north-eastern and south-western arms, and a pedestrian and cyclist bridge on the south-eastern arm. There are box turns on all arms for right-turning cyclists.

The north-western arm approach consists of one left-turn slip, one advisory cycle lane, one bus lane which permits left-turning traffic to the slip lane and two straight-ahead traffic lanes. The cycle lane continues straight ahead across the junction to a cycle track on the south-eastern arm exit. Vehicles on this approach are not permitted to turn right. The north-western arm exit consists of one cycle lane which leads to a cycle track, one bus lane, and two traffic lanes. This arm contains a traffic island which separates opposing traffic flows.

The north-eastern arm approach consists of a left-turn flare of approximately 45m length, one advisory cycle lane, one straight-ahead and right-turn lane, and a right-turn flare of approximately 100m length. The cycle lane continues straight ahead across the junction. There is an advance stop line for cyclists in the middle (straight-ahead and right-turn) traffic lane which does not extend to the offside (right-turn) traffic lane. The north-eastern arm exit consists of one advisory cycle lane and one traffic lane. This arm contains a traffic island which separates opposing traffic flows.

The south-eastern arm approach consists of one left-turn slip, one bus lane which also permits left-turning traffic to the slip lane, two straight-ahead lanes, and one right-turn flare of approximately 150m length. The cycle lane continues straight ahead across the junction. The south-eastern arm exit consists of one cycle lane which leads to a cycle track and two traffic lanes with a total width of approximately 9m. A bus lane starts approximately 20m

after the exit on this arm. This arm contains a raised median which separates opposing traffic flows, and a traffic island which separates the bus lane from the adjacent straight-ahead lane on the approach.

The road on the south-western arm is a shared street where cyclists take the lane and traffic follows. The south-western arm approach consists of a straight-ahead and left-turn lane, and a right-turn flare of approximately 30m. An advisory cycle lane starts after the pedestrian crossing on this arm and extends straight ahead across the junction. The south-western arm exit consists of one advisory cycle lane and one traffic lane. This arm contains a traffic island which separates opposing traffic flows.

The characteristics of this junction are shown below.

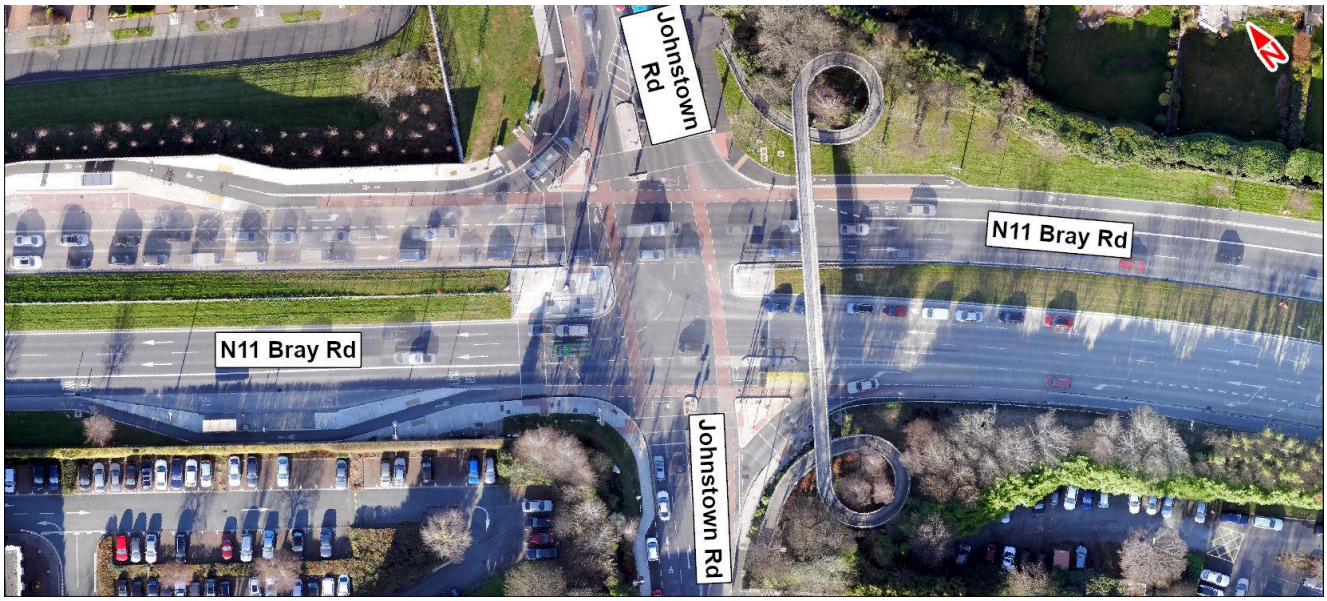

Image 5.34: N11 Bray Road / Johnstown Road Four-arm Signalised Junction

N11 Bray Road / Druids Glen Road three-armed signalised junction: The N11 Bray Road / Druids Glen Road Junction is a three-armed signalised junction with signalised pedestrian crossings (pelicans) on the southern and western arms.

The northern arm approach consists of a combined bus and cycle lane, two straight-ahead traffic lanes, and two-lane right-turn flare of approximately 80m in length. The northern arm exit consists of a bus lane, and two traffic lanes. This arm contains a raised median which separates opposing traffic flows.

The southern arm approach consists of a left-turn slip, a cycle lane, one bus lane which also permits left-turning traffic to the slip lane and two straight-ahead lanes. The cycle lane continues through the junction. There is a break in the median approximately 20m ahead of the junction to facilitate a U-turn and there is a U-turn flare of approximately 40m length on the approach. The southern arm exit consists of a cycle lane, bus lane, and two traffic lanes. This arm contains a traffic island which separates opposing traffic flows.

The western arm approach consists of a two-lane left-turn slip and a right-turn lane. The western arm exit consists of two traffic lanes. This arm contains a traffic island which separates opposing traffic flows.

The characteristics of this junction are shown below.

Image 5.35: N11 Bray Road / Druids Glen Road Junction

N11 Bray Road Southbound / Wyattville Link Road Interchange four-arm signalised junction: The interchange of Wyattville Link Road and N11 Bray Road Southbound is a four-arm signalised junction with signalised pedestrian crossings on the north-western, north-eastern and south-eastern arms.

The north-western arm is entry only and consists of a left-turn flare of approximately 30m, an advisory cycle lane which continues through the junction, one straight-ahead and right-turn lane, and one right-turn lane. There is an advanced stop line for cyclists across the straight-ahead and right-turn lanes which does not extend to the nearside left-turn slip lane.

The north-eastern arm approach consists of a left-turn slip which begins approximately 100m in advance of the junction, an advisory cycle lane, and two straight-ahead lanes. The cycle lane continues straight ahead across the junction. The north-eastern arm exit consists of two traffic lanes. This arm contains a wide traffic island (approximately 8.2m wide) which separates opposing traffic flows.

The south-eastern arm is exit only and consists of an advisory cycle lane and one traffic lane. The advisory cycle lane becomes a combined cycle and bus lane approximately 25m after the exit on this arm.

The south-western arm approach consists of two straight-ahead lanes, and a right-turn flare of approximately 85m. There is an advanced stop line for cyclists and an advisory cycle lane starts at the intersection with the north-western arm and extends straight ahead across the junction. The south-western arm exit consists of two traffic lanes which flare to three to provide a right-turn lane approximately 10m to facilitate the junction to the west. This arm contains a raised median which separates opposing traffic flows.

The characteristics of this junction are shown below.

Image 5.36: N11 Bray Road Southbound / Wyattville Link Road Interchange

N11 Bray Road / Wyattville Link Road on / off-slip (Northbound): The N11 Bray Road / Wyattville Link Road on / off-slip (northbound) junction is a three-arm junction with a staggered signalised pedestrian crossing on the eastern arm.

The south-western arm is entry only and consists of a left-turn slip lane (unsignalised) which commences approximately 80m prior to the junction, one straight-ahead bus lane and two straight-ahead general traffic lanes.

The eastern arm approach consists of two general traffic lanes which permit northbound access only. The eastern arm exit consists of one traffic lane which becomes two lanes approximately 200m north of the off-slip. This arm contains a wide island (approximately 26m wide) which separates opposing traffic flows.

The north-eastern arm is exit only and consists of bus lane and two traffic lanes.

The characteristics of this junction are shown below.

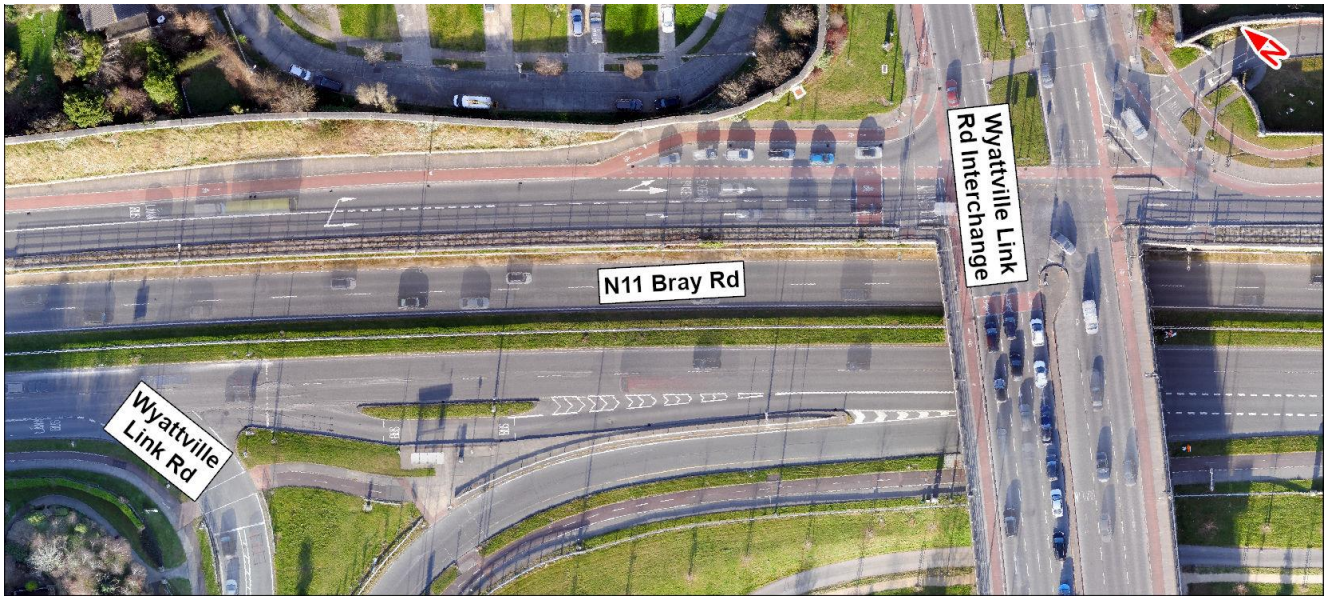

Image 5.37: N11 Bray Road / Wyattville Link Road on / off-slip (Northbound)

Loughlinstown Roundabout: Loughlinstown Roundabout is a four-arm roundabout with an external size, or inscribed circle diameter, of approximately 60m. The roundabout has two circulatory lanes and no at-grade pedestrian crossings. However, there is a pedestrian bridge over the northern arm approximately 50m from the roundabout, and a toucan crossing across the eastern arm approximately 70m from the roundabout.

There are two lanes on the northern, eastern, and southern arm approaches, and one lane on the western arm approach. There are two lanes on the northern and southern arm exits, and one lane on the eastern and western arm exits. The eastern arm has a bus lane which ends approximately 40m in advance of the roundabout. Every arm contains a raised splitter island which separates approaching and exiting traffic.

The characteristics of this junction are shown below.

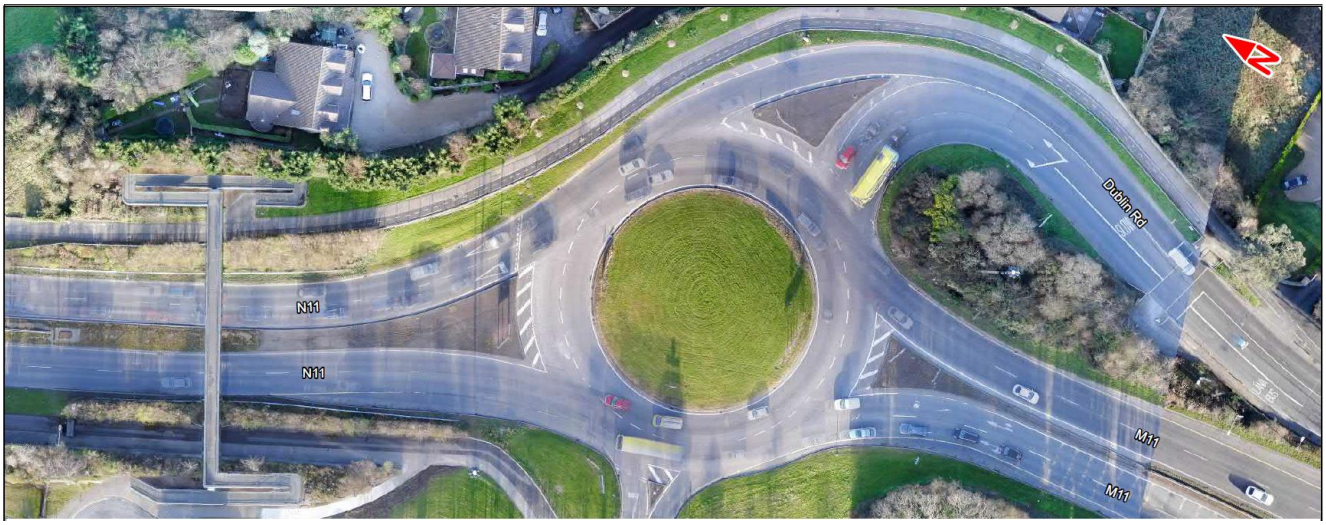

Image 5.38: Loughlinstown Four-arm Roundabout

5.3.3.3.3 Proposed UCD Bus Interchange

Within the UCD site, traffic operates in a one-way system and is subject to a speed limit of 30km/h. All roads are currently signed as shared space for vehicles, pedestrians, and cyclists. In summary:

- **N11 Stillorgan Road UCD Entrance:** Access and egress to and from the site is primarily via the N11 Stillorgan Road UCD Entrance. A one-way system currently exists resulting in separate access and egress links between the site and the N11 Stillorgan Road UCD Entrance. The site access link providing to the site is approximately 5.8m in width and consists of one general traffic lane. The site egress link is approximately 6m in width and consists of two general traffic lanes: one for left turning traffic to the Belfield Interchange and one for straight-ahead and right turning traffic (which remains within the UDC campus);
- **N11 northbound on-ramp egress:** Egress from the site to the N11 northbound on-ramp is located to the east of the site. The egress road has a carriageway width of approximately 5.0m and yields to the on-slip carriageway. The bus lane on the northbound on-slip is temporarily discontinued to allow for exiting traffic at this location. As the on-ramp is one-way, vehicles exiting the site here are not permitted to turn right;
- **South-western car park access / egress:** Vehicular access to the remaining car park is located to the south-west of the site;
- **Veterinary Hospital Large Animal Yard access / egress:** The veterinary hospital large animal yard is accessed directly from the site (to the north). Gates restrict access at this location and yellow box markings are in place; and
- **Internal service road access:** A service road connects the car park with the veterinary hospital (to the north). Gates restrict vehicles access at this location permitting access to the veterinary hospital and for emergency services only.

5.3.3.4 Existing Parking / Loading

Along Section 2 of the Proposed Scheme there is a total of 58 existing parking / loading spaces. These comprise:

- Three permit parking spaces on Johnstown Road;
- Two disabled permit parking spaces on St Brigid's Church Road;
- 52 informal parking spaces of which the majority (23 spaces) are located on Belmont Terrace. The remaining informal spaces are located on St Brigid's Church Road (four spaces), Airfield Park (13 spaces) and Old Bray Road to the south of Cherrywood Road (12 spaces); and
- One parking / loading bay located on Belmont Terrace.

There are a number of side streets which can be used by local residents and visitors / businesses throughout this section. In total there are approximately 58 parking spaces on streets surrounding Section 2 of the Proposed Scheme: Beechwood Court, Belmond Grove and Belmond Green.

5.3.3.4.0 Proposed UCD Bus Interchange

The UCD Campus contains approximately 31 car parks which contain UCD permit, pay and display and paid premium car parking spaces. It is considered that cumulatively, these car parks provide over 3,000 private car parking spaces across the UCD site.

UCD Car Park N2 which partially falls within the Proposed Scheme red line boundary currently comprises approximately 350 private car parking spaces which are partially UCD permit parking and paid premium parking spaces. There are 82 permit spaces within the red line boundary.

5.3.4 Section 3 - Loughlinstown Roundabout to Bray North (Wilford Roundabout)

This section outlines the baseline environment for walking, cycling, bus services, general traffic and parking / loading facilities along Section 3 of the Proposed Scheme, between Loughlinstown Roundabout and Bray North (Wilford Roundabout). Section 3 begins at Loughlinstown Roundabout just south of the pedestrian bridge over the N11 and then extends to the south, along R837 Dublin Road and through Shankill Village, ending at the Wilford Roundabout.

5.3.4.1 Pedestrian Infrastructure

Footpaths are generally provided on both sides of the carriageway along the R837 Dublin Road between Loughlinstown Roundabout and Wilford Roundabout and generally are greater than 1.8m in width.

A footpath, adjacent to the R837 Dublin Road southbound carriageway, approximately 2.0m wide, commences at the Loughlinstown Roundabout and runs to the R837 Dublin Road / Seaview Park Junction. At the R837 Dublin Road / Seaview Park Junction, the width of the footpath adjacent to the southbound carriageway reduces to between 1.3m and 1.7m for a length of approximately 400m. At the R837 Dublin Road / Stonebridge Road junction, the footpath width increases back to a minimum of 1.8m and continues along the remainder of the section, to Wilford Roundabout.

Between Wilford Roundabout and the R837 Dublin Road / Seaview Park Junction a footpath, between approximately 1.6m and 1.8m in width, runs adjacent to the R837 Dublin Road northbound carriageway. At the R837 Dublin Road / Seaview Park Junction the footpath width reduces, to between 1.0m and 1.3m, for approximately 200m where it ends at a toucan crossing. There are no footpaths adjacent to the northbound carriageway for approximately 70m between the toucan crossing and Loughlinstown Roundabout.

There are several controlled pedestrian crossings along Section 3 of the Proposed Scheme which benefit from tactile paving and dropped kerbs which can be found at the following locations:

- A signalised direct crossing North of R837 Dublin Road is provided, adjacent to the M11;
- The three-arm R837 Dublin Road / Stonebridge Road junction provides three signalised crossings. There are two direct crossings across R138 Dublin Road and there is one indirect crossing across Stonebridge Road which staggered by a pedestrian refuge island;
- A signalised direct crossing South of R837 Dublin Road is provided, adjacent to the M11;and
- A signalised direct crossing North of R119 Dublin Road is provided, adjacent to Aubrey Park lane.

Uncontrolled crossings across priority junctions at side roads benefit from dropped kerbs. The locations of the pedestrian crossings are illustrated in TIA Appendix 3 (Maps).

Further details of the baseline pedestrian facilities (i.e. routing, directness, accessibility, crossing and footpath widths) at each junction along Section 3 of the Proposed Scheme is included in TIA Appendix 4 (Pedestrian Impact Assessment Section).

5.3.4.2 Cycling Infrastructure

Along Section 3, a range of cycle facilities are currently provided including mandatory cycle lanes, advisory cycle lanes, combined bus and cycle lanes, and cycle tracks. Between Loughlinstown Roundabout and Shankill Roundabout and between R119 Dublin Road / Quinn's Road / Cherrington Road Roundabout and Wilford Roundabout, northbound and southbound cycle facilities are provided adjacent to Dublin Road. Southbound cycle tracks measuring approximately 1.5m in width are provided for 180m adjacent to the Townland of Cork Little and Shanganagh development.

Between Shankill Roundabout and the R119 Dublin Road / Quinn's Road / Cherrington Road Roundabout, there are no dedicated cycle facilities in either direction.

All signalised junctions from Loughlinstown Roundabout and Wilford Roundabout require shared green time for cyclists and vehicular traffic.

Cycle parking stands are provided at the following points along of the Proposed Scheme (inside the redline boundary) at on Main Street adjacent to Aubrey Park (12 Sheffield stands available to accommodate 24 bicycles).

Additional cycle parking stands are provided in Cemetery Car Park adjacent to Shanganagh Recycling Centre (5 Sheffield stands available to accommodate 10 bicycles).

5.3.4.3 Bus Infrastructure

5.3.4.3.0 Bus Priority Measures

No southbound bus lanes are available along Dublin Road between Loughlinstown Roundabout and Wilford Roundabout. A northbound combined bus and cycle lane is available for approximately 280m between approximately 120m south of the R119 Dublin Road / Shanganagh Cemetery Junction and approximately 75m

south of the R119 Dublin Road / Allies River Road Junction. On the R837 Dublin Road northbound approach to the Loughlinstown Roundabout, a bus lane is available for approximately 120m. The northbound bus lane is discontinued 40m south of the Loughlinstown Roundabout. The bus lane widths are generally between 3.0m and 3.5m. Operating times for the bus lanes in this section are not sign-posted.

5.3.4.3.1 Bus Stop Facilities

There are currently 17 bus stops along Section 3 of the Proposed Scheme. The inbound stops are:

- Stop 3142 on R837 Dublin Road south of Kentfield. This is currently a shared bus and coach stop;
- Stop 3141 on R837 Dublin Road south of Station Road;
- Stop 3140 on R119 Dublin Road south of Stonebridge Close. This is currently a shared bus and coach stop;
- Stop 4206 on R119 Dublin Road adjacent to the junction with Claremount. This is currently a shared bus and coach stop;
- Stop 4205 on R119 Dublin Road south of the junction with Crinken Lane.
- Stop 4204 on R119 Dublin Road north of the junction with Allies River Road;
- Stop 5090 on R119 Dublin Road opposite the Shanganagh Park / recycling centre entrance;
- Stop 4203 on R119 Dublin Road north of Crinken Church; and
- Stop 4202 on R119 Dublin Road outside Woodbrook College. This is currently a shared bus and coach stop.

The outbound stops are:

- Stop 3136 on R837 Dublin Road south of Kentfield;
- Stop 3138 on R837 Dublin Road north of St Anne's Roman Catholic Church;
- Stop 3139 on R119 Dublin Road north of Stonebridge Close. This is currently a shared bus and coach stop;
- Stop 4124 on R119 Dublin Road north of Claremount;
- Stop 4125 on R119 Dublin Road north of the junction with Allies River Road;
- Stop 4126 on R119 Dublin Road adjacent to Shanganagh public playground;
- Stop 4127 on R119 Dublin Road north of the junction with Woodbrook Downs; and
- Stop 4128 on R119 Dublin Road outside Woodbrook College.

Out of the 17 bus stops, the following three stops are indented from the carriageway:

- St. James's Church, stop 4203;
- Woodbrook College, stop 4128; and
- Woodbrook College, stop 4202.

The majority of bus stops along Section 3 (16 out of 17) have accessible kerbs however, fewer stops have real-time information, timetable information, shelters or seating.

Table 5.7 shows the availability of bus stop facilities at the existing 17 bus stops between Loughlinstown Roundabout and Bray North (Wilford Roundabout).

Table 5.7: Section 3 - Availability of Bus Stop Facilities (of a Total 17 Bus Stops)

Bus Stop Facility	Number of Bus Stops in Baseline with Facility	Percentage of Bus Stops in Baseline with Facility
RTPI	2	12%
Timetable Information	10	59%
Shelter	6	35%
Seating	5	29%
Accessible Kerbs	16	94%
Indented Drop Off Area	3	18%

This section of the Proposed Scheme facilitates 12 bus services, nine of which are summarised in Table 5.4 and Table 5.6 whilst the three additional bus services (45A, 45B, 7N) are described in Table 5.8.

Table 5.8: Section 3 - Bus Service Frequency

Service	Route	Typical Service Frequency	
		Weekday	Weekend
45a	Dun Laoghaire - Kilmacanogue	20 minutes	30 minutes
45b	Dun Laoghaire - Kilmacanogue	Once daily	
7n	D'Olier St. - Shankill (60 min late night Fri-Sat)	No Service	60 minutes
145, 155, 181, 7d	See Table 5.4	See Table 5.4	See Table 5.4
84, 143, 702, 84a, 84n	See Table 5.6	See Table 5.6	See Table 5.6

5.3.4.4 General Traffic

5.3.4.4.0 R837 Dublin Road (Loughlinstown Roundabout to Shankill Village)

This section of the R837 Dublin Road is a two-way single carriageway which is subject to a speed limit of 50km/h. It has a typical carriageway width of 9.0m and has a north-west to south-east alignment for 1.1km from Loughlinstown Roundabout to Shankill Roundabout.

For most of its length the road has one advisory cycle lane and one traffic lane in each direction.

The existing major junction arrangements along Dublin Road from Loughlinstown Roundabout to Shankill Village are as follows:

- R837 Dublin Road / Stonebridge Road Junction; and
- Shankill Roundabout.

R837 Dublin Road / Stonebridge Road Three-Arm Signalised Junction: This junction has signalised pedestrian crossing (pelicans) on all arms.

The north-western arm approach consists of one advisory cycle lane and one straight-ahead and right-turn traffic lane. There is an advanced stop line for cyclists and the cycle lane continues straight ahead across the junction. The north-western arm exit consists of one advisory cycle lane and one traffic lane.

The south-eastern arm approach consists of one advisory cycle lane and one straight-ahead and left-turn traffic lane. The cycle lane continues straight ahead across the junction. The south-eastern arm exit consists of one advisory cycle lane and one traffic lane.

The western arm approach consists of one traffic lane for all movements. The western arm exit consists of one traffic lane. A traffic island separates the approach and exit lanes on this arm.

The characteristics of this junction are shown below.

Image 5.39: R837 Dublin Road / Stonebridge Road Three-Arm Signalised Junction

Shankill Four-Arm Roundabout: Shankill Roundabout has an inscribed circle diameter, of approximately 30m. The roundabout has one circulatory lane and uncontrolled pedestrian crossings are present across every arm.

There is one traffic lane on the approach and on the exit of every arm. The north-western arm also has an advisory cycle lane on the approach and on the exit. Every arm contains a raised splitter island which separates approaching and exiting traffic and provides pedestrian refuge at the uncontrolled pedestrian crossings.

The characteristics of this junction are shown below.

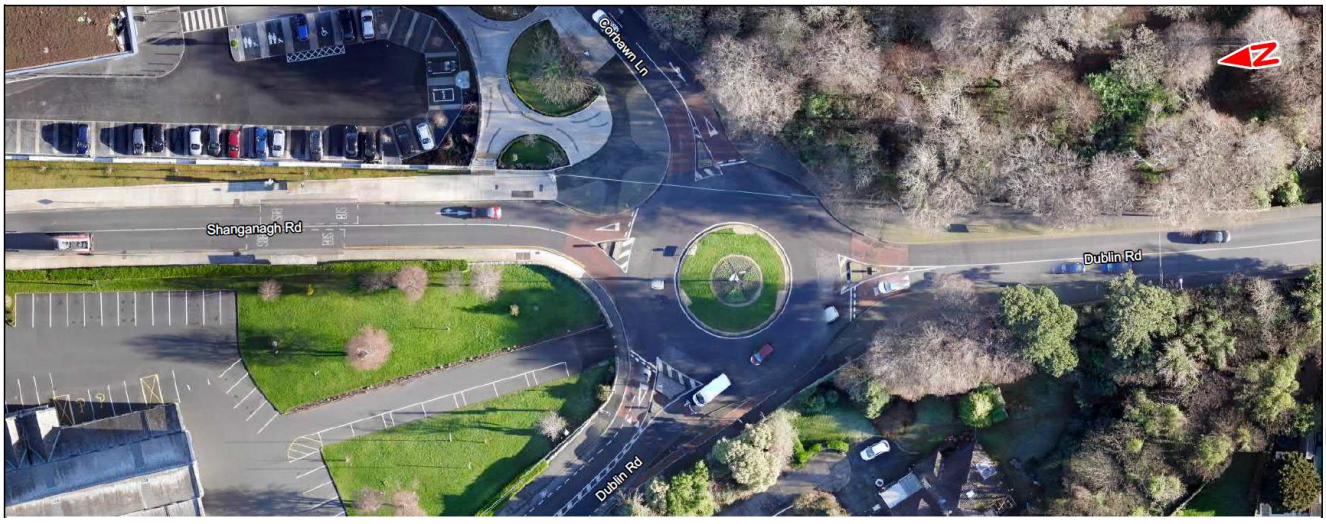

Image 5.40: Shankill Four-Arm Roundabout

5.3.4.4.1 R119 Dublin Road through Shankill Village (Shankill Roundabout to Quinn's Road)

This section of the R119 Dublin Road, through Shankill Village, is a two-way single carriageway which is subject to a speed limit of 50km/h. It has a typical carriageway width of 7.0m and has a north-west to south-east alignment for 500m from Shankill Roundabout to the R119 Dublin Road / Quinn's Road / Cherrington Road Roundabout. The road has one traffic lane in each direction.

The existing major junction arrangements along R119 Dublin Road through Shankill Village from Shankill Roundabout to R119 Dublin Road / Quinn's Road / Cherrington Road Roundabout are as follows:

- R119 Dublin Road / Quinn's Road / Cherrington Road Roundabout.

R119 Dublin Road / Quinn's Road / Cherrington Road Four-Arm Roundabout: This roundabout has an inscribed circle diameter, of approximately 20m. The roundabout has one circulatory lane and uncontrolled pedestrian crossings are present across every arm.

There is one traffic lane on the approach and on the exit of every arm. The southern arm also has an advisory cycle lane on the approach and on the exit. Every arm contains a raised splitter island which separates approaching and exiting traffic and provides pedestrian refuge at the uncontrolled crossings.

The characteristics of this junction are shown below.

Image 5.41: R119 Dublin Road / Quinn's Road / Cherrington Road Four-Arm Roundabout

5.3.4.4.2 R119 Dublin Road (Quinn's Road to Allies River Road)

This section of the R119 Dublin Road is a two-way single carriageway which is subject to a speed limit of 50km/h. It has a typical carriageway width of 8.0m and has a north-west to south-east alignment for 700m from the R119 Dublin Road / Quinn's Road / Cherrington Road Roundabout to the R119 Dublin Road / Allies River Road Junction. For most of its length the road has one advisory cycle lane and one traffic lane in each direction.

The existing junction arrangements of note along R119 Dublin Road from the R119 Dublin Road / Quinn's Road Junction to the R119 Dublin Road / Allies River Road Junction are as follows:

- R119 Dublin Road / Olcovar Junction.

R119 Dublin Road / Olcovar Three-Arm Priority Junction: The R119 Dublin Road / Olcovar Junction northern arm approach consists of one advisory cycle lane and one straight-ahead traffic lane and right-turn filter lane which is approximately 15m in length. The cycle lane continues straight ahead across the junction. The northern arm exit consists of one cycle lane and one traffic lane.

The southern arm approach consists of one advisory cycle lane and general traffic lane from which vehicles are permitted to turn left and continue straight ahead. The cycle lane continues straight ahead across the junction. The south-eastern arm exit is separated from the northern arm by a traffic island and consists of one advisory cycle lane and one traffic lane.

The western arm approach consists of one traffic lane for all movements. The western arm exit consists of one traffic lane.

The characteristics of this junction are shown below.

Image 5.42: R119 Dublin Road / Olcovar Priority Junction

5.3.4.4.3 R119 Dublin Road (Allies River Road to Wilford Roundabout)

This section of the R119 Dublin Road is a two-way single carriageway which is subject to a speed limit of 50km/h. It has a typical carriageway width of 9.0m and has a north-west to south-east alignment for 1.1km from the R119 Dublin Road / Allies River Road Junction to Wilford Roundabout. For most of its length the road has one advisory cycle lane and one traffic lane in each direction. A northbound combined bus and cycle lane is available for approximately 280m between approximately 120m south of the R119 Dublin Road / Shanganagh Cemetery Junction and approximately 75m south of the R119 Dublin Road / Allies River Road Junction.

The existing major junction arrangements along R119 Dublin Road from the R119 Dublin Road / Allies River Road Junction to Wilford Roundabout are as follows:

- R119 Dublin Road / Woodbrook Downs Junction; and
- Wilford Roundabout.

R119 Dublin Road / Woodbrook Downs Four-Arm Signalised Junction: The R119 Dublin Road / Woodbrook Downs Junction northern arm approach consists of one general traffic lane for straight-ahead and left-turn movements and a right turn filter lane which commences approximately 20m prior to the junction. The northern arm exit consists of one advisory cycle lane and one traffic lane.

The eastern arm consists of two general traffic lanes one of which permits turn-turn and straight-ahead movements and the other permits right turn movements only. The exit arm consists of one general traffic lane.

The southern arm approach consists of one advisory cycle lane, one general traffic lane for straight-ahead and left-turn movements and a right turn filter lane which commences approximately 60m prior to the junction. The cycle lane continues straight ahead across the junction. The southern arm exit consists of one general traffic lane.

The western arm approach consists of one traffic lane for all movements. The western arm exit consists of one traffic lane.

Wilford Three-Arm Roundabout: Wilford Roundabout has an inscribed circle diameter, of approximately 60m. The roundabout has one circulatory lane and no pedestrian crossings.

There is one traffic lane and an advisory cycle lane on the approach from the northern arm and two traffic lanes on the approach from the southern and western arms. There is one traffic lane on the exit to every arm. Every arm contains a raised splitter island which separates approaching and exiting traffic.

The characteristics of this junction are shown below.

Image 5.43: Wilford Three-Arm Roundabout

5.3.4.4.4 Stonebridge Road

Stonebridge Road is a two-way single carriageway which is subject to a speed limit of 50km/h. It has a typical carriageway width of 6.5m and has an east to west alignment for 650m from R837 Dublin Road to Mullinastill Road and in a north to south alignment for 200m from Mullinastill Road to Ferndale Road. For most of its length the road has one traffic lane in each direction.

5.3.4.4.5 Existing Parking and Loading

Along Section 3 of the Proposed Scheme there is a total of 109 existing parking / loading spaces. These comprise:

- 99 informal parking spaces of which the majority (83 informal parking spaces) are located within the property of St. Anne's Church. The remaining 16 spaces are located in Shankill Village;
- Four disabled permit spaces of which three are located within the property of St. Anne's Church and one is located within Shankill Village; and
- Six loading / unloading (set down) spaces located on Stonebridge Road.

There are a number of side streets which can be used by local residents and visitors / businesses throughout this section. In total there are approximately 179 parking spaces on streets surrounding Section 3 of the Proposed Scheme: Dorney Court, Eaton Wood Avenue, Athgoe Road and Clonasleigh.

5.3.5 Section 4 - Bray North (Wilford Roundabout) to Bray South (Fran O'Toole Bridge)

This Section outlines the baseline environment for walking, cycling, bus services, general traffic and parking / loading facilities along Section 4 of the Proposed Scheme, Bray North (Wilford Roundabout) to Bray South (Fran O'Toole Bridge). This section begins at the Wilford Roundabout and extends to the south along the R761 Dublin Road and into Bray via Castle Street, ending at Fran O'Toole Bridge.

5.3.5.1 Pedestrian infrastructure

Footpaths are provided on both sides of the carriageway along the R761 Dublin Road with the exception of a northbound footpath for 90m to the south of Wilford Roundabout. Along the R761 Dublin Road, street lighting columns are situated along both sides of the carriageway within close proximity to or at the back of the footpaths.

The footpaths vary in width along Section 4 of the Proposed Scheme and there are many pinch point locations particularly on the southbound side, where footpath widths below the minimum width of 1.8m.

There are several pedestrian crossings along the R761 between Wilford Roundabout and Fran O'Toole Bridge, both signalised and uncontrolled.

There are several controlled pedestrian crossings along Section 4 of the Proposed Scheme which benefit from tactile paving and dropped kerbs which can be found at the following locations:

- The four-arm R761 Dublin Road / Old Connaught Avenue / Corke Abby Avenue junction provides two direct signalised crossings across Dublin Road and Old Connaught Avenue;
- The three-arm R761 Dublin Road / Upper Dargle Road junction provides two signalised junctions. A direct toucan crossing is provided across Dublin Road. An indirect crossing is staggered across Dargle Road by a pedestrian refuge island; and
- A signalised direct crossing is provided across R761 Castle Street adjacent to Little Bray Post Office.

Uncontrolled crossings across priority junctions at side roads benefit from dropped kerbs. The locations of the pedestrian crossings are illustrated in TIA Appendix 3 (Maps)..

Further details of the baseline pedestrian facilities (i.e. routing, directness, accessibility, crossing and footpath widths) at each junction along Section 4 of the Proposed Scheme is included in TIA Appendix 4 (Pedestrian Infrastructure Assessment Section).

5.3.5.1.0 Cycling Infrastructure

Along Section 4, cycle facilities comprise advisory cycle lanes and combined bus and cycle lanes. Southbound cycle facilities are provided for much of the section between the R761 Dublin Road / St Peters Road Junction and Fran O'Toole Bridge. Northbound cycle provision is predominately between Fran O'Toole Bridge and the R761 Dublin Road / Chapel Lane Junction.

Between Wilford Roundabout and the R761 Dublin Road / Old Connaught Avenue Junction, there are no dedicated cycle facilities in either direction.

Adjacent to the R761 Dublin Road southbound carriageway, an advisory cycle lane starts to the south the R761 Dublin Road / St Peters Road Junction. The southbound advisory cycle lane varies in width, between approximately 1.0m and 1.8m, and extends for a length of approximately 370m. It terminates approximately 30m north of R761 Castle Street / Saint Cronan's Road Junction. Here, a combined bus and cycle lane, of approximately 3.0m width, commences on the southbound carriageway and extends for a length of approximately 245m. The combined bus and cycle lane terminates approximately 30m north of Fran O'Toole Bridge and an advisory cycle lane, of approximately 1.3m width, extends from this point to Fran O'Toole Bridge.

Adjacent to the northbound carriageway, an advisory cycle lane of approximately 1.3m width extends from Fran O'Toole Bridge and terminates approximately 30m north of the bridge. A combined bus and cycle lane, approximately 3.0m wide, extends from here to the south of the R761 Dublin Road / R918 Upper Dargle Road Junction. There are no dedicated northbound cycle facilities through the R761 Dublin Road / R918 Upper Dargle Road Junction. To the north of the R761 Dublin Road / R918 Upper Dargle Road Junction an advisory cycle lane, approximately 1.3m in width, commences adjacent to the northbound carriageway. The advisory cycle lane is present until it terminates at the R761 Dublin Road / Chapel Lane Junction.

All signalised junctions from Loughlinstown Roundabout and Wilford Roundabout require shared green time for cyclists and vehicular traffic.

The existing cycle facilities along Section 4 of the Proposed Scheme are illustrated in TIA Appendix 3 (Maps).

5.3.5.1.1 Bus Infrastructure

5.3.5.1.1.0 Bus Priority Measures

A southbound combined bus and cycle lane, approximately 3.0m in width, commences at the R761 Castle Street / Saint Cronan's Road Junction and extends for a length of approximately 245m. The southbound combined bus and cycle lane terminates approximately 30m north of Fran O'Toole Bridge.

A northbound combined bus and cycle lane is present on R761 Castle Street for approximately 35m adjacent to St Columcille's Terrace. The combined bus and cycle lane is temporarily discontinued for the R761 Castle Street / Saint Cronan's Road Junction. To the north of the R761 Castle Street / Saint Cronan's Road Junction the combined bus and cycle lane re-commences for 95m until the R761 Dublin Road / R918 Upper Dargle Road Junction.

The bus lane widths are generally between 3.0m and 3.5m and are in operation between 07.00 and 19.00 from Monday to Saturday.

5.3.5.1.1.1 Bus Stop Facilities

There are currently six bus stops along Section 4 of the Proposed Scheme. The inbound stops are:

- Stop 4201 on R761 Dublin Road north of Old Connaught Avenue;
- Stop 4416 on R761 Dublin Road opposite Lidl (Bray); and
- Stop 4154 on R761 on Caste Street south of St Cronan's Road. This is currently a shared bus and coach stop.

The outbound stops are:

- Stop 4129 R761 Dublin Road north of Old Connaught Avenue;
- Stop 4130 on R761 Castle Street north of St. Patrick's Square; and
- Stop 4131 on R761 Castle Street north of Dwyer Park. This is currently a shared bus and coach stop.

Out of the six bus stops along this section, one stop is indented from the carriageway:

- St. Cronan's Road, Stop 4154.

Table 5.9 outlines the availability of bus stop facilities at the existing six bus stops between Bray North (Wilford Roundabout) and Bray South (Fran O'Toole Bridge).

Table 5.9: Section 4 - Availability of Bus Stop Facilities (of a Total Six Bus Stops)

Bus Stop Facility	Number of Bus Stops in Baseline with Facility	Percentage of Bus Stops in Baseline with Facility
RTPI	1	17%
Timetable Information	2	33%
Shelter	3	50%
Seating	2	33%
Accessible Kerbs	5	83%
Indented Drop Off Area	1	17%

This section of the Proposed Scheme facilitates 11 bus services, nine of which are summarised in previously in Table 5.6 and Table 5.8 whilst the one additional bus service (185) is described in Table 5.10.

Table 5.10: Section 4 – Bus Service Frequency

Service	Route	Typical Service Frequency	
		Weekday	Weekend
185	Bray Station to Enniskerry	30 minutes	30 minutes
133, 145, 155	See Table 5.4	See Table 5.4	See Table 5.4
84, 143, 702, 84a, 84n	See Table 5.6	See Table 5.6	See Table 5.6
45a, 45b	See Table 5.8	See Table 5.8	See Table 5.8

5.3.5.1.2 General Traffic

5.3.5.1.2.0 R761 Dublin Road (Wilford Roundabout to Old Connaught Avenue)

This section of the R761 Dublin Road is a two-way single carriageway which is subject to a speed limit of 50km/h. It has a typical carriageway width of 8.5m and has a north-west to south-east alignment for 400m from Wilford Roundabout to the R761 Dublin Road / Old Connaught Avenue Junction. For most of its length the road has one traffic lane in each direction.

The existing major junction arrangements along the R761 Dublin Road from Wilford Roundabout to R761 Dublin Road / Old Connaught Avenue Junction are as follows:

- R761 Dublin Road / Old Connaught Avenue Junction.

R761 Dublin Road / Old Connaught Avenue Four-Arm Signalised Junction: The R761 Dublin Road / Old Connaught Junction has a signalised pedestrian crossings (pelicans) across the south-eastern and south-western arms.

The north-western arm approach consists of one left-turn slip, one straight-ahead traffic lane, and one right-turn flare approximately 60m in length. The north-western arm exit consists of one traffic lane.

The north-eastern arm approach consists of a left-turn slip which begins approximately 20m in advance of the junction, and one traffic lane for all other movements. The north-eastern arm exit consists of one traffic lane.

The south-eastern arm approach consists of one straight-ahead and left-turn lane and one right-turn lane, the arm widens to the width of two lanes approximately 30m in advance of the junction, following the with R761 Dublin Road / St. Peter's Road Junction. The south-eastern arm exit consists of one nearside merging lane, approximately 20m in length, and one traffic lane.

The south-western arm approach consists of one straight-ahead and left-turn lane and one right-turn lane. The south-western arm exit consists of one traffic lane.

The characteristics of this junction are shown below.

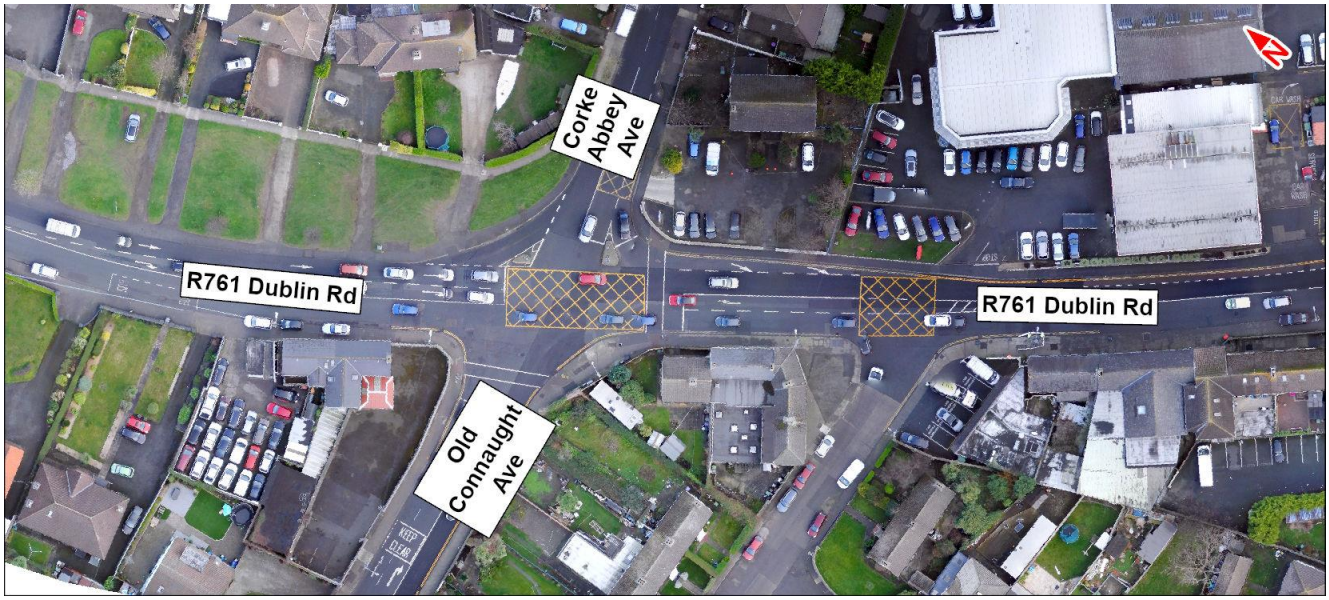

Image 5.44: R761 Dublin Road / Old Connaught Avenue / Corke Abbey Avenue Four-Arm Signalised Junction

5.3.5.1.2.1 R761 Dublin Road and R761 Castle Street (Old Connaught Avenue to Fran O'Toole Bridge)

This section of the R761 Dublin Road and R761 Castle Street are two-way single carriageways which are subject to a speed limit of 50km/h. These roads have typical carriageway widths of approximately 12.5m and travel in a north-west to south-east alignment for 750m from the R761 Dublin Road / Old Connaught Avenue Junction to Fran O'Toole Bridge.

For most of its length the carriageway has one traffic lane, and either one advisory cycle lane or combined bus and cycle lane, in each direction. Bus lanes in this section are in operation between 07.00 and 19.00 from Monday to Saturday.

The existing major junction arrangements along R761 Dublin Road and R761 Castle Street from R761 Dublin Road / Old Connaught Avenue Junction to Fran O'Toole Bridge are as follows:

- R761 Dublin Road / Chapel Lane Junction; and
- R761 Dublin Road / R918 Upper Dargle Road Junction.

R119 Dublin Road / Chapel Lane Four-Arm Priority Junction: The R119 Dublin Road / Chapel Lane Junction north-western arm approach consists of one advisory cycle lane, one straight-ahead traffic lane and a right-turn filter lane measuring approximately 15m in length. The cycle lane continues straight ahead across the junction. The north-western arm exit consists of one general traffic lane.

The north-eastern arm approach consists of one mandatory cycle lane which joins the advisory cycle lane on the southbound carriageway, one left-turn traffic lane and one right-turn traffic lane. From this arm, traffic is not permitted to continue straight-ahead to Chapel Lane. The north-eastern arm exit consists of one mandatory cycle lane and one general traffic lane. A pedestrian refuge island and hatching separates the approach and exit arms.

The south-eastern arm approach consists of one advisory cycle lane, one straight-ahead traffic lane, from which left turns are permitted, and one right-turn traffic lane. The south-eastern arm exit consists of one advisory cycle lane and one general traffic lane.

The south-western arm approach consists of one traffic lane for all movements. The south-western arm exit consists of one traffic lane.

The characteristics of this junction are shown below.

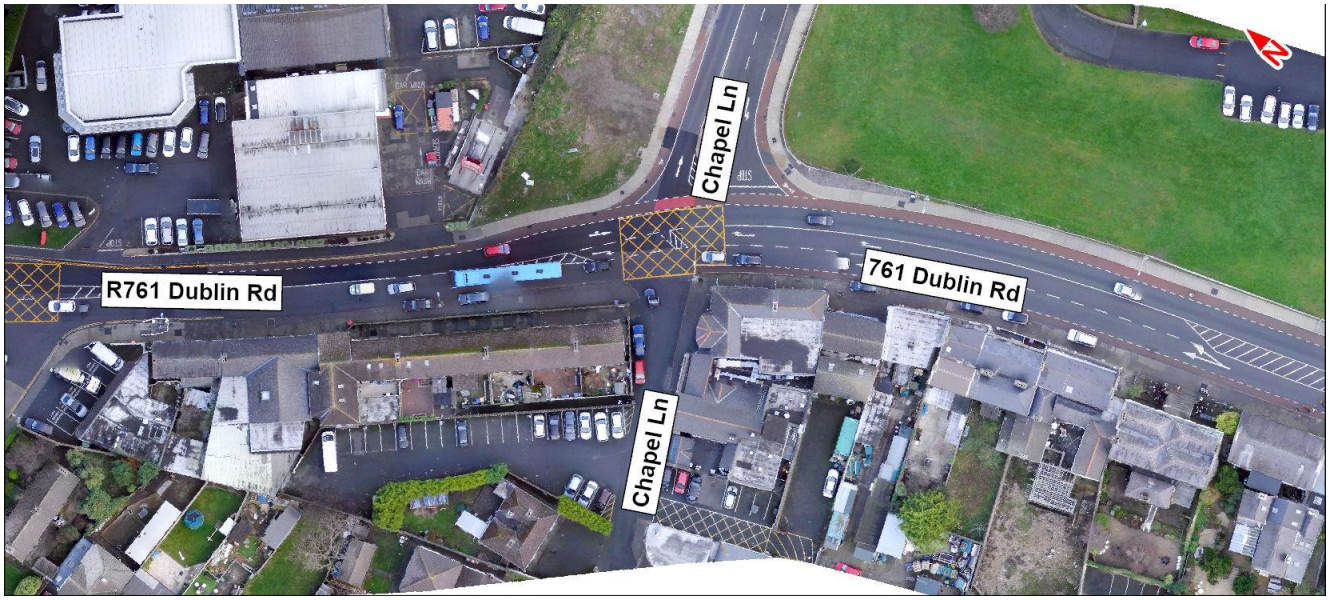

Image 5.45: R119 Dublin Road / Chapel Lane Priority Junction

R761 Dublin Road / R918 Upper Dargle Road Three-Arm Signalised Junction: The R761 Dublin Road / R918 Upper Dargle Road Junction with signalised pedestrian crossings (pelicans) on the south-eastern and south-western arms and across the left-turn slip lane from the south-eastern arm.

The north-western arm approach consists of one advisory cycle lane and one straight-ahead and right-turn traffic lane. The cycle lane continues straight ahead across the junction. The stop line for this approach arm is beyond the south-western arm at the pedestrian crossing. The north-western arm exit consists of one advisory cycle lane and one traffic lane.

The south-eastern arm approach consists of one left-turn slip approximately 10m in advance of the junction, one combined bus and cycle lane and one straight-ahead traffic lane. The south-eastern arm exit consists of one advisory cycle lane and one traffic lane.

The south-western arm approach consists of one straight-ahead lane and one right-turn lane. The south-western arm exit consists of one traffic lane. A kerbed refuge island separates arm from the left-turn slip from the south-eastern arm.

The characteristics of this junction are shown below.

Image 5.46: R761 Dublin Road / R918 Upper Dargle Road Three-Arm Signalised Junction

5.3.5.1.3 Existing Parking / Loading

Along Section 4 of the Proposed Scheme there is a total of 265 existing parking / loading spaces. These comprise:

- 92 commercial vehicle spaces for display (car sales) of which 59 are located at Windsor Motors Bray to the south of Wilford Roundabout, 17 are located at Fitzpatrick Motors (Bray) Limited, opposite St. Peter's Road and 16 are located at Castle Garage Bray, south of Dwyer Park;
- 34 commercial parking spaces of which 19 are located to the east of Dublin Road at the Dublin Road / Corke Abbey Avenue / Old Connaught Avenue Junction and 15 spaces are located to the east of Castle Street;
- 132 informal parking spaces of which are located in the Castle Street Shopping Centre;
- Five disabled parking spaces are located in the Castle Street Shopping Centre; and
- Two designated loading / unloading bay located adjacent to the Castle Street northbound carriageway.

There are a number of side streets which can be used by local residents and visitors / businesses throughout this section. In total there are approximately 137 parking spaces on streets surrounding Dublin Road and approximately 215 parking spaces on streets surrounding Castle Street.

6. Potential Impacts

6.1 Characteristics of the Proposed Scheme

The Proposed Scheme (and Section 1) commences at the Leeson Street Lower / R138 St. Stephens Green Junction. The route then comprises 2.6km of R138 Leeson Street Lower, R138 Leeson Street Upper, R138 Sussex Road, R138 Morehampton Road and R138 Donnybrook Road, ending at the R138 Donnybrook Road / R815 Anglesea Road Junction.

Section 2 commences at the R138 Donnybrook Road / R815 Anglesea Road Junction and extends south along the R138 Stillorgan Road, N11 Stillorgan Road, and N11 Bray Road, ending at Loughlinstown Roundabout. This section includes a proposed bus interchange at the gateway to the UCD campus adjacent to the Stillorgan Road flyover bridge.

Section 3 begins at Loughlinstown Roundabout just south of the pedestrian bridge over the N11 and then extends to the south, along R837 Dublin Road and through Shankill Village, ending at the Wilford Roundabout.

Section 4 begins at the Wilford Roundabout and extends to the south along the R761 Dublin Road and into Bray via Castle Street, ending at Fran O'Toole Bridge.

6.2 Do Nothing Scenario

With regards to this Traffic and Transport chapter, the 'Do Nothing' scenario means there would be no changes to existing transport infrastructure, so infrastructure provision for buses, pedestrians and cyclists would remain the same. The streetscape would continue to be based around the movement and parking requirements of private cars instead of people. High levels of traffic are associated with discouraging pedestrian and cyclist activity and this activity would be further discouraged as traffic congestion remains the same or increases. The baseline situation of congestion and journey time reliability issues for buses would also continue, and potentially be exacerbated over time as traffic congestion increases in line with travel demand growth.

6.3 'Do Minimum' Scenario

The 'Do Minimum' scenario represents the likely traffic and transport conditions of the direct and indirect study areas **without** the Proposed Scheme in place. This scenario forms the reference case by which to compare the Proposed Scheme ('Do Something'). The opening year for the Proposed Scheme is assumed to be 2028, with a design assessment year (opening + 15 years) assumed to be 2043.

For the qualitative analysis the assessment is in relation to the conditions of the existing transport network, which have been outlined in Section 5 (Baseline Environment) corresponding with a Do Nothing scenario. As a result of the COVID-19 pandemic a number of temporary transport mobility measures have been implemented. Due to their temporary status, the measures are not considered a permanent long-term feature of the receiving environment and as such have not been considered in the impact assessments.

For the quantitative analysis (i.e. the transport modelling elements of the impact assessment), the Do Minimum scenario is based on the 'likely' conditions of the transport network and include for any known permanent improvements or changes to the road or public transport network that have taken place, been approved or are planned for implementation. The transport schemes and demand assumptions within the Do Minimum scenario are detailed below.

6.3.1 Do Minimum Transport Schemes

The core reference case (Do Minimum) modelling scenarios (Opening year - 2028 and Design year - 2043) are based on the progressive roll-out of the Greater Dublin Area (GDA) Transport Strategy 2022-2042 (GDA Strategy), with a partial implementation by 2028, in line with National Development Plan (NDP) investment priorities and the full implementation by 2043.

The GDA Strategy provides an appropriate transport receiving environment for the assessment of the Proposed Scheme for the following reasons:

- The GDA Strategy is the approved statutory transportation plan for the region, providing a framework for investment in transport within the region up to 2042;
- The GDA Strategy provides a consistent basis for the 'likely' future receiving environment that is consistent with Government plans and Policies including the National Planning Framework (NPF) and National Development Plan (NDP); and
- Schemes within the GDA Strategy are a means to deliver the set of objectives of the GDA Strategy. The sequencing and delivery of the strategy is defined by the implementation plan, but the optimal outcome of aiming to accommodate all future growth in travel demand on sustainable modes underpins the Strategy.

The Do Minimum scenarios (in both 2028 and 2043) include all other elements of the BusConnects Programme of projects (apart from the CBC Infrastructure Works elements) i.e. the new BusConnects routes and services (as part of the revised Dublin Area bus network), new bus fleet, the Next Generation Ticketing and integrated fare structure proposals are included in the Do Minimum scenarios.

In 2028, other notable Do Minimum transport schemes include the roll out of the DART+ Programme, Luas Green Line capacity enhancement and the Greater Dublin Area Cycle Network Plan implementation (excluding BusConnects CBC elements). As outlined above, the 2043 Do Minimum scenario assumes the full implementation of the GDA Strategy schemes, so therefore assumes that proposed major transport schemes such as MetroLink, Luas line extensions to Lucan, Finglas, Poolbeg and Bray are all fully operational.

6.3.2 Do Minimum Transport Demand

The transport demand changes for the 2028 and 2043 assessment years have been included in the analysis contained within this chapter, using travel demand forecasting, which accounts for increases in population and economic activity, in line with planned growth contained within the NPF, Regional Spatial and Economic Strategy (RSES) for the Eastern and Midland region and the local development plans for the GDA local authorities.

It is envisaged that the population will grow by 11% up to 2028 and 25% by 2043 (above 2016 census data levels). Similarly, employment growth is due to increase by 22% by 2028 and 49% by 2043 (Source: NTA Reference Case Planning Sheets 2028, 2043).

The GDA Strategy (along with existing supply side capacity constraints e.g., parking availability, road capacity etc.) has the effect of limiting the growth in car demand on the road network into the future. Total trip demand will increase into the future in line with demographic growth (population and employment levels etc.). To limit the growth in car traffic and to ensure that this demand growth is catered for predominantly by sustainable modes, a number of measures will be required, that include improved sustainable infrastructure and priority measures delivered as part of the NDP/GDA Strategy. In addition to this, demand management measures will play a role in limiting the growth in transport demand, predominantly to sustainable modes only. The result will be only limited or no increases in overall demand for travel by private car. The Proposed Scheme will play a key role in this as part of the wider package of GDA Strategy measures.

In general, total trip demand (combining all transport modes) will increase into the future in line with population and employment growth. A greater share of the demand will be by sustainable modes (Public Transport, Walking, Cycling). Private car demand may still grow in some areas but not linearly in line with demographics, as may have occurred in the past.

In terms of the transport modelling scenarios for the traffic and transport assessment, as per the Strategy proposals, there are no specific demand management measures included in the Do Minimum scenario in the 2028 Opening year, other than constraining parking availability in Dublin at existing levels. For the design year, 2043 scenario, demand management is included in the Do Minimum in line with the Strategy's Core Demand Management Measures; Reduction of free workplace parking in urban areas, increased parking charges in urban areas and adjustment of traffic signal timings across the metropolitan area to better facilitate movement by sustainable modes.

6.4 Do Something Scenario

The Do Something scenario represents the likely conditions of the direct and indirect study areas with the Proposed Scheme in place. The traffic and transport elements of the Proposed Scheme are presented in detail in Chapter 4 (Proposed Scheme Description) of the EIAR.

6.5 Construction Phase

This Section considers the potential temporary traffic and transport impacts that construction of the Proposed Scheme will have on the direct and indirect study areas during the construction phase.

Chapter 5 (Construction) of the EIAR has been prepared to demonstrate the likely approach that will be taken to construct the Proposed Scheme, while it also provides an overview of the construction activities necessary to undertake the works, including information on the proposed Construction Compounds, construction plant and equipment. This assessment, as outlined herein, provides an overview of the potential traffic and transport impacts of the Construction Phase based on the information set out in Chapter 5 (Construction) of the EIAR.

A Construction Environmental Management Plan (CEMP) has been prepared and is included as Appendix A5.1 in Volume 4 of the EIAR. The CEMP which will be updated and finalised by the appointed contractor prior to construction commencing. The CEMP comprises the construction mitigation measures, which are set out in the EIAR, and will be updated with any additional measures which may be required by the conditions attached to An Bord Pleanála's decision. Implementation of the CEMP will ensure disruption and nuisance are kept to a minimum during the Construction Phase. The CEMP has regard to the guidance contained in the TII Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan, and the handbook published by Construction Industry Research and Information Association (CIRIA) in the UK, Environmental Good Practice on Site Guide, 4th Edition (CIRIA 2015).

All of the content provided in the CEMP will be implemented in full by the appointed contractor and its finalisation will not affect the robustness and adequacy of the information presented and relied upon in this TIA.

As with any construction project, the appointed contractor will be obliged to prepare a comprehensive Construction Traffic Management Plan (CTMP). In preparing the CTMP for the proposed works, the appointed contractor will be required to give consideration where practicable to facilitate and identify opportunities for the maximum movement of people during the construction period through implementing the following hierarchy of transport mode users:

- Pedestrians;
- Cyclists;
- Public Transport; and
- General Traffic.

Access will be maintained for emergency vehicles along the Proposed Scheme, throughout the Construction Phase.

6.5.1 Description of Construction Works

  - The Proposed Scheme has been divided into four principal sections. The division line between sections has been determined by grouping similar carriageway types together. These sections have been further subdivided into 10 sub-sections, according to the types of construction works required. The sections / sub-sections are the following (as shown in Diagram 6.1):
  - Section 1 - Leeson Street to Donnybrook (Anglesea Road Junction):
  - Section 1a – Leeson Street to Wellington Place (Morehampton Road); and
  - Section 1b - Wellington Place (Morehampton Road) to Donnybrook (Anglesea Road Junction).
- Section 2 - Donnybrook (Anglesea Road Junction) to Loughlinstown Roundabout:
  - Section 2a - Anglesea Bridge to Whites Cross (Leopardstown Rd); and

- Section 2b - Whites Cross (Leopardstown Road) to Loughlinstown Roundabout.

- Section 3 - Loughlinstown Roundabout to Bray North (Wilford Roundabout):
  - Section 3a: Loughlinstown Roundabout to Shanganagh Road, incl. Stonebridge Road;
  - Section 3b: Shanganagh Road to Quinn's Road; and
  - Section 3c: Quinn's Road to Bray North (Wilford Roundabout).
- Section 4 - Bray North: Wilford Roundabout to Bray South (Fran O'Toole Bridge):
  - Section 4a: Bray North (Wilford Roundabout) to Old Connaught Avenue;
  - Section 4b: Old Connaught Avenue Section to Upper Dargle Road; and
  - Section 4c: Upper Dargle Road to Bray South to (Fran O'Toole Bridge).

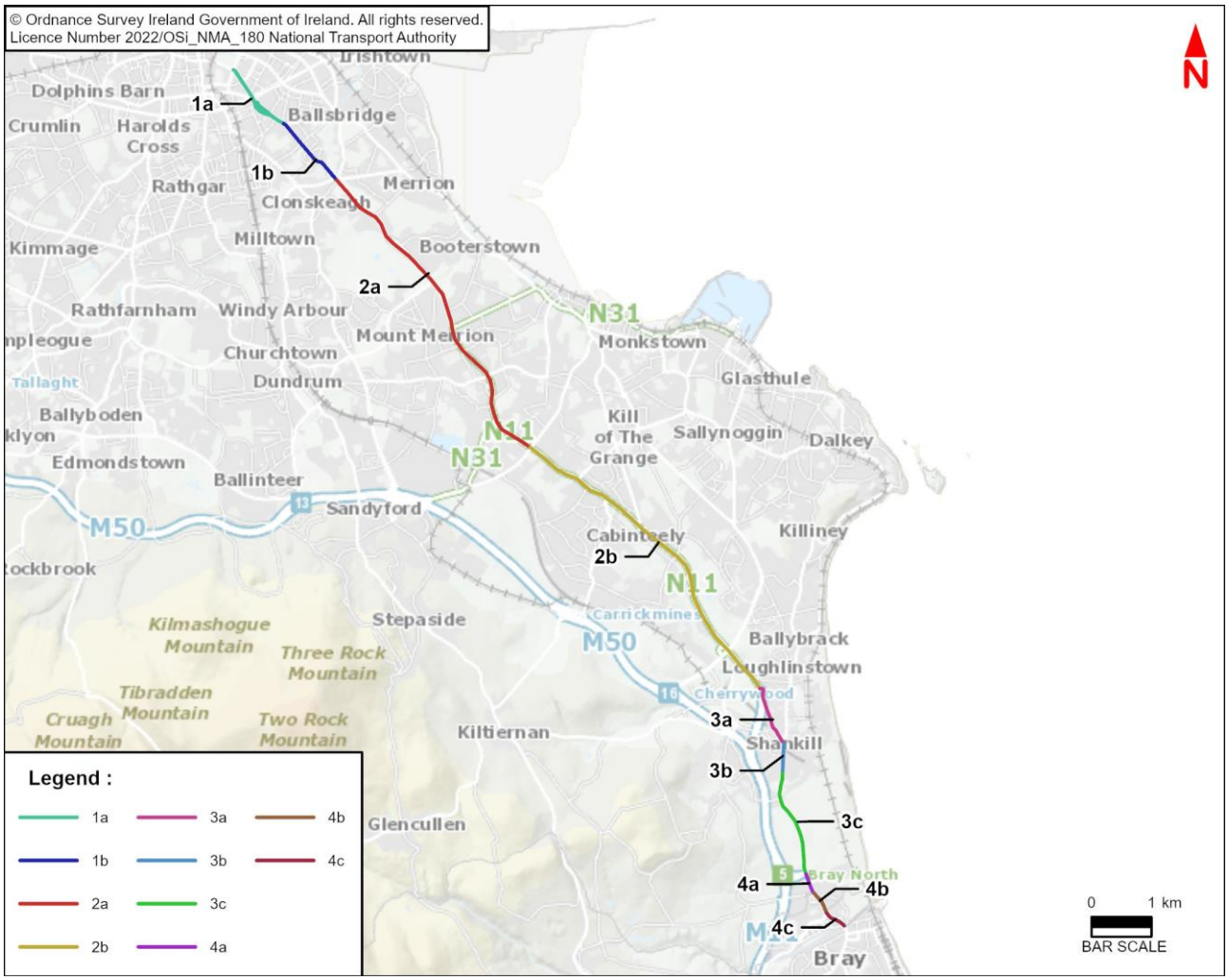

Diagram 6.1: Proposed Subsections of the Construction Phase

6.5.2 Construction Programme

An outline, indicative programme for the Proposed Scheme is provided in Chapter 5 (Construction) in Volume 2 of this EIAR. The Proposed Scheme is estimated to require some 30 months (approximately) to complete, however, individual activities will have shorter durations.

The programme sequence has been governed by the need to complete works between the City Centre and Donnybrook (Section 1) at the outset of the Construction Phase. Thereafter, in order to minimise traffic disruption along the Proposed Scheme, the works will be separated by as much distance as possible. The programme is driven by maximising the separation between sections under construction at the same time. Works are envisaged to proceed concurrently on multiple work-fronts to minimise the overall construction duration.

6.5.3 Construction Access Route

Access to and egress from the Construction Compounds is permitted via dedicated Construction Access Routes. The haulage of material on site is anticipated to be minimal. There will however be the removal of excavated material and the delivery of construction materials to site. It is anticipated that the exporting and delivery of materials will be executed as efficiently as possible along the National roads such as the close by N11, N31 and M50 Motorway and from the local Regional road network. It is assumed that all National and Regional roads including the Regional routes in the immediate vicinity of the Proposed Scheme will be used to supply/remove this material.

It is envisaged that construction vehicles will travel to and from the construction works via the following road network (as shown in Diagram 6.2):

- M50;
- M11;
- N11;
- N31.
- R113;
- R118;
- R119;
- R133;
- R138;
- R761;
- R811;
- R825;
- R837; and
- R840.

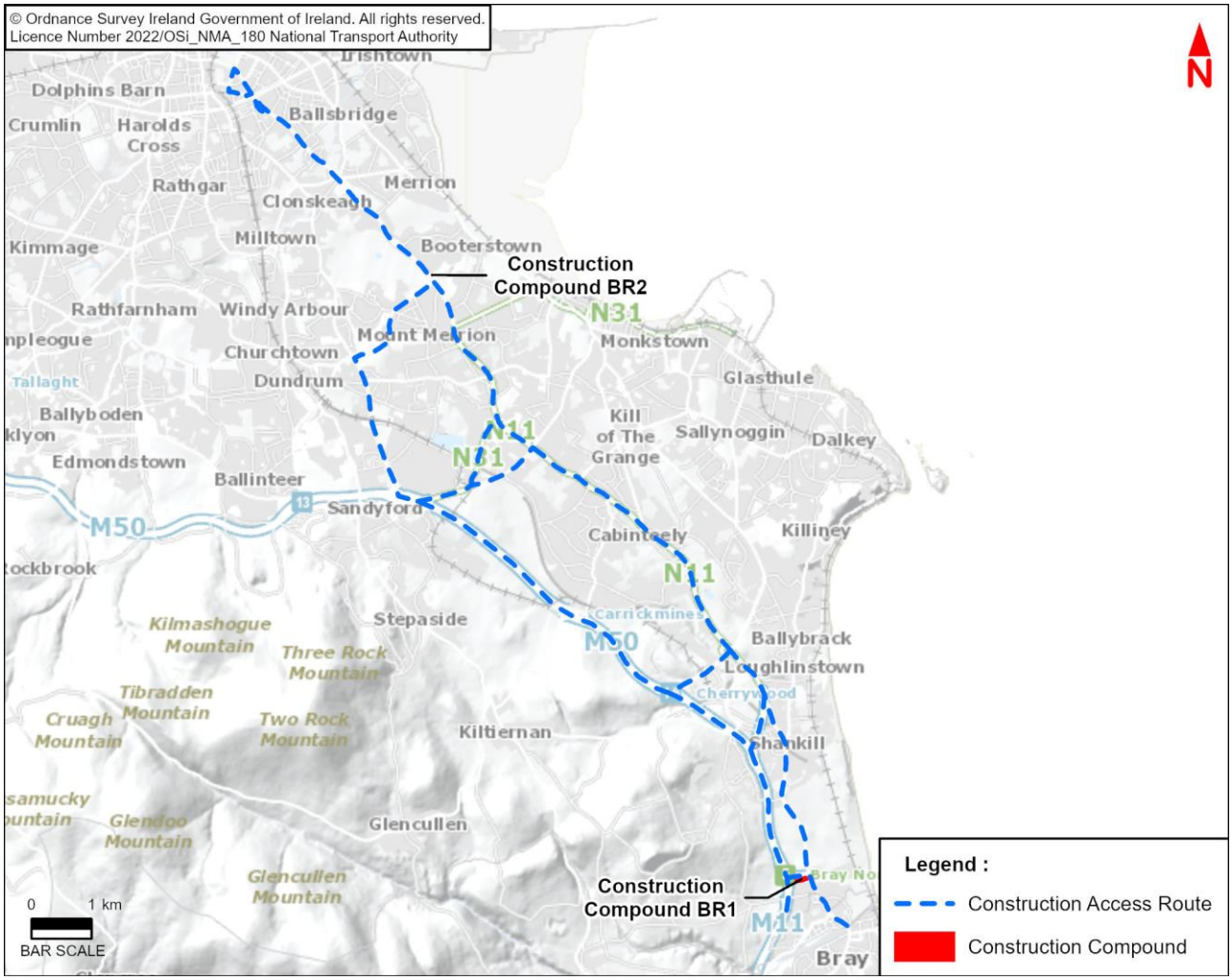

Diagram 6.2: Proposed Construction Routes and Main Compound Locations

Given the length and varying nature of each subsection it is proposed to establish several construction compounds for the duration of the works. These areas will be used to store construction materials, cater for employee facilities and may also provide limited space for employee parking. Diagram 6.2 illustrates the extent of each subsection of the works with reference to the indicative locations of the main construction compounds:

- **Construction Compound BR1:** Cois Cairn, southwest of Wilford Junction; and
- **Construction Compound BR2:** Fosterbrook.

In addition to the Construction Compounds, welfare facilities will be provided along the Proposed Scheme. The Contractor, when appointed, may identify other (or additional) construction compound locations, subject to gaining all necessary approvals.

6.5.4 Potential Construction Impact

Construction of the Proposed Scheme has the potential to impact people's day-to-day activities along the corridor while the works are underway. Chapter 5 (Construction) of the EIAR and the CEMP (Appendix A5.1 in Volume 4 of the EIAR), identify impactful activities, considers their effect, and identifies mitigation measures to reduce or remove their impact insofar as practicably possible.

For construction activities on or adjacent public roads, all works will be undertaken in accordance with DTTS's 'Traffic Signs Manual, Chapter 8 Temporary Traffic Measures and Signs for Roadworks' and associated guidance. Chapter 5 (Construction) of the EIAR contains temporary traffic management proposals for the Proposed Scheme. These proposals maintain safe distance between road users and road workers, depending on the type of construction activities taking place and existing site constraints. Temporary diversions, and in some instances

temporary road closures, may be required where a safe distance cannot be maintained to undertake works necessary to complete the Proposed Scheme. All road closures and diversions will be determined by the NTA, who may liaise with the local authority and An Garda Siochana, as necessary. The need for temporary access restrictions will be confirmed with residents and businesses prior to their implementation.

6.5.4.1 Pedestrian Provision

As described in Chapter 5 (Construction) of the EIAR, pedestrians will be temporarily impacted by construction activities along the direct study area. Pedestrian diversions and temporary surface footpaths will be used to facilitate pedestrian movements around construction activities. Access to local amenities, such as bus stops, traffic crossings, private dwellings, and businesses, may be temporarily altered but access will be maintained.

Due consideration will be given to pedestrian provisions in accordance with Section 8.2.8 of the DTTS Chapter 8, Temporary Traffic Measures and Signs for Roadworks of the Traffic Signs Manual (DTTS 2019a) and the DTTS Temporary Traffic Management Design Guidance (DTTS 2019b), to ensure the safety of all road users, in particular pedestrians (including able-bodied pedestrians, wheel-chair users, mobility impaired pedestrians, pushchair users etc.). Therefore, where footpaths are affected by construction, a safe route will be provided past the works area, and where practicable, provisions for matching existing facilities for pedestrians. Due consideration will also be given to the need for temporary ramps, and measures for accessible users, where changes in elevation are temporarily introduced to facilitate works and footpath diversions. Entrance points to the construction zone will be controlled as required.

6.5.4.2 Cycling Provisions

Cyclists may be temporarily impacted by construction activities along the Proposed Scheme corridor. As part of Temporary Traffic Management arrangements, the appointed Contractor will give due consideration to cyclist provision in accordance with Section 8.2.8 of the DTTS Chapter 8, Temporary Traffic Measures and Signs for Roadworks of the Traffic Signs Manual (DTTS 2019a) and the DTTS Temporary Traffic Management Design Guidance (DTTS 2019b), including the use of site-based risk assessments. Therefore, where cycle tracks are affected by construction, a safe route will be provided past the work area, and where practicable, provisions for matching existing facilities for cyclists will be made.

6.5.4.3 Public Transport Provisions

Existing public transport routes will be maintained throughout the duration of the Construction Phase of the Proposed Scheme (notwithstanding potential for occasional road closures / diversions as described in Chapter 5 (Construction) of the EIAR. Wherever practicable, bus services will be prioritised over general traffic. However, the temporary closure of sections of existing dedicated bus lanes may be required to facilitate the construction of new bus priority infrastructure that is being developed as part of the Proposed Scheme. It is also likely that some existing bus stop locations may need to be temporarily relocated to accommodate the works. In such cases operational bus stops will be safely accessible to all users.

6.5.4.4 Parking and Loading

Parking and loading locations may be temporarily impacted by construction activities along the Proposed Scheme corridor. There may be temporary restrictions to on-street parking and loading facilities. The appointed contractor will discuss temporary traffic management measures with the road authority and directly affected residents/business with the aim of minimising disruption.

6.5.4.5 General Traffic

The Proposed Scheme will be constructed to ensure the mitigation of disturbance to residents, businesses and existing traffic. Localised temporary lane or road closures may be required for short periods. Details of indicative temporary traffic management measures to facilitate construction of the Proposed Scheme are included in Chapter 5 (Construction) of the EIAR. All road closures and diversions will be determined by the NTA, who may liaise with the local authority and An Garda Siochana, as necessary. It should be noted that access will be maintained for emergency vehicles along the Proposed Scheme, throughout the Construction Phase.

6.5.4.5.1 General Traffic Redistribution

Significant impacts due to general traffic redistribution away from the direct study area are not anticipated during the Construction Phase based on the intended nature of the progressive works along the corridor whereby traffic flows are to be maintained in both directions. There may be a requirement for some localised temporary lane closures for short durations of the day, which will involve consultation between the appointed contractor and relevant authorities. Access for general traffic to existing residential and commercial units immediately adjacent to the Proposed Scheme is to be accommodated throughout the Construction Phase.

The appointed contractor will develop a CTMP that gives due consideration to provision of local access requirements and designates appropriate diversion routes in the case where localised temporary closures are required. Overall, for these reasons, the effect on general traffic redistribution is anticipated to be **Medium Negative and Short Term** due to the temporary nature of any restrictions.

For the purpose of Air Quality (Chapter 7 of the EIAR), Climate (Chapter 8 of the EIAR) and Noise & Vibration (Chapter 9 of the EIAR) impacts assessments, a worst-case scenario for construction activities was considered for assessment purposes and has been modelled in the LAM based on a notional stage of construction whereby sub-sections within Sections 1a, 1b 2a, 2b 3a, 3b and 4a are under construction concurrently. Further details on the impacts assessment can be found within these chapters.

6.5.4.5.2 Construction Traffic Generation

Site Operatives: As described in the supporting CTMP, it is expected that there will be 150 to 200 staff directly employed across the Proposed Scheme, rising to 280 staff at peak construction.

Typical work hours on site are expected to be between 07:00 and 23:00 with personnel working across early and late shifts. On-site start and finish times will ensure personnel travel does not correspond to the peak hour periods of 08:00 to 09:00 and 17:00 to 18:00. On this basis, less than 10 trips by private vehicle are expected to and from site during peak AM and PM periods by personnel.

The appointed contractor will prepare a Construction Stage Mobility Management Plan (CSMMP) which will be developed prior to construction, as described in Appendix A5.1 CEMP in Volume 4 of the EIAR, to actively discourage personnel from using private vehicles to travel to site. The CSMMP will promote the use of public transport, cycling and walking by personnel. Private parking at the Construction Compound will be limited. Vehicle-sharing will be encouraged, subject to public health guidelines, where travel by private vehicle is a necessity e.g. for transporting heavy equipment. A combination of CSMMP measures, as well as work shift patterns, means that fewer than 10 trips by private vehicle are envisaged to and from site during peak periods.

Heavy Goods Vehicles (HGVs): Additional construction traffic will be generated during the Construction Phase of the Proposed Scheme, for the purpose of the following:

- Clearance of existing site material and waste;
- Deliveries of construction material; and
- Removal of construction waste material.

The construction section of the EIAR provides a breakdown of the expected operation for the construction of the Proposed Scheme during each subsection. It should be noted that the CTMP will control vehicular movement along the construction route, including restrictions on the number of HGVs accessing and egressing the construction works throughout the day to mitigate the impacts to general traffic on the surrounding road network.

Based on construction activities associated with the Proposed Scheme, the maximum number of HGVs expected to be in operation across the Proposed Scheme during peak haulage activities is 86 vehicles.

In a typical hour during peak haulage activity of the Proposed Scheme, 40% of HGVs are anticipated to be in operation, which equates to 34 HGVs in total. A total of 34 two-way truck movements are therefore expected in a typical hour during peak haulage activity of the Proposed Scheme.

Overall Peak Hour Impacts: The contents of Table 6.1 outline the anticipated maximum construction traffic generation by site operatives and HGVs during the AM and PM Peak Hours.

Table 6.1: Anticipated Maximum Construction Traffic Generation during Construction Phase

Peak Hour	Arrivals		Departures		Total Two-Way Traffic Flows (Vehicles)	Total Two-Way Traffic Flows (PCUs)
	Car / Van (1 PCU)	HGV (2.3 PCUs)	Car / Van (1 PCU)	HGV (2.3 PCUs)		
AM Peak Hour	10	34	0	34	78	166
PM Peak Hour	0	34	10	34	78	166

Given that the above impacts are marginally over the thresholds set out in TII's Guidelines for Transport Assessments, and that the vehicle usage will be spread through the length of the route, it is considered appropriate to define the general traffic impacts of the Construction Phase to be **Medium Negative and Short Term**. Therefore, no further analysis is required for the purpose of this assessment.

It should be noted that further detail on the restrictions to construction vehicle movements during the peak periods of the day will be contained within the appointed contractor's CTMP prior to construction. An outline CTMP can be found in Appendix A5.1 (Construction Environmental Management Plan) in Volume 4 of the EIAR.

6.5.4.5.3 Construction Phase Summary

The contents of Table 6.2 present a summary of the predicted impacts of the Proposed Scheme during Construction Phase.

Table 6.2: Summary of Construction Phase Predicted Impacts

Assessment Topic	Effect	Predicted Impact
Walking	Restrictions to pedestrians along Proposed Scheme.	Low, Negative and Short-term
Cycling	Restrictions to cyclists along Proposed Scheme	Medium, Negative and Short-term
Bus	Restrictions to public transport along Proposed Scheme.	Low, Negative and Short-term
Parking and Loading	Restrictions to parking / loading along Proposed Scheme.	Low, Negative and Short-term
General Traffic	Restrictions to general traffic along Proposed Scheme	Medium, Negative and Short-term
	Additional construction traffic flows upon surrounding road network	Medium, Negative and Short-term

6.6 Operational Phase

6.6.1 Overview

As previously noted, the impact assessment for the Operational Phase has been outlined in terms of a qualitative (walking, cycling, bus infrastructure and parking / loading) and quantitative (bus journey times / reliability, general traffic and people movement) impact analysis, which are outlined in the following sections.

6.6.2 Qualitative Assessment

6.6.2.1 Qualitative Assessment Methodology

The structure of the qualitative assessment is consistent with the Baseline Environment (Section 6.3) where the Proposed Scheme has been split into two sections. This has allowed for a more detailed analysis of the quality of the infrastructure proposals per section. The approach for each qualitative assessment is outlined below.

6.6.2.1.1 Pedestrian Infrastructure

The impacts to the quality of the Pedestrian Infrastructure as a result of the Proposed Scheme have been considered with reference to any changes to the existing pedestrian facilities along footpaths and crossing locations within the direct study area. Whilst reference has been given to the overall changes along the full length of the Proposed Scheme the impact assessment primarily focuses only on the pedestrian facilities at junctions.

Where the Proposed Scheme introduces a change to a junction layout, the impact on pedestrians has been assessed using a set of criteria which has been derived from guidance listed in Section 3. The contents of Table 6.3 outline the assessment criteria for each junction.

Table 6.3: Pedestrian Junction Assessment Criteria

Aspect	Indicator
Routing	Are pedestrian crossings (signalised or uncontrolled) available on all arms?
Directness	Where crossings are available, do they offer direct movements which do not require diversions or staggered crossings i.e., no or little delay required for pedestrians to cross in one direct movement?
Vehicular speeds	Are there measures in place to promote low vehicular speeds, such as minimally sized corner radii and narrow carriageway lane widths?
Accessibility	Where crossings exist, are there adequate tactile paving, dropped kerbs and road markings?
Widths	Are there adequate footpath and crossing widths in accordance with national standards?

A LoS rating has been applied to each junction for both the Do Minimum and Do Something scenarios based on whether the above indicators have been met.

Table 6.4: Pedestrian Junction Assessment LoS

LoS	Indicators Met (of a Total of 5)
A	5
B	4
C	3
D	2
E	1
F	0

When comparing the Do Minimum and Do Something scenarios for pedestrians, the terms outlined in Table 6.4 have been used to describe the impact, based on the changes in the Qualitative Pedestrian LoS rating.

Table 6.5: Description of Impact for Pedestrian Qualitative Assessment

Magnitude of Impact	Change in LoS Rating
High	4 to 5
Medium	2 to 3
Low	1
Negligible	0

6.6.2.1.2 Cycling Infrastructure

The impacts to the quality of the cycling infrastructure as a result of the Proposed Scheme have been considered with reference to the changes in physical provision for cyclists provided during the Do Minimum and Do Something scenarios. The NTA's National Cycle Manual's Quality of Service (QoS) Evaluation criteria have been adapted for use in assessing the cycling qualitative impact along the Proposed Scheme. The refined cycling facilities criteria are as follows:

- **Segregation:** a measure of the separation between vehicular traffic and cycling facilities;
- **Number of adjacent cyclists / width:** the capacity for cycling two abreast and / or overtaking ('2+1' accommodates two abreast plus one overtaking); and
- **Junction Treatment:** a measure of the treatment of cyclist traffic at existing junctions.

Table 6.6 outlines the assessment criteria with reference to the corresponding LoS ratings.

Table 6.6: Cycling Assessment Criteria

LoS	Segregation	No. of adjacent cyclists / width		Junction treatment
A+	High degree of separation. Minimal delay	2+1	2.5m	Cyclists get green signal priority at signalised junctions / has priority across uncontrolled junctions
A	Well separated at mid-link with some conflict at intersections	1+1	2.0m	Toucan crossings at signalised junctions for cyclists along CBC / Protected junctions not already classified as A+ for junction treatment
B	On-road cycle lanes or carriageway designated as 'quiet cycle routes'	1+1	1.75m	Cyclists share green time with general traffic and cycle lanes continue through the junction, for junctions not already classified as A or A+ for junction treatment
C	Bicycle share traffic or bus lanes	1+0	1.25m	Cyclists share green time with general traffic with cycle facilities (advanced stacking locations / cycle lanes) available up to the junction but don't continue through
D	No specific bicycle facilities	1+0	0.75m	No specific bicycle facilities

As the cycle provision varies along the corridor, each section of the Proposed Scheme has been further separated into smaller subsections in order to apply the cycling assessment criteria appropriately.

When comparing the DoMinimum and DoSomething scenarios for cyclists, the terms outlined in Table 6.7 have been used to describe the impact, based on the changes in the Qualitative Cycling LoS rating.

Table 6.7: Description of Impact for Cycling Qualitative Assessment

Magnitude of Impact	Change in LoS Rating
High	3 to 4
Medium	2
Low	1
Negligible	0

6.6.2.1.3 Bus Infrastructure

The implementation of the Proposed Scheme will result in changes in the quality of bus infrastructure provision along the route, including dedicated bus lanes and bus stop upgrades / relocations. Improvement in bus priority measures will reduce the interaction between buses and general traffic and reduce the likelihood of delays.

The qualitative impact assessment has been undertaken based on the following factors:

- Provision of bus lanes;
- Bus stop provision; and
- Changes to the existing bus stop facilities:
  - Real-time information;
  - Timetable information;
  - Shelters;
  - Seating;
  - Accessible kerbs; and
  - Removal of indented drop off areas, where appropriate.

The magnitude of impact of the Proposed Scheme, applied to the qualitative review of the above factors, is set out in Table 6.8.

Table 6.8: Magnitude of Impact for Bus Users Qualitative Assessment

Impact	Description of Impact / Proposed Changes
High positive	Significant benefit for bus users with no disbenefits
Medium positive	Positive impact for bus stop users with benefits outweighing any minor disbenefits.
Low positive	Slight benefit for users with benefits outweighing any disbenefits.
Negligible impact	Marginal impact to user buses where any benefits or disbenefits are offset.
Low negative	Slight negative impact for users with disbenefits marginally outweighing benefits.
Medium negative	Negative impact for bus users with benefits not outweighing any disbenefits.
High negative	Complete removal of provision.

6.6.2.1.4 Parking and Loading

The potential impacts of the Proposed Scheme on parking and loading provision have been assessed through a comparison of the availability of spaces or lengths of bay in the Do Minimum and Do Something scenarios. The assessment considers the impact of any changes on the general availability of parking and loading in the vicinity of the Proposed Scheme. It classifies parking into the following categories:

- Designated Paid Parking;
- Permit Parking;
- Disabled Permit Parking;
- Loading / Unloading (in designated Loading Bays);
- Loading / Unloading (outside designated Loading Bays);
- Taxi Parking (Taxi Ranks);
- Commercial vehicles parked for display (car sales); and
- Informal Parking.

This qualitative assessment has also taken into account nearby parking, which is defined as alternative parking locations along side roads within 200 – 250m of the Proposed Scheme.

Significance ratings for the impacts of any changes in parking provision have been generated for each specific instance of change and for each section of the Proposed Scheme. The ratings are based upon professional judgement and experience and consider:

- The magnitude of change in parking availability;

- The availability of alternative parking; and
- Nearby land uses, such as businesses.

Note that the parking and loading assessment has been undertaken as a qualitative analysis based on the above criteria and does not generate a resulting LoS rating.

6.6.2.2 Section 1 – Leeson Street to Donnybrook (Anglesea Road Junction)

6.6.2.2.0 Pedestrian Infrastructure

The key infrastructural changes to the pedestrian links along Section 1 of the Proposed Scheme are the following:

- Increased footpath width, crossing width, and pedestrian directness;
- Increased provision of priority crossings across side streets with raised tables; and
- Provision of signalised pedestrian crossings on all arms at R138 Leeson Street Lower / Hatch Street Lower junction, R138 Leeson Street Lower / Fitzwilliam Place junction, R138 Sussex Road / Sussex Terrace junction, R138 Leeson Street Upper / Dartmouth Road junction, R138 Leeson Street Upper / Appian Way junction, R138 Leeson Street Upper / Wellington Place junction, R138 Morehampton Road / Bloomfield Avenue junction and R138 Donnybrook Road / Belmont Avenue junction.

The assessment of the qualitative impacts on the Pedestrian Infrastructure for Section 1 of the Proposed Scheme are summarised in Table 6.9. A detailed breakdown of the assessment at each impacted junction, including a list of the junctions which experience no change, can be found in TIA Appendix 4 (Pedestrian Infrastructure Assessment Section).

Table 6.9: Section 1 – Pedestrian Impact during Operational Phase

Location	Chainage	Do Minimum LoS	Do Something LoS	Impact
R138 Leeson Street Lower / R138 St. Stephens Green Junction	A0 - A25	E	C	Medium Positive
R138 Leeson Street Lower / Leeson Lane JunctionR138 Leeson Street Lower / Leeson Lane Junction	A50 - A60	D	C	Low Positive
R138 Leeson Street Lower mid-link crossing *Between R138 Leeson Street Lower / Leeson Lane Junction and the R138 Leeson Street Lower / Stable Lane Junction*	A160	B	A	Low Positive
R138 Leeson Street Lower / Hatch Street Lower 4-arm Signalised Junction	A230 - A250	D	A	Medium Positive
R138 Leeson Street Lower / Fitzwilliam Place 4-arm Signalised Junction	A450 - A500	E	A	High Positive
R138 Leeson Street Lower / Wilton Terrace 4-arm Signalised Junction	A530 - A550	C	B	Low Positive
R138 Leeson Street Upper / Grand Parade 4-arm Signalised Junction	A550 - A580	D	B	Medium Positive
R138 Leeson Street Upper / Sussex Road 3-arm Signalised Junction	B50 - B80	F	D	Medium Positive
R138 Sussex Road / Sussex Terrace 3-arm Priority Junction	B100 - B130	E	A	High Positive
R138 Leeson Street Upper / Dartmouth Road 3-arm Priority Junction	A690 - 720	E	A	High Positive
R138 Sussex Road / Mespil Estate Access	B240	D	B	Medium Positive
R138 Sussex Road / Mespil Estate (south) Access	B280	D	B	Medium Positive
R138 Leeson Street Upper / Burlington Road 4-arm Signalised Junction	A970 - A1020	E	C	Medium Positive
R138 Leeson Street Upper / Appian Way 3-arm Signalised Junction	A1100 - A1140	E	A	High Positive
R138 Leeson Street Upper / Waterloo Lane 3-arm Priority Junction	D	D	B	Medium Positive

Location	Chainage	Do Minimum LoS	Do Something LoS	Impact
R138 Leeson Street Upper / Waterloo Road 3-arm Signalised Junction	A1220 - A1250	E	C	Medium Positive
R138 Leeson Street Upper / Wellington Place 3-arm Signalised Junction	A1280 - A1320	F	A	High Positive
R138 Morehampton Road / Bloomfield Avenue 3-arm Signalised Junction	A1420 - A1480	D	A	Medium Positive
R138 Morehampton Road / Hampton Hotel 3-arm Priority Junction (north)	A1520 - A1540	C	B	Low Positive
R138 Morehampton Road / Hampton Hotel 3-arm Priority Junction (south)	A1590 - A1610	C	B	Low Positive
R138 Morehampton Road / Morehampton Terrace 3-arm Priority Junction	A1650	C	B	Low Positive
R138 Morehampton Road / Brendan Road 3-arm Priority Junction	A1875	C	B	Low Positive
R138 Morehampton Road / Mount Eden Road 3-arm Priority Junction	A1890 - A1910	C	B	Low Positive
R138 Morehampton Road / Auburn Avenue 3-arm Priority Junction	A1940 - A1950	C	B	Low Positive
R138 Donnybrook Road / Belmont Avenue 4-Arm Priority Junction	A1980 - A2020	F	A	High Positive
R138 Donnybrook Road / Mulberry Lane 3-arm Priority Junction	A2060 - A2070	E	B	Medium Positive
R138 Donnybrook Road / The Crescent 3-arm Priority Junction	A2100 - A2130	E	C	Medium Positive
R138 Donnybrook Road / Pembroke Cottages 3-arm Priority Junction	A2160 - A2170	D	C	Low Positive
R138 Donnybrook Road / The Crescent 4-arm Priority Junction	A2250 - A2280	D	C	Low Positive
R138 Donnybrook Road / Eglinton Terrace 3-Arm Priority Junction	A2290 - A2300	C	B	Low Positive
R138 Donnybrook Road / Brookvale Road 3-Arm Priority Junction	A2350 - A2370	D	B	Medium Positive
R138 Donnybrook Road / Eglinton Road 3-Arm Signalised Junction	A2520 - A2550	F	B	High Positive
Section Summary		**D**	**B**	**Medium Positive**

The contents of Table 6.9 demonstrate that the Proposed Scheme will have a long-term positive impact on the quality of the pedestrian infrastructure at junctions within Section 1.

The LoS during the Do Minimum scenario ranges between B and F with 31 of the 32 impacted locations being rated as C or lower. During the Do Something scenario, 24 of the 32 impacted locations along this section achieve the highest A / B ratings, with seven locations receiving a C rating and one location increasing from F to D. This is because of the proposed improvements to the existing pedestrian facilities in the form of additional crossing locations, increased pedestrian directness, provision of traffic calming measures to reduce vehicle speeds, improved accessibility and increased footpath and crossing widths. All proposed facilities have been designed in accordance with the principles of DMURS and the National Disability Authority (NDA) 'Building for Everyone: A Universal Design Approach' (NDA 2020) with regards to catering for all users, including those with disabilities.

Overall, it is anticipated that there will be **Medium Positive impact** to the quality of the pedestrian infrastructure along Section 1 of the Proposed Scheme, during the operational phase, which aligns with the overarching aim to provide enhanced walking infrastructure on the corridor.

6.6.2.2.1 Cycling Infrastructure

The key cycling improvements along Section 1 of the Proposed Scheme can be summarised as follows:

- Proposed 1.25 to 2.0m wide cycle track, with on both sides of R138 Leeson Street Lower, R138 Leeson Street Upper, R138 Sussex Road, R138 Morehampton Road and R138 Donnybrook Road

to replace the existing cycle lanes and combined bus and cycle lanes between R138 Leeson Street Lower / R138 St. Stephens Green Junction to the R138 Donnybrook Road / R815 Anglesea Road Junction;

- Introduced link to the proposed Dodder Greenway at the Eglinton Road junction;
- Updated layouts incorporated for the junctions with Appian Way, Waterloo Road, Wellington Place, Herbert Park, Belmont Avenue, Eglinton Road and Anglesea Road to accommodate revised cycle layouts, revised pedestrian crossings, and revised kerb lines where necessary; and
- Proposed provision of continuous cycle bypasses at all bus stops.

Along Section 1, the Proposed Scheme will provide a 60mm set down kerb segregation between the footpath and the cycle track. This is of particular importance in the context of providing for pedestrians with visual impairments, whereby the use of white line segregation (as is the case in some areas of the baseline environment) is not as effective for establishing a clear understanding of the change of pavement use and potential for cyclist / pedestrian interactions. The cycle tracks will also be raised 120mm from the carriageway to provide segregation from vehicles.

The contents of Table 6.10 outline the cycling qualitative assessment along Section 1 of the Proposed Scheme, which sets out the overall Do Minimum LoS and the Do Something LoS and the description of impact. TIA Appendix 4 (Cycling Infrastructure Assessment Section) outlines in further detail the methodology behind each LoS rating given to the Do Minimum and Do Something scenarios.

Table 6.10: Section 1 – Cycling Impact during Operational Phase

Location	Chainage	DoMinimum LoS	DoSomething LoS	Impact
R138 Leeson Street Lower: R138 St Stephen's Green to R111 Grand Parade	A0 - A600	B	B	Negligible
R138 Leeson Street Upper / Sussex Road: R111 Grand Parade to Burlington Road	A600 - A1000	C	B	Low Positive
R138 Leeson Street Upper: Burlington Road to Wellington Place	A1000 - A1300	D	B	Medium Positive
R138 Morehampton Road: Wellington Place to Herbert Park	A1300 - A1700	B	A	Low Positive
R138 Morehampton Road / Donnybrook Road: Herbert Park to Belmont Avenue	A1700 - A2000	C	B	Low Positive
R138 Donnybrook Road: Belmont Avenue to R815 Anglesea Road	A2000 - A2600	C	B	Low Positive
Section Summary		**C**	**B**	**Low Positive**

Table 6.10 demonstrates that the scheme will have a permanent positive impact on the quality of the cycle infrastructure along Section 1 of the Proposed Scheme.

During the DoSomething scenario, i.e. following the development of the Proposed Scheme the LoS rating increases to a B. This is due to the proposed improvements to the existing cycling facilities along this stretch of cycle route, in the form of improved segregation, and junction treatment. Most junctions receive a final B rating in the Do Something LoS, with one receiving an A, whilst they range from B to D in the Do Minimum LoS.

Overall, it is anticipated that there will be a **Low Positive** impact to the quality of the cycling infrastructure along Section 1 of the Proposed Scheme, during the Operational Phase.

The findings of the cycling assessment fully align with the objective of the CBC Infrastructure Works, applicable to the Traffic and Transport assessment of the Proposed Scheme, to 'Enhance the potential for cycling by providing safe infrastructure for cycling, segregated from general traffic wherever practicable'.

6.6.2.2.2 Bus Infrastructure

This section provides an assessment of the changes in the quality of bus stop infrastructure provision as a result of the Proposed Scheme between R138 Leeson Street Lower / R138 St. Stephens Green Junction to the R138 Donnybrook Road / R815 Anglesea Road Junction, including upgrades and any relocations.

There are currently a total of 19 bus stops along Section 1, 10 inbound stop and nine outbound stops. Under the Proposed Scheme, there will be a total of 24 bus stops along Section 1 with 12 inbound and 12 outbound stops, five more than in the Do Minimum. The layout of new bus stops is considered to better serve the existing and future catchment and be closer to existing and new pedestrian crossing facilities for improved convenience.

Table 6.11 presents a summary of the number and location of proposed new bus stops as a result of the scheme.

Table 6.11: Overview of Changes to Bus Stops Between Leeson Street and Donnybrook (Anglesea Road Junction)

Direction	Stop	Chainage	Do Something	Comment
Inbound	786 (Bus)	A180	Relocated	Bus stop 786 to be relocated 50m south of existing location.
Inbound	786 (Coach)	A215	New separated coach stop	The existing coach stop 786 is shared with a local bus stop. It is proposed to separate the stops and provide a new coach stop 75m south of the existing stop.
Inbound	909 (Bus)	A400	Retained	Bus stop 909 to be retained.
Inbound	909 (Coach)	A340	New separated coach stop	The existing coach stop 909 is shared with a local bus stop. It is proposed to separate the stops and provide a new coach stop 70m north of the existing stop.
Inbound	908 (Bus)	A675	Retained	Bus stop 908 to be retained
Inbound	908 (Coach)	A645	New separated coach stop	The existing coach stop 908 is shared with a local bus stop. It is proposed to separate the bus and coach stops and provide a new coach stop 20m north of the existing stop. The relocated stop will also cater for coach services currently serving stop 906.
Inbound	907 (Bus)	A850	Retained	Bus stop 907 to be retained.
Inbound	906 (Bus)	A1170	Relocated	Bus stop 907 to be relocated 85m south of existing location.
Inbound	906 (Coach)	AN/A	Removed / rationalised	It is proposed to remove the coach stop currently shared with the local bus stop (906). Services currently utilising the stop are proposed to use coach stop 908 which is 440m north of the existing stop 906.
Inbound	777 (Bus)	A1415	Retained	Bus stop 777 to be retained
Inbound	776 (Combined Bus and Coach)	A1630	Retained	Stop 776 is a combined bus and coach stop. It is proposed to retain the shared stop. The retained stop will also cater for coach services currently serving stop 775.
Inbound	775 (Bus)	A1925	Retained	Bus stop 775 to be retained
Inbound	775 (Coach)	A1630	Removed / rationalised	It is proposed to remove the coach stop currently shared with the local bus stop (775). Services currently utilising the stop are proposed to use coach stop 776 which is proposed 290m north of the existing 775 stop.
Inbound	774 (Bus)	AN/A	Removed	It is proposed to remove stop 774.
Inbound	773 (Combined Bus and Coach)	A2475	Relocated	Stop 773 is a combined bus and coach stop. It is proposed to relocate the shared stop 15m north of the existing location. The relocated stop will also cater for coach services currently serving stop 772.
Outbound	845 (Bus)	A110	Retained	Bus stop 845 to be retained
Outbound	845 (Coach)	A140	New separated coach stop	The existing coach stop 845 is shared with a local bus stop. It is proposed to separate the stops and provide a new coach stop 30m south of the existing stop.
Outbound	846 (Bus)	A365	Retained	Bus stop 846 to be retained
Outbound	846 (Coach)	A420	New separated coach stop	The existing coach stop 846 is shared with a local bus stop. It is proposed to separate the stops and provide a new coach stop 55m south of the existing stop.
Outbound	847 (Combined Bus and Coach)	A610	Retained	Stop 847 is a combined bus and coach stop. It is proposed to retain the shared stop.
Outbound	848 (Bus)	A350	Retained	Bus stop 848 to be retained

Direction	Stop	Chainage	Do Something	Comment
Outbound	848 (Coach)	AB300	New separated coach stop	The existing coach stop 848 is shared with a local bus stop. It is proposed to separate the bus and coach stops and provide a new coach stop 50m north of the existing stop.
Outbound	2795 (Bus)	A1265	Relocated	Bus stop 2795 to be relocated 95m south of existing location.
Outbound	756 (Combined Bus and Coach)	A1540	Relocated	Stop 756 is a combined bus and coach stop. It is proposed to relocate the combined stop 25m south.
Outbound	757 (Bus)	A1820	Relocated	Bus stop 757 to be relocated 30m north of existing location.
Outbound	758 (Bus)	A2050	Retained	Bus stop 758 to be retained
Outbound	759 (Bus)	A2440	Retained	Bus stop 759 to be retained
Outbound	759 (Coach)	A2850	Removed / rationalised	It is proposed to remove the coach stop currently shared with the local bus stop (759). Services currently utilising the stop are proposed to use coach stop 760 which is proposed 420m south of the existing 759 stop.

As indicated in Table 6.11, the proposed changes result in the total number of bus / coach stops along Section 1 increasing from 19 to 24.

Table 6.12 outlines a summary of the improvements to the bus stop infrastructure along Section 1, with reference to the number and percentage of bus stops that provide each facility in the Do Minimum and Do Something scenarios.

Table 6.12: Overview of Changes in Bus Stop Facilities Between Leeson Street and Donnybrook (Anglesea Road Junction)

Bus Stop Facility	Do Minimum		Do Something		Comment
	Number of stops	Percentage of stops	Number of stops	Percentage of stops	
Realtime information	14	74%	24	100%	It is proposed that all bus stops provide real-time information.
Timetable information	18	95%	24	100%	It is proposed that all bus stops provide timetable information.
Shelter	8	42%	24	100%	It is proposed that all bus stops provide a shelter.
Seating	6	32%	24	100%	It is proposed for all bus stops provide seating.
Accessible Kerbs	11	58%	24	100%	It is proposed that all bus stops provide accessible kerbs for alighting/boarding of passengers.
Indented Drop off Area	4	21%	4	17%	17% of stops to be indented from bus lane
Total number of stops	19		24		A difference of 5 from the Do Minimum

Table 6.12 outlines that there are significant improvements to the bus stop facilities along Section 1 of the Proposed Scheme. It is proposed that all bus stops provide real time / timetable information, accessible kerbs and shelter and seating. The Proposed Scheme has an overall **Medium Positive** impact on the bus stop facilities along Section 1.

6.6.2.2.3 Parking and Loading

The Proposed Scheme will impact on some existing parking and loading locations along Section 1. The areas of parking changes are as follows:

- There are currently 17 taxi parking spaces located on the R138 Leeson Street Upper northbound and southbound carriageways between Hatch Street Lower and Leeson Close. It is proposed to remove all 17 spaces at this location to facilitate the development of bus and cycle tracks. To mitigate this impact, it is proposed that 21 (parallel) day and display parking spaces on Hatch Street will be amended to time plated parking and cater to pay and display parking during the day and taxi bays at night. The impact of this loss of 17 taxi spaces and time plating of 21 pay and display spaces is considered to have a **Low Negative** impact;

- There are currently 13 taxi parking spaces located on R138 Sussex Road southbound carriageway. It is proposed to remove four taxi parking spaces at this location to facilitate the provision of a coach stop. Given the retention of nine of the 13 taxi parking spaces, this loss of four spaces is considered to have a **Low Negative** impact;
- There are currently eight loading / unloading spaces located on R138 Leeson Street and R138 Sussex Road between Grand Parade and Burlington Road. It is proposed to remove six of the eight loading / unloading spaces to enable a right turn lane from R138 Leeson Street Upper to R138 Sussex Road. Additionally, it is proposed to relocate the current two loading/ unloading spaces which are located to prior to the R138 Sussex Road / Sussex Terrace junction from north of the carriageway to south of the carriageway. The impact of this loss is considered to have a **Medium Negative** impact;
- There are currently 56 permit parking spaces located along R138 Leeson Street Upper and R138 Sussex Road between Grand Parade and Burlington Road. It is proposed to provide three additional permit parking spaces to the south of the existing permit parking on R138 Leeson Street Upper. This is considered to have a **Low Positive** impact;
- There are currently two designated paid parking spaces located on the R138 Sussex Road southbound carriageway. It is proposed to remove the two designated paid parking spaces to provide a relocated loading / unloading bay. This loss is considered to have a **Low Negative** impact;
- There are currently 20 designated paid parking spaces on R138 Morehampton Road. It is proposed to remove all 20 spaces at this location, which is considered to have a **Medium Negative,** impact;
- There are 21 permit spaces are located on R138 Morehampton Road between Wellington Place and Belmont Avenue. It is proposed to remove 18 spaces in this location resulting in a total of three remaining permit parking spaces (between Bloomfield Avenue and Morehampton Court). Due to the number of parking adjacent to R138 Morehampton Road, this loss is considered to have a **Low Negative** impact;
- There are four informal parking spaces located on the R138 Morehampton Road southbound carriageway between Marlborough Road and Brendan Road, it is proposed to remove all four spaces. Due to the number of parking adjacent to R138 Morehampton Road, this loss is considered to have a **Low Negative** impact;
- There is currently one disabled parking space located on R138 Morehampton Road to the south of the Herbert Park junction. It is proposed to relocate the disabled space to Herbert Park approximately 140m from the existing location. The impact is thus considered to be a **Low Negative** impact;
- There is currently one loading / unloading bay along R138 Morehampton Road to the north of the R138 Morehampton Road / Victoria Avenue junction. The existing bay provides space for two vehicles. It is proposed to formalise the loading / unloading bay which results in the reduction of one space. Additionally, it is proposed to provide an additional loading / unloading bay along R138 Morehampton Road to the south of the R138 Morehampton Road / Herbert Park / Marlborough Road junction which will provide space for two vehicles. The change is considered to have a **Negligible** impact;
- There are currently 35 designated paid parking spaces on R138 Donnybrook Road predominately between Brendan Road and The Crescent. It is proposed to remove 14 spaces across two locations: opposite Aubrey Road where parking providing is removed and adjacent to Mulberry Lane where parking providing is reduced. The impact is thus considered to be a **Low Negative** impact;
- There is currently one permit parking space on R138 Donnybrook Road (one space) on the northbound carriageway opposite Donnybrook Stadium. It is proposed to remove the existing permit parking which is considered to have a **Negligible** impact;
- There are currently five loading / unloading bays located on R138 Donnybrook Road. It is proposed to remove two of the five spaces, these are located to the north of Brookvale Road and to the north of Belmont Avenue. Considering the two loading bays on adjacent roads and the retention of three loading bays, the impact is thus determined to be a **Low Negative** impact; and
- There are currently 15 commercial (business) parking spaces located along R138 Donnybrook Road. Of the 15 spaces, 12 spaces are adjacent to the northbound carriageway between Eglinton Road and Brookvale Road (six at Fast Fit and six at First Stop) and three are adjacent to R138 Donnybrook Road southbound carriageway between Mulberry Lane and The Crescent (MOLA Architecture). It is proposed to remove a total of ten spaces (three spaces at MOLA Architecture, five spaces at Fast Fit and two spaces at First Stop). The impact of this loss is considered to be a **Medium Negative** impact.

The contents of Table 6.13: present a summary of the parking and loading spaces during the Do Minimum and Do Something scenarios and the resulting change in parking along Section 1.

Table 6.13: Section 1 – Overall Changes in Parking / Loading Spaces

Street	Parking Type	Number of Parking Spaces		
		Do Minimum	Do Something	Change
R138 Leeson Street Upper / R138 Leeson Street Lower / R138 Sussex Road	Designated Paid Parking	2	0	-2
	Permit Parking	56	59	3
	Disabled Permit Parking	1	1	0
	Loading/Unloading (in Designated Loading Bays)	8	2	-6
	Taxi Parking	30	9	-21
	Side Street Parking	230	230	0
R138 Morehampton Road	Designated Paid Parking	20	0	-20
	Permit Parking	21	3	-18
	Disabled Permit Parking	1	1	0
	Loading/Unloading (in Designated Loading Bays)	2	3	1
	Informal Parking	4	0	-4
	Side Street Parking	455	455	0
R138 Donnybrook Road	Designated Paid Parking	35	21	-14
	Permit Parking	1	0	-1
	Disabled Permit Parking	1	1	0
	Loading/Unloading (in Designated Loading Bays)	5	3	-2
	Commercial Vehicles Parked for Display (Car Sales)	15	5	-10
	Side Street Parking	229	229	0
Hatch Street	Designed Paid Parking	50	50	0
	Permit Parking	3	3	0
	Disabled Permit Parking	1	1	0
	Loading / Unloading (Designated)	2	2	0
Total		**1,172**	**1,078**	**-94**

As shown in Table 6.13, the proposed amendments to parking / loading will result in a loss of 94 spaces along Section 1. Where parking is removed, the impact varies between negligible and medium. The overall significance of effect is assessed as a **Medium Negative** impact.

6.6.2.3 Section 2 – Donnybrook (Anglesea Road Junction) to Loughlinstown Roundabout

6.6.2.3.1 Pedestrian Infrastructure

The key infrastructure changes to pedestrian links along Section 2 of the Proposed Scheme are summarised as follows:

- Increased footpath width, crossing width, and pedestrian directness;
- Increased provision of priority crossings across side streets with raised tables;
- Provision of signalised pedestrian crossings on all arms at R138 Donnybrook Road / R815 Anglesea Road junction, R138 Stillorgan Road / Airfield Park junction, R138 Stillorgan Road / Nutley Park junction, Belfield Interchange (Northbound) junction, R138 Stillorgan Road / Merrion Grove / The Rise junction, N11 Stillorgan Road / N31 Brewery Road junction, N11 Stillorgan Road / R113 Leopardstown Road junction, N11 Stillorgan Road / Westminster Road junction, N11 Bray Road / R827 Clonkeen Road junction;
- A new priority controlled pedestrian crossing at the UCD exit (to the Belfield Interchange R138 Stillorgan Road northbound on-slip). This will provide a more defined, controlled crossing option for pedestrians;
- Removal of crossing at the Belfield Interchange (southbound) western arm due to the provision of a cycle track at this location which provides improved cycle segregation. It is not expected to result in severance issues due to the retention of the pedestrian crossing approximately 50m to the west; and

- Provision of new mid-link pedestrian crossings along R128 Stillorgan Road between Dublin Road and R825 Stillorgan Park and to the north Knocksinna.

The assessment of the qualitative impacts on the Pedestrian Infrastructure for Section 2 of the Proposed Scheme are summarised in Table 6.14. A detailed breakdown of the assessment at each impacted junction, including a list of the junctions which experience no change, can be found in TIA Appendix 4 (Pedestrian Infrastructure Assessment Section).

Table 6.14: Section 2 – Pedestrian Impact During Operational Phase

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact
R138 Donnybrook Road / R815 Anglesea Road Signalised Junction	A2570 - A2620	F	B	High Positive
R138 Stillorgan Road / The Court 3-arm Priority Junction	A2890 - A2910	F	B	High Positive
R138 Stillorgan Road / Donnybrook Close 3-arm Priority Junction	A2950 - A2970	D	B	Medium Positive
R138 Stillorgan Road / Airfield Park 4-arm Signalised Junction	A3180 - A3220	C	B	Low Positive
R138 Stillorgan Road / Thornfield (north) 3-arm Priority Junction	A3275	C	B	Low Positive
R138 Stillorgan Road / Thornfield (south) 3-arm Priority Junction	A3340	C	B	Low Positive
R138 Stillorgan Road / Nutley Lane 4-arm Signalised Junction	A3450 - A3500	F	B	High Positive
R138 Stillorgan Road / Belfield Court 3-arm Priority Junction	A3750	E	B	Medium Positive
R138 Stillorgan Road / Nutley Park 3-arm Priority Junction	A3825	F	B	High Positive
Belfield Interchange, Northbound on-slip (at the Proposed Bus interchange)	A3930-A3960	D	B	Medium Positive
Belfield Interchange, Southbound Side 3-arm Signalised Junction	A4050 - A4100	A	B	Low Negative
R138 Stillorgan Road / R112 Fosters Avenue 3-arm Signalised Junction	A4930 - A4980	E	C	Medium Positive
R138 Stillorgan Road / Merrion Grove / The Rise 4-arm Signalised Junction	A5100 - A5140	D	B	Medium Positive
R138 Stillorgan Road / Booterstown Avenue 3-arm Signalised Junction	A5450 - A5500	E	C	Medium Positive
N11 Stillorgan Road / N31 Mount Merrion Avenue 3-arm Signalised Junction	A5780 - 5820	E	C	Medium Positive
N11 Stillorgan Road / Trees Road Lower 4-arm Signalised Junction	A6100 - A6130	E	B	Medium Positive
N11 Stillorgan Road mid-link crossing	A6120	C	B	Low Positive
N11 Stillorgan Road / Priory Drive / Old Dublin Road 4-arm Signalised Junction	A6220 - A6280	E	C	Medium Positive
N11 Stillorgan Road mid-link crossing	A6720	No existing facility	B	High Positive
N11 Stillorgan Road / R825 Lower Kilmacud Road 4-arm Signalised Junction	A6800 - A6850	D	A	Medium Positive
N11 Bray Road / The Hill 3-arm Priority Junction	A7050	F	B	High Positive
N11 Bray Road / Stillorgan Grove 3-arm Priority Junction	A7200	F	B	High Positive
N11 Stillorgan Road mid-link crossing	A7350	C	B	Low Positive
N11 Bray Road / Hospitaller Order of St John of God Access 3-arm Priority Junction	A7450 - A 7460	F	B	High Positive
N11 Stillorgan Road / N31 Brewery Road 4-arm Signalised Junction	A7600 - A7650	F	A	High Positive

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact
N11 Bray Road / Beachwood Court 3-arm Priority Junction	A7850 - A7880	C	B	Low Positive
N11 Stillorgan Road / R113 Leopardstown Road 4-arm Signalised Junction	A8300 - A8370	E	B	Medium Positive
N11 Stillorgan Road mid-link crossing	A8810	No existing facility	B	High Positive
N11 Bray Road / Knocksinna 3-arm Priority Junction	A8840	D	B	Medium Positive
N11 Stillorgan Road / Springfield Park 3-arm Signalised Junction	A9070 - A9120	B	C	Low Negative
N11 Stillorgan Road / R830 Kill Lane 3-arm Signalised Junction	A9270 - A9320	C	B	Low Positive
N11 Stillorgan Road / Westminster Road 3-arm Signalised Junction	A9480 - A9520	E	B	Medium Positive
N11 Stillorgan Road / R842 Old Bray Road 4-arm Signalised Junction	A9850 - A9900	E	C	Medium Positive
N11 Bray Road / R827 Clonkeen Road Junction 4-arm Signalised Junction	A10550 - A10620	E	C	Medium Positive
N11 Bray Road / Johnstown Road 4-arm Signalised Junction	A11350 - A11400	C	B	Low Positive
N11 Bray Road mid-link crossing	A11880	C	B	Low Positive
N11 Bray Road / Druids Glen Road 3-arm Signalised Junction	A12090 - A12130	D	C	Low Positive
N11 Bray Road / Beech Park 3-arm Priority Junction	A12300	D	B	Medium Positive
N11 Bray Road / Shanganagh Vale 3-arm Priority Junction	A12385- A12400	C	B	Low Positive
N11 Bray Road / Sunnyhill Park 3-arm Priority Junction	A12550	D	B	Medium Positive
N11 Bray Road / Willow Avenue 3-arm Priority Junction	A1810 - A1840	F	B	High Positive
N11 Bray Road Northbound / Wyattville Link Road Interchange	A13060 - A13150	E	D	Low Positive
N11 Bray Road Southbound / Wyattville Link Road Interchange	A13200 - A13250	D	C	Low Positive
N11 Bray Road / Commons Road / Bóthar Bhré Slip roads	A13700 - A13800	E	B	High Positive
Section Summary		**D**	**B**	**Medium Positive**

The contents of Table 6.14 demonstrate that the Proposed Scheme will have a long-term positive impact on the quality of the pedestrian infrastructure at the majority of junctions within Section 2.

The LoS during the Do Minimum scenario ranges between A and F with 42 of the 44 impacted junction being rated as C or lower (21 of which are rated E/F). During the Do Something scenario, 34 of the 44 impacted junctions along this section achieve the highest A / B ratings, with nine junctions receiving a C rating and one junction increasing from E to D. This is because of the proposed improvements to the existing pedestrian facilities in the form of additional crossing locations, increased pedestrian directness, provision of traffic calming measures to reduce vehicle speeds, improved accessibility and increased footpath and crossing widths. All proposed facilities have been designed in accordance with the principles of DMURS and the National Disability Authority (NDA) 'Building for Everyone: A Universal Design Approach' (NDA 2020) with regards to catering for all users, including those with disabilities.

At most locations there is a positive impact, with two exceptions. A low negative impact is anticipated at two junctions along the route (Belfield Interchange Southbound Side and N11 Stillorgan Road / Springfield Park). At Belfield Interchange Southbound Side the low negative impact is anticipated as a result of the proposed removal of a crossing on the western arm of the junction whilst crossings on all three other arms are retained. It is not considered to result in severance issues at this location due to the retention of the pedestrian crossing

approximately 50m to the west. The low negative impact at N11 Stillorgan Road / Springfield Park Junction is anticipated as a result of proposed staggered crossings on the western and southern arm due to the width of the junction requiring a refuge area, in keeping with the BusConnects Preliminary Design Guidance.

Overall, it is anticipated that there will be a **Medium Positive** impact to the quality of the pedestrian infrastructure along Section 2 of the Proposed Scheme, during the operational phase, which aligns with the overarching aim to provide enhanced walking infrastructure on the corridor.

6.6.2.3.2 Cycling Infrastructure

- The key cycling improvements along Section 2 of the Proposed Scheme can be summarised as follows: Proposed 1.4m to 2.0m wide one-way cycle track adjacent to the southbound and northbound carriageway for the majority of Section 2, between R815 Anglesea Road and Loughlinstown Roundabout, to replace the existing combined bus and cycle lanes;
- Proposed 2.5m wide minimum two-way cycle tracks adjacent to the southbound carriageway between Belfield Interchange and Belfield Park and between R118 Wyattville Road bridge and Loughlinstown Roundabout;
- Proposed short diversion of the northbound cycle track away from the N11 has been introduced to achieve the minimum standard width between Brewery Road and Lower Kilmacud Road. This includes the introduction of traffic calming measures and associated road markings and signage along St Brigid's Church Road;
- Updated layouts, including kerb realignment, signal islands, approach lane reconfiguration, cycle provision and pedestrian crossings have been introduced where appropriate for all major junctions along this section. This includes junctions with Airfield Park, Nutley Lane, Fosters Avenue, The Rise, Booterstown Avenue, Mount Merrion Avenue, Trees Road, Old Dublin Rd, Lower Kilmacud Road, Brewery Road, Leopardstown Road, Kill Lane, Westminster Road, Bray Road, Clonkeen Road, Johnstown Road, Druids Glen Road and Wyattville Road;
- Upgrading several existing signalised junctions to provide a protected junction design, signal priority for cyclists, or, where cyclists share green time with general traffic, on-road cycle lanes through the junction; and
- Proposed provision of continuous cycle bypasses at all bus stops.

Along Section 2, the Proposed Scheme will provide a 60mm set down kerb segregation between the footpath and the cycle track. This is of particular importance in the context of providing for pedestrians with visual impairments, whereby the use of white line segregation (as is the case in some areas of the baseline environment) is not as effective for establishing a clear understanding of the change of pavement use and potential for cyclist / pedestrian interactions. The cycle tracks will also be raised 120mm from the carriageway to provide segregation from vehicles.

The contents of Table 6.15 outline the cycling qualitative assessment along Section 2 of the Proposed Scheme, which sets out the overall Do Minimum LoS and the Do Something LoS and the description of impact. TIA Appendix 4 (Cycling Infrastructure Assessment Section) outlines in further detail the methodology behind each LoS rating given to the Do Minimum and Do Something scenarios.

Table 6.15: Section 2 - Cycling Qualitative Assessment

Location	Chainage	Do Minimum LoS	Do Something LoS	Impact
R138 Stillorgan Road: R815 Anglesea Road to Nutley Park	A2600 – A3800	B	A	Low Positive
R138 Stillorgan Road Grade separated Junction: Nutley Park to Ashfield Park	A3800 – A4450	B	A	Low Positive
R138 Stillorgan Road: Ashfield Park to N31 Mount Merrion Avenue	A4450 – A5800	B	B	Negligible
N11 / N31 Stillorgan Road: N31 Mount Merrion Avenue to R825 Stillorgan Park Road	A5800 – A6800	C	B	Low Positive
N11 Stillorgan Road: R825 Stillorgan Park Road to N11 Brewery Road	A6800 – A7600	B	A+	Medium Positive
N11 Stillorgan Road: N11 Brewery Road to R830 Kill Lane	A7600 – A9300	B	B	Negligible
N11: R830 Kill Lane to Johnstown Road	A9300 – A11400	B	B	Negligible
N11 Bray Road: Johnstown Road to Willow Avenue	A11400 – A12850	B	B	Negligible
N11 / R118 Grade separated Junction: Willow Avenue to R116 Cherrywood Avenue	A12850 – A13500	B	A	Low Positive
N11: R116 Cherrywood Avenue to Loughlinstown Roundabout	A13500 – A14050	A	A	Negligible
Section Summary		**B**	**A**	**Low Positive**

The LoS rating increases from a B in the Do Minimum scenario to an A during the Do Something scenario. This is due to the proposed improvements to the existing cycling facilities along this stretch of cycle route, in the form of segregation, improvements to cycleway widths, and junction treatment. Individually, during the Do Something scenario, one received an A+ rating, four received A ratings, and the remaining five received B ratings, with the most successful change from the Do Minimum scenario occurred at junction R825 Stillorgan Park Road to N11 Brewery Road, moving from B to A+.

Overall, it is anticipated that there will be a **Low Positive impact** to the quality of the cycling infrastructure along Section 2 of the Proposed Scheme, during the Operational Phase.

The findings of the cycling assessment fully aligns with the objective of the CBC Infrastructure Works, applicable to the Traffic and Transport assessment of the Proposed Scheme, to 'Enhance the potential for cycling by providing safe infrastructure for cycling, segregated from general traffic wherever practicable'.

6.6.2.3.3 Bus Infrastructure

This section provides an assessment of the changes in the quality of bus stop infrastructure provision as a result of the Proposed Scheme between Donnybrook (Anglesea Road Junction) and Loughlinstown Roundabout, including upgrades and any relocations.

There are 56 existing stops along this Section 2 of the Proposed Scheme - 28 inbound stops and 28 outbound stops. Under the proposed Scheme, there will be a total of 76 bus stops along Section 2 with 37 inbound and 39 outbound stops. Table 6.16 presents a summary of the number and location of proposed new bus stops as a result of the scheme.

Table 6.16: Overview of Changes to Bus Stops Between Donnybrook (Anglesea Road Junction) and Loughlinstown Roundabout

Direction	Stop	Chainage	Do Something	Comment
Inbound	772 (Combined Bus and Coach)		Removed / rationalised	It is proposed to remove stop 772. Coach services currently utilising the stop are proposed to use coach stop 773 which is located 200m north of the existing stop 772
Inbound	771 (Bus)	A3050	Retained	Bus stop 771 to be retained
Inbound	770 (Bus)	A3315	Relocated	Bus stop 770 to be relocated 60m south of existing location.
Inbound	770 (Coach)	A3010	New separated coach stop	The existing coach stop 770 is shared with a local bus stop. It is proposed to separate the stops and provide a new coach stop 235m north of the existing stop.
Inbound	769 (Bus)	A3710	Retained	Bus stop 769 to be retained
Inbound	768 (Bus)	A4000	New separated bus stop	The existing bus stop 768 is shared with a coach stop. It is proposed to separate the bus and coach stops and provide a new local bus stop 10m north of the existing stop.
Inbound	768 (Coach)	A4020	Retained	The existing coach stop 768 is shared with a bus stop. It is proposed retain the coach stop at the existing location and provide a new local bus stop.
Inbound	2084 (Bus)	A4620	Relocated	Bus stop 2084 to be relocated 20m north of existing location
Inbound	2070 (Bus)	A5180	Relocated	Bus stop 2070 to be relocated 150m south of existing location
Inbound	2070 (Coach)	A5225	New separated coach stop	The existing coach stop 2070 is shared with a local bus stop. It is proposed to separate the stops and provide a new coach stop 195m south of the existing stop.
Inbound	2069 (Bus)		Removed	It is proposed to remove stop 2069.
Inbound	2068 (Bus)	A5640	Retained	Bus stop 2068 to be retained
Inbound	2068 (Coach)	A6200	New separated coach stop	The existing coach stop 2068 is shared with a local bus stop. It is proposed to provide a separate coach stop 190m south of the existing location which will be shared with the coach stop at 461. The proposed coach stop will also cater for coach services currently serving stop 461.
Inbound	461 (Bus)		Removed / rationalised	It is proposed to remove stop 461. Coach services currently utilising the stop are proposed to use coach stop 2068, 190m south of the existing stop 461.
Inbound	4728 (Bus)	A6150	Relocated	Bus stop 4728 to be relocated 50m north of existing location.
Inbound	4727 (Bus)	A6600	New separated bus stop	The existing stop 4727 is a shared bus and coach stop. It is proposed to separate the stops and provide a new, relocated bus stop 40m south of the existing location.
Inbound	4727 (Coach)	A6600	Retained	The existing stop 4727 is a shared bus and coach stop. It is proposed to retain the coach stop and provide a new separate bus stop.
Inbound	2065 (Bus)	A7330	Retained	Bus stop 2065 to be retained
Inbound	2064 (Bus)	A7570	Relocated	Bus stop 2064 to be relocated 20m north of existing location.
Inbound	2063 (Bus)	A7970	New separated bus stop	The existing stop 2063 is a shared bus and coach stop. It is proposed to separate the stops and provide a new, relocated bus stop 30m south of the existing location.
Inbound	2063 (Coach)	A7930	Retained	The existing stop 2063 is a shared bus and coach stop. It is proposed to retain the coach stop and provide a new separate bus stop.
Inbound	2062 (Bus)	A8280	Relocated	The existing stop 2062 is a shared bus and coach stop. It is proposed to separate the stops and for the bus stop to be relocated 40m south of existing location.
Inbound	2062 (Coach)	A8245	New separated coach stop	The existing stop 2062 is a shared bus and coach stop. It is proposed to separate the stops and provide a new, relocated coach stop 45m north of the existing location. This stop will also cater for services currently serving stop 2061 which is proposed to be removed.
Inbound	2061 (Bus)	A8790	Retained	Bus stop 2061 to be retained
Inbound	2061 (Coach)	A8245	Removed / rationalised	The existing stop 2061 is a shared bus and coach stop. It is proposed to remove the coach stop. Coach services currently serving the stop are proposed to utilise coach stop 2062, 545m north of the existing stop 2061.

Direction	Stop	Chainage	Do Something	Comment
Inbound	2060 (Bus)	A9265	Relocated	The existing stop 2060 is a shared bus and coach stop. It is proposed to separate the stops and for the bus stop to be relocated 65m south of existing location.
Inbound	2060 (Coach)	A9230	New separated coach stop	The existing stop 2060 is a shared bus and coach stop. It is proposed to separate the stops and provide a new, relocated coach stop 25m south of the existing location. This stop will also cater for services currently serving stop 3258 which is proposed to be removed.
Inbound	3258 (Bus)	A9450	Retained	Bus stop 3258 to be retained
Inbound	3258 (Coach)	A9230	Removed / rationalised	The existing stop 3258 is a shared bus and coach stop. It is proposed to remove the coach stop. Coach services currently serving the stop are proposed to utilise coach stop 2060, 220m north of the existing stop 3258.
Inbound	2996 (Bus)	A9815	Retained	Bus stop 2996 to be retained
Inbound	5128 (Bus)	A10700	Retained	Bus stop 5128 to be retained
Inbound	5128 (Coach)	A10665	New separated coach stop	The existing stop 5128 is a shared bus and coach stop. It is proposed to separate the stops and provide a new coach stop 35m north of the existing location.
Inbound	5127 (Bus)	A11260	New separated bus stop	The existing stop 5127 is a shared bus and coach stop. It is proposed to separate the stops and provide a new bus stop 60m north of the existing location.
Inbound	5127 (Coach)	A11320	Retained	The existing stop 5127 is a shared bus and coach stop. It is proposed to retain the coach stop and provide a new separate bus stop.
Inbound	3148 (Bus)	A11790	Retained	Bus stop 3148 to be retained
Inbound	3147 (Bus)	A12195	Relocated	Bus stop 3147 to be relocated 30m south of existing location
Inbound	3146 (Bus)	A12720	Retained	Bus stop 3146 to be retained
Inbound	3145 (Bus)	A13040	New separated bus stop	The existing stop 3145 is a shared bus and coach stop. It is proposed to separate the stops and provide a new bus stop 95m north of the existing location.
Inbound	3145 (Coach)	A13120	Retained	The existing stop 3145 is a shared bus and coach stop. It is proposed to retain the coach stop and provide a new separate bus stop.
Inbound	3144 (Bus)	A13440	Retained	Bus stop 3144 to be retained
Inbound	3143 (Bus)	A13860	New separated bus stop	The existing stop 3143 is a shared bus and coach stop. It is proposed to separate the stops and provide a new bus stop 50m north of this location
Inbound	3143 (Coach)	A13900	Retained	The existing stop 3143 is a shared bus and coach stop. It is proposed to separate the stops and provide a new coach stop 50m south of this location
Outbound	760 (Bus)	A2700	Relocated	Bus stop 760 to be relocated 10m south of existing location.
Outbound	760 (Coach)	A2860	New separated coach stop	The existing coach stop 760 is shared with a local bus stop. It is proposed to separate the stops and provide a new coach stop 190m south of the existing stop. The stop will also cater for coach services currently serving stop 759.
Outbound	761 (Bus)	A3075	Retained	Bus stop 761 to be retained
Outbound	762 (Bus)	A3350	Retained	Bus stop 762 to be retained
Outbound	762 (Coach)	A3285	New separated coach stop	The existing coach stop 762 is shared with a local bus stop. It is proposed to separate the stops and provide a new coach stop 35m north of the existing stop.
Outbound	763 (Bus)	A3660	Retained	Bus stop 763 to be retained.
Outbound	764 (Combined Bus and Coach)	A4020	Retained	Stop 764 is a combined bus and coach stop. It is proposed to retain stop 764.
Outbound	2007 (Bus)	A4200	Retained	The existing stop 2007.
Outbound	2007 (Coach)	A4200	Retained	The existing stop 2007.
Outbound	2008 (Bus)	A4685	Retained	Bus stop 2008 to be retained
Outbound	2009 (Bus)	A5250	Relocated	Bus stop 2009 to be relocated 225m south of existing location
Outbound	2009 (Coach)	A4870	New separated coach stop	The existing coach stop 2009 is shared with a local bus stop. It is proposed to separate the stops and provide a new coach stop 155m north of the existing stop.

Direction	Stop	Chainage	Do Something	Comment
Outbound	2010 (Bus)	A5575	Relocated	Bus stop 2010 to be relocated 25m south of existing location
Outbound	435 (Bus)		Removed	It is proposed to remove stop 435.
Outbound	7353 (Bus)	A6200	Retained	Bus stop 7353 to be retained
Outbound	7353 (Coach)	A6300	New separated coach stop	The existing coach stop 7353 is shared with a local bus stop. It is proposed to separate the stops and provide a new coach stop 415m south of the existing stop.
Outbound	4571 (Bus)	A6740	New separated bus stop	The existing stop 4571 is a shared bus and coach stop. It is proposed to separate the stops and provide a new, relocated bus stop 135m north of the existing location.
Outbound	4571 (Coach)	A6875	Retained	The existing stop 4571 is a shared bus and coach stop. It is proposed to retain the coach stop and provide a new separate bus stop.
Outbound	2013 (Bus)	A7400	Relocated	Bus stop 2013 to be relocated 115m south of existing location.
Outbound	2014 (Bus)	A7670	Retained	Bus stop 2014 to be retained
Outbound	4636 (Bus)	A7880	Relocated	Bus stop 4636 to be relocated 40m north of existing location.
Outbound	4636 (Coach)	A7780	New separated coach stop	The existing coach stop 4636 is shared with a local bus stop. It is proposed to separate the stops and provide a new coach stop 140m north of the existing stop.
Outbound	2016 (Bus)	A8410	Retained	Bus stop 2016 to be retained
Outbound	2016 (Coach)	A8475	New separated coach stop	The existing stop 2016 is a shared bus and coach stop. It is proposed to separate the stops and provide a new, relocated coach stop 65m south of the existing location.
Outbound	2015 (Bus)	A8850	Retained	Bus stop 2015 to be retained
Outbound	2017 (Bus)	A9180	Retained	Bus stop 2017 to be retained
Outbound	2017 (Coach)	A9120	New separated coach stop	The existing stop 2017 is a shared bus and coach stop. It is proposed to retain the bus stop and provide a new separate coach stop.
Outbound	3259 (Bus)	A9600	Relocated	Bus stop 3259 to be relocated 165m south of existing location
Outbound	7361 (Bus)	A9905	Retained	Bus stop 7361 to be retained
Outbound	7361 (Coach)	A10700	Removed / rationalised	The existing stop 7361 is a shared bus and coach stop. It is proposed to remove the coach stop. Coach services currently serving the stop are proposed to utilise coach stop 7362, 805m south of the existing stop 7361.
Outbound	7362 (Bus)	A10650	Retained	The existing stop 7362 is a shared bus and coach stop. It is proposed to separate the stops and provide a new, relocated coach stop 60m south of the existing location.
Outbound	7362 (Coach)	A10700	New separated coach stop	The existing stop 7362 is a shared bus and coach stop. It is proposed to separate the stops and provide a new, relocated coach stop 60m south of the existing location. This stop will also cater for services currently serving stop 7361 which is proposed to be removed.
Outbound	3129 (Bus)	A11450	New separated bus stop	The existing stop 3129 is a shared bus and coach stop. It is proposed to separate the stops and provide a new bus stop 165m south of the existing location.
Outbound	3129 (Coach)	A11285	Retained	The existing stop 3129 is a shared bus and coach stop. It is proposed to retain the coach stop and provide a new separate bus stop.
Outbound	3130 (Bus)	A11810	Relocated	Bus stop 3130 to be relocated 10m south of existing location
Outbound	3131 (Bus)	A12150	Retained	Bus stop 3131 to be retained
Outbound	3132 (Bus)		Removed	Bus stop 3132 to be removed
Outbound	3133 (Bus)	A12810	Retained	Bus stop 3133 to be retained
Outbound	3134 (Bus)	A13300	New separated bus stop	The existing stop 3134 is a shared bus and coach stop. It is proposed to separate the stops and provide a new bus stop 15m south of the existing location.
Outbound	3134 (Coach)	A13300	Retained	The existing stop 3134 is a shared bus and coach stop. It is proposed to retain the coach stop and provide a new separate bus stop.
Outbound	3135 (Bus)	A13900	New separated coach stop	The existing stop 3135 is a shared bus and coach stop. It is proposed to separate the stops and provide a new bus stop 30m south of this location

Direction	Stop	Chainage	Do Something	Comment
Outbound	3135 (Coach)	A13900	Retained	The existing stop 3135 is a shared bus and coach stop. It is proposed to separate the stops and provide a new coach stop 25m north of this location

As indicated in Table 6.16, the proposed changes result in the total number of bus stops along Section 2 increasing from 56 to 76 through the provision of additional separated bus and coach stops where possible.

Table 6.17 outlines a summary of the improvements to the bus stop infrastructure along Section 2, with reference to the number and percentage of bus stops that provide each facility in the Do Minimum and Do Something scenarios.

Table 6.17: Overview of Changes in Bus Stop Facilities Between Donnybrook (Anglesea Road Junction) and Loughlinstown Roundabout

Bus Stop Facility	DoMinimum		DoSomething		Comment
	Number of stops	Percentage of stops	Number of stops	Percentage of stops	
Realtime information	25	45%	76	100%	It is proposed that all bus stops provide real-time information.
Timetable information	49	88%	76	100%	It is proposed that all bus stops provide timetable information.
Shelter	46	82%	76	100%	It is proposed for all bus stops to provide shelters.
Seating	47	84%	76	100%	It is proposed for all bus stops to provide seating.
Accessible Kerbs	51	91%	76	100%	It is proposed that all bus stops provide accessible kerbs.
Indented Drop off Area	17	30%	22	29%	29% of stops to be indented from bus lane.
Total number of stops	56		76		A difference of 20 from the Do Minimum

Table 6.17 outlines that there are significant improvements to the bus stop facilities along Section 2 of the Proposed Scheme. It is proposed that all bus stops provide real time / timetable information, accessible kerbs and shelter and seating. The Proposed Scheme has an overall **Medium Positive** impact on the bus stop facilities along Section 2.

6.6.2.3.4 Parking and Loading

The Proposed Scheme will impact on some existing parking and loading locations along Section 2. The areas of parking changes are as follows:

- There are currently 23 informal parking spaces along Belmont Terrace. It is proposed to remove two spaces at the southern end of the road whilst retaining the 21 adjacent spaces. Due to the retention of 23 spaces and the availability of spaces on side streets (Belmont Terrace) it is considered that this loss will have a **Low Negative** impact.

The contents of Table 6.18 present a summary of the parking and loading spaces during both the Do Minimum and Do Something scenarios and the resulting changes along Section 2.

Table 6.18: Section 2 – Overall Changes in Parking / Loading Spaces

Street	Parking Type	Number of Parking Spaces		
		Do Minimum	Do Something	Change
Belmont Terrace	Loading/Unloading (in Designated Loading Bays)	1	1	0
	Informal Parking	23	21	-2
	Side Street Parking	58	58	0
St Brigid's Church Road	Disabled Permit Parking	2	2	0
	Informal Parking (Designated Free Parking)	4	4	0
Airfield Park	Informal Parking (Designated Free Parking)	13	13	0
Johnstown Road	Permit Parking	3	3	0
Old Bray Road	Informal Parking (Designated Free Parking)	12	12	0
Total		**116**	**114**	**-2**

As shown in Table 6.18, the proposed amendments to parking / loading will result in a loss of 2 spaces along Section 2. Where parking is removed, the impact is assessed as a **Low Negative**. This slight effect is considered acceptable in the context of the planned outcome of the Proposed Scheme, which is to improve accessibility to this local area (on foot, by bicycle and bus) for residents and visitors to local shops and businesses.

6.6.2.4 Section 2 – UCD Bus Interchange

The proposed UCD Interchange will be a new bus interchange facility along the CBC for coach and local bus services, at the gateway to the UCD campus adjacent to the Stillorgan Road flyover bridge. The UCD Interchange design, originally included in the Emerging Preferred Route Option, has been developed further in co-ordination with the UCD Future Campus

6.6.2.4.1 Pedestrian Infrastructure

The key infrastructural changes to the pedestrian links within the UCD Bus Interchange are the following:

- Creation of a shared path route to enhance permeability from UCD to N11 for pedestrians and cyclists. Pedestrian and cycle paths will be defined clearly through surface materials;
- Provision of a plaza island to serve as a main landing area for pedestrians and bus users;
- Increased connectivity within the interchange through the provision of zebra crossings with flashing beacons;
- Existing steps and ramp linking to the UCD James Joyce Library path to be replaced with a new sloped ground walkway; and
- Provision of location and wayfinding signs.

Within the UCD Bus Interchange it is anticipated that there will be a high positive impact. The significant of effect at this location is categorised as high due to the high volumes of users (cars, pedestrians and cyclists). As such, it is anticipated that there will be a **High Positive impact** to the quality of the pedestrian infrastructure within the UCD Bus Interchange, during the operational phase.

6.6.2.4.2 Cycling Infrastructure

The key infrastructural changes to the cycling links within the UCD Bus Interchange are the following:

- Creation of a shared path route to enhance permeability from UCD to N11 for pedestrians and cyclists;
- Existing steps and ramp linking to the UCD James Joyce Library path to be replaced with a new sloped ground walkway; and
- Provision of location and wayfinding signs.

Within the UCD Bus Interchange it is anticipated that there will be a high positive impact. The significant of effect at this location is categorised as high due to the high volumes of users (cars, pedestrians and cyclists). As such,

it is anticipated that there will be a **High Positive impact** to the quality of the cycling infrastructure within the UCD Bus Interchange, during the operational phase.

6.6.2.4.3 Bus Infrastructure

The changes to the existing UCD car park to provide a Bus Interchange is anticipated to have a **High Positive impact** to the quality of the bus infrastructure within the UCD Bus Interchange, during the operational phase.

6.6.2.4.4 Parking and Loading Infrastructure

The UCD Campus contains approximately 31 car parks which contain UCD permit, pay and display and paid premium car parking spaces. It is considered that cumulatively, these car parks provide over 3,000 private car parking spaces across the UCD site.

The Proposed Scheme will impact on some existing parking and loading at UCD. The areas of parking changes are as follows:

- There are currently 67 permit parking spaces along within the Proposed Scheme. It is proposed to remove all 67 permit spaces which, when considering the surrounding parking spaces, is considered to have a **Low Negative** impact.

The contents of Table 6.19 present a summary of the parking and loading spaces during both the Do Minimum and Do Something scenarios and the resulting changes at UCD.

Table 6.19: UCD Bus Interchange – Overall Changes in Parking / Loading Spaces

Street	Parking Type	Number of Parking Spaces		
		Do Minimum	Do Something	Change
UCD	Permit Parking	82	0	-82
Total		**82**	**0**	**-82**

As shown in Table 6.19, the proposed amendments to parking / loading will result in a loss of 67 spaces at UCD. Where parking is removed, the impact is assessed as **Low Negative**. This slight effect is considered acceptable in the context of the planned outcome of the Proposed Scheme, which is to improve accessibility to this local area (on foot, by bicycle and bus) for residents and visitors to local shops and businesses.

6.6.2.5 Section 3 – Loughlinstown Roundabout to Bray North (Wilford Roundabout)

6.6.2.5.1 Pedestrian infrastructure

The key infrastructure changes to pedestrian links along Section 3 of the Proposed Scheme are summarised as follows:

- Increased footpath width, crossing width, and pedestrian directness;
- Increased provision of priority crossings across side streets with raised tables;
- Provision of pedestrian crossings on all arms at Shanganagh Road / Beechfield Manor junction, R119 Dublin Road / Lower Road / Cluain Na Gréine Court junction, R119 Dublin Road / Olcovar junction, R119 Dublin Road / Shanganagh Castle development lands entrance junction;
- Provision of new mid-link pedestrian crossings along R837 Dublin Road (north of the R837 Dublin Road / Seaview Park junction), R119 Dublin Road (southeast of the R119 Dublin Road / Allies River Road junction) and R837 Dublin Road (southeast of Shanganagh Cemetery access). This will enable improved connectivity between bus stop and facilities; and
- Approximately 120m of Shanganagh Road has been widened to achieve improved footway widths.

The assessment of the qualitative impacts on the Pedestrian Infrastructure for Section 3 of the Proposed Scheme are summarised in Table 6.20. A detailed breakdown of the assessment at each impacted junction, including a list of the junctions which experience no change, can be found in TIA Appendix 4 (Pedestrian Infrastructure Assessment Section).

Table 6.20: Section 3 – Pedestrian Impact during Operational Phase

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Magnitude of Impact
R119 Dublin Road / Seaview Park 3-arm Priority Junction	A14375	E	B	Medium Positive
R837 Dublin Road mid-link crossing South of the R837 Dublin Road / Seaview Park Junction	A14450	No existing facility	A	High Positive
R119 Dublin Road / Kentfield 3-arm Priority Junction	A14490	E	B	Medium Positive
R119 Dublin Road / Rathmichael Woods 3-arm Priority Junction	A14640 - A14650	C	B	Low Positive
R837 Dublin Road / Stonebridge Road 3-arm Signalised Junction	A14770 - A14810	B	A	Low Positive
R119 Dublin Road / Station Road 3-arm Priority Junction	A14870 -A14880	E	B	Medium Positive
Shanganagh Road / Beechfield Manor 3-arm Signalised Junction	A15000	D	B	Medium Positive
Shankill Roundabout	A15070 - A15120	C	B	Low Positive
R119 Dublin Road / Lower Road / Cluain Na Gréine Court 4-arm Staggered Priority Junction	A15300 - A15330	D	A	Medium Positive
R119 Dublin Road / Aubrey Park 3-arm Priority Junction	A15300 - A15330	C	B	Low Positive
R119 Dublin Road / Shankill Village 3-arm Priority Junctions at Accesses	A15350 - A15450	C	B	Low Positive
R119 Dublin Road mid-link crossing South of the R119 Dublin Road / Aubrey Park Junction	A15460	B	A	Low Positive
R119 Dublin Road / Stonebridge Close 3-arm Priority Junction	A15460 - A15470	C	B	Low Positive
R119 Dublin Road / Quinn's Road / Cherrington Road Roundabout	A15580 - A15620	C	A	Medium Positive
R119 Dublin Road / Castle Farm 3-arm Priority Junction	A15800 - A15820	D	B	Medium Positive
R119 Dublin Road / Olcovar 3-arm Priority Junction	A15860 - A15880	D	A	Medium Positive
R119 Dublin Road / Crinken Lane 3-arm Priority Junction	A16000 - A16050	C	B	Low Positive
R119 Dublin Road / Aughmore Lane 3-arm Priority Junction	A16100 - A16130	D	C	Low Positive
R119 Dublin Road / Shanganagh Castle development lands entrance (proposed by others)	A16180 - A16220	F	A	High Positive
R119 Dublin Road / Allies River Road 3-arm Priority Junction	A16250 - A16290	D	B	Medium Positive
R119 Dublin Road mid-link crossing Southeast of the R119 Dublin Road / Allies River Road Junction	A16280	No existing facility	A	High Positive
R837 Dublin Road mid-link crossing Southeast of Shanganagh Cemetery access	A16640 - A16650	No existing facility	A	High Positive
R119 Dublin Road / Shanganagh Cemetery Junction 3-arm Priority Junction	A16450 - A16500	F	B	High Positive
R119 Dublin Road / Mullen's Laurel Park 3-arm Priority Junction (north)	A17080 - A17100	E	B	Medium Positive
R119 Dublin Road / Mullen's Laurel Park 3-arm Priority Junction (south)	A17140 - A17150	E	B	Medium Positive
Wilford Roundabout	A17360 - A17420	F	C	Medium Positive
Section Summary		**D**	**B**	**Medium Positive**

The contents of Table 6.20 demonstrate that the Proposed Scheme will have a long-term positive impact on the quality of the pedestrian infrastructure at junctions within Section 3.

The LoS during the Do Minimum scenario ranges between B and F with 17 of the 26 impacted locations being rated as D or lower. During the Do Something scenario, 24 of the 26 impacted locations along this section achieve the highest A / B ratings, with two locations receiving a C rating. This is because of the proposed improvements to the existing pedestrian facilities in the form of additional crossing locations, increased pedestrian directness, provision of traffic calming measures to reduce vehicle speeds, improved accessibility and increased footpath and crossing widths. All proposed facilities have been designed in accordance with the principles of DMURS and the National Disability Authority (NDA) 'Building for Everyone: A Universal Design Approach' (NDA 2020) with regards to catering for all users, including those with disabilities.

Overall, it is anticipated that there will be a **Medium Positive** impact to the quality of the pedestrian infrastructure along Section 3 of the Proposed Scheme, during the operational phase, which aligns with the overarching aim to provide enhanced walking infrastructure on the corridor. A detailed breakdown of the assessment at each impacted junction, including a list of the junctions which experience no change, can be found in TIA Appendix 4 (Pedestrian Infrastructure Assessment Section).

6.6.2.5.2 Cycling Infrastructure

The key cycling improvements along Section 3 of the Proposed Scheme can be summarised as follows:

- Proposed 2.5m wide two-way cycle track adjacent to the R837 Dublin Road southbound carriageway between the R837 Dublin Road / Stonebridge Road Junction and Shankill Roundabout for approximately 300m;
- Proposed two-way cycle track along Stonebridge Rd, running along the northern verge to serve Rathmichael National School and continuing through existing trees at Rathbeg to a new toucan crossing by Stonebridge Lane to terminate at St Anne's National School. The cycle track also continues from the Stonebridge Road/Dublin Road junction along the eastern side of the Dublin Road as far as Corbawn Lane;
- Proposed 2m wide one-way cycle track adjacent to the northbound carriageway between the R119 Dublin Road / Crinken Lane Junction and south of the R119 Dublin Road / Allies River Road Junction, to replace the existing advisory cycle lane;
- Proposed 2m wide one-way cycle track adjacent to the southbound carriageway between the R119 Dublin Road / Aughmore Lane and south of the R119 Dublin Road / Allies River Road Junction, to replace the existing advisory cycle lane;
- Proposed two-way cycle track adjacent to the southbound carriageway between south of the R119 Dublin Road / Allies River Road Junction and the R119 Dublin Road / Shanganagh Cemetery Junction for approximately 200m;
- Proposed cycle track adjacent to the northbound carriageway and southbound carriageway between R119 Dublin Road / Shanganagh Cemetery Junction and Wilford roundabout to replace the existing cycle lanes / combined bus and cycle lanes;
- Upgrading roundabouts along Section 3 (Shankill roundabout, R119 Dublin Road / Quinn's Road / Cherrington Road roundabout and Wilford roundabout) to signalised junctions. Proposed cycle tracks / lanes at the Shankill roundabout and Wilford roundabout; and
- Positioning the proposed cycle tracks to bypass behind the bus stops along Section 3.

However, due to the width restrictions along Section 3 of the Proposed Scheme, removal of some existing substandard advisory cycle lanes are required at the following locations:

- Existing substandard advisory cycle lanes along R837 Dublin Road between Loughlinstown Roundabout and the R837 Dublin Road / Stonebridge Road Junction to be removed to accommodate combined bus and cycle lanes in both directions for the majority of the carriageway. Whilst no segregated cycle lanes will be provided along here, cyclists will share the combined bus and cycle lanes and therefore be segregated from general traffic; and
- Existing cycle lanes along R119 Dublin Road between R119 Dublin Road / Quinn's Road / Cherrington Road roundabout and the R119 Dublin Road / Crinken Lane Junction to be removed to accommodate a northbound bus lane between R119 Dublin Road / Olcovar Road Junction the R119

Dublin Road / Crinken Lane Junction. Whilst no segregated cycle lanes will be provided along here, northbound cyclists will share the combined bus and cycle lane, where present, and therefore be segregated from general traffic.

Along Section 3, the Proposed Scheme will provide a 60mm set down kerb segregation between the footpath and the cycle track. This is of particular importance in the context of providing for pedestrians with visual impairments, whereby the use of white line segregation (as is the case in some areas of the baseline environment) is not as effective for establishing a clear understanding of the change of pavement use and potential for cyclist / pedestrian interactions. The cycle tracks will also be raised 120mm from the carriageway to provide segregation from vehicles.

The contents of Table 6.21 outline the cycling qualitative assessment along Section 3 of the Proposed Scheme, which sets out the overall Do Minimum LoS and the Do Something LoS and the description of impact. TIA Appendix 4 (Cycling Infrastructure Assessment Section) outlines in further detail the methodology behind each LoS rating given to the Do Minimum and Do Something scenarios.

Table 6.21: Section 3 - Cycling Impact during Operational Phase

Location	Chainage	Do Minimum LoS	Do Something LoS	Impact
R837 Dublin Road: Loughlinstown Roundabout to R119 Shanganagh Road	A14050 - A15100	C	D	Low Negative
R119 Dublin Road: R119 Shanganagh Road to Quinn's Road	A15100 - A15600	D	D	Negligible
R119 Dublin Road: Quinn's Road to Allies River Road	A15600 - A16250	C	D	Low Negative
R119 Dublin Road: Allies River Road to Wilford Roundabout	A16250 - A17400	C	A	Medium Positive
Section Summary		**C**	**C**	**Negligible**

The contents of Table 6.21 demonstrate that along Section 3, the Proposed Scheme will result in a **Negligible impact** along Section 3.

The low negative impacts along A837 / R119 Dublin Road are due to the removal of existing substandard advisory cycle lanes due to existing width constraints along these areas. The removal of the existing infrastructure along this section enables improved pedestrian facilities (width) and the provision of combined bus and cycle lanes where possible thus removing cyclists from general traffic.

6.6.2.5.3 Bus Infrastructure

There are currently a total of 17 bus stops along Section 3, 9 inbound and 8 outbound. Under the Proposed Scheme, there will be a total of 17 bus stops along Section 3 with 9 inbound and 8 outbound stops. The layout of new bus stops is considered to better serve the existing and future catchment and be closer to existing and new pedestrian crossing facilities for improved convenience.

Table 6.22 presents a summary of the number and location of proposed bus stops along Section 3 of the Proposed Scheme.

Table 6.22: Overview of Changes to Bus Stops Between Loughlinstown Roundabout and Bray North (Wilford Roundabout)

Direction	Stop	Chainage	Do Something	Comment
Inbound	3142 (Combined Bus and Coach)	A14505	Retained	Stop 4131 is a combined bus and coach stop. It is proposed to retain the combined stop.
Inbound	3141 (Bus)	A14930	Retained	Bus stop 3141 to be retained
Inbound	3140 (Bus)	A15480	Retained	The existing stop 3140 is a shared bus and coach stop. It is proposed to retain the existing bus stop at this location.
Inbound	3140 (Coach)	A16335	Removed / Rationalised	The existing stop 3140 is a shared bus and coach stop. It is proposed to remove the coach stop. Coach services currently serving the stop are proposed to utilise coach stop 4206, 835m south of the existing stop 3140.
Inbound	4206 (Bus)	A15780	Relocated	The existing stop 4206 is a shared bus and coach stop. It is proposed to separate the stops and for the bus stop to be relocated 40m south of existing location.
Inbound	4206 (Coach)	A16335	New separated coach stop	The existing stop 4206 is a shared bus and coach stop. It is proposed to separate the stops and provide a new coach stop 595m south of the existing location. The proposed stop will also cater for coach services currently utilising the shared 3140 stop.
Inbound	4205 (Bus)	AN/A	Removed / Rationalised	It is proposed to remove stop 4205.
Inbound	4204 (Bus)	A16170	Relocated	Bus stop 4204 to be relocated 55m north of existing location
Inbound	5090 (Bus)	A16460	Retained	Bus stop 5090 to be retained
Inbound	4203 (Bus)	A16800	Relocated	Bus stop 4203 to be relocated 110m south of existing location
Inbound	4202 (Combined Bus and Coach)	A17080	Relocated	Stop 4202 is a combined bus and coach stop. It is proposed to relocate stop 4202 40m north of the existing location.
Outbound	3136 (Bus)	A14545	Retained	Bus stop 3136 to be retained
Outbound	3138 (Bus)	A15010	Relocated	Bus stop 3138 to be relocated 60m south of existing location
Outbound	3139 (Bus)	A15445	Retained	The existing stop 3139 is a shared bus and coach stop. It is proposed to retain the existing bus stop at this location.
Outbound	3139 (Coach)	A16515	New separated coach stop	The existing stop 3139 is a shared bus and coach stop. It is proposed to provide a new separate coach stop 1070m south of the existing location.
Outbound	4124 (Bus)	A15920	Relocated	Bus stop 4124 to be relocated 220m south of existing location
Outbound	4125 (Bus)	A16310	Relocated	Bus stop 4125 to be relocated 90m south of existing location
Outbound	4126 (Bus)	AN/A	Removed	It is proposed to remove stop 4126.
Outbound	4127 (Bus)	A16890	Relocated	Bus stop 4127 to be relocated 90m south of existing location
Outbound	4128 (Bus)	A17225	Relocated	Bus stop 4128 to be relocated 110m south of existing location

As indicated in Table 6.23, the proposed changes result in the total number of bus stops along Section 3 is proposed to remain at 17 albeit with some differing in location.

Table 6.23 outlines a summary of the improvements to the bus stop infrastructure along Section 3, with reference to the number and percentage of bus stops that provide each facility in the Do Minimum and Do Something scenarios.

Table 6.23: Overview of Changes in Bus Stop Facilities Between Loughlinstown Roundabout and Bray North (Wilford Roundabout)

Bus Stop Facility	Do Minimum		Do Something		Comment
	Number of stops	Percentage of stops	Number of stops	Percentage of stops	
Realtime information	2	12%	17	100%	It is proposed that all bus stops provide real-time information.
Timetable information	7	41%	17	100%	It is proposed that all bus stops provide timetable information.
Shelter	6	35%	17	100%	It is proposed for all bus stops to provide shelters.
Seating	4	24%	17	100%	It is proposed for all bus stops to provide seating.
Accessible Kerbs	16	94%	17	100%	It is proposed that all bus stops provide accessible kerbs.
Indented Drop off Area	5	29%	2	12%	12% of stops to be indented from bus lane.
Total number of stops	17		17		No change from Do Minimum

Table 6.23 indicates that there are improvements to the bus stop facilities along Section 3 of the Proposed Scheme. There is a reduction in the number of stops with indented Drop off Areas but overall, there are improvements in the provision of real-time information, shelters, seating and accessible kerbs at the bus stops throughout Section 3 of the Proposed Scheme are assessed as providing an overall positive impact for bus passengers. All proposed facilities have been designed in accordance with BusConnects Preliminary Design Guidance which has been developed with cognisance to the relevant accessibility guidance.

The Proposed Scheme therefore has an overall **Low Positive** impact on the bus stop facilities along Section 3.

6.6.2.5.4 Parking and Loading

The Proposed Scheme will impact on some existing parking and loading locations along Section 3. The areas of parking changes are as follows:

- There are currently 83 informal parking spaces at St Anne's Church. It is proposed to reconfigure St. Anne's Church car park which will result in no overall loss in the number of car parking spaces. As such, the impact of this change is considered to be **Negligible**.

The contents of Table 6.24 present a summary of the parking and loading spaces during both the Do Minimum and Do Something scenarios and the resulting changes along Section 3.

Table 6.24: Section 3 – Overall Changes in Parking / Loading Spaces

Street	Parking Type	Number of Parking Spaces		
		Do Minimum	Do Something	Change
Shankill Roundabout / St Anne's Church	Disabled Permit Parking	3	3	0
	Informal Parking	83	83	0
	Side Street Parking	179	179	0
Shankill Village	Disabled Permit Parking	1	1	0
	Informal Parking (Designated Free Parking) (Off Street)	16	16	0
Stonebridge Road	Loading / Unloading (Designated)	6	6	0
Total		**288**	**288**	**0**

As shown in Table 6.24, the proposed amendments to parking / loading will result in no overall loss to car parking spaces along Section 3. The impact of the changes along Section 3 is assessed as **Negligible**.

6.6.2.6 Section 4 – Bray North (Wilford Roundabout) to Bray South (Fran O'Toole Bridge)

6.6.2.6.1 Pedestrian Infrastructure

The key infrastructure changes to pedestrian links along Section 4 of the Proposed Scheme are summarised as follows:

- Increased footpath width, crossing width, and pedestrian directness;
- Increased provision of priority crossings across side streets with raised tables;
- Provision of pedestrian crossings on all arms at R761 Dublin Road / Old Connaught Avenue junction, R761 Dublin Road / Chapel Lane junction and R761 Dublin Road / R918 Upper Dargle Road junction; and
- Provision of new mid-link pedestrian crossing along R761 Castle Street to the north of the R761 Castle Street / Lower Dargle Road junction.

The assessment of the qualitative impacts on the Pedestrian Infrastructure for Section 4 of the Proposed Scheme are summarised in Table 6.25. A detailed breakdown of the assessment at each impacted junction, including a list of the junctions which experience no change, can be found in TIA Appendix 4 (Pedestrian Infrastructure Assessment Section).

Table 6.25: Section 4 - Pedestrian Qualitative Assessment – Junctions

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact
R761 Dublin Road / Old Connaught Avenue 4-arm Signalised Junction	A17710 - A17780	E	A	High Positive
R761 Dublin Road / St Peter's Road 3-arm Priority Junction	A17790 - A17810	D	B	Medium Positive
R761 Dublin Road / Chapel Lane 4-arm Priority Junction	A17880 - A17930	D	A	Medium Positive
R761 Dublin Road / Lidl Entrance Staggered 4-arm Priority Junction	A18030 - A18050	D	B	Medium Positive
R761 Dublin Road / R918 Upper Dargle Road Junction 3-arm Signalised Junction	A18120 - A18170	E	A	High Positive
R761 Castle Street / St Patrick's Square 3-arm Priority Junction	A18200 - A18210	D	B	Medium Positive
R761 Castle Street / Saint Cronan's Road 3-arm Priority Junction	A18250 - A18260	F	B	High Positive
R761 Dublin Road / Dwyer Park (north) Staggered 4-arm Junction	A18320 - A18360	E	B	Medium Positive
R761 Castle Street mid-link crossing *North of the of the R761 Castle Street / Dwyer Park (south) Junction*	A18370	B	A	Low Positive
R761 Dublin Road / Dwyer Park (south) 3-arm Priority Junction	A18440 - A18450	D	B	Medium Positive
R761 Castle Street / Lower Dargle Road 4-arm Junction	A18480 - A18500	C	B	Low Positive
Section Summary		**D**	**B**	**Medium Positive**

The contents of Table 6.25 demonstrates that the introduction of the scheme will provide long term pedestrian benefits at all junctions which are proposed to be upgraded along Section 4 of the Proposed Scheme.

The LoS during the Do Minimum scenario ranges between B and F with nine of the 11 impacted locations being rated as D or lower. During the Do Something scenario, all of the impacted junctions along this section achieve the highest A / B ratings. This is because of the proposed improvements to the existing pedestrian facilities in the form of additional crossing locations, increased pedestrian directness, provision of traffic calming measures to reduce vehicle speeds, improved accessibility and increased footpath and crossing widths. All proposed facilities have been designed in accordance with the principles of DMURS and the National Disability Authority (NDA) 'Building for Everyone: A Universal Design Approach' (NDA 2020) with regards to catering for all users, including those with disabilities.

Overall, it is anticipated that there will be a **Medium Positive** impact to the quality of the pedestrian infrastructure along Section 4 of the Proposed Scheme, during the operational phase, which aligns with the overarching aim to provide enhanced walking infrastructure on the corridor.

6.6.2.6.2 Cycling Infrastructure

The key cycling improvements along Section 4 of the Proposed Scheme can be summarised as follows:

- Proposed 1.25m to 2m wide one-way cycle tracks adjacent to the southbound and northbound carriageway throughout Section 4 with the exception of a 50m section between north of the R761 Castle Street / Dwyer Park (south) Junction and south of the R761 Castle Street / Dwyer Park (south) Junction where a combined bus and cycle lane is provided for southbound cyclists; and
- Positioning the proposed cycle tracks to bypass behind the bus stops along Section 4.

Along Section 4, the Proposed Scheme will provide a 60mm set down kerb segregation between the footpath and the cycle track. This is of particular importance in the context of providing for pedestrians with visual impairments, whereby the use of white line segregation (as is the case in some areas of the baseline environment) is not as effective for establishing a clear understanding of the change of pavement use and potential for cyclist / pedestrian interactions. The cycle tracks will also be raised 120mm from the carriageway to provide segregation from vehicles.

The contents of Table 6.26 outline the cycling qualitative assessment along Section 4 of the Proposed Scheme, which sets out the overall Do Minimum LoS and the Do Something LoS and the description of impact. TIA Appendix 4 (Cycling Infrastructure Assessment Section) outlines in further detail the methodology behind each LoS rating given to the Do Minimum and Do Something scenarios.

Table 6.26: Section 4 - Cycling Qualitative Assessment

Location	Chainage	Do Minimum LoS	Do Something LoS	Magnitude and type of Impact
R761 Dublin Road: Wilford Roundabout to Chapel Lane	A17400 - A17900	D	A	Medium Positive
R761 Dublin Road: Chapel Lane to Upper Dargle Road	A17900 - A18150	C	B	Low Positive
R761 Castle Street: Upper Dargle Road to Fran O'Toole Bridge	A18150 - A18500	C	C	Negligible
Section Summary		**C**	**B**	**Low Positive**

During the DoMinimum scenario the LoS ranges between C and D. During the DoSomething scenario, the LoS ratings increase to between A and C. This is due to the proposed improvements to the existing cycling facilities, in the form of increased segregation, improvements to the cycle way widths and improvements to the cycling priority at junctions.

Overall, it is anticipated that there will be **Low Positive** impact to the quality of the cycling infrastructure along Section 4 of the Proposed Scheme, during the Operational Phase.

6.6.2.6.3 Bus Infrastructure

There are currently a total of six bus stops along Section 4 - three inbound and three outbound stops. Under the proposed Scheme there will be a total of seven bus stops along Section 4, with four inbound and three outbound stops. The layout of new bus stops is considered to better serve the existing and future catchment and be closer to existing and new pedestrian crossing facilities for improved convenience.

The contents of Table 6.27 presents a summary of the number and location of proposed new bus stops as a result of the scheme.

Table 6.27: Overview of Changes to Bus Stops Between Wilford Roundabout and Bray South (Fran O'Toole Bridge)

Direction	Stop	Chainage	Do Something	Comment
Inbound	4201 (Bus)	A17675	Retained	Bus stop 4201 to be retained
Inbound	4416 (Bus)	A17960	Relocated	Bus stop 4416 to be relocated 60m north of existing location
Inbound	4154 (Bus)	A18410	New separated bus stop	The existing stop 4154 is a shared bus and coach stop. It is proposed to separate the stops and provide a new bus stop 120m south of the existing location.
Inbound	4154 (Coach)	A18290	Retained	The existing coach stop 4154 is shared with a local bus stop. It is proposed to separate the stops and for the coach stop to be retained at the existing location and a new bus stop be provided.
Outbound	4129 (Bus)	A17790	Relocated	Bus stop 4129 to be relocated 90m south of existing location
Outbound	4130 (Bus)	A18210	Relocated	Bus stop 4130 to be relocated 20m south of existing location
Outbound	4131 (Combined Bus and Coach)	A18390	Relocated	Stop 4131 is a combined bus and coach stop. It is proposed to relocate the combined stop 50m south of the existing location.

As indicated in Table 6.27, the proposed changes result in the total number of bus stops along Section 4 increasing from six to seven through the provision of a new inbound bus stop (4154) enabling distinction between the coach and bus stop. Table 6.28 outlines a summary of the improvements to the bus stop infrastructure along Section 4, with reference to the number and percentage of bus stops that provide each facility in the Do Minimum and Do Something scenarios.

Table 6.28: Overview of Changes in Bus Stop Facilities Between Wilford Roundabout and Bray South (Fran O'Toole Bridge)

Bus Stop Facility	Do Minimum		Do Something		Comment
	Number of stops	Percentage of stops	Number of stops	Percentage of stops	
Realtime Information	1	17%	7	100%	It is proposed that all bus stops provide real-time information.
Timetable Information	2	33%	7	100%	It is proposed that all bus stops provide timetable information.
Shelter	3	50%	7	100%	It is proposed for all bus stops to provide shelters.
Seating	2	33%	7	100%	It is proposed for all bus stops to provide seating.
Accessible Kerbs	5	83%	7	100%	It is proposed that all bus stops provide accessible kerbs.
Indented Drop Off Area	1	17%	1	14%	14% of stops to be indented from bus lane.
Total number of stops	**6**		**7**		A change of 1 from Do Minimum

The contents of Table 6.28 outlines that there are significant improvements to the bus stop facilities along Section 4 of the Proposed Scheme. Improvements in the provision of real-time information, shelters, seating and accessible kerbs at the bus stops throughout Section 4 of the Proposed Scheme are assessed as providing an overall positive impact for bus passengers. All proposed facilities have been designed in accordance with BusConnects Preliminary Design Guidance which has been developed with cognisance to the relevant accessibility guidance.

Overall, the changes to bus infrastructure along Section 4 of the Proposed Scheme is assessed as providing an overall **High Positive impact** for bus passengers.

6.6.2.6.4 Parking and Loading

The Proposed Scheme will impact on some existing parking and loading locations along Section 4. The areas of parking changes are as follows:

- There are currently 59 commercial vehicle spaces for display (car sales) located at Windsor Motors Bray to the south of Wilford Roundabout. It is proposed to remove six spaces whilst 53 spaces will be retained. This loss of six spaces is considered to have a **Low Negative** impact;
- There are currently 17 commercial vehicle spaces for display (car sales) located at Fitzpatrick Motors (Bray) Limited opposite St. Peter's Road. It is proposed to remove eight spaces whilst nine spaces will be retained. This loss is considered to have a **Medium Negative** impact;
- There are currently 12 commercial parking spaces located within the Axa Car Park, adjacent to the Circle K and Fitzpatrick site. It is proposed to remove five spaces at this location and to provide seven commercial parking spaces and one disabled space. This loss of five spaces balanced with the provision of one additional disabled space and the loss of five additional commercial spaces (detailed below) is considered to have a **Medium Negative** impact;
- There are currently seven commercial parking spaces located to the east of Dublin Road. It is proposed to remove five spaces at this location and to provide two commercial parking spaces The impact of the loss of these spaces balanced with the loss of five additional commercial spaces (detailed above) is considered to have a **Medium Negative** impact;

There are currently 132 informal parking spaces of which are located in the Castle Street Shopping Centre. It is proposed to reconfigure the existing car park which will result in an overall loss of 13 car parking spaces. This impact is considered have to a **Low Negative** impact;

- There are currently two designated loading / unloading bay located adjacent to the Castle Street northbound carriageway It is proposed to provide four additional loading / unloading spaces which is considered to have a **Low Positive** impact;
- There are currently 16 commercial vehicle spaces for display (car sales) located at Castle Garage Bray, south of Dwyer Park. It is proposed to reduce the number of spaces at this location by three. The impact of the loss of three spaces at this location is considered to be a **Low Negative** impact; and
- There are currently 15 commercial parking spaces located to the east of Castle Street opposite St Cronan's Road. It is proposed to reduce the number of commercial parking spaces at this location to four. The loss of 11 spaces at this location is considered have to a **Medium Negative** impact.

The contents of Table 6.29 present a summary of the parking and loading spaces during both the Do Minimum and Do Something scenarios and the resulting changes along Section 4.

Table 6.29: Section 4 – Overall Changes in Parking / Loading Spaces

Street	Parking Type	Number of Parking Spaces		
		Do Minimum	Do Something	Change
Dublin Road	Disabled Permit Parking	0	1	1
	Commercial Vehicles Parked for Display (Car Sales)	76	62	-14
	Commercial Parking (Incl. business impacted accommodation works)	19	9	-10
	Side Street Parking	137	137	0
Castle Street	Designated Paid Parking	132	119	-13
	Disabled Permit Parking	5	5	0
	Loading / Unloading (Designated)	2	6	4
	Commercial Vehicles for Display (Car Sales)	16	13	-3
	Commercial Parking (Incl. business impacted accommodation works)	15	4	-11
	Side Street Parking	215	215	0
Total		**617**	**571**	**-46**

As shown in Table 6.29, the proposed amendments to parking / loading will result in a loss of 46 spaces along Section 4. Where parking is removed, the impact varies between negligible and medium negative. The overall impact of this change is assessed as a **Medium Negative** impact. This medium impact is considered acceptable in the context of the planned outcome of the Proposed Scheme, which is to improve accessibility to this local area (on foot, by bicycle and bus) for residents and visitors to local shops and businesses.

6.6.2.7 Summary of Corridor-Wide Infrastructure Works

6.6.2.7.1 Pedestrian Infrastructure

The Proposed Scheme will increase the number of controlled pedestrian crossings from 106 in the Do Minimum to 170 in the Do Something scenario, equating to a 60% increase.

6.6.2.7.2 Cycling Infrastructure

The Proposed Scheme will provide 33.4km of inbound and outbound segregated cycle facilities which is an increase from only 8.0km and 9.4km respectively in both directions in the Do Minimum scenario. In turn, there will be a decrease in non-segregated cycle facilities in the Do Something scenario compared to the Do Minimum as these facilities will be upgraded to segregated facilities in most cases.

Overall, total cycle facilities (segregated and non-segregated) will be increased to 91% of the whole route as part of the Proposed Scheme. The proportion of the corridor with segregated facilities (including quiet street treatment) will increase from 47% in the Do Minimum to 91% in the Do Something scenario.

6.6.2.7.3 Bus Priority Infrastructure

The Proposed Scheme will provide 16.1km inbound and 17.1km outbound of bus lanes across the corridor. This is an increased from 12.6km inbound and 12.8km outbound in the Do Minimum scenario. This contributes to an increase of 45% in total bus priority measures in both directions in the Do Something scenario compared to the Do Minimum. Overall, the Proposed Scheme will provide bus priority measures along the entirety of the corridor.

6.6.3 Quantitative Assessment

This quantitative assessment has been prepared with reference to the modelling outputs obtained from the four-tiered modelling approach outlined in Section 6.2. The following assessment topics have been considered:

- People Movement:
  - Peak Hour People Movement along the Proposed Scheme;
  - People Movement by Bus; and
  - Bus Boarding.
- Bus Network Performance Indicators:
  - Bus Journey Times; and
  - Bus Journey Time Reliability.
- General Traffic Network Performance Indicators:
  - Junction Capacity Outputs on the Direct Study Area; and
  - Redistributed flows and Junction Capacity Outputs on the Indirect Study Area.
- Overall Network-Wide Performance Indicators:
  - Queueing;
  - Total Travel Times;
  - Total Travel Distance; and
  - Average Network Speed.

6.6.3.1 People Movement

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 ERM 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 inbound and outbound 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).

6.6.3.1.1 Peak Hour People Movement along the Proposed Scheme

To determine the impact that the Proposed Scheme has on modal share changes on the direct CBC as a result of its implementation, the modelled number of people moved by each mode (Car, Bus, Active Modes) has been extracted from the ERM / LAM. The analysis compares the 2-way movement of people across both north and south quays in the Do Minimum and Do Something scenarios at a central point on the Proposed Scheme. The analysis has been produced for the AM and PM peak periods 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 BusConnects bus network proposals. It is acknowledged, therefore, that the assessment is conservative in terms of the level of people movement that is predicted in the Do Something scenario. The Do Something scenario will facilitate opportunities to increase bus network capacity operating along the corridor due to the extensive priority provided. In addition to this, the significant segregation and safety improvements to walking and cycling infrastructure that are a key feature of the Proposed Scheme will further maximise the movement of people travelling sustainably along the corridor and will therefore cater for higher levels of future population and employment growth. In the absence of the delivery of the Proposed Scheme, growth along this key corridor would continue to contribute to increased congestion and operational issues on the road network. The Proposed scheme delivers a reliable alternative to car-based travel that can support future sustainable growth and provide a positive contribution towards reducing carbon emissions.

6.6.3.1.1.1 <u>2028 AM Peak Hour People Movements</u>

Diagram 6.3 illustrates the People Movement by mode travelling along the Proposed Scheme towards the city centre during the AM Peak Hour in 2028.

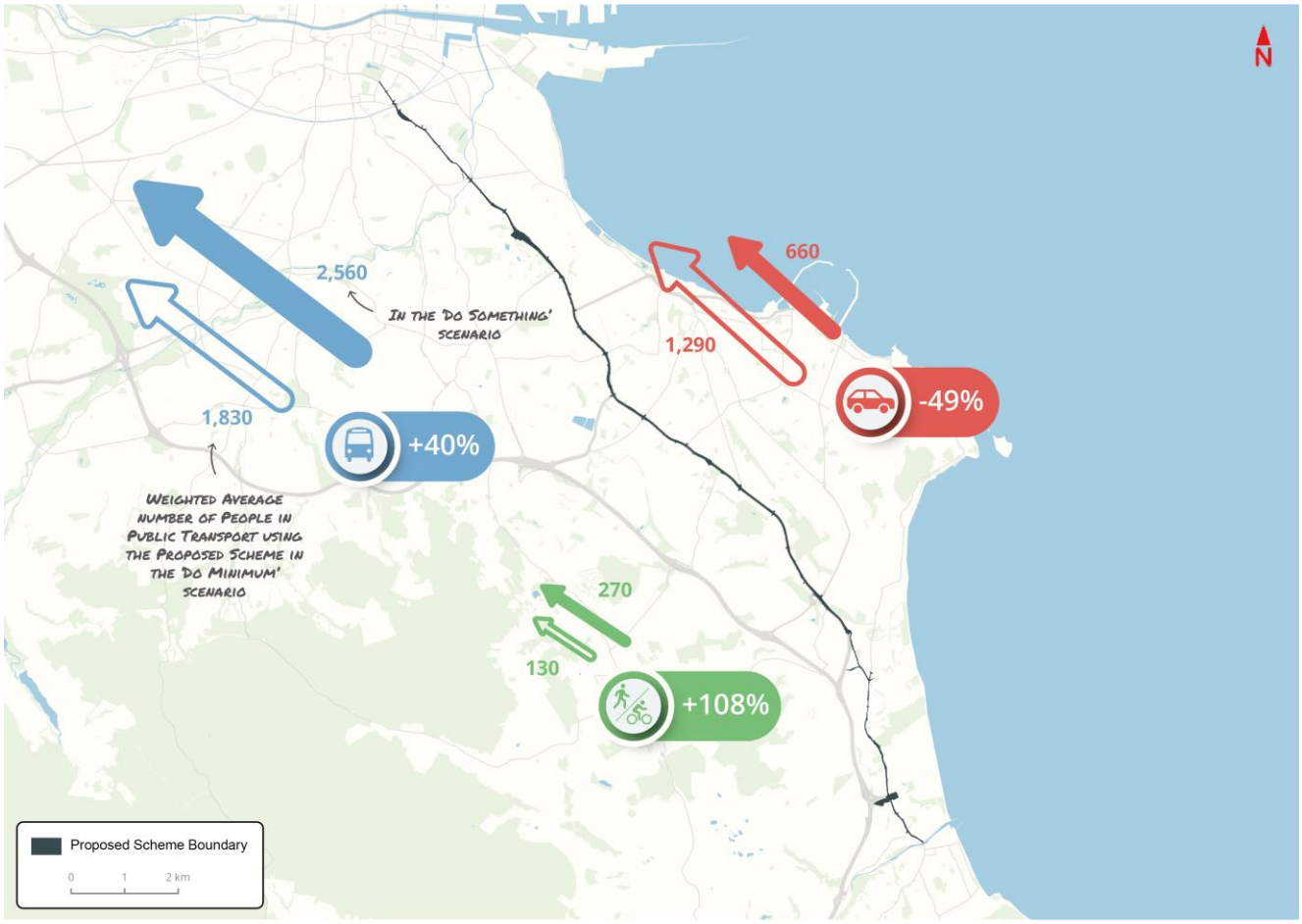

Diagram 6.3: Weighted Average People Movement by Mode During 2028 AM Peak Hour

As indicated in Diagram 6.3, there is a reduction of 49% in the number of people travelling via car, an increase of 40% in the number of people travelling via bus and an increase of 108% in people walking or cycling along the Proposed Scheme during the AM Peak Hour. It should be noted that the model predicts limited change in total walking trips between each scenario. This is due to the fact that walking trips in the Do Minimum scenario are also transferring to public transport and cycling due to the improved provision with any new walkers transferring from car replacing these trips.

The Proposed Scheme will facilitate a step change in the level of segregated cycling provision in comparison with existing conditions along the entire length of the corridor. The transport modelling undertaken, is therefore conservative in terms of the predicted cycling mode share. The Proposed Scheme has been designed to cater for much higher levels of cycling uptake and this will provide the opportunity for a significant increase in the movement of people travelling sustainably along the corridor, which would otherwise not be achieved in the absence of the Proposed Scheme.

Table 6.30 outlines the difference in modal split between the DoMinimum and DoSomething scenarios for each mode of travel in an inbound direction towards the City Centre during the AM Peak Hour. The results indicate a 44% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 6.30: Modal Shift of 2028 AM Peak Hour Along Proposed Scheme

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Hourly Trips	Modal Split (%)	Hourly Trips	Modal Split (%)	Hourly Trips	Difference (%)
Inbound towards the City Centre	AM Peak Period	General Traffic	1,290	40%	660	19%	-630	-49%
		Public Transport	1,830	56%	2,560	73%	730	40%
		Walking	100	3%	120	3%	20	20%
		Cycling	30	1%	150	4%	120	400%
		Combined Walking/Cycling	130	4%	270	8%	140	108%
		Sustainable Modes Total	**1,960**	**60%**	**2,830**	**81%**	**870**	**44%**
		Total (All modes)	**3,250**	**100%**	**3,490**	**99%**	**240**	**7%**

6.6.3.1.1.2 2028 PM Peak Hour People Movements

Diagram 6.4 illustrates the People Movement by mode travelling outbound from the city centre during the PM Peak Hour.

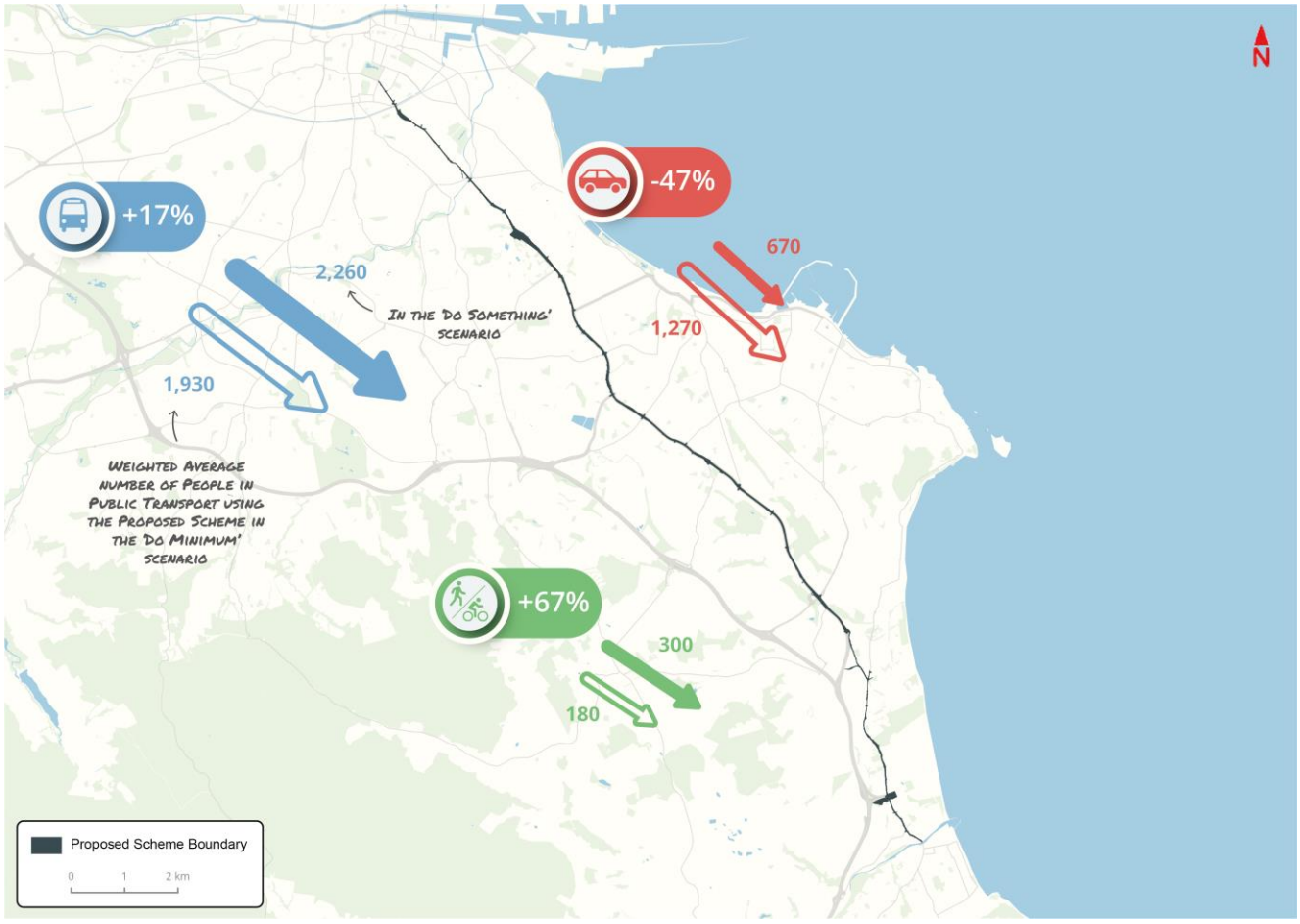

Diagram 6.4: Weighted Average People Movement by Mode During 2028 PM Peak Hour

As indicated in Diagram 6.4, there is a reduction of 47% in the number of people travelling via car, an increase of 17% in the number of people travelling via bus and an increase in 67% in the number of people walking or cycling along the Proposed Scheme during the PM Peak Hour.

Table 6.31 outlines the difference in modal split between the DoMinimum and DoSomething scenarios for each mode of travel in an outbound direction from the City Centre during the PM Peak Hour. The results indicate a 21% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 6.31: Modal Shift of 2028 PM Peak Hour Along Proposed Scheme

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Hourly Trips	Modal Split (%)	Hourly Trips	Modal Split (%)	Hourly Trips	Difference (%)
Outbound from the City Centre	PM Peak Period	General Traffic	1,270	38%	670	21%	-600	-47%
		Public Transport	1,930	57%	2,260	70%	330	17%
		Walking	150	4%	160	5%	10	7%
		Cycling	30	1%	140	4%	110	367%
		Combined Walking/Cycling	180	5%	300	9%	120	67%
		Sustainable Modes Total	**2,110**	**62%**	**2,560**	**79%**	**450**	**21%**
		Total (All modes)	**3,380**	**100%**	**3,230**	**100%**	**-150**	**-4%**

6.6.3.1.1.3 2043 AM Peak Hour People Movements

Diagram 6.5 illustrates the People Movement by mode inbound towards the city centre during the AM Peak Hour in 2043.

Diagram 6.5: Weighted Average People Movement by Mode During 2043 AM Peak Hour

As indicated in Diagram 6.5, there is a decrease of 47% in the number of people travelling via car, an increase of 60% in the number of people travelling via bus and an increase of 211% in the number of people walking and cycling along the Proposed Scheme during the AM Peak Hour.

Table 6.32 outlines the difference in modal split between the DoMinimum and DoSomething scenarios for each mode of travel in an inbound direction towards the City Centre during the AM Peak Hour. The results indicate a 73% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 6.32: Modal Shift of 2043 AM Peak Hour Along Proposed Scheme

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Hourly Trips	Modal Split (%)	Hourly Trips	Modal Split (%)	Hourly Trips	Difference (%)
Inbound towards the City Centre	AM Peak Period	General Traffic	1,096	42%	586	19%	-510	-47%
		Public Transport	1,358	53%	2,168	69%	810	60%
		Walking	81	3%	97	3%	16	20%
		Cycling	49	2%	307	10%	258	524%
		Combined Walking/Cycling	130	5%	405	13%	275	211%
		Sustainable Modes Total	**1,489**	**58%**	**2,573**	**81%**	**1,084**	**73%**
		Total (All modes)	**2,585**	**100%**	**3,159**	**100%**	**574**	**22%**

6.6.3.1.1.4 2043 PM Peak Hour People Movements

Diagram 6.6 illustrates the People Movement by mode travelling outbound from the city centre during the PM Peak Hour in 2043.

Diagram 6.6: Weighted Average People Movement by Mode During 2043 PM Peak Hour

As indicated in Diagram 6.6, there is a decrease of 42% in the number of people travelling via car, an increase of 17% in the number of people travelling via bus and an increase of 125% in the number of people walking and cycling along the Proposed Scheme during the PM Peak Hour. Table 6.33 outlines the difference in modal split between the Do Minimum and Do Something scenarios for each mode of travel in an outbound direction from the City Centre during the PM Peak Hour. The results a 26% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 6.33: Modal Shift of 2043 PM Peak Hour Along Proposed Scheme

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Hourly Trips	Modal Split (%)	Hourly Trips	Modal Split (%)	Hourly Trips	Difference (%)
Outbound from the City Centre	PM Peak Period	General Traffic	975	34%	566	20%	-410	-42%
		Public Transport	1,695	60%	1,978	68%	283	17%
		Walking	86	3%	80	3%	-5	-6%
		Cycling	71	3%	272	9%	201	282%
		Combined Walking/Cycling	157	6%	352	12%	195	125%
		Sustainable Modes Total	**1,852**	**66%**	**2,330**	**80%**	**478**	**26%**
		Total (All modes)	**2,827**	**100%**	**2,896**	**100%**	**68**	**2%**

6.6.3.1.2 People Movements by Bus

The following section presents the ERM demand outputs for People Movement by Bus. The results indicate that the improvements in bus priority infrastructure with the Proposed Scheme in place show a substantial increase in Bus patronage during the peak hours compared to the Do Minimum scenario.

6.6.3.1.2.0 2028 AM Peak Hour Bus Passengers

Diagram 6.7 presents the passenger loading profile comparing the DoMinimum and DoSomething scenarios in the AM Peak Hour in the inbound direction in 2028.

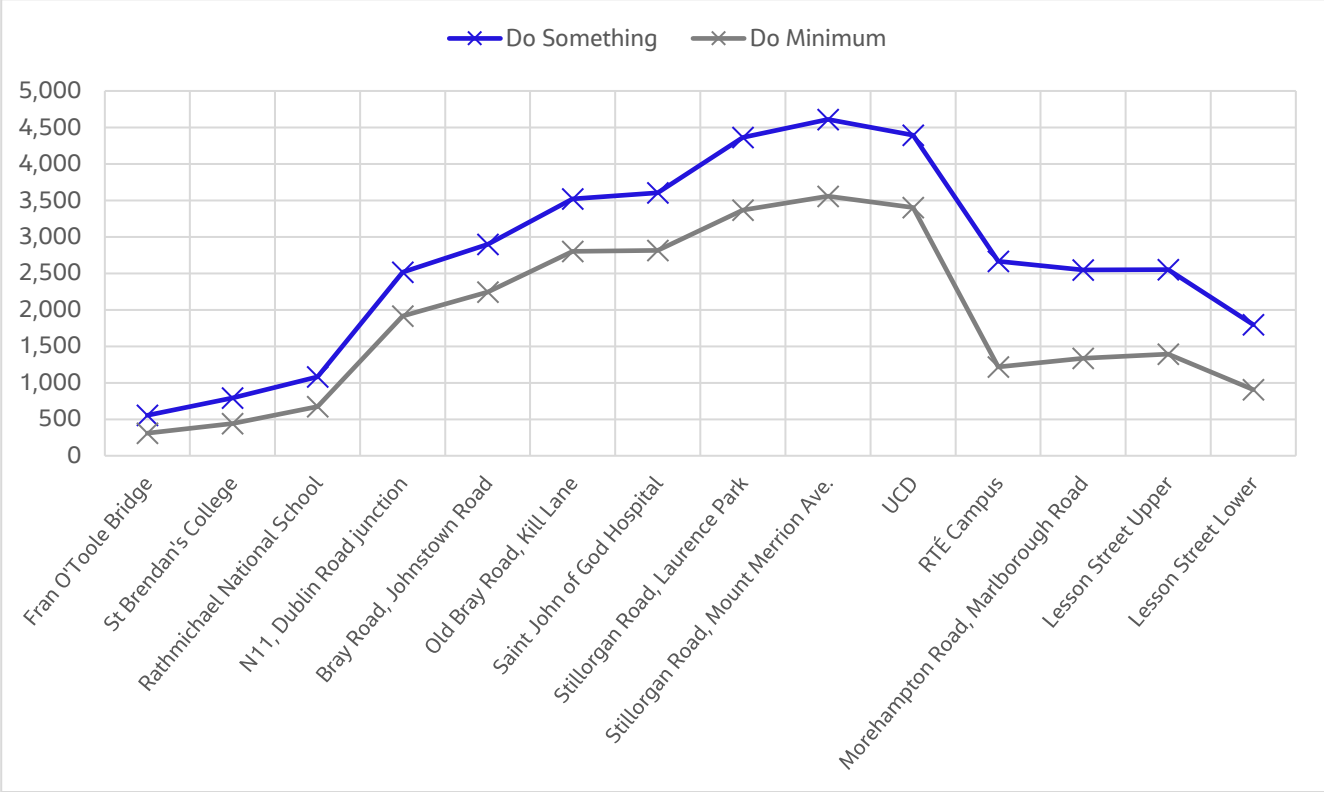

Diagram 6.7: 2028 AM Peak Hour Passenger Volume Along Proposed Scheme (Inbound Direction)

Diagram 6.7 shows higher levels of bus passenger loadings along the Proposed Scheme with a peak at the intersection between Stillorgan Road and Mount Merrion Avenue where the volume of passengers reaches 4,600 passengers in the AM Peak hour, compared to approximately 3,600 in the Do Minimum scenario.

The increase in bus passengers remains at a high level along the Proposed Scheme with approximately 600 to 1,200 additional users on most of the corridor, compared to the Do Minimum scenario

6.6.3.1.2.1 2028 PM Peak Hour Bus Passengers

Diagram 6.8 presents the passenger loading profile comparing the Do Minimum and Do Something scenarios in the PM Peak Hour in the outbound direction in 2028.

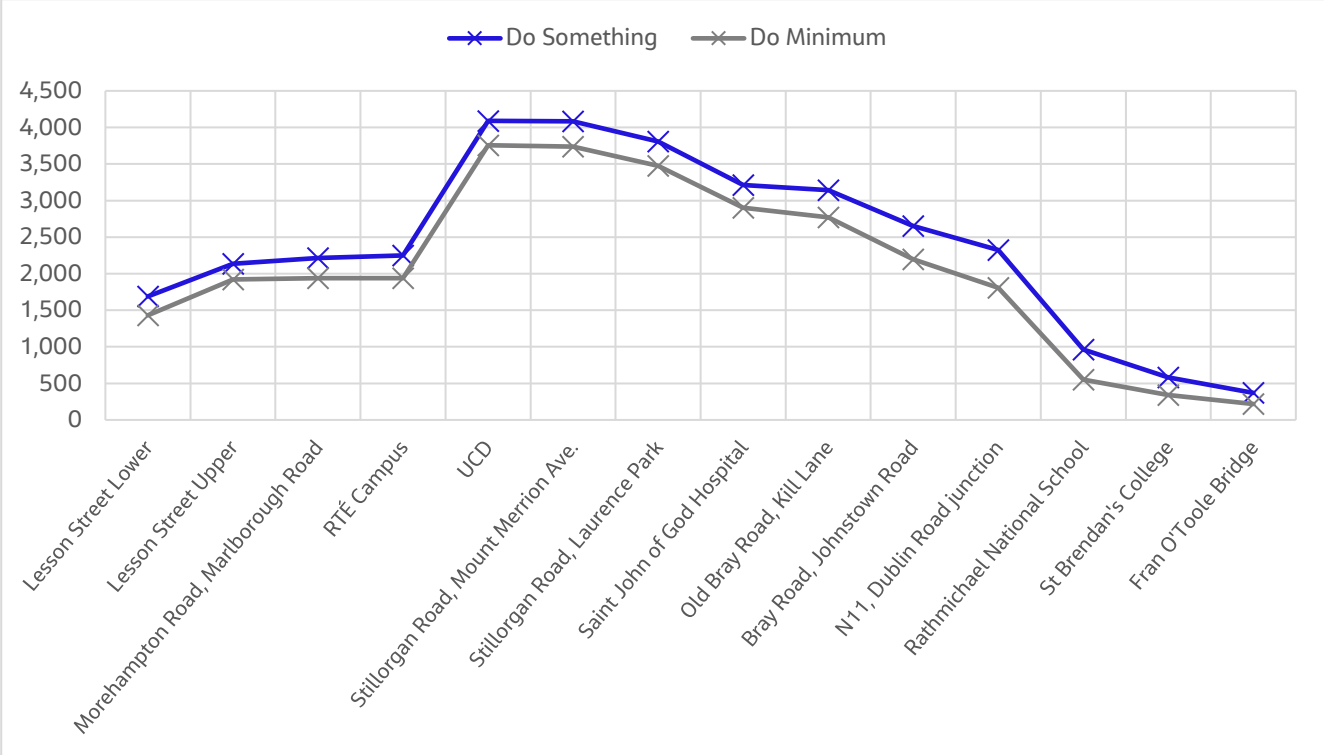

Diagram 6.8: 2028 PM Peak Hour Passenger Volume Along Proposed Scheme (Outbound Direction)

Diagram 6.8 shows higher levels of bus passenger loadings along the Proposed Scheme with a peak at UCD where the volume of passengers reaches 4,100 in the PM Peak hour, compared to approximately 3,800 in the Do Minimum scenario.

The increase in bus passengers is consistent along the Proposed Scheme with approximately 300 to 400 additional users on the corridor, compared to the Do Minimum scenario.

6.6.3.1.2.2 2043 AM Peak Hour Bus Passengers

Diagram 6.9 presents the passenger loading profile comparing the Do Minimum and Do Something scenarios in the AM Peak Hour in the inbound direction in 2043.

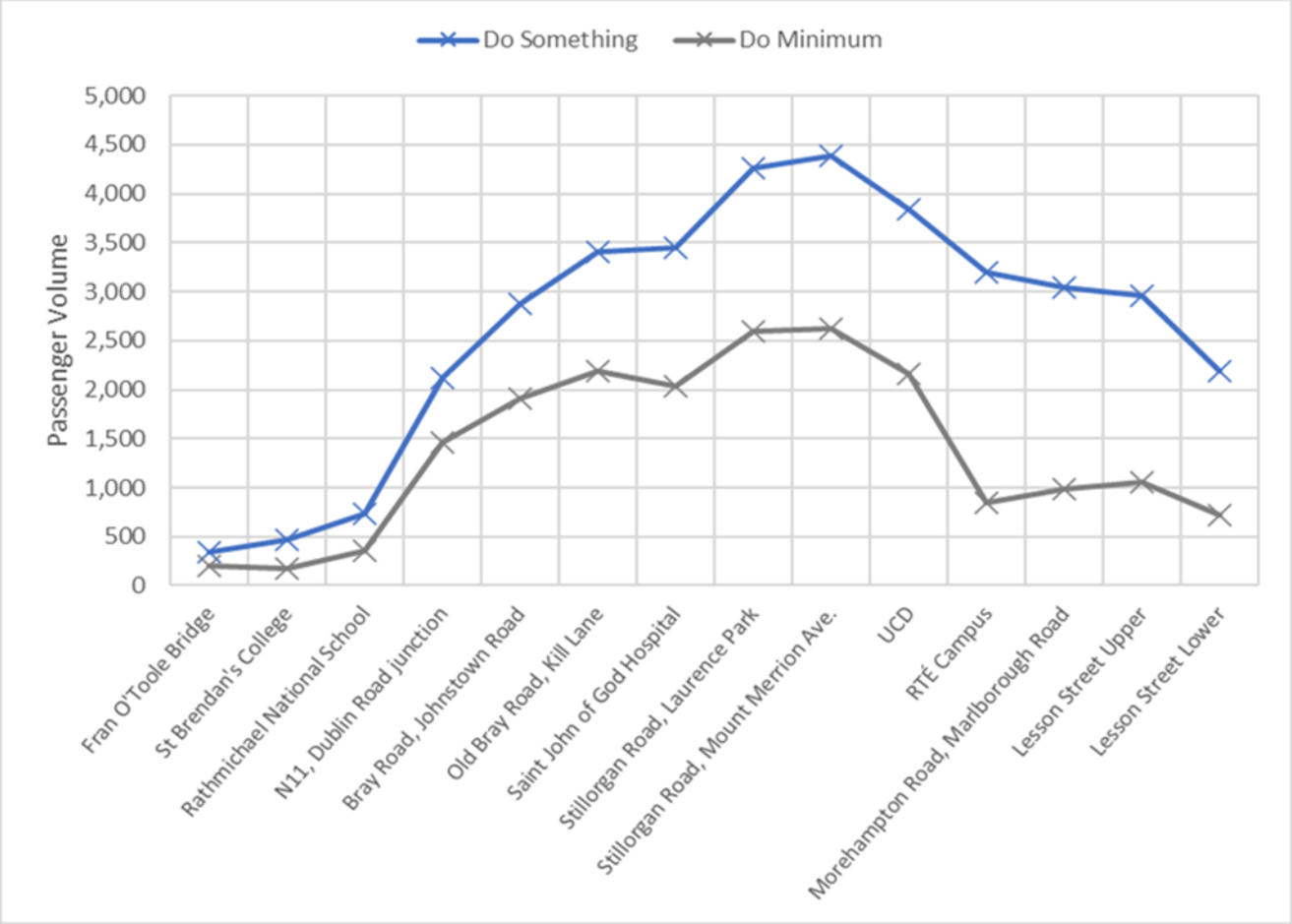

Diagram 6.9: 2043 AM Peak Hour Passenger Volume Along Proposed Scheme (Inbound Direction)

Diagram 6.9 shows higher levels of bus passenger loadings along the Proposed Scheme with a peak at the intersection between Stillorgan Road and Mount Merrion Avenue where the volume of passengers reaches approximately 4,400 in the AM Peak hour, compared to approximately 2,550 in the DoMinimum scenario.

The increase in bus passengers is consistent along the Proposed Scheme with approximately 250 to 1,850 additional users on the corridor, compared to the DoMinimum scenario.

6.6.3.1.2.3 2043 PM Peak Hour Bus Passengers

Diagram 6.10 presents the passenger loading profile comparing the DoMinimum and DoSomething scenarios in the PM Peak Hour in the outbound direction in 2043.

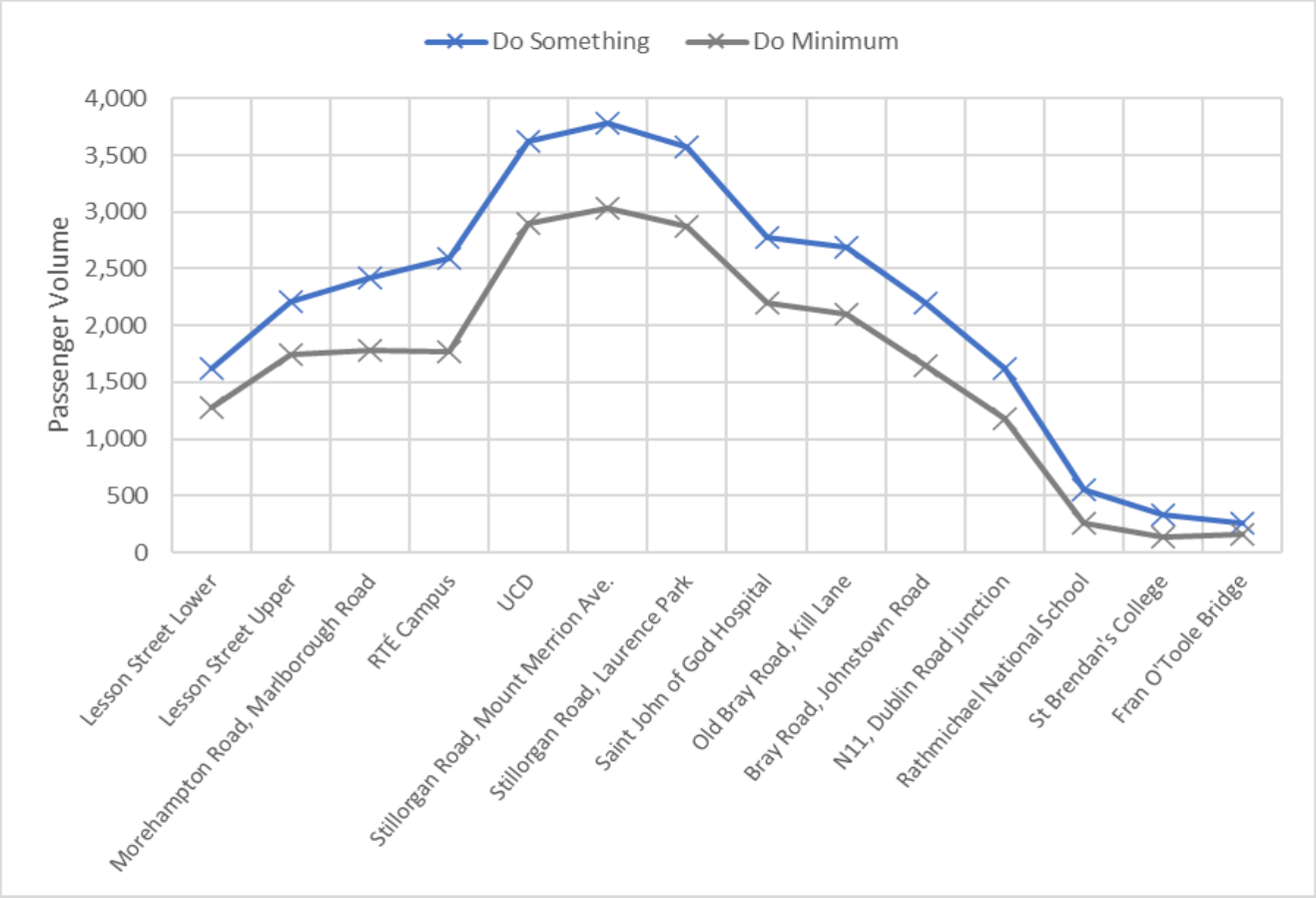

Diagram 6.10: 2043 PM Peak Hour Passenger Volume Along Proposed Scheme (Outbound Direction)

Diagram 6.10 shows higher levels of bus passenger loadings along the Proposed Scheme with a peak at the intersection of Stillorgan Road and Mount Merrion Avenue where the volume of passengers reaches approximately 3,750 in the PM Peak hour, compared to approximately 3,000 in the DoMinimum scenario.

The increase in bus passengers is consistent along the Proposed Scheme with approximately 250 to 750 additional users on the corridor, compared to the DoMinimum scenario.

6.6.3.1.2.4 Bus Boardings

Since many bus services commence and end further away from the direct alignment of the Proposed Scheme, an additional assessment has been undertaken to compare the total boardings on bus routes that use any part of the Proposed Scheme (including those stops not directly on the Proposed Scheme) in both 2028 and 2043 forecast years.

Table 6.34: 2028 Peak Hour Bus Boardings on Routes Using the Proposed Scheme (inc. Boarding at Stops Outside Proposed Scheme)

Time Period	Do Minimum	Do Something	Difference in Boardings	Difference (%)
AM Peak Hour	23,690	25,890	2,200	9.3%
PM Peak Hour	18,650	20,310	1,660	8.9%

Table 6.34 shows that there will be a 9.3% increase in people boarding bus routes which use the Proposed Scheme during the AM Peak Hour. This represents an addition of 2,200 passengers in the AM Peak hour.

In the PM Peak hour, there will be an 8.9% increase in people boarding bus routes which use the Proposed Scheme, representing an additional 1,660 passengers.

Table 6.35: 2043 Peak Hour Bus Boardings on Routes Using the Proposed Scheme (inc. Boarding at Stops Outside Proposed Scheme)

Time Period	Do Minimum	Do Something	Difference in Boardings	Difference (%)
AM Peak Hour	17,693	18,884	1,191	6.7%
PM Peak Hour	19,083	20,248	1,165	6.1%

The contents of

Table 6.35 shows that there will be a 6.7% increase in people boarding bus routes which use the Proposed Scheme during the AM Peak Hour. This represents an addition of 1,191 passengers in the AM Peak hour.

In the PM Peak hour, there will be a 6.1% increase in people boarding bus routes which use the Proposed Scheme, representing an additional 1,165 passengers.

6.6.3.2 People Movement - Summary of Impact

Taking into account the changes in mode share, demand changes by mode along the Proposed Scheme as well as bus usage presented above, the Proposed Scheme has been adjudged to deliver a **High Positive impact** on People Movement by sustainable modes along the direct study area.

The findings of the People Movement assessment demonstrate that the Proposed Scheme can be shown to deliver significant improvements in people movement by sustainable modes along the direct CBC alignment, particularly by bus, with reductions in car mode share due to the enhanced sustainable mode provision.

6.6.3.3 Operational Impacts for Bus Passengers and Operators

6.6.3.3.1 Overview

The impacts of the Proposed Scheme for Bus Users have been assessed based on journey times and reliability metrics extracted from the micro-simulation model of the Proposed Scheme corridor.

Due to the stochastic nature of the micro-simulation software, model outputs based on the average of 10 simulation seed runs (minimum of 5 recommended as per Transport for London (2010) Traffic Modelling Guidelines) have been calculated between the point of Proposed Scheme entry and exit and compared against the corresponding DoMinimum scenarios.

6.6.3.3.2 Bus Journey Time and Reliability changes as a result of the Proposed Scheme

To give an overview of how the Proposed Scheme will impact on bus journey times along the corridor, outputs for the E1 service, which traverses the entire length of the Proposed Scheme, have been extracted from the model. The assessment is based in the context of the full implementation of the BusConnects network re-design in both the Do Minimum and Do Something scenarios, with the Proposed Scheme servicing the D-Spine services.

Inbound Direction

Average journey times for the inbound E1 service in 2028 Opening Year and in 2043 Design Year can be seen in Table 6.36. A breakdown of the changes in average journey times for all other bus services using the Proposed Scheme can be found in TIA Appendix 4 (Average Bus Journey Times Section).

Table 6.36: E1 Service Bus Average Journey Times (Inbound Direction)

Peak Hour	Do Minimum (minutes)	Do Something (minutes)	Difference (minutes)	% Difference
2028 AM	55.9	49.9	-5.9	-11%
2028 PM	56.2	50.5	-5.7	-10%
2043 AM	55.9	50.1	-5.8	-10%
2043 PM	56.1	50.5	-5.7	-10%

Additional information regarding the range of journey times (minimum, maximum, average and standard deviation) for inbound E1 buses in the Do Minimum (red) and Do Something (blue) can be seen in Table 6.37 and Diagram 6.11 below. Each dot in the diagram represents the journey time for each individual bus in each scenario. A larger range of journey times are an indication of lower levels of reliability in a given scenario.

Table 6.37: E1 Service – Range of Journey Times (Inbound Direction)

Peak Hour	Do Minimum				Do Something			
	MIN	MAX	AVG	STDEV	MIN	MAX	AVG	STDEV
2028 AM	50.0	62.4	55.9	2.3	45.3	56.1	49.9	1.7
2028 PM	49.5	62.6	56.2	2.3	45.6	56.7	50.5	1.8
2043 AM	48.7	60.7	55.9	2.2	45.9	56.2	50.1	2.1
2043 PM	50.7	63.3	56.1	2.3	45.9	55.4	50.5	1.7

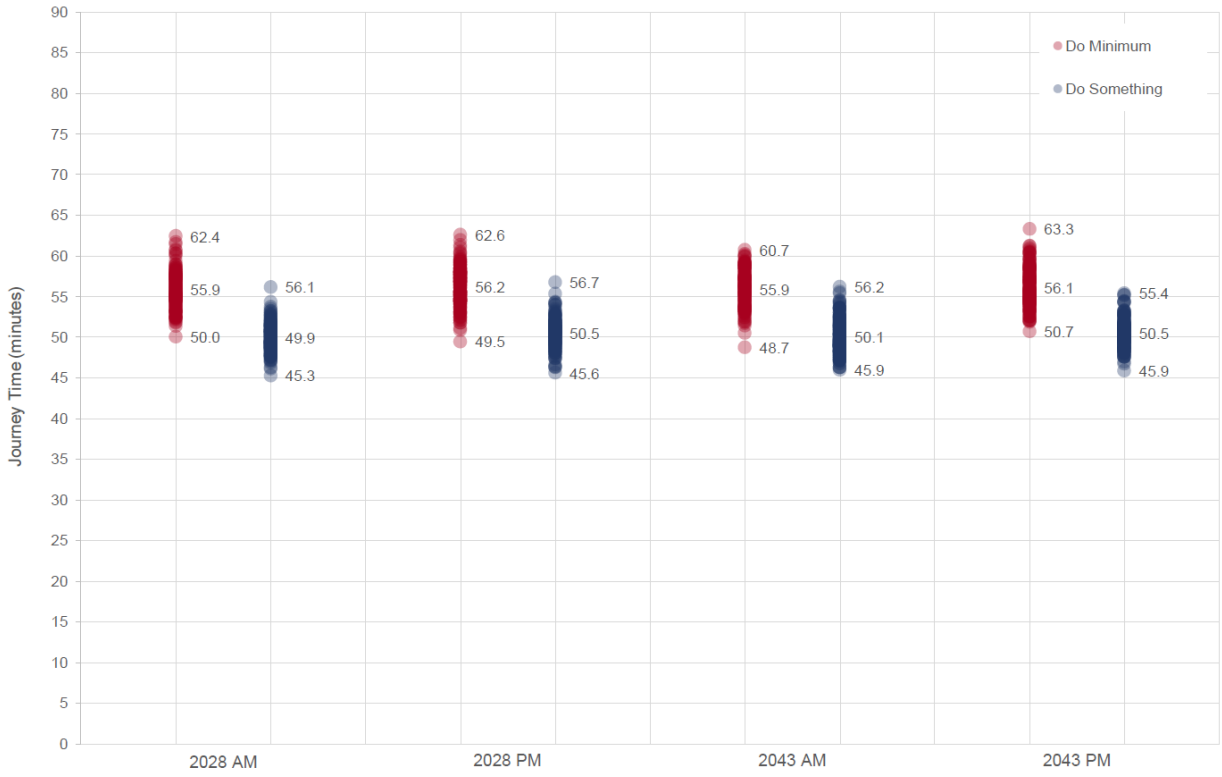

Diagram 6.11: E1 Bus Journey Times (Inbound Direction)

Based on the results presented in Table 6.37, the Proposed Scheme will deliver average inbound journey time savings for E1 service bus passengers of 5.9 minutes (11%) in 2028 and 5.8 minutes (10%) in 2043. Furthermore, results presented in Diagram 6.11 suggest an improvement in bus journey time reliability in all 4 core scenarios as indicated by the reduced ranges of journey times achieved with the individual durations focused much closer

to the average journey times (lower standard deviation) in the Do Something scenario (blue dots) with the Proposed Scheme in place compared to the more dispersed range in the Do Minimum scenario (red dots).

Note that the variation in journey times shown above are based on one set of predicted flows for the Do Minimum and Do Something scenario. Traffic flows fluctuate daily which would mean that the variation in journey times would be much greater in the Do Minimum with any increases in traffic flows compared to the protection of journey time reliability provided by the bus priority measures that comprise the Proposed Scheme.

A comparison of average Do Minimum and Do Something journey times for the inbound E1 service are also illustrated in the cumulative time-distance graphs shown below.

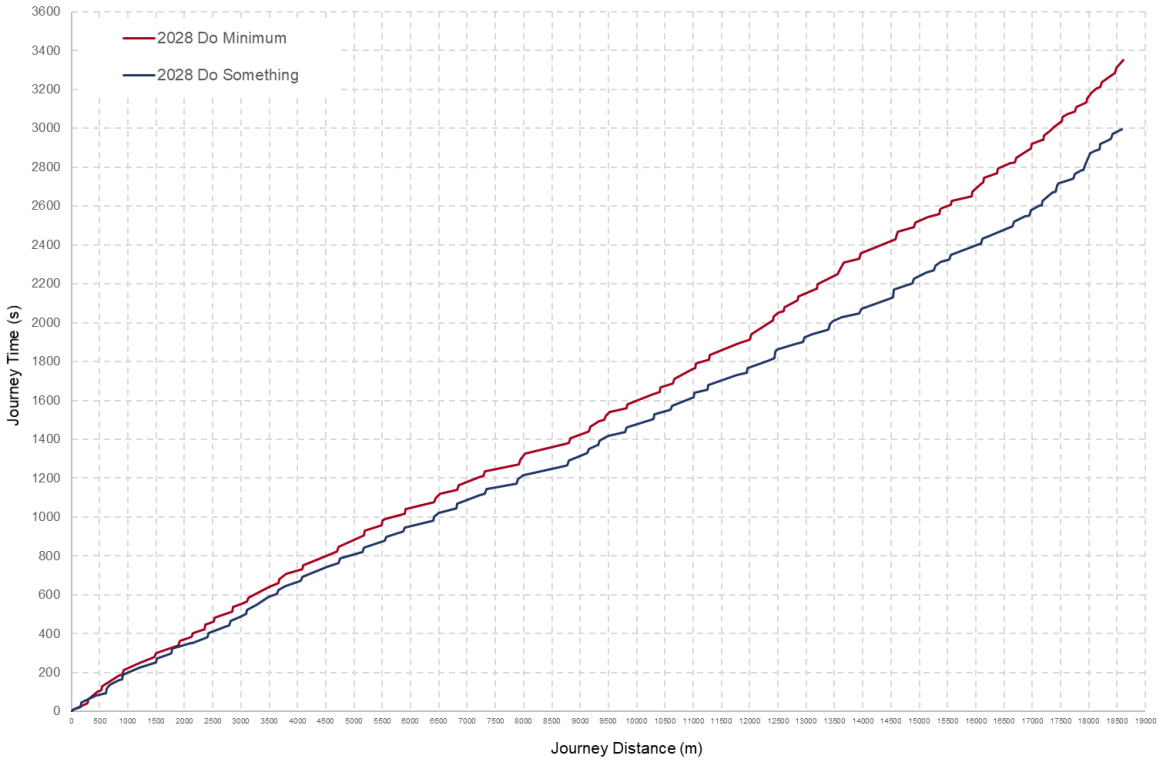

Diagram 6.12: E1 Bus Journey Time (2028 AM, Inbound)

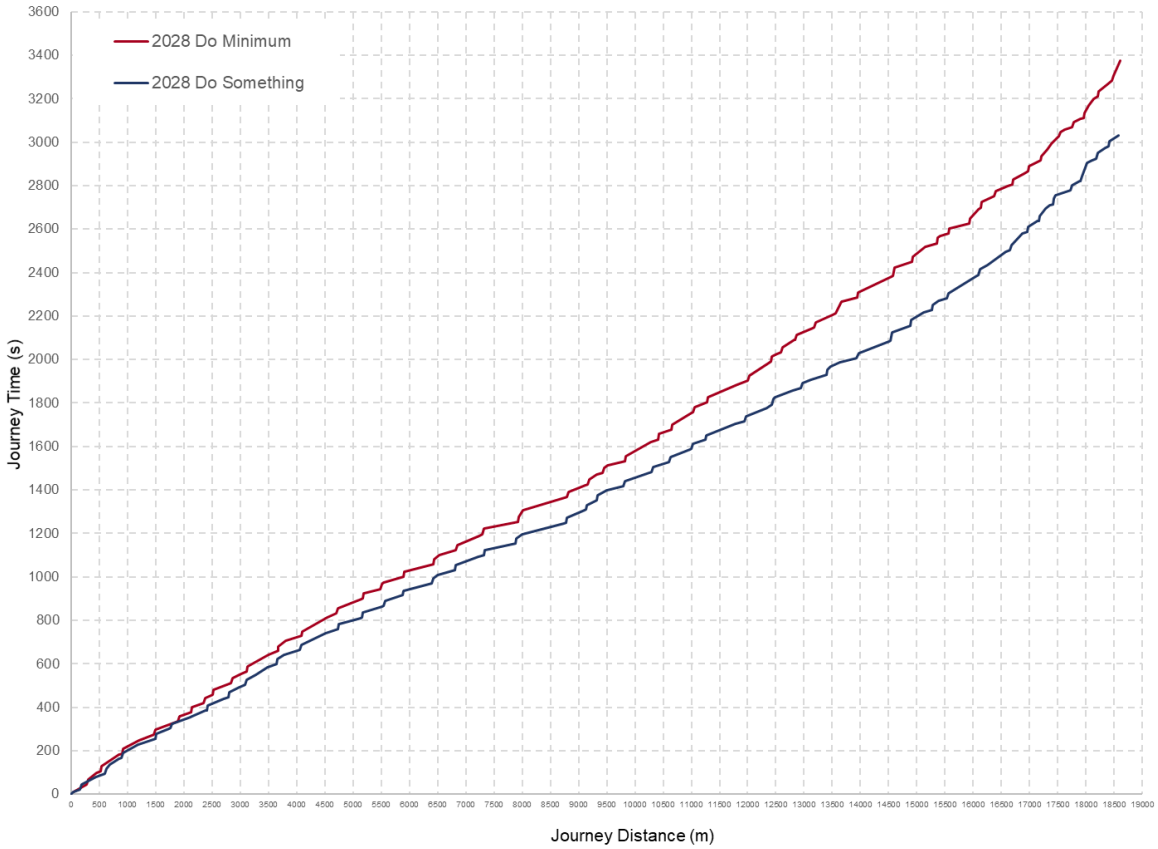

Diagram 6.13: E1 Bus Journey Time (2028 PM, Inbound)

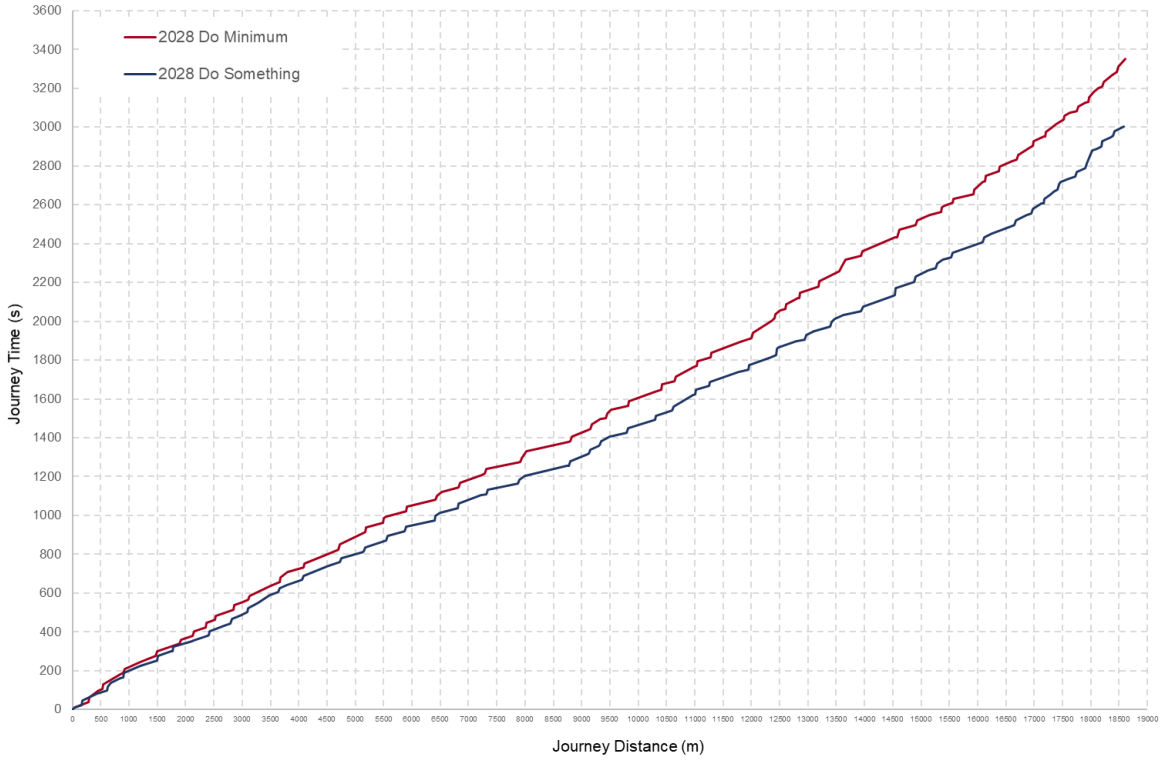

Diagram 6.14: E1 Bus Journey Time (2043 AM, Inbound)

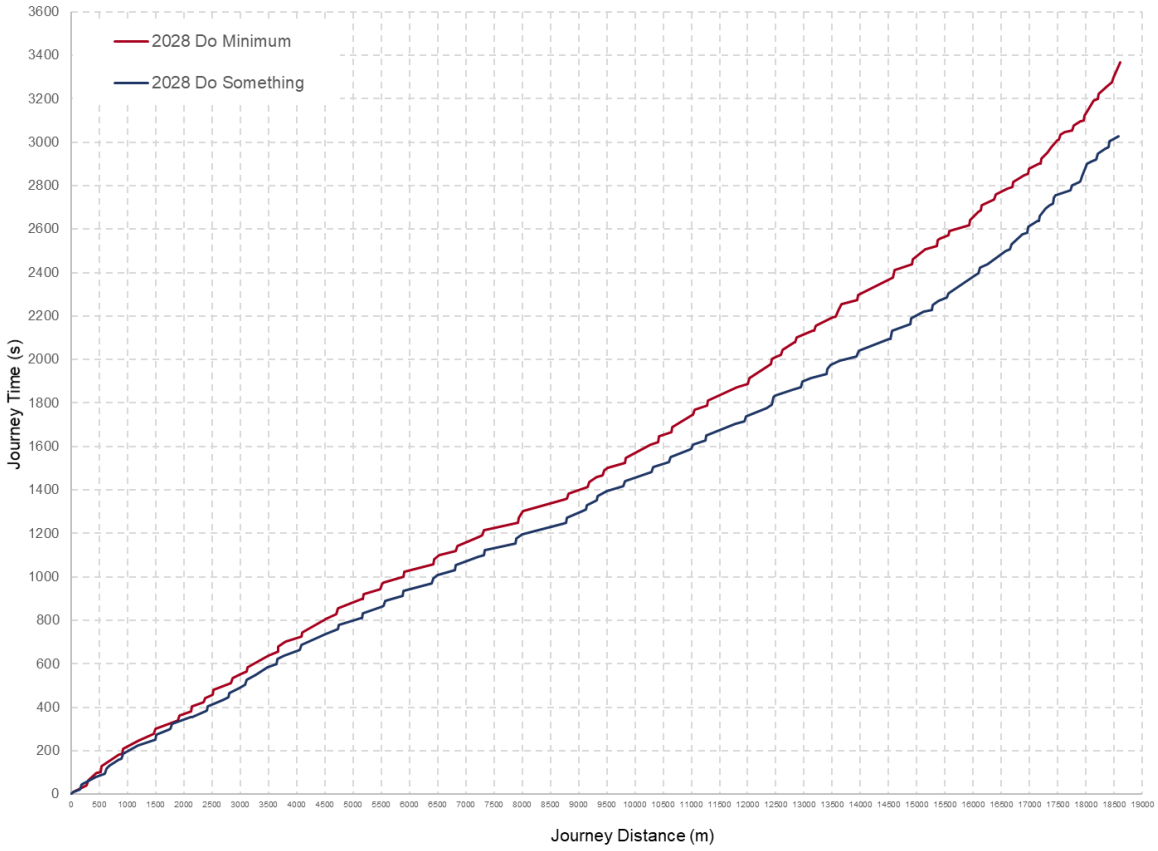

Diagram 6.15: E1 Bus Journey Time (2043 PM, Inbound)

Based on the results presented above, the Proposed Scheme is expected to deliver bus journey time savings in both the AM and PM peaks. Whilst modest benefits can be seen through Bray, Shankill and the southern half of the Stillorgan Road, these can be seen to increase beyond Stillorgan Park Road with further savings seen on the Morehampton Road approaches to Wellington Place, Waterloo Road and Appian Way as well as the Leeson Street Lower approach to the Eustace Bridge.

Outbound Direction

Average journey times for the outbound E1 service in 2028 Opening Year and in 2043 Design Year can be seen in Table 6.38 A breakdown of the changes in average journey times for all other bus services using the Proposed Scheme can be found in TIA Appendix 4 (Average Bus Journey Times Section).

Table 6.38: E1 Service Bus Journey Times (Outbound Direction)

Peak Hour	Do Minimum (minutes)	Do Something (minutes)	Difference (minutes)	% Difference
2028 AM	58.8	51.8	-7.1	-12%
2028 PM	59.8	52.5	-7.3	-12%
2043 AM	59.2	51.7	-7.5	-13%
2043 PM	59.9	52.4	-7.4	-12%

Additional information regarding the range of journey times (minimum, maximum, average and standard deviation) for outbound E1 buses in the Do Minimum (red) and Do Something (blue) can be seen in Table 6.39 and Diagram 6.16: below. Each dot represents the journey time for each individual bus in each scenario. A larger range of journey times are an indication of lower levels of reliability.

Table 6.39: E1 Service – Range of Journey Times (Outbound Direction)

Peak Hour	Do Minimum				Do Something			
	MIN	MAX	AVG	STDEV	MIN	MAX	AVG	STDEV
2028 AM	51.9	65.2	58.8	2.5	47.8	56.6	51.8	1.9
2028 PM	52.9	66.2	59.8	2.4	47.5	59.5	52.5	2.3
2043 AM	52.6	66.2	59.2	2.6	46.9	57.5	51.7	1.9
2043 PM	54.1	68.4	59.9	2.5	45.9	58.8	52.4	2.2

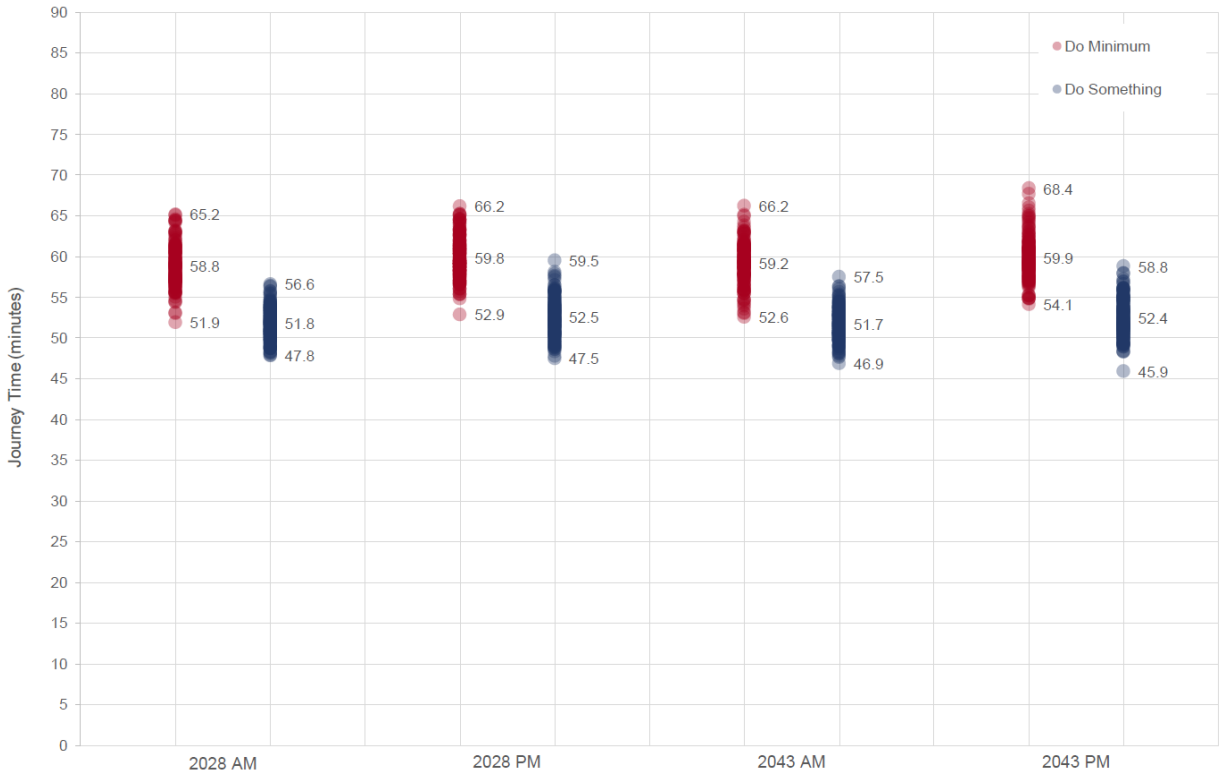

Diagram 6.16: E1 Bus Journey Times (Outbound Direction)

Based on the results presented in Table 6.39, the Proposed Scheme will deliver average outbound journey time savings for E1 service bus passengers of up to 7.3 minutes (12%) in 2028 (PM) and 7.5 minutes (13%) in 2043 (AM). Furthermore, results presented in Diagram 6.16: suggest an improvement in bus journey time reliability in all four scenarios as indicated by the reduced ranges of journey times achieved with the durations focused much closer to the average journey times (lower standard deviation) in the Do Something scenario (blue dots) with the Proposed Scheme in place compared to the more dispersed range in the Do Minimum scenario (red dots).Note that the variation in journey times shown above are based on one set of predicted flows for the Do Minimum and Do Something scenario. Traffic flows fluctuate daily which would mean that the variation in journey times would be much greater in the Do Minimum with any increases in traffic flows compared to the protection of journey time reliability provided by the bus priority measures that comprise the Proposed Scheme.

A comparison of average Do Minimum and Do Something journey times for the E1 service for the outbound direction of travel illustrated in the cumulative time-distance graphs shown below.

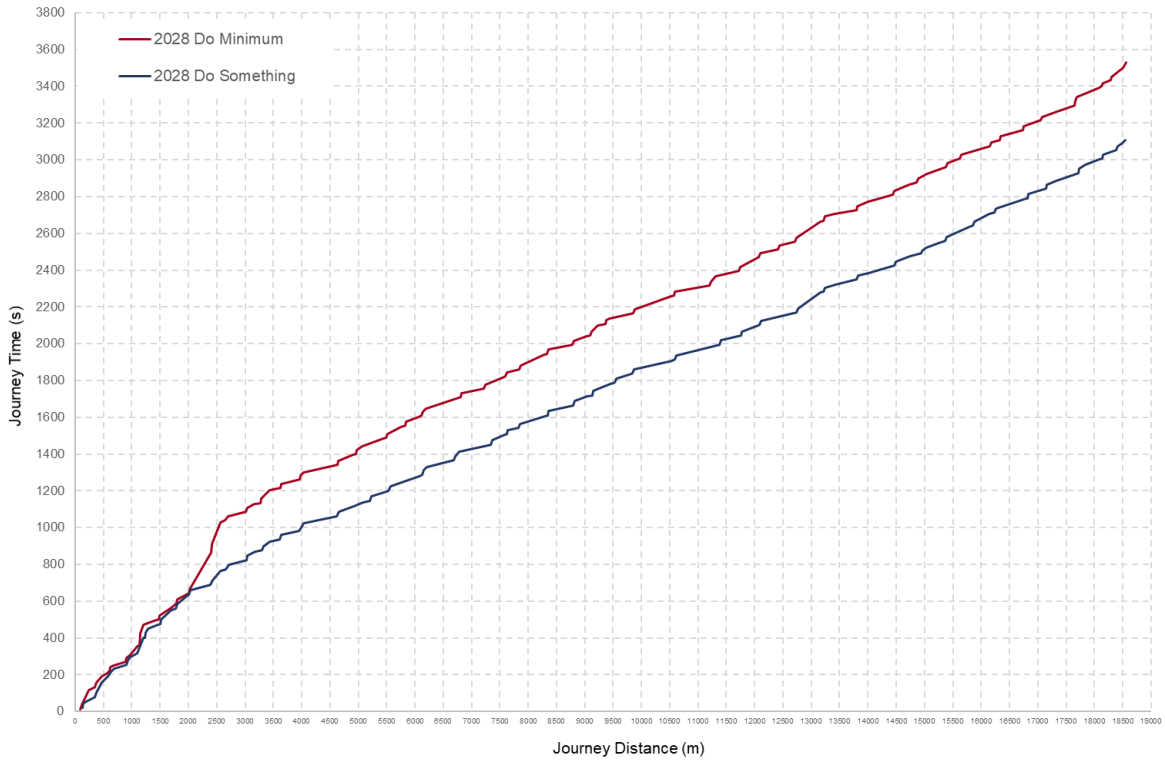

Diagram 6.17: E1 Bus Journey Time (2028 AM, Outbound)

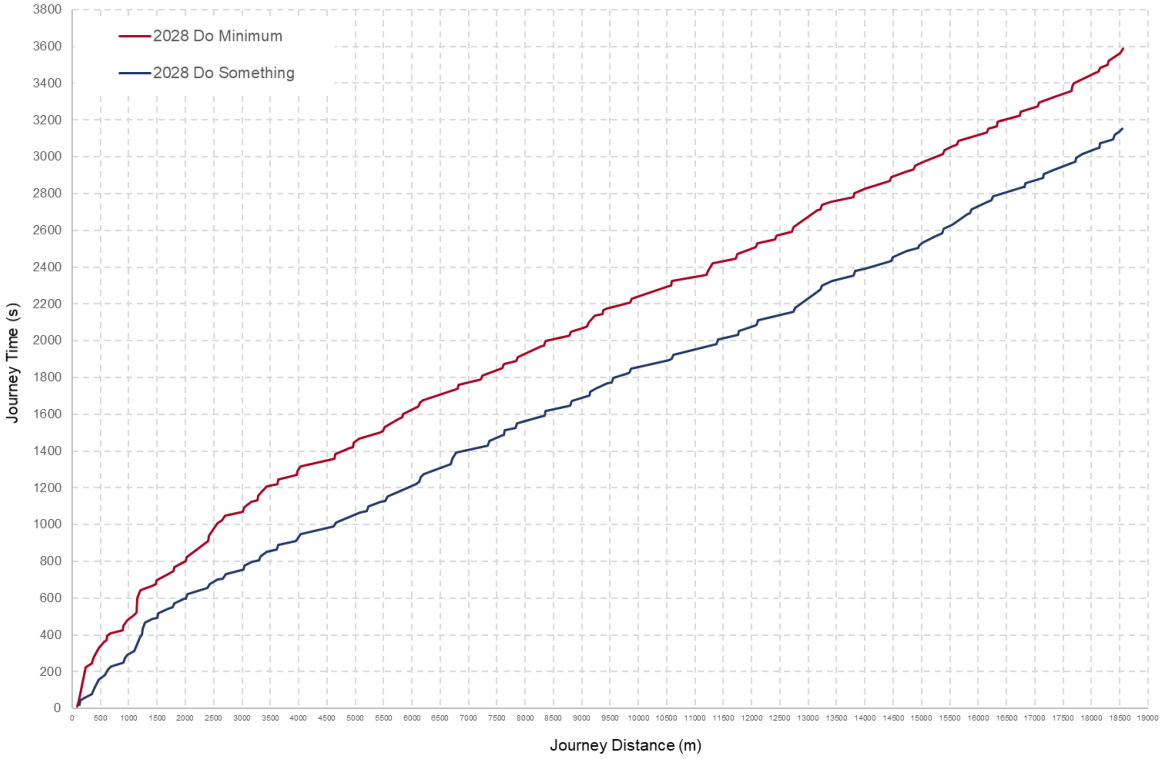

Diagram 6.18: E1 Bus Journey Time (2028 PM, Outbound)

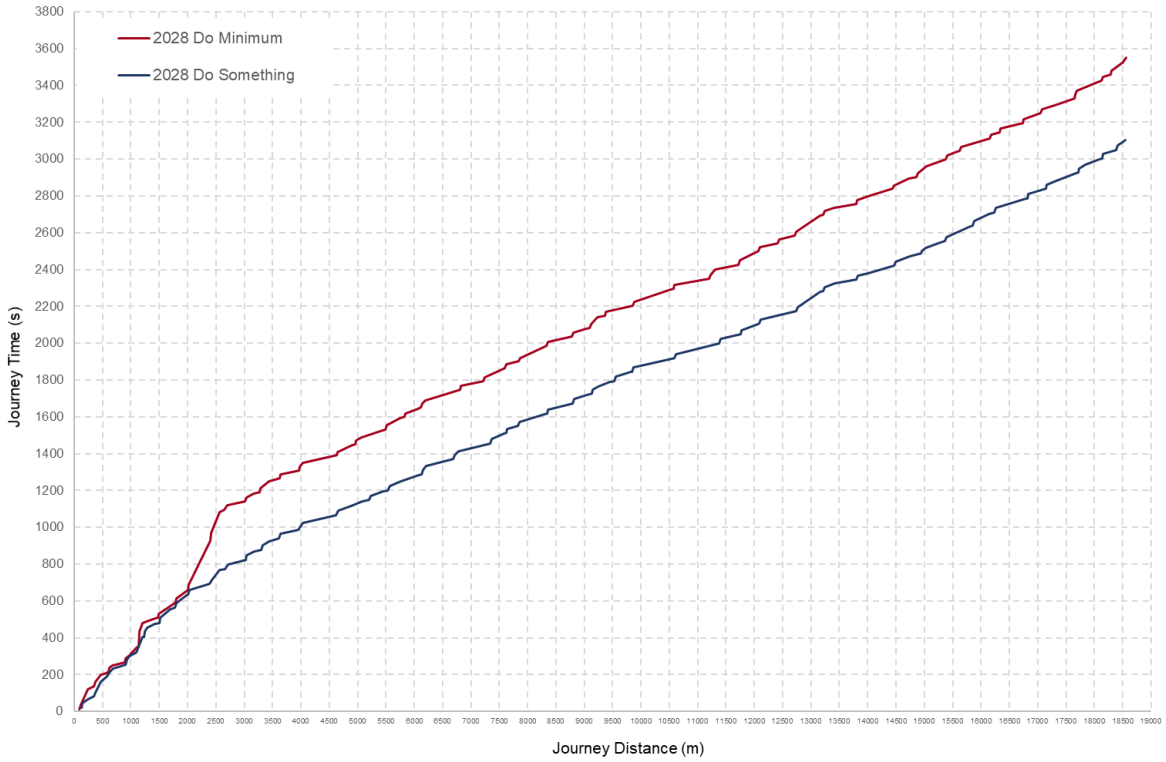

Diagram 6.19: E1 Bus Journey Time (2043 AM, Outbound)

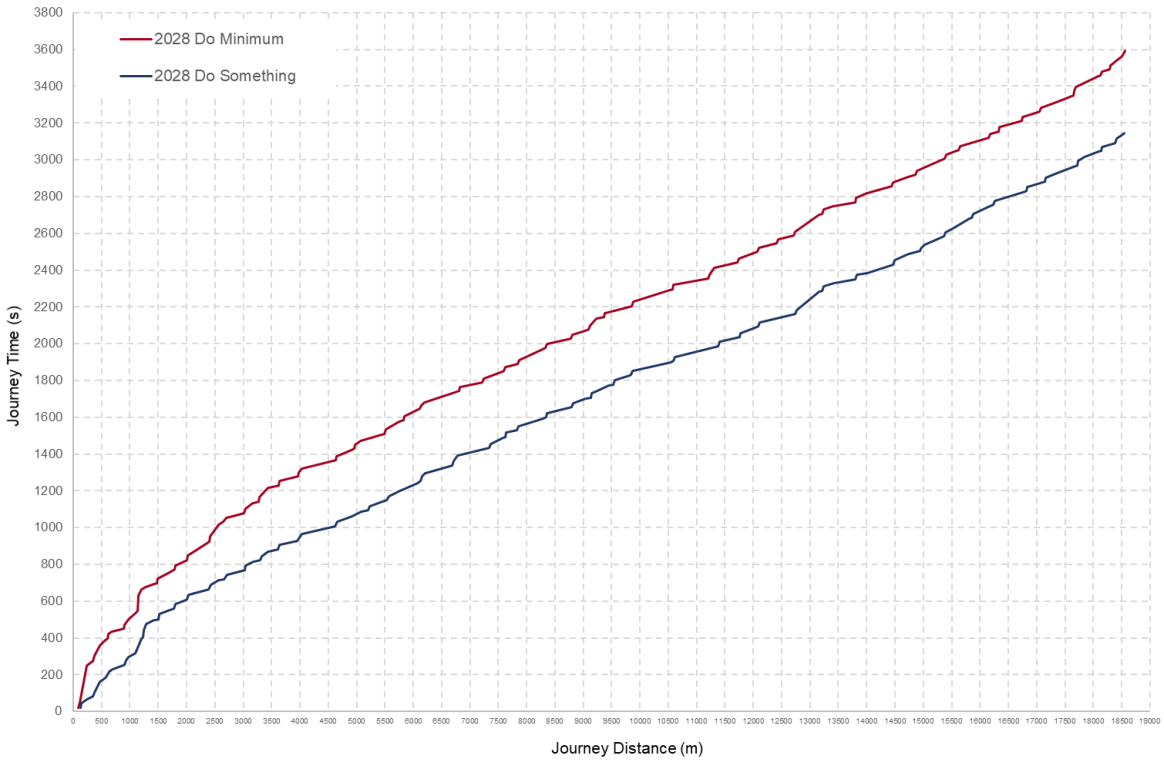

Diagram 6.20: E1 Bus Journey Time (2043 PM, Outbound)

Based on the results presented above, the Proposed Scheme is expected to deliver savings in bus journey time in both the AM and PM peak. In the AM peak, significant delay savings can be seen on Donnybrook Road between Victoria Avenue/Belmont Avenue and Anglesea Road / Beaver Row following the introduction of an outbound bus

lane in the Proposed Scheme. In the PM peak, delay savings can also be seen on Leeson Street Lower between St Stephens Green and the Eustace Bridge. This is due to exit blocking and queuing originating from Fitzwilliam Place which extends through the Hatch Street Lower junction in the Do Minimum. Outside of these sections, cumulative journey time savings can be seen in the Proposed Scheme along the CBC due to the introduction of signal controlled priority at junctions.

6.6.3.3.3 Total Journey Time Changes for all Proposed Scheme Bus Services

The change in total bus journey time for all buses travelling along the Proposed Scheme, is shown in Table 6.40 in vehicle minutes.

Table 6.40: Total Bus Journey Time

Peak Hour	Do Minimum (vehicle.minutes)	Do Something (vehicle.minutes)	Difference (vehicle.minutes)	%Difference
2028 AM	2503.8	2185.2	-318.6	-13%
2028 PM	2533.2	2252.1	-281.1	-11%
2043 AM	2511.3	2191.4	-319.9	-13%
2043 PM	2533.8	2233.0	-300.8	-12%

Based on the results presented in Table 6.40, modelling shows that the Proposed Scheme will reduce total bus journey times along the Proposed Scheme by up to 13% in 2028 and 2043. Based on the AM and PM peak hours alone, this equates to **c10 hours of savings in 2028 and 2043** combined across all buses when compared to the Do Minimum. On an annual basis this equates to over 7,500 hours of bus vehicle savings in 2028 and 7,800 hours in 2043, when considering weekday peak periods only.

6.6.3.3.4 Bus Users Assessment Summary

The findings of the Bus User assessment shows that the Proposed Scheme fully aligns with the aims and objectives of the CBC Infrastructure Works, to 'Enhance the capacity and potential of the public transport system by improving bus speeds, reliability and punctuality through the provision of bus lanes and other measures to provide priority to bus movement over general traffic movements'.

The significance of impact on bus users of the Proposed Scheme has been appraised using a qualitative assessment, taking the changes in journey time and journey reliability metrics presented above into consideration. The Proposed Scheme is considered to deliver a **High Positive** impact overall.

6.6.3.3.5 Increased Bus Frequency - Resilience Sensitivity Analysis

Background

For the purposes of this TIA and the transport modelling undertaken in support of this TIA, no increase in bus service frequency beyond that planned under the current Bus Connects Network redesign proposals was assessed. The bus frequencies used in the modelling are based on the proposed service rollout as part of the BusConnects Network Redesign and are the same in both the Do Minimum and Do Something scenarios. This rollout is currently underway. The rationale for undertaking this approach was that the planning consent being sought and which the TIA supports is solely for the infrastructural improvements associated with providing bus priority along the Proposed Scheme.

This analysis, however, is conservative as the bus priority infrastructure improvements and indeed the level of protection it will provide to bus journey time consistency and reliability will provide a significant level of resilience for bus services that will use the Proposed Scheme from implementation into the future. The resilience provided by the Proposed Scheme will allow the service pattern and frequency of bus services to be increased into the future to accommodate additional demand without having a significant negative impact on bus journey time reliability or the operation of cycle and pedestrian facilities. In order to assess this resilience and the potential impacts of this resilience on carbon emissions, an additional analysis has been undertaken, which is detailed below.

Resilience Testing

A key benefit of the provision of a resilient BusConnects Service network, one which can provide reliable and consistent journey times, is that it has potential to cater for further significant transfer from private car travel to more sustainable and environmentally friendly travel via public transport.

To assess the resilience of the Proposed Scheme to cater for additional bus service frequency provision whilst maintaining a high level of bus journey time reliability, a separate analysis was undertaken in the Proposed Scheme micro-simulation model. In this analysis, the service frequency, in both directions of travel, was increased to achieve a 10 buses per hour increase, at the busiest section, to assess whether the Proposed Scheme could cater for this increased service frequency whilst maintaining a high level of journey time reliability. The analysis was undertaken in the 2028 Minimum and Do Something models to assess whether the bus priority infrastructure was having the desired impact of protecting bus journey time reliability.

The bus service frequency, along the busiest section, in the 2028 Do Minimum model and in the 2028 Do Something Resilience testing models is outlined in Table 6.41 below.

Table 6.41: Resilience Testing Bus Service Frequency Scenario Testing

Scenario	Inbound (Buses per Hour)	Outbound (Buses per Hour)
Do Minimum	42	45
Do Something	42	45
Do Minimum - Additional Services Resilience Test	52	55
Do Something - Additional Services Resilience Test	52	55

Table 6.42 outlines the average journey times for the outbound E1 service in the 2028 Opening Year.

Table 6.42: E1 Service – Average Bus Journey Times

Direction	Do Minimum (minutes)	Do Minimum (Additional Services) (minutes)	% Difference	Do Something (minutes)	Do Something - Additional Services (minutes)	% Difference
2028 Inbound AM	55.9	56.8	1.7%	49.9	50.4	1.0%
2028 Outbound PM	59.8	62.9	5.1%	52.5	53.5	1.8%

The results of the scenario testing with an additional 10 buses per direction per hour operating along the Proposed Scheme in the 2028 Opening Year are presented graphically below. The diagram displays the maximum, minimum and average journey times for each of the E1 bus services modelled.

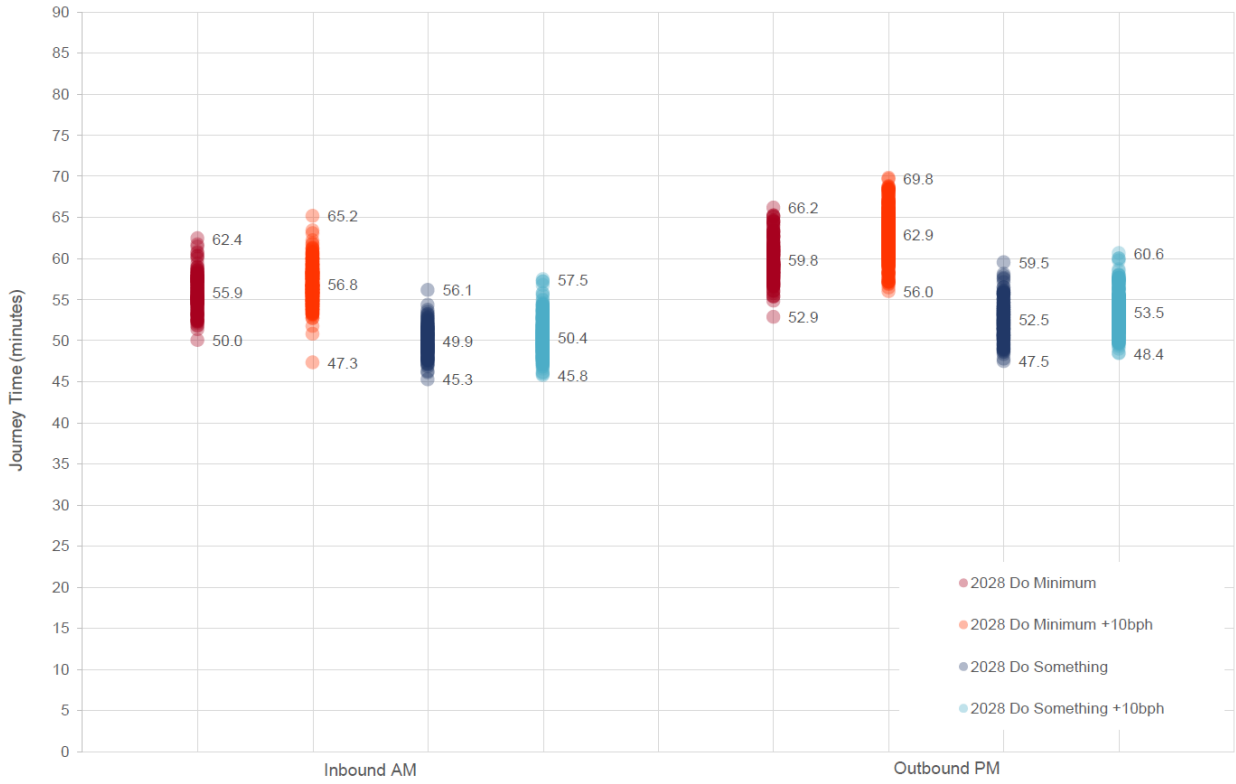

Diagram 6.21: Resilience Testing Bus Journey Time Reliability Indicators - Scenario Testing– Opening Year (2028)

The results indicate a negligible change in Do Minimum and Do Something bus journey times even with an additional 10 services operating per direction per hour along the corridor. ***This highlights the benefit that the Proposed Scheme infrastructure improvements can provide in protecting bus journey time reliability and consistency, as passenger demand continues to grow into the future.***

It must be noted that it was assumed the general traffic levels included in each scenario would remain static. If traffic levels were to increase (typical daily variations are in the order of +/- 15%) then the bus priority infrastructure would further protect journey time reliability and resilience in comparison with the Do Minimum scenario.

6.6.3.3.6 General Traffic Assessment

6.6.3.3.6.1 Overview

The Proposed Scheme aims to provide an attractive alternative to the private car and promote a modal shift to public transport, walking and cycling. It is however recognised that there will be an overall reduction in operational capacity for general traffic along the direct study area given the proposed changes to the road layout and the rebalancing of priority to walking, cycling and bus.

The N/M11 route is one of the most heavily trafficked radial routes into Dublin and serves a currently highly car dependent commuter catchment from the south-east of the country, beyond the extent of the Proposed Scheme. As outlined in the Bray to Arklow Transport Study (NTA 2021) (supporting document to the GDA Strategy), car ownership is higher in this area relative to the wider GDA, and the proportion of trips to work by car is far higher than the average GDA figure (81% vs. 55%). The reduction in operational capacity for general traffic along the Proposed Scheme will likely create some level of trip redistribution onto the surrounding road network and the potential impacts of this are documented in this section.

It should be noted that the Do Minimum and Do Something scenarios are based on the assumption that travel behaviour will remain broadly consistent over time and that car demand, used for this assessment, represents a likely worst-case scenario. It is possible that societal trends in the medium to long term may reduce car demand

further due to the ongoing changes to travel behaviours and further shifts towards sustainable travel, flexibility in working arrangements brought on following COVID-19, and delayed car ownership trends that are emerging.

The assessment also assumes that goods vehicles (HGVs and LGVs) continue to grow in line with forecasted economic activity with patterns of travel remaining the same. For example, the assessment assumes a 45% and 77% increase in goods traffic versus the base year in 2028 and 2043 respectively. This is considered a very conservative assumption. It should be noted, however, that the Climate Action Plan (CAP) (2023) includes reference to DoT's Ireland's Road Haulage Strategy 2022-2031 (RHS)(2023) which will seek to further integrate smart technologies in logistics management and may include the regulation of delivery times as far as practicable to off-peak periods to limit traffic congestion in urban areas. Ireland's Road Haulage Strategy 2022-2031 outlines measures to manage the increase in delivery and servicing requirements as the population grows. These measures may include the development of consolidation centres to limit the number of 'last-mile' trips made by larger goods vehicles with plans for higher use of smaller electric vans or cargo bikes for 'last-mile' deliveries in urban areas. The purpose of this section is to assess the overall impact that any redistributed general traffic will have on both the direct and indirect study areas. It should be noted that the impacts presented in this chapter are based on the final Preliminary Design for the Proposed Scheme which includes embedded mitigation to limit environmental and traffic and transport impacts to a minimal level as part of the iterative design development work described previously above.

The purpose of this section is to assess the overall impact that any redistributed general traffic will have on both the direct and indirect study areas. It should be noted that the impacts presented in this chapter are based on the final Preliminary Design for the Proposed Scheme which includes embedded mitigation to limit environmental and traffic and transport impacts to a minimal level as part of the iterative design development work described previously above.

To determine the impact that the Proposed Scheme has in terms of general traffic redistribution on the direct and indirect study areas, the LAM Opening Year 2028 model results have been used to identify the difference in general traffic flows between the DoMinimum and DoSomething scenarios and the associated level of traffic flow difference as a result of the Proposed Scheme. The assessment has been considered with reference to both the reductions and increases in general traffic flows along road links.

Reduction in General Traffic: For this assessment, the reductions in general traffic flows have been described as a positive impact to the environment.

The majority of instances where a reduction in general traffic flow occurs are located along or adjacent to the Proposed Scheme (i.e. the direct study area), where there are proposed measures to improve priority for bus, cycle and walking facilities.

Localised junction models have been developed using industry standard modelling packages such as LinSig and Junctions 9 to determine the appropriate staging, phasing, green times and operational capacity at all junctions along the direct study area. These junction models have been developed using consistent traffic flows as predicted and modelled in the ERM / LAM and micro-simulation model using the iterative traffic modelling process described in Section 3 of this TIA. The full outputs of the results are available in the TIA Appendix 2 (Junction Design Report).

Increase in General Traffic: To determine the impact that the Proposed Scheme has in terms of an increase in general traffic flows on the direct and indirect study areas, a robust assessment has been undertaken, with reference to TII's Traffic and Transport Assessment Guidelines (May 2014).

This document is considered best practice guidance for the assessment of transport impacts related to changes in traffic flows due to proposed developments and is an appropriate means of assessing the impact of general traffic trip redistribution on the surrounding road network.

A snapshot from the guidance which outlines "Advisory Thresholds for Traffic and Transport Assessment Where National Roads are Affected" is below.

Where applications affect national roads a Transport Assessment should be requested if the thresholds in Table 2.2, below, are exceeded.

Table 2.2 Advisory Thresholds for Traffic and Transport Assessment Where National Roads are Affected

Vehicle Movements	*100 trips in / out combined in the peak hours for the proposed development*
	Development traffic exceeds 10% of turning movements at junctions with and on National Roads.
	Development traffic exceeds 5% of turning movements at junctions with National Roads if location has potential to become congested or sensitive.

Traffic and Transport Assessment Guidelines PE-PDV-02045 May 2014, TII Publications

Diagram 6.22: Extract from the Traffic and Transport Assessment Guidelines (PE-PDV-02045, May 2014)

The basis of the guidance is to assess the impacts of additional trips that have been generated as part of a new development (for example, a new housing estate etc.). Noting that the guidance relates to National Roads only, for the purpose of this assessment, the principles of the guidance have been adapted for the assessment of the Proposed Scheme. This has been achieved by extending the threshold from National Roads only to cover all road types in the vicinity of the Proposed Scheme. This ensures a robust and rigorous assessment has been undertaken and that potential impacts on more localised or residential streets have been captured as part of the assessment.

The impact assessment of increases to the general traffic flows has used the following thresholds based on the above guidelines:

- **Local / Regional Roads:** Traffic redistribution results in an increase above 100 combined flows (i.e. in a two-way direction) along residential, local and regional roads in the vicinity of the Proposed Scheme in the AM and PM peak hours:
  - The threshold aligns with an approximate 1 vehicle per minute increase per direction on any given road. This is a very low level of traffic increase on any road type and ensures that a robust assessment of the impacts of redistributed traffic has been undertaken.
- **National Roads:** Traffic exceeds 5% of the combined turning flows at junctions with/ on/or with national roads in the AM and PM peak hours as a result of traffic redistribution comparing the DoMinimum to the DoSomething scenario with the Proposed Scheme in place:
  - The guidelines indicate that a 10% threshold may be used, however, to ensure a rigorous assessment in this instance the lower 5% threshold for turning movements has been utilised.

Where road links have been identified as experiencing additional general traffic flow increases which exceed the above thresholds, a further assessment has been undertaken by way of a traffic capacity analysis on the associated junctions along the affected links.

6.6.3.3.6.2 General Traffic Flow Difference – AM Peak Hour

Diagram 6.23 illustrates the difference in traffic flows on the road links in the AM Peak Hour for the 2028 Opening Year. Please refer to TIA Appendix 4 (General Traffic Assessment Section) for the full LAM outputs.

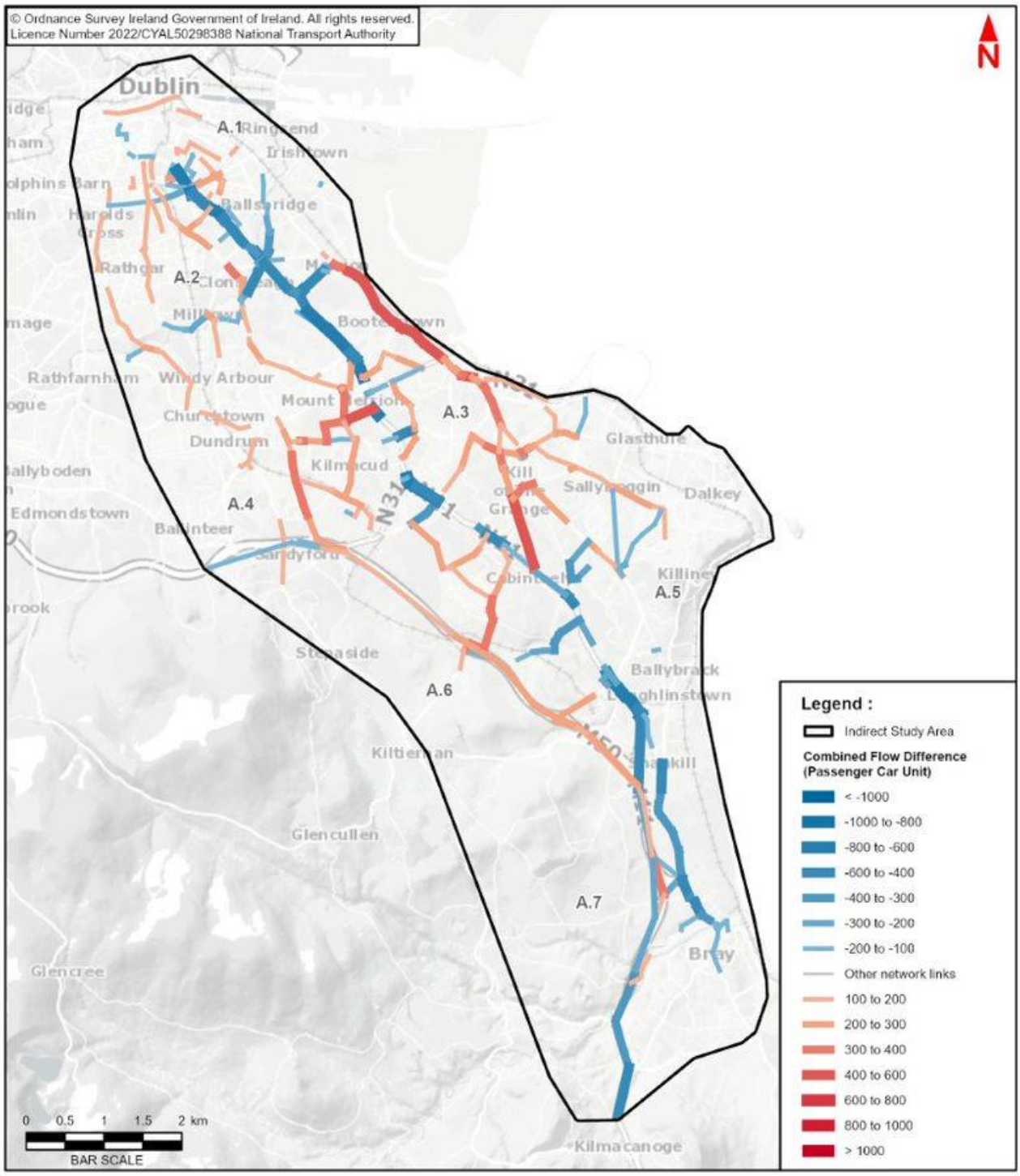

Diagram 6.23: Flow Difference on Road Links (DoMinimum vs. DoSomething), AM Peak Hour, 2028 Opening Year

Impact on Direct Study Area (AM Peak Hour)

Direct Reductions in General Traffic: The LAM indicates that during the 2028 Opening Year scenario, there are reductions in general traffic noted along the Proposed Scheme during the AM Peak Hour, as illustrated by the blue lines in Diagram 6.23, which indicates where a reduction of at least -100 combined traffic flows occur.

The key reductions in traffic flows during the AM Peak Hour are outlined in Table 6.43.

Table 6.43: Road Links that Experience a Reduction of at least -100 Combined Flows during AM Peak Hour (Direct Study Area) (pcus)

Location	Map I.D.	Road Name	DoMinimum Flows	DoSomething Flows	Flow Difference
Section 1 – City Centre to Leeson Street	A.2	Leeson Street Lower	1605	537	-1068
		Leeson Street Upper	1531	508	-1023
Section 2 – Leeson Street to Cabinteely	A.3	Donnybrook Road	1088	784	-304
		Stillorgan Road	2197	1280	-917
		Bray Road	3525	1786	-1738
Section 3 – Cabinteely to Shankill	A.5	N11	1690	950	-739
		Cabinteely Bypass	1784	819	-964
Section 4 – Shankill to Bray	A.7	Castle Street	982	590	-392
		Main Street	1007	710	-297

As indicated in Table 6.43, the traffic reductions vary between -297 and -1738 combined flows.

- Along Section 1 of the Proposed Scheme, Leeson Street Lower experiences a reduction in up to 1068 combined traffic flows. There is also a similar decrease of 1023 flows on Leeson Street Upper.
- Along Section 2, there is a reduction of 1738 combined flows along Bray Road and other decreases of 917 on Stillorgan Road and 304 on Donnybrook Road.
- Along Section 3, there are reductions of 964 on the Cabinteely Bypass and 739 on the N11.
- Along Section 4, there is a reduction of 392 on Castle Street and slight reduction of 297 on Bray Main Street.

Increases in General Traffic: There are no anticipated increases greater than 100 combined two-way flows within the direct study area.

Overall Impact on Direct Study Area: In summary, there is a low to high reduction of between -297 and -1738 combined general traffic flows along the direct study area during the AM Peak Hour in 2028 Opening Year. This is attributed to the Proposed Scheme and the associated modal shift as a result of its implementation.

Impact on Indirect Study Area (AM Peak Hour)

Indirect Reductions in General Traffic: In addition to the general traffic flow reductions occurring along the indirect study area, there are key reductions in general traffic noted along certain road links within the indirect study area during the AM Peak Hour. The key reductions in traffic flows along the indirect study area during the AM Peak Hour are outlined in Table 6.44.

Table 6.44: Road Links that Experience a Reduction of ≥100 Combined Flows During AM Peak Hour (Indirect Study Area)

Location	Map I.D.	Road Name	DoMinimum Flows	DoSomething Flows	Flow Difference
Adjacent to Section 1 – City Centre – Leeson Street	A.2	Canal Road	1028	856	-172
		Fitzwilliam Square South	512	412	-105
		Wellington Road	259	155	-104
		Marlborough Road	618	514	-104
		Cuffe Street	927	773	-154
		Kevin Street Lower	950	826	-124
		Wilton Terrace	267	133	-134
		Grand Parade	866	611	-254
Adjacent to Section 2 – Leeson Street - Cabinteely	A.3	Eglinton Road	723	434	-289
		Nutley Lane	1022	412	-610
		Anglesea Mews	1732	1429	-303
		Anglesea Road	1685	1152	-533
		Stillorgan Park	1354	918	-436
		Leopardstown Road	1591	1282	-309
Adjacent to Section 3 – Cabinteely - Shankill	A.5	Johnstown Road	1600	762	-838
		Granville Road	916	582	-333
		Stonebridge Road	2272	1837	-436
		R118	1585	1136	-449
		Seaview Park	728	624	-105
		Church Road	1248	-1095	-153
		Lehaunstown Road	625	281	-344
		Kilbogget Grove	2009	1058	-951
Adjacent to Section 4 – Shankill to Bray	A.7	Galtrim Park	231	126	-105
		Vevay Road	456	324	-132
		Shanganagh Vale	2952	1701	-1251
		Upper Dargle Road	192	65	-127

As indicated in Table 6.44, the traffic reductions vary between -103 and -1251 combined flows along the surrounding road links.

Indirect Increases in General Traffic: The road links which experience additional traffic volumes of over 100 combined flows are illustrated by the orange / red lines in Diagram 6.23 These road links have been identified as experiencing traffic volumes above the additional traffic threshold and therefore require further analysis. The road links and associated flow difference between the DoMinimum and DoSomething scenarios during the AM Peak Hour are outlined in Table 6.45.

Note, national roads are not included within the table below as a separate assessment has been undertaken and is presented subsequently.

Table 6.45: Road Links that Experience an Increase of at least +100 Combined Flows (AM Peak Hour) (pcus)

Orientation	Map ID	Road Name	DoMinimum Flows	DoSomething Flows	Flow Difference
Inner City	A.1	Aston Quay	603	763	160
	A.1	Burgh Quay	746	902	156
	A.1	Burlington Road	197	311	114
	A.1	Camden Street Lower	771	882	111
	A.1	Camden Street Upper	1372	1490	118
	A.1	Charlemont Street	766	895	129
	A.1	Clanbrassil Street Upper	1366	1477	112
	A.1	Clanwilliam Place	966	1138	172
	A.1	Essex Quay	765	929	164
	A.1	George's Quay	667	779	112
	A.1	Haddington Road	636	838	202
	A.1	Harcourt Road	807	956	149
	A.1	Harcourt Street	220	417	197
	A.1	Hatch Street Lower	371	699	329
	A.1	Heytesbury Street	569	732	163
	A.1	Merchant's Quay	730	876	146
	A.1	Merrion Row	765	877	113
	A.1	Merrion Square South	404	506	103
	A.1	Merrion Street Upper	848	982	134
	A.1	Mount Street Crescent	210	319	108
	A.1	Mount Street Upper	326	509	183
	A.1	Pearse Street	1504	1617	113
	A.1	Pembroke Road	2018	2215	197
	A.1	Richmond Street South	668	823	155
	A.1	South Circular Road	1029	1130	101
	A.1	St Stephen's Green	1241	1353	112
	A.1	Wellington Quay	592	751	160
	A.1	Wood Quay	790	928	137
Rathgar/Clonskeagh/ UCD/Ballsbridge	A.2	Appian Way	688	842	153
	A.2	Baggot Street Lower	405	543	138
	A.2	Baggot Street Upper	1199	1448	249
	A.2	Bannaville	306	417	111
	A.2	Brookville Park	1111	1411	300
	A.2	Clonskeagh Road	897	1206	310
	A.2	Dundrum Road	808	1044	236
	A.2	Foster's Avenue	1271	1378	107
	A.2	Green Park	489	635	146
	A.2	Harold's Cross Road	940	1090	151
	A.2	Mespil Road	865	1118	253
	A.2	Mount Pleasant Avenue Upper	156	274	118
	A.2	North Avenue	451	819	368
	A.2	Orwell Road	981	1212	231
	A.2	Ranelagh	1268	1548	280
	A.2	Ranelagh Road	743	903	160
	A.2	Rathgar Avenue	705	849	144
	A.2	Rathmines Road Lower	1224	1453	228
	A.2	Rathmines Road Upper	657	846	189

Orientation	Map ID	Road Name	DoMinimum Flows	DoSomething Flows	Flow Difference
	A.2	Roebuck Road	1565	1792	226
	A.2	Rosemount Crescent	1577	1729	152
	A.2	Sandford Road	1255	1528	272
	A.2	Waterloo Road	750	1002	252
Blackrock/Dun Laoghaire/ Mount Merrion	A.3	Benildus Avenue	362	539	178
	A.3	Booterstown Avenue	826	1065	240
	A.3	Callary Road	62	278	216
	A.3	Carrickbrennan Road	585	711	126
	A.3	Claremont Road	772	1149	376
	A.3	Clonkeen Road	468	959	491
	A.3	Cross Avenue	291	558	267
	A.3	Foxrock Avenue	191	294	103
	A.3	Frascati Road	1756	2164	408
	A.3	Glenart Avenue	563	785	223
	A.3	Grange Grove	1093	1372	279
	A.3	Greenfield Road	92	308	216
	A.3	Grove Avenue	557	807	250
	A.3	Holly Park Avenue	294	409	114
	A.3	Kill Avenue	646	858	212
	A.3	Kill Lane	1123	1509	385
	A.3	Kilmacud Road Upper	1107	1209	102
	A.3	Lanesville	723	988	266
	A.3	Merrion Road	2427	2927	500
	A.3	Monkstown Avenue	343	618	275
	A.3	Monkstown Farm	105	216	112
	A.3	Monkstown Link Road	583	712	128
	A.3	Monkstown Road	371	599	228
	A.3	Montpelier Place	1272	1572	300
	A.3	Mounttown Cottages	620	844	224
	A.3	Mounttown Upper	347	577	231
	A.3	Newtown Avenue	735	915	180
	A.3	Newtownpark Avenue	462	708	246
	A.3	Oliver Plunkett Road	105	216	112
	A.3	Phoenix Terrace	1810	2288	477
	A.3	Priory Avenue	165	328	163
	A.3	Priory Drive	186	292	106
	A.3	Redesdale Road	521	920	399
	A.3	Rochestown Avenue	979	1263	283
	A.3	Rock Road	1767	2274	506
	A.3	Rockford Park	184	380	196
	A.3	Rowan Park	184	380	196
	A.3	Rowanbyrn	1029	1306	276
	A.3	Saint Raphaela's Road	658	898	240
	A.3	Sandyford Road	1279	1398	119
	A.3	Seafield Avenue	608	759	151
	A.3	Seapoint Avenue	674	818	143
	A.3	South Avenue	207	322	115
	A.3	St Michaels Park	846	1163	318
	A.3	St Patrick's Crescent	105	216	112

Orientation	Map ID	Road Name	DoMinimum Flows	DoSomething Flows	Flow Difference
	A.3	St Thomas Road	106	374	268
	A.3	Stillorgan Grove	106	377	270
	A.3	Stillorgan Wood	659	901	241
	A.3	Stradbrook Lawn	896	1197	302
	A.3	Stradbrook Road	770	973	203
	A.3	Temple Hill	1629	1984	355
	A.3	Temple Road	862	1073	211
	A.3	The Rise	106	338	232
	A.3	Thornhill Road	173	291	118
	A.3	Trees Road Lower	394	894	500
	A.3	Trees Road Upper	220	349	128
	A.3	Windsor Park	734	840	106
Dundrum/Churchtown/ Sandyford/Ballinteer	A.4	Blackglen Road	949	1061	112
	A.4	Blackthorn Avenue	555	824	269
	A.4	Blackthorn Drive	575	798	223
	A.4	Blackthorn Road	628	741	114
	A.4	Carmanhall Road	836	945	109
	A.4	Churchtown Road	1684	1813	129
	A.4	Churchtown Road Lower	758	877	119
	A.4	Churchtown Road Upper	1695	1824	129
	A.4	Drummartin Link Road	1847	2165	318
	A.4	Drummartin Road	1049	1373	323
	A.4	Lower Drummartin Road	1417	1639	222
	A.4	Lower Kilmacud Road	1091	1362	271
	A.4	Maple Avenue	1060	1165	104
	A.4	Overend Way	873	974	101
	A.4	R114	1231	1459	228
	A.4	R117	896	1131	235
	A.4	Taney Road	1099	1219	120
Dalkey/Deansgrange/ Killiney/Cabinteely	A.5	Abbey Road	289	495	207
	A.5	Church Road	2099	2247	148
	A.5	Dean's Grange Road	288	601	313
	A.5	Glenageary Road Upper	300	523	223
	A.5	Glenageary Roundabout	335	564	228
	A.5	Killiney Road	168	329	161
	A.5	Summerhill Road	135	237	102
	A.5	Westminster Road	79	300	221
Carrickmines/ Foxrock	A.6	Ballyogan Road	1080	1416	336
	A.6	Bray Road	662	766	104
	A.6	Cornelscourt Hill Road	462	618	156
	A.6	Green Route South	1227	1490	264
	A.6	Hainault Road	191	352	161
	A.6	Joyce Avenue	219	362	143
	A.6	Torquay Road	415	677	262
	A.6	Valley Avenue	926	1029	103
Bray/ Shankill	A.7	Castle Park	305	506	202
	A.7	Fassaroe Avenue	768	881	113
	A.7	Ferndale Road	3978	4122	144
	A.7	R918	522	667	145

Orientation	Map ID	Road Name	DoMinimum Flows	DoSomething Flows	Flow Difference
	A.7	R918 Upper Dargle Road	564	712	148
	A.7	Upper Dargle Road	733	933	199

As presented in Table 6.45 the additional traffic on the road links that exceed the threshold for further assessment varies between +101 and +506 combined flows during the AM Peak Hour. These road links have been identified as experiencing additional traffic volumes over the defined threshold and therefore require further analysis which is presented in subsequently.

Operational capacity outputs have been extracted from the LAM at the junctions along the identified road links. This will enable the appreciation of whether there is reserve capacity to facilitate the uplift in traffic. The results are presented in terms of the significance of the impact to the V / C ratio for each junction based on its sensitivity and magnitude of impact. It should be noted that the worst performing arm of each junction has been used for the purpose of the assessment to ensure a conservative impact assessment is undertaken.

It should be noted that the worst performing arm of the junction has been used for the purpose of the assessment to ensure a conservative impact assessment is undertaken.

National Roads – 5% Threshold Impact Assessment

On the basis of the assessment methodology specifically for national roads, whereby traffic exceeding 5% of the combined turning flows at junctions on or with national roads as a result of traffic redistribution associated with the Proposed Scheme, the junctions and associated flow difference between the DoMinimum and DoSomething scenarios during the AM Peak Hour are outlined in Table 6.46.

Table 6.46: National Road Links where the 5% Additional Traffic Threshold is Exceeded (AM Peak Hour)

Junction	Total DoMinimum Turning Flows	Total DoSomething Turning Flows	Turning Flow Difference	Percentage Difference
N11 J7	7845	7220	-625	-8%
N11 J6a	5705	5484	-221	-4%
M11 J6	6650	6663	13	0%
M11 J5	8269	6874	-539	-7%
M11 / M50 J4	7427	7301	-126	-2%
M50 J16	7305	7472	167	2%
M50 J15	8887	8970	83	1%
M50 J13 (south)	10750	10593	-157	-1%
M50 J14	11325	11037	-288	-3%
M50 J13 (north)	11403	10792	-611	-5%
N11 / N31 Mount Merrion Av	3594	1327	-2266	-63%
N11 / Trees Road Lower	3066	1307	-1759	-57%
N11 / Old Dublin Road	3072	1144	-1929	-63%
N11 / Stillorgan Park	4083	1583	-2500	-61%
N11 / Stillorgan Grove (SB)	3020	1079	-1941	-64%
N11 / N31 Brewery Road	3485	1370	-1795	-52%
N11 / Beechwood Court (SB)	2705	1333	-1372	-51%
N11 / Belmont Grove (SB)	2807	1433	-1374	-49%
N11 / Newtownpark Ave	4468	2623	-1845	-41%
N11 / Springfield Park	3749	1715	-2035	-54%
N11 / Kill Lane	4039	2209	-1830	-45%
N11 / Westminster Road	2898	1302	-1597	-55%
N11 / Old Bray Road	2964	1379	-1585	-53%
N11 / Clonkeen Road	3066	1886	-1180	-38%
N11 / Johnstown Road	4008	2063	-1945	-49%
N11 / Druids Glen Road	3403	1030	-1691	-50%
N11 / Shanganagh Vale	2913	1010	-1307	-45%
N11 / Wyattville Road	6263	4761	-1501	-24%
N11 / Cherrywood Road	3960	2768	-1191	-30%
N11 / Shankill	3667	2777	-890	-24%

The contents of Table 6.46 demonstrate that redistributed traffic from the Proposed Scheme will have a less than 5% increase on turning flows at junctions with national roads, and in almost all cases shows a reduction in traffic flow. Therefore, no further assessment of the national junctions in the AM Peak Hour has been undertaken.

6.6.3.3.6.3 General Traffic Flow Difference – PM Peak Hour

Diagram 6.24 illustrates the difference in traffic flows on road links in the PM Peak Hour for the 2028 Opening Year. Please refer to TIA Appendix 4 (General Traffic Assessment Section) for the full LAM outputs

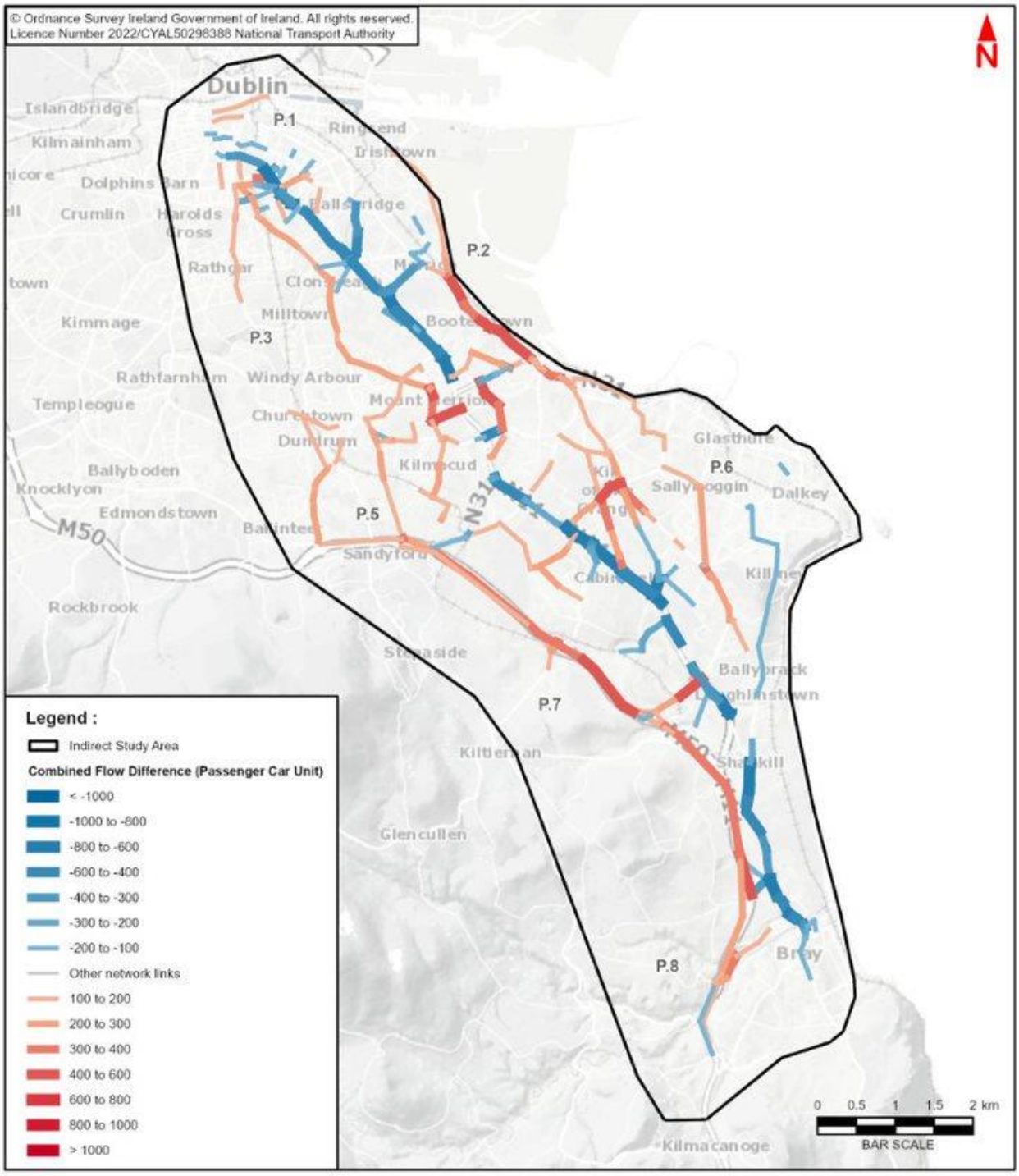

Diagram 6.24: Flow Difference on Road Links (Do Minimum vs. Do Something), PM Peak Hour, 2028 Opening Year

Impact on Direct Study Area (PM Peak Hour)

Direct Reductions in General Traffic Flows: The LAM indicates that during the 2028 Opening Year scenario, there are key reductions in general traffic noted along the Proposed Scheme during the PM Peak Hour, as illustrated by the blue lines which indicates where a reduction of at least -100 combined traffic flows occurs.

The key reductions in traffic flows during the PM Peak Hour are outlined in Table 6.47.

Table 6.47: Road Links That Experience a Reduction of ≥100 Combined Flows During PM Peak Hour (Direct Study Area)

Location	Map I.D.	Road Name	DoMinimum Flows	DoSomething Flows	Flow Difference
Section 1 – City Centre to Leeson Street	P.1	Leeson Street Lower	1601	446	-1155
		Leeson Street Upper	1695	587	-1108
Section 2 – Leeson Street to Cabinteely	P.4	Donnybrook Road	2394	1475	-920
		Stillorgan Road	1710	408	-1302
		Bray Road	2669	1487	-1183
Section 3 – Cabinteely to Shankill	P.7	N11	2098	1393	-705
		Cabinteely Bypass	1045	393	-652
Section 4 – Shankill to Bray	P.8	Castle Street	1327	718	-609
		Main Street	1298	870	-428

The contents of Table 6.47 indicate the traffic flow reductions vary between -428 and -1302 combined flows.

- Along Section 1 of the Proposed Scheme, Leeson Street Lower experiences a reduction in up to -1108 combined traffic flows. There is also a larger decrease of -1155 on Leeson Street Upper;
- Along Section 2, there are reductions on Stillorgan Road of -1302 and Bray Road of -1183. There is also a reduction on Donnybrook Road of -920;
- Along Section 3, there are reductions of -705 on the N11 and -652 on the Cabinteely Bypass; and
- Along Section 4, there are also reductions of -609 on Castle Street and -428 on Bray Main Street.

Direct Increases in General Traffic: There are no anticipated increases greater than 100 combined two-way flows within the direct study area.

Impact on Indirect Study Area (PM Peak Hour)

Reductions in General Traffic Flows: In addition to the general traffic flow reductions occurring along the indirect study area, there are key reductions in general traffic noted along certain road links within the indirect study area during the PM Peak Hour. The key reductions in traffic flows along the indirect study area during the PM Peak Hour are outlined in Table 6.48.

Table 6.48: Road Links That Experience a Reduction of ≥100 Combined Flows During PM Peak Hour (Indirect Study Area)

Location	Map I.D.	Road Name	DoMinimum Flows	DoSomething Flows	Flow Difference
Adjacent to Section 1 – City Centre – Leeson Street	P.1	Fitzwilliam St Lwr	644	537	-107
		Fitzwilliam Sq East	450	348	-102
		Herbert Place	294	162	-132
		Cuffe Street	1165	836	-328
		Kevin Street Lower	1034	857	-177
		Grand Parade	955	757	-198
		Canal Road	1136	917	-220
		Fitzwilliam Place	737	560	-176
Adjacent to Section 2 – Leeson Street - Cabinteely	P.4	Eglinton Road	717	408	-309
		Morehampton Road	1416	830	-586
		Nutley Lane	878	311	-567
		Merrion Road	2633	2452	-181
		Stillorgan Park	1414	815	-599
		Mount Merrion Ave	634	433	-201
		Leopardstown Road	1658	1454	-204
Adjacent to Section 3 – Cabinteely - Shankill	P.7	Johnstown Road	1380	664	-717
		Glenageary Rd Upr	255	144	-111
		Killiney Road	343	176	-166
		Cornelscourt Hill Rd	704	540	-164
		Brighton Road	474	355	-119
		Shanganagh Road	1135	915	-219
		Killiney Hill Road	734	557	-177
Adjacent to Section 4 – Shankill to Bray	P.8	Galtrim Park	409	285	-124
		Vevay Road	542	354	-187

As indicated in Table 6.48, the traffic reductions vary between a slight -102 and a very significant -717 combined flows along the surrounding road links.

Increases in General Traffic: The key road links which experience additional traffic volumes in the PM Peak Hour are illustrated by the red lines. These red lines indicate where an increase in at least 100 combined flows are occurring. The road links and associated flow difference between the Do Minimum and Do Something scenarios during the PM Peak Hour are outlined in Table 6.49.

The additional traffic on these road links varies between +101 and +586 combined flows during the PM Peak Hour. These road links have been identified as experiencing additional traffic volumes above the threshold outlined and therefore require further analysis which is presented subsequently.

Table 6.49: Road Links Where Link Threshold of 100 Combined Flows is Exceeded (PM Peak Hour)

Location	Map ID	Road Name	DoMinimum Flows	DoSomething Flows	Flow Difference
Inner City	P.1	Adelaide Road	685	898	213
	P.1	Aston Quay	969	1129	161
	P.1	Baggot Street Upper	1171	1293	122
	P.1	Burgh Quay	1033	1182	149
	P.1	Charlemont Street	834	1136	302
	P.1	Dame Street	571	672	101
	P.1	Earlsfort Terrace	498	724	226
	P.1	Essex Quay	1434	1556	122
	P.1	Fownes Street Upper	577	718	141
	P.1	George's Quay	888	1040	152
	P.1	Haddington Road	653	831	178
	P.1	Harcourt Road	1047	1300	252
	P.1	Harcourt Street	382	524	142
	P.1	Hatch Street Lower	335	734	399
	P.1	Heytesbury Street	617	726	109
	P.1	Leeson Park	443	594	151
	P.1	Lord Edward Street	811	920	109
	P.1	Mespil Road	855	1128	273
	P.1	Richmond Street South	658	844	187
	P.1	Sussex Terrace	283	388	105
	P.1	Wellington Place	368	504	136
	P.1	Wellington Quay	1217	1340	122
	P.1	Wellington Road	208	355	146
Merrion/ Ballsbridge/ Sandymount	P.2	Beach Road	835	973	138
	P.2	Brookville Park	845	990	145
	P.2	Campus Ring Road	457	610	153
	P.2	Foster's Avenue	1376	1574	198
	P.2	Merrion Road	2291	2714	423
	P.2	R131	827	965	138
	P.2	Strand Road	932	1140	208
Clonskeagh/Milltown/ Windy Arbour	P.3	Clonskeagh Road	941	1238	297
	P.3	Flemingstown Park	685	837	152
	P.3	Ranelagh	1395	1644	250
	P.3	Ranelagh Road	835	1082	247
	P.3	Rathmines Road Lower	816	1019	202
	P.3	Rathmines Road Upper	530	652	122
	P.3	Rosemount Crescent	1923	2078	154
	P.3	Sandford Road	1336	1574	239
	P.3	Trees Road Lower	461	956	496
	P.3	Trees Road Upper	401	575	175
Blackrock/Monkstown/ Deansgrange/Mount Merrion	P.4	Booterstown Avenue	853	1035	183
	P.4	Callary Road	195	392	196
	P.4	Carrickbrennan Road	325	516	191
	P.4	Cedar Square	330	700	370
	P.4	Clifton Avenue	266	383	117
	P.4	Cross Avenue	304	609	304
	P.4	Dean's Grange Road	314	492	179
	P.4	Frascati Road	2108	2503	395

Location	Map ID	Road Name	DoMinimum Flows	DoSomething Flows	Flow Difference
	P.4	Glenart Avenue	336	761	425
	P.4	Grange Grove	854	1013	159
	P.4	Greenfield Road	240	461	221
	P.4	Grove Avenue	327	800	473
	P.4	Kilmacud Road Upper	671	891	219
	P.4	Lower Kilmacud Road	841	1070	229
	P.4	Maple Avenue	427	584	157
	P.4	Monkstown Avenue	795	1010	215
	P.4	Monkstown Link Road	424	528	104
	P.4	Montpelier Place	1518	1679	161
	P.4	Mount Merrion Avenue	639	740	101
	P.4	Mounttown Cottages	638	745	108
	P.4	Mounttown Road Lower	687	809	122
	P.4	Mounttown Upper	619	727	108
	P.4	N31 Frascati Road	990	1254	264
	P.4	Newtown Avenue	781	971	190
	P.4	Newtownpark Avenue	918	1059	141
	P.4	North Avenue	397	799	401
	P.4	Park Villas	359	756	397
	P.4	Phoenix Terrace	1912	2326	415
	P.4	Rock Road	1763	2221	458
	P.4	Roebuck Road	951	1228	277
	P.4	Rosslyn	235	360	125
	P.4	Rowanbyrn	785	930	145
	P.4	Seafield Avenue	747	923	176
	P.4	Seapoint Avenue	748	923	176
	P.4	St Brigid's Church Road	247	388	141
	P.4	St Thomas Road	101	260	160
	P.4	Stillorgan Grove	84	361	278
	P.4	Stillorgan Road	457	610	153
	P.4	Stillorgan Wood	670	896	226
	P.4	Stradbrook Lawn	982	1152	170
	P.4	Stradbrook Road	843	975	132
	P.4	Temple Hill	1716	1938	222
	P.4	Temple Road	1405	1608	202
Ballinteer/Dundrum/ Churchtown/Sandyford	P.5	Ballinteer Road	1935	2173	238
	P.5	Blackthorn Avenue	504	683	179
	P.5	Blackthorn Road	670	872	202
	P.5	Churchtown Road	1868	2044	176
	P.5	Churchtown Road Upper	1881	2056	176
	P.5	Drummartin Link Road	2057	2262	205
	P.5	Drummartin Road	919	1184	265
	P.5	Goatstown Cottages	1079	1274	196
	P.5	Green Park	601	712	111
	P.5	Hainault Road	191	421	230
	P.5	Knockrabo Drive	1067	1261	194
	P.5	Leopardstown Road	1469	1631	162
	P.5	Lower Drummartin Road	1739	2036	298
	P.5	Mount Anville Road	1079	1274	196

Location	Map ID	Road Name	DoMinimum Flows	DoSomething Flows	Flow Difference
	P.5	Overend Way	1033	1138	104
	P.5	R114	1400	1576	176
	P.5	R117	911	1064	153
	P.5	Redesdale Road	486	619	133
	P.5	Saint Raphaela's Road	696	922	226
	P.5	South Avenue	125	355	230
	P.5	Taney Road	1135	1244	110
	P.5	Thornhill Road	176	372	196
	P.5	Wesley College	1258	1445	186
	P.5	Windsor Park	773	929	156
	P.5	Wyckham Way	2202	2470	268
Dun Laoghaire/Glasthule/ Sallynoggin/Killiney	P.6	Abbey Road	953	1176	223
	P.6	Clonkeen Road	475	810	335
	P.6	Glenageary Road Upper	642	824	181
	P.6	Glenageary Roundabout	605	844	238
	P.6	Kill Avenue	961	1486	525
	P.6	Moorefield	568	734	165
	P.6	Park Road	1256	1497	242
	P.6	Pottery Road	336	574	238
	P.6	Rochestown Avenue	983	1568	586
Carrickmines/Foxrock	P.7	Ballyogan Road	2013	2279	266
	P.7	Glenamuck Road	717	835	119
	P.7	Glenamuck Road North	376	506	130
	P.7	Glenamuck Road South	1914	2079	165
	P.7	Green Route North	2074	2265	191
	P.7	Green Route South	929	1079	150
	P.7	Joyce Avenue	206	393	188
	P.7	Levmoss Park	3321	3476	155
	P.7	Rathsallagh Bridge	161	263	103
	P.7	Torquay Road	566	685	119
	P.7	Valley Avenue	834	952	117
	P.7	Westminster Road	214	443	230
Bray/Shankill	P.8	Ballybride Road	1996	2375	379
	P.8	Fassaroe Avenue	936	1041	105
	P.8	Ferndale Road	1525	1717	192
	P.8	R918	494	718	224
	P.8	Upper Dargle Road	892	1250	359

As presented in Table 6.49 the additional traffic on the road links that exceed the threshold for further assessment varies between +103 and +586 combined flows during the PM Peak Hour. These road links have been identified as experiencing additional traffic volumes over the defined threshold and therefore require further analysis which is presented in subsequently.

Operational capacity outputs have been extracted from the LAM at the junctions along the identified road links. This will enable the appreciation of whether there is reserve capacity to facilitate the uplift in traffic. The results are presented in terms of the V / C ratio for each junction based on its magnitude of impact. It should be noted that the worst performing arm of each junction has been used for the purpose of the assessment to ensure a conservative impact assessment is undertaken.

National Roads – 5% Increase Threshold Impact Assessment (PM Peak Hour)

On the basis of the assessment methodology specifically for national roads, whereby traffic exceeding 5% of the combined turning flows at junctions on or with national roads as a result of traffic redistribution associated with the Proposed Scheme, the junctions and associated flow difference between the DoMinimum and DoSomething scenarios during the PM Peak Hour are outlined in Table 6.50.

Table 6.50: National Road Junctions where DoSomething Turning Counts Exceed 5% Threshold (PM Peak Hour)

Junction	Total DoMinimum Turning Flows	Total DoSomething Turning Flows	Turning Flow Difference	Percentage Difference
N11 J7	5361	5277	-85	-2%
N11 J6a	4786	4865	79	2%
M11 J6	5530	5907	376	7%
M11 J5	6711	5844	-171	-3%
M11 / M50 J4	5581	5977	396	7%
M50 J16	5940	6461	521	9%
M50 J15	8028	8623	596	7%
M50 J13 (south)	10235	10467	232	2%
M50 J14	10270	10408	138	1%
M50 J13 (north)	10372	10404	32	0%
N11 / N31 Mount Merrion Av	3858	1747	-2111	-55%
N11 / Trees Road Lower	3557	1713	-1844	-52%
N11 / Old Dublin Road	3573	1634	-1939	-54%
N11 / Stillorgan Park	4408	2010	-2398	-54%
N11 / Stillorgan Grove (SB)	3300	1507	-1793	-54%
N11 / N31 Brewery Road	3666	1429	-1753	-48%
N11 / Beechwood Court (SB)	2740	1415	-1325	-48%
N11 / Belmont Grove (SB)	2797	1470	-1327	-47%
N11 / Newtownpark Ave	4015	2696	-1319	-33%
N11 / Springfield Park	3141	1794	-1347	-43%
N11 / Kill Lane	3706	2392	-1314	-35%
N11 / Westminster Road	2993	1585	-1408	-47%
N11 / Old Bray Road	2925	1432	-1493	-51%
N11 / Clonkeen Road	2924	1829	-1095	-37%
N11 / Johnstown Road	3475	1899	-1576	-45%
N11 / Druids Glen Road	2760	699	-1090	-39%
N11 / Shanganagh Vale	2513	621	-855	-34%
N11 / Wyattville Road	5663	4907	-756	-13%
N11 / Cherrywood Road	3807	2846	-961	-25%
N11 / Shankill	3419	2784	-635	-19%

The contents of Table 6.51 demonstrate that redistributed traffic from the Proposed Scheme will have a less than 5% at most junctions with just four junctions exceeding 5% on the M50.

Testing within the LAM shows that when optimised, all four junctions operate with a V / C ratio of under 100% in the DoSomething scenario despite the traffic increases. Therefore, no further assessment of the junctions with national roads during the PM peak hour has been undertaken, except for instances where the 100 combined flow of additional traffic threshold is exceeded.

6.6.3.3.6.4 General Traffic Impact Assessment

This section details the magnitude of the impacts as a result of the redistributed general traffic on the indirect study area. Note that further assessment is presented in Chapter 6 of the EIAR which considers the junction sensitivities and the significant of effects.

To understand the magnitude impact of the redistributed traffic, operational capacities have been extracted from the LAM.

The capacity of junctions within the LAM are expressed in terms of Volume to Capacity ratios (V / C ratios). The V / C ratios represent the operational efficiency for each arm of a junction. For the purpose of this TIA, operational capacity outputs of a junction have been identified with reference to the busiest arm which experiences the maximum V/C ratio.

A V / C ratio of below 85% indicates that a junction is operating well, with spare capacity, with traffic not experiencing queuing or delays throughout the hour. A value of 85% to 100% indicates that the junction is approaching its theoretical capacity with traffic possibly experiencing occasional queues and delays within the hour. A value of over 100% indicates that a junction is operating above its theoretical capacity and traffic experiences queues and delays regularly within the hour. The junctions have been described in the ranges outlined in Table 6.51.

Table 6.51: Junction Volume / Capacity Ranges

V / C Ratio	Traffic Condition
≤85%	A junction is operating well within theoretical capacity.
85% - 100%	A junction is approaching theoretical capacity and may experience occasional queues and delays within the hour.
≥100%	A junction is operating above its theoretical capacity and experiences queues and delays quite regularly within the hour.

When comparing the V / C ratios during the DoMinimum and DoSomething scenarios for the key junctions, the terms outlined in Table 6.52 have been used to describe the impact.

Table 6.52: Magnitude of Impact for Redistributed Traffic

		Do Something		
		≤85%	**85% - 100%**	**≥100%**
Do Minimum	**≤85%**	Negligible	Low Negative	High Negative
	85% - 100%	Negligible	Negligible	Medium Negative
	≥100%	Medium Positive	Negligible	Low Negative

As indicated in Table 6.52, the changes in V / C ratios between the DoMinimum and DoSomething scenarios result in either a positive, negative or negligible magnitude of impact.

General Traffic Impact Assessment (2028 Opening Year) – Indirect Study Area - AM Peak Hour

The contents of Table 6.53 outline the V / C ratios at the key local / regional road junctions in the AM Peak Hour for the 2028 Opening Year. A table of results containing all of the assessed junctions is provided in TIA Appendix 4 (General Traffic Assessment Section).

Table 6.53: Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), AM Peak, 2028 Opening Year

Road Name	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Magnitude of Impact
		≤85%	85% - 100%	>100%	≤85%	85% - 100%	>100%	
Baggot Street Lower	Fitzwilliam Street Upper / Baggot Street Lower / Baggot Street Lower / Fitzwilliam Street Upper			✓			✓	Low
Harcourt Street	Harcourt Street / Cuffe Street / St Stephen's Green	✓				✓		Low
Camden Street Upper	Camden Street Upper	✓				✓		Low
Merrion Road	Strand Road / Merrion Road / Rock Road		✓				✓	Medium
Ranelagh	Ranelagh / Sandford Road / Anna Villa	✓				✓		Low
Clonskeagh Road	Clonskeagh Road / Beaver Row / Clonskeagh Road	✓				✓		Low
Merrion Road	Trimleston Avenue / Merrion Road / Rock Road	✓				✓		Low
Merrion Road	Merrion Road			✓			✓	Low
Rock Road	Merrion Road / Rock Road		✓				✓	Medium
Frascati Road	Frascati Road / Carysfort Avenue / Frascati Road	✓				✓		Low
Rock Road	Booterstown Avenue / Rock Road / Rock Road	✓				✓		Low
Rock Road	Rock Road / Mount Merrion Avenue / Rock Road	✓				✓		Low
Booterstown Avenue	Sans Souci Park / Booterstown Avenue / Cross Avenue / Booterstown Avenue	✓				✓		Low
Lower Kilmacud Road	Lower Kilmacud Road / Redesdale Road / Lower Kilmacud Road	✓				✓		Low
Torquay Road	Torquay Road / Leopardstown Road / Leopardstown Road	✓				✓		Low
Clonskeagh Road	Clonskeagh Road / Wynnsward Drive / Clonskeagh Road	✓				✓		Low
Roebuck Road	Goatstown Road / Roebuck Road / Roebuck Road	✓				✓		Low
Churchtown Road Upper	Woodlawn Park / Churchtown Road Upper / Churchtown Road Upper	✓				✓		Low
Sandyford Road	Sandyford Village / Sandyford Road	✓				✓		Low
Drummartin Link Road	Blackthorn Drive / Drummartin Link Road / Drummartin Link Road / Blackthorn Drive			✓			✓	Low
Rock Road	Rock Road / Rock Road / Castledawson Avenue	✓				✓		Low
Rochestown Avenue	Johnstown Road / Rochestown Avenue / Rochestown Avenue	✓				✓		Low
Rochestown Avenue	Abbey Road / Kill Avenue / Kill Lane / Rochestown Avenue		✓				✓	Medium
Rochestown Avenue	Pottery Road / Rochestown Avenue / Rochestown Avenue	✓				✓		Low
Mounttown Upper	Mounttown Upper / York Road / Tivoli Road / Mounttown Road Lower	✓				✓		Low
Glenageary Roundabout	Glenageary Roundabout / Glenageary Roundabout / R118	✓				✓		Low
Glenamuck Road South	Glenamuck Road / Glenamuck Road	✓				✓		Low
Rock Road	Rock Road	✓				✓		Low
Rock Road	Rock Road	✓				✓		Low

Road Name	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Magnitude of Impact
		≤85%	85% - 100%	>100%	≤85%	85% - 100%	>100%	
Rock Road	Rock Road / Rock Road / Emmet Square	✓				✓		Low
Merrion Road	Herbert Avenue / Merrion Road / Merrion Road	✓				✓		Low
Merrion Road	Estate Avenue / Merrion Road / Merrion Road	✓				✓		Low

The results of the analysis presented in Table 6.53 demonstrate that the majority of junctions are operating at a maximum V / C ratio of below 85% during the AM Peak Hour in the 2028 scenario. This indicates that these junctions are operating well, with spare capacity that could accommodate additional traffic that may occur as a result of traffic redistribution following the delivery of the Proposed Scheme.

Capacity constraints are noted at the following junctions:

- **Fitzwilliam Street/Baggot Street (6153)** - operates just above 100% during both the DoMinimum and DoSomething scenarios;
- **Strand Road / Merrion Road / Rock Road** – operates between 85% and 100% during the DoMinimum and over 100% in the DoSomething;
- **Merrion Road (11373)** - operates just above 100% during both the DoMinimum and DoSomething scenarios;
- **Merrion Road / Rock Road** - operates between 85% and 100% during the DoMinimum scenario and just above 100% in the DoSomething scenario;
- **Drummartin Link Road/Blackthorn Drive (19536)** - operates just above 100% during both the DoMinimum and DoSomething scenarios; and
- **Abbey Road / Kill Avenue / Kill Lane / Rochestown Avenue -** operates between 85% and 100% during the DoMinimum scenario and just above 100% in the DoSomething scenario.

Three out of the six junctions listed operate with a V / C ratio of above 100% in the Do Minimum scenario, therefore, the impact of Proposed Scheme is low or negligible and no further analysis or mitigation is required. At the remaining three junctions the impact is **Medium Negative** therefore it is considered that no mitigation is required at these locations also.

Given that the redistributed traffic will not lead to a significant deterioration of the operational capacity on the surrounding road network during the AM peak 2028 DoSomething scenario, no further mitigation measures have been considered to alleviate the impact outside of the direct study area.

General Traffic Impact Assessment (2028 Opening Year) – Indirect Study Area - PM Peak Hour

The contents of Table 6.54 outline the V / C ratios at the key local / regional road junctions in the PM Peak Hour for the 2028 Opening Year. A table of results containing all of the assessed junctions is provided in TIA Appendix 4 (General Traffic Assessment Section).

Table 6.54: Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), PM Peak, 2028 Opening Year

Road Name	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Magnitude of Impact
		≤85%	85% - 100%	>100%	≤85%	85% - 100%	>100%	
Burgh Quay	D'Olier Street / O'Connell Bridge / Burgh Quay	✓	·	·	·	✓	·	Low
Baggot Street Upper	Baggot Street Lower / Wilton Terrace / Herbert Place / Baggot Street Bridge	✓	·	·	·	✓	·	Low
Hatch Street Lower	Leeson Street Lower / Leeson Street Lower / Pembroke Street Upper / Hatch Street Lower	✓	·	·	·	✓	·	Low
Charlemont Street	Ranelagh Road / Grand Parade / Canal Road / Ranelagh Road	✓	·	·	·	✓	·	Low
Rathmines Road Lower	Rathmines Road Lower / Leinster Road / Rathmines Road Lower	✓	·	·	·	✓	·	Low
Ranelagh	Ranelagh / Sandford Road / Anna Villa	✓	·	·	·	✓	·	Low
Sandford Road	Sandford Road / Sandford Road / Marlborough Road	✓	·	·	·	✓	·	Low
Rock Road	Merrion Road / Rock Road	·	✓	·	·	·	✓	Medium
Clonskeagh Road	Clonskeagh Road / Wynnsward Drive / Clonskeagh Road	·	·	✓	·	·	✓	Low
Drummartin Link Road	Blackthorn Drive / Drummartin Link Road / Drummartin Link Road / Blackthorn Drive	·	·	✓	·	·	✓	Low
Rosemount Crescent	Bird Avenue / Clonskeagh Road / Roebuck Road	✓	·	·	·	✓	·	Low
Kill Lane	Abbey Road / Kill Avenue / Kill Lane / Rochestown Avenue	✓	·	·	·	✓	·	Low
Westminster Road	Brighton Road / Westminster Road / Torquay Road / Westminster Court	✓	·	·	·	✓	·	Low
Mounttown Upper	Mounttown Upper / York Road / Tivoli Road / Mounttown Road Lower	✓	·	·	·	✓	·	Low
Blackthorn Road	Blackthorn Road / Blackthorn Avenue / Blackthorn Avenue	✓	·	·	·	✓	·	Low

The results of the junction analysis demonstrate that the majority of junctions are operating with a maximum V / C ratio of below 85% during the PM Peak Hour in the 2028 Opening Year and that the Proposed Scheme will have a negligible impact on the majority of assessed local / regional road links within the indirect study area.

Capacity constraints are noted at the following junctions:

- **Merrion Road / Rock Road** – operates between 85% and 100% during the DoMinimum and over 100% in the DoSomething;
- **Clonskeagh Road Clonskeagh Road / Wynnsward Drive / Clonskeagh Road** - operates above 100% during both the DoMinimum and DoSomething scenarios; and
- **Blackthorn Drive / Drummartin Link Road / Drummartin Link Road / Blackthorn Drive** - operates above 100% during both the DoMinimum and DoSomething scenarios.

Two out of the three junctions listed operate with a V / C ratio of above 100% in the Do Minimum scenario, therefore, the impact of Proposed Scheme is low or negligible and no further analysis or mitigation is required. At the remaining two junctions the impact is **Medium Negative** therefore it is considered that no mitigation is required at these locations also.

Given that the redistributed traffic will not lead to a significant deterioration of the operational capacity on the surrounding road network during the PM peak 2028 DoSomething scenario, no further mitigation measures have been considered to alleviate the impact outside of the direct study area.

General Traffic Impact Assessment (2043 Opening Year) – Indirect Study Area - AM Peak Hour

The contents of Table 6.55 outline the V / C ratios at the key local / regional road junctions in the AM Peak Hour for the 2043 Opening Year. A table of results containing all of the assessed junctions is provided in TIA Appendix 4 (General Traffic Assessment Section).

Table 6.55: Volume Over Capacity Ratios at Key Junctions (DoMinimum vs. DoSomething), AM Peak, 2043 Design Year

Road Name	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Magnitude of Impact
		≤85%	85% - 100%	>100%	≤85%	85% - 100%	>100%	
Burgh Quay	D'Olier Street / O'Connell Bridge / Burgh Quay	✓				✓		Low
Baggot Street Lower	Fitzwilliam Street Upper / Baggot Street Lower / Baggot Street Lower / Fitzwilliam Street Upper			✓			✓	Low
Hatch Street Lower	Leeson Street Lower / Leeson Street Lower / Pembroke Street Upper / Hatch Street Lower	✓				✓		Low
Harcourt Street	Harcourt Street / Cuffe Street / St Stephen's Green	✓				✓		Low
Merrion Road	Merrion Road / Ailesbury Road / Ailesbury Road / Merrion Road	✓				✓		Low
Sandford Road	Sandford Road / Sandford Road / Marlborough Road	✓				✓		Low
Clonskeagh Road	Clonskeagh Road / Beaver Row / Clonskeagh Road	✓				✓		Low
Merrion Road	Merrion Road		✓				✓	Medium
Rock Road	Merrion Road / Rock Road		✓				✓	Medium
Rock Road	Booterstown Avenue / Rock Road / Rock Road	✓				✓		Low
Lower Drummartin Road	Taney Road / Goatstown Cottages / Goatstown Cottages / Lower Drummartin Road		✓				✓	Medium
Rochestown Avenue	Abbey Road / Kill Avenue / Kill Lane / Rochestown Avenue	✓				✓		Low
Mounttown Upper	Mounttown Upper / York Road / Tivoli Road / Mounttown Road Lower	✓				✓		Low
Glenageary Roundabout	Glenageary Roundabout / Glenageary Roundabout / R118	✓				✓		Low
Sandyford Road	Hillcrest Road / Enniskerry Road / Blackglen Road / Sandyford Road	✓				✓		Low
Glenamuck Road South	Glenamuck Road / Glenamuck Road		✓				✓	Medium

The results of the junction analysis demonstrate that the majority of junctions are operating with a maximum V / C ratio of below 85% during the AM Peak Hour in the 2043 Opening Year and that the Proposed Scheme will have a negligible impact on the majority of assessed local / regional road links within the indirect study area.

Capacity issues are noted at the following five junctions:

- **Fitzwilliam Street Upper / Baggot Street Lower / Baggot Street Lower / Fitzwilliam Street Upper -** operates above 100% during both the DoMinimum and DoSomething scenarios;
- **Merrion Road (11373) -** operates between 85% and 100% during the DoMinimum scenario and over 100% during the DoSomething scenario;
- **Merrion Road / Rock Road -** operates between 85% and 100% during the DoMinimum scenario and over 100% during the DoSomething scenario;
- **Taney Road / Goatstown Cottages / Goatstown Cottages / Lower Drummartin Road -** operates between 85% and 100% during the DoMinimum scenario and over 100% during the DoSomething scenario; and
- **Glenamuck Road / Glenamuck Road -** operates between 85% and 100% during the DoMinimum scenario and over 100% during the DoSomething scenario.

One of the five junctions operate with a maximum V / C ratio of above 100% in both the DoMinimum and DoSomething scenarios, therefore, the impact is considered to be **Low Negative**. The remaining junction increases from below 85% to over 100% and is considered **Medium Negative impact**.

Given that the redistributed traffic will not lead to a significant deterioration of the operational capacity on the surrounding road network during the AM peak 2043 DoSomething scenario, no further mitigation measures have been considered to alleviate the impact outside of the direct study area.

General Traffic Impact Assessment (2043 Opening Year) – Indirect Study Area - PM Peak Hour

The contents of Table 6.56 outline the V / C ratios at the key local / regional road junctions in the PM Peak Hour for the 2043 Opening Year. A table of results containing all of the assessed junctions is provided in TIA Appendix 4 (General Traffic Assessment Section).

Table 6.56: Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), PM Peak, 2043 Design Year

Road Name	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Magnitude of Impact
		≤85%	85% - 100%	>100%	≤85%	85% - 100%	>100%	
Essex Quay	Grattan Bridge / Wellington Quay / Essex Quay / Parliament Street	✓				✓		Low
Beach Road	R131 / Church Avenue / Sean Moore Road / Beach Road / Pembroke Street			✓			✓	Negligible
Hatch Street Lower	Leeson Street Lower / Leeson Street Lower / Pembroke Street Upper / Hatch Street Lower	✓				✓		Low
Charlemont Street	Ranelagh Road / Grand Parade / Canal Road / Ranelagh Road	✓				✓		Low
Merrion Road	Merrion Road			✓			✓	Low
Rock Road	Merrion Road / Rock Road	✓				✓		Low
Clonskeagh Road	Clonskeagh Road / Wynnsward Drive / Clonskeagh Road		✓				✓	Medium
Drummartin Link Road	Blackthorn Drive / Drummartin Link Road / Drummartin Link Road / Blackthorn Drive			✓			✓	Low
Temple Hill	Temple Hill	✓				✓		Low
Temple Hill	Temple Hill	✓				✓		Low
Westminster Road	Brighton Road / Westminster Road / Torquay Road / Westminster Court	✓				✓		Low
Mounttown Upper	Mounttown Upper / York Road / Tivoli Road / Mounttown Road Lower	✓				✓		Low

The results of the junction analysis demonstrate that the majority of junctions are operating with a maximum V / C ratio of below 85% during the PM Peak Hour in the 2043 Opening Year and that the Proposed Scheme will have a negligible impact on the majority of assessed local / regional road links within the indirect study area.

Capacity issues are noted at the following four junctions:

- **R131 / Church Avenue / Sean Moore Road / Beach Road / Pembroke Street -** operates above 100% during both the DoMinimum and DoSomething scenarios;
- **Merrion Road / Merrion Road -** operates above 100% during both the DoMinimum and DoSomething scenarios;
- **Clonskeagh Road / Wynnsward Drive / Clonskeagh Road -** operates between 85% and 100% during the DoMinimum scenario and above 100% during the DoSomething scenario; and
- **Blackthorn Drive / Drummartin Link Road / Drummartin Link Road / Blackthorn Drive -** operates above 100% during both the DoMinimum and DoSomething scenarios.

Three of the four junctions where capacity issues are notable operate with a maximum V / C ratio of above 100% in both the DoMinimum and DoSomething scenarios, therefore, the impact due to traffic redistribution during the 2043 PM Peak is considered to be **Low Negative** or **Negligible**. The remaining junction increases from below 85% to over 100% and is considered **Medium Negative** impact.

Given that the redistributed traffic will not lead to a significant deterioration of the operational capacity on the surrounding road network during the PM peak 2043 DoSomething scenario, no further mitigation measures have been considered to alleviate the impact outside of the direct study area.

6.6.3.3.6.5 General Traffic Impact Assessment Summary – Indirect Study Area

Given the improvements to bus priority, walking and cycling as a result of the Proposed Scheme, there will likely be an overall reduction in operational capacity for general traffic along the direct study area. This may in turn result in some level of redistribution of general traffic away from the main corridor onto the surrounding road network.

Using the TII guidelines as an indicator for best practice, the LAM Opening Year 2028 model results were used to identify the difference in traffic flows between the DoMinimum and DoSomething scenarios. The following thresholds have been used to identify where a Transport Assessment is required:

- **Local / Regional Roads:** Traffic redistribution results in an increase above 100 combined flows (i.e. in a two-way direction) along residential, local and regional roads in the vicinity of the Proposed Scheme in the AM and PM peak hours; and
- **National Roads:** Traffic exceeds 5% of the combined turning flows at junctions with/ on/or with national roads in the AM and PM peak hours as a result of traffic redistribution comparing the DoMinimum to the DoSomething scenario with the Proposed Scheme in place**.**

The threshold impact assessment identified the following roads that experience a reduction of at least -100 combined traffic flows during the DoSomething scenario with the Proposed Scheme in place:

- **AM Peak Hour:** Canal Road, Fitzwilliam Square South, Wellington Road, Marlborough Road, Cuffe Street, Kevin Street Lower, Wilton Terrace, Grand Parade, Eglington Road, Nutley Lane, Anglesea Mews, Anglesea Road, Stillorgan Park, Leopardstown Road, Johnstown Road, Granville Road, Stonebridge Road, R118, Seaview Park, Church Road, Lehaunstown Road, Kilbogget Grove, Latrim Park, Vevay Road, Shanganagh Vale and Upper Dargle Road; and
- **PM Peak Hour:** Fitzwilliam Street Lower, Fitzwilliam Place, Fitzwilliam Square East, Herbert Place, Cuffe Street, Kevin Street Lower, Grand Parade, Eglington Road, Morehampton Road, Nutley Lane, Merrion Road, Stillorgan Park, Mount Merrion Avenue, Leopardstown Road, Johnstown Road, Glenageary Road Upper, Killiney Road, Cornelscourt Hill Road, Brighton Road, Shanganagh Road, Killiney Hill Road, Galtrim Park and Vevay Road.

The threshold impact assessment also identified the following roads that experience an increase in traffic flows and require further traffic analysis:

- **AM Peak Hour:** Aston Quay, Ailesbury Drive, Burgh Quay, Burlington Road, Camden Street Lower, Camden Street Upper, Ballybride Road, Charlemont Street, Clanbrassil Street Upper, Belmont Avenue, Clanwilliam Place, Essex Quay, George's Quay, Haddington Road, Harcourt Road, Harcourt Street, Braemor Road, Hatch Street Lower, Brookvale Road, Heytesbury Street, Merchant's Quay, Merrion Row, Merrion Square South, Merrion Street Upper, Mount Street Crescent, Mount Street Upper, Pearse Street, Pembroke Road, Richmond Street South, South Circular Road, St Stephen's Green, Wellington Quay, Wood Quay, Appian Way, Baggot Street Lower, Baggot Street Upper, Bannaville, Brookville Park, Clonskeagh Road, Dundrum Road, Foster's Avenue, Green Park, Drummartin Park, Harold's Cross Road, Dublin Road, Mespil Road, Elgin Road, Ely Place, Enniskerry Road, Mount Pleasant Avenue Upper, North Avenue, Orwell Road, Ranelagh, Ranelagh Road, Rathgar Avenue, Rathmines Road Lower, Glasthule Road, Glenageary Road Lower, Rathmines Road Upper, Roebuck Road, Glenamuck Road North, Glenamuck Road South, Rosemount Crescent, Sandford Road, Waterloo Road, Benildus Avenue, Booterstown Avenue, Callary Road, Carrickbrennan Road, Claremont Road, Clonkeen Road, Cross Avenue, Foxrock Avenue, Frascati Road, Herbert Road, Glenart Avenue, Grange Grove, Greenfield Road, Grove Avenue, Holly Park Avenue, Killarney Glen, Kill Avenue, Kill Lane, Kilmacud Road Upper, Lanesville, Merrion Road, Monkstown Avenue, Mart Lane, Monkstown Farm, Monkstown Link Road, Monkstown Road, Montpelier Place, Mounttown Cottages, Mounttown Upper, Newtown Avenue, Newtownpark Avenue, Oliver Plunkett Road, Phoenix Terrace, Priory Avenue, Priory Drive, Redesdale Road, Rochestown Avenue, Rock Road, Rockford Park, Rowan Park, Rowanbyrn, Saint Raphaela's Road, Old Dublin Road, Sandyford Road, Seafield Avenue, Seapoint Avenue, South Avenue, Pembroke Lane, St Michaels Park, Percy Place, St Patrick's Crescent, St Thomas Road, Stillorgan Grove, Stillorgan Wood, Stradbrook Lawn, R118, Stradbrook Road, Temple Hill, Temple Road, The Rise, Thornhill Road, Trees Road Lower, Trees Road Upper, Windsor Park, Blackglen Road, Blackthorn Avenue, Blackthorn Drive, Blackthorn Road, Carmanhall Road, Churchtown Road, Churchtown Road Lower, Churchtown Road Upper, Drummartin Link Road, Sallymount Avenue, Drummartin Road, Lower Drummartin Road, Lower Kilmacud Road, Maple Avenue,

Overend Way, R114, R117, Taney Road, Abbey Road, Church Road, Dean's Grange Road, Glenageary Road Upper, Glenageary Roundabout, Killiney Road, Summerhill Road, Westminster Road, Ballyogan Road, Bray Road, Cornelscourt Hill Road, Green Route South, Hainault Road, Joyce Avenue, Torquay Road, Valley Avenue, Castle Park, Fassaroe Avenue, Ferndale Road, R918, R918 Upper Dargle Road, Upper Dargle Road; and

- **PM Peak Hour:** Adelaide Road, Aston Quay, Baggot Street Upper, Burgh Quay, Charlemont Street, Dame Street, Earlsfort Terrace, Essex Quay, Beechfield Manor, Fownes Street Upper, Blackthorn Drive, George's Quay, Haddington Road, Braemor Road, Brookvale Road, Harcourt Road, Harcourt Street, Burton Hall Road, Hatch Street Lower, Heytesbury Street, Leeson Park, Lord Edward Street, Mespil Road, Church Road, Richmond Street South, Sussex Terrace, Claremont Road, Wellington Place, Wellington Quay, Wellington Road, Commons Road, Beach Road, Cumberland Street, Brookville Park, Campus Ring Road, Foster's Avenue, Merrion Road, Dublin Road, Dundrum Road, R131, Strand Road, Clonskeagh Road, Flemingstown Park, Ranelagh, Ranelagh Road, Rathmines Road Lower, Rathmines Road Upper, Rosemount Crescent, Sandford Road, Trees Road Lower, Trees Road Upper, Booterstown Avenue, Callary Road, Carrickbrennan Road, Cedar Square, Clifton Avenue, Cross Avenue, Green Park Road, Dean's Grange Road, Frascati Road, Glenart Avenue, Grange Grove, Greenfield Road, Grove Avenue, Kilmacud Road Upper, Lower Kilmacud Road, Maple Avenue, Herbert Road, Monkstown Avenue, Monkstown Link Road, Montpelier Place, Killarney Glen, Mount Merrion Avenue, King Edward Park, Mounttown Cottages, Mounttown Road Lower, Leopardstown Race Course Road, Mounttown Upper, N31 Frascati Road, Newtown Avenue, Newtownpark Avenue, North Avenue, Park Villas, Phoenix Terrace, Rock Road, Milltown Road, Roebuck Road, Rosslyn, Rowanbyrn, Seafield Avenue, Seapoint Avenue, St Brigid's Church Road, St Thomas Road, Stillorgan Grove, Stillorgan Road, Stillorgan Wood, Stradbrook Lawn, Stradbrook Road, Temple Hill, Old Dublin Road, Orwell Road, Temple Road, Owenstown Park, Ballinteer Road, Blackthorn Avenue, Percy Place, Blackthorn Road, Churchtown Road, Priory Avenue, Priory Drive, Churchtown Road Upper, Drummartin Link Road, R118, Drummartin Road, Goatstown Cottages, Green Park, Hainault Road, Knockrabo Drive, Leopardstown Road, Lower Drummartin Road, Mount Anville Road, Overend Way, R114, R117, Redesdale Road, Saint Raphaela's Road, South Avenue, Taney Road, Thornhill Road, Wesley College, Windsor Park, Wyckham Way, Abbey Road, Clonkeen Road, Glenageary Road Upper, Glenageary Roundabout, Kill Avenue, Moorefield, Park Road, Pottery Road, Rochestown Avenue, Ballyogan Road, Glenamuck Road, Glenamuck Road North, Glenamuck Road South, Green Route North, Green Route South, Joyce Avenue, Levmoss Park, Trimleston Avenue, UCD Slip Southbound, Rathsallagh Bridge, Torquay Road, Waterloo Road, Valley Avenue, Westminster Road, Ballybride Road, Fassaroe Avenue, Ferndale Road, R918, Wyattville Link Road Northbound Off-Slip.

The general traffic impact assessment on the indirect study area has been undertaken by extracting operational capacities from the LAM at the key junctions along the above road links identified in the threshold impact assessment.

The results are presented in terms of the significance of the change in V / C ratio for each junction based on its sensitivity and magnitude of impact. To undertake a robust assessment, the operational capacity outputs have been presented with reference to the worst performing arm of a junction that experiences the maximum V / C ratio.

The overall results of this assessment can be summarised as follows:

- The majority of assessed junctions have V / C ratios of below 85%, i.e. they are operating well within capacity for all assessed years in both the DoMinimum and DoSomething scenarios. This indicates that these junctions will be able to accommodate any additional general traffic volumes redistributed as a result of the Proposed Scheme. The effect of the Proposed Scheme on the majority of junctions is deemed negligible;
- It should be noted that while there are low impacts to the operational capacity in the indirect study area, this level of congestion is acceptable according to national guidance. Section 3.4.2 of DMURS (2019) recognises that a certain level of traffic congestion is an inevitable feature within urban networks and that junctions may have to operate at saturation levels for short periods of time during the peak hours of the day. Chapter 1 of the Smarter Travel Policy Document also acknowledges that it is not feasible or sustainable to accommodate continued demand for car use. Therefore, it can be concluded that the traffic congestion that is outlined in the impact assessment is acceptable with regard to the urban location of the area;

- Accordingly, it is determined that there will be an overall negative, low impact from the redistributed general traffic as a result of the Proposed Scheme. Given that the redistributed traffic will not lead to a significant deterioration of the operational capacity on the surrounding road network, no further mitigation measures have been considered to alleviate the impact outside of the direct study area; and
- It should therefore be considered that the traffic congestion that is outlined in the impact assessment is acceptable with regard to the urban location of the area in the context of the increased movement of people overall and on sustainable modes in particular.

6.6.3.3.7 Network-Wide Performance Indicators for General Traffic (Indirect Study Area)

The traffic and transport analysis considers the impact that the Proposed Scheme will have on the road network, within the direct and indirect study areas. To further quantify the impact of the Proposed Scheme on the traffic and transport conditions, network-wide performance indicators have been extracted for the general traffic conditions beyond the defined study areas, covering the full LAM modelled area.

The following indicators have been provided for both scenarios:

- **Transient Queues** (pcu.hrs) represent delay caused by reduced speeds approaching junctions and by waiting time at junctions. It does not include delay created whilst stopped in queues at over capacity junctions;
- **Over Capacity Queues** (pcu.hrs) measures the time spent queuing as a result of junctions operating over capacity and is a measure of network congestion;
- **Total Travel Time** (pcu.hrs) is the sum of the time spent in transient queues, over capacity queues and link cruise time;
- **Total Travel Distance** (pcu.kms) is the total distance travelled by all the vehicles in the model; and
- **Average Network Speed** (km/hr) is the average speed of all the vehicles in the network over the modelled period. It's calculated by dividing total travel distance by total travel time.

The contents of Table 6.57 outline the impact that the Proposed Scheme will have on the wider transport network, beyond the defined study areas.

Table 6.57: Network-Wide Performance Indicators with Proposed Scheme in Place

Scenario	Metric	Do Minimum	Do Something	% Difference	Impact
2028 Opening Year AM Peak Hour	Transient Queues (pcu.hrs)	18,724.30	19,761.40	5.54%	Low Negative
	Over Capacity Queues (pcu.hrs)	5,093.20	5,116.80	0.46%	
	Total Travel Times (pcu.hrs)	62,083.60	63,178.40	1.76%	
	Total Travel Distance (pcu.kms)	2,022,116.40	2,016,528.50	-0.28%	
	Average Network Speed (km / h)	32.60	31.90	-2.15%	
2028 Opening Year PM Peak Hour	Transient Queues (pcu.hrs)	18,012.00	18,726.30	3.97%	Low Negative
	Over Capacity Queues (pcu.hrs)	4,694.50	4,963.20	5.72%	
	Total Travel Times (pcu.hrs)	59,030.90	59,942.70	1.54%	
	Total Travel Distance (pcu.kms)	1,941,052.30	1,931,226.00	-0.51%	
	Average Network Speed (km / h)	32.90	32.20	-2.13%	
2043 Opening Year AM Peak Hour	Transient Queues (pcu.hrs)	16976.6	17754.2	4.58%	Negligible
	Over Capacity Queues (pcu.hrs)	7843.6	7922.3	1.00%	
	Total Travel Times (pcu.hrs)	62947.1	63671.6	1.15%	
	Total Travel Distance (pcu.kms)	2121715.8	2109067.0	-0.60%	
	Average Network Speed (km / h)	33.7	33.1	-1.78%	
2043 Opening Year AM Peak Hour	Transient Queues (pcu.hrs)	18051.3	18833.2	4.33%	Low Negative
	Over Capacity Queues (pcu.hrs)	9733.5	10343.6	6.27%	
	Total Travel Times (pcu.hrs)	64882.5	66215.5	2.05%	
	Total Travel Distance (pcu.kms)	2049703.5	2043035.3	-0.33%	
	Average Network Speed (km / h)	31.6	30.9	-2.22%	

The results of the assessment demonstrate that the impacts to the network performance indicators range between -2.2% and 6.27%, therefore a **Low Negative** impact is anticipated.

6.6.4 Operational Phase Summary

The contents of Table 6.58 present a summary of the predicted impacts of the Proposed Scheme during the Operational Phase.

Table 6.58: Summary of Predicted Operational Phase Impacts

Assessment Topic	Effect	Predicted Impact
Pedestrian Infrastructure	Improvements to the quality of the pedestrian infrastructure along the Proposed Scheme.	Medium Positive impact
Cycling Infrastructure	Improvements to the quality of the cycling infrastructure along the Proposed Scheme.	Low Positive impact
Bus Infrastructure	Improvements to the quality of the bus infrastructure along the Proposed Scheme.	Medium Positive impact
Parking and Loading	A total loss of 214 parking / loading spaces along the Proposed Scheme.	Medium Negative impact
People Movement	Increases to the total number of people travelling through the Proposed Scheme.	High Positive impact
Bus Network Performance Indicators	Improvements to the network performance indicators for bus users along the Proposed Scheme.	High Positive impact
General Traffic Network Performance Indicators	Reduction in general traffic flows along the Proposed Scheme.	Medium Positive impact
	Redistributed general traffic along the surrounding road network in the indirect study area as a result of the reduction of reserve capacity along the Proposed Scheme.	Low Negative impact

As outlined in Table 6.58 above, the Proposed Scheme will deliver strong positive impacts to the quality of pedestrian, cycling and bus infrastructure during the Operational Phase providing for enhanced levels of People Movement in line with the scheme objectives. These improvements will help to provide an attractive alternative to the private car and promote a modal shift to walking, cycling and public transport, allowing for greater capacity along the corridor to facilitate the sustainable movement of people as population and employment levels grow in the future.

The Proposed Scheme will address sustainable mode transport infrastructure deficits while contributing to an overall integrated sustainable transport system as proposed in the GDA Strategy. It will increase the effectiveness and attractiveness of bus services operating along the corridor and will result in more people availing of public transport due to the faster, more reliable journey times which the Proposed Scheme provides. This in turn will support the future increase to the capacity of the bus network and services operating along the corridor and thereby further increasing the attractiveness of public transport. In addition to this, the significant segregation and safety improvements to walking and cycling infrastructure that is a key feature of the Proposed Scheme will further maximise the movement of people travelling sustainably along the corridor. All of these changes combined will therefore cater for higher levels of future population and employment growth.

In the absence of the Proposed Scheme bus services will be operating in a more congested environment, leading to higher journey times for and lower reliability for bus journeys. This limits their attractiveness to users which will lead to reduced levels of public transport use, making the bus system less resilient to higher levels of growth. The absence of walking and cycling measures that the Proposed Scheme provides will also significantly limit the potential to grow those modes into the future.

On the whole, the Proposed Scheme will make a significant contribution to the overall aims of BusConnects, the GDA Strategy and allow the city to grow sustainably into the future, which would not be possible in the absence of the Proposed Scheme. Further summary and conclusions of the assessment can be found in Section 7.

7. Cumulative Assessment

7.1 Construction Stage Cumulative Effects

The assessment of cumulative effects associated with the Construction Phase of the Proposed Scheme is contained within Chapter 21 (Cumulative Impacts & Environmental Interactions) in Volume 2 of the EIAR.

7.2 Operational Stage Cumulative Impacts

7.2.1 Introduction

This chapter also reports the assessment of cumulative effects associated with the Operational Phase of the Proposed Scheme. This includes the cumulative impacts of the Proposed Scheme on relevant transport receptors in combination with other existing and/or approved projects including all other Proposed BusConnects Schemes. The transport modelling undertaken as part of the Traffic and Transport assessment informs the cumulative impacts assessment of other environmental topics. Further details on the cumulative impacts of Air quality, Climate, Noise and vibration, Population and Human health are detailed within Chapter 21, Volume 2 of the EIAR.

7.2.2 Transport Schemes

As detailed in Section 6.3 and 6.4, the core reference case (Do Minimum) modelling scenarios (Opening Year (2028) and Design Year (2043)) are based on the progressive roll-out of the Greater Dublin Area (GDA) Transport Strategy 2022-2042 (GDA Strategy), with a partial implementation by 2028, in line with (National Development Plan (NDP) (Government of Ireland 2021) investment priorities) and the full implementation by 2043. To this end, the modelling scenarios developed for the operational assessment of the Proposed Scheme(s) inherently accounts for the cumulative effects of complementary committed and proposed transport schemes within the GDA region.

The GDA Strategy provides is an appropriate receiving environment for the assessment of cumulative effects for the following reasons:

- The GDA Strategy is the approved statutory transportation plan for the region, providing a framework for investment in transport within the region up to 2042;
- The GDA Strategy provides a consistent basis for the 'likely' future receiving environment that is consistent with Government plans and Policies (National Planning Framework (NPF) (Government of Ireland 2018) and National Development Plan (NDP); and
- Schemes within the GDA Strategy are a means to deliver the set of objectives of the GDA Strategy. The sequencing and delivery of the strategy is defined by the implementation plan, but the optimal outcome of aiming to accommodate all future growth in travel demand on sustainable modes underpins the GDA Strategy.

7.2.3 Transport Demand

Cumulative transport demand for the 2028 and 2043 assessment years have been included in the analysis contained within this TIA, using travel demand forecasting, which accounts for increases in population and economic activity, in line with planned growth contained within the NPF, Regional Spatial and Economic Strategy (RSES) for the Eastern and Midland region and the local development plans for GDA local authorities.

It is envisaged that the population will grow by 11% up to 2028 and 25% by 2043 (above 2016 census data levels). Similarly, employment is due to grow by 22% by 2028 and 49% by 2043 (Source: NTA Reference Case Planning Sheets 2028, 2043). Strategic Trip Demand Assessment

As described previously in section 6.3, the GDA Strategy (along with existing supply side capacity constraints e.g., parking availability, road capacity etc.) has the effect of limiting the growth in car demand on the road network into the future.

To limit the growth in car traffic and to ensure that this demand growth is catered for predominantly by sustainable modes, a number of measures will be required, that include improved sustainable infrastructure and priority measures delivered as part of the NDP/GDA Strategy. In addition to this, demand management measures will play a role in limiting the growth in transport demand, predominantly to sustainable modes only. The result will be only limited or no increases overall in private car travel demand. The Proposed Scheme will play a key role in this as part of the wider package of GDA Strategy measures.

In general, total trip demand (combining all transport modes) will increase into the future in line with population and employment growth. A greater share of the demand will be by sustainable modes (Public Transport (PT), Walking, Cycling). Private car demand may still grow in some areas but not linearly in line with demographics, as may have occurred in the past.

In terms of the transport modelling scenarios for the cumulative traffic and transport assessment, as per the GDA Strategy proposals, there are no specific demand management measures included in the Do Minimum reference case (receiving environment) scenario in the Opening Year (2028), other than constraining parking availability in Dublin at existing levels. For the Design Year (2043) scenario, demand management is included in the Do Minimum in line with the Strategy's Core Demand Management Measures; Reduction of free workplace parking in urban areas, increased parking charges in urban areas and adjustment of traffic signal timings across the metropolitan area to better facilitate movement by sustainable modes.

7.2.3.0.1 Trip Demand Growth within Study area of the Proposed Schemes.

To understand the background levels of demand growth within the study area of the Proposed Schemes in the assessment years (2028, 2043), the 24-hour demand outputs by mode from the NTA ERM have been analysed. A buffer of 500m beyond the extent of the Proposed Schemes has been chosen to capture the population that is most likely to interact with the Proposed Schemes, and which could reasonably be exposed to cumulative effects in combination with other developments.

Diagram 7.1 outlines the changes in total trip demand, comparing car demand with sustainable mode demand (public transport, walking and cycling). The figures are presented for both 2028 and 2043 Do Minimum scenarios (i.e., without the Proposed Schemes in place) in relation to the 2020 ERM demand levels.

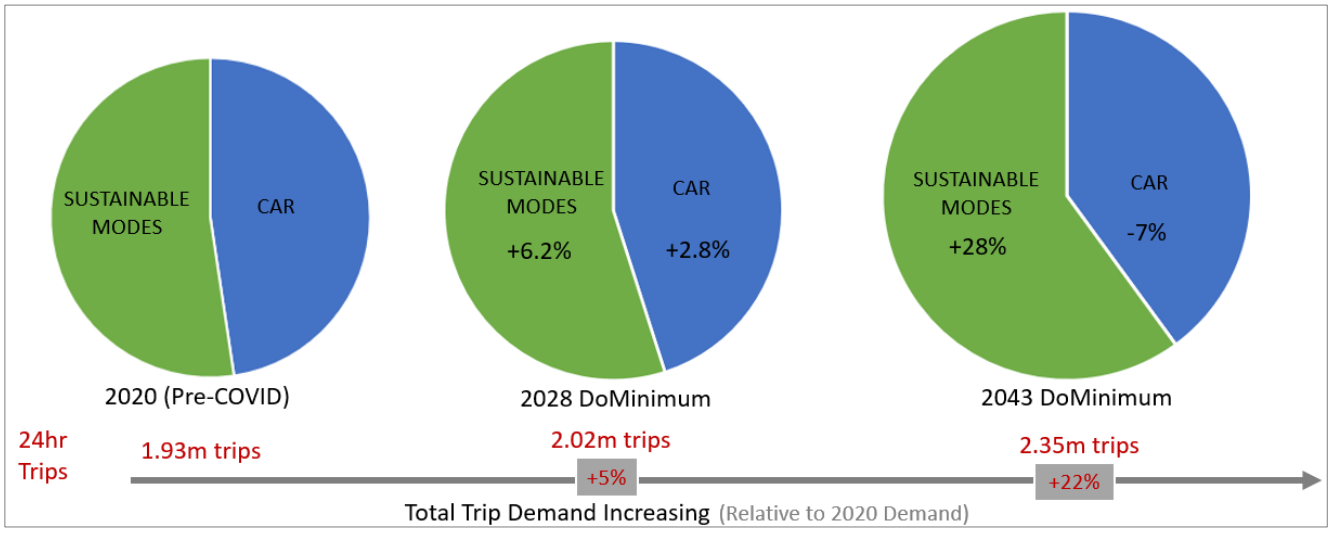

Diagram 7.1: Trip Demand Changes without the Proposed Schemes (in Relation to 2020 Demand)

As shown above, there are 1.93m trips[3] over a 24hr period within 500m of the Proposed Schemes. Total trip demand increases to 2.02m trips (5% increase) in 2028 and to 2.35m trips (+22% increase) in 2043.

In terms of the modal composition of the 5% increase in total demand in 2028, there will be a 6.2% increase in sustainable modes (PT, walk, cycle) and a 2.8% increase in private car demand above 2020 levels, without the Proposed Schemes in place. In 2043, the 22% increase in total trip demand (above 2020 levels) will be made up of a 28% increase in sustainable modes demand (PT, walk, cycle) and a 7% reduction in private car demand, compared to 2020 (pre-COVID 19) levels. The analysis indicates that even without the Proposed Schemes in place, other GDA Transport Strategy measures and road network capacity constraints mean that private car demand is not growing at the same rate as overall travel demand, and in fact car traffic levels will reduce below current / 2020 traffic levels.

The overall share of Sustainable modes trips on the network will increase from 49% in 2020, to 58% in 2028 and to 63% in 2043 with corresponding reductions in the private car share of overall travel demand.

7.2.3.0.2 Impacts of BusConnects Proposed Scheme Works on Travel Demand Growth

A similar assessment has been undertaken comparing 24-hour car demand with sustainable mode demand (public transport, walking and cycling) for both the 2028 and 2043 Do Something scenarios (i.e., with all Proposed Schemes in place) in relation to the 2020 ERM demand levels (and is shown in Diagram 7.2).

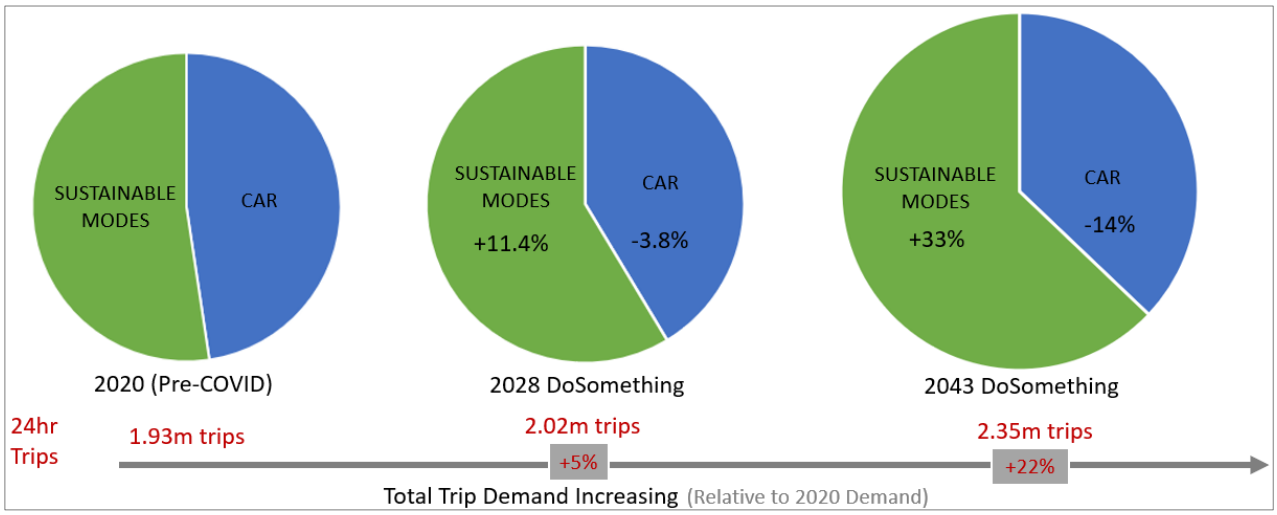

Diagram 7.2: Trip Demand Changes with the Proposed Schemes (in Relation to 2020 Demand)

As shown above, the same level of overall trip demand will occur, however, significantly higher levels of these trips will be made by sustainable modes due to the provision of the BusConnects Proposed Scheme Infrastructure Works. In terms of the modal composition of the 5% increase in total demand in 2028, there will be an 11.4% increase in sustainable modes (PT, walk, cycle) and a 3.8% decrease in private car demand compared to 2020 levels, with the Proposed Schemes in place. In 2043, the 22% increase in total trip demand (above 2020 levels) will be made up of a 33% increase in sustainable modes demand (PT, walk, cycle) and a 14% decrease in private car demand, compared to 2020 levels. The analysis indicates that the Proposed Schemes will have a significant impact on sustainable mode share. The schemes will prevent any increase in private car traffic within the study area and will instead result in a further substantial reduction in car trips below 2020 levels.

[3] Trips to/from ERM zones within a 500m distance from the Proposed Scheme to/from any destination

With the Proposed Schemes in place, the overall share of Sustainable modes trips on the network will increase from 49% in 2020, to 61% in 2028 and to 66% in 2043 with corresponding reductions in the private car share of overall travel demand.

7.2.4 People Movement Assessment

7.2.4.1 Overview

In order to understand the benefit with regards to the Movement of People following the full implementation of all 12 of the Proposed Schemes, a quantitative People Movement assessment has been undertaken using outputs of the modelling suite 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:

- Daily Mode share changes within a 500m catchment of the Proposed Schemes comparing the Do Minimum and Do Something scenarios for trips to the City Centre and trips to any destination in the 2028 and 2043 assessment years;
- The average number of people moved by each transport mode (i.e., Car, Bus, Walking and Cycling) along the corridor in the inbound and outbound 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 on the direct CBC corridor as a result of the Proposed Scheme measures; and
- People Movement by Bus:
    - Total Passengers Boarding Buses on bus routes that use any part of the Proposed Schemes for each forecast year (2028, 2043).

7.2.4.2 Daily People Movement by Mode (Mode Share)

Daily (07:00-19:00 – weekday) mode share data has been extracted from the ERM for zones within a 500m catchment of the Proposed Schemes comparing the Do Minimum and Do Something scenarios for each of the forecast years (2028, 2043).

Diagram 7.3 and Diagram 7.4 illustrate the mode share changes (% increase and absolute) comparing the Do Minimum and Do Something (All Proposed Schemes) scenarios for Car, Public Transport and Cycling for the following:

- People travelling from the catchment area of the Proposed Schemes to any destination within the catchment (inclusive of the City Centre) in the Morning Peak period (AM) (07:00-10:00) and All-day (07:00-19:00) period; and
- People travelling from the catchment area of the Proposed Schemes inbound towards the city centre (defined as the Canal Cordon) in the Morning Peak period (AM) 07:00-19:00 period.

7.2.4.2.0 2028 Demand Changes by Mode

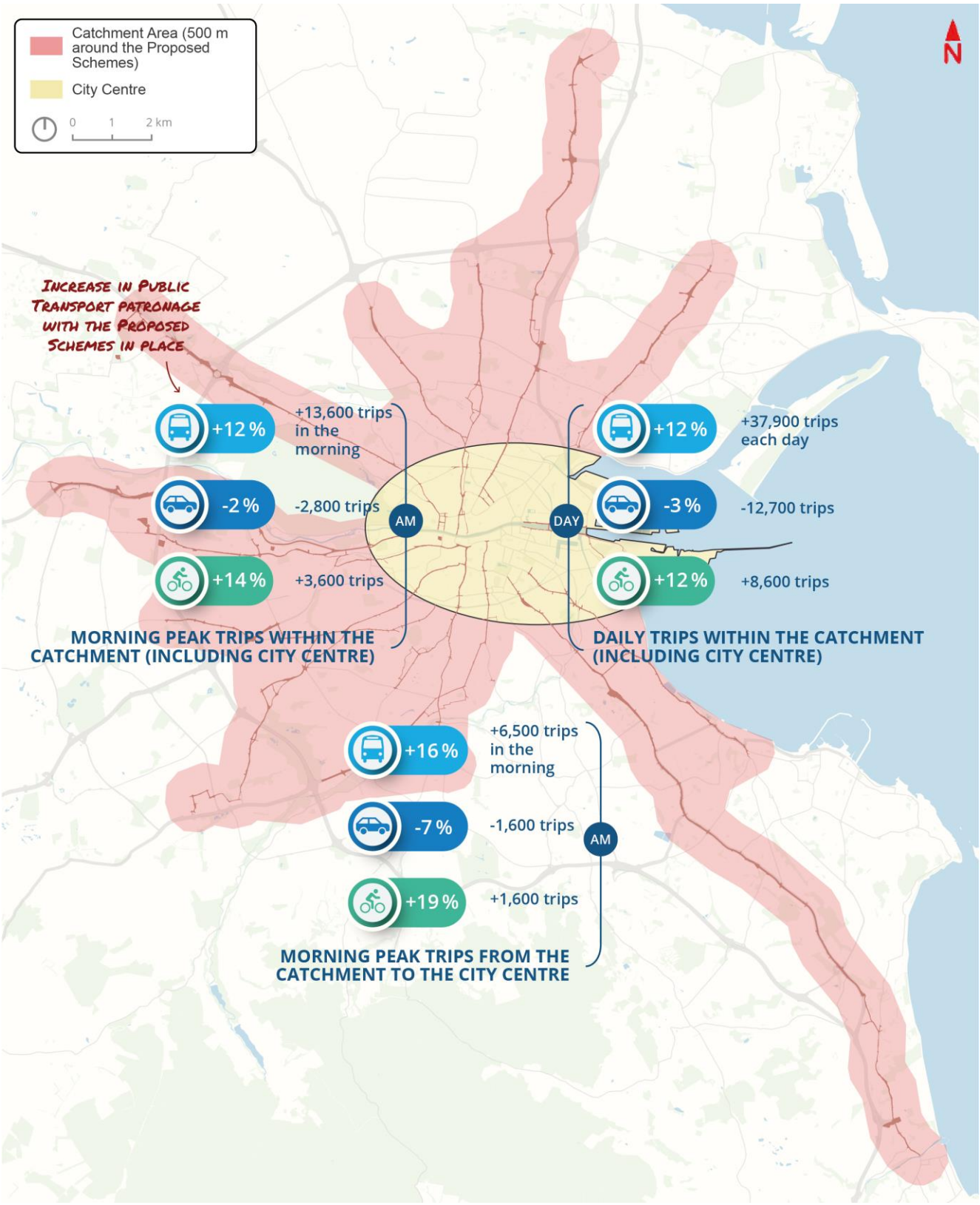

Diagram 7.3: Change in Trips by Mode within a 500m Catchment Area of the Proposed Schemes and the City Centre and Trips Originating from the Catchment Inbound to the City Centre in 2028

As indicated in Diagram 7.3, it is estimated that for people travelling within the 500m catchment area (including City Centre) there will be a 12% increase in public transport trips, 2% decrease in general traffic trips (i.e.

motorists) and a 14% increase in cycling trips in the morning peak period (07:00-10:00). Across the whole day (07:00-19:00), there will be a 12% increase in public transport, 3% decrease in general traffic and a 12% increase in cycling trips.

It is also estimated that for people travelling inbound to the city centre from the catchment area in the morning peak period there will be 16% increase in public transport trips, 7% decrease in general traffic trips (i.e. motorists) and a 19% increase in cycling trips.

Table 7.1 outlines the difference in trips and modal split between the Opening Year Do Minimum and Do Something scenarios for people travelling within the Catchment Area and the City Centre in the morning peak period and All-Day (07:00-19:00).

Table 7.1: 2028 Modal Share of Trips within a 500m Catchment Area from of the Proposed Schemes and the City Centre

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Daily Trips	Modal Split (%)	Daily Trips	Modal Split (%)	Daily Trips	Difference (%)
Within Catchment Area and City Centre	AM (07:00-10:00)	Public Transport	111,090	25.5%	124,700	27.7%	13,610	12.3%
		General Traffic	145,560	33.4%	142,730	31.7%	-2,830	-1.9%
		Cycling	25,670	5.9%	29,250	6.5%	3,580	13.9%
		Walking	154,000	35.3%	153,160	34.0%	-840	-0.5%
		Total	436,320	100%	449,840	100%	13,520	3.1%
Within Catchment Area and City Centre	Daily (07:00-19:00)	Public Transport	328,800	24.8%	366,730	27.0%	37,930	11.5%
		General Traffic	435,860	32.9%	423,140	31.2%	-12,720	-2.9%
		Cycling	70,680	5.3%	79,270	5.8%	8,590	12.2%
		Walking	487,880	36.9%	487,400	35.9%	-480	-0.1%
		Total	1,323,220	100%	1,356,540	100%	33,320	2.5%

As shown in Table 7.1 it is expected that there will be an approximate 3% (13,500) increase in People Movement within the Catchment Area (including City Centre) as a result of the Proposed Schemes in the morning peak period. The slight net increase in the total number of trips is due to the improved accessibility and reduced congestion for sustainable mode users provided with the Proposed Schemes in place. Over the whole day, approximately 46,000 additional trips will be made by bus and cycling.

It is also estimated that a modal shift will occur in the morning peak period consisting of an increase in Public Transport mode share from 25.5% to 27.7%, a decrease in general traffic share from 33.4% to 31.7% and an increase in the number of cyclists from 5.9% to 6.5%. The modal shift in the daily trips within the 500m catchment area and the City Centre will consist of an increase in Public Transport users from 24.8% to 27%, a decrease in general traffic share from 32.9% to 31.2% and an increase in the number of cyclists from 5.3% to 5.8%.

The number of walking trips is shown to remain broadly similar in the Do Something scenario. This is mainly due to a mode shift from walking to bus, due to the enhanced public transport provision in the Do Something scenario.

Table 7.2 outlines the difference in trips and modal split between the Opening Year Do Minimum and Do Something (All Proposed Schemes) scenarios for people travelling from the Catchment Area inbound towards the City Centre in the morning peak period.

Table 7.2: 2028 Modal Share of Trips Originating from a 500m Catchment Area from of the Proposed Schemes to the City Centre

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Daily Trips	Modal Split (%)	Daily Trips	Modal Split (%)	Daily Trips	Difference (%)
Within Catchment Area and City Centre	AM (07:00-10:00)	Public Transport	40,050	48.4%	46,500	52.5%	6,450	16.1%
		General Traffic	23,180	28.0%	21,540	24.3%	-1,640	-7.1%
		Cycling	8,530	10.3%	10,150	11.5%	1,620	19.0%
		Walking	11,030	13.3%	10,450	11.8%	-580	-5.3%
		Total	82,790	100%	88,640	100%	5,850	7.1%

As shown in Table 7.2, the modelling indicates that there will be an approximate 7% (6,000) increase in total People Movement travelling from the Catchment Area to the City Centre as a result of the Proposed Schemes in the morning peak period.

It is also indicated that a modal shift will occur consisting of an increase in Public Transport users from 48.4% to 52.5%, a decrease in general traffic mode share from 28% to 24.3% and an increase in the cycling mode share from 10.3% to 11.5% with the Proposed Schemes in operation.

7.2.4.2.1 2043 Demand Changes by Mode

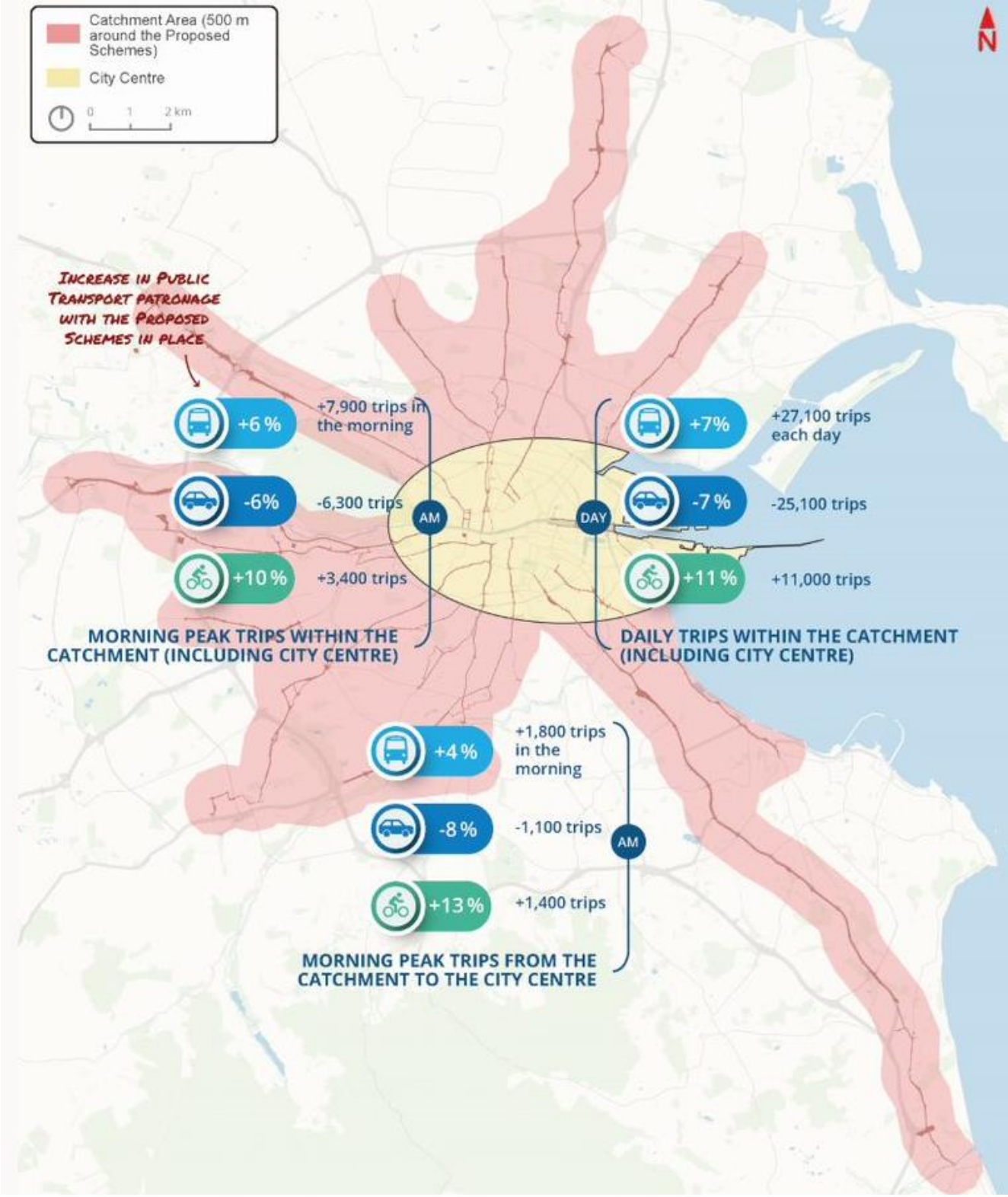

Diagram 7.4: Change in trips by mode within a 500m Catchment Area of the Proposed Schemes and the City Centre and Trips originating from the Catchment inbound to the City Centre in 2043

As indicated in Diagram 7.4, it is estimated that for people travelling within the 500m catchment area (including City Centre) there will be a 6% increase in public transport trips, 6% decrease in general traffic trips (i.e. motorists) and a 10% increase in cycling trips in the morning peak period and a 7% increase in public transport, 7% decrease in general traffic and a 11% increase in cycling trips each day (07:00-19:00).

The modelling shows that for people travelling inbound to the city centre from the Catchment Area in the morning peak period there will be a 4% increase in public transport trips, 8% decrease in general traffic trips (i.e., motorists) and a 13% increase in cycling trips.

Table 7.3 outlines the difference in trips and modal split between the Opening Year Do Minimum and Do Something (All Proposed Schemes) scenarios for people travelling within the Catchment Area and the City Centre in the morning peak period and All Day (07:00-19:00).

Table 7.3: 2043 Modal Shift of Trips within a 500m Catchment Area from of the Proposed Schemes and the City Centre

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Daily Trips	Modal Split (%)	Daily Trips	Modal Split (%)	Daily Trips	Difference (%)
Within Catchment Area and City Centre	AM (07:00-10:00)	Public Transport	129,599	29.4%	137,493	30.8%	7,894	6.1%
		General Traffic	103,586	23.5%	97,233	21.8%	-6,353	-6.1%
		Cycling	36,596	8.3%	40,146	9.0%	3,550	9.7%
		Walking	171,570	38.9%	170,979	38.4%	-591.55	-0.3%
		Total	441,351	100%	445,851	100%	4,500	1.0%
Within Catchment Area and City Centre	Daily (07:00-19:00)	Public Transport	384,759	27.3%	411,921	28.9%	27,162	7.1%
		General Traffic	341,912	24.2%	316,802	22.2%	-25,110	-7.3%
		Cycling	102,803	7.3%	113,894	8.0%	11,091	10.8%
		Walking	582,146	41.2%	585,411	41%	3,266	0.6%
		Total	1,411,619	100%	1,428,028	100%	16,409	1.2%

As shown in Table 7.3, it is expected that there will be an approximate 1% (4,500) increase in People Movement travelling within the Catchment Area (including City Centre) as a result of the Proposed Schemes in the morning peak period. The slight net increase in the total number of trips is due to the improved accessibility and reduced congestion for sustainable mode users provided with all the Proposed Schemes in place. Over the whole day, approximately 38,300 additional trips will be made by bus and cycling, which is a significant increase, when considering that other elements of the GDA Strategy will be place in 2043.

It is also estimated that a modal shift will occur in the morning peak period consisting of an increase in Public Transport share from 29.4% to 30.8%, a decrease in general traffic share from 23.5% to 21.8% and an increase in cycling from 8.3% to 9.0%. The modal shift in the daily trips within the 500m catchment area and the City Centre will consist of an increase in Public Transport users from 27.3% to 28.9%, a decrease in general traffic from 24.2% to 22.2% and an increase in cyclists from 7.3% to 8.0%.

General traffic is seen to have much higher levels of reduction in 2043 than when compared to 2028 due to the increased level of non-bus public transport infrastructure (MetroLink, Luas extensions and DART+ from the GDA Strategy) in tandem with the road capacity reduction measures as part of the Proposed Scheme leading to increased usage on all public transport modes. The number of walking trips is shown to remain broadly similar in the Do Something scenario. This is mainly due to a mode shift from walking to bus, due to the enhanced public transport provision in the Do Something scenario.

Table 7.4 outlines the difference in trips and modal split between the Opening Year Do Minimum and Do Something (All Proposed Schemes) scenarios for people travelling from the Catchment Area inbound towards the City Centre in the morning peak period.

Table 7.4: 2043 Modal Shift of Trips originating from a 500m Catchment Area from of the Proposed Schemes to the City Centre

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Daily Trips	Modal Split (%)	Daily Trips	Modal Split (%)	Daily Trips	Difference (%)
Within Catchment Area and City Centre	AM	Public Transport	45,323	52.4%	47,098	53.4%	1,775	3.9%
		General Traffic	14,881	17.2%	13,761	15.6%	-1,121	-7.5%
		Cycling	11,127	12.9%	12,571	14.2%	1,444	13.0%
		Walking	15,188	17.6%	14,843	16.8%	-344.57	-2.3%
		Total	86,519	100%	88,272	100%	1,754	2.0%

As shown in Table 7.4, the modelling indicates that there will be an approximate 2% increase in total People Movement travelling from the Catchment Area to the City Centre as a result of the Proposed Schemes, in the morning peak period.

It is also indicated that a modal shift will occur consisting of an increase in Public Transport mode share from 52.4% to 53.4%, a decrease in general traffic mode share from 17.2% to 15.6% and an increase in the cycling mode share from 12.9% to 14.2%.

7.2.4.3 Peak Hour People Movement along the Proposed Schemes

To determine the cumulative impact that the implementation of the Proposed Schemes will have on modal share changes on the direct study areas, the weighted average number of people moved by each mode (Car, Bus, Active Modes) has been extracted from the modelling suite. The analysis compares the Do Minimum and Do Something (All Proposed Schemes) scenarios both in the inbound and outbound direction in the AM and PM Peak Hour periods for each forecast years (2028, 2043).

7.2.4.3.0 2028 AM Peak Hour People Movement

Diagram 7.5 illustrates the average People Movement by mode, across all Proposed Schemes, inbound towards the City Centre during the AM Peak Hour in 2028.

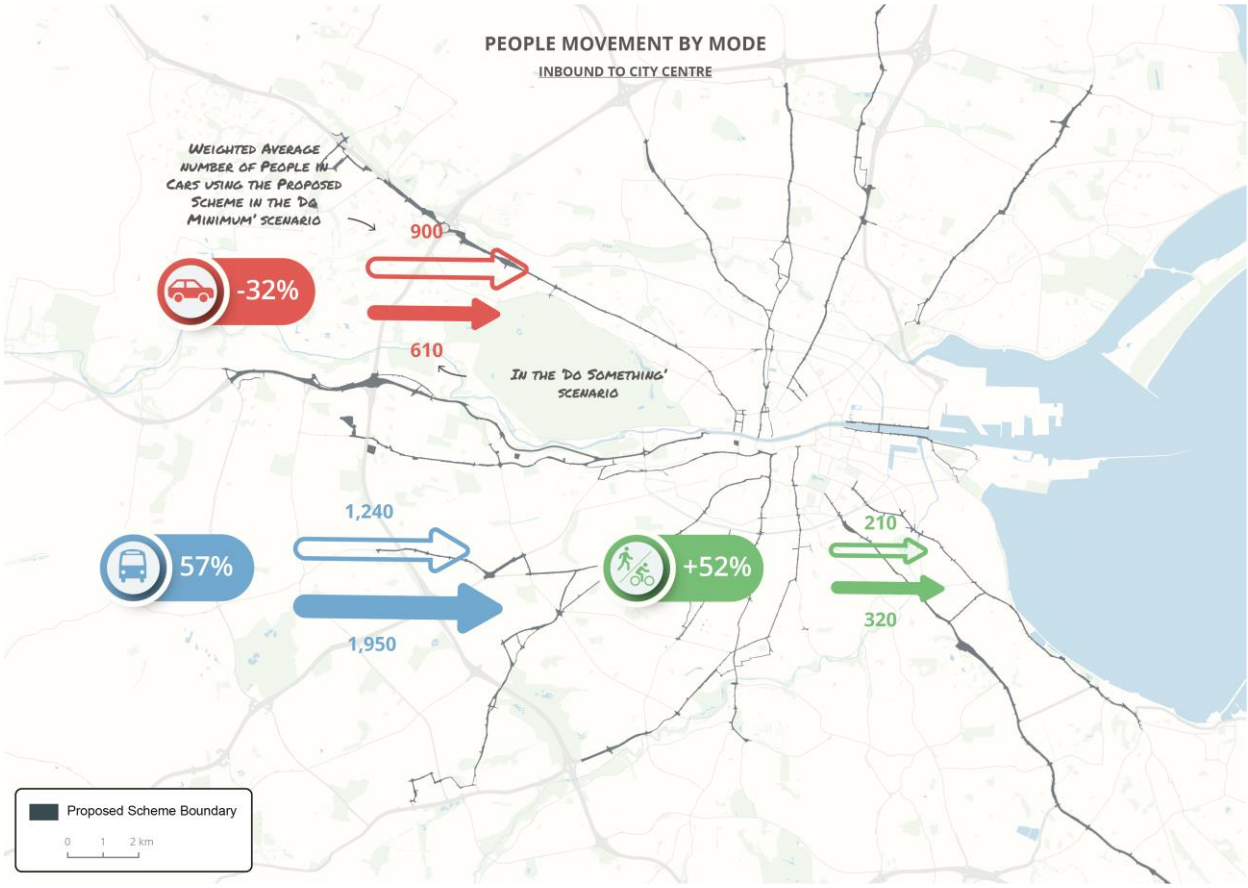

Diagram 7.5: Weighted Average People Movement by Mode during 2028 AM Peak Hour

As indicated in Diagram 7.5, on average across all Proposed Schemes, there is a predicted reduction of 30% in the number of people travelling via car, an increase of 50% in the number of people travelling via bus and an increase in 38% in the number of people walking or cycling along the Proposed Schemes during the PM Peak Hour.

Table 7.5 outlines the difference in modal split between the Do Minimum and Do Something scenarios for each mode of transport in an inbound direction towards the City Centre during the AM Peak Hour. The results indicate a 23% increase in total people moved as a result of the Proposed Schemes and a 57% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 7.5: Modal Shift of 2028 AM Peak Hour along Proposed Schemes

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Hourly Trips	Modal Split (%)	Hourly Trips	Modal Split (%)	Hourly Trips	Difference (%)
Inbound towards the City Centre	AM Peak Period	General Traffic	900	38%	610	21%	-290	-32%
		Public Transport	1,240	53%	1,950	68%	710	57%
		Walking	140	6%	140	5%	0	0%
		Cycling	70	3%	180	6%	110	157%
		Combined Walking/Cycling	210	9%	320	11%	110	52%
		Sustainable Modes Total	**1,450**	**62%**	**2,270**	**79%**	**820**	**57%**
		Total (all modes)	**2,350**	**100%**	**2,880**	**100%**	**530**	**23%**

7.2.4.3.1 2028 PM Peak Hour People Movement

Diagram 7.6 illustrates the average People Movement by mode, across all Proposed Schemes, travelling outbound from the city centre during the PM Peak Hour.

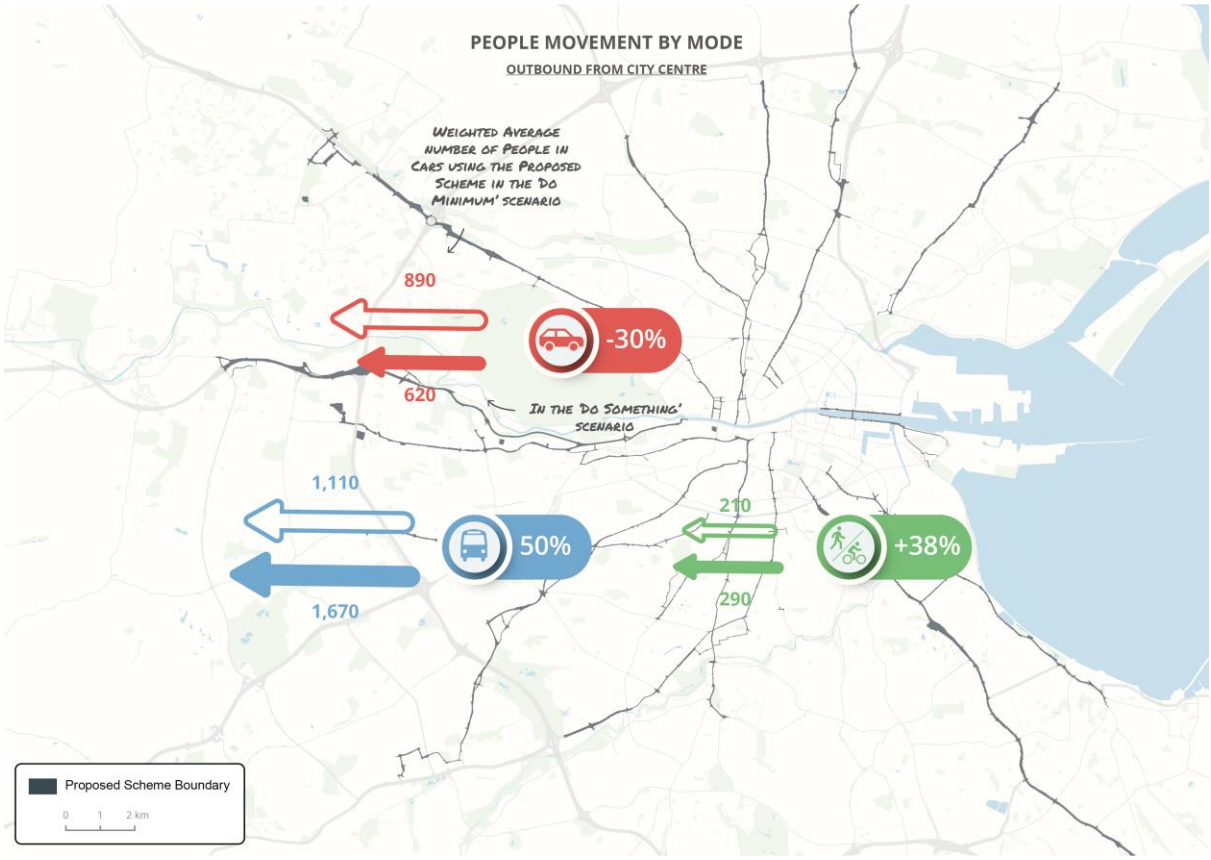

Diagram 7.6: Weighted Average People Movement by Mode during 2028 PM Peak Hour

As indicated in Diagram 7.6, on average across all Proposed Schemes, there is a predicted reduction of 30% in the number of people travelling via car, an increase of 50% in the number of people travelling via bus and an increase in 38% in the number of people walking or cycling along the Proposed Schemes during the PM Peak Hour.

Table 7.6 outlines the difference in modal split between the Do Minimum and Do Something (All Proposed Schemes) scenarios for each mode of transport in an outbound direction from the City Centre during the PM Peak Hour. The results indicate a 17% increase in total people moved as a result of the Proposed Schemes and a 48% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 7.6: Modal Shift of 2028 PM Peak Hour along Proposed Schemes

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Hourly Trips	Modal Split (%)	Hourly Trips	Modal Split (%)	Hourly Trips	Difference (%)
Outbound from the City Centre	PM Peak Period	General Traffic	890	40%	620	24%	-270	-30%
		Public Transport	1,110	50%	1,670	65%	560	50%
		Walking	150	7%	140	5%	-10	-7%
		Cycling	60	3%	150	6%	90	150%
		Combined Walking/Cycling	210	10%	290	11%	80	38%
		Sustainable Modes Total	**1,320**	**60%**	**1,960**	**76%**	**640**	**48%**
		Total (All modes)	**2,210**	**60%**	**2,580**	**76%**	**370**	**17%**

7.2.4.3.2 2043 AM Peak Hour People Movement

Diagram 7.7 illustrates the average People Movement by mode, across all Proposed Schemes, inbound towards the City Centre during the AM Peak Hour in 2043.

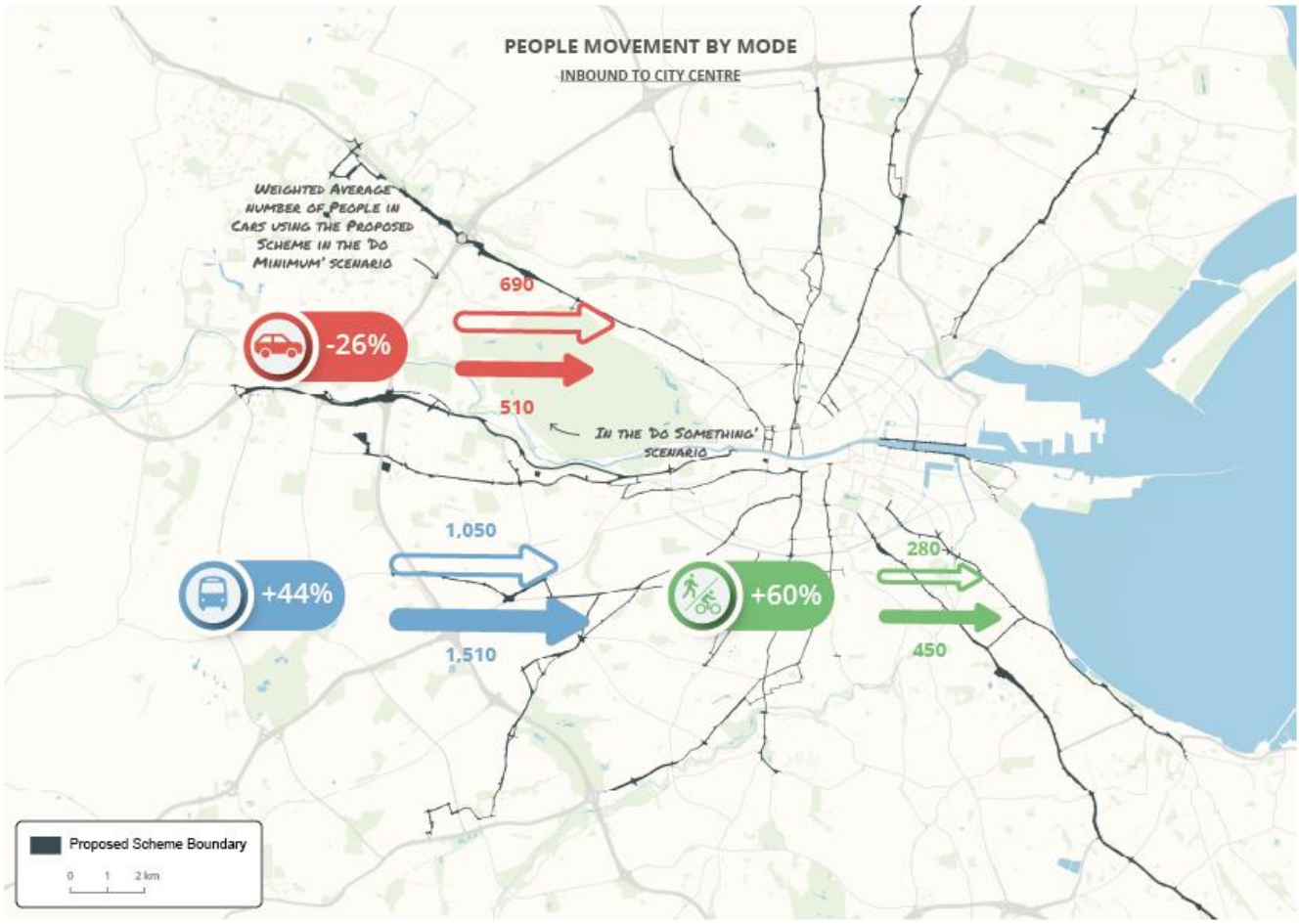

Diagram 7.7: Weighted Average People Movement by Mode during 2043 AM Peak Hour

As indicated in Diagram 7.7, on average across all Proposed Schemes, there is a predicted decrease of 26% in the number of people travelling via car, an increase of 44% in the number of people travelling via bus and an increase of 60% in the number of people walking and cycling along the Proposed Schemes during the AM Peak Hour.

Table 7.7 outlines the difference in modal split between the Do Minimum and Do Something (All Proposed Schemes) scenarios for each mode of transport in an inbound direction towards the City Centre during the AM Peak Hour. The results indicate a 47% increase in total people moved as a result of the Proposed Schemes and 60% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 7.7: Modal Shift of 2043 AM Peak Hour along Proposed Schemes

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Hourly Trips	Modal Split (%)	Hourly Trips	Modal Split (%)	Hourly Trips	Difference (%)
Inbound towards the City Centre	AM Peak Period	General Traffic	690	34%	510	21%	-180	-26%
		Public Transport	1,053	52%	1,514	61%	461	44%
		Walking	150	7%	165	7%	16	10%
		Cycling	129	6%	280	11%	151	117%
		Combined Walking/Cycling	**278**	**14%**	**445**	**18%**	**167**	**60%**
		Sustainable Modes Total	**1,332**	**66%**	**1,960**	**79%**	**628**	**47%**
		Total (All modes)	**2,022**	**100%**	**2,469**	**100%**	**448**	**22%**

7.2.4.3.3 2043 PM Peak Hour People Movement

Diagram 7.8 illustrates the average People Movement by mode, across all Proposed Schemes, travelling outbound from the City Centre during the PM Peak Hour in 2043.

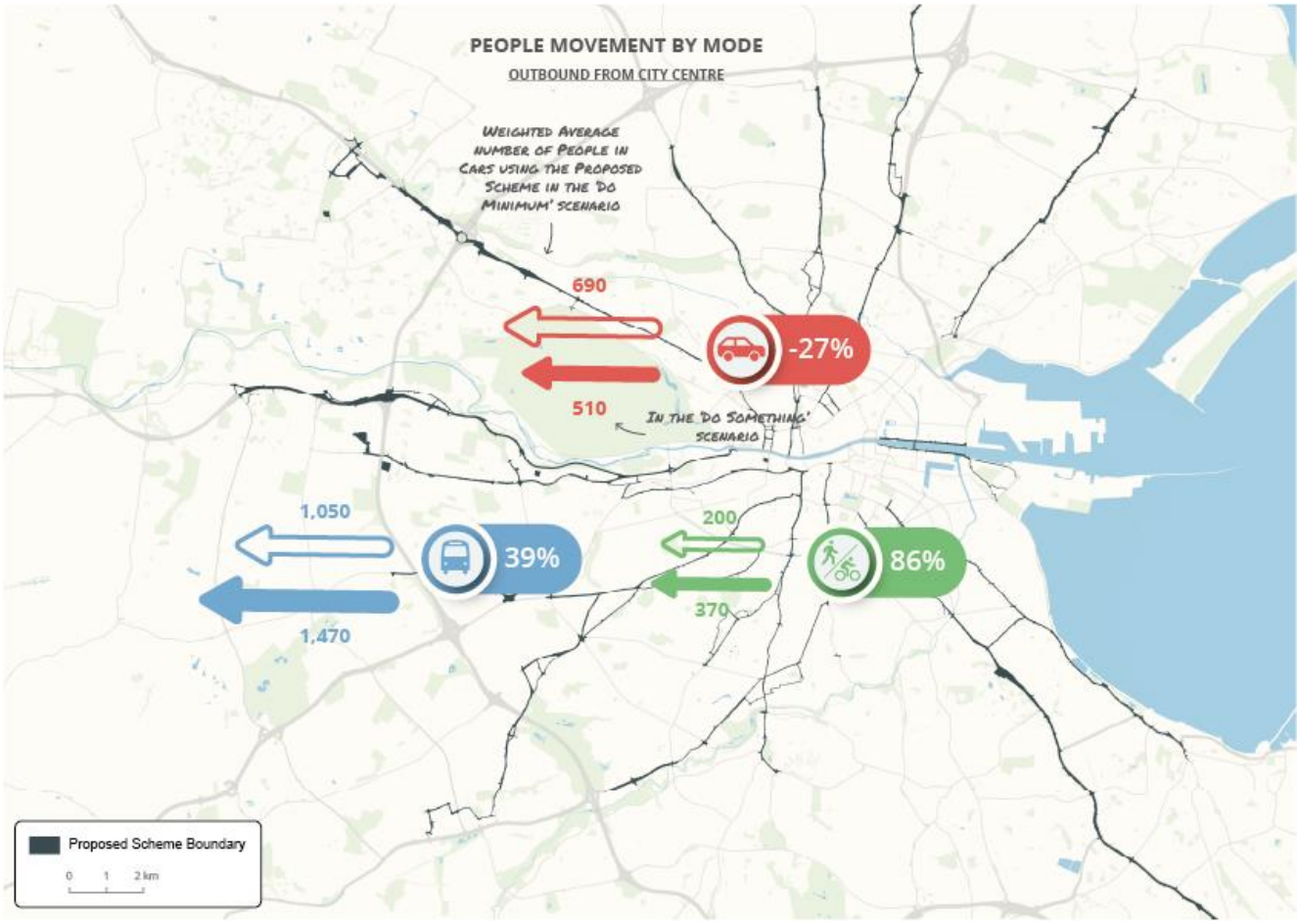

Diagram 7.8: Weighted Average People Movement by Mode during 2043 PM Peak Hour

As indicated in Diagram 7.8, on average across all Proposed Schemes, there is a predicted decrease of 27% in the number of people travelling via car, an increase of 39% in the number of people travelling via bus and an increase of 86% in the number of people walking and cycling along the Proposed Schemes during the PM Peak Hour in 2043.

Table 7.8 outlines the difference in modal split between the Do Minimum and Do Something (All Proposed Schemes) scenarios for each mode of transport in an outbound direction from the City Centre during the PM Peak Hour. The results indicate a 20% increase in total people moved as a result of the Proposed Schemes and a 46% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 7.8: Modal Shift of 2043 PM Peak Hour along Proposed Schemes

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Hourly Trips	Modal Split (%)	Hourly Trips	Modal Split (%)	Hourly Trips	Difference (%)
Outbound from the City Centre	PM Peak Period	General Traffic	694	36%	509	22%	-185	-27%
		Public Transport	1,058	54%	1,470	63%	413	39%
		Walking	86	4%	128	5%	42	49%
		Cycling	113	6%	241	10%	129	114%
		Combined Walking/Cycling	**199**	**10%**	**369**	**16%**	**171**	**86%**
		Sustainable Modes Total	**1,256**	**64%**	**1,840**	**78%**	**583**	**46%**
		Total (All modes)	**1,950**	**100%**	**2,349**	**100%**	**399**	**20%**

7.2.4.4 Movement of People by Bus

The following section presents the modelling outputs for the Movement of People by Bus. The results indicate that the improvements in bus priority infrastructure with the Proposed Schemes in place results in a substantial increase in Bus patronage during the Peak Hours and throughout the day.

Diagram 7.9 to Diagram 7.12 present the difference in passenger loadings (Do Something minus Do Minimum loadings) on the Proposed Schemes in 2028 and 2043, AM and PM Peak Hours.

7.2.4.4.0 2028 AM Peak Hour Bus Passengers

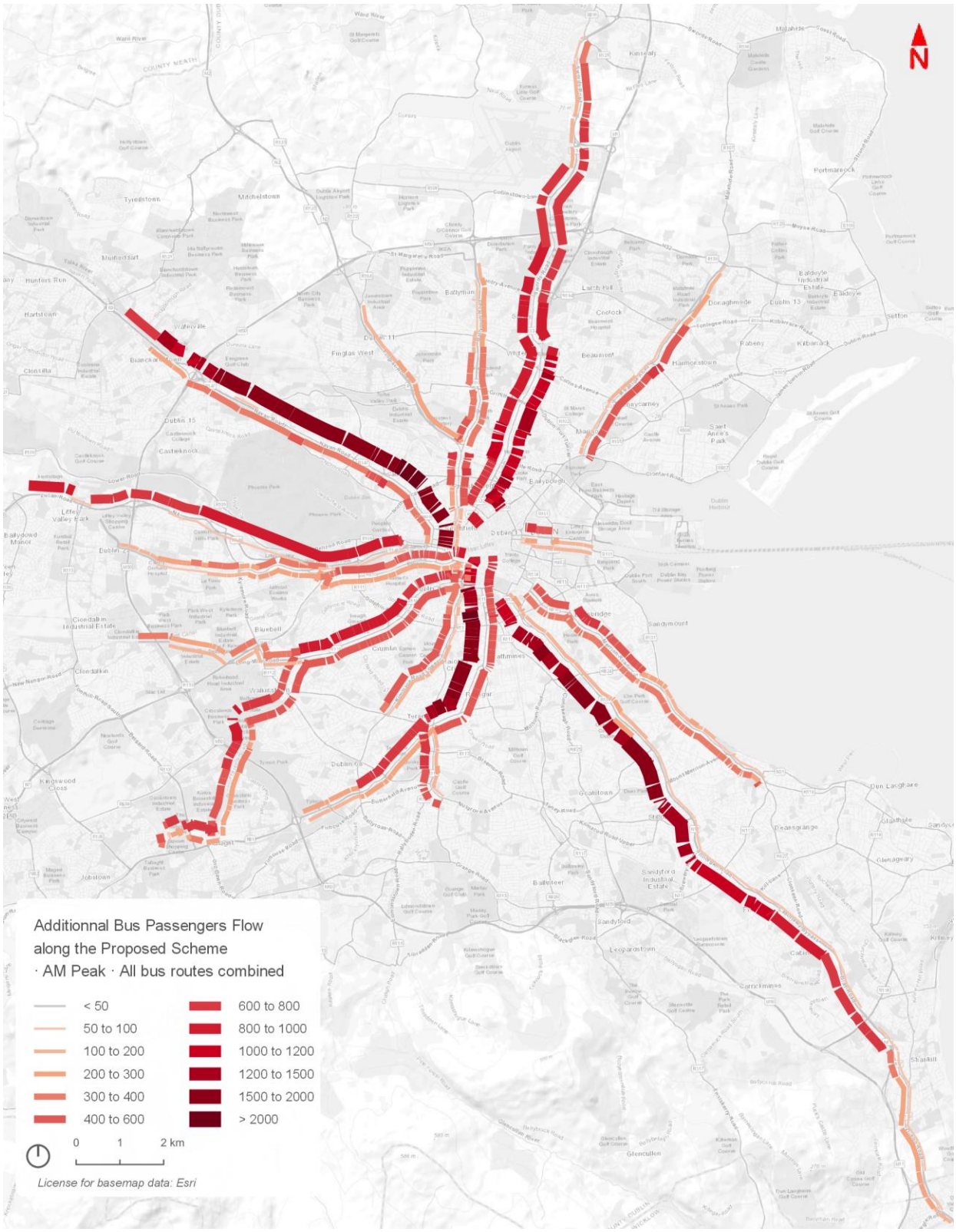

Diagram 7.9: AM Peak Hour Total Bus Passenger Flows Along the Proposed Schemes (All Bus Routes Combined)

As indicated in Diagram 7.9:, there is a high growth in bus patronage along all the Proposed Schemes in the AM Peak Hour. Some of the bigger increases occur in the inbound direction on the Blanchardstown to City Centre, the Rathfarnham to City Centre and the Bray to City Centre schemes where the loadings reach more than 2,000

additional passengers per hour compared to the Do Minimum scenario. The Bray to City Centre Scheme shows an increase of approximately 1,700 passengers in the inbound direction in the 2028 AM Peak Hour.

Since many bus services commence and end further away from the direct alignment of the Proposed Schemes, but still benefit from the improvements provided, an assessment has been undertaken to compare the total passengers boarding bus routes that use any part of the Proposed Scheme (including those stops not directly on the Proposed Scheme) in both 2028 and 2043 forecast years. Table 7.9 below displays the results for the 2028 AM Peak Hour for the Bray to City Centre Scheme as well as for all Proposed Schemes.

Table 7.9: 2028 AM Peak Hour Bus Boardings on Routes using the Proposed Schemes (inc. boarding at stops outside Proposed Schemes)

Scheme	Do Minimum	Do Something	Difference in Boardings	Difference (%)
Bray to City Centre Scheme	23,690	27,310	3,620	15.3%
All Schemes	85,990	101,760	15,770	18.3%

As shown above there will be a 15.3% increase in people boarding bus routes which use any part of the Bray Scheme during the AM Peak Hour. This represents an addition of 3,620 passengers.

There will be a 18.3% increase in people boarding bus routes which use any part of the Proposed Schemes, representing an additional 15,770 passengers due to the bus priority improvements.

7.2.4.4.1 2028 PM Peak Hour Bus Passengers

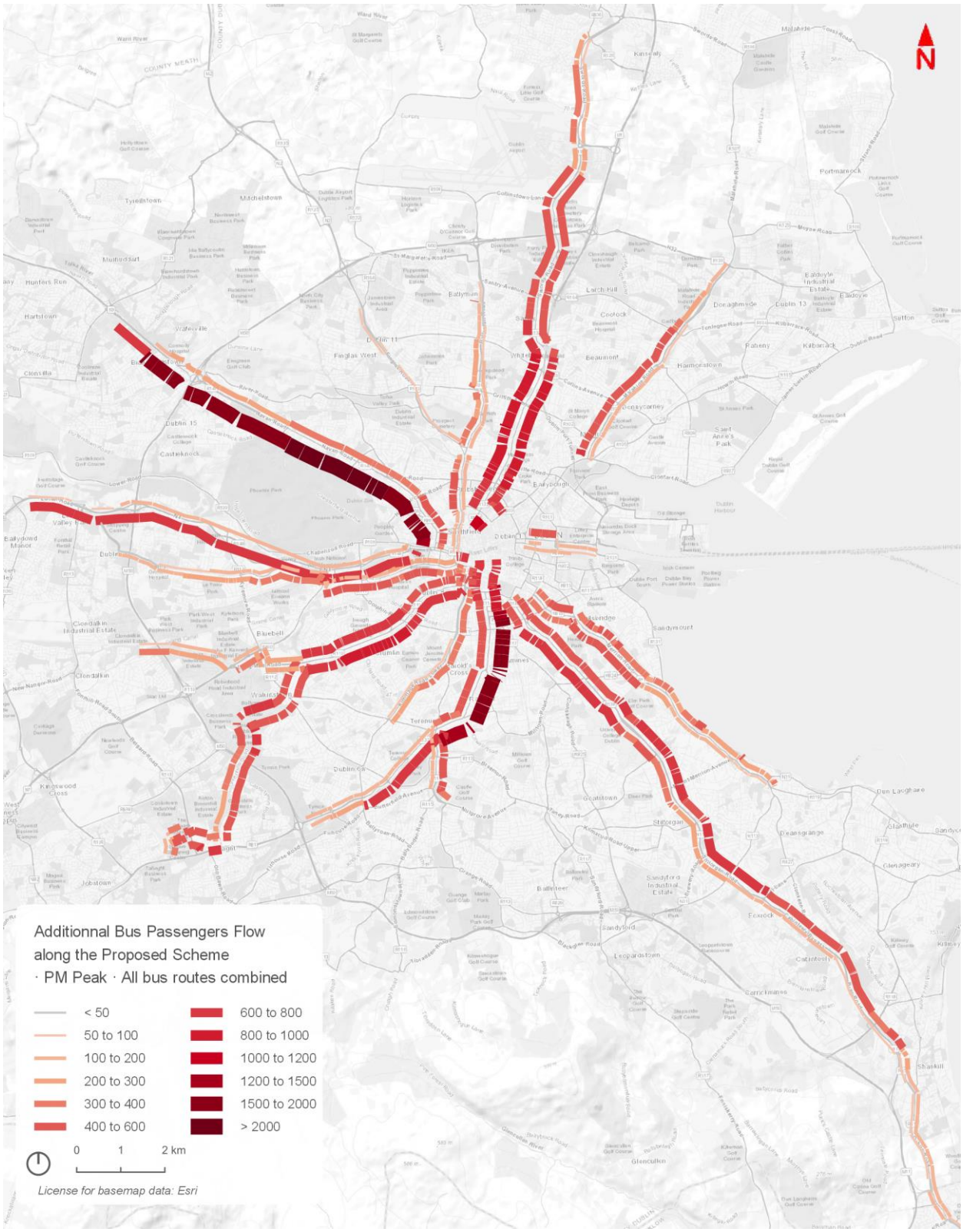

Diagram 7.10: PM Peak Hour Total Bus Passenger Flows Along the Proposed Schemes (All Bus Routes Combined)

As indicated in Diagram 7.10, there is a high growth in bus patronage along all the Proposed Schemes in the PM Peak Hour. Some of the bigger increases occur in the outbound direction on the Blanchardstown to City Centre and the Rathfarnham to City Centre where the loadings reach more than 2,000 additional passengers per hour

compared to the Do Minimum scenario. The Bray to City Centre Scheme shows an increase of approximately 700 passengers in the outbound direction.

Table 7.10 presents the total passengers boarding bus routes that use any part of the Proposed Scheme (including those stops not directly on the Proposed Scheme) in the 2028 PM Peak Hour for the Bray to City Centre Scheme as well as for all Proposed Schemes.

Table 7.10: 2028 PM Peak Hour Bus Boardings on Routes using the Proposed Schemes (inc. boarding at stops outside Proposed Schemes)

Scheme	Do Minimum	Do Something	Difference in Boardings	Difference (%)
Bray to City Centre Scheme	18,650	21,500	2,850	15.3%
All Schemes	71,280	85,170	13,890	19.5%

As shown in Table 7.10, there will be a 15.3% increase in people boarding bus routes which use any part of the Bray to City Centre Scheme during the PM Peak Hour. This represents an addition of 2,850 passengers

There will be a 19.5% increase in people boarding bus routes which use any part of the Proposed Schemes, representing an additional 13,890 passengers due to the bus priority improvements.

7.2.4.4.2 2043 AM Peak Hour Bus Passengers

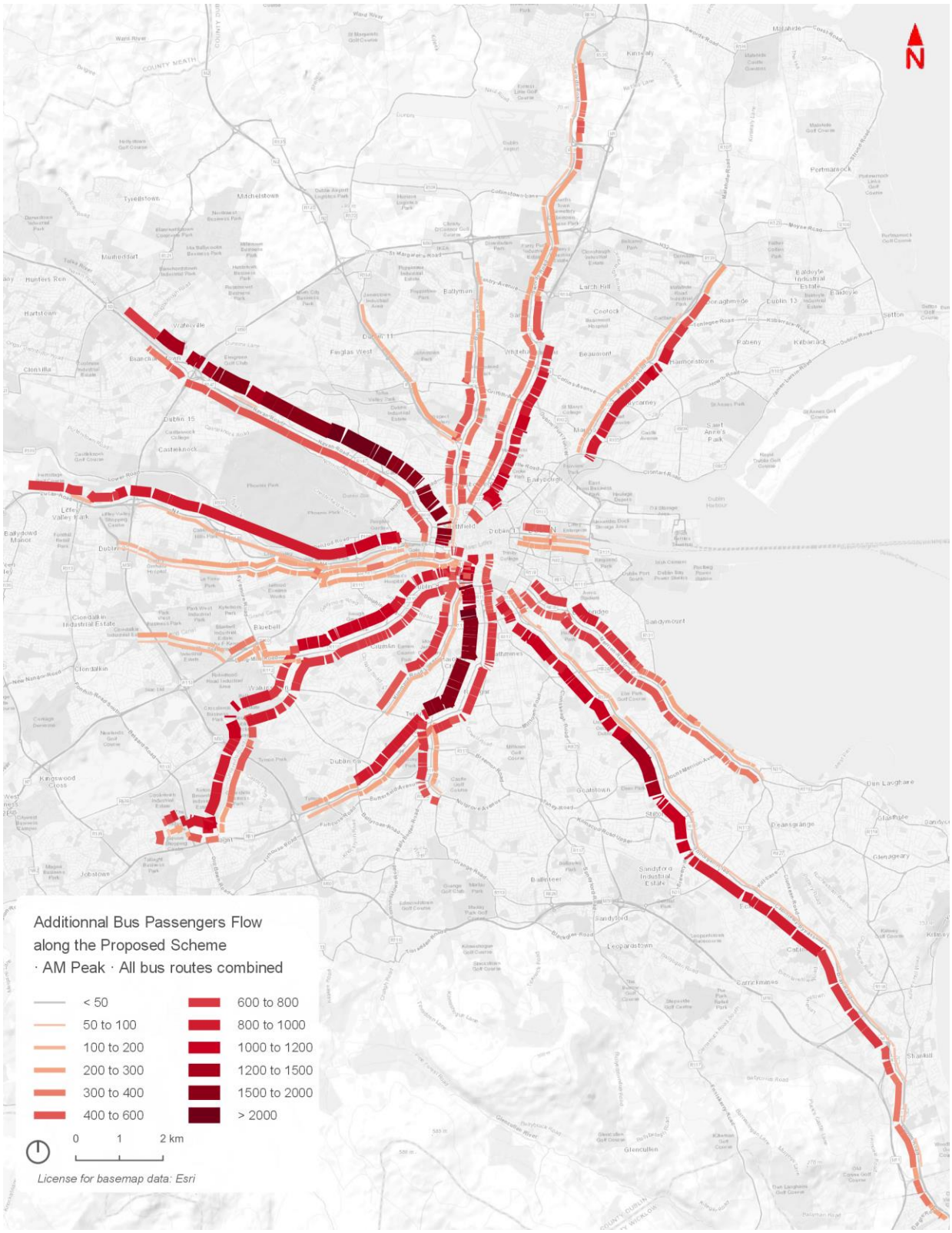

Diagram 7.11: AM Peak Hour Total Bus Passenger Flows Along the Proposed Schemes (All Bus Routes Combined)

As indicated in Diagram 7.11, there is a high growth in bus patronage along all the Proposed Schemes in the 2043 AM Peak Hour. Some of the bigger increases occur in the inbound direction on the Blanchardstown to City Centre and the Rathfarnham to City Centre where the loadings reach more than 2,000 additional passengers per

hour compared to the Do Minimum scenario. The Bray to City Centre Scheme shows an increase of approximately 1,300 passengers in the inbound direction.

Table 7.11 presents the total passengers boarding bus routes that use any part of the Proposed Scheme (including those stops not directly on the Proposed Scheme) in the 2043 AM Peak Hour for the Bray to City Centre Scheme as well as for all Proposed Schemes.

Table 7.11: 2043 AM Peak Hour Bus Boardings on Routes using the Proposed Schemes (inc. boarding at stops outside Proposed Schemes)

Scheme	Do Minimum	Do Something	Difference in Boardings	Difference (%)
Bray to City Centre Scheme	17,693	21,949	4,256	24.1%
All Schemes	95,030	118,550	23,520	24.8%

As shown in Table 7.11, there will be a 24.1% increase in people boarding bus routes which use any part of the Bray to City Centre Scheme during the AM Peak Hour. This represents an addition of 4,256 passengers in the AM Peak Hour.

There will be a 24.8% increase in people boarding bus routes which use any part of the Proposed Schemes, representing an additional 23,520 passengers due to the bus priority improvements.

7.2.4.4.3 2043 PM Peak Hour Bus Passengers

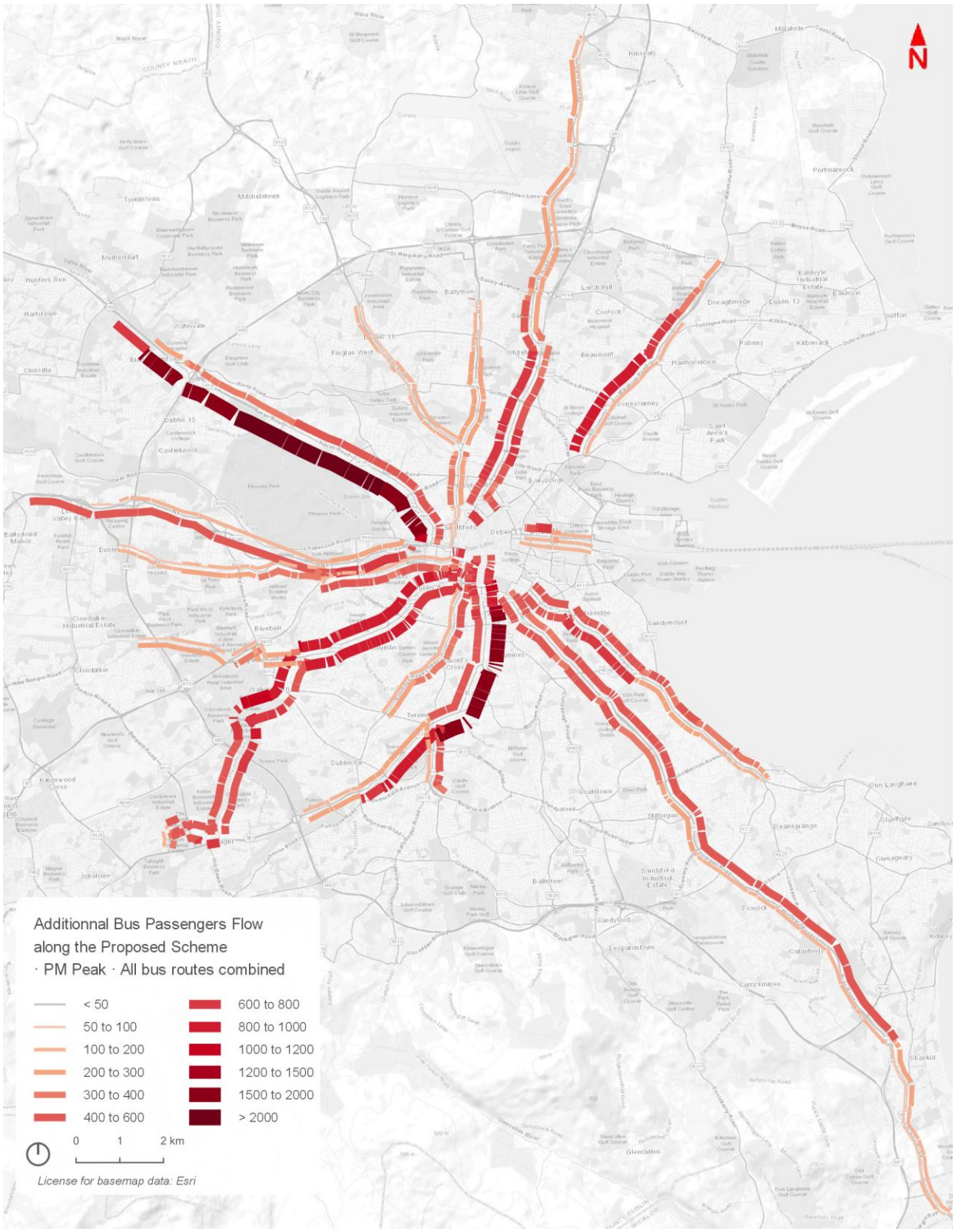

Diagram 7.12: PM Peak Hour Total Bus Passenger Flows Along the Proposed Schemes (All Bus Routes Combined)

As indicated in Diagram 7.12, there is a high growth in bus patronage along all the Proposed Schemes in the PM Peak Hour. Some of the bigger increases occur in the outbound direction on the Blanchardstown to City Centre and the Rathfarnham to City Centre where the loadings reach more than 2,000 additional passengers per hour

compared to the Do Minimum scenario. The Bray to City Centre Scheme shows an increase of approximately 600 passengers in the outbound direction.

Table 7.12 presents the total boardings on bus routes that use any part of the Proposed Scheme (including those stops not directly on the Proposed Scheme) in the 2043 PM Peak Hour for the Bray to City Centre Scheme as well as all Proposed Schemes.

Table 7.12: 2043 PM Peak Hour Bus Boardings on Routes using the Proposed Schemes (inc. boarding at stops outside Proposed Schemes)

Scheme	Do Minimum	Do Something	Difference in Boardings	Difference (%)
Bray to City Centre Scheme	19,083	22,046	2,962	15.5%
All Schemes	78,120	98,390	20,270	25.9%

As shown in Table 7.12 there will be a 15.5% increase in people boarding bus routes which use any part of the Bray to City Centre Scheme during the PM Peak Hour. This represents an addition of 2,963 passengers in the AM Peak Hour.

There will be a 25.9% increase in people boarding bus routes which use any part of the Proposed Schemes, representing an additional 20,270 passengers due to the bus priority improvements.

7.2.5 Integration with Other Public Transport Modes

The aim of the Proposed Scheme is to provide improved walking, cycling and bus infrastructure, which will enable and deliver efficient, safe, and integrated sustainable transport movement along the corridor. In tandem with this aim a key objective of the Works applicable to the Proposed Scheme is to:

- Improve accessibility to jobs, education and other social and economic opportunities through the provision of improved sustainable connectivity and integration with other public transport services.

The modelling suite has been used to assess the change in connectivity and integration with other public transport services and the following section presents this assessment based on the following metrics:

- Total Boardings by Public Transport (PT) Mode (including non-bus modes);
- Level of interchange with other public transport services; and
- Average Public Transport Networkwide Travel Speeds.

7.2.5.0 Passenger Boardings by Public Transport Mode

The following section presents the number of passenger boardings by each of the PT sub-modes (Rail, Luas, Bus and Metro) within the Study Area. The results are presented in Table 7.13 for the Do Minimum and Do Something scenarios for the 2028 and 2043 assessment years in the AM and PM Peak Hour periods.

Table 7.13: 2028 AM Peak Hour PT Boardings

Public Transport Mode	Do Minimum	Do Something	Difference in Boardings	Difference (%)
Rail	26,060	25,820	-240	-1%
Luas	25,930	25,070	-860	-3%
Bus	81,790	95,710	13,920	17%
Total	**133,780**	**146,600**	**12,820**	**10%**

As presented in Table 7.13 with the Proposed Schemes in place, there will be an estimated 10% more passenger boardings across all PT services and 17% more boarding on bus services in the AM Peak Hour. The improved bus infrastructure results in slight reductions in boardings on Rail and Luas services, which will help provide additional resilience for these modes to accommodate future travel demand growth.

Table 7.14: 2028 PM Peak Hour PT Boardings

Public Transport Mode	Do Minimum	Do Something	Difference in Boardings	Difference (%)
Rail	30,150	30,990	840	3%
Luas	21,520	20,740	-780	-4%
Bus	72,370	85,730	13,360	18%
Total	**124,040**	**137,460**	**13,420**	**11%**

As presented in Table 7.14 with the Proposed Schemes in place, there will be an estimated 11% increase in total passengers boarding PT services and 18% more boardings on buses services in the PM Peak Hour in 2028. The improved bus infrastructure results in a slight reduction in boardings on Luas services, which will help provide additional resilience for this mode to accommodate future travel demand growth in the PM peak period.

Table 7.15: 2043 AM Peak Hour PT Boardings

Public Transport Mode	Do Minimum	Do Something	Difference in Boardings	Difference (%)
Rail	33,070	36,200	3,130	9%
Luas	46,370	46,330	-40	0%
Bus	90,110	100,050	9,940	11%
Metro	18,700	18,730	30	0%
Total	**188,250**	**201,310**	**13,060**	**7%**

As presented in Table 7.15, with the Proposed Schemes in place, there will be a predicted 7% increase in total passengers boarding PT services and a 11% increase in boardings on bus services in the AM Peak Hour in 2043. The improved bus infrastructure results in negligible changes in boardings on Luas and MetroLink services. Rail boardings increase due to additional interchange between Rail and bus services

Table 7.16: 2043 PM Peak Hour PT Boardings

Public Transport Mode	Do Minimum	Do Something	Difference in Boardings	Difference (%)
Rail	36,200	34,700	-1,500	-4%
Luas	34,720	38,330	3,610	10%
Urban Bus	78,180	89,500	11,320	14%
Metro	12,660	11,680	-980	-8%
Total	**161,760**	**174,210**	**12,450**	**8%**

As presented in Table 7.16, with the Proposed Schemes in place, there will be an estimated 8% increase in total passengers boarding PT services and a 14% increase in boardings on bus services in the PM Peak Hour 2043. The improved bus infrastructure results in slight reductions in boardings on Rail and MetroLink services, which will help provide additional resilience for these modes to accommodate future travel demand growth. Luas boardings increase due to additional interchange between Luas and bus services. Luas boardings increase due to additional interchange between Luas and bus services.

7.2.5.0.0 Public Transport Interchange

To determine the impact the Proposed Schemes will have on the integration and complementarity between the different PT modes, the number of transfers between each PT modes (Bus, Rail, Luas and Metro) has been extracted from the modelling suite. The analysis compares the Do Minimum and Do Something in the AM Peak Hour period for each forecast year (2028, 2043).

Table 7.17: 2028 AM Peak Hour Transfers between PT Modes

	Do Minimum				Do Something			
To:	**Bus**	**Rail**	**Luas**	**Total**	**Bus**	**Rail**	**Luas**	**Total**
Bus	3,840	3,330	6,900	**14,070**	4,500	3,350	7,020	**14,870**
Rail	3,710	60	1,800	**5,570**	4,080	60	1,560	**5,700**
Luas	5,090	450	400	**5,940**	5,280	340	310	**5,930**
Total	**12,640**	**3,840**	**9,100**	**25,580**	**13,860**	**3,750**	**8,890**	**26,500**

As shown in Table 7.17 the total number of transfers between PT modes will increase by 4% from 25,580 in the Do Minimum scenario to 26,500 in the Do Something scenario, Transfers from Rail and Luas to buses will increase by 6% from 8,800 to 9,360 with the Schemes in place. This highlights the increased level of accessibility and transfer opportunities facilitated by the Proposed Schemes.

The Bray to City Centre Scheme does not have any direct interchange points with Luas, Rail or MetroLink stations.

The contents of Table 7.18 present the predicted AM Peak Hour transfers between each PT Mode (including Metrolink) in 2043.

Table 7.18: 2043 AM Peak Hour Transfers between PT Modes

	Do Minimum					Do Something				
To:	**Bus**	**Rail**	**Luas**	**Metro**	**Total**	**Bus**	**Rail**	**Luas**	**Metro**	**Total**
Bus	4,850	5,740	9,220	3,890	**23,700**	7,000	5,730	10,540	4,430	**27,700**
Rail	4,900	100	3,630	2,480	**11,110**	4,080	90	3,670	2,370	**10,210**
Luas	6,210	1,050	850	500	**8,610**	7,200	930	860	620	**9,610**
Metro	2,450	980	410	0	**3,840**	2,640	870	360	0	**3,870**
Total	**18,410**	**7,870**	**14,110**	**6,870**	**47,260**	**20,920**	**7,620**	**15,430**	**7,420**	**51,390**

As shown above, with the roll out of the GDA Strategy the level of interchange increases substantially in the period from 2028 to 2043 without the Proposed Schemes. The total number of transfers between PT modes is expected to increase by 9% from 47,260 in the Do Minimum scenario to 51,390 in the Do Something scenario (with the Proposed Schemes in place). Transfers to buses predicted to increase by 17% from 23,700 to 27,700. This highlights the increased level of accessibility and transfer opportunities facilitated by the Proposed Schemes.

7.2.5.1 Average Public Transport Network Wide Travel Speeds

In order to assess the travel time and integration efficiencies provided by the Proposed Schemes, an average per passenger PT network-wide travel speed metric has been extracted from the modelling suite. The metric considers the average speed across all public transport modes for the entire Study Area which covers all Proposed Schemes.

Table 7.19: 2028 AM Peak Hour Average Journey Speed per PT Passenger (km/h)

Scenario	Do Minimum	Do Something	Speed Difference (%)
All Schemes Scenario	21.13	23.08	+9.2%

As presented in Table 7.19, with all Proposed Schemes operational, the average speed per PT passenger is expected to grow by 9.2%, representing a substantial increase in the average travel speeds for all PT users in 2028.

Table 7.20: 2043 AM Peak Hour Average Journey Speed per PT Passenger (km/h)

Scenario	Do Minimum	Do Something	Speed Difference (%)
All Schemes Scenario	21.03	22.85	+8.7%

As presented in Table 7.20, with all Proposed Schemes operational, the average speed per PT passenger is expected to grow by 8.7%, representing a substantial increase in the average travel speeds for all PT users in 2043.

7.2.1 General Traffic

7.2.1.1 Overview

The Proposed Scheme and the other proposed Core Bus Corridor schemes aim to provide an attractive alternative to the private car and promote a modal shift to public transport, walking and cycling. As shown in the preceding sections, the transport modelling indicates, that there will be a significant level of modal shift from car to more sustainable modes of travel. It is anticipated there will be a reduction in general traffic (car) trips of approximately 13,000 and 25,000 on a typical weekday (7am-7pm) in 2028 and 2043 respectively. This represents the equivalent of the removal of up to 78km of traffic queues in 2028 and 150km by 2043 across the Dublin road network. For context, the queue reduction corresponds to approximately twice the length of the M50 motorway in 2028 and almost four times the length of the M50 in 2043. This reduction in car demand facilitated by the schemes will provide significant opportunities to manage the road network more effectively and promote greater movement of people by sustainable modes.

It is recognised, however, that there will be an overall reduction in operational capacity for general traffic along the direct study area of each scheme given the proposed changes to the road layout and the rebalancing of priority to walking, cycling and bus. This reduction in operational capacity for general traffic along the Proposed Scheme (and the other Proposed Core Bus Corridor Schemes) will likely create some level of trip redistribution onto the surrounding road network.

When all Core Bus Corridor schemes are operational, however, more people will be able to move in a more effective and efficient manner by sustainable modes.

To demonstrate this effect, a scenario has been modelled whereby the Proposed Scheme as well as all other proposed Core Bus Corridor schemes are operational in both 2028 and 2043.

7.2.1.2 Assessment Considerations

It should be noted that the Do Minimum and Do Something scenarios assume that travel behaviour will remain broadly consistent over the assessment period (2028-2043) and that car demand data used for this assessment, represents a reasonable worst-case scenario. It is anticipated, however, that societal trends in the medium to long term may reduce car demand further due to the ongoing changes to travel behaviour which would include further shifts towards sustainable travel; flexibility in working arrangements brought on following COVID-19 restrictions; and delayed car ownership trends that are emerging.

Goods vehicles

The assessment also assumes that goods vehicles (HGVs and LGVs) continue to grow in line with forecasted economic activity with patterns of travel remaining the same. For example, the assessment assumes a 45% and 77% increase in goods traffic versus the base year in 2028 and 2043 respectively. This is considered a very conservative assumption. It should be noted, however, that the Climate Action Plan (CAP) (2023) includes reference to DoT's Ireland's Road Haulage Strategy 2022-2031 (RHS)(2023) which will seek to further integrate smart technologies in logistics management and may include the regulation of delivery times as far as practicable to off-peak periods to limit traffic congestion in urban areas. Ireland's Road Haulage Strategy 2022-2031 outlines measures to manage the increase in delivery and servicing requirements as the population grows. These measures may include the development of consolidation centres to limit the number of 'last-mile' trips made by larger goods vehicles with plans for higher use of smaller electric vans or cargo bikes for 'last-mile' deliveries in urban areas.

Cycling

The Proposed Scheme (and the other proposed Core Bus Corridor Schemes) will facilitate a step change in the level of segregated cycling provision in comparison with existing conditions along the entire length of the corridors.

The representation of improvements to cycling infrastructure in the transport models follows a standard approach and are appropriate for the strategic nature of the model. Improvements are applied by way of an increase in cycling speed on the network where the improvements have been made, as well as new connectivity by way of new links as part of the proposals. Modelling cycling infrastructure improvements using speeds is a standard approach that means an increase in cycling mode share can be obtained through a reduction in the modelled cost of a journey by bicycle relative to other modes. This has been applied as part of the modelling of the Proposed Scheme to represent improvements with a cycling mode share of approximately 5-7% achieved. The transport modelling undertaken, is therefore conservative in terms of the predicted cycling mode share. This has the effect that predicted traffic levels are on the higher and conservative side in relation to a potential future receiving environment. This is appropriate for TIA purposes as a reasonable worst-case has been assessed in terms of traffic levels on the road network.

It should be noted, however, that the Proposed Scheme (and the other proposed Core Bus Corridor schemes) has been designed to cater for much higher levels of cycling uptake and the significant segregation and safety improvements to walking and cycling infrastructure. This will provide the opportunity for a significant increase in the movement of people travelling sustainably along the corridor and will therefore cater for higher levels of future population and employment growth and support higher cycling mode share levels, which would otherwise not be achieved in the absence of the proposals. The background environment changes with regards to cycling segregation and safety improvements will encourage more people to cycle in greater numbers.

Demand Management

The GDA Transport Strategy, of which the Proposed Scheme (and the other proposed Core Bus Corridor Schemes) are a key element of, aims to provide for the efficient, effective and sustainable movement of people and goods and to accommodate future travel growth in a managed and balanced way. Increased public transport provision, coupled with enhanced cycling and walking facilities in the urban areas, will enable a transition to more sustainable travel modes for many people in addition to providing the means to cater for much of the increased travel demand. However, without complementary demand management measures the full benefits of the Strategy will not be achieved.

The Proposed Scheme (and the other proposed Core Bus Corridor schemes) will be an enabler to allow for further reductions in car mode share with corresponding transfer to public transport, walking and cycling modes. Sustainable modes capacity is significantly enhanced by the Core Bus Corridors which in turn will support demand management measures which could be applied to meet climate emission targets. This growth in sustainable mode share cannot be accommodated in the absence of the Proposed Scheme (and the other proposed Core Bus Corridor schemes). A greater increase in sustainable mode share can be accommodated by the Core Bus Corridors which would in turn lead to further reductions in traffic levels, beyond those reported in this assessment.

7.2.1.3 General Traffic Flow Changes

To determine the impact that the Proposed Scheme (in combination with the other proposed Core Bus Corridor schemes) will have in terms of general traffic redistribution, the LAM Opening Year (2028) and Design Year (2043) model results have been used to identify the difference in general traffic flows between the Do Minimum and Do Something scenarios i.e. with and without all proposed Core Bus Corridor schemes in place.

The changes in traffic flows have been presented with reference to TII's Traffic and Transport Assessment Guidelines (May 2014) i.e., traffic redistribution resulting in an increase or decrease above 100 combined flows (i.e. in a two-way direction) along roads in the vicinity of the Core Bus Corridors in the AM and PM Peak Hours are presented. The threshold aligns with an approximate 1 vehicle per minute increase or decrease per direction on any given road. This is a very low level of traffic change on any road type and ensures that a robust assessment of the changes in traffic levels are presented.

Diagram 7.13 and Diagram 7.14 below illustrate the difference in traffic flows (Do Minimum vs Do Something) on roads in the AM Peak Hour for the 2028 Opening Year and 2043 Design Year with the Proposed Scheme and all other proposed Core Bus Corridor schemes in place. The diagrams are extracts from Figure 6.13 and 6.16 in TIA Appendix 3 (Maps). Reductions in traffic flows are indicated by the blue lines with increases in traffic flow indicated by the red lines.

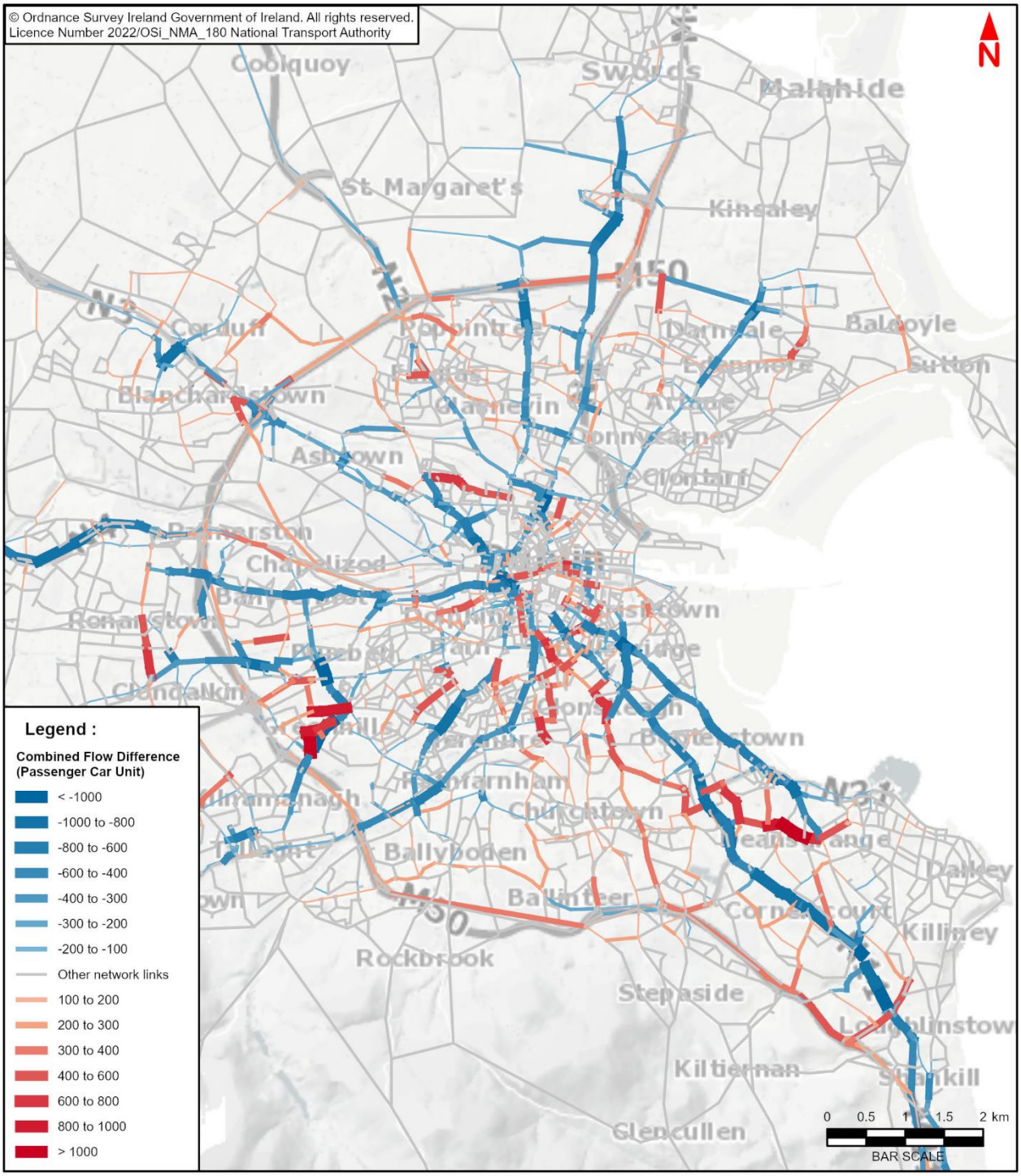

Diagram 7.13: Flow Difference on Road Links (Do Minimum vs. Do Something), AM Peak Hour, 2028 Opening Year – Cumulative Scenario

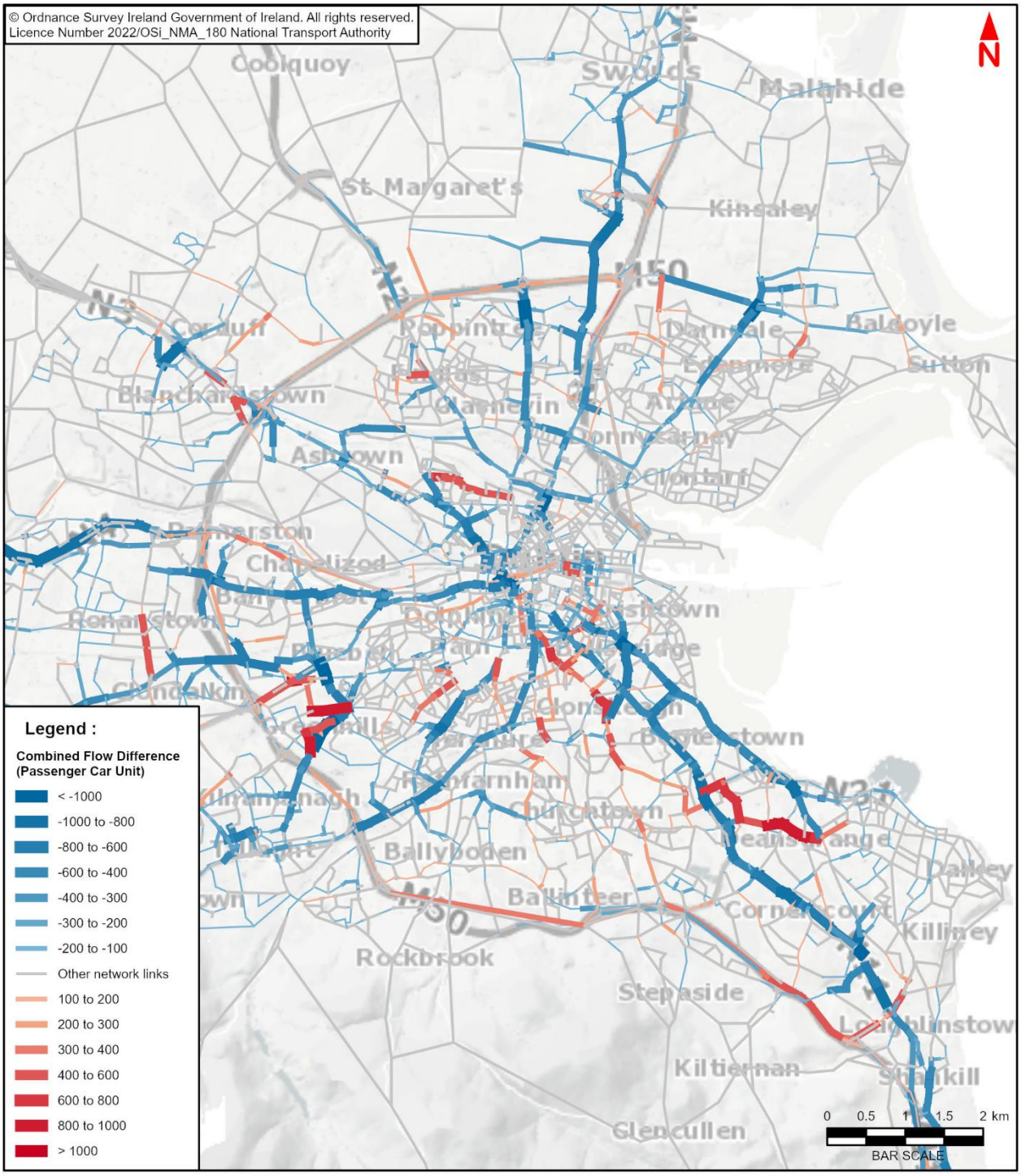

Diagram 7.14: Flow Difference on Road Links (Do Minimum vs. Do Something), AM Peak Hour, 2043 Design Year – Cumulative Scenario

Diagram 7.15 and Diagram 7.16 below illustrate the difference in traffic flows (Do Minimum vs Do Something) on roads in the PM Peak Hour for the 2028 Opening Year and 2043 Design Year with the Proposed Scheme and all other proposed Core Bus Corridor schemes in place. The maps are extracts from Figure 6.14 and 6.16 in TIA Appendix 3 (Maps). Reductions in traffic flows are indicated by the blue lines with increases in traffic flow indicated by the red lines.

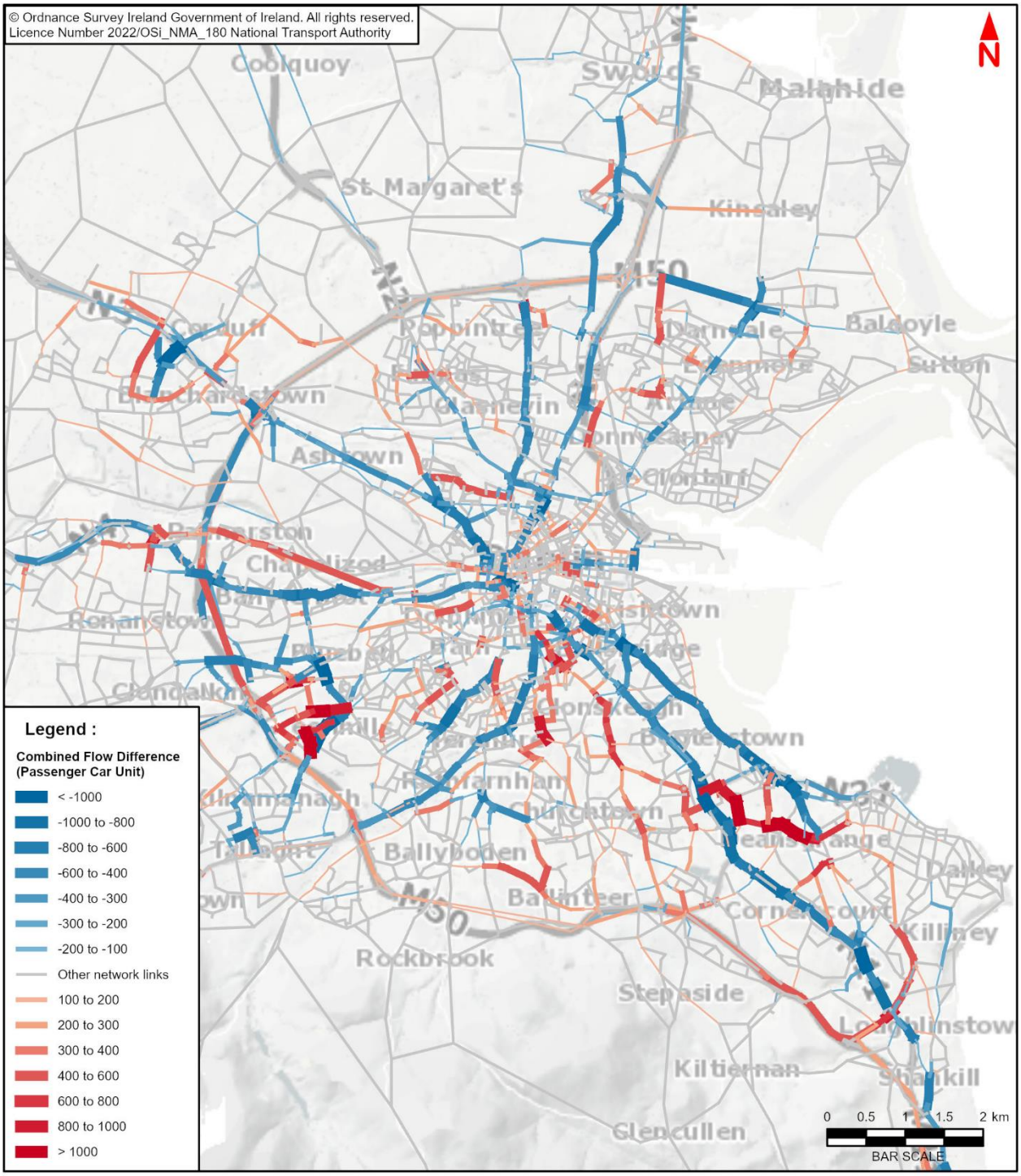

Diagram 7.15: Flow Difference on Road Links (Do Minimum vs. Do Something), PM Peak Hour, 2028 Opening Year – Cumulative Scenario

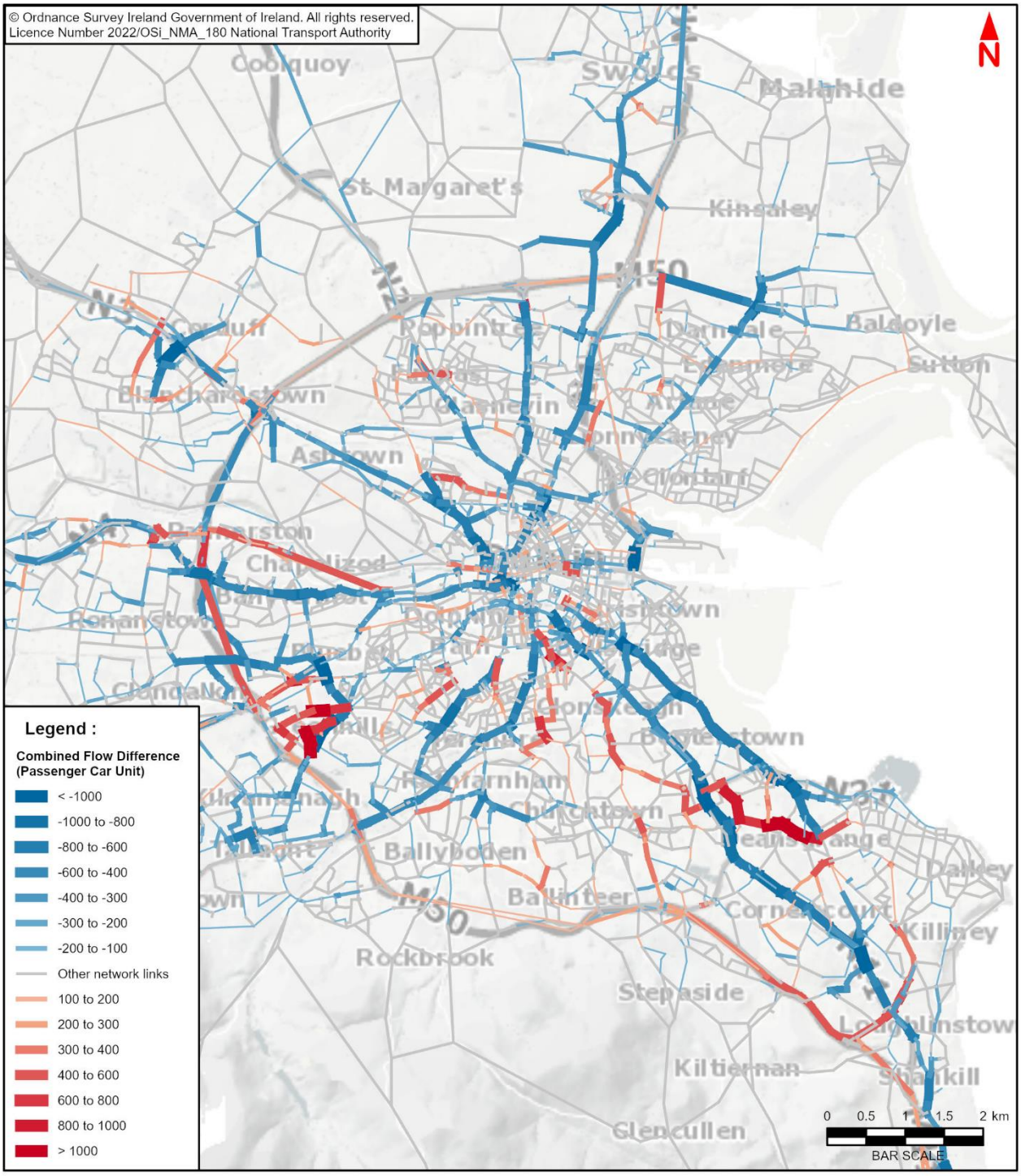

Diagram 7.16: Flow Difference on Road Links (Do Minimum vs. Do Something), PM Peak Hour, 2043 Design Year – Cumulative Scenario

7.2.1.4 Cumulative Traffic Flow Summary

As can be seen in the diagrams above, the level of traffic redistribution is shown to reduce between the Opening and Design years as further modal shift from car to sustainable modes occurs during the period, facilitated by the further roll out of the GDA Transport Strategy measures and, importantly, the sustainable mode capacity provided Core Bus Corridor schemes. As mentioned previously the implementation of all Core Bus Corridor schemes will facilitate the ability of the network to accommodate significant levels of additional travel growth by sustainable modes. It should be noted that higher levels of modal shift from car to sustainable modes are likely to occur either

during or before this period due to the requirement to achieve, for example, 2023 Climate Action Plan (CAP) (DCCAE 2021) targets with further policy measures, likely to be implemented. As the specifics of these policy measures have yet to be determined they are, therefore, not included in the transport modelling to ensure a conservative and reasonable worst-case assessment of effects.

7.2.2 People Movement – Cumulative Impact Summary

The cumulative impact for the movement of People Movement by sustainable modes with the Proposed Schemes in place has been appraised as a qualitative assessment, taking into account the changes in mode share, demand changes by mode along the Proposed Scheme (and the other Core Bus Corridors) as well as bus usage and integration with other public transport modes, as presented above. It is acknowledged that a certain level of residual traffic redistribution is likely, however, these increases are largely constrained to new road infrastructure (as part of the Proposed Schemes) and regional and distributor roads that are designed to cater for high volumes of traffic. The Proposed Schemes in combination have been adjudged to deliver a **High positive** overall impact on People Movement by sustainable modes. The Proposed Schemes can be shown to deliver significant improvements in People Movement by sustainable modes along the direct Proposed Scheme alignments, particularly by bus and cycling, with reductions in car mode share due to the enhanced sustainable mode provision. The Proposed Schemes provide for enhanced integration and efficiencies for all public transport modes by facilitating substantial increases in public transport average network wide travel speeds.

8. Summary and Conclusions

The aim of the Proposed Scheme is to provide enhanced walking, cycling and bus infrastructure on this key access corridor in the Dublin region, which will enable and deliver efficient, safe, and integrated sustainable transport movement along the corridor. The objectives of the CBC Infrastructure Works, applicable to the Traffic and Transport assessment of the Proposed Scheme, are to:

- Enhance the capacity and potential of the public transport system by improving bus speeds, reliability and punctuality through the provision of bus lanes and other measures to provide priority to bus movement over general traffic movements;
- Enhance the potential for cycling by providing safe infrastructure for cycling, segregated from general traffic wherever practicable;
- Support the delivery of an efficient, low carbon and climate resilient public transport service, which supports the achievement of Ireland's emission reduction targets;
- Enable compact growth, regeneration opportunities and more effective use of land in Dublin, for present and future generations, through the provision of safe and efficient sustainable transport networks;
- Improve accessibility to jobs, education and other social and economic opportunities through the provision of improved sustainable connectivity and integration with other public transport services; and
- Ensure that the public realm is carefully considered in the design and development of the transport infrastructure and seek to enhance key urban focal points where appropriate and feasible.

The Proposed Scheme, from Bray to the city centre, comprises the development of improved bus priority along the entire route. This TIA provides a robust assessment of the scheme through qualitative assessment and quantitative analysis using a suite of multi-modal transport modelling tools.

During the construction phase, the Proposed Scheme will have temporary **Low Negative** impacts to pedestrian bus access and parking and loading.

The Proposed Scheme will have temporary **Medium Negative** impacts on cycle access. Where cycle tracks are affected by construction, a safe route will be provided past the work area, and where practicable, provisions for matching existing facilities for cyclists will be made.

The impact on general traffic is anticipated to be a **Medium Negative** and temporary impact due to the short-term nature of any restrictions. It is anticipated that traffic flows along the scheme will to be maintained in both directions. There may be a requirement for some localised temporary lane closures for short durations of the daytime and night-time. Access for general traffic to existing residential and commercial units immediately adjacent to the Proposed Scheme is to be accommodated throughout the Construction Phase.

The impact of construction traffic is anticipated to result in a **Medium Negative** and temporary impact due to the low numbers of vehicles anticipated which are and below the thresholds set out in the Transport Assessments Guidelines.

Summary of Construction Phase Predicted Impacts

Assessment Topic	Effect	Predicted Impact
Pedestrian Access	Restrictions to pedestrians along Proposed Scheme.	Low Negative and Short-term
Cycling Access	Restrictions to cyclists along Proposed Scheme	Medium Negative and Short-term
Bus Access	Restrictions to public transport along Proposed Scheme.	Low Negative and Short-term
Parking and Loading	Restrictions to parking / loading along Proposed Scheme.	Low Negative and Short-term
General Traffic	Restrictions to general traffic along Proposed Scheme	Medium Negative and Short-term
	Additional construction traffic flows upon surrounding road network	Medium Negative and Short-term

During the Operational Phase, the Proposed Scheme will deliver positive impacts in terms of People Movement, pedestrian, cycling and bus infrastructure. These improvements will help to provide an attractive alternative to the private car and promote a modal shift to walking, cycling and public transport, allowing for greater capacity along

the corridor to facilitate the movement of people. Some negative impacts for parking / loading availability are anticipated. The assessment demonstrates that the Proposed Scheme supports travel by sustainable modes and that the surrounding road network has the capacity to accommodate the associated traffic and transport impacts.

This TIA demonstrates that the Proposed Scheme results in the following impacts:

- **Pedestrian Infrastructure:** The Proposed Scheme consists of measures to enhance the existing pedestrian infrastructure along the direct study area. A Level of Service (LoS) junction assessment has been undertaken using a set of five criteria to determine the impact that the Proposed Scheme has for pedestrians. The assessments demonstrate in the Do Minimum scenario, 72% of the junctions assessed had LoS ratings of D or below, 23% had a C rating, 4% had a B rating and 1% had an A rating. In the Do Something scenario, i.e. following the development of the Proposed Scheme, 82% of the assessed junctions had the highest A / B LoS ratings, 16% had C ratings and 2% had D ratings. The improvements to the quality of the pedestrian infrastructure will be **Medium Positive** in all Sections along the Proposed Scheme and a **High Positive** at the proposed UCD Bus Interchange;
- **Cycling Infrastructure:** The Proposed Scheme also consists of measures to enhance the existing cycling infrastructure along the direct study area. A LoS assessment was undertaken using an adapted version of the NTA's National Cycle Manual Quality of Service (QoS) Evaluation criteria. The assessments demonstrate in the Do Minimum scenario, 15% of the route sections assessed had LoS ratings of D, 44% had a C rating, 37% had a B rating and 4% had an A rating.

  In the Do Something scenario, 4% of the assessed route sections had an A+ rating, 26% had an A rating, 52% had a B rating, 8% had C ratings and 11% had D ratings. The potential improvements to the quality of the cycling infrastructure will be **Low Positive** in Sections 1, 2 and 4 and **Negligible** in Section 3. A **High Positive** impact to cycling infrastructure is anticipated at the proposed UCD Bus Interchange;
- **Bus Infrastructure:** A qualitative impact assessment has been undertaken based on the provision of bus priority, pedestrian accessibility and changes to the bus stop facilities. The results of the assessment demonstrate that the improvements to the quality of the bus infrastructure will be **Medium Positive** in Sections 1 and 2 , **Low Positive** in Section 3 and a **High Positive** in Section 4. A **High Positive** impact to bus infrastructure is anticipated at the proposed UCD Bus Interchange;
- **Parking and Loading:** A qualitative impact assessment has been undertaken of the Proposed Scheme impacts on the existing parking and loading. The results of the assessment demonstrate that the changes to the parking and loading provision will result in an overall loss of 214 spaces (-94 spaces in Section 1, -84 spaces in Section 2, of which -82 spaces are proposed at the UCD Bus Interchange and -46 spaces in Section 4). Given the nature of the loss in parking and the availability of alternative spaces in the indirect study area, the impact is expected to be **Medium Negative** in Sections 1 and 4, **Low Negative** in Section 2 (including at the UCD bus interchange) and **Negligible** in Section 3;
- **People Movement:** Given the proposed amendments to the pedestrian, cycling, bus and parking / loading infrastructure outlined above, the Proposed Scheme will have greater capacity to facilitate movement of people travelling along the corridor. A quantitative impact assessment has been undertaken using outputs from the NTA's ERM and LAM, comparing the Do Minimum and Do Something peak hour scenarios for each forecast year (2028, 2043).

  The results of the assessment demonstrate that there will be an increase in the number of people travelling along the Proposed Scheme by sustainable modes of 44% and 21% during the 2028 AM and PM Peak Hours respectively. During the 2043 scenario there will be an increase in the number of people travelling along the Proposed Scheme by sustainable modes of 22% and 2% during the AM and PM Peak Hours respectively.

  The analysis also shows that there will be an increase of 9.3% and 8.9% in passengers boarding buses during the 2028 AM and PM Peak Hours respectively. During the 2043 scenario there will be an increase in 6.7% and 6.1% of passengers boarding buses during the AM and PM Peak Hours respectively. Overall, it is adjudged that the Proposed Scheme will have a **High Positive** on the sustainable movement of people along the corridor;
- **Bus Network Performance Indicators:** A micro-simulation modelling assessment has been developed and network performance indicators established for bus operations along the 'end to end' corridor. The results of the assessment demonstrate that the total bus journey times on all modelled bus services will improve by between 8% and 19% during the AM and PM Peak hours of the 2028 Opening Year and 2043 Design Year. Based on the AM and PM peak hours alone, this equates to approximately **10 hours of savings in 2028 and in 2043**, when compared to the Do Minimum combined across all buses. On an annual basis this equates to over 6,000 hours of bus vehicle savings in 2028 and in 2043, when

considering weekday peak periods only. Journey time variation and reliability are shown to improve in all Do Something scenarios compared to the Do Minimum. Overall, it is anticipated that the improvements to the network performance indicators for bus users along the Proposed Scheme will be a **High Positive** impact;

- **General Traffic Network Performance Indicators:** There will be an overall reduction in operational capacity for general traffic along the direct study area, given the proposed infrastructural changes to the existing road layout outlined above. This reduction in operational capacity for general traffic will create some level of traffic redistribution from the Proposed Scheme onto the surrounding road network.

  The LAM Opening Year 2028 model results were used to identify the impact in traffic flows between the Do Minimum and Do Something scenarios. A reduction in general traffic flows along a road link has been described as a positive impact to the environment. An increase in general traffic flows along a road link has been described as a negative impact to the environment. Reference has been given to TII's Traffic and Transport Assessment Guidelines as an indicator for best practice, to determine the key road links that require further traffic analysis due to the increase in traffic. Operational capacities were extracted from the LAM at the associated junctions of the key road links to identify the impact that the Proposed Scheme will have on the Volume / Capacity ratios. The results are presented in terms of the significance of the impact to the V / C ratio for each junction based on its sensitivity and magnitude of impact.

  The results of the assessment demonstrate that the surrounding road network has the capacity to accommodate the redistributed general traffic as a result of the Proposed Scheme. The majority of assessed junctions that required further traffic analysis have V / C ratios that are broadly similar before and after the Proposed Scheme implementation;

- **Network Wide Performance Indicators:** Given the impacts to the traffic conditions outlined above, there will be a knock-on effect to the operational efficiency of the road network beyond the direct and indirect study areas. A quantitative impact assessment has been undertaken using outputs from the NTA's ERM and LAM to determine the conditions to queuing, travel times, travel distances and network speeds during the Do Minimum and Do Something scenarios. The results of the assessment demonstrate that the impacts to the network performance indicators range between -2.2% to +6.3% and will therefore have a **Negligible impact**; and

- **Cumulative Assessment**: In general, total trip demand (combining all transport modes) will increase into the future in line with population and employment growth. A greater share of the demand will be by sustainable modes (Public transport, Walking, Cycling) as facilitated by the GDA Strategy implementation.

  The analysis indicates that the 12 BusConnects Proposed Schemes in place, there will be a high positive impact on sustainable mode share. The schemes will prevent any increase in private car traffic within the study area and will instead result in a reduction in car trips below 2020 levels.

  In the 2028 Opening Year scenario, it is estimated that for people travelling within the 500m catchment area (including City Centre) there will be a 12% increase in public transport trips, 2% decrease in general traffic trips (i.e. motorists) and a 14% increase in cycling trips in the AM Peak Hour and a 12% increase in public transport, 3% decrease in general traffic and a 12% increase in cycling trips each day (7am-7pm). In the 2043 Design Year scenario, it is estimated that for people travelling within the 500m catchment area (including City Centre) there will be a 6% increase in public transport trips, 6% decrease in general traffic trips (i.e. motorists) and a 10% increase in cycling trips in the morning peak hour and a 7% increase in public transport, 7% decrease in general traffic and a 11% increase in cycling trips each day (7am-7pm).

  General traffic levels reduce more in 2043 than when compared to 2028 due to the increased level of additional non-bus public transport infrastructure and services (MetroLink, Luas extensions and DART+ from the GDA Strategy) in tandem with the road capacity reduction measures as part of the Proposed Scheme leading to increased usage on all public transport modes.

  The modelling outputs for the 2028 Cumulative Opening Year scenario demonstrate that there is a high growth in bus patronage along all the Proposed Schemes in the AM Peak Hour. The bigger increases occur in the inbound direction on the Blanchardstown to City Centre, the Rathfarnham to City Centre and the Bray to City Centre schemes where the loadings reach more than 2,000 additional passengers per Hour compared to the Do Minimum scenario.

  In the 2028 Opening Year AM Peak Hour scenario with the Proposed Schemes in place, there will be an estimated 10% more passenger boardings across all public transport services and 17% more boardings on bus services. In the 2028 Opening Year PM Peak Hour scenario with the Proposed

Schemes in place, there will be an estimated 11% increase in total passengers boarding Public transport services and 18% more passengers boarding buses services.

In the 2043 Design Year AM and PM Peak Hour scenarios, increase in total passengers boarding all public transport services will be 7% and 8% respectively, and the increase in passengers boarding bus services will increase by 11% and 14% respectively.

Table 8.1 presents a summary of the predicted impacts of the Proposed Scheme during the Operational Phase.

Table 8.1: Summary of Predicted Operational Phase Impacts

Assessment Topic	Effect	Predicted Impact
Pedestrian Infrastructure	Improvements to the quality of the pedestrian infrastructure along the Proposed Scheme.	Medium to High Positive
Cycling Infrastructure	Improvements to the quality of the cycling infrastructure along the Proposed Scheme.	Low to High Positive
Bus Infrastructure	Improvements to the quality of the bus infrastructure along the Proposed Scheme.	Low to Medium Positive
Parking and Loading	A total loss of 88 parking / loading spaces along the Proposed Scheme.	Negligible to Low Negative
People Movement	Increases to the total number of people travelling through the Proposed Scheme.	High Positive
Operational Impacts for Bus Passengers and Operators	Improvements to the network performance indicators for bus users along the Proposed Scheme.	High Positive
General Traffic Network Performance Indicators	Reduction in general traffic flows along the Proposed Scheme.	Medium Positive
	Redistributed general traffic along the surrounding road network in the indirect study area as a result of the reduction of reserve capacity along the Proposed Scheme.	Medium Negative
	Deterioration to the network-wide queuing capacity, travel times, travel distances and average network speeds beyond the direct and indirect study areas	Negligible
Cumulative Impact	Higher mode share for sustainable modes of travel (walking, cycling and buses), improvements in bus travel speeds.	High Positive

The Proposed Scheme will address sustainable mode transport infrastructure deficits while contributing to an overall integrated sustainable transport system as proposed in the GDA Transport Strategy. It will increase the effectiveness and attractiveness of bus services operating along the corridor and will result in more people availing of public transport due to the faster, more reliable journey times which the Proposed Scheme provides. This in turn will support the future increase to the capacity of the bus network and services operating along the corridor and thereby further increasing the attractiveness of public transport. In addition to this, the significant segregation and safety improvements to walking and cycling infrastructure that is a key feature of the Proposed Scheme will further maximise the movement of people travelling sustainably along the corridor. All of these changes combined will therefore cater for higher levels of future sustainable population and employment growth.

In the absence of the Proposed Scheme bus services will be operating in a more congested environment, leading to higher journey times and lower reliability for bus journeys. This limits their attractiveness to users which will lead to reduced levels of public transport use, making the bus system less resilient to higher levels of growth and leading to increased levels of car use and

congestion. The absence of walking and cycling measures that the Proposed Scheme provides will also significantly limit the potential to grow those modes into the future.

On the whole, the Proposed Scheme will make a significant contribution to the overall aims of BusConnects, the GDA Transport Strategy and allow the city to grow sustainably into the future, which would not be possible in the absence of the Proposed Scheme.

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