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 Belfield/Blackrock to City Centre Core Bus Corridor Scheme (hereafter referred to as the Proposed Scheme). The TIA also informs Chapter 6 of the EIAR (Traffic and Transport) for the Proposed Scheme which will assess the impacts and significance of those impacts in relation to the receiving environment 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;
- 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) of this 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 impacts and benefits of the Proposed Scheme covering all transport modes for both Construction and Operational Phases.

Proposed Scheme Description

The Proposed Scheme, as described in detail in Chapter 4 (Proposed Scheme Description) has an overall length of approximately 8.3km and will be comprised of two main alignments in terms of the route it follows; Blackrock to the City Centre and along Nutley Lane between the R138 Stillorgan Road and R118 Merrion Road. The Blackrock to City Centre section will commence on the R113 at Temple Hill, to the north of R827 Stradbrook Road, travel along the N31 Frascati Road, the R118 Rock Road / Merrion Road / Pembroke Road, the R816 Pembroke Road / Baggot Street Upper / Baggot Street Lower, turn onto Fitzwilliam Street Lower and terminate at the junction of Mount Street Upper / Merrion Square South / Merrion Square East.

The Nutley Lane section of the Proposed Scheme will commence at the tie-in with the signalised junction on the R138 Stillorgan Road on the southern end of Nutley Lane, travel along Nutley Lane and terminate at the junction with the R118 Merrion Road.

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

- Section 1 –Stradbrook Road to Booterstown Avenue;
- Section 2 –Booterstown Avenue to Nutley Lane;
- Section 3 – Nutley Lane to Ballsbridge;
- Section 4 – Ballsbridge to Merrion Square; and
- Section 5 – Nutley Lane (Stillorgan Road to Merrion Road).

Assessment Methodology

The assessment of the Proposed Scheme in relation to the baseline transport environment requires 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.

Overall, cycling infrastructure provision on the corridor currently consists of 41% inbound (5% segregated cycle tracks and 36% non-segregated cycle lanes) and 53% outbound (4% segregated cycle tracks and 49% non-segregated cycle lanes) all non-segregated cycle lanes).

Bus services along the Proposed Scheme currently operate within a constrained and congested environment, with 39% priority inbound and 35% priority outbound on the corridor.

Section 1 of the Proposed Scheme covers from the R828 Stradbrook Road to the L1003 Booterstown Avenue. The route is approximately 2.4km in length and consists of the R113 Temple Hill, N31 Frascati Road and R118 Rock Road until the L1003 Booterstown Avenue.

There are continuous walking facilities provided along Section 1 of the Proposed Scheme, with footpaths and public lighting provided on both sides of the carriageway along the entirety of this section. In general, the footpaths are approximately 3.0m wide.

Section 2 commences on R118 Merrion Road at its junction with Nutley Lane and continues along R118 Rock Road until Ballsbridge. Section 2 passes through Merrion, past Elmpark Business Campus and St. Vincent's Hospital as well as various retail units and residential properties. The walking facilities along Section 2 of the Proposed Scheme are generally of a good standard with footpaths present on both sides of the road which vary in width but are a minimum of approximately 2.0m.

Section 3 of the Proposed Scheme comprises R118 Merrion Road from Nutley Lane to Ballsbridge. Section 3 is approximately 1.6km and passes through a busy urban area with a mix of residential homes and buildings that have direct frontage onto the R118 Merrion Road. The road along Section 3 of the Proposed Scheme is predominantly a single carriageway with two lanes travelling in each direction.

The walking facilities along Section 3 of the Proposed Scheme comprise well-lit footpaths on both sides of the road. The footpaths vary in width but are approximately 2.0m at narrower points and 3.0m at wider points.

Section 4 comprises the area between Ballsbridge to Merrion Square and is approximately 1.7km in length. The section follows the R118 Pembroke Road, the R816 Pembroke Road, the R816 Baggot Street Upper, across Macartney Bridge onto the R816 Baggot Street Lower, followed by Fitzwilliam Street Lower to Merrion Square. Generally, the walking facilities are good with wide, well-lit footpaths ranging between 3.0m and 5.0m wide.

Section 5 is approximately 0.8km in length and runs along Nutley Lane which is a relatively quiet, suburban street and provides an access into St. Vincent's Hospital. Nutley Lane runs parallel with Elm Park Golf and Sports Club. Nutley Lane is a single carriageway road with one lane travelling in each direction. There are footpaths present on both sides of the road which range between approximately 2.5m and 3.5m in width, and the area is well-lit with street lighting columns provided on both sides of the road.

Potential 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, cycling, bus access and parking and loading.

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 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 **Low Negative** impact due to the low numbers of 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	Low 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	Low 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.

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. All proposed facilities have been designed in accordance with PDGB which has been developed with cognisance to the relevant accessibility guidance. A LoS junction assessment was undertaken using a set of five criteria to determine the impact that the Proposed Scheme has for pedestrians. The results of the impacted junctions demonstrate that the LoS during the Do Minimum scenario consists predominantly of the low D / E ratings. During the Do Something scenario, i.e. following the development of the Proposed Scheme, the LoS consists predominantly of the highest A / B ratings. Overall, the improvements to the quality of the pedestrian infrastructure will have a **Medium Positive impact** across all sections of the Proposed Scheme.

- **Cycling Infrastructure:** The Proposed Scheme also consists of measures to enhance the potential for cycling by providing safe infrastructure for cycling, segregated from general traffic (and pedestrians) wherever practicable along the direct study area. A LoS assessment was undertaken using an adapted version of the NTA's National Cycle Manual QoS Evaluation criteria. The results of the assessment demonstrate that the LoS during the Do Minimum scenario consists of C ratings. During the Do Something scenario, the LoS consists predominantly of the highest A / A+ ratings. Given the quality of the existing cycling infrastructure along the Proposed Scheme, the improvements will have a **Medium Positive impact** in Sections 2, 4 and 5 of the Proposed Scheme, and a **Low Positive impact** in Sections 1 and 3.

- **Bus Infrastructure:** The implementation of the Proposed Scheme will result in improvements in the quality of bus infrastructure provision along the direct study area. 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 have a **High Positive impact** in Section 1 of the Proposed Scheme, a **Medium Positive impact** in Sections 2 and 5, and a **Low Positive impact** in Sections 3 and 4.

- **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 165 spaces within the redline boundary of the Proposed Scheme (-11 spaces in Section 1, -8 spaces in Section 2, +1 spaces in Section 3, -101 spaces in Section 4, and -46 spaces in Section 5). Given the nature of the loss in parking and the availability of alternative spaces in the indirect study area, the impact is expected to have a **Low Negative impact** in all sections of the Proposed Scheme.

- **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 corridor by sustainable modes of 86% and 105% during the 2028 AM and PM Peak respectively. During the 2043 scenario there will be an increase of 113% and 107% in the number of people travelling along the Proposed Scheme by sustainable modes during the AM and PM Peak Hours respectively. The analysis also shows that there will be an increase of 11.3% and 12.3% of bus boarders during the 2028 AM and PM Peak Hours respectively. During the 2043 scenario there will be an increase of 16% and 18% in bus boarders during the AM and PM Peak Hours respectively. Overall, it is anticipated that the increases to the total number of people travelling through the Proposed Scheme will have a **High Positive impact.**

- **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 16% and 18% during the AM and PM Peak hours of the 2028 Opening Year and 2043 Design Year. The Proposed Scheme will reduce total bus journey times along the Proposed Scheme by up to 18% in both 2028 and 2043 respectively. Based on the AM and PM peak hours alone, this equates to **8.2 hours of savings in 2028 and 7.6 hours in 2043**, when compared to the Do Minimum combined across all buses. On an annual basis this equates to approximately 6,200 hours of bus vehicle savings in 2028 and 5,700 hours 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 have 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. The significance of the impact has been described in terms of the reduction in traffic flows. 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 largely 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.

Overall, it has been determined that the impact of the reduction in general traffic flows along the Proposed Scheme will be a **Medium Positive** impact whilst the impact of the redistributed general traffic along the surrounding road network will have a **Medium Negative impact**.

- **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 -0.91% and 2.77% and will therefore have a **Low Negative impact**.

- **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 11% increase in public transport trips, 4% decrease in general traffic trips (i.e. motorists) and a 15% increase in cycling trips in the morning peak hour and a 9% increase in public transport, 5% decrease in general traffic and a 13% 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 9% respectively, and the increase in passengers boarding bus services will increase by 23% and 22% 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 Belfield/Blackrock 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 temporary **Low Negative impacts** to pedestrian cycling, bus access and parking and loading. 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 night-time. Therefore, the impact on general traffic redistribution is anticipated to be a temporary **Medium Negative impact**. The impact of construction traffic is anticipated to result in a temporary **Low Negative 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 in terms of People Movement and to the quality of 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 the EIAR Traffic & Transport chapter. The TIA should be read in conjunction with the EIAR chapter in Volume 2 of this EIAR.

The Proposed Scheme has an overall length of approximately 8.3km and will be comprised of two main alignments in terms of the route it follows; Blackrock to the City Centre and along Nutley Lane between the R138 Stillorgan Road and R118 Merrion Road. The Blackrock to City Centre section will commence on the R113 at Temple Hill, to the north of R827 Stradbrook Road, travel along the N31 Frascati Road, the R118 Rock Road / Merrion Road / Pembroke Road, the R816 Pembroke Road / Baggot Street Upper / Baggot Street Lower, turn onto Fitzwilliam Street Lower and terminate at the junction of Mount Street Upper / Merrion Square South / Merrion Square East.

The Nutley Lane section of the Proposed Scheme will commence at the tie-in with the signalised junction on the R138 Stillorgan Road on the southern end of Nutley Lane, travel along Nutley Lane and terminate at the junction with the R118 Merrion Road.

The Proposed Scheme includes an upgrade of the existing bus priority and cycle facilities. The scheme includes a substantial increase in the level of bus priority provided along the corridor, including the provision of additional lengths of bus lane resulting in improved journey time reliability.

Throughout the Proposed Scheme bus stops will be enhanced to improve the overall journey experience for bus passengers and 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 as well as the provision of side road ramps. In addition, public realm works will be undertaken at key locations with higher quality materials, planting and street furniture provided to enhance the pedestrians experience, an example of this can be seen in Ballsbridge, particularly at the Herbert Park / Pembroke Road junction.

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	**8.3km**	
Bus Priority	**Existing (km)**	**Proposed Scheme (km)**
Bus Lanes		
Inbound	3.2	7.4
Outbound	2.9	7.3
Bus Priority through Traffic Management		
Inbound	0	1
Outbound	0	0.9
Total Bus Priority (both directions)	6.1	16.6 (+172%)
Bus Measures		
Proportion of Route with Bus Priority Measures	37%	100%
Cycle Facilities – Segregated		
Inbound	0.4	8.3
Outbound	0.04	8.3
Cyclist Facilities – Non-segregated		
Inbound	3	0
Outbound	4.1	0
Total Cyclist Facilities (both directions)	7.8	16.6 (+112%)
Proportion Segregated	4%	100%

Total Length of Proposed Scheme	8.3km	
Bus Priority	**Existing (km)**	**Proposed Scheme (km)**
Pedestrian Facilities		
Number of Side Entry Treatments (raised tables)	9	55 (+511%)
Number of Signalised Crossings	68	96 (+41%)

The Proposed Scheme is supported by 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
BCIDC-ARP-GEO_GA-1415_XX_01-DR-CR-9001	General Arrangement
BCIDC-ARP-GEO_CS-1415_XX_01-DR-CR-9001	Typical Cross Sections
BCIDC-ARP-TSM_GA-1415_XX_00-DR-CR-9001	Traffic Signs and Road Markings
BCIDC-ARP-TSM_SJ-1415_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; and
- 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 planning and design of the Proposed Scheme has been guided by these aims and objectives.

1.1.1 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 optimisation 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. 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 traffic and transport chapter, People Movement is the key design philosophy and the Proposed Scheme impacts (both positive and negative) have been assessed on that basis.

1.1.2 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) (refer to Appendix A4.1 in Volume 4 of this EIAR) 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 in Section 6.2.3. Details on the development of junction designs along the Proposed Scheme are included in Appendix A6.1 – Sub 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 below.

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 Transport Impact Assessment (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 has 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 traffic displacement 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.

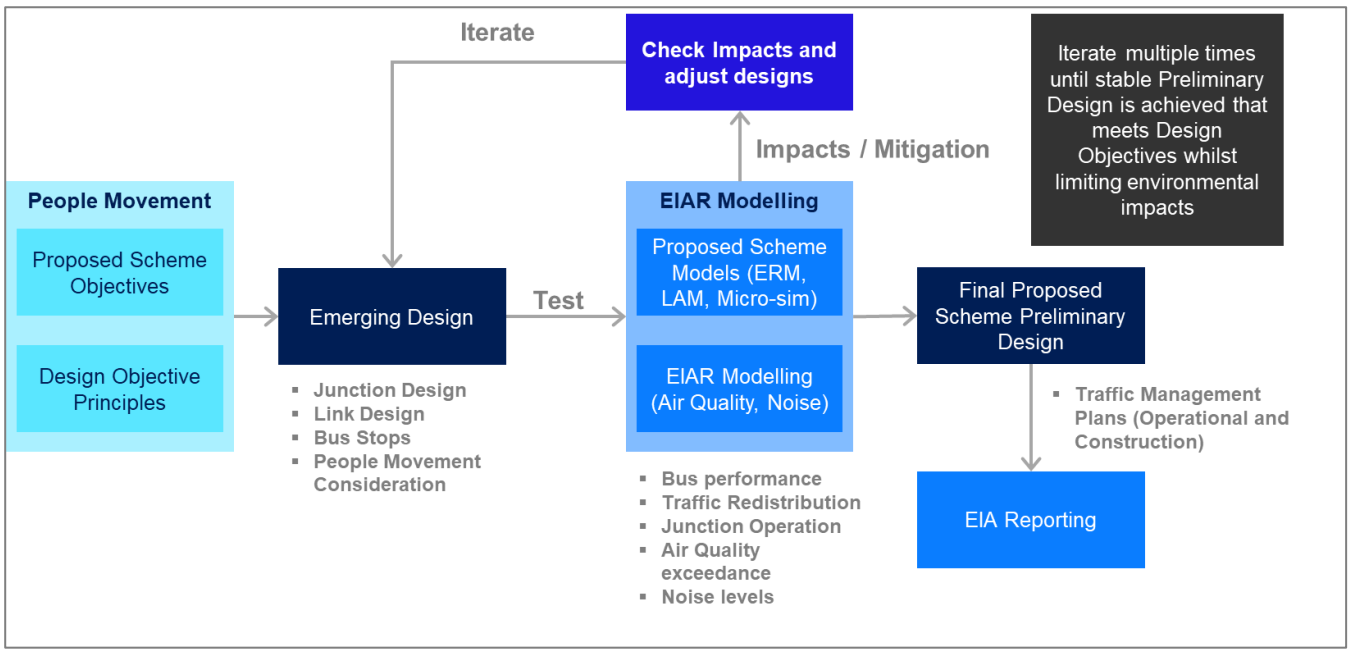


Diagram 1.1: Proposed Scheme Impact Assessment and Design Interaction

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 2017), 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.
- **'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 outlines the national, regional and local transport and planning policies applicable to the Proposed Scheme.
- **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 5 – Scheme Proposals:** This chapter provides an overview of the Proposed Scheme;
- **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. 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 6.5.4.6 for further details on the threshold applied in relation to traffic volume changes used in the definition of the indirect study area).

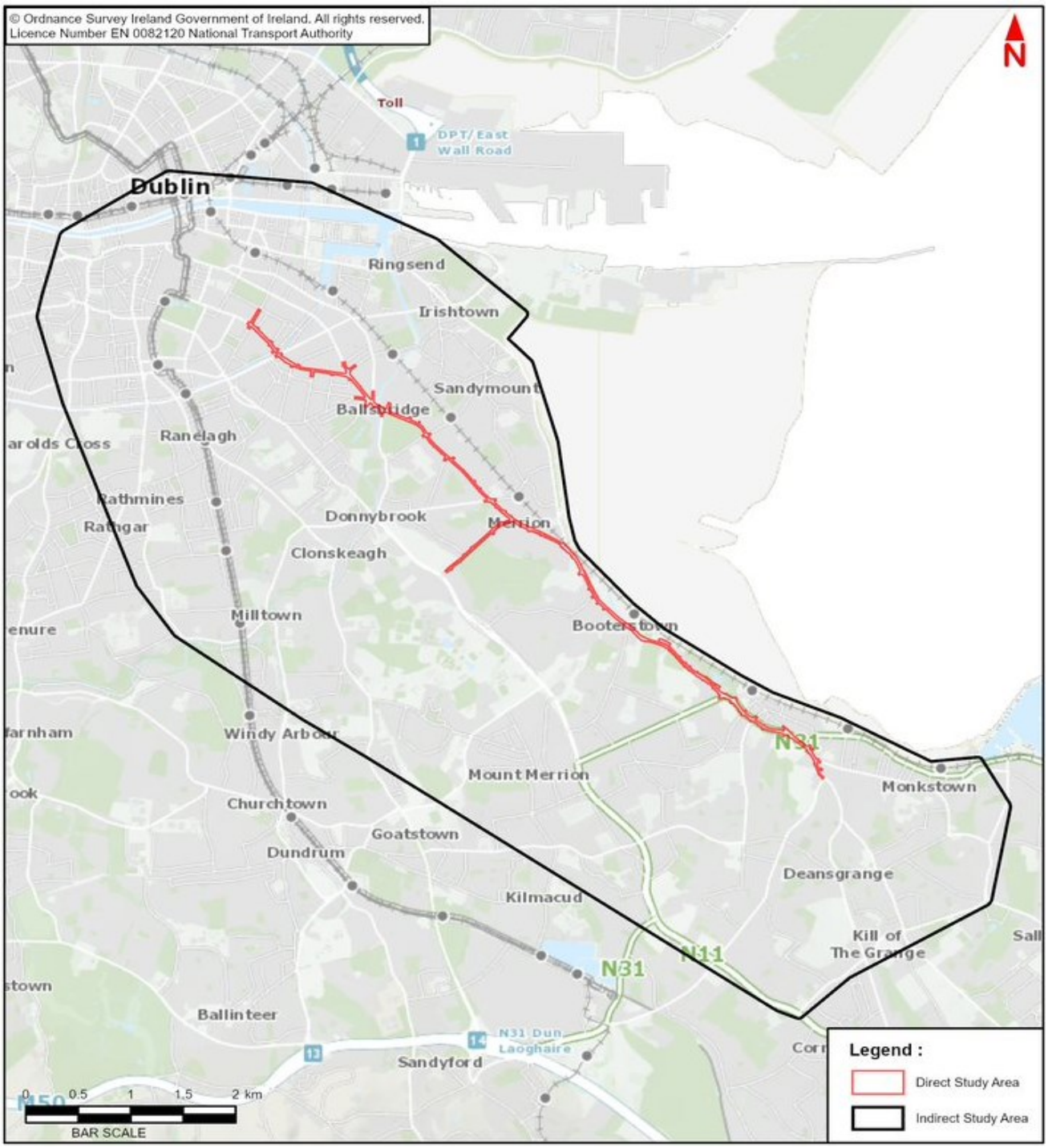


Diagram 2.1: Proposed Scheme Direct and Indirect Study Area

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 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) (DTTS 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, characterised 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 (DTTS, 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 (DTTS, 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 Section 3.1.

3.2 National Policy

3.2.1 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.

3.2.2 National Development Plan (NDP) (2018 – 2027)

The National Development Plan (NDP) (2018- 2027) (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 states that investment in public transport infrastructure will be accelerated to support the development of an integrated and sustainable national public transport system consistent with the NPF's National Strategic Outcomes of 'Sustainable Mobility' as well as 'Compact Growth'. It outlines that the programmes and underlying projects proposed for delivery during the period up to 2027 which includes the BusConnects scheme, as follows:

> *'Delivery of the full BusConnects programme for all of Ireland's cities (inclusive of ticketing systems, bus corridors, additional capacity, new bus stops and bus shelters etc.'*
>
> *'Delivery of comprehensive cycling and walking network for Ireland's cities.'*

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.

3.2.3 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.

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 least three of the NIFTI investment priorities; protecting and renewing Dublin's public transport network, enabling better mobility for people across the Dublin City-region, and supporting the decarbonisation of Dublin's transport network.

3.2.4 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.

3.2.5 National Cycle Policy Framework (2009)

In support of the Smarter Travel Policy, the National Cycle Policy Framework (NCPF) (DTTS, 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.

3.2.6 Statement of Strategy (2016 – 2019)

The Statement of Strategy (Department of Transport, Tourism and Sport (DTTS), 2019) is the DTTS'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.'*

DTTS'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.

3.2.7 Road Safety Strategy

The Road Safety Strategy (2013-2020) (Road Safety Authority (RSA), 2019) sets out targets to be achieved in terms of road safety in Ireland, with the primary target defined as follows:

> *'A reduction of road collision fatalities on Irish roads to 25 per million population or less by 2020 is required to close the gap between Ireland and the safest countries. This means reducing deaths from 162 in 2012 to 124 or fewer by 2020. A provisional target for the reduction of serious injuries by 30% from 472 (2011) to 330 or fewer by 2020 or 61 per million population has also been set.'*

The Strategy goes on to state that:

> *'…the attractiveness of walking depends strongly on the safety of the infrastructure provided. Collisions involving pedestrians account for 1 in 5 fatalities annually.'*

> *'…collisions involving cyclists account for 1 in 25 road deaths annually, and many collisions involving cyclists lead to serious head injuries.'*

The document sets out strategies for engineering and infrastructure that can effectively reduce collisions. The Proposed Scheme incorporates measures that will contribute to improving road safety in the form of upgrades to key junctions, and new / upgraded pedestrian and cycle infrastructure along the corridor.

3.2.8 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 DTTS 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
- Maximise 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 DTTS investment framework, and the Capital Plan.

3.2.9 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 industrialisation 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.

3.2.10 Climate Action Plan

The Climate Action Plan (Department of the Taoiseach, 2019) sets out the strategy of the Irish Government for tackling the climate change crisis and seeks to achieve a zero-carbon energy systems objective for Irish society and in the process, create a resilient, vibrant and sustainable country.

A central pillar of this plan is the role that transport can play in reducing our carbon footprint and improving air quality in our towns and cities. The plan acknowledges that the delivery of improved public transport will lead to a modal shift away from unsustainable transport choices and go a large way to the decarbonization challenge that lies ahead.

BusConnects, and improvements to the bus fleet, are identified in the Climate Action Plan as being a central component of this objective, as noted in the following actions which are extracted from the plan:

> *'Implement major sustainable-mobility projects such as DART Expansion, Metro Link, and the BusConnects Programme. BusConnects targets a 50% increase in bus passenger numbers over the lifetime of the project in our major cities.*
>
> *Expand sustainable-travel measures, including a comprehensive cycling and walking network for metropolitan areas of Ireland's cities, with a particular emphasis on safety of cyclists. We shall also expand greenways and develop over 200km of new cycling network under BusConnects.*
>
> *Establish a new fare structure in BusConnects which will encourage flexible use of an integrated public transport network. We committed to transition to Low-Emission Vehicles, including electric buses, for the urban public bus fleet, with no diesel-only purchases from 1 July 2019, and will set a roadmap for all public PSO urban bus fleets to become LEVs by 2035.'*

By enhancing public and active travel networks the Proposed Scheme will encourage the use of these modes and reduce reliance on private car. Therefore, the Proposed Scheme is aligned with the Climate Action Plan.

3.3 Regional Policy

3.3.1 Transport Strategy for the Greater Dublin Area (2016 – 2035)

The Transport Strategy for the Greater Dublin Area (2016 – 2035) (National Transport Agency (NTA), 2016) provides a framework for the planning and delivery of transport infrastructure and services in the Greater Dublin Area (GDA) over the next two decades.

The Strategy outlines that the GDA is heavily reliant on the bus network and the existing infrastructure is of varying standards and levels of continuity. It therefore identifies the Core Bus Network for the GDA which represents the most important bus routes in the region; generally characterised by a high frequency of bus services, high passenger volumes and with significant trip attractors located along the route.

The GDA Transport Strategy states:

> *'In order to ensure an efficient, reliable and effective bus system, it is intended, as part of the Strategy, to develop the Core Bus network to achieve, as far as practicable, continuous priority for bus movement on the portions of the Core Bus Network within the Metropolitan Area.'*

The NTA has recently published an Issues Paper to commence the review of the Strategy. The purpose of the review is to assess the implementation of the current plan thus far and look to produce an updated Strategy setting out the framework for investment in transport infrastructure and services up to 2042. BusConnects is identified as a major project by the Issues Paper, stating that the BusConnects Core Bus Corridors element is due to go to planning in 2021.

To complement this Strategy, the NTA devised an Integrated Implementation Plan 2019-2024. It sets out an infrastructure investment programme, integrated service plan and actions to be undertaken by the NTA over the Plan period. A core element of this Plan relates to the delivery of the BusConnects programme.

3.3.2 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 involves 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 will 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.

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

3.3.3 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.

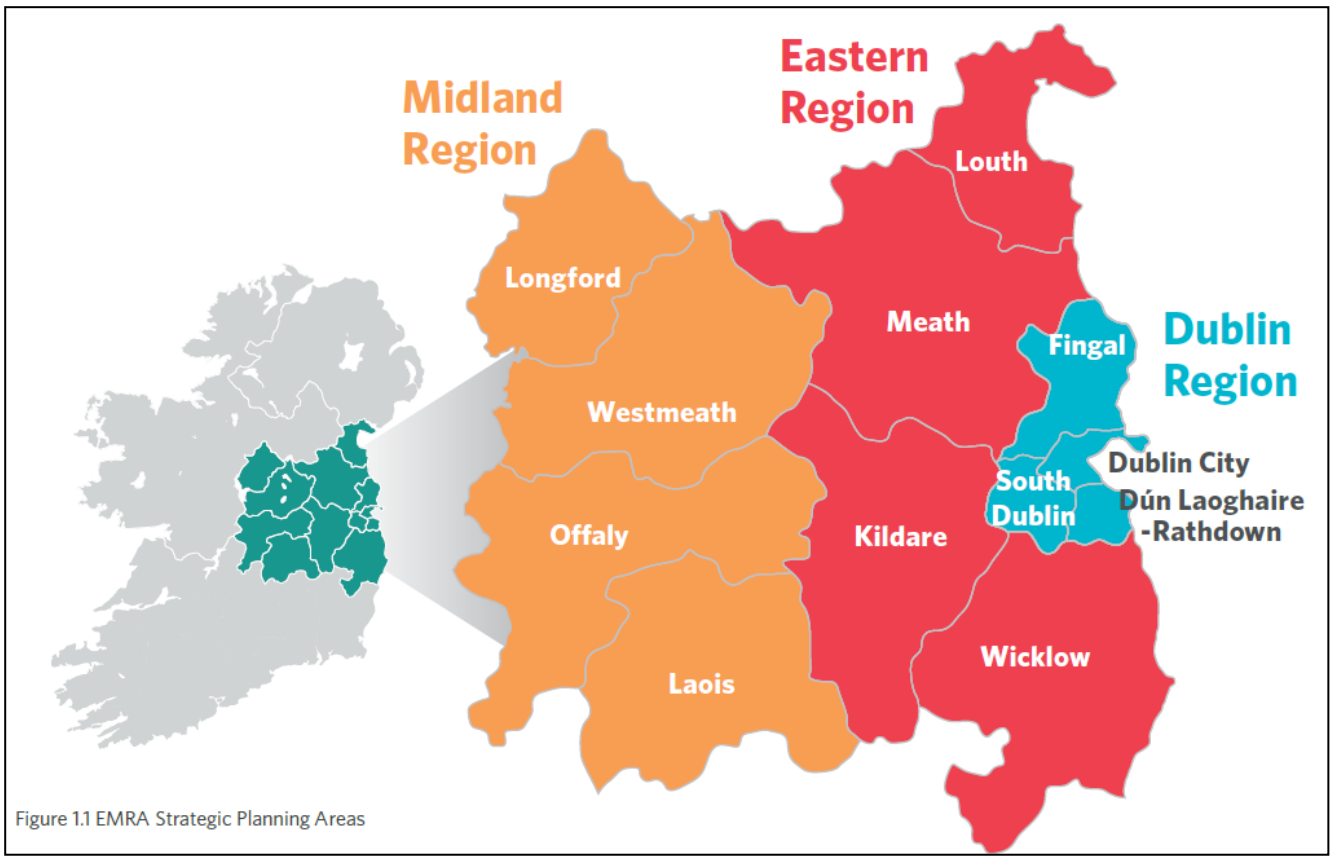


Diagram 3.2: RSES Planning Areas

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 maximises 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

Extract from RSES RPO8.9 (Table 8.3: Bus Projects for the Region)
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.

3.3.4 Dublin City Council Development Plan (2016 – 2022)

The Dublin City Development Plan (CDP) (Dublin City Council, 2016) sets out policies and objectives to guide how and where development will take place in the city over the lifetime of the Plan. It provides an integrated, coherent spatial framework within the context of national policies to ensure the city is developed in an inclusive way which improves the quality of life for its citizens, whilst also being a more attractive place to visit and work. The entirety of the Proposed Scheme falls within the remit of the DCDP.

The vision for the city is:

> *'…within the next 25 to 30 years, Dublin will have an established international reputation as one of Europe's most sustainable, dynamic and resourceful city regions.'*

DCDP supports and encourages the uptake of sustainable travel modes to achieve a modal shift through various policies and objectives outlined in the Plan. Mobility and Transport Policy 2 (MT2) states that Dublin City Council (DCC) will:

> *'…promote modal shift from private car use towards increased use of more sustainable forms of transport such as cycling, walking and public transport, and to co-operate with the NTA, Transport Infrastructure Ireland (TII) and other transport agencies in progressing an integrated set of transport objectives.'*

Policy MT4 makes specific reference to the promotion and facilitation of improvements to the bus network in order to achieve strategic transport objectives.

Policy MT7 is to implement walking and cycling improvements at thoroughfares and junctions and develop new and safe routes. Policy MT11 is to promote improved permeability for both cyclists and pedestrians in existing urban areas. The BusConnects scheme incorporates upgrades to pedestrian and cycle infrastructure along the Proposed Scheme and at key junctions.

The Proposed Scheme incorporates upgrades to pedestrian and cycle infrastructure along the Proposed Scheme and at key junctions thus can be considered in alignment with the DCDP.

3.3.5 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 (DCCDP) 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 public 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

3.4.1 Dun Laoghaire Rathdown County Council Development Plan (2016 – 2022)

The Dún Laoghaire-Rathdown County Development Plan (DLRCDP) (Dún Laoghaire-Rathdown County, 2016) sets out the policies for the continuing sustainable development of the County for the period 2016 to 2022. The vision statement is:

Sustainable Transport (ST) policies in the DLRCDP that the Proposed Scheme aligns with are:

- "To actively support sustainable modes of transport and ensure that land use and zoning are fully integrated with the provision and development of high public quality transportation systems." [ST2]
- "It is Council Policy to secure the development of a high-quality walking and cycling network across the County in accordance with relevant Council and National policy and guidelines." [ST5]
- "It is Council policy to co-operate with the NTA and other relevant agencies to facilitate the implementation of the Bus Network measures as set out in the NTA's 'Greater Dublin Area Draft Transport 2016-2035' and to extend the bus network to other areas where appropriate subject to design, public consultation, approval, finance and resources." [ST12]

The significant improvements to the walking, cycling and bus infrastructure along the Proposed Scheme directly align with these policies.

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 receiving transport environment.

The assessment of the Proposed Scheme in relation to the baseline transport environment requires 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 2017), 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).

Where relevant 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 assessments which are based upon outputs from the transport 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 6. Further detail can be found in Appendix A6.1 – Sub Appendix 1 (Transport Modelling Report).

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 photography 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 Traffic and Transport Chapter 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 EIAR:

- Road Network: Functional Class of each road link in the road network, which is a road type indicator, reflecting traffic speed and volume, as well as the importance and connectivity of the road. 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. Further detail can be found in Appendix A6.1 – Sub 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 Proposed Scheme, a full set of consistent updated traffic counts for a neutral period e.g. November / February when schools, colleges were in session 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 of the strategic model and microsimulation model. The two types of counts used in the study are Junction Turning 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	Dates
JTC	Nationwide	71	Tue 1/2/2020, Mon 11/2/2020
ATC	Nationwide	10	31/1/2020 - 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. 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 along 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 5.1.

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 Custom Area Analysis dataset through the TomTom TrafficStats portal. The NTA has an agreement with TomTom to provide anonymised 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 developed for the Proposed Scheme, 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 be 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 LAM and micro-simulation model 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 Appendix A6.1 – Sub 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 the projected volume of people moving along the Proposed Scheme 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 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 in relation to the following scenarios:

- **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.
- **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.
  - **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 applied universally throughout the world, 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, where applied.

4.3 Transport Modelling Methodology

A multi-tiered transport modelling approach has been developed. 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 cordoned (sub-set model) 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 ERM.

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 Appendix A6.1 – Sub 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 is passed from the ERM to the cordoned local area model, microsimulation models and junction 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 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 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.

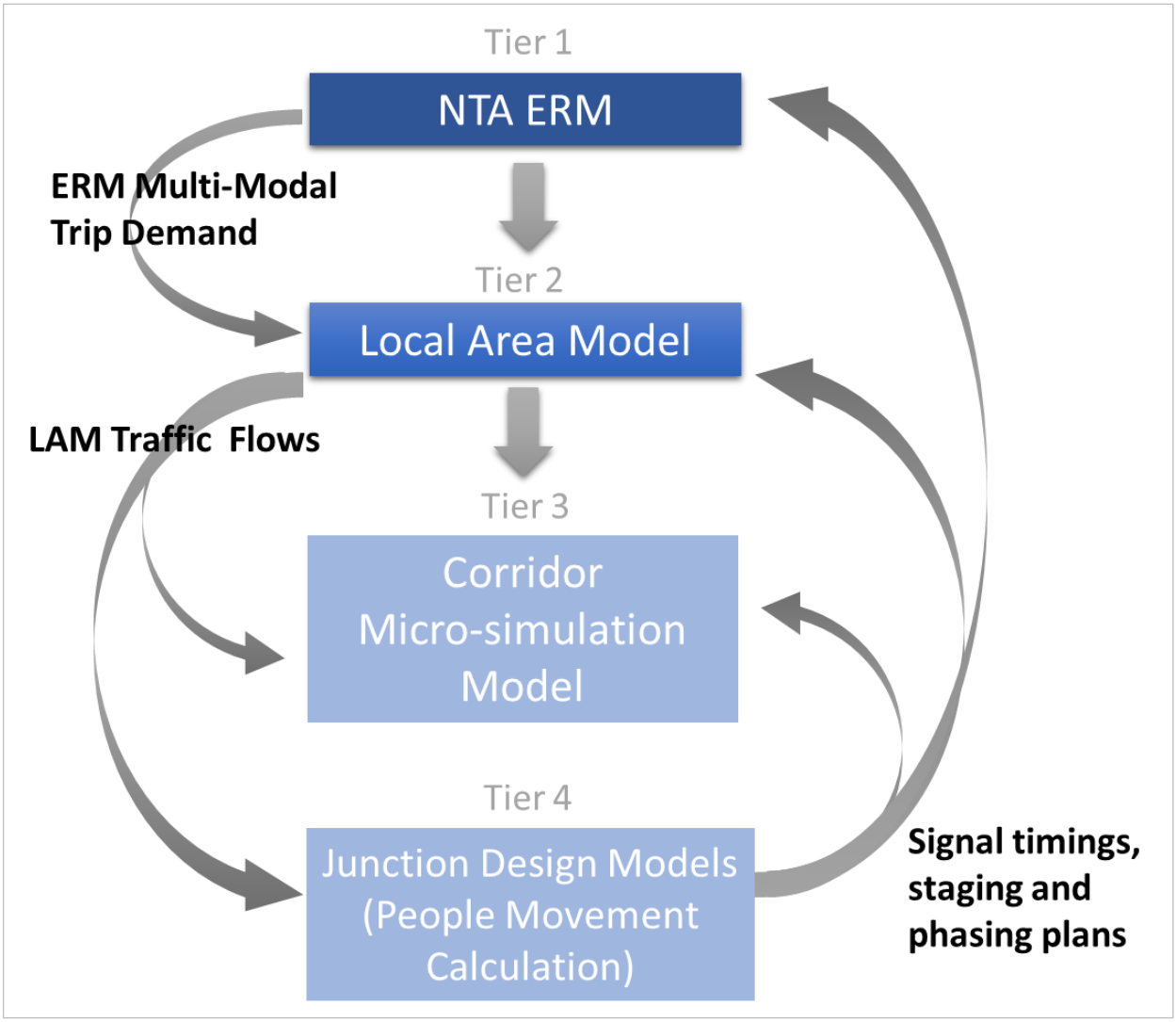


Diagram 4.1: Proposed Scheme Modelling Hierarchy

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 Appendix A6.1 – Sub Appendix 1 (Transport Modelling Report) and Appendix A6.1 – Sub Appendix 2 (Junction Design Report). 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 Flows to inform PDR	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	Traffic surveys Journey time data ERM forecast matrices Proposed Scheme designs

Tool	Purpose	Inputs
	Construction Strategy and Traffic Management measure testing Donor network for Proposed Scheme Micro-sim model	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 TIA and EIAR.

4.3.1.3 Local Area Model (LAM)

To support the detailed assessment of the Proposed Scheme a more disaggregated urban area traffic model has been developed, as a cordoned model from the ERM, that incorporates 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. As such, a Local Area Model (LAM) has been developed to support the assessment of the Proposed Scheme.

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 development 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 and 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 LAM network as shown in Diagram 4.2.

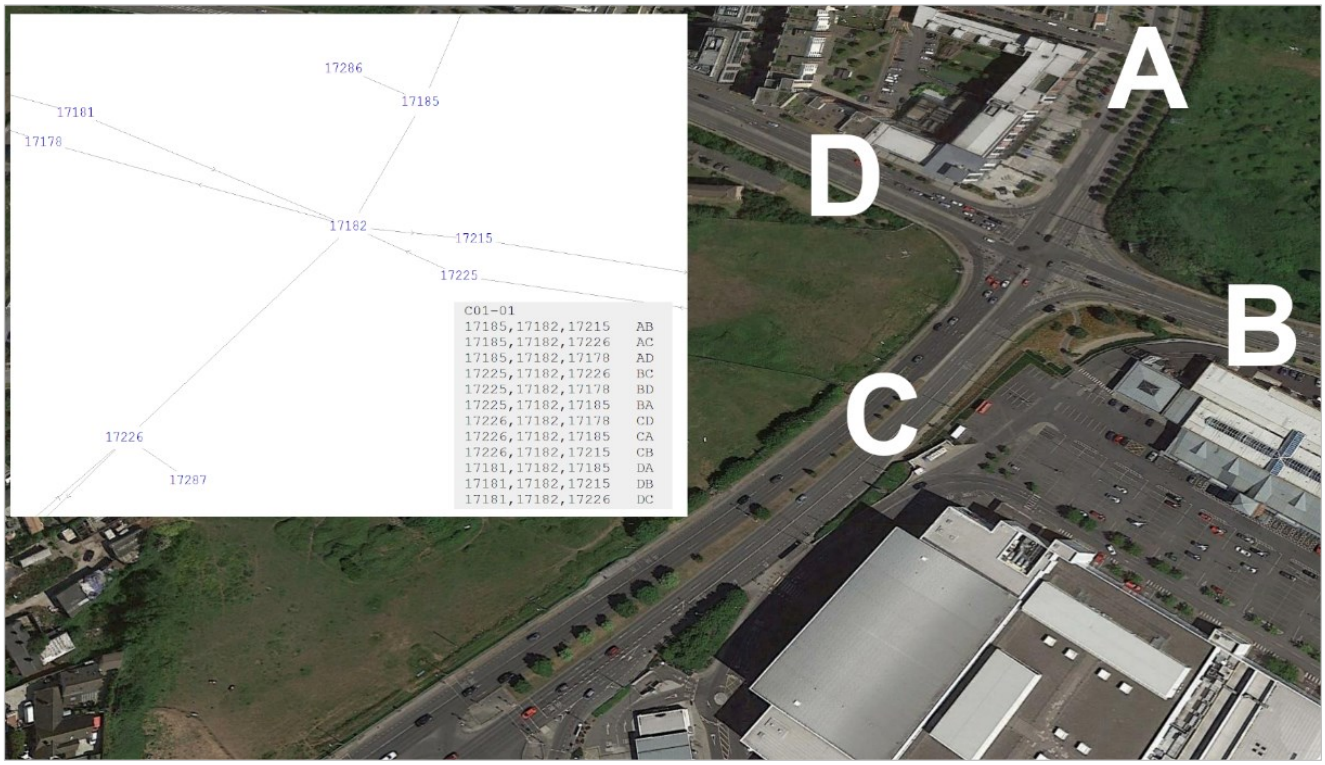


Diagram 4.2: Bus Connects LAM Node Matching (Junction C01-01)

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

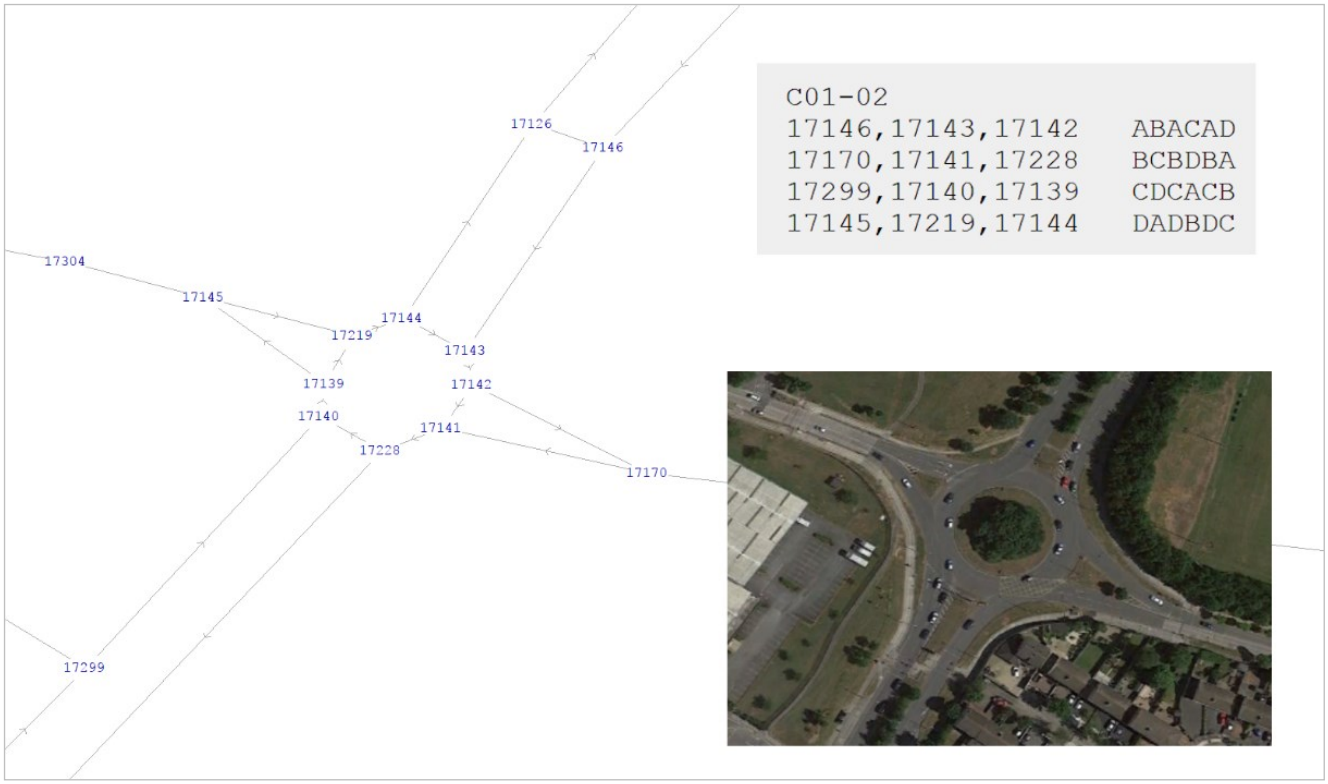


Diagram 4.3: Bus Connects LAM Node Matching (Junction C01-02)

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 Microsimulation 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 is 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, Micro-simulation and local junction models contain consistent design, transport demand, signal phasing and staging information. Further information is contained in Appendix A6.1 – Sub 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.

Overall, cycling infrastructure provision on the corridor currently consists of 41% cycle priority inbound (5% segregated cycle tracks and 36% non-segregated cycle lanes) and 53% cycle priority outbound (4% segregated cycle tracks and 49% non-segregated cycle lanes).

5.1 Bus Journey Times

Bus services along the Proposed Scheme currently operate within a constrained and congested environment, with 39% priority inbound and 35% priority outbound on the corridor. 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 11 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)

Table 5.1 displays the JTCs collected for the Proposed Scheme, the locations of which are shown in Diagram 5.1. The results demonstrate that the busiest junction (51,878 daily movements) within the direct study area is R138 Stillorgan Road / Nutley Lane junction four-arm signalised junction. The next busiest junctions are:

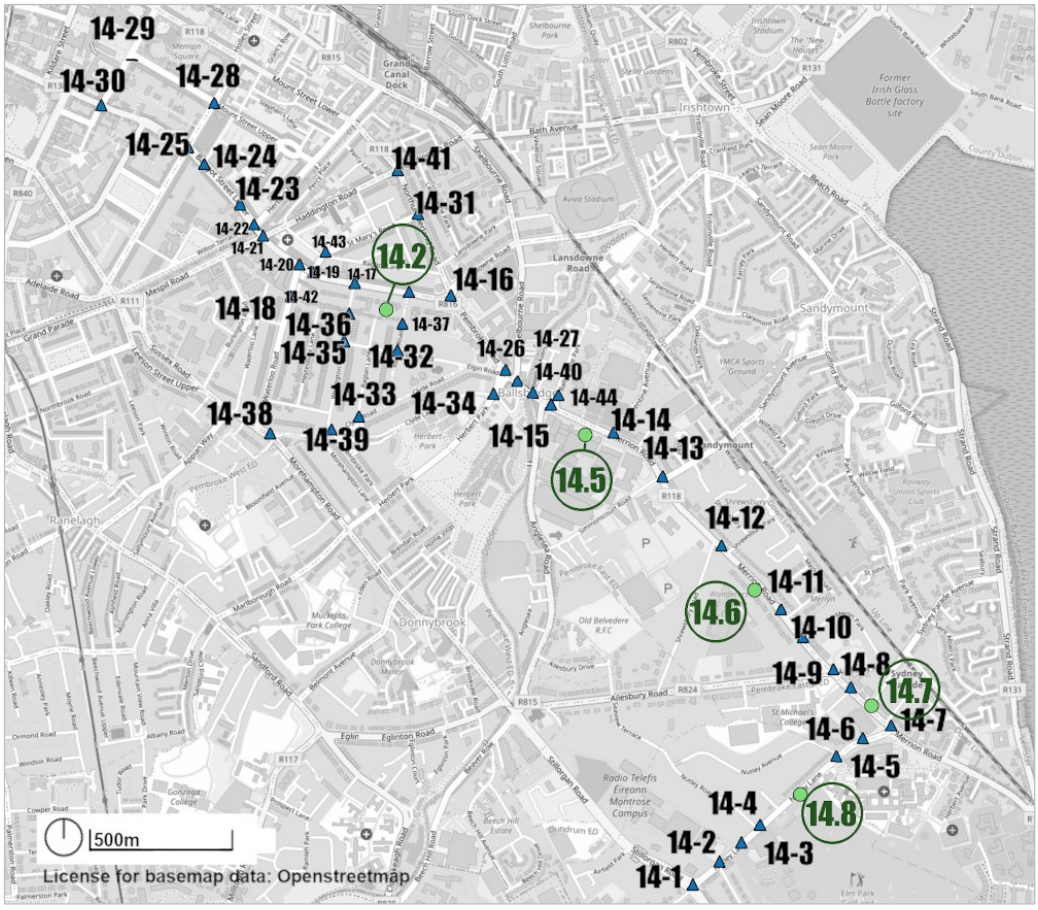
- R815 Shelbourne Road / R118 Pembroke Road (40,844 daily movements);
- R118 Merrion Road / Ballsbridge Park (40,787 daily movements);
- R118 Pembroke Road / Beatty's Avenue (39538 daily movements); and
- R118 Rock Road / N31 Mount Merrion Avenue (36,672 daily movements).

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

Junction Identifier	Junction Name	Type	Daily Movements	AM Movements	PM Movements
14-1	Nutley Lane/Stillorgan Road	Signals	51,878	4,038	3,928
14-2	Nutley Lane/Nutley Park	Priority	16,808	1,507	1,277
14-3	Nutley Lane/Elm Park Golf Club	Priority	16,728	1,501	1,280
14-4	Nutley Lane/Nutley Lane	Priority	17,083	1,587	1,278
14-5	Nutley Lane/St Vincent's Hospital	Priority	16,958	1,453	1,063
14-6	Nutley Lane/Nutley Lane	Priority	12,376	880	818
14-7	Merrion Rd/Nutley Lane	Signals	26,548	1,964	1,833

Junction Identifier	Junction Name	Type	Daily Movements	AM Movements	PM Movements
14-8	Merrion Rd/Merrion View Ave	Priority	23,202	1,839	1,615
14-9	Ailesbury Road/Merrion Rd	Signals	28,101	2,246	2,013
14-10	Merrion Rd/Merlyn Park	Priority	20,525	1,586	1,426
14-11	Merlyn Road/Merrion Rd	Signals	20,733	1,588	1,432
14-12	Shrewsbury Park/Merrion Rd	Signals	22,332	1,815	1,681
14-13	Sandymount Ave/Merrion Rd	Signals	28,388	2,358	2,091
14-14	Serpentine Ave/Merrion Rd	Signals	28,644	2,399	2,091
14-15	Ballsbridge Park/Merrion Rd	Signals	40,787	3,482	2,791
14-16	Northumberland Rd / Lansdowne Rd/Pembroke Rd	Signals	30,615	2,567	2,204
14-17	Pembroke Rd/Raglan Rd	Priority	15,525	1,322	1,277
14-18	Pembroke Rd/Pembroke Rd	Priority	16,655	1,389	1,426
14-19	Eastmoreland Pl/Pembroke Rd	Priority	17,665	1,510	1,401
14-20	Baggot St Upper/Waterloo Rd	Signals	23,709	1,899	1,946
14-21	Haddington Rd/Baggot St Upper	Signals	33,687	2,764	2,601
14-22	Herbert Pl/Macartney Bridge	Signals	22,560	2,294	2,062
14-23	Herbert St/Baggot St Lower	Priority	16,979	1,454	1,258
14-24	James St E/Baggot St Lower	Priority	15,019	1,289	1,149
14-25	Fitzwilliam St Lower/Baggot St Lower	Signals	24,800	1,993	1,824
14-26	Pembroke Rd/Herbert Park	Signals	30,161	2,666	2,004
14-27	Shelbourne Rd/Pembroke Rd	Signals	40,844	3,478	2,720
14-28	Fitzwilliam Street/Merrion Square S	Signals	15,892	1,323	1,179
14-29	Merrion Sq. W/Merrion Sq. S	Priority	15,913	1,300	1,108
14-30	Merrion St Upper/Baggot St Lower	Signals	25,116	1,858	1,624
14-31	Northumberland Rd/Northumberland Rd	Priority	17,547	1,437	1,242
14-32	Raglan Rd/Elgin Rd	Priority	2,661	370	280
14-33	Raglan Ln/Clyde Rd	Priority	4,171	521	349
14-34	Herbert Park/Pembroke Pl	Priority	4,417	426	359
14-35	Wellington Rd/Elgin Rd	Priority	3,751	385	513
14-36	Wellington Rd/Pembroke Ln	Priority	3,707	398	500
14-37	Raglan Rd/Pembroke Ln	Priority	1,645	240	171
14-38	Wellington Pl/Morehampton Rd	Signals	30,966	2,351	2,152
14-39	Wellington Rd/Clyde Rd	Signals	6,585	708	659
14-40	Pembroke Rd/Beatty's Ave	Signals	39,538	3,430	2,757
14-41	Northumberland Rd/Haddington Rd	Signals	26,171	2,106	1,879
14-42	Waterloo Rd/Pembroke Ln	Priority	12,522	1,055	1,107
14-43	Eastmoreland Pl/St Mary's Rd	Priority	3,064	355	232
14-44	Ballsbridge Ave/Ballsbridge Park	Signals	2,256	247	205
15-1	Temple Hill/Temple Crescent	Signals	29,372	2,070	2,141
15-2	Newtown Avenue/Temple Park Avenue	Signals	36,278	2,525	2,638
15-3	Temple Road/Temple Road	Signals	34,409	2,352	2,490
15-4	Carysfort/Frascati Rd	Signals	34,920	2,161	2,555
15-5	George's Ave/Frascati Rd	Priority	30,749	1,890	2,208
15-6	Rock Hill/Frascati Rd	Signals	34,979	2,286	2,510
15-7	Rock Rd/Mount Merrion Avenue	Signals	36,672	2,480	2,602
15-8	Emmet Square/Rock Rd	Signals	29,542	2,101	1,993
15-9	Rock Rd/Blackrock College	Priority	27,493	2,128	1,836
15-10	Rock Rd/Willow Park School	Priority	27,766	2,180	1,847

Junction Identifier	Junction Name	Type	Daily Movements	AM Movements	PM Movements
15-11	Booterstown Dart Station/Rock Rd	Signals	34,002	2,604	2,342
15-12	Rock Rd/Grotto Ave	Priority	32,376	2,478	2,208
15-13	Rock Rd/St Helen's Rd (S)	Priority	32,402	2,477	2,243
15-14	Rock Rd/St Helens Rd (N)	Priority	32,387	2,473	2,235
15-15	Merrion Rd/Rock Road	Signals	35,017	2,835	2,373
15-16	Merrion Rd/Bellevue Ave	Priority	32,416	2,559	2,031
15-17	Merrion Rd/Merrion Rd	Signals	34,046	2,749	2,111
15-18	Merrion Rd/Merrion Rd	Priority	32,606	2,565	1,960
15-19	Strand Rd/Merrion Rd	Signals	33,531	2,654	1,992
15-20	Church Entrance/Merrion Rd	Priority	20,247	1,418	1,340
15-21	Merrion Village/Merrion Rd	Signals	22,605	1,527	1,472
15-22	N31/Sweetman's Ave	Priority	31,086	2,064	2,239
15-23	Main St/Bath Place	Signals	7,165	659	462
15-24	Main Street/Carysfort Avenue	Signals	8,162	711	553
15-25	Seapoint Avenue/Newtown Avenue	Signals	12,671	1,179	876
15-26	Strand Rd/Strand Rd	Priority	14,982	1,343	781
15-27	Strand Rd/Strand Rd	R3	17,934	1,612	936



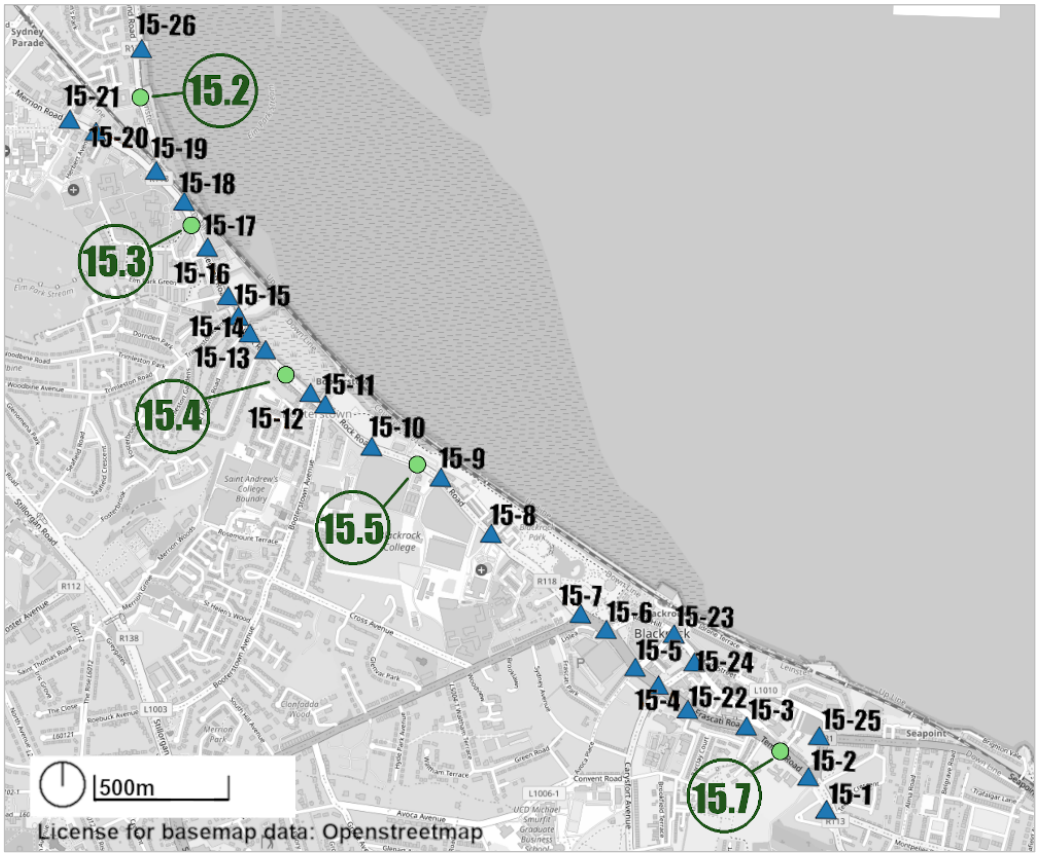


Diagram 5.1: ATC and JTC Traffic Count Locations

5.2.2 Automatic Turning Counts

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 were recorded on the R118 Rock Road at Booterstown Marsh.

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

ATC Identifier	ATC Location	Direction	Daily Movements	AM Movements	PM Movements
14.2A	Pembroke Road	Southbound	6,155	355	385
14.2B		Northbound	7,683	666	638
14.5A	Merrion Road at RDS	Southbound	10,983	586	847
14.5B		Northbound	9,634	907	573
14.6A	Merrion Road south of Shrewsbury Road	Northbound	10,600	972	639
14.6B		Southbound	10,294	548	811
14.7A	Merrion Road north of Nutley Lane	Northbound	10,843	923	658
14.7B		Southbound	12,043	811	890
14.8A	Nutley Lane	Eastbound	6,569	684	294
14.8B		Westbound	7,825	553	603
15.2A	Strand Road at Merrion Hall	Northbound	7,373	624	298
15.2B		Southbound	7,575	544	368
15.3 north	Merrion Road north of Elmpark	Southbound	15,426	1,214	878
15.4A	Rock Road at Booterstown Marsh	Northbound	15,179	1,028	798
15.4B		Southbound	16,288	1,052	1,261
15.5A	Rock Road at Blackrock College	Northbound	13,415	1,221	681
15.5B		Southbound	11,611	689	829
15.7A	Temple Road north of Newpoint Avenue	Northbound	14,544	1,029	822

5.3 Baseline Conditions

5.3.1 Overview

In describing the baseline conditions, the Proposed Scheme has been divided into five sections in accordance with the proposed design, as outlined within all other disciplines of the subject application. The five sections are as follows:

- Section 1 –Stradbrook Road to Booterstown Avenue; and
- Section 2 –Booterstown Avenue to Nutley Lane.
- Section 3 – Nutley Lane to Ballsbridge
- Section 4 – Ballsbridge to Merrion Square; and
- Section 5 – Nutley Lane (Stillorgan Road to Merrion Road).

5.3.2 Section 1 –Stradbrook Road to Booterstown Avenue

This section of the chapter outlines the baseline environment for walking, cycling, bus services, general traffic and parking / loading facilities along Section 1 of the Proposed Scheme, between the R827 Stradbrook Road and the L1003 Booterstown Avenue. Section 1 commences on the R113 Temple Hill to the north of the R827 Stradbrook Road junction. Section 1 is approximately 2.4km in length and consists of the R113 Temple Hill, N31 Frascati Road and R118 Rock Road up to the L1003 at Booterstown Avenue.

5.3.2.1 Pedestrian Infrastructure

There are continuous walking facilities provided along Section 1 of the Proposed Scheme, with footpaths and public lighting provided on both sides of the carriageway along the entirety of this section. In general, the footpaths

are approximately 3.0m wide. Therefore, the walking facilities along Section 1 of the Proposed Scheme are desirable in accordance with DMURS for areas with low pedestrian activity.

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

- The R113 Temple Hill / R119 Monkstown Road three-arm signalised junction has signalised crossings on all its arms. The R113 Temple Hill crossing is staggered in two stages with a traffic island and guard rails;
- The N31 Temple Road / N31 Newtown Avenue / R113 Temple Hill / St Vincent's Park four-arm signalised junction has signalised crossings on two arms. The N31 Temple Road crossing is staggered in three stages with traffic islands and guard rails;
- The N31 Temple Road / Temple Road / Barclay Court / N11 Frascati Road four-arm signalised junction has signalised crossings on three arms (no crossing on the N11 Temple Road). The N31 Frascati Road crossing is staggered in two stages with a traffic island and guard rails. The Barclay Court crossing is staggered in two stages with a traffic island;
- A pelican crossing of the N31 Frascati Road, immediately north-west of Sweetman's Avenue;
- The N31 Frascati Road / Carysfort Avenue / R825 Carysfort Avenue four-arm signalised junction has pelican crossings on all of its arms;
- A pelican crossing of the N31 Frascati Road at George's Avenue. The crossing is in two stages with a traffic island for pedestrian refuge;
- A pelican crossing of the N31 Frascati Road at Frascati Shopping Centre, to the south of Rock Hill. This crossing is in two stages with a traffic island for pedestrian refuge and also features a raised table;
- The N31 Frascati Road / L1009 Rock Hill / Frascati Shopping Centre four-arm signalised junction has signalised crossings on its L1009 Rock Hill and Frascati Shopping Centre arms. There is also a pelican crossing of the left turn slip lane from the N31 Frascati Road North to L1009 Rock Hill at this junction;
- The R118 Rock Road / N31 Frascati Road / N31 Mount Merrion Avenue three-arm signalised junction has signalised crossings on its N31 Frascati Road (south arm) and N21 Mount Merrion Avenue arms. Both crossings are in two stages and the N31 Mount Merrion Avenue crossing features guard rails at the traffic island;
- A pelican crossing of the R118 Rock Road, immediately north of Emmet Square; and
- The R118 Rock Road / L1003 Booterstown Avenue / Booterstown DART Station Car Park four-arm signalised junction has signalised crossings on three of the four arms (no crossing on the 118 Rock Road north arm). The crossing of the R118 Rock Road (south arm) is staggered in two stages.

Uncontrolled crossings across priority junctions at side roads benefit from dropped kerbs. The locations of the pedestrian crossings are illustrated in Figure 6.3a in Appendix A6.1 – Sub Appendix 3 (Maps).

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 is included in Appendix A6.1 – Sub Appendix 4 (Impact Assessments).

5.3.2.2 Cycling Infrastructure

Existing cycle facilities along Section 1 of the Proposed Scheme are as follows:

- On-road cycle lanes of approximately 2.0m wide in both directions between the R827 Stradbrook Road and the R113 Newtownpark Avenue;
- A shared pedestrian and cyclist facility on both sides of the road between the R113 Newtownpark Avenue and Montpelier Place;
- On-road cycle lanes of approximately 2.0m width in both directions between Montpelier Place and Monkstown Road;
- Off-road cycle tracks of approximately 2.0m wide outbound between Monkstown Road and Newtown Avenue with an on-road cycle lane inbound;
- Off-road cycle tracks of approximately 2.0m wide between Newtown Avenue and Carysfort;

- Off-road cycle tracks of approximately 2.0m wide between Carysfort Avenue and Rock Hill inbound with an on-road cycle lane outbound; and
- On-road cycle lanes of approximately 1.5m width in both directions between Rock Hill the N31 Mount Merrion Avenue and the L1003 Booterstown Avenue.

There are no designated cycle hire scheme parking racks within Section 1 of the Proposed Scheme, with the exception of three Sheffield stands at Booterstown Station providing capacity for six bicycles.

The existing cycle facilities along Section 1 of the Proposed Scheme are illustrated in Figure 6.4a in Appendix A6.1 – Sub Appendix 3 (Maps).

Further details of the baseline cycling facilities (i.e. level of segregation from vehicles, capacity for cycling two abreast and / or overtaking, and junction treatment) along the length of Section 1 of the Proposed Scheme is included in Appendix A6.1 – Sub Appendix 4 (Impact Assessments).

5.3.2.3 Bus Infrastructure

5.3.2.3.1 Bus Priority Measures

There are no existing bus lanes along the first part of the route on Section 1 of the Proposed Scheme between the R827 Stradbrook Road and the N31 Mount Merrion Avenue. Bus lanes are then provided along the R118 Rock Road in both directions between the N31 Mount Merrion Avenue and L1003 Booterstown Avenue, operating Monday to Saturday between 07:00 and 19:00.

5.3.2.3.2 Bus Stop Facilities

There are 13 bus stops along Section 1 of the Proposed Scheme. The inbound stops are as follows:

- Stop 3164 on R113 Temple Hill, 80m south of R119 Monkstown Road;
- Stop 3083 / 3084 on N31 Frascati Road, 80m south of Rock Hill;
- Stop 469 on R118 Rock Road, 80m north of N31 Mount Merrion Avenue;
- Stop 470 on R118 Rock Road, 50m north of Castledawson Avenue;
- Stop 471 on R118 Rock Road, 40m east of Willow Terrace; and
- Stop 472 on R118 Rock Road, 110m south of Booterstown Avenue.

The outbound stops are:

- Stop 427 on R118 Rock Road, 150m south of Booterstown Avenue;
- Stop 428 on R118 Rock Road, 40m east of Willow Terrace;
- Stop 429 on R118 Rock Road, 40m west of Phoenix Terrace;
- Stop 3032 on R118 Rock Road, 50m north of Rock Hill;
- Stop 6334 on N31 Frascati Road, 40m north of George's Avenue;
- Stop 7660 on N31 Frascati Road, 40m west of Temple Road; and

On the R118 Rock Road, the bus stops are fairly evenly separated (approximately 300-350m) and grouped in pairs. On the N31 Frascati Road, Temple Road, and the R113 Temple Hill, the bus stops are separated by larger distances (approximately 500m).

Only one bus stop has real-time information, while around half have timetable information, shelter and seating. All bus stops on this section of the route have accessible kerbs (containment Kassel kerbs). The contents of

Table 5.3 show the availability of bus stop facilities at the existing 13 bus stops along Section 1 of the Proposed Scheme.

Table 5.3: Section 1 – Availability of Bus Stop Facilities (of a Total of 13 no. Bus Stops)

Bus Stop Facility	Number of Bus Stops in Baseline with Facility	Percentage of Bus Stops in Baseline with Facility
RTPI	1	8%
Timetable information	10	77%
Shelter	8	62%
Seating	8	62%
Accessible Kerbs	13	100%
Indented Drop Off Area	4	33%

Bus routes 4, 7, 7A and 84 are operated by Dublin Bus, while route 17 is operated by Go-Ahead Ireland. Bus route 703 is operated by Aircoach.

The existing bus facilities along Section 1 of the Proposed Scheme are illustrated in Figure 6.5a in Appendix A6.1 – Sub Appendix 3 (Maps). The bus services which operate along Section 1 are outlined in Table 5.4.

Table 5.4: Section 1 – Bus Service Frequency

Service	Route	Typical Service Frequency	
		Weekday	Weekend
4	Harristown - Ballymun - Botanic Ave. - Phibsborough Shopping Centre - City Centre - Pembroke Rd. - Blackrock - Monkstown Ave.	12 minutes	30 minutes
7	Mountjoy Sq. (Mountjoy Sq. North) - Ballsbridge (RDS) – Blackrock - Dun Laoghaire - Brides Glen (Luas Station)	30 minutes	40 minutes
7A	Mountjoy Sq. (Mountjoy Sq. North) - Ballsbridge - Blackrock - Dun Laoghaire - Loughlinstown Pk. (Loughlinstown Wood)	30 minutes	40 minutes
17	Rialto Church - Saint Agnes School - Rathfarnham Road - Rathfarnham Wood - The Oaks - Dundrum Luas - North Avenue – UCD – UCD - Blackrock Station	10 minutes	30 minutes
84	Blackrock - Deans Grange - Cabinteely - Brides Glen (Luas Station) - Bray - Newcastle	30 minutes	30 minutes
703	Dalkey (Castle Street, Hyde Road) - Glasthule (opp. St Joseph's Church) - Dun Laoghaire (Royal Marine Hotel) - Dun Laoghaire (County Hall, Marine Road) - Monkstown (Knox Memorial Hall) - Blackrock (Frascati Centre) - Booterstown (DART station) - Booterstown (Tara Towers Hotel) – St. Vincent's Hospital, R118 Merrion Road (outside hospital opposite Circle K garage) - Clayton Hotel – Ballsbridge (outside hotel grounds at the 483 Dublin Bus Shelter) - RDS (directly outside the RDS opposite the Horse Show House Pub) - Ballsbridge Hotel (on Pembroke Rd opposite the hotel at the 487 Dublin Bus Shelter) - School House Hotel (Northumberland Rd opposite the hotel at the 490 Dublin bus stop) - Grand Canal (Cardiff Lane, An Post before Clayton Hotel) - The 3 Arena (North Wall Quay, outside the 3 Arena, before the roundabout)	60 minutes	60 minutes

5.3.2.4 General Traffic

5.3.2.4.1 R113 Temple Hill

The R113 Temple Hill is a two-way carriageway with two lanes in both directions with opposing flows separated by a central reservation. The carriageway has a curved alignment and is subject to a 50km/h speed limit.

The existing major junction arrangements along the section are as follows:

- R113 Temple Hill / Montpelier Place three-arm priority junction;
- R113 Temple Hill / R119 Monkstown Road three-arm signalised junction; and
- N31 Temple Road / N31 Newtown Avenue / R113 Temple Hill / St Vincent's Park four-arm signalised junction.

The characteristics of each major junction is described in turn below, alongside satellite images which are extracts from Figure 6.6 in Appendix A6.1 – Sub Appendix 3 (Maps).

R113 Temple Hill / Montpelier Place three-arm priority junction: The R113 Temple Hill is a single carriageway with one lane travelling in each direction at this junction, before widening to two lanes for northbound traffic approximately 43.0m north of the junction. There are on-road cycle lanes travelling in both directions. There is an existing bus stop (Stop 3164) directly opposite the Montpelier Place arm, along the R113 Temple Hill northbound movement.

Montpelier Place is a residential car park access (no-through traffic) and is approximately 8.0m wide with one lane approaching and exiting the junction respectively. Approximately 9.0m back from the stop line, there is a loading bay. Parking bays are present on both sides of Montpelier Place. There is a yellow box in front of the Montpelier Place arm, across the R113 Temple Hill southbound traffic lane.

These characteristics are illustrated in Image 5.1.

Image 5.1: R113 Temple Hill / Montpelier Place Junction

R113 Temple Hill / Monkstown Road three-arm signalised junction: The R113 Temple Hill North arm consists of two lanes and a cycle lane in both directions. On the outbound approach to the junction, the left traffic lane is for left turn movements only and the signals include a left turn filter phase. The cycle lane splits into two lanes, one for straight ahead and left turn movements respectively, and there are green priority signals for cyclists. Additionally, there is an access point to Temple Crescent from this junction which can be accessed from the R113 Temple Hill North arm only by making a left turn. The R113 Temple Hill North arm has two traffic lanes and a cycle lane exiting the junction in the inbound direction.

The R113 Temple Hill South arm has two traffic lanes for straight ahead movements only, as right turn movements are not permitted. There is also a cycle lane that continues through the junction. There is a single traffic lane and a cycle lane exiting the R113 Temple Hill South arm.

The approach on the R119 Monkstown Road arm consists of two traffic lanes, both of which can be used to turn onto the R113 Temple Hill northbound, while the inside lane is also for those turning left to head southbound along the R113 Temple Hill South. There is a single lane exiting the junction onto the R119 Monkstown Road arm.

The junction includes a yellow box for southbound traffic along the R113 Temple Hill. These characteristics are shown in Image 5.2.

Image 5.2: R113 Temple Hill / R119 Monkstown Road Junction

R113 Temple Hill / N31 Temple Road / N31 Newtown Avenue / St Vincent's Park four-arm signalised junction: The approach of the R113 Temple Hill arm has three lanes, two for straight ahead movements and the right most lane is a flare lane of approximately 35.0m in length for right turn movements onto the N31 Newtown Avenue, plus a cycle lane. Prior to the stop line, there is a left turn slip lane into St Vincent's Park which is priority controlled. There are two lanes and a cycle lane exiting the junction onto this arm.

Additionally, there is an access point to the residential street, Temple Park Avenue, from this junction which can only be accessed from the R113 Temple Hill southbound lanes of this arm. There is a raised table on entrance to Temple Park Avenue.

The approach of the N31 Temple Road arm has three traffic lanes and a cycle lane; the right most lane is a dedicated right turn flare lane of approximately 25.0m in length. The two left lanes are for straight ahead movements and there is also a left turn slip lane onto the N31 Newtown Avenue. The cycle lane continues southbound through the junction. There are two traffic lanes and a cycle lane exiting the junction onto the N31 Temple Road arm.

The approach of the N31 Newtown Avenue arm has two lanes; both of which allow right turn movements. The inside lane also permits straight ahead and left turn movements. There is a single lane exiting the junction onto this arm.

The St Vincent's Park arm is approximately 5.0m wide and has faded road markings, but has a single lane approaching and exiting the junction respectively. There is a yellow box in front of the St Vincent's Park arm across the R113 Temple Hill northbound traffic lanes.

There are advanced stacking locations for cyclists on the N31 Newtown Avenue arm. These characteristics are shown in Image 5.3.

Image 5.3: R113 Temple Hill / Temple Road / Newtown Avenue Junction

5.3.2.4.2 N31 Temple Road / Frascati Road

The N31 Temple Road / Frascati Road is a dual carriageway with two lanes travelling in each direction separated by a hard central reservation. The road has a slight curve in alignment and is subject to a 50km/h speed limit. The existing major junction arrangements along the N31 Frascati Road are as follows:

- N31 Temple Road / L1011 Temple Road three-arm priority junction;
- N31 Frascati Road / Temple Road / N31 Temple Road / Barclay Court four-arm signalised junction;
- N31 Frascati Road / Sweetman's Avenue four-arm priority junction;
- N31 Frascati Road / R825 Carysfort Avenue four-arm signalised junction;
- N31 Frascati Road / George's Avenue four-arm priority junction; and
- N31 Frascati Road / L1009 Rock Hill / Frascati Road Shopping Centre Car Park Access four-arm signalised junction.

The characteristics of each major junction is described in turn below, alongside satellite images that have been extracted from Figure 6.6 in Appendix A6.1 – Sub Appendix 3 (Maps).

N31 Temple Road / L1011 Temple Road three-arm priority junction: The N31 Temple Road is a dual carriageway with two lanes travelling southbound and three lanes travelling northbound separated by a central reservation. There are on-road cycle lanes travelling in both directions.

The L1011 Temple Road is an exit only left turn slip road for use by buses and cyclists only and is approximately 6.5m wide. There is a yellow box in front of the L1011 Temple Road arm across the N31 Temple Road southbound traffic lane.

These characteristics are illustrated in Image 5.4

Image 5.4: Temple Road / L1011 Temple Road Junction

N31 Frascati Road / L1011 Temple Road / N31 Temple Road / Barclay Court four-arm signalised junction: The approach of the N31 Frascati Road arm has two lanes for straight ahead movements with the left lane also for left turn movements. Right turns by vehicles onto Barclay Court are not permitted. There is also a cycle lane which continues through the junction and cyclists are able to make a right turn onto Barclay Court in two stages by staying left and using the storage lane provided in front of the L1011 Temple Road arm. Two traffic lanes and a cycle lane exit the junction onto the N31 Frascati Road arm.

The N31 Temple Road arm has three lanes of traffic; two lanes are for straight ahead movements and the outside lane is a right turn lane that flares approximately 80.0m before the junction. Additionally, there is a left turn flare lane onto Barclay Court with its own signal head. There are two traffic lanes and a cycle lane exiting the junction onto the N31 Temple Road arm.

Barclay Court has just one approach lane allowing traffic to turn left, right or go straight ahead, and a single lane exiting the junction.

The L1011 Temple Road has two traffic lanes and a cycle lane approaching the junction. The two traffic lanes are a right turn only traffic lane and a lane for left turn and straight ahead movements. There is a single lane and a cycle lane exiting from the junction onto this arm. The approach and exit lanes are separated by a traffic island.

There are two yellow boxes in the middle of the junction across the N31 Frascati Road southbound lanes and the N31 Temple Road northbound traffic lanes. These characteristics are shown in Image 5.5.

Image 5.5: N31 Frascati Road / L1011 Temple Road / N31 Temple Road / Barclay Court Junction

N31 Frascati Road / Sweetman's Avenue four-arm priority junction: The N31 Frascati Road has two vehicular lanes an on-road cycle lane of approximately 2.0m wide in both directions. The cycle lane becomes a segregated cycle track in both directions approximately 38m north and 25m south of the junction respectively.

The Sweetman's Avenue (North) arm is approximately 6.5m wide and there a left-in, left-out arrangement from the N31 Frascati Road for southbound traffic only. There is parking for official Garda vehicles on the western side of Sweetman's Avenue (North), approximately 7.5m back from the stop line.

The Sweetman's Avenue (South) arm is approximately 7.5m wide and there a left-in, left-out arrangement from the N31 Frascati Road for northbound traffic only.

Image 5.6: N31 Frascati Road / Sweetman's Avenue Junction

N31 Frascati Road / Carysfort Avenue / R825 Carysfort Avenue four-arm signalised junction: The approaches on the N31 Frascati Road North and South arms both comprise two lanes; each lane is for straight ahead movements and the left lane also for left turn movements. There are cycle lanes travelling in both directions which continue through the junction, with the outer lane for straight ahead movements. Right turns are banned from these arms. There are two lanes (plus a cycle lane) exiting the junction onto each of these arms.

The Carysfort Avenue (North) arm has two lanes approaching the junction, one for right turning vehicles and one for left turn and straight ahead movements. There is also a short 20.0m section of cycle lane on approach that is approximately 1.5m in width.

The R825 Carysfort Avenue arm approach has one lane for all movements and a single lane exiting the junction. There is a yellow box in front of the R825 Carysfort Avenue arm across the N31 Frascati Road South northbound traffic lanes.

Cyclists turning right at this junction can do so in two stages and there are right turn storage boxes for cyclists in front of the N31 Frascati Road North, Carysfort Avenue (North) and R825 Carysfort Avenue arms. These characteristics are shown in Image 5.7.

Image 5.7: N31 Frascati Road / Carysfort Avenue Junction

N31 Frascati Road / George's Avenue four-arm priority junction: The N31 Frascati Road has two vehicular lanes travelling in each direction There are on-road cycle lanes of approximately 2.0m wide in both directions to the north of the junction and segregated cycle tracks to the south of the junction.

George's Avenue is exit only on both arms, however, cyclists are able to enter through a dedicated segregated cycle entrance to the George Avenue (West) arm from the N31 Frascati Road northbound cycle track.

The George's Avenue (East) arm has two lanes for turning left onto the N31 Frascati Road southbound carriageway. The George's Avenue (West) arm has one lane for turning left onto the N31 Frascati Road northbound carriageway. There is a yellow box in front of George Avenue across the N31 Frascati Road eastbound traffic lane.

These characteristics are illustrated in Image 5.8.

Image 5.8: N31 Frascati Road / George's Avenue Junction

N31 Frascati Road / L1009 Rock Hill / Frascati Road Shopping Centre Car Park Access four-arm signalised junction: The approach of the N31 Frascati Road North arm consists of three lanes of traffic and an on-road cycle lane. The right lane is a flare lane 55.0m from the junction and is for right turn movements to Frascati Shopping Centre Car Park only. The middle two lanes are for straight ahead movements and there is a left turn slip road to the L1009 Rock Hill which also comprises a signalised pedestrian crossing. There are two traffic lanes (plus a cycle lane) exiting the junction.

The approach of the N31 Frascati Road South arm consists of three lanes of traffic and an on-road cycle lane. The right lane is for right turn movements onto the L1009 Rock Hill and there is a separate signal head and green phase for this movement. The left two lanes are for straight ahead movements only. No left turn is permitted. There is a yellow box in the centre of the junction for traffic travelling northwards along the N31 Frascati Road. There are two traffic lanes (plus a cycle lane) exiting the junction.

The cycle lanes on the N31 Frascati Road North and South arms continue through the junction.

The L1009 Rock Hill arm has two lanes approaching the junction and a single lane exiting the junction. On the approach, the inside lane is for all movements and the outside lane is for turning right only.

The Frascati Road Shopping Centre Car Park Access arm has a two-lane approach with the inside lane for left turn and straight ahead movements, and the outer lane for right turn movements. There is a single lane exiting the junction onto this arm.

These characteristics are shown in Image 5.9.

Image 5.9: R118 Rock Road / Rock Hill / N31 Frascati Road Junction

5.3.2.4.3 R118 Rock Road

The R118 Rock Road is a dual carriageway with two lanes travelling in each direction. The road is subject to a speed limit of 50km/h. The existing major junction arrangements along R118 Rock Road are as follows:

- R118 Rock Road / N31 Mount Merrion Avenue three-arm signalised junction.
- R118 Rock Road / Castledawson three-arm priority junction;
- R118 Rock Road / Phoenix Terrace three-arm priority junction;
- R118 Rock Road / Emmet Square / Blackrock Clinic four-arm priority junction; and
- R118 Rock Road / Seafort Parade / Castledawson Avenue three-arm priority junction.

The characteristics of each major junction is described in turn below, together with satellite images that have been extracted from Figure 6.6 in Appendix A6.1 – Sub Appendix 3 (Maps).

R118 Rock Road / Mount Merrion Avenue three-arm signalised junction: The approach of the R118 Rock Road North arm consists of three lanes of traffic. The outer most lane is a right turn lane that flares 35m before the junction. The inner two lanes are for continuing straight ahead. There is an on-road cycle lane up to the stop line.

The approach arm of the N31 Rock Road South consists of two lanes of traffic. Both lanes continue straight and there is also a signal controlled left turn slip to the N31 Mount Merrion Avenue with a pelican crossing. Across this approach arm is a signalised pedestrian pelican crossing with dropped kerbs and tactile paving, pedestrian road markings and a traffic island. There is a non-mandatory cycle lane, which becomes mandatory for the final 15m before the junction. There is an additional mandatory cycle lane on the left turn slip.

The N31 Mount Merrion Avenue arm to the south has a two-lane approach with the inner lane for all directions and the outer lane for right turn movement. Across this approach arm is a staggered signalised pedestrian pelican crossing with dropped kerbs, pedestrian guard rail, tactile paving, pedestrian road markings and a traffic island. There is an advanced stacking location and a left turn slip cycle track provided for cyclists.

All cycle tracks/lanes are approximately 2.0m in width and continue across the junction. There are two yellow boxes for traffic moving across the junction. These characteristics are shown in Image 5.10.

Image 5.10: R118 Rock Road / Mount Merrion Avenue Junction

R118 Rock Road / Castledawson three-arm priority junction: The R118 Rock Road is a single carriageway with two lanes travelling in each direction, separated by a central reservation at this junction. The inside lane is a bus lane in both directions, and there are on-road cycle lanes in both directions. In addition, there is a right turn filter lane of approximately 55.0m in length for traffic turning right from the R118 Rock Road North to Castledawson.

The Castledawson arm provides access into a residential estate and is approximately 6.5m wide with one lane approaching and exiting the junction respectively. Double yellow lines are present along both sides of the road. There is a yellow box in front of the Castledawson arm across the R118 Rock Road westbound traffic lanes.

These characteristics are illustrated in Image 5.11.

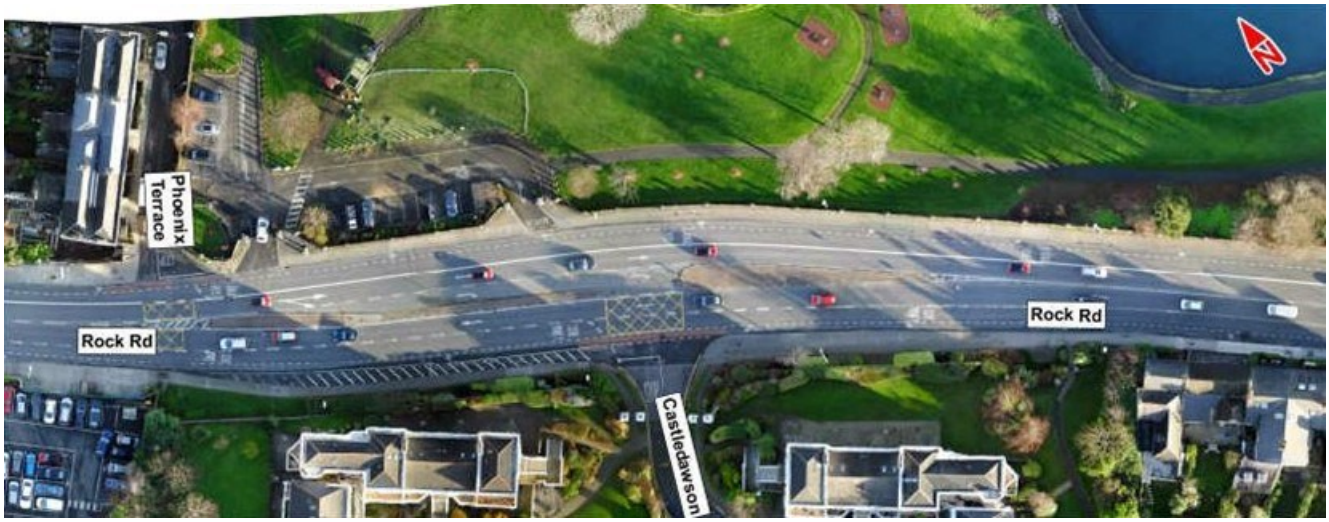


Image 5.11: R118 Rock Road / Castledawson Junction

R118 Rock Road / Phoenix Terrace three-arm priority junction: The R118 Rock Road is a single carriageway with a bus lane and general traffic lane travelling in each direction at this junction. There are on-road cycle lanes travelling in both directions.

Phoenix Terrace is a no-through road, providing access to a residential estate. The road is approximately 5.5m wide and has one lane approaching and exiting respectively. Approximately 12.0m back from the stop line, there is on-street parking on both sides of the road which effectively narrows the carriageway to a single lane. Two yellow boxes are located in front of the Phoenix Terrace arm, one across the R118 Rock Road eastbound traffic lane and one across the westbound traffic lane.

These characteristics are illustrated in Image 5.12.

Image 5.12: Rock Road / Phoenix Terrace Junction

R118 Rock Road / Emmet Square / Blackrock Clinic four-arm priority junction: The R118 Rock Road is a single carriageway with a bus lane and general traffic lane travelling in each direction at this junction. There are on-road cycle lanes travelling in both directions. There are storage boxes in the middle of the junction for one right turner waiting to turn into Emmet Square and the Blackrock Clinic respectively.

Emmet Square provides access to a residential cul-de-sac and is approximately 5.5m wide, with double yellow lines present on both sides of the road and has tight corner radii. There are no centre line road markings present on the Emmet Square arm.

The Blackrock Clinic access is approximately 7.5m wide and has two lanes approaching the junction and one lane exiting the junction. Approximately 10.0m back from the stop line there is a zebra crossing. There is a yellow box in front of both minor arms across the northbound and southbound traffic lanes on the R118 Rock Road.

These characteristics are illustrated in Image 5.13.

Image 5.13: R118 Rock Road / Emmet Square / Blackrock Clinic Junction

R118 Rock Road / Seafort Parade / Castledawson Avenue three-arm priority junction: The R118 Rock Road is a single carriageway with a bus lane and general traffic lane travelling in each direction at this junction. There are on-road cycle lanes travelling in both directions.

Seafront Parade is one-way travelling towards the R118 Rock Road, is approximately 4.0m wide, and has tight corner radii. Approximately 4.5m from the stop line, parking bays are present on the western side of the road. There are double yellow lines on the eastern side of the road.

Castledawson Avenue is a no-through road and is approximately 6.0m wide with tight corner radii. There are no parking restrictions, and cars are typically parked immediately on entry which effectively narrows the carriageway width to approximately 4.0m.

There is a yellow box in front of the Seafront Parade arm across the northbound and southbound general traffic lanes on the R118 Rock Road.

These characteristics are illustrated in Image 5.14.

Image 5.14: R118 Rock Road / Seafort Parade / Castledawson Avenue Junction

5.3.2.5 Existing Parking / Loading

There is limited on-street parking and loading along Section 1 of the Proposed Scheme which can be found at the following locations:

- R118 Rock Road between Emmet Square and Castledawson Avenue, there is a bay for parking and loading which can accommodate approximately seven vehicles. These parking bays are pay & display and permit parking in operation from Monday to Saturday between 08:00 and 19:00;
- R118 Rock Road between Seaford Parade (North) and the access to Blackrock College, there are two parking bays, one which can accommodate approximately five vehicles and the other can accommodate approximately two vehicles; and
- R118 Rock Road between the Willow Park School entrance and the L1003 Booterstown Avenue, there is a short stretch of parking (approximately 40m) which can accommodate approximately eight vehicles.

5.3.3 Section 2 –Booterstown Avenue to Nutley Lane

This section of the chapter outlines the baseline environment for walking, cycling, bus services, general traffic and parking / loading facilities along Section 2 of the Proposed Scheme between the L1003 Booterstown Avenue and Nutley Lane. Section 2 begins on the R118 Rock Road at its junction with Booterstown Avenue and continues along the R118 Rock Road until Nutley Lane. It passes Elmpark Green Business Campus, the Merrion Gates junction and St. Vincent's University Hospital as well as various retail units and residential properties. Section 2 of the Proposed Scheme is approximately 1.6km in length and runs in a southeast to northwest direction along the R118 Rock Road and Merrion Road.

5.3.3.1 Pedestrian Infrastructure

The walking facilities along Section 2 of the Proposed Scheme are of an adequate standard with footpaths present on both sides of the road of approximately 2.0m in width and street lighting is also provided throughout.

There are several pedestrian crossings along Section 2 of the Proposed Scheme, the majority of which are signalised. Pedestrian crossing facilities can be found at the following locations:

- The R118 Rock Road / Trimleston Avenue three-arm signalised junction has signalised crossings on two of the three arms (the R118 Rock Road (South) and Trimleston Avenue arms);
- The R118 Merrion Road / Elmpark Green three-arm signalised junction has signalised crossings on two of the three arms (the R118 Merrion Road (South) and Elmpark Green arms). Both crossings are staggered in three stages with traffic islands and guard rails;
- A signalised crossing on the R118 Merrion Road (North) arm at the junction with the R131 Strand Road with a traffic island providing pedestrian refuge;
- A pelican crossing on the R118 Merrion Road approximately 14.0m east of Herbert Avenue with a traffic island providing pedestrian refuge;
- The staggered four-arm R118 Merrion Road / Merrion Village / St. Vincent's University Hospital signalised junction has signalised crossings on the R118 Merrion Road (North) and St. Vincent's University Hospital arms. Both crossings are staggered in three stages; and
- The R118 Merrion Road / Nutley Lane three-arm signalised junction has signalised crossings on two of the three arms (the R118 Merrion Road (South) and Nutley Lane arms). The R118 Merrion Road (South) arm features a traffic island and the Nutley Lane crossing is staggered in two stages with a traffic island and guard rails.

Uncontrolled crossings across priority junctions at side roads benefit from dropped kerbs. The location of pedestrian crossings is illustrated in Figure 6.3b in Appendix A6.1 – Sub 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 Appendix A6.1 – Sub Appendix 4 (Impact Assessments).

5.3.3.2 Cycling Infrastructure

Existing cycle facilities from the L1003 Booterstown Avenue to Nutley Lane along the R118 Rock Road and Merrion Road predominantly consist of on-road cycle lanes and cyclists sharing the bus lanes as follows:

- Cycle lanes of approximately 1.5m wide on both sides of the road between the L1003 Booterstown Avenue and Trimleston Avenue;
- Cyclists share the bus lane travelling southbound between Trimleston Avenue and Elmpark Green (no specific cyclist facilities travelling northbound);
- Cyclists share the bus lanes in both directions between Elmpark Green and the R131 Strand Road;
- Cyclists share the bus lane travelling northbound between the R131 Strand Road and Herbert Avenue;
- Cyclists share the bus lanes in both directions between Herbert Avenue and Nutley Lane.

At signalised junctions, there are typically advanced stacking locations for cyclists along the mainline (R118 Rock Road and Merrion Road) but no cyclist facilities continue through the junction. Where cycle lanes are present, these typically traverse priority junctions along Section 2 of the Proposed Scheme.

There are five Sheffield style cycle parking racks (able to accommodate up to 10 bicycles) on the R118 Rock Road immediately south of St Helen's Street (South). Elsewhere there is no public cycle parking or designated cycle hire scheme racks along Section 2 of the Proposed Scheme.

The existing cycle facilities along Section 2 of the Proposed Scheme is illustrated in Figure 6.4b in Appendix A6.1 – Sub Appendix 3 (Maps).

Further details of the baseline cycling facilities (i.e. level of segregation from vehicles, capacity for cycling two abreast and / or overtaking, and junction treatment) along the length of Section 2 of the Proposed Scheme is included in Appendix A6.1 – Sub Appendix 3 (Maps).

5.3.3.3 Bus Infrastructure

5.3.3.3.1 Bus Priority Measures

Bus lanes are provided along the majority of Section 2 of the Proposed Scheme (aside from intermittent breaks and junctions).

5.3.3.3.2 Bus Stop Facilities

There are currently 11 bus stops along Section 2 of the Proposed Scheme. The inbound stops are as follows:

- Stop 473 on R118 Rock Road at Grotto Avenue;
- Stop 4705 on R118 Rock Road, 40m south of St Helen's Road North;
- Stop 475 R118 Merrion Road, 50m north of Bellevue Avenue;
- Stop 476 R118 Merrion Road, 60m east of Strand Road;
- Stop 477 R118 Merrion Road, 100m east of Herbert Avenue; and
- Stop 478 R118 Merrion Road, 40m west of St Vincent's Hospital north access.

The outbound stops are:

- Stop 422 R118 Merrion Road, 90m west of St Vincent's University Hospital north access;
- Stop 423 R118 Merrion Road, 60m east of Herbert Avenue;
- Stop 424 R118 Merrion Road, 130m east of Strand Road;
- Stop 425 R118 Merrion Road, 20m north of Bellevue Avenue; and
- Stop 426 on R118 Rock Road, 40m south of St Helen's Road North.

The bus stops are separated fairly evenly, varying between 150m – 350m with most grouped in pairs. The majority of bus stops have timetable information, shelter and seating as well as accessible kerbs. Only around 30% have real-time information.

The content of Table 5.5 outlines the availability of bus stop facilities at the existing 11 bus stops along Section 2 of the Proposed Scheme.

Table 5.5 Section 2 – Availability of Bus Stop Facilities (of a Total of 11 no. Bus Stops)

Bus Stop Facility	Number of Bus Stops in Baseline with Facility	Percentage of Bus Stops in Baseline with Facility
RTPI	3	27%
Timetable information	9	82%
Shelter	9	82%
Seating	9	82%
Accessible Kerbs	10	91%
Indented Drop Off Area	6	55%

The existing bus facilities along Section 2 of the Proposed Scheme are illustrated in Figure 6.5b in Appendix A6.1 – Sub Appendix 3 (Maps). The bus services that operate along Section 2 are outlined in Table 5.6.

Table 5.6: Section 2 – Bus Service Frequency

Service Route	Route	Typical Service Frequency	
		Weekday	Weekend
4	Harristown - Ballymun - Botanic Ave. - Phibsboro Shopping Centre - City Centre - Pembroke Rd. - Blackrock - Monkstown Ave.	12 minutes	30 minutes
7A	Mountjoy Sq. (Mountjoy Sq. North) - Ballsbridge - Blackrock - Dún Laoghaire - Loughlinstown Pk. (Loughlinstown Wood)	30 minutes	40 minutes

5.3.3.4 General Traffic

5.3.3.4.1 R118 Rock Road

The R118 Rock Road is a dual carriageway with two lanes travelling in each direction and is subject to a 50km/h speed limit. The number of lanes typically increases on the approach to signalised junctions to incorporate designated right and / or left turn movements. This section of the road is mostly straight in alignment with a slight curve. The inside lane in each direction is generally a bus lane, while the right-hand lane is for general traffic.

The existing major junction arrangements along the R118 Rock Road within Section 2 of the Proposed Scheme are as follows:

- R118 Rock Road / L1003 Booterstown Avenue / Booterstown DART Station Car Park four-arm signalised junction;
- R118 Rock Road / St Helens Road (South) three-arm priority junction;
- R118 Rock Road / St Helens Road (North) three-arm priority junction; and
- R118 Rock Road / Trimleston Avenue three-arm signalised junction.

R118 Rock Road / L1003 Booterstown Avenue / Booterstown DART Station Car Park four-arm signalised junction: The approach of the R118 Rock Road North arm consists of three lanes of traffic and a cycle lane. The right-hand lane is a right turn lane that flares approximately 100m before the junction and the signals operate a right turn filter phase. The middle and left lanes are for straight ahead movements and for left turn movements into the Booterstown DART Station car park (later merging with the middle lane past the junction). Exiting the junction onto this arm are two traffic lanes and a cycle lane.

The approach of the R118 Rock Road South arm consists of two lanes of traffic and a cycle lane. Both lanes are for straight ahead movements, while traffic on the inside lane can also turn left onto the L1003 Booterstown Avenue. Exiting the junction onto this arm are two traffic lanes and a cycle lane.

The L1003 Booterstown Avenue and Booterstown DART Station car park arms have one lane approaches with all movements permitted, and single lane exits. There is a yellow box across the R118 Rock Road northbound and southbound traffic lanes.

These characteristics are illustrated in Image 5.15.

Image 5.15: R118 Rock Road / Booterstown Avenue Junction / Booterstown DART Station Car Park

R118 Rock Road / St Helens Road (South) three-arm priority junction: The R118 Rock Road is a single carriageway with a bus lane and general traffic lane travelling in each direction at this junction. The junction also includes on-road cycle lanes travelling in both directions.

St Helens Road (South) is approximately 7m wide and has one lane entering and one lane existing respectively, with generous corner radii. Double yellow lines are present on entry, with car parking located on both sides of the road approximately 24.1m from the stop line. There is a yellow box in front of St Helens Road (South) arm across the R118 Rock Road westbound traffic lane.

These characteristics are illustrated in Image 5.16.

Image 5.16: R118 Rock Road / St Helens Road (South) Junction

R118 Rock Road / St Helens Road (North) three-arm priority junction: This section of the R118 Rock Road is single carriageway with a bus lane and general traffic lane travelling in each direction. It also includes on-road cycle lanes travelling in both directions.

St Helens Road (North) is approximately 6.8m wide and has one lane entering and one lane existing respectively, with generous corner radii. Double yellow lines are present on entry, with car parking located on both sides of the road approximately 38.7m and 23.1m from the stop line respectively. There is a yellow box in front of the St Helens Road (North) arm across the R118 Rock Road westbound traffic lanes.

These characteristics are illustrated in Image 5.17.

Image 5.17: R118 Rock Road / St Helens Road (North) Junction

R118 Rock Road / Trimleston Avenue three-arm signalised junction: The approach of the R118 Rock Road North arm consists of three traffic lanes. The right-hand lane is a right turn lane that flares approximately 40.0m before the junction and the traffic signals include a right turn filter phase. There are two traffic lanes exiting the junction onto this arm.

The approach of the R118 Rock Road South arm consists of two lanes of traffic, both lanes for straight ahead movements, while the inside lane is also used for left turns to Trimleston Avenue. There is also a cycle lane at the stop line which does not continue through the junction. Exiting the junction onto this arm are two traffic lanes, the inside of which becomes a bus lane approximately 25.0m from the junction.

The Trimleston Avenue arm has a two-lane approach; the inside lane for turning left and the outside lane for turning right; and a single lane exiting the junction onto this arm. There is also an advanced stacking location for cyclists. There is a raised table approximately 30.0m back from the stop line.

There is a yellow box in the middle of the junction, across the R118 Rock Road northbound and southbound traffic lanes. These characteristics are illustrated in Image 5.18.

Image 5.18: R118 Rock Road / Trimleston Avenue Junction

5.3.3.4.2 R118 Merrion Road

The R118 Merrion Road is a two-way carriageway with three lanes, and the traffic is separated by a central reservation on parts of the road. The width of the road varies between approximately 7m to 20m. The R118 Merrion Road is subject to a speed limit of 50km/h. The road is mostly straight in alignment with a slight curve towards Nutley Lane. The existing major junction arrangements along the R118 Merrion Road within Section 2 of the Proposed Scheme are as follows:

- R118 Merrion Road / Elmpark Green three-arm signalised junction;
- R118 Merrion Road / R131 Strand Road Left-Turn Slip Lane priority junction;
- R118 Merrion Road / R131 Strand Road three-arm signalised junction;
- R118 Merrion Road / Herbert Avenue three-arm priority junction;
- R118 Merrion Road / Merrion Village / St. Vincent's University Hospital four-arm staggered signalised junction; and
- R118 Merrion Road / Nutley Lane three-arm signalised junction.

R118 Merrion Road / Elmpark Green three-arm signalised junction: The approach of the R118 Merrion Road North arm consists of three lanes of traffic; the inside lane is a bus lane (which continues through the junction), the middle lane is for straight ahead movements and the outside lane is a right turn lane that flares approximately 150m before the junction. There are two lanes which exit onto this arm and shortly widens out to three lanes (the inside lane for buses) approximately 35.0m from the junction.

The approach of the R118 Merrion Road South arm consists of two lanes of traffic, plus a left slip lane onto Elmpark Green which is separated by a traffic island. Both lanes and for straight ahead movements. There are two lanes exiting the junction onto this arm with the inside lane a bus lane.

The Elmpark Green arm has a two-lane approach; the inside lane leading to a left-turn slip lane which then yields to the R118 Merrion Road northbound traffic, and the right-hand lane for vehicles turning right at the traffic signals. There is a single lane exiting from the junction in addition to the left turn slip lane from the R118 Merrion Road South arm which yields to vehicles on Elmpark Green.

All arms have advanced stacking locations for cyclists and there are two yellow boxes; one across the two R118 Merrion Road northbound traffic lanes, and the other across the R118 Merrion Road southbound general traffic lane. These characteristics are illustrated in Image 5.19.

Image 5.19: R118 Merrion Road / Elmpark Green Junction

R118 Merrion Road / R131 Strand Road Left-Turn Slip Lane priority junction: The R118 Merrion Road has a bus lane and one general traffic lane travelling southbound and a bus lane and two general traffic lanes travelling northbound at this junction. There is a bus stop (Stop 476) on the R118 Merrion Road northbound carriageway opposite the R131 Strand Road left-turn slip lane.

The R131 Strand Road left-turn slip lane is a left turn exit only arrangement which yields to the R118 Merrion Road southbound traffic. The left-turn slip is approximately 3.5m wide. There is a yellow box located in front of the R131 Strand Road left-turn slip lane across the R118 Merrion Road arm southbound lanes.

These characteristics are illustrated in Image 5.20.

Image 5.20: R118 Merrion Road / R131 Strand Road Left-Turn Slip Lane Junction

R118 Merrion Road / R131 Strand Road three-arm signalised junction: The approach of the R118 Merrion Road North arm consists of two lanes of traffic; both of which are for straight ahead movements, with the left lane also for left turn movements onto the R131 Strand Road. Two lanes exit the junction onto this arm, the inside of which is a bus lane.

The approach of the R118 Merrion Road South arm consists of three lanes of traffic. The inside lane is a bus lane and the middle lane continues straight ahead. The outside lane is for right turns onto the R131 Strand Road and the signals operate a right turn filter phase. Two lanes exit the junction onto this arm, the inside of which is a bus lane.

The R131 Strand Road arm has a one lane approach and is subject to a left-turn only arrangement that merges onto R118 Merrion Road south approximately 70.0m to the south of the junction. There is a single lane exiting the junction onto this arm. There is a level crossing (Merrion Gates) on the R131 Strand Road which is linked to the signals at this junction and a yellow box across the approach and exit lanes.

There is also a yellow box across the R118 Merrion Road southbound lanes. These characteristics are illustrated in Image 5.21.

Image 5.21: R118 Merrion Road / R131 Strand Road Junction

R118 Merrion Road / Herbert Avenue three-arm priority junction: The R118 Merrion Road is a single carriageway with a bus lane and one general traffic lane travelling in each direction at this junction. There is a pelican crossing with a traffic island approximately 14.5m south-east of Herbert Avenue.

Herbert Avenue is a no-through road, approximately 7.0m wide with one lane approaching and exiting respectively and has a raised table at the stop line. Double yellow lines are present on both sides of the road. There are parking spaces on the north-western side of the road, approximately 16.5m back from the stop line. There is a yellow box in front of the Herbert Avenue arm across the R118 Merrion Road southbound general traffic lane.

These characteristics are illustrated in Image 5.22.

Image 5.22: R118 Merrion Road / Herbert Avenue Junction

R118 Merrion Road / Merrion Village / St. Vincent's University Hospital four-arm staggered: The approach of the R118 Merrion Road North arm consists of three lanes of traffic. The right-hand lane is a right turn lane to

St Vincent's University Hospital that flares approximately 40.0m before the junction and the signals operate a right turn filter phase. The middle lane continues straight ahead while the inside lane is a bus lane. There are also an advanced stacking location present for cyclists. This arm has a two-lane exit, the inside of which is a bus lane.

The approach of the R118 Merrion Road South arm has two lanes; the left lane for left turn movements only to St Vincent's University Hospital and the right lane for straight ahead movements. Right turn movements onto the Merrion Village arm are made on a priority basis, yielding to southbound traffic from the R118 Merrion Road North. This arm has a two-lane exit, the inside of which is a bus lane. Between the R118 Merrion Road arms, there is a traffic island in the middle of the junction.

The Merrion Village arm is approximately 7.0m wide with one lane approaching and exiting the junction respectively and is a no-through road. There is a yellow box across the R118 Merrion Road northbound and southbound traffic lanes, in front of the Merrion Village arm.

The St. Vincent's University Hospital arm has a one lane approach for right turn movements and a left-slip lane which yields to the R118 Merrion Road northbound traffic. There is a cycle lane approaching the junction which continues along the left-slip. There is one traffic lane and a cycle lane exiting the junction onto this arm. Two traffic islands separate each approach lane and the exit lane.

These characteristics are illustrated in Image 5.23.

Image 5.23: R118 Merrion Road / Merrion Village / St. Vincent's University Hospital Junction

R118 Merrion Road / Nutley Lane three-arm signalised junction: The approach of the R118 Merrion Road North arm has three lanes; two lanes for straight ahead movements (inside lane is a bus lane) and the right lane for right turn movements onto Nutley Lane. There is a storage box marked in the centre of the junction for one vehicle waiting to turn right. There is an advanced stacking location for cyclists. There are two lanes exiting the junction onto this arm, the inside of which is a bus lane.

The R118 Merrion Road South arm has three approach lanes; two for straight ahead movements and the left lane for left turn movements onto Nutley Lane. The middle lane is a bus lane. There are two lanes exiting the junction onto this arm, the inside of which is a bus lane, and the approach and exit lanes are separated by an approximately 1.5m wide central reservation.

Nutley Lane has two lanes approaching the junction, one for left and right turn movements respectively, and one lane exiting the junction. There is a traffic island separating the approach and exit lanes.

There is a yellow box in the middle of the junction across the R118 Merrion Road northbound and southbound lanes. These characteristics are illustrated in Image 5.24.

Image 5.24: R118 Merrion Road / Nutley Lane Junction

5.3.3.5 Existing Parking / Loading

The existing conditions for parking and loading for Section 2 of the Proposed Scheme are as follows:

- To the north of the L1003 Booterstown Avenue along the R118 Rock Road there are approximately five indented parking bays on the southern side of the road that operate a pay & display system (maximum stay three hours) from Monday to Friday between 08:00 and 19:00. There is also a long stretch of parking bays on the southern side of the road between Grotto Avenue and St Helen's Road, including a disabled bay, operating between the same hours;
- Between the R131 Strand Road and Herbert Avenue there is approximately 100m of parking on the northern side of the road which is available for free parking outside the hours of Monday to Saturday, 16:00 – 19:00; and

Between St. Vincent's University Hospital and Nutley Lane, there are sections of parking bays (approximately 15 parking spaces in total) on the northern side of the R118 Merrion Road. A pay & display and permit parking system is in operation at these bays between Monday and Saturday from 07:00 to 19:00.

5.3.4 Section 3 – R118 Merrion Road (Nutley Lane to Ballsbridge)

This section of the chapter outlines the baseline environment for walking, cycling, bus services, general traffic and parking / loading facilities along Section 3 of the Proposed Scheme, between Nutley Lane and Ballsbridge. Section 3 of the Proposed Scheme is approximately 1.6km in length and passes through a busy urban area with a mix of residential homes and buildings that have direct frontage onto the R118 Merrion Road. The road along Section 3 of the Proposed Scheme is predominantly a single carriageway with two lanes travelling in each direction.

5.3.4.1 Pedestrian Infrastructure

The walking facilities along Section 3 of the Proposed Scheme comprise well-lit footpaths on both sides of the road. The footpaths vary in width but are approximately 2.0m at narrower points and 3.0m at wider points. Therefore, in relation to its surrounding land use, the walking facilities along Section 3 of the Proposed Scheme are adequate according to DMURS for areas with low to moderate pedestrian activity.

There are several pedestrian crossings along Section 3 of the Proposed Scheme. Pedestrian crossing facilities can be found at the following locations:

- A pelican crossing at the R118 Merrion Road at Sydney Parade Avenue with a traffic island for pedestrian refuge;
- The R118 Merrion Road / Ailesbury Road four-arm signalised junction has signalised crossing on all arms. All crossings are staggered in two stages with traffic islands;
- A pelican crossing at the R118 Merrion Road, approximately 30.0m north of Merlyn Road;

- A pelican crossing at the R118 Merrion Road, approximately 20.0m south of Shrewsbury Road;
- The R118 Merrion Road / Sandymount Avenue / Simmonscourt Road four-arm signalised junction has a signalised crossing on the R118 Merrion Road South arm only;
- The R118 Merrion Road / Serpentine Avenue three-arm signalised junction has a signalised crossing on the R118 Merrion Road North arm;
- A pelican crossing at the R118 Merrion Road, approximately 90.0m north of Serpentine Avenue, adjacent to Royal Dublin Society Library; and
- The R118 Merrion Road / Ballsbridge Park / R815 Anglesea Road staggered four-arm signalised junction has signalised crossings at the R118 Merrion Road South and R815 Anglesea Road arms. The R815 Anglesea Road crossing is staggered in three stages with traffic islands and only two of the stages are signalised.

Uncontrolled crossings across priority junctions at side roads benefit from dropped kerbs. The location of pedestrian crossings is illustrated in Figure 6.3c in Appendix A6.1 – Sub 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 Appendix A6.1 – Sub Appendix 4 (Impact Assessments).

5.3.4.2 Cycling Infrastructure

Existing cycle facilities are provided along the length of Section 3 of the Proposed Scheme on both sides of the road. At different points of the road, these vary between on-road cycle lanes and cyclists sharing the bus lane, as follows:

- Cyclists share the bus lane travelling northbound between Nutley Lane and Sydenham Road. Travelling southbound, there is an on-road cycle lane which traverses priority and signalised junctions;
- Between Sandymount Avenue and Sydenham Road, cyclists share the bus lanes in both directions;
- Between Sydenham Road and Serpentine Avenue, there is an on-road cycle lane travelling northbound and cyclists share the bus lane travelling southbound;
- Cyclists share the bus lanes in both directions between Serpentine Avenue and Ballsbridge Park; and
- There are cycle lanes in both directions between Ballsbridge Park and Ballsbridge.

Where cycle lanes are present, these typically traverse priority and signalised junctions, whereas bus lanes break at junctions.

Several cycle parking stands are present in Ballsbridge, with two Sheffield stands on Merrion Road west of the junction with Serpentine Avenue, and a further four Sheffield stands near to the junction with Ballsbridge Terrace. These stands provide capacity for a total of 12 bicycles and are all designated cycle hire scheme racks.

The existing cycle facilities along Section 3 of the Proposed Scheme are illustrated in Figure 6.4c in Appendix A6.1 – Sub Appendix 3 (Maps).

Further details of the baseline cycling facilities (i.e. level of segregation from vehicles, capacity for cycling two abreast and / or overtaking, and junction treatment) along the length of Section 3 of the Proposed Scheme is included in Appendix A6.1 – Sub Appendix 4 (Impact Assessments).

5.3.4.3 Bus Facilities

5.3.4.3.1 Bus Priority Measures

There are currently bus lanes along the majority of Section 3 of the Proposed Scheme, operating Monday to Saturday between 07:00 and 19:00, at the following locations:

- In both directions between Nutley Lane and Sydney Parade Avenue;
- Northbound between Sydney Parade Avenue and Merrion View Avenue;
- Northbound between Ailesbury Road and Simmonscourt Road; and

- In both directions between Simmonscourt Road and Ballsbridge.

5.3.4.3.2 Bus Stop Facilities

There are 12 bus stops along this section of the Proposed Scheme. The inbound city centre stops are:

- Stop 479 on R118 Merrion Road, 80m north of Nutley Lane;
- Stop 480 on R118 Merrion Road, 60m north of R824 Ailesbury Road;
- Stop 481 on R118 Merrion Road, 30m north of Merlyn Road;
- Stop 482 on R118 Merrion Road, 30m north of Shrewsbury Road;
- Stop 483 on R118 Merrion Road, 60m south of Sandymount Avenue; and
- Stop 485 on R118 Merrion Road, 100m east of Ballsbridge Park.

The outbound city centre stops are:

- Stop 416 on R118 Merrion Road, 40m east of Ballsbridge Park;
- Stop 417 on R118 Merrion Road, 40m west of Sydenham Road;
- Stop 418 on R118 Merrion Road, 100m south of Sandymount Avenue;
- Stop 419 on R118 Merrion Road, 40m south of Shrewsbury Park;
- Stop 420 on R118 Merrion Road, 60m north of Merlyn Park; and
- Stop 421 on R118 Merrion Road opposite Merrion View Avenue.

The bus stops are evenly separated, and most are grouped in pairs on either side of the road. The majority of bus stops have timetable information, seating and shelters. Almost all stops have accessible kerbs, while only a quarter of the bus stops have real-time information.

Table 5.7 below outlines the availability of bus stop facilities at the existing 12 bus stops along Section 3 of the Proposed Scheme.

Table 5.7: Section 3 – Availability of Bus Stop Facilities (of a Total of 12 Bus Stops)

Bus Stop Facility	Number of Bus Stops in Baseline with Facility	Percentage of Bus Stops in Baseline with Facility
RTPI	3	25%
Timetable information	10	83%
Shelter	9	75%
Seating	9	75%
Accessible Kerbs	11	92%
Indented Drop Off Area	3	25%

The existing bus facilities along Section 3 of the Proposed Scheme are illustrated in Figure 6.5c in Appendix A6.1 – Sub Appendix 3 (Maps). The bus services that operate along Section 3 are outlined in Table 5.8.

Table 5.8: Section 3 – Bus Service Frequency

Service	Route	Typical Service Frequency	
		Weekday	Weekend
2	O'Hanrahan Station – Templeshannon - Main St – Whitmore Jewellers - Knockmore Northbound Stop – Lidl - Euro Shop - Ferrybank Church - Terminal 2 – Departures Road	10 minutes	10 minutes
4	Harristown - Ballymun - Botanic Ave. - Phibsboro Shopping Centre - City Centre - Pembroke Rd. - Blackrock - Monkstown Ave.	12 minutes	30 minutes
7	Mountjoy Sq. (Mountjoy Sq. North) - Ballsbridge (RDS) – Blackrock - Dún Laoghaire - Brides Glen (Luas Station)	30 minutes	40 minutes
7A	Mountjoy Sq. (Mountjoy Sq. North) - Ballsbridge - Blackrock - Dún Laoghaire - Loughlinstown Pk. (Loughlinstown Wood)	30 minutes	40 minutes

18	Newgrove Avenue - RDS Ballsbridge - Burlington Road - Ranelagh Luas - Rathmines Garda Stn - Sundrive Road - Scoil Una Naofa - Crumlin Hospital - Kylemore Road - Ballyfermot Comm Cen - Kennelsfort Green - Hollyville Lawn	15 minutes	30 minutes

5.3.4.4 General Traffic

5.3.4.4.1 R118 Merrion Road

The R118 Merrion Road along Section 3 of the Proposed Scheme is characterised by a single carriageway with a lane in each direction for general traffic and an additional inside bus lane running both ways. The R118 Merrion Road is subject to a 50km/h speed limit and is mostly straight in alignment with a curve towards Ballsbridge.

The existing key junction arrangements along Section 3 of the Proposed Scheme are as follows:

- R118 Merrion Road / Merrion View Avenue three-arm priority junction;
- R118 Merrion Road / Ailesbury Road / R824 Ailesbury Road four-arm signalised junction;
- R118 Merrion Road / Merlyn Park priority junction;
- R118 Merrion Road / Merlyn Road priority junction;
- R118 Merrion Road / Shrewsbury Park priority junction;
- R118 Merrion Road / Shrewsbury Road priority junction;
- R118 Merrion Road / Sandymount Avenue / Simmonscourt Road four-arm signalised junction;
- R118 Merrion Road / Serpentine Avenue three-arm signalised junction; and
- R118 Merrion Road / Ballsbridge Park / R815 Anglesea Road four-arm staggered signalised junction.

R118 Merrion Road / Merrion View Avenue three-arm priority junction: The R118 Merrion Road is a single carriageway with two lanes travelling in each direction at this junction. Along the R118 Rock Road South arm, the inside lane on the northbound carriageway is a bus lane, and there is an advisory cycle lane sharing the inside lane of the southbound carriageway. Along the R118 Rock Road North arm, there are two traffic lanes, and the inside lane is shared with an advisory cycle lane in both directions. There is a bus stop (Stop 421) opposite Merrion View Avenue along the R118 Merrion Road southbound carriageway.

Merrion View Avenue is a no-through road and approximately 8.0m wide with no centre or stop line road markings. There is a raised table on this arm where it meets the R118 Rock Road. Approximately 11.5m from the assumed stop line, there are parking bays on both sides of Merrion View Avenue. There is a yellow box in front of the Merrion View Avenue arm across the R118 Merrion Road northbound traffic lanes.

These characteristics are illustrated in Image 5.25.

Image 5.25: R118 Merrion Road / Merrion View Avenue Junction

R118 Merrion Road / Ailesbury Road / R824 Ailesbury Road four-arm signalised junction: The R118 Merrion Road North arm has two lanes approaching the junction; the inside lane is for left turn and straight ahead movements and the right lane is for right turn and straight ahead movements. There are two lanes exiting the junction onto this arm, the inside of which is a bus lane.

The R118 Merrion Road South arm has two traffic lanes and a cycle lane approaching the junction; the inside lane is for left turn and straight ahead movements and the right lane is for straight ahead movements only. Right turns onto Ailesbury Road (East) are not permitted. There is one traffic lane and a cycle lane exiting the junction onto this arm.

The cycle lanes continue through the junction northbound and southbound along the R118 Merrion Road.

The Ailesbury Road (East) arm has one lane approaching and exiting the junction respectively. In addition, there is a short, left turn slip lane onto the R118 Merrion Road South, which is controlled by its own signal head, alongside which is approximately 15m of cycle lane. Similarly, the R824 Ailesbury Road arm has one lane approaching and exiting the junction respectively, with a short, left turn slip lane onto the R118 Merrion Road North which is controlled by its own signal head.

These characteristics are illustrated in Image 5.26.

Image 5.26: R118 Merrion Road / Ailesbury Road Junction

R118 Merrion Road / Merlyn Park priority junction: This R118 Merrion Road is a single carriageway with a bus lane and one general traffic lane travelling northbound and one traffic lane and a cycle lane travelling southbound at this junction.

Merlyn Park is a one-way (exit-only) road from a residential estate and is approximately 4.5m wide. Approximately 10.0m back from the stop line there are on-street parking bays on the northern side of the road, while double yellow lines are present elsewhere. There is a yellow box in front of the Merlyn Park arm across both general traffic lanes on the R118 Merrion Road.

These characteristics are illustrated in Image 5.27.

Image 5.27: R118 Merrion Road / Merlyn Park Junction.

R118 Merrion Road / Merlyn Road three-arm priority junction: The R118 Merrion Road is a single carriageway with a bus lane, one general traffic lane travelling northbound and one traffic lane and a cycle lane travelling southbound at this junction. There is a pelican crossing of the R118 Merrion Road approximately 30.0m north of Merlyn Road.

Merlyn Road is a no-through road and is approximately 7.0m wide, with one lane approaching and exiting the junction respectively, with generous corner radii. Approximately 16.5m back from the stop line, there are on-street parking bays on the southern side of the road and double yellow lines elsewhere. There is a yellow box in front of Merlyn Road arm across both general traffic lanes on the R118 Merrion Road.

These characteristics are illustrated in Image 5.28.

Image 5.28: R118 Merrion Road / Merrion Road Junction

R118 Merrion Road / Shrewsbury Park three-arm priority junction: The R118 Merrion Road is a single carriageway with a bus lane and one general traffic lane travelling northbound and one traffic lane and a cycle lane travelling southbound at this junction. There is a pelican crossing approximately 35.0m north of Shrewsbury Park.

Shrewsbury Park is approximately 7.0m wide and has one lane approaching and exiting the junction respectively. Double yellow lines are present on both sides of the road. There is a yellow box in front of the Shrewsbury Park arm across the R118 Merrion Road northbound general traffic lane.

These characteristics are illustrated in Image 5.29.

Image 5.29: R118 Merrion Road / Shrewsbury Park Junction

R118 Merrion Road / Shrewsbury Road priority junction: The R118 Merrion Road is a single carriageway with a bus lane and one general traffic lane travelling northbound and one traffic lane and a cycle lane travelling southbound at this junction. There is a pelican crossing approximately 20.0m south of Shrewsbury Road.

Shrewsbury Road is approximately 8.5m wide and has one lane approaching and exiting the junction respectively. Double yellow lines are present on both sides of the road. There is a traffic island separating the approach and exit lanes.

These characteristics are illustrated in Image 5.30.

Image 5.30: R118 Merrion Road / Shrewsbury Road Junction

R118 Merrion Road / Sandymount Avenue / Simmonscourt Road four-arm signalised junction: The R118 Merrion Road North arm has two lanes approaching the junction, the left lane is for left turn movements onto Sandymount Avenue and the right lane is for straight ahead and right turn movements. There are two lanes exiting the junction onto this arm, the inside of which is a bus lane.

The R118 Merrion Road South arm has two lanes approaching the junction, the inside of which is a bus lane and for left turns onto Simmonscourt Road, while the right lane is for straight ahead movements only. There is also an advisory cycle lane marked within the bus lane. Right turns onto Sandymount Avenue are not permitted. There is

one traffic lane and a cycle lane exiting the junction onto this arm. The approach and exit lanes are separated by a traffic island and white line hatching.

Sandymount Avenue has one lane approaching the junction that widens to two narrow lanes (approximately 5.0m wide in total). The left lane is for left turn movements and the right lane is for right turn and straight ahead movements. There is one lane exiting the junction onto this arm that is separated from the approach lane by a traffic island.

Similarly, the Simmonscourt arm has two lanes approaching the junction, the inside of which is for left turn movements and the right lane for right turn and straight ahead movements. There is an advanced stacking location for cyclists. There is one lane exiting the junction onto this arm that is separated from the approach lane by a traffic island.

There is a yellow box in the middle of the junction across the two R118 Merrion Road northbound bus and traffic lanes.

These characteristics are illustrated in Image 5.31.

Image 5.31: R118 Merrion Road / Sandymount Avenue / Simmonscourt Road Junction

R118 Merrion Road / Serpentine Avenue three-arm signalised junction: The approach of the R118 Merrion Road North arm has two traffic lanes and a cycle lane. The left lane is a bus lane which breaks to allow left turn movements onto Serpentine Avenue. The right lane is for general traffic travelling straight ahead. There is one wide traffic lane (approximately 4.5m wide) and a cycle lane exiting the junction onto this arm. Approximately 30.0m past the junction, this splits into a bus lane and a general traffic lane. The approach and exit lanes are separated by a traffic island and white line hatching.

The approach of the R118 Merrion Road South arm has two traffic lanes and a cycle lane; both traffic lanes are for straight ahead movements and the right lane is also for right turn movements onto Serpentine Avenue. There is an advanced stacking location for cyclists. There are two lanes exiting the junction onto this arm, the inside of which is a bus lane.

The approach of the Serpentine Avenue arm has two lanes; one for left and right turn movements respectively. There is one lane exiting the junction onto this arm. A traffic island and white line hatching separates the approach and exit lanes.

Cycle lanes continue in both directions through the junction along the R118 Merrion Road. There is a yellow box in the middle of the junction across the R118 northbound and southbound traffic lanes.

These characteristics are illustrated in Image 5.32.

Image 5.32: R118 Merrion Road / Serpentine Avenue Junction

R118 Merrion Road / Ballsbridge Park / R815 Anglesea Road four-arm staggered signalised junction: The R118 Merrion Road North arm has two lanes approaching the junction and a cycle lane. The left lane is for left turn movements onto Ballsbridge Park and for straight ahead movements for buses only. The right lane is for straight ahead movements for general traffic. Three traffic lanes and a cycle lane exit the junction onto this arm.

The Ballsbridge Park arm has two lanes approaching the junction. The inside lane is a priority-controlled left turn slip lane that yields to the R118 Merrion Road southbound traffic, while the outside lane is a signal-controlled right turn lane. There is one lane exiting the junction onto this arm.

The approach of the R118 Merrion Road South arm has three lanes that approach a stop line at Ballsbridge Park where there is an advanced stacking location for cyclists. The right lane is for right turn movements onto Ballsbridge Park and the left two lanes are for straight ahead movements. Three lanes (and the cycle lane) then continue north to another stop line approximately 40.0m north at the R815 Anglesea Road. Here, there is a priority-controlled left turn slip lane that yields to R815 Anglesea Road. Two lanes, the inside of which is a bus lane, and a cycle lane exit the junction onto the R118 Merrion Road South arm.

The R815 Anglesea Road arm has two traffic lanes and a cycle lane approaching the junction, and one lane exiting the junction. Both approach lanes are for left turn movements onto the R118 Merrion Road North and no right turns or straight ahead movements are permitted. The approach and exit lanes are separated by a traffic island, and then another traffic island separates the exit lane and the slip lane from the R118 Merrion Road South.

Cycle lanes continue through the junction in both directions along the R118 Merrion Road. There are four yellow boxes at this junction in the following locations:

- Across the R118 Merrion Road southbound bus lane in front of the slip lane from Ballsbridge Park;
- Across the two traffic lanes (bus and general traffic) of the R118 Merrion Road southbound movement in front of the Ballsbridge Park approach and exit lanes;
- In front of the R815 Anglesea Road exit lane across the three lanes of the R118 Merrion Road northbound movement; and
- In front of the R815 Anglesea Road approach lanes across the left lane of the R118 Merrion Road northbound movement.

These characteristics are illustrated in Image 5.33.

Image 5.33: R118 Merrion Road / Ballsbridge Park / Anglesea Road Junction

5.3.4.5 Existing Parking / Loading

There are limited on-street parking and loading bays along Section 3 of the Proposed Scheme. No parking or loading bays are present along the R118 Merrion Road between Nutley Lane and Ballsbridge Park, prevented by the presence of bus lanes.

On the R118 Merrion Road, there is indented on-street parking and a loading bay between Beatty's Avenue and Ballsbridge Park. A pay & display system is in operation from Monday to Saturday between 07:00 and 19:00.

5.3.5 Section 4 – Ballsbridge to Merrion Square

This section of the chapter outlines the baseline environment for walking, cycling, bus services, general traffic and parking / loading facilities along Section 4 of the Proposed Scheme between Ballsbridge and Merrion Square. Section 4 of the Proposed Scheme is approximately 1.7km in length and follows the R118 Pembroke Road, the R816 Pembroke Road, the R816 Baggot Street Upper, across Macartney Bridge onto the R816 Baggot Street Lower, followed by Fitzwilliam Street Lower to Merrion Square.

5.3.5.1 Pedestrian Infrastructure

Generally, the walking facilities along Section 4 of the Proposed Scheme are good with street lighting and footpaths ranging between 3.0m and 5.0m wide. In relation to its surrounding land use, the walking facilities along Section 4 of the Proposed Scheme are desirable for areas with low to moderate pedestrian activity according to DMURS.

There are several pedestrian crossings along Section 4 of the Proposed Scheme, the majority of which are signalised. Pedestrian crossing facilities can be found at the following locations:

- The R118 Pembroke Road / R815 Shelbourne Road three-arm signalised junction has signalised crossings on all arms. Both crossings are staggered in two stages and feature guard rails;
- The R118 Pembroke Road / Elgin Road / Herbert four-arm signalised junction has signalised crossings on the R118 Pembroke Road North and Elgin Road arms;
- The R118 Northumberland Road / Lansdowne Road / R118 Pembroke Road / R816 Pembroke Road staggered four-arm signalised junction has signalised crossings at the R816 Pembroke Road, the R118 Northumberland Road and Lansdowne Road arms. The Lansdowne Road and R815 Pembroke Road crossings are staggered in two and three stages respectively, and both feature guard rails;
- The R816 Baggot Street Upper / Waterloo Road three-arm signalised junction has signalised crossings on the R816 Baggot Street Upper (South) and Waterloo Road arms, with both featuring traffic islands;
- The R816 Baggot Street Upper / R111 Mespil Road / R111 Haddington Road four-arm signalised junction has signalised crossings at the R111 Haddington Road, R815 Baggot Street Upper (South) and R111 Mespil Road arms;

- The R816 Baggot Street Lower / Herbert Place / Wilton Terrace four-arm signalised junction has signalised crossings at each arm. The R815 Baggot Street Lower North crossing is staggered in two stages and features guard rails; and
- The Fitzwilliam Street Lower / R816 Baggot Street Lower / Fitzwilliam Street Upper four-arm signalised junction has signalised crossings on each arm, all featuring traffic islands.

Uncontrolled crossings across priority junctions at side roads benefit from dropped kerbs. The location of pedestrian crossings is illustrated in Figure 6.3d in Appendix A6.1 – Sub 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 Appendix A6.1 – Sub Appendix 4 (Impact Assessments).

5.3.5.2 Cycling Infrastructure

There are on-road cycle lanes between the R815 Anglesea Road and Elgin Road across Ballsbridge in both directions. North of Elgin Road there are no dedicated cycle facilities along the remainder of Section 4 of the Proposed Scheme, and hence, cyclists must share the carriageway with all other vehicles.

There are numerous cycle parking stands along this route, including seven Sheffield stands at the junction with Shelbourne Road, approximately 17 on the R816 Baggot Street Upper, 21 on Baggot Street Lower, four on Fitzwilliam Street Lower and a cycle hoop at the corner of Merrion Square. These stands provide capacity for approximately 100 bicycles. Along the R816 Baggot Street Lower there is one Dublin Bikes station, that includes hire bikes with associated stands.

The existing cycle facilities along Section 4 of the Proposed Scheme are illustrated in Figure 6.4b in Appendix A6.1 – Sub Appendix 3 (Maps).

Further details of the baseline cycling facilities (i.e. level of segregation from vehicles, capacity for cycling two abreast and / or overtaking, and junction treatment) along the length of Section 4 of the Proposed Scheme is included in Appendix A6.1 – Sub Appendix 4 (Impact Assessments).

5.3.5.3 Bus Infrastructure

5.3.5.3.1 Bus Priority Measures

There are bus lanes in both directions along the R118 Pembroke Road between Elgin Road and Lansdowne Road which operate from Monday to Saturday between 07:00 – 10:00 and 12:00 – 19:00. There are no bus lanes along the remainder of Section 4 of the Proposed Scheme.

5.3.5.3.2 Bus Stop Facilities

There are currently 13 bus stops along Section 4 of the Proposed Scheme. The inbound stops are as follows:

- Stop 487 on R816 Pembroke Road, 140m north of Elgin Road;
- Stop 2798 on R816 Pembroke Road, 50m west of R118 Pembroke Road;
- Stop 2799 on R816 Pembroke Road, 50m east of Eastmoreland Place;
- Stop 782 on R816 Baggot Street Upper, 60m south of R111 Mespil Road;
- Stop 783 on R816 Baggot Street Lower, 50m north of Pembroke Row; and
- Stop 784 on R816 Baggot Street Lower, 50m south of Fitzwilliam Street Upper.

The outbound stops are as follows:

- Stop 750 on R816 Baggot Street Lower, 50m south of Fitzwilliam Street Upper;
- Stop 751 on R816 Baggot Street Lower, 30m north of Herbert Street;
- Stop 752 on R816 Baggot Street Upper, 60m south of R111 Mespil Road;
- Stop 2796 on R816 Pembroke Road, 20m east of Wellington Road;

- Stop 2797 on R816 Pembroke Road, 80m west of R118 Northumberland Road;
- Stop 414 on R816 Pembroke Road, 80m south of R816 Lansdowne Road; and
- Stop 415 on R816 Pembroke Road, 100m north of R815 Shelbourne Road.

The majority of bus stops have timetable information, while less than half have real-time information, shelters, seating, and accessible kerbs.

Table 5.9 below outlines the availability of bus stop facilities at the existing 17 bus stops along Section 4 of the Proposed Scheme.

Table 5.9: Section 4 – Availability of Bus Stop Facilities (of a total of 13 no. bus stops)

Bus Stop Facility	Number of Bus Stops in Baseline with Facility	Percentage of Bus Stops in Baseline with Facility
RTPI	6	46%
Timetable information	10	77%
Shelter	5	38%
Seating	5	38%
Accessible Kerbs	4	31%
Indented Drop Off Area	1	8%

The existing bus facilities along Section 4 of the Proposed Scheme are illustrated in Figure 6.5d in Appendix A6.1 – Sub Appendix 3 (Maps). The bus services which operate along Section 4 are outlined in Table 5.10.

Table 5.10: Section 4 – Bus Service Frequency

Service	Route	Typical Service Frequency	
		Weekday	Weekend
4	Harristown - Ballymun - Botanic Ave. - Phibsboro Shopping Centre - City Centre - Pembroke Rd. - Blackrock - Monkstown Ave.	12 minutes	30 minutes
7A	Mountjoy Sq. (Mountjoy Sq. North) - Ballsbridge - Blackrock - Dún Laoghaire - Loughlinstown Pk. (Loughlinstown Wood)	30 minutes	40 minutes
18	Newgrove Avenue - RDS Ballsbridge - Burlington Road - Ranelagh Luas - Rathmines Garda Stn - Sundrive Road - Scoil Una Naofa - Crumlin Hospital - Kylemore Road - Ballyfermot Comm Cen - Kennelsfort Green - Hollyville Lawn	15 minutes	30 minutes
37	Baggot St. / Wilton Terrace - O'Connell Bridge - Stoneybatter - Navan Rd. Garda Station - Ashtown - Castleknock Village - Blanchardstown Centre	20 minutes	30 minutes
38	Burlington Rd. - O'Connell Bridge - Berkeley Rd. - Navan Rd. Garda Station - Ashtown - Castleknock - Blanchardstown Village - Damastown	30 minutes	30 minutes
38A	Burlington Rd. - O'Connell Bridge - Berkeley Rd. - Navan Rd. Garda Station - Ashtown - Castleknock - Blanchardstown Village - Damastown	30 minutes	30 minutes
39	Burlington Rd. - O'Connell Bridge - Stoneybatter - Navan Rd. Garda Station - Ashtown - Blanchardstown Village - Clonsilla -Ongar	30 minutes	30 minutes
39A	UCD Belfield - Baggot St. (Grand Canal) - O'Connell Bridge - Stoneybatter - Navan Rd. Garda Station - Ashtown - Hartstown - Ongar	10 minutes	15 minutes
39X	Burlington Rd. - Aston Quay / Bachelors Walk - Blanchardstown Road - Ongar	20 minutes	20 minutes
66X	UCD Belfield - Maynooth (Straffan Rd.)	20 minutes	20 minutes
67X	UCD Belfield - Celbridge	20 minutes	20 minutes
70	Burlington Rd. - O'Connell Bridge - Stoneybatter - Navan Rd. Garda Station - Ashtown - Littlepace - Dunboyne	30 minutes	60 minutes

5.3.5.4 General Traffic

5.3.5.4.1 R118 Merrion Road / Pembroke Road

The R118 Merrion Road / Pembroke Road is a single carriageway with two lanes in each direction - a bus lane, and a general traffic lane. The R118 Merrion Road and R118 Pembroke Road are subject to a speed limit of 50km/h.

The existing major junction arrangements along the R118 Merrion Road / Pembroke Road in Section 4 of the Proposed Scheme are as follows:

- R118 Merrion Road / Beatty's Avenue three-arm priority junction;
- R118 Pembroke Road / R815 Shelbourne Road / Herbert Park four-arm signalised junction -arm signalised junction;
- R118 Pembroke Road / Elgin Road three-arm signalised junction; and
- R118 Northumberland Road / Lansdowne Road / R118 Pembroke Road / R816 Pembroke Road four-arm signalised junction.

R118 Merrion Road / Beatty's Avenue three-arm priority junction: The R118 Merrion Road has three traffic lanes and a cycle lane travelling northbound and two traffic lanes and a cycle lane travelling southbound at this junction. Additionally, there is a right turn lane of approximately 2.0m wide and 18.0m long for right turn movements from the R118 Merrion Road South to Beatty's Avenue.

Beatty's Avenue is approximately 6.0m wide and has no centre or stop line road markings. Double yellow lines are present on both sides of the road. There is a yellow box in front of Beatty's Avenue arm across the two R118 Merrion Road southbound traffic lanes.

These characteristics are illustrated in Image 5.34.

Image 5.34: R118 Merrion Road / Beatty's Avenue Junction

R118 Pembroke Road / R815 Shelbourne Road / Herbert Park four-arm signalised junction: The R118 Pembroke Road North arm has three traffic lanes and a cycle lane. The inside lane is for left turn movements onto the R815 Shelbourne Road. The cycle lane sits between the left lane and the middle lane which is for straight ahead movements and there is an advanced stacking location. The right lane is also for straight ahead movements. There are two lanes exiting the junction onto this arm which are separated from the approach lanes by a traffic island.

The R118 Pembroke Road South arm has three lanes approaching the junction. The left lane is a flare lane for left turn movements onto Herbert Road (or Elgin Road at the next junction) which flares from approximately 35.0m south of the junction. The middle and right lane are for straight ahead movements. There is also a lane for turning

right onto the R815 Shelbourne Road which is approximately 10.0m before from the stop line and has its own signal head. There are two lanes exiting the junction onto this arm which are separated from the approach lanes by a traffic island.

The approach of the R815 Shelbourne Road arm is marked as a wide single lane, which, in practice, operates as a two-lane approach with approximately 20.0m of queueing space available in the outside lane. Left turn movements only onto the R118 Pembroke Road South are permitted. There is one lane exiting the junction onto this arm which is separated from the approach lane by a traffic island.

The approach from Herbert Park has just one wide lane of approximately 5.0m permitting traffic to continue straight ahead onto the R118 Pembroke Road northbound carriageway only. There is one lane exiting the junction onto this arm that is separated from the approach lane by a large traffic island of approximately 16.0m at its widest. There is a yellow box across the front of the Herbert Road exit across the two R118 Pembroke Road northbound traffic lanes.

There is a yellow box in front of the R815 Shelbourne Road across the two straight ahead lanes of the R118 Pembroke Road southbound movement. These characteristics are illustrated in Image 5.35.

Image 5.35: R118 Pembroke Road / R815 Shelbourne Road / Herbert Park Junction

R118 Pembroke Road / Elgin Road three-arm signalised junction: The R118 Pembroke Road North arm has three lanes approaching the junction, the inside of which is a bus lane. All lanes continue straight ahead onto the R118 Pembroke Road / R815 Shelbourne Road / Herbert Park four-arm signalised junction. There are two lanes exiting the junction onto this arm that are separated from the approach lanes by a traffic island.

The R118 Pembroke Road South arm has three lanes approaching the junction, the left of which is for left turn movements onto Elgin Road and split from the right two lanes by a large traffic island, with its own stop line and signal head. The right two lanes are for straight ahead movements. There are three lanes and a cycle lane exiting the junction onto this arm, the inside lane of which becomes a left turn lane onto the R815 Shelbourne Road, that are separated from the approach lanes by a traffic island.

The Elgin Road arm has one wide traffic lane of approximately 5.0m and a cycle lane of approximately 20.0m in length approaching the junction. There is an advanced stacking location for cyclists. There is one lane exiting the junction onto this arm that is separated from the approach lane by a traffic island.

There are two yellow boxes in the middle of the junction across the R118 Pembroke Road northbound and southbound lanes respectively.

These characteristics are illustrated in Image 5.36.

Image 5.36: R118 Pembroke Road / Elgin Road

R118 Northumberland Road / Lansdowne Road / R118 Pembroke Road / R816 Pembroke Road four-arm signalised junction: The R118 Northumberland Road arm has two traffic lanes and a cycle lane approaching the junction. Both lanes are for straight ahead movements and the left lane is also for left turn movements onto Lansdowne Road while the right lane is also for right turn movements onto the R816 Pembroke Road. There is one traffic lane and a cycle lane exiting the junction onto this arm.

The Lansdowne Road arm has two lanes approaching the junction next to a taxi rank running along the inside kerb. The left lane is for left turn movements onto the R118 Pembroke Road and the right lane is for straight ahead movements onto the R816 Pembroke Road. Right turns are not permitted. There is a single wide lane exiting the junction onto the Lansdowne Road arm of approximately 8.0m wide which is separated from the approach lanes by a traffic island.

The R118 Pembroke Road has three lanes approaching the junction, the far left of which is a left turn priority-controlled slip lane yielding to the R816 Pembroke Road. The middle lane (left lane at the stop line) is a bus lane. Right turns onto Lansdowne Road are not permitted. There are two traffic lanes and a cycle lane exiting the junction onto this arm.

The R816 Pembroke Road arm has two lanes approaching the junction. The left lane is for left turn and straight ahead movements, while the right lane is for right turn movements only. There is one lane exiting the junction onto this arm that is separated from the approach lanes by a traffic island.

There is a yellow box in the middle of the junction across the R118 Pembroke Road / Northumberland Road northbound and southbound movements. The cycle lane from the R118 Northumberland Road continues southbound through the junction.

These characteristics are illustrated in Image 5.37.

Image 5.37: R118 Northumberland Road / Lansdowne Road / R118 Pembroke Road / R816 Pembroke Road Junction

5.3.5.4.2 R816 Pembroke Road

The R816 Pembroke Road is a single carriageway with one lane travelling in each direction, separated by an approximately 2.5m wide hatched central reservation that breaks to provide right turn storage lanes. There is on-street parking along the length of the R816 Pembroke Road. The R816 Pembroke Road is subject to a speed limit of 50km/h.

The existing major junction arrangements along the R816 Pembroke Road in Section 4 of the Proposed Scheme are as follows:

- R816 Pembroke Road / Raglan Road;
- R816 Pembroke Road / Wellington Road; and
- R816 Pembroke Road / Eastmoreland Place priority junction.

R816 Pembroke Road / Raglan Road: The R816 Pembroke Road is a single carriageway with one lane travelling in each direction at this junction and parking on both sides of the road. There is a right turn lane of approximately 25.5m long (from the centre of Raglan Road) for vehicles turning right from the R816 Pembroke Road eastbound onto Raglan Road. There is a traffic island on the R816 Pembroke Road immediately east of Raglan Road.

Raglan Road is approximately 9.0m wide (including the parking bays) and has no stop line road markings present. Approximately 9.5m from the assumed stop line, there are on-street parking bays on both sides of the Raglan Road, narrowing the carriageway to approximately 4.0m.

These characteristics are illustrated in Image 5.38.

Image 5.38: R816 Pembroke Road / Raglan Road Junction

R816 Pembroke Road / Wellington Road: The R816 Pembroke Road is a single carriageway with one lane travelling in each direction at this junction and parking on both sides of the road. There is a right turn lane of approximately 16m long (from the centre of Wellington Road) for vehicles turning right from the R816 Pembroke Road eastbound onto Wellington Road.

Wellington Road is approximately 13.0m wide and has no stop line road markings present. Approximately 12.0m from the assumed stop line, there are on-street parking bays on both sides of the Raglan Road, narrowing the carriageway to approximately 7.5m. There is a traffic island between the approach and exit lane on Wellington Road.

These characteristics are illustrated in Image 5.39.

Image 5.39: R816 Pembroke Road / Wellington Road Junction

R816 Pembroke Road / Eastmoreland Place three-arm priority junction: The R816 Pembroke Road is a single carriageway with one lane travelling in each direction at this junction. From the R816 Pembroke Road East there is a narrow right turn flare lane of approximately 2.0m wide and 25.0m long for right turn movements onto Eastmoreland Place. Immediately west of the junction, the R816 Pembroke Road westbound carriageway widens to two lanes. Across the R816 Pembroke Road West arm there is an uncontrolled dropped kerb crossing with a traffic island for pedestrian refuge. There are no on-road cycle lanes at this junction, but on-street parking bays are present on the northern side on the road as well as the southern side of the road on the eastern arm.

Eastmoreland Place has no centre or stop line road markings present and is approximately 9.5m wide (including the parking bays). Approximately 9.0m from the assumed stop line, there are on-street parking bays on both sides of the Eastmoreland Place, narrowing the carriageway to approximately 5.5m. There is a yellow box in front of the Eastmoreland Place arm across the R816 Pembroke Road westbound traffic lane.

These characteristics are illustrated in Image 5.40.

Image 5.40: R816 Pembroke Road / Eastmoreland Place Junction

5.3.5.4.3 R816 Baggot Street Upper / Lower

The R816 Baggot Street Upper and R816 Baggot Street Lower are single carriageways with two lanes travelling in each direction and on-street parking along their length. They are subject to a speed limit of 50km/h. The R816 Baggot Street Lower has a central reservation of approximately 2.0m in width separating the northbound and southbound traffic lanes.

The existing major junction arrangements are as follows:

- R816 Baggot Street Upper / Waterloo Road three-arm signalised junction;
- R816 Baggot Street Upper / R111 Mespil Road / R111 Haddington Road four-arm signalised junction;
- R816 Baggot Street Lower / Herbert Place / Wilton Terrace four-arm signalised junction; and
- R816 Baggot Street Lower / Herbert Street three-arm priority junction.

R816 Baggot Street Upper / Waterloo Road three-arm signalised junction: There are two lanes on each approach to the junction with a yellow box present. There are advisory cycle lanes and advanced stacking locations on the approach arms of Waterloo Road and Baggot Street Upper West for cyclists. The cycle lanes do not continue through the junction.

There is a left turn lane and a straight ahead lane on the eastern arm of Baggot Street Upper, while on the western arm, there is a straight ahead lane and a right turn lane. The Waterloo Road approach comprises a left turn lane and a right turn lane.

On the eastern arm of the junction, there is a signalised pedestrian pelican crossing that includes tactile paving, dropped kerbs, pedestrian road markings and a traffic island.

On the southern approach arm, there is an uncontrolled pedestrian crossing with tactile paving, dropped kerbs, pedestrian road markings and a traffic island. There is also an advanced stacking location for cyclists. These characteristics are illustrated in Image 5.41.

Image 5.41: R816 Baggot Street Upper / Waterloo Road Junction

R816 Baggot Street Upper / R111 Mespil Road / R111 Haddington Road four-arm signalised junction: All approach arms have two lanes and there is a yellow box to prevent congestion affecting the operation of the junction. On the western arm on the R111 Mespil Road, the inside lane is for left and straight ahead movements, while the outside lane is for right turns. There is an advance stacking location present on this arm for cyclists.

Right turn movement is banned from both the R816 Baggot Street Upper arm and the R111 Haddington Road arm. These arms have two lanes for straight ahead movements with the inside lanes also used for left turns. There are also left turn filter lights present.

The southern arm of the R816 Baggot Street Upper has a signalised pedestrian pelican crossing that includes tactile paving, dropped kerbs, pedestrian road markings and a traffic island. Both the eastern and western arms have signalised pedestrian pelican crossing with tactile paving and dropped kerbs, albeit the road markings for the crossing on the western arm do not match the location of the dropped kerbs and tactile paving currently. These characteristics are illustrated in Image 5.42.

Image 5.42: R816 Baggot Street Upper / Mespil Road / Haddington Road Junction

R816 Baggot Street Lower / Herbert Place / Wilton Terrace four-arm signalised junction: Both the R816 Baggot Street Lower approach arms of the junction (including the Baggot Street (Macartney) Bridge) consist of two lanes. Both lanes are for straight ahead movements with the inner lane is also used for turning left. Right turns are banned between Monday and Saturday, 07:00 to 10:00.

Both Herbert Place and Wilton Terrace have one approach lane, however, in practice Wilton Terrace has enough room for vehicles to stack side by side for approximately 15m back to the bus stop. Both of these arms have two-way cycle tracks on the canal side and there are toucan crossings with tactile paving and dropped kerbs.

The junction includes a yellow box and advanced stacking locations are provided on all approach arms for cyclists.

On the northern arm of the R816 Baggot Street Lower, there is a signalised pedestrian pelican crossing with tactile paving and dropped kerbs. On the southern approach arm, there is a staggered signalised pedestrian crossing with tactile paving, dropped kerb, traffic island and pedestrian guard railing. These characteristics are illustrated in Image 5.43.

Image 5.43: Baggot Street Lower / Herbert Place / Wilton Terrace Junction

5.3.5.4.4 Fitzwilliam Street Lower

Fitzwilliam Street Lower has a straight alignment and is subject to a speed limit of 50km/h. There is one traffic lane and an on-road cycle lane of approximately 2.0m wide in each direction which are separated by on-street parking bays on both sides of the road. The existing major junction arrangement is the Fitzwilliam Street Lower / Baggot Street Lower / Fitzwilliam Street Upper four-arm signalised junction.

Fitzwilliam Street Lower / Baggot Street Lower / Fitzwilliam Street Upper four-arm signalised junction: The northern arm of Fitzwilliam Street Lower consists of a two-lane approach, with approximately 20m of queueing space available in the inside lane. Traffic in the inside lane can turn left or continue straight ahead, while traffic in the outside lane can turn right or continue straight ahead.

The eastern arm of Baggot Street Lower is marked as a wide, single lane, but in practice operates as a two-lane approach, with approximately 25.0m of queueing space available in the inside lane. Traffic on the inside lane can turn left or head straight on, while traffic in the outside lane can turn right or continue straight ahead.

The southern arm of Fitzwilliam Street Upper has two lanes approaching the junction, with both lanes turning left or right respectively and both being able to continue straight on.

The western arm of Baggot Street Lower consists of three lanes with an advanced stacking location for cyclists and a tree-lined central reservation. The outside lane is marked for right turns only and provides 20.0m of stacking space and has a right turn filter light. The central lane is marked as straight ahead.

All approach arms have signalised pedestrian pelican crossings with tactile paving, dropped kerbs and traffic islands. These characteristics are illustrated in Image 5.44.

Image 5.44: Fitzwilliam Street Lower / Baggot Street Lower / Fitzwilliam Street Upper Junction

5.3.5.5 Existing Parking / Loading

The existing conditions for parking and loading for this Section 4 of the Proposed Scheme are as follows:

- R118 / R816 Pembroke Road – There are intermittent stretches of parking on both sides of the R118/R816 Pembroke Road, including loading bays and a disabled parking bay. These parking bays are pay & display and permit parking in operation from Monday to Saturday between 07:00 – 19:00;
- R816 Baggot Street Upper – There is almost continuous parking on either side of the R816 Baggot Street Upper, including loading bays and disabled parking spaces. These parking bays are pay & display and permit parking in operation from Monday to Saturday between 07:00 – 19:00;
- R816 Baggot Street Lower – There are stretches of parking available on both sides of the R816 Baggot Street Lower which are pay & display and permit parking in operation from Monday to Saturday between 07:00 – 19:00; and
- Fitzwilliam Street Lower – There are parking bays on both sides of the road which are pay & display and permit parking in operation from Monday to Saturday between 07:00 – 19:00.

5.3.6 Section 5 – Nutley Lane (Stillorgan Road to Merrion Road)

This section outlines the baseline environment for walking, cycling, bus services, general traffic and parking / loading facilities along Section 5 of the Proposed Scheme, along Nutley Lane. Section 5 of the Proposed Scheme is approximately 0.8km in length along Nutley Lane which provides an access into St. Vincent's University Hospital. Nutley Lane runs parallel with Elm Park Golf and Sports Club. Nutley Lane is a single carriageway road with one lane travelling in each direction.

5.3.6.1 Pedestrian Infrastructure

There are footpaths present on both sides of the road that range between approximately 2.5m and 3.5m in width which is considered the desirable width for areas with low to moderate pedestrian activity by DMURS. The area is well-lit with street lighting provided on both sides of the road.

From Nutley Lane, there is pedestrian access to St. Vincent's University Hospital, with a connecting footpath to the various hospital entrances. There is also direct pedestrian access to the Merrion Shopping Centre and Tesco Superstore near the junction with the R118 Merrion Road.

There are several pedestrian crossings along Section 5 of the Proposed Scheme, the majority of which are signalised. Pedestrian crossing facilities can be found at the following locations:

- The R138 Stillorgan Road / Nutley Lane / Greenfield Park four-arm signalised junction has signalised crossing on the R138 Stillorgan Road (North) arm only. This crossing is staggered in three stages with traffic islands. There is an uncontrolled crossing on the Nutley Lane arm which is staggered with traffic islands;

- The Nutley Lane / St. Vincent's University Hospital three-arm signalised junction has signalised crossings at the Nutley Lane South and St. Vincent's University Hospital arms. The St. Vincent's University Hospital crossing features a traffic island;
- A zebra crossing of the Merrion Shopping Centre arm of the Nutley Lane / Merrion Shopping Centre three-arm priority controlled junction; and
- The R118 Merrion Road / Nutley Lane three-arm signalised junction has signalised crossings at the R118 Merrion Road South and Nutley Lane arms.

Uncontrolled crossings across priority junctions at side roads benefit from dropped kerbs. The location of pedestrian crossings is illustrated in Figure 6.3e in Appendix A6.1 – Sub Appendix 3 (Maps).

Further details of the baseline pedestrian facilities (i.e. routing, directness, accessibility, crossing and footpath widths) at each junction along Section 5 of the Proposed Scheme is included in Appendix A6.1 – Sub Appendix 4 (Impact Assessments).

5.3.6.2 Cycling Facilities

There are no dedicated cycle facilities on Nutley Lane, therefore cyclists must share the traffic lane with vehicles. Cycle parking is provided at both entrance points to the Merrion Shopping Centre, totaling 11 racks and space for 22 bicycles. A further two Sheffield stands are present at St. Vincent's University Hospital in proximity to Nutley Lane, providing space for four bicycles. All three cycle parking areas are designated cycle hire scheme parking racks.

5.3.6.3 Bus Facilities

5.3.6.3.1 Bus Priority Measures

There are currently no bus lanes along Section 5 of the Proposed Scheme.

5.3.6.3.2 Bus Stop Facilities

There are currently five bus stops along Section 5 of the Proposed Scheme, with separation distances of approximately 200 – 300m. The inbound stops are as follows:

- Stop 2085 on Nutley Lane, 70.0m west of Nutley Road; and
- Stop 2086 on Nutley Lane, 40.0m east of Nutley Avenue.

The outbound stops are:

- Stop 7053 on Nutley Lane, 90.0m east of R118 Merrion Road;
- Stop 2088 on Nutley Lane, 50.0m west of St Vincent's Hospital; and
- Stop 2089 on Nutley Lane, 40.0m west of Nutley Road.

The bus stops along Nutley Lane do not have real-time information nor do they have accessible kerbs. A third of the bus stops have timetable information, shelter and seating. All bus stops are in line with the carriageway, meaning no bus stops have indented drop off areas.

Table 5.11 below outlines the availability of bus stop facilities at the existing five bus stops along Section 5 of the Proposed Scheme.

Table 5.11: Section 5 – Availability of Bus Stop Facilities (of a Total 5 Bus Stops)

Bus Stop Facility	Number of Bus Stops in Baseline with Facility	Percentage of Bus Stops in Baseline with Facility
RTPI	0	0%
Timetable information	2	40%
Shelter	2	40%

Bus Stop Facility	Number of Bus Stops in Baseline with Facility	Percentage of Bus Stops in Baseline with Facility
Seating	2	40%
Accessible Kerbs	0	0%
Indented Drop Off Area	0	0%

The existing bus facilities along Section 5 of the Proposed Scheme are illustrated in Figure 6.5e in Appendix A6.1 – Sub Appendix 3 (Maps). The bus services which operate along Section 5 are outlined in Table 5.12.

Table 5.12: Section 5 – Bus Service Frequency

Service Route	Route	Typical Service Frequency	
		Weekday	Weekend
2	O'Hanrahan Station – Templeshannon - Main St – Whitmore Jewellers - Knockmore Northbound Stop – Lidl - Euro Shop - Ferrybank Church - Terminal 2 – Departures Road	10 minutes	10 minutes
47	Poolbeg St. - Ringsend - UCD Belfield - Sandyford - Belarmine	30 minutes	60 minutes

5.3.6.4 General Traffic

5.3.6.4.1 Nutley Lane

Section 5 of the Proposed Scheme comprises a single carriageway, with one lane in each direction. Nutley Lane is subject to a speed limit of 50 km/h and the road is straight in alignment. Along Nutley Lane there are also several intermittent speed bumps for traffic calming.

The existing major junction arrangement along Section 5 of the Proposed Scheme comprises the following:

- R138 Stillorgan Road / Nutley Lane / Greenfield Park four-arm signalised junction;
- Nutley Lane / Nutley Park three arm priority junction;
- Nutley Lane / Nutley Road three-arm priority junction;
- Nutley Lane / Elm Park three-arm priority junction;
- Nutley Lane / St. Vincent's University Hospital three-arm signalised junction;
- Nutley Lane / Nutley Avenue three-arm priority junction; and
- Nutley Lane / Merrion Shopping Centre three-arm priority junction.

In addition, there are various other simple priority junctions along Section 5 of the Proposed Scheme where minor roads yield to Nutley Lane.

R138 Stillorgan Road / Nutley Lane / Greenfield Park four-arm signalised junction: The R138 Stillorgan Road North arm has four general traffic lanes, a bus lane and an on-road cycle lane approaching the junction. The left lane is a slip lane for left turn movements onto Nutley Lane and is controlled by a separate signal head. The bus lane continues straight ahead and there are two lanes for straight ahead movements by general traffic. The right lane is for right turn movements onto Greenfield Park and has a separate signal phase to the straight ahead movement. There is an advanced stacking location for cyclists. There are two general traffic lanes, a bus lane and cycle lane exiting the junction onto this arm.

The R138 Stillorgan Road South arm has four traffic lanes and a segregated cycle track approaching the junction. The left lane is for left turn movements onto Greenfield Park, the two middle lanes are for straight ahead movements and the right lane is for right turn movements onto Nutley Lane. There are separate signal phases for the left, straight ahead and right turn movements. There is a stacking location for cyclists. There are two general traffic lanes, a bus lane and cycle lane exiting the junction onto this arm.

Nutley Lane has two approach lanes; the left lane has a separate signal head is for left turn movements onto the R138 Stillorgan Road South arm (southbound movement) and the right lane is for straight ahead and right turn movements. There is one lane exiting onto this arm from the centre of the junction, plus the slip lane from the R138 Stillorgan Road North arm which yields to traffic coming from the centre of the junction. There are no cycle lanes on the Nutley Lane arm.

The Greenfield Park arm has one all movement lane approaching and one lane exiting the junction respectively. There are no cycle lanes on the Greenfield Park arm.

These characteristics are illustrated in Image 5.45.

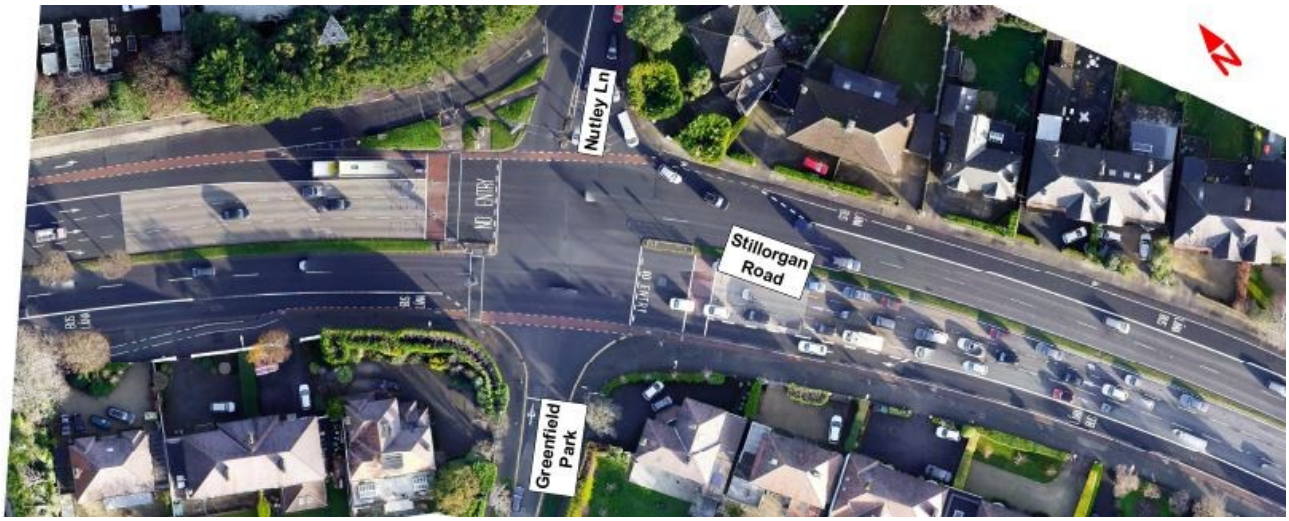


Image 5.45: R138 Stillorgan Road / Nutley Lane / Greenfield Park Junction

Nutley Lane / Nutley Park three arm priority junction: Nutley Lane is a single carriageway with one lane travelling in each direction. There are no on-road cycle lanes at this junction. Nutley Park is a no-through road and is approximately 6.6m wide and has one lane approaching and exiting the junction respectively with generous corner radii. Approximately 18.0m back from the stop line, there are on-street parking bays on both sides of Nutley Park, which effectively narrow the carriageway to a single lane. There is a yellow box in front of the Nutley Park arm across the Nutley Lane westbound traffic lane.

These characteristics are illustrated in Image 5.46.

Image 5.46: Nutley Lane / Nutley Park Priority Junction

Nutley Lane / Nutley Road three-arm priority junction: Nutley Lane is a single carriageway with one lane travelling in each direction at this junction. There are no on-road cycle lanes at this junction. There is a speed table on Nutley Lane, approximately 22.0m south of the Nutley Road arm.

Nutley Road is approximately 5.6m wide and has no centre or stop line road markings. There is a yellow box in front of the Nutley Road arm across the Nutley Lane westbound traffic lane.

These characteristics are illustrated in Image 5.47.

Image 5.47: Nutley Lane / Nutley Road Priority Junction

Nutley Lane / Elm Park three-arm priority junction: Nutley Lane is a single carriageway with one lane travelling in each direction at this junction, plus an approximately 2.0m wide parking lane for pay & display parking on the eastern side of the road. There are no on-road cycle lanes at this junction.

Elm Park is a no-through road and is approximately 5.0m wide and has no centre or stop line road markings. Approximately 12.5m back from the assumed stop line, the road widens to approximately 7.5m to accommodate on-street parking bays on both sides, effectively narrowing the road to a single lane. There is a yellow box in front of the Elm Park arm across both traffic lanes of Nutley Lane.

These characteristics are illustrated in Image 5.48.

Image 5.48: Nutley Lane / Elm Park Priority Junction

Nutley Lane / St. Vincent's University Hospital three-arm signalised junction: The approach of the St. Vincent's University Hospital arm has two traffic lanes; one lane for left and right turn movements respectively, and a cycle lane adjacent to the kerb. The signals on this arm include a right turn filter. There is one traffic lane and a cycle lane exiting the junction onto this arm.

Both Nutley Lane arms have one lane approaching and exiting the junction. There is a yellow box in front of the approach lane of St. Vincent's University Hospital across the northbound and southbound lanes along Nutley Lane.

These characteristics are illustrated in Image 5.49.

Image 5.49: Nutley Lane / St. Vincent's Junction

Nutley Lane / Nutley Avenue three-arm priority junction: Nutley Lane is a single carriageway with one lane travelling in each direction at this junction. There are no on-road cycle lanes at this junction. Nutley Avenue is a no-through road and is approximately 7.0m wide at its narrowest and widens where it meets Nutley Lane with generous corner radii. There is a yellow box in front of the Nutley Avenue arm across both traffic lanes on Nutley Lane.

These characteristics are illustrated in Image 5.50.

Image 5.50: Nutley Lane / Nutley Avenue Priority Junction

Nutley Lane / Merrion Shopping Centre three-arm priority junction: Nutley Lane is a single carriageway with one lane travelling in each direction. There are no on-road cycle lanes at this junction. There is a bus stop (Stop 2086) on Nutley Lane opposite the Merrion Shopping Centre arm, and indented loading and disabled bays approximately 25.0m east of the Merrion Shopping Centre arm.

The Merrion Shopping Centre arm is approximately 10.3m wide and has one lane approaching and exiting the junction respectively. There are double yellow lines on both sides of the road and a zebra crossing approximately 5.5m back from the stop line. There is a small yellow box in front of the Merrion Shopping Centre arm across the eastbound traffic lane on Nutley Lane.

These characteristics are illustrated in Image 5.51.

Image 5.51: Nutley Lane / Merrion Shopping Centre Priority Junction

5.3.6.5 Existing Parking / Loading

There are four disabled on-street parking bays and one large (or two small) loading bay(s) on Nutley Lane outside of Merrion Shopping Centre that operates from Monday to Saturday between 07:00 and 19:00.

There is also approximately 230m of on-street parking along the eastern side of the road, adjacent to the entrance to St. Vincent's University Hospital. These parking bays are pay & display operating from Monday to Saturday between 07:00 and 19:00.

6. Potential Impacts

6.1 Characteristics of the Proposed Scheme

The Proposed Scheme comprises the development of improved bus priority along the route, commencing on the R113 at Temple Hill, to the north of R827 Stradbrook Road, traveling along the N31 Frascati Road, the R118 Rock Road / Merrion Road / Pembroke Road, the R816 Pembroke Road / Baggot Street Upper / Baggot Street Lower, turning onto Fitzwilliam Street Lower and terminating at the junction of Mount Street Upper / Merrion Square South / Merrion Square East.

The Nutley Lane section of the Proposed Scheme commences at the tie-in with the signalised junction on the R138 Stillorgan road on the southern end of Nutley Lane, travels along Nutley Lane and will terminate at the junction with the R118 Merrion Road.

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 includes 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 2016-2035 (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 2035;
- 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) 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, DART+ Tunnel, Luas line extensions to Lucan, Finglas and Bray are all fully operational.

Appendix A6.1 – Sub Appendix 1 (Transport Modelling Report) contains further information on the modelling assumptions contained within the Do Minimum scenario including the full list of transport schemes included.

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. This is shown diagrammatically in Diagram 6.1.

Total trip demand (indicated by the dashed line) 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 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.

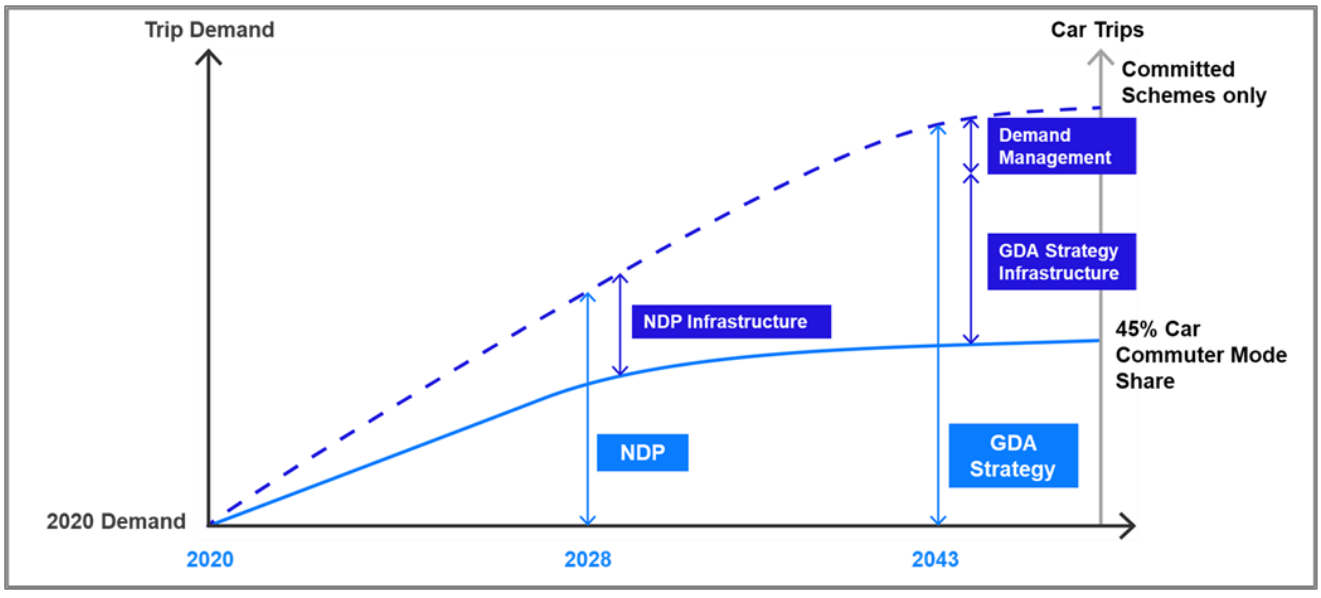


Diagram 6.1: Trip Demand Growth and the GDA Strategy

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, a proxy for a suite of demand management measures is included in the Do Minimum in line with the target to achieve a maximum 45% car driver commuter mode share target, across the GDA, as outlined in the Strategy.

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 Volume 2 of this 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 projected 2024 scenario.

Chapter 5 (Construction) of Volume 2 of this 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 a proposed Construction Compound, 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 Volume 2 of this EIAR.

A Construction Environmental Management Plan (CEMP) has been prepared and is included as Appendix A5.1 in Volume 4 of this 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 this 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 five principal sections. The division line between sections has been determined by grouping similar carriageway types together. These sections have been further subdivided into 16

sub-sections, according to the types of construction works required. The sections / sub-sections are the following (as shown in Diagram 6.2):

- **Section 1:** Stradbrook Road to Booterstown Avenue:
  - **Section 1a:** Stradbrook Road to Carysfort Avenue;
  - **Section 1b:** Carysfort Avenue to Phoenix Terrace; and
  - **Section 1c:** Phoenix Terrace to Booterstown Avenue.
- **Section 2:** Booterstown Avenue to Nutley Lane:
  - **Section 2a:** Booterstown Avenue to Elmpark Apartments; and
  - **Section 2b:** Elmpark Apartments to Nutley Lane.
- **Section 3:** Merrion Road – Nutley Lane to Ballsbridge:
  - **Section 3a:** Nutley Lane to Shrewsbury Road;
  - **Section 3b:** Shrewsbury Road to Ballsbridge Avenue; and
  - **Section 3c:** Ballsbridge Avenue Junction.
- **Section 4:** Ballsbridge to Merrion Square (Pembroke Road, Baggot Street and Fitzwilliam Street):
  - **Section 4a:** Ballsbridge Avenue to Shelbourne Road;
  - **Section 4b:** Shelbourne Road Junction;
  - **Section 4c:** Shelbourne Road to Lansdowne Road;
  - **Section 4d:** Lansdowne Road Junction;
  - **Section 4e:** Lansdowne Road to Haddington Road;
  - **Section 4f:** Haddington Road to Fitzwilliam Street Lower; and
  - **Section 4g:** Fitzwilliam Street Lower.
- **Section 5:** Nutley Lane to Merrion Road.

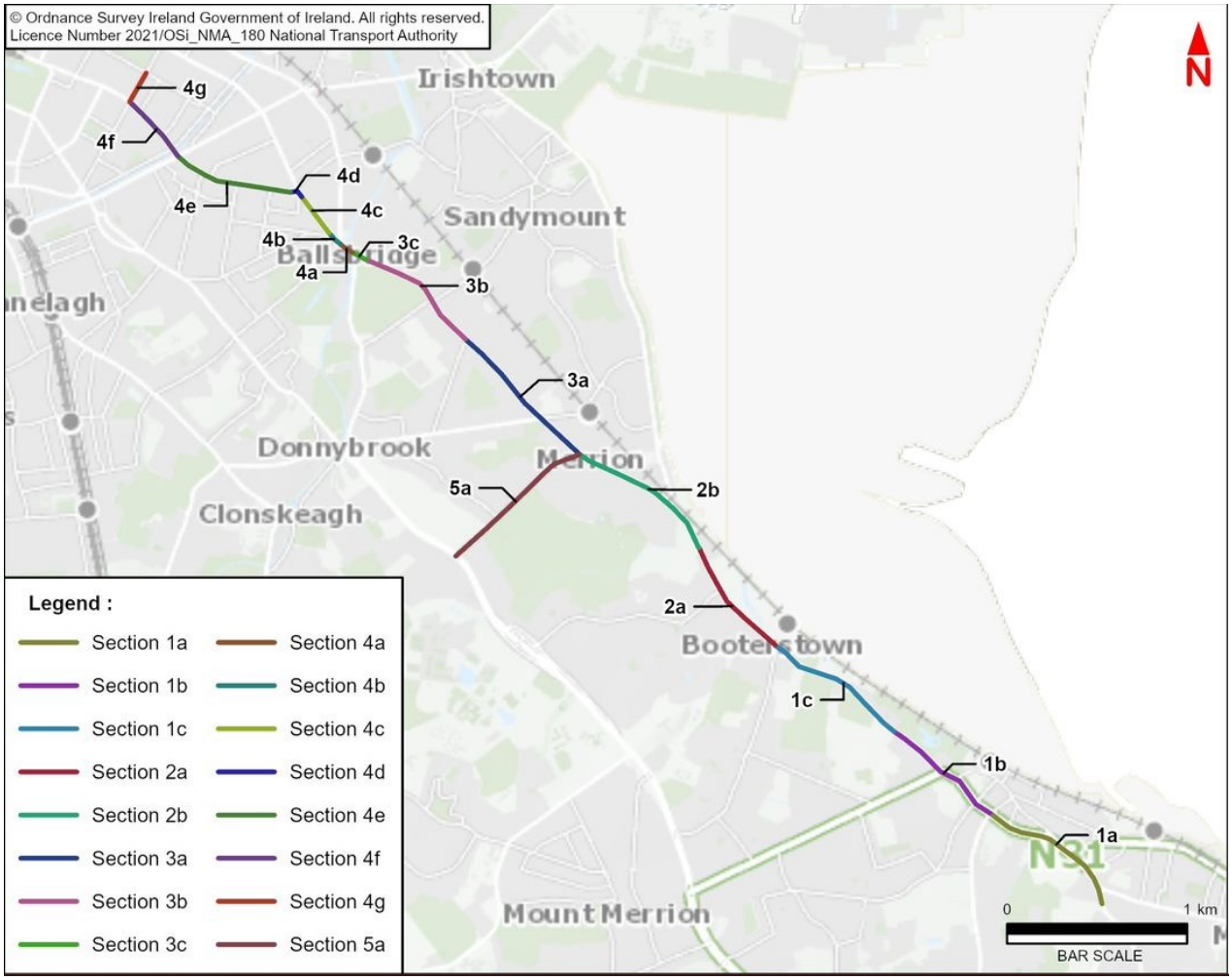


Diagram 6.2: Proposed Subsections of Construction Phase

6.5.2 Construction Programme

An indicative programme for the Proposed Scheme is provided in Chapter 5 (Construction) of Volume 2 of this EIAR. The Proposed Scheme is estimated to require some 24 months (approximately) to complete, however, individual activities will have shorter durations. Works are envisaged to proceed concurrently on multiple work-fronts to minimise the overall construction duration.

6.5.3 Construction Route

The location for a Construction Compound is identified on lands in Booterstown Car Park, within Blackrock Park, along the R118, opposite Willow Terrace (as shown in Diagram 6.3). The appointed contractor's CTMP shall include measures for managing traffic into and out of the compound. Access to and egress from the Construction Compound will be permitted via dedicated Construction Access Routes and will utilise the existing access point directly from Rock Road. The appointed contractor will be responsible for developing the final layout and use of the Construction Compound within the framework set out within the EIAR. The Contractor may identify other (or additional) Construction Compound locations, subject to gaining all necessary approvals. In addition to the Construction Compound, temporary / portable welfare facilities will be provided along the Proposed Scheme.

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 this exporting and delivery of materials will be executed as efficiently as possible using dedicated Construction Access Routes. Construction Vehicles will be directed to access work sections via the Proposed Scheme and dedicated routes on the National and Regional Road Network where practicable, to minimise use of the local road network.

The following national primary and national secondary roads will be utilised as construction vehicle routes during the construction period (as shown in Diagram 6.3):

- M50 Motorway;
- N11; and
- N31.

The following regional roads will be utilised as construction vehicle routes during the construction period (as shown in Diagram 6.3):

- R113;
- R118;
- R138;
- R815;
- R816; and
- R824.

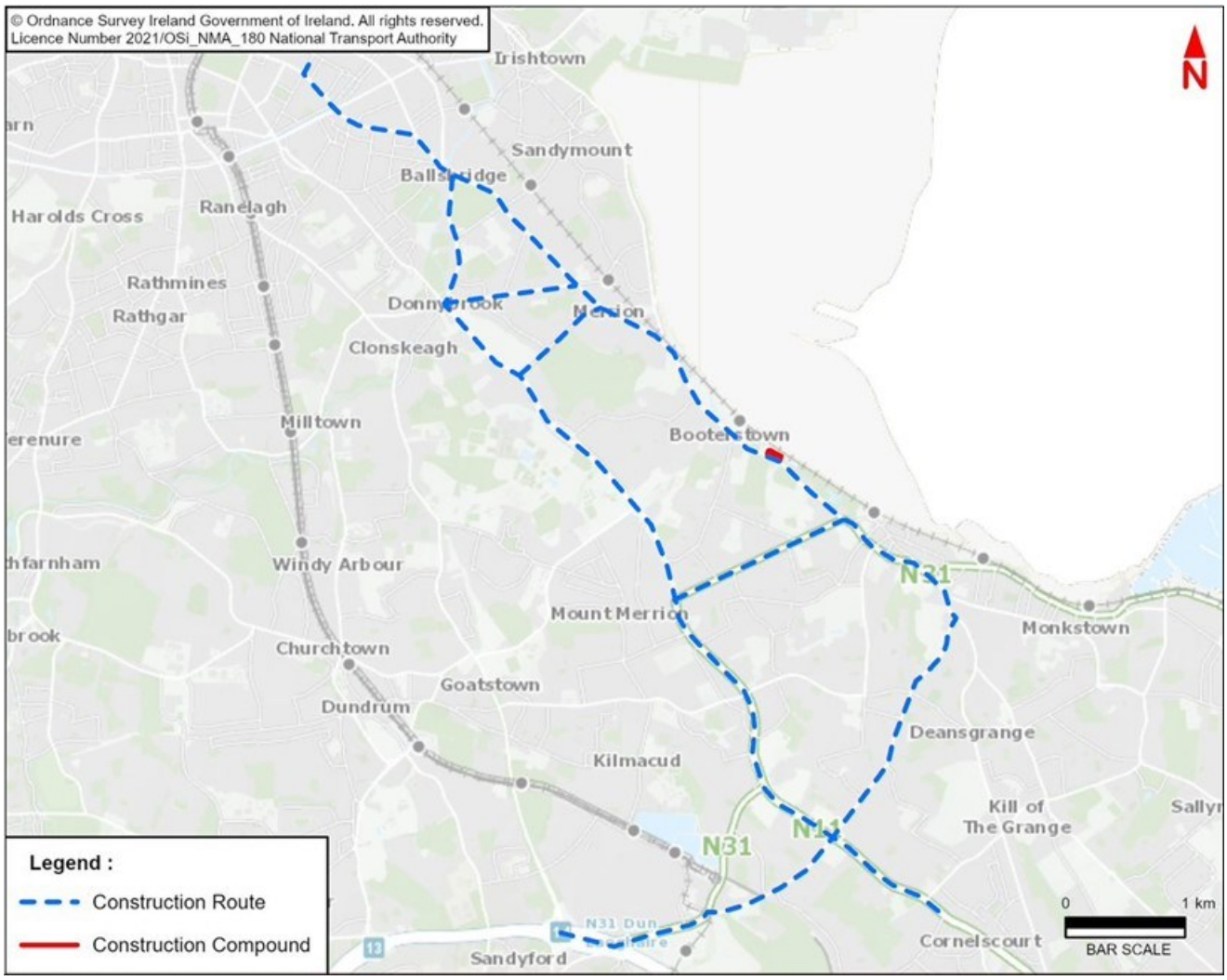


Diagram 6.3: Proposed Construction Routes and Main Compound Location

6.5.4 Potential Construction Impact

6.5.4.1 Overview

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.

6.5.4.2 Pedestrian Infrastructure

As described in Chapter 5 (Construction) of the EIAR, pedestrians may be temporarily impacted by construction activities along the Proposed Scheme corridor. Pedestrian diversions and temporary surface footpaths will be used to facilitate pedestrian movements around work areas. Access to local amenities, such as to 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, this provision will match 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.

6.5.4.3 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.

6.5.4.4 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.

6.5.4.5 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.

6.5.4.6 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.

6.5.4.7 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 impact 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 Volume 2 of this EIAR), Climate (Chapter 8 of Volume 2 of this EIAR) and Noise & Vibration (Chapter 9 of Volume 2 of this 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 Sections 1a, 1c, 2b, 3a, 4a and 4b were under construction concurrently. Further details on the impacts assessment can be found within these chapters.

6.5.4.8 Construction Traffic Generation

Site Operatives: It is expected that there will be approximately 200 personnel staff directly employed across the Proposed Scheme, rising to 250 personnel staff at peak construction.

Typical work hours on site are between 07:00 and 23:00 with staff working across early and late shifts. The adopted shift patterns help minimise travel by personnel during the peak hour periods of 08:00 to 09:00 and 17:00 to 18:00.

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 this 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.

Chapter 5 (Construction) of this 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, a maximum of 32 HGV trips are estimated to access / egress the construction works during the AM and PM Peak Hours.

Overall Peak Hour Impacts: The contents of Table 6.1 outlines 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	32	0	32	74	157
PM Peak Hour	0	32	10	32	74	157

Given that the above impacts are minimal and comfortably below the thresholds set out in TII's Guidelines for Transport Assessments, it is considered appropriate to define the general traffic impacts of the Construction Phase to have a **Low Negative and Short-term impact**. 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.

6.5.5 Construction Phase Summary

The contents of Table 6.2 present a summary of the potential 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	Low 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	Low 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 5) where the Proposed Scheme has been split into five 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. Reference has been made to the overall changes along the full length of the Proposed Scheme and the impact assessment primarily focuses only on the pedestrian facilities at junctions to provide a direct comparison between the Do Minimum and Do Something scenarios.

Where the Proposed Scheme introduces a change to a junction layout, the potential impact on pedestrians has been assessed using a set of criteria, which has been derived from a set of industry standards and guidance listed in Section 3. Table 6.3 outlines 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 (or raised table treatment) and road markings for pedestrians (including able-bodied, wheelchair users, mobility impaired and pushchairs)?
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 displays the LoS rating based on the number of indicators 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 6.5 have been used to describe the potential 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 potential 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 (NTA, 2011) 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 Do Minimum and Do Something scenarios for cyclists, the terms outlined in Table 6.7 have been used to describe the potential 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 (containment Kassel 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 stop 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 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 (baseline environment) and Do Something scenarios. The assessment has taken the parking information and 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 (i.e. parking alongside the kerb which is unrestricted).

This qualitative assessment has also taken account of adjacent parking on side streets 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.

6.6.2.1.5 Section 1 – Stradbrook Road to Booterstown Avenue

6.6.2.1.5.1 Pedestrian Infrastructure

The key infrastructural changes to the pedestrian link along Section 1 of the Proposed Scheme are the following:

- Footpaths with a minimum running width of 2.0m;
- Raised table treatments provided on priority side roads where the stop/yield line is located behind the raised table and footpath crossing to encourage a "courtesy crossing" for pedestrians, in line with the PDGB;
- Additional pedestrian crossing on the western arm of the Monkstown Road junction;
- New landscaped area for pedestrians, comprising wide footpaths and greenery, at either side of the N31 Mount Merrion Avenue
- Additional pedestrian crossing on the western arm of the N31 Mount Merrion Avenue junction; and
- A new toucan crossing approximately 80.0m east of Willow Terrace.

The assessment of the qualitative impacts on the pedestrian facilities at the junctions along 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 Appendix A6.1 – Sub Appendix 4 (Impact Assessments).

Table 6.9: Section 1 – Pedestrian Qualitative Assessment

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact
R113 Temple Hill / R119 Monkstown Road signalised junction	A100	D	C	Low Positive
R113 Temple Hill / Temple Park Avenue priority junction	A225	C	B	Low Positive
N31 Temple Road / N31 Newtown Avenue / R113 Temple Hill signalised junction	A250	D	C	Low Positive
N31 Frascati Road / Temple Road / N31 Temple Road / Barclay Court signalised junction	A525	D	C	Low Positive
N31 Frascati Road / Sweetman's Avenue / Blackrock Business Park priority junction	A750	B	A	Low Positive
N31 Frascati Road / Carysfort Avenue signalised junction	A875	B	A	Low Positive
N31 Frascati Road / George's Avenue priority junction	A975	C	B	Low Positive
N31 Frascati Road / L1009 Rock Hill / Frascati Shopping Centre Car Park signalised junction	A1125	D	B	Medium Positive
R118 Rock Road / N31 Frascati Road / N31 Mount Merrion Avenue signalised junction	A1250	D	C	Low Positive
R118 Rock Road / Ben Inagh Park priority junction	A1375	E	B	Medium Positive
R118 Rock Road / Castledawson Avenue priority junction	A1500	D	B	Medium Positive
R118 Rock Road / Phoenix Terrace priority junction	A1575	E	C	Medium Positive
R118 Rock Road / Emmet Square / Blackrock Clinic signalised junction	A1675	D	A	Medium Positive
R118 Rock Road / Seafort Parade (Exit) / Castledawson Avenue priority junction	A1725	D	B	Medium Positive
R118 Rock Road / Seafort Parade (Entrance) priority junction	A1825	D	B	Medium Positive
R118 Rock Road / Blackrock College priority junction	A1925	D	A	Medium Positive
R118 Rock Road / Booterstown Dart Station Parking Access / L1003 Booterstown Avenue signalised junction	A2400	D	C	Low Positive
Section Summary		**D**	**B**	**Medium Positive**

The contents of Table 6.9 demonstrates that the scheme will have a long-term positive impact on the quality of the pedestrian infrastructure between the R827 Stradbrook Road and L1003 Booterstown Avenue. The LoS during the Do Minimum scenario ranges between B and E, with 13 of the 17 impacted junctions along this section being given a low D / E rating. These ratings have been determined using the previously referenced assessment criteria set out in Table 6.7.

During the Do Something scenario, i.e. following the development of the Proposed Scheme, 11 of the 17 impacted junctions along this section achieve the highest A / B LoS ratings, with six junctions receiving a C rating. This is due to the proposed improvements to the existing pedestrian facilities in the form of additional crossing locations, increased pedestrian directness, provision of traffic calming measures, improved accessibility facilities and increased footpath and crossing widths. Where the Proposed Scheme achieves an LoS rating of C, this is to provide a balance of improvements for pedestrians alongside improvements for cyclists and buses without a significant detriment to general traffic.

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.

6.6.2.1.5.2 Cycling Infrastructure

The following section sets out the qualitative impacts on the cycling receptor for Section 1 of the Proposed Scheme The key cycling improvements along Section 1 of the Proposed Scheme can be summarised as follows:

- Provision of 2.0m wide cycle tracks in both directions between the R827 Stradbrook Road and Booterstown Avenue;
- Raised table treatments provided on priority side roads Cycle symbol markings are to be used on the cycle track across the junction;
- Proposed parking protected cycle tracks, whereby raised adjacent cycle tracks are located between the pedestrian footpath and any proposed parking spaces, along with a buffer of a minimum width of 0.75m being provided between parking bays and the cycle track, to provide additional protection for cyclists; and
- Protected treatment for cyclists at signalised junctions in the form of dedicated cycle crossings with kerb segregation at corners, in addition to proposed green signal priority for buses and cyclists at some junctions along the Proposed Scheme. Such junction designs have been developed to ensure that cyclists can negotiate and traverse junctions safely and more smoothly.

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 is not as effective for establishing a clear understanding of the change of pavement use and potential for cyclist / pedestrian interactions. In addition, a full height 120mm upstand kerb between the carriageway and the cycle track should be provided (120mm kerb height on the bus lane side and 60mm minimum kerb height on the cycle track side).

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 impact. Appendix A6.1 – Sub Appendix 4 (Impact Assessments) 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	Do Minimum LoS	Do Something LoS	Impact
R827 Stradbrook Road to George's Avenue	A000 - A1650	B	A	Low Positive
George's Avenue to Emmet Square	A1650 - A2400	B	A	Low Positive
Emmet Square to L1003 Booterstown Avenue	A1650 - A2400	B	A	Low Positive
Section Summary		**B**	**A**	**Low Positive**

Table 6.10 demonstrate that the Proposed Scheme will have a long-term positive impact on the quality of the cycling infrastructure between the R827 Stradbrook Road and L1003 Booterstown Avenue.

The LoS rating of the cycling facilities will improve from B in the Do Minimum to A in the Do Something along the entirety of Section 1 of the Proposed Scheme. This is due to the proposed improvements to the existing cycling facilities in the form of wider cycle lanes and protected treatment at signalised junctions.

Overall, it is anticipated that there will be **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'.

6.6.2.1.5.3 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 the R828 Stradbrook Road to the L1003 Booterstown Avenue, including upgrades and any relocations. Any relocations of bus stops which need to be carried through to the EIAR for significance assessment are identified.

There are currently 13 bus stops along Section 1 of the Proposed Scheme – six inbound stops and seven outbound. Table 6.11 presents a summary of the changes in the number and location of bus stops as a result of the Proposed Scheme.

Table 6.11: Section 1 – Overview of Amendments to Bus Stop Locations

Direction	Stop	Chainage	Do Something	Comment
Inbound	3164	A075	Relocated	Stop moved approximately 40m to the north, closer to crossing facilities at Monkstown Road junction.
Inbound	-	A575	New	A new stop will be created on N31 Frascati Road, approximately 40m west of Temple Road This location is close to pedestrian crossing facilities and is well-spaced between the stops before and after. The new stop will complete a pair of stops with outbound Stop 7660.
Inbound	3083 / 3084	A1050	Retained	This stop is located in close proximity to the pedestrian crossing and serves the key trip attractors of Blackrock Shopping Centre and the Frascati Centre. Double length stop.
Inbound	469	A1325	Relocated	Stop moved approximately 200m west, into newly created layby. This location achieves better spacing from the previous stop, and better serves Blackrock Clinic. Existing stop retained in layby for longer distance services.
Inbound	470	A1775	Removed	This stop is located very close to stop 472 and the proposed location for stop 469. With this stop removed, a 400m distance is still maintained.
Inbound	471	A1675	Retained	This stop serves the key trip attractor of Blackrock College.
Inbound	472	A2325	Relocated	Stop moved approximately 70m west and made double length. This location is closer to the Booterstown Avenue Junction and the Booterstown Dart Station.
Outbound	427	A2300	Retained	This location serves the Booterstown Dart Station.
Outbound	428	A1975	Retained	This stop serves the key trip attractor of Blackrock College, and is located close to a proposed pedestrian crossing.
Outbound	429	A1625	Retained	This location is directly after a junction and maintains approximately 400m spacing between previous and next stops.
Outbound	3032	A1200	Retained	N/A
Outbound	6334	A1025	Retained	This stop is located in close proximity to the pedestrian crossing, and serves the key trip attractors of Blackrock Shopping Centre and the Frascati Centre
Outbound	7660	A575	Retained	This location serves Temple road and is well spaced between the previous and next stops.
Outbound	3114	A050	Retained	This stop serves the Monkstown road catchment and is located directly after the junction where crossing facilities are present.

A rationalisation of existing stops has been undertaken, with one stop removed. The proposals will introduce two additional bus stops along Section 1 of the Proposed Scheme in the form of a new inbound stop on N31 Frascati Road to the west of Temple Road, and a new coach lay-by on Rock Road to the east of Ben Inagh Park – with the existing bus stop at this location being relocated further west towards the Castledawson residential estate. Bus lanes in both directions will be provided throughout Section 1 between Monkstown Road and the L1003 Booterstown Avenue.

Table 6.12 provides a summary of the improvements to the bus stop infrastructure along Section 1 of the Proposed Scheme, 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: Section 1 – Overview of Amendments to Bus Stop Facilities

Bus Stop Facility	Do Minimum		Do Something		Comment
	No. of Stops	Percentage of Stops	No. of Stops	Percentage of Stops	
RTPI	1	8%	15	100%	RTPI added to all bus stops.
Timetable information	10	77%	15	100%	Timetable information provided at all bus stops.
Shelter	8	62%	15	100%	Shelter to be provided at all bus stops.
Seating	8	62%	15	100%	Seating to be provided at all bus stops.
Accessible Kerbs	13	100%	15	100%	Accessible kerbs provided at all bus stops.
Indented Drop Off Area	4	31%	3	20%	Three inbound stops (Chainage A1050, A1325 and A2275) are proposed as indented to allow longer bus waiting times.

Bus Stop Facility	Do Minimum		Do Something		Comment
	No. of Stops	Percentage of Stops	No. of Stops	Percentage of Stops	
Total Stops	**13**		**15**		Two additional bus stops than Do Minimum.

Table 6.12 indicates that the facilities at existing bus stops are of a reasonable standard, with the majority having shelters and seating, and all having accessible kerbs. Only one stop currently has real-time bus information.

Under the proposals, each of the bus stops on the route would have a full range of facilities, including real-time information. Three of the proposed inbound stops will be located in indented drop-off areas as coach laybys allowing for longer waiting times, with the remainder situated in dedicated bus lanes and therefore not impacting on the flow of traffic. All proposed facilities have been designed in accordance with the PDGB which has been developed with cognisance to the relevant accessibility guidance.

Overall, the improvements in the standard of bus stop facilities throughout Section 1 of the Proposed Scheme is assessed as providing an overall **High positive** impact for bus passengers. The Proposed Scheme improves the quality of existing bus infrastructure along Section 1 of the Proposed Scheme, which will provide long-term benefits for bus users and aligns with the overarching aim to provide enhanced bus infrastructure on the corridor.

6.6.2.1.5.4 Parking and Loading

The proposals will impact on existing parking and loading along Section 1 of the Proposed Scheme. The main parking and loading changes are as follows:

- Removal of the three of the five informal general residential / commercial parking spaces along the eastern side of the R118 Rock Road, adjacent to Seafort Parade to provide enhanced, continuous cycle facilities. Any displaced residential parking will be able to utilise permit parking available along the adjacent streets of Seafort Parade and / or along Emmet Square and displaced commercial / general informal parking can utilise the pay & display spaces along Seaford Parade, of which there are over 30 further spaces. The loading bay will be retained and extended to accommodate two loading spaces. These can be used for general parking outside of the loading times. The impact of losing one loading bay at this location is therefore considered have a low, negative impact.
- Removal of one of the five informal general residential / commercial parking spaces between Seafort Parade (North) and the Blackrock College access, and the two residential parking spaces opposite Blackrock College to provide enhanced, continuous cycle facilities. Four on-street spaces will be retained. There is parking along the adjacent Seafort Parade and basement parking provided for the properties opposite Blackrock College. It is therefore considered that the impact of this loss of parking will have low, negative impact; and
- Removal of the six informal general residential spaces along the western side R118 Rock Road, to the south of the L1003 Booterstown Avenue to accommodate a bus stop island and cycle track bypass for an uninterrupted, continuous cycle provision along this stretch. The residential properties adjacent to these parking spaces have basement parking and there are further pay & display and permit parking approximately 100m north along the R118 Rock Road, along Booterstown Avenue and Booterstown Grove within 200m of this location, and within Booterstown Dart Station off-street car park across from L1003 Booterstown Avenue. It is therefore considered that the impact of this loss of parking will have a low, negative impact**.**

Table 6.13 presents a summary of the proposed changes to parking and loading along Section 1 of the Proposed Scheme.

Table 6.13: Section 1 – Overall Changes in Parking / Loading Spaces

Location	Parking Type	Number of Parking Spaces		
		Do Minimum	Do Something	Change
R118 Rock Road (eastern side); between Phoenix Terrace and Castledawson Avenue	Loading Bay	1 bay (1 space)	1 bay (2 spaces)	+1 space
	Informal Parking: general residential / commercial	5	2	-3
R118 Rock Road (eastern side); Between Seafort Parade (North) and Blackrock College	Informal Parking: general residential / commercial	7	4	-3
R118 Rock Road (western side); Immediately south of L1003 Booterstown Avenue	Informal Parking: general residential / commercial	6	0	-6
Total		**19**	**8**	**-11**

As shown in Table 6.13, there are currently 19 on-street parking spaces within the Section 1 of the Proposed Scheme. The Proposed Scheme will result in the loss of eight spaces in total, comprising informal residential and commercial parking spaces. The assessment identifies that there are equivalent types of parking (over 30 further parking spaces) on several streets adjacent to these locations which can be utilised instead. One loading bay will be retained and extended to accommodate two loading spaces which can be used for general parking outside of the loading hours.

The Proposed Scheme will provide significant improvement to the walking, cycling and bus facilities encouraging the use of sustainable modes of transport, which will ultimately reduce the demand for parking along with the availability of adjacent parking. Overall, the impact of this loss of parking is considered to have a **Low Negative** impact.

6.6.2.1.6 Section 2 –Booterstown Avenue to Nutley Lane

6.6.2.1.6.1 Pedestrian Infrastructure

The key infrastructure changes to pedestrian links along Section 2 of the Proposed Scheme are summarised as follows:

- Footpaths with a minimum running width of 2.0m;
- Raised table treatments provided on priority side roads where the stop/yield line is located behind the raised table and footpath crossing to encourage a “courtesy crossing” for pedestrians;
- Additional pedestrian crossing on the western arm of the R118 Rock Road / Trimleston Avenue junction;
- Additional pedestrian crossing on the western arm of the R118 Merrion Road / Elmpark Green junction;
- Additional pedestrian crossing on the eastern arm of the R118 Merrion Road / St. Vincent’s University Hospital junction;
- Additional pedestrian crossing on the western arm of the R118 Merrion Road / Nutley Lane junction; and
- New landscaped areas for pedestrians, comprising wider footpaths and greenery, on either side of the Elmpark Green access and the R131 Strand Road junction by rationalising the vehicles lanes at these junctions.

There are proposed improvements to the pedestrian facilities at key junctions along Section 2 of the Proposed Scheme. The impact assessment for the proposed junction upgrades are outlined in Table 6.14. A detailed breakdown of the assessment at each junction can be found in Appendix A6.1 – Sub Appendix 4 (Impact Assessments).

Table 6.14: Section 2 – Pedestrian Qualitative Assessment

Location	Chainage	Do Minimum LoS	Do Something LoS	Impact
R118 Rock Road / Grotto Avenue priority junction	A2475	D	B	Medium Positive
R118 Merrion Road / R118 Rock Road / Trimleston Avenue signalised junction	A2850	C	A	Medium Positive

Location	Chainage	Do Minimum LoS	Do Something LoS	Impact
R118 Merrion Road / Bellvue Avenue priority junction	A2925	D	B	Medium Positive
R118 Merrion Road / Elmpark Green signalised junction	A3100	D	A	Medium Positive
R118 Merrion Road / St Mary's Nursing Home Access priority junction	A3300	C	B	Low Positive
R118 Merrion Road / R131 Strand Road signalised junction	A3425	C	B	Low Positive
R118 Merrion Road / Estate Avenue priority junction	A3625	D	B	Medium Positive
R118 Merrion Road / Herbert Avenue priority junction	A3675	C	B	Low Positive
R118 Merrion Road / Merrion Avenue / St Vincent's Hospital signalised junction	A3775	E	A	High Positive
R118 Merrion Road / Nutley Lane Signalised Junction	A3975	E	A	High Positive
Section Summary		**D**	**B**	**Medium Positive**

Table 6.14 demonstrates that the Proposed Scheme will have a long-term positive impact on the quality of the pedestrian infrastructure between the L1003 Booterstown Avenue and Nutley Lane. The LoS during the Do Minimum scenario ranges between B and E, with six of the 10 impacted junctions along this section being given a low D / E rating. These ratings have been determined using the previously referenced assessment criteria set out in Table 6.3.

During the Do Something scenario, i.e. following the development of the Proposed Scheme, all of the impacted junctions along this section achieve the highest A / B ratings. This is due to the proposed improvements to the existing pedestrian facilities in the form of additional crossing locations, increased pedestrian directness, provision of traffic calming measures, improved accessibility facilities 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 2 of the Proposed Scheme, during the Operational Phase.

6.6.2.1.6.2 Cycling Infrastructure

The key cycling improvements along Section 2 of the Proposed Scheme can be summarised as follows:

- Provision of a 3.5m wide bidirectional cycle track on the eastern side of the carriageway in addition to a 2.0m wide cycle lane on the western side of the carriageway (travelling northbound) between the L1003 Booterstown Avenue and the R131 Strand Road;
- The northbound cycle track bypasses on-street parking bays between L1003 Booterstown Avenue and St Helen's Road. The bidirectional cycle track bypasses the outbound bus stop at St Helen's Road and the bus stop east of R131 Strand Road;
- Provision of parking protected cycle tracks in both directions between the R131 Strand Road and Nutley Lane. The cycle track bypasses on-street parking bays immediately north of the R131 Strand Road and the inbound bus stop immediately west of St. Vincent's University Hospital;
- Provision of bidirectional cycle crossings through the R118 Merrion Road / R131 Strand Road junction;
- Dedicated cycle crossings at the R118 Merrion Road / Nutley Lane junction with connectivity to adjacent cycling routes on Ailesbury Park;
- Raised table treatments provided on priority side roads with cycle symbol markings on the cycle track across the junction; and
- Protected treatment for cyclists at signalised junctions in the form of cycle dedicated crossings with kerb segregation at corners.

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 is not as effective for establishing a clear understanding of the change of pavement use and potential for cyclist / pedestrian interactions. In addition, a full height 120mm upstand kerb between the carriageway and the cycle track should be provided (120mm kerb height on the bus lane side and 60mm minimum kerb height on the cycle track side).Table 6.15 outlines the overall Do Minimum and Do Something LoS ratings for each segment within Section 2 of the Proposed Scheme, along with the resultant impact.

Table 6.15: Section 2 – Cycling Impact during Operational Phase

Location	Chainage	Do Minimum LoS	Do Something LoS	Description of Impact
L1003 Booterstown Avenue to Trimleston Avenue	A2400 - A3450	B	A	Low Positive
Trimleston Avenue to R131 Strand Road	A3450 - A3950	C	A	Medium Positive
R131 Strand Road to Nutley Lane	A3450 - A3950	C	B	Low Positive
Section Summary		**C**	**A**	**Medium Positive**

Table 6.15 demonstrates that the Proposed Scheme will have a long-term positive impact on the quality of the cycling infrastructure between the L1003 Booterstown Avenue and Nutley Lane. The LoS during the Do Minimum scenario achieves a C rating overall. These ratings have been determined using the previously referenced assessment criteria set out in Table 6.6.

During the Do Something scenario, i.e. following the development of the Proposed Scheme the LoS rating increases to an A overall. This is due to the proposed improvements to the existing cycling facilities in the form of wider cycle lanes, greater segregation from vehicles and protected treatment at signalised junctions.

Overall, it is anticipated that there will be **Medium 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 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'.

6.6.2.1.6.3 Bus Infrastructure

There is currently a total of 11 bus stops along Section 2, six inbound and five outbound. Under the proposals, there will be a total of nine stops on this section – five inbound and four outbound. A rationalisation of existing stops has been undertaken, with three bus stops removed. Four stops have been relocated, with passenger catchments, stop spacing and access to crossing facilities all factors that have been considered in this process. The proposals will introduce one additional bus stop along Section 2 of the Proposed Scheme in the form of a new coach lay-by on Merrion Road at St. Vincent's University Hospital.

Table 6.16 presents a summary of the changes in the number and location of bus stops as a result of the Proposed Scheme.

Table 6.16 Section 2 – Overview of Amendments to Bus Stop Locations

Direction	Stop	Chainage	Do Something	Comment
Inbound	473	A2475	Removed	Stop located within 150m of upstream Stop 472, therefore removed.
Inbound	4705	A2725	Retained	Current location serves St Helen's Road and Trimleston Avenue and is well-spaced from upstream and downstream stops.
Inbound	475	A3150	Relocated	Stop moved approximately 175m north. This location better serves Elm Park and is located close to the signalised crossing facilities at the Elm Park junction.
Inbound	476	A3325	Retained	N/A

Direction	Stop	Chainage	Do Something	Comment
Inbound	477	A3575	Removed	This stop has a relatively low surveyed level of usage and is located only approximately 180m from Stop 476. It has therefore been removed.
Inbound	478	A3850	Relocated	Stop moved approximately 40m to the east, closer to the St Vincent's Hospital access, and has been converted into a double-length stop. The existing stop has been retained for longer-distance services.
Inbound	-	A3900	New	New indented bus stop approximately 55m south of Nutley Avenue to serve as waiting point for long distance services.
Outbound	422	A3850	Retained	Current location serves the entrance to St Vincent's hospital and is located close to the pedestrian crossings at the access junction. Double length bus stop.
Outbound	423	A3600	Removed	This stop is located very close to the upstream and downstream stops and has therefore been removed.
Outbound	424	A3400	Relocated	Stop moved approximately 100m to the west. This location brings the stop closer to the Strand Road Junction and the pedestrian crossing
Outbound	425	A3050	Relocated	Stop moved approximately 125m north. This location better serves Elm Park and is located close to the signalised crossing facilities at the Elm Park junction.
Outbound	426	A2725	Retained	This location serves the catchment of St Helens and Trimleston Ave and maintains approximately 400m spacing from previous and next stops.

Under the proposals, there will be a total of nine stops on this section – five inbound and four outbound. A rationalisation of existing stops has been undertaken, with three stops being removed. Four stops have been relocated, with passenger catchments, stop spacing and access to crossing facilities all factors that have been considered in this process.

Table 6.17 provides a summary of the improvements to the bus stop infrastructure along Section 2 of the Proposed Scheme, 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 Section 2 – Overview of Amendments to Bus Stop Facilities

Bus Stop Facility	Do Minimum		Do Something		Comment
	No. of Stops	Percentage of Stops	No. of Stops	Percentage of Stops	
RTPI	3	27%	9	100%	RTPI added to all bus stops.
Timetable information	9	82%	9	100%	Timetable information provided at all bus stops.
Shelter	9	82%	9	100%	Shelter to be provided at all bus stops. Overall number of stops along this section with timetable information remains consistent with the Do Minimum.
Seating	9	82%	9	100%	Seating to be provided at all bus stops. Overall number of stops along this section with seating remains consistent with the Do Minimum.
Accessible Kerbs	10	91%	9	100%	Accessible kerbs provided at all bus stops.
Indented Drop Off Area	6	55%	1	11%	One inbound stop is proposed (Chainage A3900) as indented to allow longer bus waiting times.
Total Stops	11		9		Two stops fewer than Do Minimum.

Table 6.16 indicates that there are slight improvements to the bus stop facilities along Section 2 of the Proposed Scheme as facilities at the existing bus stops are generally good. Most stops are equipped with shelters and have accessible kerbs, however, only three stops currently provide real-time information. Under the proposals, each of the bus stops on the route would have a full range of facilities, including real-time information. All proposed facilities have been designed in accordance with the PDGB which has been developed with cognisance to the relevant accessibility guidance.

One new indented bus stop is proposed to serve as a waiting point for long distance coach services while all other bus stops will be provided within the bus lanes and therefore not impact the flow of traffic.

The rationalisation in the number of stops from eleven to nine will result in improvements to bus journey times while maintaining appropriate spacing between bus stops. Taking into account the provision of bus lanes, pedestrian accessibility and bus stop facilities outlined within this section.

Overall, the improvements in the standard of bus stop facilities throughout Section 2 of the Proposed Scheme are assessed as providing an overall **Medium Positive** impact for bus passengers.

6.6.2.1.6.4 Parking and Loading

The proposals will impact on existing parking and loading along Section 2 of the Proposed Scheme. The main parking changes are as follows:

- One of the five pay & display spaces on the western side of the R118 Rock Road to the north of the junction with the L1003 Booterstown Avenue will be removed to provide enhanced pedestrian and cycle facilities. Four spaces will be retained, therefore, the impact of this loss of parking is considered to have a low, negative impact;
- Removal of 9 of the 22 designated residential pay & display and permit parking spaces on the western side of the R118 Rock Road, between Grotto Avenue and St Helen's Road to provide a continuous cycle track by-passing the parking spaces which are to be retained. By retaining 13 of these parking spaces and the disabled bay, it is considered that this amount will be sufficient to serve the needs of the residential properties that front this location and do not have their own off-street parking. Given that many of these properties do have private off-street parking and that alternative parking is available on adjacent streets, namely Grotto Place and St Helen's Road, it is considered that the impact of this loss will have a low, negative impact; and
- Removal of the three pay & display commercial parking spaces on the eastern side of the R118 Merrion Road between Herbert Avenue and Nutley Lane to provide improvements for pedestrians and cyclists by widening the footpath and providing a continuous cycle lane. An additional five designated paid residential parking spaces (total provision of 13 spaces) will be provided along this section. The impact of loss here is therefore considered to have a low, negative impact.

Table 6.18 presents a summary of the proposed changes to parking along Section 2 of the Proposed Scheme.

Table 6.18: Section 2 – Overall Changes in Parking / Loading Spaces

Location	Parking Type	Number of Parking Spaces		
		Do Minimum	Do Something	Change
R118 Rock Road (western side); North of L1003 Booterstown Avenue junction	Pay & Display: residential / commercial	5	4	-1
R118 Rock Road (western side); Between Grotto Avenue and St Helen's Road	Pay & Display and Permit Parking	22	13	-9
	Disabled Bay	1	1	0
R118 Merrion Road (eastern side); Between Trimleston Avenue and Nutley Lane	Pay & display: commercial	3	0	-3
	Pay & display and Permit Parking: general residential	8	13	+5
Total		**39**	**31**	**-8**

As shown in Table 6.18, approximately eight parking spaces overall will be lost along Section 2 of the Proposed Scheme. In most cases there are equivalent parking opportunities along adjacent streets within 200m of the location. Furthermore, the Proposed Scheme is considered to allow for significant improvement to the walking, cycling and bus facilities encouraging the use of sustainable modes of transport, which will ultimately reduce the demand for parking along with the availability of adjacent parking. Overall, the impact of the loss is considered to have a **Low Negative** impact.

6.6.2.1.7 Section 3 – Merrion Road to Ballsbridge

6.6.2.1.7.1 Pedestrian Infrastructure

The key infrastructure changes to pedestrian links along Section 3 of the Proposed Scheme are summarised as follows:

- Footpaths with a minimum running width of 2.0m;
- Raised table treatments provided on priority side roads where the stop/yield line is located behind the raised table and footpath crossing to encourage a "courtesy crossing" for pedestrians;
- Additional pedestrian crossing on the western arm of the R118 Merrion Road / Shrewsbury Road junction;
- Additional pedestrian crossing on the northern arm of the R118 Merrion Road / Sandymount Avenue junction;
- Additional pedestrian crossing on the eastern arm of the R118 Merrion Road / Serpentine Avenue junction and the conversion of the crossing on the northern arm into a dedicated signalised crossing;
- Additional pedestrian crossing on the western arm of the R118 Merrion Road / Ballsbridge Park junction east of Anglesea Road, additional toucan crossing to the west of Anglesea Road, and the conversion of the crossing on the northern arm into a dedicated signalised crossing.

The assessment of the qualitative impacts on the pedestrian facilities at the junctions along Section 3 of the Proposed Scheme are summarised in Table 6.19. A detailed breakdown of the assessment at each impacted junction, including a list of the junctions which experience no change, can be found in Appendix A6.1 – Sub Appendix 4 (Impact Assessments).

Table 6.19 Section 3 – Pedestrian Qualitative Assessment

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact
R118 Merrion Road / Merrion View Avenue Priority Junction	A4175	C	B	Low Positive
R118 Merrion Road / Ailesbury Road / R824 Ailesbury Road Signalised Junction	A4275	D	A	Medium Positive
R118 Merrion Road / Merlyn Park Priority Junction	A4425	D	B	Medium Positive
R118 Merrion Road / Merlyn Road Priority Junction	A4525	D	B	Medium Positive
R118 Merrion Road / Wanderers F.C. Rugby Club Access Priority Junction	A4575	B	A	Low Positive
R118 Merrion Road / Shrewsbury Park Priority Junction	A4825	C	B	Low Positive
R118 Merrion Road / Shrewsbury Road Signalised Junction	A4875	E	A	High Positive
R118 Merrion Road / British Embassy Access Priority Junction	A5025	C	B	Low Positive
R118 Merrion Road / Sandymount Avenue / Simmonscourt Road Signalised Junction	A5175	C	A	Medium Positive
R118 Merrion Road / Sydenham Road Priority Junction	A5300	C	B	Low Positive
R118 Merrion Road / Serpentine Avenue Signalised Junction	A5400	D	A	Medium Positive
R118 Merrion Road / Former AIB Bankcentre Access Priority Junction	A5525	C	B	Low Positive
R118 Merrion Road / Ballsbridge Park Signalised Junction	A5625	E	A	High Positive
R118 Merrion Road / R815 Anglesea Road Signalised Junction	A5675	E	A	High Positive
R118 Merrion Road / Granite Place Priority Junction	A5700	D	A	High Positive
Section Summary		**D**	**A**	**Medium Positive**

Table 6.19 demonstrates that the scheme will have a long-term positive impact on the quality of the pedestrian infrastructure between the Nutley Lane and Ballsbridge. The LoS during the Do Minimum scenario ranges between B and E, with eight of the 15 impacted junctions along this section being given a low D / E rating. These ratings have been determined using the previously referenced assessment criteria set out in Table 6.3.

During the Do Something scenario, i.e. following the development of the Proposed Scheme, all of the impacted junctions along this section achieve the highest A / B ratings. This is due to the proposed improvements to the existing pedestrian facilities in the form of additional crossing locations, increased pedestrian directness, provision of traffic calming measures, improved accessibility facilities and increased footpath and crossing widths.

All proposed facilities have been designed in accordance with the principles of DMURS and Building for Everyone: A Universal Design Approach (NDA 2020) with regards to catering for all users, including those with disabilities.

At six junctions, improvements that result in a Low Positive impact are predicted where existing facilities are slightly improved; for example, by the introduction of fully compliant dropped kerbs, tactile paving and road markings at the crossing points.

Overall, it is anticipated that there will be **Medium Positive** impact to the quality of the pedestrian infrastructure along Section 3 of the Proposed Scheme, during the Operational Phase.

6.6.2.1.7.2 Cycling Infrastructure

The key cycling improvements along Section 3 of the Proposed Scheme can be summarised as follows:

- Provision of 2.0m wide cycle tracks in both directions generally along the R118 Merrion Road between Nutley Lane and Ballsbridge, although it is proposed to reduce the proposed track widths to 1.5m in certain sections which aids in the retention of a number of trees. This also includes locally reducing footpaths to a minimum width of 1.2m and cycle tracks to a minimum width of 1.4m over the short length of particular pinch points;
- Provision of 2.0m cycle track which bypasses on-street parking bays opposite Anglesea Road with parking protected cycle tracks, whereby raised adjacent cycle tracks are located between the pedestrian footpath and any proposed parking spaces, along with a buffer of a minimum width of 0.75m being provided between parking bays and the cycle track, to provide additional protection for cyclists;
- On the eastern side of the Dodder River, it is proposed to provide a two-way cycle track from Anglesea Road to Beatty's Avenue connected by a toucan crossing on the R118 in Ballsbridge Village. This integrates with the proposed Dodder Greenway;
- Raised table treatments provided on priority side roads Cycle symbol markings are to be used on the cycle track across the junction; and
- Protected treatment for cyclists at signalised junctions in the form of dedicated cycle crossings with kerb segregation at corners.

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 is not as effective for establishing a clear understanding of the change of pavement use and potential for cyclist / pedestrian interactions. In addition, a full height 120mm upstand kerb between the carriageway and the cycle track should be provided (120mm kerb height on the bus lane side and 60mm minimum kerb height on the cycle track side).

Table 6.20 outlines the overall Do Minimum and Do Something LoS ratings for each segment within Section 3 of the Proposed Scheme, along with the resultant impact.

Table 6.20 Section 3 – Cycling Impact during Operational Phase

Location	Chainage	Do Minimum LoS	Do Something LoS	Impact
Nutley Lane to Ailesbury Road	A3950 - A4300	B	A	Low Positive
Ailesbury Road to Shewsbury Road	A4300 - A4850	C	B	Low Positive
Shewsbury Road to Simmonscourt Road	A4850 - A5200	C	A	Medium Positive
Simmonscourt Road to Ballsbridge	A5200 - A5750	B	A	Low Positive
Section Summary		**B**	**A**	**Low Positive**

Table 6.20 demonstrates that the Proposed Scheme will have a long-term positive impact on the quality of the cycling infrastructure between Nutley Lane and Ballsbridge. The LoS during the Do Minimum scenario from has been given a B / C.

In the Do Something scenario, i.e. following the development of the Proposed Scheme the LoS rating increases to an A / B. This is due to the proposed improvements to the existing cycling facilities in the form of wider cycle lanes, greater segregation from vehicles and protected treatment at signalised junctions.

It is therefore anticipated that there will be a **Low Positive** impact to the quality of the cycling infrastructure along Section 3 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'

6.6.2.1.7.3 Bus Infrastructure

There is currently a total of 12 bus stops along Section 2, six inbound and six outbound. Under the proposals, there will be a total of 10 stops along Section 3 of the Proposed Scheme. Several existing stops along this section have been moved, either to improve spacing, provide better access to crossing facilities, or to serve key trip attractors.

The proposed network of bus stops is the result of a rationalisation process that will continue to provide suitable coverage for the residential, commercial and public properties along the route, whilst reducing the number of bus stops. This approach strikes a balance between bus stop coverage and service journey times.

Table 6.21 presents a summary of the changes in the number and location of bus stops as a result of the Proposed Scheme.

Table 6.21 Section 3 – Overview of Amendments to Bus Stop Locations

Direction	Stop	Chainage	Do Something	Comment
Inbound	479	A4075	Relocated	Stop moved approximately 140m to the north, improving the spacing between Stop 479 (Section 1).
Inbound	480	A4325	Removed	Stop removed as existing location is close to relocated Stop 479.
Inbound	481	A4625	Retained	Stop located at start of the bus lane, and is well-spaced to Stop 479
Inbound	482	A4925	Retained	N/A
Inbound	483	A5225	Relocated	Stop moved approximately 120m to the north, after the Simmonscourt Road junction, and improves spacing with Stop 482 compared to the existing situation.
Inbound	485	A5550	Retained	Existing location serves the RDS Arena, which is a key trip attractor. A triple length bus stop is proposed.
Outbound	416	A5450	Relocated	Bus stop moved approximately 150m to the east in front of the proposed new office development, which would be a key trip attractor.
Outbound	417	A5275	Removed	Stop removed as existing location is approximately 100m from relocated Stop 416.
Outbound	418	A5125	Relocated	Bus stop moved approximately 80m to the north, closer to the Sandymount Avenue junction where crossing facilities are available. The new location also improves spacing between adjacent stops.
Outbound	419	A4800	Retained	N/A
Outbound	420	A4475	Retained	N/A

Outbound	421	A4175	Relocated	Stop moved approximately 30m to the east, where there is more space for passengers to wait.

Table 6.22 provides a summary of the improvements to the bus stop infrastructure along Section 3 of the Proposed Scheme, with reference to the number and percentage of bus stops that provide each facility in the 'Do Minimum' and 'Do Something' scenarios.

Table 6.22 Section 3 – Overview of Changes in Bus Stop Facilities

Bus Stop Facility	Do Minimum		Do Something		Comment
	No. of Stops	Percentage of Stops	No. of Stops	Percentage of Stops	
RTPI	3	25%	10	100%	RTPI added to all bus stops.
Timetable information	10	83%	10	100%	Timetable information provided at all bus stops. Overall number of stops along this section with timetable information remains consistent with the Do Minimum.
Shelter	9	75%	10	100%	Shelter to be provided at one more bus stop compared to Do Minimum.
Seating	9	75%	10	100%	Seating to be provided at one more bus stop compared to Do Minimum.
Accessible Kerbs	11	92%	10	100%	Accessible kerbs provided at all bus stops.
Indented Drop Off Area	3	25%	0	0%	The proposed bus stops are within bus lanes and hence does not impact the flow of general traffic.
Total Stops	**12**		10		Two fewer bus stops than Do Minimum.

The existing bus stops generally have adequate provision, but few have real-time information systems. significant improvements to the bus stop facilities along Section 3 of the Proposed Scheme. It is proposed that all bus stops will be provided inline within dedicated bus lanes, and therefore will not impact the flow of general traffic. 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 the PDGB which has been developed with cognisance to the relevant disability guidance

The improvements described above throughout Section 3 of the Proposed Scheme are assessed as providing an overall **Low Positive** impact for bus passengers.

6.6.2.1.7.4 Parking and Loading

The parking and loading changes are as follows:

- Removal of the five commercial pay & display and permit parking spaces along the R118 Merrion Road between the R815 Anglesea Road and Beatty's Avenue to accommodate a new toucan crossing immediately north of the parking bays. There is currently one disabled bay provided at this location which will be retained. Displaced parking is accommodated by the creation of five additional pay & display and permit parking spaces on Ballsbridge Avenue adjacent to this location. Furthermore, the loading spaces can be used as general parking outside of the loading hours (expected to be Monday to Saturday, 07:00 to 19:00). The impact of this change is considered to have a low, negative impact;

Retention of the loading bay opposite the R815 Anglesea Road which will be extended to accommodate three loading spaces as opposed to one. The impact of the loss of two space here is considered to have a negligible effect. Table 6.23 presents a summary of the proposed changes to parking and loading along Section 3 of the Proposed Scheme.

Table 6.23: Section 3 – Overall Changes in Parking / Loading Spaces

Location	Parking Type	Number of Parking Spaces		
		Do Minimum	Do Something	Change
R118 Merrion Road (eastern side); Between R815 Anglesea Road and Beatty's Avenue	Pay & Display and Permit Parking	5	0	-5
	Disabled Bay	1	1	0
	Loading Bay	1 bay (2 spaces)	1 bay (3 spaces)	+1
Ballsbridge Avenue (eastern side)	Pay & Display and Permit Parking	4	9	+5
Total		**12**	**13**	**+1**

As shown in Table 6.23 there are approximately 13 designated parking spaces along Section 3 of the Proposed Scheme which is one additional space compared to the Do Minimum scenario (extra loading space). Therefore overall, the impact of this loss of parking is considered to have a **Negligible** impact.

6.6.2.1.8 Section 4 – Ballsbridge to Merrion Square

6.6.2.1.8.1 Pedestrian Infrastructure

The key infrastructure changes to pedestrian links along Section 4 of the Proposed Scheme are summarised as follows:

- Footpaths with a minimum running width of 2.0m;
- Raised table treatments provided on priority side roads where the stop/yield line is located behind the raised table and footpath crossing to encourage a "courtesy crossing" for pedestrians;
- The consolidation of the R118 Pembroke Road / Herbert Park junction into a single crossroads provides dedicated pedestrian crossings on all arms plus a significant increase in the urban realm. This greatly improves the pedestrian environment in the busy area of Ballsbridge;
- Additional pedestrian crossing on the eastern arm of the R118 Pembroke Road / Lansdowne Road junction and the overall consolidated of the crossings at the junction;
- Additional pedestrian crossing on the western arm of the R186 Pembroke Road / Waterloo Road junction;
- Provision of wider footpaths across the Macartney Bridge from the R816 Baggot Street Upper to Baggot Street Lower; and

In addition, there are proposed improvements to the pedestrian facilities at key junctions along Section 4 of the Proposed Scheme. The impact assessment for the proposed junction upgrades are outlined in Table 6.24. A detailed breakdown of the assessment at each junction can be found in Appendix A6.1 – Sub Appendix 4 (Impact Assessments).

Table 6.24 Section 4 – Pedestrian Qualitative Assessment – Junctions

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact
R118 Merrion Road / Beatty's Avenue Priority Junction	A5725	D	B	Medium Positive
R118 Pembroke Road / Ballsbridge Terrace priority junction	A5775	C	B	Low Positive
R118 Pembroke Road / Clyde Lane priority junction	A5800	D	B	Medium Positive
R118 Pembroke Road / R815 Shelbourne Road / Herbert Park signalised junction	A5825	C	B	Low Positive
R118 Pembroke Road / Elgin Road signalised to priority junction	A5850	B	A	Low Positive
R118 Pembroke Road / Pembroke Lane priority junction	A6125	C	A	Medium Positive
R118 Pembroke Road / R118 Lansdowne Road / R816 Pembroke Road signalised junction	A6175	C	A	Medium Positive

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact
R816 Pembroke Road / Raglan Road priority junction	A6325	D	B	Medium Positive
R816 Pembroke Road / Wellington Road priority junction	A6525	D	B	Medium Positive
R816 Baggot Street Upper / Eastmoreland Place / R816 Pembroke Road priority junction	A6675	C	B	Low Positive
R816 Baggot Street Upper / Waterloo Road signalised junction	A6725	D	A	Medium Positive
R816 Macartney Bridge / R111 Haddington Road / R816 Baggot Street Upper / Mespil Road signalised junction	A6875	E	A	High Positive
R816 Baggot Street Lower / Herbert Place / R816 Macartney Bridge / Wilton Terrace signalised junction	A6925	D	A	Medium Positive
R816 Baggot Street Lower / Herbert Street / Pembroke Row priority junction	A7025	D	B	Medium Positive
R816 Baggot Street Lower / James Street East / Lad Lane priority junction	A7200	D	B	Medium Positive
R816 Baggot Street Lower / Fitzwilliam Street Lower / Fitzwilliam Street Upper signalised junction	A7275	C	A	Medium Positive
Fitzwilliam Street Lower / Fitzwilliam Lane priority junction	A7275	C	B	Low Positive
Fitzwilliam Street Lower / Clifton Mews priority junction	A7300	C	B	Low Positive
Section Summary		**D**	**B**	**Medium Positive**

The contents of Table 6.24 demonstrates that the scheme will have a long-term positive impact on the quality of the pedestrian infrastructure between the Ballsbridge and Merrion Square. The LoS during the Do Minimum scenario ranges between B and E, with nine of the 18 impacted junctions along this section being given a low D / E rating. These ratings have been determined using the previously referenced assessment criteria set out in Table 6.3.

During the Do Something scenario, i.e. following the development of the Proposed Scheme, all of the impacted junctions along this section achieve the highest A / B ratings. This is due to the proposed improvements to the existing pedestrian facilities in the form of additional crossing locations, increased pedestrian directness, provision of traffic calming measures, improved accessibility facilities and increased footpath and crossing widths.

All proposed facilities have been designed in accordance with the principles of DMURS and 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 4 of the Proposed Scheme, during the Operational Phase.

6.6.2.1.8.2 Cycling Infrastructure

The key cycling improvements along Section 4 of the Proposed Scheme can be summarised as follows:

- Provision of 2.0m wide cycle tracks in both directions generally along the R118 Pembroke Road between Ballsbridge and the R118 Northumberland Road, although it is proposed to reduce the proposed track widths to 1.5m in certain sections which aids in the retention of a number of trees;
- Additional dedicated cycle crossings at the Pembroke Road / Shelbourne Road junction, including connectivity into and from Elgin Road;
- Additional dedicated cycle crossings at the Pembroke Road / Lansdowne Road junction;
- Provision of 2.0m wide cycle track travelling in each direction on the R118 Pembroke Road between Northumberland Road and Fitzwilliam Street Lower where there are currently no cycling facilities present. The proposed cycle facilities comprise parking protected cycle tracks, whereby raised adjacent cycle tracks are located between the pedestrian footpath and any proposed parking spaces, along with a buffer of a minimum width of 0.75m being provided between parking bays and the cycle track, to provide additional protection for cyclists;
- Additional dedicated cycle crossings at the Baggot Street Lower / Herbert Place junction with connectivity to and from the existing two-way cycle track along the Grand Canal;

- Additional dedicated cycle crossings at the Baggot Street Lower / Fitzwilliam Street Upper junction;
- Provision of 2.0m wide cycle tracks in both directions between Fitzwilliam Street Lower and Merrion Square where there are currently no cycling facilities present;
- Raised table treatments provided on priority side roads Cycle symbol markings are to be used on the cycle track across the junction; and
- Protected treatment for cyclists at signalised junctions in the form of dedicated cycle crossings with and kerb segregation at corners at all junctions.

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 is not as effective for establishing a clear understanding of the change of pavement use and potential for cyclist / pedestrian interactions. In addition, a full height 120mm upstand kerb between the carriageway and the cycle track should be provided (120mm kerb height on the bus lane side and 60mm minimum kerb height on the cycle track side).

Table 6.25 outlines the cycling qualitative assessment along Section 4 of the Proposed Scheme. Appendix A6.1 – Sub Appendix 4 (Impact Assessments) provides further detail on the assessed LoS ratings.

Table 6.25 Section 4 – Cycling Qualitative Assessment

Location	Chainage	Do Minimum LoS	Do Something LoS	Impact
Ballsbridge to R118 Northumberland Road	A5750 - A6150	C	B	Low Positive
R118 Northumberland Road to Haddington Road	A6150 - A6750	D	A	High Positive
Haddington Road to Fitzwilliam Street	A6750 - A6900	D	B	Medium Positive
Fitzwilliam Street to Merrion Square	A6750 - A6900	D	A	High Positive
Section Summary		**D**	**A**	**High Positive**

Table 6.25 demonstrates that the Proposed Scheme will have a long-term positive impact on the quality of the cycling infrastructure between Ballsbridge and Merrion Square. The LoS during the Do Minimum scenario from has been given a C / D. During the Do Something scenario, i.e. following the development of the Proposed Scheme, the LoS rating increases to an A / B. This is due to the proposed improvements to the existing cycling facilities in the form of wider cycle tracks, greater segregation from vehicles and protected treatment at signalised junctions.

It is therefore anticipated that there will be **High Positive** impact to the quality of the cycling infrastructure along Section 4 of the Proposed Scheme, during the operational phase.

6.6.2.1.8.3 Bus Infrastructure

There is currently a total of 13 bus stops along Section 4, six inbound and seven outbound. Under the proposals, there will be a total of 11 stops on this section – five inbound and six outbound. Stop 2799 (inbound) and Stop 2796 (outbound) will be removed as part of a rationalisation process that will continue to provide suitable coverage for the residential, commercial and public properties along the route, while reducing the number of stops served by buses. This approach strikes a balance between bus stop coverage and service journey times.

Seven existing stops along this section, two inbound and five outbound, have been moved, primarily to improve stop spacing, to retain existing trees, to provide better access to crossing facilities, or to serve key trip attractors. Table 6.26 presents a summary of the changes in the number and location of bus stops as a result of the Proposed Scheme.

Table 6.26 Section 4 – Overview of Amendments to Bus Stop Locations

Direction	Stop	Chainage	Do Something	Comment
Inbound	487	A5975	Retained	N/A
Inbound	2798	A6300	Relocated	Stop moved approximately 200m to the west, to achieve better spacing with Stop 487, and to better serve the catchment along Elgin Road.
Inbound	2799	A6625	Removed	Stop located approximately 200m from both the upstream and the downstream stops, therefore removed to retain suitable spacing.
Inbound	782	A6825	Retained	N/A
Inbound	783	A7025	Retained	N/A
Inbound	784	A7350	Relocated	Relocated approximately 80m to the north onto Fitzwilliam Street Lower. The proposed lane layout at the existing stop location would make it problematic to retain the current stop location.
Outbound	750	A7250	Retained	N/A
Outbound	751	A7000	Relocated	Stop moved approximately 50m to the south, to position the stop downstream of the Herbert Road junction
Outbound	752	A7600	Relocated	Stop moved approximately 130m to the east, between Waterloo Road and Eastmoreland Place, to achieve better spacing with Stops 751 and 2796
Outbound	2796	A6525	Removed	Stop located approximately 150m from both the upstream and the downstream stops, therefore removed to retain suitable spacing.
Outbound	2797	A6350	Relocated	Stop relocated approximately 90m west to position the stop downstream of the R188 Pembroke Road junction.
Outbound	414	A6075	Retained	N/A
Outbound	415	A5775	Relocated	Stop moved approximately 150m to the south, onto the bridge over the River Dodder. The new location provides more space for passengers to wait, and is closer the centre of Ballsbridge.

Table 6.27 provides a summary of the improvements to the bus stop infrastructure along Section 4 of the Proposed Scheme, with reference to the number and percentage of bus stops that provide each facility in the 'Do Minimum' and 'Do Something' scenarios.

Table 6.27 Section 4 – Overview of Changes in Bus Stop Facilities

Bus Stop Facility	Do Minimum		Do Something		Comment
	No. of Stops	Percentage of Stops	No. of Stops	Percentage of Stops	
RTPI	6	46%	11	100%	RTPI added to all bus stops.
Timetable information	10	77%	11	100%	Timetable information provided at all bus stops. Overall number of stops along this section with timetable information is one more than Do Minimum.
Shelter	5	38%	11	100%	Shelter to be provided at all bus stops.
Seating	5	38%	11	100%	Seating to be provided at all bus stops.
Accessible Kerbs	4	31%	11	100%	Accessible kerbs provided at all bus stops.

Bus Stop Facility	Do Minimum		Do Something		Comment
	No. of Stops	Percentage of Stops	No. of Stops	Percentage of Stops	
Indented Drop Off Area	1	8%	0	0%	The proposed bus stops are within bus lanes and hence does not impact the flow of general traffic.
Total Stops	**13**		**11**		Two fewer bus stops than Do Minimum.

Facilities at existing bus stops are generally limited, with less than half of stops currently having shelters, seating and real-time bus information. The Proposed Scheme would see all of the stops in this section equipped with real-time information, shelters, seating and accessible kerbs. It is proposed that all bus stops will be provided inline within dedicated bus lanes, and therefore will not impact the flow of general traffic. All proposed facilities have been designed in accordance with the PDGB which has been developed with cognisance to the relevant disability guidance.

The changes described above throughout Section 4 of the Proposed Scheme are assessed as providing an overall **Low Positive** impact for bus passengers.

6.6.2.1.8.4 Parking and Loading

The proposals will impact on existing parking and loading along Section 4 of the Proposed Scheme. The main parking and loading changes are as follows:

- Removal of three of the 10 pay & display and permit parking spaces on the eastern side of the R815 Shelbourne Road between the R118 Pembroke Road and Estate Cottages to allow space for a proposed new cycle track by-passing the on-street parking retained at this location. Given that the majority of spaces here are to be retained and that there are approximately 30 further parking spaces starting from approximately 15.0m north of this location. The impact of this loss of parking is considered to have a low, negative impact;
- Removal of approximately 29 of the 67 general residential pay & display and permit parking spaces along the R816 Pembroke Road between Pembroke Lane and Wellington Road to provide controlled sections of parking bays. This enables more orderly parking practices, provides build out at bus stop islands and allows the cycle track to move off-road to bypasses both the on-street parking retained at this location and the bus stop islands. The residential properties on the southern side of the road typically have off-street car parking, whereas the properties on the northern side rely on the on-street parking provision. Additionally, there is ample alternative parking along adjacent streets of Ragland Road and Wellington Road within 100m of this location. It is therefore considered that retaining 38 on-street parking spaces is sufficient to serve the needs of the residential properties along this section, and the impact of the loss of parking is considered to have a low, negative impact;
- Removal of six of the 22 residential pay & display and permit parking and the loading bay along the R816 Pembroke Road between Wellington Road and Waterloo Road to provide improvements for pedestrian and cyclists in the form of widening the footpath and reallocating road space to provide cycle tracks in both directions. A new loading bay accommodating two loading spaces will be created on Wellington Road and there is ample alternative parking along the R816 Pembroke Road to the east, and along Eastmoreland Place directly adjacent to this location. Therefore, the impact of this loss of parking is to have a low, negative impact;
- Provision of an additional seven residential pay & display and permit parking spaces (and one loading bay with two spaces) along Wellington Road by converting the parallel parking to side-by-side spaces perpendicular to the kerb to replace some of the parking lost along this section;
- Removal of nine commercial pay & display and permit parking spaces, one disabled bay and one loading bay (three loading spaces) along the R816 Baggot Street Upper between Waterloo Road and the R111 Haddington Road to allow space for proposed new cycle tracks on both sides of the road to transition into off-road cycle tracks that bypass the on-street parking to be retained at this location. Both the R111 Haddington Road and Eastmoreland Place have ample amounts of equivalent parking spaces within proximity to this location. It is estimated that there are approximately 194 alternative spaces within 200m. As a result, the impact of this loss of parking is considered to have a low, negative impact;

- Removal of 29 of the 42 residential pay & display and permit parking spaces along the R816 Baggot Street Lower between Wilton Terrace and James Street East to accommodate a cycle track, bus lane and general traffic lane in each direction. Seven commercial pay & display spaces at this location will be retained. It is estimated that there are approximately 250 equivalent parking spaces within 200m of this location along the adjacent streets of Wilton Terrace, Herbert Place and Herbert Street which can accommodate any displaced parking as a result of the proposals. As a result, the impact of this loss of parking is considered to have a low, negative impact**;** and
- Removal of the 20 commercial pay & display and permit parking (18 regular spaces and two electric vehicle charging spaces) along Fitzwilliam Street Lower between the R816 Baggot Street Lower and Mount Street Upper to provide a bus lane and continuous cycle track in both directions. As a result, the impact of this loss of parking is considered to have a medium, negative impact.

Table 6.28 presents a summary of the proposed changes to parking and loading along Section 4 of the Proposed Scheme.

Table 6.28: Section 4 – Overall Parking / Loading Changes

Location	Parking Type	Number of Parking Spaces		
		Do Minimum	Do Something	Change
R815 Shelbourne Road (eastern side)	Pay & Display and Permit Parking: commercial	10	7	-3
R816 Pembroke Road; Between Pembroke Lane and Wellington Road	Pay & Display and Permit Parking: residential	67	38	-29
	Disabled Bay	1	1	0
Wellington Road	Pay & Display and Permit Parking: residential	16	23	+7
	Loading Bay	0	1 bay (2 spaces)	+2 spaces
R816 Pembroke Road (northern side); Between Wellington Road and Waterloo Road	Pay & Display and Permit Parking: residential	22	16	-6
	Loading Bay	1	0	-1
R816 Baggot Street Upper; Between Waterloo Road and R111 Haddington Road	Pay & Display and Permit Parking: commercial	13	3	-10
	Disabled Bay	4	3	-1
	Loading Bay	3 bays (6 spaces)	2 bays (3 spaces)	-3 spaces
R816 Baggot Street Lower; Between Wilton Terrace and James Street East	Pay & Display and Permit Parking: residential	42	13	-29
	Pay & Display: commercial	7	0	0
Fitzwilliam Street Lower; Between R816 Baggot Street Lower and Mount Street Upper	Pay & Display and Permit Parking: commercial	18	0	-18
	Pay & Display and Permit Parking: commercial (electric)	2	0	-2
Total		**192**	**112**	**-101**

As shown in Table 6.28 there are currently approximately 192 parking spaces along Section 4 of the Proposed Scheme and the proposals would result in a net-loss of 101 spaces. The assessment has identified that there is ample parking of equivalent types available within 200m of these locations. Furthermore, the Proposed Scheme is considered to allow for significant improvement to the walking, cycling and bus facilities encouraging the use of sustainable modes of transport, that will ultimately reduce the demand for parking along with the availability of adjacent parking. Therefore, these changes are considered to have a **Low Negative impact** on parking and loading along Section 4 of the Proposed Scheme.

6.6.2.2 Section 5 – Nutley Lane to Merrion Road

6.6.2.2.1.1 Pedestrian Infrastructure

The key infrastructure changes to pedestrian links along Section 5 of the Proposed Scheme are summarised as follows:

- Footpaths with a minimum running width of 2.0m on the northern side of carriageway;
- Removal of the left turn slip lane from Nutley Lane to the R138 Stillorgan Road and associated conversion of the crossing here into a single dedicated signalised crossing;
- Between the entrance to Elm Park Golf Club and the entrance to St. Vincent's University Hospital, no footpath is proposed on the Elm Park Golf Club side of road, however, a toucan crossing will be provided just north of the access to Elm Park Golf Club. Footpaths with a minimum running width of 2.0m are provided on the remaining sections of the southern side of the carriageway; and
- Raised table treatments provided on priority side roads where the stop/yield line is located behind the raised table and footpath crossing to encourage a "courtesy crossing" for pedestrians.

The assessment of the qualitative impacts on the pedestrian facilities at the junctions along Section 1 of the Proposed Scheme are summarised in Table 6.29. A detailed breakdown of the assessment at each impacted junction, including a list of the junctions which experience no change, can be found in Appendix A6.1 – Sub Appendix 4 (Impact Assessments).

Table 6.29 Section 5 – Pedestrian Qualitative Assessment – Junctions

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact
R138 Stillorgan Road / Nutley Lane / Greenfield Park Signalised Junction	B-050	F	D	Medium Positive
Nutley Lane / RTE Car Park Exit Priority Junction	B025	D	B	Medium Positive
Nutley Lane / Nutley Park Priority Junction	B050	D	B	Medium Positive
Nutley Lane / Elm Park Golf Club and Sports Club Car Park Access Priority Junction	B175	D	B	Medium Positive
Nutley Lane / Nutley Road Priority Junction	B225	D	B	Medium Positive
Nutley Lane / Elm Park Priority Junction	B350	D	B	Medium Positive
Nutley Lane / Broch House Suites Access Priority Junction	B375	D	B	Medium Positive
Nutley Lane / St Vincent's Hospital Access Signalised Junction	B575	D	A	Medium Positive
Nutley Lane / Nutley Avenue Priority Junction	B625	D	A	High Positive
Nutley Lane / Brooklands Residential Development Access Priority Junction	B675	C	B	Low Positive
Nutley Lane / The Merrion Shopping Centre Priority Junction	B725	D	B	Medium Positive
Section Summary		**D**	**B**	**Medium Positive**

Table 6.29 demonstrates that the scheme will have a long-term positive impact on the quality of the pedestrian infrastructure between the Nutley Lane and the R118 Merrion Road. The LoS during the Do Minimum scenario ranges between C and F, with 10 of the 11 impacted junctions along this section being given a low D/F rating. These ratings have been determined using the previously referenced assessment criteria set out in Table 6.3.

During the Do Something scenario - i.e. following the development of the Proposed Scheme - all of the impacted junctions along this section achieve the highest A / B ratings (with the exception of the R138 Stillorgan Road / Nutley Lane / Greenfield Park signalised junction, where the LoS rating improves from F to D). This is due to the proposed improvements to the existing pedestrian facilities in the form of additional crossing locations, increased pedestrian directness, provision of traffic calming measures, improved accessibility facilities 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 5 of the Proposed Scheme, during the Operational Phase.

6.6.2.2.1.2 Cycling Infrastructure

The key cycling improvements along Section 5 of the Proposed Scheme can be summarised as follows:

- Upgraded provision for cyclists at the Stillorgan Road / Nutley Lane / Greenfield Park junction through the provision of a dedicated two-way crossing on the southern arm of the junction;
- Provision of a 3.5m wide bidirectional cycle track on the southern side of the carriageway between the start of the Proposed scheme and the access to St Vincent's University Hospital where there are currently no cycling facilities;
- A new toucan crossing is proposed between the Elm Park Golf Club access and Nutley Road to allow cyclists to access the junction on the western side of the carriageway;
- Upgraded crossings at the Nutley Lane / St Vincent's University Hospital / Nutley Avenue signalised junction from pelican to toucan crossings on two of the arms. This provides a link between the bidirectional cycle tracks and the one-way cycle track on either side of the carriageway between St Vincent's University Hospital and the R118 Merrion Road, as well as connecting to Nutley Avenue via which a nearby school is accessed by pedestrians and cyclists;
- Provision of 2.0m wide cycle tracks on both sides of the road between Nutley Avenue and the R118 Merrion Road where there are currently no cycling facilities;
- Raised table treatments provided on priority side roads Cycle symbol markings are to be used on the cycle track across the junction; and
- Protected treatment for cyclists at the R118 Merrion Road / Nutley Lane signalised junction in the form of dedicated cycle crossings at the junction, two stage right turn movements, kerb segregation at corners, in addition to proposed green signal priority for buses and cyclists from the Nutley Lane arm.

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 is not as effective for establishing a clear understanding of the change of pavement use and potential for cyclist / pedestrian interactions. In addition, a full height 120mm upstand kerb between the carriageway and the cycle track should be provided (120mm kerb height on the bus lane side and 60mm minimum kerb height on the cycle track side).

Table 6.30 outlines the overall Do Minimum and Do Something LoS ratings for each segment within Section 5 of the Proposed Scheme, along with the resultant impact. Appendix A6.1 – Sub Appendix 4 (Impact Assessments) provides further detail on the assessed LoS ratings.

Table 6.30 Section 5 – Cycling Qualitative Assessment

Location	Chainage	Do Minimum LoS	Do Something LoS	Impact
R138 Stillorgan Road to Nutley Avenue	B000 - B600	D	A	High Positive
Nutley Avenue to R118 Merrion Road	B600 - B800	D	A	High Positive
Section Summary		**D**	**A**	**High Positive**

Table 6.30 demonstrates that the Proposed Scheme will have a long-term positive impact on the quality of the cycling infrastructure between the R138 Stillorgan Road to R118 Merrion Road. The LoS during the Do Minimum scenario from has been given a D.

During the Do Something scenario, i.e. following the development of the Proposed Scheme the LoS rating increases to an A. This is due to the proposed provision of cycle infrastructure along Nutley Lane where there is currently limited / no provision.

It is therefore anticipated that there will be a **High Positive** impact to the quality of the cycling infrastructure along Section 5 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'.

6.6.2.2.1.3 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 Nutley Lane and the R118 Merrion Road, including upgrades and any relocations. Any relocations of bus stops which need to be carried through to the EIAR for significance assessment are identified.

Currently, there are a total of five bus stops along Section 5, two inbound and three outbound. Under the proposals, the location of the inbound stops will remain consistent with the Do Minimum scenario. Two of the outbound stops will be relocated slightly. Stop 2088 will be removed as the catchment would overlap with relocated Stop 7053 which will serve St Vincent's University Hospital.

Table 6.31 presents a summary of the changes in the number and location of bus stops as a result of the Proposed Scheme.

Table 6.31: Section 5 – Overview of Amendments to Bus Stop Locations

Direction	Stop	Chainage	Do Something	Comment
Inbound	2085	B175	Retained	N/A
Inbound	2086	B650	Retained	N/A
Outbound	7053	B650	Relocated	Bus stop moved approximately 80m to the west, to a location that better serves the western entrance to St Vincent's Hospital.
Outbound	2088	B5025	Removed	Stop removed as relocated Stop 7053 will better serve St Vincent's Hospital.
Outbound	2089	B125	Relocated	Bus stop moved approximately 60m to the west to allow it to be served by a footpath.

Table 6.32 provides a summary of the improvements to the bus stop infrastructure along Section 5 of the Proposed Scheme, with reference to the number and percentage of bus stops that provide each facility in the 'Do Minimum' and 'Do Something' scenarios.

Table 6.32 Section 5 – Overview of Changes in Bus Stop Facilities

Bus Stop Facility	Do Minimum		Do Something		Comment
	No. of Stops	Percentage of Stops	No. of Stops	Percentage of Stops	
RTPI	0	0%	4	100%	RTPI added to all bus stops.
Timetable information	2	40%	4	100%	Timetable information added to two more bus stops.
Shelter	2	40%	4	100%	Shelter to be provided at two more bus stops.
Seating	2	40%	4	100%	Seating to be provided at two more bus stops.
Accessible Kerbs	0	0%	4	100%	Accessible kerbs added to all bus stops.
Indented Drop Off Area	0	0%	0	0%	The proposed bus stops are within bus lanes and hence does not impact the flow of general traffic. No change from Do Minimum.
Total Stops	5		4		One fewer bus stop along Section 5.

Table 6.32 indicates that there are significant improvements to the bus stop facilities along Section 5 of the Proposed Scheme. It is proposed that all bus stops will be provided inline within dedicated bus lanes, and therefore will not impact the flow of general traffic. Improvements in the provision of real-time information, shelters, seating and accessible kerbs at the bus stops are assessed as providing an overall positive impact for bus passengers. All proposed facilities have been designed in accordance with the PDGB which has been developed with cognisance to the relevant accessibility guidance.

The slight rationalisation of outbound stops will continue to provide suitable coverage along the route, whilst reducing the number of stops that buses serve. This approach strikes a balance between bus stop coverage and service journey times.

Overall, the improvements described above are assessed as providing a **Medium Positive** impact for bus passengers.

6.6.2.2.1.4 Parking and Loading

The proposals will impact on existing parking and loading along Section 5 of the Proposed Scheme. The main parking and loading changes are as follows:

- Removal of 39 residential pay & display and permit parking spaces along the eastern side of Nutley, Lane between Nutley Road and Nutley Avenue, to gain road space to provide a bus lane and general traffic lane travelling in each direction, where there is currently only one lane in each direction and no bus priority measures. All of the residential properties along this stretch have off-street parking and the on-street spaces are underutilised. There are approximately 60 equivalent parking spaces with ample availability along adjacent streets of Elm Park, Nutley Park, Nutley Road and Nutley Avenue where any displaced parking can be accommodated. As a result, the impact of this loss of parking is considered to have a low, negative impact; and
- Removal of four disabled bays, one commercial pay & display, and two loading bays along the western side of Nutley Lane outside of Merrion Shopping Centre. This change is to gain road space to provide a cycle lane, bus lane and general traffic lane travelling in each direction. Merrion Shopping Centre provides free parking for customers in an off-street car park, including disabled parking. Furthermore, the shopping centre has a designated service yard for loading and servicing activities, therefore, the impact of the loss of the parking and loading bays at this location is considered to have a low, negative impact.

Table 6.33 presents a summary of the proposed changes to parking and loading along Section 5 of the Proposed Scheme.

Table 6.33 Section 5 - Overall Changes in Parking / Loading Spaces

Location	Parking Type	Number of Parking Spaces		
		Do Minimum	Do Something	Change
Nutley Lane (eastern side); Between Nutley Road and Nutley Avenue	Pay & Display and Permit Parking: residential	39	0	-39
Nutley Lane (western side); Outside Merrion Shopping Centre	Pay & Display and Permit Parking: commercial	1	0	-1
	Disabled Bay	4	0	-4
	Loading Bay	2	0	-2
Total		**46**	**0**	**-46**

As shown in Table 6.33, there are approximately 46 parking spaces along Section 5 of the Proposed Scheme that will be removed to accommodate cycle lanes and bus priority improvements. The assessment has identified that there is ample parking of equivalent types available within 200m of these locations on adjacent residential streets and within Merrion Shopping Centre. Overall, the impact of this loss of parking is considered to have a **Low Negative** impact on the area surrounding Section 5 of the Proposed Scheme.

6.6.2.2.2 Summary of Corridor-Wide Infrastructure Works

6.6.2.2.2.1 Pedestrian Infrastructure

Overall, the Proposed Scheme will increase the number of controlled pedestrian crossings from 68 in the Do Minimum to 96 in the Do Something scenario, equating to a 41% increase. Additionally, there will be an increase in the number of raised table crossings on side roads from 9 in the Do Minimum to 55 in the Do Something scenario, equating to a 511% increase.

6.6.2.2.2.2 Cycling Infrastructure

The Proposed Scheme will provide segregated cycle facilities along the entire length of the corridor (8.31km inbound and outbound respectively), which is an increase of 7.88km inbound and 8.27km outbound of segregated facilities in the Do Minimum scenario.

With regards to cycle parking, 73 spaces are provided in the Do Minimum scenario. The Proposed Scheme will increase provision by 175% to a total of 201 spaces across the entire corridor in the Do Something scenario.

6.6.2.2.2.3 Bus Priority Infrastructure

The Proposed Scheme will provide 7.4km inbound and 7.3km outbound of bus lanes across the corridor. This is an increased from 3.2km inbound and 2.9km outbound in the Do Minimum scenario. This contributes to an increase of 37% 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.

6.6.2.2.2.4 Parking & Loading

Total parking provision will be reduced by 165 spaces along the Proposed Scheme, which equates to a 12% reduction approximately.

Aspects of the Proposed Scheme and network proposals are expected to mitigate the reduction in parking by reducing reliance on private cars due to availability of an improved bus network with journey reliability, by availability of improved cycling infrastructure, and by continued and managed use of private off-street parking.

Similarly, many properties along the Proposed Scheme have driveways, and residents should be encouraged to utilise their available off-road space for parking (rather than seek to park on-street). Improved compliance with parking and loading bay regulations, and management of loading activities will also assist in offsetting the reduction in on-street parking spaces. It is concluded that the overall impact of loss of parking space on these streets is limited and will be largely offset by the cumulative effect of mitigations.

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 4.3. 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:
  - Flow changes on the Direct Study Area; and
  - Redistributed flows and Junction Capacity Outputs on the Indirect Study Area.
- Overall Road Network-Wide Performance Indicators

- Queuing;
- 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 in the direct study area as a result of its implementation, the weighted average number of people moved by each mode (Car, Bus, Active Modes) has been extracted from the ERM / LAM. The analysis compares the Do Minimum and Do Something scenarios both in the inbound and outbound direction in the AM and PM peak hours (8-9am, 5-6pm) for each forecast year (2028, 2043).

As outlined previously, the same demographic assumptions (population, employment levels) are included in both the Do Minimum and Do Something scenarios. The bus network and frequency assumptions are also the same in both scenarios and are in line with the BusConnects Network Redesign 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 is 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 2028 AM Peak Hour People Movement

Diagram 6.4 illustrates the People Movement by mode along the Proposed Scheme inbound towards the city centre during the AM Peak Hour in 2028.

Diagram 6.4: People Movement by Mode travelling along the Proposed Scheme during 2028 AM Peak Hour

As indicated in Diagram 6.4, there is a reduction of 50% in the number of people travelling via car, an increase of 100% in the number of people travelling via bus and an increase of 67% 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 as a result of the improved provision for these modes with any new pedestrians transferring from car replacing these trips.

The Proposed Scheme will facilitate a step change in the level of segregated cycling provision in comparison to 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 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 6% increase in people moved as a result of the Proposed Scheme and 86% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 6.34: 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	820	59%	410	28%	-410	-50%
		Public Transport	330	24%	660	45%	330	100%
		Walking	180	13%	170	12%	-10	-6%
		Cycling	60	4%	230	16%	170	283%

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Hourly Trips	Modal Split (%)	Hourly Trips	Modal Split (%)	Hourly Trips	Difference (%)
		Combined Walk/Cycle	240	17%	400	27%	160	67%
		Sustainable Modes Total	**570**	**41%**	**1,060**	**72%**	**490**	**86%**
		Total (All Modes)	**1,390**	**100%**	**1,470**	**100%**	**80**	**6%**

6.6.3.1.1.2 2028 PM Peak Hour People Movement

Diagram 6.5 illustrates the People Movement by mode travelling along the Proposed Scheme outbound from the city centre during the PM Peak Hour.

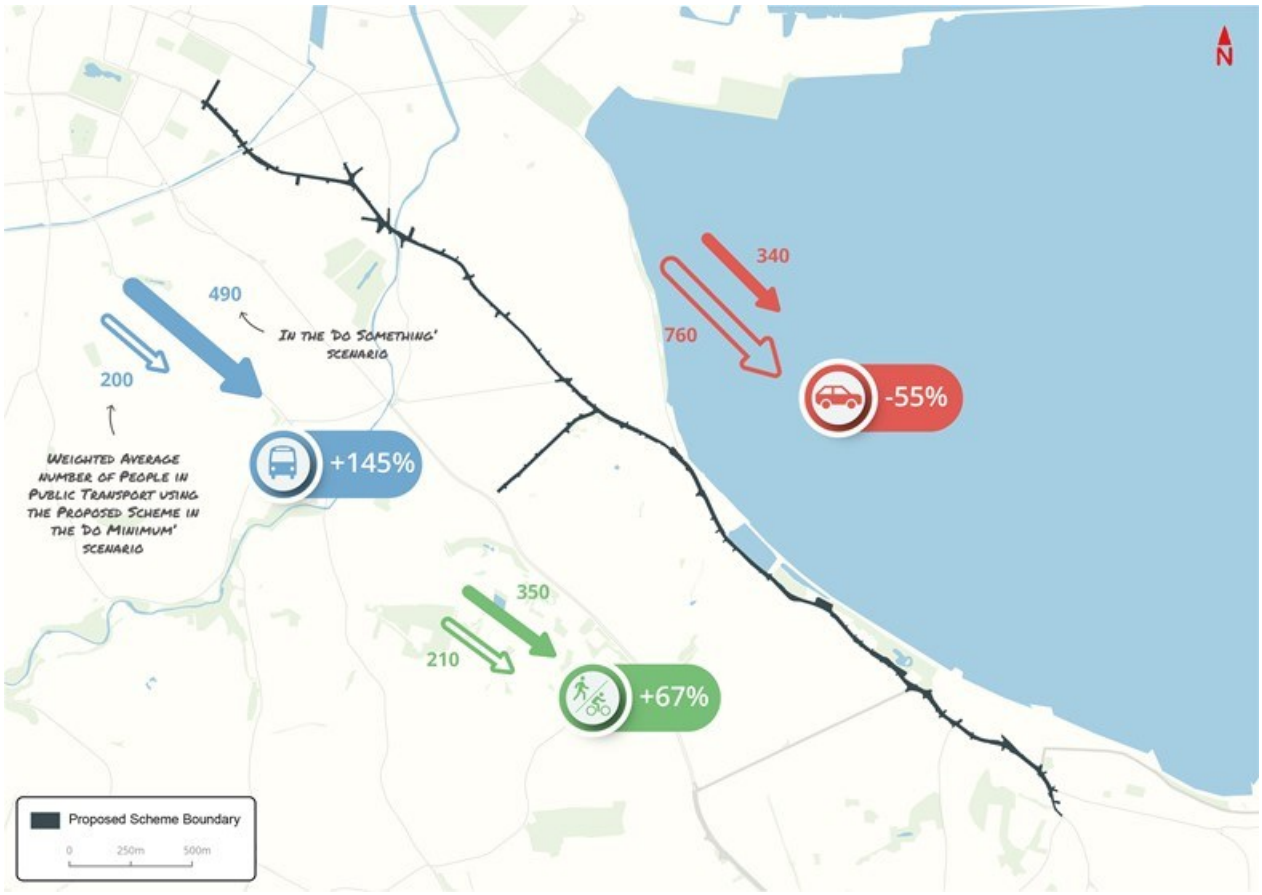


Diagram 6.5: People Movement by Mode travelling along the Proposed Scheme during 2028 PM Peak Hour

As indicated in Diagram 6.5, there is a reduction of 55% in the number of people travelling via car, an increase of 145% 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 6.35 outlines the difference in modal split between the Do Minimum and Do Something scenarios for each mode of transport in an outbound direction from the City Centre during the PM Peak Hour. The results indicate a 105% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 6.35: 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	760	65%	340	29%	-420	-55%
		Public Transport	200	17%	490	42%	290	145%
		Walking	150	13%	130	11%	-20	-13%
		Cycling	60	5%	220	19%	160	267%
		Combined Walk/Cycle	210	18%	350	30%	140	67%
		Sustainable Modes Total	**410**	**35%**	**840**	**71%**	**430**	**105%**
		Total (All Modes)	**1,170**	**35%**	**1,180**	**71%**	**10**	**1%**

6.6.3.1.1.3 2043 AM Peak Hour People Movement

Diagram 6.6 illustrates the People Movement by mode travelling along the Proposed Scheme inbound towards the city centre during the AM Peak Hour in 2043.

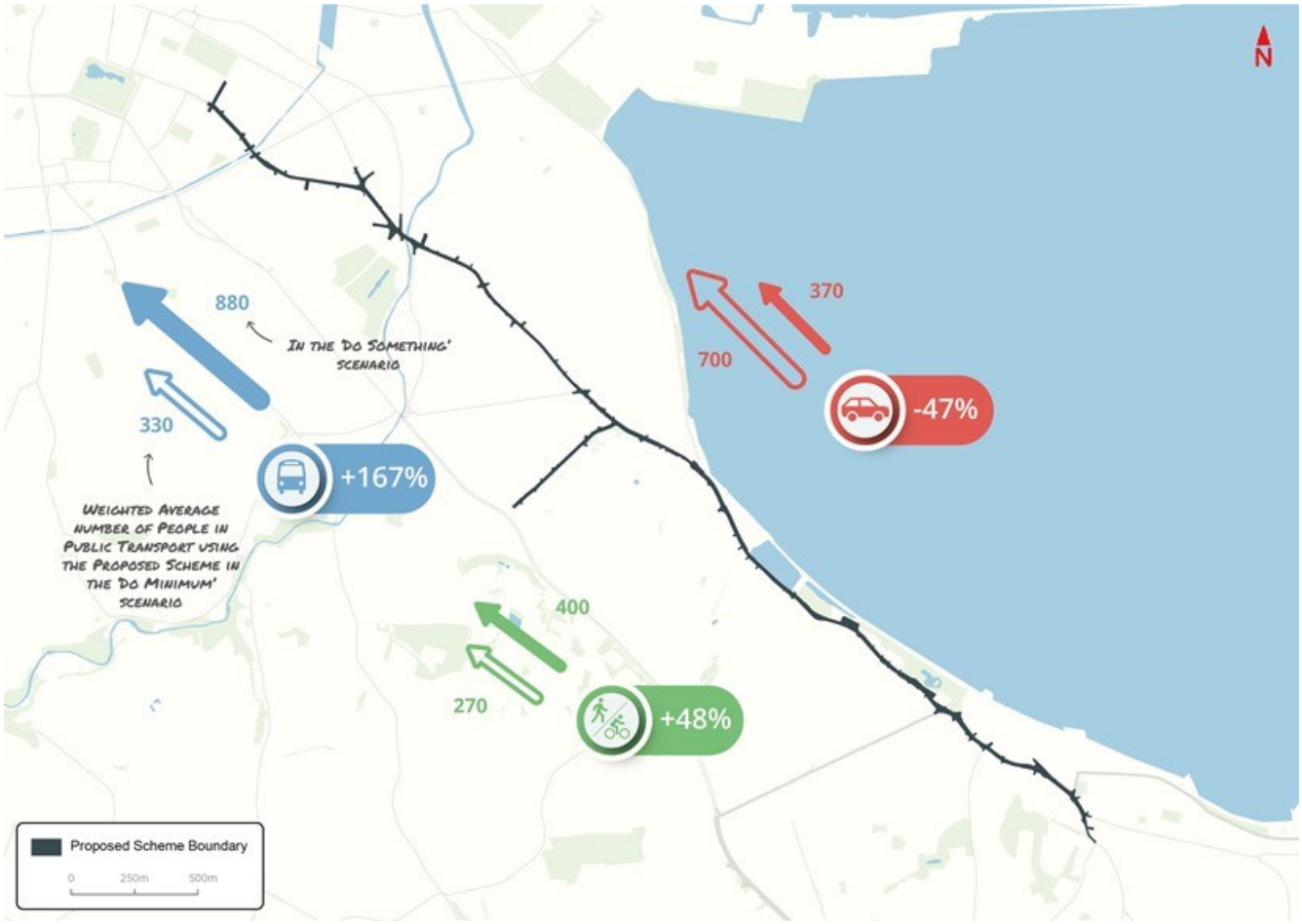


Diagram 6.6: People Movement by Mode travelling along the Proposed Scheme during 2043 AM Peak Hour

As indicated in Diagram 6.6 there is a decrease of 47% in the number of people travelling via car, an increase of 167% in the number of people travelling via bus and an increase of 48% in the number of people walking and cycling along the Proposed Scheme during the AM Peak Hour.

The contents of Table 6.36 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 27% increase in people moved as a result of the Proposed Scheme and 113% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 6.36: 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	700	54%	370	22%	-330	-47%
		Public Transport	330	25%	880	53%	550	167%
		Walking	210	16%	180	11%	-30	-14%
		Cycling	60	5%	220	13%	160	267%
		Combined Walk/Cycle	270	21%	400	24%	130	48%
		Sustainable Modes Total	**600**	**46%**	**1,280**	**78%**	**680**	**113%**
		Total (All Modes)	**1,300**	**100%**	**1,650**	**100%**	**350**	**27%**

6.6.3.1.1.4 2043 PM Peak Hour People Movement

Diagram 6.7 illustrates the People Movement by mode travelling along the Proposed Scheme outbound from the city centre during the PM Peak Hour in 2043.

Diagram 6.7: People Movement by Mode travelling along the Proposed Scheme during 2043 PM Peak Hour

As indicated in Diagram 6.7, there is a decrease of 55% in the number of people travelling via car, an increase of 164% in the number of people travelling via bus and an increase of 52% in the number of people walking and cycling along the Proposed Scheme during the PM Peak Hour.

The contents of Table 6.37 outlines the difference in modal split between the Do Minimum and Do Something scenarios for each mode of transport in an outbound direction from the City Centre during the PM Peak Hour. The results indicate an 11% increase in people moved as a result of the Proposed Scheme and 107% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 6.37: 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	650	59%	290	24%	-360	-55%
		Public Transport	220	20%	580	48%	360	164%
		Walking	170	15%	140	11%	-30	-18%
		Cycling	60	5%	210	17%	150	250%
		Combined Walk/Cycle	230	21%	350	29%	120	52%
		Sustainable Modes Total	**450**	**41%**	**930**	**76%**	**480**	**107%**
		Total (All Modes)	**1,100**	**41%**	**1,220**	**76%**	**120**	**11%**

6.6.3.1.2 People Movement by Bus

The following section presents the ERM demand outputs for People Movement by Bus in terms of passenger loadings along the corridor. 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.

6.6.3.1.2.1 2028 AM Peak Hour Bus Passengers

Diagram 6.8 presents the passenger loading profile comparing the Do Minimum and Do Something scenarios in the AM Peak Hour in the inbound direction in 2028.

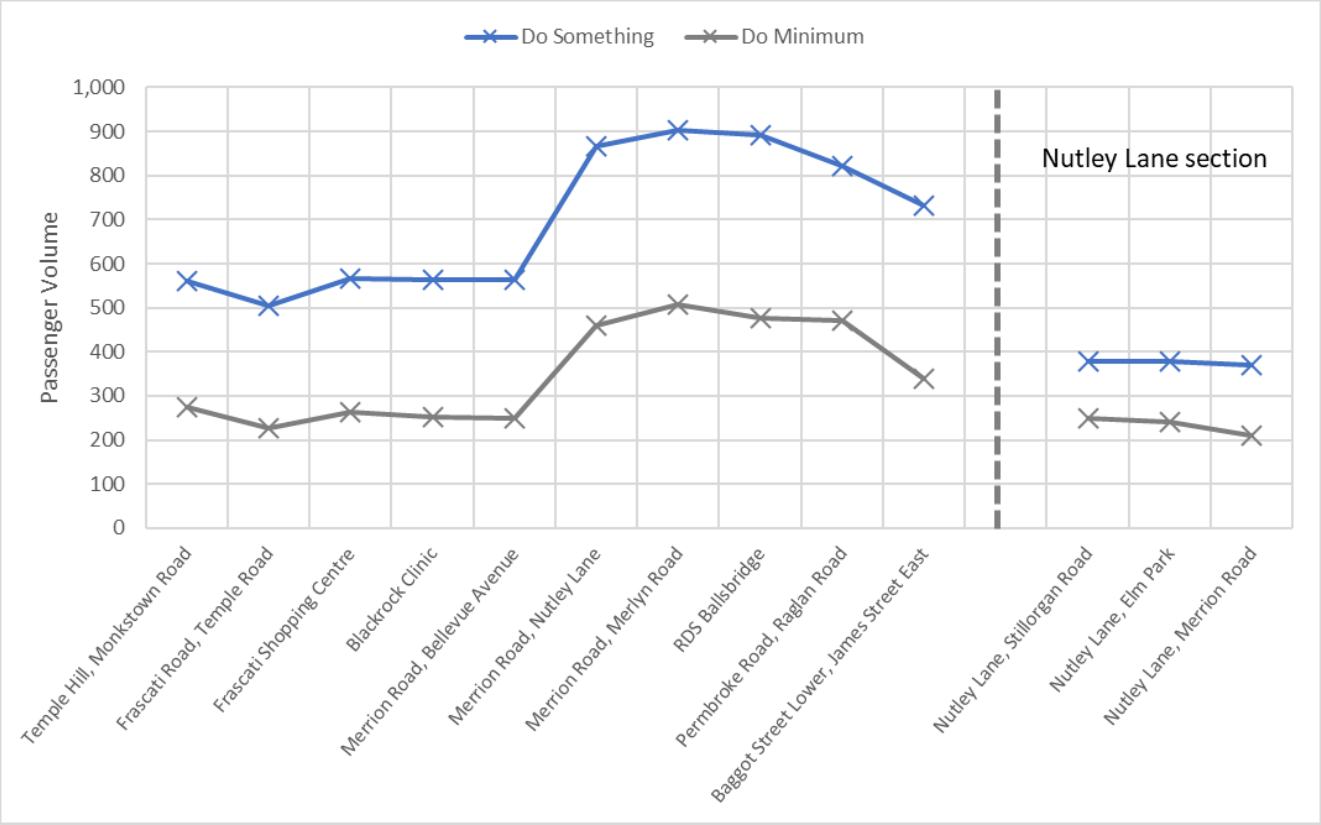


Diagram 6.8: 2028 AM Peak Hour Passenger Volume Along Proposed Scheme (inbound direction)

Diagram 6.8 shows higher levels of bus passenger loadings along the Proposed Scheme with a notable increase at the junction of the R118 Merrion Road and Nutley Lane, where the B Spine services converge (B3 and B4 services combine with the B1 and B2 services from this point). The peak for the whole corridor occurs at the intersection with Merlyn Road where the volume of passengers reaches 900 passengers in the AM Peak hour, compared to approximately 500 in the Do Minimum scenario.

The increase in bus passengers remains at a high level 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.

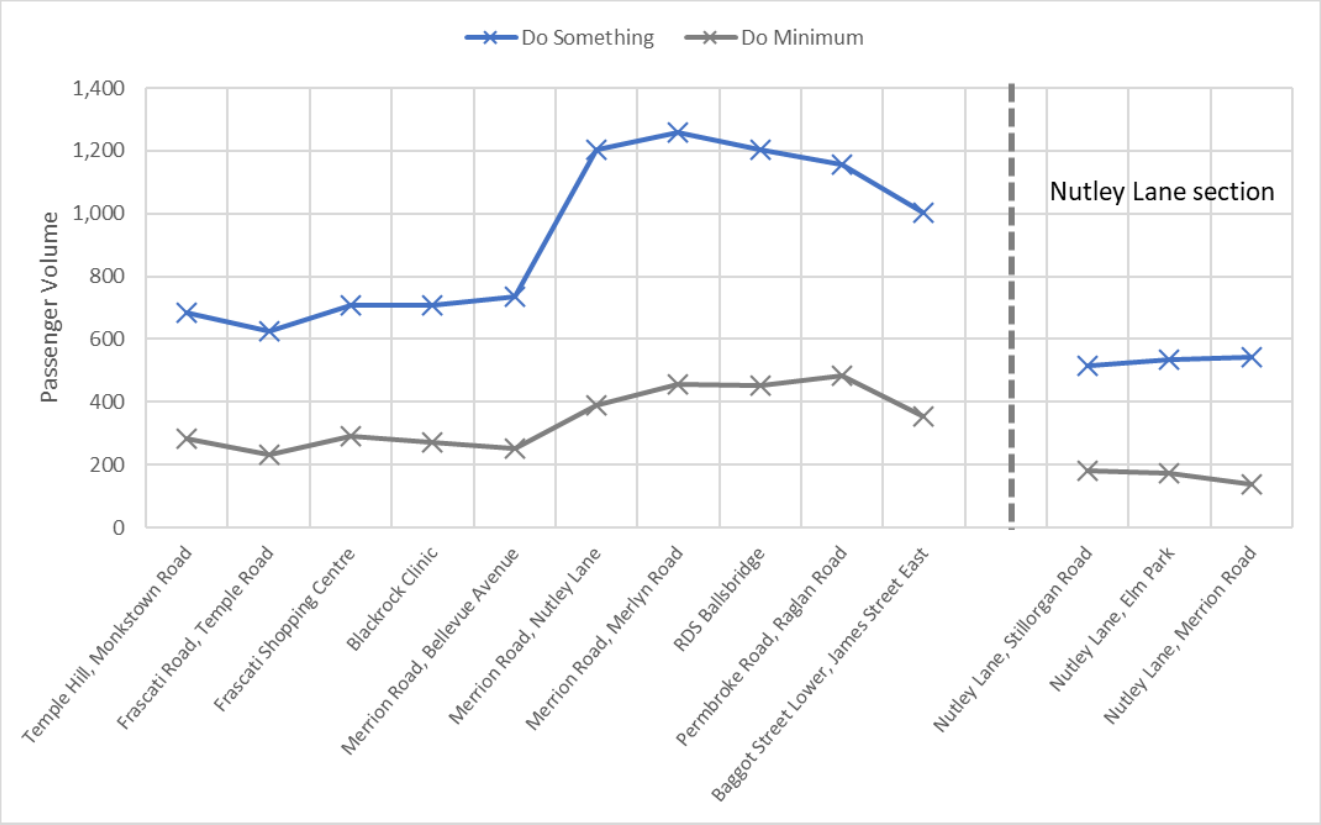


Diagram 6.9: 2043 AM Peak Hour Passenger Volume Along Proposed Scheme (inbound direction)

Diagram 6.9 shows higher levels of bus passenger loadings along the Proposed Scheme with a notable increase at the intersection between Merrion Road and Nutley Lane, where the B Spine services converge (B3 and B4 services combine with the B1 and B2 services from this point). The peak for the whole corridor occurs at the intersection with Merlyn Road where the volume of passengers reaches 1,200 passengers in the AM Peak hour, compared to approximately 450 in the Do Minimum scenario.

The increase in bus passengers remains at a high level along the Proposed Scheme with approximately 400 additional users on the southern part of the corridor and approximately 800 additional users on the northern section of the corridor, compared to the Do Minimum scenario.

6.6.3.1.2.3 2028 PM Peak Hour Bus Passengers

Diagram 6.10 presents the passenger loading profile comparing the Do Minimum and Do Something scenarios in the PM Peak Hour in the outbound direction in 2028.

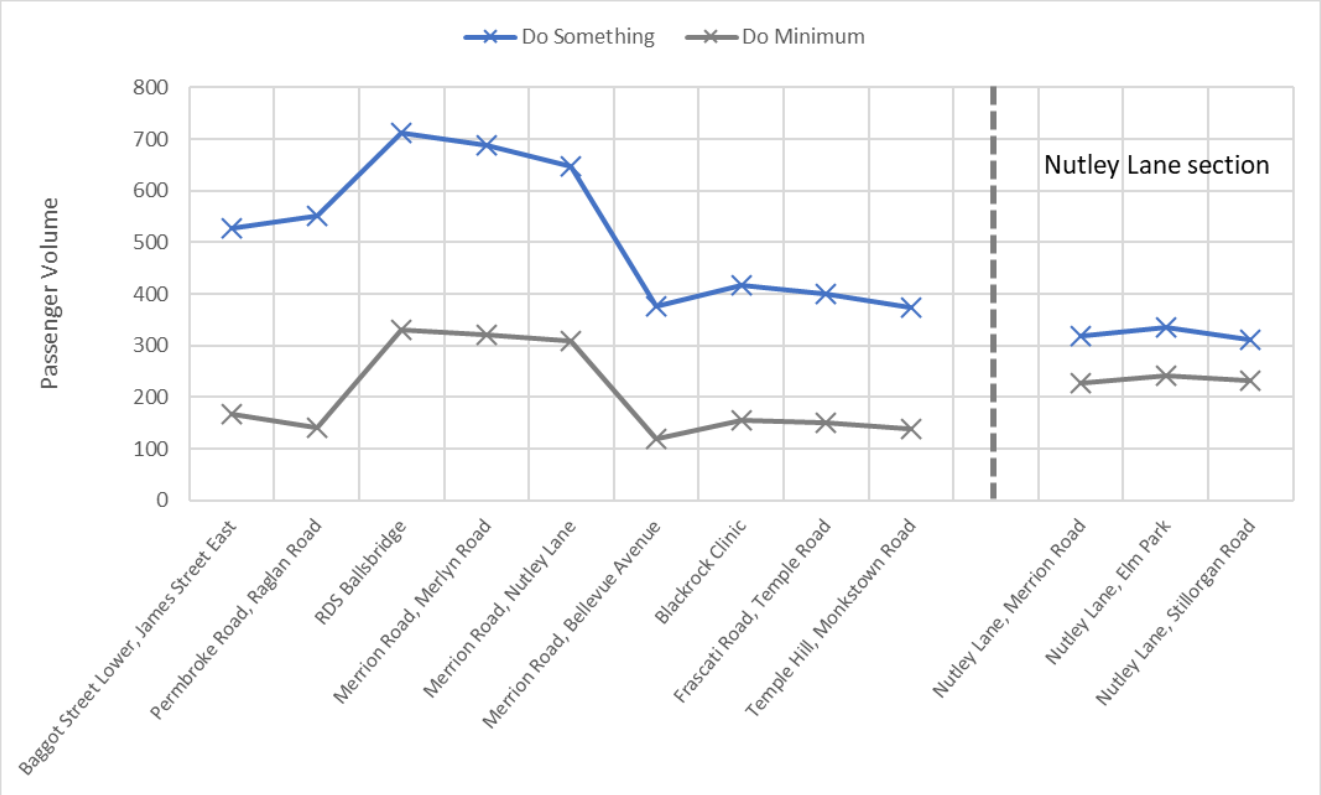


Diagram 6.10: 2028 PM Peak Hour Passenger Volume Along Proposed Scheme (outbound direction)

Diagram 6.10 shows higher levels of bus passenger loadings along the Proposed Scheme with a peak at RDS Ballsbridge where the volume of passengers reaches 700 passengers in the PM Peak hour, compared to approximately 300 in the Do Minimum scenario. There is a notable decrease at the intersection between Merrion Road and Nutley Lane where the B Spine services diverge (B3 and B4 services split with the B1 and B2 services from this point).

The increase in bus passengers remains at a high level along the Proposed Scheme with approximately 300 to 400 additional users on the corridor, compared to the Do Minimum scenario.

6.6.3.1.2.4 2043 PM Peak Hour Bus Passengers

Diagram 6.11 presents the passenger loading profile comparing the Do Minimum and Do Something scenarios in the PM Peak Hour in the outbound direction in 2043.

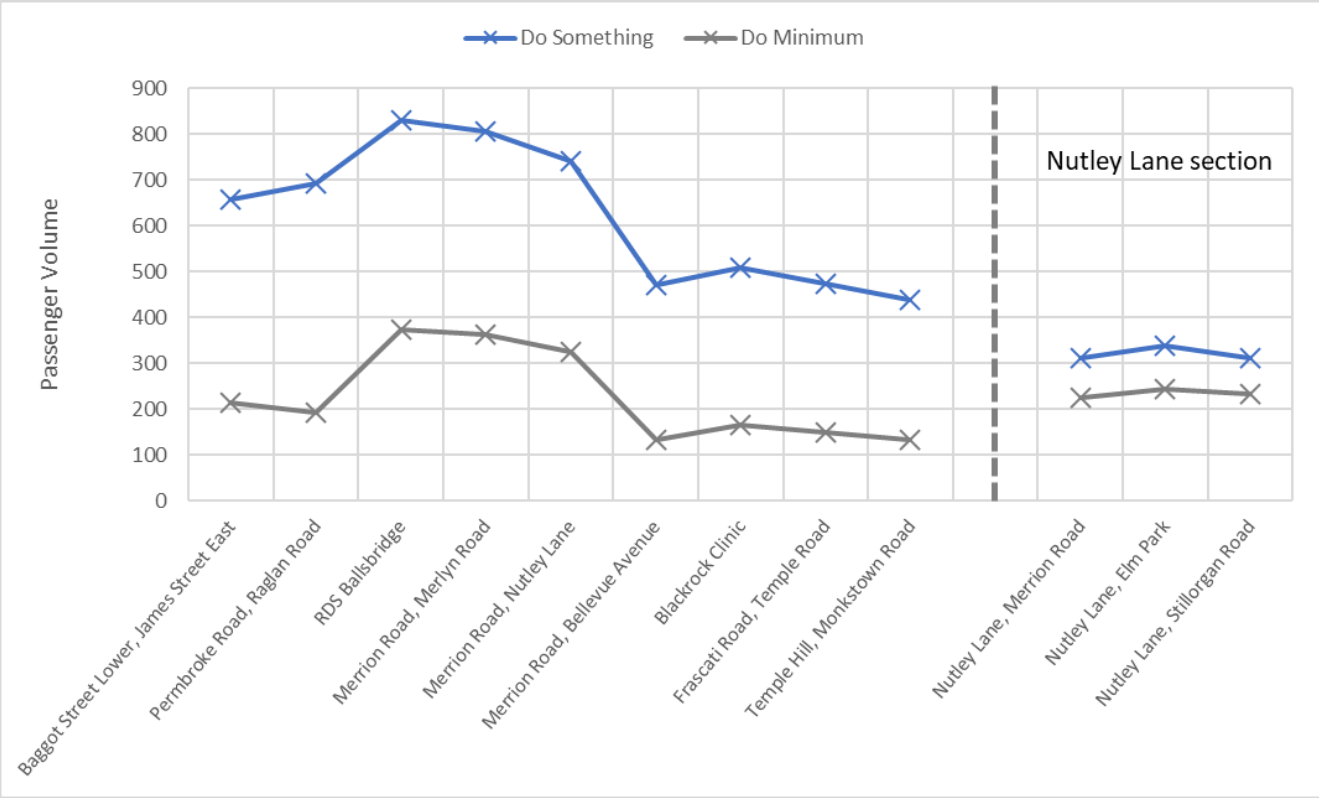


Diagram 6.11: 2043 PM Peak Hour Passenger Volume Along Proposed Scheme (outbound direction)

Diagram 6.11 shows higher levels of bus passenger loadings along the Proposed Scheme with a peak at RDS Ballsbridge where the volume of passengers reaches 850 passengers in the PM Peak hour, compared to approximately 350 in the Do Minimum scenario. There is a notable decrease at the intersection between Merrion Road and Nutley Lane where the B Spine services diverge (B3 and B4 services split with the B1 and B2 services from this point).

The increase in bus passengers remains at a high level along the Proposed Scheme with approximately 350 to 400 additional users on the corridor, compared to the Do Minimum scenario.

6.6.3.1.2.5 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 Do Minimum and Do Something total passengers boarding 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. The results for the 2028 Opening Year scenario are indicated in Table 6.38.

Table 6.38: 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	11,440	12,730	1,290	11.3%
PM Peak Hour	9,480	10,650	1,170	12.3%

The contents of Table 6.38 show that there will be a 11.3% increase in people boarding bus routes that use the physical infrastructure implemented through the Proposed Scheme during the AM Peak Hour. This represents an addition of 1,290 passengers in the AM Peak hour.

In the PM Peak hour, there will be a 12.3% increase in people boarding bus routes that use the Proposed Scheme, representing an additional 1,170 passengers.

The comparison results for the 2043 Design Year scenario are indicated in Table 6.39.

Table 6.39: 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	12,410	14,390	1,980	16.0%
PM Peak Hour	10,440	12,320	1,880	18.0%

The contents of Table 6.39 shows that there will be a 16.0% increase in people boarding bus routes that use the Proposed Scheme during the AM Peak Hour. This represents an addition of 1,980 passengers in the AM Peak hour.

In the PM Peak hour, there will be a 18% increase in people boarding bus routes that use the physical infrastructure implemented through the Proposed Scheme, representing an additional 1,880 passengers.

6.6.3.1.3 People Movement – Significance of Impact

The significance of the effect on the movement of People by sustainable modes with the Proposed Scheme in place has been appraised qualitatively, taking into account the changes in mode share, demand changes by mode along the Proposed Scheme as well as bus usage presented above. The impact of the Proposed Scheme has been adjudged to deliver a **High Positive impact** in terms of People Movement by sustainable modes. The Proposed Scheme can be shown to deliver significant improvements in people movement by sustainable modes along the Proposed Scheme corridor, particularly by bus, with reductions in car mode share due to the enhanced sustainable mode provision.

The findings of the People Movement assessment demonstrate that the Proposed Scheme aligns fully with the aims and objectives of the CBC Infrastructure Works, to 'provide enhanced walking, cycling and bus infrastructure on this key access corridor in the Dublin region, that will enable and deliver efficient, safe, and integrated sustainable transport movement along the corridor'.

6.6.3.1.4 Operational Impacts for Bus Users

6.6.3.1.4.1 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 Do Minimum scenarios.

6.6.3.1.4.2 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 B3 service, which traverses the largest extent of the Proposed Scheme (Sections 1-4), have been extracted from the model. As outlined in Section 6.2, the assessment is based in the context of the full implementation of the BusConnects Network Redesign in both the Do Minimum and Do Something scenarios, with the Proposed Scheme servicing the B-Spine services.

Inbound Direction

Average journey times for the inbound B3 service in 2028 Opening Year and in 2043 Design Year can be seen in Table 6.40.

Table 6.40: B3 Service Bus Average Journey Times (Inbound Direction)

Peak Hour	Do Minimum (minutes)	Do Something (minutes)	Difference (minutes)	% Difference
2028 AM	33.5	26.9	-6.6	-20%
2028 PM	30.5	26.8	-3.7	-12%
2043 AM	32.3	27.1	-5.2	-16%
2043 PM	29.9	26.7	-3.2	-11%

Additional information regarding the range of journey times (minimum, maximum, average and standard deviation) for inbound B3 buses in the Do Minimum (red) and Do Something (blue) can be seen in Table 6.41 and Diagram 6.12 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 6.41: B3 Service – Range of Journey Times (Inbound Direction)

Peak Hour	Do Minimum				Do Something			
	MIN	MAX	AVG	STDEV	MIN	MAX	AVG	STDEV
2028 AM	28.5	39.7	33.5	2.7	24.0	30.2	26.9	1.3
2028 PM	25.2	36.2	30.5	1.9	24.4	29.5	26.8	1.1
2043 AM	25.9	38.2	32.3	2.7	23.3	31.9	27.1	1.2
2043 PM	25.2	33.5	29.9	2	24.1	29.0	26.7	1.1

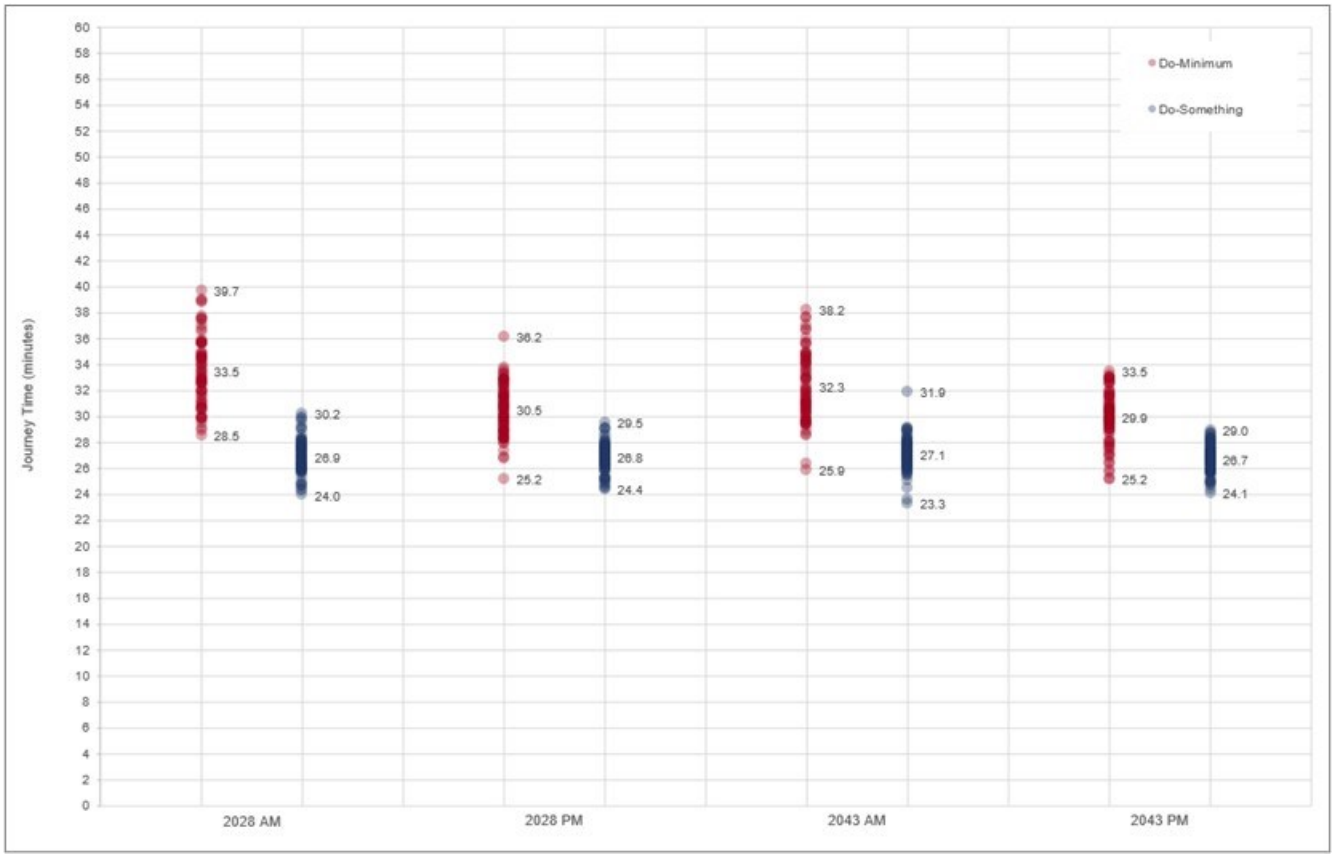


Diagram 6.12: B1 Bus Journey Times (Inbound Direction)

Based on the results presented in Table 6.40, the Proposed Scheme will deliver average inbound journey time savings for B3 service bus passengers of up to 6.6 minutes (20%) in 2028 (AM) and 5.2 minutes (16%) in 2043 (AM). Furthermore, results presented in Diagram 6.15 suggest an improvement in bus journey time reliability in all four 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. As traffic flows fluctuate daily, this 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.

Comparisons of average Do Minimum and Do Something journey times for the inbound B3 service are also illustrated in the cumulative time-distance graphs shown in Diagram 6.13 to Diagram 6.16.

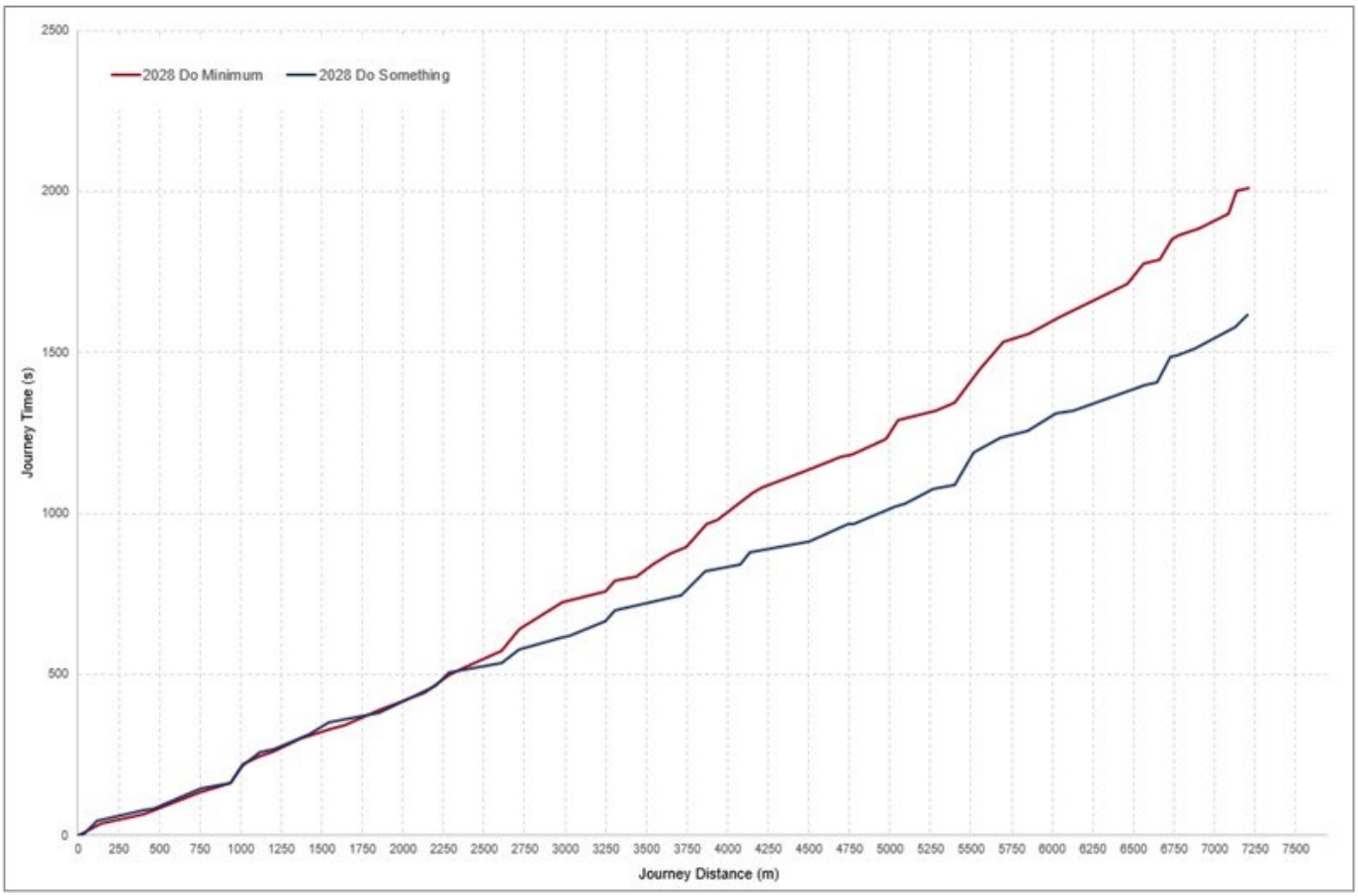


Diagram 6.13: B3 Bus Journey Time (2028 AM, Inbound)

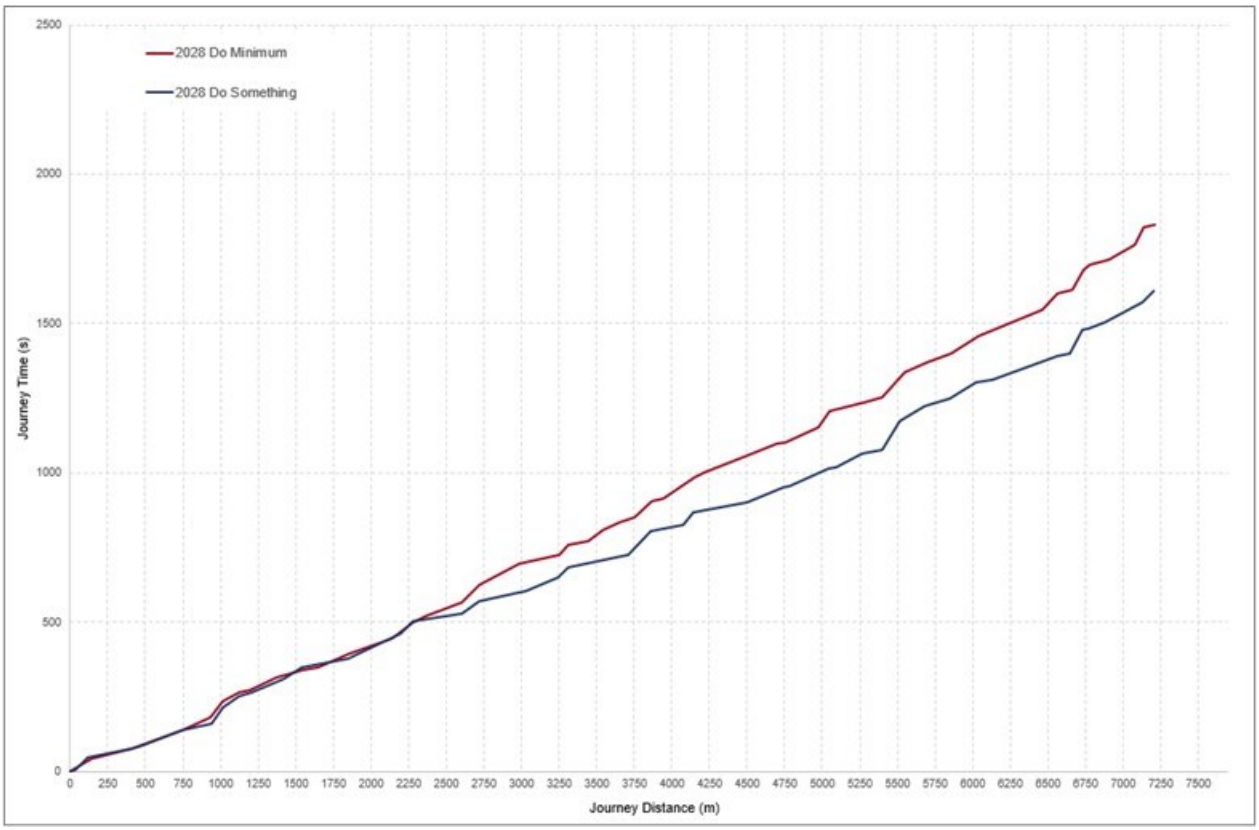


Diagram 6.14: B3 Bus Journey Time (2028 PM, Inbound)

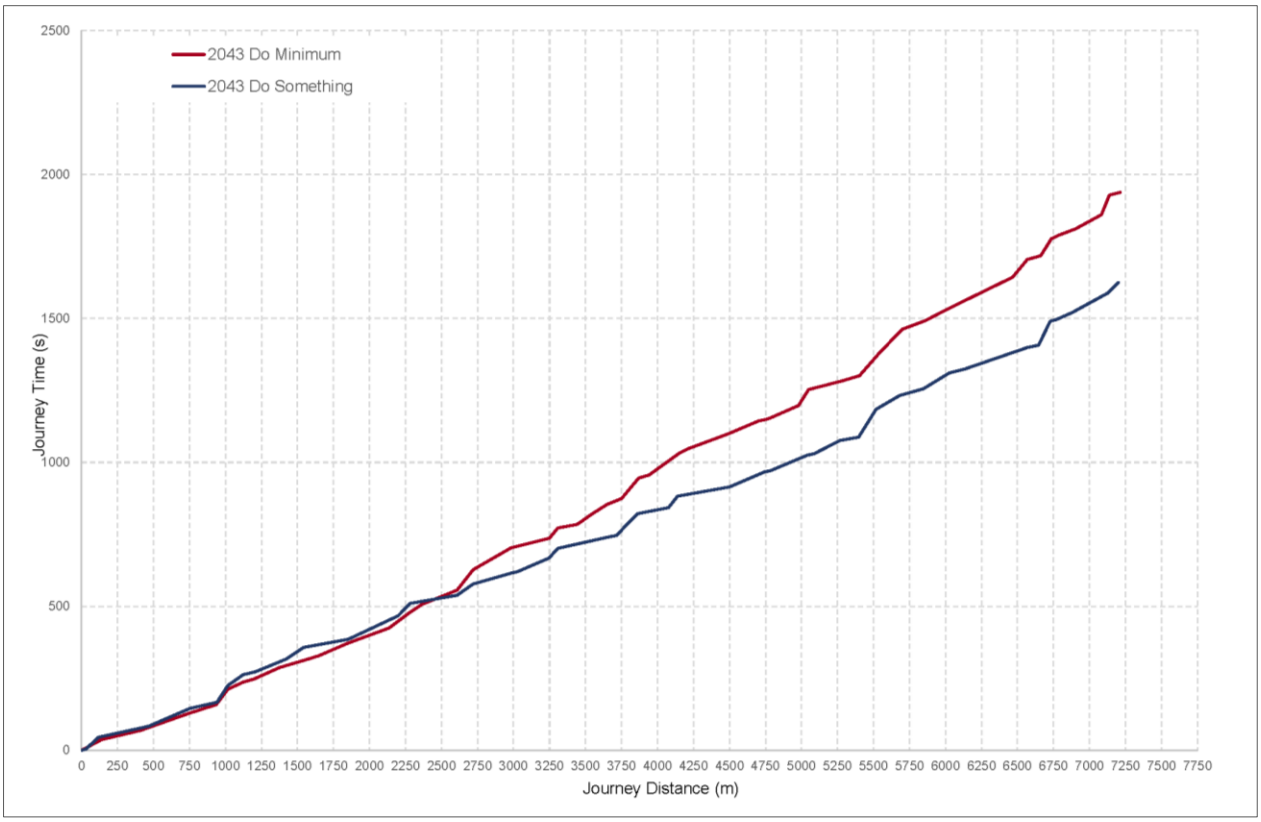


Diagram 6.15: B3 Bus Journey Time (2043 AM, Inbound)

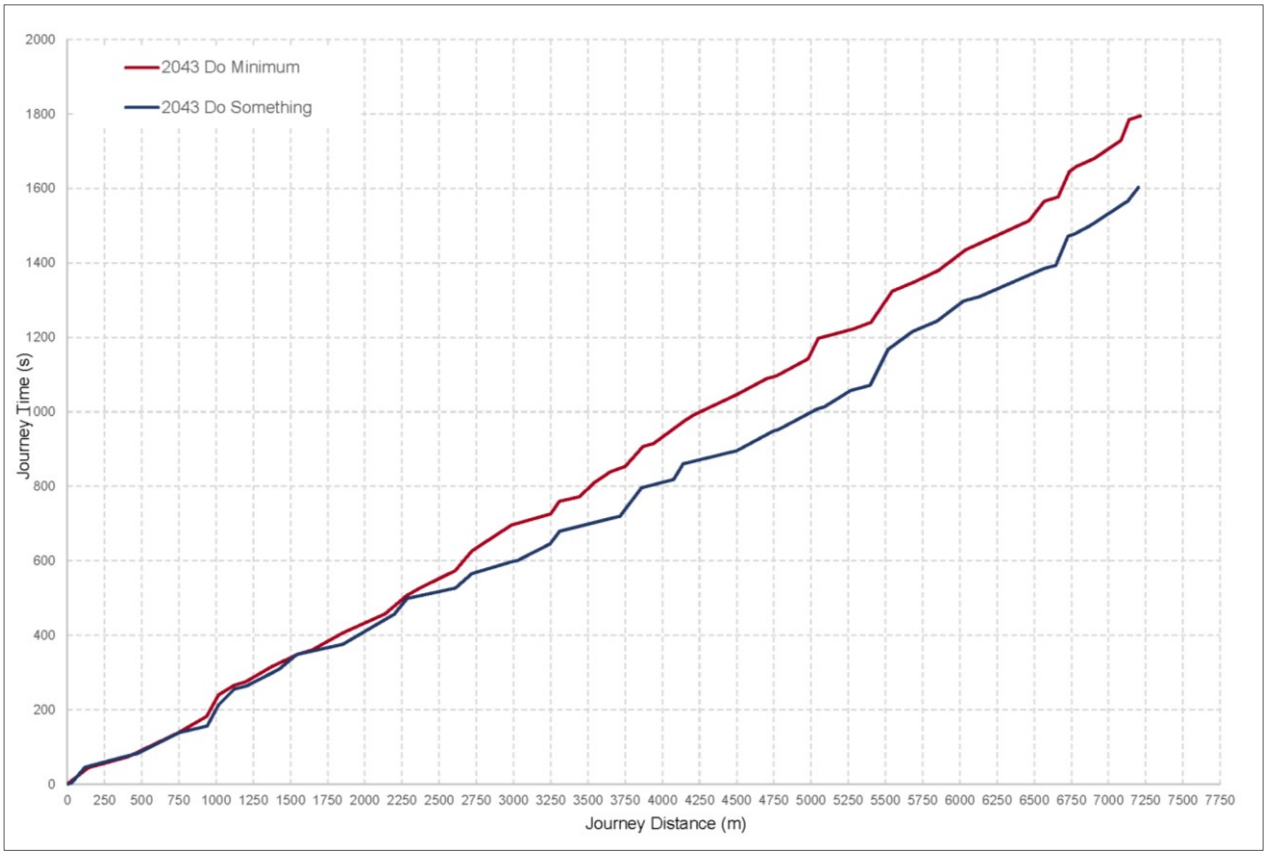


Diagram 6.16: B3 Bus Journey Time (2043 PM, Inbound)

Based on the results presented in Diagram 6.13 to Diagram 6.16, the Proposed Scheme will deliver notable bus journey time savings from the northbound Rock Road approach to the Booterstown Avenue junction in all scenarios. This is due to the introduction of a short but effective section of bus lane through the junction, which contributes to the continuous provision of bus lanes (both existing and those introduced as part of the Proposed Scheme). In addition, the bus priority 'hurry calls' (use of traffic signal plans to give buses priority ahead of general traffic) offered to mainline buses as part of the Proposed Scheme enable journey time savings. Buses benefit from unlimited high priority and alternative bus priority stages offered for straight ahead, northbound left-turning and southbound right-turning bus movements at the Merrion Road and Nutley Lane junction.

Beyond Nutley Lane, the junction improvements and bus priority 'hurry calls' included as part of the Proposed Scheme can be shown to create cumulative bus journey time savings over the Do Minimum, most notably between Sandymount Avenue and Serpentine Avenue, where the existing bus lane is non continuous.

Outbound Direction

Average journey times for the outbound B3 service in 2028 Opening Year and in 2043 Design Year can be seen in Table 6.42. A breakdown of the changes in average journey times for all other bus services using the Proposed Scheme can be found in Appendix A6.1 – Sub Appendix 4 (Impact Assessments).

Table 6.42: B3 Service Bus Journey Times (Outbound Direction)

Peak Hour	Do Minimum (minutes)	Do Something (minutes)	Difference (minutes)	% Difference
2028 AM	30.7	26.0	-4.7	-15%
2028 PM	34.8	25.4	-9.4	-27%
2043 AM	30.8	26.0	-4.9	-16%
2043 PM	33.1	25.5	-7.6	-23%

Additional information regarding the range of journey times (minimum, maximum, average and standard deviation) for outbound B3 buses in the Do Minimum (red) and Do Something (blue) can be seen in Table 6.43 and Diagram 6. 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 6.43: B3 Service – Range of Journey Times (Outbound Direction)

Peak Hour	Do Minimum				Do Something			
	MIN	MAX	AVG	STDEV	MIN	MAX	AVG	STDEV
2028 AM	26.4	35.2	30.7	2	23.8	28.9	26.0	1.4
2028 PM	30.4	41.6	34.8	2.5	23.5	28.7	25.4	1.1
2043 AM	26.9	35.8	30.8	2	23.6	28.5	25.9	1.2
2043 PM	27.1	38.8	33.1	2.4	23.4	28.0	25.5	1

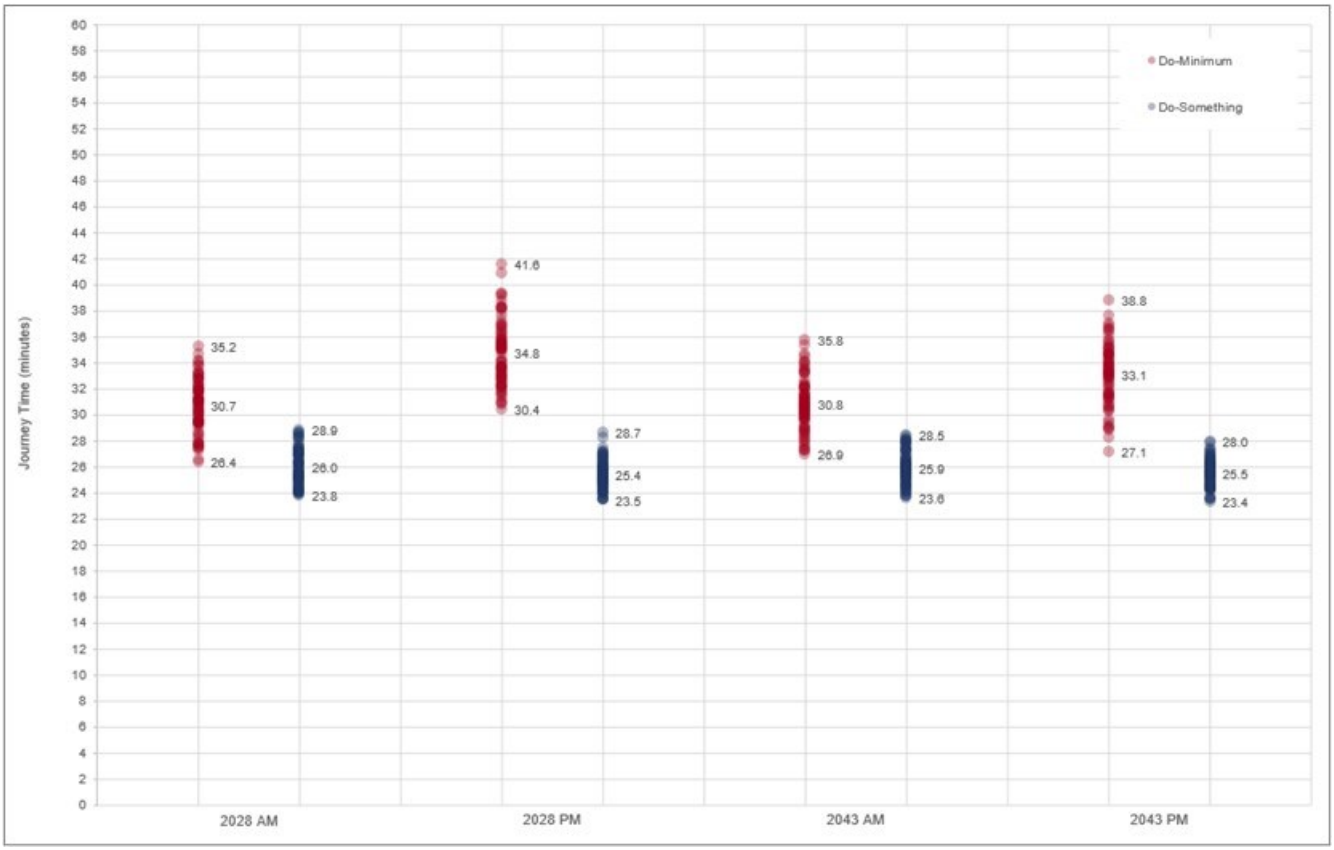


Diagram 6.17: B3 Bus Journey Times (Outbound Direction)

Based on the results presented in Table 6.42, the Proposed Scheme will deliver average outbound journey time savings for B3 service bus passengers of up to 9.4 minutes (27%) in 2028 (PM) and 7.6 minutes (23%) in 2043 (PM). Furthermore, results presented in Diagram 6.17 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. As traffic flows fluctuate daily, this 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 B3 service for the outbound direction of travel illustrated in the cumulative time-distance graphs shown in Diagram 6.18 to Diagram 6.21.

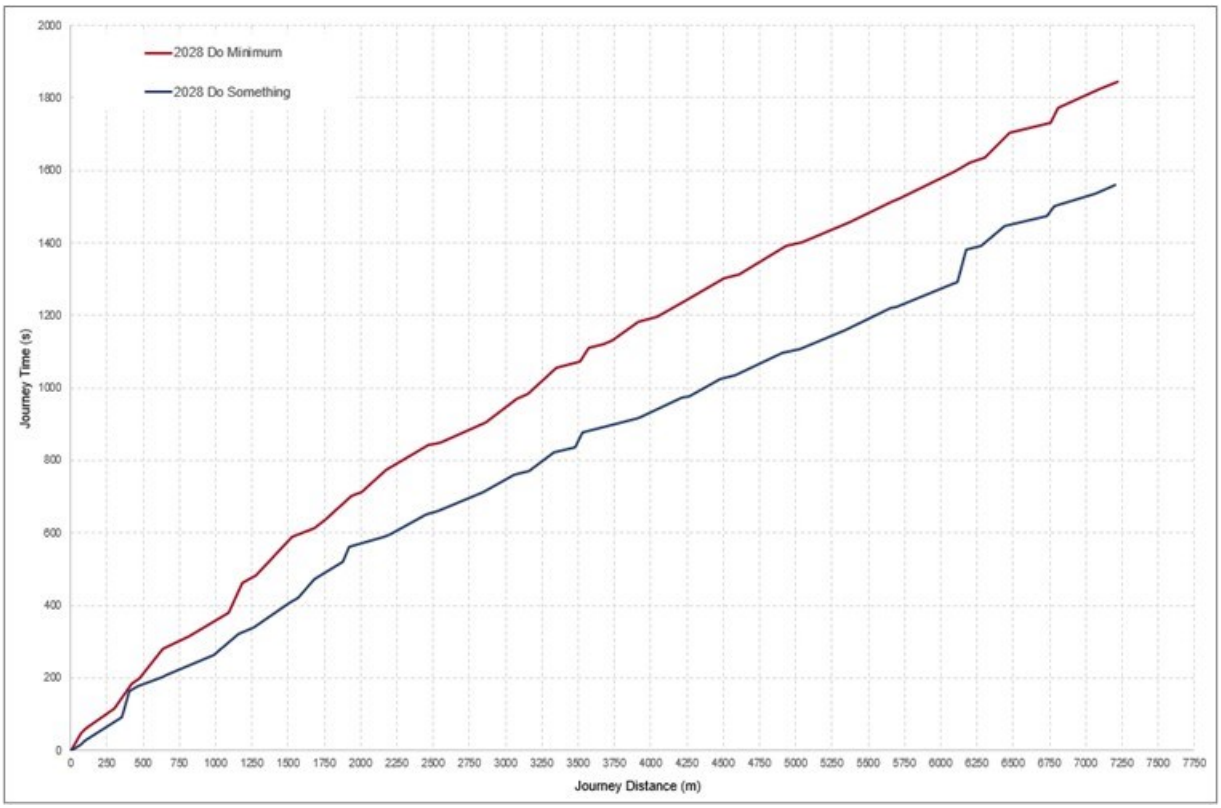


Diagram 6.18: B3 Bus Journey Time (2028 AM, Outbound)

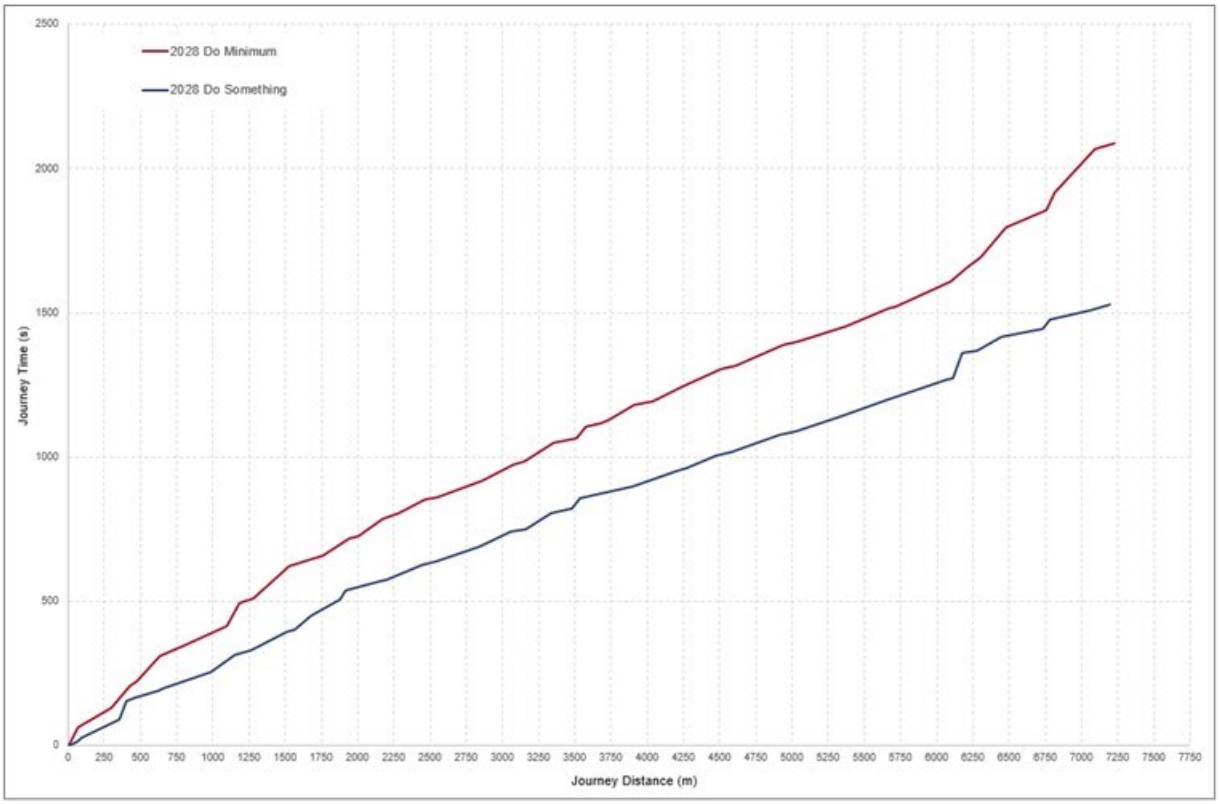


Diagram 6.19: B3 Bus Journey Time (2028 PM, Outbound)

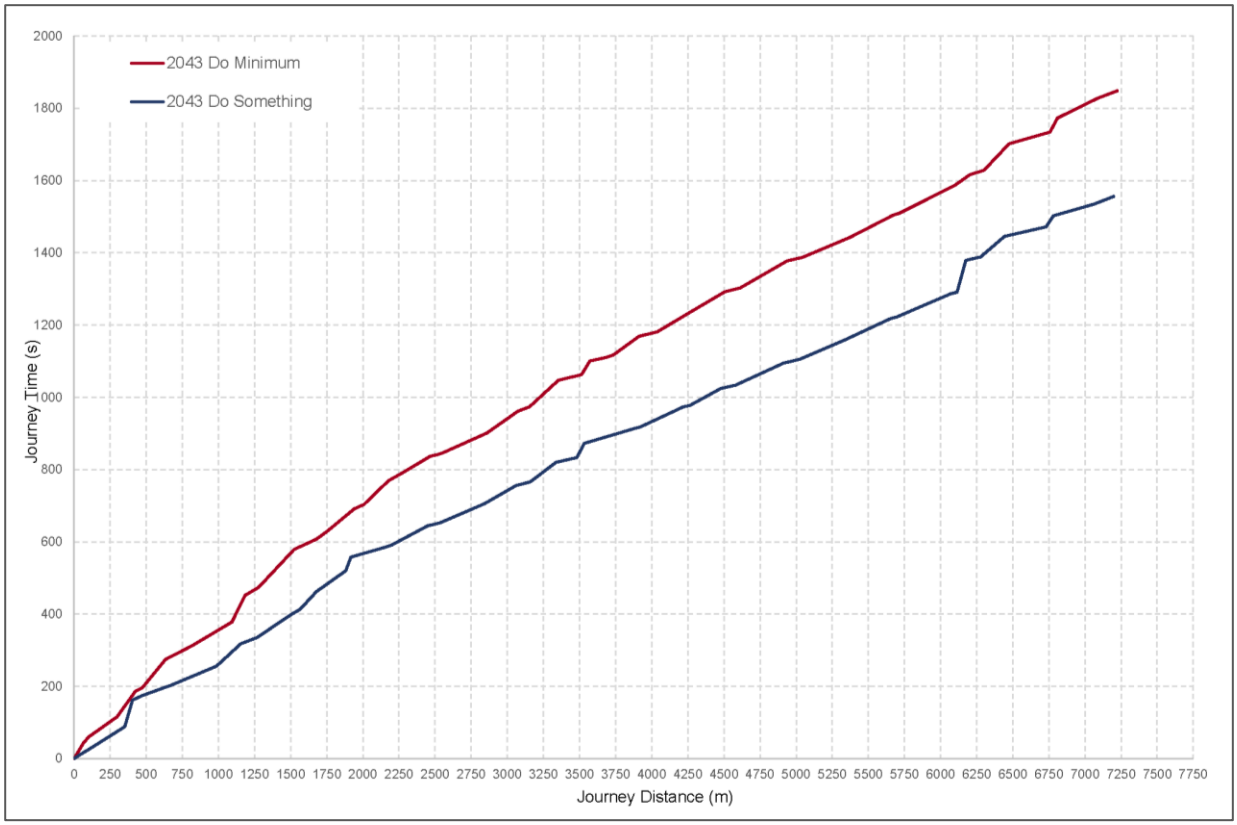


Diagram 6.20: B3 Bus Journey Time (2043 AM, Outbound)

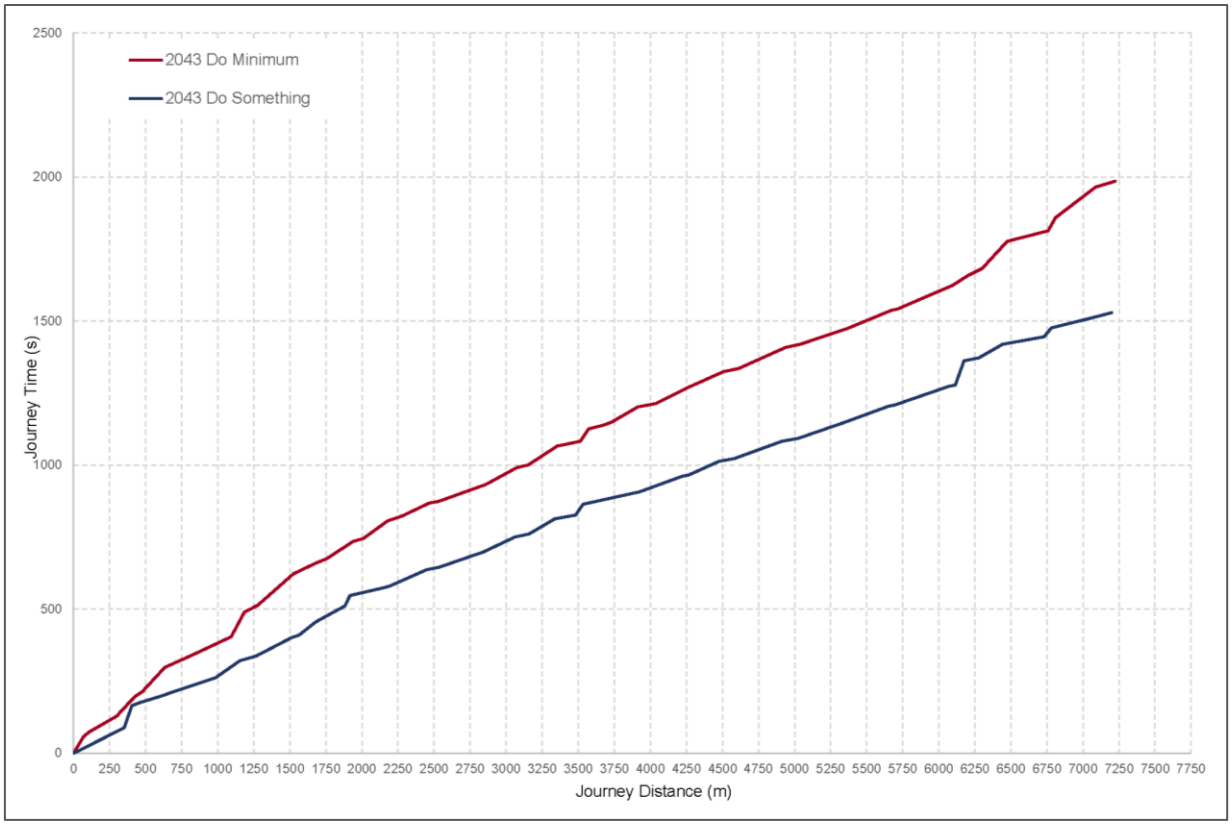


Diagram 6.21: B3 Bus Journey Time (2043 PM, Outbound)

Based on the results presented in Diagram 6.18 to Diagram 6.21, the Proposed Scheme will deliver substantial bus journey time savings in the outbound direction from the Waterloo Road three-arm junction due to the introduction of a bus gate at this location as part of the Proposed Scheme.

As expected, Do Something benefits along this section are most notable in the PM peak where blocking back from the Anglesea Road and Ballsbridge Park four-arm junction extends beyond the R815 Shelbourne Road to the Lansdowne Road junction in the Do Minimum scenario.

Beyond Anglesea Road, the junction improvements and bus priority 'hurry calls' included as part of the Proposed Scheme can be shown to create cumulative bus journey time savings over the Do Minimum, most notably at the Nutley Lane junction.

Significant journey time savings can also be seen in the Do Something on the southbound Merrion Road approach to the Strand Road junction. Adaptive control and a yellow box after the bus stop on the north arm allows straight ahead buses to continue through the junction when the level crossing gates are down for an oncoming train. As expected, these benefits are most notable in the PM peak.

More marginal improvements in journey times can be seen on the section of the Rock Road approaching Blackrock at Rock Hill four-arm signalised junction. This is due to the coordination and critical linkage of the Mount Merrion Avenue and Rock Hill junctions which therefore run a fixed time signal plan to ensure a green wave (a coordinated green signal on approach to both junctions) for buses. The journey time savings remain considerable through this part of the corridor.

B1 (Nutley Lane) Service

Average journey times for the inbound and outbound B1 service in 2028 Opening Year and in 2043 Design Year can be seen in Table 6.44 and Table 6.45.

Table 6.44: B1 Service Bus Average Journey Times (Inbound Direction)

Peak Hour	Do Minimum (minutes)	Do Something (minutes)	Difference (minutes)	% Difference
2028 AM	20.0	15.9	-4.1	-21%
2028 PM	18.2	16.0	-2.2	-12%
2043 AM	19.9	15.8	-4.1	-21%
2043 PM	18.1	16.1	-2.0	-11%

Table 6.45: B1 Service Bus Average Journey Times (Outbound Direction)

Peak Hour	Do Minimum (minutes)	Do Something (minutes)	Difference (minutes)	% Difference
2028 AM	20.4	16.1	-4.3	-21%
2028 PM	20.3	16.0	-4.3	-21%
2043 AM	20.7	16.6	-4.1	-20%
2043 PM	20.5	15.7	-4.8	-23%

Based on the results presented in Table 6.44, the Proposed Scheme will deliver average inbound journey time savings for B1 service bus passengers (which encompasses Section 5 – Nutley Lane) of up to 4.1 minutes (21%) in 2028 (AM) and 4 minutes (20%) in 2043 (AM). In the outbound direction, journey time savings of up to 4.3 minutes (2028 AM and PM) and 4.8 minutes (2043 PM) are predicted. A breakdown of the changes in average journey times for all other bus services using the Proposed Scheme can be found in Appendix A6.1 – Sub Appendix 4 (Impact Assessments).

6.6.3.1.4.3 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 6.46 in vehicle minutes.

Table 6.46: Total Bus Journey Time

Peak Hour	Do Minimum (vehicle.minutes)	Do Something (vehicle.minutes)	Difference (vehicle.minutes)	%Difference
2028 AM	1425	1166	-259	-18%
2028 PM	1303	1072	-231	-18%
2043 AM	1423	1169	-254	-18%
2043 PM	1272	1070	-202	-16%

Based on the results presented in Table 6.46, modelling shows that the Proposed Scheme will reduce total bus journey times along the Proposed Scheme by up to 18% in 2028 and 18% in 2043. Based on the AM and PM peak hours alone, this equates to **8.2 hours of savings in 2028 and 7.6 hours in 2043** combined across all buses when compared to the Do Minimum. On an annual basis this equates to approximately 6,200 hours of bus vehicle savings in 2028 and 5,700 hours in 2043, when considering weekday peak periods only.

6.6.3.1.5 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.

6.6.3.1.6 Increased Bus Frequency - Resilience Sensitivity Analysis

6.6.3.1.6.1 Background

For the purposes of this EIAR and the transport modelling undertaken in support of the EIAR, no increase in bus service frequency beyond that which is planned under the current Bus Connects Network Redesign proposals was included in the assessment. 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 this EIAR 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 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.

6.6.3.1.6.2 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 while 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 was increased by 10 buses per hour in both directions at the busiest section. This was done to assess whether the Proposed Scheme could cater for this increased service frequency while maintaining a high level of journey time reliability. The analysis was undertaken

in the 2028 Do 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 6.47 below.

Table 6.47: Resilience Testing Bus Service Frequency Scenario Testing

Scenario	Inbound (Buses per Hour)	Outbound (Buses per Hour)
Do Minimum	45	45
Do Something	45	45
Do Minimum - Additional Services Resilience Test	55	55
Do Something - Additional Services Resilience Test	55	55

The contents of Table 6.48 outline the average AM journey times for the inbound Dún Laoghaire to B3 service, and the average PM journey times for the outbound B3 service in the 2028 Opening Year.

Table 6.48: B3 Service – Average Bus Journey Times

Peak Hour	Do Minimum (minutes)	Do Minimum (Additional Services) (minutes)	% Difference	Do Something (minutes)	Do Something - Additional Services (minutes)	% Difference
2028 AM	33.5	33.3	-0.6%	26.9	27.0	0.4%
2028 PM	34.8	35.2	1.0%	25.4	25.3	-0.5%

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 in Diagram 6.22 below. The diagram displays the maximum, minimum and average journey times for each of the B3 bus services modelled.

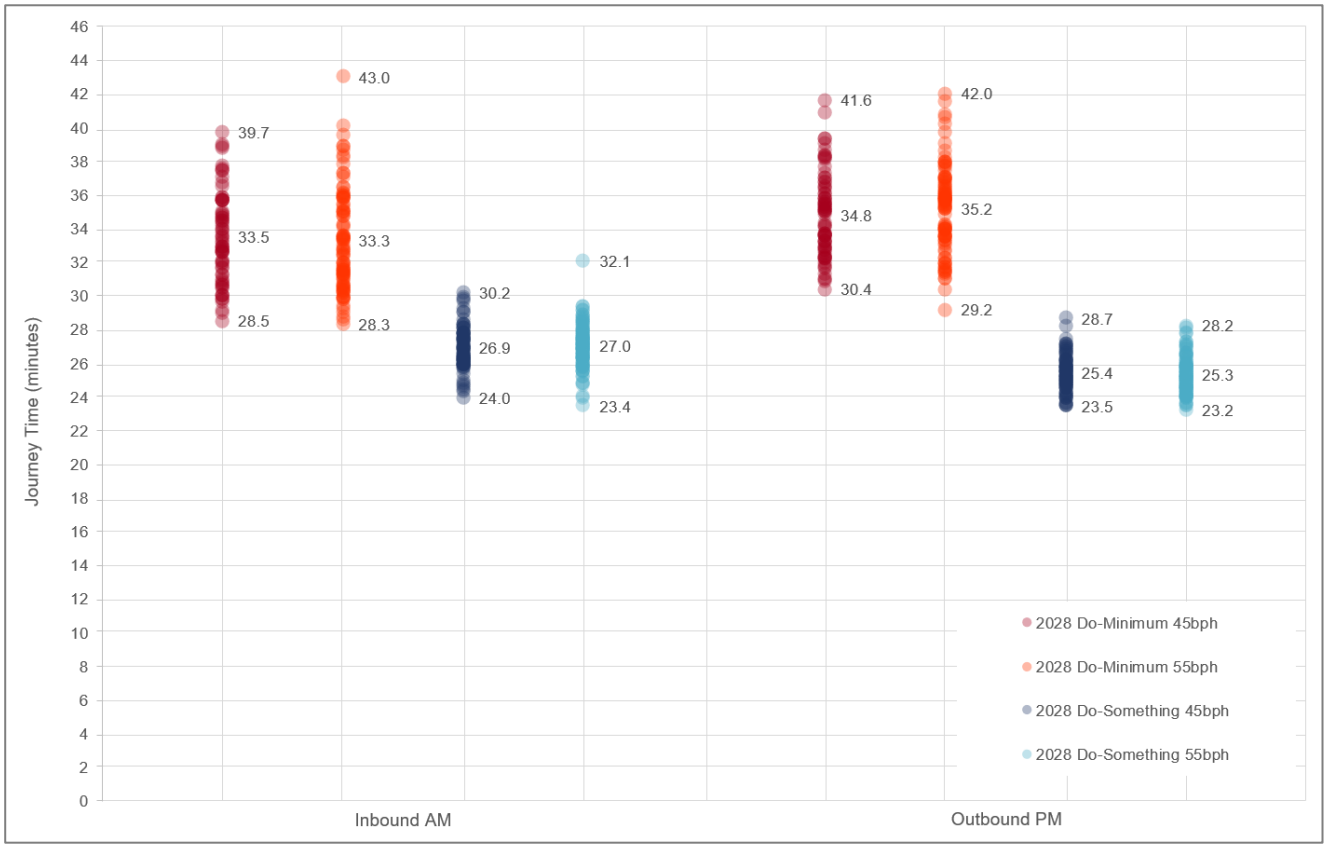


Diagram 6.22: Resilience Testing Bus Journey Time Reliability Indicators - Scenario Testing– Opening Year (2028)

As can be seen from Table 6.48 and Diagram 6.22, the results indicate that even with an additional 10 services operating per direction per hour along the Proposed Scheme, a high level of journey time reliability is maintained in the Do Something scenarios, comparable to the 45 buses per direction per hour results. The results indicate negligible change in journey times in the Do Something Resilience sensitivity test per bus. However, in the Do Minimum Resilience sensitivity test, bus journey time reliability is impacted more significantly with additional services in place. ***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.

Further details on the potential additional greenhouse gas (GHG) emissions savings that could occur from this resilience is outlined in Chapter 8 (Climate) of Volume 2 of the EIAR.

6.6.3.1.7 General Traffic Assessment

6.6.3.1.7.1 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. This reduction in operational capacity for general traffic along the Proposed Scheme will likely create some level of trip redistribution onto the surrounding road network.

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 reasonable 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 2021 Climate Action Plan (CAP) (DCCAE 2021) includes reference to a freight strategy for the region that 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. The 2021 Climate Action Plan 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. As proposals for the above are at a pre-planning stage, it was not deemed appropriate to account for them in the assessments and a worst-case assessment has been undertaken based on continued growth in goods traffic.

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 Do Minimum and Do Something 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 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 4 of this TIA. The full outputs of the results are included in Appendix A6.1 – Sub 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 more 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.

Diagram 6.23 provides a snapshot from the guidance which outlines "Advisory Thresholds for Traffic and Transport Assessment Where National Roads are Affected".

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.

Diagram 6.23 Extract from the Traffic and Transport Assessments 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 to cover all road types[1] in the vicinity of the Proposed Scheme, not only National Roads. This ensures a robust and rigorous assessment has 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;

[1] Part II of The Roads Act 1993 sets out the current classification of roads as National (National Primary and National Secondary), Regional and Local (Local Tertiary and Local Secondary). The road types are governed by the default speed limit of the road. National Roads are TII owned whilst Regional and Local Roads are owned by the associated Local Authority.

- 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 or on national roads in the AM and PM Peak Hours as a result of traffic redistribution comparing the Do Minimum to the Do Something 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. This further assessment is outlined in the following sections.

6.6.3.1.7.2 General Traffic Flow Difference - AM Peak Hour

Diagram 6.24 illustrates the difference in traffic flows on the road links in the AM Peak Hour for the 2028 Opening Year. Please see Appendix A6.1 – Sub Appendix 4 (Impact Assessments) for the full LAM outputs.

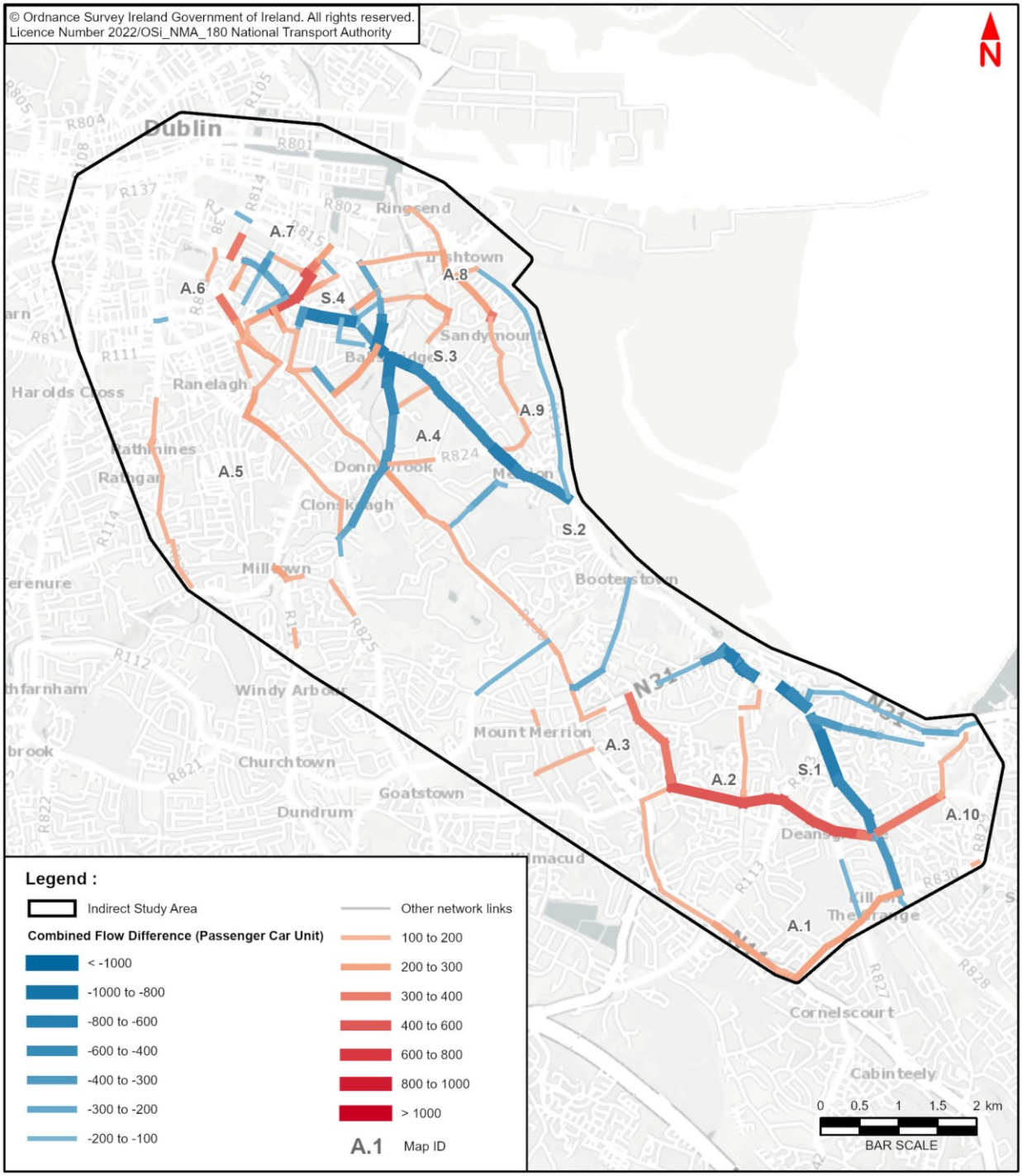


Diagram 6.24: Flow Difference on Road Links (Do Minimum vs. Do Something), AM Peak Hour, 2028 Opening Year

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 6.24, which indicates where a reduction of at least 100 combined traffic flows occurred in the model.

6.6.3.1.7.3 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 6.24, 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 6.49.

Table 6.49: Road Links that Experience a Reduction of ≥ 100 Combined Flows during AM Peak Hour (Direct Study Area)

Location	Map I.D.	Road Name	Do Minimum Flows (PCUs)	Do Something Flows (PCUs)	Flow Difference (PCUs)
Section 1 – R827 Stradbrook Road to L1003 Booterstown Avenue	S.1	Temple Hill	1,643	608	-1035
		Temple Road	867	380	-488
		Frascati Road	1,754	680	-1,074
		Rock Road South of Booterstown	1,819	938	-881
Section 2 – L1003 Booterstown Avenue to Nutley Lane	S.2	Rock Road North of Booterstown	2,160	1,178	-981
Section 3 – R118 Merrion Road to Ballsbridge	S.3	Merrion Road South of Nutley Lane	1,431	781	-651
		Merrion Road North of Nutley Lane	2,420	1,545	-875
Section 4 – Ballsbridge to Merrion Square	S.4	Pembroke Road	1,085	101	-984
		Baggot Street Upper	1,274	322	-952
		Baggot Street Lower	430	113	-317
		Fitzwilliam Street Upper	665	316	-349
Section 5 – R138 Stillorgan Road to R118 Merrion Road – Nutley Lane	S.5	Nutley Lane	1,112	892	-220

Table 6.49 demonstrates that there is a moderate to significant reduction of between -220 and -1,074 general traffic flows along the direct study area during the AM Peak Hour, which is attributed to the Proposed Scheme and the associated modal shift as a result of its implementation. This reduction in general traffic flow has been determined as an overall medium positive impact on the direct study area. The most significant impact occurs along the N31 Frascati Road.

There are no increases to general traffic flows along the direct study area.

6.6.3.1.7.4 Impact on Indirect Study Area (AM Peak Hour)

Indirect Reductions in General Traffic: In addition to the general traffic flow reductions occurring along the direct 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 6.50.

Table 6.50: Road Links that Experience a Reduction of ≥100 Combined Flows during AM Peak Hour (Indirect Study Area)

Location	Map I.D.	Road Name	Do Minimum Flows (PCUs)	Do Something Flows (PCUs)	Flow Difference (PCUs)
Section 1 – R827 Stradbrook Road to L1003 Booterstown Avenue	S.1	Abbey Road	955	564	-391
		Booterstown Avenue	828	605	-223
		Dean's Grange Road	442	340	-102
		Foster's Avenue	919	778	-142
		Mount Merrion Avenue	588	263	-326

Location	Map I.D.	Road Name	Do Minimum Flows (PCUs)	Do Something Flows (PCUs)	Flow Difference (PCUs)
		Newtown Avenue	730	527	-203
		Old Dunleary Road	492	307	-185
		Rochestown Avenue	918	757	-162
		Seapoint Avenue	520	316	-204
		Stradbrook Road	905	277	-628
		Windsor Park	741	210	-531
Section 2 – L1003 Booterstown Avenue to Nutley Lane	S.2	Strand Road	1,556	1,346	-210
Section 3 – R118 Merrion Road to Ballsbridge	S.3	Anglesea Road	1,440	775	-665
		Beach Road	1,127	949	-178
		Beaver Row	1,393	1,066	-327
		Beech Hill Avenue	1,218	900	-319
		Clonskeagh Road	1,807	1,695	-111
Section 4 – Ballsbridge to Merrion Square	S.4	Clare Street	834	721	-113
		Elgin Road	384	247	-136
		Fitzwilliam Place	871	731	-139
		Fitzwilliam Square East	577	441	-135
		Fitzwilliam Street Upper	593	443	-150
		Harcourt Road	713	594	-119
		Lansdowne Road	323	201	-122
		Mount Street	1,125	952	-173
		Northumberland Road	1,096	899	-196
		Pembroke Park	365	116	-249
		Raglan Road	342	172	-169
		Shelbourne Road	2,852	1,458	-1,394
		Waterloo Road	558	249	-309
		Wilton Terrace	606	438	-168

As indicated in Table 6.50 the traffic reductions within the indirect study area vary between -102 and -1,394 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 6.24. 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 Do Minimum and Do Something scenarios during the AM Peak Hour are outlined in Table 6.51.

Table 6.51: Road Links where the 100 Flow Additional Traffic Threshold is Exceeded (AM Peak Hour)

Orientation	Map I.D.	Road Name	Do Minimum Flows (pcu)	Do Something Flows (pcu)	Flow Difference (pcu)
Western side of Proposed Scheme	A.1	Kill Lane	1,474	1,747	273
	A.2	Carysfort Avenue	870	1,111	241
		New Road	1,120	1,465	346
		Stillorgan Park	1,456	1,916	459
		Grove Avenue	554	928	374
	A.3	Mount Merrion Avenue	903	1,103	199
		Stillorgan Road	900	1144	244
		Stradbrook Road	778	879	101

Orientation	Map I.D.	Road Name	Do Minimum Flows (pcu)	Do Something Flows (pcu)	Flow Difference (pcu)
		Trees Road Lower	374	505	131
	A.4	Simmonscourt Road	270	449	180
	A.5	Burlington Road	273	498	226
		Clonskeagh Road	883	1,058	175
		Dartmouth Road	437	547	109
		Dartry Road	887	1,019	132
		Donnybrook Road	1561	1,721	160
		Leeson Park	364	493	128
		Leeson Street Lower	912	1,223	311
		Leeson Street Upper	927	1,183	256
		Morehampton Road	1,475	1,643	168
		Rathmines Road Lower	1,220	1,428	209
		Rathmines Road Upper	695	852	157
		Sallymount Avenue	200	457	257
		Sandford Road	1,256	1,466	210
		Sussex Road	500	796	296
		The Appian Way	692	858	166
	A.6	Waterloo Road	679	843	164
		Wellington Place	278	414	136
		Fitzwilliam Square West	649	853	204
		Haddington Road	631	1,222	591
		Merrion Street Upper	906	1,302	395
		Mespil Road	848	1,364	516
		Pembroke Street Lower	666	855	189
		St Stephen'S Green	1,240	1,383	143
	A.7	Irishtown Road	577	729	152
		Mount Street Crescent	239	418	178
		Mount Street Upper	368	537	169
		Percy Place	398	868	469
		Warrington Place	570	874	305
Eastern side of Proposed Scheme	A.8	Bath Avenue	307	473	166
		Bridge Street	1,189	1,291	102
		Herbert Park	249	540	291
		Herbert Road	273	475	202
		Lansdowne Road	600	756	155
		Sandymount Green	632	937	305
		Sandymount Road	632	910	277
		Serpentine Avenue	755	910	155
		Tritonville Road	608	885	277
	A.9	Ailesbury Road	220	399	180
		Gilford Road	494	598	104
		Park Avenue	398	532	135
	A.10	Carrickbrennan Road	587	719	133
		Monkstown Avenue	679	1,040	360
		Pakenham Road	828	939	111

As outlined in Table 6.51 the additional traffic on the key road links within the indirect study area varies between 101 and 591 combined flows during the AM Peak Hour. Further junction capacity assessment has been undertaken along these road links to determine whether the above road links have the capacity to cater for the additional traffic volumes as a result of the Proposed Scheme.

Operational capacity outputs have been extracted from the LAM at the associated junctions along the subject road links to determine 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 the junction has been used for the purpose of the assessment to ensure a conservative impact assessment is undertaken.

6.6.3.1.7.5 National Roads – 5% Threshold Impact Assessment (AM Peak Hour)

The assessment methodology specifically for national roads stipulates that 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 requires further assessment.

In the context of the indirect study area for the Proposed Scheme, this assessment comprises consideration of the N11 Stillorgan Road and N31 Mount Merrion Road national roads. Numerous junctions along these road links are assessed further in this chapter (in terms of junction capacity) where traffic flows along sections of the road link have exceed the threshold for 100 combined flow of additional traffic, as outlined above. Therefore, only the junctions along these national roads that are not triggered by the 100 combined flow of additional traffic threshold are considered by the 5% threshold impact assessment.

A comparison of flow difference between the Do Minimum and Do Something scenarios during the AM Peak Hour at the identified junctions is outlined in Table 6.52.

Table 6.52: National Road Links where > 5% Additional Traffic Threshold is Exceeded (AM Peak Hour)

National Road Link	Junction	Total Do Minimum Turning Flows (PCU)	Total Do Something Turning Flows (PCU)	Turning Flow Difference (PCU)	% Difference
N11	Stillorgan Road / Stillorgan Grove	2,965	3,075	110	+4%
	Stillorgan Road / Priory Drive / Old Dublin Road	4,519	4,756	237	+5%
N31	Mount Merrion Avenue / Hyde Park Avenue	670	596	-74	-11%
	Mount Merrion Avenue / Waltham Terrace	469	363	-106	-23%
	Mount Merrion Avenue / Cross Avenue	639	479	-160	-25%
	Mount Merrion Avenue / Sydney Avenue	626	412	-214	-34%
	Mount Merrion Avenue / Frascati Park	632	328	-304	-48%
	Seapoint Avenue / Newtown Avenue	786	617	-170	-22%
	Seapoint Avenue / Alma Road	690	546	-144	-21%
	Seapoint Avenue / Clifton Avenue	613	466	-148	-24%
	Old Dunleary Road / Longford Place	535	334	-201	-38%
	Old Dunleary Road / Wallace's Hill	502	316	-186	-37%

Table 6.52 demonstrates that redistributed traffic from the Proposed Scheme will have a ≤5% impact on turning flows at junctions with national roads, therefore, no further assessment of the AM Peak Hour has been

undertaken, aside from instances where the 100 combined flow of additional traffic threshold is exceeded, as shown in Table 6.51.

Table 6.51 and Appendix A6.1 – Sub Appendix 4 (Impact Assessments).

6.6.3.1.8 PM Peak Hour - General Traffic Flow Difference

Diagram 6.25 illustrates the difference in traffic flows on road links in the PM Peak Hour for the 2028 Opening Year. Appendix A6.1 – Sub Appendix 4 (Impact Assessments) provides further details of the LAM outputs.

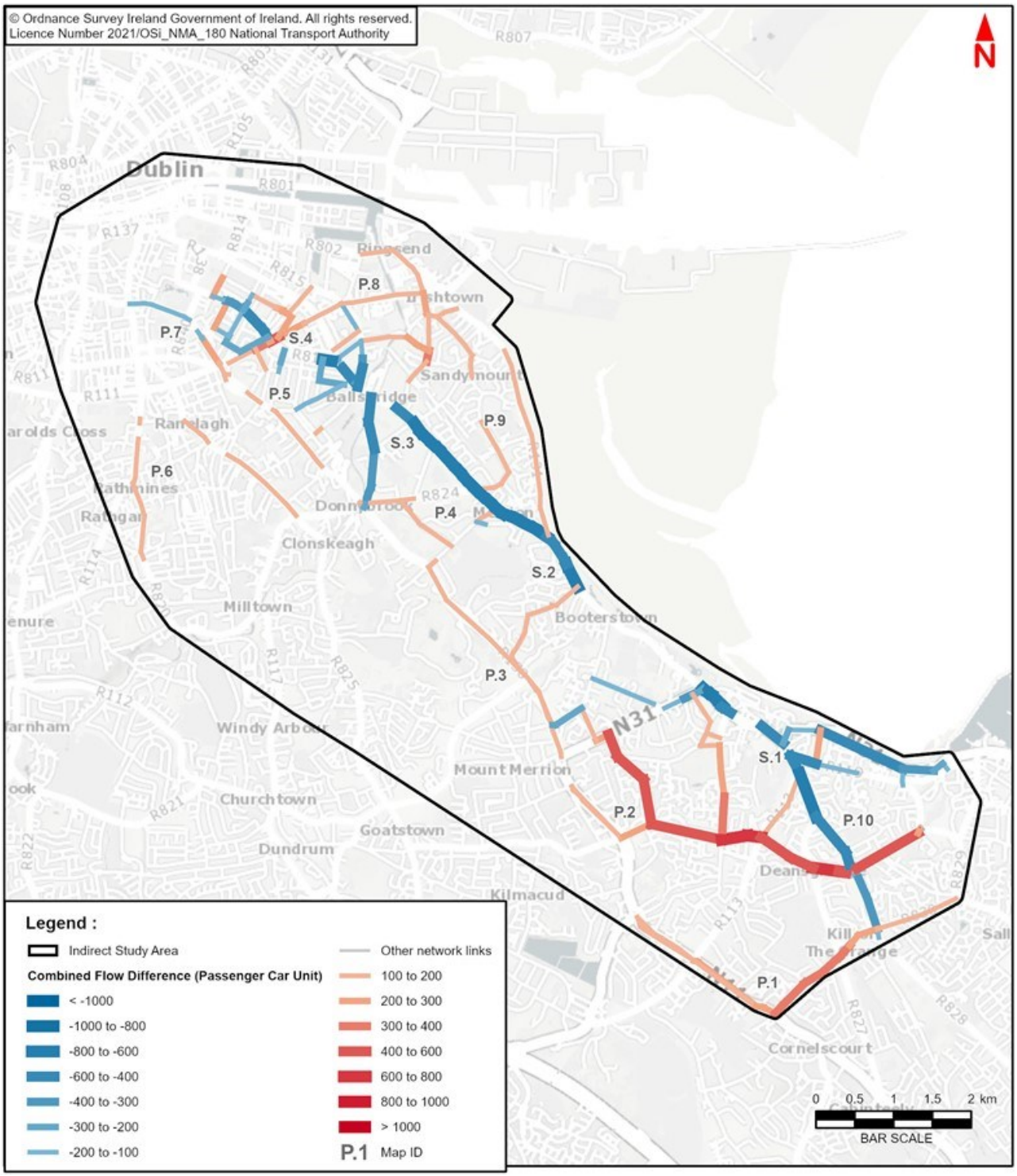


Diagram 6.25: Flow Difference on Road Links (Do Minimum vs. Do Something), PM Peak, 2028 Opening Year

6.6.3.1.8.1 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 in Diagram 6.25, which indicates where a reduction of at least 100 combined traffic flows occur.

The key reductions in traffic flows during the PM Peak Hour are outlined in Table 6.53.

Table 6.53: Road Links that Experience a Reduction of ≥100 Combined Flows during PM Peak Hour (Direct Study Area)

Location	Map I.D.	Road Name	Do Minimum Flows (PCUs)	Do Something Flows (PCUs)	Flow Difference (PCUs)
Section 1 – R827 Stradbrook Road to L1003 Booterstown Avenue	S.1	Frascati Road	2,099	734	-1,365
		Monkstown Road	1,007	528	-479
		Temple Hill	1,721	605	-1,116
		Temple Road	1,407	448	-959
Section 2 – L1003 Booterstown Avenue to Nutley Lane	S.2	Rock Road	1,820	935	-885
		Pembroke Road	1,118	62	-1,055
Section 3 – R118 Merrion Road to Ballsbridge	S.3	Merrion Road	2,646	1,135	-1,511
Section 4 – Ballsbridge to Merrion Square	S.4	Baggot Street Lower	563	82	-481
		Baggot Street Upper	1,178	178	-1,000
		Fitzwilliam Street Lower	533	312	-221

Table 6.53 demonstrates that there is a moderate to significant reduction of between -221 and -1,511 general traffic flows along the direct study area during the AM Peak Hour, which is attributed to the Proposed Scheme and the associated modal shift as a result of its implementation. This reduction in general traffic flow has been determined as a low to high positive impact on the direct study area. The most significant impact occurs along the R107 Malahide Road which is the main corridor of the Proposed Scheme.

There are no reductions in general traffic flows of at least 100 along Nutley Lane within Section 5 of the Proposed Scheme.

6.6.3.1.8.2 Impact on Indirect Study Area (PM Peak Hour)

Reductions in General Traffic Flows: In addition to the general traffic flow reductions occurring along the direct 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 6.54.

Table 6.54: Road Links that Experience a Reduction of ≥100 Combined Flows during PM Peak Hour (Indirect Study Area)

Location	Map I.D.	Road Name	Do Minimum Flows (PCUs)	Do Something Flows (PCUs)	Flow Difference (PCUs)
Section 1 – R827 Stradbrook Road to L1003 Booterstown Avenue	S.1	Abbey Road	897	578	-319
		Booterstown Avenue	865	609	-256
		Carrickbrennan Road	250	100	-150
		Clifton Avenue	264	146	-118
		Montpelier Place	1,525	928	-597
		Mount Merrion Avenue	646	332	-314
		Newtown Avenue	778	571	-207
		Old Dunleary Road	501	227	-274
		Phoenix Terrace	1,908	1,038	-870

Location	Map I.D.	Road Name	Do Minimum Flows (PCUs)	Do Something Flows (PCUs)	Flow Difference (PCUs)
		Rochestown Avenue	868	704	-164
		Seafield Avenue	744	323	-421
		Seapoint Avenue	744	576	-168
		Stradbrook Lawn	985	292	-693
		Windsor Park	770	174	-596
Section 2 – L1003 Booterstown Avenue to Nutley Lane	S.2	Cross Avenue	377	255	-122
Section 3 – R118 Merrion Road to Ballsbridge	S.3	Anglesea Mews	1,354	973	-382
		Anglesea Road	1,258	774	-485
		Herbert Park	1,285	1033	-252
Section 4 – Ballsbridge to Merrion Square	S.4	Beggar's Bush Court	701	593	-107
		Clyde Road	369	205	-164
		Cuffe Street	1,175	1064	-111
		Cumberland Road	618	380	-238
		Elgin Road	316	112	-204
		Fitzwilliam Place	733	507	-226
		Fitzwilliam Square East	435	300	-135
		Fitzwilliam Square South	506	317	-189
		Fitzwilliam Street Upper	464	327	-137
		St Stephen's Green	308	140	-168
		Leeson Street Lower	1,043	942	-101
		Raglan Road	399	178	-221
		Shelbourne Lane	832	380	-451
		Shelbourne Road	2,646	1,310	-1,336
		St Stephen's Green	1,119	1,008	-110
		Waterloo Road	442	146	-296
		Wilton Terrace	657	383	-274

The LAM indicates that during the 2028 Opening Year, there is a reduction in general traffic travelling along the main corridor in the PM peak hour, as illustrated with blue links in Diagram 6.25. The traffic flow reduction varies between 101 and 1,336 combined flows, with peak reductions occurring on the R107 Malahide Road (939) and along the R139 Northern Cross Extension between Clonshaugh Road and the R107 Malahide Road (659).

Increases in General Traffic Flows: The road links which experience additional traffic volumes of over 100 combined flows are illustrated by the red lines in Diagram 6.25. The road links and associated flow difference between the Do Minimum and Do Something scenarios during the PM Peak Hour are outlined in Table 6.55.

Table 6.55: Road Links Where Link Threshold of 100 Combined Flows is Exceeded (PM Peak Hour)

Orientation	Map I.D.	Road Name	Do Minimum Flows (PCUs)	Do Something Flows (PCUs)	Flow Difference (PCUs)
Western side of Proposed Scheme	P.1	Kill Avenue	967	1,099	132
		Kill Lane	1,300	1,624	325
	P.2	Alma Road	171	422	251
		Benamore Road	787	1,381	595
		Carysfort Avenue	780	1,114	334
		Fleurville	830	1,630	800
		Grove Avenue	359	820	460
		Monkstown Avenue	492	907	415

Orientation	Map I.D.	Road Name	Do Minimum Flows (PCUs)	Do Something Flows (PCUs)	Flow Difference (PCUs)
		New Road	853	1,486	634
		Newtownpark Avenue	694	807	113
		Stillorgan Park	1,251	1,843	593
		Upper Carysfort Avenue	686	1,012	327
	P.3	Seafield Road	202	350	149
		Stillorgan Road	1,650	1,867	216
		Trimleston Avenue	269	377	108
		Trimleston Road	161	269	108
	P.4	Ailesbury Road	217	359	141
		Donnybrook Road	2,392	2,528	136
		Sydney Parade Avenue	245	364	120
	P.5	Burlington Road	265	384	118
		Mespil Road	948	1,264	316
		Morehampton Road	1,417	1,555	137
		Sussex Road	735	901	166
	P.6	Ranelagh Road	1,309	1,430	122
		Rathmines Road Lower	1,386	1,543	158
		Rathmines Road Upper	512	629	117
		Sandford Road	1,486	1,631	145
	P.7	Fitzwilliam Square West	686	930	244
		Leeson Street Lower	1,221	1,450	229
		Leeson Street Upper	1,395	1,536	141
		Merrion Street Upper	805	1,054	250
		Pembroke Street Lower	663	906	243
Eastern side of Proposed Scheme	P.8	Bath Avenue	274	422	148
		Bath Street	619	766	148
		Bridge Street	966	1,117	151
		Clanwilliam Place	1,023	1,184	161
		Haddington Road	663	1,090	427
		Herbert Road	187	414	227
		Huband Bridge	376	646	271
		Irishtown Road	995	1145	150
		Lansdowne Park	115	279	165
		Lansdowne Road	534	720	186
		Mount Street Crescent	169	388	219
		Mount Street Upper	301	492	191
		Percy Place	411	641	230
		Warrington Place	628	794	166
	P.9	Gilford Road	408	536	128
		Park Avenue	247	367	120
		Sandymount Road	517	663	147
		Serpentine Avenue	589	725	136
		Strand Road	925	1079	154
		Tritonville Road	401	736	335
	P.10	Carrickbrennan Road	224	339	115

As outlined in Table 6.55, the additional traffic on the key road links varies between 108 and 800 combined flows during the PM Peak Hour and these road links have been identified as experiencing additional traffic volumes over the threshold for further assessment.

6.6.3.1.8.3 National Roads – 5% Threshold Impact Assessment (PM Peak Hour)

On the basis of the assessment methodology set out for national roads, a comparison of flow difference between the Do Minimum and Do Something scenarios during the AM Peak Hour at the identified junctions within the indirect study area (i.e. those that are not triggered by exceeding the threshold for 100 combined flow of additional traffic) is outlined in Table 6.56.

Table 6.56: National Road Links where >5% Additional Traffic Threshold is Exceeded (PM Peak Hour)

National Road Link	Junction	Total Do Minimum Turning Flows (pcu)	Total Do Something Turning Flows (pcu)	Turning Flow Difference (pcu)	% Difference
N11	Stillorgan Road / Beechwood Court	1,631	1,716	84	+5%
	Stillorgan Road / Stillorgan Grove	1,631	1,716	84	+5%
N31	Mount Merrion Avenue / Woodlands Park	749	792	43	+6%
	Mount Merrion Avenue / Hyde Park Avenue	677	599	-78	-12%
	Mount Merrion Avenue / Waltham Terrace	468	382	-86	-18%
	Mount Merrion Avenue / Cross Avenue	665	485	-180	-27%
	Mount Merrion Avenue / Sydney Avenue	657	435	-222	-34%
	Mount Merrion Avenue / Frascati Park	693	445	-248	-36%
	Seapoint Avenue / Newtown Avenue	776	562	-214	-28%
	Seapoint Avenue / Clifton Avenue	725	307	-418	-58%
	Old Dunleary Road / Longford Place	529	233	-296	-56%
	Old Dunleary Road / Wallace's Hill	501	228	-273	-55%

The contents of Table 6.56 demonstrate that the highest impact of increased traffic predicted for total turning flows between the Do Minimum and Do Something scenarios in the PM Peak Hour is 6% at the N31 Mount Merrion Road / Woodlands Park priority junction. Therefore, this junction has been included in the further assessment of operational capacity (comparing the Do Minimum and Do Something volume over capacity ratios) outlined in the following section of this chapter.

At all other junctions considered, either a negligible increase (≤5%) or a decrease in turning flows is predicted as a result of the Proposed Scheme. Therefore, no further assessment into these junctions the PM Peak Hour has been undertaken, aside from instances where the 100 combined flow of additional traffic threshold is exceeded, as shown in Table 6.55 and Appendix A6.1 – Sub Appendix 4 (Impact Assessments).

6.6.3.1.9 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 effect.

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 traffic is operating well, with spare capacity, and does not experience queuing or delays throughout the hour. A value of 85% to 100% indicates that traffic is approaching its theoretical capacity and may experience occasional queues and delays within the hour. A value of over 100% indicates that traffic is operating above its theoretical capacity and experiences queues and delays regularly within the hour. The junctions have been described in the ranges outlined in Table 6.57.

Table 6.57 Junction Volume / Capacity Ranges

V / C Ratio	Traffic Condition
≤85%	Traffic is operating well within theoretical capacity.
85% - 100%	Traffic is approaching theoretical capacity and may experience occasional queues and delays.
≥100%	Traffic is operating above its theoretical capacity and experiences queues and delays regularly.

When comparing the V / C ratios during the Do Minimum and Do Something scenarios for the key junctions, the terms outlined in Table 6.58 have been used to describe the impact.

Table 6.58 Magnitude of Impact for Redistributed Traffic

		Do Something		
		≤85%	85% - 100%	≥100%
Do Minimum	≤85%	Negligible	Low Negative	High Negative
	85% - 100%	Low Positive	Negligible	Medium Negative
	≥100%	Medium Positive	Low Positive	Negligible

As indicated in Table 6.58, the changes in V / C ratios between the Do Minimum and Do Something scenarios result in either a positive, negative or negligible magnitude of impact.

6.6.3.1.9.1 General Traffic Impact Assessment (2028 Opening Year) – Indirect Study Area - AM Peak Hour

The contents of Table 6.59 outline the V / C ratios at the key local / regional road junctions in the AM Peak Hour for the 2028 Opening Year. The location of these junctions and the V / C ratio comparison between the Do Minimum and Do Something scenarios in the 2028 AM Peak Hour are illustrated in Figure 6.9 in Appendix A6.1 – Sub Appendix 3 (Maps).

Table 6.59: 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%	
Stillorgan Road	Stillorgan Road / Newtownpark Avenue / Leopardstown Road	✓		✓			✓	Negligible
Merrion Road	Stillorgan Road / Airfield Park	✓		✓			✓	Negligible
Kill Lane	Stillorgan Road / Kill Lane	✓				✓		Low Negative

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%	
Burlington Road	Mespil Road / Burlington Road	✓				✓		Low Negative
Clonskeagh Road	Eglinton Road / Milltown Road / Sandford Road / Clonskeagh Road		✓				✓	Medium Negative
Leeson Street Upper	Leeson Street Upper / Wellington Place / / Morehampton Road		✓				✓	Medium Negative
The Appian Way	Stillorgan Road / Farmleigh Avenue / Brewery Road	✓				✓		Low Negative
Merrion Street Upper	Baggot Street Lower / Merrion Street Upper / Merrion Row / Ely Place	✓				✓		Low Negative
Clanwilliam Place	Mount Street Lower / Clanwilliam Place / Warrington Place	✓				✓		Low Negative
Bath Avenue	Shelbourne Road / Haddington Road / South Lotts Road / Grand Canal Street Upper	✓					✓	High Negative
Irishtown Road	Irishtown Road / Church Avenue / Londonbridge Road / Tritonville Road	✓				✓		Low Negative
Lansdowne Road	Shelbourne Road / Shelbourne Road / Lansdowne Road / Lansdowne Road	✓				✓		Low Negative
Ailesbury Road	Ailesbury Road / Anglesea Road	✓				✓		Low Negative
Stillorgan Park	Stillorgan Park / Park Villas	✓				✓		Low Negative

The results of the junction analysis illustrated in Table 6.59 demonstrate that the majority of junctions are operating with a maximum V / C ratio of below 85% during the AM Peak Hour in the 2028 Opening Year.

Capacity issues are noted at the following five junctions:

- Stillorgan Road / Newtownpark Avenue / Leopardstown Road four-arm signalised junction (19432) operates with a maximum V / C ratio of above 100% in both the Do Minimum and Do Something scenarios;
- Stillorgan Road / Airfield Park three-arm signalised junction (40126) operates with a maximum V / C ratio of above 100% in both the Do Minimum and Do Something scenarios;
- Eglinton Road / Milltown Road / Sandford Road / Clonskeagh Road four-arm staggered signalised junction (11166) operates with a maximum V / C ratio of 85% - 100% in the Do Minimum scenario and above 100% in the Do Something scenario;
- Leeson Street Upper / Wellington Place / Morehampton Road three-arm signalised junction (11343) operates with a maximum V / C ratio of 85% - 100% in the Do Minimum scenario and above 100% in the Do Something scenarios; and
- Shelbourne Road / Haddington Road / South Lotts Road / Grand Canal Street Upper five-arm signalised junction (6190) operates with a maximum V / C ratio of below 85% in the Do Minimum scenario and above 100% in the Do Something scenario.

The junction analysis contained within the EIAR considers the sensitivity of each of the above junctions and combines this with the predicted magnitude of impact to produce an overall significance of effects.

Full details of this assessment can be found in Section 6.4 of the EIAR. The results demonstrate that no junctions are predicted to have a significance of effect of significant of higher, therefore, no further assessment of the AM Peak Hour in the 2028 Opening Year is required.

6.6.3.1.9.2 PM Peak Hour – General Traffic Impact Assessment (2028 Opening Year) – Indirect Study Area

Table 6.60 outlines the V / C ratios at the key local / regional road junctions in the PM Peak Hour for the 2028 Opening Year at junctions where the impact is assessed as low or higher. The full set of results for all junctions assessed is contained within Appendix A6.1 – Sub Appendix 4 (Impact Assessments).

Table 6.60: 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%	
Kill Avenue	Abbey Road / Kill Avenue / Kill Lane / Rochestown Avenue	✓				✓		Low Negative
Benamore Road	Dean's Grange Road / Brookville Park	✓				✓		Low Negative
Carysfort Avenue	Carysfort Avenue / Stillorgan Park / Fleurville Road	✓				✓		Low Negative
Grove Avenue	Stillorgan Park / Park Villas	✓				✓		Low Negative
Newtownpark Avenue	Newtownpark Avenue / Benaville Road / Fleurville Road	✓				✓		Low Negative
Ailesbury Road	Merrion Road / Ailesbury Road	✓				✓		Low Negative
Donnybrook Road	Stillorgan Road / Anglesea Road / Beaver Row			✓		✓		Low Positive
Ranelagh Road	Ranelagh Road / Sandford Road / Anna Villa	✓				✓		Low Negative
Sandford Road	Sandford Road / Larch Grove	✓				✓		Low Negative
	R117 / Sandford Road	✓				✓		Low Negative
Leeson Street Upper	Leeson Street Upper / Wellington Place / / Morehampton Road	✓				✓		Low Negative
Merrion Street Upper	Baggot Street Lower / Merrion Street Upper / Merrion Row / Ely Place	✓				✓		Low Negative
Bath Avenue	Shelbourne Road / Haddington Road / South Lotts Road / Grand Canal Street Upper		✓		✓			Low Positive
Stillorgan Road	Stillorgan Road / Newtownpark Avenue / Leopardstown Road			✓			✓	Negligible

The results of the junction analysis illustrated in Table 6.60 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 the Proposed Scheme.

Capacity issues are noted at the following junction:

- Stillorgan Road / Newtownpark Avenue / Leopardstown Road four-arm signalised junction (19432) operates with a maximum V / C ratio of above 100% in both the Do Minimum and Do Something scenarios.

The junction analysis contained within the EIAR considers the sensitivity of each of the above junctions, and combines this with the predicted magnitude of impact to produce an overall significance of effects.

Full details of this assessment can be found in Section 6.4 of the EIAR. The results demonstrate that no junctions are predicted to have a significance of effect of significant of higher, therefore, no further assessment of the AM Peak Hour in the 2028 Design Year is required.

6.6.3.1.9.3 AM Peak Hour – General Traffic Impact Assessment (2043 Design Year) – Indirect Study Area

The contents of Table 6.61 outline the V / C ratios at the key local / regional road junctions in the AM Peak Hour for the 2043 Design Year at junctions where the impact is assessed as low or higher. The full set of results for all junctions assessed is contained within Appendix A6.1 – Sub Appendix 4 (Impact Assessments).

Table 6.61: Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), 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%	
Kill Lane	Stillorgan Road / Kill Lane	✓				✓		Low Negative
Burlington Road	Mespil Road / Burlington Road	✓				✓		Low Negative
Stillorgan Road	Stillorgan Road / Newtownpark Avenue / Leopardstown Road			✓			✓	Negligible
	Stillorgan Road / Airfield Park			✓			✓	Negligible
Clonskeagh Road	Eglinton Road / Milltown Road / Sandford Road / Clonskeagh Road	✓				✓		Low Negative
Sandford Road	Norwood Park / Sandford Road / Sandford Road	✓				✓		Low Negative
	Sandford Road / Larch Grove	✓				✓		Low Negative
	Sandford Road / Marlborough Road	✓				✓		Low Negative
	R117 / Sandford Road	✓				✓		Low Negative
	Sandford Road / Belmont Avenue	✓				✓		Low Negative
The Appian Way	Stillorgan Road / Farmleigh Avenue / Brewery Road	✓				✓		Low Negative
Haddington Road	Northumberland Road / Haddington Road		✓		✓			Low Positive
Merrion Street Upper	Baggot Street Lower / Merrion Street Upper / Merrion Row / Ely Place	✓				✓		Low Negative
Clanwilliam Place	Mount Street Lower / Clanwilliam Place / Warrington Place	✓				✓		Low Negative
Bath Avenue	Shelbourne Road / Haddington Road / South Lotts Road / Grand Canal Street Upper		✓		✓			Low Positive
Bath Street	Irishtown Road / Oliver Plunkett Avenue / Bath Street		✓		✓			Low Positive
Lansdowne Road	Shelbourne Road / Shelbourne Road / Lansdowne Road / Lansdowne Road	✓				✓		Low Negative
Ailesbury Road	Ailesbury Road / Anglesea Road	✓				✓		Low Negative
Park Villas	Stillorgan Park / Park Villas	✓				✓		Low Negative

The results of the junction analysis illustrated in Table 6.61 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 the Proposed Scheme.

Only the Stillorgan Road / Newtownpark Avenue / Leopardstown Road four-arm signalised junction and Stillorgan Road / Airfield Park four-arm signalised junctions are shown to operate with a maximum V / C ratio of above 100% and this occurs in both the Do Minimum and Do Something scenarios. Therefore, the significance of effect is concluded as **Negligible.**

Further assessment into mitigation measures is therefore not necessary for any junctions in the AM Peak Hour of the 2043 Design Year.

6.6.3.1.9.4 PM Peak Hour – General Traffic Impact Assessment (2043 Design Year) – Indirect Study Area

Table 6.62 outlines the V / C ratios at the key local / regional road junctions in the PM Peak Hour for the 2043 Design Year at junctions where the impact is assessed as low or higher. The full set of results for all junctions assessed is contained within and Appendix A6.1 – Sub Appendix 4 (Impact Assessments).

Table 6.62: 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%	
Kill Avenue	Abbey Road / Kill Avenue / Kill Lane / Rochestown Avenue	✓				✓		Low Negative
Benamore Road	Dean's Grange Road / Brookville Park	✓				✓		Low Negative
Carysfort Avenue	Carysfort Avenue / Stillorgan Park / Fleurville Road	✓				✓		Low Negative
Grove Avenue	Stillorgan Park / Park Villas	✓				✓		Low Negative
Ailesbury Road	Merrion Road / Ailesbury Road	✓				✓		Low Negative
Donnybrook Road	Stillorgan Road / Anglesea Road / Beaver Row			✓		✓		Low Positive
Sandford Road	R117 / Sandford Road	✓				✓		Low Negative
	Sandford Road / Belmont Avenue	✓				✓		Low Negative
Leeson Street Upper	Leeson Street Upper / Wellington Place / / Morehampton Road	✓				✓		Low Negative
Bridge Street	South Lotts Road / South Dock Road / Bridge Street / Ringsend Road	✓				✓		Low Negative
Clanwilliam Place	Mount Street Lower / Clanwilliam Place / Warrington Place	✓				✓		Low Negative
Stillorgan Road	Stillorgan Road / Newtownpark Avenue / Leopardstown Road			✓			✓	Negligible

The results of the junction analysis illustrated in Table 6.62 demonstrate that the majority of junctions continue to operate with a maximum V / C ratio of below 85% in the Do Something scenario during the PM Peak Hour in the 2043 Design Year.

Only the Stillorgan Road / Newtownpark Avenue / Leopardstown Road four-arm signalised junction is shown to operate with a maximum V / C ratio of above 100% and this occurs in both the Do Minimum and Do Something scenarios. Therefore, the significance of effect is concluded as **Negligible.**

Further assessment into mitigation measures is therefore not necessary for any junctions in the PM Peak Hour of the 2043 Design Year.

6.6.3.1.10 Night-time Traffic Redistribution

The night-time period is defined as between 23:00 and 07:00. Analysis of traffic data during this period indicates that traffic levels are considerably lower and that junctions have a higher capacity for vehicular movement. Less pedestrian, cycling and bus demand requirements leading to higher level of general traffic green time allocation per typical signal cycle.

Automatic Traffic Counter data demonstrates that, typically, within Dublin the night-time period has approximately 19% of the traffic levels compared to the morning peak hour (08:00-09:00). As a result, during the night-time period junctions do not experience flows in excess of capacity which would result in queuing and in turn potential re-distribution of traffic to alternative routes to avoid congestion. Therefore, the impact of traffic redistribution due to any of the Proposed Schemes will be **Negligible** during the night-time period.

6.6.3.1.11 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 Do Minimum and Do Something 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 Do Minimum to the Do Something scenario with the Proposed Scheme in place.

In terms of the national roads 5% threshold impact assessment for the N1 and N31, all junctions considered against this threshold are predicted to experience either a negligible increase ($\leqslant$5%) or a decrease in turning flows as a result of the Proposed Scheme. The percentage increase between the Do Minimum and Do Something scenarios exceeds 5% at only one junction in the PM Peak Hour, the N31 Mount Merrion Avenue / Woodlands Park priority junction (19195). Assessment into the operation capacity of this junction demonstrates that the V / C ratio will remain below 85% in the Do Something scenario and no further assessment is required.

The general traffic impact assessment was undertaken by extracting operational capacities from the LAM at the key junctions along the above road links. 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. Mitigation measures would be considered at junctions where the significance of effect is predicted to be significant or higher.

The overall results of this assessment can be summarised as follows:

- The majority of junctions assessed have V / C ratios of below 85%, i.e. they are operating within capacity for all assessed years in the Do Minimum and Do Something scenarios. This indicates that these junctions will be able to accommodate for the additional general traffic volumes redistributed, as a result of the Proposed Scheme and the impact is deemed **Negligible to Low negative**.
- At the small number of junctions indicating capacity constraints, the majority of these junctions operate with a maximum V / C ratio of above 100% in both the Do Minimum and Do Something, therefore, the impact is considered to be **Negligible**. 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. 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. Therefore, the proposed impacts are considered acceptable when considered against the Scheme Objectives.

Overall, it is determined that there will be a **Low Negative** 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 mitigation measures have been considered to alleviate the impact outside of the direct study area.

During the night-time lower traffic flows aligned with more vehicular capacity at junctions will reduce or eliminate traffic redistribution from the Proposed Scheme Corridor. Thus, the impact during this period will be **Negligible**.

It should therefore be considered that the traffic congestion 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.

6.6.3.1.12 Network-Wide Performance Indicators

6.6.3.1.12.1 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 6.63 outline the impact that the Proposed Scheme will have on the wider transport network, both within and beyond the defined study areas.

Table 6.63: 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 hr)	18,690	19,060	1.98%	Low Negative
	Over-capacity Queues (pcu hr)	5,361	5,359	-0.04%	
	Total Travel Times (pcu hr)	62,260	62,660	0.64%	
	Total Travel Distance (pcu km)	2,020,000	2,022,000	0.10%	
	Average Speed (km/h)	32	32	-0.55%	
2028 Opening Year PM Peak Hour	Transient Queues (pcu hr)	18,000	18,350	1.94%	Negligible
	Over-capacity Queues (pcu hr)	4,653	4,621	-0.69%	
	Total Travel Times (pcu hr)	58,980	59,270	0.49%	
	Total Travel Distance (pcu km)	1,943,000	1,941,000	-0.10%	
	Average Speed (km/h)	33	33	-0.61%	
	Transient Queues (pcu hr)	18,070	18,570	2.77%	Low Negative

Scenario	Metric	Do Minimum	Do Something	% Difference	Impact
2043 Opening Year AM Peak Hour	Over-capacity Queues (pcu hr)	5,271	5,223	-0.91%	
	Total Travel Times (pcu hr)	61,610	62,140	0.86%	
	Total Travel Distance (pcu km)	2,057,000	2,061,000	0.19%	
	Average Speed (km/h)	33	33	-0.66%	
2043 Opening Year AM Peak Hour	Transient Queues (pcu hr)	17,490	17,720	1.32%	Negligible
	Over-capacity Queues (pcu hr)	4,392	4,427	0.80%	
	Total Travel Times (pcu hr)	58,030	58,240	0.36%	
	Total Travel Distance (pcu km)	1,944,000	1,941,000	-0.15%	
	Average Speed (km/h)	34	33	-0.51%	

The results of the assessment demonstrate that the impacts to the network performance indicators range between -2.77% and -0.91%. A low negative impact is anticipated in the AM Peak Hour scenarios and a negligible impact is predicated in the PM Peak Hour scenarios.1

6.6.4 Operational Phase Summary

The contents of Table 6.64 present a summary of the predicted impacts of the Proposed Scheme during the Operational Phase.

Table 6.64: Summary of Predicted Operational Phase Impacts

Assessment Topic	Description of Change	Predicted Impacts
Pedestrian Infrastructure	Improvements to the quality of the pedestrian infrastructure along the Proposed Scheme.	Medium Positive
Cycling Infrastructure	Improvements to the quality of the cycling infrastructure along the Proposed Scheme.	Medium Positive
Bus Infrastructure	Improvements to the quality of the bus infrastructure along the Proposed Scheme.	Medium Positive
Parking and Loading	A total loss of 174 parking / loading spaces along the Proposed Scheme.	Low Negative
People Movement	Increases to the total number of people travelling through the Proposed Scheme.	High Positive
Bus Network Performance Indicators	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.	Low Negative
Network Wide Performance Indicators	Deterioration to the network-wide queuing capacity, travel times, travel distances and average network speeds beyond the direct and indirect study areas.	Low Negative

As outlined within Section 6.6 (Operational Phase) and summarised in Table 6.64 above, the Proposed Scheme will deliver strong 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 movement of people.

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 this EIAR.

7.2 Operational Stage Cumulative Impacts

7.2.1 Introduction

This chapter also reports the assessment of cumulative effects associated with the Operational Stage 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, 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 2016-2035 (GDA Strategy), with a partial implementation by 2028, in line with (National Development Plan (NDP) 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 2035;

- 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) 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.

7.2.3 Transport Demand

Cumulative transport demand 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 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 grow by 22% by 2028 and 49% by 2043 (Source: NTA Reference Case Planning Sheets 2028, 2043).

7.2.3.1 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 Strategy proposals, there are no specific demand management measures included in the Do Minimum reference case (receiving environment) scenario in the 2028 Opening year, other than constraining parking availability in Dublin at existing levels. For the design year, 2043 scenario, a proxy for a suite of demand management measures is included in the Do Minimum in line with the target to achieve a maximum 45% car driver commuter mode share target, across the GDA, as outlined in the Strategy.

7.2.3.1.1 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 Scheme, and which could reasonably be exposed to cumulative effects in combination with other developments. Diagram 7.1 below 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.

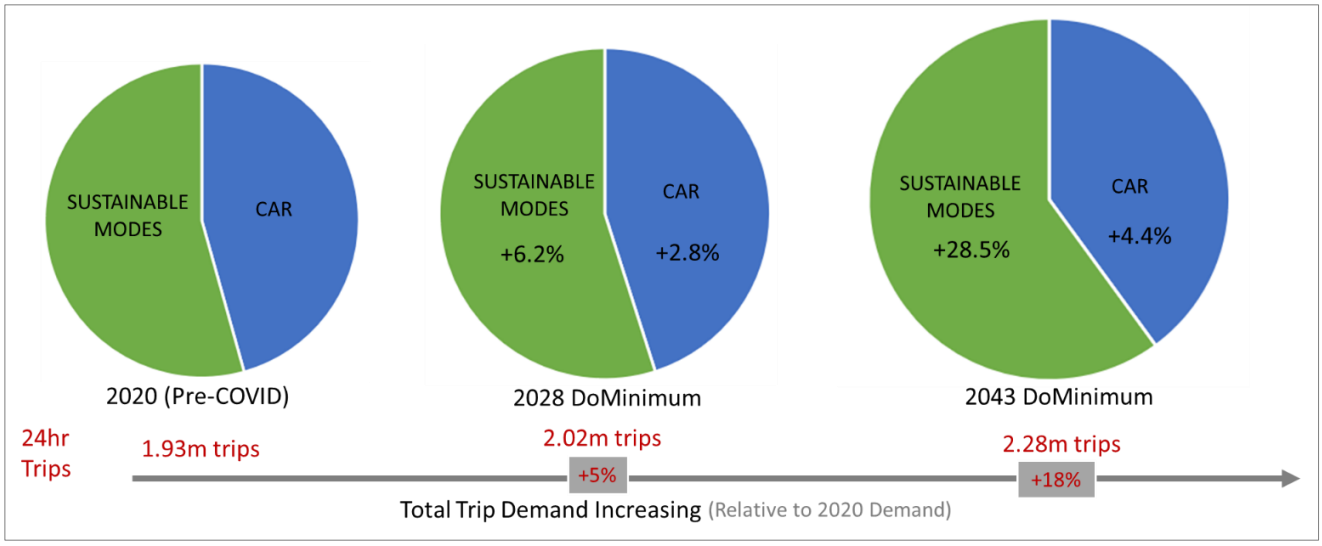


Diagram 7.1: Trip Demand Changes without the Proposed Schemes (in Relation to 2020 Demand)

As shown above, there are 1.93m trips[2] over a 24hr period within 500m of the Proposed Schemes. Total trip demand increases to 2.02m trips (5% increase) in 2028 and to 2.81m trips (+19% 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 18% increase in total trip demand (above 2020 levels) will be made up of a 28.5% increase in sustainable modes demand (PT, walk, cycle) and a 4.4% increase in private car demand, over 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, however, car traffic levels will still increase over current / 2020 traffic levels.

The overall share of Sustainable modes trips on the network will increase from 57% in 2020, to 58% in 2028 and to 62% in 2043 with corresponding reductions in the private car share of overall travel demand.

7.2.3.1.2 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 below).

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

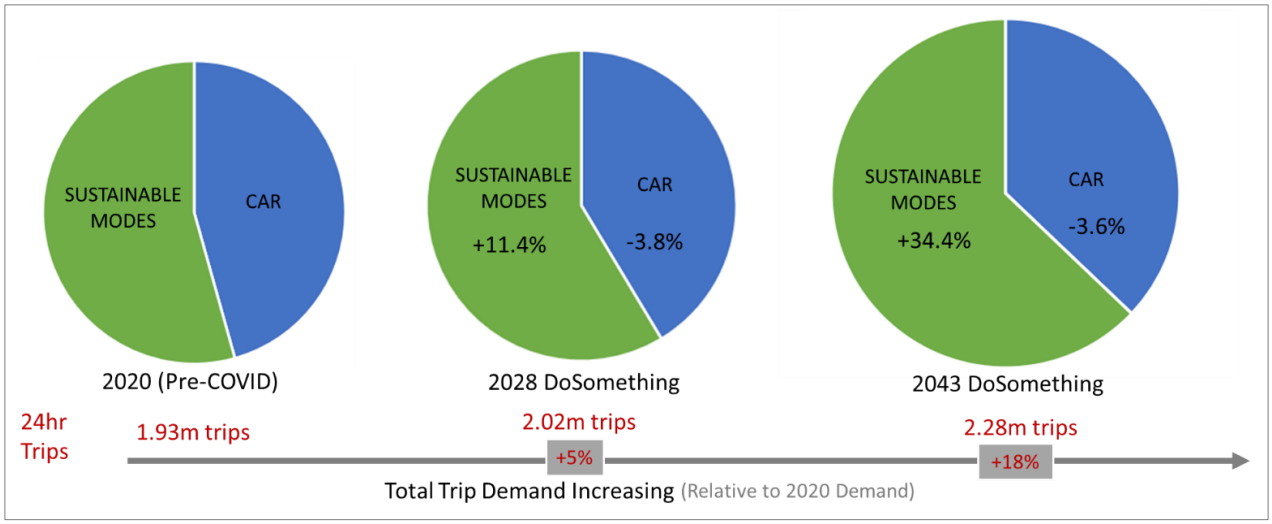


Diagram 7.2: Trip Demand Changes with the Proposed Schemes (in Relation to 2020 Demand)

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 18% increase in total trip demand (above 2020 levels) will be made up of a 33.4% increase in sustainable modes demand (PT, walk, cycle) and a 3.6% 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 reduction in car trips below 2020 levels.

With the Proposed Schemes in place, the overall share of Sustainable modes trips on the network will increase from 57% in 2020, to 61% in 2028 and to 65% 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[3] 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 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 Scheme 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[4] 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.

[3] 500m recommended maximum walking distance to Core Bus Corridors - “Buses In Urban Development”, CIHT 2018

[4] The analysis includes only trips from the defined catchment i.e., it does not include trips from external areas outside of the catchment that travel to the city centre

7.2.4.2.1 2028 Demand Changes by Mode

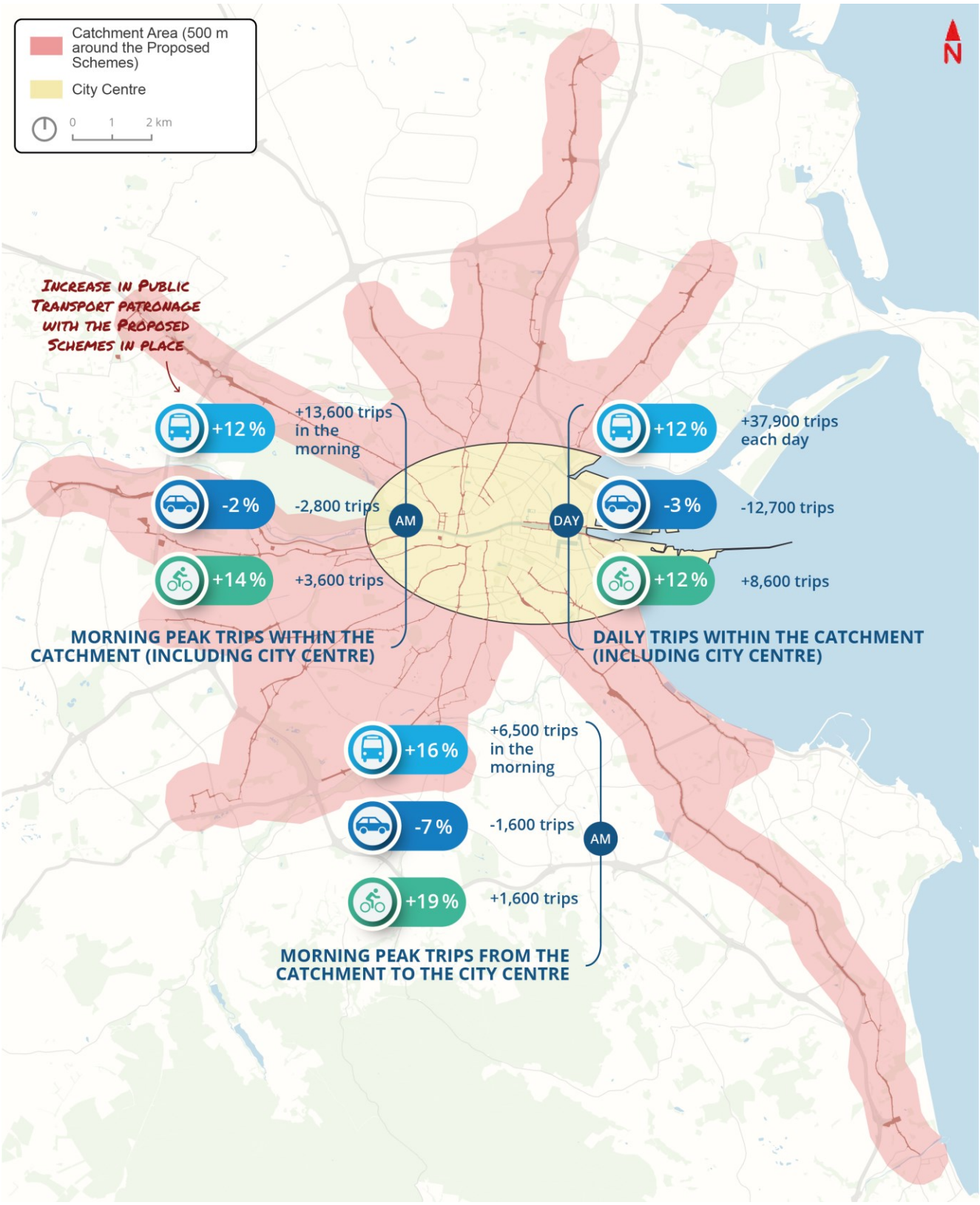


Diagram 7.3: Change in Trips by Mode within a 500m Catchment Area of the Proposed Schemes and the City Centre and Trips Originating from the Catchment Inbound to the City Centre in 2028

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 and a 12% increase in public transport, 3% decrease in general traffic and a 12% increase in cycling trips each day (07:00-19:00).

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 BusConnects Core Bus Corridors in operation.

7.2.4.2.2 2043 Demand Changes by Mode

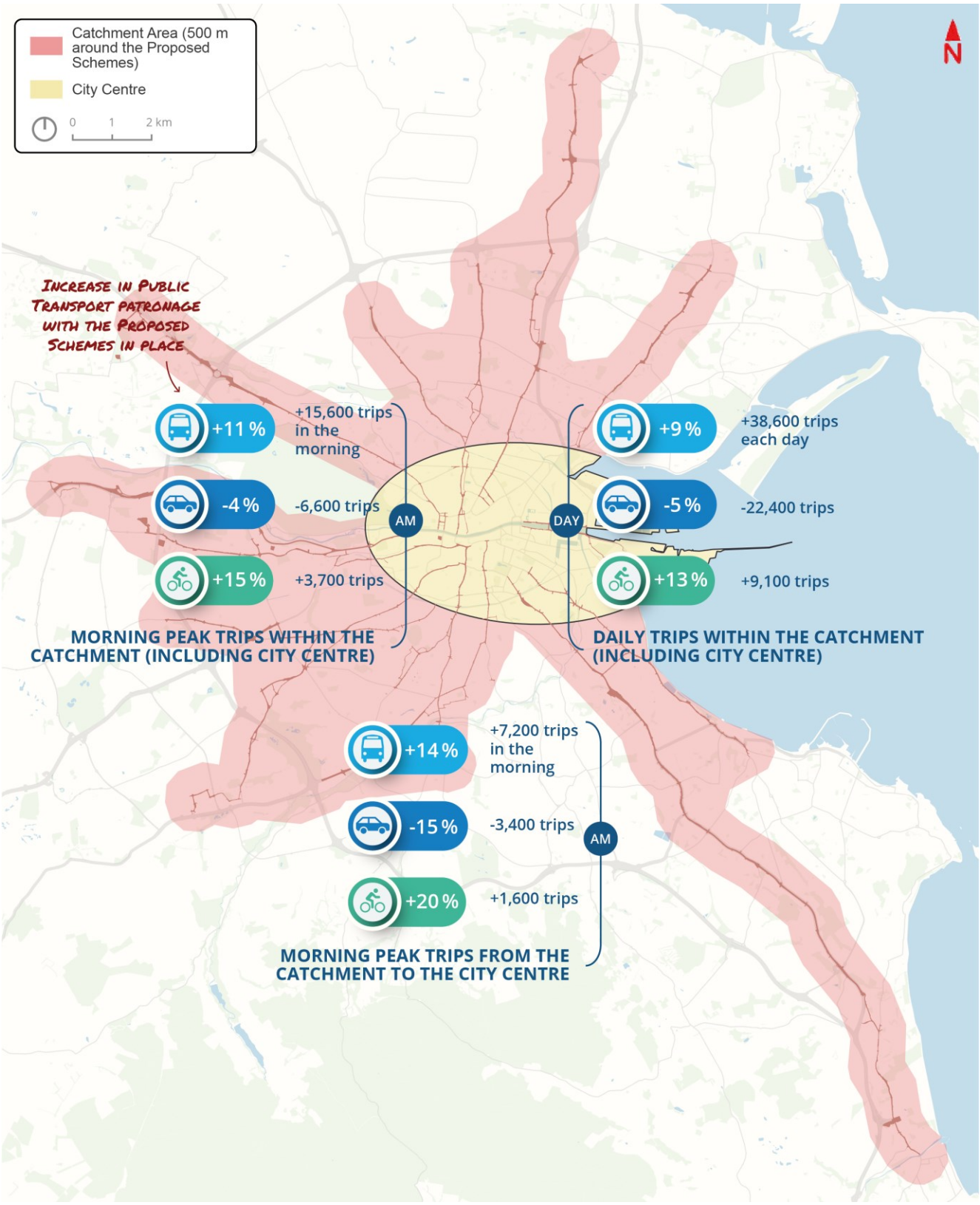


Diagram 7.4: Change in trips by mode within a 500m Catchment Area of the Proposed Schemes and the City Centre and Trips originating from the Catchment inbound to the City Centre in 2043

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 11% increase in public transport trips, 4% decrease in general traffic trips (i.e. motorists) and a 15% increase in cycling trips in the morning peak period and a 9% increase in public transport, 5% decrease in general traffic and a 13% 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 14% increase in public transport trips, 15% decrease in general traffic trips (i.e., motorists) and a 20% 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	144,880	29.4%	160,480	31.7%	15,600	10.8%
		General Traffic	156,670	31.8%	150,070	29.7%	-6,600	-4.2%
		Cycling	25,670	5.2%	29,410	5.8%	3,740	14.6%
		Walking	165,820	33.6%	165,890	32.8%	70	0.0%
		Total	493,040	100%	505,850	100%	12,810	2.6%
Within Catchment Area and City Centre	Daily (07:00-19:00)	Public Transport	444,900	29.4%	483,530	31.4%	38,630	8.7%
		General Traffic	473,200	31.3%	450,780	29.3%	-22,420	-4.7%
		Cycling	71,350	4.7%	80,400	5.2%	9,050	12.7%
		Walking	523,910	34.6%	526,400	34.2%	2,490	0.5%
		Total	1,513,360	100%	1,541,110	100%	27,750	1.8%

As shown in Table 7.3, it is expected that there will be an approximate 3% (12,800) 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 50,000 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 31.7%, a decrease in general traffic share from 31.8% to 29.7% and an increase in cycling from 5.2% to 5.8%. 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 29.4% to 31.4%, a decrease in general traffic from 31.3% to 29.3% and an increase in cyclists from 4.7% to 5.2%.

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	51,700	55.1%	58,880	59.8%	7,180	13.9%
		General Traffic	22,930	24.4%	19,490	19.8%	-3,440	-15.0%
		Cycling	7,940	8.5%	9,510	9.7%	1,570	19.8%
		Walking	11,240	12.0%	10,660	10.8%	-580	-5.2%
		Total	93,810	100%	98,540	100%	4,730	5.0%

As shown in Table 7.4, the modelling indicates that there will be an approximate 5% 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 55.1% to 59.8%, a decrease in general traffic mode share from 24.4% to 19.8% and an increase in the cycling mode share from 8.5% to 9.7%.

7.2.4.3 Peak Hour People Movement along the Proposed Schemes

To determine the cumulative impact that the Proposed Schemes will have on modal share changes on the direct study areas as a result of their implementation, 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).

7.2.4.3.1 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.

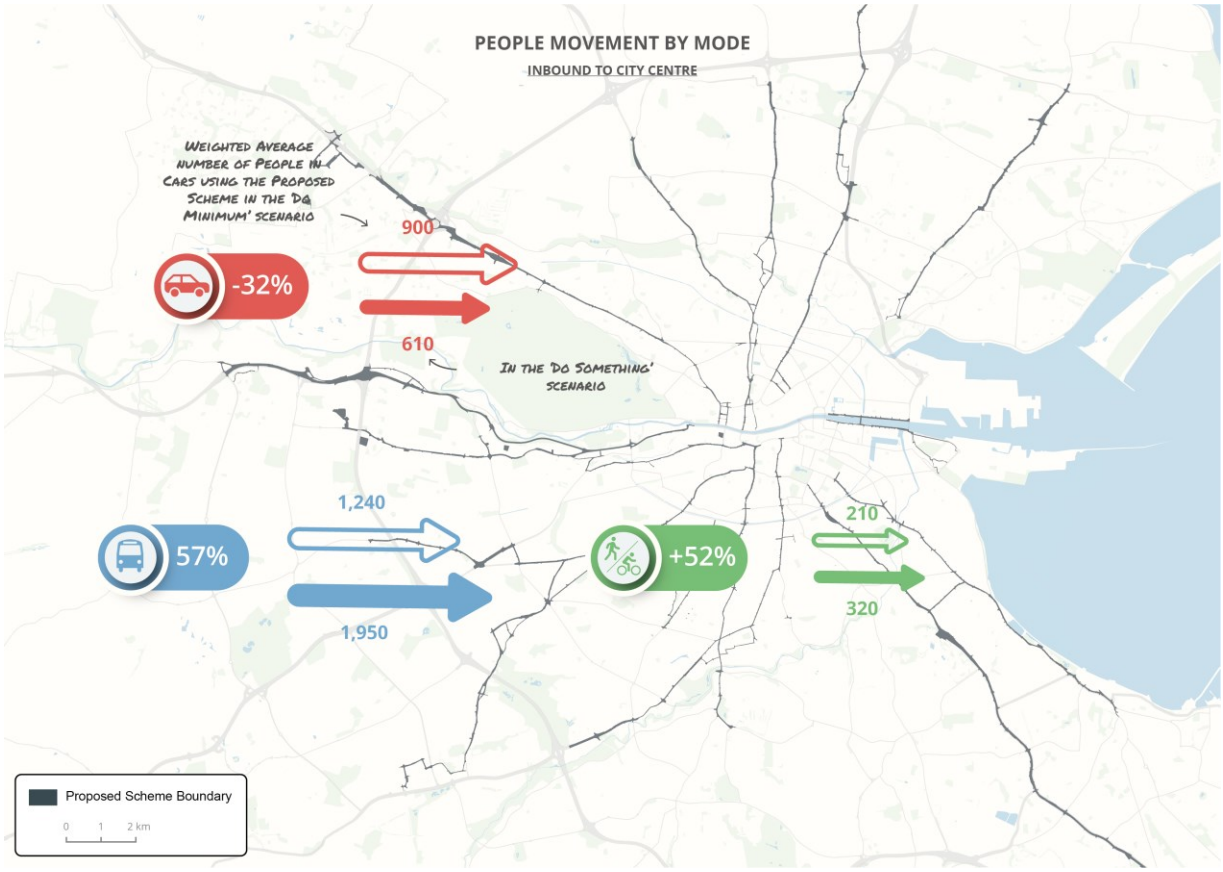


Diagram 7.5: People Movement by Mode during 2028 AM Peak Hour

As indicated in Diagram 7.5, on average across all Proposed Schemes, there is a predicted reduction of 32% in the number of people travelling via car, an increase of 57% in the number of people travelling via bus and an increase of 52% in people walking or cycling along the Proposed Schemes 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 Schemes 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 Schemes have 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 Schemes.

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%

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Hourly Trips	Modal Split (%)	Hourly Trips	Modal Split (%)	Hourly Trips	Difference (%)
		Cycling	70	3%	180	6%	110	157%
		Sustainable Modes Total	**1,450**	**62%**	**2,270**	**79%**	**820**	**57%**
		Total (all modes)	**2,350**	**100%**	**2,880**	**100%**	**530**	**23%**

7.2.4.3.2 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.

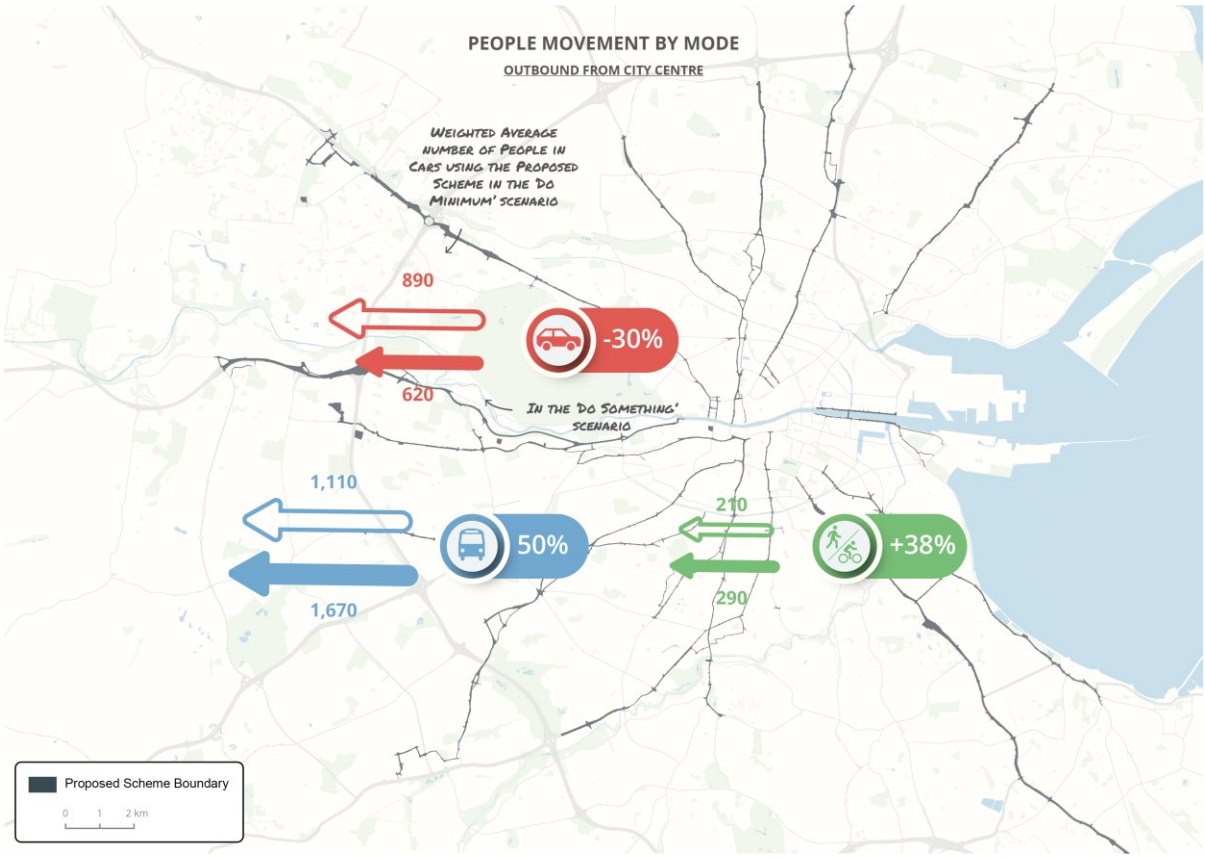


Diagram 7.6: People Movement by Mode during 2028 PM Peak Hour

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%
		Sustainable Modes Total	**1,320**	**60%**	**1,960**	**76%**	**640**	**48%**
		Total (All modes)	**2,210**	**60%**	**2,580**	**76%**	**370**	**17%**

7.2.4.3.3 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.

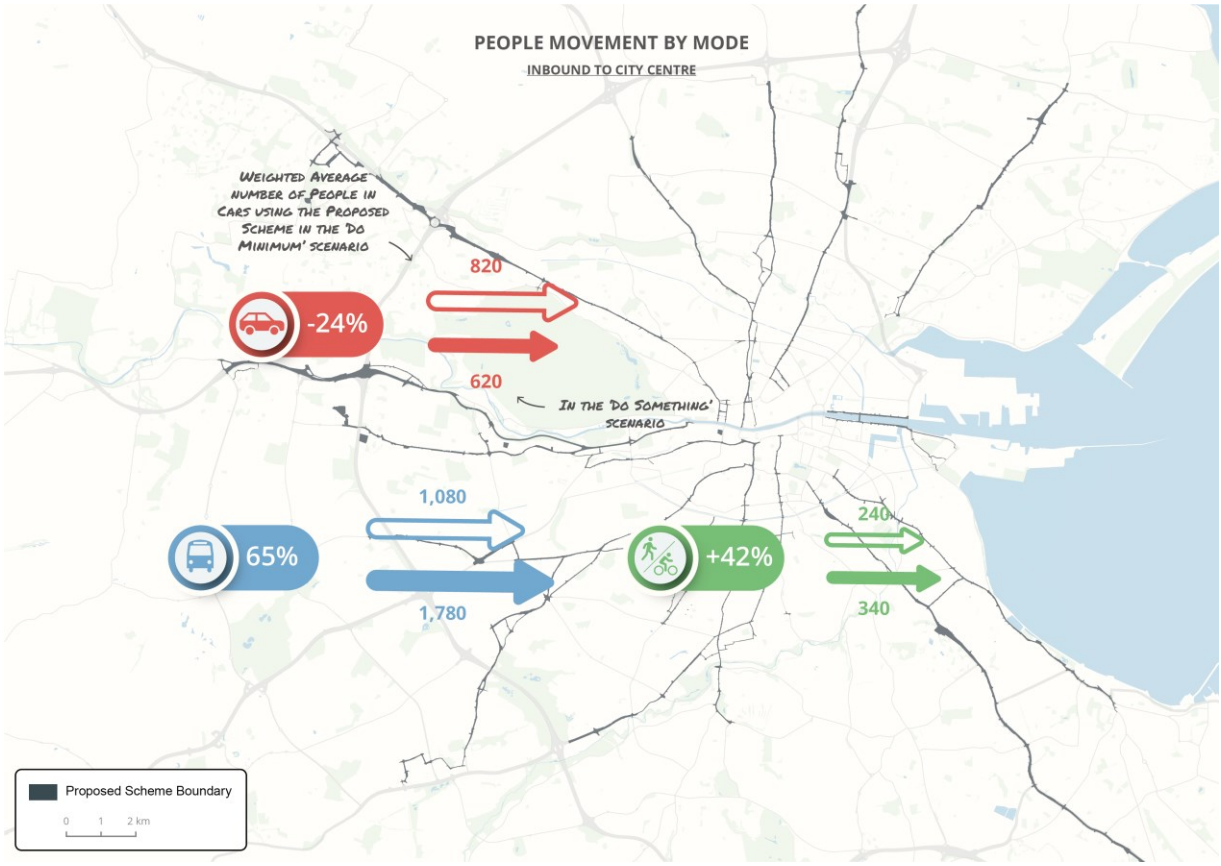


Diagram 7.7: People Movement by Mode during 2043 AM Peak Hour

As indicated in Diagram 7.7, on average across all Proposed Schemes, there is a predicted decrease of 24% in the number of people travelling via car, an increase of 65% in the number of people travelling via bus and an increase of 42% 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 28% increase in total people moved as a result of the Proposed Schemes and 61% 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	820	38%	620	23%	-200	-24%
		Public Transport	1,080	50%	1,780	65%	700	65%
		Walking	170	8%	160	6%	-10	-6%
		Cycling	70	3%	180	7%	110	157%
		Sustainable Modes Total	**1,320**	**62%**	**2,120**	**77%**	**800**	**61%**
		Total (All modes)	**2,140**	**100%**	**2,740**	**100%**	**600**	**28%**

7.2.4.3.4 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.

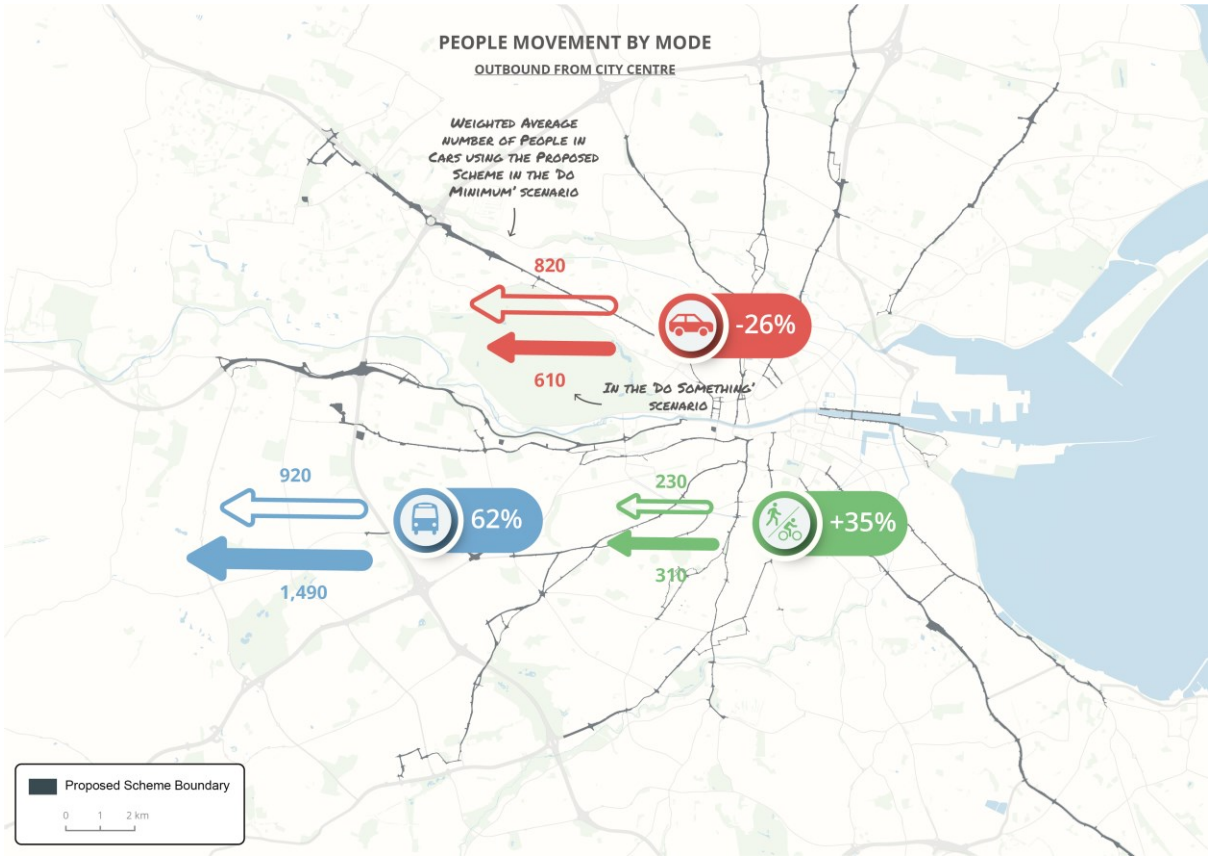


Diagram 7.8: People Movement by Mode during 2043 PM Peak Hour

As indicated in Diagram 7.8, on average across all Proposed Schemes, there is a predicted decrease of 26% in the number of people travelling via car, an increase of 62% in the number of people travelling via bus and an increase of 35% 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 22% 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 7.8: 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	820	42%	610	25%	-210	-26%
		Public Transport	920	47%	1,490	62%	570	62%
		Walking	180	9%	180	7%	0	0%
		Cycling	50	3%	130	5%	80	160%
		Sustainable Modes Total	**1,150**	**58%**	**1,800**	**75%**	**650**	**57%**
		Total (All modes)	**1,970**	**100%**	**2,410**	**100%**	**440**	**22%**

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.

7.2.4.4.1 2028 AM Peak Hour Bus Passengers

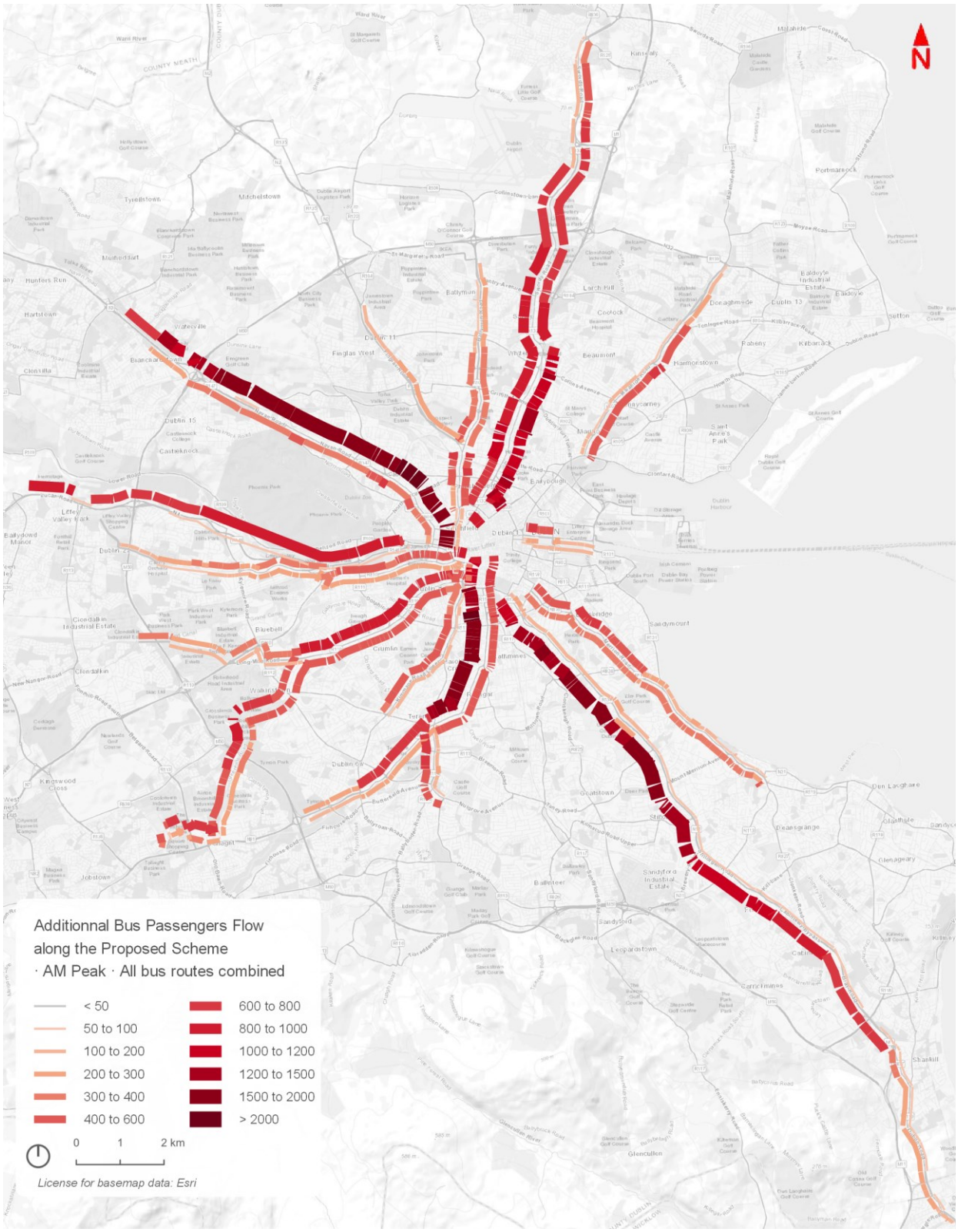


Diagram 7.9: AM Peak Hour Total Bus Passenger Flows Along the Proposed Schemes (All Bus Routes Combined)

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 Proposed 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 Belfield / Blackrock 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 (%)
Belfield / Blackrock to City Centre Scheme	11,350	13,950	2,600	22.9%
All Schemes	85,990	101,760	15,770	18.3%

As shown above, there will be a 22.9% increase in people boarding bus routes which use any part of the Blackrock/Belfield Scheme during the AM Peak Hour. This represents an addition of 2,600 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.

7.2.4.4.2 2028 PM Peak Hour Bus Passengers

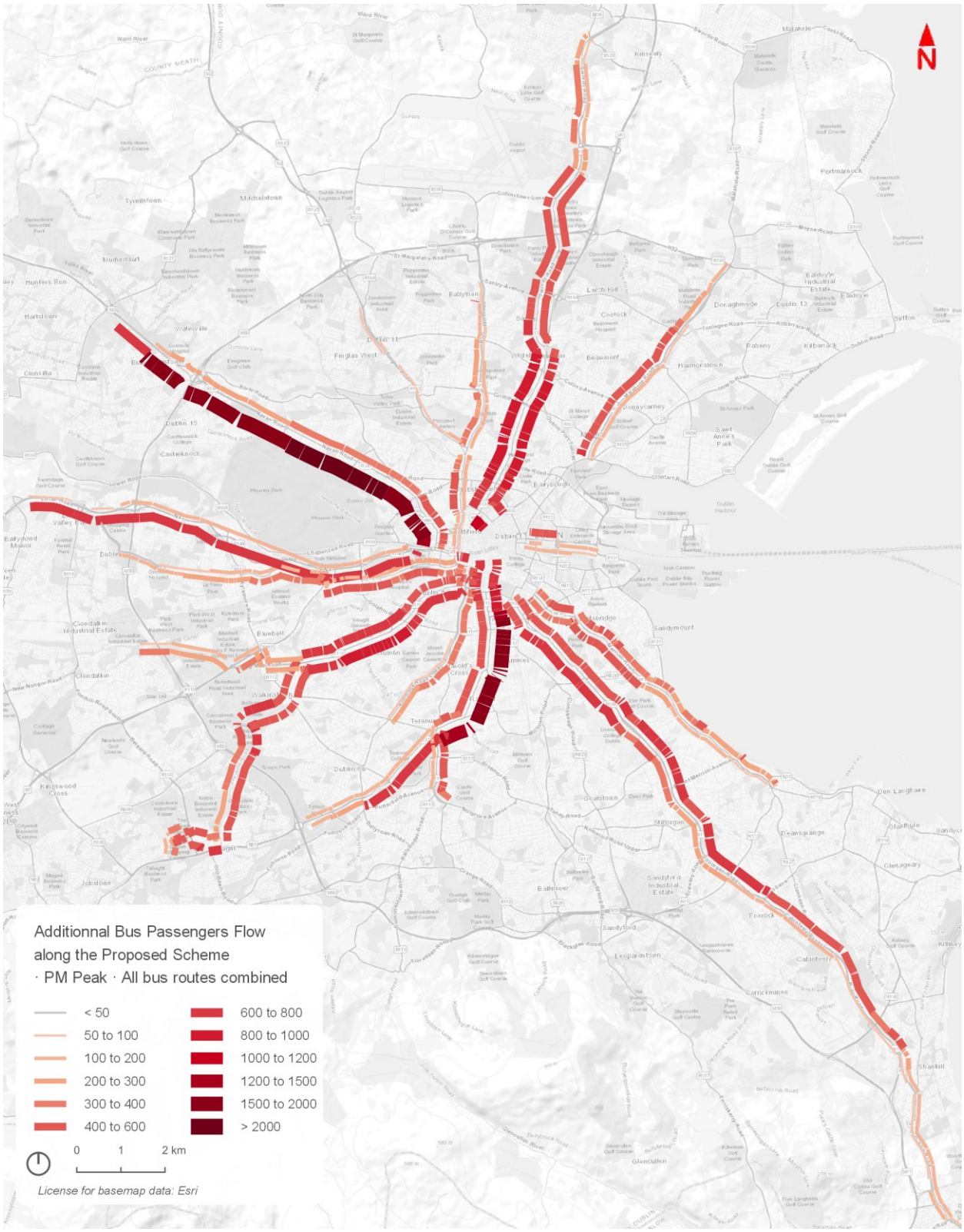


Diagram 7.10: PM Peak Hour Total Bus Passenger Flows Along the Proposed Schemes (All Bus Routes Combined)

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 Proposed 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 Belfield / Blackrock 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 (%)
Belfield / Blackrock to City Centre Scheme	9,480	11,920	2,440	25.7%
All Schemes	71,280	85,170	13,890	19.5%

As shown in Table 7.10, there will be a 25.7% increase in people boarding bus routes which use any part of the Blackrock/Belfield to City Centre Scheme during the PM Peak Hour. This represents an addition of 2,440 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. 2043 AM Peak Hour Bus Passengers

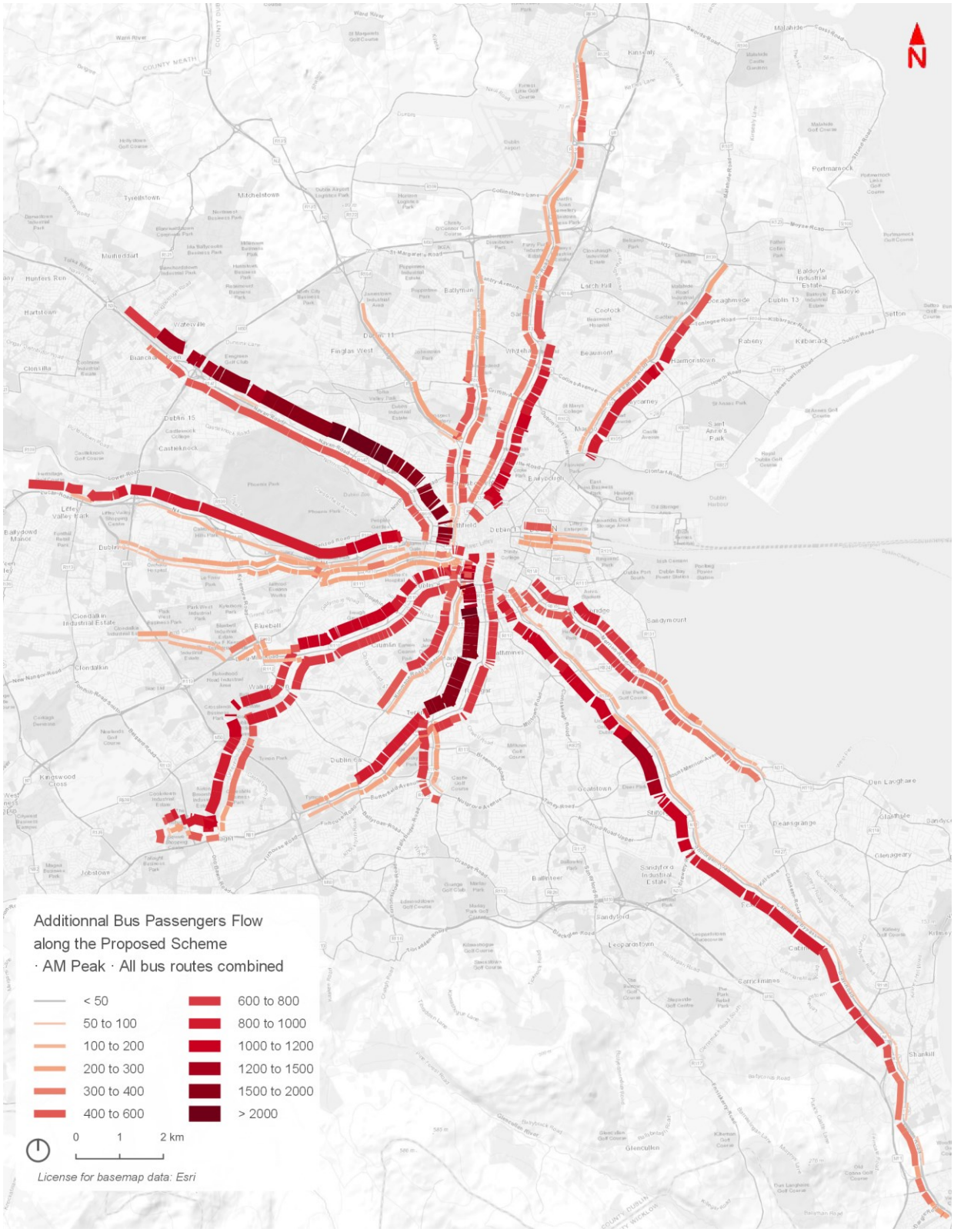


Diagram 7.11: AM Peak Hour Total Bus Passenger Flows Along the Proposed Schemes (All Bus Routes Combined)

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 Proposed 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 Belfield / Blackrock 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 (%)
Belfield / Blackrock to City Centre Scheme	12,320	15,990	3,670	29.8%
All Schemes	86,380	106,040	19,660	22.8%

As shown in Table 7.11, there will be a 29.8% increase in people boarding bus routes which use any part of the Blackrock/Belfield to City Centre Scheme during the AM Peak Hour. This represents an addition of 3,670 passengers in the AM Peak Hour.

There will be a 22.8% increase in people boarding bus routes which use any part of the Proposed Schemes, representing an additional 19,660 passengers due to the bus priority improvements. 2043 PM Peak Hour Bus Passengers

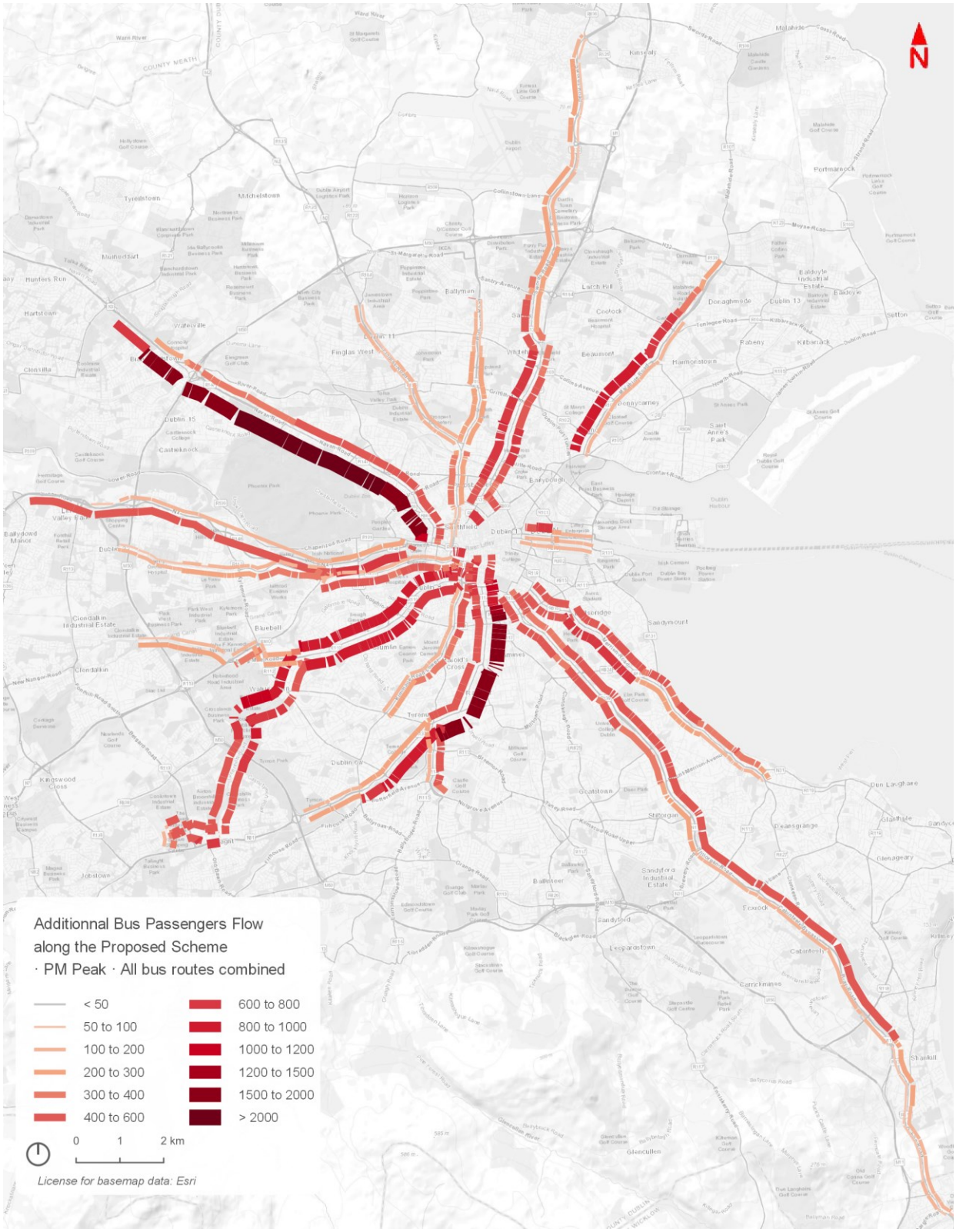


Diagram 7.12: PM Peak Hour Total Bus Passenger Flows Along the Proposed Schemes (All Bus Routes Combined)

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 Proposed 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 Belfield / Blackrock 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 (%)
Belfield / Blackrock to City Centre Scheme	10,440	13,460	3,020	28.9%
All Schemes	72,910	89,280	16,370	22.5%

As shown in Table 7.12, there will be a 28.9% increase in people boarding bus routes which use any part of the Blackrock/Belfield to City Centre Scheme during the PM Peak Hour. This represents an addition of 3,020 passengers in the AM Peak Hour.

There will be a 22.5% increase in people boarding bus routes which use any part of the Proposed Schemes, representing an additional 16,370 passengers due to the bus priority improvements.

7.2.5 Integration with Other Public Transport Modes

The aim of the CBC Infrastructure Works 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.

7.2.5.1 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	47,040	49,210	2,170	5%
Luas	37,560	34,890	-2,670	-7%
Bus	79,830	97,830	18,000	23%
Metro	18,520	17,960	-560	-3%
Total	**182,950**	**199,890**	**16,940**	**9%**

As presented in Table 7.15, with the Proposed Schemes in place, there will be a predicted 9% increase in total passengers boarding PT services and a 23% increase in boardings on bus services in the AM Peak Hour in 2043. The improved bus infrastructure results in slight reductions in boardings on Luas and MetroLink services, which will help provide additional resilience for these modes to accommodate future travel demand growth.

Table 7.16: 2043 PM Peak Hour PT Boardings

Public Transport Mode	Do Minimum	Do Something	Difference in Boardings	Difference (%)
Rail	55,240	56,730	1,490	3%
Luas	31,620	30,640	-980	-3%
Urban Bus	73,160	88,970	15,810	22%
Metro	14,290	13,760	-530	-4%
Total	**174,310**	**190,100**	**15,790**	**9%**

As presented in Table 7.16, with the Proposed Schemes in place, there will be an estimated 9% increase in total passengers boarding PT services and a 22% increase in boardings on bus services in the PM Peak Hour 2043. The improved bus infrastructure results in slight reductions in boardings on Luas and MetroLink services, which will help provide additional resilience for these modes to accommodate future travel demand growth.

7.2.5.1.1 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 Proposed Scheme will run in close proximity to a number of Heavy Rail stations, although the transfers between the Proposed Scheme and Heavy Rail are expected to be limited as they both serve radial routes towards the City Centre.

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	2,690	4,680	5,600	4,420	**17,390**	3,670	5,480	6,130	4,520	**19,800**
Rail	3,390	3,970	2,430	1,670	**11,460**	4,720	4,010	2,220	1,590	**12,540**
Luas	4,530	1,230	430	1,650	**7,840**	4,780	980	370	1,360	**7,490**
Metro	2,940	960	1,320	0	**5,220**	3,270	830	1,090	0	**5,190**
Total	**13,550**	**10,840**	**9,780**	**7,740**	**41,910**	**16,440**	**11,300**	**9,810**	**7,470**	**45,020**

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 7% from 41,910 in the Do Minimum scenario to 45,020 in the Do Something scenario (with the Proposed Schemes in place) with transfers from Rail, Luas and Metrolink to buses predicted to increase by 18% from 10,860 to 12,770. This highlights the increased level of accessibility and transfer opportunities facilitated by the Proposed Schemes.

7.2.5.2 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 (%)
Belfield / Blackrock to City Centre Scheme	21.13	21.25	+0.6%
All Schemes Scenario	21.13	23.08	+9.2%

As presented in Table 7.19, the average networkwide speed per PT passenger is expected to grow by 0.6%, with the Proposed Scheme only in operation in the AM Peak Hour in 2028. 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 (%)
Belfield / Blackrock to City Centre Scheme	21.18	21.31	+0.6%
All Schemes Scenario	21.18	23.14	+9.3%

As presented in Table 7.20, the average networkwide speed per PT passenger is expected to grow by 0.6%, with the Blackrock/Belfield Scheme only in operation in the AM Peak Hour in 2043. With all Proposed Schemes operational, the average speed per PT passenger is expected to grow by 9.3%, representing a substantial increase in the average travel speeds for all PT users in 2043.

7.2.6 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 Schemes as well as bus usage and integration with other public transport modes, as presented above.

The Proposed Schemes have been adjudged to deliver a **High Positive** overall impact to 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

8.1 Summary

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 includes an upgrade of the existing bus priority and cycle facilities. The scheme includes a substantial increase in the level of bus priority provided along the corridor, including the provision of additional lengths of bus lane resulting in improved journey time reliability.

Throughout the Proposed Scheme bus stops will be enhanced to improve the overall journey experience for bus passengers and 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 as well as the provision of side road ramps. In addition, public realm works will be undertaken at key locations with higher quality materials, planting and street furniture provided to enhance the pedestrians experience. This TIA provides a robust assessment of the scheme through qualitative assessment and quantitative analysis using a suite of multi-modal transport modelling tools.

The impacts during the construction phase are outlined in Table 8.1. During the construction phase, the Proposed Scheme will have **Low Negative** and temporary impacts to pedestrian cycling, bus access and parking and loading. 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 **Low 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.

Table 8.1: Summary of Construction Phase Predicted Impacts

Assessment Topic	Effect	Potential Impact
Pedestrian Access	Restrictions to pedestrians along Proposed Scheme.	Low Negative
Cycling Access	Restrictions to cyclists along Proposed Scheme	Low 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	Low Negative

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 general traffic and parking / loading availability may be anticipated, however the Proposed Scheme has been designed and outlined within this assessment to take cognisance in relevant traffic and transport guidelines. The assessment demonstrates that the Proposed Scheme can be readily utilised 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. All proposed facilities have been designed in accordance with PDGB which has been developed with cognisance to the relevant accessibility guidance. A LoS junction assessment was undertaken using a set of five criteria to determine the impact that the Proposed Scheme has for pedestrians. The results of the impacted junctions demonstrate that the LoS during the Do Minimum scenario consists predominantly of the low D / E ratings. During the Do Something scenario, i.e., following the development of the Proposed Scheme, the LoS consists predominantly of the highest A / B ratings. Overall, the improvements to the quality of the pedestrian infrastructure will have a **Medium Positive impact** across all sections of the Proposed Scheme.

- **Cycling Infrastructure:** The Proposed Scheme also consists of measures to enhance the potential for cycling by providing safe infrastructure for cycling, segregated from general traffic (and pedestrians)

wherever practicable along the direct study area. A LoS assessment was undertaken using an adapted version of the NTA's National Cycle Manual QoS Evaluation criteria. The results of the assessment demonstrate that the LoS during the Do Minimum scenario consists of C ratings. During the Do Something scenario, the LoS consists predominantly of the highest A / A+ ratings. Given the quality of the existing cycling infrastructure along the Proposed Scheme, the improvements will have a **Medium Positive impact** in Sections 2, 4 and 5 of the Proposed Scheme, and a **Low Positive impact** in Sections 1 and 3.

- **Bus Infrastructure:** The implementation of the Proposed Scheme will result in improvements in the quality of bus infrastructure provision along the direct study area. 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 have a **High Positive impact** in Section 1 of the Proposed Scheme, a **Medium Positive impact** in Sections 2 and 5, and a **Low Positive impact** in Sections 3 and 4.

- **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 165 spaces within the redline boundary of the Proposed Scheme (-11 spaces in Section 1, -8 spaces in Section 2, +1 spaces in Section 3, -101 spaces in Section 4, and -46 spaces in Section 5). Given the nature of the loss in parking and the availability of alternative spaces in the indirect study area, the impact is expected to have a **Low Negative impact** in all sections of the Proposed Scheme.

- **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 corridor by sustainable modes of 86% and 105% during the 2028 AM and PM Peak respectively. During the 2043 scenario there will be an increase of 113% and 107% in the number of people travelling along the Proposed Scheme by sustainable modes during the AM and PM Peak Hours respectively. The analysis also shows that there will be an increase of 11.3% and 12.3% of bus boarders during the 2028 AM and PM Peak Hours respectively. During the 2043 scenario there will be an increase of 16% and 18% in bus boarders during the AM and PM Peak Hours respectively. Overall, it is anticipated that the increases to the total number of people travelling through the Proposed Scheme will have a **High Positive impact.**

- **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 16% and 18% during the AM and PM Peak hours of the 2028 Opening Year and 2043 Design Year. The Proposed Scheme will reduce total bus journey times along the Proposed Scheme by up to 18% in both 2028 and 2043 respectively. Based on the AM and PM peak hours alone, this equates to **8.2 hours of savings in 2028 and 7.6 hours in 2043**, when compared to the Do Minimum combined across all buses. On an annual basis this equates to approximately 6,200 hours of bus vehicle savings in 2028 and 5,700 hours 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 have 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. The significance of the impact has been described in terms of the reduction in traffic flows. 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 largely 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.

Overall, it has been determined that the impact of the reduction in general traffic flows along the Proposed Scheme will be a **Medium Positive** impact whilst the impact of the redistributed general traffic along the surrounding road network will have a **Medium Negative impact**.

- **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 -0.91% and 2.77% and will therefore have a **Low Negative impact**.

- **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 11% increase in public transport trips, 4% decrease in general traffic trips (i.e. motorists) and a 15% increase in cycling trips in the morning peak hour and a 9% increase in public transport, 5% decrease in general traffic and a 13% 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 9% respectively, and the increase in passengers boarding bus services will increase by 23% and 22% respectively.

  Overall, the Proposed Schemes are expected to deliver a **High Positive cumulative impact** on People Movement by sustainable modes.

The impacts during the Operational Phase are summarised in Table 8.2.

Table 8.2: Summary of Potential Operational Phase Impacts

Assessment Topic	Effect	Potential Impact
Pedestrian Infrastructure	Improvements to the quality of the pedestrian infrastructure along the Proposed Scheme.	Medium Positive
Cycling Infrastructure	Improvements to the quality of the cycling infrastructure along the Proposed Scheme.	Medium Positive impact in Sections 2, 4 and 5, and a Low Positive impact in Sections 1 and 3.
Bus Infrastructure	Improvements to the quality of the bus infrastructure along the Proposed Scheme.	High Positive impact in Section 1, Medium Positive impact in Sections 2 and 5, and Low Positive impact in Sections 3 and 4.
Parking and Loading	A total loss of 165 parking / loading spaces along the Proposed Scheme.	Low Negative
People Movement	Increases to the total number of people travelling through the Proposed Scheme.	High Positive
Bus Network Performance Indicators	Improvements to journey time and reliability 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
Network Wide Performance Indicators	Deterioration to the network-wide queuing capacity, travel times, travel distances and average network speeds beyond the direct and indirect study areas.	Low Negative
Cumulative Assessment	The Proposed Scheme in tandem with other Core Bus Corridors and GDA Strategy schemes will facilitate substantial mode shift from car to sustainable modes.	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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