Chapter 06
Traffic & Transport

Contents

6. Traffic & Transport

6.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) has considered the potential traffic & transport impacts associated with the Construction and Operational Phases of the Belfield / Blackrock to City Centre Core Bus Corridor Scheme (hereafter referred to as the Proposed Scheme).

The chapter describes the traffic and transportation impacts in accordance with the requirements of the relevant Environmental Protection Agency's (EPA) guidance on the information to be contained in EIARs. To accompany this chapter, a Traffic Impact Assessment (TIA) has been prepared. The TIA presents a comprehensive review of the traffic and transportation impacts associated with the Proposed Scheme, which has informed the production of this EIAR Traffic & Transport chapter. The TIA should be read in conjunction with this EIAR chapter and is included as Appendix A6.1 (Transport Impact Assessment Report) in Volume 4 of this EIAR.

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. 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 6.1 summarises the changes which will be made to the existing transport environment along the corridor as a result of the Proposed Scheme.

Table 6.1: 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	0.9
Outbound	0	1.0
Total Bus Priority (both directions)	6.1	16.6 (+172%)

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

The Proposed Scheme, as described in Chapter 4 (Proposed Scheme Description) is supported by a series of drawings, which are contained in Volume 3 of the EIAR. The following drawings (listed in Table 6.2) should be read in conjunction with this chapter.

Table 6.2: 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 Systems Design Drawings

Cumulative impacts of Traffic and Transport, along with other topics, can be found in Chapter 21 (Cumulative Impacts & Environmental Interactions) of this EIAR, as well as in Appendix A6.1 (Transport Impact Assessment Report) in Volume 4 of this EIAR.

6.1.1 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 core bus corridor (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.

6.1.1.1 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 buses 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.

6.1.1.2 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 Signals 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 A6.3 (Junction Design Report) in Volume 4 of this EIAR.

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 6.2.3 below.

6.1.2 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 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 6.2.3) was developed to support this iterative design process.

Diagram 6.1 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.

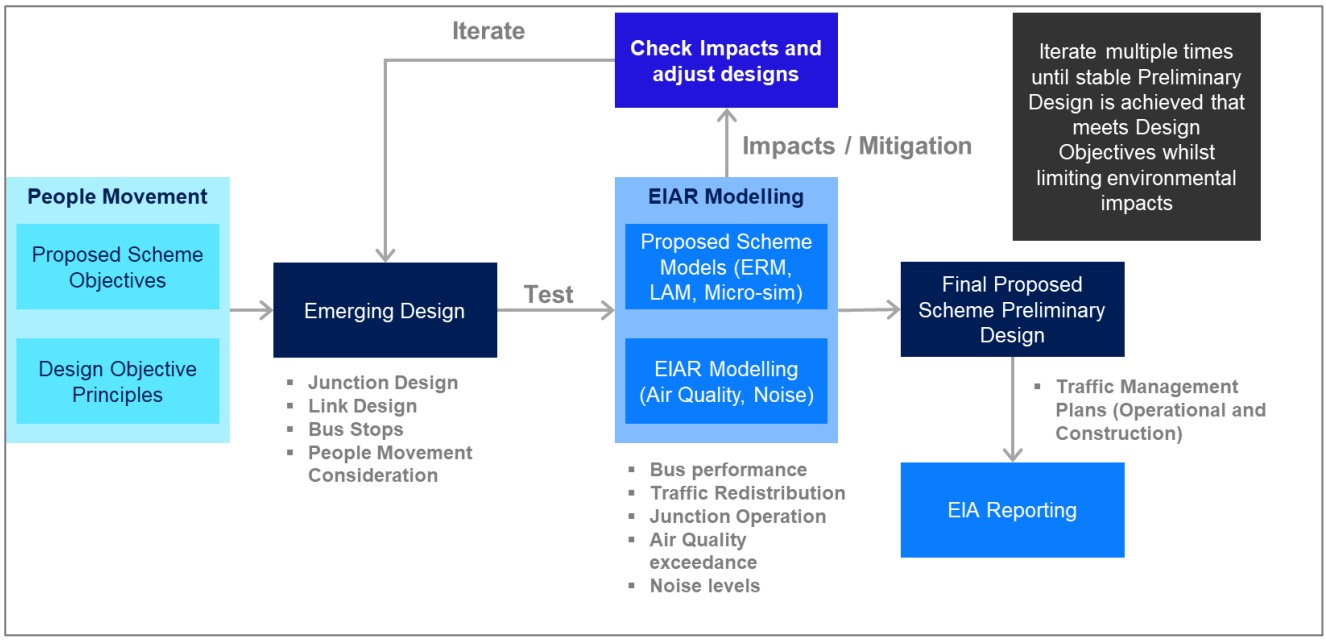


Diagram 6.1 Proposed Scheme Impact Assessment and Design Interaction

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 method described above.

6.2 Methodology

The methodology for the traffic and transport related impacts of the Proposed Scheme has incorporated a number of key references and inter-related stages, which have been outlined in the following sections.

6.2.1 Study Area

The direct and indirect impacts have been considered with reference to the following study area extents (as shown in Diagram 6.2):

- **Direct Study Area** – The Proposed Scheme (i.e. the transport network within the red line boundary); and
- **Indirect Study Area** – This is the area of influence that 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 6.4.5.4.6 for further details on the threshold applied in relation to traffic volume changes used in the definition of the indirect study area).

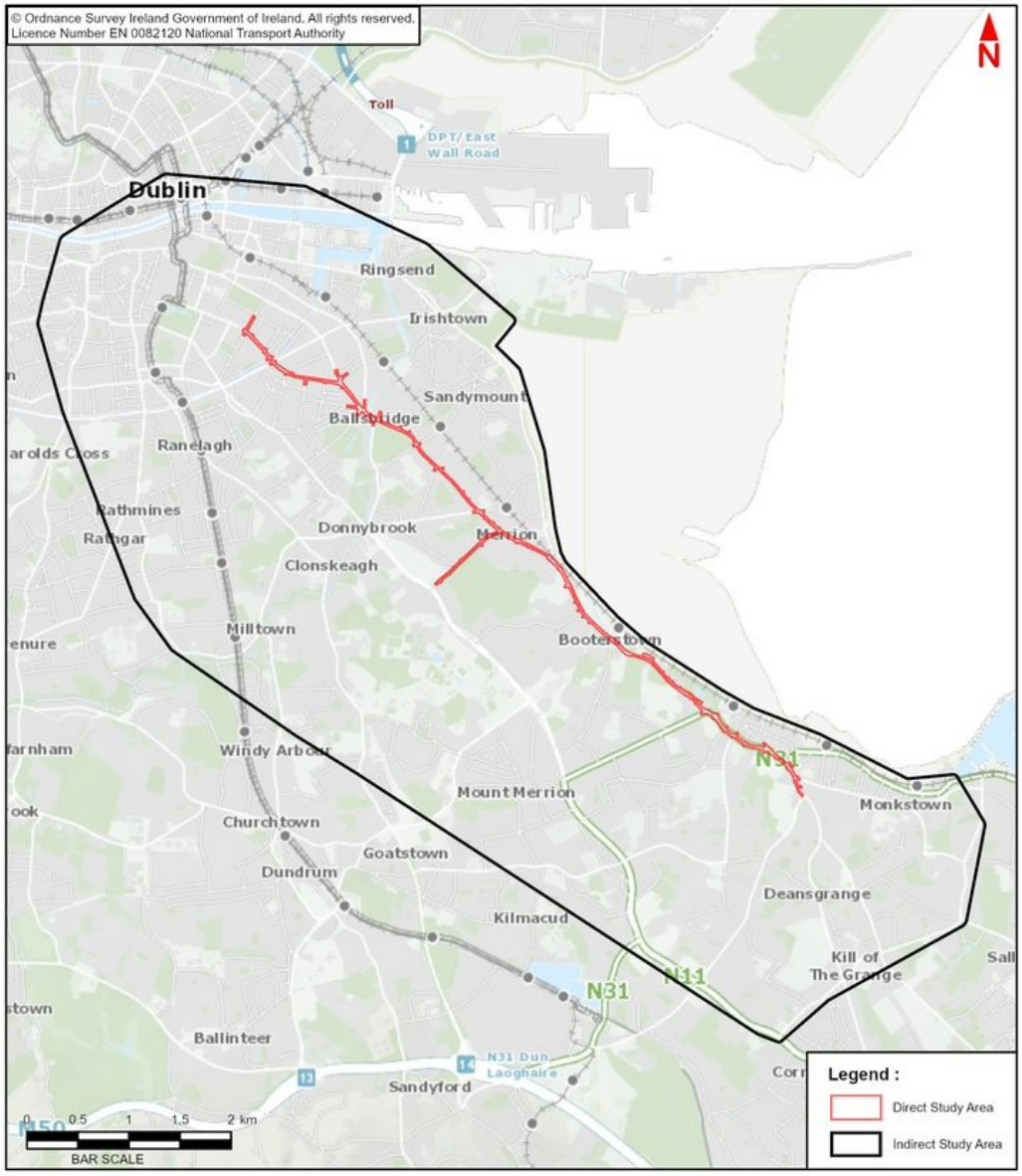


Diagram 6.2: Proposed Scheme Direct and Indirect Study Area

6.2.2 Relevant Guidelines, Policy and Legislations

The policies and legislation which are applicable to the Traffic & Transport chapter are detailed in Chapter 2 (Need for the Proposed Scheme) of the EIAR and in Appendix A6.1 (Transport Impact Assessment Report) of Volume 4 of this EIAR. The specific traffic and transport guidelines which have informed this chapter are detailed in turn below.

6.2.2.1 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 TIA, which supports this EIAR chapter, follows the Traffic and Transport Assessment Guidelines and offers an impartial description of the likely impacts of the Proposed Scheme, outlining both its positive and negative aspects.

6.2.2.2 Design Manual for Urban Roads and Streets

The Design Manual for Urban Roads and Streets (DMURS) (Department of Transport, Tourism and Sport (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.

The Proposed Scheme has been designed and assessed with reference to these guidelines.

6.2.2.3 Traffic Signs Manual (Chapter 8: Temporary Traffic Measures and Signs for Roadworks)

The Traffic Signs Manual (Department of Transport (DoT), 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.

6.2.2.4 Traffic Management Guidelines

The Traffic Management Guidelines (DoT, 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:

- Environment Improvement;
- Congestion Relief;
- Capacity Improvement;
- Safety;
- Accessibility;
- Economic Vitality; and
- Politics.

The Proposed Scheme has been designed and assessed with reference to these guidelines. In addition to the above key guidelines, the Proposed Scheme has been designed and assessed with reference to a set of policy and guidance documents outlined in Section 6.9 of this chapter.

6.2.3 Proposed Scheme Impact Assessment Modelling Tools

This section summarises the various transport modelling tools that have been developed and used to inform the preparation of the TIA and this chapter of the EIAR. The purpose of each tool has been detailed and its use for each element of the Proposed Scheme assessment has been defined.

The different modelling tools that have been developed as part of the assessment do not work in isolation, but instead work as a combined modelling system driven by the NTA's Eastern Regional Model (ERM) as the primary source for multi-model demand and trip growth. Demand information is then passed to the cordoned Local Area Model (LAM), corridor micro-simulation models and junction models which have been refined and calibrated to represent local conditions to a greater level of detail than that contained in the ERM.

In summary, there are four tiers of transport modelling which have been used to assess the impacts of the Proposed Scheme:

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

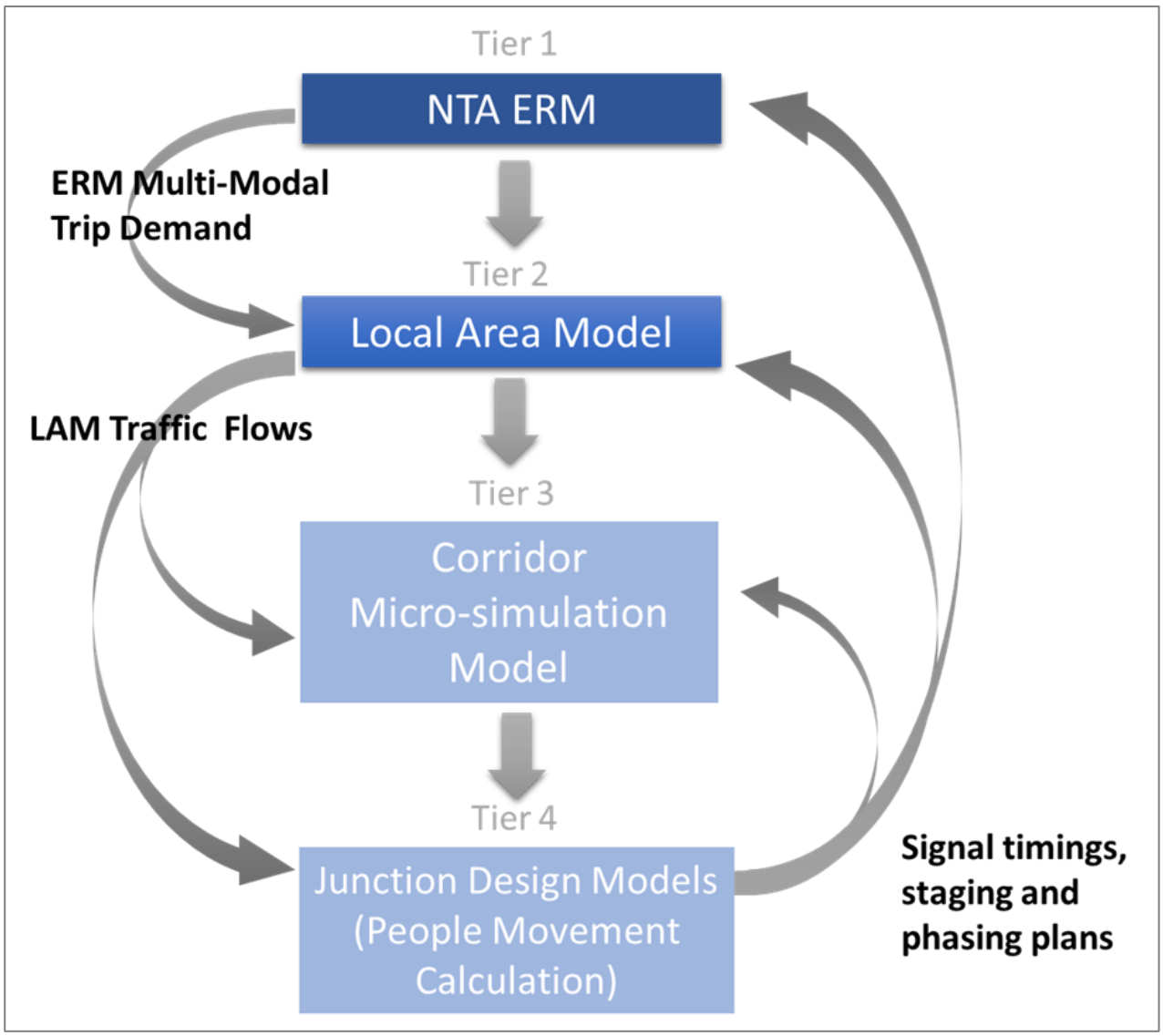


Diagram 6.3: Proposed Scheme Modelling Hierarchy

Further detail on the transport model development process, the traffic data inputs used, the calibration, validation and forecast model development for the suite of transport models can be found in the Transport Modelling Report, in Appendix A6.2 (Transport Modelling Report) and Appendix A6.3 (Junction Design Report) of Volume 4 of this EIAR.

6.2.4 Appraisal Method for the Assessment of Impacts

6.2.4.1 Overview

This section details 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;
- Determining the Predicted Magnitude of Impacts;
- Defining the Sensitivity of the Environment; and
- Determining the Significance of Effects.

The above approach has been carried out in accordance with procedures described in the Guidelines to be Contained in EIARs (EPA 2017) and methodologies outlined in the 'Traffic and Transport Assessment Guidelines (TII 2014), using a Multi-Modal Level of Service (LoS) approach.

6.2.4.2 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, which have been undertaken using the Proposed Scheme modelling tools described previously:
  - **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 (by mode – Walking, Cycling, Bus and General Traffic) moving along the Proposed Scheme during the Operational Phase only;
  - **Bus Performance Indicators**: The changes to the projected journey times and reliability for buses as a result of the Proposed Scheme; and
  - **General Traffic:** The direct and indirect impacts that will occur for the general traffic conditions on the Proposed Scheme and surrounding road network.

6.2.4.3 Determining the Predicted Magnitude of Impacts

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

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

- **'Do 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 and other GDA Strategy projects, which has been outlined in Section 6.3 (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, have 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 6.4.3.
- **'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, have 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 assessment of changes between the Do Minimum and Do Something scenarios have been presented in either a positive, negative or neutral magnitude of impact 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 6.4 for further information on the methodology in applying these ratings for each assessment.

6.2.4.3.1 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 the 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.

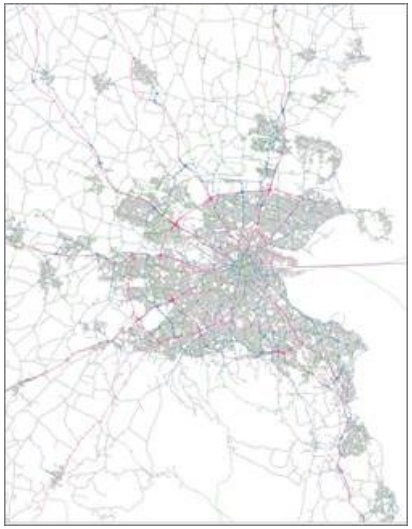
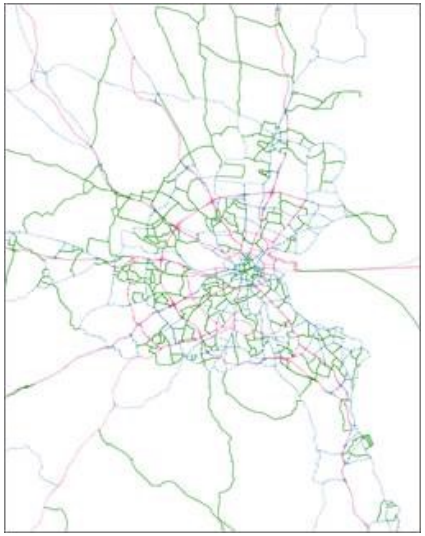
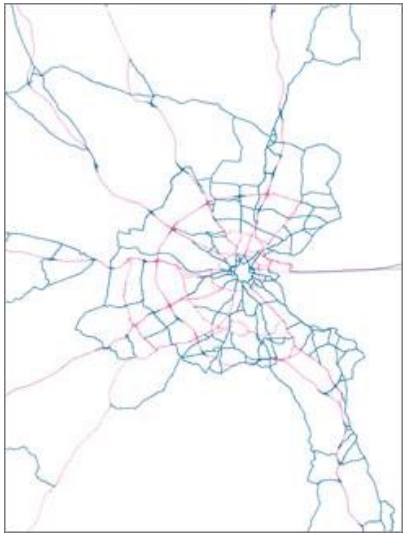
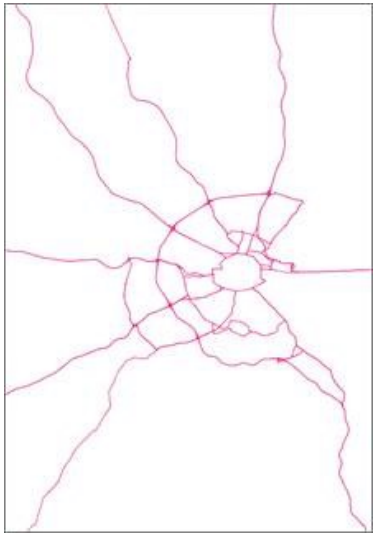
6.2.4.4 Defining the Sensitivity of the Environment

The impact assessment sensitivities established for the Traffic and Transport Chapter have been informed using the following data sources:

- OpenStreet Map – to identify community facilities, and open spaces within 50m of the Proposed Scheme; and
- The LAM (NavStreets) and Google Traffic data – to identify the capability of roads to cater for traffic volumes and existing congested junctions / road links.

The content of Table 6.3 outlines the two sets of sensitivity ratings that have been applied to the impact assessments, depending on whether the assessment location is within the direct or indirect study area.

Table 6.3: BusConnects Traffic and Transport Sensitivities

Assessment Area	Sensitivity			
	High	Medium	Low	Negligible
Proposed Scheme / Direct Study Area Sensitivities	Sections of the Proposed Scheme that are in the vicinity of community facilities such as schools or colleges, neighbourhood centres; AND currently experiencing congestion for pedestrians, cyclists, buses or general traffic	Sections of the Proposed Scheme that currently experience congestion for pedestrians, cyclists, buses or general traffic that have not been identified as high sensitivity	Sections of the Proposed Scheme near public open space, nature conservation areas, residential areas that have not been identified as medium or high sensitivity	Areas of low sensitivity to traffic flows i.e. isolated sites or areas with a high standard road network
Indirect Study Area Sensitivities	Category 5: Low capacity, low operating speeds. Local and minor roads. (shown in grey) 	Category 4: High capacity, moderate operating speeds. Roads connecting between neighbourhoods. (shown in green) 	Category 3 roads: *High capacity, high* operating speeds (less than Category 2). Roads connecting Category 2 roads. (shown in blue) 	Category 1: High capacity, high operating speeds. Roads connecting between major cities or urban areas; and Category 2: Roads connecting Category 1 roads, enabling high capacity through and between cities (shown in red) 

6.2.4.5 Determining the Significance of Effects

The Significance of Effects rating has been established using Table 6.4, which was derived from Figure 3.5 of the EPA Guidelines on EIARs. This enables the sensitivities and magnitudes of impact to determine the significance of a particular impact. For example, a section of a Proposed Scheme with a high sensitivity and a long-term medium positive impact would have a predicted 'Positive, Very Significant and Permanent' impact. A section of a Proposed Scheme with a low sensitivity and a short-term low negative impact would have a predicted 'Negative, Slight and Temporary' impact.

Table 6.4: Significance of Effects Matrix for Traffic and Transport Chapter

		Sensitivity of Existing Environment			
		High	Medium	Low	Negligible
Description Impact	High	Profound	Very Significant	Moderate	Slight
	Medium	Very Significant	Significant	Moderate	Not Significant
	Low	Moderate	Moderate	Slight	Not Significant
	Negligible	Not Significant	Not Significant	Not Significant	Imperceptible

The definitions for the Significance of Effects ratings for the Proposed Scheme ranging from Imperceptible to Profound are outlined in Table 6.5.

Table 6.5: EIAR Impact Significances

Significance of Effects (EPA)	Typical Criteria Descriptors
Imperceptible	An effect capable of measurement but without significant consequences.
Not significant	An effect which causes noticeable changes in the character of the environment but without significant consequences
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Profound	An effect which obliterates sensitive characteristics

Potential mitigation and monitoring measures have been considered for assessments that result in a negative impact of significant or higher (i.e. significant, very significant or profound).

6.2.5 Data Collection and Collation

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

6.2.5.1 Qualitative Assessment Data Collection

This section discusses the data collection undertaken to inform the qualitative assessment metrics set out in Section 6.2.4.

6.2.5.1.1 Site Surveys

A walkover of the route of the Proposed Scheme was undertaken and photographs were used to record locations of particular importance. This ensures 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
- Existing parking and loading facilities.

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

6.2.5.1.2 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.

6.2.5.2 Quantitative Assessment Data Collection

This section discusses the data collection undertaken to inform the quantitative assessment metrics set out in Section 6.2.4. Further detail can be found in Appendix A6.2 (Transport Modelling Report) of Volume 4 of this EIAR.

6.2.5.2.1 Existing Data Review (Gap Analysis)

A review of existing traffic survey data available for the area of interest 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 Counters: 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.

6.2.5.2.2 Commissioned Traffic Survey Data

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

6.2.5.2.2.1 Junction Turning Counts (JTCs)

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.

6.2.5.2.2.2 Automatic Traffic Counts (ATCs)

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.

The ATCs were taken for an entire week. A summary of the collected data can be found in Appendix A6.1 (Transport Impact Assessment Report) of Volume 4 of this EIAR.

6.2.5.2.3 Road and Bus Journey Time Data

6.2.5.2.3.1 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.

6.2.5.2.3.2 TomTom Road Journey Time Data

Road Journey time data for the Proposed Scheme models has been sourced from TomTom, who calculate journey times using vehicle position data from GPS-enabled devices and provide this on a commercial basis to a number of different users. The NTA purchased a license to access the anonymised Custom Area Analysis dataset through the TomTom TrafficStats portal. The NTA has an agreement with TomTom to provide travel time information covering six areas of Ireland and for certain categories of road.

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

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

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

6.2.5.2.3.3 TomTom Data Processing

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

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

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

6.2.5.2.3.4 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 A6.2 (Transport Modelling Report) of Volume 4 of this EIAR.

6.3 Baseline Environment

6.3.1 Overview

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)

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) data collected by the NTA indicates that the current standard deviation for journey times of buses on the corridor is 11 minutes. With any further increases in traffic levels, this variability of bus speeds is expected to be exacerbated, thus impacting further on bus passengers. In addition, longer and less reliable bus services will 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 an unbalanced use of bus capacity.

In describing the baseline conditions, the scheme has been divided into five sections. These sections are outlined as follows and are illustrated in Figure 6.1 and Figure 6.2a to Figure 6.2e in Volume 3 of this EIAR:

- 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).

6.3.2 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.

6.3.2.1 Pedestrian Infrastructure

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

- The 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 Volume 3 of this EIAR.

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 A6.4.1 (Pedestrian Infrastructure Assessment) of Volume 4 of this EIAR.

6.3.2.2 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 Avenue;
- 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 Volume 3 of this EIAR.

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 A6.4.2 (Cycling Infrastructure Assessment) of Volume 4 of this EIAR.

6.3.2.3 Bus Infrastructure

6.3.2.3.1 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.

6.3.2.3.2 Bus Stop Facilities

There are currently 13 existing 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
- Stop 3114 on R113 Temple Hill, 60m south of R119 Monkstown Road.

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).

Table 6.6 shows the availability of bus stop facilities at the existing 13 bus stops along Section 1 of the Proposed Scheme.

Table 6.6: 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%

The existing bus facilities along Section 1 of the Proposed Scheme are illustrated in Figure 6.5a in Volume 3 of this EIAR. The bus services that operate along Section 1 are outlined in Table 6.7.

Table 6.7: Section 1 – 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
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
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) - Dún Laoghaire (Royal Marine Hotel) - Dún Laoghaire (County Hall, Marine Road) - Monkstown (Knox Memorial Hall) - Blackrock (Frascati Centre) - Booterstown (DART station) - Booterstown (Tara Towers Hotel) – St. Vincent's University 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 - The 3 Arena	60 minutes	60 minutes

6.3.2.4 General Traffic

6.3.2.4.1 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 that have been extracted from Figure 6.6 in Volume 3 of this EIAR.

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 6.1.

Image 6.1: 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 onto 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 6.2.

Image 6.2: 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 6.3.

Image 6.3: R113 Temple Hill / Temple Road / Newtown Avenue Junction

6.3.2.4.2 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 Volume 3 of this EIAR.

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 6.4.

Image 6.4: 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 6.5.

Image 6.5: 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. These characteristics are shown in Image 6.6.

Image 6.6: 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 6.7.

Image 6.7: 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 6.8.

Image 6.8: 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 6.9.

Image 6.9: R118 Rock Road / Rock Hill / N31 Frascati Road Junction

6.3.2.4.3 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 are described in turn below, together with satellite images that have been extracted from Figure 6.6 in Volume 3 of this EIAR.

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 6.10.

Image 6.10: 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 6.11.

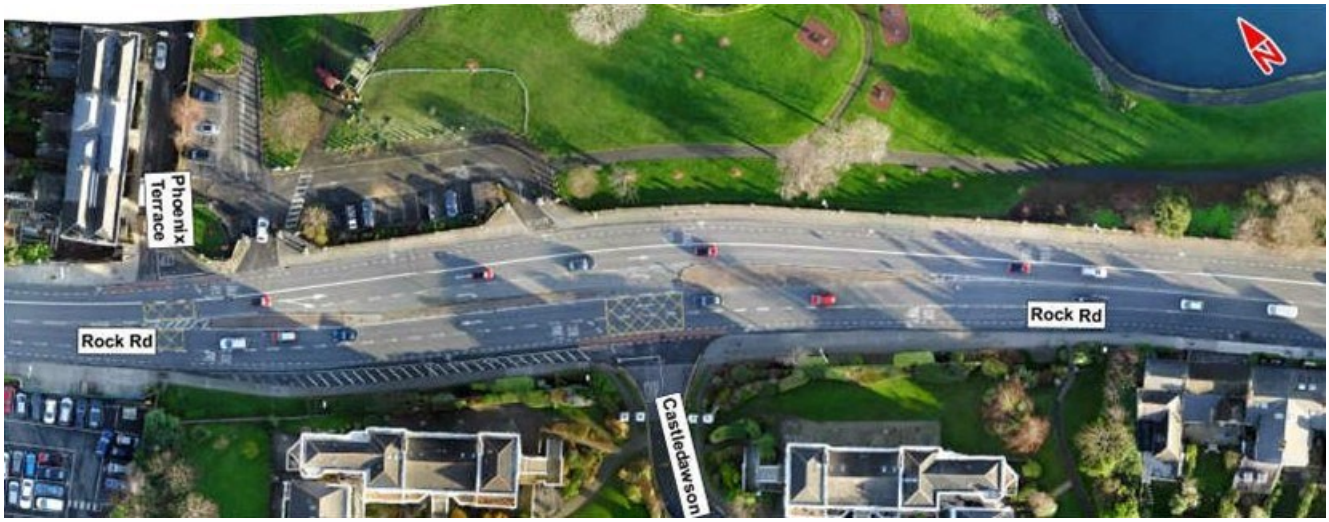


Image 6.11: R118 Rock Road / Castledawson Junction

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 6.12.

Image 6.12: 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 6.13.

Image 6.13: 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 6.14.

Image 6.14: R118 Rock Road / Seafort Parade / Castledawson Avenue Junction

6.3.2.5 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.

6.3.3 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.

6.3.3.1 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. All controlled pedestrian crossings along this section are supported by dropped kerbs and tactile paving. The location of pedestrian crossings is illustrated in Figure 6.3b in Volume 3 of this EIAR.

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 A6.4.1 (Pedestrian Infrastructure Assessment) of Volume 4 of this EIAR.

6.3.3.2 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 of Volume 3 of this EIAR.

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 A6.4.2 (Cycling Infrastructure Assessment) of Volume 4 of this EIAR.

6.3.3.3 Bus Infrastructure

6.3.3.3.1 Bus Priority Measures

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

6.3.3.3.2 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 6.8 outlines the availability of bus stop facilities at the existing 11 bus stops along Section 2 of the Proposed Scheme.

Table 6.8 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 Volume 3 of this EIAR. The bus services that operate along Section 2 are outlined in Table 6.9.

Table 6.9: 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

6.3.3.4 General Traffic

6.3.3.4.1 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 6.15.

Image 6.15: 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 6.16.

Image 6.16: 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 6.17.

Image 6.17: 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 6.18.

Image 6.18 R118 Rock Road / Trimleston Avenue Junction

6.3.3.4.2 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 6.19.

Image 6.19: 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 6.20.

Image 6.20: 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 6.21.

Image 6.21: 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 6.22.

Image 6.22: 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 6.23.

Image 6.23: 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 6.24.

Image 6.24: R118 Merrion Road / Nutley Lane Junction

6.3.3.5 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.

6.3.4 Section 3 –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.

6.3.4.1 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 Volume 3 of this EIAR.

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 A6.4.1 (Pedestrian Infrastructure Assessment) of Volume 4 of this EIAR.

6.3.4.2 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 Volume 3 of this EIAR.

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 A6.4.2 (Cycling Infrastructure Assessment) of Volume 4 of this EIAR.

6.3.4.3 Bus Facilities

6.3.4.3.1 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.

6.3.4.3.2 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 6.10 below outlines the availability of bus stop facilities at the existing 12 bus stops along Section 3 of the Proposed Scheme.

Table 6.10: 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 Volume 3 of this EIAR. The bus services that operate along Section 3 are outlined in Table 6.11.

Table 6.11: 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

6.3.4.4 General Traffic

6.3.4.4.1 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 6.25.

Image 6.25: 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 6.26.

Image 6.26: 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 6.27.

Image 6.27: 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 6.28.

Image 6.28: 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 6.29.

Image 6.29: 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 6.30.

Image 6.30: 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 6.31.

Image 6.31: 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 6.32.

Image 6.32: 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 6.33.

Image 6.33: R118 Merrion Road / Ballsbridge Park / Anglesea Road Junction

6.3.4.5 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.

6.3.5 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.

6.3.5.1 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 Volume 3 of this EIAR.

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 A6.4.1 (Pedestrian Infrastructure Assessment) of Volume 4 of this EIAR.

6.3.5.2 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 Volume 3 of this EIAR.

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 A6.5.2 (Cycling Infrastructure Assessment) of Volume 4 of this EIAR.

6.3.5.3 Bus Infrastructure

6.3.5.3.1 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.

6.3.5.3.2 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 6.12 below outlines the availability of bus stop facilities at the existing 17 bus stops along Section 4 of the Proposed Scheme.

Table 6.12: 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 Volume 3 of this EIAR. The bus services which operate along Section 4 are outlined in Table 6.13.

Table 6.13: 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

6.3.5.4 General Traffic

6.3.5.4.1 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 6.34.

Image 6.34: 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 6.35.

Image 6.35: 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 6.36.

Image 6.36: 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 6.37.

Image 6.37: R118 Northumberland Road / Lansdowne Road / R118 Pembroke Road / R816 Pembroke Road Junction

6.3.5.4.2 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 6.38.

Image 6.38: 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 6.39.

Image 6.39: 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 6.40.

Image 6.40: R816 Pembroke Road / Eastmoreland Place Junction

6.3.5.4.3 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 6.41.

Image 6.41: 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 6.42.

Image 6.42: 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 6.43.

Image 6.43: Baggot Street Lower / Herbert Place / Wilton Terrace Junction

6.3.5.4.4 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 6.44.

Image 6.44: Fitzwilliam Street Lower / Baggot Street Lower / Fitzwilliam Street Upper Junction

6.3.5.5 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.

6.3.6 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 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.

6.3.6.1 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 Volume 3 of this EIAR.

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 A6.4.1 (Pedestrian Infrastructure Assessment) of Volume 4 of this EIAR.

6.3.6.2 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, totalling 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.

6.3.6.3 Bus Facilities

6.3.6.3.1 Bus Priority Measures

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

6.3.6.3.2 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 6.14 below outlines the availability of bus stop facilities at the existing five bus stops along Section 5 of the Proposed Scheme.

Table 6.14: 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%
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 Volume 3 of this EIAR. The bus services which operate along Section 5 are outlined in Table 6.15.

Table 6.15: 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

6.3.6.4 General Traffic

6.3.6.4.1 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 6.45

Image 6.45: 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 6.46.

Image 6.46: 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 6.47.

Image 6.47: 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 6.48.

Image 6.48: 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 6.49.

Image 6.49: 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 6.50.

Image 6.50: 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 6.51.

Image 6.51: Nutley Lane / Merrion Shopping Centre Priority Junction

6.3.6.5 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.

6.4 Potential Impacts

This section presents potential impacts that may occur due to the Construction and Operation of the Proposed Scheme, taking into account the Proposed Scheme design in the absence of any further mitigation. This informs the need for mitigation or monitoring to be proposed (refer to Section 6.5). Predicted 'residual' impacts taking into account any proposed mitigation is then presented in Section 6.6.

6.4.1 Characteristics of the Proposed Scheme

The characteristics of the Proposed Scheme are described in detail in Chapter 4 (Proposed Project Description).

6.4.2 '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 and hence, 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.

6.4.3 '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 undertaken in relation to the conditions of the existing transport network, which have been outlined in Section 6.3 (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 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.

6.4.3.1 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 A6.2 (Transport Modelling Report) of Volume 4 of this EIAR contains further information on the modelling assumptions contained within the Do Minimum scenario including the full list of transport schemes included.

6.4.3.2 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 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.

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 6.4. 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 in overall demand for travel by private car. The Proposed Scheme will play a key role in this as part of the wider package of GDA Strategy measures.

In general, total trip demand (combining all transport modes) will increase into the future in line with population and employment growth. A greater share of the demand will be by sustainable modes (Public Transport (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.

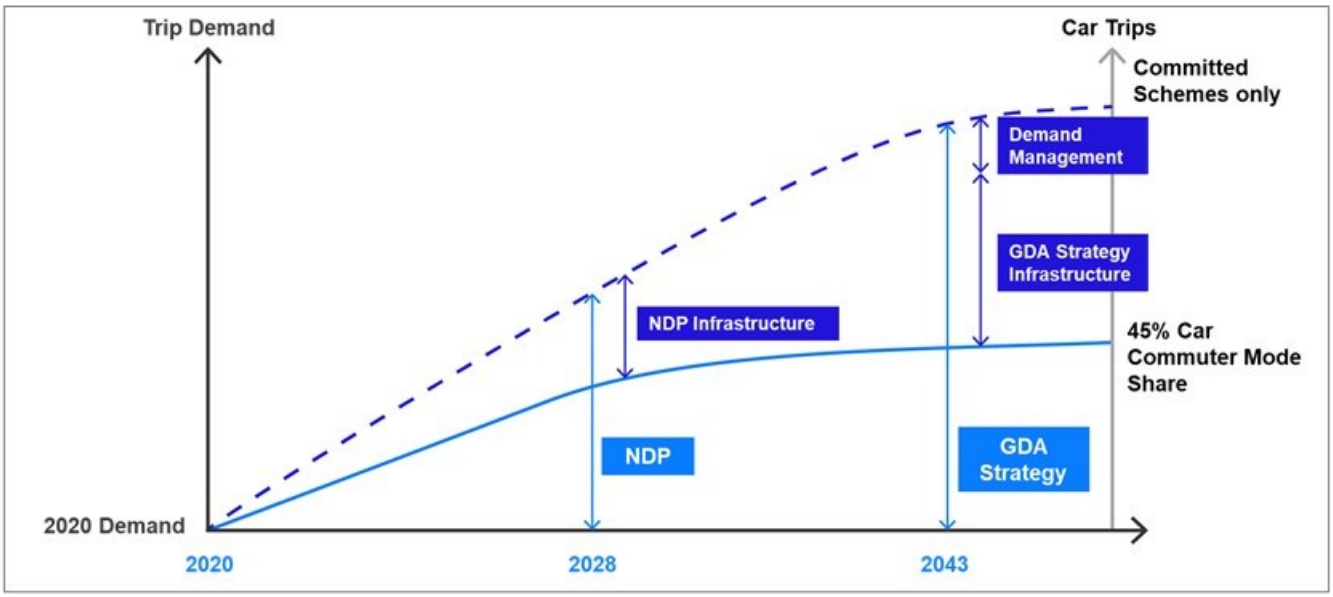


Diagram 6.4: Trip Demand Growth and the GDA Strategy

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.

6.4.4 '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 Project Description).

6.4.5 Construction Phase

This section considers the potential temporary traffic and transport impacts that construction of the Proposed Scheme will have on the direct and indirect study areas during the construction phase.

Chapter 5 (Construction) 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).

A Construction Environmental Management Plan (CEMP) has been prepared and is included as Appendix A5.1 of 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 EIAR.

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.

6.4.5.1 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 6.5):

- **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.

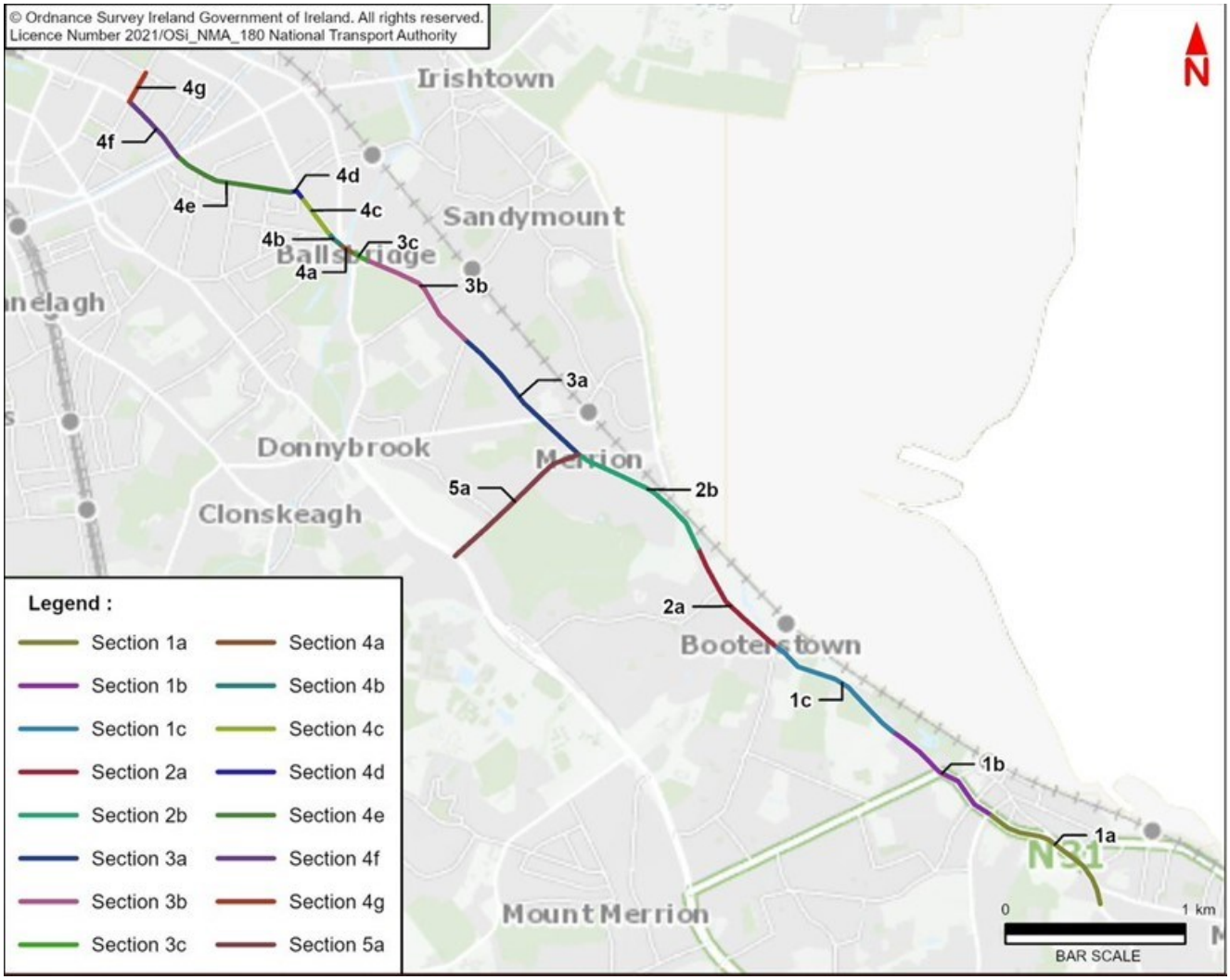


Diagram 6.5: Proposed Subsections of Construction Phase

6.4.5.2 Construction Programme

An outline, indicative programme for the Proposed Scheme is provided in Chapter 5 (Construction) of this report. 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.

6.4.5.3 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 6.6). 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 6.6):

- M50 Motorway;
- N11; and
- N31.

The following regional roads will be utilised as construction vehicle routes during the construction period (as shown in Diagram 6.6):

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

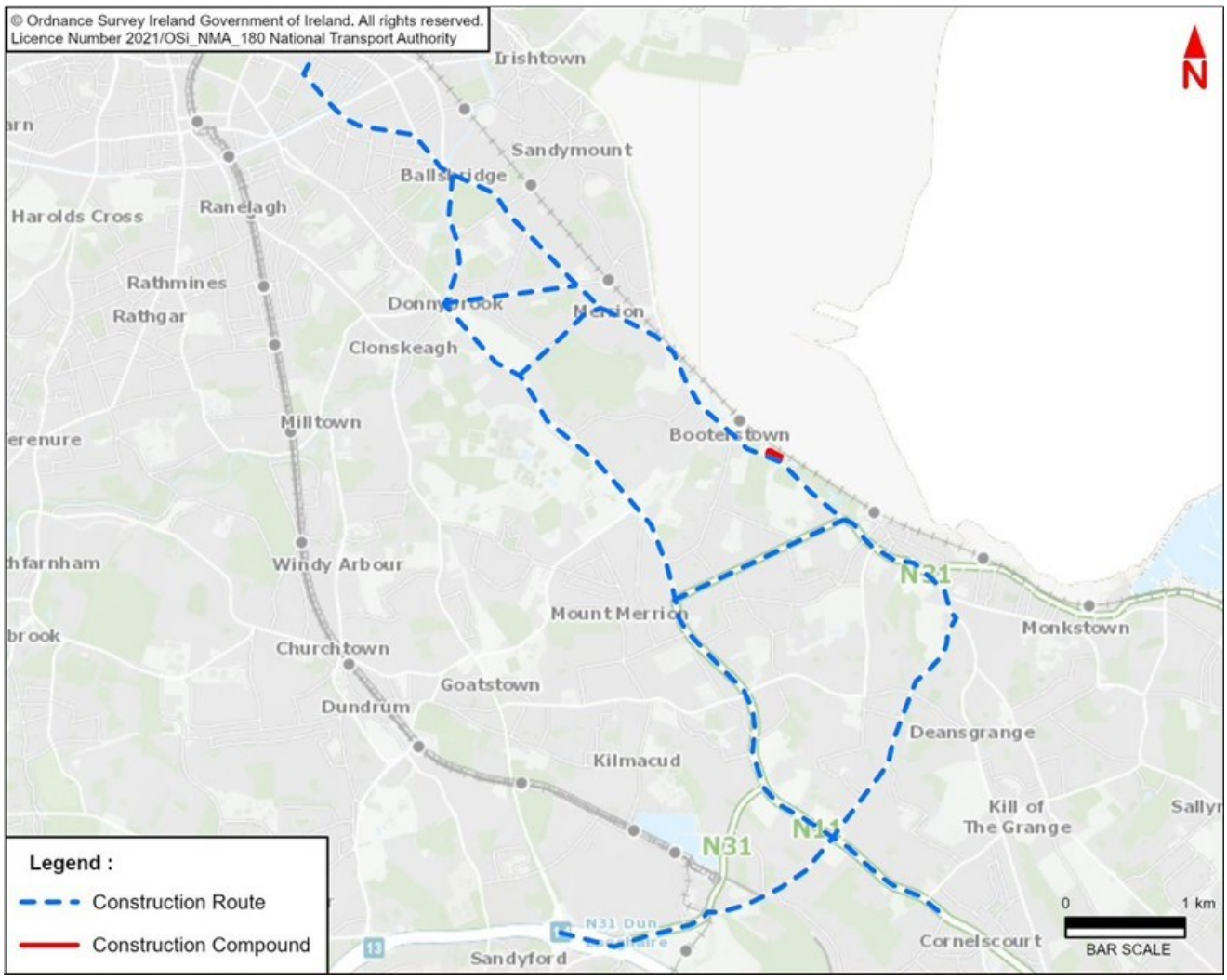


Diagram 6.6: Proposed Construction Routes and Main Compound Location

6.4.5.4 Potential Construction Impact

6.4.5.4.1 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) and the CEMP (Appendix A5.1 of Volume 4 of this 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 to public roads, all works will be undertaken in accordance with Department of Transport's 'Traffic Signs Manual, Chapter 8 Temporary Traffic Measures and Signs for Roadworks' and associated guidance. Chapter 5 (Construction) 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.

6.4.5.4.2 Pedestrian Provisions

As described in Chapter 5 (Construction), 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. The impact is considered to have **a Negative, Slight and Temporary effect** to pedestrians.

6.4.5.4.3 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. The impact is considered to have **a Negative, Slight and Temporary effect** to cyclists.

6.4.5.4.4 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 this 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. The impact is considered to have **a Negative, Slight and Temporary effect** to public transport users.

6.4.5.4.5 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. The impact is considered to have **a Negative, Slight and Temporary effect** to parking and loading.

6.4.5.4.6 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). 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.

6.4.5.4.6.1 General Traffic Redistribution

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

The appointed contractor will develop a CTMP that gives due consideration to provision of local access requirements and designates appropriate diversion routes in the case where localised temporary closures are required. Overall, for these reasons, the impact on general traffic redistribution is anticipated to be **Negative, Moderate and temporary** due to the temporary nature of any restrictions.

For the purpose of Air Quality (Chapter 7), Climate (Chapter 8) and Noise & Vibration (Chapter 9) 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.

6.4.5.4.6.2 Construction Traffic Generation

Site Operatives: As described in Chapter 5 (Construction) of this EIAR, 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 of 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 6.16 outlines the anticipated maximum construction traffic generation by site operatives and HGVs during the AM and PM Peak Hours.

Table 6.16: 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 **Negative, Slight and Temporary effect**. 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.

6.4.5.5 Construction Phase Summary

The contents of Table 6.17 resent a summary of the potential impacts of the Proposed Scheme during Construction Phase.

Table 6.17: Summary of Construction Phase Potential Impacts

Assessment Topic	Effect	Potential Impact
Walking	Restrictions to pedestrians along Proposed Scheme.	Negative, Slight and Temporary
Cycling	Restrictions to cyclists along Proposed Scheme	Negative, Slight and Temporary
Bus	Restrictions to public transport along Proposed Scheme.	Negative, Slight and Temporary
Parking and Loading	Restrictions to parking / loading along Proposed Scheme.	Negative, Slight and Temporary
General Traffic	Restrictions to general traffic along Proposed Scheme	Negative, Moderate and Temporary
	Additional construction traffic flows upon surrounding road network	Negative, Slight and Temporary

6.4.6 Operational Phase

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.

6.4.6.1 Qualitative Assessment

6.4.6.1.1 Qualitative Assessment Methodology

The structure of the qualitative assessment is consistent with the Baseline Environment (Section 6.3) where the Proposed Scheme has been split into 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.

6.4.6.1.1.1 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 impact on pedestrians has been assessed using a set of criteria which has been derived from guidance listed in Section 6.9. The contents of Table 6.18 outline the assessment criteria for each junction.

Table 6.18: 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?

The LoS rating demonstrated in Table 6.19 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 6.19: 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 6.20 have been used to describe the impact, based on the changes in the Qualitative Pedestrian LoS rating.

Table 6.20: 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

To establish the Significance of Effect for the impacts of the Pedestrian Infrastructure, as a result of the Proposed Scheme, a sensitivity rating has been applied to each junction in accordance with the methodology set out in Section 6.2.4.

6.4.6.1.1.2 Cycling Infrastructure

The impacts to the quality of the cycling infrastructure as a result of the Proposed Scheme have been considered with reference to the changes in physical provision for cyclists provided during the Do Minimum and Do Something scenarios. The NTA's National Cycle Manual's Quality of Service (QoS) Evaluation criteria have been adapted for use in assessing the cycling qualitative impact along the Proposed Scheme. The refined cycling facilities criteria are as follows:

- **Segregation:** a measure of the separation between vehicular traffic and cycling facilities;
- **Number of adjacent cyclists / width:** the capacity for cycling two abreast and / or overtaking ('2+1' accommodates two abreast plus one overtaking); and
- **Junction Treatment:** a measure of the treatment of cyclist traffic at existing junctions.

The contents of Table 6.21 outline the assessment criteria with reference to the corresponding LoS ratings.

Table 6.21: 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 6.22 have been used to describe the impact, based on the changes in the Qualitative Cycling LoS rating.

Table 6.22: Description of Impact for Cycling Qualitative Assessment

Magnitude of Impact	Change in LoS Rating
High	3 to 4
Medium	2
Low	1
Negligible	0

To establish the Significance of Effect for the impacts of the cycling infrastructure, as a result of the Proposed Scheme, a sensitivity rating has been applied to each assessed section in accordance with the methodology set out in Section 6.2.

6.4.6.1.1.3 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 6.23.

Table 6.23: Magnitude of Impact for Bus Users Qualitative Assessment

Impact	Description of Impact / Proposed Changes
High positive	Significant benefit for bus users with no disbenefits
Medium positive	Positive impact for bus stop users with benefits outweighing any minor disbenefits.
Low positive	Slight benefit for users with benefits outweighing any disbenefits.
Negligible impact	Marginal impact to user buses where any benefits or disbenefits are offset.
Low negative	Slight negative impact for users with disbenefits marginally outweighing benefits.
Medium negative	Negative impact for bus users with benefits not outweighing any disbenefits.
High negative	Complete removal of provision.

To establish the Significance of Effect for the impacts of the bus infrastructure, as a result of the Proposed Scheme, a sensitivity rating has been applied to each assessed section in accordance with the methodology set out in Section 6.2.

6.4.6.1.1.4 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.

6.4.6.1.2 Section 1 – Stradbrook Road to Booterstown Avenue

6.4.6.1.2.1 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 infrastructure for Section 1 of the Proposed Scheme are summarised in Table 6.24. A detailed breakdown of the assessment at each junction can be found in Appendix A6.4.1 (Pedestrian Infrastructure Assessment) of Volume 4 of this EIAR.

Table 6.24: Section 1 – Significance of Effects for Pedestrian Impact during Operational Phase

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

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 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 6.18.

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 a 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 **Positive, Significant and Long-term** effects 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.

6.4.6.1.2.2 Cycling Infrastructure

The following section sets out the qualitative impacts on the cycling receptor for Section 1 of the Proposed Scheme. The results are summarised in Table 6.25, along with the accompanying sensitivity for each section and the resultant significance of impact.

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 6.25 provide a summary of the cycling qualitative assessment along Section 1 of the Proposed Scheme. A detailed breakdown of the assessment along each link can be found in Appendix A6.4.2 (Cycling Infrastructure Assessment) of Volume 4 of this EIAR.

Table 6.25: Section 1 – Cycling Impact during Operational Phase

Location	Chainage	Do Minimum LoS	Do Something LoS	Impact	Sensitivity of Environment	Significance of Effect
R827 Stradbrook Road to George's Avenue	A000 - A1650	B	A	Low	High	Positive Moderate
George's Avenue to Emmet Square	A1650 - A2400	B	A	Low	High	Positive Moderate
Emmet Square to L1003 Booterstown Avenue	A1650 - A2400	B	A	Low	High	Positive Moderate
Section Summary		**B**	**A**	**Low**	**High**	**Positive Moderate**

The contents of Table 6.25 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 during the Do Minimum scenario from has been given a B rating overall. These ratings have been determined using the previously referenced assessment criteria set out in Table 6.21.

During the Do Something scenario, the LoS rating increases to an A throughout Section 1. 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.

It is therefore anticipated that there will be **Positive, Moderate and Long-term** effects 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'.

6.4.6.1.2.3 Bus Infrastructure

There is currently a total of 13 bus stops along Section 1, six inbound and seven outbound. Under the proposals, there will be a total of 15 stops on this section – eight inbound (including two indented bays, one of which is primarily intended as private coach lay-by) and seven outbound. 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.

The contents of Table 6.26 outline a summary of the changes 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 6.26: Section 1 – Overview of Amendments to Bus Stop Locations

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.
Total Stops	**13**		**15**		Two additional bus stops than Do Minimum.

The contents of Table 6.26 indicate that there are moderate improvements to the bus stop facilities along Section 1 of the Proposed Scheme. 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.

Taking into account the provision of bus lanes, pedestrian accessibility and bus stop facilities outlined within this section, the contents of Table 6.27 outline the bus qualitative assessment along Section 1 of the Proposed Scheme.

Table 6.27: Section 1 – Bus Qualitative Impact during Operational Phase

Section	Chainage	Description of Impact	Impact	Sensitivity of Environment	Significance of Effect
R827 Stradbrook Road to L1003 Booterstown Avenue	A000 - A2450	• Two additional bus stops to serve local community. • Bus stops are located in more convenient locations for communities and access to signalised crossings. • Moderate improvements to bus stop facilities.	Medium	High	Positive Very Significant

As indicated in Table 6.27, 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. The impact for this section of the Proposed Scheme is medium. The sensitivity of environment rating is predominately categorised as high due to the high traffic levels and number surrounding community facilities within Blackrock local centre. This is predicted to result in a **Positive, Very Significant Long-term** effect on this section.

6.4.6.1.2.4 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. It is therefore considered that the impact of this loss of parking will have a **Negative, Slight and Long-term effect**;
- 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 considered that the impact of this loss of parking will have a **Negative, Slight and Long-term effect**.
- 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 **Negative, Slight and Long-term effect.**

The contents of Table 6.28 present a summary of the proposed changes to parking along Section 1 of the Proposed Scheme.

Table 6.28: 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

Location	Parking Type	Number of Parking Spaces		
		Do Minimum	Do Something	Change
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 6.28, 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 **Negative, Slight and Long-term** effect.

6.4.6.1.3 Section 2 – Booterstown Avenue to Nutley Lane

6.4.6.1.3.1 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 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.

The assessment of the qualitative impacts on the pedestrian infrastructure for Section 2 of the Proposed Scheme is summarised in Table 6.29. A detailed breakdown of the assessment at each junction can be found in Appendix A6.4.1 (Pedestrian Infrastructure Assessment) of Volume 4 of this EIAR.

Table 6.29: Section 2 – Significance of Effects for Pedestrian Impact during Operational Phase

Location	Chainage	Do Minimum LoS	Do Something LoS	Impact	Sensitivity	Significance of Effect
R118 Rock Road / Grotto Avenue priority junction	A2475	D	B	Medium	Low	Positive Moderate
R118 Merrion Road / R118 Rock Road / Trimleston Avenue signalised junction	A2850	C	A	Medium	Low	Positive Moderate
R118 Merrion Road / Bellvue Avenue priority junction	A2925	D	B	Medium	Low	Positive Moderate
R118 Merrion Road / Elmpark Green signalised junction	A3100	D	A	Medium	Medium	Positive Significant
R118 Merrion Road / St Mary's Nursing Home Access priority junction	A3300	C	B	Low	High	Positive Moderate

Location	Chainage	Do Minimum LoS	Do Something LoS	Impact	Sensitivity	Significance of Effect
R118 Merrion Road / R131 Strand Road signalised junction	A3425	C	B	Low	High	Positive Moderate
R118 Merrion Road / Estate Avenue priority junction	A3625	D	B	Medium	Low	Positive Moderate
R118 Merrion Road / Herbert Avenue priority junction	A3675	C	B	Low	Medium	Positive Moderate
R118 Merrion Road / Merrion Avenue / St Vincent's Hospital signalised junction	A3775	E	A	High	High	Positive Profound
R118 Merrion Road / Nutley Lane Signalised Junction	A3975	E	A	High	High	Positive Profound
Section Summary		**D**	**B**	**Medium**	**Medium**	**Positive Significant**

The contents of Table 6.29 demonstrate that the 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 in 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 6.18.

In 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.

It is noted that the Proposed Scheme will have **Positive, Profound and Long-term effects** at the R118 Merrion Road / Merrion Avenue / St Vincent's Hospital and R118 Merrion Road / Nutley Lane signalised junctions.

Overall, it is anticipated that there will be **Positive, Significant and Long-term** effects to the quality of the pedestrian infrastructure along Section 2 of the Proposed Scheme during the operational phase, which aligns with the overarching aim to provide enhanced walking infrastructure on the corridor.

6.4.6.1.3.2 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).

The contents of Table 6.30 provide a summary of the cycling qualitative assessment along Section 2 of the Proposed Scheme. A detailed breakdown of the assessment along each link can be found in Appendix A6.4.2 (Cycling Infrastructure Assessment) of Volume 4 of this EIAR.

Table 6.30 Section 2 – Cycling Impact during Operational Phase

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

The contents of Table 6.30 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 6.21

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.

It is therefore anticipated that there will be **Positive, Significant and Long-term effects** to the quality of the cycling infrastructure along Section 2 of the Proposed Scheme, during the operational phase. A detailed breakdown of the assessment along each section can be found in Appendix A6.4.2 (Cycling Infrastructure Assessment) of Volume 4 of this EIAR.

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'.

6.4.6.1.3.3 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.

The contents of Table 6.31 outline 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 6.31: Section 2 – Overview of Amendments to Bus Stop Locations

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.

The contents of Table 6.31 indicate 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 11 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, Table 6.32 outlines the bus qualitative assessment along Section 2 of the Proposed Scheme.

Table 6.32: Section 2 – Bus Qualitative Impact during Operational Phase

Section	Chainage	Description of Impact	Impact	Sensitivity of Environment	Significance of Effect
L1003 Booterstown Avenue to Nutley Lane	A2450 - A3950	• Number of stops rationalised from 11 to nine, to optimise spacing and journey times. • Bus stops are located in more convenient locations for communities and access to signalised crossings. • Slight improvements to bus stop facilities.	Low	Medium	Positive Moderate

As indicated Table 6.32, the Proposed Scheme improves the quality of existing bus infrastructure along Section 2 of the Proposed Scheme, which will provide long term benefits for bus users. The impact for this section of the Proposed Scheme is low. The sensitivity of environment rating is predominately categorised as medium due to the traffic levels and number of nearby community facilities in proximity to the Merrion Shopping Centre and within the surrounding Merrion Road retail area. This will result in a **Positive, Moderate and Long-term** effect.

6.4.6.1.3.4 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 **Negative, Slight and Long-term** effect.
- 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 **Negative, Slight and Long-term effect**; 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 **Negligible and Long-term effect.**

The contents of Table 6.33 present a summary of the proposed changes to parking along Section 2 of the Proposed Scheme between the Do Minimum and Do Something scenarios.

Table 6.33: 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 6.33, 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 **Negative, Slight and Long-term effect**.

6.4.6.1.4 Section 3 – Nutley Lane to Ballsbridge –Merrion Road

6.4.6.1.4.1 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 infrastructure for Section 3 of the Proposed Scheme is summarised in Table 6.34. A detailed breakdown of the assessment at each junction can be found in Appendix A6.4.1 (Pedestrian Infrastructure Assessment) of Volume 4 of this EIAR.

Table 6.34 Section 3 – Significance of Effects for Pedestrian Impact during Operational Phase

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

The contents Table 6.34 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 6.18.

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.

It is noted that the Proposed Scheme will have **Positive, Profound and Long-term effects** at the R118 Merrion Road / Ballsbridge Park and R118 Merrion Road / R815 Anglesea Road signalised junctions.

Overall, it is anticipated that there will be **Positive, Significant and Long-term effects** to the quality of the pedestrian infrastructure along Section 3 of the Proposed Scheme during the operational phase, which aligns with the overarching aim to provide enhanced walking infrastructure on the corridor.

6.4.6.1.4.2 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).

The contents of Table 6.35 provide a summary of the cycling qualitative assessment along Section 3 of the Proposed Scheme. A detailed breakdown of the assessment along each link can be found in Appendix A6.4.2 (Cycling Infrastructure Assessment) of Volume 4 of this EIAR.

Table 6.35 Section 3 – Cycling Impact during Operational Phase

Location	Chainage	Do Minimum LoS	Do Something LoS	Impact	Sensitivity of Environment	Significance of Effect
Nutley Lane to Ailesbury Road	A3950 - A4300	B	A	Low	Medium	Positive Moderate
Ailesbury Road to Shewsbury Road	A4300 - A4850	C	B	Low	Low	Positive Slight
Shewsbury Road to Simmonscourt Road	A4850 - A5200	C	A	Medium	Low	Positive Moderate
Simmonscourt Road to Ballsbridge	A5200 - A5750	B	A	Low	High	Positive Moderate
Section Summary		**B**	**A**	**Low**	**Medium**	**Positive Moderate**

The contents of Table 6.35 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. These ratings have been determined using the previously referenced assessment criteria set out in Table 6.21.

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 lanes, greater segregation from vehicles and protected treatment at signalised junctions and.

It is therefore anticipated that there will be **Positive, Moderate and Long-term** effects 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'.

6.4.6.1.4.3 Bus Infrastructure

There is currently a total of 12 bus stops along Section 3, 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.

The contents of Table 6.36 outline 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 6.36: 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.

Table 6.36 indicates that there are 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.

Taking into account the provision of bus lanes, pedestrian accessibility and bus stop facilities outlined within this section, Table 6.37 outlines the bus qualitative assessment along Section 3 of the Proposed Scheme.

Table 6.37: Section 3 – Bus Qualitative Impact during Operational Phase

Section	Chainage	Description of Impact	Impact	Sensitivity of Environment	Significance of Effect
Nutley Lane to Ballsbridge – R118 Merrion Road	A3950 - A5750	• Number of stops rationalised from 12 to 10 to optimise spacing and journey times. • Bus stops are located in more convenient locations for communities and access to signalised crossings. • Slight improvements to bus stop facilities.	Low	Medium	Positive Moderate

As indicated in Table 6.37, the Proposed Scheme improves the quality of existing bus infrastructure along Section 3 of the Proposed Scheme, which will provide long term benefits for bus users. The impact for this section of the Proposed Scheme is low. The sensitivity of environment rating is categorised as medium due to the predominantly residential environment and the presence of community facilities in Merrion and Ballsbridge local centres. The impact of the Proposed Scheme changes is expected to result in a **Positive, Moderate and Long-term effect**.

6.4.6.1.4.4 Parking and Loading

The parking and loading changes along Section 3 of the Proposed Scheme 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 in parking is considered to have a **Negligible and Long-term effect.**
- 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 this change in loading spaces is considered to have a **Negligible and Long-term effect**.

Table 6.38 presents a summary of the proposed changes to parking and loading along proposed changes to parking along Section 3 of the Proposed Scheme between the Do Minimum and Do Something scenarios.

Table 6.38: 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 6.38, 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). The impact of this change in parking and loading is considered to have a **Negligible and Long-term effect**.

6.4.6.1.5 Section 4 – Ballsbridge to Merrion Square

6.4.6.1.5.1 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
- A dedicated mid-block toucan crossing of the R816 Baggot Street Lower approximately 85m north of Herbert Street.

The assessment of the qualitative impacts on the pedestrian infrastructure for Section 4 of the Proposed Scheme are summarised in Table 6.39. A detailed breakdown of the assessment at each junction can be found in Appendix A6.4.1 (Pedestrian Infrastructure Assessment) of Volume 4 of this EIAR.

Table 6.39: Section 4 – Significance of Effects for Pedestrian Impact during Operational Phase

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact	Sensitivity	Significance of Effect
R118 Merrion Road / Beatty's Avenue Priority Junction	A5725	D	B	Medium	Low	Positive Moderate
R118 Pembroke Road / Ballsbridge Terrace priority junction	A5775	C	B	Low	Low	Positive Slight
R118 Pembroke Road / Clyde Lane priority junction	A5800	D	B	Medium	Low	Positive Moderate
R118 Pembroke Road / R815 Shelbourne Road / Herbert Park signalised junction	A5825	C	B	Low	High	Positive Moderate
R118 Pembroke Road / Elgin Road signalised to priority junction	A5850	B	A	Low	Low	Positive Slight
R118 Pembroke Road / Pembroke Lane priority junction	A6125	C	A	Medium	Low	Positive Moderate
R118 Pembroke Road / R118 Lansdowne Road / R816 Pembroke Road signalised junction	A6175	C	A	Medium	Medium	Positive Significant
R816 Pembroke Road / Raglan Road priority junction	A6325	D	B	Medium	Low	Positive Moderate
R816 Pembroke Road / Wellington Road priority junction	A6525	D	B	Medium	Low	Positive Moderate
R816 Baggot Street Upper / Eastmoreland Place / R816 Pembroke Road priority junction	A6675	C	B	Low	Low	Positive Slight
R816 Baggot Street Upper / Waterloo Road signalised junction	A6725	D	A	Medium	Medium	Positive Significant
R816 Macartney Bridge / R111 Haddington Road / R816 Baggot Street Upper / Mespil Road signalised junction	A6875	E	A	High	Medium	Positive Very Significant
R816 Baggot Street Lower / Herbert Place / R816 Macartney Bridge / Wilton Terrace signalised junction	A6925	D	A	Medium	Low	Positive Moderate

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact	Sensitivity	Significance of Effect
R816 Baggot Street Lower / Herbert Street / Pembroke Row priority junction	A7025	D	B	Medium	Low	Positive Moderate
R816 Baggot Street Lower / James Street East / Lad Lane priority junction	A7200	D	B	Medium	Low	Positive Moderate
R816 Baggot Street Lower / Fitzwilliam Street Lower / Fitzwilliam Street Upper signalised junction	A7275	C	A	Medium	Medium	Positive Significant
Fitzwilliam Street Lower / Fitzwilliam Lane priority junction	A7275	C	B	Low	Medium	Positive Moderate
Fitzwilliam Street Lower / Clifton Mews priority junction	A7300	C	B	Low	Medium	Positive Moderate
Section Summary		**D**	**B**	**Medium**	**Low**	**Positive Moderate**

The contents of Table 6.39 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 6.18.

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 **Positive, Moderate and Long-term** effects to the quality of the pedestrian infrastructure along Section 4 of the Proposed Scheme during the operational phase, which aligns with the overarching aim to provide enhanced walking infrastructure on the corridor.

6.4.6.1.5.2 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).

The contents of Table 6.40 provide a summary of the cycling qualitative assessment along Section 4 of the Proposed Scheme. A detailed breakdown of the assessment along each link can be found in Appendix A6.4.2 (Cycling Infrastructure Assessment) of Volume 4 of this EIAR.

Table 6.40: Section 4 – Cycling Impact during Operational Phase

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

The contents of Table 6.40 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. These ratings have been determined using the previously referenced assessment criteria set out in Table 6.21.

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 and.

It is therefore anticipated that there will be **Positive, Very Significant and Long-term** effects to the quality of the cycling infrastructure along Section 4 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'.

6.4.6.1.5.3 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.

The contents of Table 6.41 outline 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 6.41: Section 4 – Overview of Amendments to Bus Stop Locations

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.
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.

The contents of Table 6.41 indicates that there are moderate improvements to the bus stop facilities along Section 4 of the Proposed Scheme. The Proposed Scheme would see all the stops 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.

This slight rationalisation of inbound and outbound stops will continue to provide suitable coverage along the route, while slightly reducing the number of bus stops. This approach strikes a balance between bus stop coverage and service journey times.

Taking into account the provision of bus lanes, pedestrian accessibility and bus stop facilities outlined within this section, the contents of Table 6.42 outlines the bus qualitative assessment along Section 4 of the Proposed Scheme.

Table 6.42: Section 4 – Bus Qualitative Impact during Operational Phase

Section	Chainage	Description of Impact	Impact	Sensitivity of Environment	Significance of Effect
Ballsbridge to Merrion Square	A5750 - A7400	• Number of stops rationalised from 13 to 11 to optimise spacing and journey times. • Bus stops are located in more convenient locations for communities and access to signalised crossings. • Slight improvements to bus stop facilities.	Low	Medium	Positive Moderate

As indicated in Table 6.42, the Proposed Scheme improves the quality of existing bus infrastructure along Section 4 of the Proposed Scheme, and this will provide long term benefits for bus users. The impact for this section of the Proposed Scheme is low positive. The sensitivity of environment rating is predominately categorised as medium due to the urban residential location. This results in a **Positive, Moderate and Long-term effect.**

6.4.6.1.5.4 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 **Negligible and Long-term effect**;

- 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 **Negative, Slight and Long-term effect**;
- 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 **Negative, Slight and Long-term effect**;
- 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 an ample amount of equivalent parking spaces within close 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 **Negative, Slight and Long-term effect**;
- 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 **Negative, Slight and Long-term effect**; 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. The impact of this loss of parking is considered to have a **Negative, Moderate and Long-term effect**.

Table 6.43 presents a summary of the proposed changes to parking and loading along Section 4 of the Proposed Scheme.

Table 6.43: 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

Location	Parking Type	Number of Parking Spaces		
		Do Minimum	Do Something	Change
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 6.43, 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 spaces 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, the overall impact of this loss of parking is considered to have a **Negative, Slight and Long-term effect.**

6.4.6.1.6 Section 5 –Stillorgan Road to Merrion Road – Nutley Lane

6.4.6.1.6.1 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 infrastructure for Section 2 of the Proposed Scheme is summarised in

Table 6.44. A detailed breakdown of the assessment at each junction can be found in Appendix A6.4.1 (Pedestrian Infrastructure Assessment) of Volume 4 of this EIAR.

Table 6.44: Section 5 – Significance of Effects for Pedestrian Impact during Operational Phase

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

The contents of Table 6.44 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 6.18.

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 **Positive, Significant and Long-term effects** to the quality of the pedestrian infrastructure along Section 5 of the Proposed Scheme during the operational phase, which aligns with the overarching aim to provide enhanced walking infrastructure on the corridor.

6.4.6.1.6.2 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).

The contents of Table 6.45 provide a summary of the cycling qualitative assessment along Section 5 of the Proposed Scheme. A detailed breakdown of the assessment along each link can be found in Appendix A6.4.2 (Cycling Infrastructure Assessment) of Volume 4 of this EIAR.

Table 6.45: Section 5 – Cycling Impact during Operational Phase

Location	Chainage	Do Minimum LoS	Do Something LoS	Impact	Sensitivity of Environment	Significance of Effect
R138 Stillorgan Road to Nutley Avenue	B000 - B600	D	A	High	Medium	Positive Very Significant
Nutley Avenue to R118 Merrion Road	B600 - B800	D	A	High	Medium	Positive Very Significant
Section Summary		**D**	**A**	**High**	**Medium**	**Positive Very Significant**

The contents of Table 6.45 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. These ratings have been determined using the previously referenced assessment criteria set out in Table 6.21.

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 **Positive, Very Significant and Long-term effects** 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'.

6.4.6.1.6.3 Bus Infrastructure

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.

The contents of Table 6.46 outline 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 6.46: 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.

The contents of Table 6.46 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.

Taking into account the provision of bus lanes, pedestrian accessibility and bus stop facilities outlined within this section, Table 6.47 outlines the bus qualitative assessment along Section 5 of the Proposed Scheme.

Table 6.47: Section 5 – Bus Qualitative Impact during Operational Phase

Section	Chainage	Description of Impact	Impact	Sensitivity of Environment	Significance of Effect
R138 Stillorgan Road to R118 Merrion Road	B-0090 – B+0830	• Number of stops rationalised from 5 to 4 to optimise spacing and journey times. • Bus stops are located in more convenient locations for communities and access to signalised crossings. • Significant improvements to bus stop facilities throughout.	High	Medium	Positive Very Significant

As indicated in Table 6.47, the Proposed Scheme enhances the quality of existing bus infrastructure along Section 5 of the Proposed Scheme, and this will provide long term benefits for bus users. The impact for this section of the Proposed Scheme is high. The sensitivity of environment rating is predominately categorised as medium due to the presence of surrounding community facilities, including Merrion Shopping Centre and St Vincent's University Hospital. This results in a **Positive, Very Significant and Long-term effect**.

6.4.6.1.6.4 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 **Negative, Slight and long-term effect**.
- 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 **Negative, Slight and long-term effect**.

The contents of Table 6.48 present a summary of the proposed changes to parking along Section 5 of the Proposed Scheme between the Do Minimum and Do Something scenarios.

Table 6.48 Section 5 - Overall Parking / Loading Changes

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 6.48, 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 **Negative, Slight and Long-term** effect.

6.4.6.1.7 Summary of Corridor-Wide Infrastructure Works

6.4.6.1.7.1 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.

6.4.6.1.7.2 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.

6.4.6.1.7.3 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.

6.4.6.1.7.4 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.

6.4.6.2 Quantitative Analysis

This quantitative assessment has been prepared with reference to the modelling outputs obtained from the four-tiered modelling approach outlined in Section 6.2. The following assessment topics have been considered:

- People Movement:
  - Peak Hour People Movement along the Proposed Scheme;
  - People Movement by Bus; and
  - Bus Boarding.
- Bus Network Performance Indicators:
  - Bus Journey Times; and
  - Bus Journey Time Reliability.
- General Traffic Network Performance Indicators:
  - Junction Capacity Outputs on the Direct Study Area; and
  - Redistributed flows and Junction Capacity Outputs on the Indirect Study Area.

6.4.6.2.1 People Movement Assessment

6.4.6.2.1.1 Overview

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).

6.4.6.2.2 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.

6.4.6.2.2.1 2028 AM Peak Hour People Movement

Diagram 6.7 illustrates the People Movement by mode along the Proposed Scheme inbound towards the city centre during the AM Peak Hour in 2028.

Diagram 6.7: People Movement by Mode travelling along the Proposed Scheme during 2028 AM Peak Hour

As indicated in Diagram 6.7, 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 6.49 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 6.49: 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%
		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%**

6.4.6.2.2.2 2028 PM Peak Hour People Movement

Diagram 6.8 illustrates the People Movement by mode travelling along the Proposed Scheme outbound from the city centre during the PM Peak Hour.

Diagram 6.8: People Movement by Mode travelling along the Proposed Scheme during 2028 PM Peak Hour

As indicated in Diagram 6.8, 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 6.50 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 6.50: 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%**

6.4.6.2.2.3 2043 AM Peak Hour People Movement

Diagram 6.9 illustrates the People Movement by mode travelling along the Proposed Scheme inbound towards the city centre during the AM Peak Hour in 2043.

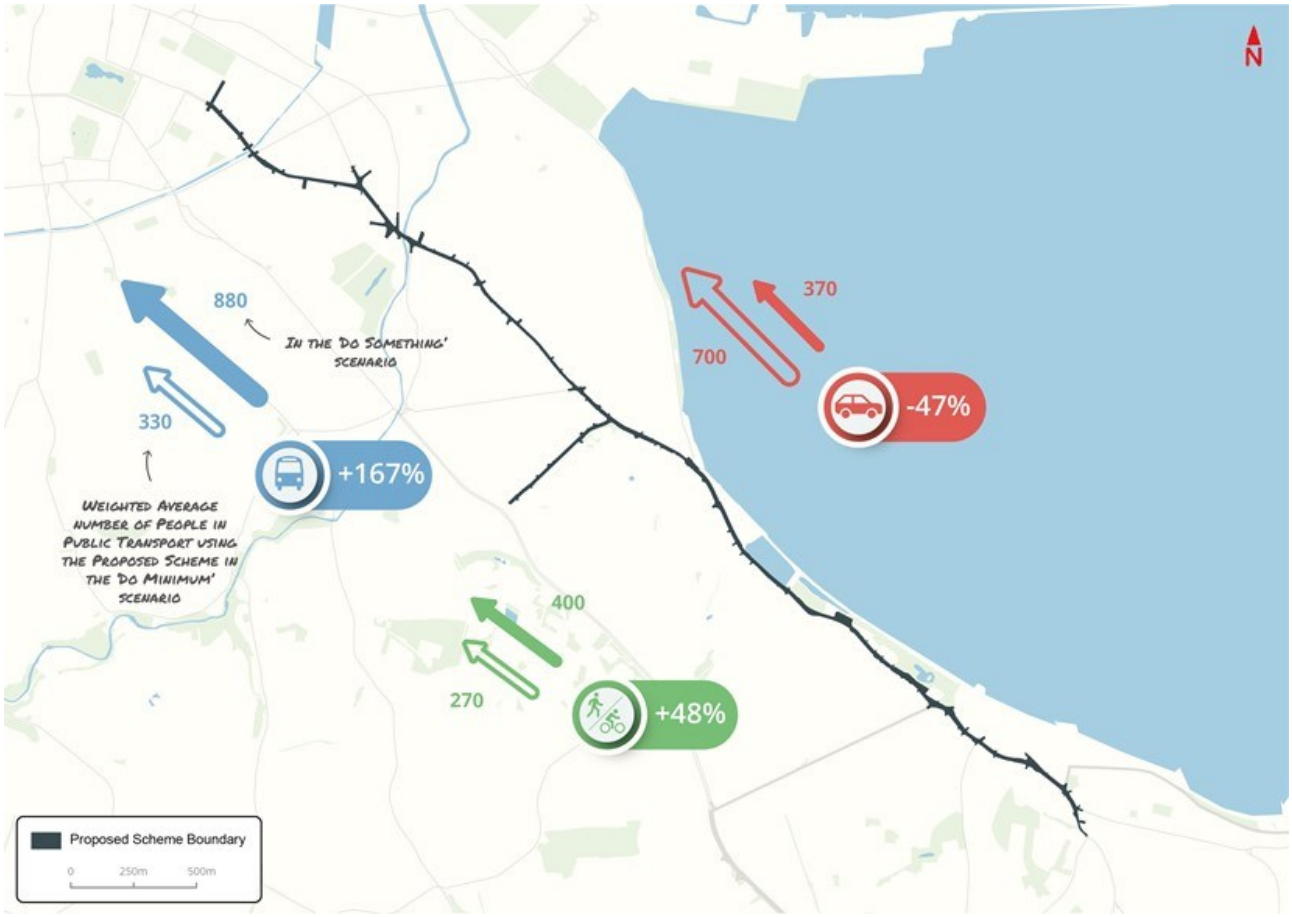


Diagram 6.9: People Movement by Mode travelling along the Proposed Scheme during 2043 AM Peak Hour

As indicated in Diagram 6.9 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 6.51 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 6.51: 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%**

6.4.6.2.2.4 2043 PM Peak Hour People Movement

Diagram 6.10 illustrates the People Movement by mode travelling along the Proposed Scheme outbound from the city centre during the PM Peak Hour in 2043.

Diagram 6.10: People Movement by Mode travelling along the Proposed Scheme during 2043 PM Peak Hour

As indicated in Diagram 6.10, 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 6.52 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 6.52: 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%**

6.4.6.2.3 People Movements 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.

6.4.6.2.3.1 2028 AM Peak Hour Bus Passengers

Diagram 6.11 presents the passenger loading profile comparing the Do Minimum and Do Something scenarios in the AM Peak Hour in the inbound direction in 2028.

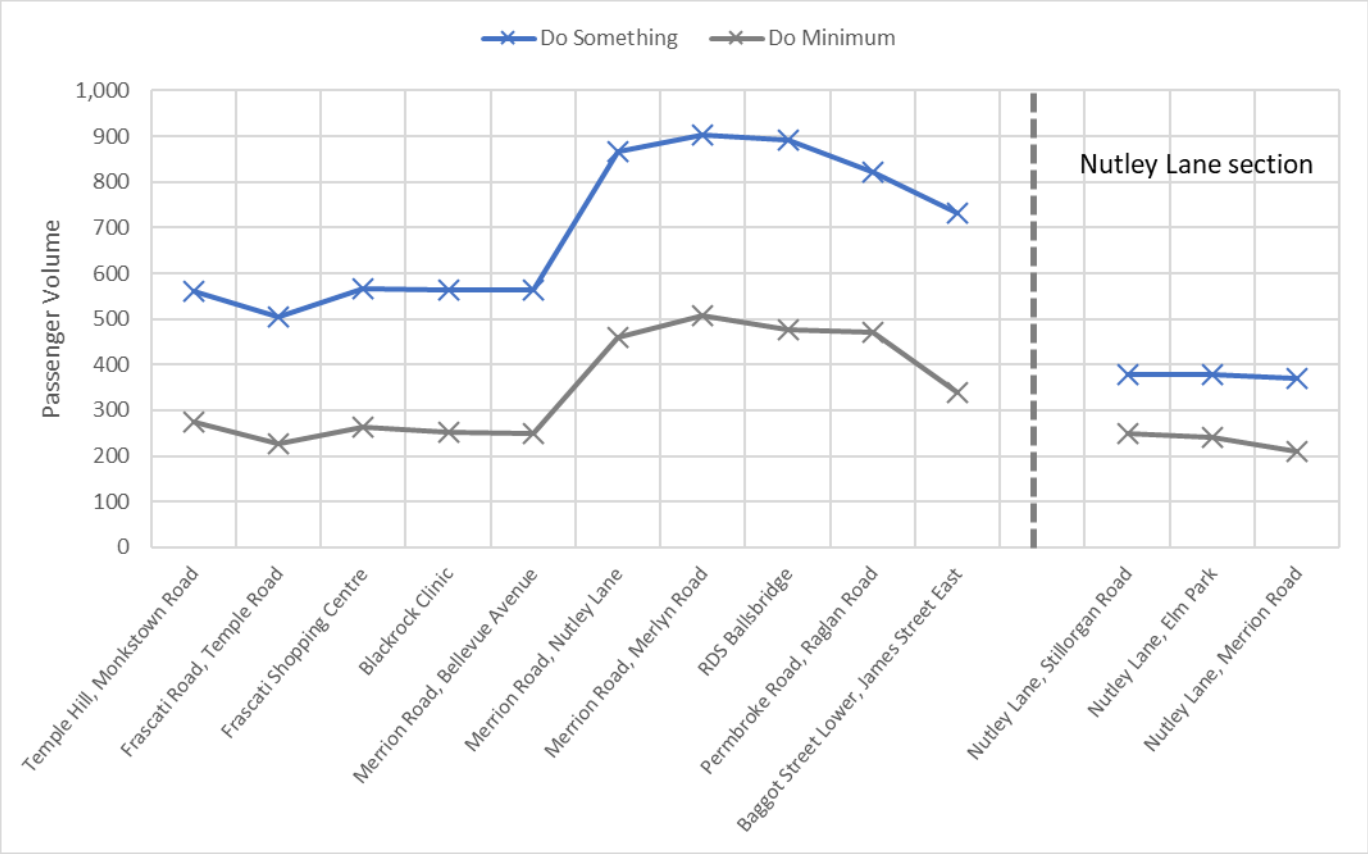


Diagram 6.11: 2028 AM Peak Hour Passenger Volume Along Proposed Scheme (inbound direction)

Diagram 6.11 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.

6.4.6.2.3.2 2043 AM Peak Hour Bus Passengers

Diagram 6.12 presents the passenger loading profile comparing the Do Minimum and Do Something scenarios in the AM Peak Hour in the inbound direction in 2043.

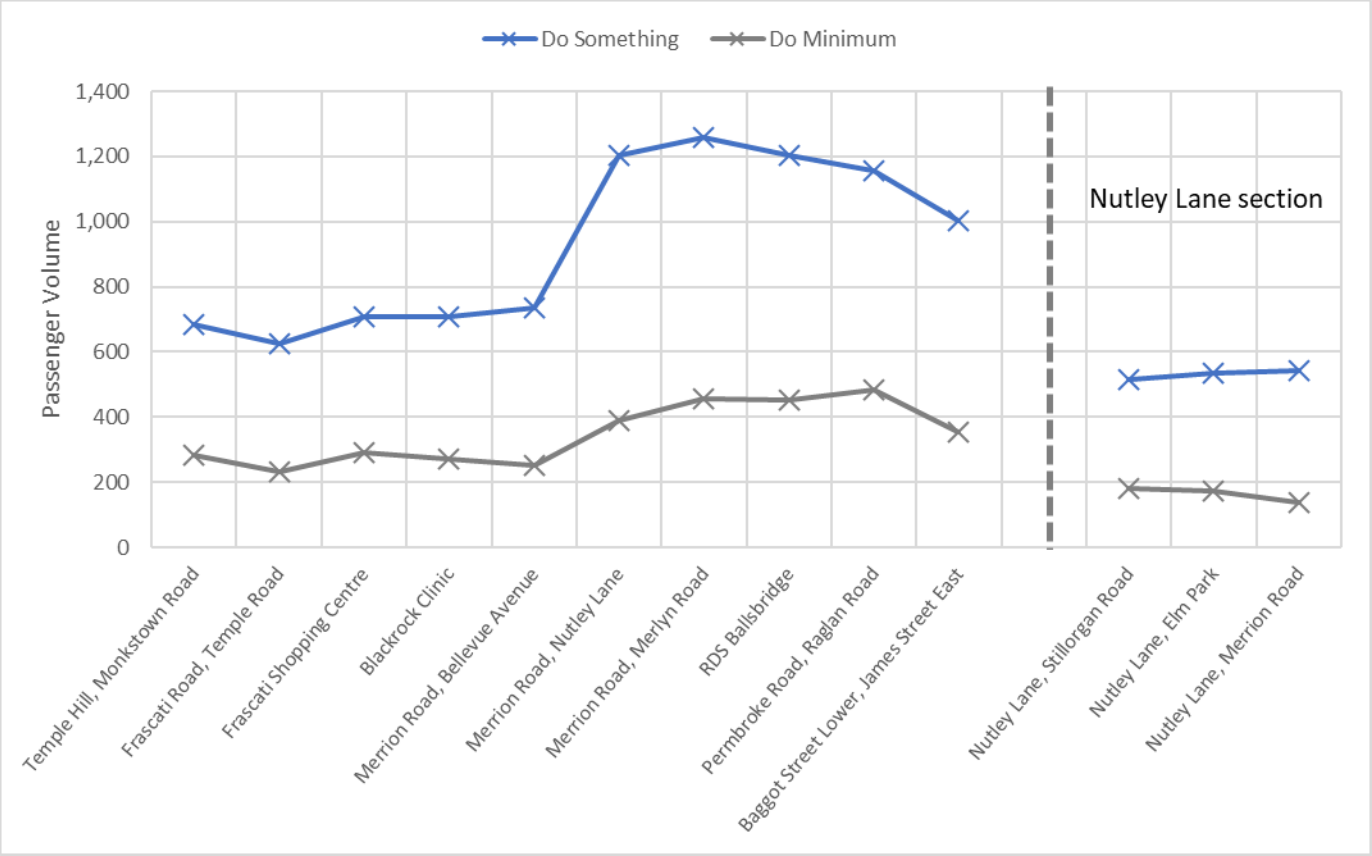


Diagram 6.12: 2043 AM Peak Hour Passenger Volume Along Proposed Scheme (inbound direction)

Diagram 6.12 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.

6.4.6.2.3.3 2028 PM Peak Hour Bus Passengers

Diagram 6.13 presents the passenger loading profile comparing the Do Minimum and Do Something scenarios in the PM Peak Hour in the outbound direction in 2028.

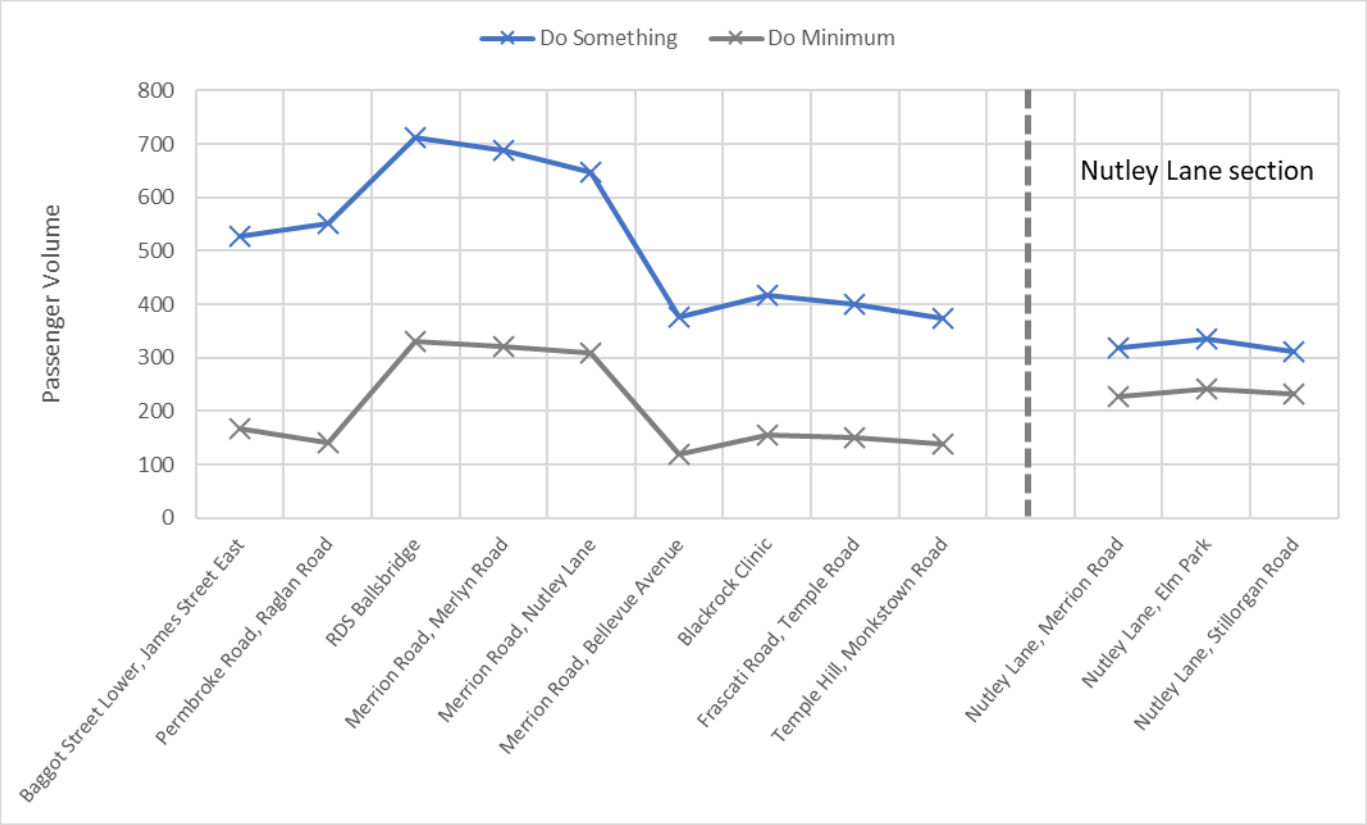


Diagram 6.13: 2028 PM Peak Hour Passenger Volume Along Proposed Scheme (outbound direction)

Diagram 6.13 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.

6.4.6.2.3.4 2043 PM Peak Hour Bus Passengers

Diagram 6.14 presents the passenger loading profile comparing the Do Minimum and Do Something scenarios in the PM Peak Hour in the outbound direction in 2043.

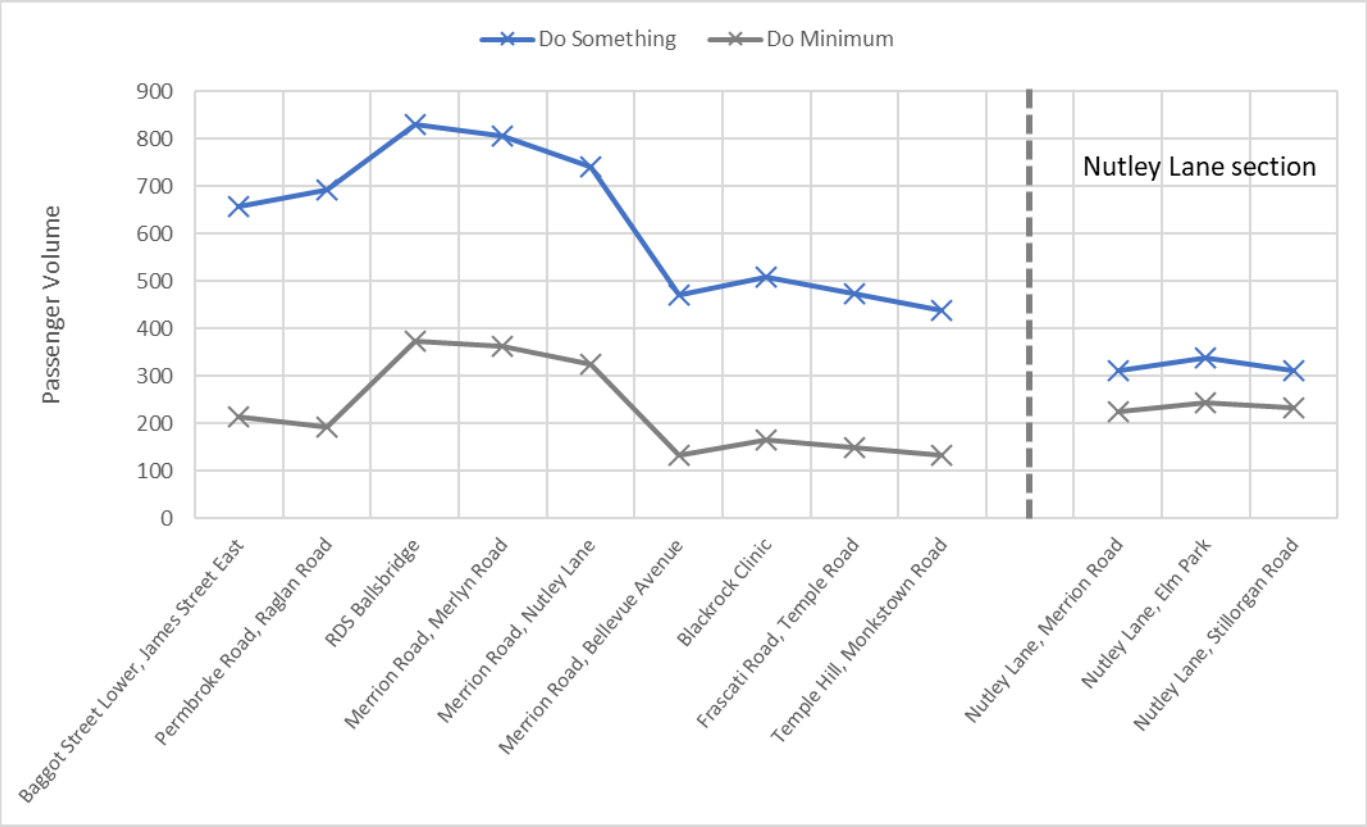


Diagram 6.14: 2043 PM Peak Hour Passenger Volume Along Proposed Scheme (outbound direction)

Diagram 6.14 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.

6.4.6.2.3.5 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 6.53.

Table 6.53: 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 6.53 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 6.54.

Table 6.54: 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 6.54 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 an 18% increase in people boarding bus routes that use the physical infrastructure implemented through the Proposed Scheme, representing an additional 1,880 passengers.

6.4.6.2.4 People Movement - Significance of Effect

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 **Positive, Very Significant and Long-term** effect 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'.

6.4.6.2.5 Operational Impacts for Bus Users

6.4.6.2.5.1 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.

6.4.6.2.5.2 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 6.4.3, 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. Information on the B1 service which traverses Section 5 - Nutley Lane

(as well as Sections 3 and 4) has also been included at the end of this section. A breakdown of the changes in average journey times for all other bus services using the Proposed Scheme can be found in Appendix A6.4.3 (Average Bus Journey Times) of Volume 4 of this EIAR.

Inbound Direction

Average journey times for the inbound B3 service in 2028 Opening Year and in 2043 Design Year can be seen in Table 6.55.

Table 6.55: 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 6.56 and Diagram 6.15 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 6.56: 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

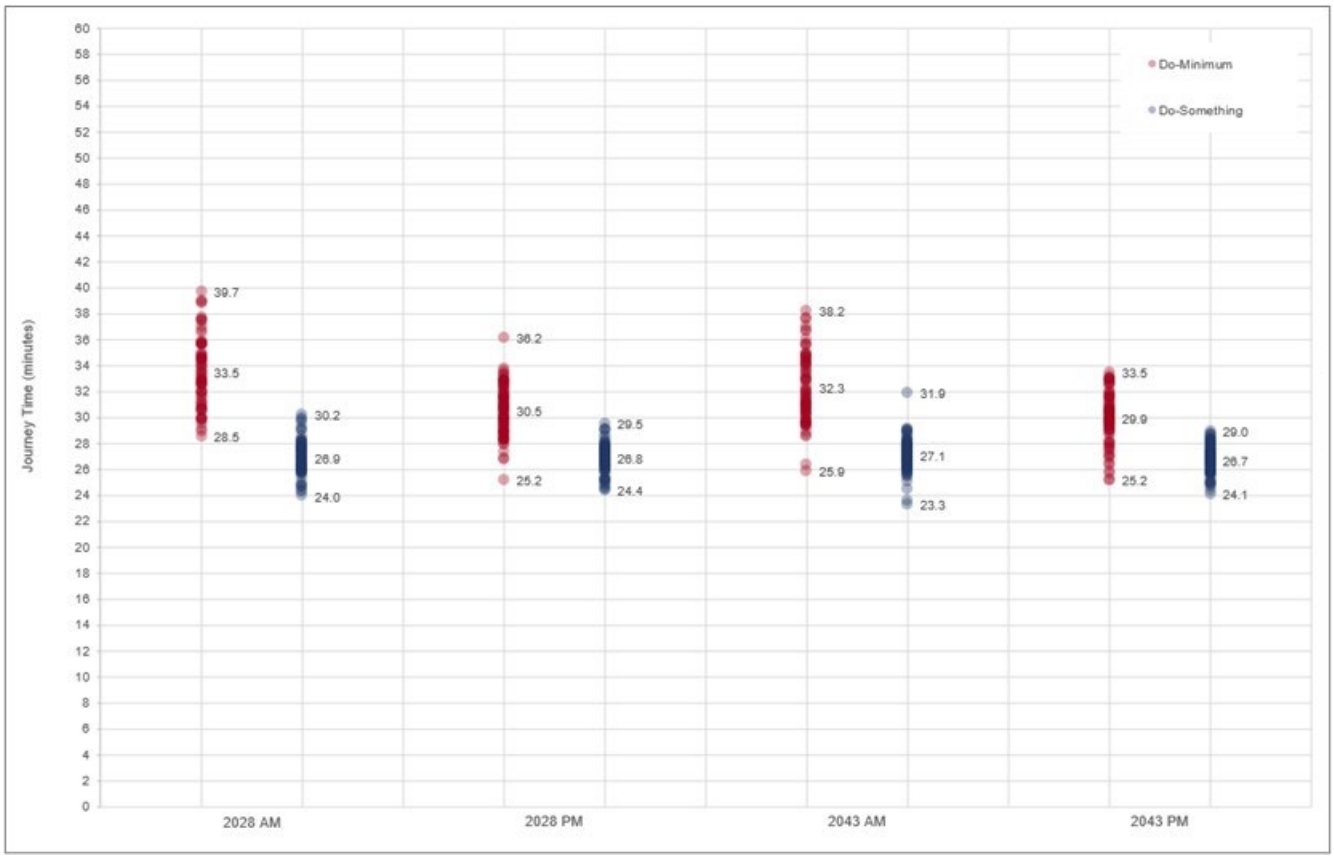


Diagram 6.15: B1 Bus Journey Times (Inbound Direction)

Based on the results presented in Table 6.55, 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 6.16 to Diagram 6.19.

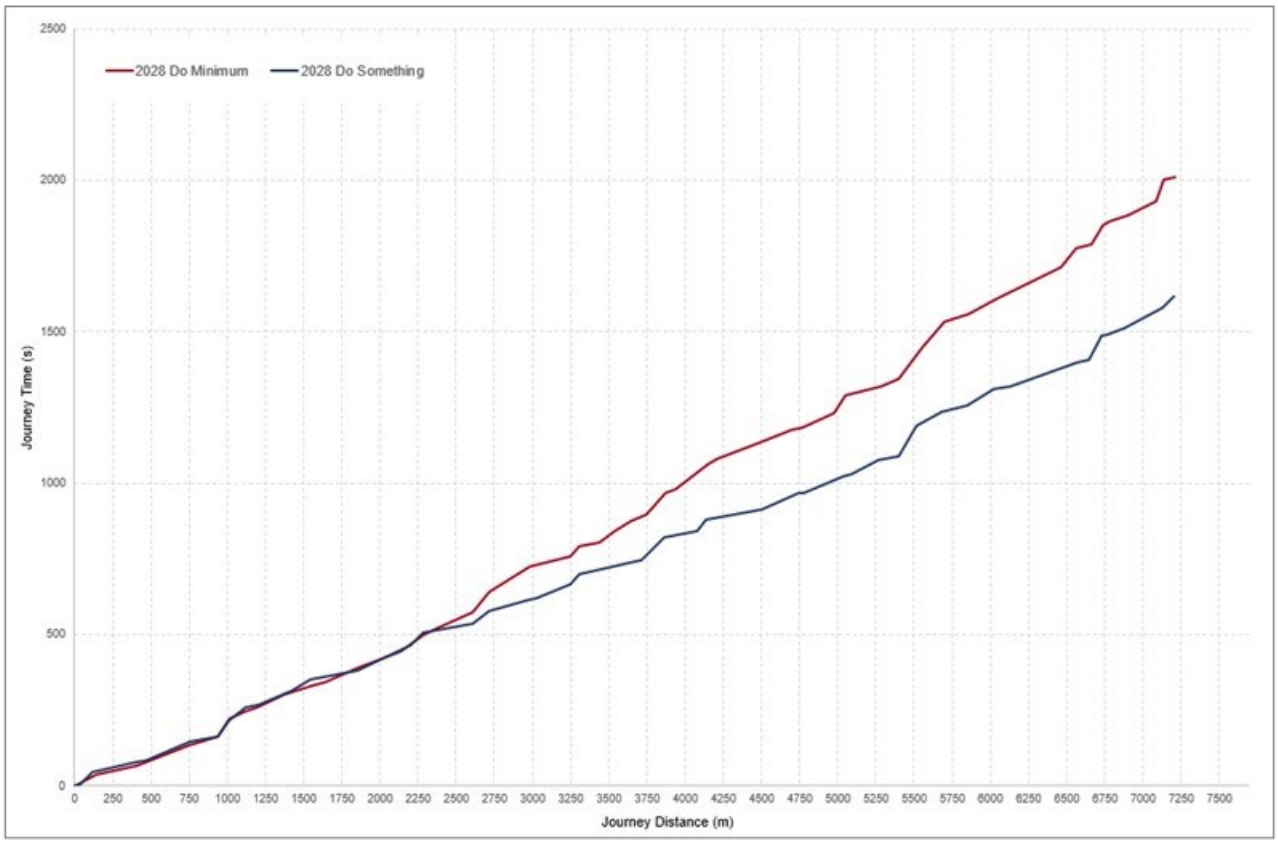


Diagram 6.16: B3 Bus Journey Time (2028 AM, Inbound)

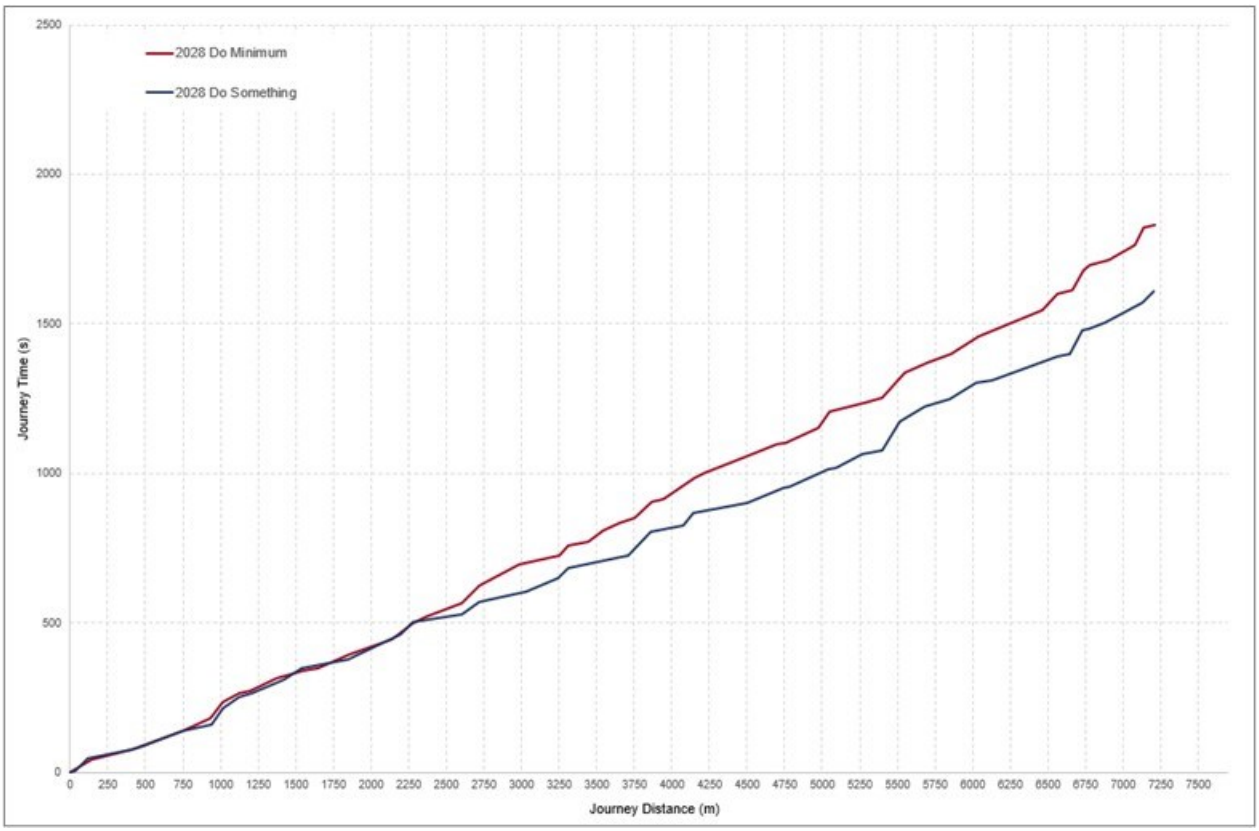


Diagram 6.17: B3 Bus Journey Time (2028 PM, Inbound)

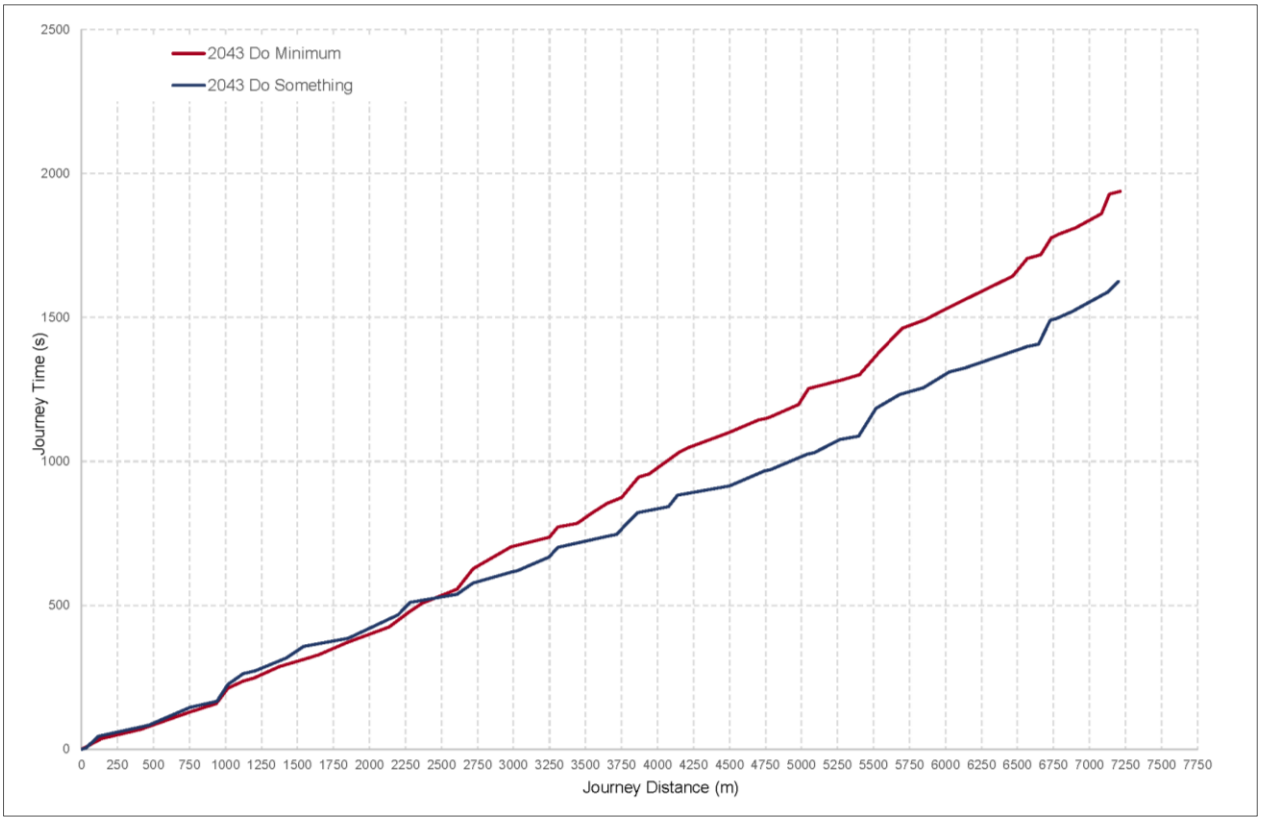


Diagram 6.18: B3 Bus Journey Time (2043 AM, Inbound)

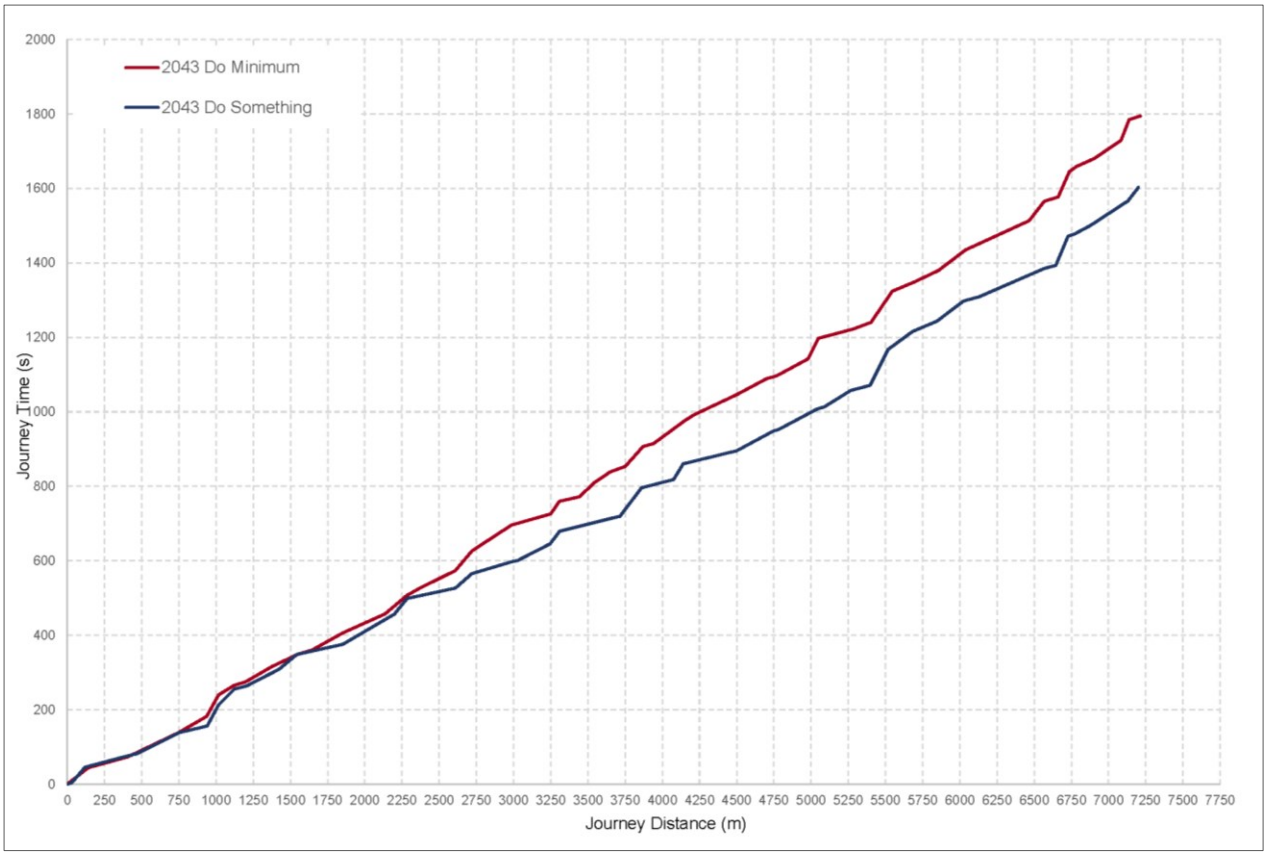


Diagram 6.19: B3 Bus Journey Time (2043 PM, Inbound)

Based on the results presented in Diagram 6.16 to Diagram 6.19, 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 6.57. A breakdown of the changes in average journey times for all other bus services using the Proposed Scheme can be found in Appendix A6.4.3 (Average Bus Journey Times) of Volume 4 of this EIAR.

Table 6.57: 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 6.58 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 6.58: 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

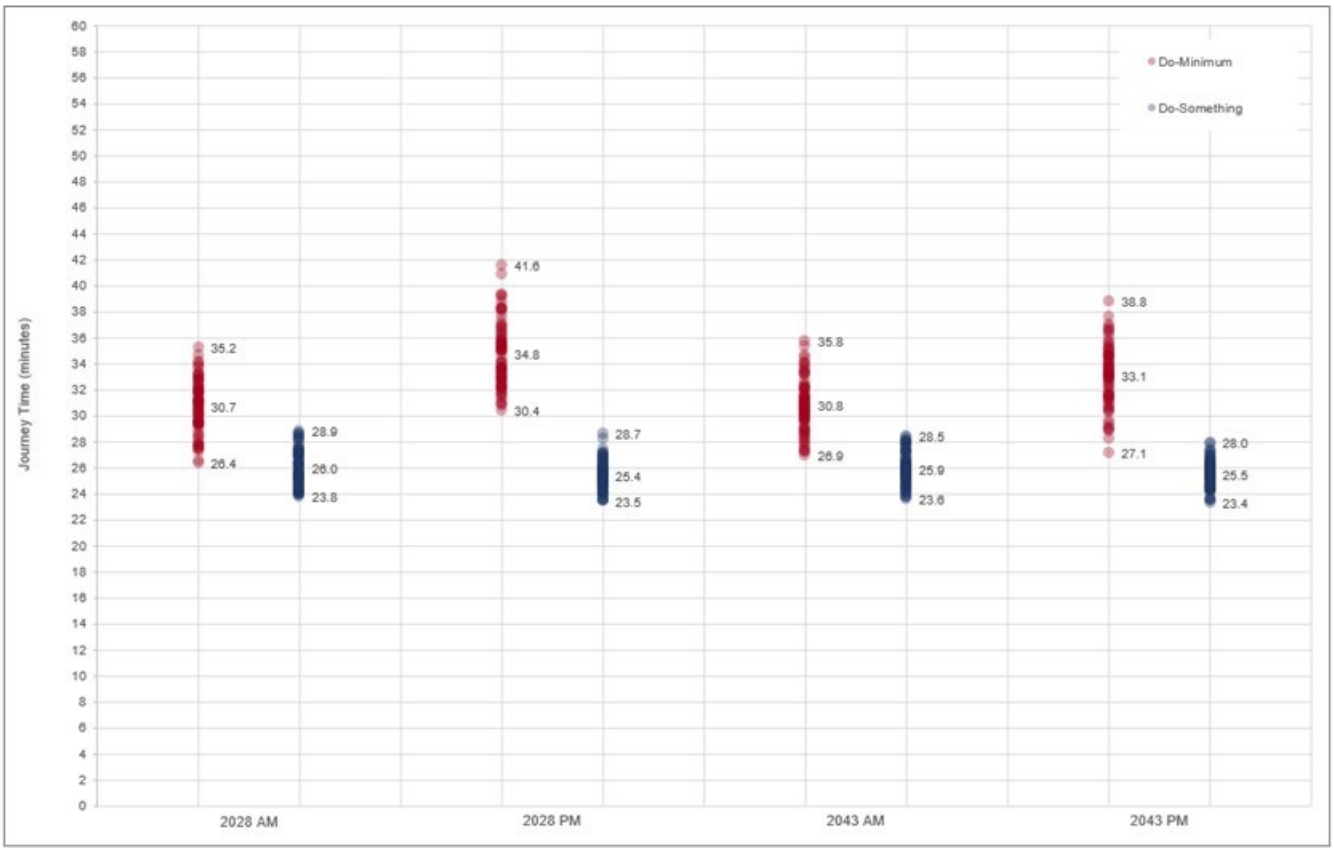


Diagram 6.20: B3 Bus Journey Times (Outbound Direction)

Based on the results presented in Table 6.57, 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 6.20 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 6.21 to Diagram 6.24.

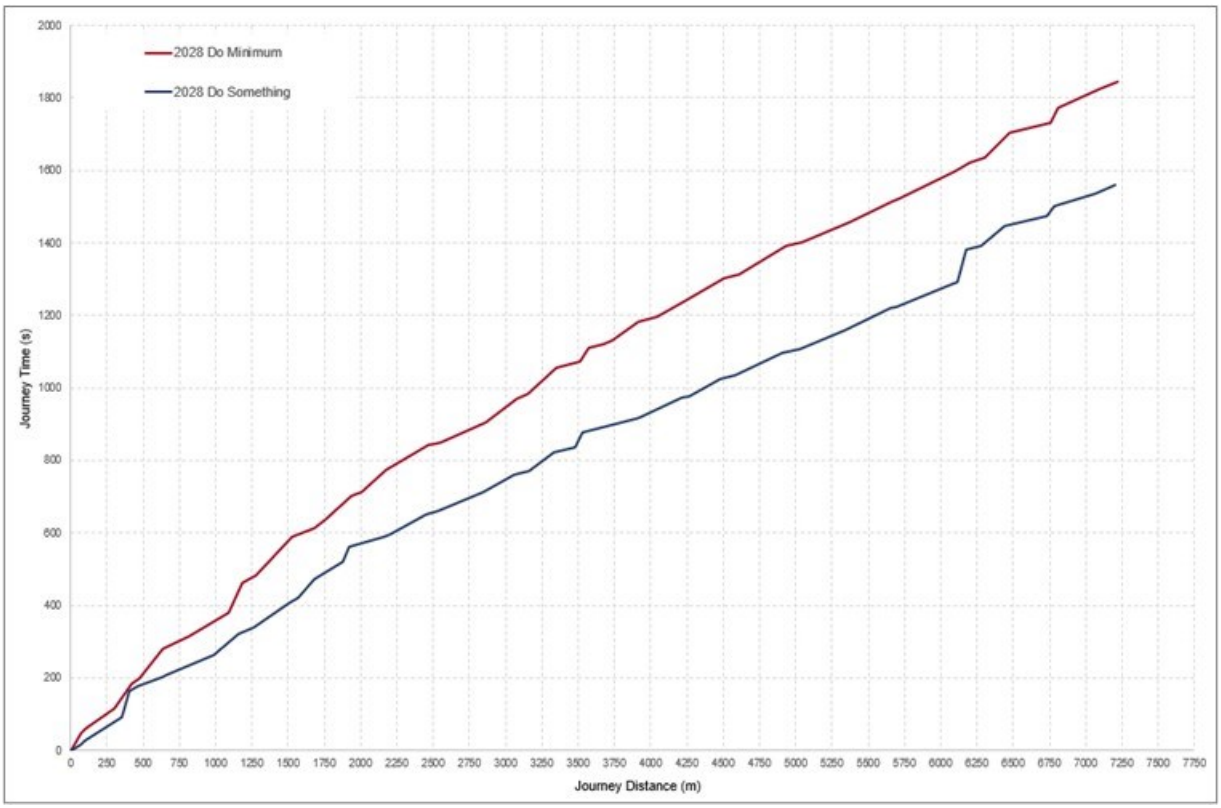


Diagram 6.21: B3 Bus Journey Time (2028 AM, Outbound)

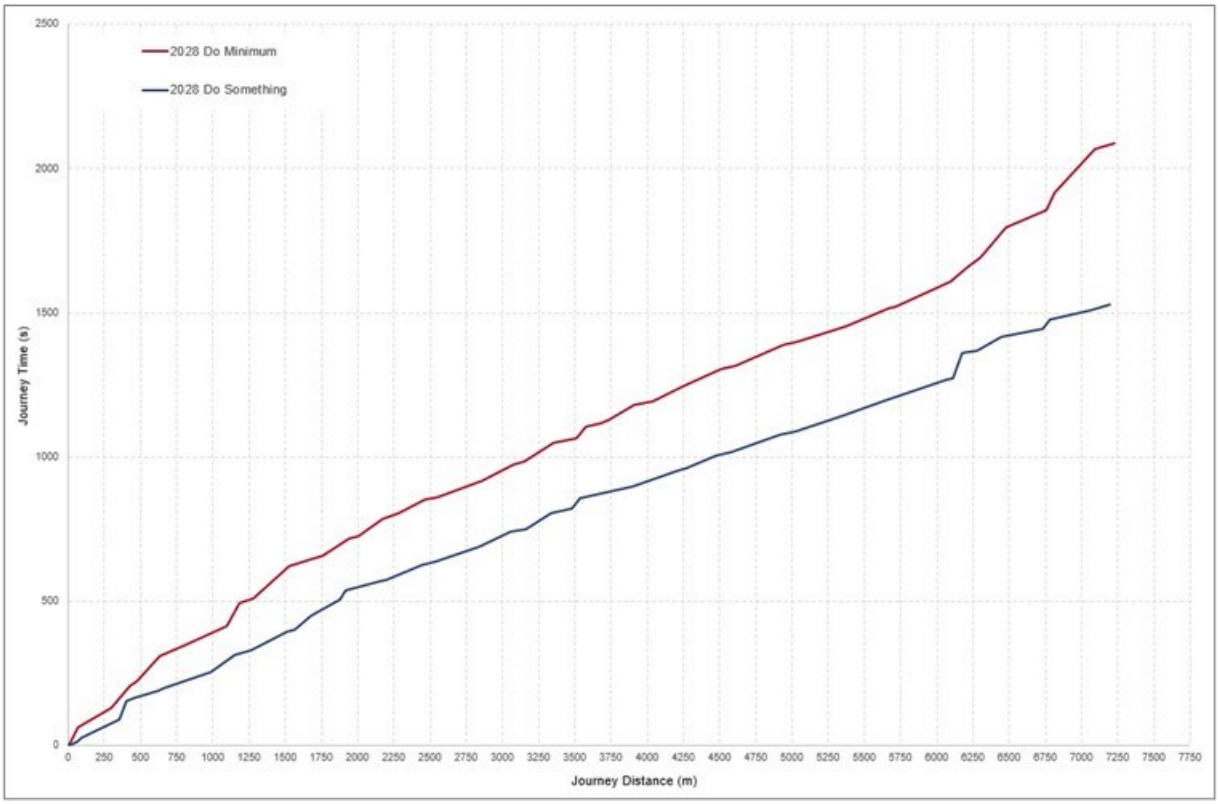


Diagram 6.22: B3 Bus Journey Time (2028 PM, Outbound)

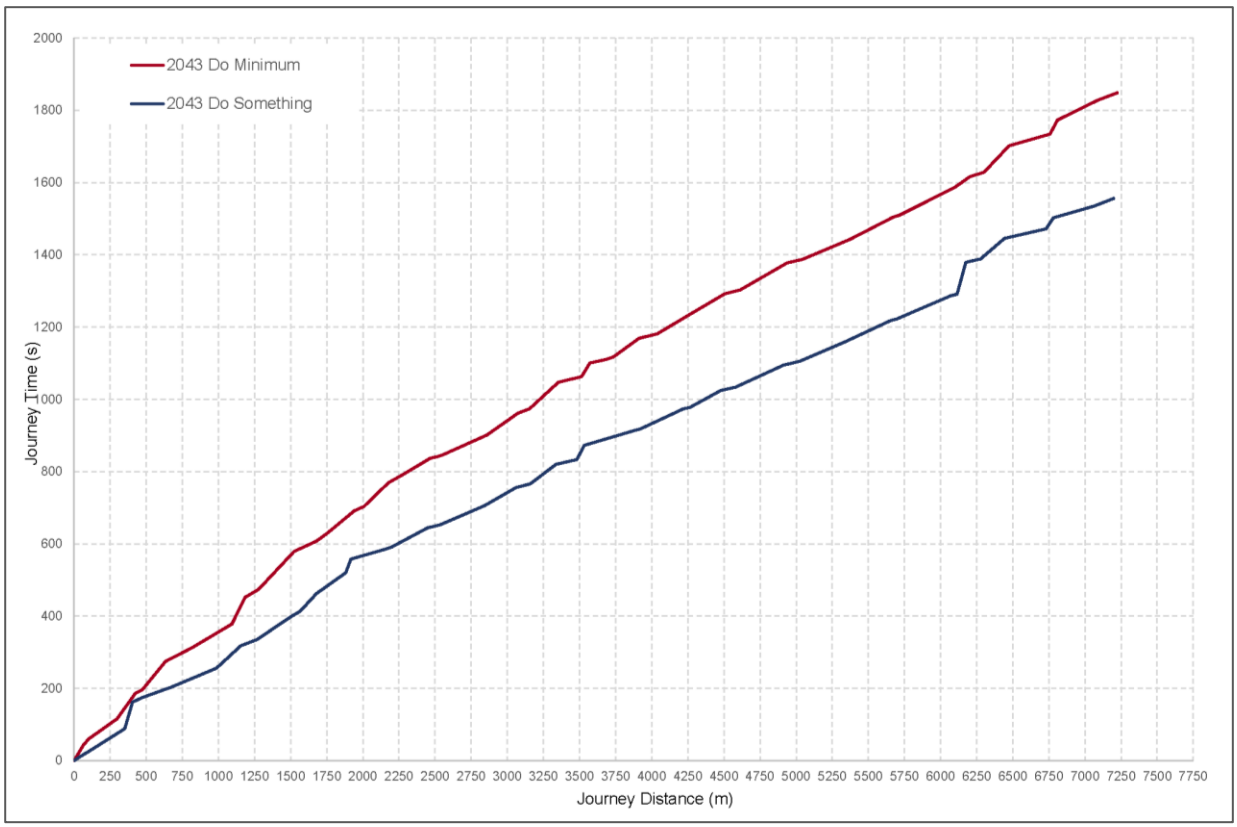


Diagram 6.23: B3 Bus Journey Time (2043 AM, Outbound)

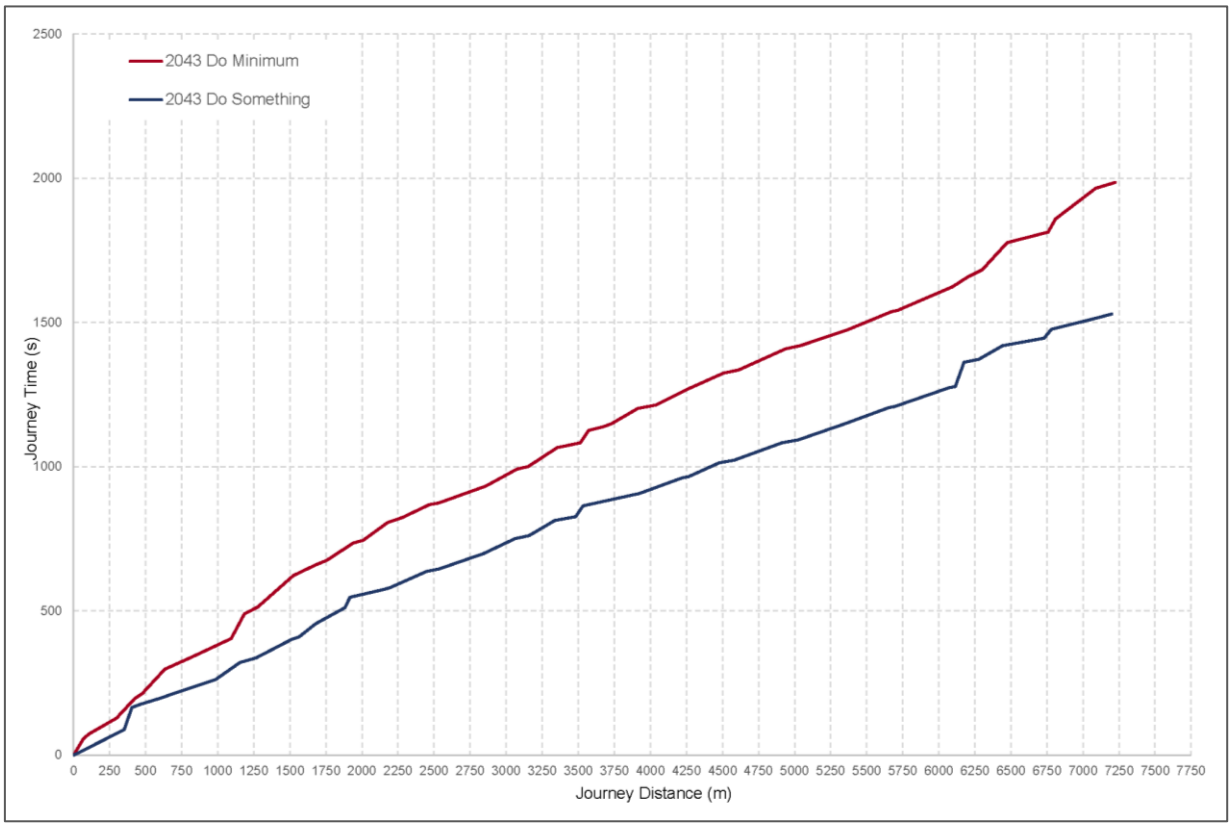


Diagram 6.24: B3 Bus Journey Time (2043 PM, Outbound)

Based on the results presented in Diagram 6.21 to Diagram 6.24, 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 6.59 and Table 6.60.

Table 6.59: 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 6.60: 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 6.59, 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 A6.4.3 (Average Bus Journey Times) of Volume 4 of this EIAR.

6.4.6.2.5.3 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 6.61 in vehicle minutes.

Table 6.61: 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 6.61, 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.

6.4.6.2.6 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 **Positive, Very Significant and Long-term** impact overall.

6.4.6.2.7 Increased Bus Frequency - Resilience Sensitivity Analysis

6.4.6.2.7.1 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 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.

6.4.6.2.7.2 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 6.62 below.

Table 6.62: 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 6.63 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 6.63: 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 6.25 below. The diagram displays the maximum, minimum and average journey times for each of the B3 bus services modelled.

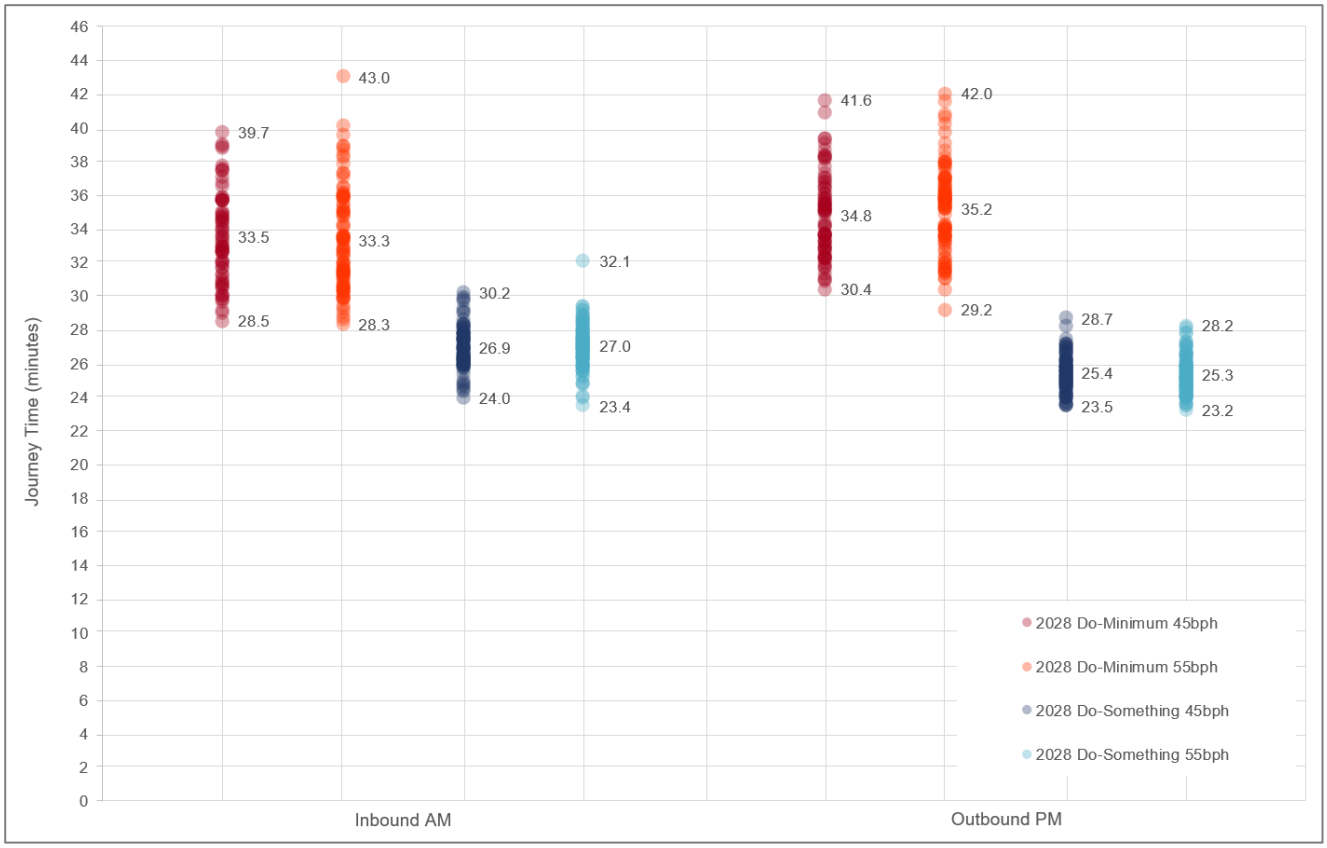


Diagram 6.25: Resilience Testing Bus Journey Time Reliability Indicators - Scenario Testing– Opening Year (2028)

As can be seen from Table 6.63 and Diagram 6.25, 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).

6.4.6.2.8 General Traffic Assessment

6.4.6.2.8.1 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.

6.4.6.2.8.2 Significance of the General Traffic Impact

To determine the impact that the Proposed Scheme will have 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.

Significance of a Reduction in General Traffic: For this assessment, the reductions in general traffic flows have been described as a positive impact to the environment. The significance of this positive impact is outlined in Table 6.64.

Table 6.64: Significance of the Reduction in General Traffic Flows

Significance of Positive Impact	Description of Impact / Proposed Changes
Profound	< -1,000
Very Significant	-1,000 to -800
Significant	-800 to -400
Moderate	-400 to -300
Slight	-300 to -100
Not Significant	> -100

The majority of instances where a reduction in general traffic flow occurs are located along or adjacent to the Proposed Scheme (i.e. the direct study area), where there are proposed measures to improve priority for bus, cycle and walking facilities.

Localised junction models have been developed using industry standard modelling packages such as LinSig (a software tool by JCT Consultancy which allows traffic engineers to model traffic signals) and Junctions 9 (a software tool by TRL for the modelling and analysis of roundabout and priority intersections) 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 models using the iterative traffic modelling process described in Section 6.2

(Methodology) of this EIAR. The full outputs of the results are available in the Appendix A6.3 (Junction Design Report) of Volume 4 of this EIAR.

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

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

Diagram 6.26 is 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.

Traffic and Transport Assessment Guidelines PE-PDV-02045 May 2014, TII Publications

Diagram 6.26: Extract from the Traffic and Transport Assessment Guidelines (PE-PDV-02045, May 2014)

The basis of the guidance is to assess the impacts of additional trips that have been generated as part of a new development (for example, a new housing estate etc.). Noting that the guidance relates to National Roads only, for the purpose of this assessment, the principles of the guidance have been adapted for the assessment of the Proposed Scheme. This has been achieved by extending the threshold from National Roads only to cover all road types in the vicinity of the Proposed Scheme. This ensures a robust and rigorous assessment is undertaken and that potential impacts on more localised or residential streets have been captured as part of the assessment.

The impact assessment of increases to the general traffic flows has used the following thresholds based on the above guidelines:

- **Local / Regional Roads:** Traffic redistribution results in an increase above 100 combined flows (i.e., in a two-way direction) along residential, local and regional roads in the vicinity of the Proposed Scheme in the AM and PM peak hours;
    - The threshold aligns with an approximate one vehicle per minute increase per direction on any given road. This is a very low level of traffic increase on any road type and ensures that a robust assessment of the impacts of redistributed traffic has been undertaken.
- **National Roads:** Traffic exceeds 5% of the combined turning flows at junctions with/ on/or with national roads in the AM and PM peak hours as a result of traffic redistribution comparing the 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 that exceed the above thresholds, a further assessment has been undertaken by way of a traffic capacity analysis on the associated junctions along the affected links.

6.4.6.2.8.3 General Traffic Flow Difference - AM Peak Hour

Diagram 6.27 (extract from Figure 6.7 in Volume 3 of this EIAR) illustrates the difference in traffic flows on the road links in the AM Peak Hour for the 2028 Opening Year. Appendix A6.4.7 (General Traffic Assessment) of Volume 4 of this EIAR contains the full LAM outputs.

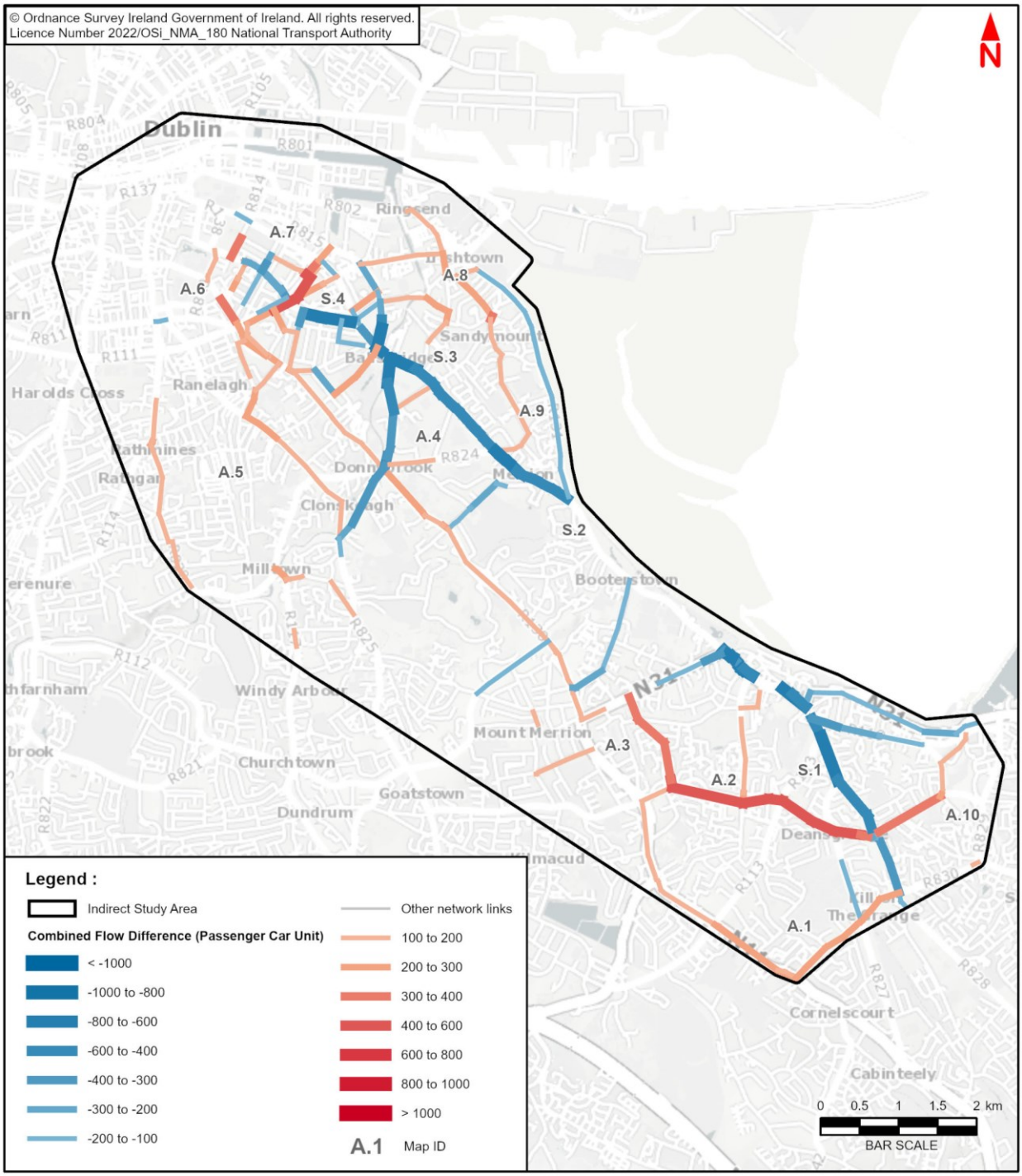


Diagram 6.27: Flow Difference on Road Links (Do Minimum vs. Do Something), AM Peak Hour, 2028 Opening Year

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

The key reductions in traffic flows during the 2028 AM Peak Hour are outlined in Table 6.65.

Table 6.65: Road Links that Experience a Reduction of ≥ 100 Combined Flows during 2028 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	-1,035
		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

The contents of Table 6.65 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 **Positive, Significant and Long-term impact** on the direct study area based on the ranges in Table 6.64. The most significant effect occurs along the N31 Frascati Road. There are no increases in general traffic flows along the direct study area.

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 2028 AM Peak Hour. The key reductions in traffic flows along the indirect study area during the AM Peak Hour are outlined in Table 6.66.

Table 6.66: Road Links that Experience a Reduction of ≥100 Combined Flows during 2028 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
		Newtown Avenue	730	527	-203

Location	Map I.D.	Road Name	Do Minimum Flows (PCUs)	Do Something Flows (PCUs)	Flow Difference (PCUs)
		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 6.66, the traffic reductions within the indirect study area vary between -102 and -1,394 combined flows along the surrounding road links, and the overall significance of impact is considered to be **Positive, Slight and Long-term** based on the ranges in Table 6.64.

Indirect Increases in General Traffic: The road links that experience additional traffic volumes of over 100 combined flows are illustrated by the orange / red lines in Diagram 6.27. 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 2028 AM Peak Hour are outlined in Table 6.67.

Table 6.67: Road Links where the 100 Flow Additional Traffic Threshold is Exceeded (AM Peak Hour)

Orientation	Map I.D.	Road Name	Do Minimum Flows (PCUs)	Do Something Flows (PCUs)	Flow Difference (PCUs)
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	1,144	244

Orientation	Map I.D.	Road Name	Do Minimum Flows (PCUs)	Do Something Flows (PCUs)	Flow Difference (PCUs)
		Stradbrook Road	778	879	101
		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	1,561	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

Orientation	Map I.D.	Road Name	Do Minimum Flows (PCUs)	Do Something Flows (PCUs)	Flow Difference (PCUs)
		Monkstown Avenue	679	1,040	360
		Pakenham Road	828	939	111

The contents of Table 6.67 outlines that 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.

National Roads – 5% Threshold Impact Assessment (AM Peak Hour): On the basis of the assessment methodology specifically for national roads, whereby traffic exceeding 5% of the combined turning flows at junctions on or with national roads as a result of traffic redistribution associated with the Proposed Scheme, the junctions and associated flow difference between the Do Minimum and Do Something scenarios during the AM Peak Hour are outlined in Table 6.68.

Table 6.68: National Road Links where > 5% Additional Traffic Threshold is Exceeded (AM Peak Hour)

National Road Link	Junction	Total Do Minimum Turning Flows (PCUs)	Total Do Something Turning Flows (PCUs)	Turning Flow Difference (PCUs)	% 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%

The contents of Table 6.68 demonstrates that redistributed traffic from the Proposed Scheme will have a ≤5% impact on turning flows at junctions with national roads. Hence, 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 6.67.

6.4.6.2.8.4 General Traffic Flow Difference – PM Peak Hour

Diagram 6.28 (extract from Figure 6.7 in Volume 3 of this EIAR) illustrates the difference in traffic flows on road links in the PM Peak Hour for the 2028 Opening Year. Appendix A6.4.7 (General Traffic Assessment) of Volume 4 of this EIAR provides further details of the LAM outputs.

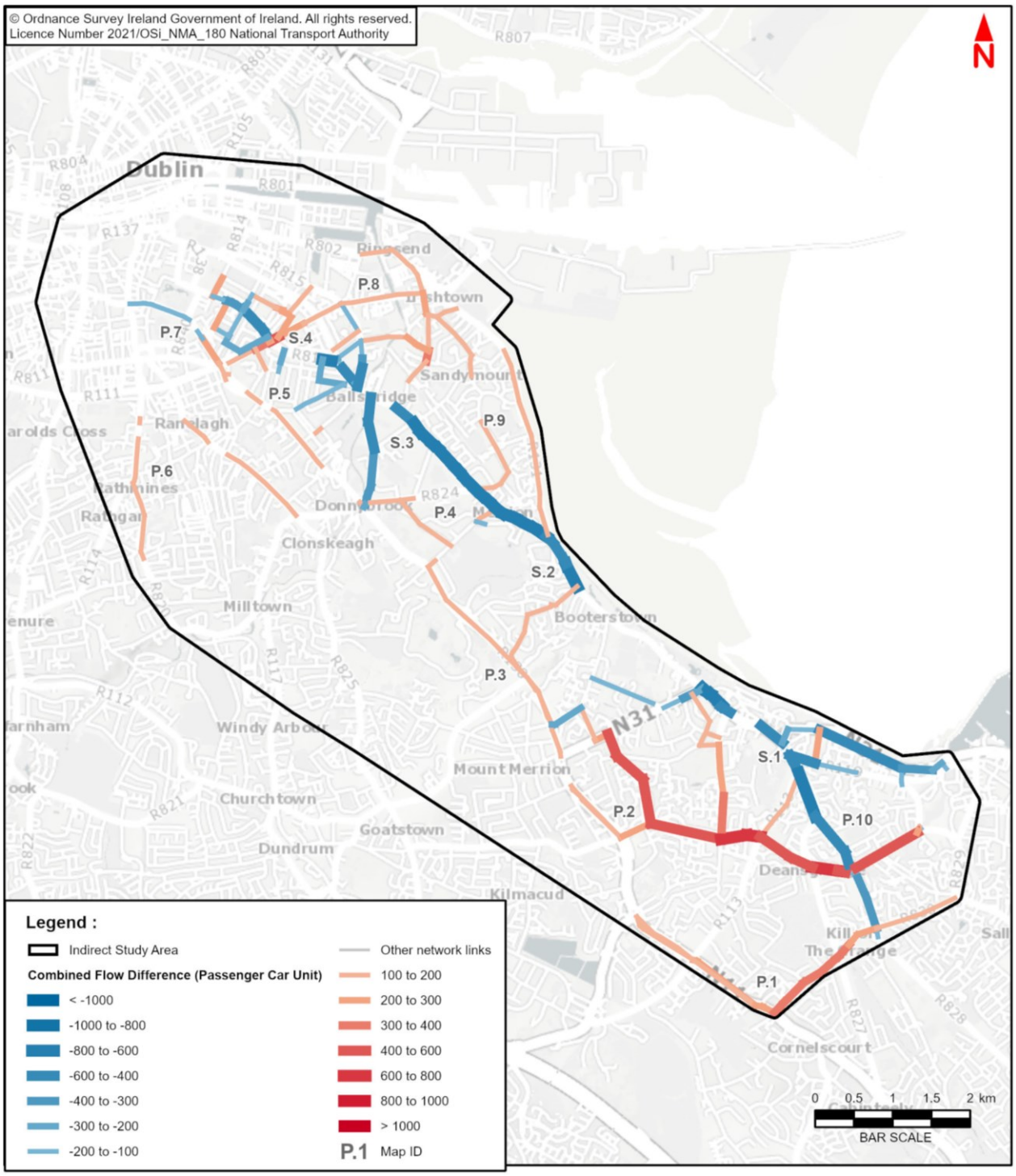


Diagram 6.28: Flow Difference on Road Links (Do Minimum vs. Do Something), PM Peak, 2028 Opening Year

Impact on Direct Study Area (PM Peak Hour)

Direct Reductions in General Traffic Flows: The LAM indicates that during the 2028 Opening Year scenario, there are key reductions in general traffic noted along the Proposed Scheme during the PM Peak Hour, as illustrated by the blue lines in Diagram 6.28, which indicate where a reduction of at least -100 combined traffic flows occurred in the model.

The key reductions in traffic flows during the 2028 PM Peak Hour are outlined in Table 6.69.

Table 6.69: 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

The contents of Table 6.69 demonstrates that there is a moderate to profound reduction of between -221 and -1,511 general traffic flows along the direct study area during the PM Peak Hour, that 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 **Positive, Very Significant and Long-term effect** on the direct study area based on the ranges in Table 6.64. The most significant effect occurs along the R118 Merrion 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.

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 2028 PM Peak Hour are outlined in Table 6.70.

Table 6.70: 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	1525	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
		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	1354	973	-382
		Anglesea Road	1,258	774	-485
		Herbert Park	1,285	1,033	-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	1,064	-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	1043	942	-101
		Raglan Road	399	178	-221
		Shelbourne Lane	832	380	-451
		Shelbourne Road	2,646	1,310	-1336
		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 6.28. The traffic flow reduction varies between -101 and -1,336 combined flows, with peak reductions occurring on the R815 Shelbourne Road (-1,336). This reduction in general traffic flow has been determined as an overall **Positive, Moderate and Long-term effect** on the direct study area based on the ranges in Table 6.64

Increases in General Traffic Flows: The road links that experience additional traffic volumes of over 100 combined flows are illustrated by the red lines in Diagram 6.28. The road links and associated flow difference between the Do Minimum and Do Something scenarios during the PM Peak Hour are outlined in Table 6.71.

Table 6.71: 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
		New Road	853	1,486	634
		Newtownpark Avenue	694	807	113
		Stillorgan Park	1,251	1,843	593
		Upper Carysfort Avenue	686	1012	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	1486	1631	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

Orientation	Map I.D.	Road Name	Do Minimum Flows (PCUs)	Do Something Flows (PCUs)	Flow Difference (PCUs)
		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	1,079	154
		Tritonville Road	401	736	335
	P.10	Carrickbrennan Road	224	339	115

The contents of Table 6.71 outline that 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.

National Roads – 5% Threshold Impact Assessment (PM Peak Hour): On the basis of the assessment methodology specifically for national roads, the junctions and associated flow difference between the Do Minimum and Do Something scenarios during the AM Peak Hour are outlined in Table 6.72.

Table 6.72: National Road Links where 5% Additional Traffic Threshold is Exceeded (PM Peak Hour)

National Road Link	Junction	Total Do Minimum Turning Flows	Total Do Something Turning Flows	Turning Flow Difference	% 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 6.72 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 6.71.

6.4.6.2.8.5 General Traffic Impact Assessment

Following the above threshold assessment, the following three-step approach has been undertaken to determine the significance of the negative impact as a result of the redistributed general traffic on the indirect study area:

Step 1 - Determination of Junction Sensitivity: Where road links experience additional traffic volumes of above the proposed thresholds, a review has been undertaken of its associated junctions using the following categories:

- **High Sensitivity (Category 5)** – Roads that cater for a lower volume of traffic than Category 4 with a lower speed limit (30km/h);
- **Medium Sensitivity (Category 4)** – Roads that can cater for a high volume of traffic with a moderate speed limit (30km/h – 50km/h), connecting neighbourhoods;
- **Low Sensitivity (Category 3)** – Roads that interconnect Category 2 type roads with a lower level of mobility than national roads; and
- **Negligible Sensitivity (Category 1 and Category 2)** – Roads that can cater for a high volume of traffic with a high speed limit (100km/h - 120km/h), between major metropolitan cities, i.e. national primary and secondary roads.

The above sensitivities / categories establish the characteristics of the surrounding road network impacted by the Proposed Scheme. The road link characteristics of the major arm of a junction has been used to determine the junction sensitivity. This has allowed for the identification of where more sensitive locations, in particular Category 5 roads / junctions, are impacted.

Step 2 – Determination of the Magnitude of Impact using Junction Analysis: 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 EIAR, operational capacity outputs of a junction have been identified with reference to the busiest arm which experiences the maximum V/C ratio.

A V / C ratio of below 85% indicates that a junction is operating well, has spare capacity, and that traffic does not experience queuing or delays throughout the hour. A value of 85% to 100% indicates that the junction is approaching its theoretical capacity with traffic possibly experiencing occasional queues and delays within the hour. A value of over 100% indicates that a junction is operating above its theoretical capacity and traffic experiences queues and delays regularly within the hour. The junctions have been described in the ranges outlined in Table 6.73.

Table 6.73: Junction Volume / Capacity Ranges

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

When comparing the V / C ratios during the Do Minimum and Do Something scenarios for the key junctions, the terms outlined in Table 6.74 have been used to describe the impact.

Table 6.74: 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 6.74, 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.

Step 3 – Determination of Significance of Effects: The magnitude of impact has been combined with the sensitivity of the road link to determine the Significance of Effect using the matrix shown in Table 6.4 which is based upon the EPA Guidelines on EIAR.

Potential mitigation measures have been considered at junctions where the Significance of Effect is predicted to be Significant or higher. At junctions where a moderate effect or lower is predicted, further consideration has not been undertaken as moderate effects represent that which effects the 'character of the environment in a manner that is consistent with existing and emerging baseline trends' (as per Table 6.5)

The above analysis was carried out on the following scenarios:

- 2028 Opening Year – Do Minimum vs Do Something – AM Peak Hour;
- 2043 Design Year (Opening Year + 15 Years) – Do Minimum vs Do Something – AM Peak Hour;
- 2028 Opening Year – Do Minimum vs Do Something – PM Peak Hour; and
- 2043 Design Year (Opening Year + 15 Years) – Do Minimum vs Do Something – PM Peak Hour.

The AM and PM Peak Hour flows are modelled as occurring between 08:00 to 09:00 and 17:00 to 18:00 respectively. The interpeak periods have not been analysed for this impact assessment as the AM and PM Peak Hour flows present an overall worst-case scenario. The full analysis tables for each scenario, demonstrating the Do Minimum and Do Something Peak Hour traffic flows and maximum V / C ratio for each junction assessed is detailed in Table 14 to Table 17 of Appendix A6.4.4 (General Traffic Assessment) of Volume 4 of this EIAR.

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

The contents of Table 6.75 outline the maximum V / C ratios at the key local / regional road junctions in the AM Peak Hour for the 2028 Opening Year at junctions where the ratio exceeds 100% in the Do Something scenario, or the significance of effect is slight or higher. 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 Volume 3 of this EIAR.

Table 6.75: Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), AM Peak, 2028 Opening Year

Road Name	Road Sensitivity	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Magnitude of Impact	Significance of Effects
			≤85%	85% - 100%	>100%	≤85%	85% - 100%	>100%		
Stillorgan Road	Negligible	Stillorgan Road / Newtownpark Avenue / Leopardstown Road			✓			✓	Negligible	Imperceptible
		Stillorgan Road / Airfield Park			✓			✓	Negligible	Imperceptible
Kill Lane	Low	Stillorgan Road / Kill Lane	✓				✓		Low	Negative Slight
Burlington Road	High	Mespil Road / Burlington Road	✓				✓		Low	Negative Moderate

Road Name	Road Sensitivity	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Magnitude of Impact	Significance of Effects
			≤85%	85% - 100%	>100%	≤85%	85% - 100%	>100%		
Clonskeagh Road	Low	Eglinton Road / Milltown Road / Sandford Road / Clonskeagh Road		✓				✓	Medium	Negative Moderate
Leeson Street Upper	Low	Leeson Street Upper / Wellington Place / / Morehampton Road		✓				✓	Medium	Negative Moderate
The Appian Way	Medium	Stillorgan Road / Farmleigh Avenue / Brewery Road	✓				✓		Low	Negative Moderate
Merrion Street Upper	Low	Baggot Street Lower / Merrion Street Upper / Merrion Row / Ely Place	✓				✓		Low	Negative Slight
Clanwilliam Place	High	Mount Street Lower / Clanwilliam Place / Warrington Place	✓				✓		Low	Negative Moderate
Bath Avenue	Low	Shelbourne Road / Haddington Road / South Lotts Road / Grand Canal Street Upper	✓						High	Negative Moderate
Irishtown Road	Low	Irishtown Road / Church Avenue / Londonbridge Road / Tritonville Road	✓				✓		Low	Negative Slight
Lansdowne Road	High	Shelbourne Road / Shelbourne Road / Lansdowne Road / Lansdowne Road	✓				✓		Low	Negative Moderate
Ailesbury Road	Low	Ailesbury Road / Anglesea Road	✓				✓		Low	Negative Slight
Stillorgan Park	Low	Stillorgan Park / Park Villas	✓				✓		Low	Negative Slight

The results of the junction analysis and summarised in in Table 6.75 demonstrate that of the total of 204 junctions assessed, 164 junctions are operating with a maximum V / C ratio of below 85% in the Do Something scenarios in the AM Peak Hour in the 2028 Opening Year. A further 34 junctions are operating with a maximum V / C ratio of between 85% - 100%. Therefore, the majority of junctions continue to operate well within capacity with the Proposed Scheme in place.

Overall, the Proposed Scheme is considered to have a **Not Significant and Long-term effect** at 164 junctions within the indirect study area. Five of the 202 junctions assessed are shown to have a significance of effect of **Negative, Slight and Long-term**, and seven are shown to have **Negative, Moderate and Long-term** effects.

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 four-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.

Notwithstanding this, the significance of effect is concluded to be **Negative, Moderate and Long-term** at three of these six junctions due to the low sensitivity of these road links. At the remaining two junctions; Stillorgan Road / Newtownpark Avenue / Leopardstown Road four-arm signalised junction and Stillorgan Road / Airfield Park four-arm signalised junction; the significance of effect is concluded to be **Imperceptible and Long-term** as the V / C ratio is above 100% in both scenarios, therefore the performance of the junction is similar with or without the Proposed Scheme.

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.

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

The contents of Table 6.76 outline 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 ratio exceeds 100% in the Do Something scenario, or the significance of effect is slight or higher. The location of these junctions and the V / C ratio comparison between the Do Minimum and Do Something scenarios in the 2028 PM Peak Hour are illustrated in Figure 6.10 in Volume 3 of this EIAR.

Table 6.76: Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), PM Peak, 2028 Opening Year

Road Name	Road Sensitivity	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Magnitude of Impact	Significance of Effects
			≤85%	85% - 100%	>100%	≤85%	85% - 100%	>100%		
Kill Avenue	High	Abbey Road / Kill Avenue / Kill Lane / Rochestown Avenue	✓				✓		Low	Negative Moderate
Benamore Road	High	Dean's Grange Road / Brookville Park	✓				✓		Low	Negative Moderate
Carysfort Avenue	Medium	Carysfort Avenue / Stillorgan Park / Fleurville Road	✓				✓		Low	Negative Moderate
Grove Avenue	High	Stillorgan Park / Park Villas	✓				✓		Low	Negative Moderate
Newtownpark Avenue	Low	Newtownpark Avenue / Benaville Road / Fleurville Road	✓				✓		Low	Negative Slight
Ailesbury Road	Low	Merrion Road / Ailesbury Road	✓				✓		Low	Negative Slight
Donnybrook Road	Negligible	Stillorgan Road / Anglesea Road / Beaver Row			✓		✓		Low	Positive Low
Ranelagh Road	Low	Ranelagh Road / Sandford Road / Anna Villa	✓				✓		Low	Negative Slight
Sandford Road	Low	Sandford Road / Larch Grove	✓				✓		Low	Negative Slight
	Low	R117 / Sandford Road	✓				✓		Low	Negative Slight
Leeson Street Upper	Low	Leeson Street Upper / Wellington Place / / Morehampton Road	✓				✓		Low	Negative Slight
Merrion Street Upper	Low	Baggot Street Lower / Merrion Street Upper / Merrion Row / Ely Place	✓				✓		Low	Negative Slight
Bath Avenue	High	Shelbourne Road / Haddington Road / South Lotts Road / Grand Canal Street Upper		✓		✓			Low	Positive Low
Stillorgan Road	Negligible	Stillorgan Road / Newtownpark Avenue / Leopardstown Road			✓			✓	Negligible	Imperceptible

The results of the junction analysis illustrate that, of a total of 199 junctions assessed, 169 junctions are operating with a maximum V / C ratio of below 85% in the Do Something scenarios in the PM Peak Hour in the 2028 Opening Year. A further 29 junctions are operating with a maximum V / C ratio of between 85% - 100%.

Overall, as a result of redistributed general traffic associated with the Proposed Scheme, the effect at 186 out of 199 junctions assessed is predicted to be **Not Significant and Long-term** and **Imperceptible and Long-term** within the Indirect Study Area. Seven of the 199 junctions assessed are shown to have a significance of effect of **Negative, Slight and Long-term**, and four are shown to have **Negative, Moderate and Long-term** effects in the 2028 Opening Year PM Peak Hour. Two junctions are shown to have **Positive, Low and Long-term** effects.

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.

Notwithstanding this, the significance of effect at this junction is concluded as **Imperceptible and Long-term** as the sensitivity of the road link is considered to be negligible and the performance of the junction with similar with or without the Proposed Scheme. Therefore, no further assessment of the PM Peak Hour in the 2028 Opening Year is required.

General Traffic Impact Assessment (2043 Design Year) – Indirect Study Area – AM Peak Hour

The contents of Table 6.77 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 ratio exceeds 100% in the Do Something scenario, or the significance of effect is slight or higher. The location of these junctions and the V / C ratio comparison between the Do Minimum and Do Something scenarios in the 2043 AM Peak Hour are illustrated in Figure 6.11 in Volume 3 of this EIAR.

Table 6.77: Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), AM Peak, 2043 Design Year

Road Name	Road Sensitivity	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Magnitude of Impact	Significance of Effects
			≤85%	85% - 100%	>100%	≤85%	85% - 100%	>100%		
Kill Lane	Low	Stillorgan Road / Kill Lane	✓				✓		Low	Negative Slight
Burlington Road	High	Mespil Road / Burlington Road	✓				✓		Low	Negative Moderate
Stillorgan Road	Negligible	Stillorgan Road / Newtownpark Avenue / Leopardstown Road			✓			✓	Negligible	Imperceptible
		Stillorgan Road / Airfield Park			✓			✓	Negligible	Imperceptible
Clonskeagh Road	Low	Eglinton Road / Milltown Road / Sandford Road / Clonskeagh Road	✓				✓		Low	Negative Slight
Sandford Road	Low	Norwood Park / Sandford Road / Sandford Road	✓				✓		Low	Negative Slight
		Sandford Road / Larch Grove	✓				✓		Low	Negative Slight
		Sandford Road / Marlborough Road	✓				✓		Low	Negative Slight
		R117 / Sandford Road	✓				✓		Low	Negative Slight
		Sandford Road / Belmont Avenue	✓				✓		Low	Negative Slight

Road Name	Road Sensitivity	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Magnitude of Impact	Significance of Effects
			≤85%	85% - 100%	>100%	≤85%	85% - 100%	>100%		
The Appian Way	Medium	Stillorgan Road / Farmleigh Avenue / Brewery Road	✓				✓		Low	Negative Moderate
Haddington Road	Negligible	Northumberland Road / Haddington Road		✓		✓			Low	Positive Low
Merrion Street Upper	Low	Baggot Street Lower / Merrion Street Upper / Merrion Row / Ely Place	✓				✓		Low	Negative Slight
Clanwilliam Place	High	Mount Street Lower / Clanwilliam Place / Warrington Place	✓				✓		Low	Negative Moderate
Bath Avenue	Low	Shelbourne Road / Haddington Road / South Lotts Road / Grand Canal Street Upper		✓		✓			Low	Positive Low
Bath Street	Low	Irishtown Road / Oliver Plunkett Avenue / Bath Street		✓		✓			Low	Positive Low
Lansdowne Road	High	Shelbourne Road / Shelbourne Road / Lansdowne Road / Lansdowne Road	✓				✓		Low	Negative Moderate
Ailesbury Road	Low	Ailesbury Road / Anglesea Road	✓				✓		Low	Negative Slight
Park Villas	Low	Stillorgan Park / Park Villas	✓				✓		Low	Negative Slight

The results of the junction analysis demonstrate that 166 of 201 junctions assessed operate with a maximum V / C ratio of below 85% in the Do Something scenario during the AM Peak Hour in the 2043 Design Year.

Table 6.77 demonstrates that the magnitude of impact for 14 of the 19 junctions highlighted is low, while the sensitivity of the road links varies from low to high, therefore determining whether the significance of effect is slight or moderate. As a result of redistributed general traffic associated with the Proposed Scheme, ten of the 159 junctions assessed are shown to have a significance of effect of **Negative, Slight and Long-term**, and four are shown to have **Negative, Moderate and Long-term** effects.

Compared to the 2028 Opening Year, only two more junctions (14 compared to 12) are shown to have a significance of effect of slight or moderate, and no junctions will be significantly impacted. 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 **Imperceptible and Long-term.**

The results therefore demonstrate that no junctions are predicted to have a significance of effect rated as significant or higher, and no further assessment of the AM Peak Hour in the 2043 Design Year is required.

General Traffic Impact Assessment (2043 Design Year) – Indirect Study Area – PM Peak Hour

The contents of Table 6.78 outline 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 ratio exceeds 100% in the Do Something scenario, or the significance of effect is slight or higher. The location of these junctions and the V / C ratio comparison between the Do Minimum and Do Something scenarios in the 2043 PM Peak Hour are illustrated in Figure 6.12 in Volume 3 of this EIAR.

Table 6.78: Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), PM Peak, 2043 Design Year

Road Name	Road Sensitivity	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Magnitude of Impact	Significance of Effects
			≤85%	85% - 100%	>100%	≤85%	85% - 100%	>100%		
Kill Avenue	High	Abbey Road / Kill Avenue / Kill Lane / Rochestown Avenue	✓				✓		Low	Negative Moderate
Benamore Road	High	Dean's Grange Road / Brookville Park	✓				✓		Low	Negative Moderate
Carysfort Avenue	Medium	Carysfort Avenue / Stillorgan Park / Fleurville Road	✓				✓		Low	Negative Moderate
Grove Avenue	High	Stillorgan Park / Park Villas	✓				✓		Low	Negative Moderate
Ailesbury Road	Low	Merrion Road / Ailesbury Road	✓				✓		Low	Negative Slight
Donnybrook Road	Negligible	Stillorgan Road / Anglesea Road / Beaver Row			✓		✓		Low	Positive Low
Sandford Road	Low	R117 / Sandford Road	✓				✓		Low	Negative Slight
		Sandford Road / Belmont Avenue	✓				✓		Low	Negative Slight
Leeson Street Upper	Low	Leeson Street Upper / Wellington Place / / Morehampton Road	✓				✓		Low	Negative Slight
Bridge Street	Low	South Lotts Road / South Dock Road / Bridge Street / Ringsend Road	✓				✓		Low	Negative Slight
Clanwilliam Place	High	Mount Street Lower / Clanwilliam Place / Warrington Place	✓				✓		Low	Negative Moderate
Stillorgan Road	Negligible	Stillorgan Road / Newtownpark Avenue / Leopardstown Road			✓			✓	Negligible	Imperceptible

The results of the junction analysis illustrated in Table 6.78 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. The effect is considered to be **Not Significant and Long-term** at 159 out of 199 junctions assessed and **Imperceptible and Long-term** at 29 junctions.

Table 6.78 demonstrates that as a result of redistributed general traffic associated with the Proposed Scheme, eight junctions assessed are shown to have a significance of effect of **Negative, Slight and Long-term**, and five are shown to have **Negative, Moderate and Long-term** effects in the 2043 Design Year PM Peak Hour.

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 **Imperceptible and Long-term.**

6.4.6.2.8.6 Night-time Traffic Redistribution

The night-time period is defined as between 23:00 and 07:00. An 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 that would result in queuing and in turn potential re-distribution of traffic to alternative routes to avoid congestion. Therefore, the effects of

traffic redistribution due to any of the Proposed Schemes will be **Negligible and Long-term** during the night-time period.

6.4.6.2.8.7 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 (≤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 effect is deemed **Imperceptible to Not Significant and Long-term**.
- Capacity issues arise at a small number of junctions; however, the significance of effect remains **Negative, Moderate and Long-term** or lower due to magnitude of the impact (i.e. capacity issues in the Do Minimum scenario) and the sensitivity of the road link. 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 and in the context of the increased movement of people overall and by sustainable modes in particular.

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.

6.4.6.3 Operational Phase 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; 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.

Based on the information and analysis presented within Section 6.4.6 (Operational Phase), the assessment determines that the Proposed Scheme meets the above objectives and integrates within the receiving transport environment with minimal impacts during the Operational Phase. The assessment demonstrates the following:

- **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 **Positive, Significant and Long-term effects** across Section 1, 2, 3 and 5 of the Proposed Scheme, and a Positive, **Moderate and Long-term effect** in Section 4.

- **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 **Positive, Moderate and Long-term effect** in Sections 1 and 3 of the Proposed Scheme, and a **Positive, Very Significant and Long-term effect** in Sections 2, 4 and 5.

- **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 **Positive, Very Significant and Long-term effect** in Sections 1 and 5 of the Proposed Scheme, and a **Positive, Moderate and Long-term effect** in Sections 2, 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 **Negative, Slight and Long-term effect** in Sections 1, 2, 4 and 5 of the Proposed Scheme, and a **Negligible and Long-term effect** in Section 3.

- **People Movement:** Given the proposed amendments to the pedestrian, cycling, bus and parking / loading infrastructure outlined above, the Proposed Scheme will have greater capacity to facilitate movement of people travelling along the corridor. A quantitative impact assessment has been undertaken using outputs from the NTA's ERM and LAM, comparing the Do Minimum and Do Something peak hour scenarios for each forecast year (2028, 2043). The results of the assessment demonstrate that there will be an increase in the number of people travelling along the 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 adjudged that the Proposed Scheme will have a **Positive, Very Significant and Long-term** effect on the sustainable movement of people along the corridor.

- **Bus Network Performance Indicators:** A micro-simulation modelling assessment has been developed and network performance indicators established for bus operations along the 'end to end' corridor. The results of the assessment demonstrate that the total bus journey times on all modelled bus services will improve by between 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 in journey times and reliability for bus users along the Proposed Scheme will have a **Positive, Very Significant and Long-term effect.**

- **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 **Positive, Moderate and Long-term effect** whilst the impact of the redistributed general traffic within the surrounding road network will have **a Negative, Slight and Long-term effect.** Thus, overall, there will be no significant deterioration in the general traffic environment in the study area as a consequence of meeting the scheme objectives of providing enhanced sustainable mode priority along the direct study area.

Table 6.79 presents a summary of the potential impacts of the Proposed Scheme during the operational phase.

Table 6.79: Summary of Potential Operational Phase Impacts

Assessment Topic	Description of Change	Potential Impacts
Pedestrian Infrastructure	Improvements to the quality of the pedestrian infrastructure along the Proposed Scheme.	Positive, Moderate to Significant and Long-term
Cycling Infrastructure	Improvements to the quality of the cycling infrastructure along the Proposed Scheme.	Positive, Moderate to Very Significant and Long-term
Bus Infrastructure	Improvements to the quality of the bus infrastructure along the Proposed Scheme.	Positive, Moderate to Very Significant and Long-term
Parking and Loading	A total loss of 165 parking / loading spaces along the Proposed Scheme.	Negative, Slight and Long-term
People Movement	Increases to the total number of people travelling along the Proposed Scheme.	Positive, Very Significant and Long-term
Bus Network Performance Indicators	Improvements to the network performance indicators for bus users along the Proposed Scheme.	Positive, Very Significant and Long-term
General Traffic Network Performance Indicators	Reduction in general traffic flows along the Proposed Scheme.	Positive, Moderate and Long-term
	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.	Negative, Slight and Long-term

As outlined within Section 6.4.5 (Operational Phase) and summarised in Table 6.79 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 are a key feature of the Proposed Scheme will further maximize the movement of people travelling sustainably along the corridor. The combined effect of these changes 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, and this 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 that is a key part of the GDA Strategy and will enable the city to grow sustainably into the future. This would not be possible in the absence of the Proposed Scheme.

6.5 Mitigation and Monitoring Measures

6.5.1 Construction Phase

Chapter 5 (Construction) 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.

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 this 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 EIAR.

A detailed Construction Traffic Management Plan will be prepared and included in the CEMP, and subsequently implemented, by the appointed contractor prior to construction, including Temporary Traffic Management arrangements prepared in accordance with Department of Transport's 'Traffic Signs Manual, Chapter 8 Temporary Traffic Measures and Signs for Roadworks'. The CTMP will be consulted upon with the road authority and will include measures to minimise the impacts associated with the Construction Phase upon the peak periods of the day. It will include imbedded mitigation measures which will assist to alleviate any negative impact as a result of the Construction Phase of the Proposed Scheme. The appointed contractor will also prepare a Construction Stage Mobility Management Plan (CSMMP) which will be developed prior to construction, as described in the CEMP, to actively encourage personnel to travel to site by sustainable means.

No further mitigation measures are therefore required to be considered as part of the Proposed Scheme.

6.5.2 Operational Phase

Given that the Proposed Scheme results in a positive impact for walking, cycling, bus and people movement, mitigation and monitoring measures have not been considered beyond those already incorporated as part of the Proposed Scheme.

The impacts to general traffic and parking / loading, including the mitigation measures incorporated into the Proposed Scheme have been outlined in Chapter 4 (Proposed Scheme Description) of this EIAR.

No further mitigation measures are required to be considered as part of the Proposed Scheme.

6.6 Residual Impacts

With the implementation of the imbedded mitigation measures which have been included as part of the Proposed Scheme, the residual impacts associated with the assessment topics outlined in Section 6.4 remain the same.

6.7 References

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