



Chapter 06
Traffic &
Transport

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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 Templeogue / Rathfarnham to City Centre Core Bus Corridor Scheme (hereafter referred to as the Proposed Scheme).

The chapter describes the traffic and transport impacts in accordance with the requirements of the relevant Environmental Protection Agency's (EPA) guidance on the information to be contained in EIARs. To accompany this chapter, a Transport Impact Assessment (TIA) has been prepared. The TIA presents a comprehensive review of the traffic and transportation impacts associated with the Proposed Scheme, which has informed the production of this EIAR Traffic & Transport chapter. The TIA should be read in conjunction with 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 10km from end to end online with additional offline upgrades and quiet street treatment of approx. 2km and 1.5km respectively. The Proposed Scheme will be comprised of two main alignments, namely from Templeogue to Terenure (3.7km), and from Rathfarnham to the City Centre (6.3km)

The Templeogue to Terenure section will commence on the R137 Tallaght Road, east of the M50 junction 11 interchange. From here, the Proposed Scheme is routed via the R137 along Tallaght Road and Templeogue Road, through Templeogue Village, to Terenure Cross, where it joins the Rathfarnham to City Centre section. The Rathfarnham to City Centre section will commence on the R821 Grange Road at the junction with Nutgrove Avenue, and is routed along the R821 Grange Road, the R115 Rathfarnham Road, the R114 Rathfarnham Road, Terenure Road East, Rathgar Road, Rathmines Road Lower, Richmond Street South, Camden Street Upper and Lower and Wexford Street as far as the junction with the R110 at Kevin Street Lower and Cuffe Street where priority bus lanes end. From Cuffe Street to Dame Street along Redmond's Hill, Aungier Street, and South Great George's Street the route will involve a traffic lane and a cycle track in both directions where it will join the prevailing traffic management regime in the city centre. In addition to the above, an alternative cycle facility will be provided along Harold's Cross Road / Terenure Road North between Terenure Cross and Parkview Avenue, as well as along Bushy Park Road, Wasdale Park, Wasdale Grove, Zion Road and Orwell Road. The route of the Proposed Scheme is shown in Image 1.1 in Chapter 1 (Introduction).

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. In addition, urban realm works will be undertaken at key locations with higher quality materials, planting and street furniture provided to enhance the pedestrians experience, an example of this can be seen in Terenure, particularly at Terenure Cross.

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		10km (+3.5km offline cycle routes)
Bus priority	Existing (km)	Proposed Scheme (km)
Bus Lanes		
Inbound	4.4	6.1
Outbound	1.5	5.4

Total Length of Proposed Scheme		10km (+3.5km offline cycle routes)
Bus priority	Existing (km)	Proposed Scheme (km)
Bus Priority Through Traffic Management		
Inbound	0.1	2.9
Outbound	0.3	3.0
Total Bus Priority (both directions)	6.3	17.4 (+175%)
Bus Measures		
Proportion of Route with Bus Measures	32%	87%
Cycle Facilities Segregated		
Inbound	1.3	9.6
Outbound	1.8	10.3
Cycle Facilities – Non segregated		
Inbound	3.3	1.7
Outbound	4.6	1.7
Cyclist Facilities – Overall		
Total Cyclist Facilities (both directions)	11	23.3 (+112%)
Proportion segregated	28%	85.4%
Pedestrian Facilities		
Number of Pedestrian Signal Crossings	76	106

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-1012_XX_01-DR-CR-9001	General Arrangement
BCIDC-ARP-GEO_CS-1012_XX_01-DR-CR-9001	Typical Cross Sections
BCIDC-ARP-TSM_GA-1012_XX_00-DR-CR-9001	Traffic Signs and Road Markings
BCIDC-ARP-TSM_SJ-1012_XX_00-DR-TR-9001	Junction System Design

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

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

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

The outputs of the calculator provided an initial estimate of the green times and vehicle capacity movements based on inputs and assumptions for each junction along the Proposed Scheme. The calculator provided an

estimate of the People Movement for the junction in question (by mode) and was used to adjust proposals with a view to maximising the total person throughput at each junction along the Proposed Scheme during the iterative design process, described further below in Section 6.2.3. Details on the development of junction designs along the Proposed Scheme are included in Appendix A6.3 (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 have been tested using the transport models as part the iteration. The transport models provided an understanding of the benefits and impacts of the proposals (mode share changes, traffic redistribution, bus performance etc.) with traffic flow information also informing other environmental disciplines (such as Air Quality, Noise and Vibration, Climate etc.) which in turn allowed feedback of potential impacts into the design process to allow for changes and in turn mitigation to be embedded in the designs. The design process included physical changes (e.g., cycle lane widening) and adjustments to traffic signals including changes to staging, phasing and green times to limit traffic displacement to the greatest extent possible as well as traffic management arrangements and/or turn bans where appropriate. This ensured that any 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.

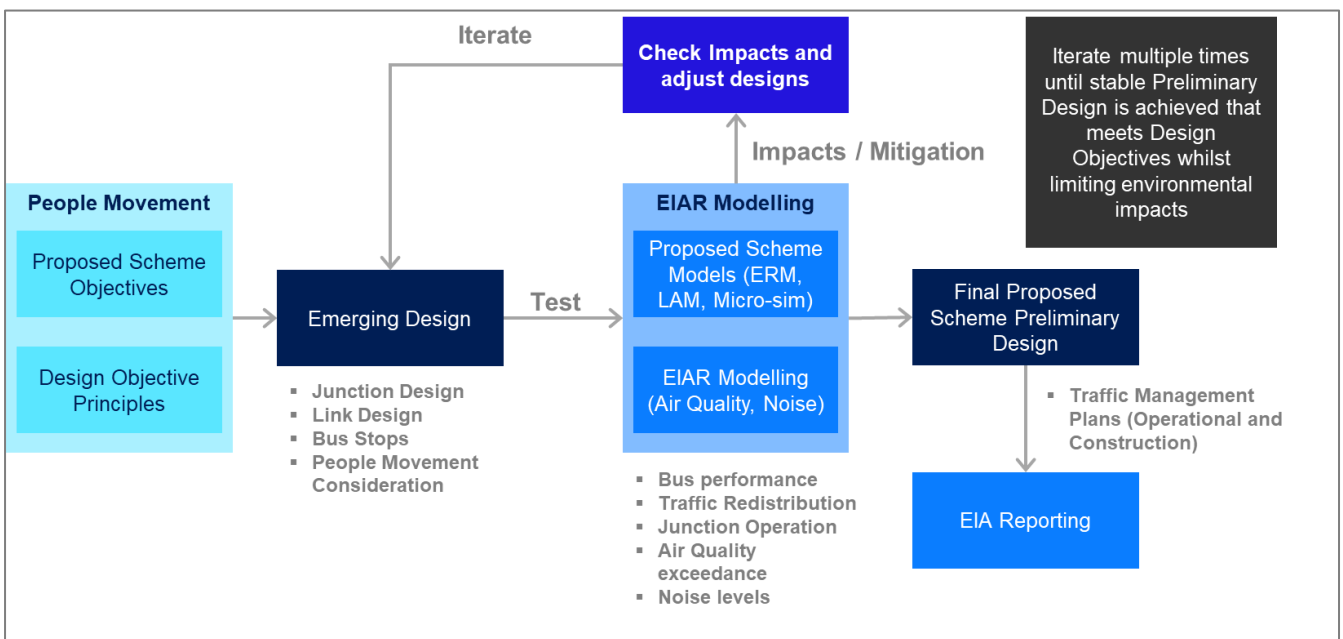


Diagram 6.1 Proposed Scheme Impact Assessment and Design Interaction

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 process 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 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 6.4.6.1.15 for further details on the threshold applied in relation to traffic volume changes used in the definition of the indirect study area).

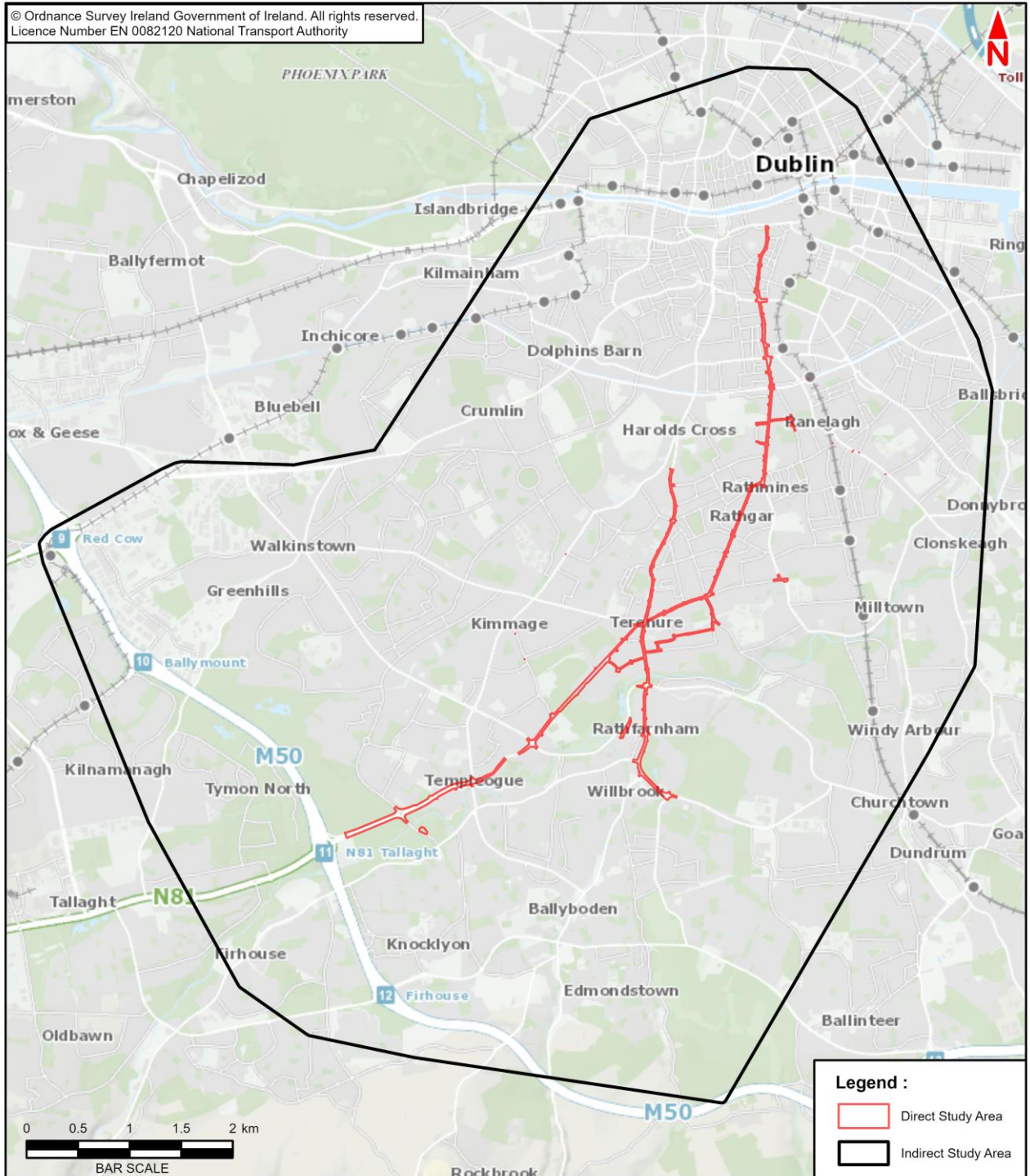


Diagram 6.2: Proposed Scheme Direct & Indirect Study Area

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) in 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 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 East Regional Model (ERM) as the primary source for multi-model demand and trip growth. Demand information is passed from the ERM 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.

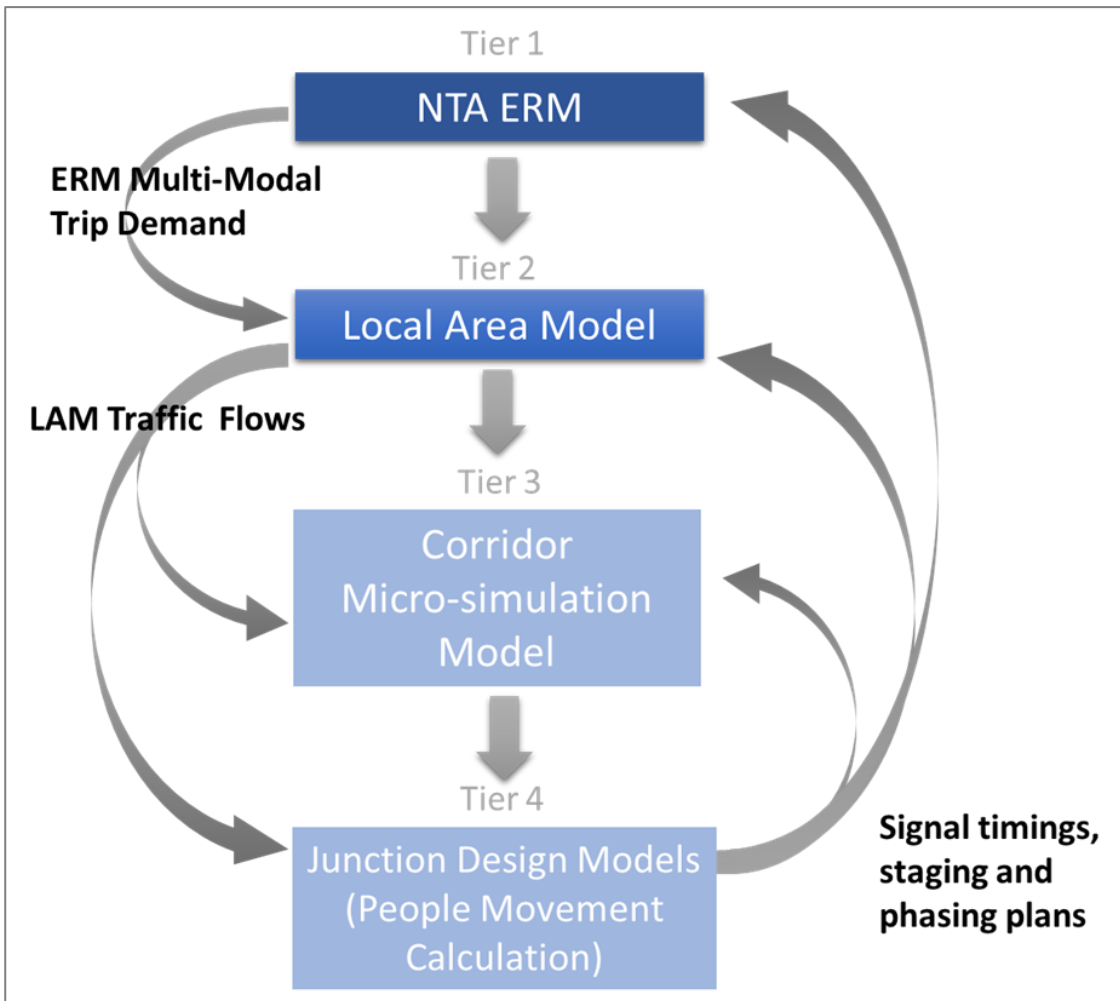


Diagram 6.3: Proposed Scheme Modelling Hierarchy

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) in 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 2022) 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, 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 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, 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, 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 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.


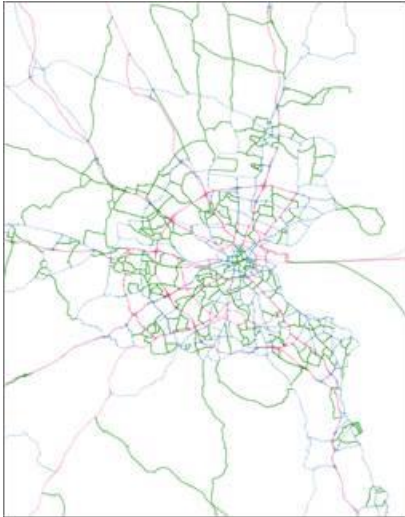
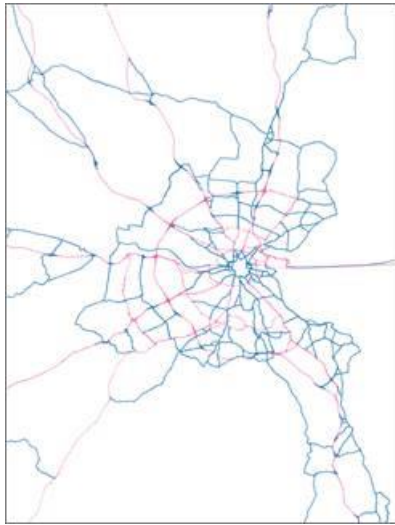
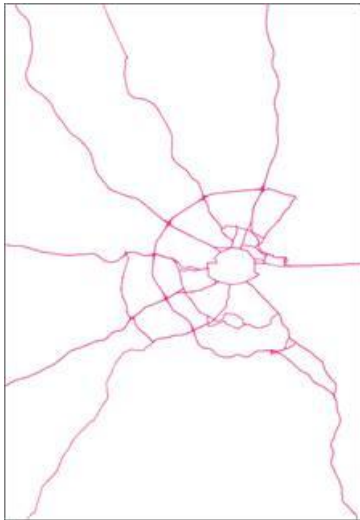
6.2.4.4 Defining the Sensitivity of the Environment

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: <i>High capacity, high operating speeds</i> (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 3.4 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) in 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) in 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) in 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 consists of 64% cycle priority outbound (18% cycle track, 26% mandatory cycle lane, 20% advisory cycle lane), with 46% inbound (13% cycle track, 1% mandatory cycle lane, 32% advisory cycle lane).

Bus services along the Proposed Scheme currently operate within a constrained and congested environment, with 18% priority outbound and 44% priority inbound on the corridor. An examination of Automatic Vehicle Location (AVL, collected by the NTA) data indicates that the current standard deviation for journey times of buses on the corridor is 11 minutes on both the Templeogue to Terenure and Rathfarnham to City Centre sections of the Proposed Scheme. 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 four sections. These sections are outlined as follows and are illustrated in Figure 6.1 and Figure 6.2a to Figure 6.2d in Volume 3 of this EIAR:

- Section 1 - Tallaght Road to Rathfarnham Road;
- Section 2 - Nutgrove Avenue to Terenure Road North – Grange Road, Rathfarnham Road;
- Section 3 - Terenure Road North to Charleville Road – Terenure Road East, Rathgar Road; and
- Section 4 - Charleville Road to Dame Street.

6.3.2 Section 1 – Tallaght Road to Rathfarnham Road

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 junction 11 of the M50 and the R114 Rathfarnham Road at Terenure Cross. Section 1 commences on the R137 Tallaght Road east of the M50 junction 11. Section 1 is approximately 3.7km in length and consists of the R137 Tallaght Road and R137 Templeogue Road up to Terenure Cross.

6.3.2.1 Pedestrian Infrastructure

The R137 Tallaght Road and Templeogue Road between the Spawell Roundabout and the R817 Cypress Grove Road benefit from a segregated footpath on the northern side of the road of approximately 3.0m wide. On the southern side of the road there are intermittent walking facilities. There is a roadside footpath which provides access to the Spawell Service Station, but this is followed by a break in provision of approximately 385m without any crossing facilities. The path re-emerges as a segregated footpath beginning at a bus stop to the west of the four-arm roundabout with Spawell Road and is then continuous along the R137 Templeogue Road.

Between the junctions with the R817 Cypress Grove Road and the R112 Templeville Road, footpaths and public lighting are provided on both sides of the R137 Templeogue Road. In general, the footpaths are approximately 1.8m wide. Shared walking and cyclist space is present adjacent to the R137 Templeogue Road, west of the Templeogue Road / Templeogue House junction. Between the R112 Templeville Road and Fortfield Road, the footpath along the southern side of the R137 Templeogue Road becomes segregated from the carriageway by

an approximately 2.0m wide grass verge. The footpath on the northern side of the carriageway is approximately 1.5m wide.

From Fortfield Road to the R114 Rathfarnham Road, there is a narrow roadside footpath along northern side of the carriageway of approximately 1.5m wide. The pedestrian facilities on the southern side of the road are segregated from the carriageway by a stone wall and approximately 3.0m wide grass verge from Fortfield Road for approximately 750m north-east until the pedestrian and cycle access to Rathdown Drive; at this point they re-join Templeogue Road. There is streetlighting throughout.

Rathdown Drive, Rathdown Crescent and Rathdown Park are residential streets which broadly run parallel to the R137 Templeogue Road and provide an alternative link to the R114 Rathfarnham Road (Section 2 of the Proposed Scheme) which bypasses Terenure Village Centre. There is a footpath of approximately 1.8m wide provided the southern side of Rathdown Drive, and on both sides of the road along Rathdown Crescent and Rathdown Park. Controlled pedestrian crossing facilities (i.e. signalised and/or zebra crossings) can be found at the following locations and benefit from dropped kerbs and tactile paving:

- On each arm of Spawell Roundabout, a four-arm roundabout between the R137 Tallaght Road, L4019 Wellington Lane, R137 Templeogue Road and L4023 Spawell Road (staggered toucan crossing with guard rails on the southern, eastern and western arms and a direct crossing on the northern arm);
- At the accesses to The Contract Bridge Association of Ireland on the northern side of the road and Cheeverstown House on the southern side of the road (staggered toucan crossing with guard rails, both substandard in relation to width);
- On two arms of the four arm signalised crossroads junction between the R137 Templeogue Road, R187 Cypress Grove Road and R817 Old Bridge Road, on all but the R137 Templeogue Road eastern and southern arms (staggered toucan crossing with guard rails);
- A signalised raised table crossing in Templeogue Village, approximately 18m east of the service station exit;
- Across all arms of the signalised crossroads junction at the R137 Templeogue Road, R112 Templeville Road and R112 Springfield Avenue (standard crossing with guard rails).
- Across the R137 Templeogue Road northern and southern arms of the signalised crossroads junction with Fortfield Road and Bushy Park House (pelican crossings without guard rails). The two minor arms have uncontrolled crossings;
- At the access to Rathdown Avenue and Terenure College there is a pelican crossing across the R137 Templeogue Road (without guard rails);
- At the access to Lakelands Park there is a pelican crossing across the R137 Templeogue Road (without guard rails); and
- Across the R137 Templeogue Road and R818 Terenure Road West arms of the three-arm signalised junction immediately west of Terenure Cross (pelican crossings without guard rails).

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 Impact Assessment) in Volume 4 of this EIAR.

6.3.2.2 Cycling Infrastructure

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

- Segregated two-way cycle track approximately 2.0m wide on the northern side of the R137 Tallaght Road and Templeogue Road between the M50 Interchange and the access to Templeogue House. The path links to the overbridge crossing of the M50 Motorway which provides pedestrian and cycle access to Tallaght to the west. The two-way cycle track is off-road, offering an increased level of service to users;
- Segregated cycle track for approximately 785m on the R137 Tallaght Road, to the east of Cheeverstown House;
- On-road cycle lanes of approximately 1.25m wide on R817 Cypress Grove Road, mandatory 70m, and then on-road advisory cycle lanes present;
- Through Templeogue Village, the cycle lane moves off-road for approximately 130m where it is segregated from the carriageway by parking bays;
- At the R137 Templeogue Road / R112 Templeville Road / R112 Springfield Avenue signalised crossroads, there are toucan crossings while at the Fortfield Road signalised junction, cyclists are required to share green time with the vehicular traffic phase or dismount and cross at the pedestrian crossings;
- On-road advisory cycle lane approximately 1.25m wide approaching the junction with the R112 Templeville Road and Springfield Avenue;
- On-road advisory cycle lane approximately 1.0m wide, travelling 1km northbound on R137 Templeogue Road, from the Terenure College access gate;
- Two-way off-road shared walking and cyclist facility through Bushy Park travelling southbound; and
- On-road advisory cycle lane of approximately 1.0m wide between Rathdown Drive and Terenure Cross at Rathfarnham Road.

There are three locations of Sheffield cycle parking stands in proximity to Section 1 of the Proposed Scheme. The first is located to the east of Templeogue Village where there are four stands (able to accommodate up to eight bicycles). Another is located on Rathdown Avenue to the north of Bushy Park also comprising four stands. At the corner of Terenure Cross, on the eastern side of the R114 Rathfarnham Road, there are a further six Sheffield stands (able to accommodate up to 12 bicycles). These six Sheffield stands are also designated Bleeperbike cycle parking racks. There are no DublinBikes cycle hire locations along Section 1 of the Proposed Scheme.

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 Impact Assessment) in Volume 4 of this EIAR.

6.3.2.3 Bus Infrastructure

6.3.2.3.1 Bus Priority Measures

Bus lanes are intermittent along Section 1 of the Proposed Scheme, but are present at the following locations:

- In both directions between Spawell Service Station and Spawell Roundabout, operating 24 hours;
- Northbound between Spawell Roundabout and 90m west of R817 Cypress Grove Road, operating 24 hours (no designated bus lane southbound, however, there are three traffic lanes);
- Northbound between the east of Templeogue Village (out the Hollingsworth Cycles shop) and Springfield Avenue/ Templeville Road.
- Between the majority of Springfield Road and Fortfield Road, operating 24 hours; and

- Northbound for approximately 420m from Rathdown Avenue, operating Monday to Saturday between 07:00 – 10:00 and 12:30 – 19:00.

6.3.2.3.2 Bus Stop Facilities

There are currently 19 bus stops along Section 1 of the Proposed Scheme: The inbound stops are as follows:

- Stop 2599 on R137 Tallaght Road, 100m west of Wellington Lane;
- Stop 2600 on R137 Templeogue Road, at Cheeverstown House;
- Stop 1155 on R137 Templeogue Road, 100m east of R817 Cypress Grove Road;
- Stop 1157 on R137 Templeogue Road, in the centre of Templeogue;
- Stop 1158 on R137 Templeogue Road, 30m north of Springfield Road;
- Stop 1159 on R137 Templeogue Road, 90m north of Fortfield Road;
- Stop 1160 on R137 Templeogue Road, 70m north of Rathdown Avenue;
- Stop 1161 on R137 Templeogue Road, 30m north of Lakelands Park;
- Stop 1162 on R137 Templeogue Road, 30m north of Rathdown Park; and
- Stop 1163 on R137 Templeogue Road, 60m north of Fergus Road.

The outbound stops are:

- Stop 1121 on R137 Templeogue Road, 80m north of Fergus Road;
- Stop 1122 on R137 Templeogue Road, 40m south of Rathdown Park;
- Stop 1123 on R137 Templeogue Road, 30m south of Lakelands Park;
- Stop 1124 on R137 Templeogue Road, 50m north of Rathdown Avenue;
- Stop 1125 on R137 Templeogue Road, 90m south of Bushy Park House;
- Stop 1127 on R137 Templeogue Road, in the centre of Templeogue;
- Stop 1130 on R137 Templeogue Road, 60m east of R817 Cypress Grove Road;
- Stop 2550 on R137 Templeogue Road, 40m west of Cheeverstown access; and
- Stop 2551 on R137 Tallaght Road, 130m west of Wellington Lane.

Bus stops in Templeogue Village are indented, alongside stop 1130, all other bus stops are situated inline with bus lanes. The majority of bus stops comprise static timetable information and accessible kerbs while only four include RTPI. Just under half of bus stops include shelters and seating.

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

Table 6.6: Section 1 – Availability of Bus Stop Facilities (of a Total 19 no. Bus Stops)

Bus Stop Facility	Number of Bus Stops in Baseline with Facility	Percentage of Bus Stops in Baseline with Facility
RTP1	4	21%
Timetable information	14	74%
Shelter	8	42%
Seating	6	32%
Accessible Kerbs	11	58%
Indented Drop Off Area	3	16%

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 which 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
15	Clongriffin – Killester Park – St Joseph’s School – Connolly Rail Station – Richmond Hill – Templeogue Post Office – Templeogue Bridge – Ballycullen Road	10 minutes	30 minutes
49	Pearse Street – Kenilworth Park - Templeogue Post Office – Templeogue Bridge – Ballycullen Road – Old Bawn Road – Tallaght (The Square)	30 minutes	45 minutes
49N	D’Olier Street – Rathgar Road – Templeogue Road – Dodder Valley Park – Old Bawn Road – Belgard Square – Mayberry Road	NA	120 minutes (3 services run at 00:00; 02:00; 04:00)
54A	Trinity College – Dublin City South – Templeogue College – Tallaght Road – Basketball Arena – Tallaght Village – Tallaght Hospital - Tallaght (The Square) – Marfield Drive	30 minutes	30 minutes (Saturday), 60 (Sunday)
65	Poolbeg Street – Richmond Hill – Templeogue Post Office – Templeogue Bridge – Cheeverstown House – Spawell Centre – Tallaght Hospital – Killinarden – Valleymount Road	60-120 minutes	90-120 minutes
65B	Poolbeg Street – Richmond Hill – Templeogue Post Office – Templeogue Bridge – Greenfield Park – Old Bawn Road – Jobstown – Citywest – Bianconi Avenue	60 minutes	60 minutes

6.3.2.4 General Traffic

6.3.2.4.1 R137 Templeogue Road

The R137 Tallaght Road (west of the Spawell Roundabout) and R137 Templeogue Road are dual carriageways with three lanes in both directions (two lanes for all traffic and a bus lane) with the dual arrangements as far as the Cypress Grove Road junction. The carriageway is subject to a 60km/h speed limit before reducing to 50km/h west of Corrybeg estate. Following the Cypress Grove Road junction the R137 Templeogue Road carriageway becomes single lane in both directions with non-continuous sections of bus lane as far Terenure Place.

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

- Spawell four-arm roundabout;

- R137 Templeogue Road / R817 Cypress Grove Road and Old Bridge Road four-arm signalised junction;
- R137 Templeogue Road / R112 Templeville Road and Springfield Avenue four arm signalised junction;
- R137 Templeogue Road / Fortfield Road / Bushy Park House four arm signalised junction; and
- R137 Templeogue Road / R818 Terenure Road West / R137 Terenure Place three-arm signalised junction.

The characteristics of each major junction is described in turn below, alongside satellite images which are extracts from Figure 6.6 in Volume 3 of this EIAR.

Spawell four-arm Roundabout: The R137 Tallaght Road has three entry lanes, the left lane is for left movements only (except buses), the centre lane is for ahead movements only and the right lane is for ahead and right movements. There are two lanes for exiting onto the R137 Tallaght Road. The R137 Templeogue Road also has three entry lanes (same arrangement) and three exit lanes, two of which are for all traffic and one for buses only.

The L4019 Wellington Lane has two entry lanes, the left lane for all movements and the right lane for right turn only movements, and two lanes on exit from the roundabout which shortly merge into one lane. The L4023 Spawell Road has an entry lane for left movements, one for ahead and left movements and a right turn flare lane. There are two lanes on exit from the roundabout onto the L4023 Spawell Road, merging to one lane.

These characteristics are illustrated in Image 6.1.

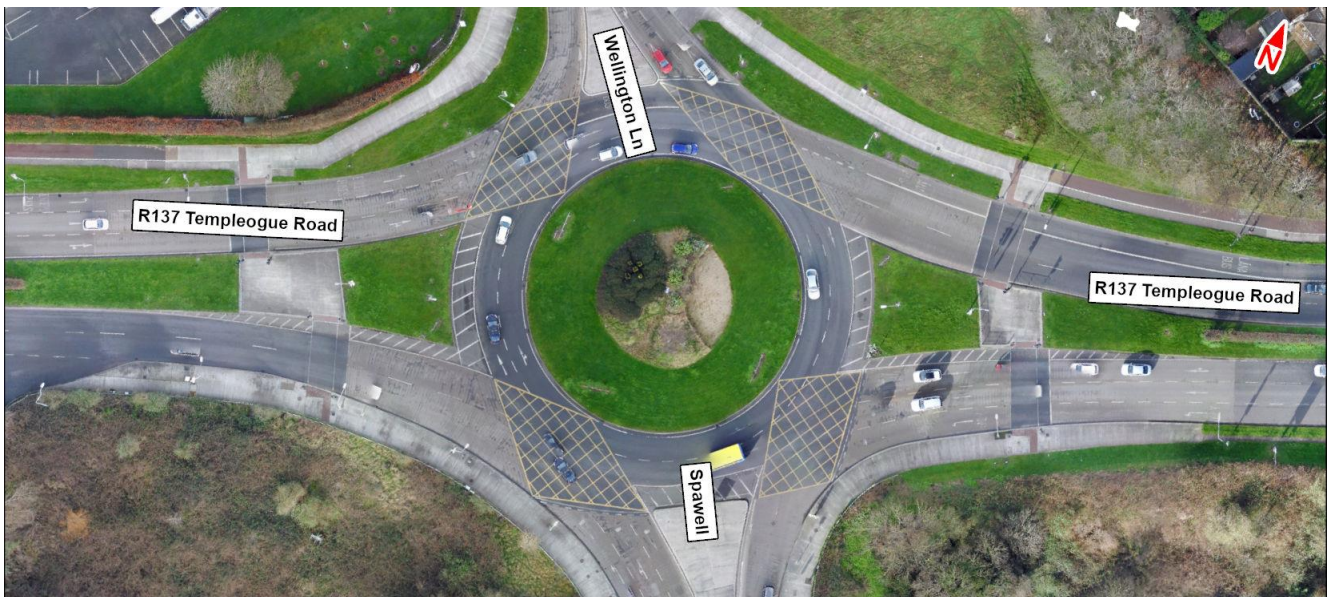


Image 6.1: Spawell Roundabout

R137 Templeogue Road / R817 Cypress Grove Road / Old Bridge Road four-arm signalised junction: At the R137 Templeogue Road / R817 four-arm signalised crossroads, the R137 Templeogue Road eastbound approach arm has a left turn lane, an ahead lane and two right turn lanes segregated by a traffic island. The westbound exit has two lanes onto this arm.

The R137 Templeogue Road East arm has three lanes, the left lane for left turn and ahead movements, the centre lane for ahead movements only and the far side lane for right turn movements only. There is storage in the yellow

box of the crossroads for one vehicle turning right from three of the arms (all except the R137 Templeogue Road West arm). The eastbound exit is a wide single lane of approximately 4m in width and a mandatory cycle lane approximately 1.25m wide.

The R187 Cypress Grove Road approach arm has two lanes, one for left and ahead movements and the one for right turn movements. There is a mandatory cycle lane approaching the junction approximately 1.25m wide with an advanced stacking location, and a raised cycle lane by approximately 25.0m from the main carriageway exiting from the junction. The road markings of the exit lane onto the R817 Cypress Grove is a single lane of approximately 6.0m wide.

The R817 Old Bridge Road approach arm has a left slip lane and a single lane for ahead and right turn movements for buses only. Both lanes are signal-controlled. There is an advanced stacking location on this arm and there are advisory cycle lanes both approaching (for left and ahead movements) and exiting the junction of approximately 1.25m wide. There are two lanes on exit from the junction onto the R817 Old Bridge Road.

The characteristics of the junction are illustrated by Image 6.2.



Image 6.2: R137 Templeogue Road / R817 Cypress Grove Road / Old Bridge Road Signalised Junction

R137 Templeogue Road / R112 Templeville Road / R112 Springfield Avenue four-arm signalised junction: At the four-arm R137 Templeogue Road / R112 signalised crossroads junction, the R137 Templeogue Road South arm has two entry lanes, one for left turn movements and one for ahead movements. Right turn movements onto the R112 Springfield Avenue are not permitted. The exit lane onto this arm is marked as a wide single lane but could accommodate two vehicles side-by-side before narrowing into single file approximately 40.0m from the junction.

The R137 Templeogue Road North entry arm has one lane for ahead and right turn movements and a priority controlled left slip lane that bypasses the signals and gives way to traffic exiting onto the R112 Springfield Avenue. The exit lane onto the R137 Templeogue Road North is a wide single lane of around 6.0m that could accommodate two vehicles side-by-side for approximately 30.0m away from the junction before moving to single file.

The R112 Templeville Road approach arm has two lanes, one for left and ahead movements and one for right turn movements. There is a marked right turn storage box beyond the pedestrian crossing for one vehicle. There is a single lane exit onto this arm. The centre of the junction is a yellow box, and each arm has traffic islands.

The R112 Springfield Avenue approach arm has one lane for ahead movements, one lane for right turn movements and a priority controlled left slip lane that bypasses the signals and gives way to traffic exiting onto the R137 Templeogue Road. There is a single lane exit onto this arm.

The characteristics of the junction are illustrated by Image 6.3.

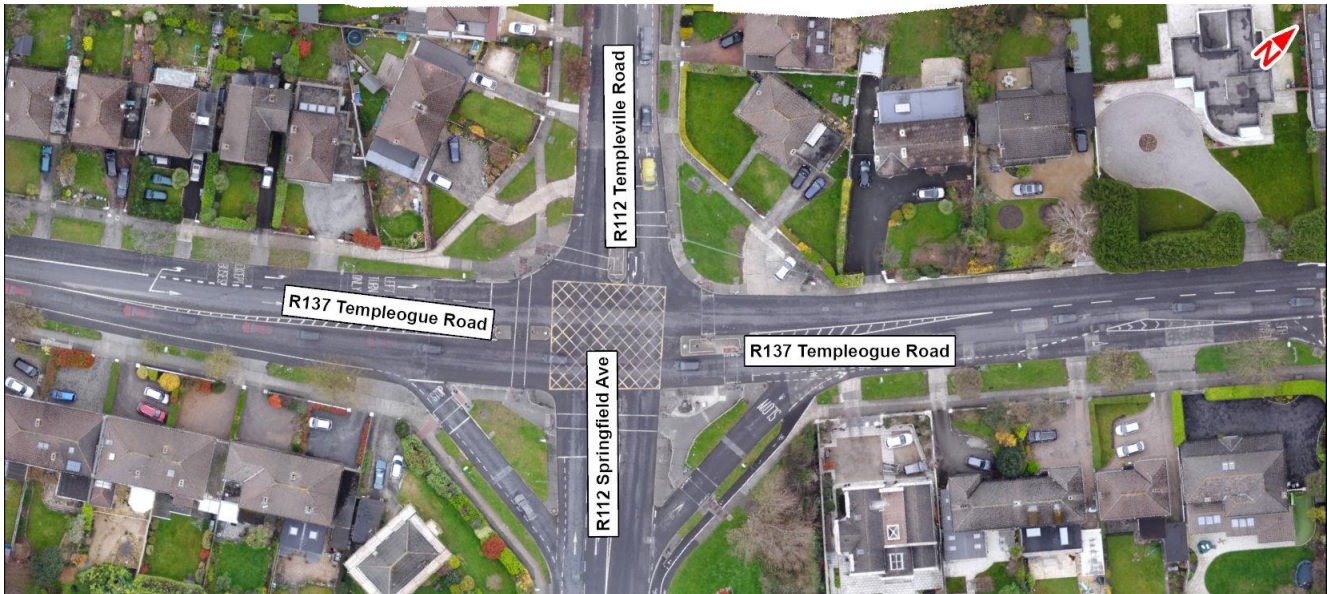


Image 6.3: R137 Templeogue Road / R112 Templeville Road / R112 Springfield Avenue Junction

R137 Templeogue Road / Fortfield Road / Bushy Park House four-arm signalised junction: The R137 Templeogue Road South arm has two entry lanes, the left lane for left turn movements and the right lane for straight ahead and right turn movements. The road markings show one lane exiting onto this arm of approximately 6.0m wide, therefore, able to accommodate two vehicles side-by-side for approximately 40.0m before the left lane becomes a bus lane. The entry and exit lanes are separated by a traffic island and there is a yellow box between the exit lane onto this arm and the R137 Templeogue Road North approach lanes.

The R137 Templeogue Road North arm has one lane entry with a flare lane for left turn movements onto Bushy Park House and to allow vehicles travelling ahead to overtake a vehicle waiting to turn right onto Fortfield Road. There is one lane exiting onto this arm.

Fortfield Road has two lanes on approach to the junction, the left lane for left turn movements and the right lane for ahead and right turn movements onto the R137 Templeogue Road with a right turn filter arrow operating. The exit lane onto this arm is approximately 6.0m wide. The entry and exit lanes are separated by a traffic island.

The Bushy Park House arm has two lane entry, the left lane for left turn and ahead movements and the right lane for right turn movements only. There is one exit lane onto this arm. The entry and exit lanes are separated by an approximately 6.0m wide traffic island. These characteristics are illustrated by Image 6.4.



Image 6.4: R137 Templeogue Road / Fortfield Road / Bushy Park House Junction

R137 Templeogue Road / R818 Terenure Road West / R137 Terenure Place junction three-arm signalised junction: This is a three-arm signalised Y-shaped junction approximately 80.0m east of Terenure Cross. The R137 Templeogue Road and R818 Terenure Road West arms both have one lane approaching and exit the junction respectively. Right turn movements from the R137 Templeogue Road onto the R818 Terenure Road West and vice versa, are not permitted. A left turn movement is allowed from the R137 Templeogue Road to R818 Terenure Road West.

The R137 Terenure Place has two lanes approaching the junction, the left lane for ahead movements (to the R137 Templeogue Road) and the right lane for right turn movements (to R818 Terenure Road West) which are controlled by separate signal timings. There is one lane exiting onto the R137 Terenure Place. There is a yellow box in the centre of the junction.

These characteristics are illustrated by Image 6.5.

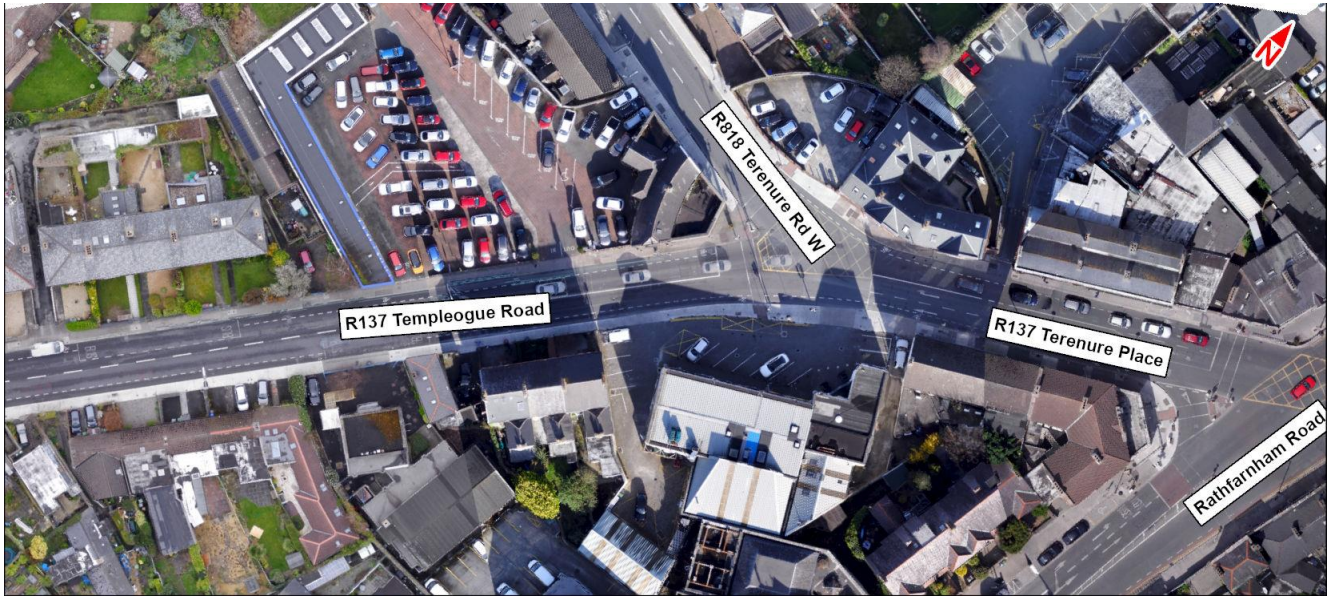


Image 6.5: R137 Templeogue Road / R818 Terenure Road West / R137 Terenure Place Junction

As part of the Proposed Scheme, the residential streets of Rathdown Drive, Rathdown Crescent and Rathdown Park will comprise an alternative route for cyclists between the R137 Templeogue Road and R114 Rathfarnham Road which bypasses the busy Terenure Cross junction. These streets have thus been considered in the baseline. These residential streets are single carriageway with traffic calming measures in the form of raised speed tables.

The key junction arrangements along this alternative cycle route of Section 1 of the Proposed Scheme are as follows:

- Rathdown Drive / Rathdown Crescent three-arm roundabout;
- Rathdown Crescent / Rathdown Park four-arm roundabout; and

Rathdown Drive / Rathdown Crescent three-arm roundabout: The Rathdown Drive east arm of this roundabout comprises one lane in either direction and leads to a no through road. The Rathdown Drive west arm of this roundabout does not contain any road markings, with the exception of double yellow lines on one side of the road. Rathdown Crescent comprises a single carriageway with one lane travelling in each direction.

The roundabout provides cyclist only access to the R137 Templeogue road via the northern (arm) access. A bollard is present at this access to prevent vehicular traffic entering and exiting the roundabout.

These characteristics are illustrated in Image 6.6.



Image 6.6: Rathdown Drive / Rathdown Crescent Roundabout

Rathdown Crescent / Rathdown Park four-arm roundabout: This roundabout is located between the Rathdown Drive / Rathdown Crescent roundabout and the Rathdown Avenue / Rathdown Crescent roundabout. Each arm of this roundabout has a single entry and an exit lane.

These characteristics are illustrated in Image 6.7.



Image 6.7: Rathdown Crescent / Rathdown Park Roundabout

6.3.2.5 Existing Parking & Loading

There is no formal parking present along Section 1 of the Proposed Scheme. The following parking is present at the alternative cycle route, showing parking within the vicinity, however this is noted as informal parking:

- Informal on-street parking is permitted along the residential streets of Rathdown Drive, Rathdown Crescent and Rathdown Park with double yellow lines present approaching and at the corners of junctions. There are no loading bays along these residential streets.

6.3.3 Section 2 – Nutgrove Avenue to Terenure Road North – Grange Road, Rathfarnham Road

This Section outlines the baseline environment for walking, cycling, bus services, general traffic and parking and loading facilities along Section 2 of the Proposed Scheme, between the R821 Nutgrove Avenue and R137 Terenure Road North.

This Section of the Proposed Scheme consists of the R821 Grange Road and the R114 Rathfarnham Road running from the signalised junction with Nutgrove Avenue / Rathfarnham Wood to Terenure Cross, the four arm signalised junction between the R137 Terenure Road North, R114 Terenure Road East, R114 Rathfarnham Road and R137 Terenure Place (which is the end of Templeogue Section of the Proposed Scheme). Section 2 of the Proposed Scheme is approximately 1.8km in length and travels through a predominantly residential area.

A proposed alternative quiet route for cyclists as part of the Proposed Scheme travels eastbound from the R114 Rathfarnham Road to the R114 Terenure Road East comprising the residential streets; Bushy Park Road, Wasdale Park, Wasdale Grove, Victoria Road, Zion Road and Orwell Road. This provides a quiet cycle route connection between Sections 2 and 3 of the Proposed Scheme.

6.3.3.1 Pedestrian Infrastructure

There are continuous walking facilities provided along Section 2 of the Proposed Scheme, with footways and public lighting provided on both sides of the carriageway along the entirety of this section. In general, the footways are approximately 1.8m wide.

Between the start of the Proposed Scheme, at the R822 Grange Road, and the R115 Rathfarnham Road / R821 Grange Road / R115 Willbrook Road three-arm signalised junction, the footway on the north-eastern side of the road also accommodates an off-road cycle path which is delineated by a white line.

Along Bushy Park Road, Wasdale Park, Wasdale Grove, Victoria Road and Zion Road and Orwell Road there are footways on each side of the carriageway with a minimum width of 1.8m wide.

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

- At three arms of the R821 Nutgrove Avenue and Grange Road / L8385 Rathfarnham Wood / R822 Grange Road four-arm signalised junction. A traffic island with pedestrian refuge is present at the R822 Grange Road arm;
- At the R822 Grange Road and R115 Willbrook Road arms of the three-arm signalised junction with the R115 Rathfarnham Road, there are signalised crossings. A traffic island with pedestrian refuge is present on the R115 Willbrook Road arm;
- Across the dual carriageway section of the R114 Rathfarnham Road, approximately 100m south of the car park access for Rathfarnham Castle, there is a staggered pelican crossing with guardrails;
- At the four-arm signalised junction between the R114 Rathfarnham Road, L8103 Castlevue and L4014 Main Street, across all arms except the R114 Rathfarnham Road North arm. Traffic islands with pedestrian refuge are present at the L8103 Castlevue and R114 Rathfarnham South arms;
- At each arm of the four-arm signalised junction between the R114 Rathfarnham Road and the R112 Dodder View and Dodder Park Roads, there are signalised crossings on all arms. There is pedestrian refuge on the traffic islands on the R112 arms;

- Across the R114 Rathfarnham Road North and Bushy Park Road arms of the signalised three arm junction there are pelican crossings without guardrails. There is also a pedestrian refuge on the traffic island in the R114 Rathfarnham Road North arm;
- At Terenure Cross, there are staggered signalised crossings with guard rails of the R137 Terenure Place and Terenure Road North Arms. The crossings of the R114 Rathfarnham Road and Terenure Road East are uncontrolled. Pedestrian refuge on the traffic islands is present on all crossings except for R114 Terenure Road East arm; and
- At all arms at the Orwell Road / Zion Road three-arm signalised junction there are signalised pedestrian crossings. The slip road from Zion Road onto Orwell Road has an uncontrolled crossing.

Uncontrolled crossings across priority junctions at side roads benefit from dropped kerbs. The locations of the pedestrian crossings are 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 footway widths) at each junction along Section 2 of the Proposed Scheme is included in Appendix A6.4.1 (Pedestrian Impact Assessment) in Volume 4 of this EIAR.

6.3.3.2 Cycling Infrastructure

Existing cycle facilities along Section 2 of the Proposed Scheme are as follows:

- Off-road cycle facility travelling southbound on Grange Road between the R822 Grange Road and the R115 Willbrook Road. Cyclists share the bus lane travelling northbound;
- On-road mandatory cycle lanes approximately 1.25m wide approximately 50m south of Crannagh Road to Brookvale Road; and
- On-road cycle lane travelling southbound for the majority of carriageway between Brookvale Road and the R114 Terenure Road East. The cycle lane varies between advisory and mandatory. Cyclists share the bus lane travelling northbound.

There are a total of 11 Sheffield cycle parking stands (able to accommodate up to 22 bicycles) along the L4014 Main Street. There are five Sheffield cycle parking stands and six secure parking lockers at bus stop 1329 on Grange Road, outside the St Mary's School access. Immediately north of the R114 Rathfarnham Road / R122 Dodder Park Road and Dodder View Road junction, there are a further four Sheffield stands (able to accommodate up to eight bicycles) on the eastern side of the road. There are no DublinBikes cycle hire locations along Section 2 of the Proposed Scheme.

The existing cycle facilities along Section 2 of the Proposed Scheme is illustrated in Figure 6.4b in 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 Impact Assessment) in Volume 4 of this EIAR.

6.3.3.3 Bus Infrastructure

6.3.3.3.1 Bus Priority Measures

Bus lanes are intermittent along Section 2 of the Proposed Scheme, but are present at the following locations:

- Northbound between the R821 Nutgrove Avenue and R115 Willbrook Road, operating Monday to Saturday between 07:00 – 19:00;
- In both directions between the R114 Butterfield Avenue and L4014 Main Street, operating Monday to Saturday between 07:00 – 19:00;

- Northbound between Brookvale Road and the R112 Dodder View Road, operating Monday to Saturday between 07:00 – 19:00;
- Northbound between Westbourne Road and Rathdown Park, operating Monday to Saturday between 07:00 – 10:00 and 12:30 – 19:00; and
- Northbound between Fergus Road and the R114 Terenure Road East, operating Monday to Saturday between 07:00 – 10:00 and 12:30 – 19:00.

Outside of the above locations, there is no bus lane provision. Therefore, there is very limited bus lane provision travelling southbound.

6.3.3.3.2 Bus Stop Facilities

There are 18 bus stops along Section 2 of the Proposed Scheme. The inbound stops are as follows:

- Stop 1329 on R821 Grange Road, 80m west of Rathfarnham Wood;
- Stop 1330 on R821 Grange Road, 70m south of Willbrook Road;
- Stop 1331 on R114 Rathfarnham Road, 90m north of Butterfield Avenue;
- Stop 1332 on R114 Rathfarnham Road, 30m north of Village Green;
- Stop 1333 on R114 Rathfarnham Road, 100m north of Brookvale Road;
- Stop 1334 on R114 Rathfarnham Road, 60m north of R112 Dodder Park Road;
- Stop 7293 on R114 Rathfarnham Road, 50m north of Westbourne Road;
- Stop 1335 on R114 Rathfarnham Road, 40m north of Bushy Park Road; and
- Stop 1336 on R114 Rathfarnham Road, opposite Beechlawn Way.

The outbound stops are:

- Stop 1320 on R822 Grange Road, 30m south of R821 Nutgrove Avenue;
- Stop 1299 on R114 Rathfarnham Road, 10m south of Cormac Terrace;
- Stop 1300 on R114 Rathfarnham Road, 45m north of Westbourne Road;
- Stop 1301 on R114 Rathfarnham Road, 50m south of Dodder Park Road;
- Stop 1302 on R114 Rathfarnham Road, 30m north of Crannagh Road;
- Stop 1303 on R114 Rathfarnham Road, 90m south of Castleside Drive;
- Stop 1304 on R114 Rathfarnham Road, 60m north of Butterfield Avenue; and
- Stop 1305 on R821 Grange Road, 80m south of Willbrook Road.
- Stop 1306 on R821 Nutgrove Road, 50m east of Grange Road.

All bus stops along this section are inline along the carriageway, usually accommodated within the bus lane. The majority of bus stops along this section do not have RTPI but do provide basic timetable information. Approximately half of the bus stops provide shelters and seating and most provide accessible kerbs.

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

Table 6.8: Section 2 – Availability of Bus Stop Facilities (of a Total 18 no. Bus Stops)

Bus Stop Facility	Number of Bus Stops in Baseline with Facility	Percentage of Bus Stops in Baseline with Facility
RTPI	2	11%

Bus Stop Facility	Number of Bus Stops in Baseline with Facility	Percentage of Bus Stops in Baseline with Facility
Timetable information	15	83%
Shelter	11	61%
Seating	10	55%
Accessible Kerbs	16	89%
Indented Drop Off Area	0	0%

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 which operate along Section 2 are outlined in Table 6.9.

Table 6.9: Section 2 – Bus Service Frequency

Service	Route	Typical Service Frequency	
		Weekday	Weekend
15B	Merrion Square – Rathmines St Mary’s College – Rathfarnham Dodder Park – Ballyboden Road – Stocking Lane – Knocklyon Dalriada	15 minutes	15 minutes (Saturday), 30 minutes (Sunday)
15D	Merrion Square – Rathmines St Mary’s College – Rathgar Village – Terenure Meadowbank – Rathfarnham Castle – Ballyboden Road – Edmonstown Ballyboden Church	2 services (15:00 and 16:45)	NA
16	Dublin Airport – Cloghan Service Station – Drumcondra Rail Station – Terenure Cross – The Grande – Ballinteer	12 minutes	15 minutes
17	Blackrock Station – Notre Dame School – St Mary’s School – Terenure Cross – Royston Village – Rialto Church	20 minutes	30 minutes
17D	Dundrum Luas – Whitebarn Road – Rathfarnham Road – Crannagh Road – Terenure – Kimmage Road West – Armagh Road – Clogher Road – Rialto Church	1 service (06:40)	1 service (06:40 Saturday, 09:40 Sunday)
61	Eden Quay – Ramleh Park – Nutgrove Avenue – Rathfarnham Church – Grange Golf Club – Reckett’s Factory – Rockbrook	75 minutes	60 minutes
75	Tallaght (The Square) - Tallaght Hospital – Willbrook Road – Rathfarnham Wood – Hazel Villas – Foxrock Church – Deansgrange Village – Kill of The Grange – Dun Laoghaire Station	30 minutes	30 minutes
75A	Tallaght (The Square) - Tallaght Hospital – Willbrook Road – Rathfarnham Wood – Hazel Villas – Foxrock Church – Deansgrange Village – Kill Valley – Dun Laoghaire Station	2 services (06:42 and 07:42)	NA

6.3.3.4 General Traffic

6.3.3.4.1 R114 Grange Road / Rathfarnham Road

The R114 Grange Road / Rathfarnham Road along Section 2 of the Proposed Scheme is single carriageway, generally with one lane for all traffic in each direction and intermittent sections with an additional lane for buses. For a section of approximately 300m between the junctions with the R114 Butterfield Avenue and the L8103 Castleside Drive, the road has a general traffic lane and a bus lane in both directions. The road generally travels in a south to north direction and is subject to 50km/h speed limit.

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

- R821 Nutgrove Avenue and Grange Road / L8385 Rathfarnham Wood / R822 Grange Road four-arm signalised junction;

- R115 Rathfarnham Road / Grange Road / Willbrook Road three-arm signalised junction;
- R114 Rathfarnham Road / R115 Rathfarnham Road / R114 Butterfield Avenue three-arm signalised junction;
- R114 Rathfarnham Road / L8103 Castleside Drive / L4014 Main Street four-arm signalised junction;
- R114 Rathfarnham Road / R112 Dodder Park Road / R112 Dodder View Road;
- R114 Rathfarnham Road / Rathdown Park three-arm signalised junction;
- R114 Rathfarnham Road / Bushy Park Road three-arm signalised junction; and
- Terenure Cross four-arm signalised junction.

R821 Nutgrove Avenue and Grange Road / L8385 Rathfarnham Wood / R822 Grange Road four-arm signalised junction: The R821 Grange Road and Nutgrove Avenue arms of the junction each have two lanes approaching and one exit lane.

The R821 Grange Road arm left lane is for left and ahead movements and the right lane is for right turn movements. There is storage beyond the stop line for one vehicle waiting to turn right onto the R822 Grange Road.

The R821 Nutgrove Avenue approach arm left lane is for left movements and the right lane is for ahead and right turn movements. The L8385 Rathfarnham Wood arm has one lane approaching and exiting the junction. The R822 Grange Road arm has two lanes approaching the junction, the left lane is for left turn movements and the right lane is for ahead and right turn movements. An advanced stacking location is provided for ahead and right turn movements by cyclists. There is one lane exiting onto this arm and a traffic island between the entry and exit lanes. The centre of the junction comprises a yellow box.

These characteristics are illustrated in Image 6.8.



Image 6.8: R821 Grange Road / R821 Nutgrove Avenue / L8385 Rathfarnham Wood / R822 Grange Road Junction

R115 Rathfarnham Road / Grange Road / Willbrook Road three-arm signalised junction: This junction is approximately 340m north of the start of this route section. The R115 Rathfarnham Road arm comprises two entry

lanes, one each for ahead and right turn movements, and two exit lanes. A priority junction with the L8451 St Mary's Avenue leads off this arm immediately north of the junction.

The R821 Grange Road arm comprises two entry lanes, one each left and ahead movements and a single lane on exit from the junction. The R115 Willbrook Road comprises one entry and exit lane separated by a traffic island. The centre of the junction comprises a yellow box. These characteristics are indicated by Image 6.9.



Image 6.9: R115 Rathfarnham Road / R115 Willbrook Road / R821 Grange Road Junction

R114 Rathfarnham Road / R115 Rathfarnham Road / R114 Butterfield Avenue three-arm signalised junction: This junction is located approximately 100m north of the R115 Rathfarnham Road / R821 Grange Road / R115 Willbrook Road junction. The R114 Rathfarnham Road North arm has three approach lanes and two exit lanes, one of which is a bus lane. Two approach lanes are allocated for ahead movements and the far side lane is for right turn movements. There is storage beyond the stop line for one vehicle turning right onto the R114 Butterfield Avenue. The R115 Rathfarnham Road South arm has two entry lanes, the left for left turn movements and the right for ahead movements and has two exit lanes.

The R114 Butterfield Avenue arm has three entry lanes; one for left turn movements and two for right turn movements onto R115 Rathfarnham Road South, the far side of which is a flare lane of approximately 90.0m long. The right and left turn movements are controlled by separate signal heads. There are two lanes exiting onto the R114 Butterfield Avenue. Each arm of the junction features traffic islands and there is a yellow box across the R114 Rathfarnham Road southbound movement.

The characteristics of this junction are illustrated in Image 6.10.

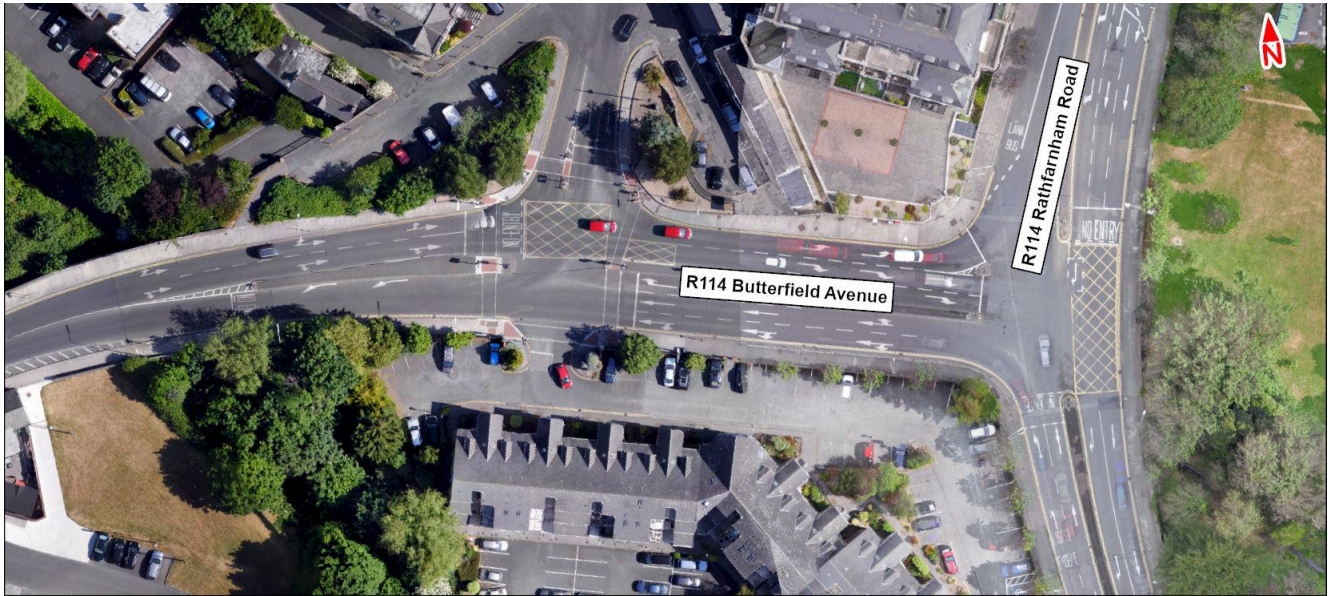


Image 6.10: R114 Rathfarnham Road / R114 Butterfield Avenue / R115 Rathfarnham Road Junction (Right)

R114 Rathfarnham Road / L8103 Castleside Drive / L4014 Main Street four-arm signalised junction: This junction has one lane on entry and exit from the junction at both the L8103 Castleside Drive and L4014 Main Street arms. The R114 Rathfarnham Road North and South arms each have three entry lanes, one for right, ahead and left movements respectively and two exit lanes. Both arms have a central reservation and provide a storage box for one vehicle waiting to turn right from the R114 Rathfarnham Road North onto the L4014 Main Street and from the R114 Rathfarnham Road South onto the L8103 Castleside Drive, marked by white lining. The signals include a right turn filter arrow phase for each of these movements.

These characteristics are illustrated in Image 6.11.



Image 6.11: R114 Rathfarnham Road / L8103 Castleside Drive / L4014 Main Street Junction

R114 Rathfarnham Road / R112 Dodder Park Road / R112 Dodder View Road four-arm signalised junction:

This is a four-arm signalised junction. Each arm provides three entry lanes. The R114 Rathfarnham Road North and South arms have a lane each for right, ahead and left turn movements respectively and one lane on exit from the junction without traffic islands.

The R112 Dodder Park Road and Dodder View Road allocate the left lane for left and ahead movements, the middle lane for ahead movements only and the right lane for right movements only. Both arms also provide a wide single lane exit, of approximately 6.0m and able to accommodate two vehicles side-by-side, before shortly indicating a merge arrow to merge into one lane approximately 40.0m away from the junction. There are traffic islands present on the R112 Dodder Park Road and Dodder View Road arms.

These characteristics are illustrated by Image 6.12.



Image 6.12: R114 Rathfarnham Road / R112 Dodder Park Road / R112 Dodder View Road Junction

R114 Rathfarnham Road North and South / Rathdown Park three-arm signalised junction: The R114 Rathfarnham Road North arm has two entry lanes, one for ahead and for right turn movements respectively, and two exit lanes. The R114 Rathfarnham Road South arm has two entry lanes with an advanced stacking location. The left lane is for left turn movements and the right lane is for ahead movements. There is a single exit lane onto the R114 Rathfarnham Road South arm. The Rathdown Park arm has one entry and exit lane respectively, separated by a traffic island. There is a yellow box in the centre of the junction.

R114 Rathfarnham Road North and South / Bushy Park Road three-arm signalised junction: Approximately 50.0m north of the junction described above is another three-arm signalised junction which comprises R114 Rathfarnham Road North and South, and Bushy Park Road. The R114 Rathfarnham Road North arm has one entry and exit lane separated by a traffic island. An advanced stacking location is provided. The Bushy Park Road arm has two entry lanes, the left lane is for left turn movements and the right lane allows left and right turn movements. There is a single exit lane onto this arm of approximately 4.0m wide. The R114 Rathfarnham Road South arm has two entry and exit lanes respectively. The left entry lane is for ahead movements and the right is for right turn movements. An advanced stacking location is provided and there is a yellow box in the centre of the junction.

Both above junctions can be seen in Image 6.13.



Image 6.13: R114 Rathfarnham Road / Rathdown Park Junction (Right) and R114 / Bushy Park Road Junction (Left)

Terenure Cross four-arm signalised junction: This junction comprises the R137 Terenure Road North, R114 Terenure Road East, R114 Rathfarnham Road and R137 Terenure Place arms. The R137 Terenure Road North arm has two entry lanes and an approximately 6.0m wide single exit lane separated by a traffic island. The left entry lane is for left and ahead movements and the right lane is for right and ahead movements. An advanced stacking location is provided, and the cycle lane continues through the junction.

The R114 Terenure Road East arm has one entry and exit lane respectively with a left turn filter arrow phase for movements onto the R114 Rathfarnham Road. An advanced stacking location is provided.

The R114 Rathfarnham Road arm has two entry lanes and a one exit lane separated by a traffic island. The left lane is for left turn movement (except buses) and becomes a yield to the R137 Terenure Place by way of a short slip lane, beyond the stop line. The right lane is for ahead movements only as right turns onto the R114 Terenure Road East are not permitted. An advanced stacking location is provided.

The R137 Terenure Place arm comprises one lane entry for left and ahead movements with a right turn flare lane of approximately 11.0m in length. The right turn movement is restricted to buses only from Monday to Saturday between the hours of 07:00 – 10:00 and 16:00 – 19:00. Outside these times, general traffic can turn right. Exit onto the R137 Terenure Place is one lane which shortly widens to two lanes. There is a yellow box in the centre of the junction.

The characteristics of this junction are illustrated in Image 6.14.

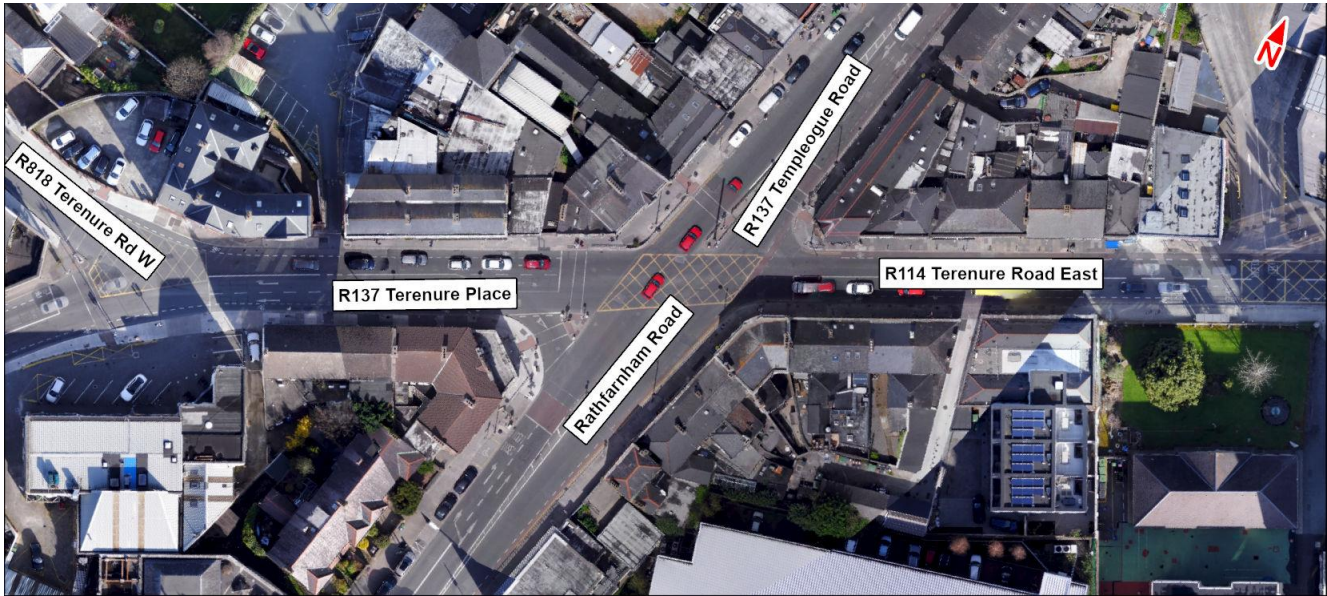


Image 6.14: Terenure Cross Junction

6.3.3.4.2 Orwell Road

Within the redline boundary of the Proposed Scheme, Orwell Road is a single carriageway routing in a north-south direction between Zion Road and the R114 Terenure Road East. There is one lane of traffic travelling in each direction and double yellow lines on both sides of the road.

The key junction along this section of road is the following:

Orwell Road / Zion Road three-arm signalised junction: The Orwell Road north arm has two lanes approaching and exiting the junction respectively. The left approach lane is for straight ahead movements and the right lane is for right turn movements onto Zion Road. One exit lane leads from Orwell Road south and the other leads from a left-slip lane from Zion Road. There is a yellow box across the two approach lanes in front of the St Peter's School access.

The Orwell Road south arm has a single lane approaching and exiting the junction respectively. There is a yellow box in the centre of the junction across the Orwell Road northbound lane, in front of Zion Road.

Zion Road has a single lane approaching and exiting the junction respectively, with an additional left-slip lane onto the Orwell Road north arm, yielding to northbound traffic along Orwell Road.

These features are illustrated in Image 6.15



Image 6.15: Orwell Road / Zion Road Signalised Junction

6.3.3.5 Existing Parking & Loading

There are parking or loading restrictions along most of Section 2 of the Proposed Scheme, which is marked by double yellow lines throughout. Parking can be found at the following locations:

- Seven designated pay and display and permit parking spaces on Grange Road/ Rathfarnham Road between Grange Road and Dodder Park Road, immediately north of St Mary's Avenue; and
- 14 designated pay and display and permit spaces and one disabled space on the R114 Rathfarnham Road between Cormac Terrace and Terenure Road East.

Further parking is provided on side roads and off-street car parks along Section 2 of the Proposed Scheme:

- A number of off-street spaces at the Bring Centre car park, off Grange Road and adjacent to the R821 Nutgrove Avenue / R821 Grange Road / R822 Grange Road signalised junction;
- 14 designated pay and display and permit spaces on Fergus Road in operation from 07:00-24:00 Monday – Saturday; and
- Informal spaces on Cormac Terrace.

There are no loading bays along Section 2 of the Proposed Scheme.

6.3.4 Section 3 – Terenure Road North to Charleville Road – Terenure Road East, Rathgar Road

This Section outlines the baseline environment for walking, cycling, bus services, general traffic and parking / loading facilities along Section 3 of the Proposed Scheme, between R137 Terenure Road North and Charleville Road. This Section of the Proposed Scheme runs from the R137 Terenure Road North at Terenure Cross to the four-arm junction between the R114 Rathgar Road East and South, Grosvenor Road and Charleville Road. The extent of Section 3 of the Proposed Scheme is approximately 1.8km in length and travels through a predominately residential area between Terenure, Rathgar and Rathmines Village Centres.

Additionally, the Proposed Scheme includes the R137 Terenure Road North and R137 Harold's Cross Road which run parallel to Section 3 of the Proposed Scheme between the R137 Terenure Road East and Parkview Avenue where it links to the Kimmage to City Centre Core Bus Corridor. This section of Proposed Scheme is approximately 1.5km in length.

6.3.4.1 Pedestrian Infrastructure

There are footways and public lighting on both sides of the carriageway along the entirety of Section 3 of the Proposed Scheme that are approximately 2.0m wide.

There is a similar level of footway provision along the proposed link to the Kimmage to City Centre Core Bus Corridor via the R137 Terenure Road North and R137 Harold's Cross Road. There are pinch points present on the R137 Terenure Road North, for example, at the Mc Morrough Road junction.

Additionally, the following priority junctions include a raised table facility on the minor arm which manages vehicle speeds and in turn, aids pedestrians crossing:

- R114 Terenure Road East / Greenmount Road priority junction;
- R114 Terenure Road East / Brighton Road priority junction;
- R114 Rathgar Road / Winton Avenue priority junction;
- R114 Rathgar Road / Garville Road priority junction;
- R114 Rathgar Road / Grosvenor Road priority junction;
- R137 Terenure Road North / Whitton Road priority junction;
- R137 Terenure Road North / St Enda's Road priority junction;
- R137 Harold's Cross Road / Brighton Square (South) priority junction;
- R137 Harold's Cross Road / Mount Tallant Avenue; and
- R137 Harold's Cross Road / Brighton Square (North) priority junction.

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

- Across the R114 Terenure Road East adjacent to Aldi Supermarket there is a toucan crossing;
- At each arm of the R114 Terenure Road East / Rathgar Avenue / R114 Rathgar Road / Orwell Road four-arm signalised junction there are crossings;
- At each arm of the R114 Rathgar Road North and South / Frankfort Avenue / Leicester Avenue four-arm signalised junction there are crossings;
- Across the R114 Rathgar Road South and Grosvenor Road arms of the four-arm signalised junction at the end of this section there are signalised crossings. The Grosvenor Road arm crossing is without guard rails and the R114 Rathgar Road South crossing is staggered with pedestrian refuge on the traffic island and has guard rails;
- Across the R137 Terenure Road North adjacent to the access to Terenure Road Car Park there is a pelican crossing;
- Across the R137 Terenure Road North, immediately south of the Ashdale Road priority junction there is a toucan crossing;
- At each arm of the R137 Harold's Cross Road North and South / Kenilworth Square North / Rathgar Avenue / Kenilworth Park five-arm signalised junction there are crossings on all arms. A traffic island offering pedestrian refuge is provided on the Rathgar Avenue arm;
- Across the R137 Harold's Cross Road, immediately south of the Tivoli Avenue priority junction there is a pelican crossing; and

- Across the R137 Harold's Cross Road, immediately south of the Harold's Cross Road and Parkview Avenue priority junctions, there is a toucan crossing.

Uncontrolled crossings across priority junctions at side roads benefit from dropped kerbs. The locations of the pedestrian crossings are 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 footway widths) at each junction along Section 3 of the Proposed Scheme is included in Appendix A6.4.1 (Pedestrian Impact Assessment) in Volume 4 of this EIAR.

6.3.4.2 Cycling Infrastructure

Existing cycling facilities along Section 3 of the Proposed Scheme are as follows:

- On-road advisory cycle lane approximately 1.5m wide in both directions between Terenure Cross and Brighton Road;
- Shared cycle/ bus lanes R114 Terenure Road East / Rathgar Avenue / R114 Rathgar Road / Orwell Road four-arm signalised junction within Rathgar Village; and
- On-road mandatory cycle lane approximately 1.75m wide travelling southbound from Rathgar Village to Charleville Road. Cyclists share the bus lane travelling northbound. There is however, an advisory on-road cycle lane travelling northbound at the beginning and end of this section of approximately 1.25m wide.

There is a total of 21 Sheffield cycle parking stands able to accommodate up to 42 bicycles at various locations along this section of the Proposed Scheme, and a further 11 stands a short distance from this section along the R114 Rathfarnham Road and Highfield Road.

The additional offline link along the R137 Terenure Road North and R137 Harold's Cross Road has intermittent on-road cycle lanes and bus lanes. On-road cycle lanes are provided in both directions between Terenure Cross and Mount Tallant Avenue. From Mount Tallant Avenue to Laundry Lane, there is an on-road cycle lane travelling southbound while cyclists share the bus lane travelling northbound. There is then a small section of cycle lanes in both directions between Laundry Lane and Kenilworth Park, and then between Tivoli Avenue and the R137 Harold's Cross Road / Parkview Avenue / Harold's Cross Road four-arm priority junction. From Kenilworth Park to Tivoli Avenue, cyclists share the bus lane travelling northbound.

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 Impact Assessment) in Volume 4 of this EIAR.

6.3.4.3 Bus Infrastructure

6.3.4.3.1 Bus Priority Measures

Bus lanes are intermittent along this route, but are present at the following locations:

- In both directions between Brighton Road and Rathgar Avenue, operating Monday to Saturday between 07:00 – 10:00 and 12:00 – 19:00;
- Northbound from Rathgar Avenue to Charleville Road, operating Monday to Friday between 07:00 – 10:00 and 16:00 – 19:00; and

- Intermittent northbound bus lanes from the start of Harold's Cross Road to 80.0m south of the Tivoli Road junction, from Mountain View Avenue to the 1343 bus stop, all operating Monday to Saturday between 07:00 – 10:00 and 12:00 – 19:00.

6.3.4.3.2 Bus Stop Facilities

There are 13 bus stops along Section 3 of the Proposed Scheme between the R137 Terenure Road North and Charleville Road. The inbound stops are as follows:

- Stop 1164 on R114 Terenure Road East, 50m west of Greenmount Road;
- Stop 1165 on R114 Terenure Road East, 100m east of Brighton Road;
- Stop 1166 on R114 Rathgar Road, 30m south of Winton Avenue;
- Stop 1167 on R114 Rathgar Road, 30m north of Garville Avenue;
- Stop 1168 on R114 Rathgar Road, 45m north of Grosvenor Road; and
- Stop 1169 on R114 Rathgar Road, opposite Rathmines Park;

The outbound stops are:

- Stop 1078 on R114 Rathgar Road, 40m north of Rathgar Place;
- Stop 1079 on R114 Rathgar Road, 60m south of Frankfort Avenue;
- Stop 1080 on R114 Rathgar Road, 60m north of Highfield Road;
- Stop 1081 on R114 Rathgar Road, 60m north of Highfield Road;
- Stop 1082 on R114 Terenure Road East, 80m west of Orwell Road;
- Stop 1083 on R114 Terenure Road East, 30m west of Brighton Road; and
- Stop 1085 on R114 Terenure Road East, 80m east of Terenure Road North.

Along the R137 Terenure Road North and R137 Harold's Cross Road, there are 13 bus stops. The inbound stops are as follows:

- Stop 1337 on R137 Terenure Road North, 50m south of Eaton Road;
- Stop 1338 on R137 Terenure Road North, 20m south of Whitton Road;
- Stop 1339 on R137 Harold's Cross Road, 45m north of Ashdale Road;
- Stop 1340 on R137 Harold's Cross Road, 45m north of Mount Tallant Avenue;
- Stop 1341 on R137 Harold's Cross Road, 15m south of Kenilworth Lane West;
- Stop 1342 on R137 Harold's Cross Road, 20m north of Tivoli Avenue; and
- Stop 1343 on R137 Harold's Cross Road, 50m south of Parkview Avenue.

The outbound stops are:

- Stop 1293 on R137 Harold's Cross Road, 25m south of Parkview Avenue;
- Stop 1294 on R137 Harold's Cross Road, 80m north of Leinster Road West;
- Stop 1295 on R137 Harold's Cross Road, 75m south of Rathgar Avenue;
- Stop 1296 on R137 Harold's Cross Road, 50m south of Mount Tallant Avenue;
- Stop 1297 on R137 Terenure Road North, 25m south of Whitton Road; and
- Stop 1298 on R137 Terenure Road North, 30m south of Elm Park Terrace.

Only a small proportion of the bus stops provide real-time information and around a third provide shelters and seating. The majority of the bus stops along this section are flag and pole stops, and provide timetable information and accessible kerbs, and all bus stops are inline along the carriageway.

Other than the above locations, there is no bus lane provision along this route and very limited bus lane provision travelling southbound.

Table 6.10 outlines the availability of bus stop facilities at the existing 13 bus stops between the R137 Terenure Road North and Charleville Road.

Table 6.10: Section 3 – Availability of Bus Stop Facilities (of a Total 13 no. Bus Stops)

Bus Stop Facility	Number of Bus Stops in Baseline with Facility	Percentage of Bus Stops in Baseline with Facility
RTPI	2	15%
Timetable information	10	77%
Shelter	4	31%
Seating	4	31%
Accessible Kerbs	12	92%
Indented Drop Off Area	0	0%

Table 6.11 outlines the availability of bus stop facilities at the existing 13 bus stops along the R137 Terenure Road North and Harold's Cross Road.

Table 6.11: R137 Terenure Road North and Harold's Cross Road – Availability of Bus Stop Facilities (of a Total 13no. Bus Stops)

Bus Stop Facility	Number of Bus Stops in Baseline with Facility	Percentage of Bus Stops in Baseline with Facility
RTPI	4	31%
Timetable information	13	100%
Shelter	9	69%
Seating	5	39%
Accessible Kerbs	12	92%
Indented Drop Off Area	1	8%

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 which operate along Section 3 are outlined in Table 6.12.

Table 6.12: Section 3 – Bus Service Frequency Along Rathfarnham

Service Route	Route	Typical Service Frequency	
		Weekday	Weekend
14	Beaumont – St Joseph's School – Richmond Hill – Rathgar Road – Mount Carmel Hospital – Ballinteer – Dundrum Luas Station	15 minutes	15 minutes (Saturday), 20 minutes (Sunday)

Service Route	Route	Typical Service Frequency	
		Weekday	Weekend
15	Ballycullen Road – Templeogue Ashfield College – Terenure College – Rathmines – Dublin Eden Quay – Belmayne – Clongriffin Station	8 minutes	15 minutes
15A	Merrion Square – Dame Street – Rathmines – Rathgar Village – Terenure Road West – Kimmage Road West - Greenhills Limekiln Avenue	20 minutes	20 minutes (Saturday), 30 minutes (Sunday)
15B	Merrion Square South – Rathmines Road Lower – Rathgar Village – Terenure Meadow Bank – Ballyboden Boden Park – Stocking Hill – Knocklyon Dalriada	15 minutes	15 minutes (Saturday), 20 minutes (Sunday)
15D	Merrion Square South – Dame Street – Rathmines Road Lower – Rathgar Village – Terenure Meadowbank – Rathfarnham Castle – Ballyboden Road – Ballyboden Church	2 services (15:00 and 16:45)	NA
16	Dublin Airport – Cloghran Service Station – Drumcondra Rail Station – Terenure Cross – The Grande – Ballinteer	12 minutes	12 minutes (Saturday), 15 minutes (Sunday)
49	College Street – Harolds Cross – Rathgar Mount Tallant Avenue - Terenure College – Firhouse College – Belgard Square South	30 minutes	30 minutes (Saturday), 60 minutes (Sunday)
65	Poolberg Street – Richmond Hill – Templeogue Post Office – Templeogue Bridge – Cheeverstown House – Spawell Golf Range – Tallaght (The Square) – Jobstown – Saggart Road	60 minutes	90 minutes
65B	Poolberg Street – Richmond Hill – Templeogue Post Office – Templeogue Bridge – Greenfield Park – Old Bawn Road – Jobstown – Citywest	60 minutes	60 minutes

6.3.4.4 General Traffic

6.3.4.4.1 R114 Terenure Road East and R114 Rathgar Road

Section 3 of the Proposed Scheme runs from the R137 Terenure Road North at Terenure Cross junction to the four-arm junction at R114 Rathgar Road East and South, Grosvenor Road and Charleville Road. The extent of Section 3 is approximately 1.8km in length and travels through a predominately residential area between Terenure, Rathgar and Rathmines Village Centres. The route generally comprises one traffic lane in each direction and an additional bus lane (northbound only) from the junction with Brighton Road. The route travels in an east-west direction along R114 Terenure Road East before travelling in a predominantly south to north direction along R114 Rathgar Road. This section is subject to 50km/h speed limit.

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

- R114 Terenure Road East / Rathgar Avenue / R114 Rathgar Road / Orwell Road four- arm signalised junction;
- R114 Rathgar Road North and South / Frankfort Avenue / Leicester Avenue four- arm signalised crossroads junction; and
- R114 Rathgar Road East and South / Grosvenor Road / Charleville Road three- arm signalised junction.

R114 Terenure Road East / Rathgar Avenue / R114 Rathgar Road / Orwell Road four-arm signalised junction: This junction is located approximately 630m east of Terenure Cross. The R114 Terenure Road East arm has two entry lanes and one exit lane. The left lane entry is for left and ahead movements and the right lane for ahead movements only. No right turn movements onto Orwell Road are permitted. An advanced stacking location for cyclists is provided. The Rathgar Avenue arm has one entry lane and one exit lane. Right turns onto the R114 Terenure Road East are not permitted.

The R114 Rathgar Road arm has a two-lane entry and exit. The road markings are faded, but it can be seen that the left lane is for left turn movements only as there is a filter arrow phase. Therefore, the right lane is for ahead movements only. Right turns onto Rathgar Avenue are not permitted. This arm has a traffic island and Highfield Road gives way to the R114 Rathgar Road approximately 30.0m back from the stop line at the signals. An advanced stacking location is provided.

The Orwell Road arm has two narrow entry lanes (approximately 2.5m wide each) and one exit lane. The left lane is for left turn and ahead movements and the right lane is for right turn movements only. There is right turn filter arrow phase in addition to the left and ahead phase. The centre of the junction comprises a yellow box and advanced stacking locations on the main arms.

Highfield Road joins this junction, approximately 40m to the northwest. Highfield Road has a single lane for entering and exiting the junction respectively with generous corner radii. It is left turn only, therefore, right turn movements onto the R114 Rathgar Road northbound are not permitted. In addition, there is a left turn slip lane with parking bays for loading activities only. There is a yellow box in front of the Highfield Road arm across the two R114 Rathgar Road southbound lanes.

These characteristics are illustrated by Image 6.16.



Image 6.16: R114 Terenure Road East / Rathgar Avenue / Orwell Road Junction

R114 Rathgar Road / Frankfort Avenue / Leicester Avenue four-arm signalised crossroads junction: This junction has one entry and exit lane on all arms except from the R114 Rathgar Road South arm which has a two-lane approach. The left entry lane is for left and ahead movements and the right lane is for ahead and right turn movements.

There are no traffic islands or filter phases at this junction. The centre of the junction comprises a yellow box and advanced stacking locations on the main arms. The cycle lanes continue through the junction as advisory lanes. These characteristics are illustrated by Image 6.17.



Image 6.17: R114 Rathgar Road / Frankfort Avenue / Leicester Avenue Junction

R114 Rathgar Road / Grosvenor Road / Charleville Road three-arm signalised junction: There is one-way entry into Charleville Road accessed from the junction. Grosvenor Road and the R114 Rathgar Road South arms both have one lane on entry and exit from the junction.

The R114 Rathgar Road East arm has two lane entry, with the left lane for left turn movements and the right lane for ahead movements only. Right turn onto Charleville Road is not permitted from this arm. The cycle lanes travelling southbound continues through the junction as an advisory lane.

The R114 Rathgar Road South has a traffic island between the entry and exit lanes. Right turn movements from Grosvenor Road to the R114 Rathgar Road South are not permitted. There is a yellow box in front of the Charleville Road access.

These characteristics are illustrated in Image 6.18.



Image 6.18: R114 Rathgar Road / Grosvenor Road / Charleville Road Junction

6.3.4.4.2 R137 Terenure Road North and R137 Harold's Cross Road

The existing major junction arrangements along the R137 Terenure Road North and R137 Harold's Cross Road are as follows:

- R137 Harold's Cross Road / Ashdale Road / Brighton Square staggered four-arm priority junction;
- Kenilworth Cross – R137 Harold's Cross Road North and South / Kenilworth Square North / Rathgar Avenue / Kenilworth Park five-arm signalised junction; and
- R137 Harold's Cross Road / Leinster Road three-arm signalised junction.

R137 Harold's Cross Road / Ashdale Road / Brighton Square staggered four-arm priority junction: The R137 Harold's Cross Road is single carriageway with one traffic lane plus an on-road cycle lane travelling in each direction at this junction. There is a toucan crossing along the R137 Harold's Cross Road approximately 2.0m south of the Ashdale Road arm.

The Ashdale Road arm is approximately 5.5m wide and has a single lane approaching and existing the junction respectively. There is on-street parking on the southern side of the road, approximately 8.0m back from the stop line.

The Brighton Square arm is approximately 9.0m wide and has a single lane approaching and existing the junction respectively. There are on-street parking bays on the northern side of the road, approximately 8.5m back from the stop line. There is also a raised table across the stop line.

Along the R137 Harold's Cross Road, in front of the Ashdale Road and Brighton Square arms, there is a yellow box across both traffic lanes. These characteristics are illustrated in Image 6.19



Image 6.19: R137 Harold's Cross Road / Ashdale Road / Brighton Square Priority Junction

R137 Harold's Cross Road North and South / Kenilworth Square North / Rathgar Avenue / Kenilworth Park five-am signalised junction: The R137 Harold's Cross Road North arm has two approach lanes and two exit lanes with the nearside exit lane a bus lane. Both approach lanes are allocated for ahead movements, and the nearside lane is also allocated for left turn movements. No right turn is permitted onto Kenilworth Park.

The R137 Harold's Cross Road South arm has two approach lanes and a wide single exit lane of approximately 4m (excluding the cycle lane). The left approach lane is allocated for left and ahead movements and the right lane is allocated for right and ahead movements.

The Kenilworth Square North arm a narrow two-lane approach (approximately 4.5m wide) and a single lane exit. The Rathgar Avenue arm has a single lane approach and exit from the junction with a traffic island separating the lanes.

The Kenilworth Park arm has two lanes approaching and exiting the junction. The left approach lane is allocated for left and ahead movements and the right lane is allocated for right and ahead movements. There is a yellow box along the R137 Harold's Cross Road for northbound and southbound movements, in front of the Kenilworth Park arm.

These characteristics are illustrated in Image 6.20.

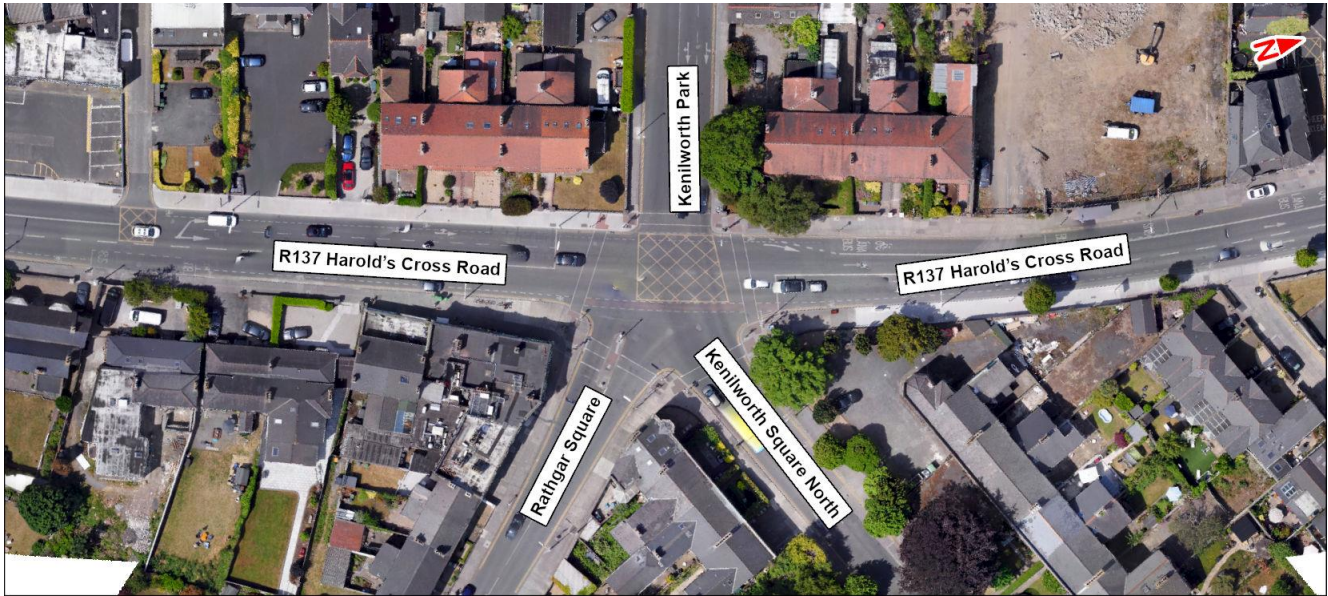


Image 6.20: Kenilworth Cross Junction

R137 Harold's Cross Road / Leinster Road three-arm signalised junction: The R137 Harold's Cross North and South arms have a single lane approaching and exiting the junction with advanced stacking locations for cyclists provided. Cycle lanes continue along the R137 Harold's Cross Road through the junction. The Leinster Road arm has a two lane approach and single lane exit without any facilities for cyclists. Left turning movements are permitted from the nearside lane only and right turning movements are permitted from the outside lane only.

These characteristics are illustrated in Image 6.21.

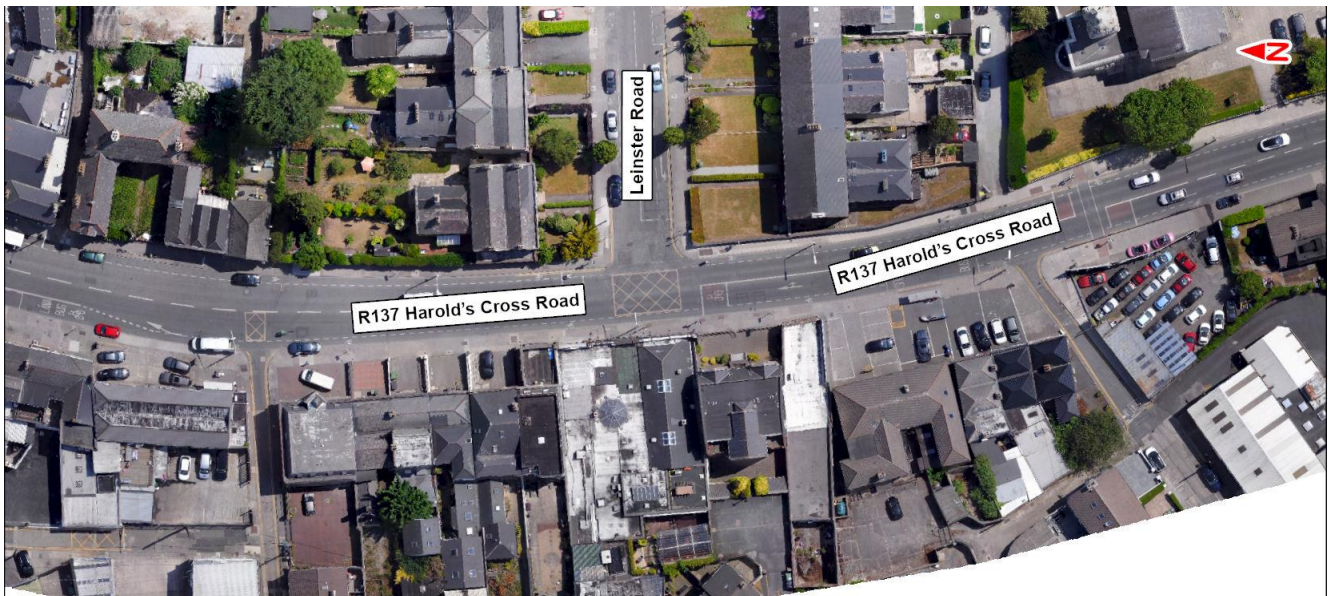


Image 6.21: R137 Harold's Cross Road / Leinster Road Junction

6.3.4.5 Existing Parking / Loading

The majority of Section 3 of the Proposed Scheme is free of on-street parking and loading due to the residential nature of the area and that most properties have driveways leading off the main road to park their vehicles. There are no double yellow line road markings, therefore, occasional parked vehicles are observed within the bus lane (which is only in operation on weekday peaks).

Parking can be found at the following locations along Section 3 of the Proposed Scheme:

- Six pay and display spaces and one disabled space on Terenure Road East, west of the Rathgar Avenue / Orwell Road junction;
- Six pay and display and permit spaces and six loading bay spaces on Rathgar Road, at the Highfield Road junction;
- Two shared loading bays/ pay and display parking spaces and two further pay and display parking spaces on Terenure Road North between Terenure Place and Yewland's Terrace;
- Two shared loading bays/ pay and display parking spaces and nine further pay and display parking spaces on Terenure Road North between Yewland's Terrace and Rathmore Villas;
- Five pay and display parking spaces and four taxi rank spaces on Terenure Road North between Rathmore Villas and Eagle Hill Avenue;
- Two shared loading bays/ pay and display parking spaces and two further pay and display parking spaces on Terenure Road North between Eagle Hill Avenue and Whitton Road;
- Six pay and display and permit spaces on Terenure Road North between West Hampton Place and Ashdale Road;
- Fifteen pay and display and permit spaces on Harold's Cross Road between Ashdale Road and Mount Tallant; and
- Eight pay and display spaces on Harold's Cross Road between Kenilworth Lane West and Leinster Road.

There are several side streets with designated pay and display and permit parking, with direct access from this corridor.

6.3.5 Section 4 – Charleville Road to Dame Street.

This Section outlines the baseline environment for walking, cycling, bus services, general traffic and parking / loading facilities along Section 4 of the Proposed Scheme, between Charleville Road and the R137 Dame Street. This Section of the Proposed Scheme runs from the four-arm junction between R114 Rathgar Road, Grosvenor Road and Charleville Road to the end of the Rathfarnham to City Centre section of the Proposed Scheme at the R137 Dame Street.

Section 3 of the Proposed Scheme is approximately 2.6km long and travels northwards through an urban residential and retail area between Rathmines Village centre and the south of the City Centre.

6.3.5.1 Pedestrian Infrastructure

There is continuous footway provision on both sides of the carriageway along this final section. Along the frontage of the retail units in Rathmines Village Centre, the footway is approximately 3.0m wide which is considered adequate for an area with a mid-high level of pedestrian activity in accordance with DMURS.

Outside of Rathmines Village, where there is a more residential nature, the footway reduces to approximately 1.8m wide which is considered adequate as there is likely to be less pedestrian activity here. Public street lighting

is provided throughout. There is generally wide and smooth footways on both sides of the carriageway to the north of Canal Road, along the frontage for various retail units.

Given the urban nature of this section of route, there are numerous uncontrolled crossings across priority junctions that benefit from dropped kerbs and a large number of controlled pedestrian crossings along this Proposed Scheme section which benefit from tactile paving and dropped kerbs which can be found at the following locations:

- At the R114 Rathgar Road and R820 Rathmines Road Upper arms of the three-arm signalised junction (pelican crossings). The crossing of R114 Rathgar Road is split into two stages and the crossings of Rathmines Road Upper is split into three stages, one of which is staggered with pedestrian refuge on the traffic island and with guard rails;
- At the R114 Rathmines Road Lower North and Castlewood Avenue arms of the three-arm priority junction there are pelican crossings. This includes pedestrian refuge on the traffic island in the R114 Rathmines Road Lower North arm and a tactile paving build-out at the corner between here and Castlewood Avenue to aid pedestrian movement;
- At the R114 Rathmines Road Lower South and Leinster Road arms of the three-arm signalised junction (pelican crossings without guard rails);
- Across the R114 Rathmines Road Lower adjacent to Aldi Supermarket, approximately 30.0m north of the priority junction with Williams Park (pelican crossing without guard rails);
- Across the R114 Rathmines Road Lower prior to the priority junction with Military Road (pelican crossing without guard rails);
- Across the R114 Rathmines Road Lower approximately 25m north of the priority junction with Lissenfield and adjacent to the Church of Mary (pelican crossing without guard rails); and
- Across three arms of the R114 Richmond Street South / R111 Cheltenham Place / R114 Rathmines Road Lower / R111 Grove Road four arm signalised crossroads junction (on all arms except the R114 Rathmines Road Lower arm) (pelican crossing without guard rails).
- At the R114 Richmond Street South and Charlemont Mall arms of four arm signalised junction immediately north of the canal (pelican crossings without guard rails);
- Across the R114 Richmond Street South approximately 50m north of the R114 / Charlemont Mall / Richmond Row four arm signalised junction (pelican crossing without guard rails);
- At two arms of the R114 Camden Street Upper / R114 Harcourt Road / R114 Richmond Street South / R811 Harrington Street four arm signalised junction (all arms except the R114 Camden Street Upper arm and R811 Harrington Street arm, which has an unsignalised crossing) (pelican crossing without guard rails);
- On the minor slip road to the south of the R114 Camden Street Upper / R114 Harcourt Road / R114 Richmond Street South / R811 Harrington Street four arm signalised junction (Richmond Street South/ Richmond Street South);
- At two arms of the R114 Camden Street Lower / R811 Charlotte Way / R114 Camden Street Upper three-way signals (across the R114 Camden Street Lower and Upper arms). This is a staggered pelican crossing which splits each crossing into two stages across one large central traffic island with pedestrian refuge (without guard rails);
- Across the R114 Camden Street Lower approximately 60m north of priority junction with Grantham Street (pelican crossing without guard rails);
- Across the R114 Camden Street Lower, immediately north of priority junctions with Pleasants Street and Camden Place (pelican crossing without guard rails);
- At each arm of the R114 Redmonds Hill / R110 Cuffe Street / R114 Wexford Street / R110 Kevin Street Lower four arm signalised junction (pelican crossings without guard rails). Crossings of the R114 Wexford Street and R110 Kevin Street Lower arms are each split into two stages with pedestrian refuge on the traffic islands due to slip lanes. The crossings of the R114 Redmonds Hill

and R110 Cuffe Street and each split into three stages with pedestrian refuge on the traffic islands due to slip lanes;

- Across the R114 Aungier Street immediately north of the Whitefriar Place and York Street priority junctions (pelican crossing without guard rails);
- At three arms of the R114 Aungier Street North and South / Longford Street Little / Longford Street Great four arm signalised crossroads junction (all but the R114 Aungier Street South arm) (pelican crossing without guard rails);
- At all arms of the R114 South Great George's Street / Stephen Street Lower / R114 Augier Street / Stephen Street Upper four arm signalised crossroads junction (pelican crossing without guard rails);
- Across the R114 South Great George's Street arm immediate north of the priority junction with Exchequer Street (pelican crossing with pedestrian refuge island and without guard rails); and
- At each arm of the R137 Dame Street East and West / R114 South Great George's Street three arm signalised junction (pelican crossing without guard rails).

Uncontrolled crossings across priority junctions at side roads benefit from dropped kerbs. The locations of the pedestrian crossings are 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 footway widths) at each junction along Section 4 of the Proposed Scheme is included in Appendix A6.4.1 (Pedestrian Impact Assessment) in Volume 4 of this EIAR.

6.3.5.2 Cycling Infrastructure

Existing cycle facilities along Section 4 of the Proposed Scheme are as follows:

- On-road cycle lanes travelling southbound approximately 1.75m wide between Charleville Road and R111 Canal Road;
- Intermittent on-road cycle lanes approximately 1.75m wide in both directions between R111 Canal Road and R137 Dame Street. Where there is no cycle lane, cyclists share the road with a bus lane;
- On-road mandatory cycle lanes and a clearway operational 24 hours a day, travelling northbound between Charlemont Mall and R811 Harrington Street (approximately 260m length); and
- On-road advisory cycle lanes or shared cycle and bus lanes travelling northbound between the R811 Harrington Street to R137 Dame Street. Travelling southbound, they are typically advisory or within the bus lane.

Given the urban nature of Section 4 of Proposed Scheme, there are numerous cycle parking locations along the R114 at regular intervals. Within Rathmines Village Centre, there are approximately 86 Sheffield stands (able to accommodate up to 172 bicycles). Between the R111 Canal Street and R110 Cuffe Street, there are approximately 93 Sheffield stands (able to accommodate up to 186 bicycles). Finally, between the R110 Cuffe Street and R137 Dame Street, there are approximately 69 Sheffield stands (able to accommodate up to 138 Bicycles) and five 'Hoop' stands.

In addition, the DublinBikes cycle hire scheme has numerous bicycle stations along the neighbouring streets of the R114 between the R111 Canal Street and R137 Dame Street.

The existing cycle facilities along Section 4 of the Proposed Scheme are illustrated in Figure 6.4d 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 A6.4.2 (Cycling Impact Assessment) in Volume 4 of this EIAR.

6.3.5.3 Bus Infrastructure

6.3.5.3.1 Bus Priority Measures

Bus lanes are intermittent along this route, but are present at the following locations:

- Northbound from Swanville Place to Lennox Street, operating Monday to Saturday between 07:00 – 10:00 and 12:00 – 19:00;
- Southbound between the R114 Harcourt Road and Camden Place, operating Monday to Saturday between 07:00-10:00 and 12:00-19:00;
- Northbound between Grantham Street and Camden Row, operating Monday to Saturday between 07:00-10:00 and 12:00-19:00;
- Southbound between the R110 Cuffe Street and Longford Street Lower, operating Monday to Saturday between 07:00 – 19:00; and
- Northbound between Stephen Street Upper and the R137 Dame Street, operating Monday to Saturday between 07:00 – 19:00.

6.3.5.3.2 Bus Stop Facilities

There are 24 bus stops along Section 4 of the Proposed Scheme. The inbound City Centre stops are as follows:

- Stop 1170/4527 on R114 Rathgar Road, 50m east of Charleville Road;
- Stop 1069 on R114 Rathmines Road Lower, 40m south of Leinster Square;
- Stop 1070 on R114 Rathmines Road Lower, 20m south of Williams Park;
- Stop 1071 on R114 Rathmines Road Lower, 15m north of Richmond Hill;
- Stop 4528 on R114 Rathmines Road Lower, 30m south of Grove Park;
- Stop 1072 on R114 Richmond Street South, 40m south of Lennox Street;
- Stop 7577 on R114 Camden Street Lower, 20m south of Grantham Street;
- Stop 1352 on R114 Camden Street Lower, 40m north of Grantham Street;
- Stop 1353 on R114 Camden Street Lower, 60m north of Pleasants Street;
- Stop 1354 on R114 Aungier Street, 60m north of Peter Row;
- Stop 1355 on R114 Aungier Street, 50m north of Whitefriar Place;
- Stop 7578 on R114 South Great George's Street, 25m north of Fade Street; and
- Stop 1357 on R114 South Great George's Street, 45m north of Fade Street.
-

The outbound stops are:

- Stop 1282 on R114 South Great George's Street, 20m north of Fade Street;
- Stop 4456 on R114 Aungier Street, 40m north of Whitefriar Place;
- Stop 7579 on R114 Redmond's Hill, 30m south of Digges Street Upper;
- Stop 1285 on R114 Camden Street Lower, 30m north of Grantham Street;
- Stop 1016 on R114 South Richmond Street, 30m south of Lennox Street;
- Stop 1017 on R114 Rathmines Road Lower, 20m north of Grove Park;
- Stop 1018 on R114 Rathmines Road Lower, opposite Lissenfield;
- Stop 1019 on R114 Rathmines Road Lower, 50m south of Military Road;
- Stop 1020 on R114 Rathmines Road Lower, opposite Williams Park;

- Stop 1076 on R114 Rathmines Road Lower, 40m north of Swanville Place; and
- Stop 1077 on R114 Rathgar Road, 40m west of Rathmines Road Upper.

Approximately half of the bus stops along this section provide shelters and seating and all but one of the bus stops are accommodated inline along the carriageway, with the exception of Bus Stop 1070 in Rathmines.

Other than the above locations, there is no bus lane provision along this route. Therefore, there is very limited bidirectional bus lane provision along this section.

Table 6.13 outlines the availability of bus stop facilities at the existing 24 bus stops between Charleville Road and the R137 Dame Street.

Table 6.13: Section 4 – Availability of Bus Stop Facilities (of a Total 24 no. Bus Stops)

Bus Stop Facility	Number of Bus Stops in Baseline with Facility	Percentage of Bus Stops in Baseline with Facility
RTPI	19	79%
Timetable information	23	96%
Shelter	14	58%
Seating	13	54%
Accessible Kerbs	22	92%
Indented Drop Off Area	1	4%

The existing bus facilities along Section 4 of the Proposed Scheme are illustrated in Figure 6.5a in Volume 3 of this EIAR. The bus services which operate along Section 4 are outlined in Table 6.14.

Table 6.14: Section 4 – Bus Service Frequency

Service Route	Route	Typical Service Frequency	
		Weekday	Weekend
9	Charlestown – Jamestown – Ballymun Road – Phibsboro Shopping Centre – Harold's Cross – Limekiln Avenue	15 minutes	15 minutes
14	Beaumont – St Joseph's School – Richmond Hill – Rathgar Road – Mount Carmel Hospital – Ballinteer – Dundrum Luas Station	15 minutes	15 minutes (Saturday), 20 minutes (Sunday)
15	Ballycullen Road – Templeogue Ashfield College – Terenure College – Rathmines – Dublin Eden Quay – Belmayne – Clongriffin Station	8 minutes	15 minutes
15A	Merrion Square – Dame Street – Rathmines – Rathgar Village – Terenure Road West – Kimmage Road West - Greenhills Limekiln Avenue	20 minutes	20 minutes (Saturday), 30 minutes (Sunday)
15D	Merrion Square South – Dame Street – Rathmines Road Lower – Rathgar Village – Terenure Meadowbank – Rathfarnham Castle – Ballyboden Road – Ballyboden Church	2 services (15:00 and 16:45)	NA
15B	Merrion Square South – Rathmines Road Lower – Rathgar Village – Terenure Meadow Bank – Ballyboden Boden Park – Stocking Hill – Knockylon Dalriada	15 minutes	15 minutes (Saturday), 20 minutes (Sunday)
16	Dublin Airport – Cloghran Service Station – Drumcondra Rail Station – Terenure Cross – The Grande – Ballinteer	12 minutes	12 minutes (Saturday), 15 minutes (Sunday)
18	Palmerstown – Crumlin Hospital – Harolds Cross – Terenure – Rathmines – Dublin City South – Ballsbridge – Sandymount Station	20 minutes	20 minutes
65	Poolberg Street – Richmond Hill – Templeogue Post Office – Templeogue Bridge – Cheeverstown House – Spawell Golf Range – Tallaght (The Square) – Jobstown – Saggart Road	60 minutes	90 minutes
65B	Poolberg Street – Richmond Hill – Templeogue Post Office – Templeogue Bridge – Greenfield Park – Old Bawn Road – Jobstown – Citywest	60 minutes	60 minutes
68	Hawkins Street – Canal Bridge – Bluebell – Castle Park – Woodlands – Peamount Road – Greenogue Business Park	60 minutes	75 minutes
68A	Hawkins Street – Whitefriars Street – Victoria Street – National Stadium – Rialto Church – Goldenbridge Avenue – Bulfin Road	3 Services (16:00; 17:00; 18:15)	NA
83	Harristown – Grove Park – Phibsboro Shopping Centre – Wood Quay – Rathmines Road – Stannaway Avenue	10 minutes	15 minutes
83A	Harristown – Grove Park – Phibsboro Shopping Centre – Wood Quay – Rathmines Road – Stannaway Avenue	60 minutes	60 minutes
122	Ashington – Cabra Road – South Circular Road – Drimnagh Road	10 minutes	20 minutes
140	Ballymun IKEA – Mellows Park – Fingals Road – Phibsboro Shopping Centre – Richmond Hill - Rathmines	15 minutes	15 minutes (Saturday), 20 minutes (Sunday)
142	Wendell Avenue – Malahide Station – Docklands Convention Centre – Merrion Square West - Rathmines Road Upper – University College of Dublin	5 Services (Every 10 minutes between 07:10 and 07:55)	NA

6.3.5.4 General Traffic

Between Charleville Road and the R111 Canal Road, the R114 comprises Rathgar Road and Rathmines Road Lower which is a continuous single carriageway road generally with one lane travelling in each direction and an

additional bus lane travelling northbound only. The road travels in a south to north direction and is subject to 50km/h speed limit.

Between the R111 Canal Road and R137 Dame Street, the R114 generally comprises three traffic lanes; one lane of traffic in each direction with an additional bus lane intermittently in the northbound and southbound directions. In many sections the opposing lanes are segregated by lit bollards and / or a white hatched central reservation. The speed limit reduces to 30km/h closer to the City Centre from the junction with R811 Harcourt Road.

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

- R114 Rathgar Road and Rathmines Road Lower / R820 Rathmines Road Upper three-arm signalised junction;
- R114 Rathmines Road Lower North and South / Castlewood Avenue three-arm signalised junction;
- R114 Rathmines Road Lower North and South / Leinster Road three-arm signalised junction;
- R114 Rathmines Road Lower / Military Road / Richmond Hill staggered four-arm priority junction;
- R114 Richmond Street South / R111 Canal Road / R114 Rathmines Road Lower / R111 Grove Road four-arm signalised crossroads junction;
- R114 Richmond Street South / Charlemont Mall / Richmond Row four-arm signalised junction;
- R114 Camden Street Upper / R114 Harcourt Road / R114 Richmond Street South / R811 Harrington Street four-arm signalised crossroads junction;
- R114 Camden Street Lower / R811 Charlotte Way junction three-way signals junction;
- R114 Redmonds Hill / R110 Cuffe Street / R114 Wexford Street / R110 Kevin Street Lower four-arm signalised junction with slip lanes;
- R114 Aungier Street North and South / Longford Street Lower / Longford Street Little four-arm signalised junction;
- R114 South Great George's Street / Stephen Street Lower / R114 Aungier Street / Stephen Street Upper four-arm signalised junction; and
- R137 Dame Street East and West / R114 South Great George's Street three-arm signalised junction.

R114 Rathgar Road / R114 Rathmines Road Lower / R820 Rathmines Road Upper three arm signalised junction: This junction is located in Rathmines Village Centre. The R114 Rathmines Road Lower arm has two lanes on entry and exit from the junction respectively. The left lane is for left turn movements and the right lane is for ahead movements. There is a left turn filter phase when turning onto the R820 Rathmines Road Upper. Cyclists making this left turn can bypass the signals.

The R820 Rathmines Road Upper arm has a three-lane entry and one lane exit from the junction. The left lane is for left turn movements onto the R114 Rathgar Road and is controlled by a separate signal head on a traffic island to the right turn lanes onto the R114 Rathmines Road Lower. The right turn lanes are separated from the exit lane by another traffic island.

The R114 Rathgar Road arm has two entry lanes and a single exit lane. The left lane is for ahead movements only and the right lane is for ahead and right turn movements onto R820 Rathmines Road Upper. There is a traffic island between the entry and exit lanes. There is a yellow box between the R114 Rathgar Road entry and exit lanes onto the R114 Rathmines Road Lower.

These features are illustrated in Image 6.22.

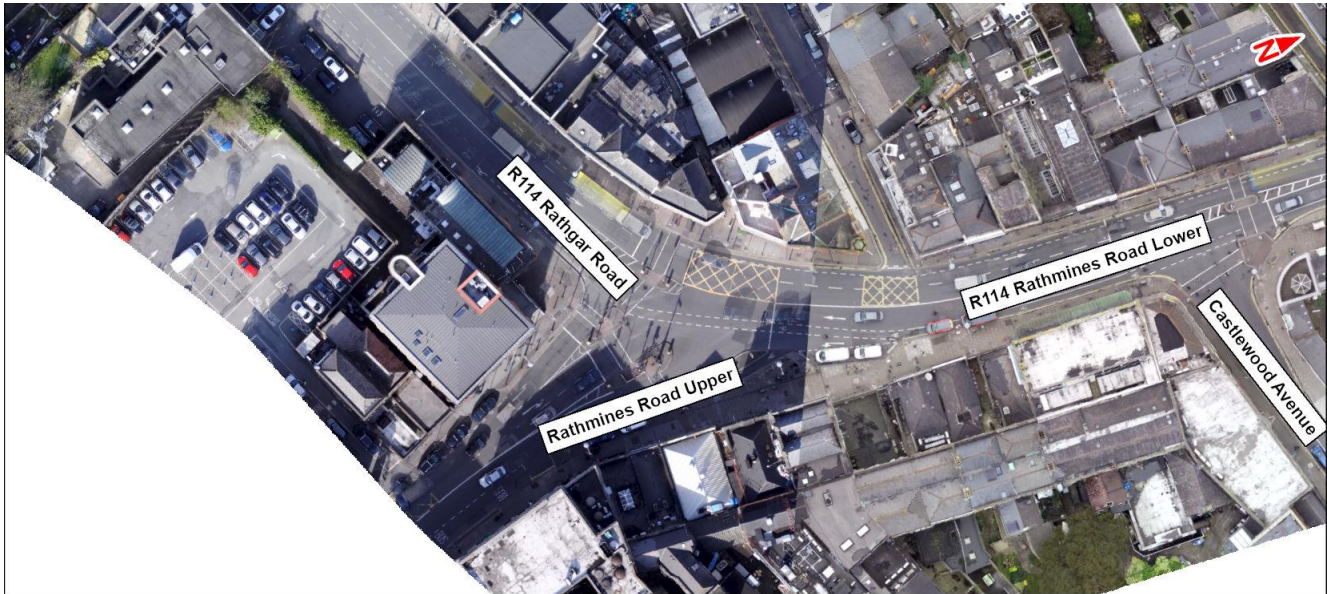


Image 6.22: R114 Rathgar Road / R114 Rathmines Road Lower / R820 Rathmines Road Upper Junction

R114 Rathmines Road Lower / Castlewood Avenue three-arm signalised junction: The R114 Rathmines Road Lower North arm has one entry lane and one exit lane, plus an on-road cycle lanes in both directions. The entry and exit lane are separated by a traffic island. Left turn movements to Castlewood Avenue are not permitted.

The R114 Rathmines Road Lower South has two entry lanes, the left lane for ahead movements and the right lane for right turn movements, and a single exit lane. There are signal heads for the ahead movement and right turn movement onto Castlewood Avenue, to provide separate green phases for these movements. There are cycle lanes in both directions that continue through the junction.

The Castlewood Avenue arm has a one entry and exit lane respectively. It is left turn only from this arm onto the R114 Rathmines Road Lower South, therefore, this movement can share green time with the R114 Rathmines Road Lower South ahead and right turn movements.

These features are illustrated in Image 6.23.



Image 6.23: R114 Rathmines Road Lower / Castlewood Avenue Junction

R114 Rathmines Road Lower / Leinster Road three-arm signalised junction: This junction is located approximately 250m north of the previous junction. The R114 Rathmines Road Lower North arm comprises two entry lanes, the right of which is a right turn flare lane of approximately 25m in length and has a right turn filter phase. The left lane is for ahead movements only and the exit onto this arm is a single lane. An advanced stacking location for cyclists is provided.

The R114 Rathmines Road Lower South arm has two entry lanes and one exit lane. The left lane is for left turn movements onto Leinster Road and the right lane is for ahead movements. The signals operate a left turn filter phase.

Leinster Road has one lane on entry and exit from the junction. Left turn movements onto the R114 Rathmines Road Lower North are permitted only. There is a yellow box in the centre of the junction.

These features are illustrated in Image 6.24.



Image 6.24: R114 Rathmines Road Lower / Leinster Road Junction

R114 Rathmines Road Lower / Military Road / Richmond Hill staggered four-arm priority junction: The R114 Rathmines Road Lower has two lanes travelling northbound, a bus lane and general traffic lane, and one traffic lane plus an on-road cycle lane travelling southbound. There is a signalised pedestrian crossing approximately 13.0m south from the Military Road arm.

Military Road is approximately 8.5m wide and has no lane / stop line road markings. There is a loading bay on the southern side of the road approximately 10.0m back from the assumed stop line, and on-street parking on both sides of the road approximately 25.0m back from the stop line. There is a yellow box in front of the Military Road arm across all traffic lanes of R114 Rathmines Road Lower.

Richmond Hill is approximately 6.0m wide and has no lane / stop line road markings. Double yellow lines are present on both sides of the road. There is a yellow box in front of the Richmond Hill arm over the R114 Rathmines Road Lower southbound traffic lane.

These features are illustrated in Image 6.25.



Image 6.25: R114 Rathmines Road Lower / Military Road / Richmond Hill Priority Junction

R114 Richmond Street South / R111 Canal Road / R114 Rathmines Road Lower / R111 Grove Road four arm signalised crossroads junction: This junction is immediately south of Lock C7 of the Grand Canal. Both R114 Richmond Street South and Rathmines Street Lower arms of the junction have two entry lanes, the left lane for left and ahead movements and the right lane for ahead movements only. Right turns are not permitted from either arm.

The R114 Richmond Street South arm has a single exit lane and the R114 Rathmines Street Lower has a single exit lane that is approximately 6.0m wide, therefore wide enough for two vehicles side-by-side which merges into one lane of traffic approximately 20.0m away from the junction.

The R111 Canal Road and Grove Road arms each have one entry and exit lane. Right turn movements from the R111 Grove Road to the R114 Rathmines Road Lower are not permitted, but vehicles can turn right between the R111 Canal Road and the R114 Richmond Street South. The centre of the junction has yellow box and advisory cycle lanes continue through the junction between the R111 Canal Road and Grove Road. All arms except Rathmines Road Lower provide advanced stacking locations for cyclists. The features of the junction are illustrated in Image 6.26



Image 6.26: Richmond Street South / R111 Canal Road / R114 Rathmines Road Lower / R111 Grove Road Signalised Junction

R114 Richmond Street South / Charlemont Mall / Richmond Row four arm signalised junction: The R114 Richmond Street South arms of the junction comprises one lane entry and two-lane exit. Vehicles can either travel ahead to continue along the R114 or turn into Richmond Row.

Charlemont Mall and Richmond Row are one-way westbound and comprises a single traffic lane of approximately 3.5m wide and a bi-directional segregated cycle track. There is a yellow box in the centre of the junction between the Richmond Street South and Charlemont Mall approaches and advanced stacking locations. These features are illustrated in Image 6.27.

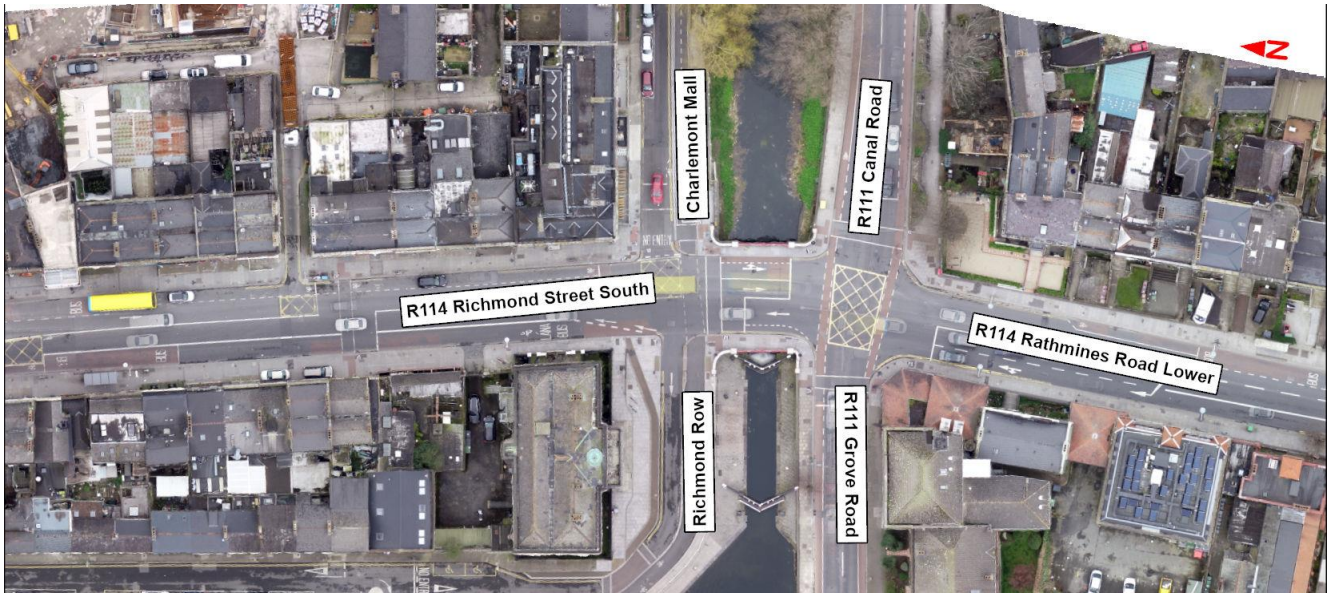


Image 6.27: R114 Rathmines Road Lower / R111 Grove Road / R111 Cheltenham Place Junction and R114 Richmond Street South / Charlemont Mall / Richmond Row Junction

R114 Camden Street Upper / R114 Harcourt Road / R114 Richmond Street South / R811 Harrington Street four arm signalised crossroads junction: The R114 Camden Street Upper has one entry lane (for buses and cyclists only) and two exit lanes separated by hatched white road markings.

The R114 Harcourt Road is one-way traveling westbound and there are four lanes entering the junction, two of which are for ahead movements as left turns onto the R114 Richmond Street South are not permitted at the junction, and two are for turning right onto The R114 Camden Street Upper. The lanes are separated by a traffic island. There is a left turn slip road that joins the R114 Richmond Street South prior to the signalised junction.

The R114 Richmond Street South has two entry lanes and one exit lane for buses and cyclists only, separated by lit bollards. The left lane is for left and ahead movements and the right lane is for ahead movements. General traffic (i.e. all but buses and cyclists) wishing to travel southbound must route in a circular motion around Harcourt Centre, using Harcourt Street and the left turn followed by yield to the R114 Richmond Street South.

The R811 Harrington Street has two entry lanes and two exit lanes that merge into a single lane shortly after the junction. The entry and exit lanes are separated by a traffic island. Both entry lanes are for left turn movements onto the R114 Camden Street Upper, given the one-way system here.

There are two yellow boxes between the R114 Harcourt Road entry / R811 Harrington Street exit, and the R114 Richmond Street South entry / R114 Camden Street Upper exit.

These features are illustrated by Image 6.28.

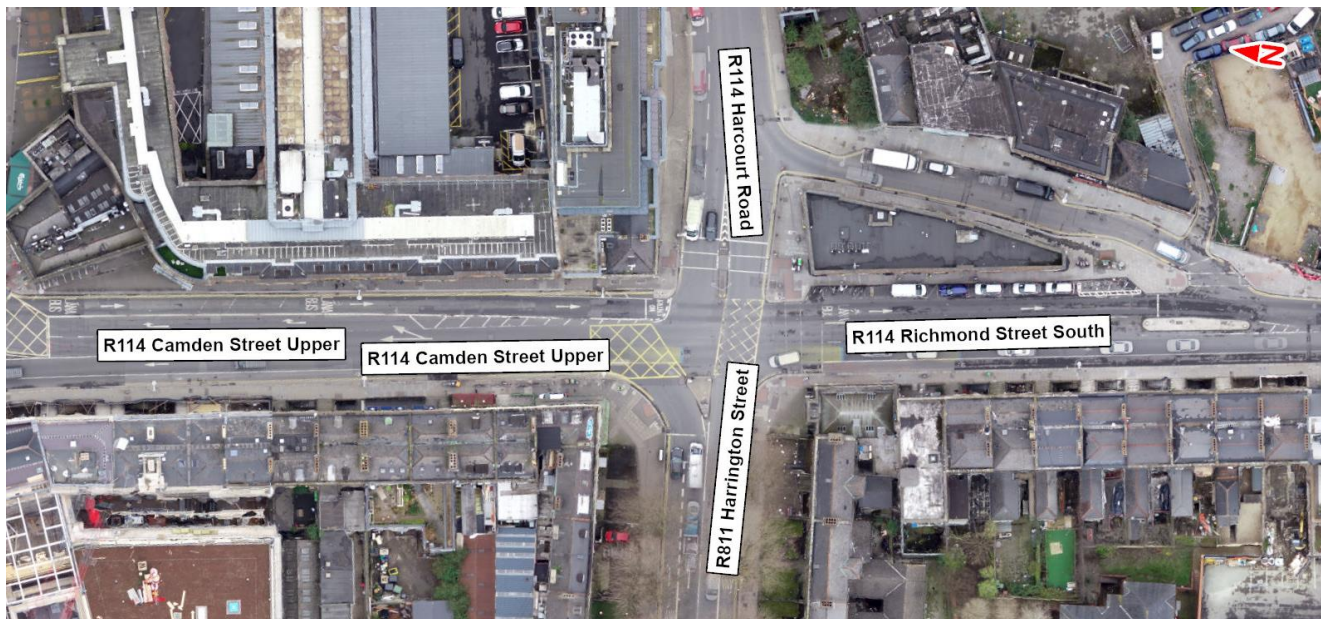


Image 6.28: R114 Camden Street Upper / R114 Harcourt Road / R114 Richmond Street South / R811 Harrington Street Junction

R114 Camden Street Lower / R811 Charlotte Way junction 3-way signalised junction: This junction facilitates the one-way system around Harcourt Centre. Buses and cyclists only can travel southbound along the R114 Camden Street Upper, therefore, there is one lane for buses making the ahead movements a one lane for all other vehicles turning left onto the R811 Charlotte Way which are controlled by separate signal timings.

The R114 Camden Street Upper travelling northbound has three lanes, two for making the right turn movement onto the R811 Charlotte Way and one for straight ahead movements.

The R811 Charlotte Way is one-way travelling eastbound and is approximately 10.0m wide, therefore able to accommodate three cars side-by-side. There are two yellow boxes between the R114 Camden Street Lower onto the R811 Charlotte Way.

These features are illustrated in Image 6.29.

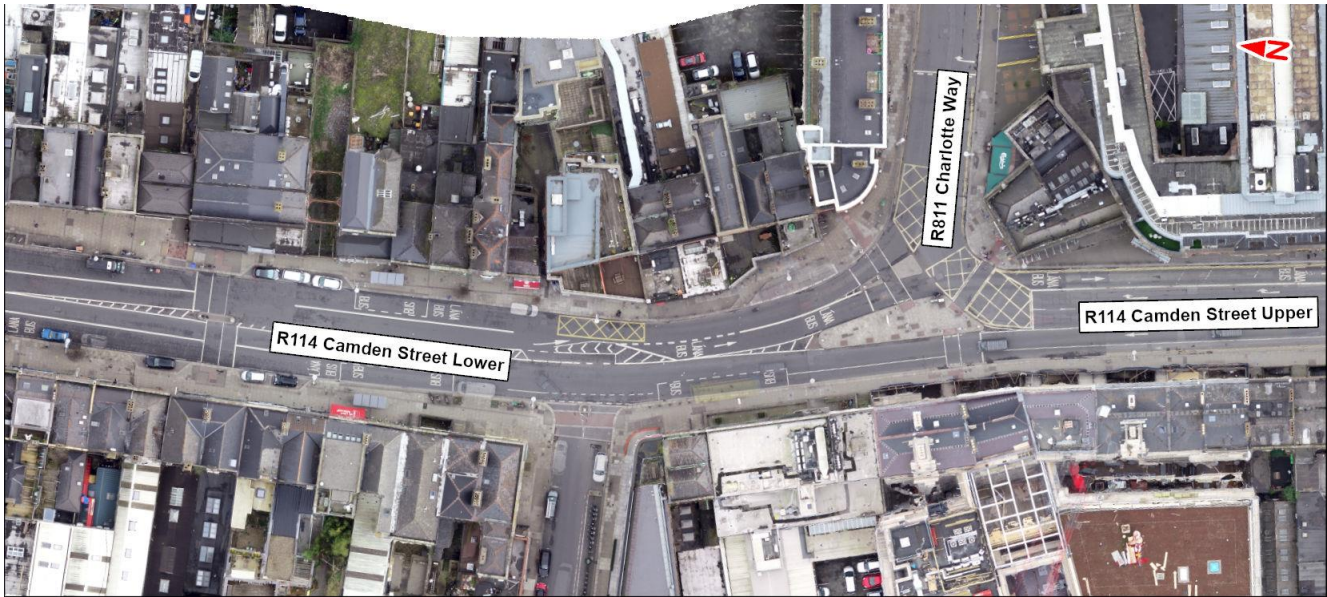


Image 6.29: R114 Camden Street Lower / R811 Charlotte Way Junction

R114 Redmonds Hill / R110 Cuffe Street / R114 Wexford Street / R110 Kevin Street Lower four arm signalised junction with slip lanes: The R114 Redmonds Hill arm has a two lane entry with an additional left slip lane onto the R110 Cuffe Street, which yields to the R110 Cuffe Street but also has a signal to allow pedestrian crossing movements. The two lanes are for ahead movements, with the left lane for buses only. Right turn movements onto the R110 Kevin Street Lower are not permitted.

The R110 Cuffe Street arm is a dual carriageway with three lanes entering the junction and two lanes exiting. The left lane is for left and ahead movements, the centre lane is for ahead movements only and the right lane is for right movements only. The left lane flares to become a left slip lane yielding to the R114 Wexford Street with a signal to allow pedestrian crossing movements.

The R114 Wexford Street has one entry and exit lane respectively and the possible movements are left or ahead only.

The R110 Kevin Lower Street has one entry and exit lane respectively, but also includes a left slip lane which yields to the R114 Redmonds Hill but has a signal to allow pedestrian crossing movements. Right turn movements from the R110 Kevin Street Lower onto the R114 Wexford Street are not permitted.

The centre of the junction comprises a yellow box and the cycle lanes continue through the junction as advisory lanes between the R114 Redmonds Hill and Wexford Street, and from the R110 Kevin Street Lower to Cuffe Street.

These features are illustrated by Image 6.30.



Image 6.30: R114 Redmonds Hill / R110 Cuffe Street / R114 Wexford Street / R110 Kevin Street Lower Junction

R114 Aungier Street / Longford Street Lower / Longford Street Little four arm signalised junction: Longford Street Lower and Longford Street Little are both one-way travelling westbound. Longford Street Lower comprises two entry lanes, the left for left turn and ahead movements and the right for ahead and right turn movements. The exit lane onto Longford Street Little is a single lane of approximately 6.0m wide which can accommodate two vehicles side-by-side.

The R114 Aungier Street North arm has one entry and exit lane respectively and there is an advanced stacking location. Left turn movements are not permitted onto Longford Street Lower due to the one-way system.

The R114 Aungier Street South arm has one entry lane for left turn and ahead movements as right turn movements onto Longford Street Lower are not permitted due to the one-way system. There is also an advanced stacking location, and the cycle lane continues through the junction to the R114 Aungier Street North (advisory lane). There is a single exit lane approximately 6.5m wide, therefore able to accommodate two vehicles side-by-side, but vehicles quickly merge into the right lane and the left lane becomes a bus lane.

These features are illustrated by Image 6.31.

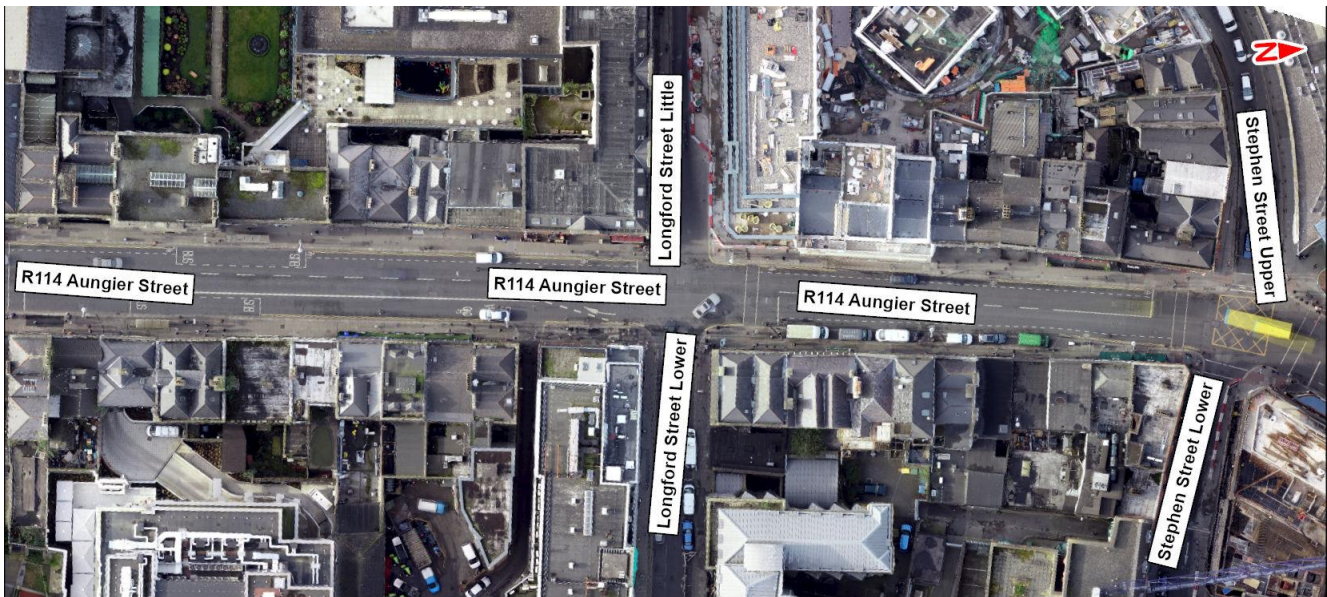


Image 6.31: R114 Aungier Street / Longford Street Lower / Longford Street Little Junction

R114 South Great George's Street / Stephen Street Lower / R114 Aungier Street / Stephen Street Upper four arm signalised junction: Stephen Street Upper and Lower are both one-way travelling eastbound. Stephen Street Upper comprises two entry lanes, the left for left turn movements and the right for ahead and right turn movements. The cycle lane travels between the lanes and there is an advanced stacking location.

The R114 South Great George Street arm has one entry lane for ahead and left movements. Right turn movements are not permitted due to the one-way system. There is a single exit lane approximately 6.5m wide, therefore able to accommodate two vehicles side-by-side, but vehicles quickly merge into the right lane and the left lane becomes a bus lane. The cycle lane continues through the junction between the R114 South Great George Street and Aungier Street as an advisory lane.

The R114 Aungier Street arm comprises one entry and exit lane respectively. Ahead movements only are permitted. The centre of the junction comprises a yellow box.

These features are illustrated by Image 6.32.

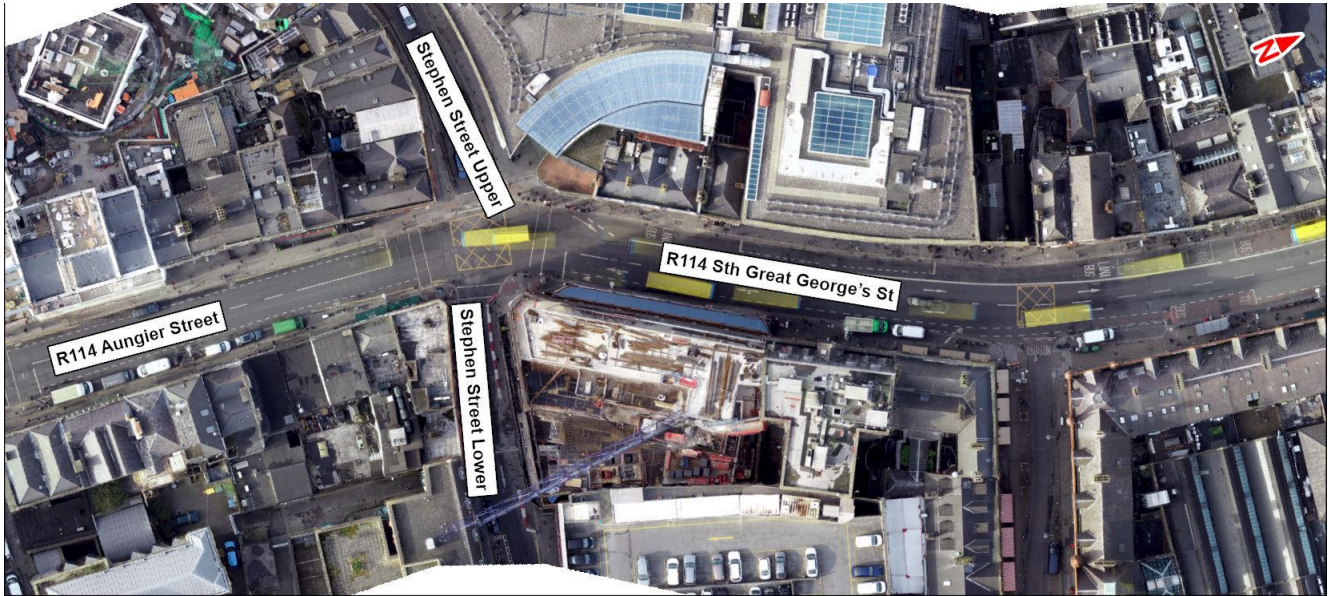


Image 6.32: R114 / Stephen Street Lower / Stephen Street Upper Junction

R137 Dame Street / R114 South Great George's Street three arm signalised junction: This junction marks the end of the Rathfarnham to City Centre section of the Proposed Scheme. The R137 Dame Street East comprises two entry lanes and an approximately 6.0m wide exit lane which can accommodate two vehicles side-by-side, with the left lane becoming a bus lane shortly after the junction. The left entry lane is for left turn movements and the right lane is for ahead movements.

The R114 South Great George's Street also has two entry lanes and a single exit lane. The left lane is for left turn movements which all general traffic must make as the right turn onto the R137 Dame Street East is for buses only. There is a separate signal head to control each movement.

The R137 Dame Street West arm has two entry lanes and an approximately 6.0m wide entry lane which can accommodate two vehicles side-by-side. Right turn movements onto the R114 South Great George's Street are not permitted, therefore, both entry lanes are for ahead movements. The centre of the junction comprises a yellow box.

These features are illustrated by Image 6.33.



Image 6.33: R137 Dame Street / R114 South Great George's Street Junction

6.3.5.5 Existing Parking / Loading

Parking can be found at the following locations along Section 4 of the Proposed Scheme:

- Approximately four loading bays (14 spaces) on Rathmines Road Lower, between Rathmines Road Upper and Grove Road. These are operational 07:00-17:00 Monday- Friday.
- 21 residential designated pay and display and permit parking spaces and one loading bay space on Military Road;
- Approximately eight commercial pay and display and permit spaces and three loading bays (six spaces) on Richmond Street South;
- 20 designated pay and display and permit parking spaces, of which four spaces act as a taxi rank from 20:00-06:00 Monday – Sunday, and four loading bays (eight spaces) on Camden Street Lower;
- Nine commercial designated pay and display and permit parking spaces, one disabled pay and two loading bays (five spaces) on Wexford Street;
- One loading bay (five spaces) on Redmond's Hill;
- Three loading bays (eight spaces) on Aungier Street; and
- Four loading bays (11 spaces) which act as a taxi rank from 20:00-06:00 Monday – Sunday and a separate taxi rank for five spaces on South Great George's Street.

There are approximately 497 on-street parking spaces within 200m of the area, along a number of side streets, alongside a number of private car parks.

6.4 Potential Impacts

6.4.1 Characteristics of the Proposed Scheme

The characteristics of the Proposed Scheme are described in detail in Chapter 4 (Proposed Scheme 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 for any known permanent improvements or changes to the road or public transport network that have taken place, been approved or are planned for implementation. The transport schemes and demand assumptions within the Do Minimum scenario are detailed below.

6.4.3.1 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 2022-2042 (GDA Strategy), with a partial implementation by 2028, in line with National Development Plan (NDP) investment priorities and the full implementation by 2043.

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

- The GDA Strategy is the approved statutory transportation plan for the region, providing a framework for investment in transport within the region up to 2042;
- The GDA Strategy provides a consistent basis for the 'likely' future receiving environment that is consistent with Government plans and Policies National Planning Framework (NPF) and National Development Plan (NDP); and
- Schemes within the GDA Strategy are a means to deliver the set of objectives of the GDA Strategy. The sequencing and delivery of the strategy is defined by the implementation plan, but the optimal

outcome of aiming to accommodate all future growth in travel demand on sustainable modes underpins the Strategy.

The Do Minimum scenarios (in both 2028 and 2043) include all other elements of the BusConnects Programme of projects (apart from the CBC Infrastructure Works elements) i.e. the new BusConnects routes and services (as part of the revised Dublin Area bus network), new bus fleet, the Next Generation Ticketing and integrated fare structure proposals are included in the Do Minimum scenarios.

In 2028, other notable Do Minimum transport schemes include; the roll out of the DART+ Programme, Luas Green Line capacity enhancement and the Greater Dublin Area Cycle Network Plan implementation (excluding BusConnects CBC elements). As outlined above, the 2043 Do Minimum scenario assumes the full implementation of the GDA Strategy schemes, so therefore assumes that proposed major transport schemes such as MetroLink, Luas line extensions to Lucan, Finglas, Poolbeg and Bray are all fully operational.

Appendix A6.2 (Transport Modelling Report) in 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. Total trip demand will increase into the future in line with demographic growth (population and employment levels etc.). To limit the growth in car traffic and to ensure that this demand growth is catered for predominantly by sustainable modes, a number of measures will be required, that include improved sustainable infrastructure and priority measures delivered as part of the NDP/GDA Strategy. In addition to this, demand management measures will play a role in limiting the growth in transport demand, predominantly to sustainable modes only. The result will be only limited or no increases in overall demand for travel by private car. The Proposed Scheme will play a key role in this as part of the wider package of GDA Strategy measures.

In general, total trip demand (combining all transport modes) will increase into the future in line with population and employment growth. A greater share of the demand will be by sustainable modes (Public Transport (PT), Walking, Cycling). Private car demand may still grow in some areas but not linearly in line with demographics, as may have occurred in the past.

In terms of the transport modelling scenarios for the traffic and transport assessment, as per the Strategy proposals, there are no specific demand management measures included in the Do Minimum scenario in the 2028 Opening year, other than constraining parking availability in Dublin at existing levels. For the design year, 2043 scenario, demand management is included in the Do Minimum in line with the Strategy's Core Demand Management Measures; Reduction of free workplace parking in urban areas, increased parking charges in urban areas and adjustment of traffic signal timings across the metropolitan area to better facilitate movement by sustainable modes.

6.4.4 'Do Something' Scenario

The Do Something scenario represents the likely conditions of the direct and indirect study areas with the Proposed Scheme in place. The traffic and transport elements of the Proposed Scheme are presented in detail in Chapter 4 (Proposed Scheme Description).

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 in Volume 4 of this EIAR. The CEMP which will be updated and finalised by the appointed contractor prior to construction commencing. The CEMP comprises the construction mitigation measures, which are set out in this EIAR, and will be updated with any additional measures which may be required by the conditions attached to An Bord Pleanála's decision. Implementation of the CEMP will ensure disruption and nuisance are kept to a minimum during the Construction Phase. The CEMP has regard to the guidance contained in the TII Guidelines for the Creation, Implementation and Maintenance of an Environmental Operating Plan, and the handbook published by Construction Industry Research and Information Association (CIRIA) in the UK, Environmental Good Practice on Site Guide, 4th Edition (CIRIA 2015).

All of the content provided in the CEMP will be implemented in full by the appointed contractor and its finalisation will not affect the robustness and adequacy of the information presented and relied upon in this 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 four primary sections. The division line between sections has been determined by grouping similar carriageway types together. These sections have been further subdivided into 18 sub-sections, according to the types of construction works required. The sections / sub-sections are:

- **Section 1: Tallaght Road, Templeogue Road to Rathfarnham Road:**
 - **Section 1a:** M50 to Spawell Roundabout;
 - **Section 1b:** Spawell Roundabout;
 - **Section 1c:** Spawell Roundabout to Cypress Grove Junction;
 - **Section 1d:** Cypress Grove Junction to Templeville Road;
 - **Section 1e:** Templeville Road to Rathdown Avenue;
 - **Section 1f:** Rathdown Avenue to Terenure Road North; and
 - **Section 1g:** Rathdown Crescent, Rathdown Park, Bushy Park Road, Wasdale Park, Wasdale Road, Wasdale Grove, Victoria Road, Zion Road and Orwell Road.
- **Section 2: Nutgrove Avenue to Terenure Road North – Grange Road, Rathfarnham Road:**
 - **Section 2a:** Grange Road Junction to Main Street Junction;
 - **Section 2b:** Main Street Junction to Dodder Park Road;
 - **Section 2c:** Dodder Park Road to Terenure Junction;
 - **Section 2d:** Rathfarnham Junction to Mount Tallant Avenue; and
 - **Section 2e:** Mount Tallant Avenue to Harold's Cross.
- **Section 3: Terenure Road North to Charleville Road – Terenure Road East, Rathgar Road:**
 - **Section 3a:** Terenure Junction to Rathgar Avenue; and
 - **Section 3b:** Rathgar Avenue to Rathmines Road.
- **Section 4: Charleville Road to Dame Street:**
 - **Section 4a:** Rathgar Road to Grove Road;
 - **Section 4b:** Grove Road to Cuffe Street;
 - **Section 4c:** Cuffe Street to Dame Street; and
 - **Section 4d:** Offline Sections.

The location of each section / sub-section along the Proposed Scheme is shown in Diagram 6.4

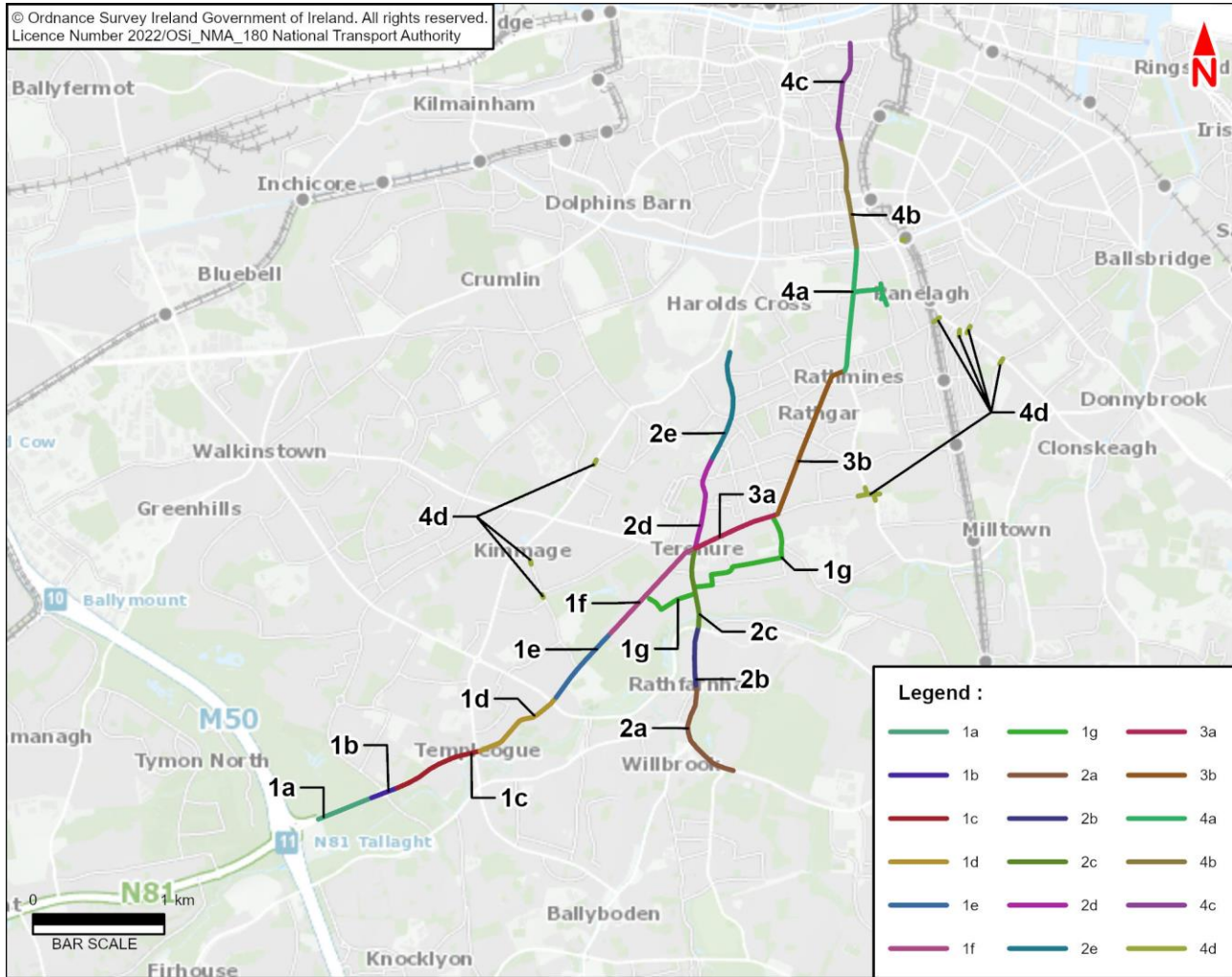


Diagram 6.4: Proposed Subsections of Construction Phase

6.4.5.2 Construction Programme

An indicative programme for the Proposed Scheme is provided in Chapter 5 (Construction) of this EIAR. The Proposed Scheme is estimated to require some 24 months (approximately) to complete, however, individual activities will have shorter durations.

In order to minimise traffic disruption along the Proposed Scheme, the works will be separated by as much distance as possible. The programme is driven by maximising the separation between sections under construction at the same time. Works are envisaged to proceed concurrently on multiple work-fronts to minimise the overall construction duration.

6.4.5.3 Construction Route

The locations for the Construction Compound to facilitate the Construction Phase of the Proposed Scheme are illustrated in Section 5.7 in Chapter 5 (Construction) of this EIAR. The Construction Compound locations have been selected due to the amount of available space, their relative locations near to the majority of the Proposed Scheme major works and access to the National and Regional Road network.

The location of the Construction Compounds in relation to the Proposed Scheme are shown in Diagram 6.5

The Construction Compounds will be located at the following sites:

- **Construction Compound TR1:** Spawell Roundabout;
- **Construction Compound TR2:** Terenure Road North;
- **Construction Compound TR3:** Dodder View Road;
- **Construction Compound TR4:** Military Road;
- **Construction Compound TR5:** Richmond Street South: and
- **Construction Compound TR6:** Spawell Link Road.

The appointed Contractor's CTMP shall include measures for managing traffic accessing and egressing the Construction Compounds. The Construction Compounds will contain a site office, and welfare facilities for NTA personnel and appointed contractor personnel. Limited car parking will be allowed at the Construction Compounds, in line with the principles contained within the CEMP (Appendix A5.1 in Volume 4 of this EIAR).

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 Roads are expected to be used as Construction Access Routes during the Construction Phase of the Proposed Scheme:

- M50 Motorway; and
- N81 National Road.

The following Regional Roads are expected to be used as Construction Access Routes during the Construction Phase of the Proposed Scheme:

- R111;
- R112;
- R114;
- R115;
- R137; and
- R817.

It is envisaged that construction vehicles will travel to and from the construction works via the following road network (as shown in Diagram 6.6).

The routes have been guided by the requirement to overcome 'no right turn bans' at several junctions along the corridor to enable access to and from compound locations and worksites. The routes identified minimise the need for construction vehicles to make opposing right turn movements on streets with high volumes of pedestrians and cyclists; for example, construction vehicles can enter the City Centre via the R114 and exit the City Centre via the R137 as part of a one-way loop without the need for any right-turn movements.



Diagram 6.5: 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 in 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 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 Síochána, 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 footways 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 footways are affected by construction, a safe route will be provided past the works area, and where practicable, provisions for matching existing facilities for pedestrians. Due consideration will also be given to the need for temporary ramps, and measures for accessible users, where changes in elevation are temporarily introduced to facilitate works and footway 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, Moderate 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 illustrative 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 the Rathmines Bus Gate was in place as well as Sections 1d, 2a, 3a, 4b and 4d (Harold's Cross Road section) 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 report 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. For this assessment it has been assumed that a maximum of 26 HGV trips will access / egress the construction works during the AM and PM Peak Hours.

Overall Peak Hour Impacts: Table 6.15 identifies the anticipated maximum construction traffic generation by site operatives and HGVs during the AM and PM Peak Hours.

Table 6.15: 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	26	0	26	62	130
PM Peak Hour	0	26	10	26	62	130

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

Table 6.16 presents a summary of the potential impacts of the Proposed Scheme during construction phase.

Table 6.16: 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, Moderate 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 movements) 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 four 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 footways 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. Table 6.17 outlines the assessment criteria for each junction.

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 6.7.

Table 6.17: Pedestrian Junction Assessment Criteria

Aspect	Indicator
Routing	Are pedestrian crossings (signalised or uncontrolled) available on all arms?
Directness	Where crossings are available, do they offer direct movements which do not require diversions or staggered crossings i.e., no or little delay required for pedestrians to cross in one direct movement?
Vehicular speeds	Are there measures in place to promote low vehicular speeds, such as minimally sized corner radii and narrow carriageway lane widths?
Accessibility	Where crossings exist, are there adequate tactile paving, dropped kerbs and road markings for pedestrians (including able-bodied, wheelchair users, mobility impaired and pushchairs)?
Widths	Are there adequate footway and crossing widths in accordance with national standards?

The LoS rating demonstrated in Table 6.18 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 6.18: 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 6.19 have been used to describe the impact, based on the changes in the Qualitative Pedestrian LoS rating.

Table 6.19: 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 6.20 outline the assessment criteria with reference to the corresponding LoS ratings.

Table 6.20: 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 6.21 have been used to describe the impact, based on the changes in the Qualitative Cycling LoS rating.

Table 6.21: 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 6.22.

Table 6.22: Magnitude of Impact for Bus Users Qualitative Assessment

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

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 6.2.4

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 – R137 Tallaght Road, R137 Templeogue Road to R114 Rathfarnham Road

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:

- Footways with a minimum running width of 2.0m where possible through the scheme;
- 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 southern arm of the R137 Templeogue Road / R817 Cypress Grove Road / R817 Old Bridge Road signalised junction;
- Toucan crossing at the R137 Templeogue Road/ Cheveerstown House junction widened to 4m;
- Provision of signalised crossings to Toucan Crossings on the northern and western arm at the R137 Templeogue Road / Fortfield Road / Bushy Park House signalised junction;
- The removal of slip lanes from the R137 Templeogue Road / R112 Templeville Road / R112 Springfield Avenue signalised junction;
- Conversion of Spawell Roundabout to a signalised junction with direct signalised crossings on the northern and southern arms;
- Informal path on the green to the north of Rathdown Drive to become a formalised footway;
- The removal of the shared walking and cyclist space to the west of Templeogue House, replaced by a new landscaped area for pedestrians; and
- A new pedestrian/ cycle only link, connecting the Rathdown Crescent / Rathdown Park roundabout to the green link at Rathdown Drive, merging with Rathdown Park to the east.

The assessment of the qualitative impacts on the pedestrian infrastructure for Section 1 of the Proposed Scheme are summarised in Table 6.23, along with the accompanying sensitivity for each junction and the resultant significance of effect. A detailed breakdown of the assessment at each junction can be found in Appendix A6.4.1 (Pedestrian Infrastructure Assessment) in Volume 4 of this EIAR.

Table 6.23: Section 1 – Significance of Effects for Pedestrian Impact during Operational Phase

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact	Sensitivity	Significance of Effect
Spawell Roundabout (roundabout to signalised junction)	J700	D	B	Medium	Medium	Positive Significant
R137 Templeogue Road / Substation Access / Corrybeg priority junction	J1250	D	B	Medium	High	Positive Very Significant
R137 Templeogue Road / R817 Cypress Grove Road / R817 Old Bridge Road signalised junction	J1450	E	C	Medium	High	Positive Very Significant
R137 Templeogue Road / Riverside Cottages priority junction	J2025	D	B	Medium	Medium	Positive Significant
R137 Templeogue Road / R112 Templeville Road / R112 Springfield Avenue signalised junction	J2150	D	A	Medium	Medium	Positive Significant

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact	Sensitivity	Significance of Effect
R137 Templeogue Road / Springfield Road priority junction	J2250	D	B	Medium	High	Positive Very Significant
R137 Templeogue Road / Fortfield Road / Bushy Park House signalised junction	J2450	F	B	High	Medium	Positive Very Significant
R137 Templeogue Road / Rathdown Avenue priority junction	J2800	C	A	Medium	Medium	Positive Significant
R137 Templeogue Road / Lakelands Park priority junction	J3100	D	B	Medium	Low	Positive Moderate
R137 Templeogue Road / Rathdown Park priority junction	J3375	E	B	Medium	Low	Positive Moderate
R137 Templeogue Road / Olney Crescent priority junction	J3450	D	B	Medium	Low	Positive Moderate
R137 Templeogue Road / Fergus Road / priority junction	J3500	D	B	Medium	Medium	Positive Significant
R137 Templeogue Road / R818 Terenure Road West / R137 Terenure Place signalised junction	J3700	D	B	Medium	High	Positive Very Significant
Rathdown Crescent / Rathdown Park roundabout (along alternative Quiet Route for Cyclists)	J3225	D	C	Low	Low	Positive Slight
Rathdown Drive / Rathdown Crescent roundabout (along alternative Quiet Route for Cyclists)	J3225	D	A	Medium	Low	Positive Moderate
Rathdown Park four-arm priority junction (along alternative Quiet Route for Cyclists)	A1500	D	B	Medium	Low	Positive Moderate
Section Summary		D	B	Medium	Medium	Positive Significant

Table 6.23 demonstrates that the scheme will have a long long-term positive impact on the quality of the pedestrian infrastructure between the R137 Templeogue Road and R114 Rathfarnham Road. The LoS during the Do Minimum scenario ranges between C and F, with three of the 16 impacted junctions along this section being given a low E / F rating. These ratings have been determined using the previously referenced assessment criteria set out in Table 6.17.

During the Do Something scenario, i.e. following the development of the Proposed Scheme, 14 of the 16 impacted junctions along this section achieve the highest A / B ratings, with two 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 footway and crossing widths.

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. A detailed

breakdown of the assessment at each impacted junction, including a list of the junctions which experience no change, can be found in Appendix A6.4.1 (Walking Infrastructure Assessment).

6.4.6.1.2.2 Cycling Assessment

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 6.24, 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:

- Toucan crossing at the R137 Templeogue Road/ Cheeverstown House junction widened to 4m;
- Upgrade of signalised crossings to Toucan Crossings on the northern, eastern and western arm at the R137 Templeogue Road / Fortfield Road / Bushy Park House signalised junction;
- Upgrade of signalised crossing to a Toucan Crossing on the western arm of the R137 Templeogue Road / Rathdown Avenue priority junction;
- A new pedestrian/ cycle only link, connecting the Rathdown Crescent / Rathdown Park roundabout to the green link at Rathdown Drive, merging with Rathdown Park to the east.
- Maintaining the 3.5m wide bidirectional cycle track with 3.7m verge on the northern side of R137 Templeogue Road between the M50 Junction 11 and L4023 Spawell Road;
- Provision of continuous 2.0m wide cycle lanes in both directions along R137 Templeogue Road between L4023 Spawell Road and the R817 Cypress Grove Road;
- Provision of 1.5m wide cycle track travelling eastbound and a 1.5m wide cycle track with a 2.6m verge travelling westbound between R112 Templeville Road to Fortfield Road;
- Provision of a bidirectional cycle track with a width of 2.5m alongside a 1.5m footway from Fortfield Road to Rathdown Avenue;
- Provision of an alternative quiet route for cyclists along Rathdown Drive travelling parallel to the R137 Templeogue Road (vehicles will still be permitted to use this route). This route continues from Rathdown Drive onto Rathdown Crescent, followed by Rathdown Park to join the Rathfarnham Proposed Scheme;
- Provision of a 2.0m wide cycle track travelling southbound on the R137 Templeogue Road between Rathdown Crescent and the R137 Terenure Place. There will be no northbound provision along the R137 Templeogue Road, instead, cyclists would follow the proposed quiet route via Rathdown Park to join Section 2 at the R114 Rathfarnham Road, south of Bushy Park Road;
- Segregation of cyclists and pedestrians adjacent to the Templeogue Arch; currently operating as a shared space;
- A reduction of speed to 30km/h for shared cyclists/ bus and traffic routes; and
- A number of island bus stops located along the Section 1, allowing a continuous cyclist movement behind the bus stop.

Along Section 1, the Proposed Scheme will provide a 60mm set down kerb segregation between the footway and the cycle track. This is of particular importance in the context of providing for pedestrians with visual impairments, whereby the use of white line segregation (as is the case in some areas of the baseline environment) is not as effective for establishing a clear understanding of the change of pavement use and potential for cyclist / pedestrian interactions. In addition, a full height 120mm upstand kerb between the carriageway and the cycle track is provided as part of the Proposed Scheme (120mm kerb height on the bus lane side and 60mm minimum kerb height on the cycle track side.)

The contents Table 6.24 outlines the cycling qualitative assessment along Section 1 of the Proposed Scheme, which sets out the overall Do Minimum LoS and the Do Something LoS and the description of impact. Please

refer to Appendix A6.4.2 (Cycling Infrastructure Assessment) in Volume 4 of this EIAR which outlines in further detail the methodology behind each LoS rating given to the Do Minimum and Do Something scenarios.

Table 6.24: Section 1 – Cycling Impact during Operational Phase

Location	Chainage	Do Minimum LoS	Do Something LoS	Impact	Sensitivity of Environment	Significance of Effect
Access junction for Cheeverstown House to R817 Cypress Grove Road	J1050 - J1500	C	A	Medium	Medium	Positive Significant
Templeogue Village to Fortfield Road	J2150 - J2500	C	B	Low	High	Positive Moderate
Fortfield Road to Rathdown Avenue	J2500 - J2800	C	A	Medium	High	Positive Very Significant
Rathdown Avenue to Rathdown Crescent	J2800 - J3250	C	B	Low	High	Positive Moderate
Rathdown Crescent to R137 Terenure Place	J3250 - A1800	C	B	Low	High	Positive Moderate
Section Summary		C	B	Low	High	Positive Moderate

Table 6.24 demonstrates that the Proposed Scheme will have a **Positive, Moderate and Long-Term effect** on the quality of the cycling infrastructure between the R137 Templeogue Road and R114 Rathfarnham Road.

The LoS during the Do Minimum scenario ranges between is C at all impacted routes along this section. These ratings have been determined using the previously referenced assessment criteria set out in Table 6.20. During the Do Something scenario, i.e. following the development of the Proposed Scheme, all impacted routes along this section achieve the highest A / B ratings. This is as a result of improved segregation for cyclists and junction treatment in the form of cycle lanes traversing priority junctions and continuing through signalised junctions with protected treatment as part of the Proposed Scheme, alongside an alternative cycle quiet route along Rathdown Avenue.

The findings of the cycling assessment fully aligns with the objective of the CBC Infrastructure Works, applicable to the Traffic and Transport assessment of the Proposed Scheme, to 'Enhance the potential for cycling by providing safe infrastructure for cycling, segregated from general traffic wherever practicable'.

6.4.6.1.2.3 Bus Infrastructure

It is proposed that there will be a total of 16 bus stops along Section 1 of the Proposed Scheme – eight inbound and eight outbound. This is three fewer outbound stops than in the Do Minimum. The layout of new bus stops is considered to better serve the existing and future catchment and be closer to existing and new pedestrian crossing facilities for improved convenience

Table 6.25 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 6.25: Section 1 – 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	4	21%	16	100%	It is proposed that all bus stops provide real-time information.
Timetable information	14	74%	16	100%	It is proposed that all bus stops provide timetable information.
Shelter	8	42%	12	75%	Shelter to be provided at all but three bus stops which are limited by spatial constraints
Seating	6	32%	12	75%	Shelter to be provided at all but three bus stops which are limited by spatial constraints.
Accessible Kerbs	11	58%	16	100%	Full provision.
Indented Drop Off Area	3	16%	1	6%	One bus stop will be indented.
Total Stops	19		16		Three fewer stops than Do Minimum.

Table 6.25 indicate that there are significant improvements to the bus stop facilities along Section 1 of the Proposed Scheme. It is proposed that one bus stop will be indented, all others all bus stops will be provided inline within dedicated bus lanes along the entirety of the corridor, meaning that buses will not incur delay when setting off after picking up passengers. Improvements in the provision of real-time information, shelters, seating and accessible kerbs at the bus stops throughout Section 1 of the Proposed Scheme are assessed as providing an overall positive impact for bus passengers. All proposed facilities have been designed in accordance with BusConnects Preliminary Design Guidance which has been developed with cognisance to the relevant accessibility guidance. Taking into account the provision of bus lanes, pedestrian accessibility and bus stop facilities outlined within this section, Table 6.26 outlines the bus qualitative assessment along Section 1 of the Proposed Scheme.

Table 6.26: Section 1 – Bus Qualitative Impact during Operational Phase

Section	Chainage	Description of Impact	Impact	Sensitivity of Environment	Significance of Effect
Tallaght to Terenure	J100 - A1800	<ul style="list-style-type: none"> Number of stops rationalised from 19 to 16 Optimisation of spacing and journey times. Bus stops are located in more convenient locations for communities and access to signalised crossings. Moderate improvements to bus stop facilities throughout. 	Medium	High	Positive Very Significant

As indicated in Table 6.26, 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 Positive. The sensitivity of environment rating is predominately categorised as ‘high’. This results in a **Positive, Very Significant and Long-term effect** on this section.

6.4.6.1.2.4 Parking and Loading

There is no existing parking along Section 1 of the scheme and hence there is no significance of effect.

6.4.6.1.3 Section 2 – R821 Nutgrove Avenue to R137 Terenure Road North

6.4.6.1.3.1 Pedestrian Infrastructure

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

- Footways with a minimum running width of 2.0m where possible through the scheme ;
- Signalised crossing added to the western arm of the R821 Nutgrove Avenue / R821 Grange Road / R822 Grange Road signalised junction;
- Signalised crossing added to the western arm of the R115 Rathfarnham Road / R821 Grange Road / R115 Willbrook Road signalised junction;
- Provision of signalised crossings on all arms at the R114 Rathfarnham Road / R115 Rathfarnham Road / R114 Butterfield Avenue signalised junction;
- Signalised crossing added to the northern arm of the R114 Rathfarnham Road / L4014 Main Street / L8103 Castleside Drive signalised junction;
- Signalised crossings added to the northern and western arms of the R114 Rathfarnham Road / Rathdown Park signalised junction
- Raised tables added to minor junctions along Section 2, including those along specified quiet route for cyclists (Victoria Road and Orwell Road);
- Tie into the proposed Dodder Greenway at the R114 Rathfarnham Road / R112 Dodder Park Road / R112 Dodder View Road signalised junction.

The assessment of the qualitative impacts on the Pedestrian Infrastructure for Section 2 of the Proposed Scheme are summarised in Table 6.27 along with the accompanying sensitivity for each junction and the resultant significance of effect. A detailed breakdown of the assessment at each junction can be found in Appendix A6.4.1 (Pedestrian Infrastructure Assessment) in Volume 4 of this EIAR.

Table 6.27: Section 2 – Significance of Effects for Pedestrian Impact during Operational Phase

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact	Sensitivity	Significance of Effect
R821 Nutgrove Avenue / R821 Grange Road / R822 Grange Road signalised junction	A000	D	A	Medium	Medium	Positive Significant
R115 Rathfarnham Road / R821 Grange Road / R115 Willbrook Road signalised junction	A350	D	A	Medium	Medium	Positive Significant
R115 Rathfarnham Road / L8451 St Mary's Avenue priority junction	A375	D	A	Medium	High	Positive Very Significant
R114 Rathfarnham Road / R115 Rathfarnham Road / R114 Butterfield Avenue signalised junction	A475	E	A	High	Medium	Positive Very Significant
R114 Rathfarnham Road / L4014 Main Street / L8103 Castleside Drive signalised junction	A750	D	A	Medium	Medium	Positive Significant
R114 Rathfarnham Road / L8122 Crannagh Road priority junction	A900	D	B	Medium	Low	Positive Moderate
R114 Rathfarnham Road / L8068 Brookvale Road priority junction	A1000	D	B	Medium	Low	Positive Moderate

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact	Sensitivity	Significance of Effect
R114 Rathfarnham Road / L8384 Rathfarnham Park priority junction	A1150	D	B	Medium	Low	Positive Moderate
R114 Rathfarnham Road / R112 Dodder Park Road / R112 Dodder View Road signalised junction	A1250	C	A	Medium	Low	Positive Moderate
R114 Rathfarnham Road / Westbourne Road priority junction	A1400	D	B	Medium	Low	Positive Moderate
R114 Rathfarnham Road / Rathdown Park signalised junction	A1500	E	B	Medium	Low	Positive Moderate
R114 Rathfarnham Road / Bushy Park Road signalised junction	A1550	C	B	Low	Medium	Positive Moderate
R114 Rathfarnham Road / Fergus Road priority junction	A1650	D	B	Medium	High	Positive Very Significant
R114 Rathfarnham Road / Cormac Terrace priority junction	A1700	D	B	Medium	High	Positive Very Significant
R114 Rathfarnham Road / Beechlawn Way priority junction	A1750	D	B	Medium	High	Positive Very Significant
R137 Terenure Road North / R114 Terenure Road East / R114 Rathfarnham Road / R137 Terenure Place priority junction	H000	D	A	Medium	High	Positive Very Significant
Orwell Road / Zion Road signalised junction (along alternative quiet route for cyclists)	B900	E	A	High	High	Positive Profound
Section Summary		D	A	Medium	Medium	Positive Significant

The contents of Table 6.27 demonstrates that the scheme will have a long-term positive impact on the quality of the pedestrian infrastructure between the R821 Nutgrove Avenue and R137 Terenure Road North.

The LoS during the Do Minimum scenario ranges between C and E, with three of the 17 impacted junctions along this section given a low E rating. These ratings have been determined using the previously referenced assessment criteria set out in Table 6.17.

The LoS will improve to an A / B rating at all impacted junctions in the Do Something scenario. This is as a result of the proposed improvements to the existing pedestrian facilities in the form of additional crossing locations, increased pedestrian directness, provision of traffic calming measures to reduce vehicle speeds, improved accessibility and increased footway 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 effect** 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. A detailed breakdown of the

assessment at each impacted junction, including a list of the junctions which experience no change, can be found in Appendix A6.4.1 (Pedestrian Infrastructure Assessment) in Volume 4 of this EIAR.

6.4.6.1.3.2 Cycling Infrastructure

The following section sets out the qualitative impacts on the cycling receptor for Section 2 of the Proposed Scheme. The results are summarised in Table 6.28, along with the accompanying sensitivity for each section and the resultant significance of impact:

- Provision of 2.0m wide cycle track in both directions with bypasses bus stops on the R821 Grange Road between R821 Nutgrove Avenue and Main Street;
- The cycle lanes bypass or continue past on-street parking at St Mary’s Avenue and in Terenure Village;
- Upgrade of signalised crossing to a Toucan crossing on the northern arm of the R114 Rathfarnham Road / R112 Dodder Park Road / R112 Dodder View Road signalised junction;
- Upgrade of signalised crossings at to Toucan crossings on the eastern and northern arms of the R114 Rathfarnham Road / Bushy Park Road signalised junction;
- Upgrade of signalised crossings and uncontrolled crossings to Toucan crossings on all arms of the R137 Terenure Road North / R114 Terenure Road East / R114 Rathfarnham Road / R137 Terenure Place junction
- Tie into the proposed Dodder Greenway at the 114 Rathfarnham Road / R112 Dodder Park Road / R112 Dodder View Road signalised junction;
- Provision of 1.5m wide cycle track in both directions along the R114 Rathfarnham Road between the R112 Dodder View Road and Rathdown Park;
- Provision of 1.5m wide cycle track in both directions between Rathdown Park and the R137 Terenure Road North. The northbound cycle lane provides a bypass of a bus stop island and on-street parking bays; and
- Provision of an alternative quiet route between Rathdown Park and Orwell Road via Bushy Park Road, Wasdale Park, Wasdale Grove, Victoria Road and Zion Road. These streets will have ‘quiet street treatment’ whereby cyclists share the traffic lanes, but road markings indicate a ‘cycle-friendly’ route.

Along Section 2, the Proposed Scheme will provide a 60mm set down kerb segregation between the footway and the cycle track. This is of particular importance in the context of providing for pedestrians with visual impairments, whereby the use of white line segregation (as is the case in some areas of the baseline environment) is not as effective for establishing a clear understanding of the change of pavement use and potential for cyclist / pedestrian interactions. In addition, a full height 120mm upstand kerb between the carriageway and the cycle track is provided as part of the Proposed Scheme (120mm kerb height on the bus lane side and 60mm minimum kerb height on the cycle track side).

Table 6.28 outlines the cycling qualitative assessment along Section 2 of the Proposed Scheme, which sets out the overall Do Minimum LoS and the Do Something LoS and the description of impact. Please refer to Appendix A6.4.2 (Cycling Infrastructure Assessment) in Volume 4 of this EIAR which outlines in further detail the methodology behind each LoS rating given to the Do Minimum and Do Something scenarios.

Table 6.28: Section 2 – Cycling Impact during Operational Phase

Location	Chainage	Do Minimum LoS	Do Something LoS	Impact	Sensitivity of Environment	Significance of Effect
R821 Nutgrove Road to Butterfield Avenue	A000 – A475	C	A	Medium	High	Positive Very Significant

Location	Chainage	Do Minimum LoS	Do Something LoS	Impact	Sensitivity of Environment	Significance of Effect
R114 Butterfield Avenue to Main Street	A475 - A750	C	A	Medium	Medium	Positive Significant
R112 Dodder View Road to Rathdown Park	A1250 - A1500	C	B	Low	Medium	Positive Moderate
Rathdown Park to R137 Terenure Road North	A1500 - H000	C	B	Low	High	Positive Moderate
Alternative Quiet Route: Bushy Park Road to Orwell Road	A1550 - A2500	D	C	Low	Low	Positive Slight
Alternative Route: Orwell Road to R114 Terenure Road East	A2500	D	A	High	High	Positive Profound
Section Summary		C	B	Low	High	Positive Moderate

Table 6.28: Section 2 – Cycling Impact during Operational Phase

Table 6.28 demonstrates demonstrate that the scheme will have a **Positive, Moderate and Long-term effect** on the cycling environment between the R821 Nutgrove Avenue and R137 Terenure Road North.

The LoS rating during the Do Minimum scenario ranges between C and D, with two of the six impacted routes along this section being given a low D rating. These ratings have been determined using the previously referenced assessment criteria set out in Table 6.20. The LoS in the Do Something scenario is C for one route, B for two route and A for three routes. This is as a result of improved segregation for cyclists and junction treatment in the form of cycle lanes traversing priority junctions and continuing through signalised junctions with protected treatment as part of the Proposed Scheme.

The findings of the cycling assessment fully aligns with the objective of the CBC Infrastructure Works, applicable to the Traffic and Transport assessment of the Proposed Scheme, to ‘Enhance the potential for cycling by providing safe infrastructure for cycling, segregated from general traffic wherever practicable’.

6.4.6.1.3.3 Bus Infrastructure

It is proposed that there will be a total of 15 bus stops along Section 2 of the Proposed Scheme – seven inbound and eight outbound. This is three fewer than the Do Minimum. The layout of new bus stops is considered to better serve the existing and future catchment and be closer to existing and new pedestrian crossing facilities for improved convenience.

Table 6.29 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 6.29: Section 2 – 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	2	11%	15	100%	RTPI added to all bus stops.
Timetable information	15	83%	15	100%	It is proposed that all bus stops provide real-time information.
Shelter	11	61%	12	80%	Shelter to be provided at all but three bus stops which are limited by spatial constraints.
Seating	10	55%	12	80%	Seating to be provided at all but three bus stops which are limited by spatial constraints.
Accessible Kerbs	16	89%	15	100%	Full provision.
Indented Drop Off Area	0	0%	0	0%	All proposed bus stops will be located inline within bus lanes.
Total Stops	18		15		Three fewer than the Do Minimum.

The contents of Table 6.29 indicate that there are significant improvements to the bus stop facilities along Section 1 of the Proposed Scheme. It is proposed that all bus stops will be provided inline within dedicated bus lanes along the entirety of the corridor, meaning that buses will not incur delay when setting off after picking up passengers. Improvements in the provision of real-time information, shelters, seating and accessible kerbs at the bus stops throughout Section 2 of the Proposed Scheme are assessed as providing an overall positive impact for bus passengers. All proposed facilities have been designed in accordance with BusConnects Preliminary Design Guidance which has been developed with cognisance to the relevant accessibility guidance.

Taking into account the provision of bus lanes, pedestrian accessibility and bus stop facilities outlined within this section, Table 6.30 below outlines the bus qualitative assessment along Section 2 of the Proposed Scheme.

Table 6.30: Section 2 – Bus Qualitative Impact during Operational Phase

Section	Chainage	Description of Impact	Impact	Sensitivity of Environment	Significance of Effect
R821 Nutgrove Avenue to R137 Terenure Road North	A000 - A1850	<ul style="list-style-type: none"> Three fewer stops than in the Do Minimum. Bus stops are located in more convenient locations for communities and access to signalised crossings. Slight improvements to bus stop facilities throughout. 	Medium	Medium	Positive Significant

As indicated in Table 6.30, 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 Medium Positive. The sensitivity of environment rating is predominately categorised as ‘medium.’ This results in a **Positive, Significant and Long-term effect** on this section.

6.4.6.1.3.4 Parking and Loading

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

- The removal of seven pay and display and permit spaces out of 14 on the R114 Rathfarnham Road between Cormac Terrace and Terenure Road East to provide a cycle lane for northbound traffic.

Table 6.31 presents a summary of the proposed on-street changes along Rathfarnham Section 2 of the Proposed Scheme. In addition to the above there will be changes to the car park at Grange Road adjacent to the R821 Nutgrove Avenue / R821 Grange Road / R822 Grange Road signalised junction. Four off street parking spaces including two disabled bays and a set down area will be provided.

Table 6.31: Section 2 – Overall Changes in Parking / Loading Spaces

Location	Parking Type	Do Minimum	Do Something	Change
Grange Road/ Rathfarnham Road (between Grange Road and Dodder Park Road)	Permit Parking Pay & display: residential	7	7	0
R114 Rathfarnham Road: Between Cormac Terrace and R137 Terenure Road East	Permit Parking Pay & display: commercial	14	7	-7
	Disabled Bay	1	1	0
Total		22	15	-7

As shown in Table 6.31 there are approximately 22 current on-street parking spaces affected within the area of the Section 2 of the Proposed Scheme. Under the proposals, seven parking spaces will be lost, all commercial spaces. This change is considered to have a **Negligible and Long-term effect**, due to the low numbers of spaces lost and the presence of a large number of similar types of spaces on side roads along Section 2. This effect is considered acceptable in the context of the aim of the Proposed Scheme, to provide enhanced walking, cycling and bus infrastructure on this key access corridor.

6.4.6.1.4 Section 3 – R137 Terenure Road North to Charleville 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:

- Footways with a minimum running width of 2.0m where possible through the scheme ;
- Provision of signalised crossings on Terenure Road East, to the west of Brighton Road and Rathgar Road and south of Wesley Road;
- Toucan crossings added to all arms at the R114 Rathgar Road / Highfield Road priority junction;
- Signalised crossings added on the eastern arm of the R114 Rathgar Road / Grosvenor Road / Charleville Road signalised junction;
- Raised tables added to minor junctions along Section 3; including those along specified quiet route for cyclists (Terenure Road North and Harold’s Cross Road)
- Toucan crossings provided on all arms of the Harold’s Cross Road / Kenilworth Park / Kenilworth Square / Rathgar Avenue.

The assessment of the qualitative impacts on the pedestrian infrastructure for Section 3 of the Proposed Scheme is summarised in Table 6.32, along with the accompanying sensitivity for each junction and the resultant significance of impact

Table 6.32: Section 3 – Significance of Effects for Pedestrian Impact during Operational Phase

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact	Sensitivity	Significance of Effect
R114 Terenure Road East / Heathfield Road / Greenmount Road priority junction	A2050	D	B	Medium	Low	Positive Moderate
R114 Terenure Road East / Ferrard Road priority junction	A2150	D	B	Medium	Low	Positive Moderate
R114 Terenure Road East / Brighton Road priority junction	A2250	C	A	Medium	Low	Positive Moderate
R114 Terenure Road East / Rathgar Park priority junction	A2450	C	B	Low	Low	Positive Slight
R114 Rathgar Road / Orwell Road / R114 Terenure Road East / Rathgar Avenue signalised junction	A2500	B	A	Low	Moderate	Positive Moderate
R114 Rathgar Road / Highfield Road priority junction	A2550	F	A	High	Medium	Positive Very Significant
R114 Rathgar Road / Wesley Road priority junction	A2725	D	A	Medium	Low	Positive Moderate
R114 Rathgar Road / Winton Avenue priority junction	A2775	C	B	Low	Low	Positive Slight
R114 Rathgar Road / Auburn Villas priority junction	A2825	C	B	Low	Low	Positive Slight
R114 Rathgar Road / Garville Mews priority junction	A2875	D	B	Medium	Low	Positive Moderate
R114 Rathgar Avenue / Belleville Avenue priority junction	A2950	C	B	Low	Low	Positive Slight
R114 Rathgar Avenue / Garville Avenue priority junction	A2975	D	B	Medium	Low	Positive Moderate
R114 Rathgar Avenue / Garville Road priority junction	A2975	C	B	Low	Low	Positive Slight
R114 Rathgar Road / Frankfort Avenue / Leicester Avenue signalised junction	A3150	C	A	Medium	Low	Positive Moderate
R114 Rathgar Road / Grosvenor Road priority junction	A3200	C	B	Low	Low	Positive Slight
R114 Rathgar Road / Spire View Lane priority junction	A3550	D	B	Medium	Medium	Positive Significant

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact	Sensitivity	Significance of Effect
R114 Rathgar Road / Rathgar Place junction	A3375	D	B	Medium	Low	Positive Moderate
R114 Rathgar Road / Rathmines Park priority junction	A3500	C	B	Low	Low	Positive Slight
R114 Rathgar Road / Grosvenor Road / Charleville Road signalised junction	A3650	F	A	High	Medium	Positive Very Significant
R137 Terenure Road North / Yewlands Terrace priority junction	H050	C	B	Low	Low	Positive Slight
R137 Terenure Road North / Elm Park Terrace priority junction	H150	C	B	Low	High	Positive Moderate
R137 Terenure Road North / Rathmore Villas priority junction	H175	D	B	Medium	High	Positive Very Significant
R137 Terenure Road North / Eaton Road priority junction	H225	D	B	Medium	High	Positive Very Significant
R137 Terenure Road North / Terenure Car Park Access / Eagle Hill Avenue priority junction	H250	D	A	Medium	High	Positive Very Significant
R137 Terenure Road North / Eaton Hall Access / Whitton Road priority junction	H325	C	B	Low	High	Positive Moderate
R137 Terenure Road North / St Enda's Road priority junction	H425	C	B	Low	High	Positive Moderate
R137 Terenure Road North / Westhampton Place / McMorrough Road priority junction	H475	D	B	Medium	High	Positive Very Significant
R137 Terenure Road North / Ashdale Road / Brighton Square priority junction	H550	C	B	Low	High	Positive Moderate
R137 Harold's Cross Road / Mount Tallant Avenue priority junction	H725	C	B	Low	Medium	Positive Moderate
R137 Harold's Cross Road / Brighton Square priority junction	H800	C	B	Low	Medium	Positive Moderate
R137 Harold's Cross Road / Kenilworth Manor priority junction	H900	C	B	Low	Low	Positive Slight
R137 Harold's Cross Road / Laundry Lane priority junction	H950	C	B	Low	Low	Positive Slight
R137 Harold's Cross Road / Kenilworth Lane West priority junction	H1150	D	B	Low	Low	Positive Slight

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact	Sensitivity	Significance of Effect
R137 Harold's Cross Road / Leinster Road West priority junction	H1200	D	B	Medium	Low	Positive Moderate
R137 Harold's Cross Road / Tivoli Avenue priority junction	H1350	C	A	Medium	Low	Positive Moderate
R137 Harold's Cross Road / Leinster Road signalised junction	H1400	C	A	Medium	Low	Positive Moderate
R137 Harold's Cross Road / Mountain View Avenue priority junction	H1450	C	B	Low	Low	Positive Slight
Section Summary		D	B	Medium	Medium	Positive Significant

The contents of Table 6.32 demonstrates that the Proposed Scheme will have a long-term positive impact on the quality of the pedestrian infrastructure between the R137 Terenure Road North and Charleville Road.

The LoS during the Do Minimum scenario ranges between B and F, with 14 of the 37 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 6.17.

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 as a result of the proposed improvements to the existing pedestrian facilities in the form of additional crossing locations, increased pedestrian directness, provision of traffic calming measures to reduce vehicle speeds, improved accessibility and increased footway 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, Significant and Long-term effect** to the quality of the pedestrian infrastructure along Section 3 of the Proposed Scheme, during the Operational Phase, which aligns with the overarching aim to provide enhanced walking infrastructure on the corridor. A detailed breakdown of the assessment at each impacted junction, including a list of the junctions which experience no change, can be found in Appendix A6.4.1 (Pedestrian Infrastructure Assessment) in Volume 4 of this EIAR.

6.4.6.1.4.2 Cycling Infrastructure

The following section sets out the qualitative impacts on the cycling receptor for Section 3 of the Proposed Scheme. The results are summarised in Table 6.33, along with the accompanying sensitivity for each section and the resultant significance of impact:

- Removal of the cycle lanes along the R114 Terenure Road East between the R137 Terenure Road North and Rathgar Avenue as an alternative quiet route is proposed via Bushy Park Road, Wasdale Park, Wasdale Grove, Victoria Road, Zion Road and Orwell Road;
- Along Orwell Road, the Proposed Scheme includes 2.0m wide cycle track in both directions to link to the R114 at the R114 Rathgar Road / Orwell Road / R114 Terenure Road East / Rathgar Avenue junction;
- Provision of 1.5m wide cycle track in both directions between Rathgar Avenue and Grosvenor Road.

- At the Charleville Road / R114 Rathgar Road / Grosvenor Road junction, advisory cycle lanes continue through the junction and there is kerb segregation for left-turn movements and right-turn movements will be made in two stages; and
- High quality 2.0m wide cycle track in both directions along the R131 Terenure Road North and Harold’s Cross Road. The cycle lanes bypass or continue past on-street parking.
- Upgrade of signalised crossings to toucan crossings at the R114 Rathgar Road / Orwell Road / R114 Terenure Road East / Rathgar Avenue signalised junction;
- Upgrade of signalised crossings to toucan crossings at the R114 Rathgar Road / Frankfort Avenue / Leicester Avenue signalised junction;
- Upgrade of signalised crossing to a toucan crossing on the southern arm of the R137 Terenure Road North / Ashdale Road / Brighton Square junction;
- Upgrade of signalised crossing to a toucan crossing on the southern arm of the R137 Harold's Cross Road / Tivoli Avenue junction;
- Upgrade of signalised crossings to toucan crossings at the R137 Harold's Cross Road / Leinster Road signalised junction; and
- Toucan crossings provided on all arms of the Harold’s Cross Road / Kenilworth Park / Kenilworth Square / Rathgar Avenue.

Along Section 3, the Proposed Scheme will provide a 60mm set down kerb segregation between the footway 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 is provided as part of the Proposed Scheme (120mm kerb height on the bus lane side and 60mm minimum kerb height on the cycle track side).

Table 6.33 outlines the cycling qualitative assessment along Section 3 of the Proposed Scheme, with reference to the accompanying sensitivity for each section and the resultant Significance of Impact.

Table 6.33: Section 3 – Cycling Impact during Operational Phase

Location	Chainage	Do Minimum LoS	Do Something LoS	Impact	Sensitivity of Environment	Significance of Effect
Rathgar Avenue to Grosvenor Road	A2500 - A3650	C	B	Low	Low	Positive Slight
R114 Terenure Road East to Eaton Road	H000 - A200	C	A	Medium	Low	Positive Moderate
Eaton Road to Westhampton Place	H200 - H450	B	A	Low	Low	Positive Slight
Westhampton Place to Mount Tallant Avenue	H450 - H700	B	A	Low	Low	Positive Slight
Mount Tallant Avenue to Kenilworth Park	H700 - H1050	C	A	Medium	Low	Positive Moderate
Kenilworth Park to Parkview Avenue (joining Kimmage to City Centre Proposed Scheme)	H1050 - H1550	C	A	Medium	High	Positive Very Significant
Section Summary		C	A	Medium	Medium	Positive Significant

Table 6.33 demonstrates that the Proposed Scheme will have a long-term positive impact on the quality of the cycling infrastructure between the R137 Terenure Road North and Charleville Road.

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 6.20. 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 cycling facilities in the form of wider cycle lanes and protected treatment at signalised junctions.

It is therefore anticipated that there will be **Positive, Significant and Long-term effect** to the quality of the cycling infrastructure along Section 3 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) in Volume 4 of this EIAR.

The findings of the cycling assessment fully aligns with the objective of the CBC Infrastructure Works, applicable to the Traffic and Transport assessment of the Proposed Scheme, to 'Enhance the potential for cycling by providing safe infrastructure for cycling, segregated from general traffic wherever practicable'.

6.4.6.1.4.3 Bus Infrastructure

There is currently a total of 26 bus stops along Section 3, 13 inbound and 13 outbound. Under the Proposed Scheme, there will be a total of 22 bus stops along Section 3 with two fewer inbound, and two fewer outbound stops, than in the Do Minimum. The layout of new bus stops is considered to better serve the existing and future catchment and be closer to existing and new pedestrian crossing facilities for improved convenience

Table 6.34 outlines 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 6.34: 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	6	23%	22	100%	It is proposed that all bus stops provide real-time information.
Timetable information	23	88%	22	100%	It is proposed that all bus stops provide timetable information.
Shelter	13	50%	15	68%	It is proposed that all, but 7 bus stops along this section is to be provided with shelter.
Seating	9	35%	15	68%	It is proposed that all, but 7 bus stops along section is to be provided with seating.
Accessible Kerbs	24	92%	22	100%	It is proposed that all bus stops provide accessible kerbs.
Indented Drop Off Area	1	4%	0	0%	All stops inline.
Total Stops	26		22		Four fewer stops along Section 3 compared to the Do Minimum

The contents of Table 6.34 indicate that there are improvements to the bus stop facilities along Section 3 of the Proposed Scheme. All stops along this section will be inline, within dedicated bus lanes along the entirety of the corridor. Improvements in the provision of real-time information, shelters, seating and accessible kerbs at the bus stops throughout Section 3 of the Proposed Scheme are assessed as providing an overall positive impact for bus passengers. All proposed facilities have been designed in accordance with BusConnects Preliminary Design Guidance which has been developed with cognisance to the relevant accessibility guidance.

Taking into account the provision of bus lanes, pedestrian accessibility and bus stop facilities outlined within this section, Table 6.35 outlines the bus qualitative assessment along Section 3 of the Proposed Scheme.

Table 6.35: Section 3 – Bus Qualitative Impact during Operational Phase

Section	Chainage	Description of Impact	Impact	Sensitivity of Environment	Significance of Effect
R137 Terenure Road North to Charleville Road	A1850 - A3650	<ul style="list-style-type: none"> Number of stops rationalised to optimise spacing and journey times. Bus stops are located in more convenient locations for communities and access to signalised crossings. Moderate improvements to bus stop facilities. 	Medium	Medium	Positive Significant

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 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 Positive. The sensitivity of environment rating is predominately categorised as ‘medium. This results in a **Positive, Significant and Long-term effect** on this section.

6.4.6.1.4.4 Parking and Loading

The proposals will impact on existing parking along Section 3 of the Proposed Scheme and the main changes are as follows:

- Currently there are six pay and display and permit spaces on Terenure Road North between West Hampton Place and Ashdale Road. It is proposed that two of these will be removed due to the presence of a cycle lane. Due to the availability of parking on various side streets in the vicinity, this is considered to have a **Negligible and Long-term impact**.
- There are five pay and display parking spaces and four taxi rank spaces on Terenure Road North between Rathmore Villas and Eagle Hill Avenue. It is proposed that all five of the pay and display parking spaces are removed due to the presence of a bus stop and cycle lane. Due to the availability of parking on various side streets in the vicinity, this is considered to have a **Negligible and Long-term impact**.
- There are currently fifteen pay and display and permit spaces on Harold’s Cross Road between Ashdale Road and Mount Tallant. Proposed changes will reduce this number down to zero due to the presence of a cycle lane. The impact of this loss of parking is considered to have a **Negative, Slight and Long-Term effect**.
- The removal of three pay and display and one loading bay space (three vehicles) on Rathgar Road, at Highfield Road. There are a large number of on-street spaces in the vicinity, this is considered to have a **Negligible and Long-term impact**.

The contents of Table 6.36 present a summary of the proposed changes to parking along Section 1 of the Proposed Scheme.

Table 6.36: Section 3 – Overall Changes in Parking / Loading Spaces

Location	Parking Type	Number of Parking Spaces		
		Do Minimum	Do Something	Change
R137 Terenure Road East (Northern Side);	Pay & display: commercial	6	6	0
	Disabled Bay	1	1	0
Terenure Road North between Terenure Place and Yewland's Terrace	Loading Bay	1 loading bay (2 spaces)	1 loading bay (2 spaces)	0
	Pay & display: commercial	2	2	0
Terenure Road North between Yewland's Terrace and Rathmore Villas	Pay & display: commercial	9	9	0
	Loading Bay	1 loading bay (2 spaces)	0	-1 loading bay (-2 spaces)
Terenure Road North between West Hampton Place and Ashdale Road	Permit Parking Pay & display	6	2	-4
Harold's Cross Road between Ashdale Road and Mount Tallant	Permit Parking Pay & display	15	0	-15
Harold's Cross Road between Kenilworth Lane West and Leinster Road	Pay & display	8	8	0
Terenure Road North between Eagle Hill Avenue and Whitton Road	Loading Bays	1 loading bay (2 spaces)	1 loading bay (2 spaces)	0
	Pay & display: commercial	2	2	0
Between Rathmore Villas and Eagle Hill Ave	Taxi Rank	4	4	0
	Pay & display	5	0	-5
Rathgar Road (between Rathgar Avenue and Rathmines Road Upper)	Permit Parking Pay & display	6	3	-3
	Loading Bays	2 loading bays (6 spaces)	1 loading bay (3 spaces)	-1 loading bay (-3 spaces)
Total		76	44	-32

As shown in Table 6.36, there are approximately 76 current parking spaces affected within the area of the Section 1 of the Proposed Scheme. Under the proposals, 32 parking spaces will be lost, mainly commercial parking spaces. This change is considered to have a **Negligible and Long-term effect** due to the presence of a large number of similar types of spaces within proximity to the affected locations. This effect is considered acceptable in the context of the aim of the Proposed Scheme, to provide enhanced walking, cycling and bus infrastructure on this key access corridor.

6.4.6.1.5 Section 4 – Charleville Road to R137 Dame Street

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:

- Footways with a minimum running width of 2.0m;
- Provision of signalised crossings on the northern arm of the R114 Rathmines Road Lower / R820 Rathmines Road Upper / R114 Rathgar Road signalised Junction; alongside the upgrading to single stage crossings across this junction;
- Signalised crossing added to the southern arm of the R114 Rathmines Road Lower / Leinster Road signalised junction;
- Signalised crossing added to the eastern and western arms of the R114 Richmond Street South / Charlemont Mall / R114 Rathmines Road Lower / Richmond Row signalised junction;
- Signalised crossing added to the southern arm of the R114 Richmond Street South / R111 Cheltenham Place / R114 Rathmines Road Lower / R111 Grove Road signalised junction;
- Signalised crossings added to all arms of the R114 Camden Street Upper / R114 Harcourt Road / R114 Richmond Street South / R811 Harrington Street signalised junction; and
- Removal of slip lanes at the R114 Redmond Hill / R110 Cuffe Street / R114 Wexford Street / R110 Kevin Street Lower signalised junction.

The assessment of the qualitative impacts on the pedestrian infrastructure for Section 4 of the Proposed Scheme are summarised in Table 6.37 along with the accompanying sensitivity for each junction and the resultant significance of impact.

Table 6.37: Section 4 – Significance of Effects for Pedestrian Impact during Operational Phase

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact	Sensitivity	Significance of Effect
R114 Rathmines Road Lower / R820 Rathmines Road Upper / R114 Rathgar Road signalised junction	A3750	E	A	High	Medium	Positive Very Significant
R114 Rathmines Road Lower / Wynnefield Road priority junction	A3800	C	B	Low	Medium	Positive Moderate
R114 Rathmines Road Lower / Castlewood Avenue signalised junction	A3820	D	A	Medium	High	Positive Very Significant
R114 Rathmines Road Lower / Swanville Place priority junction	A3875	C	B	Low	Medium	Positive Moderate
R114 Rathmines Road Lower / Swan Centre Car Park Access / Leinster Square priority junction	A3975	C	B	Low	Low	Positive Slight
R114 Rathmines Road Lower / Leinster Road signalised junction	A4250	D	A	Medium	Medium	Positive Significant
R114 Rathmines Road Lower / Parker Hill / Williams Park priority junction	A4125	C	B	Low	Medium	Positive Moderate

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact	Sensitivity	Significance of Effect
R114 Rathmines Road Lower / Observatory Lane priority junction	A4200	D	B	Medium	Low	Positive Moderate
R114 Rathmines Road Lower / Military Road priority junction	A4325	C	A	Medium	Low	Positive Moderate
R114 Rathmines Road Lower / Richmond Hill priority junction	A4375	D	B	Medium	Low	Positive Moderate
R114 Rathmines Road Lower / Lissenfield priority junction	A4425	C	A	Medium	Low	Positive Moderate
R114 Rathmines Road Lower / Blackberry Lane priority junction	A4525	D	B	Medium	Low	Positive Moderate
R114 Rathmines Road Lower / Grove Park priority junction	A4600	D	B	Medium	Low	Positive Moderate
R114 Richmond Street South / R111 Cheltenham Place / R114 Rathmines Road Lower / R111 Grove Road signalised junction	A4675	C	A	Medium	Low	Positive Moderate
R114 Richmond Street South / Charlemont Mall / R114 Rathmines Road Lower / Richmond Row signalised junction	A4700	C	B	Low	Low	Positive Slight
R114 Richmond Street South / Richmond Place South priority junction	A775	C	A	Medium	Low	Positive Moderate
R114 Richmond Street South / Gordon Place / Lennox Place priority junction	A4875	C	B	Low	Low	Positive Slight
R114 Camden Street Upper / R114 Harcourt Road / R114 Richmond Street South / R811 Harrington Street signalised junction	A4975	C	A	Medium	High	Positive Very Significant
R114 Camden Street Lower / Grantham Street priority junction	A5150	B	A	Low	High	Positive Moderate
R114 Camden Street Lower / Camden Place / Pleasants Street priority junction	A5300	C	B	Low	High	Positive Moderate
R114 Redmonds Hill / R110 Cuffe Street / R114 Wexford Street / R110 Kevin Street Lower signalised junction	A5550	D	A	Medium	High	Positive Very Significant
R114 Aungier Street / Digges Street Upper / R114 Redmonds Hill / Bishop Street priority junction	A5625	C	B	Low	Low	Positive Slight
R114 Aungier Street / Bishop Street / Peter's Row Priority junction	A5650	D	B	Medium	Low	Positive Moderate

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact	Sensitivity	Significance of Effect
R114 Aungier Street / York Street / Whitefriar Place signalised junction	A5725	C	B	Low	Low	Positive Slight
R114 Aungier Street / Longford Street Little / Longford Street Great signalised junction	A5900	C	B	Low	Low	Positive Slight
R114 South Great George's Street / Stephen Street Lower / R114 Aungier Street / Stephen Street Upper	A5975	B	A	Low	Low	Positive Slight
R114 South Great George's Street / Fade Street priority junction	A6025	C	B	Low	Medium	Positive Moderate
R114 South Great George's Street / Exchequer Street priority junction	A6150	C	B	Low	Low	Positive Slight
R114 South Great George's Street / Dame Lane priority junction	A6275	C	B	Low	Medium	Positive Moderate
Section Summary		C	A	Medium	Medium	Positive Significant

Table 6.37: Section 4 – Significance of Effects for Pedestrian Impact during Operational Phase

Table 6.37 demonstrates that the scheme will have a long-term positive impact on the quality of the pedestrian infrastructure between Charleville Road and the R137 Dame Street.

The LoS during the Do Minimum scenario ranges between B and E, with nine of the 29 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 6.17.

During the Do Something scenario, i.e. following the development of the Proposed Scheme, all 29 of the impacted junctions along this section achieve the highest A / B ratings. This is as a result of the proposed improvements to the existing pedestrian facilities in the form of additional crossing locations, increased pedestrian directness, provision of traffic calming measures to reduce vehicle speeds, improved accessibility and increased footway 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, Significant and Long-term effect** 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. A detailed breakdown of the assessment at each impacted junction, including a list of the junctions which experience no change, can be found in Appendix A6.4.1 (Pedestrian Infrastructure Assessment) in Volume 4 of this EIAR.

6.4.6.1.5.2 Cycling Infrastructure

The following section sets out the qualitative impacts on the cycling receptor for Section 4 of the Proposed Scheme. The results are summarised in Table 6.38, along with the accompanying sensitivity for each section and the resultant significance of impact:

- Provision of 2m wide cycle track in both directions between Charleville Road and the R111 Grove Road;
- Provision of 2m wide cycletrack in both directions between the R111 Grove Road and Harrington Street;
- Provision of a continuous 1.5m wide cycletrack in both directions between Grantham Street and the R110 Kevin Street; and
- Provision of 2.0m wide cycle track in both directions between Camden Row and R173 R137 Dame Street.

Along Section 4, the Proposed Scheme will provide a 60mm set down kerb segregation between the footway 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 is provided as part of the Proposed Scheme (120mm kerb height on the bus lane side and 60mm minimum kerb height on the cycle track side).

Table 6.38 outlines the cycling qualitative assessment along Section 4 of the Proposed Scheme, with reference to the accompanying sensitivity for each section and the resultant Significance of Effect.

Table 6.38: Section 4 – Cycling Impact during Operational Phase

Location	Chainage	Do Minimum LoS	Do Something LoS	Impact	Sensitivity of Environment	Significance of Effect
Charleville Road to Swanville Place	A3650 - A3850	B	A	Low	Low	Positive Slight
Swanville Place to R111 Grove Road	A3850 - A4700	C	A	Medium	Medium	Positive Significant
R111 Grove Road to R811 Harrington Street	A4700 - A5000	C	A	Medium	Low	Positive Moderate
R811 Harrington Street to Grantham Street	A5000 - A5150	C	B	Low	Low	Positive Slight
Grantham Street to Camden Row	A5150 - A5400	C	B	Low	Medium	Positive Moderate
R110 Kevin Street Lower to Longford Street Great	A5550 - A5900	C	A	Medium	Low	Positive Moderate
Longford Street Great to Stephen Street Upper	A5900 - A6000	C	A	Medium	Low	Positive Moderate
Stephen Street Upper to R137 Dame Street	A6000 - A6300	C	A	Medium	Low	Positive Moderate
Summary		C	A	Medium	Low	Positive Moderate

Table 6.38 demonstrates that the Proposed Scheme will have a long-term positive impact on the quality of the cycling infrastructure between Charleville Road and the R137 Dame Street. 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 6.20.

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 as a result of improved segregation for cyclists and junction treatment in the form of cycle lanes traversing priority junctions and continuing through signalised junctions with protected treatment as part of the Proposed Scheme.

Overall, it is anticipated that there will be **Positive, Moderate and Long-term effect** to the quality of the cycling infrastructure along Section 4 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) in Volume 4 of this EIAR.

The findings of the cycling assessment fully aligns with the objective of the CBC Infrastructure Works, applicable to the Traffic and Transport assessment of the Proposed Scheme, to 'Enhance the potential for cycling by providing safe infrastructure for cycling, segregated from general traffic wherever practicable'.

6.4.6.1.5.3 Bus Infrastructure

There is currently a total of 24 bus stops along Section 4, 12 inbound and 11 outbound stops. Under the Proposed Scheme, there will be a total of 22 bus stops along Section 4 with two less than in the Do Minimum. The layout of new bus stops is considered to better serve the existing and future catchment and be closer to existing and new pedestrian crossing facilities for improved convenience.

Table 6.39 outlines 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 6.39: Section 4 – Overview of Changes in Bus Stop Facilities

Bus Stop Facility	Do Minimum		Do Something		Comment
	No. of Stops	Percentage of Stops	No. of Stops	Percentage of Stops	
RTPI	19	79%	22	100%	It is proposed that all bus stops provide real-time information.
Timetable information	23	96%	22	100%	It is proposed that all bus stops provide timetable information.
Shelter	14	58%	14	64%	Shelters to be provided in all locations except those which are limited by spatial constraints. This equates to proposed provision at one more bus stop compared to the Do Minimum.
Seating	13	54%	14	64%	Seating to be provided in all locations except those which are limited by spatial constraints. This equates to proposed provision at four more bus stops compared to the Do Minimum.
Accessible Kerbs	22	92%	22	100%	Accessible kerbs provided at all bus stops. I.e. equal provision overall to Do Minimum.
Indented Drop Off Area	1	4%	0	0%	All stops inline.
Total Stops	24		22		Two fewer along Section 4 compared to the Do Minimum

Table 6.39 indicates that there are improvements to the bus stop facilities along Section 4 of the Proposed Scheme. All stops along this section will be inline, within dedicated bus lanes along the entirety of the corridor. Improvements in the provision of real-time information, shelters, seating and accessible kerbs at the bus stops throughout Section 4 of the Proposed Scheme are assessed as providing an overall positive impact for bus passengers. All proposed facilities have been designed in accordance with BusConnects Preliminary Design Guidance which has been developed with cognisance to the relevant accessibility guidance.

Taking into account the provision of bus lanes, pedestrian accessibility and bus stop facilities outlined within this section, Table 6.40 outlines the bus qualitative assessment along Section 4 of the Proposed Scheme.

Table 6.40: Section 4 – Bus Qualitative Impact during Operational Phase

Section	Chainage	Description of Impact	Impact	Sensitivity of Environment	Significance of Effect
Charleville Road to R137 Dame Street	A3650 - A6300	<ul style="list-style-type: none"> Number of stops rationalised from 24 to 22, 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

The Proposed Scheme improves the quality of existing bus infrastructure along Section 4 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 Low Positive. The sensitivity of environment rating is predominately categorised as 'medium. This results in a **Positive, Moderate and Long-term effect** on this section.

6.4.6.1.5.4 Parking and Loading

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

- Increase from four loading bays (14 spaces) to six loading bays (20 parking spaces) on Rathmines Road Lower, between Rathmines Road Upper and Grove Road. Therefore, the impact of this increase in parking is considered to have a **Positive, Slight and Long-term effect**.
- Removal of four spaces on Military Road, out of 21 residential pay and display spaces. There are a number of side streets which can be used by local residents. The removal of four spaces is minor and is therefore considered to have a **Negligible and Long-term effect**.
- The reduction from 20 commercial pay and display spaces to 13 on Camden Street Lower due to the presence of a cycle lane. There are various pay and display spaces on local side streets. This is considered to have a **Negative, Slight and Long-term effect**.
- The removal of nine commercial pay and display spaces on Wexford Street. Loading bay parking spaces will be reduced from five to two one loading bay). The impact of this is considered to be a **Negative, Slight and Long-term effect**.
- There are currently three loading bays (8 spaces) existing on Aungier Street. This is going to be reduced to two loading bays (five spaces). There are other loading bays in the vicinity and hence this is considered to have a **Negative, Slight and Long-term effect**.
- On South Great George’s Street, there are currently four loading bays (11 spaces), in the proposed scheme this will be reduced down to three loading bays (8 spaces). There are other loading bays in the vicinity and hence this is considered to have a **Negative, Slight and Long-term effect**.

Table 6.41 presents a summary of the proposed changes to parking along Section 4 of the Proposed Scheme between the Do Minimum and Do Something scenarios.

Table 6.41: Section 4 – Overall Changes in Parking / Loading Spaces

Location	Parking Type	Number of Parking Spaces		
		Do Minimum	Do Something	Change
Rathmines Road Lower, between Rathmines Road Upper and Grove Road.	Loading Bay	4 loading bays (14 spaces)	6 loading bays (20 spaces)	+ 2 loading bays (+6 spaces)
Military Road	Loading Bay	1	1	0
	Informal Parking: pay and display residential	21	17	-4
Richmond Street South (between Lennox Street and Harcourt Road and Richmond Street)	Pay & display: commercial	8	8	0
	Loading Bays	3 loading bays (6 spaces)	3 loading bays (6 spaces)	0
Camden Street Lower (between Harcourt Road and Montague Street)	Pay & display: commercial	20	13	-7
	Disabled Bay	0	1	+1
	Loading Bay	4 loading bays (8 spaces)	5 loading bays (11 spaces)	+1 loading bay (+3 spaces)
Wexford Street	Loading Bay	2 loading bays (5 spaces)	1 loading bays (2 spaces)	-1 loading bays (-3 spaces)
	Pay & display: commercial	9	0	-9
	Disabled Bay	1	0	-1
Redmond's Hill	Loading Bay	1 loading bay (5 spaces)	1 loading bay (5 spaces)	0
Aungier Street	Loading Bay	3 loading bays (8 spaces)	2 loading bays (5 spaces)	-1 loading bays (-3 spaces)
South Great George's Street	Loading Bay	4 loading bays (11 spaces)	3 loading bays (8 spaces)	-1 loading bay (-3 spaces)
	Taxi Rank	5	5	0
Total		122	102	-20

As shown in Table 6.41, there are currently approximately 122 parking spaces affected along Section 4 of the Proposed Scheme and it is proposed that 20 of these spaces are removed. The Proposed Scheme will formalise the parking arrangements at these locations to improve the environment, particularly for pedestrians and cyclists. Given the local number of parking spaces being removed and availability of equivalent types of parking along adjacent streets within 200m of these locations (and typically within under 100m), the overall impact of this loss of parking is considered to have a **Negative, Slight and Long-term effect**. This effect is considered acceptable

in the context of the aim of the Proposed Scheme, to provide enhanced walking, cycling and bus infrastructure on this key access corridor.

6.4.6.1.6 Summary of Corridor-Wide Infrastructure Works

6.4.6.1.6.1 Pedestrian Infrastructure

Overall, the Proposed Scheme will provide an average increase in footway area for pedestrians of 25% inbound and 28% outbound across the corridor compared to the Do Minimum scenario. The Proposed Scheme will increase the number of controlled pedestrian crossings from 76 in the Do Minimum to 106 in the Do Something scenario, equating to a 39% increase. Additionally, there will be an increase in the number of raised table crossings on side roads from 30 in the Do Minimum to 105 in the Do Something scenario, equating to a 250% increase.

Cycling Infrastructure

The Proposed Scheme will provide 9.6km inbound and 10.3km outbound of segregated cycle facilities which is an increase from only 1.3km and 1.8km respectively in the Do Minimum scenario. In turn, there will be a decrease in non-segregated cycle facilities in the Do Something scenario compared to the Do Minimum as these facilities will be upgraded to segregated facilities in most cases.

Overall, total cycle facilities (segregated and non-segregated) will be increased by 112% as part of the Proposed Scheme. The proportion of the corridor with segregated facilities (including quiet street treatment) will increase from 28% in the Do Minimum to 85.4% in the Do Something scenario.

With regards to cycle parking, 220 spaces are provided in the Do Minimum scenario. The Proposed Scheme will increase provision by 49% to a total of 328 spaces across the entire corridor in the Do Something scenario.

6.4.6.1.6.2 Bus Priority Infrastructure

The Proposed Scheme will provide 6.1km inbound and 5.4km outbound of bus lanes across the corridor. This is an increase from 4.4km inbound and 1.5km outbound in the Do Minimum scenario. Bus priority through traffic management will be provided along 2.9km inbound and 3.0km outbound across the corridor. This is an increase from 0.1km inbound and 0.3km outbound in the Do Minimum scenario. This contributes to an increase of 175% 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 87% of the corridor in the Do Something scenario compared to 32% in the Do Minimum scenario.

6.4.6.1.6.3 Parking & Loading

Whilst total parking provision will be reduced by 54 parking spaces and five loading bays as part of the Proposed Scheme, the majority of these are commercial spaces and have a range of alternative parking spaces within a 200m vicinity/ on side streets.

6.4.6.1.7 People Movement Assessment

6.4.6.1.7.1 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).

6.4.6.1.8 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 bus network proposals. It is acknowledged, therefore, that the assessment is conservative in terms of the level of people movement that is predicted in the Do Something scenario. The Do Something scenario will facilitate opportunities to increase bus network capacity operating along the corridor due to the extensive priority provided. In addition to this, the significant segregation and safety improvements to walking and cycling infrastructure that 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 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 bus network proposals. It is acknowledged, therefore, that the assessment is conservative in terms of the level of people movement that is predicted in the Do Something scenario. The Do Something scenario will facilitate opportunities to increase bus network capacity operating along the corridor due to the extensive priority provided. In addition to this, the significant segregation and safety improvements to walking and cycling infrastructure that 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.

6.4.6.1.8.1 2028 AM Peak Hour People Movement

Diagram 6.6 illustrates the People Movement by mode inbound towards the City Centre during the AM Peak Hour in 2028.

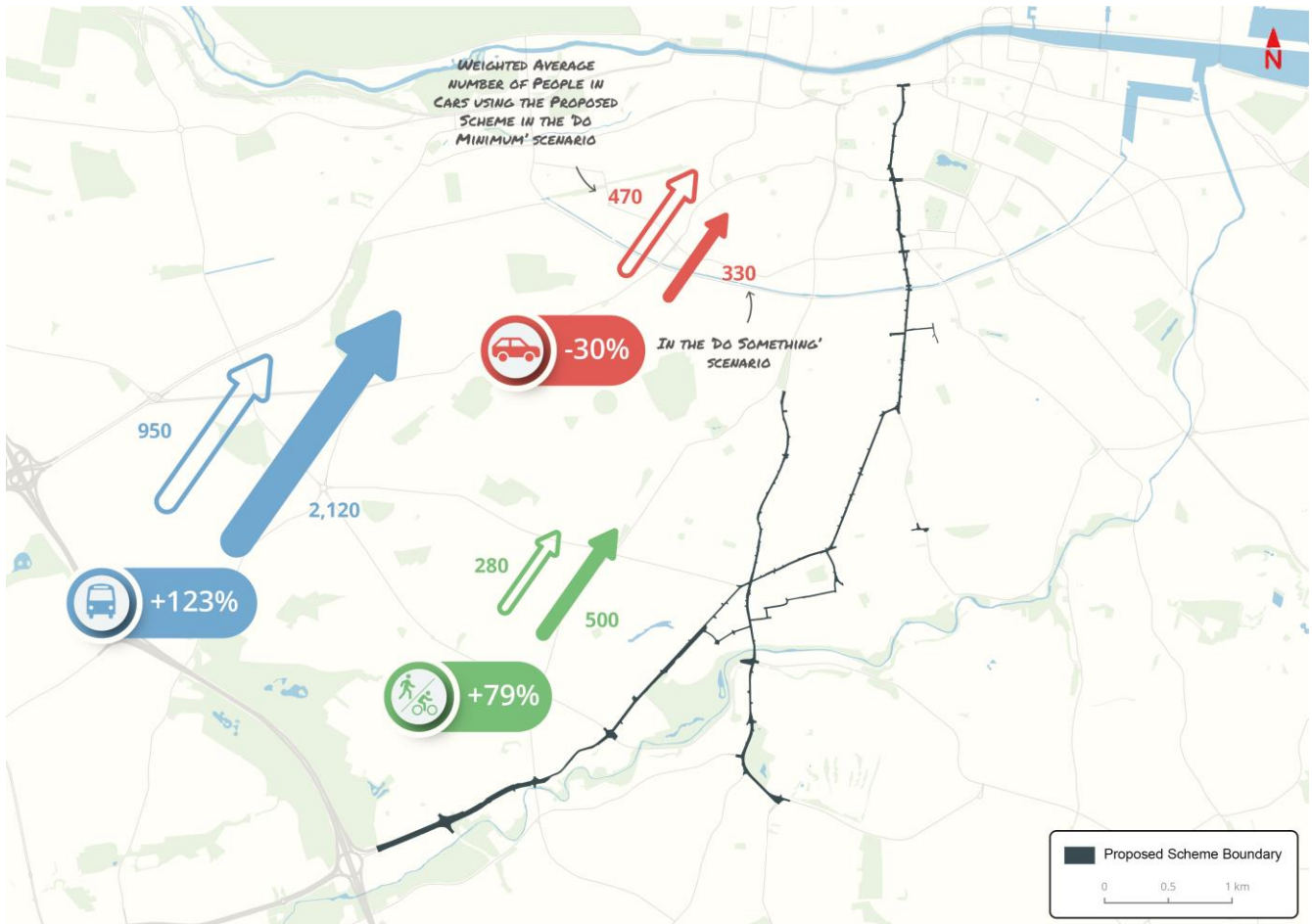


Diagram 6.6: Average People Movement by Mode during 2028 AM Peak Hour

As indicated in Diagram 6.6, there is a reduction of 30% in the number of people travelling via car, an increase of 123% in the number of people travelling via bus and an increase of 79% 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 growth in walk trips is offset by some walking trips in the Do Minimum scenario 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 with existing conditions along the entire length of the corridor. The transport modelling is conservative in terms of the predicted cycling mode share. The Proposed Scheme has been designed to cater for much higher levels of cycling uptake than modelled outputs, to cater for long-term trends in travel behaviours as people make sustainable travel lifestyle choices, which would otherwise not be achievable in the absence of the Proposed Scheme.

Table 6.42 outlines the difference in modal split between the Do Minimum and Do Something scenarios for each mode of travel in an inbound direction towards the City Centre during the AM Peak Hour. The results indicate a 74% 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 6.42: 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	470	28%	330	11%	-140	-30%
		Public Transport	950	56%	2,120	72%	1,170	123%
		Walking	170	10%	140	5%	-30	-18%
		Cycling	110	6%	360	12%	250	227%
		Combined Walking/Cycling	280	16%	500	17%	220	79%
		Sustainable Modes Total	1,230	72%	2,620	89%	1,390	113%
		Total (All modes)	1,700	100%	2,950	100%	1,250	74%

6.4.6.1.8.2 2028 PM Peak Hour People Movement

Diagram 6.7 illustrates the People Movement by mode travelling outbound from the City Centre during the PM Peak Hour.

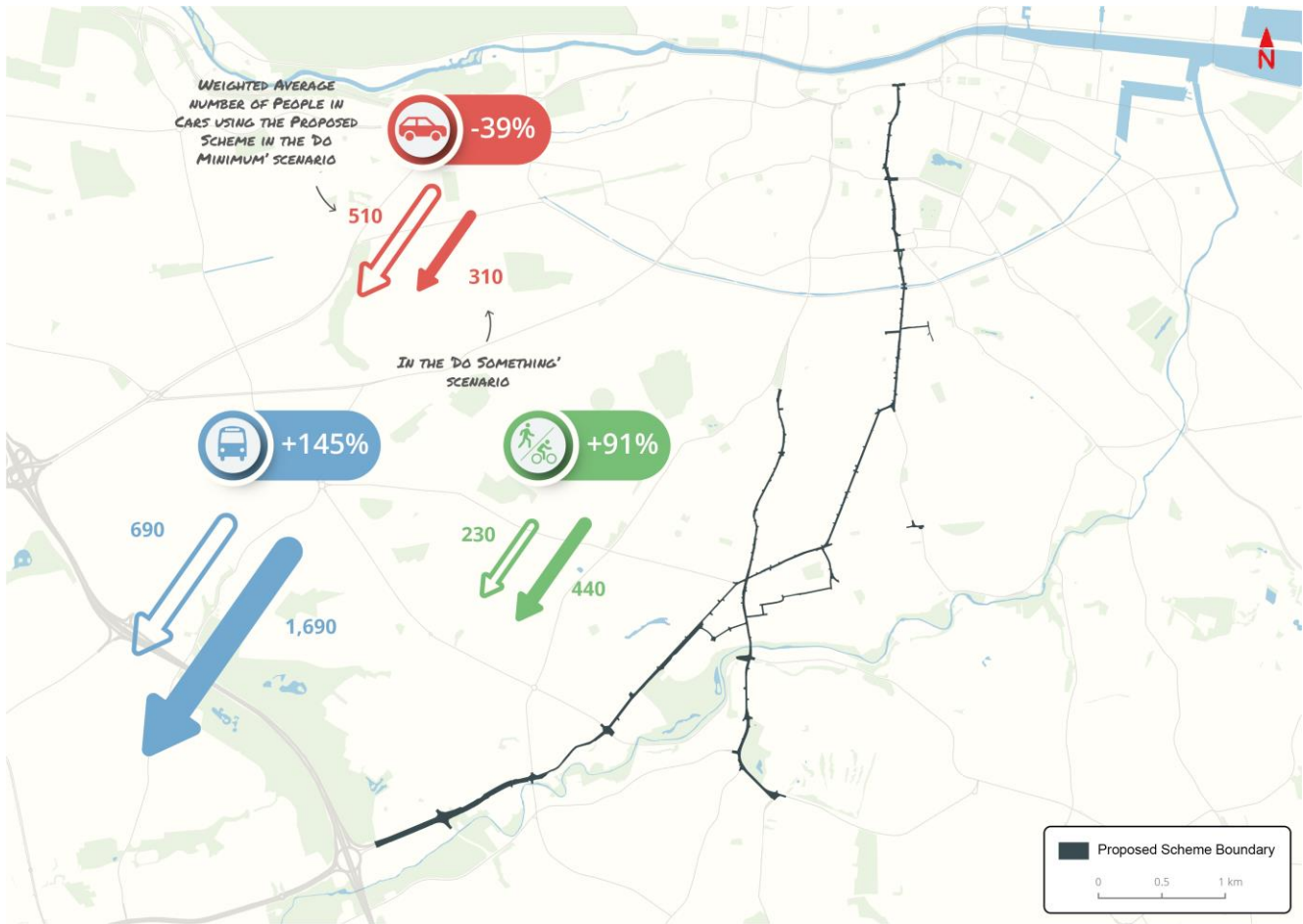


Diagram 6.7: Average People Movement by Mode during 2028 PM Peak Hour.

As indicated in Diagram 6.7, there is a reduction of 39% in the number of people travelling via car, an increase of 145% in the number of people travelling via bus and an increase in 91% in the number of people walking or cycling along the Proposed Scheme during the PM Peak Hour. Table 6.43 outlines the difference in modal split between the Do Minimum and Do Something scenarios for each mode of travel in an outbound direction from the City Centre during the PM Peak Hour. The results indicate 71% increase in people moved as a result of the Proposed Scheme and 132% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 6.43: 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	510	36%	310	13%	-200	-39%
		Public Transport	690	48%	1,690	69%	1,000	145%
		Walking	150	10%	130	5%	-20	-13%
		Cycling	80	6%	310	13%	230	288%
		Combined Walking/Cycling	230	16%	440	18%	210	91%

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Hourly Trips	Modal Split (%)	Hourly Trips	Modal Split (%)	Hourly Trips	Difference (%)
		Sustainable Modes Total	920	64%	2,130	87%	1,210	132%
		Total (All modes)	1,430	64%	2,440	87%	1,010	71%

6.4.6.1.8.3 2043 AM Peak Hour People Movement

Diagram 6.8 illustrates the People Movement by mode inbound towards the City Centre during the AM Peak Hour in 2043.

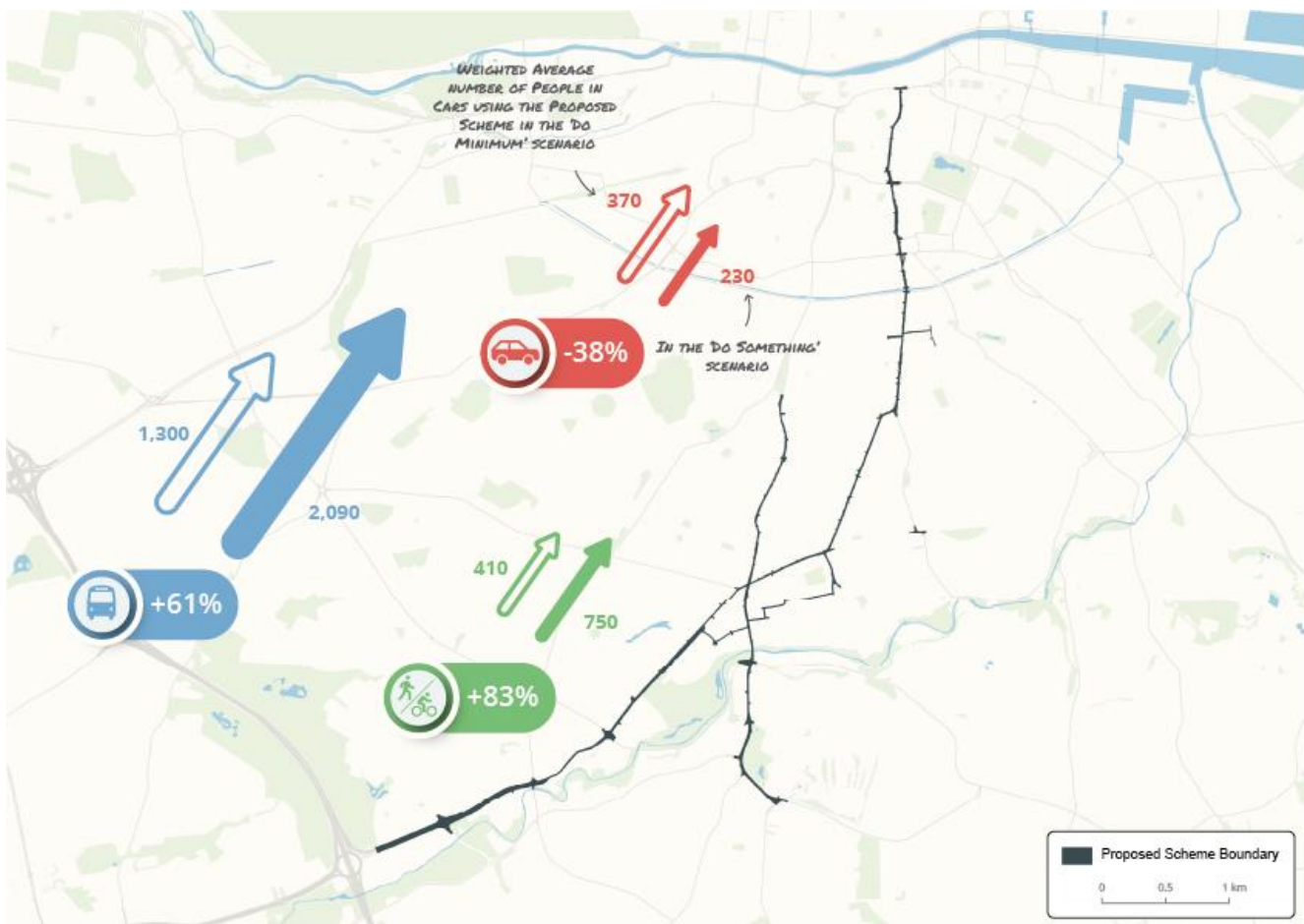


Diagram 6.8: Average People Movement by Mode during 2043 AM Peak Hour

As indicated in Diagram 6.8, there is a decrease of 38% in the number of people travelling via car, an increase of 61% in the number of people travelling via bus and an increase of 83% in the number of people walking and cycling along the Proposed Scheme during the AM Peak Hour. Table 6.44 outlines the difference in modal split between the Do Minimum and Do Something scenarios for each mode of travel in an inbound direction towards the City Centre during the AM Peak Hour. The results indicate a 48% increase in people moved as a result of the Proposed Scheme and 67% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 6.44: 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	370	18%	231	7%	-140	-38%
		Public Transport	1,298	62%	2,094	68%	797	61%
		Walking	196	9%	207	7%	12	6%
		Cycling	215	10%	546	18%	331	154%
		Combined Walking/Cycling	411	20%	753	24%	342	83%
		Sustainable Modes Total	1,708	82%	2,847	93%	1,139	67%
		Total (All modes)	2,079	100%	3,078	100%	999	48%

6.4.6.1.8.4 2043 PM Peak Hour People Movement

Diagram 6.9 illustrates the People Movement by mode travelling outbound from the City Centre during the PM Peak Hour in 2043.

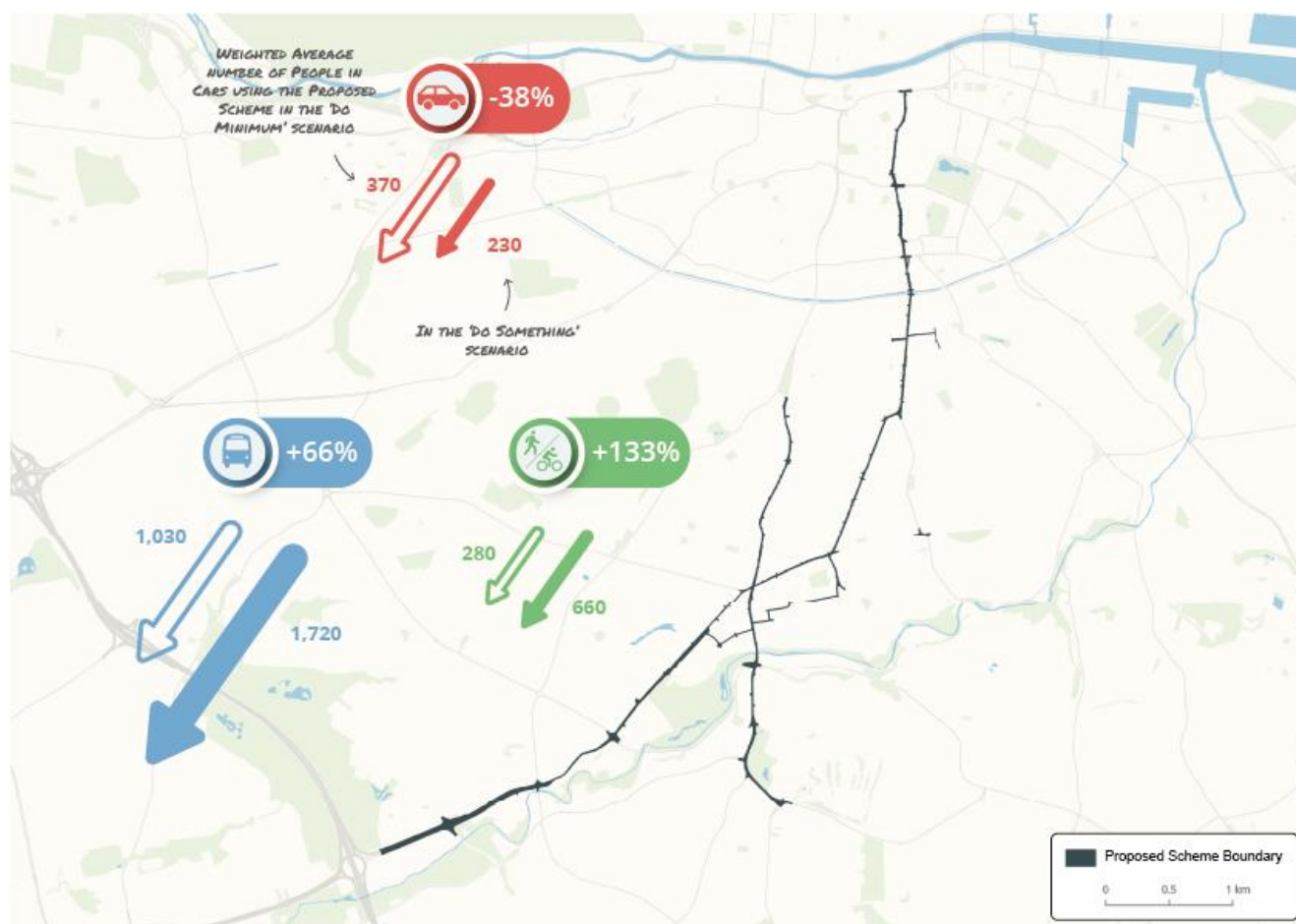


Diagram 6.9: Average People Movement by Mode during 2043 PM Peak Hour

As indicated in Diagram 6.9, there is a decrease of 38% in the number of people travelling via car, an increase of 66% in the number of people travelling via bus and an increase of 133% in the number of people walking and cycling along the Proposed Scheme during the PM Peak Hour. Table 6.45 outlines the difference in modal split between the Do Minimum and Do Something scenarios for each mode of travel in an outbound direction from the City Centre during the PM Peak Hour. The results indicate 55% increase in people moved as a result of the Proposed Scheme and 81% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 6.45: 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	369	22%	230	9%	-139	-38%
		Public Transport	1,032	61%	1,715	66%	684	66%
		Walking	86	5%	173	7%	88	102%
		Cycling	198	12%	488	19%	289	146%
		Combined Walking/Cycling	284	17%	661	25%	377	133%
		Sustainable Modes Total	1,316	78%	2,376	91%	1,061	81%
		Total (All modes)	1,685	100%	2,606	100%	921	55%

6.4.6.1.9 People Movement by Bus

The following section presents the ERM demand outputs for People Movement by Bus. The results indicate that the improvements in bus priority infrastructure with the Proposed Scheme in place show a substantial increase in Bus patronage during the peak hours.

6.4.6.1.9.1 2028 AM Peak Hour Bus Passengers

Diagram 6.10 and Diagram 6.11 present the passenger loading profile comparing the Do Minimum and Do Something scenarios in the AM Peak Hour in the inbound direction in 2028.

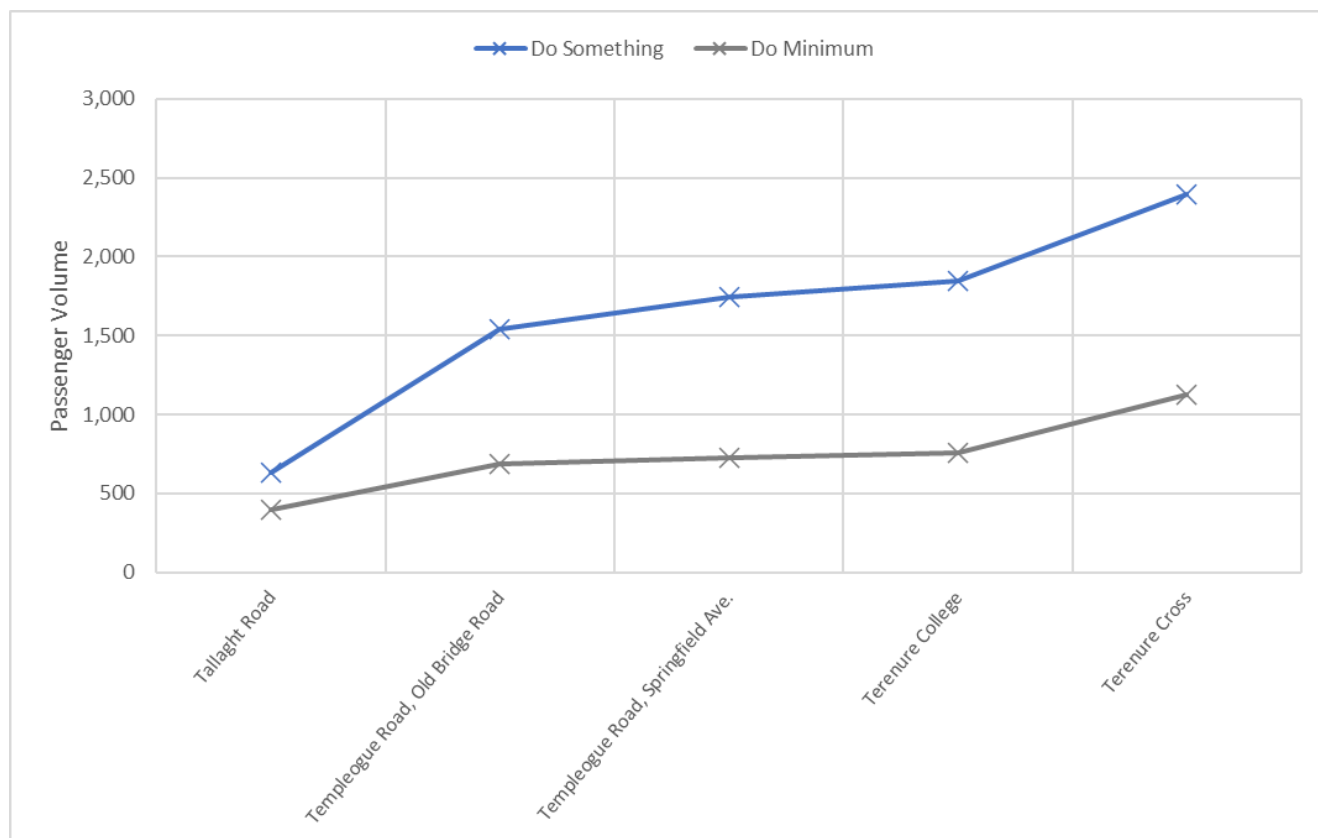


Diagram 6.10: 2028 AM Peak Hour Passenger Volume Along Proposed Scheme (inbound direction – Templeogue to Terenure)

Diagram 6.10 shows higher levels of bus passenger loadings along the Templeogue to Terenure section of the Proposed Scheme with a peak at Terenure Cross where the volume of passengers reaches 2,400 passengers in the AM Peak hour, compared to approximately 1,100 in the Do Minimum scenario.

The increase in bus passengers remains at a high level along this section of the Proposed Scheme with approximately 1,000 additional users on most of the corridor, compared to the Do Minimum scenario.

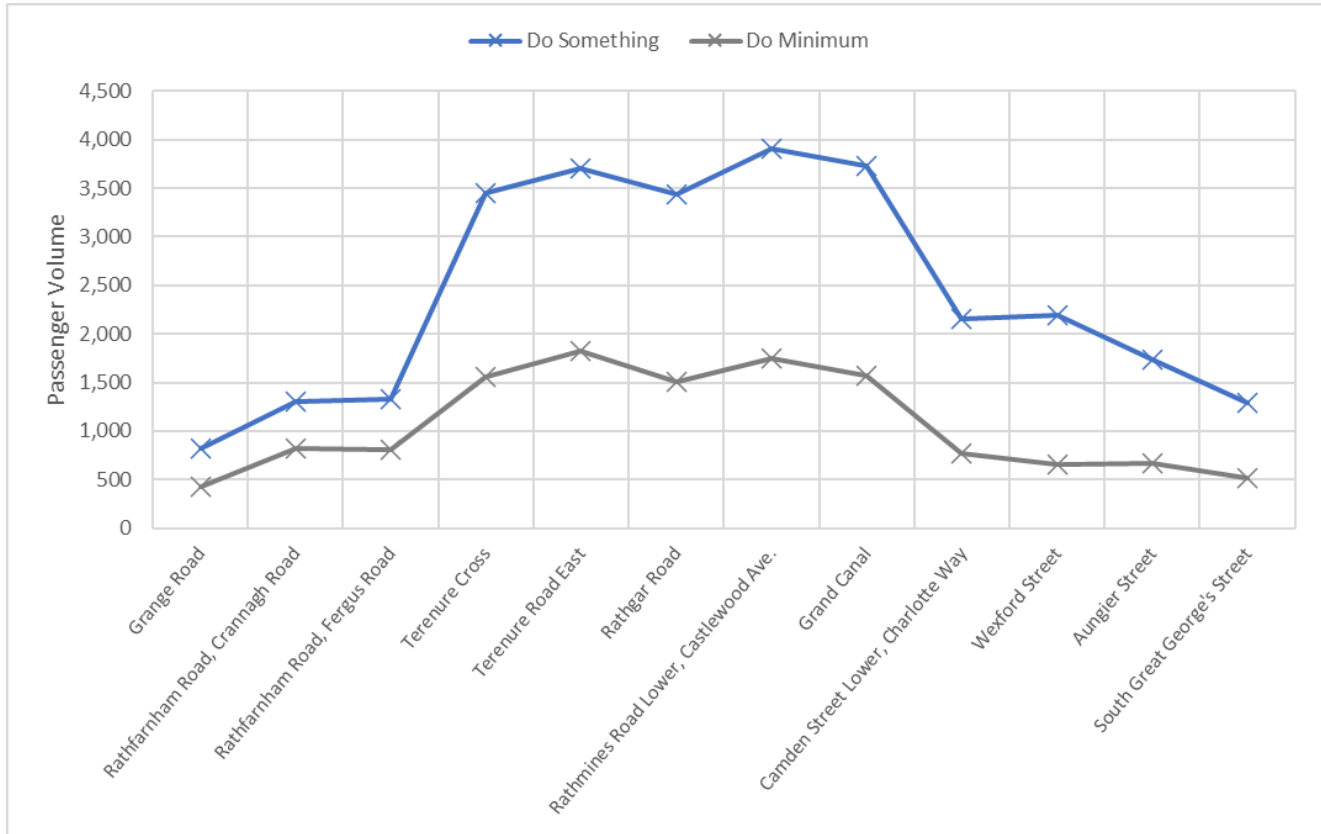


Diagram 6.11: 2028 AM Peak Hour Passenger Volume Along Proposed Scheme (inbound direction – Rathfarnham to City Centre)

Diagram 6.11 shows higher levels of bus passenger loadings along the Rathfarnham to City Centre section of the Proposed Scheme with a large increase at Terenure Cross where the two corridors join (the A2 and A4 services merge with the A1 and A3 services) and a peak at Rathmines Road Lower / Castlewood Avenue where the volume of passengers reaches 3,900 passengers in the AM Peak hour, compared to approximately 1,700 in the Do Minimum scenario.

The increase in bus passengers remains at a high level along the Proposed Scheme with approximately 2,000 additional users on the corridor between Terenure Cross and the Grand Canal, compared to the Do Minimum scenario.

6.4.6.1.9.2 2028 PM Peak Hour Bus Passengers

Diagram 6.12 and Diagram 6.13 present the passenger loading profile comparing the Do Minimum and Do Something scenarios in the PM Peak Hour in the outbound direction in 2028.

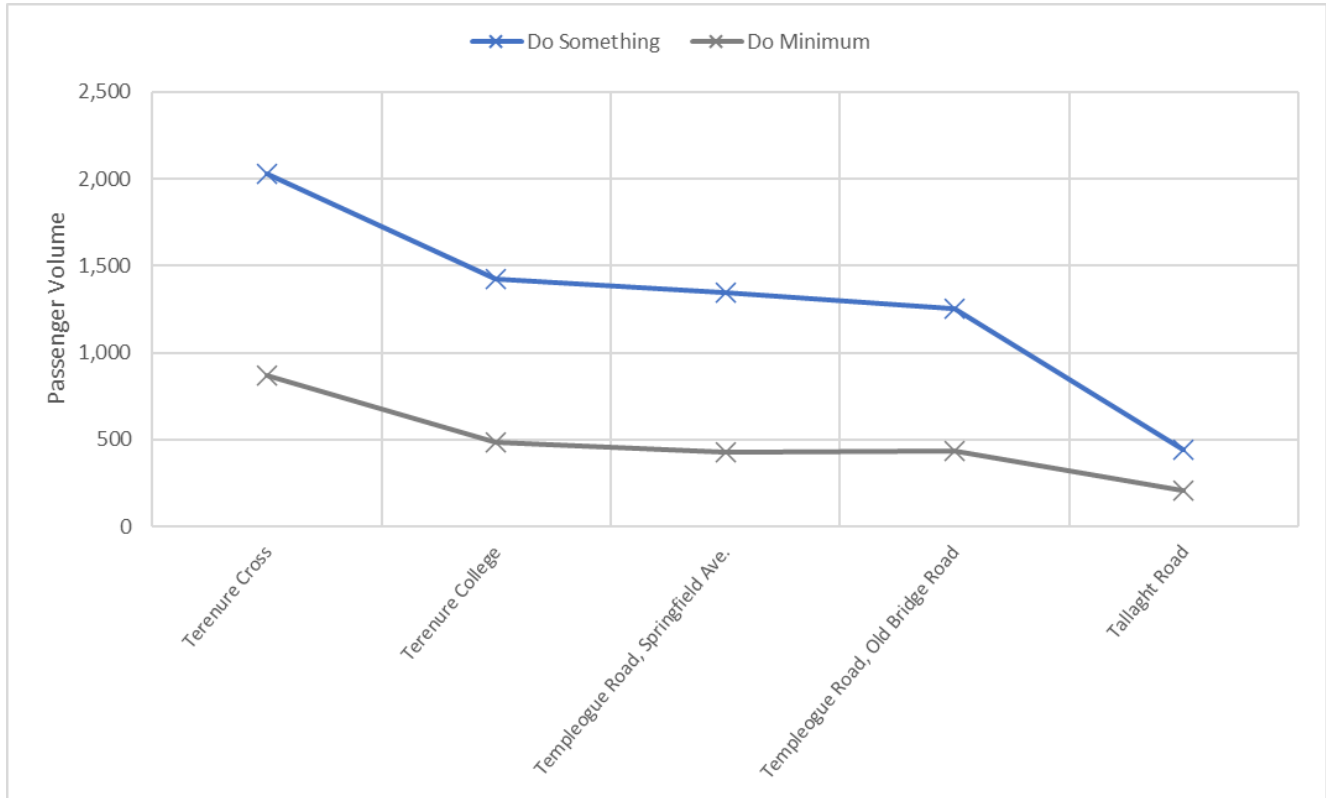


Diagram 6.12: 2028 PM Peak Hour Passenger Volume Along Proposed Scheme (outbound direction – Templeogue to Terenure)

Diagram 6.12 shows higher levels of bus passenger loadings along the Templeogue to Terenure section of the Proposed Scheme with a peak at Terenure Cross where the volume of passengers reaches 2,000 in the PM Peak hour, compared to approximately 850 in the Do Minimum scenario.

The increase in bus passengers remains at a high level along this section of the Proposed Scheme with approximately 1,000 to 1,200 additional users on most of the corridor, compared to the Do Minimum scenario.

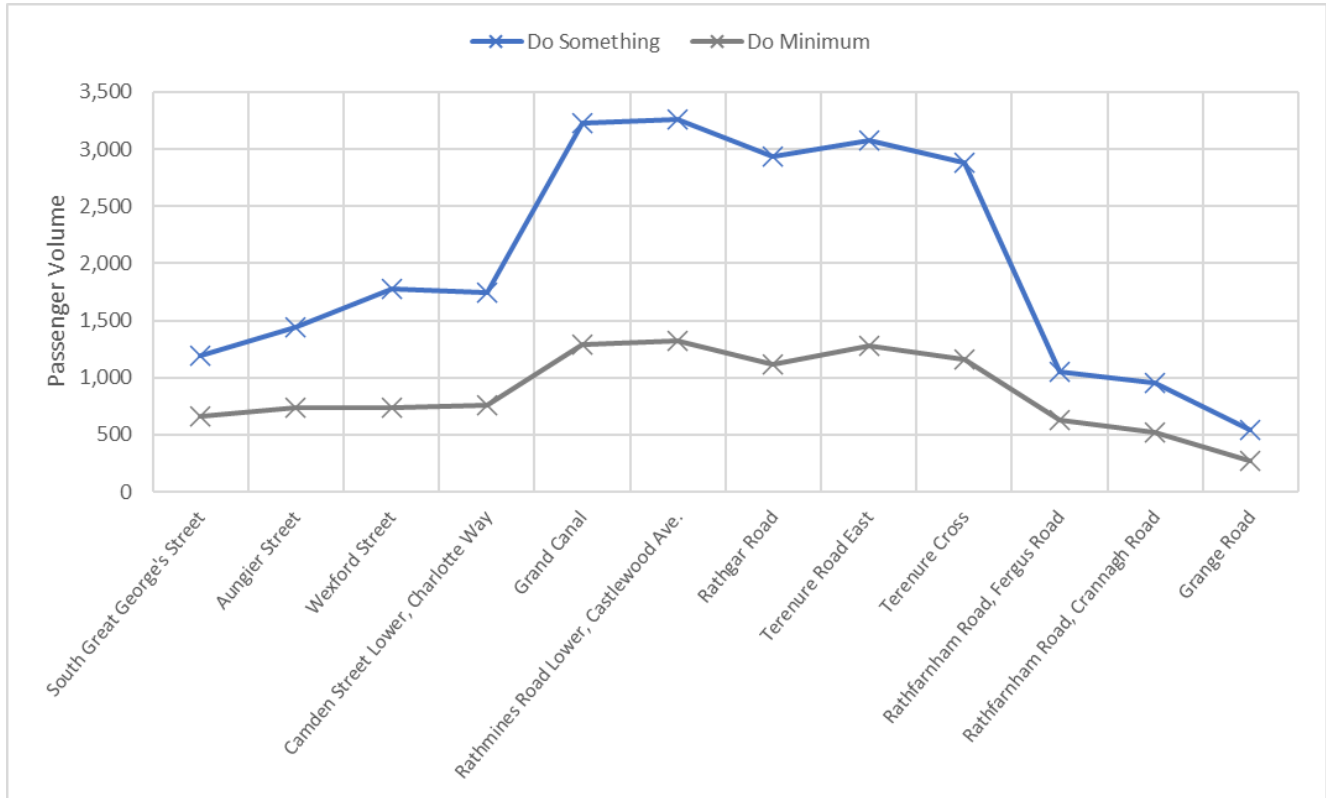


Diagram 6.13: 2028 PM Peak Hour Passenger Volume Along Proposed Scheme (outbound direction – Rathfarnham to City Centre)

Diagram 6.13 shows higher levels of bus passenger loadings along the Rathfarnham to City Centre section of the Proposed Scheme with a peak at the intersection with the Grand Canal, where the volume of passengers reaches 3,200 in the PM Peak hour, compared to approximately 1,300 in the Do Minimum scenario.

The increase in bus passengers remains at a high level along the Proposed Scheme with approximately 2,000 additional users on the corridor between the Grand Canal and Terenure Cross, compared to the Do Minimum scenario.

6.4.6.1.9.3 2043 AM Peak Hour Bus Passengers

Diagram 6.14 and Diagram 6.15 present the passenger loading profile comparing the Do Minimum and Do Something scenarios in the AM Peak Hour in the inbound direction in 2043.

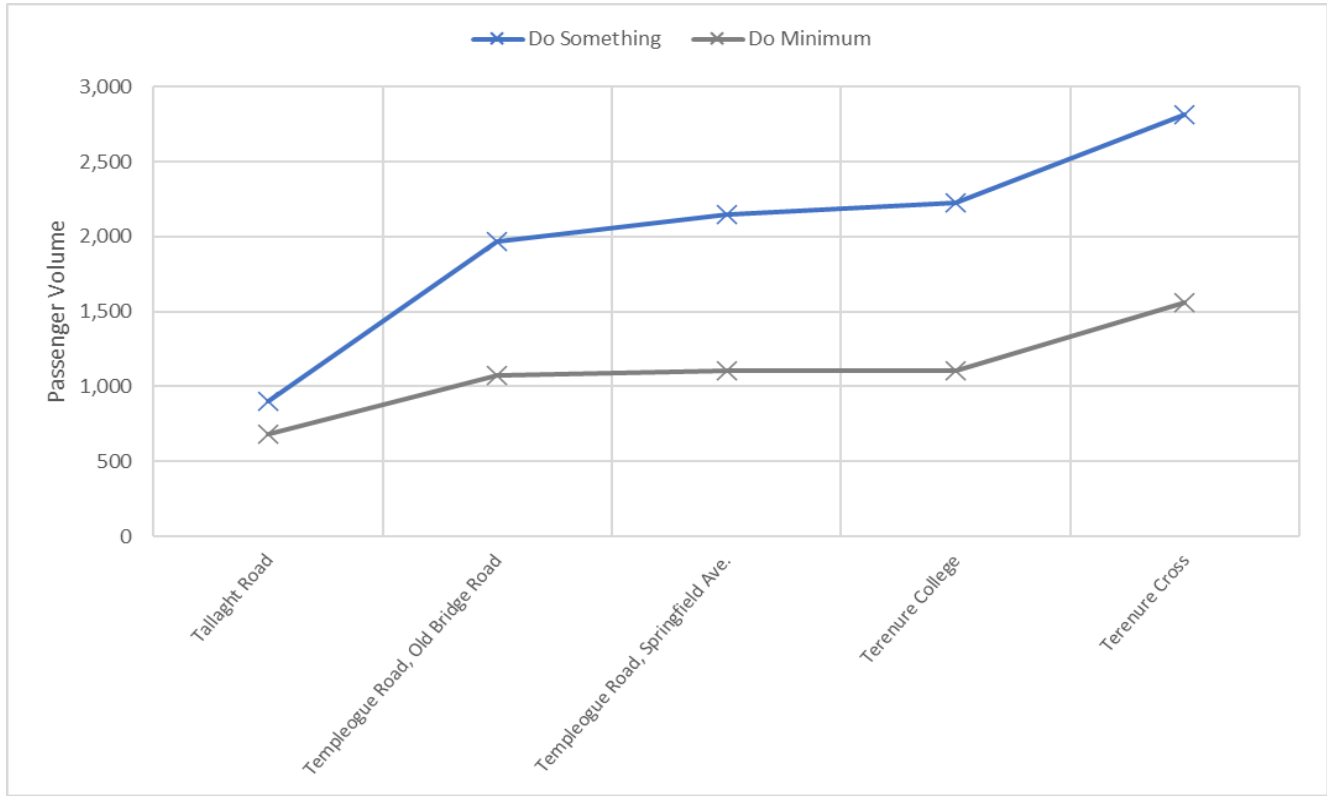


Diagram 6.14: 2043 AM Peak Hour Passenger Volume Along Proposed Scheme (inbound direction – Templeogue to Terenure)

Diagram 6.14 shows higher levels of bus passenger loadings along the Templeogue to Terenure section of the Proposed Scheme with a peak at Terenure Cross where the two corridors join (the A2 and A4 services merge with the A1 and A3 services) and where the volume of passengers reaches 2,900 in the AM Peak hour, compared to approximately 1,600 in the Do Minimum scenario.

The increase in bus passengers remains at a high level along this section of the Proposed Scheme with approximately 1,000 to 1,400 additional users on most of the corridor, compared to the Do Minimum scenario.

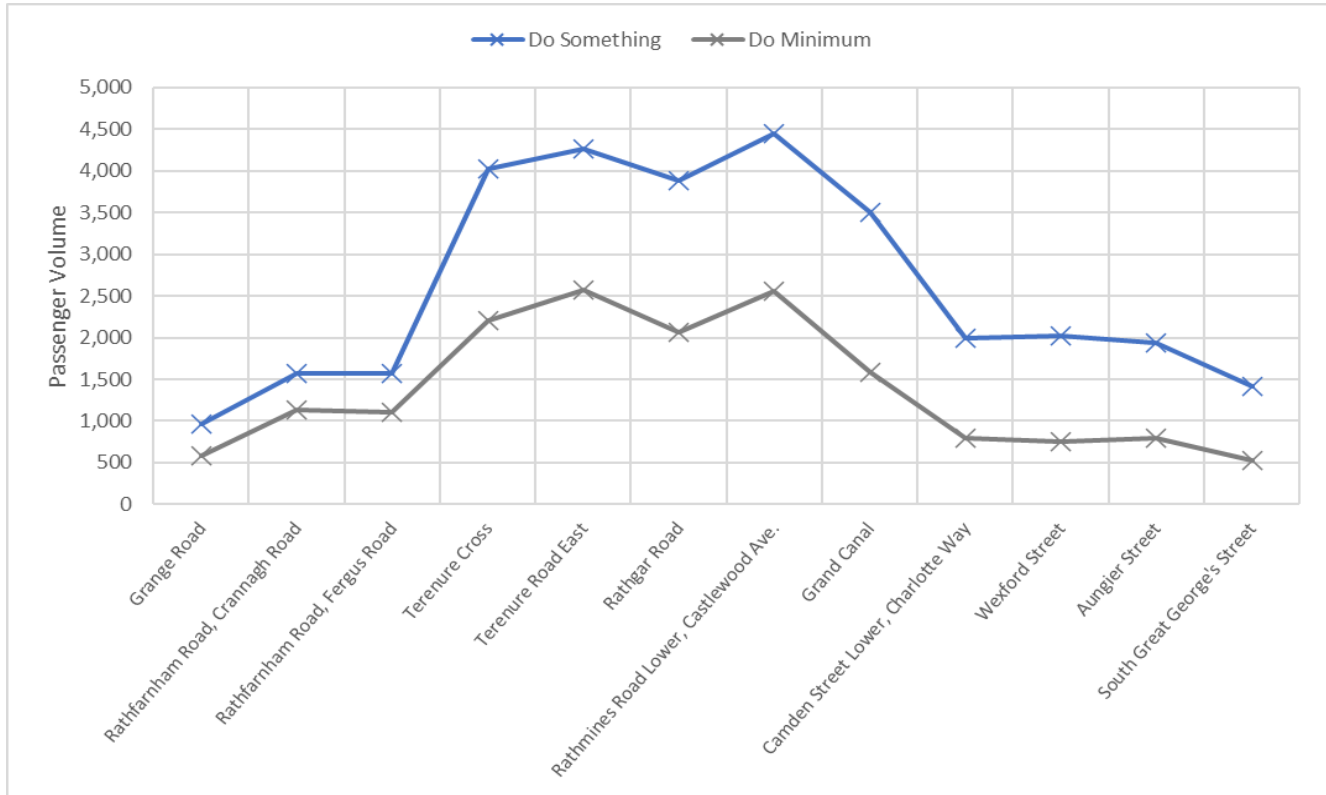


Diagram 6.15: 2043 AM Peak Hour Passenger Volume Along Proposed Scheme (inbound direction – Rathfarnham to City Centre)

Diagram 6.15 shows higher levels of bus passenger loadings along the Rathfarnham to City Centre section of the Proposed Scheme with a peak at the intersection between Rathmines Road Lower and Castlewood Avenue where the volume of passengers reaches 4,500 in the AM Peak hour, compared to approximately 2,500 in the Do Minimum scenario.

The increase in bus passengers remains at a high level along this section of the Proposed Scheme with approximately 2,000 additional users on the corridor between Terenure Cross and the Grand Canal, compared to the Do Minimum scenario.

6.4.6.1.9.4 2043 PM Peak Hour Bus Passengers

Diagram 6.16 and Diagram 6.17 present the passenger loading profile comparing the Do Minimum and Do Something scenarios in the PM Peak Hour in the outbound direction in 2043.

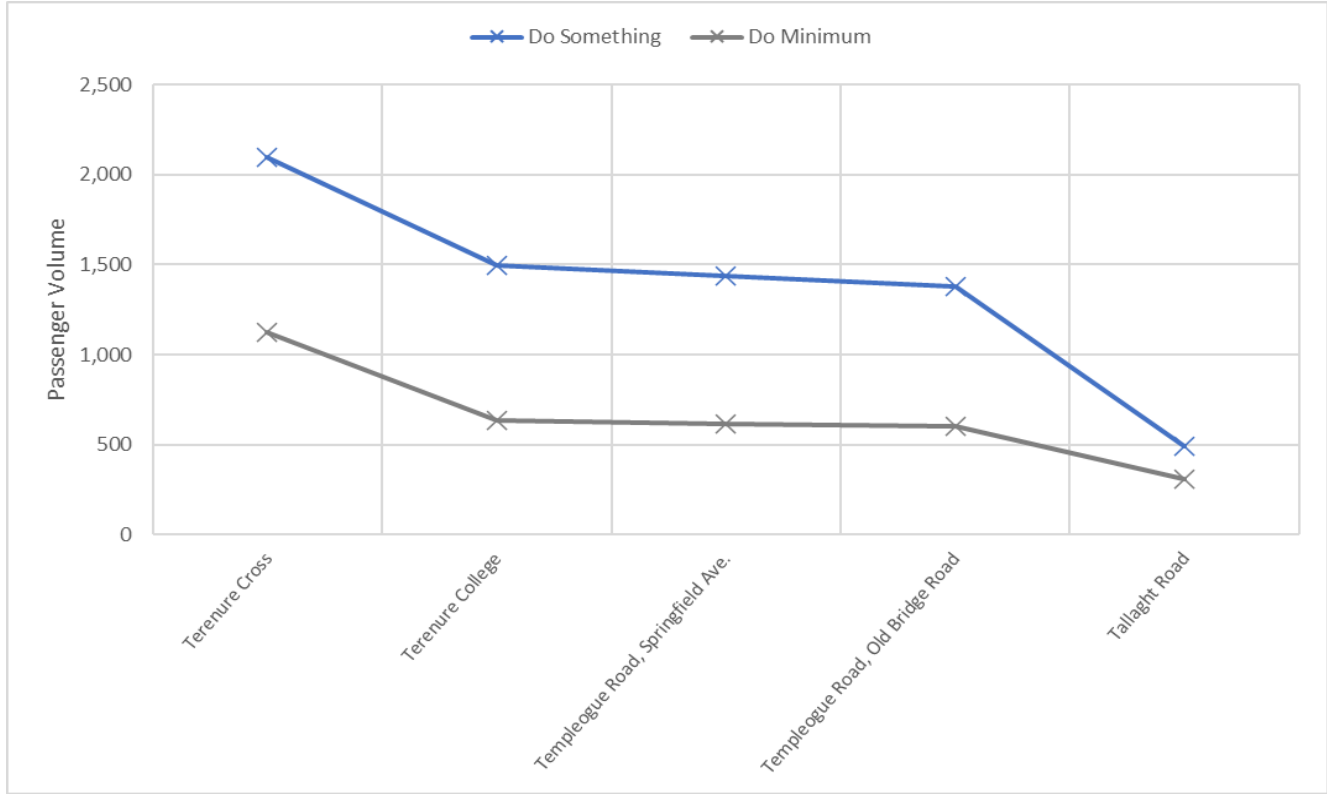


Diagram 6.16: 2043 PM Peak Hour Passenger Volume Along Proposed Scheme (outbound direction – Templeogue to Terenure)

Diagram 6.16 shows higher levels of bus passenger loadings along the Terenure to Templeogue section of the Proposed Scheme with a peak at Terenure Cross where the two corridors join (the A2 and A4 services merge with the A1 and A3 services) and where the volume of passengers reaches 2,300 in the PM Peak hour, compared to approximately 1,100 in the Do Minimum scenario.

The increase in bus passengers remains at a high level along this section of the Proposed Scheme with approximately 1,000 to 1,300 additional users on most of the corridor, compared to the Do Minimum scenario.

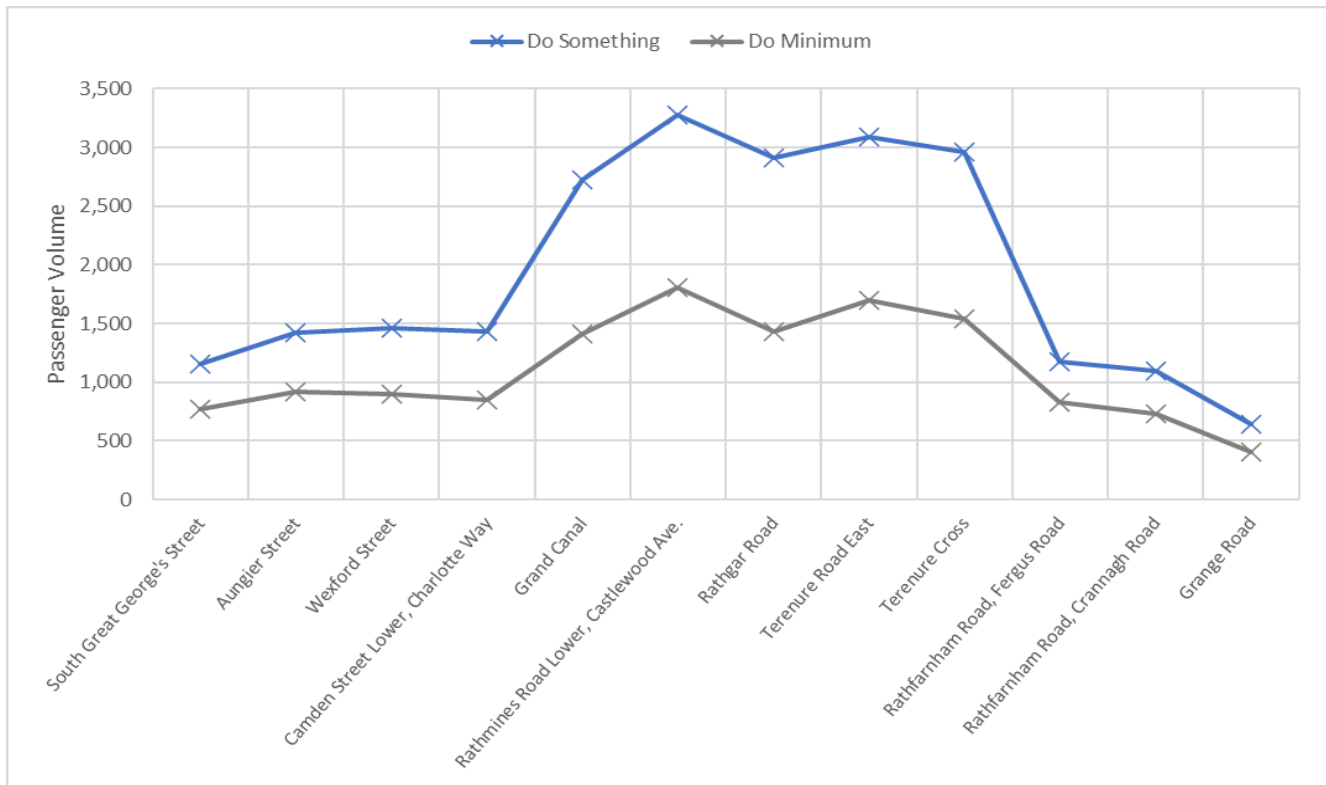


Diagram 6.17: 2043 PM Peak Hour Passenger Volume Along Proposed Scheme (outbound direction – Rathfarnham to City Centre)

Diagram 6.17 shows higher levels of bus passenger loadings along the Rathfarnham to City Centre section of the Proposed Scheme with a peak at the intersection between Rathmines Road Lower and Castlewood Avenue where the volume of passengers reaches 3,300 in the PM Peak hour, compared to approximately 1,800 in the Do Minimum scenario.

The increase in bus passengers remains at a high level along the Proposed Scheme with approximately 2,000 additional users on the corridor between the Grand Canal and Terenure Cross, compared to the Do Minimum scenario.

6.4.6.1.9.5 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 total boardings on bus routes that use any part of the Proposed Scheme (including those stops not directly on the Proposed Scheme) in both 2028 and 2043 forecast years.

Table 6.46: 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	18,900	21,680	2,780	14.7%
PM Peak Hour	14,180	16,580	2,400	16.9%

Table 6.46 shows that there will be a 14.7% increase in people boarding bus routes which use the Proposed Scheme during the AM Peak Hour. This represents an addition of 2,780 passengers in the AM Peak hour.

In the PM Peak hour, there will be a 16.9% increase in people boarding bus routes which use the Proposed Scheme, representing an additional 2,400 passengers.

Table 6.47: 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	21,600	23,870	2,270	10.5%
PM Peak Hour	16,329	18,200	1,871	11.5%

Table 6.47 shows that there will be a 10.5% increase in people boarding bus routes which use the Proposed Scheme during the AM Peak Hour. This represents an addition of 2,270 passengers in the AM Peak hour.

In the PM Peak hour, there will be a 11.5% increase in people boarding bus routes which use the Proposed Scheme, representing an additional 1,871 passengers.

6.4.6.1.10 People Movement - Significance of Impact

The significance of the effect on the movement of People by sustainable modes with the Proposed Scheme in place has been appraised qualitatively, taking into account the changes in mode share, demand changes by mode along the Proposed Scheme as well as bus usage presented above. The impact of the Proposed Scheme has been adjudged to deliver a **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 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'.

6.4.6.1.11 Operational Impacts for Bus Passengers and Operators

6.4.6.1.11.1 Overview

The impacts of the Proposed Scheme for Bus Users and Operators have been assessed based on journey times and reliability metrics extracted from the micro-simulation model of the corridor.

Due to the stochastic nature of the micro-simulation software, model outputs based on the average of 20 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.

The results for bus services using the Templeogue to Terenure and Rathfarnham to City Centre sections of the Proposed Scheme have been presented separately so that bus services using the whole length of each section of the Proposed Scheme can be assessed.

Templeogue to Terenure Section

6.4.6.1.11.2 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 A3 service, which traverses the length of the Terenure section of Proposed Scheme, have been extracted from the model. As outlined in Section 6.4.3.1 the assessment is based in the context of the full implementation of the BusConnects network re-design in both the Do Minimum and Do Something scenarios, with this section of the Proposed Scheme servicing the A-Spine services.

Inbound Direction

Average journey times for the inbound A3 service in 2028 Opening Year and in 2043 Design Year can be seen in Table 6.48. 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).

Table 6.48: A3 Service Bus Average Journey Times (Inbound Direction)

Peak Hour	Do Minimum (minutes)	Do Something (minutes)	Difference (minutes)	% Difference
2028 AM	11.7	10.1	-1.6	-14%
2028 PM	11.0	9.9	-1.1	-10%
2043 AM	10.7	10.0	-0.7	-7%
2043 PM	10.8	9.8	-1.0	-9%

Additional information regarding the range of journey times (minimum, maximum, average and standard deviation) for inbound A3 buses in the Do Minimum (red) and Do Something (blue) can be seen in Table 6.49 and Diagram 6.18. 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 6.49: A3 Service – Range of Journey Times (Inbound Direction)

Peak Hour	Do Minimum				Do Something			
	MIN	MAX	AVG	STDEV	MIN	MAX	AVG	STDEV
2028 AM	8.9	14.3	11.7	1.2	8.7	12.8	10.1	0.9
2028 PM	9.0	13.3	11.0	1.0	8.2	12.2	9.9	0.8
2043 AM	8.7	14.0	10.7	1.0	8.4	12.1	10.0	0.7
2043 PM	8.6	12.8	10.8	0.9	8.2	11.2	9.8	0.7

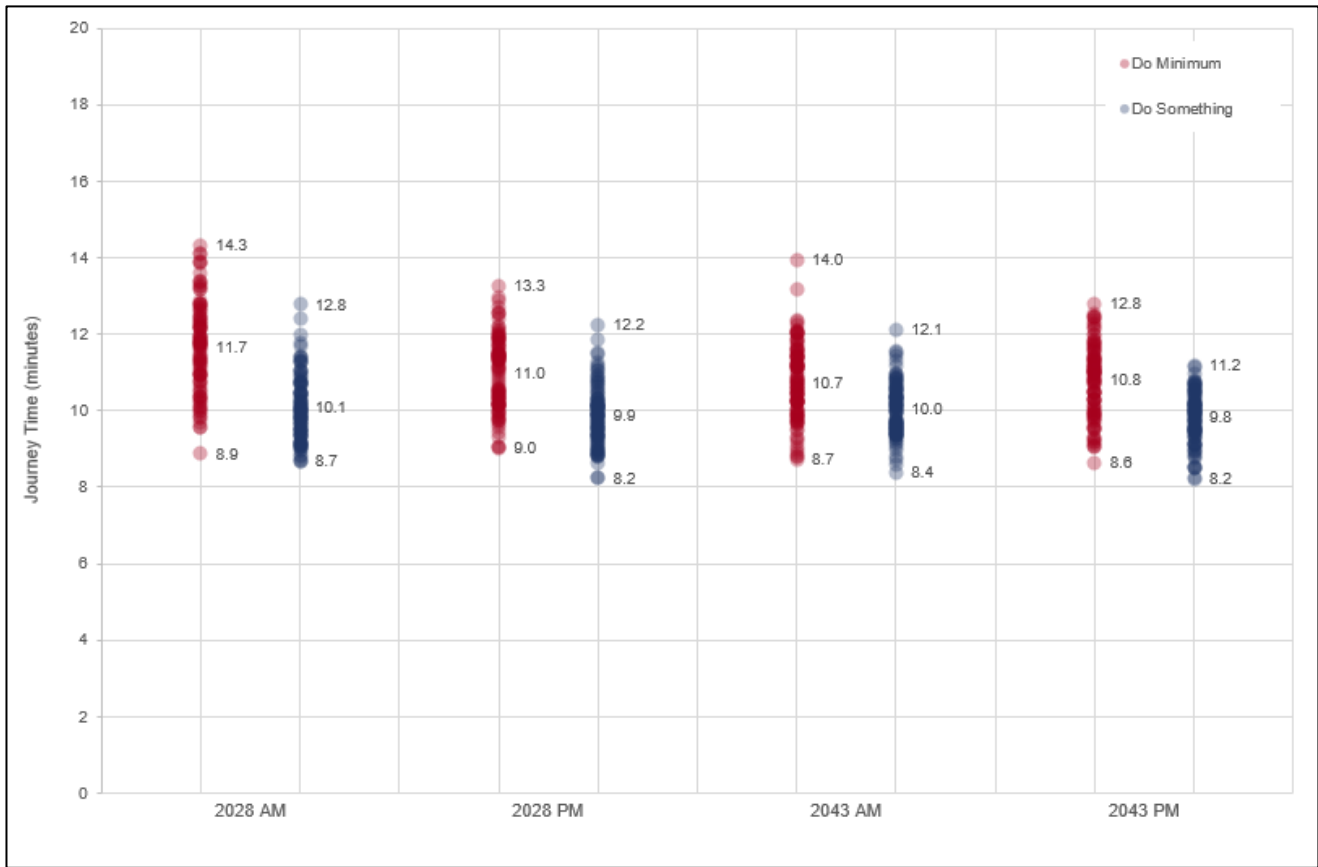


Diagram 6.18: A3 Bus Journey Times (Inbound Direction)

Based on the results presented in Table 6.48 the Proposed Scheme will deliver average inbound journey time savings for A3 service bus passengers of up to 1.6 minutes (14%) in 2028 (AM) and 0.7 minutes (7%) in 2043 (AM). Furthermore, results presented in Diagram 6.18 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. Traffic flows fluctuate daily which would mean that the variation in journey times would be much greater in the Do Minimum with any increases in traffic flows compared to the protection of journey time reliability provided by the bus priority measures that comprise the Proposed Scheme.

A comparison of average Do Minimum and Do Something inbound journey times are also illustrated in the cumulative time-distance graphs shown in Diagram 6.19 to Diagram 6.22. Note that the cumulative time-distance graphs are also based on the A3 service, which captures the full extent of this section of the Proposed Scheme to Rathfarnham Road.

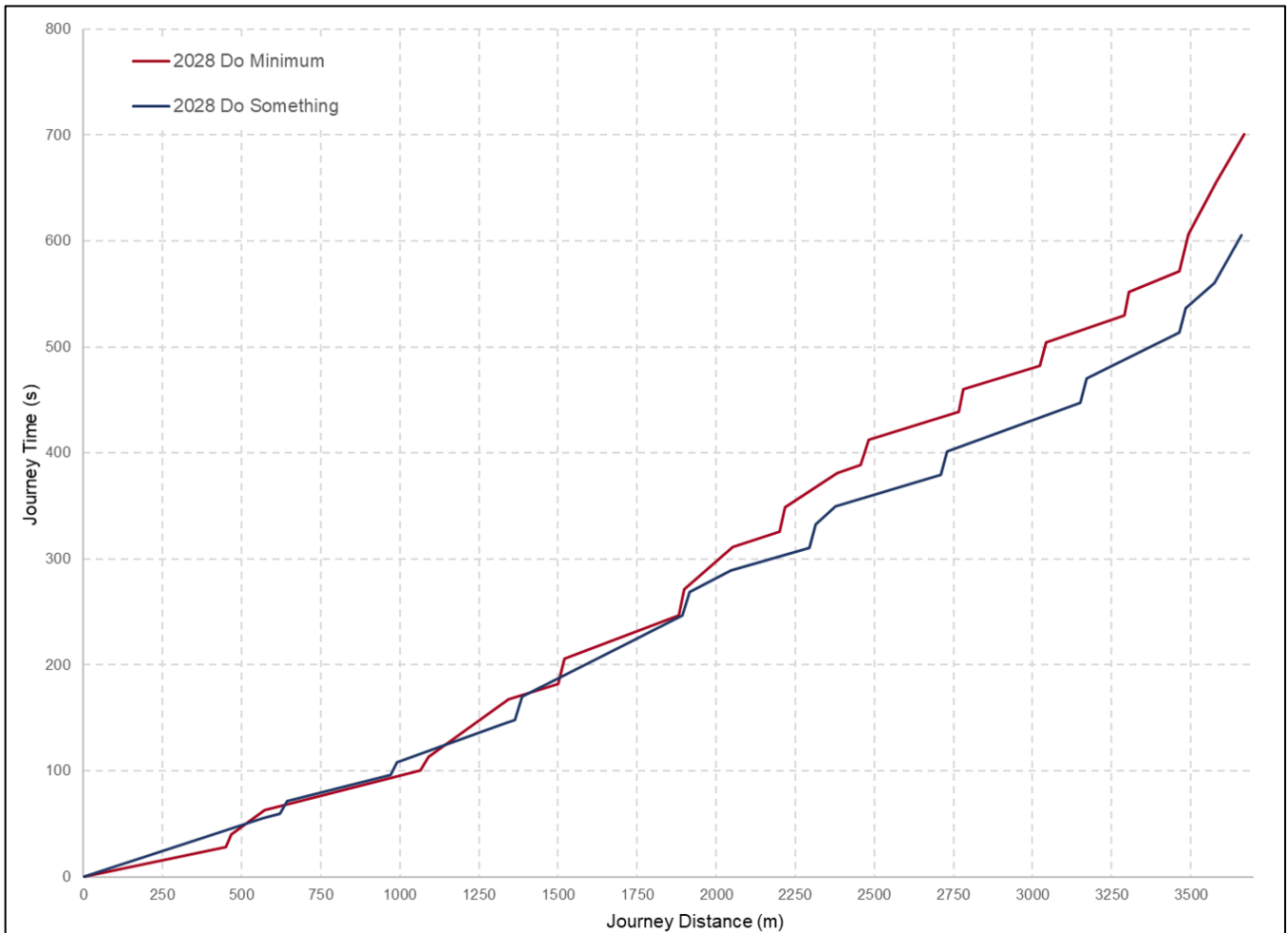


Diagram 6.19: A3 Bus Journey Time (2028 AM, Inbound)

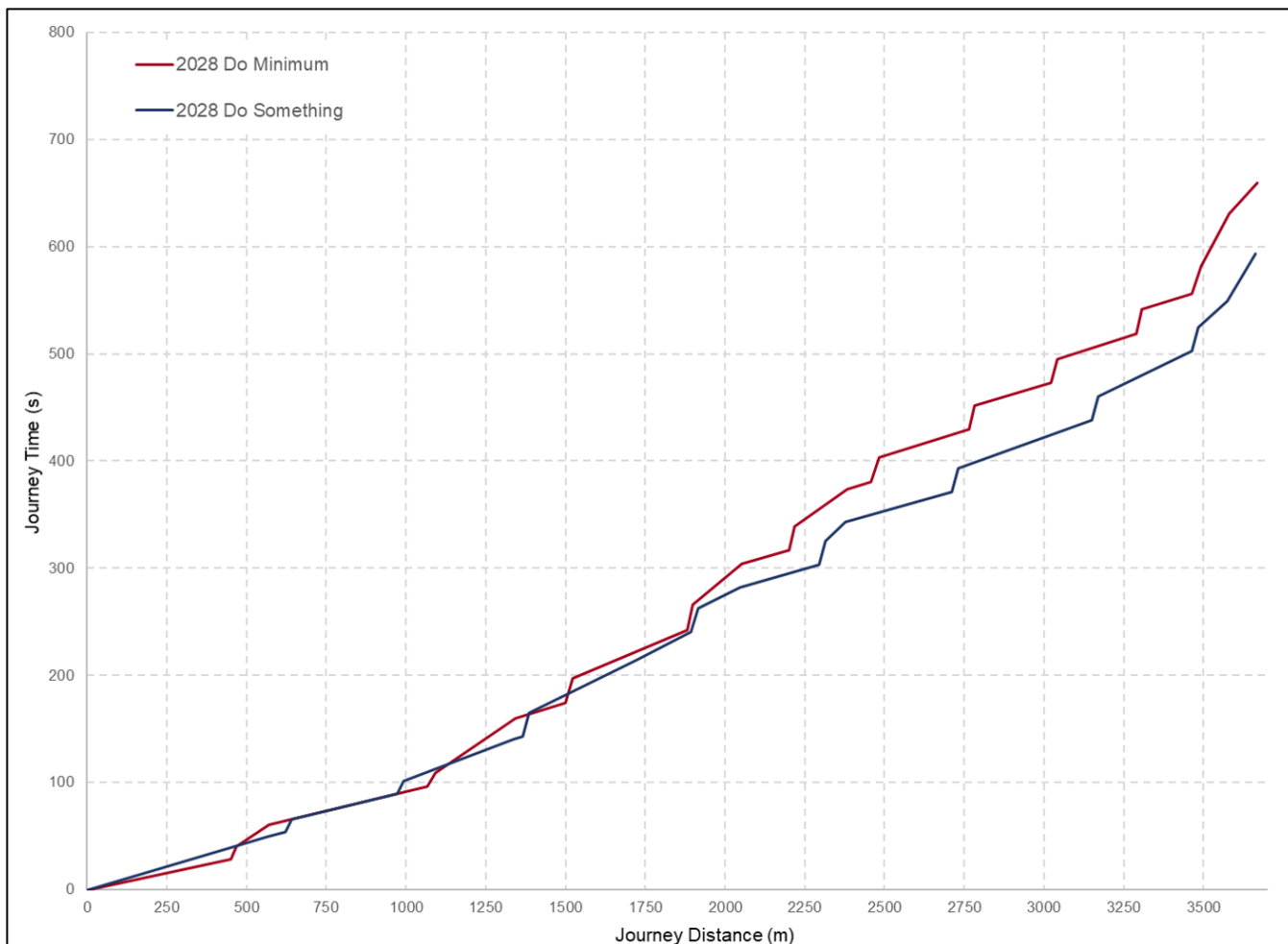


Diagram 6.20: A3 Bus Journey Time (2028 PM, Inbound)

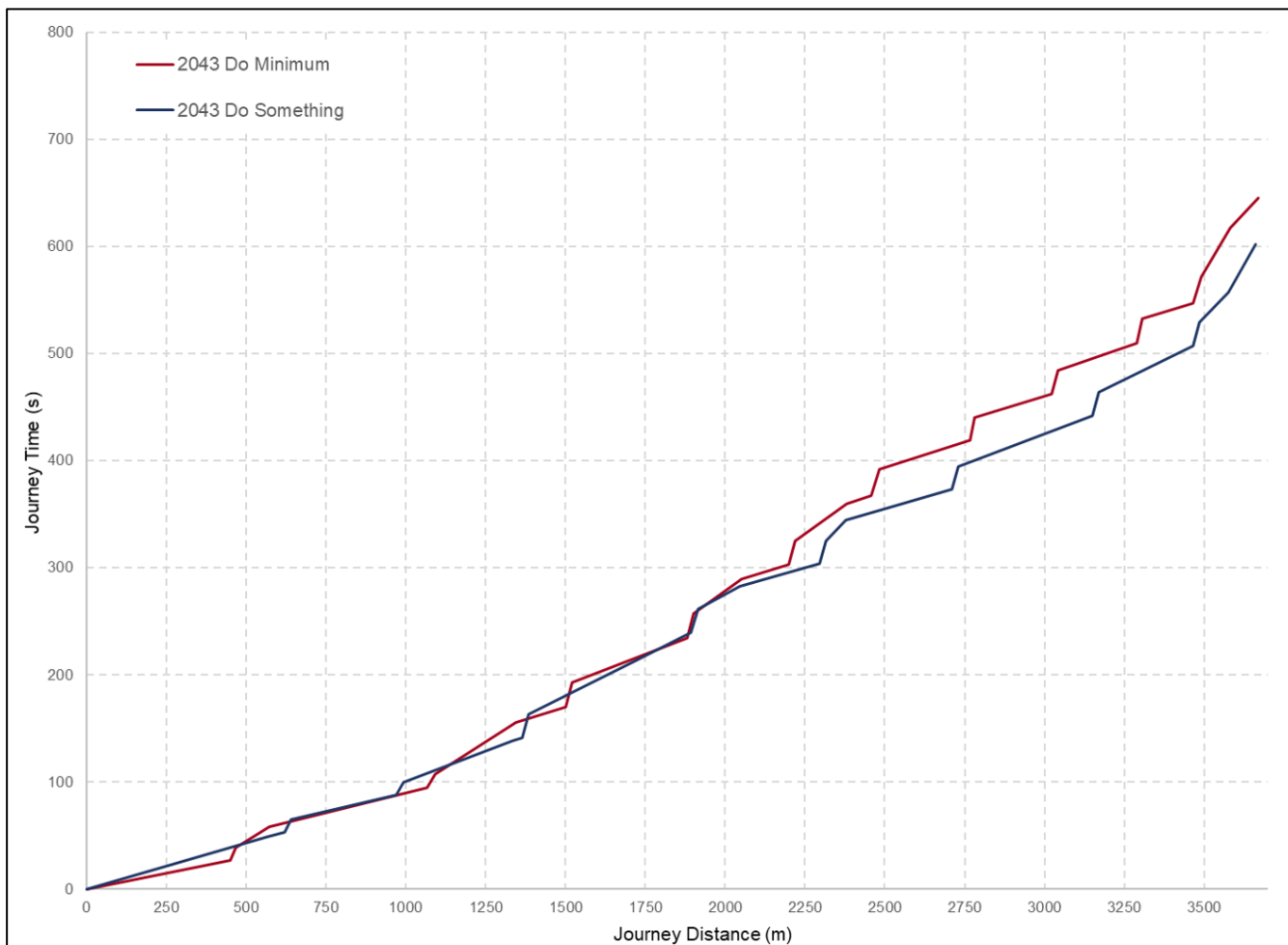


Diagram 6.21: A3 Bus Journey Time (2043 AM, Inbound)

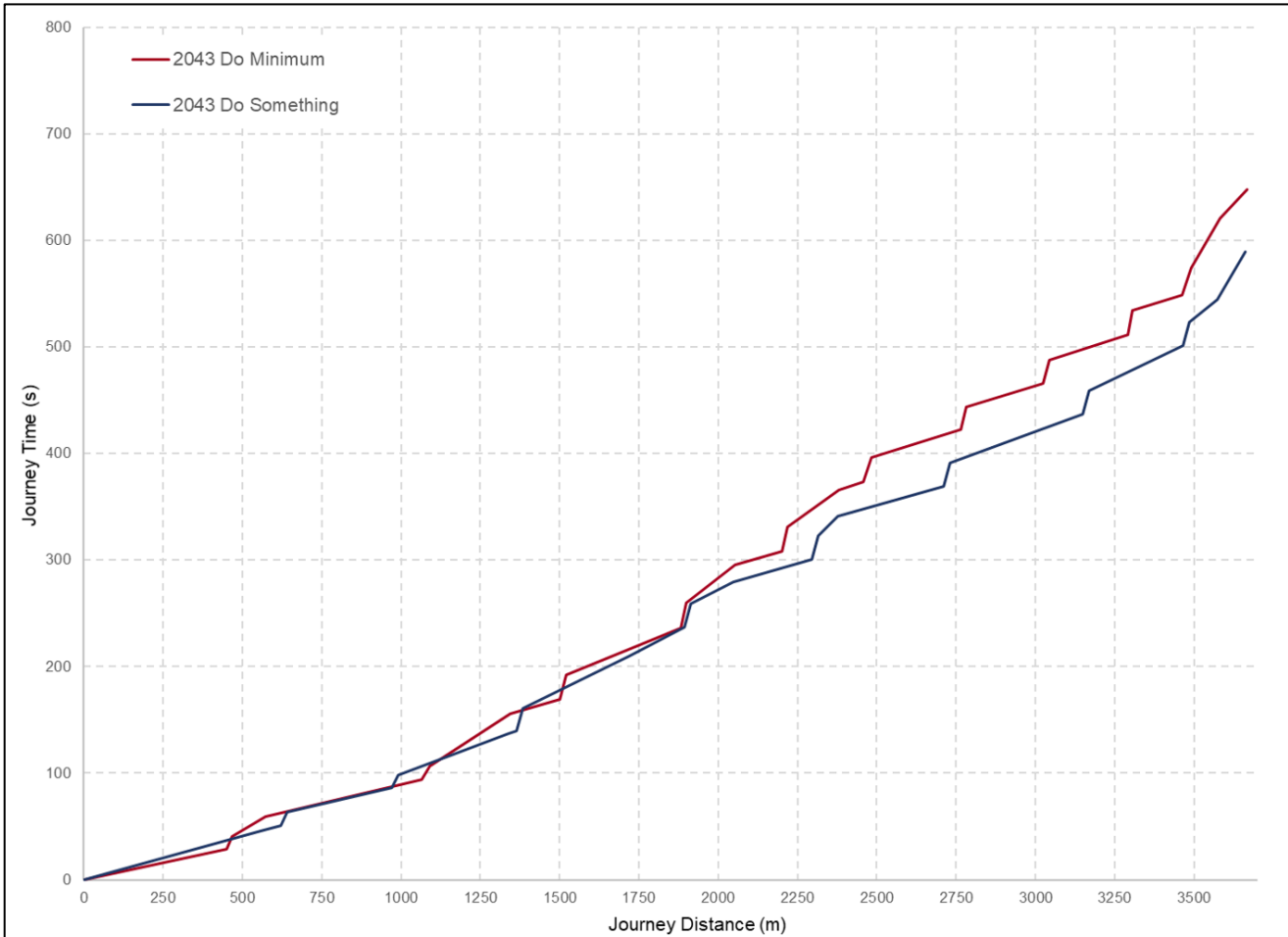


Diagram 6.22: A3 Bus Journey Time (2043 PM, Inbound)

Based on the results presented in Diagram 6.19 to Diagram 6.22 the Proposed Scheme is expected to deliver journey time savings, most notably on the section of Templeogue Road between the Spawell junction and Old Bridge Road/Cypress Grove Road and on the section of Templeogue Road between Templeville Road and Fortfield Road. This is due to the introduction of segments of inbound bus lane that provide an uninterrupted bus facility and bus priority ‘hurry calls’ signalling (use of traffic signal plans to give buses priority ahead of general traffic) offered to mainline buses as part of the Proposed Scheme.

Outbound Direction

Average journey times for the outbound A3 service in 2028 Opening Year and in 2043 Design Year can be seen in Table 6.50. A breakdown of the changes in average journey times for all other bus services using this section of the Proposed Scheme can be found in Appendix A6.4.3 (Average Bus Journey Times).

Table 6.50: A3 Service Bus Journey Times (Outbound Direction)

Peak Hour	Do Minimum (minutes)	Do Something (minutes)	Difference (minutes)	% Difference
2028 AM	10.7	9.3	-1.4	-13%
2028 PM	10.9	9.3	-1.6	-15%

Peak Hour	Do Minimum (minutes)	Do Something (minutes)	Difference (minutes)	% Difference
2043 AM	10.4	9.3	-1.1	-11%
2043 PM	10.2	9.4	-0.8	-8%

Additional information regarding the range of journey times (minimum, maximum, average and standard deviation) for outbound A3 buses in the Do Minimum (red) and Do Something (blue) can be seen in Table 6.51 and Diagram 6.23. 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 6.51: A3 Service – Range of Journey Times (Outbound Direction)

Peak Hour	Do Minimum				Do Something			
	MIN	MAX	AVG	STDEV	MIN	MAX	AVG	STDEV
2028 AM	8.4	13.4	10.7	1.1	8.1	10.8	9.3	0.6
2028 PM	9.3	13.2	10.9	1.0	8.2	10.7	9.3	0.5
2043 AM	8.4	13.0	10.4	1.0	8.2	10.6	9.3	0.5
2043 PM	9.1	12.0	10.2	0.8	8.0	11.3	9.4	0.7

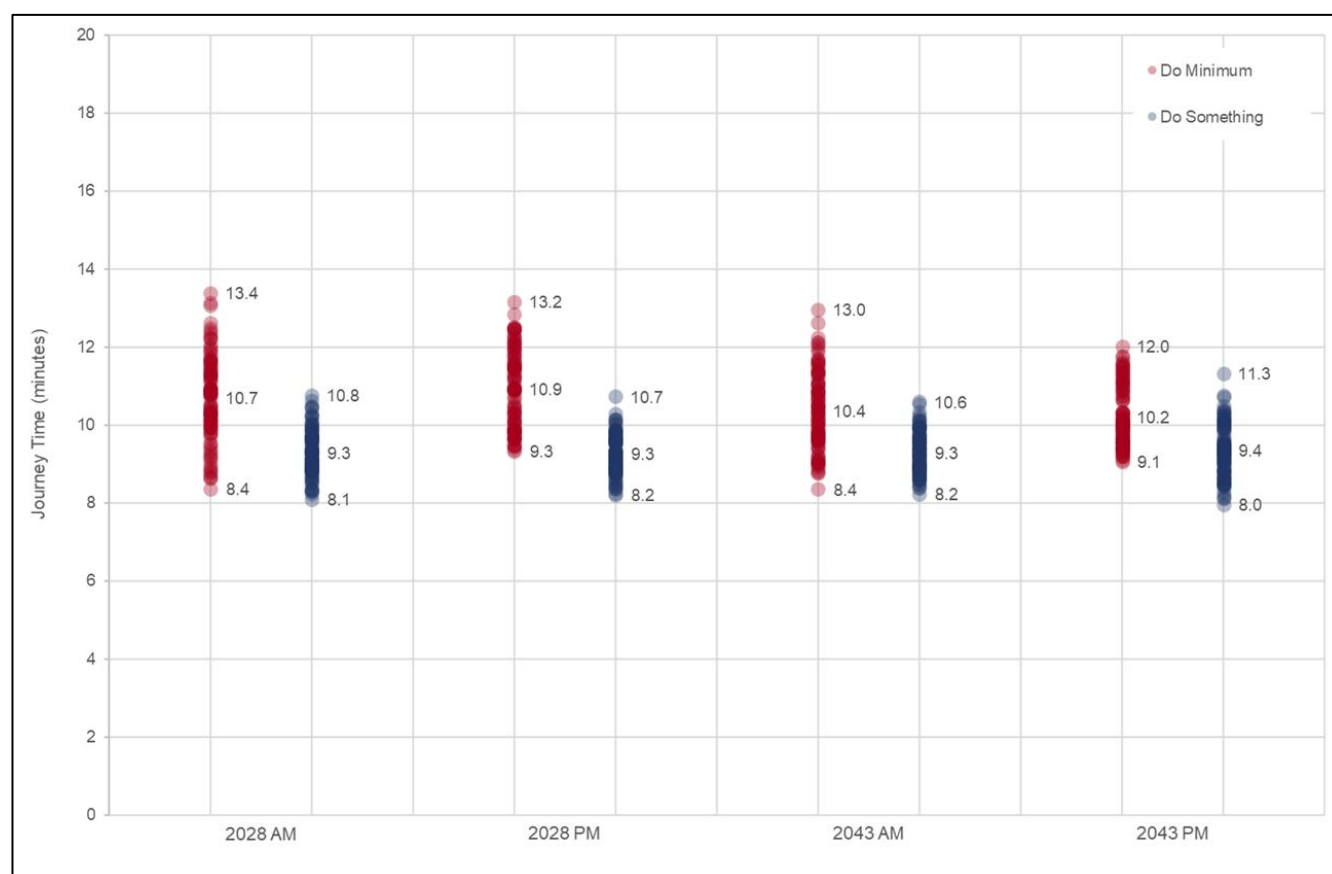


Diagram 6.23: A3 Bus Journey Times (Outbound Direction)

Based on the results presented in Table 6.51, the Proposed Scheme will deliver average outbound journey time savings for A3 service bus passengers of up to 1.6 minutes (15%) in 2028 (PM) and 0.8 minutes (8%) in 2043 (PM). Furthermore, results presented in Diagram 6.23 suggest an improvement in bus journey time reliability in all four scenarios as indicated by the reduced ranges of journey times achieved with the durations focused much closer to the average journey times (lower standard deviation) in the Do Something scenario (blue dots) with the Proposed Scheme in place compared to the more dispersed range in the Do Minimum scenario (red dots).

Note that the variation in journey times shown above are based on one set of predicted flows for the Do Minimum and Do Something scenario. Traffic flows fluctuate daily which would mean that the variation in journey times would be much greater in the Do Minimum with any increases in traffic flows compared to the protection of journey time reliability provided by the bus priority measures that comprise the Proposed Scheme.

A comparison of average Do Minimum and Do Something outbound journey times are also illustrated in the cumulative time-distance graphs shown in Diagram 6.24 to Diagram 6.27. As above, the cumulative time-distance graphs are also based on the A3 service, which captures the full extent of the Proposed Scheme to Rathfarnham Road.

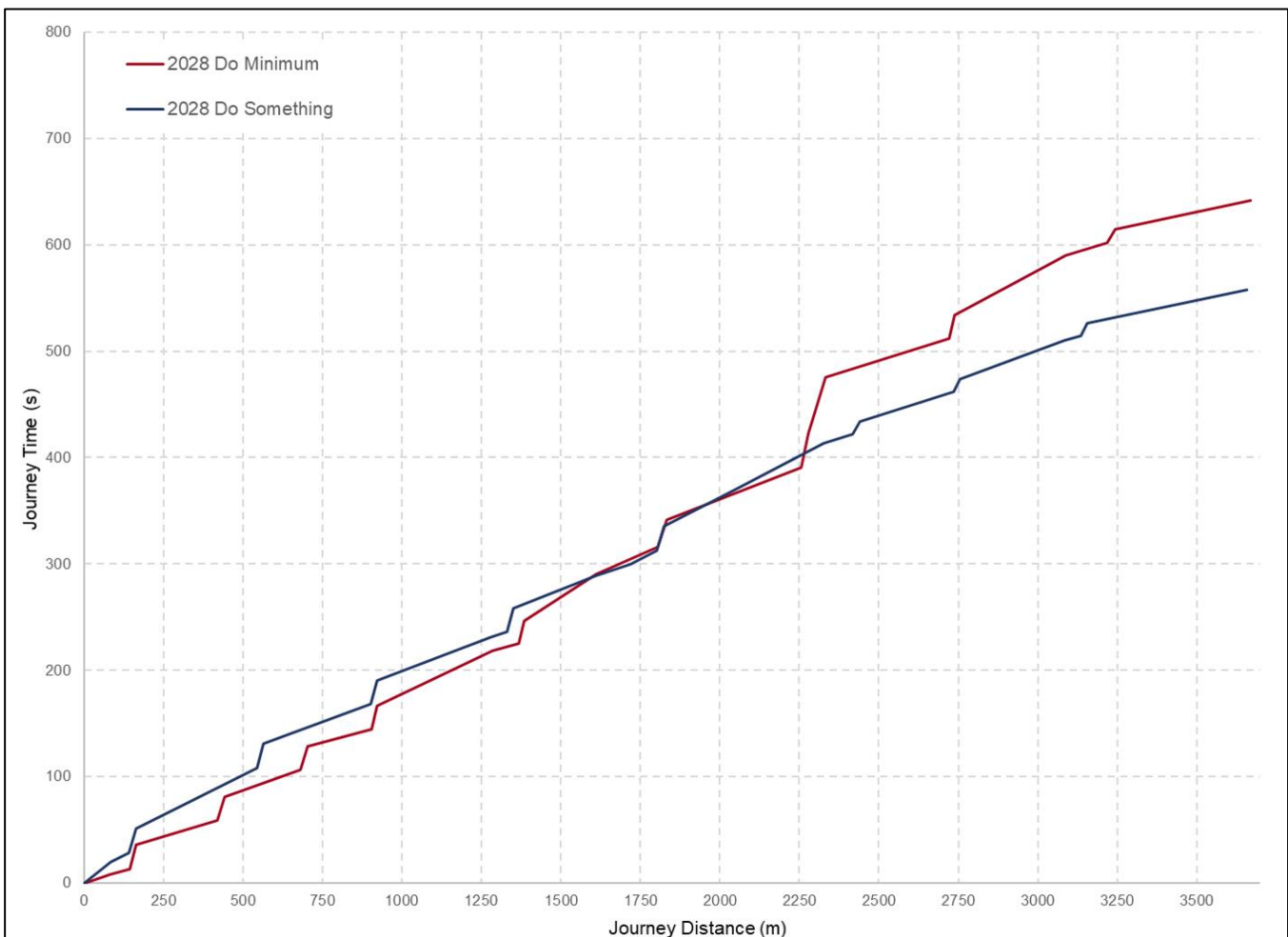


Diagram 6.24: A3 Bus Journey Time (2028 AM, Outbound)

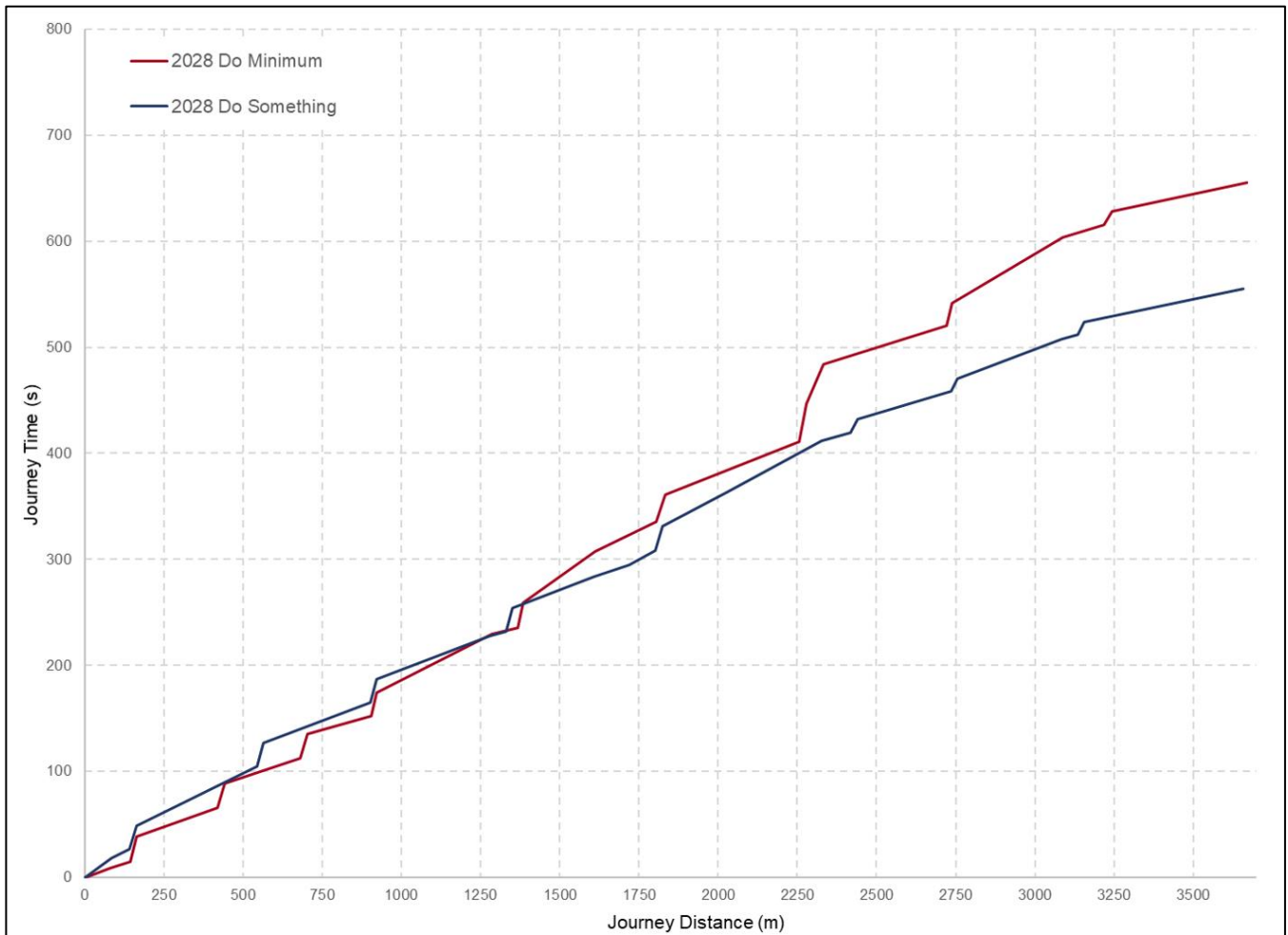


Diagram 6.25: A3 Bus Journey Time (2028 PM, Outbound)

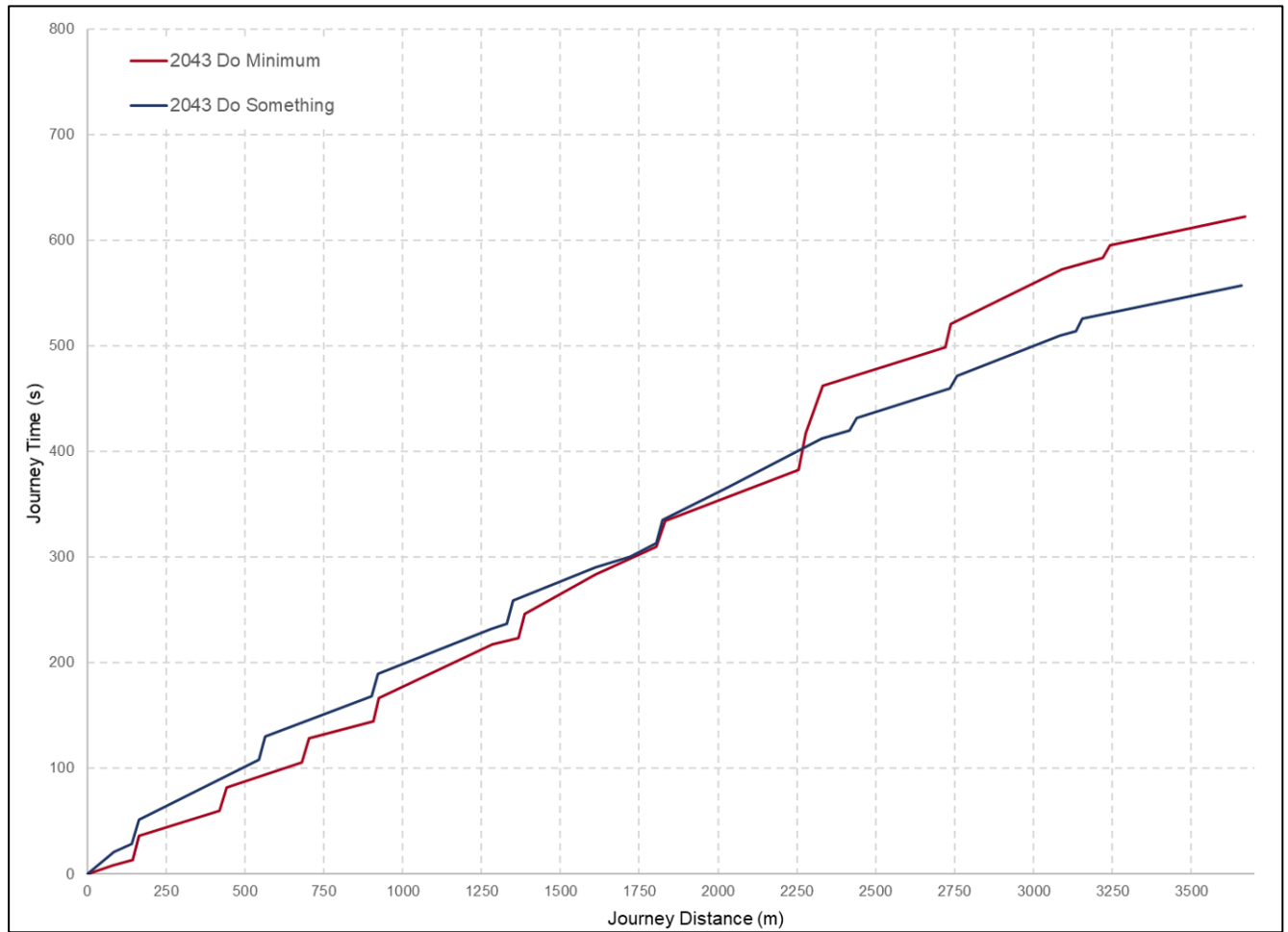


Diagram 6.26: A3 Bus Journey Time (2043 AM, Outbound)

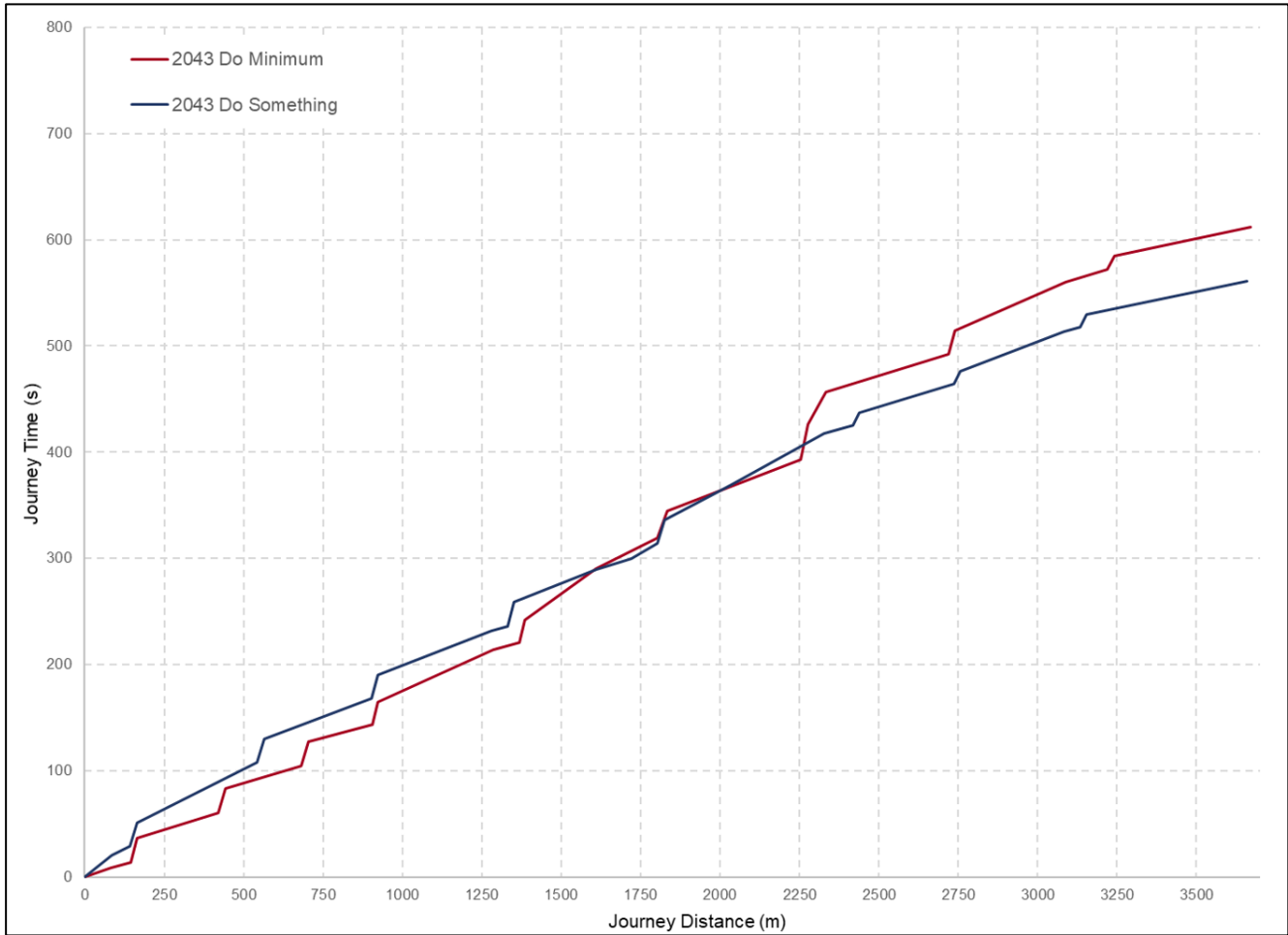


Diagram 6.27: A3 Bus Journey Time (2043 PM, Outbound)

Based on the results presented in Diagram 6.24 to Diagram 6.27 the Proposed Scheme is expected to deliver bus journey time savings, most notably on key sections such as outbound on Templeogue Road from Templeville Road to Old Bridge Road/Cypress Grove Road and from Old Bridge Road/Cypress Grove Road to the Spawell junction. This is due to the new segments of bus lane and provision of bus priority ‘hurry calls’ signalling as part of the Proposed Scheme.

At the Old Bridge Road/Cypress Grove Road junction, there is an existing bus stop on the east arm of the junction, and there is no bus priority at this location (i.e. there is neither a dedicated bus lane to the stop line nor bus priority ‘hurry calls’ signalling) in the Do Minimum scenario. As part of the Proposed Scheme, the outbound bus stop has been relocated to the west of the junction and bus priority introduced. The Proposed Scheme includes an outbound bus lane to the stop line in addition to bus priority ‘hurry calls’ signalling. As a result, the journey time savings of the Proposed Scheme notably accumulate from this particular junction.

Outside of these sections, bus lanes to junction stop lines and the bus priority ‘hurry calls’ signalling (use of traffic signal plans to give buses priority ahead of general traffic) offered to mainline buses as part of the Proposed Scheme can be shown to create cumulative bus journey time savings over the Do Minimum.

Rathfarnham to City Centre Section

6.4.6.1.11.3 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 Rathfarnham to City Centre section of the Proposed Scheme, outputs for the A2 service, which traverses the entire length of the section, have been extracted from the model. As outlined in Section 6.4.3.1 the assessment is based in the context of the full implementation of the BusConnects network re-design in both the Do Minimum and Do Something scenarios, with this section of the Proposed Scheme servicing the A-Spine services.

When considering the results below, it should be noted that the Rathfarnham Road to City Centre section already includes a high proportion of bus priority measures in the form of bus lanes in the inbound direction. The Proposed Scheme seeks to address the remaining un-prioritised sections of bus priority with a combination of further sections of bus lane and signal control priority at pinch-points and junctions whilst also improving the pedestrian and cycling environment. The Proposed Scheme also introduces outbound bus priority with a combination of signal control priority and bus lanes, which are not currently included in the outbound direction on the Rathfarnham Road to City Centre section.

Inbound Direction

Average journey times for the inbound A2 service (which leaves the Proposed Scheme extents at the south arm of the Dame Street/South Great George’s Street junction) in the 2028 Opening Year and in the 2043 Design Year can be seen in Table 6.52. 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).

Table 6.52: A2 Service Bus Average Journey Times (Inbound Direction)

Peak Hour	Do Minimum (minutes)	Do Something (minutes)	Difference (minutes)	% Difference
2028 AM	35.2	29.4	-5.8	-16%
2028 PM	31.1	29.1	-2.0	-6%
2043 AM	33.2	29.3	-3.9	-12%
2043 PM	30.7	29.3	-1.4	-5%

Additional information regarding the range of journey times (minimum, maximum, average and standard deviation) for inbound A2 buses in the Do Minimum (red) and Do Something (blue) can be seen in Table 6.53 and Diagram 28. 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 6.53: A2 Service – Range of Journey Times (Inbound Direction)

Peak Hour	Do Minimum				Do Something			
	MIN	MAX	AVG	STDEV	MIN	MAX	AVG	STDEV
2028 AM	31.1	40.7	35.2	2.0	25.9	32.4	29.4	1.5
2028 PM	25.8	35.0	31.1	2.2	24.1	33.2	29.1	1.8
2043 AM	29.8	37.6	33.2	1.7	23.3	32.9	29.3	1.6
2043 PM	25.4	34.7	30.7	1.9	25.8	33.6	29.3	1.7

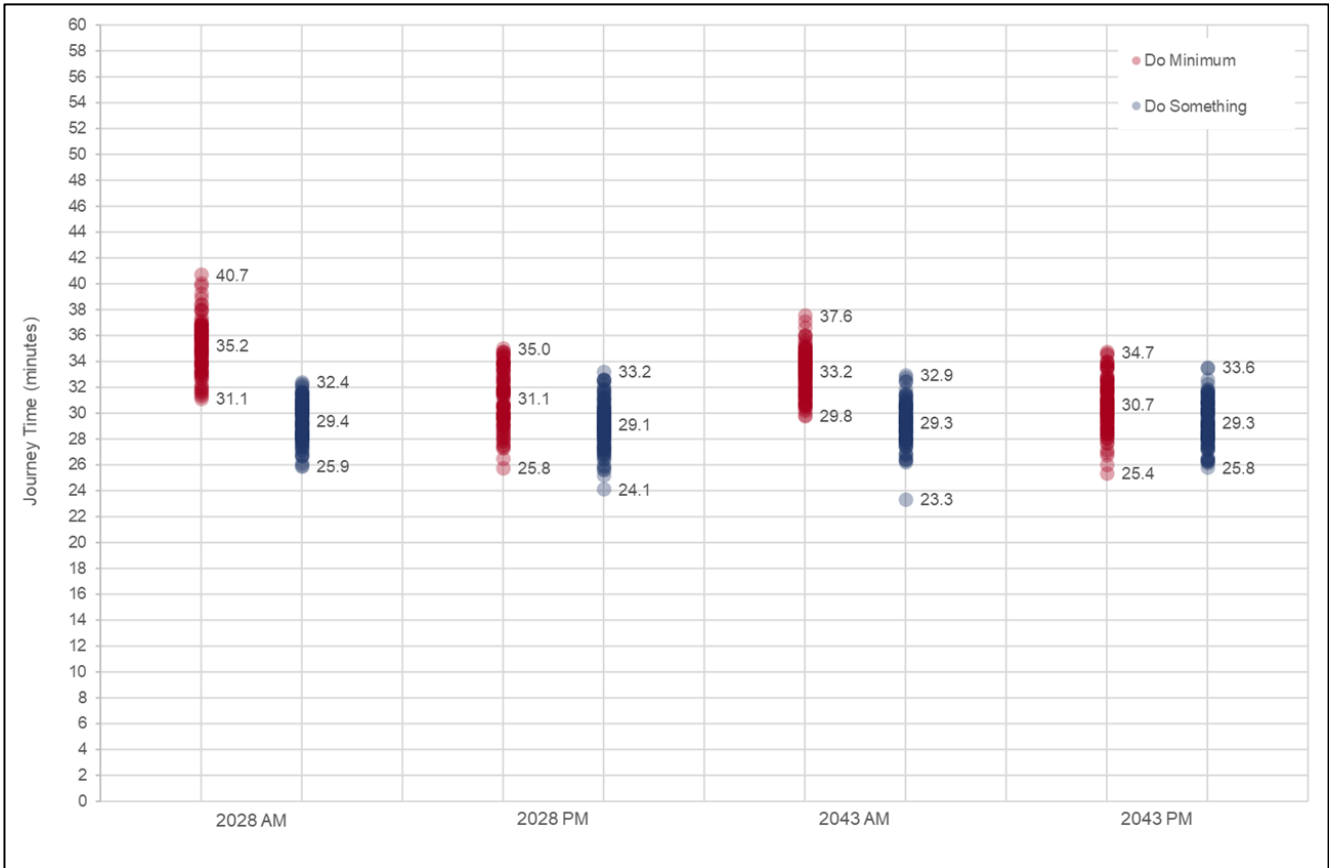


Diagram 6.28: A2 Bus Journey Times (Inbound Direction)

Based on the results presented in Table 6.53, the Proposed Scheme will deliver average inbound journey time savings for A2 service bus passengers of circa 6 minutes in the AM in 2028 and 4 minutes in the AM in 2043. Furthermore, results presented in Diagram 6.29 suggest an improvement in bus journey time reliability all 4 core scenarios as indicated by the reduced ranges of journey times achieved with the individual durations focused much closer to the average journey times (lower standard deviation) in the Do Something scenario (blue dots) with the Proposed Scheme in place compared to the more dispersed range in the Do Minimum scenario (red dots).

Note that the variation in journey times shown above are based on one set of predicted flows for the Do Minimum and Do Something scenario. Traffic flows fluctuate daily which would mean that the variation in journey times would be much greater in the Do Minimum with any increases in traffic flows compared to the protection of journey time reliability provided by the bus priority measures that comprise the Proposed Scheme.

A comparison of average Do Minimum and Do Something journey times for the inbound A2 service are also illustrated in the cumulative time-distance graphs shown in Diagram 6.29 to Diagram 6.32.

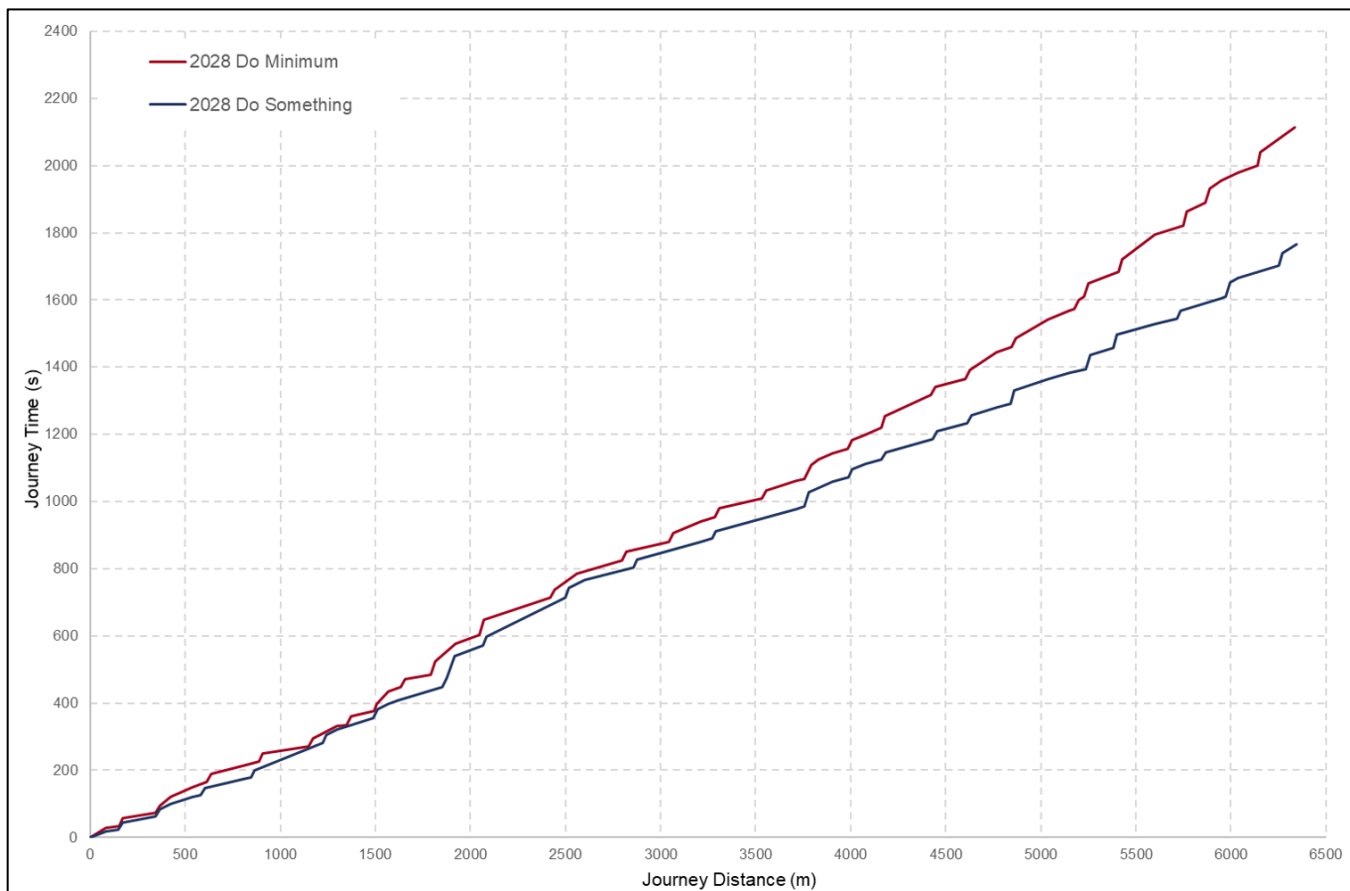


Diagram 6.29: A2 Bus Journey Time (2028 AM, Inbound)

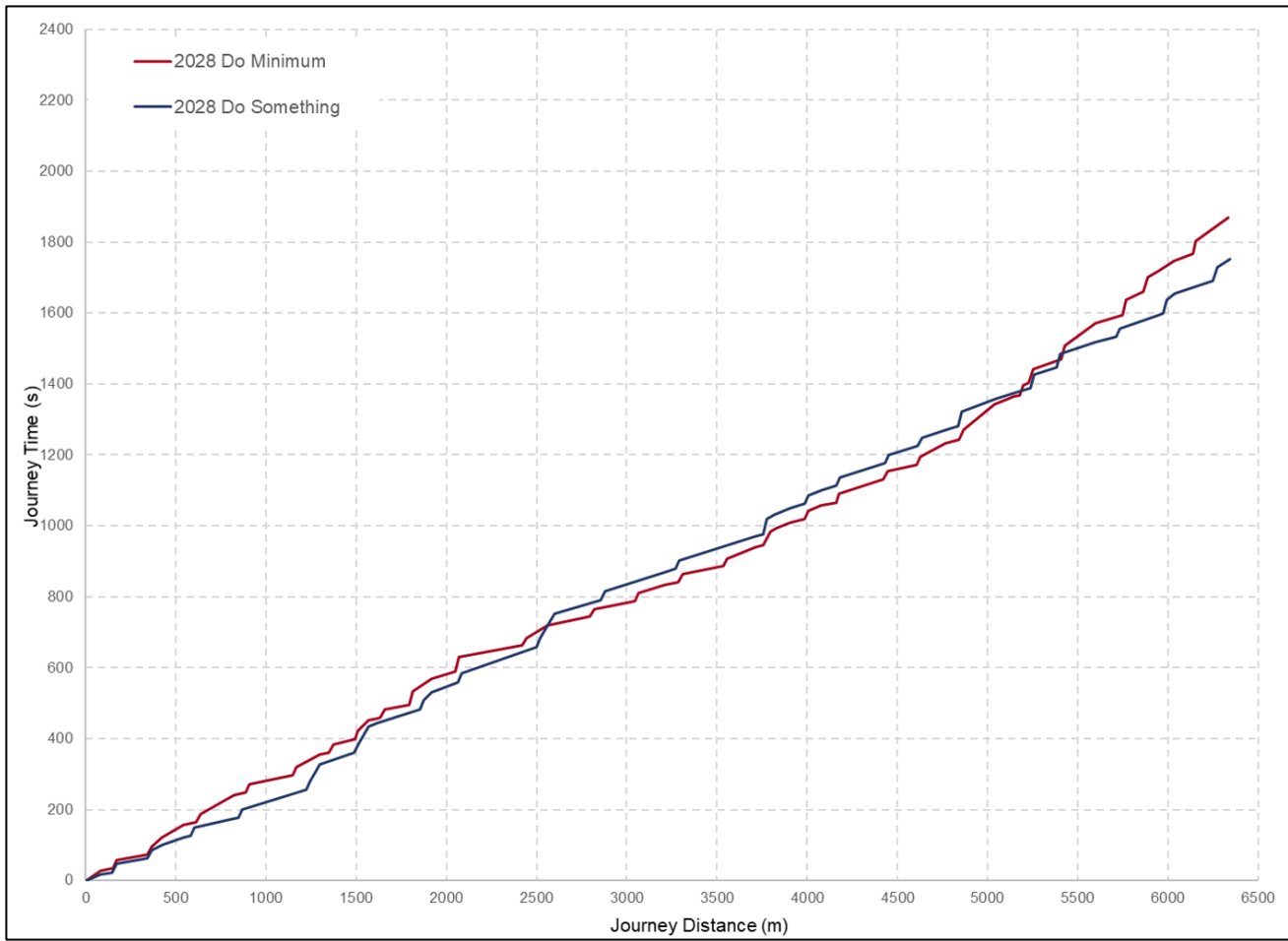


Diagram 6.30: A2 Bus Journey Time (2028 PM, Inbound)

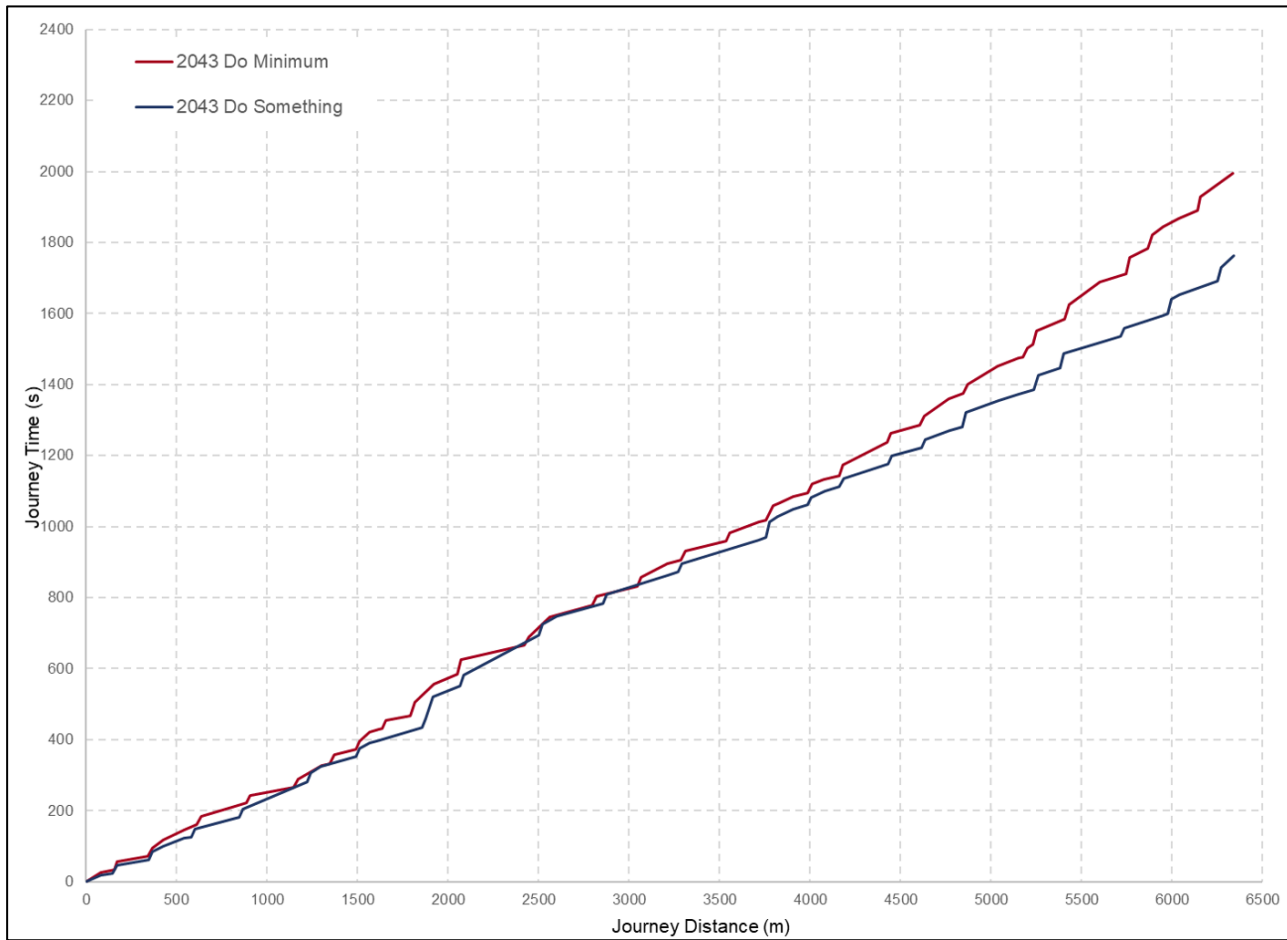


Diagram 6.31: A2 Bus Journey Time (2043 AM, Inbound)

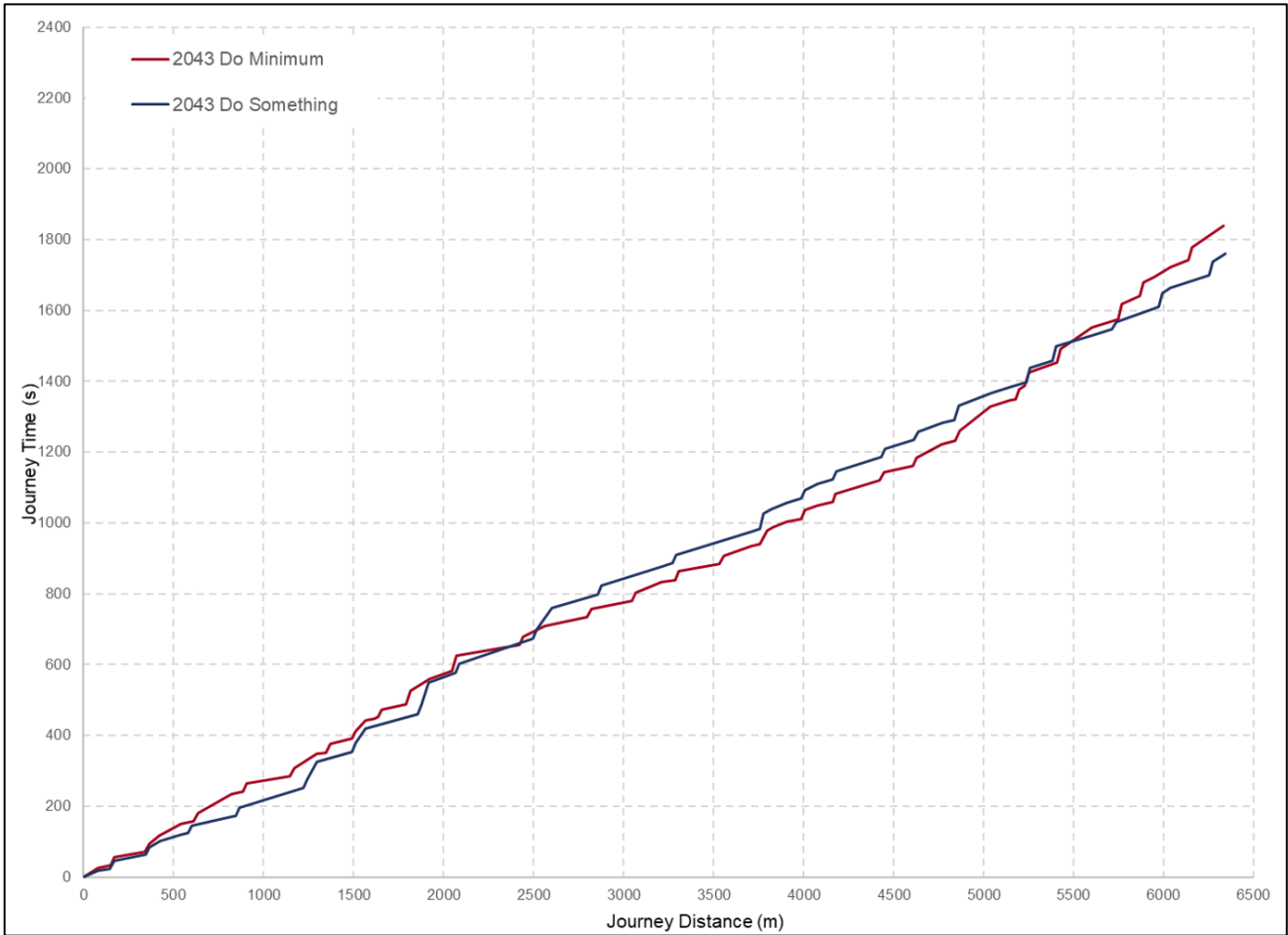


Diagram 6.32: A2 Bus Journey Time (2043 PM, Inbound)

Based on the results presented in Diagram 6.29 to Diagram 6.32, the Proposed Scheme offers considerable average bus journey time savings for the peak period (AM) direction, most notably on the sections of Rathfarnham Road between Bushy Park and Terenure Road and Rathgar Road between Charleville Road and Rathmines Road Upper. This is due to the introduction of continuous inbound bus lane to the stop line on Rathfarnham Road at Terenure Road and through the Charleville Road and Rathmines Road Upper junctions. The accumulation of inbound bus journey time savings is particularly notable from the Charleville Road and Rathmines Road Upper section, where bus priority 'hurry calls' signalling is provided.

There are a number of short sections of bus lane through the Dodder Park area, therefore, the level of bus priority is lower on Rathfarnham Road than other parts of the Proposed Scheme. In order to ensure adequate progression of traffic through this area, bus priority 'hurry calls' signalling is only provided in the peak period direction (i.e. inbound in the AM peak and outbound in the PM peak). Because of the lack of bus priority 'hurry calls' signalling in the non-peak direction, the Proposed Scheme offers modest inbound average journey time savings in the PM peak.

Outbound Direction

Average journey times for the outbound A2 service (which serves the Proposed Scheme extents from (Dame Street to Rathfarnham Wood), in 2028 Opening Year and in 2043 Design Year can be seen in Table 6.54. 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).

Table 6.54: A2 Service Bus Journey Times (Outbound Direction)

Peak Hour	Do Minimum (minutes)	Do Something (minutes)	Difference (minutes)	% Difference
2028 AM	29.5	28.9	-0.6	-2%
2028 PM	35.2	27.0	-8.2	-23%
2043 AM	28.4	28.1	-0.3	-1%
2043 PM	31.1	26.5	-4.6	-15%

Additional information regarding the range of journey times (minimum, maximum, average and standard deviation) for outbound A2 buses in the Do Minimum (red) and Do Something (blue) can be seen in Table 6.55 and Diagram 6.33. 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 6.55: A2 Service – Range of Journey Times (Outbound Direction)

Peak Hour	Do Minimum				Do Something			
	MIN	MAX	AVG	STDEV	MIN	MAX	AVG	STDEV
2028 AM	25.8	33.8	29.5	1.8	24.7	32.2	28.9	1.7
2028 PM	29.3	41.8	35.2	2.4	23.7	30.0	27.0	1.3
2043 AM	25.1	32.8	28.4	1.7	23.6	31.9	28.1	1.6
2043 PM	26.1	35.7	31.1	1.9	23.2	29.4	26.5	1.4

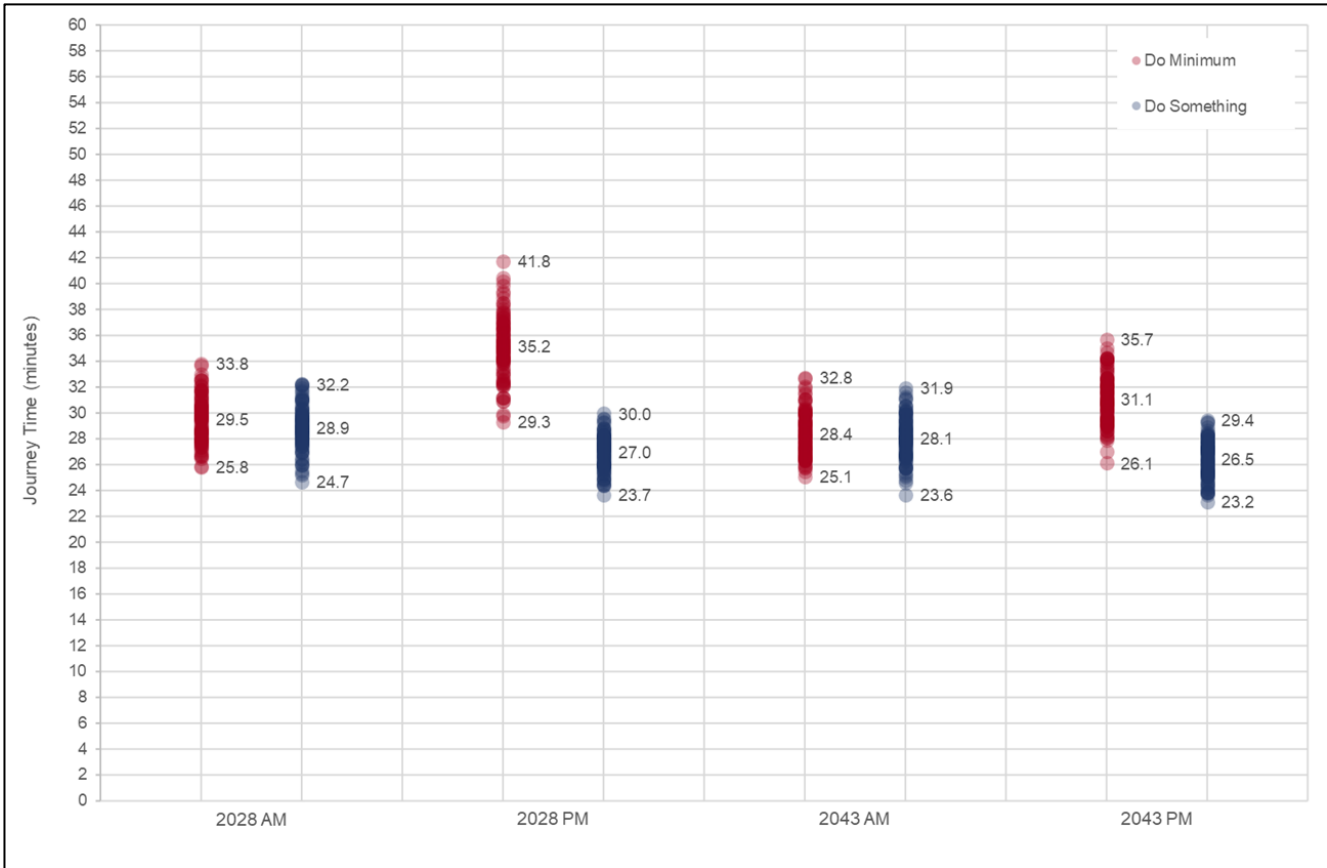


Diagram 6.33: A2 Bus Journey Times (Outbound Direction)

Based on the results presented in Table 6.55, the Proposed Scheme will deliver significant average outbound journey time savings, in the peak direction of travel, for A2 service bus passengers of up to 8.2 minutes (23%) in 2028 (PM) and 4.6 minutes (15%) in 2043 (PM). The Proposed Scheme will deliver modest journey time savings in the non-peak period direction. Furthermore, results presented in Diagram 6.33 suggest an improvement in bus journey time reliability in the two PM peak periods 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).

In the AM peak period in the outbound direction, the improvement in bus journey time reliability is not as notable. This is primarily due to variable journey times through the Terenure Road/Rathfarnham Road junction, where priority is given to the inbound buses. In the PM peak, bus priority ‘hurry calls’ signalling is provided in the outbound direction only to ensure adequate progression for general traffic through the junction. For this reason, the outbound journey time reliability improvements are more significant in the PM peak, which is appropriate being the peak direction of travel for bus users.

Note that the variation in journey times shown above are based on one set of predicted flows for the Do Minimum and Do Something scenario. Traffic flows fluctuate daily which would mean that the variation in journey times would be much greater in the Do Minimum with any increases in traffic flows compared to the protection of journey time reliability provided by the bus priority measures that comprise the Proposed Scheme.

A comparison of average Do Minimum and Do Something journey times for the A2 service for the outbound direction of travel illustrated in the cumulative time-distance graphs shown in Diagram 6.34 to Diagram 6.37.

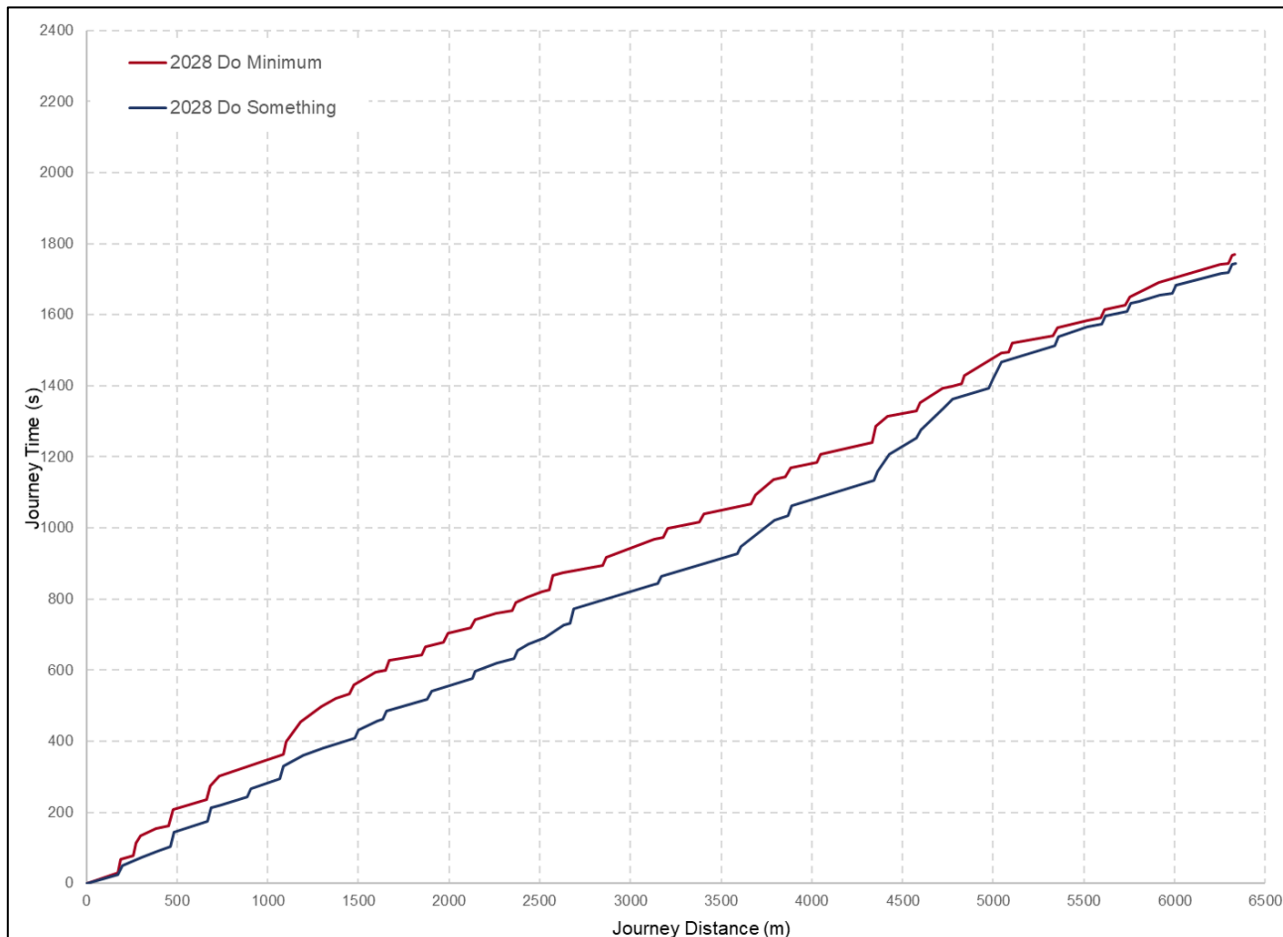


Diagram 6.34: A2 Bus Journey Time (2028 AM, Outbound)

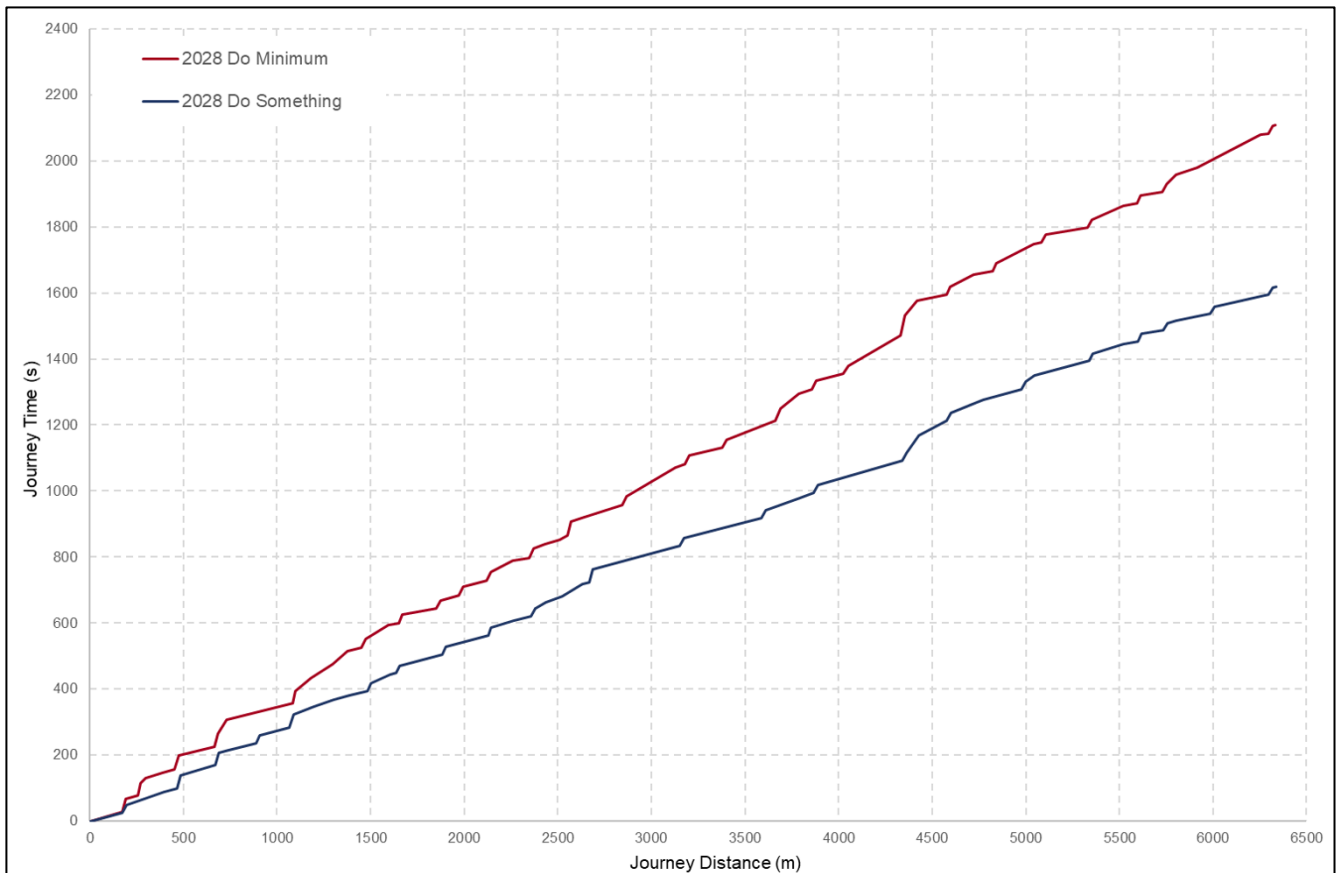


Diagram 6.35: A2 Bus Journey Time (2028 PM, Outbound)

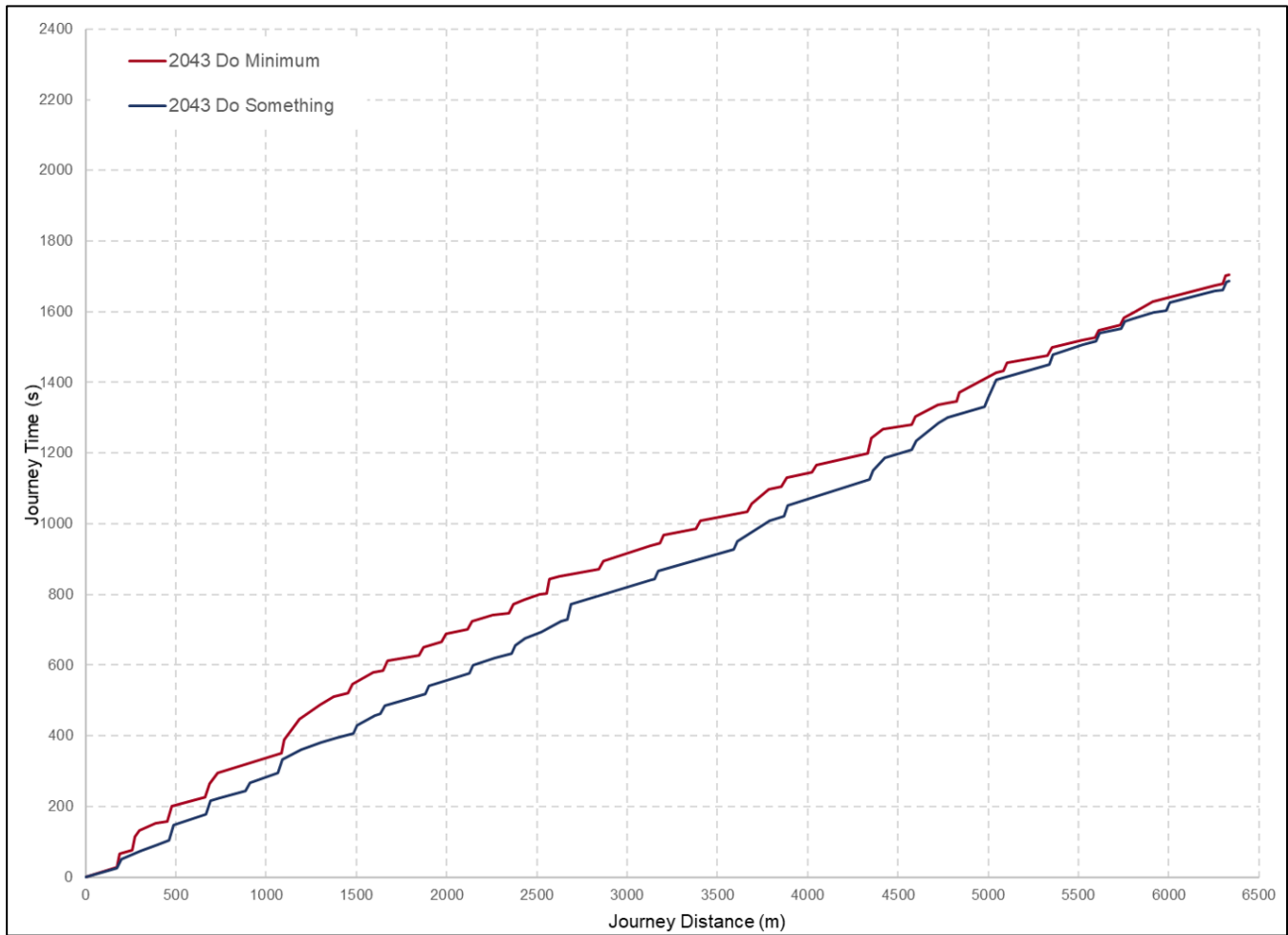


Diagram 6.36: A2 Bus Journey Time (2043 AM, Outbound)

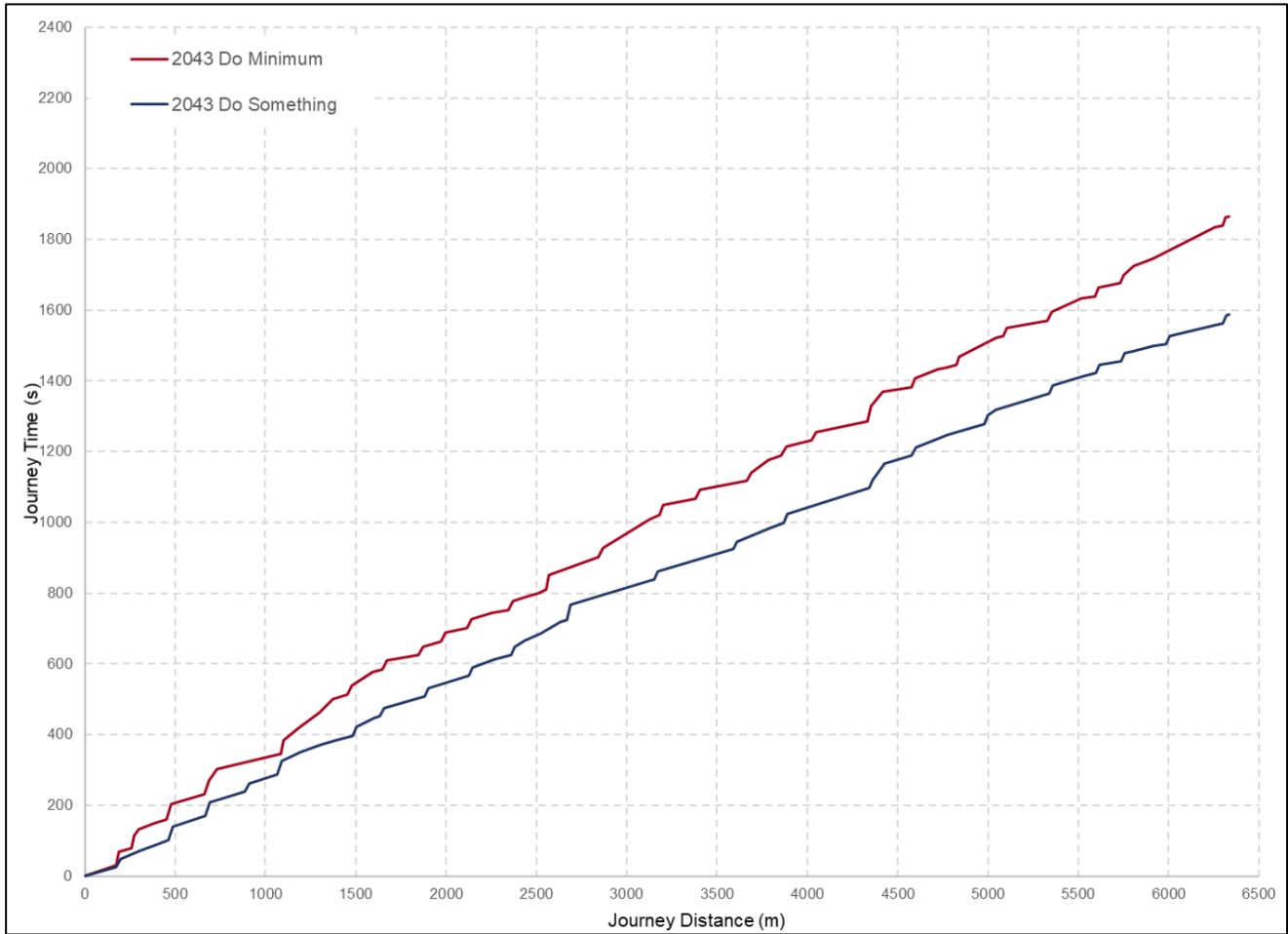


Diagram 6.37: A2 Bus Journey Time (2043 PM, Outbound)

Based on the results presented in Diagram 6.34 to Diagram 6.37, the Proposed Scheme offers considerable outbound average bus journey time savings for the peak period (PM) direction, most notably at the Harrington Street and Richmond Street junction and on Terenure Road East from Rathgar Avenue to Rathfarnham Road. The Proposed Scheme introduces a bus gate on the southern arm of the Harrington Street and Richmond Street junction. As a result, buses do not need to compete with general traffic flows for the single traffic lane. The bus gate from this location to Military Road/Rathmines Road provides significant bus journey time savings when combined with the bus priority 'hurry calls' signalling. The continuous bus lane on Terenure Road East from Rathgar Avenue to Rathfarnham Road and bus priority 'hurry calls' signalling at this location provide additional benefits.

It is important to note that while there are existing, though segmented, bus lanes in the inbound direction. The outbound direction currently lacks dedicated bus lanes on the majority of this corridor. The Proposed Scheme introduces considerable bus priority infrastructure in the form of outbound bus lanes along key sections. This bus priority infrastructure contributes to the even greater bus journey time savings achieved in the outbound peak period (PM) direction.

As mentioned previously, there are a number of short sections of bus lane through the Dodder Park area, therefore, the level of bus priority is lower on Rathfarnham Road than other parts of the Proposed Scheme. In order to ensure adequate progression of traffic through this area, bus priority 'hurry calls' signalling is only provided

in the peak period direction (i.e. inbound in the AM peak and outbound in the PM peak). Due to the lack of bus priority ‘hurry calls’ signalling in the non-peak direction, the Proposed Scheme offers modest inbound average journey time savings in the AM peak.

6.4.6.1.12 Total Journey Time Changes for all Proposed Scheme Bus Services

The change in total bus journey time for all buses travelling along both the Templeogue and Rathfarnham sections of the Proposed Scheme, is shown in Table 6.56.

Table 6.56: Total Bus Journey Time

Peak Hour	Do Minimum (vehicle.minutes)	Do Something (vehicle.minutes)	Difference (vehicle.minutes)	%Difference
2028 AM	2240.5	2059.5	-181.0	-8%
2028 PM	2195.2	1930.4	-264.9	-12%
2043 AM	2142.7	1962.8	-179.9	-8%
2043 PM	2050.8	1860.0	-190.8	-9%

Based on the results presented in Table 6.72 modelling indicates that the Proposed Scheme will reduce total bus journey times along the Proposed Scheme by up to 12% in 2028 and 9% in 2043. Based on the AM and PM peak hours alone, this equates to **7.4 hours of savings in 2028 and 6.2 hours in 2043** combined across all buses when compared to the Do Minimum. On an annual basis this equates to approximately 5,600 hours of bus vehicle savings in 2028 and 7,700 hours in 2043, when considering weekday peak periods only.

6.4.6.1.13 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.

6.4.6.1.14 Increased Bus Frequency - Resilience Sensitivity Analysis

6.4.6.1.14.1 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 planned under the current Bus Connects Network redesign proposals was assessed. The bus frequencies used in the modelling are based on the proposed service rollout as part of the BusConnects Network Redesign and are the same in both the Do Minimum and Do Something scenarios. This rollout is currently underway. The rationale for undertaking this approach was that the planning consent being sought and which this EIAR supports is solely for the infrastructural improvements associated with providing bus priority and other sustainable modes measures along the Proposed Scheme.

This analysis, however, is conservative as the bus priority infrastructure improvements and indeed the level of protection it will provide to bus journey time consistency and reliability will provide a significant level of resilience for bus services that will use the Proposed Scheme from implementation into the future. The resilience provided by the Proposed Scheme will allow the service pattern and frequency of bus services to be increased into the future to accommodate additional demand without having a significant negative impact on bus journey time

reliability or the operation of cycle and pedestrian facilities. In order to assess this resilience and the potential impacts of this resilience on carbon emissions, an additional analysis has been undertaken, which is detailed below.

6.4.6.1.14.2 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 whilst maintaining a high level of bus journey time reliability, a separate analysis was undertaken in the Proposed Scheme micro-simulation model. In this analysis, the service frequency, in both directions of travel, was increased to achieve a 10 buses per hour increase, at the busiest section, to assess whether the Proposed Scheme could cater for this increased service frequency whilst maintaining a high level of journey time reliability. The analysis was undertaken in the 2028 Minimum and Do Something models to assess whether the bus priority infrastructure was having the desired impact of protecting bus journey time reliability.

The bus service frequency, along the busiest section along Aungier Street, in the 2028 Do Minimum model and in the 2028 Do Something Resilience testing model is outlined in Table 6.57.

Table 6.57: Resilience Testing Bus Service Frequency Scenario Testing

Scenario	Inbound (Buses per Hour)	Outbound (Buses per Hour)
Do Minimum	46	46
Do Something	46	46
Do Minimum - Additional Services Resilience Test	56	56
Do Something - Additional Services Resilience Test	56	56

Table 6.58 outlines the average journey times for the inbound and outbound A2 service in the 2028 Opening Year scenarios. The A2 service has been chosen for the resilience testing as it represents the bus service which travels the longest distance along the Proposed Scheme.

Table 6.58: A2 Service – Average Bus Journey Times

Direction	Do Minimum (minutes)	Do Minimum (Additional Services) (minutes)	% Difference	Do Something (minutes)	Do Something - Additional Services (minutes)	% Difference
2028 Inbound AM	35.2	37.7	7.0%	29.4	30.4	3.6%
2028 Outbound PM	35.2	36.9	4.9%	27.0	28.4	5.3%

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 6.38. The diagram displays the maximum, minimum and average journey times for each of the A2 bus services modelled.

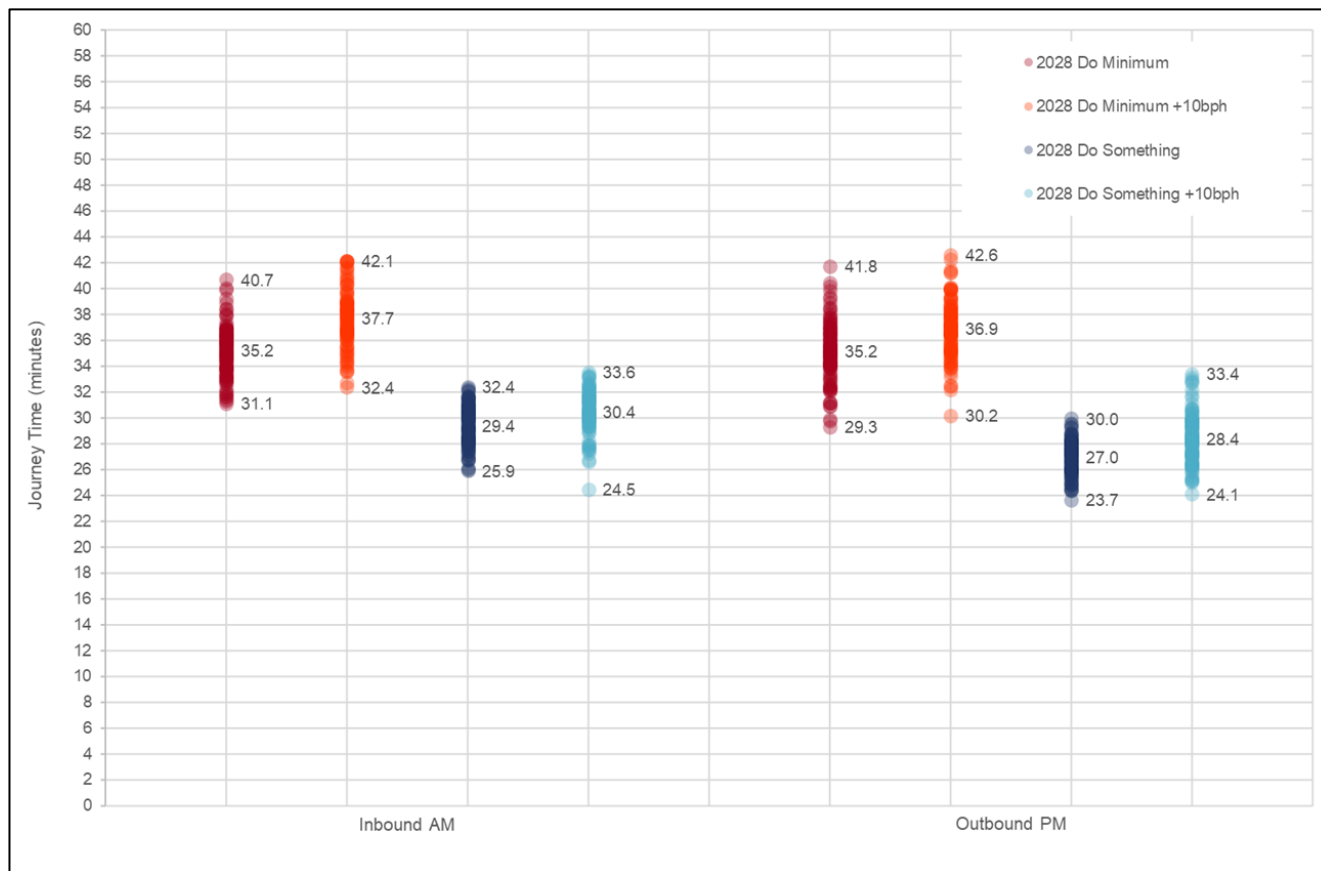


Diagram 6.38: Resilience Testing Bus Journey Time Reliability Indicators - Scenario Testing– Opening Year (2028)

As can be seen from Diagram 6.38 the modelling indicates 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 scenario, comparable with the 46 buses per direction per hour results. The results indicate limited change in average journey times in the Do Something Resilience sensitivity tests per bus. In the Do Minimum Resilience sensitivity test, journey times are more severely impacted, particularly in the AM peak inbound. In the Do Something Resilience sensitivity test bus journey time reliability is maintained with the additional services in place as indicated by the reduced range of journey times compared to the Do Minimum Resilience Test scenario. ***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 should 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).

6.4.6.1.15 General Traffic Assessment

6.4.6.1.15.1 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 Climate Action Plan (CAP) (2023) includes reference to DoT's Ireland's Road Haulage Strategy 2022-2031 (RHS)(2023) which will seek to further integrate smart technologies in logistics management and may include the regulation of delivery times as far as practicable to off-peak periods to limit traffic congestion in urban areas. Ireland's Road Haulage Strategy 2022-2031 outlines measures to manage the increase in delivery and servicing requirements as the population grows. These measures may include the development of consolidation centres to limit the number of 'last-mile' trips made by larger goods vehicles with plans for higher use of smaller electric vans or cargo bikes for 'last-mile' deliveries in urban areas. The purpose of this section is to assess the overall impact that any redistributed general traffic will have on both the direct and indirect study areas.

It should be noted that the impacts presented in this chapter are based on the final Preliminary Design for the Proposed Scheme which includes embedded mitigation to limit environmental and traffic and transport impacts to a minimal level as part of the iterative design development work described previously above.

6.4.6.1.15.2 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 6.59.

Table 6.59: Significance of the Reduction in General Traffic Flows

Significance of Positive Impact	Description of Impact / Proposed Changes
Profound	< -1000
Very Significant	-1000 to -800

Significance of Positive Impact	Description of Impact / Proposed Changes
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 6.2.3 of this EIAR. The full outputs of the results are available in the Appendix A6.3 (Junction Design Report) in 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 6.39 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	<i>100 trips in / out combined in the peak hours for the proposed development</i>
	<i>Development traffic exceeds 10% of turning movements at junctions with and on National Roads.</i>
	<i>Development traffic exceeds 5% of turning movements at junctions with National Roads if location has potential to become congested or sensitive.</i>

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

Diagram 6.39: Extract from the Traffic and Transport Assessment Guidelines (PE-PDV-02045, May 2014)

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

undertaken and that potential impacts on more localised or residential streets have been captured as part of the assessment.

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

- **Local / Regional Roads:** Traffic redistribution results in an increase above 100 combined flows (i.e. in a two-way direction) along residential, local and regional roads in the vicinity of the Proposed Scheme in the AM and PM peak hours;
 - The threshold aligns with an approximate 1 vehicle per minute increase per direction on any given road. This is a very low level of traffic increase on any road type and ensures that a robust assessment of the impacts of redistributed traffic has been undertaken.
- **National Roads:** Traffic exceeds 5% of the combined turning flows at junctions with/ on/or with national roads in the AM and PM peak hours as a result of traffic redistribution comparing the 'Do Minimum' to the 'Do Something' scenario with the Proposed Scheme in place.
 - The guidelines indicate that a 10% threshold may be used, however, to ensure a rigorous assessment in this instance the lower 5% threshold for turning movements has been utilised.

Where road links have been identified as experiencing additional general traffic flow increases which exceed the above thresholds, a further assessment has been undertaken by way of a traffic capacity analysis on the associated junctions along the affected links.

6.4.6.1.15.3 AM Peak Hour – General Traffic Flow Difference

Diagram 6.40 in traffic flows on the road links in the AM Peak Hour for the 2028 Opening Year. Please see Appendix A6.4.4 (General Traffic Assessment) in Volume 4 of this EIAR for the full LAM outputs.

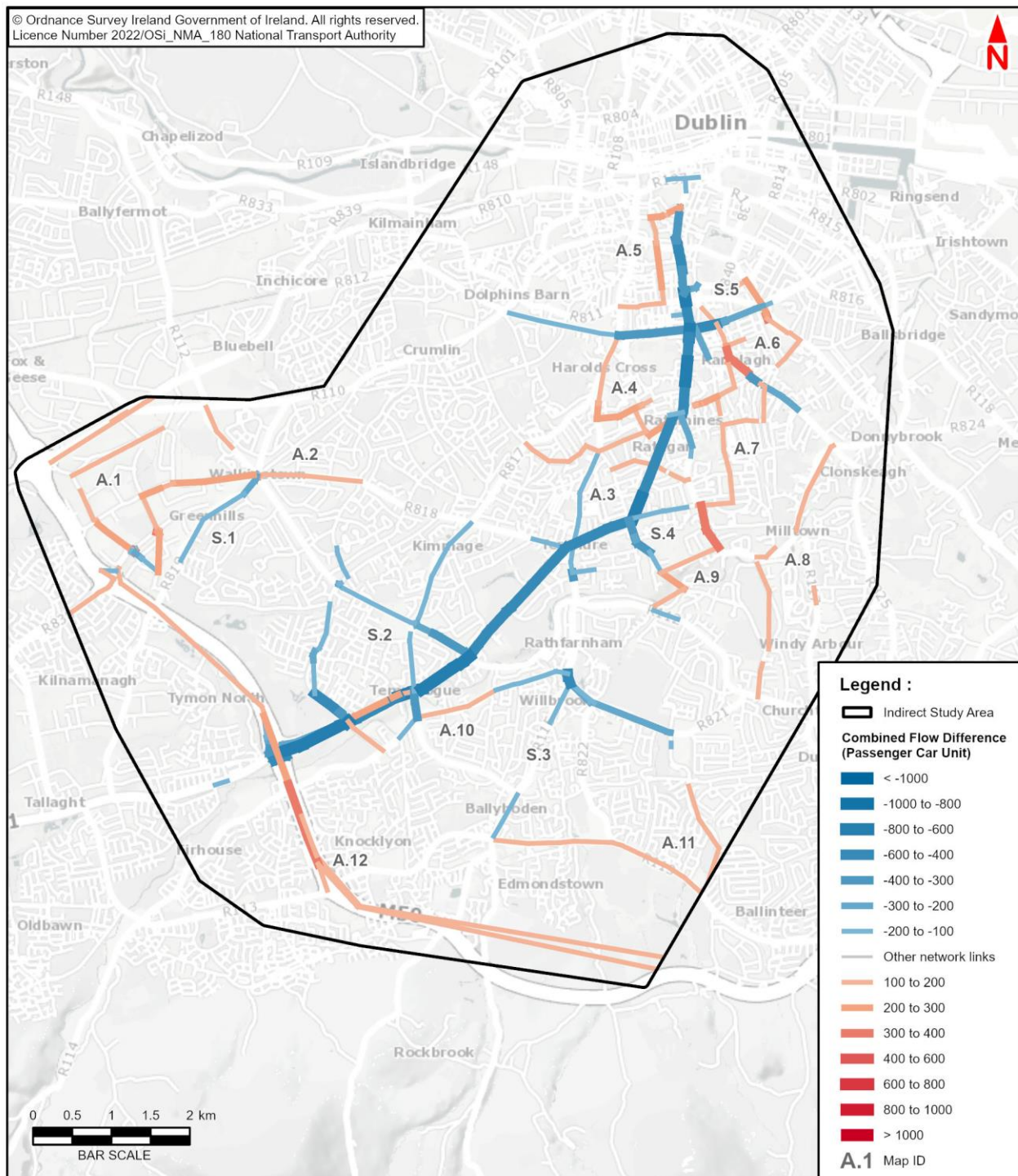


Diagram 6.40: Flow Difference on Road Links (Do Minimum vs. Do Something), AM Peak Hour, 2028 Opening Year**Impact on Direct Study Area (AM Peak Hour)**

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 6.40 which indicates where a reduction of at least -100 combined traffic flows occur.

The key reductions in traffic flows during the AM Peak Hour are outlined in Table 6.60.

Table 6.60: Road Links that Experience a Reduction of ≥ 100 Combined Flows during AM Peak Hour (Direct Study Area)

Location	Map ID	Road Name	Do Minimum Flow (pcu)	Do Something Flow (pcu)	Flow Difference (pcu)
Section 1 - R137 Templeogue Road to R114 Rathfarnham Road	S.2	Cypress Grove Road	1,108	926	-182
		Old Bridge Road	1,333	983	-350
		Tallaght Road	1,675	1,400	-275
		Templeville Road	1,036	689	-348
		Wellington Lane	2,141	1,851	-291
	S.4	Templeogue Road	665	212	-453
		Terenure Place	1,345	759	-586
		Terenure Road West	704	597	-107
Section 2 - R821 Nutgrove Avenue to R137 Terenure Road North	S.3	Butterfield Avenue	979	822	-158
		Grange Road	606	484	-122
		Nutgrove Avenue	1,275	995	-280
		Rathfarnham Road	1,336	843	-493
		Willbrook Road	798	602	-196
	S.4	Bushy Park Road	441	301	-141
		Rathfarnham Road	950	837	-114
Section 3 - R137 Terenure Road North to Charleville Road	S.4	Highfield Road	633	456	-177
		Orwell Road	1,175	876	-299
		Rathfarnham Road	1,025	875	-150
		Rathgar Road	603	109	-494
		Terenure Road East	838	436	-401
		Terenure Road North	977	824	-153
Section 4 - Charleville Road to R137 Dame Street	S.4	Charleville Road	144	30	-114
		Rathgar Road	817	672	-144
		Rathmines Road Lower	1,225	849	-376
		Rathmines Road Upper	578	328	-249

Location	Map ID	Road Name	Do Minimum Flow (pcu)	Do Something Flow (pcu)	Flow Difference (pcu)
		Wynnefield Road	218	87	-131
	S.5	Aungier Street	456	202	-254
		Camden Street Lower	649	343	-306
		Camden Street Upper	416	200	-216
		Canal Road	1,062	550	-512
		Charlotte Way	1,087	797	-289
		Grove Road	1,018	663	-356
		Lennox Street	280	96	-185
		Mount pleasant Avenue Lower	306	54	-252
		Rathmines Road Lower	902	366	-537
		Redmond's Hill	909	388	-521
		Richmond Hill	248	133	-114
		Richmond Street South	591	150	-442
		South Great George's Street	326	216	-110
Wexford Street	634	221	-413		

Table 6.60 demonstrates that there is a moderate to significant reduction of between -107 and -586 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, Moderate and Long-term effect** on the direct study area. The most significant effect occurs along the Terenure Place which is part of Section 1 of the Proposed Scheme.

Increases in General Traffic Flows: The road links which experience additional traffic volumes of over 100 combined flows are illustrated by the orange / red lines in Diagram 6.40. The road links and associated flow difference between the Do Minimum and Do Something scenarios during the PM Peak Hour are outlined in Table 6.61.

Table 6.61: Road Links that Experience an Increase of ≥ 100 Combined Flows during AM Peak Hour (Direct Study Area)

Location	Map ID	Road Name	Do Minimum Flow	Do Something Flow	Flow Difference
Section 1 - R137 Templeogue Road to R114 Rathfarnham Road	A.10	Spawell Link Road	796	991	+194
		Templeogue Road	805	1,040	+236
Section 3 - R137 Terenure Road North to Charleville Road	S.4	Kenilworth Park	760	885	+125
		Kenilworth Square North	381	511	+131
		Leicester Avenue	170	343	+173
	A.4	Grosvenor Road	402	637	+235
		Harolds Cross Road	1,017	1,265	+249
		Leinster Road	218	499	+281

Location	Map ID	Road Name	Do Minimum Flow	Do Something Flow	Flow Difference
Section 4 - Charleville Road to R137 Dame Street	A.5	Stephen Street Upper	310	516	+206

Capacity analysis of Direct Study Area junctions is available in Appendix A6.3 (Junction Design Report) in Volume 4 of this EIAR.

Impact on Indirect Study Area (AM Peak Hour)

Indirect Reductions in General Traffic: In addition to the general traffic flow reductions occurring along the direct study area, there are key reductions in general traffic noted along certain road links within the indirect study area during the AM Peak Hour. The key reductions in traffic flows along the indirect study area during the AM Peak Hour are outlined in Table 6.62.

Table 6.62: Road Links that Experience a Reduction of ≥ 100 Combined Flows during AM Peak Hour (Indirect Study Area)

Location	Map ID	Road Name	Do Minimum Flow (pcu)	Do Something Flow (pcu)	Flow Difference (pcu)
Eastern Side of Proposed Scheme	S.2	Firhouse Road	1,016	902	-114
		Old Bridge Road	1,356	1,008	-348
		Templeogue Road	1,128	498	-630
	S.3	Ballyboden Road	941	807	-134
		Butterfield Avenue	970	808	-163
		Nutgrove Avenue	1,148	871	-277
		Nutgrove Way	1,109	1,006	-103
	S.4	Braemor Road	597	497	-101
		Highfield Road	619	499	-119
		Orwell Road	1,148	1,013	-135
		Rathmines Road Upper	697	524	-172
	S.5	Canal Road	1,028	570	-458
		Charlotte Way	754	541	-213
		Dame Street	673	478	-195
		Grand Parade	864	605	-259
		Mespil Road	810	666	-144
		Ranelagh	1,266	1,035	-232
Sandford Road		1,254	1,028	-226	
Western Side of Proposed Scheme	S.1	Ballymount Road Upper	886	776	-111
		Calmount Road	748	647	-101
		Greenhills Road	1,598	1,419	-180
		Tallaght Bypass	2,624	2,515	-109
		Walkinstown Roundabout	1,055	935	-121
	S.2	Cypress Grove Road	1,191	1,041	-149
		Fortfield Road	1,178	1,064	-114

Location	Map ID	Road Name	Do Minimum Flow (pcu)	Do Something Flow (pcu)	Flow Difference (pcu)
		Tallaght Bypass	1,405	1,298	-106
		Tallaght Interchange	1,046	852	-194
		Tallaght Road	1,212	963	-250
		Templeville Road	479	334	-145
		Wainsfort Road	925	821	-104
		Wellington Lane	1,346	1,171	-174
		Wellington Road	1,533	1,421	-111
		Whitehall Road West	803	695	-109
	S.4	Terenure Road West	704	597	-107
	S.5	Dame Street	624	502	-122
		Grove Road	974	643	-332
		Parnell Road	661	540	-121

As indicated in Table 6.62, the traffic reductions within the indirect study area vary between -101 and -630 combined flows along the surrounding road links. This reduction in general traffic flow has an average of -183 two-way flows, which has been determined as an overall **Positive, Slight and Long-term effect** on the indirect study area.

Indirect Increases in General Traffic: The road links which experience additional traffic volumes of over 100 combined flows are illustrated by the orange / red lines in Diagram 6.40. These road links have been identified as experiencing traffic volumes above the additional traffic threshold and therefore require further analysis. The road links and associated flow difference between the Do Minimum and Do Something scenarios during the AM Peak Hour are outlined in Table 6.63.

Table 6.63: Road Links where the 100 Flow Additional Traffic Threshold is Exceeded (AM Peak Hour) (Indirect Study Area)

Location	Map ID	Road Name	Do Minimum Flow (pcu)	Do Something Flow (pcu)	Flow Difference (pcu)
Eastern Side of Proposed Scheme	A.06	Ashfield Road	363	495	+132
		Charlemont Street	762	874	+112
		Charleston Road	779	971	+192
		Hatch Street Lower	421	521	+100
		Leeson Street Lower	1,604	1,846	+241
		Leeson Street Upper	937	1,238	+301
		Mountpleasant Place	147	354	+207
		Northbrook Road	260	369	+109
		Oxford Road	155	270	+115
		Ranelagh	885	1,230	+345
		Ranelagh Road	970	1,349	+379
	The Appian Way	691	802	+112	
	A.07	Ashfield Road	330	458	+128
Beechwood Road		426	543	+117	

Location	Map ID	Road Name	Do Minimum Flow (pcu)	Do Something Flow (pcu)	Flow Difference (pcu)
		Belgrave Square East	122	228	+105
		Belgrave Square North	640	873	+232
		Castlewood Avenue	619	824	+206
		Dunville Avenue	357	510	+153
		Frankfort Avenue	120	311	+191
		Milltown Road	1,049	1,185	+136
		Palmerston Park	853	1,028	+175
		Palmerston Road	108	304	+196
	A.08	Churchtown Road Lower	764	877	+114
		Dundrum Road	739	849	+111
		Milltown Road	1,312	1,488	+177
	A.09	Churchtown Road Lower	741	845	+105
		Dartry Road	896	1,296	+400
		Lower Dodder Road	448	556	+108
		Orwell Park	585	736	+151
		Orwell Road	1,307	1,507	+201
	A.10	Butterfield Avenue	788	933	+145
		Spawell Link Road	833	1,029	+195
		Taylor's Lane	841	992	+151
	A.11	Broadford Road	945	1,059	+114
		Grange Road	1,114	1,299	+185
		Stonemason's Way	811	948	+137
		Taylor's Lane	662	837	+175
A.12	M50	5,714	6,023	+309	
	M50 On-Ramp	1,352	1,482	+130	
Western Side of Proposed Scheme	A.01	Ballymount Avenue	585	895	+310
		Ballymount Cross Rbt	924	1,056	+132
		Ballymount Road Lower	955	1,181	+225
		Ballymount Road Upper	1,864	2,084	+220
		Calmount Road	399	722	+324
		Katharine Tynan Road	905	1,045	+140
		Limekiln Road	258	398	+140
		M50	4,256	4,449	+193
		M50 Ramps	450	608	+159
		Naas Road	1,425	1,555	+130
		Robinhood Road	993	1,095	+103
		Turnpike Road	1,218	1,402	+185

Location	Map ID	Road Name	Do Minimum Flow (pcu)	Do Something Flow (pcu)	Flow Difference (pcu)
	A.02	Ballymount Road Lower	1,328	1,612	+285
		Cromwellsfort Road	914	1,034	+120
		Walkinstown Avenue	1,419	1,612	+193
		Walkinstown Roundabout	1,472	1,769	+297
	A.03	Clareville Road	701	854	+153
		Kenilworth Square South	145	330	+184
		Larkfield Avenue	903	1,076	+173
		Larkfield Park	700	849	+149
	A.04	Grosvenor Place	435	646	+211
		Harold's Cross Road	889	1,068	+179
		Kenilworth Road	348	481	+133
		Kenilworth Square North	348	474	+126
		Leinster Road	320	591	+271
	A.05	Bride Street	626	764	+138
		Golden Lane	629	855	+226
		Heytesbury Street	594	802	+208
		New Bride Street	590	800	+210
		South Circular Road	987	1,184	+197
		Stephen Street Upper	152	314	+162
	A.12	M50	4,708	4,929	+221
		Tallaght Interchange	734	969	+235

As outlined in Table 6.63 the additional traffic on the key road links within the indirect study area varies between 100 and 400 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 increase in traffic. The results are presented in terms of the significance of the impact to the V / C ratio for each junction based on its sensitivity and magnitude of impact.

It should be noted that the worst performing arm of the junction has been used for the purpose of the assessment to ensure a conservative impact assessment is undertaken.

6.4.6.1.15.4 PM Peak Hour - General Traffic Flow Difference

Diagram 6.41 (extract from Figure 6.8 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 A6.4.4 (General Traffic Assessment) in Volume 4 of this EIAR provides further details of the LAM outputs.

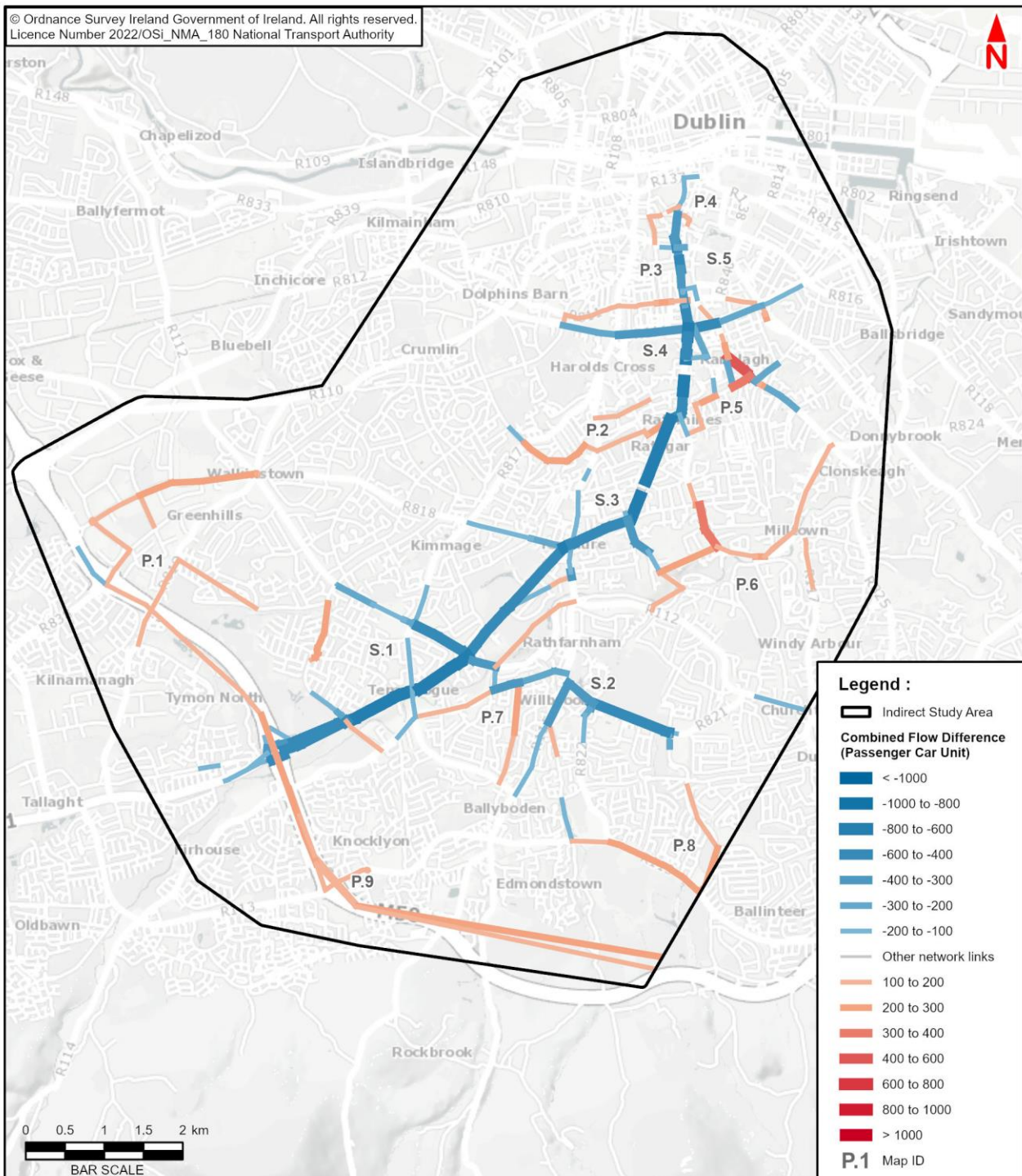


Diagram 6.41: Flow Difference on Road Links (Do Minimum vs. Do Something), PM Peak, 2028 Opening Year

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 6.41 which indicates where a reduction of at least -100 combined traffic flows occur.

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

Table 6.64 Road Links that Experience a Reduction of ≥ 100 Combined Flows during PM Peak Hour (Direct Study Area)

Location	Map ID	Road Name	Do Minimum Flow (pcu)	Do Something Flow (pcu)	Flow Difference (pcu)
Section 1 - R137 Templeogue Road to R114 Rathfarnham Road	S.1	Cypress Grove Road	1,080	900	-180
		Old Bridge Road	1,242	1,087	-155
		Springfield Avenue	1,265	926	-339
		Tallaght Road	1,471	1,044	-427
		Templeogue Road	1,303	852	-451
		Templeville Road	972	558	-414
		Wellington Lane	2,241	1,960	-280
	S.2	Templeogue Road	864	462	-402
	S.3	Rathdown Park	171	30	-140
		Templeogue Road	864	462	-402
		Terenure Place	1,535	795	-740
		Terenure Road West	802	584	-218
	Section 2 - R821 Nutgrove Avenue to R137 Terenure Road North	S.2	Butterfield Avenue	894	630
Grange Road			711	496	-215
Nutgrove Avenue			1,279	736	-543
Rathfarnham Road			1,610	765	-845
Willbrook Road			979	667	-311
S.3		Rathfarnham Road	980	826	-154
Section 3 - R137 Terenure Road North to Charleville Road	S.3	Harold's Cross Road	1,091	983	-107
		Orwell Road	1,140	813	-327
		Rathfarnham Road	1,014	833	-182
		Rathgar Avenue	756	649	-107
		Rathgar Road	782	70	-712
		Terenure Road East	903	386	-516
		Terenure Road North	1,034	926	-108
Section 4 - Charleville Road to R137 Dame Street	S.4	Canal Road	1,087	605	-482
		Grove Road	1,002	658	-345

Location	Map ID	Road Name	Do Minimum Flow (pcu)	Do Something Flow (pcu)	Flow Difference (pcu)
		Mountpleasant Avenue Lower	300	58	-242
		Rathgar Road	1,072	581	-491
		Rathmines Road Lower	935	389	-546
		Rathmines Road Upper	521	331	-191
		Richmond Hill	319	149	-170
		Richmond Street South	314	116	-198
	S.5	Aungier Street	391	197	-194
	Camden Street Lower	532	246	-287	
	Camden Street Upper	366	200	-166	
	Charlotte Way	711	584	-127	
	Cuffe Street	1,107	893	-214	
	Kevin Street Lower	1,046	932	-113	
	Redmond's Hill	837	324	-513	
	South Great George's Street	472	366	-105	
	Wexford Street	535	171	-364	

Table 6.65 demonstrates that there is a moderate to significant reduction of between -105 and -845 general traffic flows along the direct study area during the PM 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, Moderate and Long-term effect** on the direct study area. The most significant effect occurs along the R114 Rathfarnham Road along Section 2 of the Proposed Scheme.

Increases in General Traffic Flows: The road links which experience additional traffic volumes of over 100 combined flows are illustrated by the orange / red lines in Diagram 6.41. The road links and associated flow difference between the Do Minimum and Do Something scenarios during the PM Peak Hour are outlined in Table 6.65.

Table 6.65: Road Links that Experience an Increase of ≥ 100 Combined Flows during PM Peak Hour (Direct Study Area)

Location	Map ID	Road Name	Do Minimum Flow (pcu)	Do Something Flow (pcu)	Flow Difference (pcu)
Section 1 - R137 Templeogue Road to R114 Rathfarnham Road	P.7	Spawell Link Road	844	975	+131
		Templeogue Road	924	1,025	+100
Section 2 - R821 Nutgrove Avenue to R137 Terenure Road North	P.2	Rathdown Park	189	305	+116
	P.7	Dodderview Road	1,051	1,171	+120
		Rathdown Park	116	240	+124
Section 3 - R137 Terenure Road North to Charleville Road	P.2	Grosvenor Road	354	563	+209
		Kenilworth Park	719	893	+174
		Kenilworth Square North	330	498	+167

Location	Map ID	Road Name	Do Minimum Flow (pcu)	Do Something Flow (pcu)	Flow Difference (pcu)
		Leinster Road	207	369	+162
Section 4 - Charleville Road to R137 Dame Street	P.4	Longford Street Little	262	426	+164
		Stephen Street Upper	222	333	+111

Capacity analysis of Direct Study Area junctions is available in Appendix A6.3 (Junction Design Report) in Volume 4 of this EIAR.

Impact on Indirect Study Area (PM Peak Hour)

Reductions in General Traffic Flows: In addition to the general traffic flow reductions occurring along the direct study area, there are key reductions in general traffic noted along certain road links within the indirect study area during the PM Peak Hour. The key reductions in traffic flows along the indirect study area during the PM Peak Hour are outlined in Table 6.66.

Table 6.66: Road Links that Experience a Reduction of ≥ 100 Combined Flows during PM Peak Hour (Indirect Study Area)

Location	Map ID	Road Name	Do Minimum Flow (pcu)	Do Something Flow (pcu)	Flow Difference (pcu)
Eastern Side of Proposed Scheme	S.1	Firhouse Road	988	872	-116
		Old Bridge Road	1,249	1,096	-153
		Springfield Avenue	1,331	987	-344
	S.2	Ballyboden Road	839	715	-124
		Butterfield Avenue	934	643	-290
		Churchtown Road Upper	1,222	1,098	-124
		Fairways	1,030	857	-173
		Grange Road	734	557	-177
		Nutgrove Avenue	754	612	-141
		Nutgrove Way	689	554	-135
		Whitechurch Road	613	512	-100
	S.3	Orwell Road	1,190	1,072	-118
	S.4	Canal Road	1,144	645	-499
		Chelmsford Road	648	404	-243
		Mount Pleasant Avenue Upper	299	189	-110
		Mountpleasant Place	315	49	-266
		Oxford Road	303	38	-266
		Ranelagh	1,301	1,009	-291
		Rathmines Road Upper	514	323	-190
	Sandford Road	1,336	1,071	-265	
	S.5	Dame Street	574	440	-134
		Grand Parade	961	693	-268
		Harcourt Street	594	477	-116

Location	Map ID	Road Name	Do Minimum Flow (pcu)	Do Something Flow (pcu)	Flow Difference (pcu)
Western Side of Proposed Scheme	S.1	Mespil Road	943	838	-105
		Cypress Grove Road	995	822	-173
		M50 Ramps	696	588	-108
		Tallaght Bypass	2,139	2,032	-108
		Tallaght Interchange	345	200	-145
		Tallaght Road	823	720	-103
		Templeville Road	1,036	908	-128
		Wainsfort Road	1,044	934	-109
		Wellington Lane	1,617	1,494	-123
	S.3	Sundrive Road	1,232	1,129	-104
		Terenure Road West	668	557	-111
	S.4	Grove Road	931	636	-295
		Parnell Road	1,011	734	-277

The LAM indicates that during the PM Peak hour in the 2028 Opening Year, there is a reduction in general traffic travelling along the Proposed Scheme, as illustrated by the blue links in Diagram 6.41.

The traffic flow reduction varies between -100 and -499 combined flows, with the largest reduction occurring on the Canal Road. This reduction in general traffic flow has an average of -193 two-way flows, which has been determined as an overall **Positive, Slight and Long-term effect** on the indirect study area.

Increases in General Traffic Flows: The road links which experience additional traffic volumes of over 100 combined flows are illustrated by the red lines in Diagram 6.41.

The road links and associated flow difference between the Do Minimum and Do Something scenarios during the PM Peak Hour are outlined in Table 6.67.

Table 6.67: Road Links Where Link Threshold of 100 Combined Flows is Exceeded (PM Peak Hour) (Indirect Study Area)

Location	Map ID	Road Name	Do Minimum Flow (pcu)	Do Something Flow (pcu)	Flow Difference (pcu)
Eastern Side of Proposed Scheme	P.3	Adelaide Road	753	858	+105
		Charlemont Street	835	955	+120
	P.4	Mercer Street Lower	463	576	+113
		Noel Purcell Walk	290	471	+182
	P.5	Anglesea Road	1,346	1,491	+146
		Belgrave Square North	614	894	+280
		Castlewood Avenue	614	836	+222
		Castlewood Park	23	144	+122
		Charleston Road	694	1,058	+365
		Church Avenue	185	290	+105

Location	Map ID	Road Name	Do Minimum Flow (pcu)	Do Something Flow (pcu)	Flow Difference (pcu)
		Cullenswood Road	756	1,114	+358
		Leeson Street Upper	700	931	+232
		Milltown Road	868	1,037	+169
		Ranelagh	837	1,318	+480
		Ranelagh Road	1,227	1,442	+216
	P.6	Dartry Road	901	1,237	+337
		Dundrum Road	435	540	+105
		Lower Dodder Road	381	499	+118
		Milltown Road	1,188	1,448	+260
		Orwell Park	372	575	+204
		Orwell Road	1,326	1,457	+131
		Palmerston Park	802	1,040	+238
		Rathmines Road Upper	621	735	+113
	P.7	Butterfield Avenue	826	952	+126
		Butterfield Park	215	456	+241
		Dodderview Road	1,047	1,166	+119
		Spawell Link Road	885	1,016	+132
		Whitechurch Road	333	441	+108
	P.8	Broadford Road	712	899	+188
		Grange Road	884	1,086	+203
		Stonemason's Way	557	779	+223
		Taylor's Lane	617	768	+150
	P.9	M50	4,281	4,567	+286
		M50 On-Ramp	583	710	+127
Scholarstown Road		776	896	+120	
St Colmcille's Way		1,478	1,614	+136	

As outlined in Table 6.67, the additional traffic on the key road links varies between 105 and 480 combined flows during the PM Peak Hour. These road links have been identified as experiencing additional traffic volumes over the threshold and require further assessment (detailed further below).

6.4.6.1.15.5 National Roads – 5% Threshold Impact Assessment

The assessment methodology specifically for national roads stipulates that traffic exceeding 5% of the combined turning flows at junctions on or with National Roads as a result of traffic redistribution associated with the Proposed Scheme requires further assessment.

In the context of the indirect study area for the Proposed Scheme, this assessment comprises consideration of the M50 and N81 national roads. All junctions along the M50 within the indirect study area have been assessed further in terms of junction capacity in the AM and PM Peak Hours as redistributed traffic flows exceeded the threshold for 100 combined flow of additional traffic (as outlined above for the AM and PM Peak Hours).

In terms of the N81, the results of redistributed traffic assessment demonstrate that a reduction of 67 and 150 combined flows will occur along this road link in the AM and PM Peak Hours respectively. Therefore, the additional 5% threshold impact assessment has not been required for the National Roads as part of this assessment.

6.4.6.1.15.6 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, with spare capacity, with traffic not experiencing queuing or delays throughout the hour. A value of 85% to 100% indicates that the junction is approaching its theoretical capacity with traffic possibly experiencing occasional queues and delays within the hour. A value of over 100% indicates that a junction is operating above its theoretical capacity and traffic experiences queues and delays regularly within the hour. The junctions have been described in the ranges outlined in Table 6.68

Table 6.68: 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 6.69 have been used to describe the impact.

Table 6.69: 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 6.69, 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 18 to Table 21 of Appendix A6.4.4 (General Traffic Assessment) in Volume 4 of this EIAR.

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

Table 6.70 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 6.70: Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), AM Peak, 2028 Opening Year

Road Name	Junction Name	Junction Sensitivity	DM Max V/C Ratio			DS Max V/C Ratio			Magnitude of Impact	Significance of Effects
			<85%	85% - 100%	>100%	<85%	85% - 100%	>100%		
Ranelagh Road	Ranelagh Road / Beechwood Avenue Lower	Low	✓				✓		Low	Negative Slight
Ranelagh	Mountpleasant Place / Ranelagh / Ranelagh Road	Low	✓				✓		Low	Negative Slight
Orwell Road	Lower Dodder Road / Orwell Road	Low	✓				✓		Low	Negative Slight
Orwell Park	Orwell Park / Orwell Road	Medium	✓				✓		Low	Negative Moderate
Milltown Road	Churchtown Road Lower / Milltown Road	Low			✓			✓	Negligible	Not Significant
M50	M50 Jct 09	Negligible			✓			✓	Negligible	Imperceptible
Katharine Tynan Road	Katharine Tynan Road / Sylvan Drive	Low			✓			✓	Negligible	Not Significant
Cromwellsfort Road	St Agnes Road / Cromwellsfort Road / Kimmage Road West / Whitehall Road West	Low			✓			✓	Negligible	Not Significant
Cromwellsfort Road	Walkinstown Rbt	Low		✓				✓	Medium	Negative Moderate
Ballymount Road Lower	Ballymount Avenue / Ballymount Road Lower	Medium			✓			✓	Negligible	Not Significant

The results of the junction analysis illustrated in Table 6.70 demonstrate that of the total of 133 junctions assessed, 108 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 19 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 or Imperceptible and Long-term effect** at 128 junctions within the indirect study area. Three of the 133 junctions assessed are shown to have a significance of effect of **Negative, Slight and Long-term**, and two are shown to have **Negative, Moderate and Long-term** effect.

Capacity issues are noted at the following six junctions:

- **Churchtown Road Lower / Milltown Road** – operates above 100% during both the Do Minimum and Do Something scenarios;
- **M50 Jct 09** – The Turnpike Road arm operates above 100% during both the Do Minimum and Do Something scenarios;
- **Katherine Tynan Road / Sylvan Drive** – operates above 100% during both the Do Minimum and Do Something scenarios;
- **St Agnes Road / Cromwellsfort Road / Kimmage Road West / Whitehall Road West** – operates above 100% during both the Do Minimum and Do Something scenarios;
- **Walkinstown Rbt (Cromwellsfort Road approach)** – operates between 85% – 100% during the Do Minimum and above 100% during the Do Something scenario; and
- **Ballymount Avenue / Ballymount Road Lower** – operates above 100% during both the Do Minimum and Do Something scenarios.

Five out of six of the junctions listed operate with a V / C ratio of above 100% in the Do Minimum scenario, therefore, the impact of Proposed Scheme is low or negligible and no further analysis or mitigation is required. At the remaining junction (Cromwellsfort Road approach to the Walkinstown Roundabout), the significance of effect is deemed to be **Moderate** when combining the road sensitivity and magnitude of impact, therefore, it is considered that no mitigation is required. Closer inspection of the V / C ratio at this junction shows that the Do Minimum ratio is 99% increasing to 104% in the Do Something, which is a limited change in capacity as a result of the Proposed Scheme. The sensitivity of these road links is deemed to be 'low', therefore, the significance of effect is **Negative, Moderate and Long-term**.

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

Table 6.72 outlines the V / C ratios at the key local / regional road junctions in the PM Peak Hour for the 2028 Opening Year at junctions where the 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 6.71: Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), PM Peak, 2028 Opening Year

Road Name	Junction Name	Junction Sensitivity	DM Max V/C Ratio			DS Max V/C Ratio			Magnitude of Impact	Significance of Effects
			<85%	85% - 100%	>100%	<85%	85% - 100%	>100%		
Anglesea Road	Ailesbury Rd / Anglesea Rd Jct	Negligible			✓			✓	Negligible	Imperceptible
Clanbrassil Street Lower	Clanbrassil Street Lower / South Circular Road	Low			✓			✓	Negligible	Not Significant
Donore Avenue	Donore Avenue / South Circular Road	Medium	✓				✓		Low	Negative Moderate
Grange Road	Grange Road / Stonemason's Way	Low	✓				✓		Low	Negative Slight
Greenhills Road	Greenhills Road / Castletymon Road	Medium			✓			✓	Negligible	Not Significant
M50	M50 Jct 12 (SB Off-slip)	Negligible			✓			✓	Negligible	Imperceptible
Milltown Road	Churchtown Road Lower / Milltown Road	Low			✓			✓	Negligible	Not Significant
Palmerston Park	Palmerston Park / Sunbury Gardens	Low	✓				✓		Low	Negative Slight
Ranelagh	Chelmsford Road / Ranelagh	Low	✓				✓		Low	Negative Slight
Ranelagh	Cullenswood Road / Ranelagh	Low	✓				✓		Low	Negative Slight
Ranelagh Road	Ranelagh Road / Beechwood Avenue Lower	Low	✓				✓		Low	Negative Slight
Scholarstown Road	Scholarstown Rd Rbt	Low			✓			✓	Negligible	Not Significant

The results of the junction analysis illustrate that, of a total of 112 junctions assessed, 89 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 17 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, as a result of redistributed general traffic associated with the Proposed Scheme, the effect at 106 out of 112 junctions assessed is predicted to be **Not Significant and Long-term** and **Imperceptible and Long-term** within the Indirect Study Area. Five of the 112 junctions assessed are shown to have a significance of effect of **Negative, Slight and Long-term**, and one is shown to have a **Negative, Moderate and Long-term** effect in the 2028 Opening Year PM Peak Hour.

Capacity issues arise at the following six junctions:

- **Ailesbury Rd / Anglesea Rd Jct** – operates above 100% during both the Do Minimum and Do Something scenarios;
- **Clanbrassil Street Lower / South Circular Road** – operates above 100% during both the Do Minimum and Do Something scenarios;
- **Greenhills Road / Castletymon Road** – operates above 100% during both the Do Minimum and Do Something scenarios;
- **M50 Jct 12 (SB Off-slip)** – operates above 100% during both the Do Minimum and Do Something scenarios;
- **Churchtown Road Lower / Milltown Road** – operates above 100% during both the Do Minimum and Do Something scenarios; and
- **Scholarstown Rd Rbt** – operates above 100% during both the Do Minimum and Do Something scenarios.

The results demonstrate that all these junctions operate with a V / C ratio of above 100% in the Do Minimum scenario, therefore, the impact of Proposed Scheme is low or negligible and no further analysis or mitigation is required.

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

Table 6.72 outlines 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 6.72: Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), AM Peak, 2043 Design Year

Road Name	Junction Name	Junction Sensitivity	DM Max V/C Ratio			DS Max V/C Ratio			Magnitude of Impact	Significance of Effects
			<85%	85% - 100%	>100%	<85%	85% - 100%	>100%		
Ballymount Road Lower	Ballymount Avenue / Ballymount Road Lower	Medium			✓			✓	Negligible	Not Significant
Cromwellsfort Road	St Agnes Road / Cromwellsfort Road / Kimmage Road West / Whitehall Road West	Low		✓				✓	Medium	Negative Moderate
Katharine Tynan Road	Katharine Tynan Road / Sylvan Drive	Low			✓			✓	Negligible	Not Significant
M50	M50 Jct 09	Negligible			✓			✓	Negligible	Imperceptible
Milltown Road	Churchtown Road Lower / Milltown Road	Low	✓				✓		Low	Negative Slight
Walkinstown Avenue	Walkinstown Avenue / Long Mile Road	Negligible			✓			✓	Negligible	Imperceptible

The results of the junction analysis illustrated in Table 6.72 demonstrate that of the total of 135 junctions assessed, 122 junctions are operating with a maximum V / C ratio of below 85% in the Do Something scenarios in the AM Peak Hour in the 2043 Design Year. A further eight 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 Positive or **Not Significant or Imperceptible and Long-term effect** at 132 junctions within the indirect study area. One of the 135 junctions assessed are shown to have a significance of effect of **Negative, Slight and Long-term**, and one are shown to have **Negative, Moderate and Long-term** effect.

Capacity issues arise at five junctions; however, the results demonstrate that all but one of these junctions operate with V / C ratios of above 100% in the Do Minimum scenario, therefore, the impact of Proposed Scheme is low or negligible and no further analysis or mitigation is required. At the remaining junction (Cromwellsfort Road - St Agnes Road / Cromwellsfort Road / Kimmage Road West / Whitehall Road West) the significance of effect is deemed to be **Moderate** when combining the road sensitivity and magnitude of impact, therefore, it is considered that no mitigation is required. Closer inspection of the V / C ratio at this junction shows that the Do Minimum ratio is 95% increasing to 101% in the Do Something, which is a limited change in capacity as a result of the Proposed Scheme. The sensitivity of these road links is deemed to be 'low', therefore, the significance of effect is **Negative, Moderate and Long-term**.

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

Table 6.73 outlines the V / C ratios at the key local / regional road junctions in the PM Peak Hour for the 2043 Design Year at junctions where the 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 Volme 3 of this EIAR.

Table 6.73: Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), PM Peak, 2043 Design Year

Road Name	Junction Name	Junction Sensitivity	DM Max V/C Ratio			DS Max V/C Ratio			Magnitude of Impact	Significance of Effects
			<85%	85% - 100%	>100%	<85%	85% - 100%	>100%		
Anglesea Road	Ailesbury Rd / Anglesea Rd Jct	Negligible			✓			✓	Negligible	Imperceptible
Ballymount Road Upper	Ballymount Avenue / Ballymount Road Lower	Medium	✓				✓		Low	Negative Moderate
Greenhills Road	Greenhills Road / Castletymon Road	Medium			✓			✓	Negligible	Not Significant
Larkfield Avenue	Larkfield Avenue / Sundrive Road	Low	✓				✓		Low	Negative Slight
M50	M50 Jct 12 (SB Off-slip)	Negligible			✓			✓	Negligible	Imperceptible
Ranelagh	Cullenswood Road / Ranelagh	Low	✓				✓		Low	Negative Slight
Calmount Road	Calmount Rd Rbt	Medium			✓			✓	Negligible	Not Significant
Scholarstown Road	Scholarstown Rd Rbt	Low			✓			✓	Negligible	Not Significant

The results of the junction analysis illustrated in Table 6.73 demonstrate that, of a total of 112 junctions assessed, 97 junctions are operating with a maximum V / C ratio of below 85% in the Do Something scenarios in the PM Peak Hour in the 2043 Design Year. A further nine 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, as a result of redistributed general traffic associated with the Proposed Scheme, the effect at 108 out of 112 junctions assessed is predicted to be **Not Significant or Imperceptible and Long-term** within the Indirect Study Area. Two of the 112 junctions assessed are shown to have a significance of effect of **Negative, Slight and Long-term** in the 2043 Design Year PM Peak Hour.

In the 2043 PM Peak Hour, capacity issues arise at five junctions, all of these junctions operate with a maximum V / C ratio of above 100% in both the Do Minimum and Do Something scenarios and the significance of effect is considered to be Imperceptible or Not Significant.

6.4.6.1.15.7 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 movement¹.

¹ Less pedestrian, cycling and bus demand requirements leading to higher level of general traffic green time allocation per typical signal cycle

Automatic Traffic Counter data demonstrates that, typically, within Dublin the night-time period has approximately 19% of the traffic levels compared to the morning peak hour (08:00-09:00). As a result, during the night-time period junctions do not experience flows in excess of capacity which would result in queuing and in turn potential re-distribution of traffic to alternative routes to avoid congestion. Therefore, the effects of traffic redistribution due to any of the Proposed Schemes will be **Negligible and Long-term** during the night-time period.

6.4.6.1.15.8 General Traffic Impact Assessment Summary

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 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 further 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;
- **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 threshold impact assessment identified a range of increases in traffic levels (exceeding 100 combined flows) within the study area from 100 to 400 combined flows during the AM Peak Hour, and from 105 to 480 combined flows during the PM Peak Hour.

This assessment comprises consideration of the M50 and N81 national roads within the indirect study area. All junctions along the M50 within the indirect study area have been assessed further in terms of junction capacity in the AM and PM Peak Hours as redistributed traffic flows exceeded the threshold for 100 combined flow of additional traffic (as outlined above for the AM and PM Peak Hours). The results of redistributed traffic assessment demonstrate that a reduction of 67 and 150 combined flows will occur along the N81 in the AM and PM Peak Hours respectively. Therefore, the additional 5% threshold impact assessment has not been required for the national roads as part of this assessment.

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 outputs for the worst-performing arm at each junction have been assessed. Potential mitigation measures have been 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 assessed junctions 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 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 in the AM and PM Peak Hours and typically, these junctions operate with a V / C ratio of above 100% in both the Do Minimum and Do Something scenarios, therefore, the impact is negligible to low.

Overall Summary: Overall, it has been determined that the potential impact of the reduction in general traffic flows along the Proposed Scheme will be **Positive, Moderate and Long-term** whilst the potential impact of the redistributed general traffic along the surrounding road network will be **Negative, Slight and Long-term**.

It should be noted that effects will be short-lived and localised. Section 5.4.2 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.

Given that the redistributed traffic is not predicted to lead to a significant deterioration of the operational capacity on the surrounding road network, no further mitigation measures have been considered to alleviate the impact outside of the direct study area.

6.4.6.2 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 (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. A Level of Service (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 C/ 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, with the exception of two Cs. Overall, the improvements to the quality of the pedestrian infrastructure will have a **Positive, Significant and Long-term effect** in all four sections of the Proposed Scheme.

- **Cycling Infrastructure:** The Proposed Scheme also consists of measures to enhance the existing cycling infrastructure along the direct study area. A LoS assessment was undertaken using an adapted version of the NTA's National Cycle Manual Quality of Service (QoS) Evaluation criteria. The 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 / B ratings, with the exception of one C (along the proposed quiet cycle route section between Bushy Park Road to Orwell Road). Given the quality of the existing cycling infrastructure along the Proposed Scheme, the improvements will have a **Positive, Significant and Long-term effect** in Section 3 of the Proposed Scheme and a **Positive, Moderate and Long-term effect** in Section 1, Section 2 and Section 4 of the Proposed Scheme.
- **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 Section 1, a **Positive, Significant and Long-term effect** in Section 2 and Section 3 and a **Positive, Moderate and Long-term effect** in Section 4 of the Proposed Scheme.
- **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 54 parking spaces and five loading bay spaces within the redline boundary of the Proposed Scheme (-7 spaces in Section 2, -32 (including 5 loading bay spaces) in Section 3 and -20 spaces in Section 4). Given the nature of the loss in parking and the availability of alternative spaces in the indirect study area, the impact is expected to have a **Negligible and Long-term effect** in Section 2 and Section 3 and a **Negative, Slight and Long-term effect** in Section 4 of the Proposed Scheme.
- **People Movement:** Given the proposed amendments to the pedestrian, cycling, bus and parking / loading infrastructure outlined above, the Proposed Scheme will have greater capacity to facilitate the sustainable 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 of 74% and 71% in the number of people travelling along the Proposed Scheme during the 2028 AM and PM Peak Hours respectively. During the 2043 scenario there will be an increase of 48% and 55% in the number of people travelling along the Proposed Scheme during the AM and PM Peak Hours respectively. These increases are all due to the increased sustainable modes people movement facilitated by the Proposed Scheme.

The analysis also shows that there will be an increase in 14.7% and 16.9% of passengers boarding buses during the 2028 AM and PM Peak hours respectively. During the 2043 scenario there will be an increase in 10.5% and 11.5% of passengers boarding buses 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 model assessment has been developed and network performance indicators established for bus operations along Proposed Scheme. The results of the assessment demonstrate that the total bus journey times on all modelled bus services will improve by between 8% and 12% during the AM and PM Peak hours of the 2028 Opening Year and 2043 Design Year. Based on the AM and PM peak hours alone, 7.4 hours of savings in 2028 and 6.2 hours in 2043, when compared to the Do Minimum combined across all buses. Overall it is anticipated that the improvements to the network performance indicators 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 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 loss 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 resulting in a **Not Significant and Long-term effect**. 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 along 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 6.74 present a summary of the potential impacts of the Proposed Scheme during the Operational Phase.

Table 6.74: Summary of Predicted Operational Phase Impacts

Assessment Topic	Effect	Potential Impact
Pedestrian Infrastructure	Improvements to the quality of the pedestrian infrastructure along the Proposed Scheme.	Positive, Significant and Long-term
Cycling Infrastructure	Improvements to the quality of the cycling infrastructure along the Proposed Scheme.	Positive Moderate to 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 54 parking spaces and 5 loading bay spaces along the Proposed Scheme.	Negligible to 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
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As outlined within Section 6.4 and summarised in Table 6.74 above, the Proposed Scheme will deliver strong positive impacts to the quality of pedestrian, cycling and bus infrastructure during the Operational Phase providing for enhanced levels of People Movement in line with the scheme objectives. These improvements will help to provide an attractive alternative to the private car and promote a modal shift to walking, cycling and public transport, allowing for greater capacity along the corridor to facilitate the sustainable movement of people as population and employment levels grow in the future.

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

In the absence of the Proposed Scheme bus services will be operating in a more congested environment, leading to higher journey times for and lower reliability for bus journeys. This limits their attractiveness to users which will lead to reduced levels of public transport use, making the bus system less resilient to higher levels of growth and leading to increased levels of car use and congestion. The absence of walking and cycling measures that the Proposed Scheme provides will also significantly limit the potential to grow those modes into the future.

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

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 implemented (and developed further as required) 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 and include in the CEMP a Construction Stage Mobility Management Plan (CSMMP) which will be developed prior to construction, as described in the CEMP, to actively encourage its 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 movements, mitigation and monitoring measures have not been considered for these assessments.

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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