



Chapter 06
Traffic
& Transport

Contents

6.	Traffic & Transport	1
6.1	Introduction	1
6.1.1	Aim and Objectives of the Proposed Scheme.....	2
6.1.2	Iterative Design Process and Mitigation by Design.....	4
6.2	Methodology	5
6.2.1	Study Area	5
6.2.2	Relevant Guidelines, Policy and Legislations.....	6
6.2.3	Proposed Scheme Impact Assessment Modelling Tools	8
6.2.4	Appraisal Method for the Assessment of Impacts	9
6.2.5	Data Collection and Collation	13
6.3	Baseline Environment.....	16
6.3.1	Overview.....	16
6.3.2	Section 1 – Mayne River Avenue to Gracefield Road – Malahide Road	16
6.3.3	Section 2 – Gracefield Road to Marino Mart / Fairview – Malahide Road	28
6.4	Potential Impacts	43
6.4.1	Characteristics of the Proposed Scheme	43
6.4.2	‘Do Nothing’ Scenario.....	43
6.4.3	‘Do Minimum’ Scenario.....	43
6.4.4	‘Do Something’ Scenario	45
6.4.5	Construction Phase	45
6.4.6	Operational Phase.....	52
6.5	Mitigation and Monitoring Measures	120
6.5.1	Construction Phase	120
6.5.2	Operational Phase.....	120
6.6	Residual Impacts	120
6.7	References	121

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 Clongriffin 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 transport 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 5.7km, and is routed along the R107 Malahide Road from Mayne River Avenue – R107 Malahide Road Junction to the junction with Marino Mart - Fairview and also routed for cyclists via the junction with Malahide Road - Brian Road along Carleton Road, St Aidan's Park, Haverty Road and Marglann Marino, all in the County of Dublin and within the Dublin City Council (DCC) administrative area. From here the scheme ties into a separate project, Clontarf to City Centre Cycle & Bus Priority Project, currently being developed by DCC. The Clontarf to City Centre Cycle & Bus Priority Project will provide segregated cycling facilities and bus priority infrastructure along a 2.7km route that extends from Clontarf Road at the junction with Alfie Byrne Road, to Amiens Street at the junction with Talbot Street in the City Centre. The start of the scheme ties into a separate project being developed by DCC namely, The Belmayne Main Street and Belmayne Avenue Scheme, which provides bus and cycle linkages to Clongriffin Dart Station.

The Proposed Scheme includes an upgrade of the existing bus priority and cycle facilities associated with the Malahide Road Quality Bus Corridor (QBC), which has been in place since 1999. The Proposed Scheme includes a substantial increase in the level of bus priority provided along the Malahide QBC, including the provision of additional lengths of bus lane, particularly in the outbound direction.

Throughout the Proposed Scheme 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. Where space for a segregated cycle track is not available on the main corridor an alternative cycle route via quiet roads is proposed. Throughout the Proposed Scheme pedestrian facilities will be upgraded, additional signalised crossings provided and the provision of side road ramps.

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	5.7km	
Bus Priority	Existing (km)	Proposed Scheme (km)
Bus Lanes		
Inbound	4.5	5.1
Outbound	3.9	5.0
Bus Priority through Traffic Management		
Inbound	0	0.6
Outbound	0	0.7
Total Bus Priority (both directions)	8.4	11.4 (+36%)
Bus Measures		
Proportion of Route with Bus Priority Measures	74%	100%
Cycle Facilities – Segregated		

Total Length of Proposed Scheme	5.7km	
Bus Priority	Existing (km)	Proposed Scheme (km)
Inbound	0.2	4.7
Outbound	0.2	5.3
Cyclist Facilities – Non-segregated		
Inbound	3.5	1.2
Outbound	4.2	0.7
Total Cyclist Facilities (both directions)	8.1	11.9 (+47%)
Proportion Segregated (including Quiet Street Treatment)	5%	100%
Other Features		
Number of Traffic Signal Controlled Junctions	11	14
Number of Signal Crossings	36	52

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
BCIDA-ACM-GEO_GA-0001_XX_00-DR-CR-9001	General Arrangement
BCIDA-ACM-GEO_CS-0001_XX_00-DR-CR-9001	Typical Cross Sections
BCIDA-ACM-TSM_GA-0001_XX_00-DR-CR-9001	Traffic Signs and Road Markings
BCIDA-ACM-TSM_SJ-0001_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 CBC Infrastructure Works, applicable to the Traffic and Transport assessment of the Proposed Scheme, are to:

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

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

6.1.1.1 People Movement

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

A typical double-deck bus takes up the same road space as three standard cars but typically carries 50-100 times the number of passengers. On average, a typical double-deck bus carries approximately 60-70 passengers making the bus typically 20 times more efficient in providing people movement capacity within the equivalent spatial area of three cars. These efficiency gains can provide a significant reduction in road network congestion where the equivalent car capacity would require 50 or more vehicles based on average occupancy levels. Consequently, by prioritising the movement of 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 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 displaced traffic was kept to a minimum and was maintained on higher capacity roads, whilst continuing to meet scheme objectives along the Proposed Scheme.

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

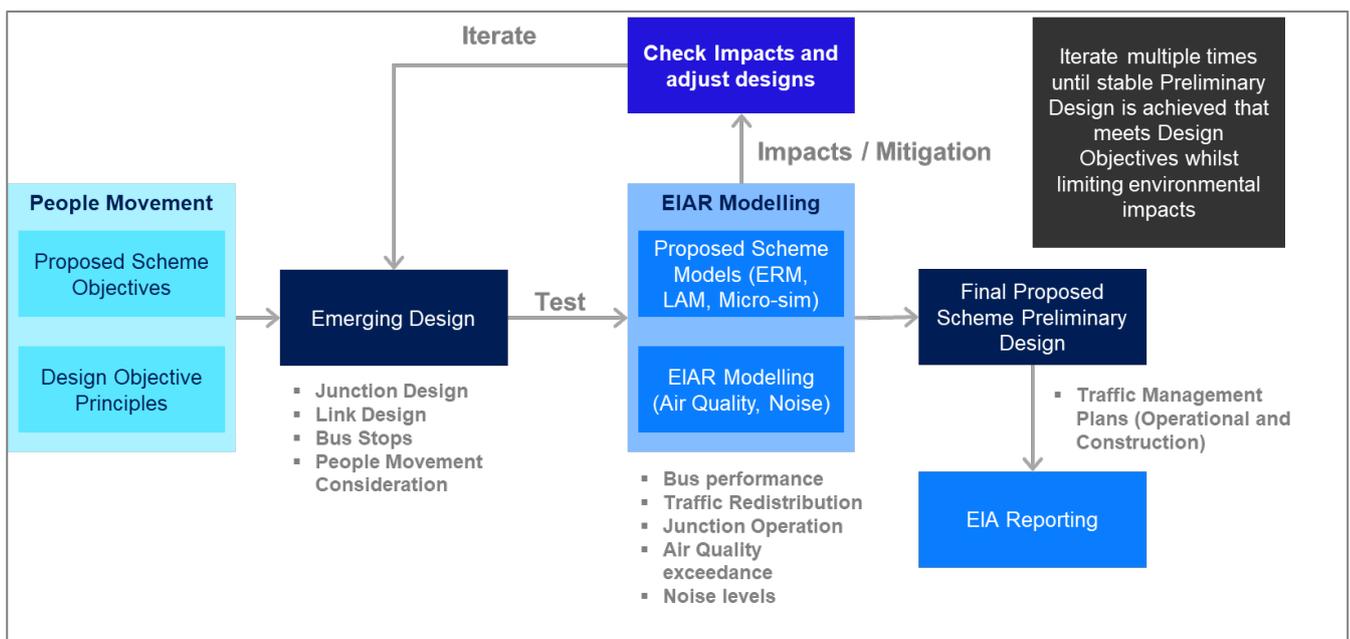


Diagram 6.1 Proposed Scheme Impact Assessment and Design Interaction

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

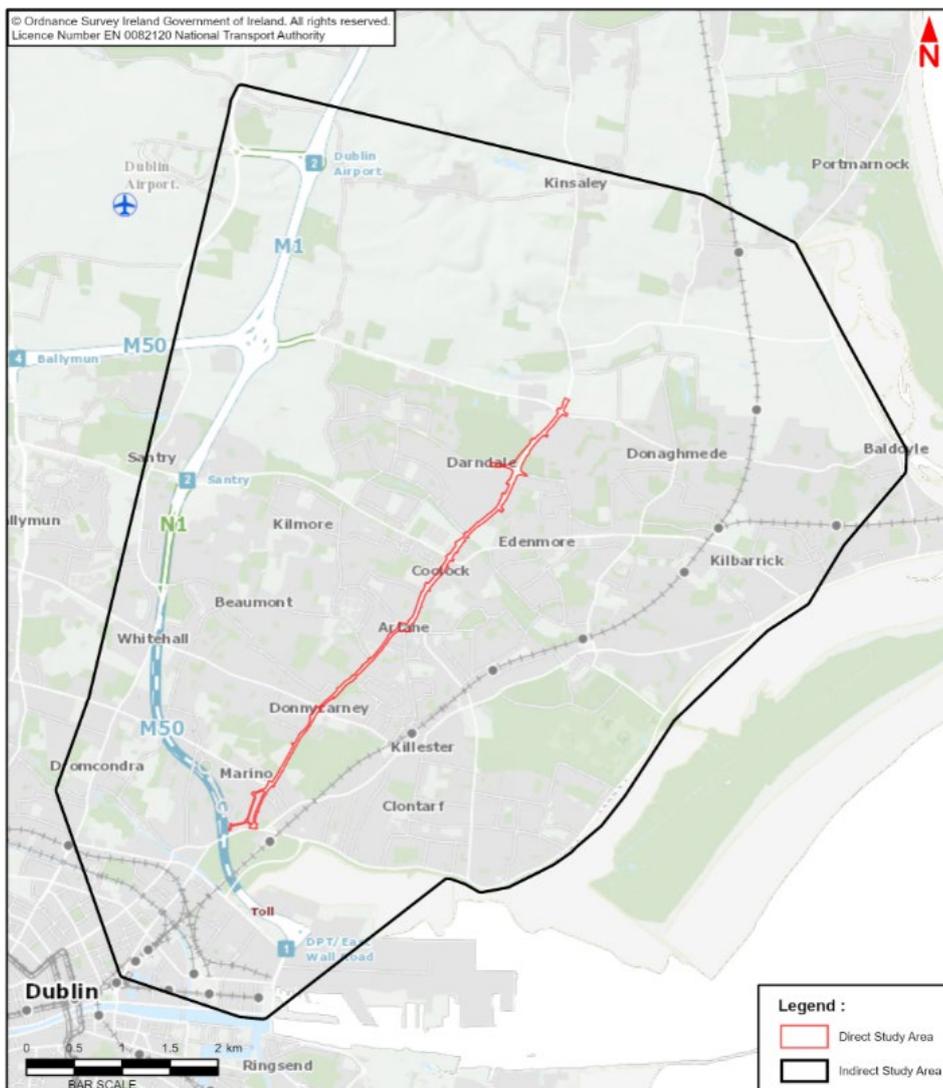


Diagram 6.2: Proposed Scheme Direct & Indirect Study Area

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.

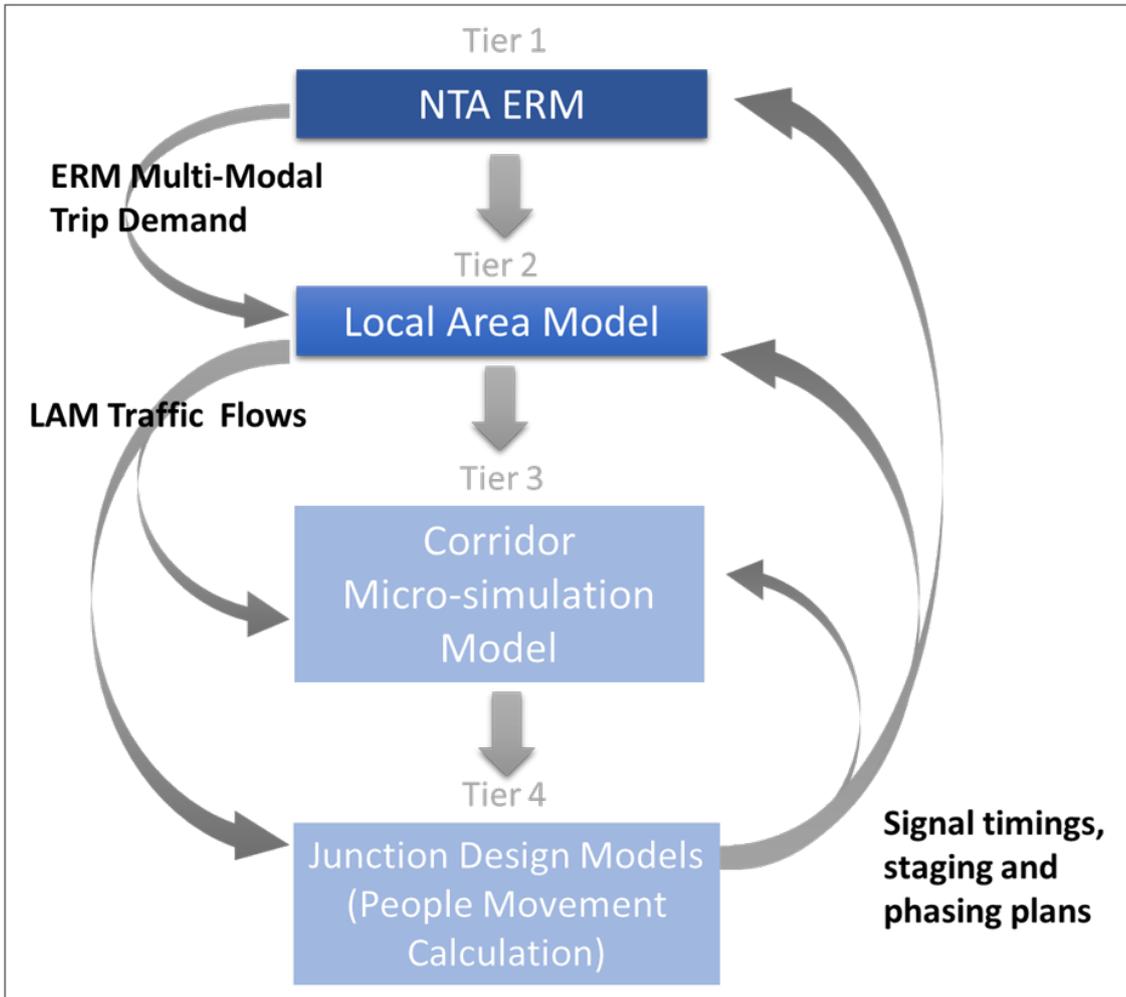


Diagram 6.3: Proposed Scheme Modelling Hierarchy

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 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 2017) and methodologies outlined in the 'Traffic and Transport Assessment Guidelines (TII 2014), using a Multi-Modal Level of Service (LoS) approach.

6.2.4.2 Outlining the Assessment Topics

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

- The qualitative assessments:
 - **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 on general traffic using 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 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.

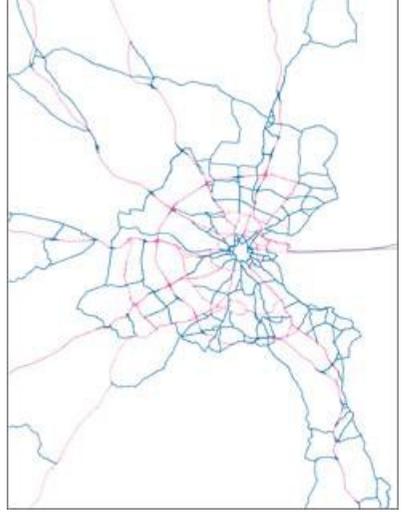
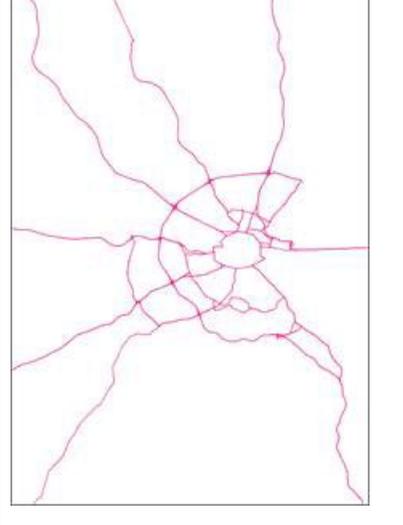
6.2.4.4 Defining the Sensitivity of the Environment

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 3.5 of the EPA Guidelines on EIARs. This enables the sensitivities and magnitudes of impact to determine the significance of a particular impact. For example, a section of a Proposed Scheme with a high sensitivity and a long-term medium positive impact would have a predicted 'Positive, Very Significant and Permanent' impact. A section of a Proposed Scheme with a low sensitivity and a short-term low negative impact would have a predicted 'Negative, Slight and Temporary' impact.

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

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

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

Table 6.5: EIAR Impact Significances

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

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

6.2.5 Data Collection and Collation

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

6.2.5.1 Qualitative Assessment Data Collection

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

6.2.5.1.1 Site Surveys

A walkover of the route of the Proposed Scheme was undertaken and photographs were used to record locations of particular importance. This ensures an up to date record of the existing environment was used to complete the qualitative assessment. The surveys focussed on the following aspects which are relevant to the assessment:

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

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

6.2.5.1.2 Mapping Data

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

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

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

- **Road Network:** Functional Class of each road link in the road network, which is a road type indicator, reflecting traffic speed and volume, as well as the importance and connectivity of the road. The Functional Class information has been used to help inform the metrics for identifying the sensitivities of roads in the indirect study area.
- **Points of Interest:** NavStreets contains information on a wide range of “points of Interest”. This has been referred to when identifying sensitive community receptors, such as schools, healthcare facilities, places of worship, retail clusters, etc, when determining how sensitive a particular location is to changes in terms of traffic and transport facilities.

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

6.2.5.2 Quantitative Assessment Data Collection

This section discusses the data collection undertaken to inform the quantitative assessment metrics set out in Section 6.2.4. Further detail can be found in Appendix A6.2 (Transport Modelling Report) 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 77% cycle priority outbound (4% cycle track, 73% advisory cycle lane), with 65% inbound (4% cycle track, 61% advisory cycle lane).

Bus services along the Proposed Scheme currently operate within a constrained and congested environment, with 68% priority outbound and 79% 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 9 minutes (14mins to the City Centre). With any further increases in traffic levels, these issues are expected to be exacerbated. While impacting upon bus passengers, longer and less reliable bus services also require operators to use additional buses to maintain headways to fill gaps created in the timetable. Aligned to this, the remaining sections of unprioritised bus network can lead to bunching of buses which, in turn, means stops can become overcrowded, creating delays in boarding and alighting and the imbalanced use of bus capacity.

In describing the baseline conditions, the scheme has been divided into two no. sections. The two sections are outlined as follows and are illustrated in Figure 6.1, Figure 6.2a and Figure 6.2b in Volume 3 of this EIAR:

- Section 1 – Mayne River Avenue to Gracefield Road – Malahide Road; and
- Section 2 – Gracefield Road to Marino Mart / Fairview – Malahide Road.

6.3.2 Section 1 – Mayne River Avenue to Gracefield Road – Malahide Road

This Section outlines the baseline environment for walking, cycling, bus services, general traffic and parking / loading facilities along Section 1 of the Proposed Scheme, between Mayne River Avenue and the R808 Gracefield Road.

This section commences at the Mayne River Avenue – R107 Malahide Road Junction. The route then comprises 3km of the R107 Malahide Road, finishing at Artane Roundabout, a four-arm roundabout between the R107 Malahide Road North and South, the R808 Gracefield Road and Ardlea Road.

6.3.2.1 Pedestrian Infrastructure

The R107 Malahide Road between Mayne River Avenue and the junction with the R139 Brookfield Crescent provides a footpath and street lighting along both sides of the road. A wide shared space of approximately 10.0m is provided for approximately 55m between Mayne River Avenue and the Hilton Hotel on the western side of the road. In front of the Hilton Hotel, pedestrians are diverted to a footpath approximately 4.0m wide. On the eastern side, the footpath is alongside a cycle track (delineated by white lining) which are segregated from the road by a grass verge a combined width of approximately 3.0m.

South of the R139 Clarehall Avenue, footpaths and street lighting on both sides of the road are adjacent to the carriageway. Continuing south, the footpaths are typically separated from the road by a grass verge. South of Belcamp Lane, there is no footpath on the western side of the road, and pedestrians are diverted onto Buttercup Park which runs parallel to the R107 Malahide Road. Pedestrians re-join the R107 Malahide Road again after crossing Priorswood Road.

South of the R104 Tonlegee Road, the footpaths are mostly provided adjacent to the carriageway for approximately 300m. The footpath is then diverted onto the roads running parallel to the R107 Malahide Road, namely Brookville Park (northbound) and St Brendan's Avenue (southbound). Uncontrolled pedestrian crossings are provided to reach the footpaths along the two parallel roads. Street lighting is provided throughout.

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

- The four-arm R107 Malahide Road / R139 Northern Cross Route Extension / R139 Clarehall Avenue signalised junction has signalised crossings on all its arms. The crossings are staggered to allow pedestrians to cross in four stages with traffic islands providing pedestrian refuge due to slip lanes at each arm and guard rails are provided;
- The three-arm signalised junction adjacent to Clarehall Shopping Centre has signalised crossings and pedestrian refuge islands with guard rails on all its arms;
- The pelican crossing across the R107 Malahide Road south of Belcamp Lane. Pedestrians cross in two stages using the central reservation between the two carriageways as a refuge island which includes guard rails;
- R107 Malahide Road / Priorswood Road / Blunden Road four-arm roundabout provides a dropped kerb on the northern arm and toucan crossings on the southern and western arms;
- The R107 Malahide Road / Greencastle Road signalised junction provides signalised crossings on the northern, western and eastern arms;
- R107 Malahide Road / R104 Tonlegee Road / R014 Brookville Crescent four-arm signalised junction has signalised crossings on its eastern, western and northern arms. The crossings are staggered and do not have guard rails;
- A pelican crossing south of St Brendan's Avenue. The crossing is staggered using the central reservation for pedestrian refuge and there are guard rails;
- A signalised crossing north of the R107 Malahide Road / Brookville Park junction, to allow crossing of the R107 Malahide Road. The crossing is staggered using the central reservation for pedestrian refuge and there are guard rails; and
- R107 Malahide Road / Ardlea Road / R808 Gracefield Road Roundabout provides toucan crossing on each arm. Each crossing provides pedestrian refuge on the traffic islands (but the crossings are not staggered).

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

Cycle facilities are provided along the length of Section 1 of the Proposed Scheme, comprising predominantly of on-road advisory cycle lanes of approximately 1.5m wide, except for the section of the R107 Malahide Road between Mayne River Avenue and the junction with the R139 Clarehall Avenue, where a cycle track segregated from vehicles is provided on each side of the road. Shared facilities and toucan crossings are provided at all arms of the Artane Roundabout with Gracefield Road.

St Brendan's Avenue runs parallel to the R107 Malahide Road and provides an alternative link between the junction with St Brendan's Park and the R808 Gracefield Road via a quieter, residential route (although there are no formal cycle facilities).

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

- Four curved steel ‘toast rack’ cycle stands (able to accommodate eight bicycles) on the footpath at the junction of R107 Malahide Road and Mayne River Avenue;
- 27 curved steel ‘toast rack’ cycle stands (able to accommodate up to 54 bicycles) outside Clare Hall shopping centre adjacent to the R107 Malahide Road;
- Four Sheffield stands (able to accommodate up to eight bicycles) adjacent to Malahide Road Retail Shopping Centre;
- 20 ‘Lo-hoop’ racks adjacent to the Leisureplex (opposite Greencastle Road);
- 13 Sheffield stands (able to accommodate 26 bicycles) along Main Street; and
- Three Sheffield stands (able to accommodate up to six bicycles) immediately south of Artane Roundabout (adjacent to the R808 Gracefield Road).

There are no designated cycle hire scheme parking racks within 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 provided along Section 1 of the Proposed Scheme at the following locations (aside from intermittent breaks and junctions):

- In both directions between the junction with R139 and the junction with Blunden Drive / Priorswood Road, operating 24 hours a day, Monday to Sunday; and
- In both directions between the junction with Blunden Drive / Priorswood Road and the junction with R808 Gracefield Road / Ardlea Road, operating between 07:00 and 19:00, Monday to Saturday.

6.3.2.3.2 Bus Stop Facilities

There are currently 15 bus stops along Section 1 of the Proposed Scheme. The inbound stops are as follows:

- Stop 4563 on R107 Malahide Road outside Clarehall Shopping Centre;
- Stop 1218 on R107 Malahide Road immediately south of the junction with Belcamp Lane;
- Stop 1270 on R107 Malahide Road south of the R017 Malahide Road / R139 Clarehall Avenue / R139 Northern Cross Route Extension signalised junction;
- Stop 1272 on R107 Malahide Road south of the Newtown Cottages junction;
- Stop 1201 on R107 Malahide Road immediately south of the R107 Malahide Road / Coolock Leisureplex / Greencastle Road signalised junction;
- Stop 1274 on R107 Malahide Road immediately south of the R107 Malahide Road / R104 Tonleegge Road / R104 Brookville Crescent signalised junction;
- Stop 1199 on R017 Malahide Road south of Chanel Road junction; and
- Stop 1276 on R107 Malahide Road to the south of the St Brendan’s Avenue / Mask Avenue junction.

The outbound stops are:

- Stop 1205 on R017 Malahide Road outside Clarehall Shopping Centre;
- Stop 6115 on R017 Malahide Road south of the junction with Belcamp Lane;
- Stop 1203 on R107 Malahide Road between Newtown Road and the R017 Malahide Road / R139 Clarehall Avenue / R139 Northern Cross Route Extension signalised junction;
- Stop 1202 on R107 Malahide Road at the access junction to Crown Paints and Decorating Centre;
- Stop 4385 on R107 Malahide Road adjacent to St Brendan's Church Coolock, opposite St Brendan's Avenue;
- Stop 1200 on R107 Malahide Road north of junction with Main Street; and
- Stop 1275 on R107 Malahide Road opposite the St Brendan's Avenue / Mask Avenue junction.

Out of the 15 bus stops, the following six stops are indented from the carriageway:

- Clare Hall, stop 4563;
- Newton Road, stops 1203 and 1270;
- Newton Cottages, stop 1271;
- St Brendan's Church, stop 4385; and
- Chanel College, stop 1200.

All other stops are situated inline within bus lanes. At one bus stop, only a pole and an accessible kerb are provided, while the remaining stops all provide timetable information, shelters, seating and accessible kerbs as a minimum.

Table 6.6 shows the availability of bus stop facilities at the existing 15 bus stops along the R107 Malahide Road.

Table 6.6: Section 1 – Availability of Bus Stop Facilities (of a Total 15no. Bus Stops)

Bus Stop Facility	Number of Bus Stops in Baseline with Facility	Percentage of Bus Stops in Baseline with Facility
RTPI	3	20%
Timetable information	13	86%
Shelter	14	93%
Seating	14	93%
Accessible Kerbs	15	100%
Indented Drop Off Area	6	40%

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 (Sq.) - Artane Roundabout - Fairview - IFSC - Aungier St. (Bishop St.) - Rathmines - Terenure - Templeogue Bridge - Ballycullen Rd.	10 minutes	15 minutes
27	Clare Hall - Artane Roundabout - Fairview - Eden Quay - Dolphin's Barn Cross - Walkinstown Cross (The Kestrel) - Tallaght (The Square) - Jobstown	10 minutes	10-15 minutes
27x	Clare Hall - Artane Roundabout Donnycarney - Fairview - Connolly Rail Station - UCD Belfield	Twice per day	No service

Service	Route	Typical Service Frequency	
		Weekday	Weekend
42	Talbot St. - Fairview (Footbridge) - Artane Roundabout - Seabury - Malahide - Sand's Hotel (Portmarnock)	30 minutes	30 minutes
43	Talbot St. - Fairview (Footbridge) - Artane Roundabout - Feltrim Rd. - Swords Business Park	15-20 minutes	50 minutes

6.3.2.4 General Traffic

6.3.2.4.1 R107 Malahide Road

The R107 Malahide Road in Section 1 of the Proposed Scheme is a dual carriageway road, with a speed limit of 60km/h, except for a 100m section on the approach to the R107 Malahide Road / Gracefield Road roundabout, where a speed limit of 50km/h is in place. The number of lanes varies as follows:

- Two lanes per direction between Mayne River Avenue and the R139 Clarehall Avenue with a carriageway width of approximately 6.0m;
- Three lanes (two standard and one bus lane) per direction between the R139 Clarehall Avenue and the entrance to the Clarehall Shopping Centre. The width of the carriageway is approximately 9.0m on each side of the central reservation;
- Five lanes northbound (four standard and one bus lane, approximate width 15.0m) and three lanes southbound (two standard, one bus lane, approximate width 10.0m) between the entrance to the Clarehall Shopping Centre and Belcamp Lane;
- Varying between two and four lanes between Belcamp Lane and the R107 Malahide Road / Priorswood Road / Blunden Road roundabout. The carriageway width varies between 9.0m and 13.0m;
- Two lanes per direction between the R107 Malahide Road / Priorswood Road / Blunden Road roundabout and the R104 Brookville Crescent. The approximate width is 7.0m on each side of the central reservation. The carriageway becomes three lanes on the approach to intersections and widens to approximately 10.0m; and
- Two lanes per direction (one standard lane and one bus lane) until the R808 Gracefield Road where the two carriageways merge into one. The carriageway is approximately 7.0m wide on each side of the central reservation.

R107 Malahide Road acts as the alternative route to Dublin Port, when the Port Tunnel is closed, meaning that at times it has to cope with higher flows of HGVs than during 'typical' traffic flow periods. This has had a particular bearing upon the design of the Proposed Scheme, in terms of road widths and junction design.

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

- R107 Malahide Road / R139 Northern Cross Route Extension / R139 Clarehall Avenue four-arm signalised junction;
- R107 Malahide Road / Clarehall Shopping Centre three-arm signalised junction;
- R107 Malahide Road / Belcamp Lane three-arm priority junction;
- R107 Malahide Road / Priorswood Road / Blunden Road four-arm roundabout;
- R107 Malahide Road / Newtown Road three-arm priority junction;
- R107 Malahide Road / Greencastle Road four-arm signalised junction;
- R107 Malahide Road / R104 Tonleagee Road / R014 Brookville Crescent four-arm signalised junction;
- R107 Malahide Road / Brookville Park four-arm priority junction; and
- R107 Malahide Road / Ardlea Road / R808 Gracefield Road four-arm roundabout.

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.

R107 Malahide Road / R139 Northern Cross Route Extension / R139 Clarehall Avenue four-arm signalised junction: This junction consists of a three-lane approach on all arms, except the R139 Clarehall Avenue which has a two-lane approach. The leftmost lane of each arm diverts left into a slip lane and yield to allow access to the correspondent left arm and bypass the signals (albeit there are signalised pedestrian crossings on the slip lanes).

The R107 Malahide Road South arm has three lanes exiting from the junction, with the left lane becoming a 24-hour bus lane approximately 100m south of the junction. The R139 Northern Cross Route Extension and R107 Malahide Road North arms have two exit lanes for all traffic, and the R139 Clarehall Avenue arm has two exit lanes, but the left lane is a bus lane from Monday to Saturday between 07:00 and 19:00.

There are cycle advanced stacking locations on each arm. These characteristics are shown in Image 6.1.



Image 6.1: R107 Malahide Road / R139 Four-Arm Signalised Junction

R107 Malahide Road / Clarehall Shopping Centre three-arm signalised junction: This junction is located approximately 275m south of the previous junction and provides access into Clarehall Shopping Centre.

The R107 Malahide Road North arm has three lanes for ahead movements (left lane is intended for buses) controlled by a set of signal heads, and a leftmost lane for left turn movements to Clarehall Shopping Centre which is controlled by a separate signal head. Advisory cycle lanes are also provided for ahead and left turn movements. Exit onto this arm comprises an advisory cycle lane, a bus lane (24 hour) and two general traffic lanes.

The Clarehall Shopping Centre arm has two approach lanes (one for right and left turn movements respectively) and two exit lanes. The signals include a left turn filter phase.

The R107 Malahide Road South arm has five approach lanes and an advisory cycle lane. The left lane is a 24-hour bus lane, two middle lanes are for ahead movements and two right lanes are for right turns to Clarehall Shopping Centre which are controlled by a separate signal phase. The cycle lane continues northwards through the junction. There are three exit lanes onto this arm; the leftmost lane is a bus lane and there is an advisory cycle lane travelling southbound.

U-turns are not permitted and there are advanced stacking locations for cyclists. These characteristics are shown in Image 6.2.



Image 6.2: R107 Malahide Road / Clarehall Shopping Centre Three-Arm Signalised Junction

R107 Malahide Road / Belcamp Lane three-arm priority junction: The R107 Malahide Road is a dual carriageway at this junction with four general traffic lanes and a bus lane travelling northbound, and two general traffic lanes and a bus lane travelling southbound. The northbound and southbound traffic lanes are separated by a central reservation. On-road cycle lanes travelling in both directions are also present.

Belcamp Lane is approximately 7.0m wide and has a one lane entering and existing the junction. The junction operates a 'left-in / left-out' arrangement to and from Belcamp Lane due to the R107 Malahide Road being a dual carriageway with numerous lanes. There is a yellow box in front of the Belcamp Lane arm across the four northbound general traffic lanes of the R107 Malahide Road.

These characteristics are shown in Image 6.3.



Image 6.3: R107 Malahide Road / Belcamp Lane Priority Junction

R107 Malahide Road / Priorswood Road / Blunden Road four-arm roundabout: This roundabout has an inscribed circle diameter of approximately 65.0m. The R107 Malahide Road North arm has two approach lanes and a wide two-lane exit approximately 10.0m wide. The exit link divides into three lanes approximately 50m from the junction, with the left-most lane being a 24-hour bus lane.

The Blunden Drive arm has two approach lanes and a wide single exit lane of approximately 7.0m. There is a yellow box between the Blunden Drive approach and the R107 Malahide Road South exit arms.

The R107 Malahide Road South arm has two approach lanes in addition to a left flare lane of approximately 20.0m long. There are two lanes exiting onto this arm.

The Priorswood Road arm has two lanes approaching the junction and a wide single exit lane of approximately 7.0m. No provision for cyclists is made on-road and instead, toucan crossings are provided.

These characteristics are shown in Image 6.4.



Image 6.4: R107 Malahide Road / Priorswood Road / Blunden Road Four-Arm Roundabout

R017 Malahide Road / Newtown Road three-arm priority junction: The R107 Malahide Road is a dual carriageway at this junction with two general traffic lanes travelling northbound, and two lanes travelling southbound; a bus lane and one general traffic lane. The northbound and southbound traffic lanes are separated by a central reservation. On-road cycle lanes travelling in both directions are also present.

The Newton Road arm is one-way traveling eastbound and has two lanes approaching the R107 Malahide Road, both of which are for left turn movements. No right turn movements are permitted at this junction. There is a former left turn lane which comprises white hatching and is not permitted for use along the northbound carriageway of the R107 Malahide Road, sitting to the left of the cycle lane. There is a yellow box in front of the Newton Road arm across the two northbound general traffic lanes of the R107 Malahide Road.

These characteristics are shown in Image 6.5.



Image 6.5: R017 Malahide Road / Newtown Road Priority Junction

R107 Malahide Road / Greencastle Road four-arm signalised junction: The junction is at the access to the Coolock Leisureplex and Odeon cinema. The R107 Malahide Road North and South arms each have three entry lanes, the right of which is a flare lane of approximately 50.0m long and the signals operate a right turn filter phase. There are two lanes and an advisory cycle lane exiting onto this arm, the left of which is a bus lane operating Monday to Saturday between 07:00 and 19:00. The entry and exit lanes are separated by the central reservation.

The Leisureplex / cinema access arm has one entry and exit lane with no separation. The Greencastle Road arm has two entry lanes and a single exit lane. Advanced stacking locations for cyclists are provided on the northern, southern and western arms of the junction.

These characteristics are shown in Image 6.6.



Image 6.6: R107 Malahide Road / Greencastle Road Four-Arm Signalised Junction

R107 Malahide Road / R104 Tonleeg Road / R104 Brookville Crescent four-arm signalised junction: The R107 Malahide Road North arm has three lanes approaching the junction and a short left slip lane onto the R104 Tonleeg Road. The two middle lanes are therefore for ahead movements (the left of which is a bus lane) and the right lane is for right turn movements only and is separated by a traffic island. The left and right turn movements are controlled by separate signal heads and green phases. There are two exit lanes onto this arm, the left of which is a bus lane operating Monday to Saturday between 07:00 and 19:00. There are advisory cycle lanes both approaching and exiting the junction from this arm.

The R104 Tonleeg Road arm has a two-lane approach, the right lane is for ahead and right turn movements, and the left lane is for ahead and left turn movements. There is a short left slip lane with its own signal head which yields to southbound traffic on the R107 Malahide Road. There is yellow box between the left turn movement from the R104 Tonleeg Road and the R107 Malahide Road South arm.

The R107 Malahide Road South arm has a four lane approach which comprises a left slip lane of approximately 45m in length (and controlled by its own signal head and flashing amber phase) which yields to westbound traffic, two ahead lanes (the left of which is a bus lane during certain hours) and a right turn lane separated by a traffic island and with a separate signal head and green phase.

The R104 Brookville Crescent arm has a two-lane approach; the left lane is for left and ahead movements and the right lane is for ahead and right turn movements. There is a single lane exiting the junction onto this arm.

Advanced stacking locations are provided on the R107 Malahide Road North and South arms. The characteristics are shown in Image 6.7.



Image 6.7: R107 Malahide Road / R104 Four-Arm Signalised Junction

R107 Malahide Road / Brookville Park four-arm priority junction: Vehicles travelling along the R107 Malahide Road have priority over the vehicles entering from the eastern and western arms, as indicated by the stop lines. A yellow box is provided for vehicles entering from the western arm. Vehicles are only permitted to turn left at this junction due to the two carriageways being separated by a central reservation. A signalised pedestrian crossing is provided across the northern arm.

These characteristics are shown in Image 6.8.



Image 6.8: R107 Malahide Road / Brookville Park Four-Arm Priority Junction

R107 Malahide Road / Ardlea Road / R808 Gracefield Road four-arm roundabout: This roundabout marks the end of Section 1 of the Proposed Scheme. The roundabout has an inscribed circle diameter of approximately 40.0m.

The R107 Malahide Road North and South arms each have two entry lanes and two exit lanes, the left of which becomes a bus lane in operation Monday to Saturday between 07:00 and 19:00, approximately 50.0m from the junction.

The R808 Gracefield Road arm also has two entry lanes and two exit lanes. The left entry lane is for left turn movements onto the R107 Malahide Road South arm (travelling southbound) and the right lane is for ahead and

right turn movements. There is a yellow box on the right-hand lane of the circulatory between this arm and the R107 Malahide Road South arm.

The Ardlea Road arm has a single lane approaching the junction which widens to approximately 6.0m at the entrance to the roundabout to allow two lanes. The exit lane is a similar width and the road markings show a single lane for traffic exiting onto this arm.

There is no on-road provision for cyclists as toucan crossings linked by cycle tracks are provided at each arm of the roundabout. These characterises are shown in Image 6.9.



Image 6.9 R07 Malahide Road / Ardlea Road / R808 Gracefield Road Four-Arm Roundabout

6.3.2.4.2 St Brendan's Avenue

St Brendan's Avenue is a residential road that runs parallel to the east of R107 Malahide Road for the majority of its length between Tonleegge Road and Gracefield Road.

St Brendan's Avenue has a single carriageway in each direction and is within a 30km/h 'slow zone'. In addition, there are speed cushions at regular intervals to slow traffic.

There are no parking restrictions, and unrestricted parking is allowed on both sides of the road, although the majority of residential properties on St Brendan's Avenue have private off-street parking in driveways. A no left-turn restriction from St Brendan's Avenue into Mask Road is in place Monday to Saturday between 07:00 and 10:00.

6.3.2.4.3 Brookville Park

The northern section of Brookville Park is a residential cul-de-sac of approximately 150m in length that runs parallel to the west of R107 Malahide Road, immediately to the north of the R107 Malahide Road / R104 Oscar Traynor Road signalised junction. Vehicular access is only possible from Oscar Traynor Road via Brookville Crescent. Direct access to Brookville Park is not possible from R107 Malahide Road, as a kerbed footway runs between the two roads.

The southern section is a residential road approximately 380m in length which heads south from the R107 Malahide Road / St Brendan's Road junction and runs parallel to R017 Malahide Road on the western side of the road. There is an existing turn ban that restricts northbound traffic on R017 Malahide Road from entering Brookville Park directly (left-out only is permitted). Entry to Brookville Park can however be achieved from the north via Main Street.

There are no parking restrictions on the northern section of Brookville Park, and unrestricted parking is allowed on both sides of the road, although each of the residential properties has driveway parking.

Along the southern section, parking is generally unrestricted with the exception of a section controlled by double yellow lines approximately 115m in length on the eastern side of the road. Residential properties also have driveway parking.

6.3.2.5 Existing Parking / Loading

There is parking directly on the R107 Malahide Road along Section 1 of the Proposed Scheme at the following locations:

- Approximately 23 informal (i.e. no marked bays or operating hours) residential parking spaces adjacent to the northbound carriageway between Greencastle Road and the R104 Tonlegee Road;
- Six parallel car parking spaces along the northbound carriageway of the R107 Malahide Road, immediately south of Mayne River Avenue, associated with the adjacent commercial units (maximum stay of 30 minutes); and
- Approximately eight informal parking spaces along the eastern side of the R107 Malahide Road, adjacent to 43 to 48 St Brendan's Avenue.

Further parking is accommodated on the streets running parallel to the main carriageway which have residential frontage as follows:

- Approximately 22 informal residential parking spaces along the western carriageway south of the R107 Malahide Road / Brookville Park junction; and
- Informal residential on-street parking occurs along St Brendan's Avenue and Brookville Park, albeit the properties along these roads have private off-street parking.

There are no loading bays along Section 1 of the Proposed Scheme.

6.3.3 Section 2 – Gracefield Road to Marino Mart / Fairview – Malahide Road

This section outlines the baseline environment for walking, cycling, bus services, general traffic and parking / loading facilities along Section 2 of the Proposed Scheme, between the R808 Gracefield Road and the R105 Marino Mart / R105 Clontarf Road Junction. Section 2 begins at the roundabout between the R107 Malahide Road / Ardlea Road / R808 Gracefield Road. Section 2 of the Proposed Scheme is approximately 2.7km in length and runs in a northeast to southwest direction along Malahide Road.

6.3.3.1 Pedestrian Infrastructure

South of the R808 Gracefield Road, footpaths and street lighting are provided on both sides of the R107 Malahide Road adjacent to the carriageway for the entirety of Section 2 of the Proposed Scheme.

A proposed alternative quiet route for cyclists as part of the Proposed Scheme utilises the residential streets; Brian Road, Carleton Road, Haverty Road and Marino Mart, to route between the R107 Malahide Road and R105 Marino Mart whilst bypassing a busy section of the R107 Malahide Road. These residential streets provide a footpath on each side of the carriageway.

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

- The R107 Malahide Road / Kilmore Road signalised junction has a signalised crossing on its northern and western arms;
- The R107 Malahide Road / Killester Avenue / St David's Wood signalised junction has a signalised crossing on the Malahide Road South arm only (uncontrolled crossings of Killester Avenue and St David's Wood arms are also provided);
- The R107 Malahide Road / Elm Mount Road signalised junction has signalised crossings on the R107 Malahide Road South arm only (an uncontrolled crossing of the Elm Mount Road arm is also provided);
- The R107 Malahide Road / R103 Collins Avenue four-arm signalised junction has signalised crossings on all arms except the R107 Malahide Road North arm;

- There is a pelican crossing on the R107 Malahide Road immediately south of Elm Road. A traffic island is provided at the centre of the carriageway providing pedestrian refuge and there are guard rails on either side of the carriageway;
- There is a pelican crossing on the R107 Malahide Road immediately south of Donnycarney Road. The crossing is staggered by a traffic island with pedestrian refuge and guard rails;
- There is a pelican crossing on the R107 Malahide Road immediately south of Casino Park. The crossing is staggered by a traffic island with pedestrian refuge and guard rails;
- There is a pelican crossing on R107 Malahide Road at the junction to the south of Nazareth House. The crossing is staggered with the central reservation acting as a traffic island and guard rails present;
- At the R107 Malahide Road / R102 Griffith Avenue / Copeland Avenue four-arm junction, signalised crossings are provided on all arms except the R107 Malahide Road South arm. The R107 Malahide Road North and R102 Griffith Avenue crossings are staggered by traffic islands with pedestrian refuge and guard rails;
- There is a raised table crossing (uncontrolled) of Brian Road and a pelican crossing on the R107 Malahide Road at the R107 Malahide Road / Brian Road / Marino Avenue staggered priority junction; and
- There are staggered signalised crossings with pedestrian refuge on traffic islands and guard rails across the R107 Malahide Road and R105 Clontarf Road arms at the R107 Malahide Road / R105 Clontarf Road three-arm signalised junction.

Uncontrolled crossings across priority junctions at side roads benefit from dropped kerbs. The location of pedestrian crossings is illustrated in Figure 6.3b in Volume 3 of this EIAR.

Further details of the baseline pedestrian facilities (i.e. routing, directness, accessibility, crossing and footpath widths) at each junction along Section 2 of the Proposed Scheme is included in Appendix A6.4.1 (Pedestrian Impact Assessment) in Volume 4 of this EIAR.

6.3.3.2 Cycling Infrastructure

Existing cycling facilities along Section 2 are intermittent. Between the R808 Gracefield Road and Danieli Road, an advisory cycle lane of approximately 1.5m wide is provided on both sides of the carriageway. From Danieli Road to Kilmore Road, the advisory cycle lane is provided for cyclists travelling northbound only. Between Kilmore Road and Donnycarney Road, cyclists have to make use of a shared bus / cycle lane.

From Donnycarney Road to the R102 Griffith Avenue, advisory cycle lanes are provided in both directions, and for the final section to the R105 Clontarf Road, cyclists travelling southbound are to use a shared bus / cycle lane, with a continuous advisory cycle lane travelling northbound.

Cycle parking stands are provided at the following locations in the vicinity of the Proposed Scheme, albeit, outside of the redline boundary:

- Three Sheffield stands (able to accommodate up to six bicycles) immediately south of Artane Roundabout (adjacent to the R808 Gracefield Road);
- Four Sheffield stands (able to accommodate up to eight bicycles) on the western side of the R107 Malahide Road, adjacent to the junction with Mornington Grove;
- Four Sheffield stands (able to accommodate up to eight bicycles) on the eastern side of the R107 Malahide Road to the south of Danieli Road;
- Three Sheffield stands (able to accommodate up to six bicycles) on the corner between the R103 Collins Avenue East and Clancarthy Road;
- Three Sheffield stands (able to accommodate up to six bicycles) on the eastern side of the R107 Malahide Road across from the junction with Brian Road which are designated public cycle parking racks;
- Six Sheffield stands (able to accommodate up to 12 bicycles) on St Aidan's Park Road at the junction with the 106 Malahide Road which are designated public cycle parking racks; and
- 22 floor mounted racks and two Sheffield stands (able to accommodate up to four bicycles) on the corner between the R107 Malahide Road and R105 Marino Mart.

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 provided along the majority of Section 2 of the Proposed Scheme at the following locations (aside from intermittent breaks and junctions):

- In both directions between the R808 Gracefield Road and Danieli Road, operating Monday to Saturday between 07:00 – 10:00 and 12:00 – 19:00;
- Southbound from Danieli Road to Kilmore Road, operating Monday to Saturday between 07:00 – 10:00 and 12:00 – 19:00;
- In both directions between Kilmore Road and Brian Road, operating Monday to Saturday between 07:00 – 10:00 and 12:00 – 19:00 (with the southbound section between Clontarf Golf Club and Copeland Avenue, and the northbound section between Brian Road and Griffith Avenue operating between 07:00-19:00 Monday to Saturday);
- Southbound from Charlemont Road to Crescent Place, operating Monday to Saturday between 07:00 and 10:00, and from 12:30 to 19:00; and
- Southbound from Crescent Place to the R105 Clontarf Road, operating Monday to Saturday between 07:00 and 10:00.

6.3.3.3.2 Bus Stop Facilities

There are currently 17 bus stops along Section 2 of the Proposed Scheme. The inbound stops are as follows:

- Stop 1277 on R017 Malahide Road immediately south of Artane Roundabout;
- Stop 1219 on R107 Malahide Road south of Danieli Road;
- Stop 1220 on R107 Malahide Road north of Killester Avenue;
- Stop 1221 on R107 Malahide Road south of Elm Mount Road, opposite Mayfield Park;
- Stop 664 on R107 Malahide Road adjacent to Donnycarney Church and opposite Elm Road;
- Stop 665 on R107 Malahide Road north of Casino Park and adjacent to Clontarf Golf Club;
- Stop 666 on R017 Malahide Road opposite Nazareth House;
- Stop 667 on R017 Malahide Road between Copeland Avenue and Brian Road; and
- Stop 668 on R017 Malahide Road opposite St Aiden's Park Road and immediately north of the R017 Malahide Road / R015 Clontarf Road / R105 Marino Mart signalled junction.

The outbound stops are:

- Stop 1198 on R107 Malahide Road between Mornington Grove and Artane Roundabout;
- Stop 1197 on R107 Malahide Road between St David's Wood and Kilmore Road;
- Stop 1196 on R107 Malahide Road north of Elm Mount Road and opposite Mayfield Park;
- Stop 4382 on R107 Malahide Road north Elm Road and opposite Donnycarney Church;
- Stop 672 on R107 Malahide Road opposite Clancarthy Road;
- Stop 671 on R107 Malahide Road adjacent to Nazareth House;
- Stop 670 on R107 Malahide Road north of R102 Griffith Avenue; and
- Stop 669 on R107 Malahide Road between Crescent Place and Charlemont Road.

Of the 17 bus stops along Section 2 of the Proposed Scheme, the Mornington Grove, Stop 1198; and Donnycarney Church, Stop 1198; are indented whilst all other bus stops are inline along the carriageway.

The majority of bus stops provide timetables, shelter, seats and accessible kerbs. Those without a shelter or seating comprise a pole only. Real time passenger information is also provided at four stops.

The content of Table 6.8 outlines the availability of bus stop facilities at the existing 17 bus stops along Section 2 of the Proposed Scheme.

Table 6.8: Section 2 – Availability of Bus Stop Facilities (of a Total 17no. Bus Stops)

Bus Stop Facility	Number of Bus Stops in Baseline with Facility	Percentage of Bus Stops in Baseline with Facility
RTPI	4	24%
Timetable information	17	100%
Shelter	15	88%
Seating	15	88%
Accessible Kerbs	17	100%
Indented Drop Off Area	2	12%

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
14	Beaumont (Ardlea Rd.) - Fairview - D'Olier Street / Eden Quay - Rathmines - Braemor Rd. - Ballinteer - Dundrum Luas Station	15 minutes	15-20 minutes
15	Clongriffin (Sq.) - Artane Roundabout - Fairview - IFSC - Aungier St. (Bishop St.) - Rathmines - Terenure - Templeogue Bridge - Ballycullen Rd.	10 minutes	15 minutes
27	Clare Hall - Artane Roundabout - Fairview - Eden Quay - Dolphin's Barn Cross - Walkinstown Cross (The Kestrel) - Tallaght (The Square) - Jobstown	10 minutes	10-15 minutes
27a	Eden Quay - Fairview - Donnycarney - Harmonstown Rd. (Ribh Rd.) - Blunden Drive	35 minutes	30-45 minutes
27b	Eden Quay - Fairview - Donnycarney Church - Artane Roundabout - Beaumont Hospital - Harristown	20 minutes	20 minutes
27x	Clare Hall - Artane Roundabout Donnycarney - Fairview - Connolly Rail Station - UCD Belfield	Twice per day	No service
15	Clongriffin (Sq.) - Artane Roundabout - Fairview - IFSC - Aungier St. (Bishop St.) - Rathmines - Terenure - Templeogue Bridge - Ballycullen Rd.	10 minutes	15 minutes
27	Clare Hall - Artane Roundabout - Fairview - Eden Quay - Dolphin's Barn Cross - Walkinstown Cross (The Kestrel) - Tallaght (The Square) - Jobstown	10 minutes	10-15 minutes
42	Talbot St. - Fairview (Footbridge) - Artane Roundabout - Seabury - Malahide - Sand's Hotel (Portmarnock)	30 minutes	30 minutes
43	Talbot St. - Fairview (Footbridge) - Artane Roundabout - Feltrim Rd. - Swords Business Park	15-20 minutes	50 minutes

6.3.3.4 General traffic

6.3.3.4.1 R107 Malahide Road

South of the R808 Gracefield Road, the R107 Malahide Road is a single carriageway with two lanes in each direction, one standard lane and one bus lane until Donnycarney Road. The carriageway is approximately 7.0m wide and becomes wider in the proximity of junctions. The speed limit on this section is 50km/h.

Between Donnycarney Road and the R102 Griffith Avenue, the road is predominantly a dual carriageway with two lanes travelling in each direction, a bus lane and a general traffic lane, separated by a central reservation of approximately 2.5m wide. The carriageway width in the dual carriageway varies between 7.0m and 9.0m each side of the central reservation. The speed limit on this section is 50km/h.

Along Section 2 of the Proposed Scheme from the R102 Griffith Avenue to R105 Clontarf Road, the R107 Malahide Road is single carriageway with one lane traveling northbound and two lanes travelling southbound (one bus lane and one lane for general traffic). The speed limit on this section is 50km/h.

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

- R107 Malahide Road / Kilmore Road three-arm signalised junction;
- R07 Malahide Road / Killester Road / St David's Wood four-arm signalised junction;
- R107 Malahide Road / Elm Mount Road three-arm Signalised junction;
- R107 Malahide Road / R103 Collins Avenue / Collins Avenue East four-arm signalised junction;
- R107 Malahide Road / Elm Road three-arm priority junction;
- R107 Malahide Road / Donnycarney Church Car Park three-arm priority junction;
- R107 Malahide Road / Clancarthy Road three-arm priority junction;
- R107 Malahide Road / Donnycarney Road three-arm priority junction;
- R107 Malahide Road / Casino Park three-arm signalised junction;
- R107 Malahide Road / Nazareth House / Clontarf Golf Club four-arm priority junction;
- R107 Malahide Road / Fire Brigade Training Centre / Mount Temple School Access four-arm priority junction;
- R107 Malahide Road / Copeland Avenue / R102 Griffith Avenue four-arm signalised junction;
- R107 Malahide Road / Brian Road three-arm priority junction;
- R107 Malahide Road / Charlemont Road three-arm priority junction;
- R107 Malahide Road / The Crescent three-arm priority junction; and
- R107 Malahide Road / R105 Clontarf Road / R105 Marino Mart 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.

R107 Malahide Road / Kilmore Road three-arm signalised junction: Each arm has a two-lane approach and advanced stacking locations for cyclists. The R107 Malahide North arm has a single exit lane and advisory cycle lane and there is a yellow box between this arm and the Malahide Road South arm. There is a peak-period right-turn ban preventing vehicles from turning right from Malahide Road onto Kilmore Road. This is in place between 07:00 and 10:00.

The R107 Malahide Road South arm has a left slip lane of approximately 40.0m long which is controlled by a separate signal head and flashing amber phase and separated from the ahead lanes by a traffic island. This arm provides an advisory cycle lane travelling northbound. This arm has two exit lanes, the left of which is a bus lane from Monday to Saturday between 07:00 – 10:00 and 12:00 – 19:00.

The Kilmore Road arm has an advisory cycle lane approaching the junction and the left and right traffic lanes are designated for left and right turn movements respectively.

These characteristics are illustrated in Image 6.10.



Image 6.10 R107 Malahide Road / Kilmore Road Signalised Junction

R107 Malahide Road / Killester Road / St David's Wood four-arm signalised junction: The R107 Malahide Road North and South arms each provide two lanes approaching the junction, advanced stacking locations for cyclists and two lanes exiting the junction. The left lane on exit onto each arm is a bus lane during the hours of operation.

The Killester Avenue and St David's Wood arms each provide a single entry and exit lane. Killester Avenue is approximately 5.5m wide and St David's Wood is approximately 6m wide. A yellow box at the centre of the junction is provided. The left turn movement from R107 Malahide Road North to Killester Avenue is not permitted between 07:00-10:30, Monday to Saturday. The junction is illustrated in Image 6.11.



Image 6.11: R107 Malahide Road / Killester Road / St David's Wood Signalised Junction

R107 Malahide Road / Elm Mount Road three-arm Signalised Junction: There are two lanes on approach and exit (left lane is a bus lane) from the R107 Malahide Road North and South arms with advanced stacking locations for cyclists.

There are two narrow lanes (approximately 4.0m combined) on the approach from Elm Mount Road and a single exit lane. A yellow box provided at the centre of the section. These characteristics are shown in Image 6.12.



Image 6.12: R107 Malahide Road / Elm Mount Road Signalised Junction

R107 Malahide Road / R103 Collins Avenue four-arm signalised junction: The R107 Malahide Road North arm has one lane for right and ahead movements and another lane for left and ahead movements and provides advanced stopping lines for cyclists. There are two lanes exiting onto this arm, the left of which is a bus lane during the hours of operation.

The R103 Collins Avenue East arm has a single lane for ahead and right turn movements, and a slip lane for vehicles turning left controlled by a separate signal head and separated by a traffic island. A yellow box is also provided after the slip lane. There is a single lane for exiting onto this arm.

The R107 Malahide Road South arm has a four-lane approach; one right-only which is a filter lane of approximately 50.0m long, one left-only and two ahead lanes. Each movement has its own signal and green time. The leftmost ahead lane is dedicated to buses and there is an advisory cycle lane adjacent to the footpath. Advanced stopping lines for cyclists are provided.

The R103 Collins Avenue (West) arm has a two-lane approach, with a right-only and a left and ahead lane. The stop line of the right only lane is provided approximately 11m behind the stop line of the left lane to enable buses and other larger vehicles to clear the left turn onto this arm from the R107 Malahide Road South. There is a single exit lane onto this arm.

A yellow box is provided at the centre of the junction. These characteristics are illustrated in Image 6.13.



Image 6.13: R107 Malahide Road / R013 Collins Avenue / Collins Avenue East Signalised Junction

R107 Malahide Road / Elm Road three-arm priority junction: The R107 Malahide Road has two lanes travelling northbound, a bus lane and general traffic lane, plus an on-road cycle lane at this junction.

The R107 Malahide Road southbound carriageway has three lanes, two bus lanes and one general traffic lane. The northbound and southbound traffic lanes are separated by a central reservation which breaks to allow the right turn movement onto Elm Road. At the right turn into the Elm Road arm there is a storage lane, additional to the three traffic lanes, of approximately 32.5m long. There is a southbound bus stop (Stop 664) opposite the Elm Road arm.

There is a peak-period left-turn ban preventing vehicles from turning left from Malahide Road onto Elm Road. This is in place between 16:00 and 19:00, Monday to Saturday.

The Elm Road arm is approximately 5.0m wide and has no lane / stop line road markings but is two-way and allows movements left and right onto the R107 Malahide Road. There is a raised table across the assumed stop line. In front of the Elm Road arm there is a yellow box across the northbound general traffic lane of the R107 Malahide Road.

These characteristics are illustrated in Image 6.14.



Image 6.14: R017 Malahide Road / Elm Road Priority Junction

R107 Malahide Road / Donnycarney Church Car Park three-arm priority junction: The R017 Malahide Road has two lanes travelling in each direction; a bus lane and one general traffic lane, at this junction. There is a signalised crossing approximately 13.0m north of the Donnycarney Church Car Park arm which features a traffic island between the northbound and southbound traffic lanes.

The Donnycarney Church Car Park arm is approximately 6.0m wide and has one entry and exit lane respectively. The arm into the car park is approximately 10.5m long before opening up to the wider car park area. There is a yellow box in front of the Donnycarney Church Car Park arm across the two general traffic lanes of the R107 Malahide Road.

These characteristics are illustrated in Image 6.15.



Image 6.15: R107 Malahide Road / Donnycarney Church Car Park Priority Junction

R107 Malahide Road / Clancarthy Road three-arm priority junction: The R017 Malahide Road has two lanes travelling in each direction; a bus lane and one general traffic lane, at this junction. There is a northbound bus stop (Stop 672) and indented parking bays opposite the Clancarthy Road arm.

Clancarthy Road is a single lane of approximately 5.5m wide and is one-way travelling eastbound away from the R107 Malahide Road. There is a raised table approximately 16.5m back from the entry into Clancarthy Road. There is a yellow box in front of the Clancarthy Road arm across the northbound general traffic lane of the R107 Malahide Road.

These characteristics are illustrated in Image 6.16.



Image 6.16: R017 Malahide Road / Clancarthy Road Priority Junction

R107 Malahide Road / Donnycarney Road three-arm priority junction: At this junction the R017 Malahide Road has two lanes travelling in each direction; a bus lane and one general traffic lane. Immediately south of the junction, the northbound and southbound lanes of the R107 Malahide Road are separated by a central reservation. There is no central reservation to the north of the junction. There is a signalised crossing approximately 17.0m south of the Donnycarney Road arm.

The Donnycarney Road arm is approximately 6.0m wide and has one entry and exit lane respectively. There is a raised table approximately 20.0m back from the stop line. There is a yellow box in front of the Donnycarney Road arm across the two general traffic lanes of the R107 Malahide Road, and there is a peak-period left-turn ban preventing vehicles from turning left from Malahide Road onto Donnycarney Road between 16:00 and 19:00, Monday to Friday.

These characteristics are illustrated in Image 6.17.

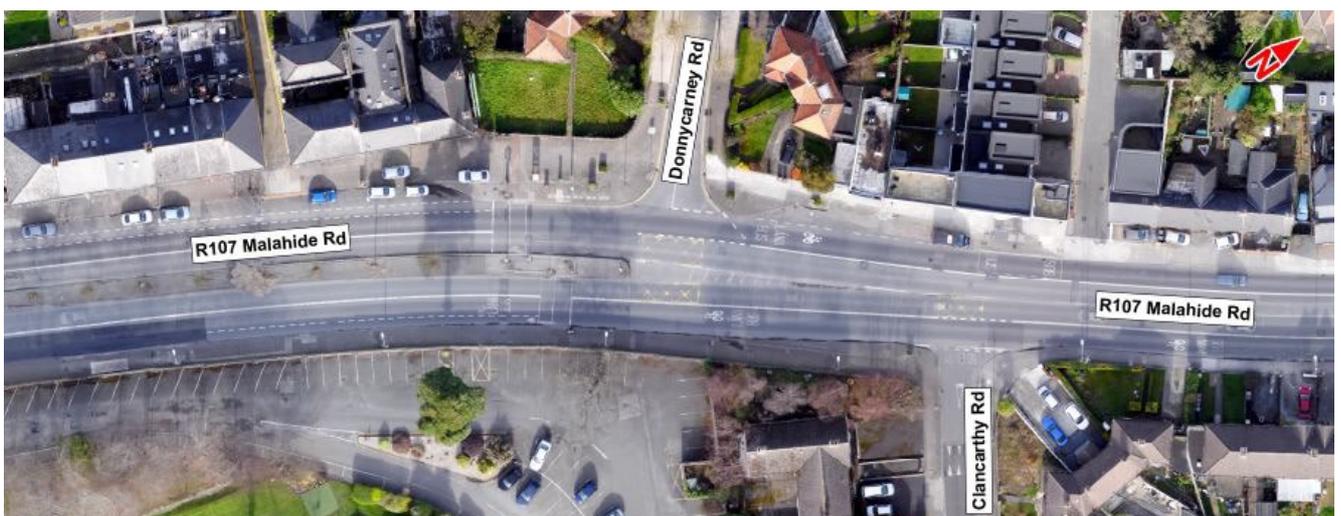


Image 6.17: R107 Malahide Road / Donnycarney Road Priority Junction

R107 Malahide Road / Casino Park three-arm signalised junction: The R107 Malahide Road North and South arms are separated by a central reservation, and provide two entry and exit lanes with the nearside lanes being bus lanes. The R107 Malahide Road North arm also provides a right turn flare lane of approximately 30m in length and the signal timings include a right turn phase.

The Casino Park has a single entry and exit lane. There is an advisory cycle lane travelling in both directions along the R107 Malahide Road which continue through the junction and there is a yellow box in the centre of the junction. These characteristics are illustrated in Image 6.18.



Image 6.18: R107 Malahide Road / Casino Park Signalised Junction

R107 Malahide Road / Nazareth House / Clontarf Golf Club four-arm priority junction: The R107 Malahide Road has two lanes travelling in each direction; a bus lane and a general traffic lane, plus an on-road advisory cycle lane. In addition, the R107 Malahide Road northbound carriageway has a right turn storage lane of approximately 27.0m long. The northbound and southbound lanes are separated by a central reservation which breaks for approximately 14.0m to facilitate movements to and from the minor arms.

The Nazareth House arm is approximately 6.5m wide and has one entry and exit lane respectively. The Clontarf Golf Club arm is approximately 7.0m wide and has one entry and exit lane respectively. Left and right turn movements out of both arms onto the R107 Malahide Road are permitted. There are two yellow boxes in front of the minor arms across the R107 Malahide Road northbound and southbound general traffic lanes respectively.

These characteristics are illustrated in Image 6.19.



Image 6.19: R107 Malahide Road / Nazareth House / Clontarf Golf Club Priority Junction

R107 Malahide Road / Fire Brigade Training Centre / Mount Temple School Access four-arm priority junction: R107 Malahide Road has two lanes travelling in each direction, comprising a bus lane and a general traffic lane, plus an on-road advisory cycle lane. The R107 Malahide Road northbound approach also has a short right-turn storage lane approximately 40.0m long. The northbound and southbound lanes are separated by a

central reservation which breaks for approximately 8.0m to allow northbound traffic to turn right from the storage lane.

The Mount Temple School Access arm is approximately 10.0m wide and has one entry and one exit lane. Only left turns out of the access are permitted. The Fire Brigade Training Centre arm is approximately 15m wide and has one entry and exit lane. A small yellow box is located at the junction in the general traffic lane of the northbound R107 Malahide Road approach to discourage drivers from the Fire Brigade Training Centre blocking the general traffic lane when using the right turn storage lane on the R107 Malahide Road northbound.

These characteristics are illustrated in Image 6.20.



Image 6.20: R107 Malahide Road / Fire Brigade Training Centre / Mount Temple School Access Priority Junction

R107 Malahide Road / Copeland Avenue / R102 Griffith Avenue four-arm signalised junction: The junction provides a three-lane approach and two-lane exit on the R107 Malahide Road North and South arms respectively which are separated by a central reservation.

The R107 Malahide Road North arm has a lane for right, ahead and left turn movements respectively. From Malahide Road South, no right turn onto Copeland Avenue is permitted, therefore, the leftmost lane is for left turn movements at which a filter green phase is provided, the middle lane is a bus lane for ahead movements and the right lane is for ahead movements by general traffic. This arm also provides an advisory cycle lane travelling northbound, and has a staggered signalised pedestrian crossing covering the entry and exit lanes. No pedestrian crossing is provided over the R107 Malahide Road South arm of the junction.

The Copeland Avenue arm has a single lane entry and exit lane of approximately 4.0m wide each. A signalised pedestrian crossing is also provided.

The R102 Griffith Avenue arm has a two-lane approach and wide single lane exit of approximately 7.0m wide, therefore able to accommodate two vehicles side-by-side. A staggered pedestrian crossing is provided covering the entry and exit lanes.

A yellow box is provided between the northern and the eastern arm and advanced stacking locations for cyclists are provided at all arms except the Copeland Avenue arm. These characteristics are illustrated by Image 6.21.



Image 6.21: R107 Malahide Road / Copeland Avenue / R102 Griffith Avenue Signalised Junction

R107 Malahide Road / Brian Road three-arm priority junction: To the south of Brian Road, the R107 Malahide Road has one lane plus an on-road advisory cycle lane travelling northbound and two lanes travelling southbound; a bus lane and a general traffic lane. To the north of Brian Road, the northbound lanes expand to three lane with the nearside lane designated for left turn movements at the R107 Malahide Road / Copeland Avenue / R102 Griffith Avenue signalised junction and the middle lane for buses.

Right turn movements from the R107 Malahide Road into Brian Road are not permitted. There is a signalised pedestrian crossing approximately 20.0m south of Brian Road.

The Brian Road arm is approximately 7.0m wide and there is one lane entering and existing the junction respectively which are separated by a traffic island. There is a raised speed table approximately 8.0m back from the stop line. There is a yellow box in front of the Brian Road arm across the R107 Malahide Road southbound general traffic lane.

These characteristics are illustrated in Image 6.22.



Image 6.22: R107 Malahide Road / Brian Road Priority Junction

R107 Malahide Road / Charlemont Road three-arm priority junction: The R107 Malahide Road has one lane plus an on-road advisory cycle lane travelling northbound and two lanes travelling southbound; a bus lane and a general traffic lane. There is a signalised pedestrian crossing approximately 20.0m north of the Charlemont Road arm.

Charlemont Road is approximately 7.6m wide and has no lane / stop line road markings but permits two-way traffic. There are on-street parking and loading bays on both side of Charlemont Road starting approximately 5.0m back from the assumed stop line. There is a yellow box in front of the Charlemont Road arm across the northbound and southbound general traffic lanes of the R107 Malahide Road.

These characteristics are illustrated in Image 6.23.



Image 6.23: R107 Malahide Road / Charlemont Road Priority Junction

R107 Malahide Road / The Crescent three-arm priority junction: The R107 Malahide Road has one lane plus an on-road advisory cycle lane travelling northbound and three lanes travelling southbound, a bus lane and two general traffic lanes. There is a bus stop (Stop 668) immediately south of The Crescent arm.

The Crescent arm is approximately 8.5m wide and has no lane / stop line road markings. The Crescent splits left and right approximately 10.0m back from the assumed stop line and provides a route to the eastbound R105 Clontarf Road (the left turn from R107 Malahide Road onto the eastbound R105 Marino Road is banned at the downstream junction). There is a yellow box in front of The Crescent arm across the two southbound general traffic lanes of the R107 Malahide Road. These characteristics are illustrated in Image 6.24.



Image 6.24: R107 Malahide Road / The Crescent Priority Junction

R107 Malahide Road / R105 Clontarf Road / R105 Marino Mart three-arm signalised junction: The R107 Malahide Road arm provides three entry lanes which all turn right onto the R105 Marino Mart, the left of which is a bus lane. There is no left turn from R107 Malahide Road onto the eastbound R105 Marino Road. To make this

movement, vehicles have to turn left on Marino Crescent approximately 50m before approaching the junction. The junction between the Marino Crescent and the R105 Clontarf Road is a priority junction, whereby Marino Crescent yields to the R105 Clontarf Road eastbound traffic. Marino Crescent is a one-way road, hence vehicles travelling along the R105 Clontarf Road cannot turn right at the junction.

The R105 Clontarf Road arm provides a three-lane approach (with an advanced stop line) and two-lane exit, including an advisory cycle lane. The leftmost approach lane is for buses, the middle lane is for ahead movements and the right lane is for ahead and right turn movements. The approach and exit lanes are separated by a white hatching of approximately 1m wide.

The R105 Marino Mart arm has three entry and exit lanes respectively. The leftmost approach lane is for left turn movements and the other two lanes are for ahead movements. There is also an advisory cycle lane between the left turn and ahead lanes. On exit onto this arm, the leftmost lane is for buses (operating Monday to Friday between 07:00 and 19:00, and Saturday between 07:00 and 10:00).

Two yellow boxes are provided at the centre of the junction between the R105 Clontarf Road, R107 Malahide Road approach lanes and R105 Marino Mart exit lanes. These characteristics are illustrated in Image 6.25.

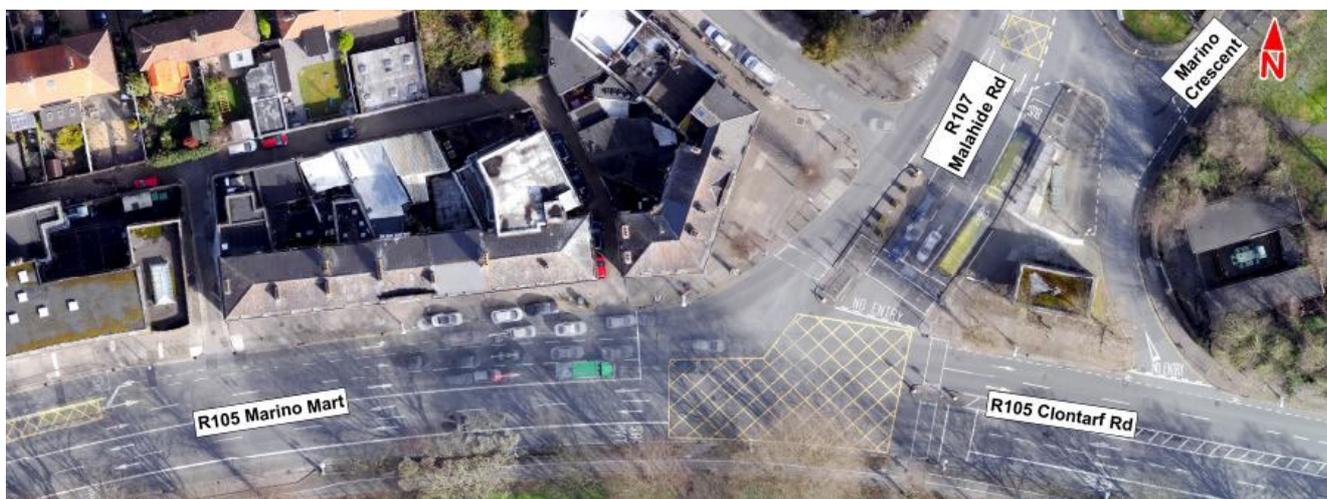


Image 6.25: R107 Malahide Road / R105 Clontarf Road / R105 Marino Mart Signalised Junction

6.3.3.4.2 Brian Road / Carleton Road / Haverty Road

Brian Road, Carleton Road and Haverty Road are residential roads that run parallel to the west of the R107 Malahide Road between the R102 Griffith Avenue and the R105 Marino Mart. Carleton Road and Haverty Road connect to the R107 Malahide Road via St Aidan's Park Road, and Haverty Road connects to the R105 Marino Mart via Marino Mart (residential street).

Brian Road, Carleton Road and Haverty Road are single-carriageway streets in each direction and are within a 30km/h 'slow zone'. In addition, there are speed cushions at regular intervals to slow traffic.

There are no parking restrictions and unrestricted parking is allowed on both sides of these residential streets, although the majority of residential properties on Brian Road, Carleton Road and Haverty Road have private off-street parking in driveways.

6.3.3.5 Existing Parking / Loading

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

- 15 informal parking spaces alongside the southbound carriageway of R107 Malahide Road, between R808 Gracefield Road and Danieli Road;

- Seven informal parking spaces and one disabled space alongside the northbound carriageway of R107 Malahide Road immediately to the south of Mornington Grove, which are associated with the parade of local shops;
- Six informal parking spaces alongside the northbound carriageway of the R107 Malahide Road immediately north of Kilmore Road, which are associated with the shops and business premises located there. It is also noted that approximately eight vehicles tend to park on the footway opposite Kilmore Road, adjacent to the row of private properties.
- 11 informal parking spaces alongside the northbound carriageway of the R107 Malahide Road between Donnycarney Road and Casino Park, associated with the row of commercial premises; and
- 14 pay and display parking spaces alongside the southbound carriageway of the R107 Malahide Road between Crescent Place and Marino Crescent, associated with the row of commercial properties. These spaces are controlled between 10:00 – 19:00, Monday to Saturday.

Informal residential on-street parking occurs along Brian Road, Carleton Road, Haverty Road and Marino Park Avenue.

6.4 Potential Impacts

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

6.4.1 Characteristics of the Proposed Scheme

The characteristics of the Proposed Scheme are described in detail in Chapter 4 (Proposed 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, so infrastructure provision for buses, pedestrians and cyclists would remain the same. The streetscape would continue to be based around the movement and parking requirements of private cars instead of people. High levels of traffic are associated with discouraging pedestrian and cyclist activity and this activity would be further discouraged as traffic congestion remains the same or increases. The baseline situation of congestion and journey time reliability issues for buses would also continue, and potentially be exacerbated over time as traffic congestion increases in line with travel demand growth.

6.4.3 '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 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 2016-2035 (GDA Strategy), with a partial implementation by 2028, in line with National Development Plan (NDP) investment priorities and the full implementation by 2043.

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

- The GDA Strategy is the approved statutory transportation plan for the region, providing a framework for investment in transport within the region up to 2035;
- The GDA Strategy provides a consistent basis for the 'likely' future receiving environment that is consistent with Government plans and Policies National Planning Framework (NPF) and National Development Plan (NDP); and
- Schemes within the GDA Strategy are a means to deliver the set of objectives of the GDA Strategy. The sequencing and delivery of the strategy is defined by the implementation plan, but the optimal outcome of aiming to accommodate all future growth in travel demand on sustainable modes underpins the Strategy.

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

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

Appendix A6.2 (Transport Modelling Report) 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. This is shown diagrammatically in Diagram 6.4. Total trip demand (indicated by the dashed line) will increase into the future in line with demographic growth (population and employment levels etc.). To limit the growth in car traffic and to

ensure that this demand growth is catered for predominantly by sustainable modes, a number of measures will be required, that include improved sustainable infrastructure and priority measures delivered as part of the NDP/GDA Strategy. In addition to this, demand management measures will play a role in limiting the growth in transport demand, predominantly to sustainable modes only. The result will be only limited or no increases overall in private car travel demand. The Proposed Scheme will play a key role in this as part of the wider package of GDA Strategy measures.

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

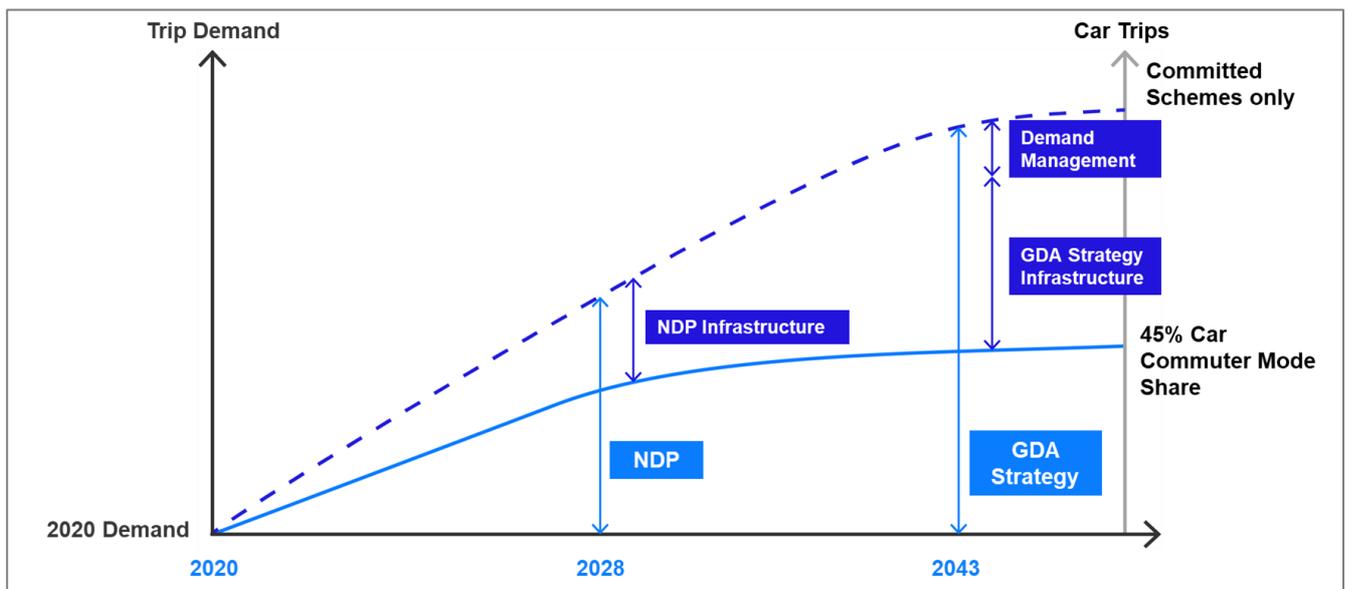


Diagram 6.4: Trip Demand Growth and the GDA Strategy

In terms of the transport modelling scenarios for the traffic and transport assessment, as per the Strategy proposals, there are no specific demand management measures included in the Do Minimum scenario in the 2028 Opening year, other than constraining parking availability in Dublin at existing levels. For the design year, 2043 scenario, a proxy for a suite of demand management measures is included in the Do Minimum in line with the target to achieve a maximum 45% car driver commuter mode share target, across the GDA, as outlined in the Strategy.

6.4.4 'Do Something' Scenario

The Do Something scenario represents the likely conditions of the direct and indirect study areas with the Proposed Scheme in place. The traffic and transport elements of the Proposed Scheme are presented in detail in Chapter 4 (Proposed 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 two principal sections. The division line between sections has been determined by grouping similar carriageway types together. These sections have been further subdivided into 13 sub-sections, according to the types of construction works required. The sections / sub-sections are the following (as shown in Diagram 6.5):

- Section 1: Mayne River Avenue to Gracefield Road – Malahide Road;
 - **Section 1a:** R107 Malahide Road – Mayne River Avenue Junction;
 - **Section 1b:** R107 Malahide Road – R139 Clarehall Avenue / R107 Malahide Road Junction;
 - **Section 1c:** R107 Malahide Road – R139 Clarehall Avenue Junction to Blunden Drive / Priorswood Road;
 - **Section 1d:** Blunden Drive / Priorswood Road / R107 Malahide Road Junction;
 - **Section 1e:** R107 Malahide Road – Blunden Drive / Priorswood Road to Santry River;
 - **Section 1f:** R107 Malahide Road – Santry River to Ardlea Road / R808 Gracefield Road;
 - **Section 1g:** Ardlea Road / R808 Gracefield Road / R107 Malahide Road Junction;
- Section 2: Gracefield Road to Marino Mart / Fairview – Malahide Road;
 - **Section 2a:** R107 Malahide Road – Ardlea Road / R808 Gracefield Road to Killester Avenue;
 - **Section 2b:** R107 Malahide Road – Killester Avenue to Collins Avenue;
 - **Section 2c:** R107 Malahide Road – R103 Collins Avenue Junction;
 - **Section 2d:** R107 Malahide Road – R103 Collins Avenue to Clancarthy Road;
 - **Section 2e:** R107 Malahide Road – Clancarthy Road to Marino Avenue; and
 - **Section 2f:** R107 Malahide Road – Marino Avenue to R105 Marino Mart / Clontarf Road.



Diagram 6.5: 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 report. The Proposed Scheme is estimated to require some 24 months (approximately) to complete, however, individual activities will have shorter durations. Works are envisaged to proceed concurrently on multiple work-fronts to minimise the overall construction duration.

6.4.5.3 Construction Route

The location for a Construction Compound is identified on lands south west of the R107 Malahide Road / R139 junction (as shown in Diagram 6.6). The appointed contractor's CTMP shall include measures for managing traffic in and out of the compound. Access to and egress from the Construction Compound will be permitted via dedicated Construction Access Routes and will utilise a temporary access point directly from Priorswood Road, immediately west of the junction with the R107 Malahide Road. The appointed contractor will be responsible for developing the final layout and use of the Construction Compound within the framework set out within the EIAR. The Contractor may identify other (or additional) Construction Compound locations, subject to gaining all necessary approvals. In addition to the Construction Compound, temporary / portable welfare facilities will be provided along the Proposed Scheme.

The haulage of material on site is anticipated to be minimal. There will however be the removal of excavated material and the delivery of construction materials to site. It is anticipated that the 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 and Regional roads are envisaged to form dedicated Construction Access Routes for construction vehicles to travel to and from the construction works (as shown in Diagram 6.6):

- M1 / N1 and M50 Motorway;
- R139 Northern Cross Extension / Clarehall Avenue;
- R104 Oscar Traynor Road / Brookville Crescent; and
- R107 Malahide Road.

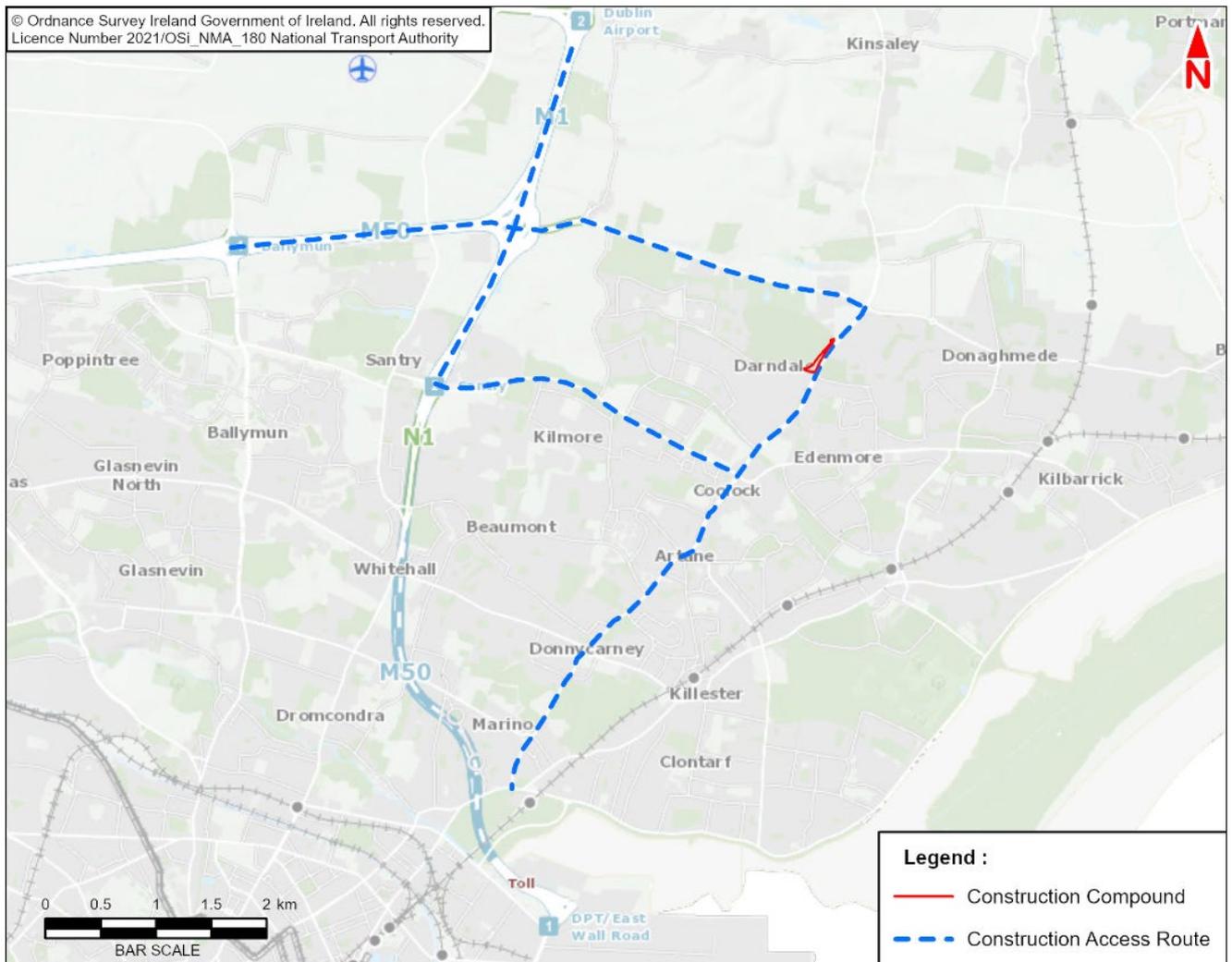


Diagram 6.6: Proposed Construction Routes and Compound Location

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 footpaths will be used to facilitate pedestrian movements around work areas. Access to local amenities, such as to bus stops, traffic crossings, private dwellings, and businesses, may be temporarily altered but access will be maintained.

Due consideration will be given to pedestrian provisions in accordance with Section 8.2.8 of the DTTS Chapter 8, Temporary Traffic Measures and Signs for Roadworks of the Traffic Signs Manual (DTTS 2019a) and the DTTS Temporary Traffic Management Design Guidance (DTTS 2019b), to ensure the safety of all road users, in particular pedestrians (including able-bodied pedestrians, wheel-chair users, mobility impaired pedestrians, pushchair users etc.). Therefore, where footpaths are affected by construction, a safe route will be provided past the works area, and where practicable, provisions for matching existing facilities for pedestrians. Due consideration will also be given to the need for temporary ramps, and measures for accessible users, where changes in elevation are temporarily introduced to facilitate works and footpath diversions. Entrance points to the construction zone will be controlled as required.

6.4.5.4.3 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.

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.

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.

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 Síochána, 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 Short Term** due to the temporary nature of any restrictions.

For the purpose of Air Quality (Chapter 7), Climate (Chapter 8) and Noise & Vibration (Chapter 9) impacts assessments, a worst-case scenario for construction activities was considered for assessment purposes and has been modelled in the LAM based on a notional stage of construction whereby Sections 1b, 1d, 1g, 2c and 2f were under construction concurrently. Further details on the impacts assessment can be found within these chapters.

6.4.5.4.6.2 Construction Traffic Generation

Site Operatives: As described in Chapter 5 (Construction) of this EIAR, it is expected that there will be 70 to 80 staff directly employed across the Proposed Scheme, rising to 100 staff at peak construction.

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

The appointed contractor will prepare a Construction Stage Mobility Management Plan (CSMMP) which will be developed prior to construction, as described in Appendix A5.1 CEMP in Volume 4 of this EIAR, to actively discourage personnel from using private vehicles to travel to site. The CSMMP will promote the use of public transport, cycling and walking by personnel. Private parking at the Construction Compound will be limited. Vehicle-sharing will be encouraged, subject to public health guidelines, where travel by private vehicle is a necessity e.g. for transporting heavy equipment. A combination of CSMMP measures, as well as work shift patterns, means that fewer than 10 trips by private vehicle are envisaged to and from site during peak periods.

Heavy Goods Vehicles (HGVs): Additional construction traffic will be generated during the Construction Phase of the Proposed Scheme, for the purpose of the following:

- Clearance of existing site material and waste;
- Deliveries of construction material; and
- Removal of construction waste material.

Chapter 5 (Construction) of this EIAR provides a breakdown of the expected operation for the construction of the Proposed Scheme during each subsection. It should be noted that the CTMP will control vehicular movement along the construction route, including restrictions on the number of HGVs accessing and egressing the construction works throughout the day to mitigate the impacts to general traffic on the surrounding road network.

Based on construction activities associated with the Proposed Scheme, a maximum of 17 HGV trips are estimated to access / egress the construction works during the AM and PM Peak Hours.

Overall Peak Hour Impacts: The contents of Table 6.10 outline the anticipated maximum construction traffic generation by site operatives and HGVs during the AM and PM Peak Hours.

Table 6.10: 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	17	0	17	44	88
PM Peak Hour	0	17	10	17	44	88

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 Short-term effect**. Therefore, no further analysis is required for the purpose of this assessment.

It should be noted that further detail on the restrictions to construction vehicle movements during the peak periods of the day will be contained within the appointed contractor's CTMP prior to construction.

6.4.5.5 Construction Phase Summary

The contents of Table 6.11 present a summary of the potential impacts of the Proposed Scheme during Construction Phase.

Table 6.11: Summary of Potential Construction Phase 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 movement) impact analysis, which are outlined in the following sections.

6.4.6.1 Qualitative Assessment

6.4.6.1.1 Qualitative Assessment Methodology

The structure of the qualitative assessment is consistent with the Baseline Environment (Section 6.3) where the Proposed Scheme has been split into two sections. This has allowed for a more detailed analysis of the quality of the infrastructure proposals per section. The approach for each qualitative assessment is outlined below.

6.4.6.1.1.1 Pedestrian Infrastructure

The impacts to the quality of the Pedestrian Infrastructure as a result of the Proposed Scheme have been considered with reference to any changes to the existing pedestrian facilities along footpaths and crossing locations within the direct study area. Reference has been made to the overall changes along the full length of the Proposed Scheme and the impact assessment primarily focuses only on the pedestrian facilities at junctions to provide a direct comparison between the Do Minimum and Do Something scenarios.

Where the Proposed Scheme introduces a change to a junction layout, the impact on pedestrians has been assessed using a set of criteria which has been derived from guidance listed in Section 6.9. The contents of Table 6.12 outline the assessment criteria for each junction.

Table 6.12: 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 footpath and crossing widths in accordance with national standards?

The LoS rating demonstrated in Table 6.13 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 6.13: 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 6.14 have been used to describe the impact, based on the changes in the Qualitative Pedestrian LoS rating.

Table 6.14: 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 6.15 outline the assessment criteria with reference to the corresponding LoS ratings.

Table 6.15: 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 6.16 have been used to describe the impact, based on the changes in the Qualitative Cycling LoS rating.

Table 6.16: 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 6.1.1.

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; 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 6.17.

Table 6.17: Magnitude of Impact for Bus Users Qualitative Assessment

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

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

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 – Mayne River Avenue to Gracefield Road – Malahide 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:

- Footpaths with a minimum running width of 2.0m;
- Proposed speed limit reduction from 60km/h to 50km/h between Clarehall Avenue and the R105 Clontarf Road;
- Provision of a new direct signalised Toucan crossing on the R107 Malahide Road to the south of the access to Malahide Road Retail Centre, and a new pedestrian access to Ayrefield Drive;
- Upgrade of the existing signalised crossings across R107 Malahide Road at St Brendan's Drive and St Brendan's Park from pelican to Toucan crossings; and
- Provision of a new staggered Toucan signalised crossing on the R107 Malahide Road to the south of Mask Avenue.

The assessment of the qualitative impacts on the Pedestrian Infrastructure for Section 1 of the Proposed Scheme are summarised in Table 6.18 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 6.18: Section 1 – Significance of Effects for Pedestrian Impact during Operational Phase

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact	Sensitivity	Significance of Effect
R107 Malahide Road / R139 Clarehall Avenue / R139 Northern Cross Route Extension signalised junction	A3200	D	B	Medium	Medium	Positive Significant
R107 Malahide Road / Clarehall Shopping Centre Access signalised junction	A3500	C	B	Low	High	Positive Moderate
R107 Malahide Road / Belcamp Lane priority junction	A3625	C	B	Low	Medium	Positive Moderate
R107 Malahide Road / Grove Lane priority junction	A3750	C	B	Low	Medium	Positive Moderate
R107 Malahide Road / Blunden Drive / Priorswood Road (roundabout to signalised junction)	A3975	E	B	Medium	Medium	Positive Significant
R107 Malahide Road / Newtown Road priority junction	A4100	C	B	Low	Medium	Positive Moderate
R107 Malahide Road / Retail Park Access priority junction	A4350	E	B	Medium	High	Positive Very Significant
R107 Malahide Road / Newtown Cottages priority junction	A4550	C	B	Low	Medium	Positive Moderate
R107 Malahide Road / Crown Paints and Decorating Centre Access / Retail Park Emergency Access priority junction	A4700	D	B	Medium	Low	Positive Moderate
R107 Malahide Road / Greencastle Road signalised junction	A4875	D	B	Medium	High	Positive Very Significant
R107 Malahide Road / R104 Brookville Crescent / R104 Tonlegee Road signalised junction	A5150	D	B	Medium	High	Positive Very Significant
R107 Malahide Road / Main Street priority junction	A5550	E	B	Medium	Medium	Positive Significant
R107 Malahide Road / St Brendan's Drive priority junction	A5550	E	B	Medium	Medium	Positive Significant
R107 Malahide Road / R808 Gracefield Road / Ardlea Road roundabout to signalised junction	A6050	D	B	Medium	Medium	Positive Significant
Section Summary		D	B	Medium	Medium	Positive Significant

The contents of Table 6.18 demonstrate that the Proposed Scheme will have a positive long-term impact on the quality of the pedestrian infrastructure along the R107 Malahide Road between Mayne River Avenue and the R808 Gracefield Road during the Operational Phase.

The LoS during the Do Minimum scenario ranges between C and E, with nine of the 14 impacted junctions along this section given the low D / E ratings. These ratings have been determined using the previously referenced assessment criteria set out in Table 6.16. The LoS will improve to 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 footpath and crossing widths. All proposed facilities

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

Overall, it is anticipated that there will be **Positive, Significant and Long-term 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.

6.4.6.1.2.2 Cycling Infrastructure

The following section sets out the qualitative impacts on the cycling receptor for Section 1 of the Proposed Scheme. The results are summarised in Table 6.19, along with the accompanying sensitivity for each section and the resultant significance of impact.

The key cycling improvements along Section 1 of the Proposed Scheme can be summarised as follows:

- Provision of continuous cycle infrastructure in both directions between Mayne River Avenue and the St Brendan's Park in the form of a 2.0m wide cycle tracks in both directions which bypass bus stop islands and continuous cycle lanes through signalised junctions with two stage right-turn movements;
- Upgrade of the existing signalised crossings on R107 Malahide Road, to the east of Belcamp Lane, from pelican to Toucan crossings;
- Upgrade of the existing signalised crossings on R107 Malahide Road at St Brendan's Drive and St Brendan's Park from pelican to Toucan crossings;
- Provision of a new staggered Toucan signalised crossing on the R107 Malahide Road to the south of Mask Avenue;
- Provision of a new, two-way cycle track between R107 Malahide Road and Ayrefield Drive.
- Addition of cycle lanes on the approach to signalised junctions at Clarehall Avenue, Blunden Drive, Priorswood Road, Greencastle Road, Tonlegee Road, Brookville Crescent, Gracefield Road and Ardlea Road;
- To the south of St Brendan's Park, cyclists travelling southbound will be diverted onto an alternative quietly trafficked route along St Brendan's Avenue (permitting vehicles, but with new demand management measures to limit traffic flows and speeds) which meets the R808 Gracefield Road. Cyclists travelling northbound will continue along a 2.0m wide cycle track which bypasses bus stop islands and on-street parking bays; and
- Provision of upgraded cycling facilities at signalised junctions to provide continuous cycle lanes through major signalised junctions with early green light starts for cyclists, with hard island segregation for left-turn movements and right-turn movements made in two stages.

Along Section 1, the Proposed Scheme will provide a 60mm set down kerb segregation between the footpath and the cycle track. This is of particular importance in the context of providing for pedestrians with visual impairments, whereby the use of white line segregation (as is the case in some areas of the baseline environment) is not as effective for establishing a clear understanding of the change of pavement use and potential for cyclist / pedestrian interactions. The cycle tracks will also be raised 120mm from the carriageway to provide segregation from vehicles.

The contents of Table 6.19 outline the cycling qualitative assessment along Section 1 of the Proposed Scheme, which sets out the overall Do Minimum LoS and the Do Something LoS and the description of impact. 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 6.19: Section 1 – Cycling Impact during Operational Phase

Locations	Chainage	Do Minimum LoS	Do Something LoS	Impact	Sensitivity of Environment	Significance of Effect
Mayne River Avenue to R139 Clarehall Avenue	A3050 - A3250	C	A	Medium	Medium	Positive Significant
R139 Clarehall Avenue to St Brendan's Park	A3250 - A5300	C	A	Medium	High	Positive Very Significant
St Brendan's Park to R808 Gracefield Road	A5300 - A6050	C	A	Medium	High	Positive Very Significant
Section Summary		C	A	Medium	High	Positive Very Significant

The contents of Table 6.19 demonstrate that the scheme will have a **Positive, Very Significant and Long-term effect** on the cycling environment along the R107 Malahide Road between Mayne River Avenue and the R808 Gracefield Road.

The LoS rating of the cycling facilities will improve from C in the Do Minimum to A in the Do Something along the entirety of Section 1 of the Proposed Scheme. 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'.

6.4.6.1.2.3 Bus Infrastructure

It is proposed that there will be a total of 15 bus stops along Section 1 of the Proposed Scheme – eight inbound and seven outbound. This is one 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.

The contents of Table 6.20 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 6.20: 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	3	19%	15	100%	It is proposed that all bus stops provide real-time information.
Timetable information	13	81%	15	100%	It is proposed that all bus stops provide timetable information.
Shelter	15	94%	15	100%	It is proposed that all bus stops along this section is to be provided with shelter. A shelter will be added to inbound Stop 1218.
Seating	15	94%	15	100%	It is proposed that all bus stops along this section will provide seating.
Accessible Kerbs	16	100%	15	100%	Full provision.

Bus Stop Facility	Do Minimum		Do Something		Comment
	No. of Stops	Percentage of Stops	No. of Stops	Percentage of Stops	
Indented Drop Off Area	6	38%	0	0%	All proposed bus stops will be located inline within bus lanes.
Total Stops	16		15		One fewer outbound stop than Do Minimum

The contents of Table 6.20 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 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, and bus stop provision and facilities outlined within this section, Table 6.21 below outlines the bus qualitative assessment along Section 1 of the Proposed Scheme.

Table 6.21: Section 1 – Bus Qualitative Impact during Operational Phase

Section	Chainage	Description of Impact	Magnitude of Impact	Sensitivity	Significance of Effect
Mayne River Avenue to Gracefield Road – Malahide Road	A3050 – A6050	<ul style="list-style-type: none"> Number of stops rationalised from 16 to 15, 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; and Bus lanes provided along the entirety of the corridor. 	Medium	High	Positive Very Significant

As indicated in Table 6.21, 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.

6.4.6.1.3 Parking and Loading

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

- The removal of the 23 informal, general residential parking spaces along the R107 Malahide Road, between Greencastle Road and the R104 Tonlegee Road to provide a 2.0m wide footpath alongside a more formalised cycle lane, bus lane and general traffic lane arrangement. In substitution, nine marked bays will be provided along Brookville Park, accessible from the R107 Malahide Road via the R104 Brookville Crescent. The residential properties adjacent to these lost spaces have off-street parking within driveways as well as informal kerb-side parking along Brookville Park. Furthermore, there are approximately 83 parking spaces along the side streets of Brookville Crescent and Brookville Park within 50m of the lost parking, and further spaces available along Dunree Park on the opposite side of R107 Malahide Road. Therefore, the net-loss of 14 spaces at this location is considered to have a **Negative, Slight and Long-term effect**;
- The reduction from 22 to 11 informal general residential parking spaces on the western side of the R107 Malahide Road, between the R104 Tonlegee Road and St Brendan's Drive to widen the footpath, formalise the cycle lanes and therefore provide improvements for pedestrians and cyclists. The five taxi bays currently provided will be retained. There are over 50 other equivalent parking spaces within 100m of this location such as along Ross Place running parallel to the R107 Malahide

Road at this location, along St Brendan's Avenue and St Brendan's Park on the opposite side of the R107 Malahide Road (pelican crossing provided), Main Street. As a result, the impact of losing 11 spaces at this location is considered to have a **Negligible and Long-term effect**;

- The removal of 10, general residential parking spaces along the eastern side of the R107 Malahide Road, between the R104 Tonlegee Road and St Brendan's Avenue which are proposed to be removed to widen the footpath and provide a cycle track which bypasses the bus stop island (Stop 1274). The residential properties adjacent to these lost spaces have off-street parking within driveways as well as informal kerb-side parking along St Brendan's Avenue. Furthermore, there are over 50 other informal parking spaces available within 100m of this location such as; along St Brendan's Avenue, St Brendan's Park, therefore, the impact of removing 10 spaces is considered to have a **Negligible and Long-term effect**; and
- It is proposed that an additional seven informal parking spaces are provided along Brookville Park, near Chanel Road between Main Street and Mask Avenue, to increase the total to 23, by slightly reducing the carriageway width to formalise car parking along Brookville Crescent. This is considered to have a **Negligible and Long-term effect** but reduces the overall number of parking spaces lost along this section.

The contents of Table 6.22 present a summary of the proposed changes to parking along Section 1 of the Proposed Scheme.

Table 6.22: Section 1 – Overall Changes in Parking / Loading Spaces

Location	Parking Type	Do Minimum	Do Something	Change
R107 Malahide Road (western side); Between Greencastle Road and R104 Tonlegee Road	Informal Parking: general residential	23	0	-23
Brookville Park; Between Greencastle Road and R104 Tonlegee Road	Informal Parking: general residential	0	9	+9
R107 Malahide Road (western side); between R104 Tonlegee Road and St Brendan's Drive	Informal Parking: general residential	22	11	-11
	Taxi Bays	5	5	0
R107 Malahide Road (eastern side); between R104 Tonlegee Road and St Brendan's Avenue	Informal Parking: general residential	10	0	-10
Brookville Park (at Chanel Road); Between Main Street and Mask Avenue	Informal Parking: general residential	17	23	6
Total		77	48	-29

As shown in Table 6.22, there are approximately 77 current parking spaces affected within the area of the Section 1 of the Proposed Scheme. Under the proposals, 29 parking spaces will be lost, all of which are informal general residential parking spaces. This change is considered to have a **Negligible and Long-term effect** in three out of four locations, due to the low numbers of spaces lost and 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.

6.4.6.1.4 Section 2 – Gracefield Road to Marino Mart / Fairview – Malahide Road

6.4.6.1.4.1 Pedestrian Infrastructure

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

- Footpaths with a minimum running width of 2.0m, with the exception of a short section between Brian Road and the R105 Clontarf Road where the width varies between 1.8m – 2.0m;
- Provision of a new direct signalised Toucan crossing along R107 Malahide Road between Mornington Grove and Danieli Road;

- Provision of raised table crossings at entrance and exit to a small collection of retail units south of Danieli Road;
- Provision of an upgraded signalised crossing along R107 Malahide Road immediately south of Elm Road from a staggered two stage crossing to a direct crossing;
- Provision of an upgraded signalised crossing along R107 Malahide Road immediately south of Donnycarney Road from a staggered two-stage crossing to a direct crossing;
- Upgrade of the existing staggered signalised crossing across R107 Malahide Road at Mount Temple House / Nazareth School to a direct Toucan crossing; and
- Relocating the signalised crossing at Brian Road from the current position immediately south of the junction to immediately north of the junction to better serve the local community.

The assessment of the qualitative impacts on the pedestrian infrastructure for Section 2 of the Proposed Scheme is summarised in Table 6.23 along with the accompanying sensitivity for each junction and the resultant significance of impact.

Table 6.23: Section 2 – Significance of Effects for Pedestrian Impact during Operational Phase

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact	Sensitivity	Significance of Effect
R107 Malahide Road / Mornington Grove Priority Junction	A6200	D	B	Medium	High	Positive Very Significant
R107 Malahide Road / Danieli Road Priority Junction	A6300	D	B	Medium	Low	Positive Moderate
R107 Malahide Road / Local Shops Car Park Access Priority Junction	A6375	D	C	Low	Low	Positive Slight
R107 Malahide Road / Local Shops Car Park Egress Priority Junction	A6375	D	C	Low	Low	Positive Slight
R107 Malahide Road / Mornington Business Park Car Park Access Priority Junction	A6475	D	C	Low	Low	Positive Slight
R107 Malahide Road / Kilmore Road Signalised Junction	A6525	C	B	Low	Low	Positive Slight
R107 Malahide Road / St David's Wood / Killester Avenue Signalised Junction	A6775	C	A	Medium	Low	Positive Moderate
R107 Malahide Road / Elm Mount Road Signalised Junction	A6975	D	A	Medium	Low	Positive Moderate
R107 Malahide Road / R103 Collins Avenue / R103 Collins Avenue East Signalised Junction	A7275	D	B	Medium	Medium	Positive Significant
R107 Malahide Road / St John's Court Priority Junction	A7475	D	B	Medium	Low	Positive Moderate
R107 Malahide Road / Clancarthy Road Priority Junction	A7550	D	B	Medium	Low	Positive Moderate
R107 Malahide Road / Donnycarney Road Priority Junction	A7600	D	B	Medium	Low	Positive Moderate
R107 Malahide Road / Casino Park Signalised Junction	A7750	D	A	Medium	Low	Positive Moderate
R107 Malahide Road / Golf Club Access / Nazareth House Access Priority Junction	A7825	D	B	Medium	Low	Positive

Junctions	Chainage	Do Minimum LoS	Do Something LoS	Impact	Sensitivity	Significance of Effect
R107 Malahide Road / Mount Temple Comprehensive School / Dublin Fire Brigade Access Signalised Junction	A8025	C	A	Medium	Low	Positive Moderate
R107 Malahide Road / R102 Griffith Avenue / Copeland Avenue Signalised Junction	A8225	D	C	Low	Low	Positive Slight
R107 Malahide Road / Marino Avenue Priority Junction	A8325	D	B	Medium	Low	Positive Moderate
R107 Malahide Road / Charlemont Road Priority Junction	A8375	D	B	Medium	Low	Positive Moderate
R107 Malahide Road / Marino Crescent Priority Junction	A8675	C	B	Low	Low	Positive Slight
R107 Malahide Road / St Aidan's Park Road Priority Junction	A8700	D	A	Medium	High	Positive Very Significant
R107 Malahide Road / R105 Clontarf Road Signalised Junction	A8725	C	B	Low	High	Positive Moderate
Section Summary		D	B	Medium	Low	Positive Moderate

The contents of Table 6.23 demonstrate that the Proposed Scheme will have a long-term positive impact on the quality of the pedestrian infrastructure at junctions along the R107 Malahide Road between the R808 Gracefield Road and R105 Clontarf Road.

The LoS during the Do Minimum scenario ranges from C to D, with 16 of the 21 impacted junctions along this section given the low D rating. These ratings have been determined using the previously referenced assessment criteria set out in Table 6.16. The LoS will improve to an A rating at 5 of the impacted junctions and a B at 12 junctions and a C at 4 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 footpath and crossing widths. All proposed facilities have been designed in accordance with the principles of DMURS and Building for Everyone: A Universal Design Approach (NDA 2020) with regards to catering for all users, including those with disabilities.

Overall, it is anticipated that there will be **Positive, Moderate and Long-term 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.

6.4.6.1.5 Cycling Infrastructure

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

- Provision of 2.0m wide cycle tracks in both directions between the R808 Gracefield Road and Kilmore Road;
- Addition of cycle tracks on the approach to signalised junctions at Kilmore Road, Collins Avenue, Casino Park, Copeland Avenue and Griffith Avenue;
- Provision of a new Toucan crossing across R10 Malahide Road between Mornington Grove and Danieli Road;
- Cycle lanes continue through R107 Malahide Road / Kilmore Road junction with hard island segregation for left-run movements and right-turn movements will be made in two stages;

- Provision of a 2.0m cycle track southbound between Kilmore Road and St David’s Wood. Advanced stop lines on all arms and continuous cycle lanes through the junction;
- Provision of 2.0m wide cycle tracks in both directions between St David’s Wood and the R102 Griffith Avenue which bypass bus stop islands and on-street parking bays;
- Continuous cycle lanes through R107 Malahide Road / R103 Collins Avenue East / R103 Collins Avenue junction with hard island segregation for left-turn movements and right-turn movements will be made in two stages (referred to as ‘Box Turns’ within the National Cycle Manual) allowing cyclists to stay within the cycle lanes at all times when navigating this large junction;
- Provision of a new Toucan crossing across R107 Malahide Road at Mount Temple School / Nazareth House;
- Southbound cycle lanes cross the R107 Malahide Road / Copeland Avenue / R102 Griffith Avenue signalised junction diagonally to join a bidirectional cycle track on the northbound side of the carriageway;
- It is proposed that cycle facilities turn off the R107 Malahide Road onto at Brian Road followed by Carleton Road to continue as an alternative quiet route along lightly trafficked roads. This alternative route follows Brian Road onto Carleton Road and St Aiden’s Park to re-join the R107 Malahide Road. Vehicles will still be permitted to use these roads; and
- Provision of a further link from St Aiden’s Park onto Haverty Road and Marglann Marino to meet the R105 Marino Mart will be an alternative, quieter route for cyclists that using the R107 Malahide Road. The northern end of Haverty Road will be closed to vehicles (removing through traffic), meaning that Havery Road and Marglann Marino will have less traffic than at present, and therefore be more attractive to cyclists.

Along Section 2, the Proposed Scheme will provide a 60mm set down kerb segregation between the footpath and the cycle track. This is of particular importance in the context of providing for pedestrians with visual impairments, whereby the use of white line segregation is not as effective for establishing a clear understanding of the change of pavement use and potential for cyclist / pedestrian interactions. The cycle tracks will also be raised 120mm from the carriageway to provide segregation from vehicles.

The contents of Table 6.24 outline the cycling qualitative assessment along Section 2 of the Proposed Scheme, with reference to the accompanying sensitivity for each section and the resultant Significance of Impact.

Table 6.24: Section 2 – Cycling Impact during Operational Phase

Locations	Chainage	Do Minimum LoS	Do Something LoS	Impact	Sensitivity of Environment	Significance of Effect
R808 Gracefield Road to Kilmore Road	A6050 - A6550	C	A	Medium	High	Positive Very Significant
Kilmore Road to St David’s Wood	A6550 - A6800	C	A	Medium	High	Positive Very Significant
St David’s Wood to R102 Griffith Avenue	A6800 - A8250	C	A	Medium	High	Positive Very Significant
R102 Griffith Avenue to Brian Road	A8250 - A8350	C	A+	High	Low	Positive Moderate
Brian Road to R105 Clontarf Road	A8350 - A8750	C	B	Low	High	Positive Moderate
Section Summary		C	A	Medium	High	Positive Very Significant

The contents of Table 6.24 demonstrate that the scheme will have a positive long-term impact on the cycling environment between the R808 Gracefield Road and R105 Clontarf Road. The Do Minimum LoS is C which has been determined using the previously referenced assessment criteria set out in Table 6.15.

In the Do Something scenario, the LoS improves to A between the R808 Gracefield Road and the R102 Griffith Avenue, as a result of the provision of well-separated cycle lanes in both directions which traverse priority

junctions and continue through signalised junction with protected treatment as part of the Proposed Scheme. There is a small section in the Do Something scenario with a LoS of A+ where a bidirectional segregated cycle track is provided as part of the Proposed Scheme.

Between Brian Road and the R105 Clontarf Road, a quiet cycle route in terms of traffic flows is proposed via the residential streets of Brian Road, Carleton Road, Haverty Road and Marino Park Avenue, with a connection to the R107 Malahide Road from St Aidan's Park Road. No formal cycle infrastructure will be put into place, however. However, traffic management arrangements will limit access to general traffic thereby resulting in a more cycle friendly environment.

There is currently a northbound on-road cycle lane along the R107 Malahide Road that runs between St Aidan's Park Road and Brian Road. Under the Proposed Scheme, this will be removed to accommodate a shared bus / cycle lane. However, cyclists will have the option of either using the shared bus / cycle lane or diverting onto the quiet route via Brian Road and Carleton Road.

Overall, it is anticipated that there will be **Positive, Very Significant and Long-term effect** to the quality of the cycling infrastructure along Section 2 of the Proposed Scheme, during the Operational Phase. A detailed breakdown of the assessment along each section can be found in Appendix A6.4.2 (Cycling Infrastructure Assessment) 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'.

6.4.6.1.5.1 Bus Infrastructure

There is currently a total of 17 bus stops along Section 2, nine inbound and eight outbound. Under the Proposed Scheme, there will be a total of 15 bus stops along Section 2 with one fewer inbound, and one 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.

The contents of Table 6.25 outline a summary of the improvements to the bus stop infrastructure along Section 2 of the Proposed Scheme, with reference to the number and percentage of bus stops that provide each facility in the Do Minimum and Do Something scenarios.

Table 6.25: Section 2 – Overview of Amendments to Bus Stop Locations

Bus Stop Facility	Do Minimum		Do Something		Comment
	No. of Stops	Percentage of Stops	No. of Stops	Percentage of Stops	
RTPI	4	24%	15	100%	It is proposed that all bus stops provide real-time information.
Timetable information	17	100%	15	100%	It is proposed that all bus stops provide timetable information, this is consistent with Do Minimum.
Shelter	15	88%	15	100%	It is proposed that all bus stops along this section is to be provided with shelter.
Seating	15	88%	15	100%	It is proposed that all bus stops along this section is to be provided with seating.
Accessible Kerbs	17	100%	15	100%	It is proposed that all bus stops provide timetable information.
Indented Drop Off Area	2	12%	0	0%	All stops inline.
Total Stops	17		15		Two fewer stops along Section 2 compared to the Do Minimum

The contents of Table 6.25 indicate that there are improvements to the bus stop facilities along Section 2 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 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, and bus stop provision and facilities outlined within this section, the contents of

Table 6.26 outline the bus qualitative assessment along Section 2 of the Proposed Scheme.

Table 6.26: Section 2 – Bus Qualitative Impact during Operational Phase

Section	Chainage	Description of Impact	Magnitude of Impact	Sensitivity	Significance of Effect
Gracefield Road to Marino Mart / Fairview – Malahide Road	A6050 - A8750	<ul style="list-style-type: none"> Number of stops reduced from 17 to 15; Bus stops are located in more convenient locations for communities with improved access to signalised crossings and have been located to optimise bus journey times; Moderate improvements to bus stop facilities; Bus lanes provided along the entirety of the corridor. 	Medium	High	Positive Very Significant

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 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.

6.4.6.1.6 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 the 10 informal general residential parking spaces along the eastern side R107 Malahide Road between the R808 Gracefield Road and Danieli Road to gain the road space to accommodate cycle lanes on both sides of the road. The adjacent residential properties have dropped kerb driveways and off-street parking capacity for approximately two vehicles. Additionally, there are approximately 80 further informal residential parking spaces along side streets within 200m of this location, such as Danieli Road and Danieli Drive. Therefore, the impact of this change is considered to have a **Negative, Slight and Long-term effect**;
- A revised parking arrangement outside the shops on the west side of R107 Malahide Road, to the south of Morning Grove. The existing parking arrangement comprises a parallel style parking however motorists currently park perpendicular to the carriageway. This parking arrangement causes a safety issue with cars blocking the cycle lane, which is illegal, whilst also reversing onto main carriageway and on-road cycle lane. Instead, it is proposed that a small off-street car parking area is provided next to this location, comprising five general parking spaces and one disabled bay. This car park will be accessible via the R107 Malahide Road and will operate a one-way system to exit onto Mornington Grove. This will result in the loss of two car parking spaces at this location. Considering this, the impact of this loss of parking is considered to have a **Negligible and Long-term effect**;
- The removal of the six informal general / commercial parking spaces along the R107 Malahide Road on the footpath at the frontage of the commercial units, immediately north of Kilmore Road. This is to allow for widening of the footpath and provision of a cycle track which bypasses the bus stop island, and therefore provide wider improvements for pedestrians and cyclists. There are a further approximately 16 pay & display parking bays along Kilmore Road, less than 50.0m from this location, and over 100 informal parking spaces available along side streets within 200m, such as Pinebrook Road and Pinebrook Grove. Considering this, the impact of this loss of parking is considered to have a **Negative, Moderate and Long-term effect**;
- The removal of five of the 11 informal general / commercial parking spaces along the R107 Malahide Road between Donnycarney Road and Casino Park to provide improvements for pedestrians and cyclists in the form of widening the footpath and provision of a continuous, uninterrupted cycle lane

along this stretch. There are approximately 140 informal parking spaces along side streets within 200m of this location, such as Casino Park, Cherrymount Crescent and Donnycarney Road, however, the impact of this loss of parking is considered to have a **Negative, Moderate and Long-term effect**; and

- The removal of the 14 pay & display general / commercial parking spaces within the southbound bus lane along the R107 Malahide Road between Crescent Place and Marino Crescent to provide a dedicated bus lane. There are approximately 91 other pay & display parking spaces within 200m of this location along side streets, including Crescent Place and Marino Crescent, however, the impact of this loss of parking is considered to have a **Negative, Moderate and Long-term effect**.

The contents of Table 6.27 present a summary of the proposed changes to parking along Section 2 of the Proposed Scheme between the Do Minimum and Do Something scenarios.

Table 6.27: Section 2 – Overall Changes in Parking / Loading Spaces

Location	Parking Type	Do Minimum	Do Something	Change
R107 Malahide Road (eastern side) - Between R808 Gracefield Road and Danieli Road	Informal Parking: general residential	10	0	-10
R107 Malahide Road (western side) - Immediately south of Mornington Grove	Informal Parking: general residential and commercial	7	5	-2
	Disabled Bay	1	1	0
R107 Malahide Road (western side) - Immediately north of Kilmore Road	Informal Parking: general residential and commercial	6	0	-6
R107 Malahide Road (eastern side) – Between Clancarthy and Donnycarney Road	Informal Parking: general residential and commercial	4	4	0
R107 Malahide Road (western side) - Between Donnycarney Road and Casino Park	Informal Parking: general residential and commercial	11	6	-5
R107 Malahide Road (eastern side) - Between Crescent Place and Marino Crescent	Pay & Display: general / commercial	14	0	-14
Total		53	16	-37

As shown in Table 6.27, there are currently approximately 53 parking spaces affected along Section 2 of the Proposed Scheme and it is proposed that 37 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 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, Moderate and Long-term effect**. This moderate 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.

6.4.6.1.7 Summary of Corridor-Wide Infrastructure Works

6.4.6.1.7.1 Pedestrian Infrastructure

Overall, the Proposed Scheme will provide an average increase in footway area for pedestrians of 26% inbound and 14% outbound across the corridor compared to the Do Minimum scenario. The Proposed Scheme will increase the number of controlled pedestrian crossings from 36 in the Do Minimum to 52 in the Do Something scenario, equating to a 70% increase. Additionally, there will be an increase in the number of raised table crossings on side roads from 9 in the Do Minimum to 31 in the Do Something scenario, equating to a 244% increase.

6.4.6.1.7.2 Cycling Infrastructure

The Proposed Scheme will provide 4.7km inbound and 5.3km outbound of segregated cycle facilities which is an increase from only 0.2km in both directions in the Do Minimum scenario. In turn, there will be a decrease in non-

segregated cycle facilities in the Do Something scenario compared to the Do Minimum as these facilities will be upgraded to segregated facilities in most cases.

Overall, total cycle facilities (segregated and non-segregated) will be increased by 47% as part of the Proposed Scheme. The proportion of the corridor with segregated facilities (including quiet street treatment) will increase from 5% in the Do Minimum to 100% in the Do Something scenario.

With regards to cycle parking, 226 spaces are provided in the Do Minimum scenario. The Proposed Scheme will increase provision by 87% to a total of 422 spaces across the entire corridor in the Do Something scenario.

6.4.6.1.7.3 Bus Priority Infrastructure

The Proposed Scheme will provide 5.1km inbound and 5.0km outbound of bus lanes across the corridor. This is an increase from 4.5km inbound and 3.9km outbound in the Do Minimum scenario. This contributes to an increase of 36% in total bus priority measures in both directions in the Do Something scenario compared to the Do Minimum. Overall, the Proposed Scheme will provide bus priority measures along the entirety of the corridor.

6.4.6.1.7.4 Parking & Loading

Whilst total parking provision will be reduced by 66 spaces as part of the Proposed Scheme, the majority of these spaces (39) are informal spaces (general residential) and the overall number of disabled parking spaces will increase by one space in the Do Something scenario compared to the Do Minimum.

6.4.6.2 Quantitative Analysis

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

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

6.4.6.2.1 People Movement Assessment

6.4.6.2.1.1 Overview

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

The assessment of People Movement includes the following metrics:

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

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

6.4.6.2.2 Peak Hour People Movement along the Proposed Scheme

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

As outlined previously, the same demographic assumptions (population, employment levels) are included in both the Do Minimum and Do Something scenarios. The bus network and frequency assumptions are also the same in both scenarios and are in line with the BusConnects 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.

6.4.6.2.2.1 2028 AM Peak Hour People Movement

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



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

As indicated in Diagram 6.7, there is a reduction of 30% in the number of people travelling via car, an increase of 24% in the number of people travelling via bus and an increase of 93% in people walking or cycling along the Proposed Scheme during the AM Peak Hour. It should be noted that the model predicts limited change in total walking trips between each scenario. This is due to the fact that walking trips in the Do Minimum scenario are also transferring to public transport and cycling due to the improved provision with any new walkers transferring from car replacing these trips.

The Proposed Scheme will facilitate a step change in the level of segregated cycling provision in comparison with existing conditions along the entire length of the corridor. The transport modelling undertaken, is therefore conservative in terms of the predicted cycling mode share. The Proposed Scheme has been designed to cater for much higher levels of cycling uptake and this will provide the opportunity for a significant increase in the movement of people travelling sustainably along the corridor, which would otherwise not be achieved in the absence of the Proposed Scheme.

The contents of Table 6.28 outline the difference in modal split between the Do Minimum and Do Something scenarios for each mode of transport in an inbound direction towards the City Centre during the AM Peak Hour. The results indicate a 15% increase in people moved as a result of the Proposed Scheme and 32% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 6.28: 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 (%)
		General Traffic	960	28%	670	17%	-290	-30%

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	Public Transport	2,110	63%	2,610	68%	500	24%
		Walking	150	4%	150	4%	0	0%
		Cycling	150	4%	430	11%	280	187%
		Combined Walking/Cycling	300	9%	580	15%	280	93%
		Sustainable Modes Total	2,410	72%	3,190	83%	780	32%
		Total (All modes)	3,370	100%	3,860	100%	490	15%

6.4.6.2.2.2 2028 PM Peak Hour People Movement

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



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

As indicated in Diagram 6.8, there is a reduction of 24% in the number of people travelling via car, an increase of 29% in the number of people travelling via bus and an increase in 83% in the number of people walking or cycling along the Proposed Scheme during the PM Peak Hour.

Table 6.29 outlines the difference in modal split between the Do Minimum and Do Something scenarios for each mode of transport in an outbound direction from the City Centre during the PM Peak Hour. The results indicate

16% increase in people moved as a result of the Proposed Scheme and 36% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 6.29: 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	930	34%	710	23%	-220	-24%
		Public Transport	1,550	57%	2,000	63%	450	29%
		Walking	110	4%	120	4%	10	9%
		Cycling	130	5%	320	10%	190	146%
		Combined Walking/Cycling	240	9%	440	14%	200	83%
		Sustainable Modes Total	1,790	66%	2,440	77%	650	36%
		Total (All modes)	2,720	100%	3,150	100%	430	16%

6.4.6.2.2.3 2043 AM Peak Hour People Movement

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



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

As indicated in Diagram 6.9, there is a decrease of 33% in the number of people travelling via car, an increase of 35% in the number of people travelling via bus and an increase of 124% in the number of people walking and cycling along the Proposed Scheme during the AM Peak Hour.

The contents of Table 6.30 outline the difference in modal split between the Do Minimum and Do Something scenarios for each mode of transport in an inbound direction towards the City Centre during the AM Peak Hour. The results indicate a 27% increase in people moved as a result of the Proposed Scheme and 48% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 6.30: 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	880	27%	590	14%	-290	-33%
		Public Transport	2,050	62%	2,760	66%	710	35%
		Walking	180	5%	170	4%	-10	-6%
		Cycling	190	6%	660	16%	470	247%
		Combined Walking/Cycling	370	11%	830	20%	460	124%
		Sustainable Modes Total	2,420	73%	3,590	86%	1,170	48%
		Total (All modes)	3,300	100%	4,180	100%	880	27%

6.4.6.2.2.4 2043 PM Peak Hour People Movement

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



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

As indicated in Diagram 6.10, there is a decrease of 21% in the number of people travelling via car, an increase of 46% in the number of people travelling via bus and an increase of 80% in the number of people walking and cycling along the Proposed Scheme during the PM Peak Hour.

The contents of Table 6.31 outline the difference in modal split between the Do Minimum and Do Something scenarios for each mode of transport in an outbound direction from the City Centre during the PM Peak Hour. The results indicate 27% increase in people moved as a result of the Proposed Scheme and 52% increase in people moved by sustainable modes (Public Transport, Walk, Cycle).

Table 6.31: 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	860	35%	680	22%	-180	-21%
		Public Transport	1,380	55%	2,020	64%	640	46%
		Walking	130	5%	140	4%	10	8%
		Cycling	120	5%	310	10%	190	158%
		Combined Walking/Cycling	250	10%	450	14%	200	80%
		Sustainable Modes Total	1,630	65%	2,470	78%	840	52%

Direction	Time Period	Mode of Transport	Do Minimum		Do Something		Difference	
			Hourly Trips	Modal Split (%)	Hourly Trips	Modal Split (%)	Hourly Trips	Difference (%)
		Total (All modes)	2,490	100%	3,150	100%	660	27%

6.4.6.2.3 People Movement by Bus

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

6.4.6.2.3.1 2028 AM Peak Hour Bus Passengers

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

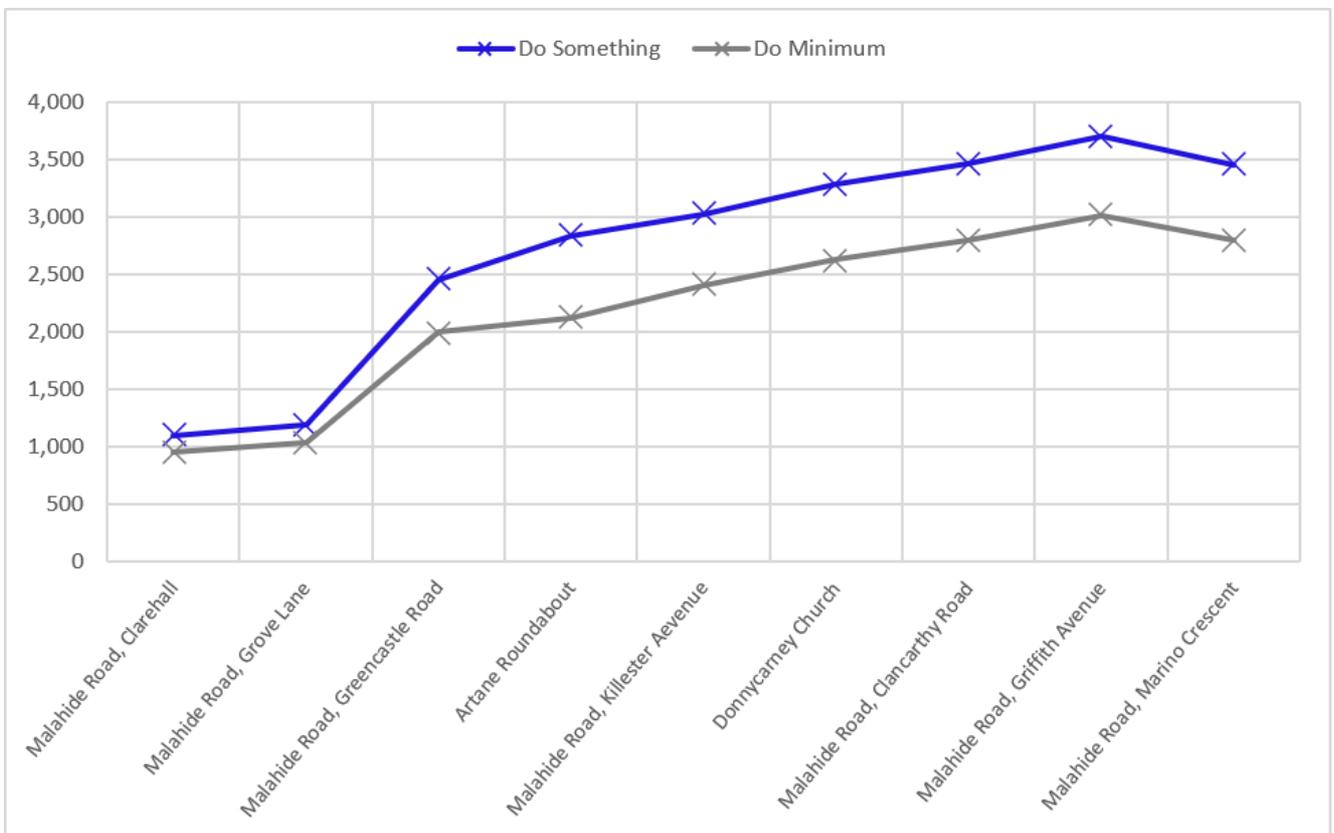


Diagram 6.11: 2028 AM Peak Hour Passenger Volume along Proposed Scheme (inbound direction)

Diagram 6.11 shows higher levels of bus passenger loadings along the Proposed Scheme with a notable increase at the intersection between Malahide Road and Greencastle Road. The volume of passengers increases consistently and reaches its peak at the intersection with Griffith Avenue with a volume of 3,700 passengers in the AM Peak hour, compared to approximately 3,000 in the Do Minimum scenario.

The increase in bus passengers remains at a high level along the Proposed Scheme with approximately 700 additional users on most of the corridor, compared to the Do Minimum scenario.

6.4.6.2.3.2 2043 AM Peak Hour Bus Passengers

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

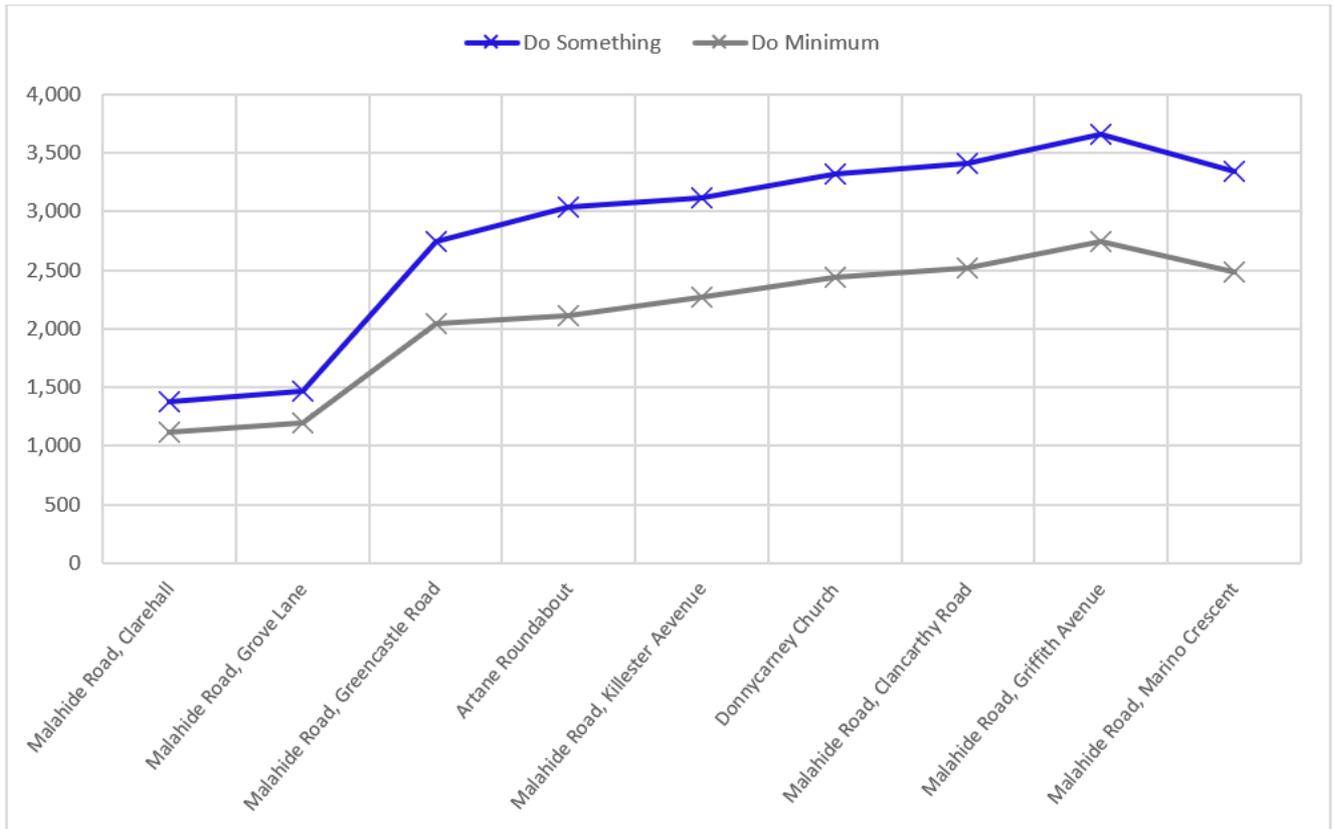


Diagram 6.12: 2043 AM Peak Hour Passenger Volume along Proposed Scheme (inbound direction)

Diagram 6.12 shows higher levels of bus passenger loadings along the Proposed Scheme with a notable increase at the intersection between the R107 Malahide Road and Greencastle Road. The volume of passengers increases consistently and reaches its peak at the intersection with Griffith Avenue with a volume of 3,700 passengers in the AM Peak hour, compared to approximately 2,700 in the Do Minimum scenario.

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

6.4.6.2.3.3 2028 PM Peak Hour Bus Passengers

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

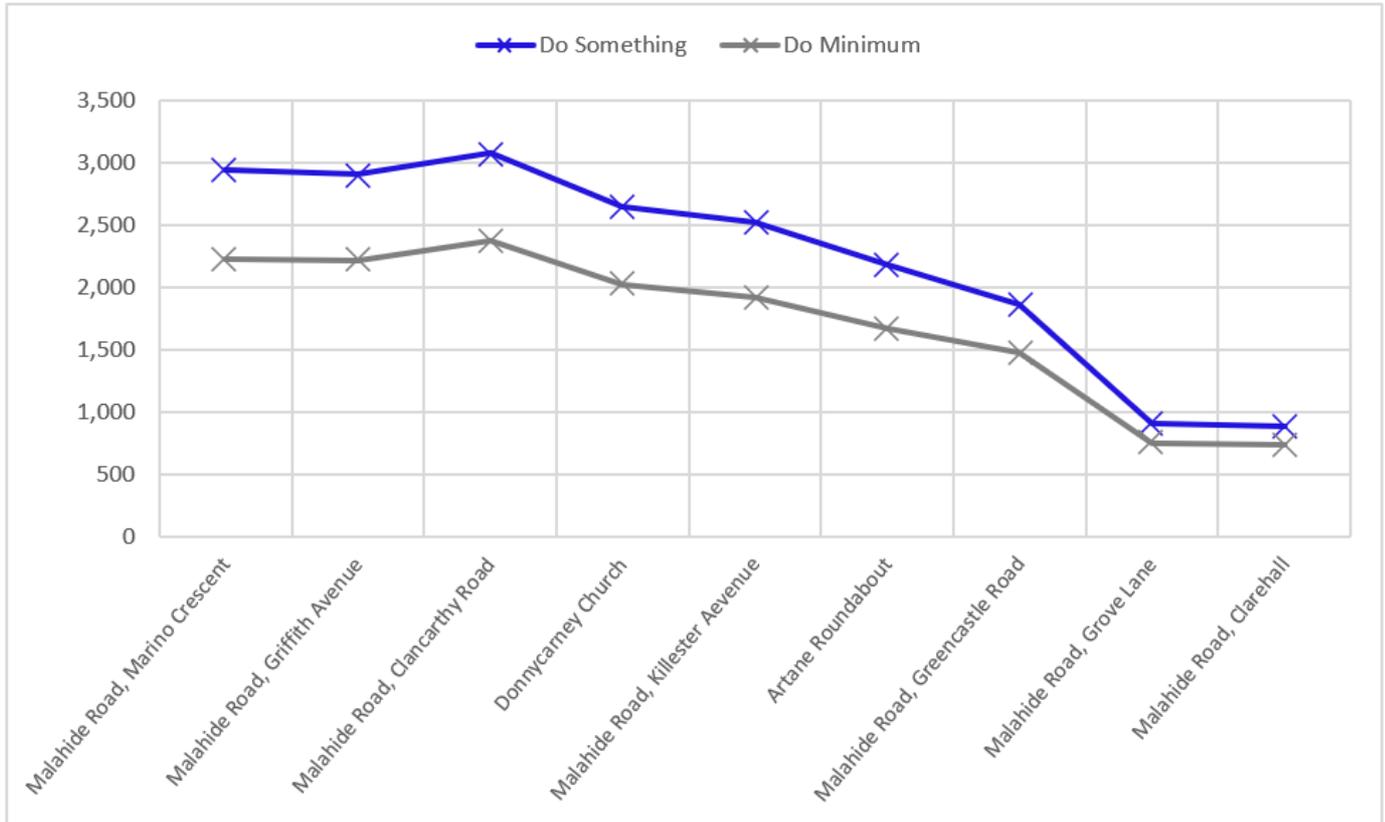


Diagram 6.13: 2028 PM Peak Hour Passenger Volume along Proposed Scheme (outbound direction)

Diagram 6.13 shows a higher level of bus passenger on the southern part of the scheme, where the loadings reach a peak at approximately 3,000 passengers in the Do Something scenario, compared to 2,300 passengers in the Do Minimum.

The increase in bus patronage is high all along the Proposed Scheme, specifically on the southern part of the corridor where the additional passengers loading is approximately 700, compared to the Do Minimum scenario.

6.4.6.2.3.4 2043 PM Peak Hour Bus Passengers

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

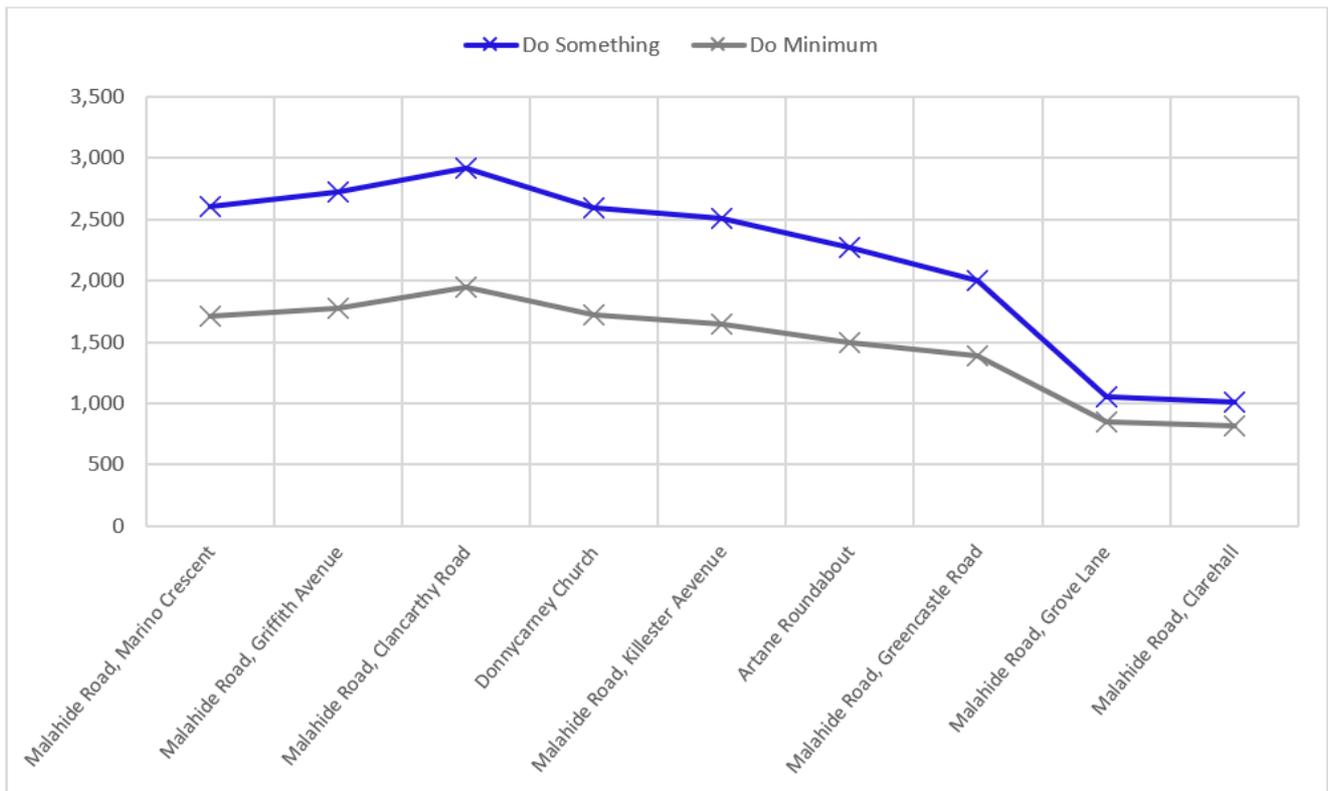


Diagram 6.14: 2043 PM Peak Hour Passenger Volume along Proposed Scheme (outbound direction)

Diagram 6.14 shows a higher level of bus passenger on the southern part of the scheme, where the loadings reach a peak loading at approximately 2,900 passengers in the Do Something scenario, compared to 1,900 passengers in the Do Minimum.

The increase in bus patronage is high all along the Proposed Scheme, specifically on the southern part of the corridor where the additional passenger load is approximately 1,000, compared to the Do Minimum scenario.

6.4.6.2.3.5 Bus Boardings

Since many bus services commence and end further away from the direct alignment of the Proposed Scheme, an additional assessment has been undertaken to compare the Do Minimum and Do Something total passengers boarding on bus routes that use any part of the Proposed Scheme (including those stops not directly on the Proposed Scheme) in both 2028 and 2043 forecast years. The results for the 2028 Opening Year scenario are indicated in Table 6.32.

Table 6.32: 2028 Peak Hour Bus Boardings on Routes using the Proposed Scheme (inc. boarding at stops outside Proposed Scheme)

Time Period	Do Minimum (no. of boardings)	Do Something (no. of boardings)	Difference in No. of Boardings	Difference (%)
AM Peak Hour	8,830	9,680	850	9.6%
PM Peak Hour	7,670	8,500	830	10.8%

The contents of Table 6.32 show that there will be a 9.6% increase in people boarding bus routes which use the Proposed Scheme during the AM Peak Hour. This represents an addition of 850 passengers in the AM Peak hour.

In the PM Peak hour, there will be a 10.8% increase in people boarding bus routes which use the Proposed Scheme, representing an additional 830 passengers.

The comparison results for the 2043 Design Year scenario are indicated in Table 6.33.

Table 6.33: 2043 Peak Hour Bus Boardings on Routes using the Proposed Scheme (inc. boarding at stops outside Proposed Scheme)

Time Period	Do Minimum (no. of boardings)	Do Something (no. of boardings)	Difference in No. of Boardings	Difference (%)
AM Peak Hour	9,070	10,020	950	10.5%
PM Peak Hour	7,750	8,840	1,090	14.1%

The contents of Table 6.33 show 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 950 passengers in the AM Peak hour.

In the PM Peak hour, there will be a 14.1% increase in people boarding bus routes which use the Proposed Scheme, representing an additional 1,090 passengers.

6.4.6.2.4 People Movement – Significance of Impact

The significance of impact for the movement of People Movement 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 Proposed Scheme has been adjudged to deliver a **Positive, Very Significant and Long-term** impact in terms of People Movement by sustainable modes. The Proposed Scheme can be shown to deliver significant improvements in people movement by sustainable modes along the Proposed Scheme corridor, particularly by bus, with reductions in car mode share due to the enhanced sustainable mode provision.

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

6.4.6.2.5 Operational Impacts for Bus Users

6.4.6.2.5.1 Overview

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

Due to the stochastic nature of the micro-simulation software, model outputs based on the average of 10 simulation seed runs (minimum of 5 recommended as per Transport for London (2010) Traffic Modelling Guidelines) have been calculated between the point of Proposed Scheme entry and exit and compared against the corresponding Do Minimum scenarios.

6.4.6.2.5.2 Bus Journey Time and Reliability changes as a result of the Proposed Scheme

To give an overview of how the Proposed Scheme will impact on bus journey times along the corridor, outputs for the D1 service, which traverses the entire length of the Proposed Scheme, have been extracted from the model. As outlined in Section 6.4.3, the assessment is based in the context of the full implementation of the BusConnects network re-design in both the Do Minimum and Do Something scenarios, with the Proposed Scheme servicing the D-Spine services.

Inbound Direction

Average journey times for the inbound D1 service in 2028 Opening Year and in 2043 Design Year can be seen in Table 6.34. 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) in Volume 4 of this EIAR.

Table 6.34: D1 Service Bus Average Journey Times (Inbound Direction)

Peak Hour	Do Minimum (minutes)	Do Something (minutes)	Difference (minutes)	% Difference
2028 AM	22.7	18.2	-4.5	-20%
2028 PM	22.7	18.0	-4.7	-21%
2043 AM	22.9	18.2	-4.7	-20%
2043 PM	22.6	17.4	-5.2	-23%

Additional information regarding the range of journey times (minimum, maximum, average and standard deviation) for inbound D1 buses in the Do Minimum (red) and Do Something (blue) can be seen in Table 6.35 and Diagram 6.15 below. Each dot in the diagram represents the journey time for each individual bus in each scenario. A larger range of journey times are an indication of lower levels of reliability in a given scenario.

Table 6.35: D1 Service – Range of Journey Times (Inbound Direction)

Peak Hour	Do Minimum				Do Something			
	MIN	MAX	AVG	STDEV	MIN	MAX	AVG	STDEV
2028 AM	20.0	24.1	22.7	1.1	16.5	20.6	18.2	1.1
2028 PM	20.3	25.0	22.7	1.4	16.3	20.0	18.0	1.0
2043 AM	20.1	28.1	22.9	1.7	17.0	22.3	18.2	1.1
2043 PM	20.3	25.3	22.6	1.4	15.9	18.7	17.4	0.7



Diagram 6.15: D1 Bus Journey Times (Inbound Direction)

Based on the results presented in Table 6.34, the Proposed Scheme will deliver average inbound journey time savings for D1 service bus passengers of up to 4.7 minutes (21%) in 2028 (PM) and 5.2 minutes (23%) in 2043 (PM). Furthermore, results presented in Diagram 6.15 suggest an improvement in bus journey time reliability in

all four scenarios as indicated by the reduced ranges of journey times achieved with the individual durations focused much closer to the average journey times (lower standard deviation) in the Do Something scenario (blue dots) with the Proposed Scheme in place compared to the more dispersed range in the Do Minimum scenario (red dots).

Note that the variation in journey times shown above are based on one set of predicted flows for the Do Minimum and Do Something scenario. 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 D1 service are also illustrated in the cumulative time-distance graphs shown in Diagram 6.16 to Diagram 6.19.

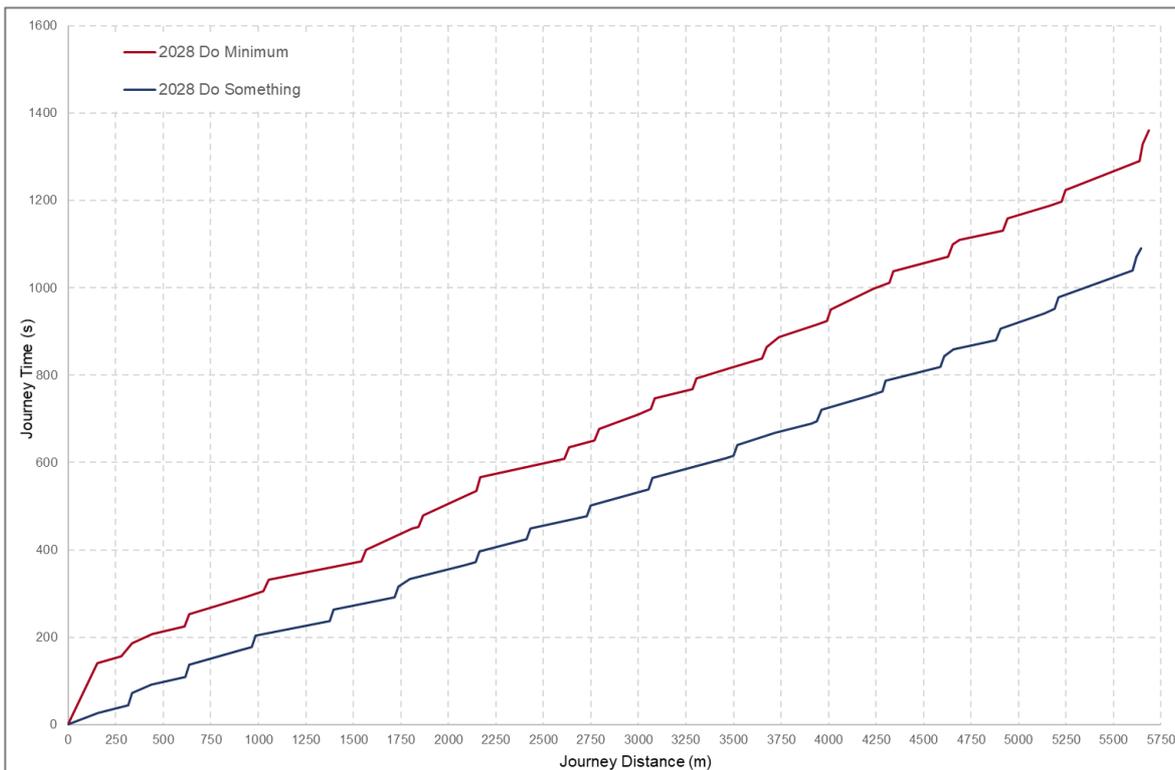


Diagram 6.16: D1 Bus Journey Time (2028 AM, Inbound)

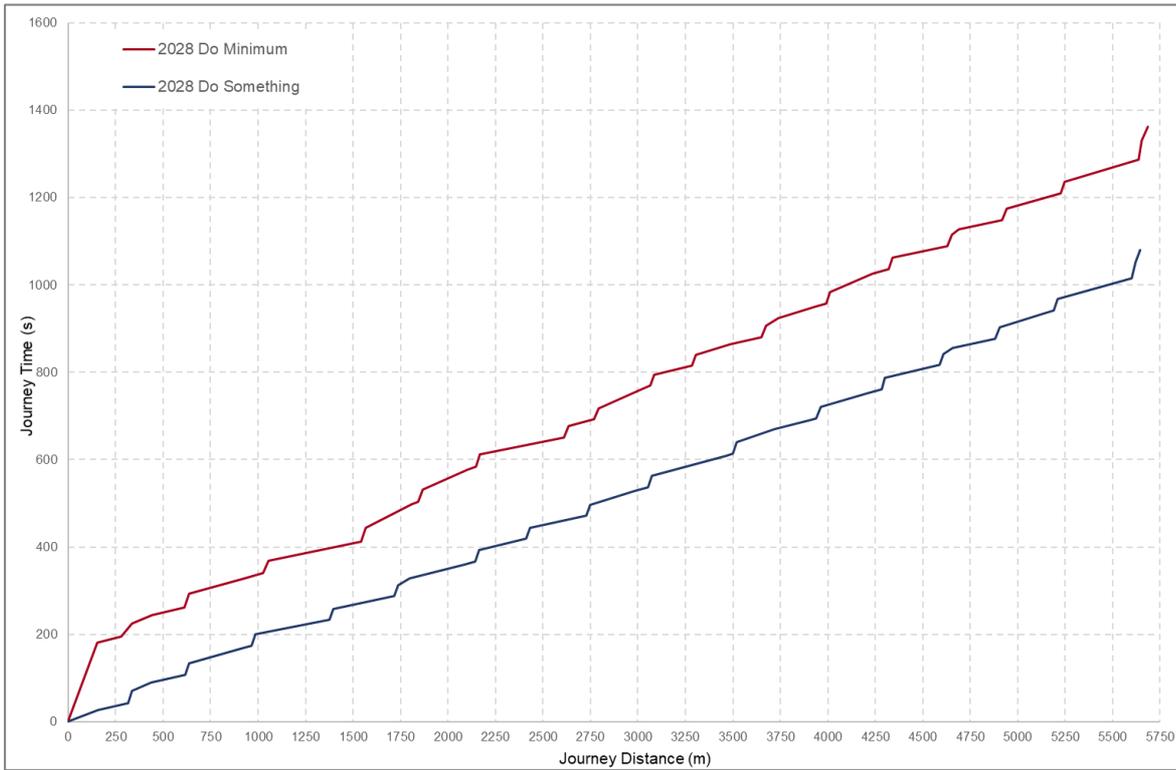


Diagram 6.17: D1 Bus Journey Time (2028 PM, Inbound)

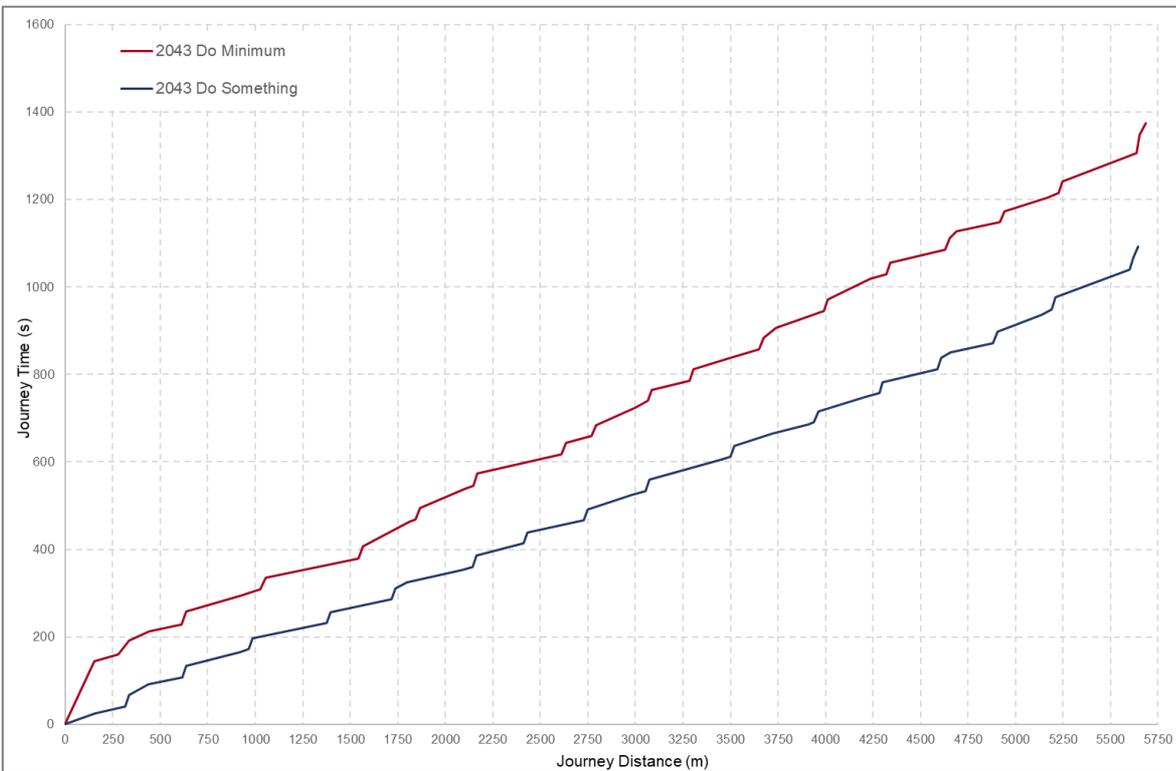


Diagram 6.18: D1 Bus Journey Time (2043 AM, Inbound)

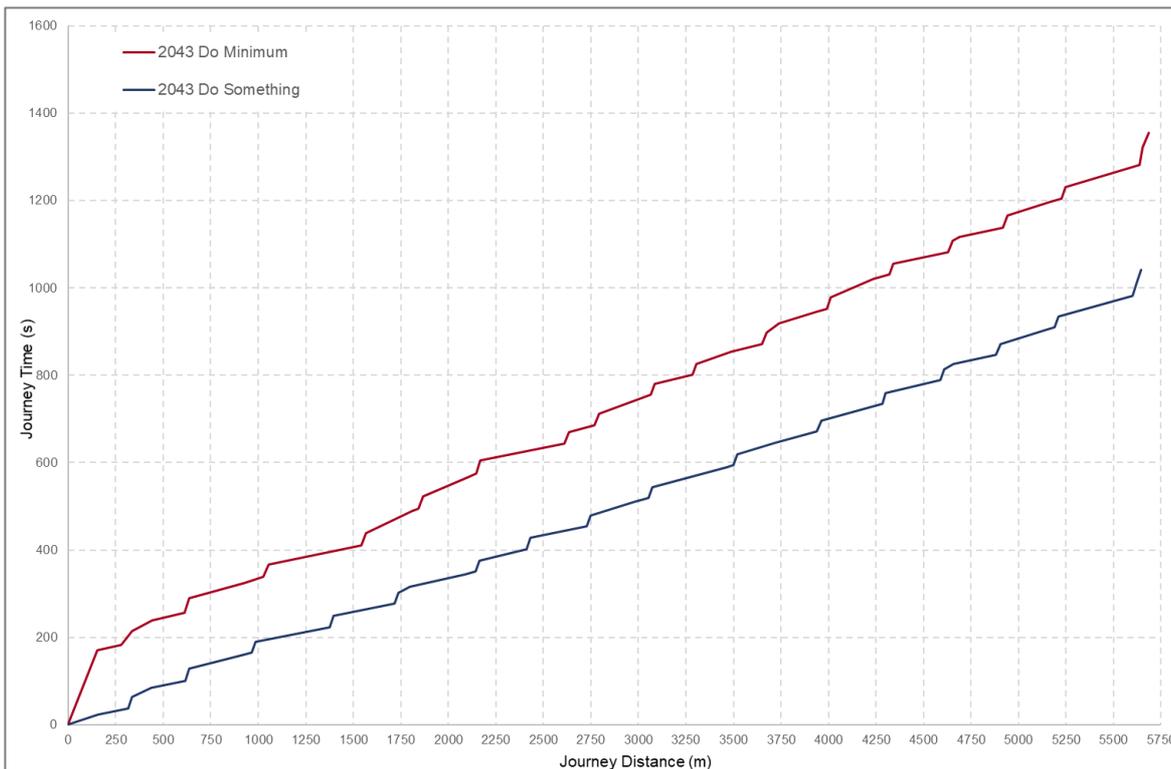


Diagram 6.19: D1 Bus Journey Time (2043 PM, Inbound)

Based on the results presented in Diagram 6.16 to Diagram 6.19, the Proposed Scheme will deliver notable bus journey time savings on the southbound R107 Malahide Road approach to the R139 Northern Cross junction in all scenarios. This is due to the introduction of a short but effective section of bus lane on the northern arm of the junction and the bus priority ‘hurry calls’ (use of traffic signal plans to give buses priority ahead of general traffic) offered to mainline buses as part of the Proposed Scheme. In all scenarios, the junction is shown to operate over capacity for general traffic, with a considerable amount of ‘gated’ traffic on the R107 and western R139 approaches.

Beyond Greencastle Road, the junction improvements and bus priority ‘hurry calls’ included as part of the Proposed Scheme can be shown to create cumulative bus journey time savings over the Do Minimum, most notably at the currently un-signalised Artane Roundabout.

Outbound Direction

Average journey times for the outbound D1 service in 2028 Opening Year and in 2043 Design Year can be seen in Table 6.34. 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) in Volume 4 of this EIAR.

Table 6.36: D1 Service Bus Journey Times (Outbound Direction)

Peak Hour	Do Minimum (minutes)	Do Something (minutes)	Difference (minutes)	% Difference
2028 AM	20.1	16.4	-3.7	-18%
2028 PM	20.6	16.5	-4.1	-20%
2043 AM	19.5	16.3	-3.2	-17%
2043 PM	19.6	17.0	-2.6	-13%

Additional information regarding the range of journey times (minimum, maximum, average and standard deviation) for outbound D1 buses in the Do Minimum (red) and Do Something (blue) can be seen in Table 6.37 and Diagram 6.20 below. Each dot represents the journey time for each individual bus in each scenario. A larger range of journey times are an indication of lower levels of reliability.

Table 6.37: D1 Service – Range of Journey Times (Outbound Direction)

Peak Hour	Do Minimum				Do Something			
	MIN	MAX	AVG	STDEV	MIN	MAX	AVG	STDEV
2028 AM	17.5	23.1	20.1	1.4	15.1	17.9	16.4	0.8
2028 PM	18.7	24.2	20.6	1.2	15.0	18.7	16.5	0.8
2043 AM	17.4	23.1	19.5	1.3	14.8	17.7	16.3	0.8
2043 PM	17.9	22.3	19.6	1.2	15.3	18.4	17.0	0.8

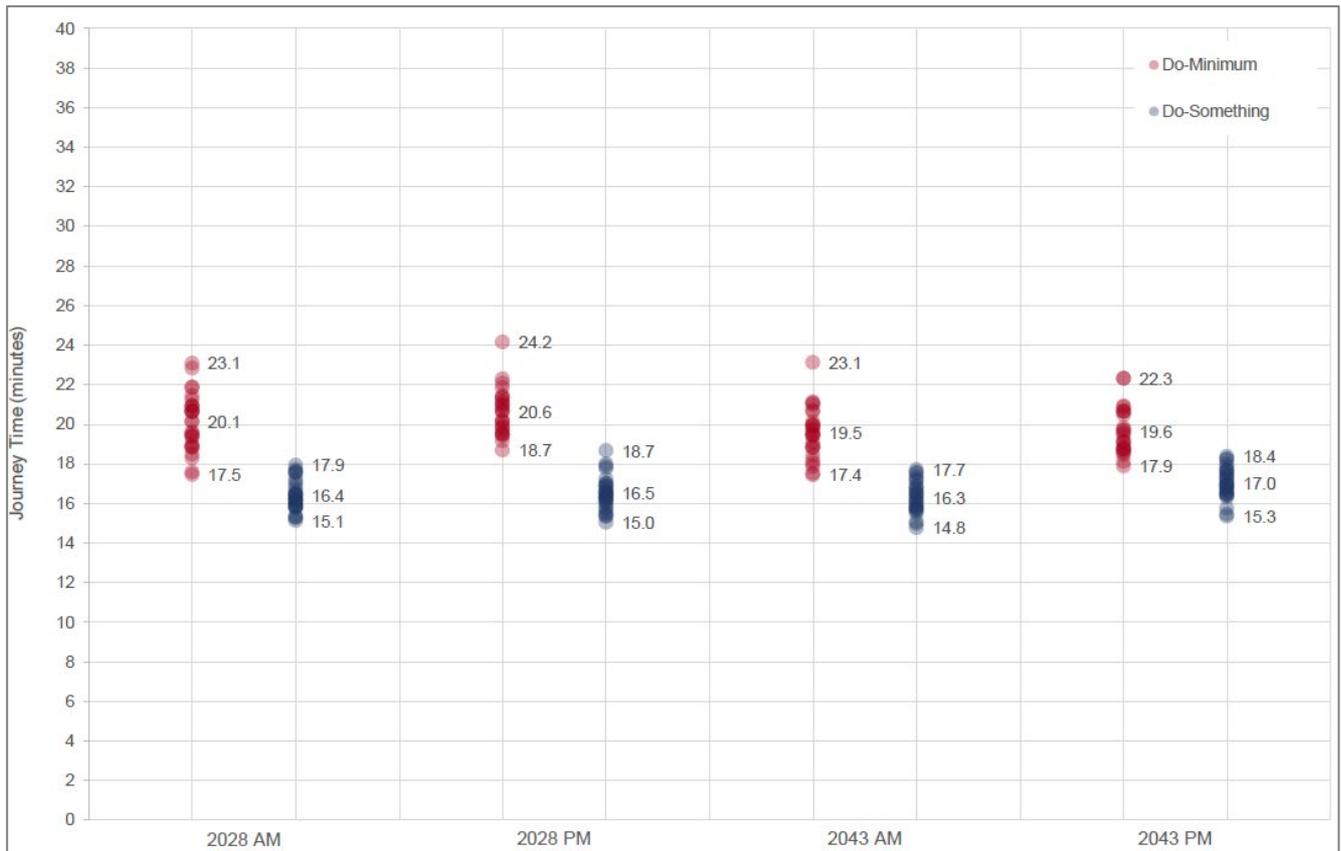


Diagram 6.20: D1 Bus Journey Times (Outbound Direction)

Based on the results presented in Table 6.34, the Proposed Scheme will deliver average outbound journey time savings for D1 service bus passengers of up to 4.1 minutes (20%) in 2028 (PM) and 3.2 minutes (17%) in 2043 (AM). Furthermore, results presented in Diagram 6.25 suggest an improvement in bus journey time reliability in all four scenarios as indicated by the reduced ranges of journey times achieved with the durations focused much closer to the average journey times (lower standard deviation) in the Do Something scenario (blue dots) with the Proposed Scheme in place compared to the more dispersed range in the Do Minimum scenario (red dots). Note that the variation in journey times shown above are based on one set of predicted flows for the Do Minimum and Do Something scenario. Traffic flows fluctuate daily which would mean that the variation in journey times would be much greater in the Do Minimum with any increases in traffic flows compared to the protection of journey time reliability provided by the bus priority measures that comprise the Proposed Scheme.

A comparison of average Do Minimum and Do Something journey times for the D1 service for the outbound direction of travel illustrated in the cumulative time-distance graphs shown in Diagram 6.21 to Diagram 6.24.

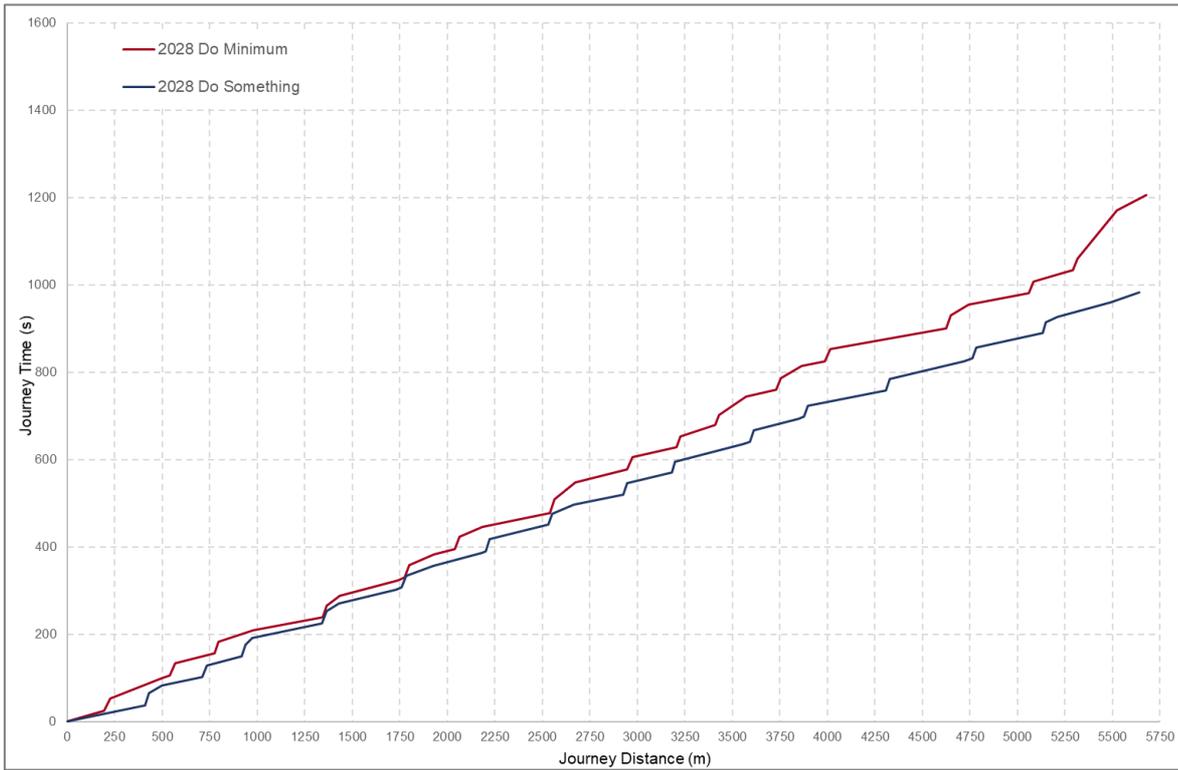


Diagram 6.21: D1 Bus Journey Time (2028 AM, Outbound)

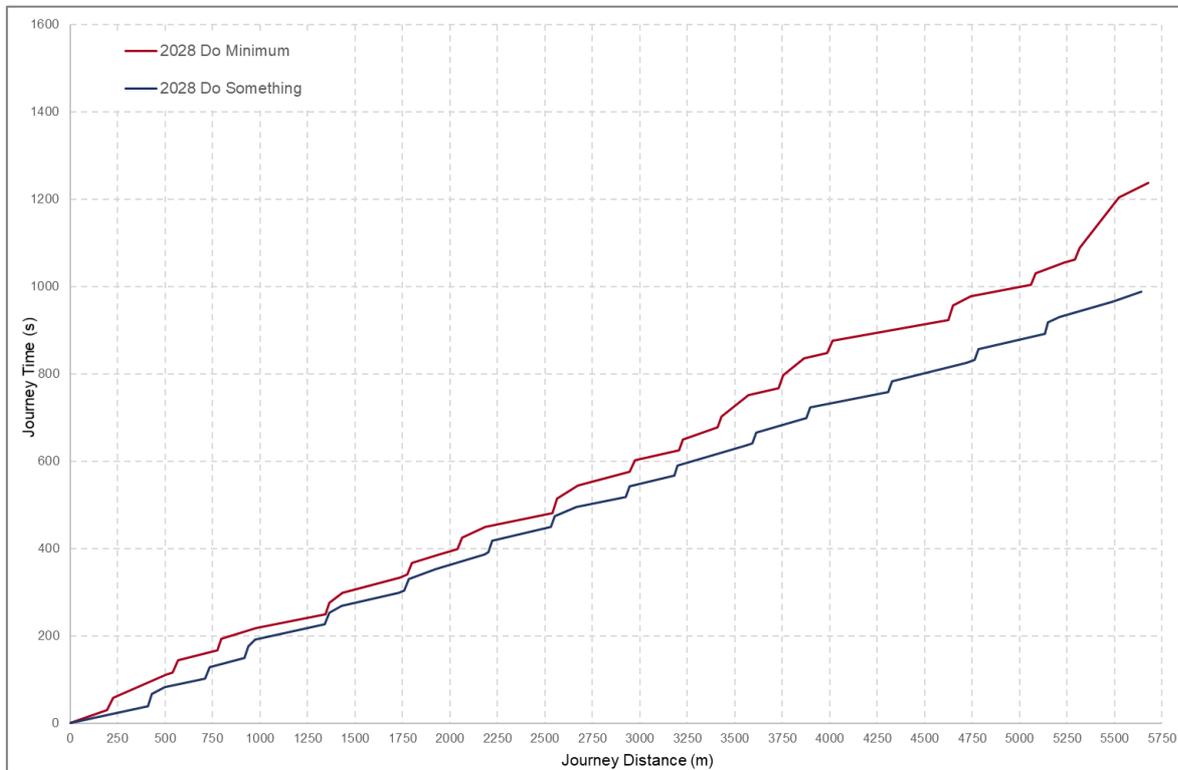


Diagram 6.22: D1 Bus Journey Time (2028 PM, Outbound)

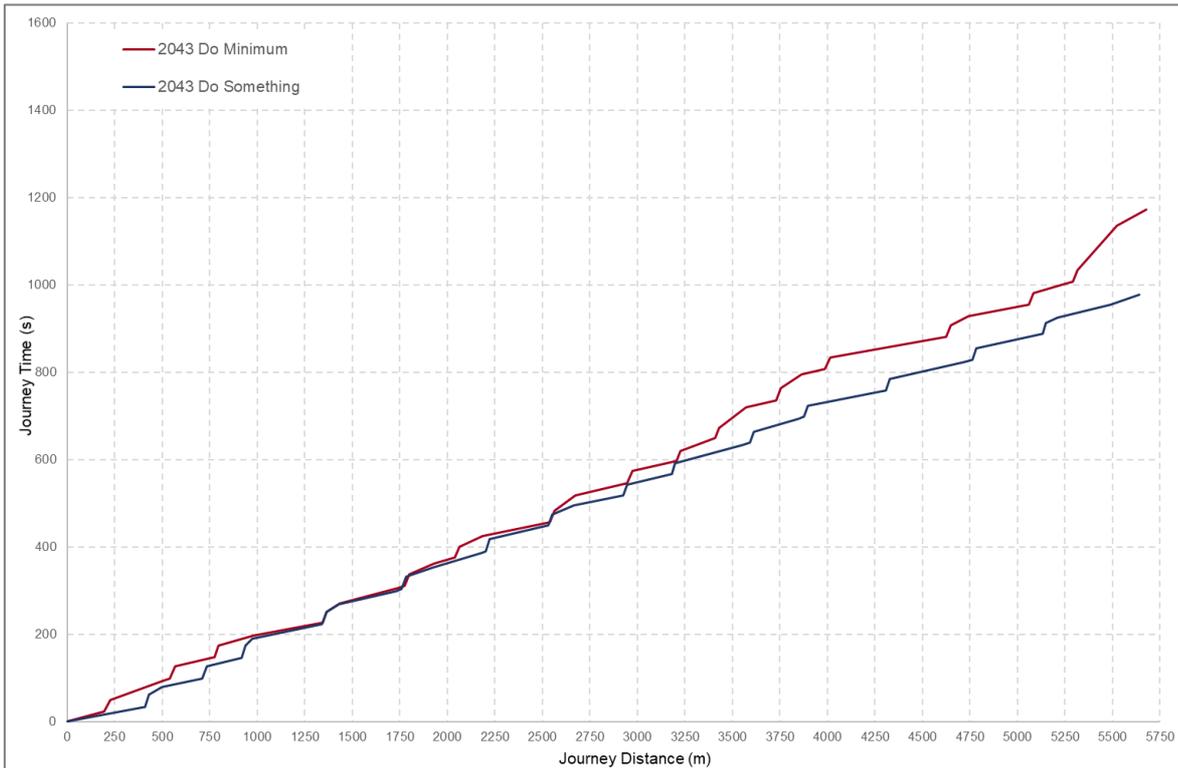


Diagram 6.23: D1 Bus Journey Time (2043 AM, Outbound)

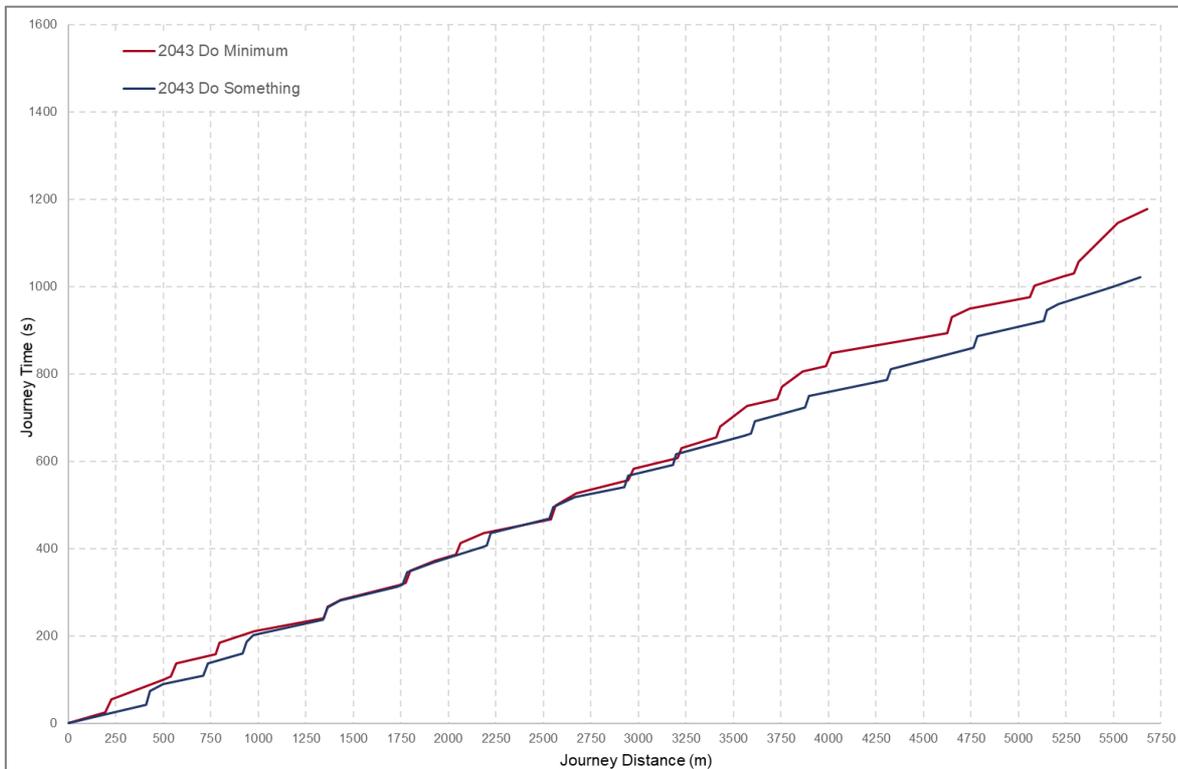


Diagram 6.24: D1 Bus Journey Time (2043 PM, Outbound)

Based on the results presented in Diagram 6.21 to Diagram 6.24 the Proposed Scheme will deliver bus journey time savings between the R105 Clontarf Road and the R102 Griffith Avenue four arm junction following the introduction of the northbound bus lane in the Proposed Scheme.

As expected, Do Something benefits along this section are most notable in the PM peak where blocking back from the R013 Collins Avenue four arm junction extends beyond the R102 Griffith Avenue in the Do Minimum scenario.

Lower changes in journey time can be seen on the section of the R107 Malahide Road between the R102 Griffith Avenue and the Kilmore Road three-arm signalised junction. This is due to the 'gating' of traffic at the R102 Collins Avenue and the upgrade of pedestrian crossing and cycle facilities (including the introduction of advanced green, pre signals for cycles) at a number of junctions in between, with the corresponding improvements for pedestrians and cyclists balanced against the provision for buses along this section.

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

Significant journey time savings can also be seen in the Do Something on the northbound R107 Malahide Road approach to the R139 Northern Cross junction as a result of the extension of the existing bus lane up to the stop line. As expected, these benefits are most notable in the PM peak.

6.4.6.2.5.3 Total Journey Time Changes for all Proposed Scheme Bus Services

The change in total bus journey time for all buses travelling along the Proposed Scheme, is shown in Table 6.38 in vehicle minutes.

Table 6.38: Total Bus Journey Time

Peak Hour	Do Minimum (vehicle minutes)	Do Something (vehicle minutes)	Difference (vehicle minutes)	%Difference
2028 AM	1034	858	-176	-17%
2028 PM	1047	860	-187	-18%
2043 AM	1029	862	-167	-16%
2043 PM	1035	860	-175	-17%

Based on the results presented in Table 6.38, modelling shows that the Proposed Scheme will reduce total bus journey times along the Proposed Scheme by up to 18% in 2028 and 17% in 2043. Based on the AM and PM peak hours alone, this equates to **6.0 hours of savings in 2028 and 5.7 hours in 2043** combined across all buses when compared to the Do Minimum. On an annual basis this equates to approximately 4,500 hours of bus vehicle savings in 2028 and 4,300 hours in 2043, when considering weekday peak periods only.

6.4.6.2.6 Bus Users Assessment Summary

The findings of the Bus User assessment shows that the Proposed Scheme fully aligns with the aims and objectives of the CBC Infrastructure Works, to 'Enhance the capacity and potential of the public transport system by improving bus speeds, reliability and punctuality through the provision of bus lanes and other measures to provide priority to bus movement over general traffic movements'.

The significance of impact on bus users of the Proposed Scheme has been appraised using a qualitative assessment, taking the changes in journey time and journey reliability metrics presented above into consideration. The Proposed Scheme is considered to deliver a **Positive, Significant and Long-term** impact overall.

6.4.6.2.7 Increased Bus Frequency - Resilience Sensitivity Analysis

6.4.6.2.7.1 Background

For the purposes of this EIAR and the transport modelling undertaken in support of the EIAR, no increase in bus service frequency beyond that 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 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.

6.4.6.2.7.2 Resilience Testing

A key benefit of the provision of a resilient BusConnects Service network, one which can provide reliable and consistent journey times, is that it has potential to cater for further significant transfer from private car travel to more sustainable and environmentally friendly travel via public transport.

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

The bus service frequency, along the busiest section, in the 2028 Do Minimum model and in the 2028 Do Something Resilience testing models is outlined in Table 6.39 below.

Table 6.39: Resilience Testing Bus Service Frequency Scenario Testing

Scenario	Inbound (Buses per Hour)	Outbound (Buses per Hour)
Do Minimum	25	25
Do Something	25	25
Do Minimum - Additional Services Resilience Test	35	35
Do Something - Additional Services Resilience Test	35	35

Table 6.40 outlines the average journey times for the inbound Clongriffin to City Centre D1 service in the 2028 Opening Year.

Table 6.40: D1 Service – Average Bus Journey Times

Peak Hour	Do Minimum (minutes)	Do Minimum (Additional Services) (minutes)	% Difference	Do Something (minutes)	Do Something - Additional Services (minutes)	% Difference
2028 AM	22.7	22.4	-1%	18.2	18.0	-1%
2028 PM	20.4	21.9	+7%	16.5	16.5	0%

The results of the scenario testing with an additional 10 buses per direction per hour operating along the Proposed Scheme in the 2028 Opening Year are presented graphically in Diagram 6.25 below. The diagram displays the maximum, minimum and average journey times for each of the D1 bus services modelled.

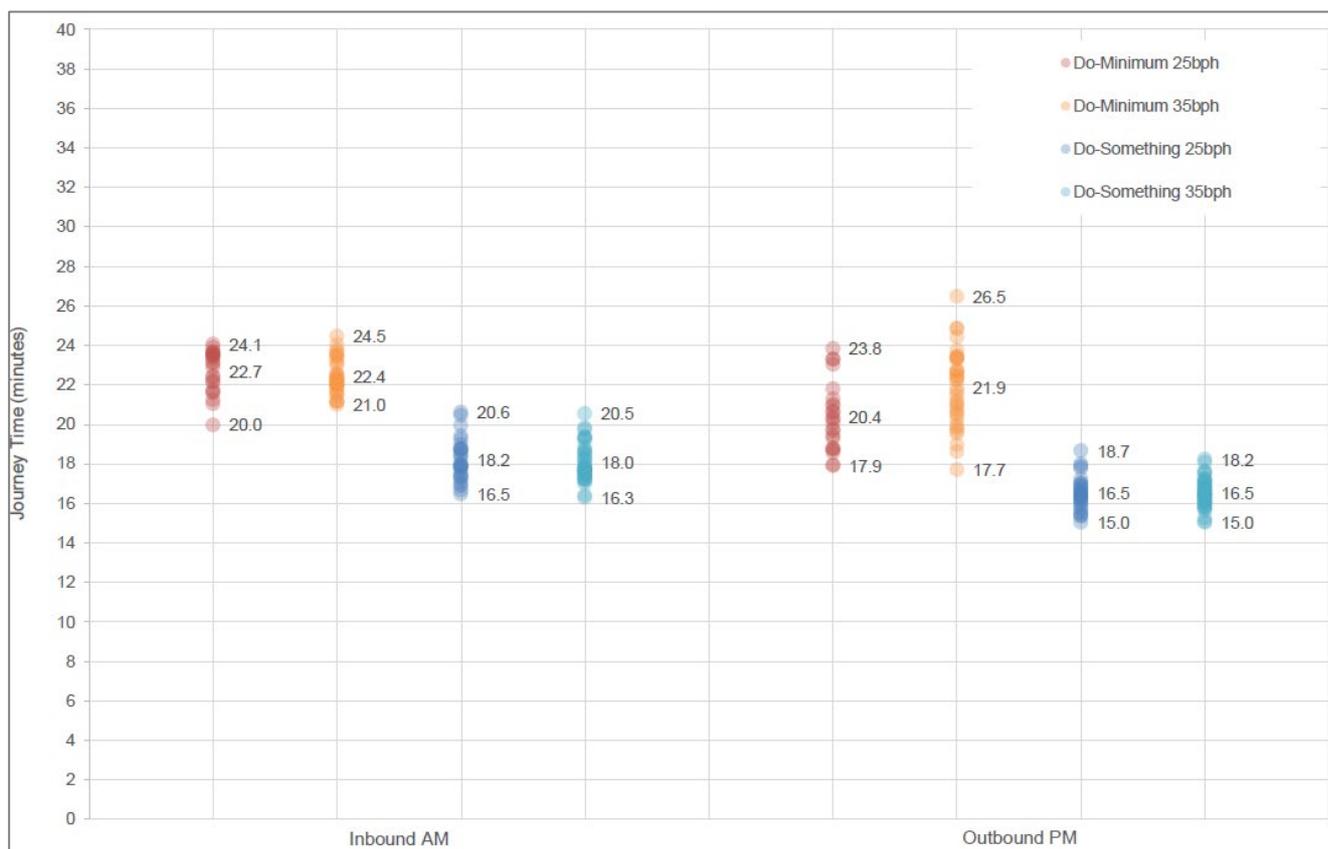


Diagram 6.25: Resilience Testing Bus Journey Time Reliability Indicators - Scenario Testing– Opening Year (2028)

As can be seen from Table 6.40 and Diagram 6.25 the results indicate that even with an additional 10 services operating per direction per hour along the Proposed Scheme, a high level of journey time reliability is maintained in the Do Something scenarios, comparable with the 25 buses per direction per hour results. The results indicate negligible change in journey times in the Do Something Resilience sensitivity test per bus. Do Minimum Resilience sensitivity test, however, bus journey time reliability is more severely impacted with additional services in place. The sensitivity test undertaken indicates that with the additional bus services in place in the Do Minimum scenario a larger change in bus journey times of up to c1.5 minutes on average per bus is experienced. ***This highlights the benefit that the Proposed Scheme infrastructure improvements can provide in protecting bus journey time reliability and consistency, as passenger demand continues to grow into the future.***

It must be noted that it was assumed the general traffic levels included in each scenario would remain static. If traffic levels were to increase (typical daily variations are in the order of +/- 15%) then the bus priority infrastructure would further protect journey time reliability and resilience in comparison with the Do Minimum scenario.

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

6.4.6.2.8 General Traffic Assessment

6.4.6.2.8.1 Overview

The Proposed Scheme aims to provide an attractive alternative to the private car and promote a modal shift to public transport, walking and cycling. It is, however, recognised that there will be an overall reduction in operational capacity for general traffic along the direct study area given the proposed changes to the road layout and the rebalancing of priority to walking, cycling and bus. This reduction in operational capacity for general traffic along the Proposed Scheme will likely create some level of trip redistribution onto the surrounding road network.

It should be noted that the Do Minimum and Do Something scenarios are based on the assumption that travel behaviour will remain broadly consistent over time and that car demand, used for this assessment, represents a

reasonable worst-case scenario. It is possible that societal trends in the medium to long term may reduce car demand further due to the ongoing changes to travel behaviours and further shifts towards sustainable travel, flexibility in working arrangements brought on following COVID-19, and delayed car ownership trends that are emerging.

The assessment also assumes that goods vehicles (HGVs and LGVs) continue to grow in line with forecasted economic activity with patterns of travel remaining the same. For example, the assessment assumes a 45% and 77% increase in goods traffic versus the base year in 2028 and 2043 respectively. This is considered a very conservative assumption. It should be noted, however, that the 2021 Climate Action Plan (CAP) (DCCA 2021) includes reference to a freight strategy for the region 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. The plan outlines plans to manage the increase in delivery and servicing requirements as the population grows, which may include the development of consolidation centres to limit the number of 'last-mile' trips made by larger goods vehicles with plans for higher use of smaller electric vans or cargo bikes for 'last-mile' deliveries in urban areas. As proposals for the above are at a pre-planning stage, it was not possible to account for them in the assessments and a worst-case assessment has been undertaken based on continued growth in goods traffic.

The purpose of this section is to assess the overall impact that any redistributed general traffic will have on both the direct and indirect study areas. It should be noted that the impacts presented in this chapter are based on the final Preliminary Design for the Proposed Scheme which includes embedded mitigation to limit environmental and traffic and transport impacts to a minimal level as part of the iterative design development work described previously above.

6.4.6.2.8.2 Significance of the General Traffic Impact

To determine the impact that the Proposed Scheme has in terms of general traffic redistribution on the direct and indirect study areas, the LAM Opening Year 2028 model results have been used to identify the difference in general traffic flows between the Do Minimum and Do Something scenarios and the associated level of traffic flow difference as a result of the Proposed Scheme. The assessment has been considered with reference to both the reductions and increases in general traffic flows along road links.

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 by the contents of Table 6.41.

Table 6.41: Significance of the Reduction in General Traffic Flows

Significance of Positive Impact	Description of Impact / Proposed Changes
Profound	< -1000
Very Significant	-1000 to -800
Significant	-800 to -400
Moderate	-400 to -300
Slight	-300 to -100
Not Significant	> -100

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

Localised junction models have been developed using industry standard modelling packages such as LinSig (a software tool by JCT Consultancy which allows traffic engineers to model traffic signals) and Junctions 9 (a software tool by TRL for the modelling and analysis of roundabout and priority intersections) to determine the appropriate staging, phasing, green times and operational capacity at all junctions along the direct study area. These junction models have been developed using consistent traffic flows as predicted and modelled in the ERM, LAM and micro-simulation models using the iterative traffic modelling process described in Section 6.2 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 6.26 is a snapshot from the guidance which outlines “Advisory Thresholds for Traffic and Transport Assessment Where National Roads are Affected”.

Where applications affect national roads a Transport Assessment should be requested if the thresholds in Table 2.2, below, are exceeded.

Table 2.2 Advisory Thresholds for Traffic and Transport Assessment Where National Roads are Affected

Vehicle Movements	100 trips in / out combined in the peak hours for the proposed development
	Development traffic exceeds 10% of turning movements at junctions with and on National Roads.
	Development traffic exceeds 5% of turning movements at junctions with National Roads if location has potential to become congested or sensitive.

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

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

The basis of the guidance is to assess the impacts of additional trips that have been generated as part of a new development (for example, a new housing estate etc.). Noting that the guidance relates to National Roads only, for the purpose of this assessment, the principles of the guidance have been adapted for the assessment of the Proposed Scheme. This has been achieved by extending the threshold to cover all road types in the vicinity of the Proposed Scheme, not only National Roads. This ensures a robust and rigorous assessment is undertaken and that potential impacts on more localised or residential streets have been captured as part of the assessment.

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

- **Local / Regional Roads:** Traffic redistribution results in an increase above 100 combined flows (i.e. in a two-way direction) along residential, local and regional roads in the vicinity of the Proposed Scheme in the AM and PM peak hours;
 - The threshold aligns with an approximate 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.

6.4.6.2.8.3 General Traffic Flow Difference - AM Peak Hour

Diagram 6.27 (extract from Figure 6.7 in Volume 3 of this EIAR) illustrates the difference in traffic flows on the road links in the AM Peak Hour for the 2028 Opening Year. Please see Appendix A6.4.4 (General Traffic Assessment) in Volume 4 of this EIAR for the full LAM outputs.

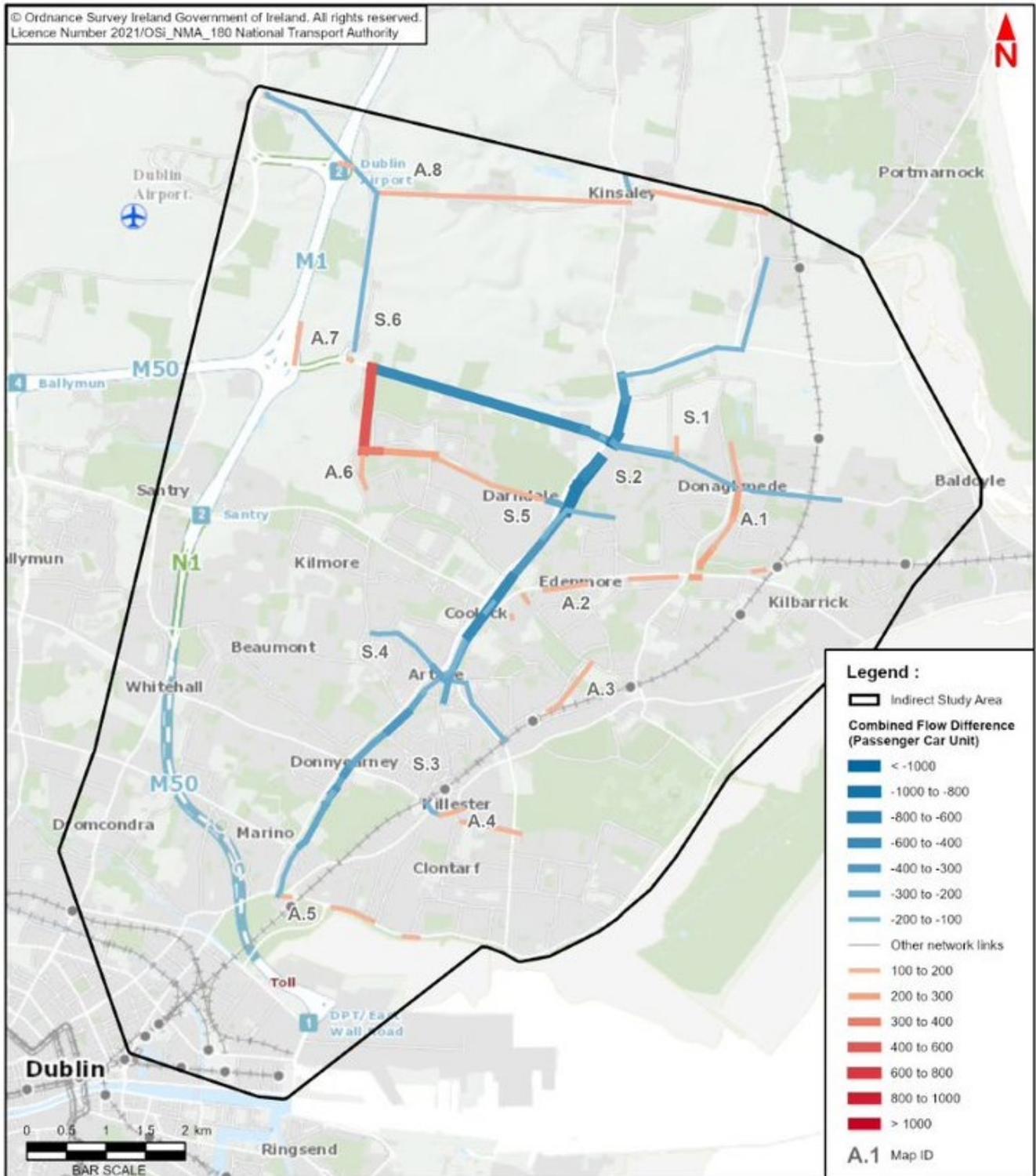


Diagram 6.27: Flow Difference on Road Links (Do Minimum vs. Do Something), AM Peak Hour, 2028 Opening Year

Impact on Direct Study Area (AM Peak Hour)

Direct Reductions in General Traffic: The LAM indicates that, during the 2028 Opening Year scenario, there are reductions in general traffic noted along the Proposed Scheme during the AM Peak Hour, as illustrated by the blue lines in Diagram 6.27, which indicates where a reduction of at least -100 combined traffic flows occur.

The key reductions in traffic flows during the AM Peak Hour are outlined in Table 6.42.

Table 6.42: Road Links that Experience a Reduction of ≥ 100 Combined Flows during AM Peak Hour (Direct Study Area)

Location	Map I.D.	Road Name	DoMinimum Flows (PCUs)	DoSomething Flows (PCUs)	Flow Difference (PCUs)
Section 1 – Mayne River Avenue to R808 Gracefield Road – R107 Malahide Road	S.1	R107 Malahide Road between Mayne River Avenue and Blunden Drive	2,741	1,633	-1,108
	S.2	R107 Malahide Road between Blunden Drive and Greencastle Road	1,111	712	-399
		R107 Malahide Road between Greencastle Road and Oscar Traynor Road	1,746	1,226	-520
		R107 Malahide Road between Brooklea Crescent and Gracefield Road	1,603	1368	-235
Section 2 – R808 Gracefield Road to R105 Clontarf Road – R107 Malahide Road	S.3	R107 Malahide Road between Gracefield Road and Kilmore Road	1,263	1,027	-235
		R107 Malahide Road between Kilmore Road and Collins Avenue	1,505	1,283	-221
		R107 Malahide Road between Casino Park and Griffith Avenue	1,020	759	-261
		R107 Malahide Road between Griffith Avenue and Marino Mart	1,402	1,236	-166

The contents of Table 6.42 demonstrate that there is a slight to very significant reduction of between -166 and -1,108 general traffic flows along the direct study area during the AM Peak Hour, which is attributed to the Proposed Scheme and the associated modal shift as a result of its implementation. This reduction in general traffic flow has been determined as an overall **Positive, Significant and Long-term effect** on the direct study area. The most significant effect occurs along the R107 Malahide Road between Mayne River Avenue and Blunden Drive.

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

Impact on Indirect Study Area (AM Peak Hour)

Indirect Reductions in General Traffic: In addition to the general traffic flow reductions occurring along the direct study area, there are key reductions in general traffic noted along certain road links within the indirect study area during the AM Peak Hour. The key reductions in traffic flows along the indirect study area during the AM Peak Hour are outlined in Table 6.43.

Table 6.43: Road Links that Experience a Reduction of ≥ 100 Combined Flows during AM Peak Hour (Indirect Study Area)

Location	Map I.D.	Road Name	DoMinimum Flow (PCUs)	DoSomething Flow (PCUs)	Flow Difference (PCUs)
Eastern Side of Proposed Scheme	S.1	R124 Drumnigh Road	857	703	-154
		R123 Balgriffin Road	801	676	-125
		R107 Malahide Road (between Belmayne and R123)	1,795	1,239	-557
		R139 Grange Road	774	650	-124
		Marsfield Avenue	330	159	-171
		R139 Clarehall Avenue	1,029	752	-277
	S.2	Blunden Drive	908	780	-128
S.3	R808 Gracefield Road	912	730	-182	
	Brockwood Avenue	522	337	-185	
Western Side of Proposed Scheme	S.4	Ardlea Road	652	467	-184
	S.5	Priorswood Road	635	381	-254
	S.6	R139 Northern Cross Extension	3,175	2,621	-554
		Stockhole Lane	1,151	969	-182
		Clonshaugh Road	969	849	-120

The contents of Table 6.43 outlines that the traffic reductions within the indirect study area that exceed 100 flows varies between -120 and -557 combined flows along the surrounding road links.

This reduction in general traffic flow has been determined as an overall **Positive, Moderate and Long-term effect** on the indirect study area. The most significant effect occurs along the R139 Northern Cross Extension which meets the Proposed Scheme at the four-arm signalised junction with the R107 Malahide Road within Section 1.

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 6.27. These road links have been identified as experiencing traffic volumes above the additional traffic threshold and therefore require further analysis. The road links and associated flow difference between the Do Minimum and Do Something scenarios during the AM Peak Hour are outlined in Table 6.44.

Table 6.44: Road Links where the 100 Flow Additional Traffic Threshold is Exceeded (AM Peak Hour)

Location	Map I.D.	Road Name	DoMinimum Flows (PCUs)	DoSomething Flows (PCUs)	Flow Difference (PCUs)
Eastern Side of Proposed Scheme	A.1	Grange Road	1609	1897	289
		Belmayne Avenue	753	856	103
	A.2	Tonlegee Road	1079	1280	202
	A.3	Harmonstown Road	187	289	102
	A.4	Howth Road	1079	1194	115
		Vernon Avenue	207	333	125
	A.5	Clontarf Road	1327	1494	168
	A.8	Chapel Road	655	765	109
Western Side of Proposed Scheme	A.6	Clonshaugh Road	818	1288	470
		Clonshaugh Avenue	243	564	321
		Priorswood Road	245	427	181
	A.7	M1 Southbound (Junction 3)	3138	3302	163
	A.8	Baskin Lane	1083	1232	149
		M1 Junction 2 Circulatory	1429	1549	120

The contents of Table 6.44 outline that the additional traffic on the key road links within the indirect study area varies between 102 and 470 combined flows during the AM Peak Hour. Further junction capacity assessment has been undertaken along these road links to determine whether the above road links have the capacity to cater for the additional traffic volumes as a result of the Proposed Scheme.

Operational capacity outputs have been extracted from the LAM at the associated junctions along the subject road links to determine whether there is reserve capacity to facilitate the uplift in traffic. The results are presented in terms of the significance of the impact to the V / C ratio for each junction based on its sensitivity and magnitude of impact.

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

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

On the basis of the assessment methodology specifically for national roads, whereby traffic exceeding 5% of the combined turning flows at junctions on or with national roads as a result of traffic redistribution associated with the Proposed Scheme, the junctions and associated flow difference between the Do Minimum and Do Something scenarios during the AM Peak Hour are outlined in Table 6.45.

Table 6.45: National Road Links where the 5% Additional Traffic Threshold is Exceeded (AM Peak Hour)

Junction	Total Do Minimum Turning Flows (PCUs)	Total Do Something Turning Flows (PCUs)	Turning Flow Difference (PCUs)	Percentage Difference
M1 Junction 2	4,589	4,614	37	1%
M50 Junction 1	1,875	1,881	6	0%
M50 Junction 2	3,467	3,411	-56	-2%
M50 Junction 3	3,719	3,688	-31	-1%

The contents of Table 6.45 demonstrate that redistributed traffic from the Proposed Scheme will have a less than 5% impact on turning flows at junctions with national roads, therefore, no further assessment of the AM Peak Hour has been undertaken, aside from instances where the 100 combined flow of additional traffic threshold is exceeded, as shown in Table 6.44.

6.4.6.2.8.4 General Traffic Flow Difference – PM Peak Hour

Diagram 6.28 (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.

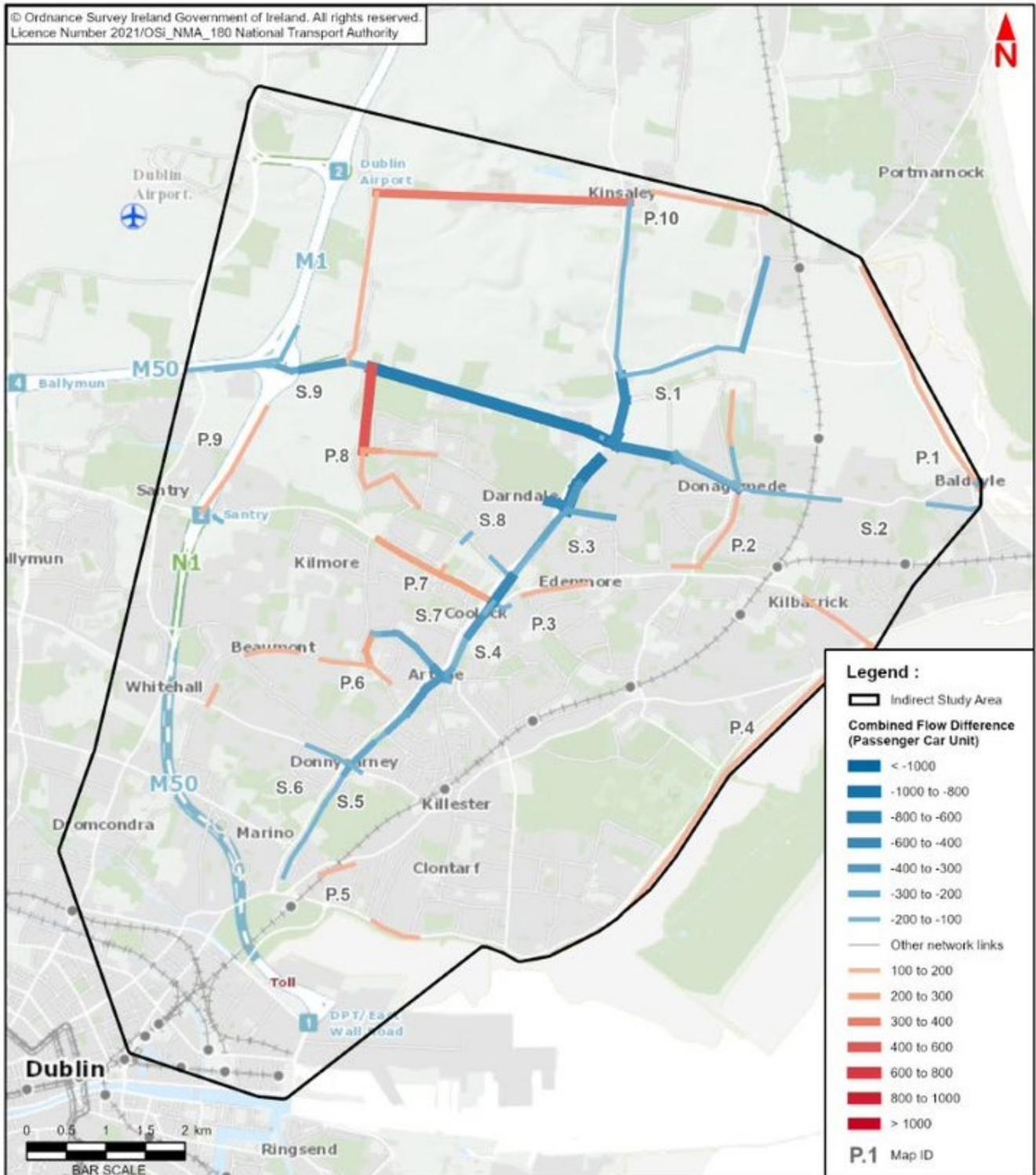


Diagram 6.28: Flow Difference on Road Links (Do Minimum vs. Do Something), PM Peak, 2028 Opening Year

Impact on Direct Study Area (PM Peak Hour)

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

The key reductions in traffic flows during the PM Peak Hour are outlined in Table 6.46.

Table 6.46: Road Links that Experience a Reduction of ≥ 100 Combined Flows during PM Peak Hour (Direct Study Area)

Location	Map I.D.	Road Name	DoMinimum Flows (PCUs)	DoSomething Flows (PCUs)	Flow Difference (PCUs)
Section 1 – Mayne River Avenue to R808 Gracefield Road	S.1	R107 Malahide Road between R139 and Blunden Drive	2,774	1,755	-1,108
	S.3	R107 Malahide Road between Greencastle Road and Oscar Traynor Road	1,808	1,330	-520
	S.4	R107 Malahide Road between Brooklea Crescent and Gracefield Road	1,665	1,266	-235
Section 2 – R808 Gracefield Road to R105 Clontarf Road	S.5	R107 Malahide Road between Kilmore Road and Collins Avenue	1,501	1,281	-221
	S.6	R107 Malahide Road between Casino Park and Griffith Avenue	568	496	-261
	S.7	R107 Malahide Road between Griffith Avenue and Marino Mart	1,219	1,080	-166

The contents of Table 6.46 demonstrate that there is a slight to very significant reduction of between -166 and -1,108 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, Significant and Long-term effect** on the direct study area. The most significant effect occurs along the R107 Malahide Road which is the main corridor of the Proposed Scheme.

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

Impact on Indirect Study Area (PM Peak Hour)

Reductions in General Traffic Flows: In addition to the general traffic flow reductions occurring along the 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 6.47.

Table 6.47: Road Links that Experience a Reduction of ≥ 100 Combined Flows during PM Peak Hour (Indirect Study Area)

Location	Map I.D.	Road Name	DoMinimum Flow (PCUs)	DoSomething Flow (PCUs)	Maximum Flow Difference (PCUs)
Eastern Side of Proposed Scheme	S.1	The Hole In The Wall Road	789	602	-187
		R139 Clarehall Avenue	976	500	-476
		R123 Balgriffin Road	836	718	-119
		R124 Drumnigh Road	844	629	-216
	S.2	Brookstone Road	566	444	-122
		R139 Grange Road	1,122	953	-169
		Dublin Street	518	415	-103
	S.3	Blunden Drive	932	720	-212
	S.4	R808 Gracefield Road	1189	958	-231

Western Side of Proposed Scheme		R104 Tonlegee Road	898	783	-115
	S.5	R103 Collins Avenue East	583	403	-180
	S.6	R103 Collins Avenue	696	509	-187
	S.7	Ardlea Road	878	617	-261
	S.8	Greencastle Road	550	427	-123
	S.8	Priorswood Road	916	455	-460
	S.8	Coolock Drive	359	225	-133
	S.9	Coolock Lane	1,256	1,131	-125
	S.9	M1 SB onto M50	361	253	-108
	S.9	M50	5,544	5,435	-108
S.9	R139 Northern Cross Extension	3,513	2,769	-743	

The LAM, as demonstrated by the contents of Table 6.47, indicates that during the 2028 Opening Year, there is a reduction in general traffic travelling in the indirect study area PM peak hour, as illustrated by blue links in Diagram 6.28. The traffic flow reduction varies between -103 and -743 combined flows, with peak reductions occurring along the R139 Northern Cross Extension to the west of the R107 Malahide Road. This reduction in general traffic flow has been determined as an overall **Positive, Moderate 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 6.28. The road links and associated flow difference between the Do Minimum and Do Something scenarios during the PM Peak Hour are outlined in Table 6.48.

Table 6.48: Road Links Where Link Threshold of 100 Combined Flows is Exceeded (PM Peak Hour)

Location	Map I.D.	Road Name	DoMinimum Flows (PCUs)	DoSomething Flows (PCUs)	Flow Difference (PCUs)
Eastern Side of Proposed Scheme	P.1	R106 Coast Road	899	1007	108
		R106 Main Street	1186	1323	137
	P.2	The Hole In The Wall Road	319	428	109
		R809 Grange Road	1807	1988	181
		Millbrook Avenue	303	411	108
	P.3	R104 Tonlegee Road	610	723	112
	P.4	Kilbarrack Road	269	372	103
		R807 James Larkin Road	1378	1539	161
		R105 Dublin Road	1567	1727	160
	P.5	R807 Clontarf Road	1378	1539	161
R105 Howth Road		1120	1253	134	
P.10	Chapel Road	641	771	130	
Western Side of Proposed Scheme	P.6	Beaumont Road	846	979	134
		Skelly's Lane	665	827	162
		Kilmore Road	717	992	274
	P.7	Oscar Traynor Road	349	626	277
	P.7	Coolock Drive	190	296	106
	P.8	Clonshaugh Road	765	1173	407
		Riverside Park	426	559	133
	P.9	M50	3585	3709	124
	P.10	Baskin Lane	882	1239	357

The contents of Table 6.48 outline that the additional traffic on the key road links varies between 103 and 407 combined flows during the PM Peak Hour. As described earlier in Section 6.4, these road links have been identified as experiencing additional traffic volumes over the threshold for further assessment.

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

On the basis of the assessment methodology specifically for national roads, the junctions and associated flow difference between the Do Minimum and Do Something scenarios during the AM Peak Hour are outlined in Table 6.49.

Table 6.49: National Road Links where the 5% Additional Traffic Threshold is Exceeded (PM Peak Hour)

Junction	Total Do Minimum Turning Flows (PCUs)	Total Do Something Turning Flows (PCUs)	Turning Flow Difference (PCUs)	Percentage Difference
M1 Junction 2	4,794	4,819	51	1%
M50 Junction 1	1,402	1,405	3	0%
M50 Junction 2	2,360	2,365	-72	-3%
M50 Junction 3	3,622	3,175	-447	-12%

The contents of Table 6.49 demonstrate that the highest impact of increased traffic predicted for total turning flows between the Do Minimum and Do Something scenarios in the PM Peak Hour is 1% at the M1 Junction 2, which is considered to have a negligible effect.

At the other three junctions, either no increase or a decrease in turning flows is predicted as a result of the Proposed Scheme. Therefore, no further assessment into the junctions with national roads during the AM Peak Hour has been undertaken, aside from instances where the 100 combined flow of additional traffic threshold is exceeded, as shown in Table 6.48.

6.4.6.2.8.5 General Traffic Impact Assessment

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

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

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

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

Step 2 – Determination of the Magnitude of Impact using Junction Analysis: To understand the magnitude impact of the redistributed traffic, operational capacities have been extracted from the LAM.

The capacity of junctions within the LAM are expressed in terms of Volume to Capacity ratios (V / C ratios). The V / C ratios represent the operational efficiency for each arm of a junction. For the purpose of this EIAR,

operational capacity outputs of a junction have been identified with reference to the busiest arm which experiences the maximum V/C ratio.

A V / C ratio of below 85% indicates that a junction is operating well, 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 6.50.

Table 6.50: 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 6.51 have been used to describe the impact.

Table 6.51: Magnitude of Impact for Redistributed Traffic

		DoSomething		
		≤85%	85% - 100%	>100%
DoMinimum	≤85%	Negligible	Low Negative	High Negative
	85% - 100%	Low Positive	Negligible	Medium Negative
	>100%	Medium Positive	Low Positive	Negligible

As indicated in Table 6.51, the changes in V / C ratios between the Do Minimum and Do Something scenarios result in either a positive, negative or negligible magnitude of impact.

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

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

The above analysis was carried out on the following scenarios:

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

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

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

The contents of Table 6.52 outline the V / C ratios at the key local / regional road junctions in the AM Peak Hour for the 2028 Opening Year and the resultant magnitude of impact and significance of effect at each junction. 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 6.52: Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), AM Peak, 2028 Opening Year

Road Name	Road Sensitivity	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Magnitude of Impact	Significance of Effects
			<85%	85% - 100%	>100%	<85%	85% - 100%	>100%		
Grange Road	Low	Grange Road / St Donagh's Road	✓			✓			Negligible	Not Significant
		Grange Road / Millbrook Avenue	✓			✓			Negligible	Not Significant
		Grange Road / Ardara Avenue / Howth View Park	✓				✓		Low	Negative Slight
		Grange Road / Donaghmede Shopping Centre	✓			✓			Negligible	Not Significant
		Grangemore Road / Grange Road	✓			✓			Negligible	Not Significant
		Grange Road / Newbrook Road		✓			✓		Negligible	Not Significant
		Grange Road / Clarehall Avenue	✓			✓			Negligible	Not Significant
		Grange Road / Belmayne Avenue	✓			✓			Negligible	Not Significant
Belmayne Avenue	High	Belmayne Avenue / Priory Hall		✓			✓	Negligible	Not Significant	
The Hole In the Wall Road	High	The Hole In The Wall Road / Grange Abbey Road	✓			✓			Negligible	Not Significant
		The Hole In The Wall Road / Grattan Wood	✓			✓			Negligible	Not Significant
		The Hole in the Wall Road / Grange Road	✓			✓			Negligible	Not Significant
		The Hole in the Wall Road / Main Street / Priory Hall			✓			✓	Negligible	Not Significant
Tonlegee Road	Low	Tonlegee Road / Grange Road / Kilbarrack Road		✓			✓		Negligible	Not Significant
		Tonlegee Road / Raheny Road	✓			✓			Negligible	Not Significant
		Tonlegee Road / Millbrook Drive	✓			✓			Negligible	Not Significant
		Tonlegee Road / Millwood Villas	✓			✓			Negligible	Not Significant
		Tonlegee Road / Millbrook Road	✓			✓			Negligible	Not Significant
		Tonlegee Road / Tonlegee Avenue	✓			✓			Negligible	Not Significant
		Tonlegee Road / Rathvale Drive	✓			✓			Negligible	Not Significant
		Glenfame Road / Tonlegee Road	✓			✓			Negligible	Not Significant
		Tonlegee Road / Moatfield Road	✓			✓			Negligible	Not Significant
Harmonstown Road	High	Lein Park / Harmonstown Road	✓			✓		Negligible	Not Significant	

Road Name	Road Sensitivity	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Magnitude of Impact	Significance of Effects	
			<85%	85% - 100%	>100%	<85%	85% - 100%	>100%			
		Springdale Road / Harmonstown Road	✓			✓			Negligible	Not Significant	
		Ribh Road / Harmonstown Road	✓			✓			Negligible	Not Significant	
Howth Road	Low	Howth Road / Collins Avenue East	✓			✓			Negligible	Not Significant	
		Dunseverick Road / Howth Road	✓			✓			Negligible	Not Significant	
		Howth Road / The Demesne	✓			✓			Negligible	Not Significant	
		Howth Road / Dunluce Road	✓			✓			Negligible	Not Significant	
		Howth Road / Furry Park Road (South)	✓			✓			Negligible	Not Significant	
		Howth Road / The Demesne / Furry Park Road	✓			✓			Negligible	Not Significant	
		Howth Road / Furry Park Road (North)	✓			✓			Negligible	Not Significant	
		Howth Road / Brookwood Avenue / Sybil Hill Road		✓			✓			Negligible	Not Significant
		Vernon Avenue	Medium	Vernon Avenue / Sybil Hill Road	✓			✓			Negligible
Castle Avenue / Vernon Avenue	✓					✓			Negligible	Not Significant	
Dunluce Road / Vernon Avenue / Vervill Court	✓					✓			Negligible	Not Significant	
Vernon Avenue / Grosvenor Court	✓					✓			Negligible	Not Significant	
Clontarf Road	Low	Marino Crescent / Clontarf Road	✓			✓			Negligible	Not Significant	
		St Lawrence Road / Clontarf Road /	✓			✓			Negligible	Not Significant	
		Clontarf Road / Alfie Byrne Road			✓			✓	Negligible	Not Significant	
		Clontarf Road / Malahide Road	✓				✓		Low	Negative Slight	
		Castle Avenue / Clontarf Road		✓			✓		Negligible	Not Significant	
		Haddon Road / Clontarf Road / Clontarf Road	✓				✓		Low	Negative Slight	
		Clontarf Road / Howth Road		✓		✓			Low Positive	Positive Slight	
		Clontarf Road / Hollybrook Road			✓		✓		Low Positive	Positive Slight	
Clonshaugh Road	Medium	Clonshaugh Road / R139			✓		✓		Low Positive	Positive Slight	
		Clonshaugh Avenue / Clonshaugh Heights	✓			✓			Negligible	Not Significant	
		Riverside Park / Clonshaugh Road	✓			✓			Negligible	Not Significant	
		Clonshaugh Road / R139	✓			✓			Negligible	Not Significant	
Clonshaugh Avenue	Medium	Clonshaugh Avenue / Glin Road	✓			✓			Negligible	Not Significant	
		Clonshaugh Road / Clonshaugh Avenue	✓			✓			Negligible	Not Significant	
Priorswood Road	Medium	Priorswood Road / Marigold Avenue	✓			✓			Negligible	Not Significant	

Road Name	Road Sensitivity	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Magnitude of Impact	Significance of Effects
			<85%	85% - 100%	>100%	<85%	85% - 100%	>100%		
		Priorswood Road / Glin Road	✓			✓			Negligible	Not Significant
		Priorswood Road / Marigold Road	✓			✓			Negligible	Not Significant
M1 Southbound (Junction 3)	Negligible	M1 Southbound / R139	✓			✓			Negligible	Imperceptible
		M1 Southbound / M1 Junction 3 Off-slip	✓			✓			Negligible	Imperceptible
Baskin Lane	High	Baskin Lane / Clonshaugh Road / Stockhole Lane			✓			✓	Negligible	Not Significant
		Malahide Road / Baskin Lane		✓			✓		Negligible	Not Significant
M1 Southbound (Junction 3)	Negligible	M1 Junction 2 / Airport Motorway	✓			✓			Negligible	Imperceptible
Chapel Road	High	R124 / Chapel Road	✓			✓			Negligible	Not Significant
		Chapel Road / Kinsealy Lane	✓			✓			Negligible	Not Significant

The results of the junction analysis illustrated in Table 6.52 demonstrate that the majority of junctions are operating with a maximum V / C ratio of below 85% during the AM Peak Hour in the 2028 Opening Year and that the Proposed Scheme will have a negligible impact on the majority of assessed local / regional road links within the indirect study area.

Capacity issues are noted at the following three junctions:

- **R807 Clontarf Road / Alfie Byrne Road three-arm signalised junction (13175¹)** – operates above 100% during both the Do Minimum and Do Something scenarios;
- **The Hole in the Wall Road / Main Street / Priory Hall four-arm signalised junction (17204)** – operates above 100% during both the Do Minimum and Do Something scenarios; and
- **Baskin Lane / Clonshaugh Road / Stockhole Lane three-arm priority junction (35656)** – operates above 100% during both the Do Minimum and Do Something scenarios.

Each of the three junctions operate with a maximum V / C ratio of above 100% in both the Do Minimum and Do Something scenarios, therefore, the impact is considered to be negligible with a **Not Significant and Long-term effect**.

Combining the road sensitivity with the magnitude of impact determines that the significance of effects of the redistributed traffic as a result of the Proposed Scheme at the remaining junctions within the indirect study area results in a **Not Significant and Long-term effect** at 53 junctions and **Imperceptible and Long-term** at three junctions. At three junctions, a **Positive, Slight and Long-term** effect is predicted. At only three junctions **Negative, Slight and Long-term effects** are predicted, however, the junctions continue to operate within theoretical capacity.

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

The contents of Table 6.53 outline the V / C ratios at the key local / regional road junctions in the PM Peak Hour for the 2028 Opening Year and the resultant magnitude of impact and significance of effect at each junction. 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.

¹ Unique junction number which corresponds with Figure 6.9 to Figure 6.12 in Volume 3 of this EIAR and to the full set of analysis tables in Appendix 6.4.4 (General Traffic Assessment) in Volume 4 of this EIAR.

Table 6.53: Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), PM Peak, 2028 Opening Year

Road Name	Road Sensitivity	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Magnitude of Impact	Significance of Effects
			<85%	85% - 100%	>100%	<85%	85% - 100%	>100%		
Coast Road	Low	Main Street / Willie Nolan Road / Coast Road		✓			✓		Negligible	Not Significant
		Red Arches Road / Coast Road	✓			✓			Negligible	Not Significant
		Coast Road / Red Arches Road	✓			✓			Negligible	Not Significant
Main Street	Low	Main Street / Main Street	✓			✓			Low	Negative Slight
		R124 New Street / Main Street / Church Road / The Mall		✓			✓		Negligible	Not Significant
		R106 Main Street / Old Street	✓			✓			Negligible	Not Significant
Moyne Road	Low	Coast Road / Strand Road / Station Road	✓			✓			Negligible	Not Significant
		Coast Road / Moyne Road	✓			✓			Negligible	Not Significant
Grange Road	Low	Grange Road / St Donagh's Road	✓			✓			Negligible	Not Significant
		Grange Road / Donaghmede Shopping Centre	✓			✓			Negligible	Not Significant
		Grangemore Road / Grange Road			✓			✓	Negligible	Not Significant
		Grange Road / Clarehall Avenue		✓			✓		Negligible	Not Significant
		Grange Road / R139 / The Hole In The Wall	✓			✓			Negligible	Not Significant
		Grange Road / Newbrook Road	✓			✓			Negligible	Not Significant
		Grange Road / The Hole In The Wall Road	✓			✓			Negligible	Not Significant
		Grange Road / Ardara Avenue		✓			✓		Negligible	Not Significant
Millbrook Avenue	High	Millbrook Drive / Millbrook Avenue	✓			✓			Negligible	Not Significant
		Grange Road / Millbrook Avenue	✓			✓			Negligible	Not Significant
The Hole In The Wall Road	High	The Hole In The Wall Road / Priory Hall / Main Street		✓			✓		Negligible	Not Significant
		The Hole In The Wall Road / St Michael's Cottages	✓			✓			Negligible	Not Significant
		The Hole In The Wall Road / Marrisfield Avenue	✓			✓			Negligible	Not Significant
Tonlegee Road	Low	Tonlegee Road / Springdale Road	✓			✓			Negligible	Not Significant
		Glenfarne Road / Tonlegee Road	✓			✓			Negligible	Not Significant
		Tonlegee Road / Tonlegee Avenue	✓			✓			Negligible	Not Significant
		Tonlegee Road / Rathvale Drive	✓			✓			Negligible	Not Significant
		Moatfield Road / Tonlegee Road	✓			✓			Negligible	Not Significant
Clontarf Road	Low	Dollymount Park / Clontarf Road	✓			✓			Negligible	Not Significant
		Clontarf Road / Seaview Avenue North / Clontarf Road			✓			✓	Negligible	Not Significant
		Clontarf Road / Kincora Road / Clontarf Road	✓			✓			Negligible	Not Significant

Road Name	Road Sensitivity	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Magnitude of Impact	Significance of Effects
			<85%	85% - 100%	>100%	<85%	85% - 100%	>100%		
		Clontarf Road / Clontarf Road / Seafield Road East	✓			✓			Negligible	Not Significant
		Conquer Hill Road / Clontarf Road / Clontarf Road	✓			✓			Negligible	Not Significant
		Danes Court / Clontarf Road / Clontarf Road	✓			✓			Negligible	Not Significant
		St Lawrence Road / Clontarf Road / Clontarf Road /			✓			✓	Negligible	Not Significant
		Dollymount Avenue / Clontarf Road	✓			✓			Negligible	Not Significant
		Clontarf Road / The Oaks	✓			✓			Negligible	Not Significant
		Castle Avenue / Clontarf Road	✓			✓			Negligible	Not Significant
		Haddon Road / Clontarf Road	✓			✓			Negligible	Not Significant
Dublin Road	Low	Dublin Road / Yellow Walls Road	✓			✓			Negligible	Not Significant
		Dublin Road / Ard Na Mara	✓			✓			Negligible	Not Significant
		Dublin Road / O'Hanlon's Lane	✓			✓			Negligible	Not Significant
Hawth Road	Low	Copeland Avenue / Hawth Road		✓			✓		Negligible	Not Significant
		Hawth Road / Hollybrook Park		✓			✓		Negligible	Not Significant
James Larkin Road	Low	Watermill Road / James Larkin Road / Causeway Road		✓			✓		Negligible	Not Significant
		Hawth Road / James Larkin Road	✓			✓			Negligible	Not Significant
		Clontarf Road / James Larkin Road / Mount Prospect Avenue	✓			✓			Negligible	Not Significant
Kilbarrack Road	High	Kilbarrack Avenue / Kilbarrack Road / Kilbarrack Road	✓			✓			Negligible	Not Significant
		St Margarets Avenue / Kilbarrack Road	✓			✓			Negligible	Not Significant
		Kilbarrack Road / Hawth Road / Dublin Road		✓			✓		Negligible	Not Significant
		Kilbarrack Road / Verbena Avenue	✓			✓			Negligible	Not Significant
		Alden Road / Kilbarrack Road	✓			✓			Negligible	Not Significant
		Thornville Road / Kilbarrack Road	✓			✓			Negligible	Not Significant
Chapel Road	High	Drumnigh Road / Chapel Road	✓			✓			Negligible	Not Significant
		Chapel Road / Gandon Lane / Kinsealy Lane	✓			✓			Negligible	Not Significant
Beaumont Road	Medium	Beaumont Road / Beaumont Road / The Thatch Road	✓			✓			Negligible	Not Significant
		Grace Park Road / Beaumont Road / Collins Avenue			✓			✓	Negligible	Not Significant
		Dromawling Road / Shantalla Road / Beaumont Road		✓			✓		Negligible	Not Significant
		Coolatree Road (West) / Beaumont Road	✓			✓			Negligible	Not Significant
		Beaumont Road / Beaumont Woods	✓			✓			Negligible	Not Significant
		Coolatree Road (East) / Beaumont Road	✓			✓			Negligible	Not Significant

Road Name	Road Sensitivity	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Magnitude of Impact	Significance of Effects
			<85%	85% - 100%	>100%	<85%	85% - 100%	>100%		
		Beaumont Road / Coolgreena Road	✓			✓			Negligible	Not Significant
		Beaumont Road / Beaumont Crescent / Skellys Lane	✓			✓			Negligible	Not Significant
		Beaumont Road / Yellow Road	✓			✓			Negligible	Not Significant
		Beaumont Road / The Park	✓			✓			Negligible	Not Significant
Kilmore Road	Medium	Maryfield Drive / Kilmore Road	✓			✓			Negligible	Not Significant
		Kilmore Road / Maryfield Crescent	✓			✓			Negligible	Not Significant
Skellys Lane	Medium	Elm Mount Park / Skellys Lane	✓			✓			Negligible	Not Significant
		Whitethorn Rise / Skellys Lane	✓			✓			Negligible	Not Significant
		Montrose Grove / Skellys Lane	✓			✓			Negligible	Not Significant
		Kilmore Road / Newlands Court Apartments	✓			✓			Negligible	Not Significant
Coolock Drive	High	Coolock Drive / Bunratty Road	✓			✓			Negligible	Not Significant
		Coolock Drive / Oscar Traynor Road	✓			✓			Negligible	Not Significant
Oscar Traynor Road	Low	Oscar Traynor Road / Armstrong Walk	✓			✓			Negligible	Not Significant
		Barrycourt Road / Oscar Traynor Road	✓			✓			Negligible	Not Significant
		R104 / Oscar Traynor Road / Malahide Road	✓			✓			Negligible	Not Significant
		Oscar Traynor Road / Beechlawn Avenue	✓			✓			Negligible	Not Significant
		Oscar Traynor Road / Brookville Crescent / Coolock Village	✓			✓			Negligible	Not Significant
		Beechpark Avenue / Oscar Traynor Road	✓			✓			Negligible	Not Significant
		Oscar Traynor Road / Kilmore Road		✓				✓	Medium	Negative Moderate
Clonshaugh Road	Medium	Clonshaugh Road / R139 Northern Cross Extension			✓			✓	Negligible	Not Significant
		R139 / Clonshaugh Road (North)			✓			✓	Negligible	Not Significant
		Clonshaugh Road / R139	✓			✓			Negligible	Not Significant
		Clonshaugh Avenue / Glin Road	✓			✓			Negligible	Not Significant
		Clonshaugh Road / Clonshaugh Avenue	✓				✓		Low	Negative Moderate
		Riverside Park / Clonshaugh Road	✓			✓			Negligible	Not Significant
		Clonshaugh Road / Newbury Wood	✓			✓			Negligible	Not Significant
		Clonshaugh Avenue / Clonshaugh Heights	✓			✓			Negligible	Not Significant
		Baskin Lane / Clonshaugh Road / Stockhole Lane	✓				✓		Low	Negative Moderate
		Clonshaugh Road / Dublin Airport Hotel / Clonshaugh Service Station	✓			✓			Negligible	Not Significant
	High	Riverside Park / Riverside Drive	✓			✓			Negligible	Not Significant

Road Name	Road Sensitivity	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Magnitude of Impact	Significance of Effects
			<85%	85% - 100%	>100%	<85%	85% - 100%	>100%		
Riverside Park		Greencastle Road / Barryscourt Road	✓			✓			Negligible	Not Significant
M50	Negligible	M50 Northbound / Junction 2 On-slip	✓				✓		Low	Not Significant
		M50 Northbound / Junction 3 Off-slip	✓			✓			Negligible	Imperceptible

The results of the junction analysis illustrated in Table 6.53 demonstrate that the majority of junctions are operating with a maximum V / C ratio of below 85% during the PM Peak Hour in the 2028 Opening Year and the Proposed Scheme will have a negligible impact on the majority of assessed local / regional road links within the indirect study area.

Capacity issues are noted at the following seven junctions:

- **Grangemore Road / Grange Road three-arm priority junction (17131)** – operates above 100% during both the Do Minimum and Do Something scenarios;
- **Clontarf Road / Seaview Avenue North three-arm signalised junction (13112)** – operates above 100% during both the Do Minimum and Do Something scenarios;
- **St Lawrence Road / Clontarf Road three-arm priority junction (13173)** – operates above 100% during both the Do Minimum and Do Something scenarios;
- **Grace Park Road / Beaumont Road / Collins Avenue four-arm signalised junction (13196)** – operates above 100% during both the Do Minimum and Do Something scenarios;
- **Oscar Traynor Road / Kilmore Road three-arm signalised junction (13463)** – operates just below 100% in the Do Minimum scenario, and just over 100% in the Do Something scenario (i.e. a marginal increase);
- **Clonsaugh Road / R139 Northern Cross Extension three-arm signalised junction (17115)** – operates above 100% during both the Do Minimum and Do Something scenario; and
- **R139 / Clonsaugh Road (North) three-arm roundabout (17118)** – operates above 100% during both the Do Minimum and Do Something scenario.

At six of the junctions above, performance is similar with or without the Proposed Scheme in place, therefore, the impact is considered to be negligible and when combining with the sensitivity of the road link, the significance of effect is **Not Significant and Long-term**. At the Oscar Traynor Road / Kilmore Road three-arm signalised junction, the impact of redistributed traffic is medium and the significance of effect is **Negative, Moderate and Long-term**. Therefore, no further assessment into these junctions has been undertaken.

Three further junctions are predicted to experience **Negative, Moderate and Long-term effects**, however, they continue to operate within theoretical capacity. At the remaining junctions, the effect of redistributed traffic associated with the Proposed Scheme is deemed **Not Significant and Long-term** at 88 of the 93 the junctions assessed. One junction is predicted to experience **Imperceptible and Long-term** effects. One junction is predicted to experience **Negative, Slight and Long-term effects**, and at three junctions **Positive, Moderate and Long-term effects** are predicted.

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

The contents of Table 6.54 outline the V / C ratios at the key local / regional road junctions in the AM Peak Hour for the 2043 Design Year and the resultant magnitude of impact and significance of effect at each junction. 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 6.54: Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), AM Peak, 2043 Design Year

Road Name	Road Sensitivity	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Magnitude of Impact	Significance of Effects
			<85%	85% - 100%	>100%	<85%	85% - 100%	>100%		
Grange Road	Low	Grange Road / St Donagh's Road	✓			✓			Negligible	Not Significant
		Grange Road / Millbrook Avenue	✓			✓			Negligible	Not Significant
		Grange Road / Ardara Avenue / Howth View Park	✓				✓		Low	Negative Slight
		Grange Road / Donaghmede Shopping Centre	✓			✓			Negligible	Not Significant
		Grangemore Road / Grange Road	✓			✓			Negligible	Not Significant
		Grange Road / Newbrook Road		✓			✓		Negligible	Not Significant
		Grange Road / Clarehall Avenue	✓			✓			Negligible	Not Significant
		Grange Road / Belmayne Avenue	✓			✓			Negligible	Not Significant
Belmayne Avenue	High	Belmayne Avenue / Priory Hall		✓			✓	Negligible	Not Significant	
The Hole In the Wall Road	High	The Hole In The Wall Road / Grange Abbey Road	✓			✓			Negligible	Not Significant
		The Hole In The Wall Road / Grattan Wood	✓			✓			Negligible	Not Significant
		The Hole in the Wall Road / Grange Road	✓			✓			Negligible	Not Significant
		The Hole in the Wall Road / Main Street / Priory Hall			✓			✓	Negligible	Not Significant
Tonlegee Road	Low	Tonlegee Road / Grange Road / Kilbarrack Road		✓			✓		Negligible	Not Significant
		Tonlegee Road / Raheny Road	✓			✓			Negligible	Not Significant
		Tonlegee Road / Millbrook Drive	✓			✓			Negligible	Not Significant
		Tonlegee Road / Millwood Villas	✓			✓			Negligible	Not Significant
		Tonlegee Road / Millbrook Road	✓			✓			Negligible	Not Significant
		Tonlegee Road / Tonlegee Avenue	✓			✓			Negligible	Not Significant
		Tonlegee Road / Rathvale Drive	✓			✓			Negligible	Not Significant
		Glenfarne Road / Tonlegee Road	✓			✓			Negligible	Not Significant
Tonlegee Road / Moatfield Road	✓			✓			Negligible	Not Significant		
Harmonstown Road	High	/ Lein Park / Harmonstown Road	✓			✓			Negligible	Not Significant
		Springdale Road / Harmonstown Road	✓			✓			Negligible	Not Significant
		Ribh Road / Harmonstown Road	✓			✓			Negligible	Not Significant
Howth Road	Low	Howth Road / Collins Avenue East	✓			✓			Negligible	Not Significant
		Dunseverick Road / Howth Road	✓			✓			Negligible	Not Significant
		Howth Road / The Demesne	✓			✓			Negligible	Not Significant
		Howth Road / Dunluce Road	✓			✓			Negligible	Not Significant
		Howth Road / Furry Park Road (South)	✓			✓			Negligible	Not Significant
		Howth Road / The Demesne / Furry Park Road	✓			✓			Negligible	Not Significant
		Howth Road / Furry Park Road (North)	✓			✓			Negligible	Not Significant
		Howth Road / Brookwood Avenue / Sybil Hill Road		✓			✓		Negligible	Not Significant

Road Name	Road Sensitivity	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Magnitude of Impact	Significance of Effects
			<85%	85% - 100%	>100%	<85%	85% - 100%	>100%		
Vernon Avenue	Medium	Vernon Avenue / Vernon Avenue / Vernon Avenue	✓			✓			Negligible	Not Significant
		Castle Avenue / Vernon Avenue	✓			✓			Negligible	Not Significant
		Dunluce Road / Vernon Avenue / Vervill Court	✓			✓			Negligible	Not Significant
		Vernon Avenue / Grosvenor Court	✓			✓			Negligible	Not Significant
Clontarf Road	Low	Marino Crescent / Clontarf Road	✓			✓			Negligible	Not Significant
		St Lawrence Road / Clontarf Road / Clontarf Road /	✓			✓			Negligible	Not Significant
		Alfie Byrne Road / Clontarf Road			✓			✓	Negligible	Not Significant
		Clontarf Road / Malahide Road	✓			✓			Negligible	Not Significant
		Castle Avenue / Clontarf Road		✓			✓		Negligible	Not Significant
		Haddon Road / Clontarf Road	✓			✓			Negligible	Not Significant
		Clontarf Road / Howth Road		✓		✓			Negligible	Imperceptible
		Clontarf Road / Holybrook Road			✓		✓		Low Positive	Positive Slight
Clonsaugh Road	Medium	Clonsaugh Road / R139			✓			✓	Negligible	Imperceptible
		Clonsaugh Avenue / Clonsaugh Heights	✓			✓			Negligible	Not Significant
		Riverside Park / Clonsaugh Road	✓			✓			Negligible	Not Significant
		Clonsaugh Road / R139	✓			✓			Negligible	Not Significant
Clonsaugh Avenue	Medium	Clonsaugh Avenue / Glin Road	✓			✓			Negligible	Not Significant
		Clonsaugh Road / Clonsaugh Avenue	✓			✓			Negligible	Not Significant
Priorswood Road	Medium	Priorswood Road / Marigold Avenue	✓			✓			Negligible	Not Significant
		Priorswood Road / Glin Road	✓			✓			Negligible	Not Significant
		Priorswood Road / Marigold Road	✓			✓			Negligible	Not Significant
M1 Southbound (Junction 3)	Negligible	M1 Southbound / R139	✓			✓			Negligible	Imperceptible
		M1 Southbound / M1 Junction 3 Off-slip	✓			✓			Negligible	Imperceptible
Baskin Lane	High	Baskin Lane / Clonsaugh Road / Stockhole Lane			✓			✓	Negligible	Not Significant
		Malahide Road / Baskin Lane		✓			✓		Negligible	Not Significant
M1 Southbound (Junction 3)	Negligible	M1 Junction 2 / Airport Motorway		✓			✓		Negligible	Imperceptible
Chapel Road	High	R124 / R124 / Chapel Road		✓			✓		Negligible	Not Significant
		Chapel Road / Kinsealy Lane	✓			✓			Negligible	Not Significant

The results of the junction analysis illustrated in Table 6.54 demonstrate that the majority of junctions continue to operate with a maximum V / C ratio of below 85% during the AM Peak Hour in the 2043 Design Year.

In 2043 Design Year, capacity issues arise at the following three junctions during the AM Peak Hour:

- **Clonsaugh Road / R139 three-arm signalised junction (17115)** – operates above 100% during both the Do Minimum and Do Something scenarios;
- **The Hole in the Wall Road / Main Street / Priory Hall for-arm signalised junction (17204)** – operates above 100% during both the Do Minimum and Do Something scenarios; and

- **Baskin Lane / Clonshaugh Road / Stockhole Lane three-arm priority junction (35656)** – operates above 100% during both the Dominion and Do Something scenarios.

As each of the junctions above operate with a maximum V / C ratio of above 100% in both the Do Minimum and Do Something, the impact is considered to be negligible.

Overall, redistributed traffic associated with the Proposed Scheme in is expected to result in a **Not Significant and Long-term effect** at 55 out of the 61 junctions assessed, and an **Imperceptible and Long-term effect** at five junctions. A **Negative, Slight and Long-term effect** is predicted at only one junction (Grange Road / Ardara Avenue / Howth View Park four-arm signalised junction). Further assessment into mitigation measures is therefore not necessary for any junctions in the AM Peak Hour of the 2043 Design Year.

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

The contents of Table 6.55 outline the V / C ratios at the key local / regional road junctions in the PM Peak Hour for the 2043 Design Year and the resultant magnitude of impact and significance of effect at each junction. The location of these junctions and the V / C ratio comparison between the Do Minimum and Do Something scenarios in the 2043 PM Peak Hour are illustrated in Figure 6.12 in Volume 3 of this EIAR.

Table 6.55: Volume over Capacity Ratios at Key Junctions (Do Minimum vs. Do Something), PM Peak, 2043 Design Year

Road Name	Road Sensitivity	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Magnitude of Impact	Significance of Effects
			<85%	85% - 100%	>100%	<85%	85% - 100%	>100%		
Coast Road	Low	Main Street / Willie Nolan Road / Coast Road		✓			✓		Negligible	Not Significant
		Red Arches Road / Coast Road	✓			✓			Negligible	Not Significant
		Coast Road / Red Arches Road	✓			✓			Negligible	Not Significant
Main Street	Low	Main Street / Main Street	✓				✓		Low	Negative Slight
		R124 New Street / Main Street / Church Road / The Mall		✓			✓		Negligible	Not Significant
		R106 Main Street / Old Street	✓			✓			Negligible	Not Significant
Moynes Road	Low	Coast Road / Strand Road / Station Road	✓			✓			Negligible	Not Significant
		Coast Road / Moynes Road	✓			✓			Negligible	Not Significant
Grange Road	Low	Grange Road / St Donagh's Road	✓			✓			Negligible	Not Significant
		Grange Road / Donaghmede Shopping Centre	✓			✓			Negligible	Not Significant
		Grangemore Road / Grange Road			✓		✓		Low Positive	Positive Slight
		Grange Road / Clarehall Avenue		✓			✓		Negligible	Not Significant
		Grange Road / R139 / The Hole In The Wall	✓			✓			Negligible	Not Significant
		Grange Road / Newbrook Road	✓				✓		Low	Negative Slight
		Grange Road / The Hole In The Wall Road	✓			✓			Negligible	Not Significant
		Grange Road / Ardara Avenue		✓			✓		Negligible	Not Significant
Millbrook Avenue	High	Millbrook Drive / Millbrook Avenue	✓			✓			Negligible	Not Significant
		Grange Road / Millbrook Avenue	✓			✓			Negligible	Not Significant
	High	The Hole In The Wall Road / Priory Hall		✓			✓		Negligible	Not Significant

Road Name	Road Sensitivity	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Magnitude of Impact	Significance of Effects
			<85%	85% - 100%	>100%	<85%	85% - 100%	>100%		
The Hole In The Wall Road		The Hole In The Wall Road / St Michael's Cottages	✓			✓			Negligible	Not Significant
		The Hole In The Wall Road / Marrsfield Avenue	✓			✓			Negligible	Not Significant
Tonlegee Road	Low	Tonlegee Road / Springdale Road	✓			✓			Negligible	Not Significant
		Glenfarne Road / Tonlegee Road	✓			✓			Negligible	Not Significant
		Tonlegee Road / Tonlegee Avenue	✓			✓			Negligible	Not Significant
		Tonlegee Road / Rathvale Drive	✓			✓			Negligible	Not Significant
		Moatfield Road / Tonlegee Road	✓			✓			Negligible	Not Significant
Clontarf Road	Low	Dollymount Park / Clontarf Road	✓			✓			Negligible	Not Significant
		Clontarf Road / Seaview Avenue North			✓			✓	Negligible	Not Significant
		Clontarf Road / Kincora Road	✓			✓			Negligible	Not Significant
		Clontarf Road / Seaview Road East	✓			✓			Negligible	Not Significant
		Conquer Hill Road / Clontarf Road	✓			✓			Negligible	Not Significant
		Danes Court / Clontarf Road	✓			✓			Negligible	Not Significant
		St Lawrence Road / Clontarf Road			✓			✓	Negligible	Not Significant
		Dollymount Avenue / Clontarf Road	✓			✓			Negligible	Not Significant
		Clontarf Road / The Oaks	✓			✓			Negligible	Not Significant
		Castle Avenue / Clontarf Road	✓			✓			Negligible	Not Significant
		Haddon Road / Clontarf Road	✓			✓			Negligible	Not Significant
Dublin Road	Low	Dublin Road / Yellow Walls Road	✓			✓			Negligible	Not Significant
		Dublin Road / Ard Na Mara	✓			✓			Negligible	Not Significant
		Dublin Road / O'Hanlon's Lane	✓			✓			Negligible	Not Significant
Howth Road	Low	Copeland Avenue / Howth Road		✓			✓		Negligible	Not Significant
		Howth Road / Hollybrook Park		✓			✓		Negligible	Not Significant
James Larkin Road	Low	Watermill Road / James Larkin Road / Causeway Road		✓			✓		Negligible	Not Significant
		Howth Road / James Larkin Road	✓			✓			Negligible	Not Significant
		Clontarf Road / James Larkin Road / Mount Prospect Avenue	✓			✓			Negligible	Not Significant
Kilbarrack Road	High	Kilbarrack Avenue / Kilbarrack Road	✓			✓			Negligible	Not Significant
		St Margarets Avenue / Kilbarrack Road	✓			✓			Negligible	Not Significant
		Kilbarrack Road / Howth Road / Dublin Road		✓			✓		Negligible	Not Significant
		Kilbarrack Road / Verbena Avenue	✓			✓			Negligible	Not Significant
		Alden Road / Kilbarrack Road	✓			✓			Negligible	Not Significant
		Thornville Road / Kilbarrack Road	✓			✓			Negligible	Not Significant

Road Name	Road Sensitivity	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Magnitude of Impact	Significance of Effects
			<85%	85% - 100%	>100%	<85%	85% - 100%	>100%		
Chapel Road	High	Drumnigh Road / Chapel Road	✓			✓			Negligible	Not Significant
		Chapel Road / Gandon Lane / Kinsealy Lane	✓			✓			Negligible	Not Significant
Beaumont Road	Medium	Beaumont Road / The Thatch Road	✓			✓			Negligible	Not Significant
		Grace Park Road / Beaumont Road / Collins Avenue / Collins Avenue			✓			✓	Negligible	Not Significant
		Dromawling Road / Shantalla Road / Beaumont Road		✓			✓		Negligible	Not Significant
		Coolatree Road (West) / Beaumont Road	✓			✓			Negligible	Not Significant
		Beaumont Road / Beaumont Woods	✓			✓			Negligible	Not Significant
		Coolatree Road (East) / Beaumont Road	✓			✓			Negligible	Not Significant
		Beaumont Road / Coolgreena Road	✓			✓			Negligible	Not Significant
		Beaumont Road / Beaumont Crescent / Skellys Lane	✓			✓			Negligible	Not Significant
		Beaumont Road / Yellow Road	✓			✓			Negligible	Not Significant
		Beaumont Road / The Park	✓			✓			Negligible	Not Significant
		Kilmore Road	Medium	Maryfield Drive / Kilmore Road	✓			✓		
Kilmore Road / Maryfield Crescent	✓					✓			Negligible	Not Significant
Skellys Lane	Medium	Elm Mount Park / Skellys Lane	✓			✓			Negligible	Not Significant
		Whitethorn Rise / Skellys Lane	✓			✓			Negligible	Not Significant
		Montrose Grove / Skellys Lane	✓			✓			Negligible	Not Significant
		Kilmore Road / Newlands Court Apartments	✓			✓			Negligible	Not Significant
Coolock Drive	High	Coolock Drive / Bunratty Road	✓			✓			Negligible	Not Significant
		Coolock Drive / Oscar Traynor Road	✓			✓			Negligible	Not Significant
Oscar Traynor Road	Low	Oscar Traynor Road / Armstrong Walk	✓			✓			Negligible	Not Significant
		Barryscourt Road / Oscar Traynor Road	✓			✓			Negligible	Not Significant
		R104 / Oscar Traynor Road / Malahide Road	✓			✓			Negligible	Not Significant
		Oscar Traynor Road / Beechlawn Avenue	✓			✓			Negligible	Not Significant
		Oscar Traynor Road / Brookville Crescent / Coolock Village	✓			✓			Negligible	Not Significant
		Beechpark Avenue / Oscar Traynor Road	✓			✓			Negligible	Not Significant
		Oscar Traynor Road / Kilmore Road		✓				✓	Medium	Negative Moderate
Clonsaugh Road	Medium	Clonsaugh Road / R139 Northern Cross Extension			✓			✓	Negligible	Not Significant
		R139 / Clonsaugh Road (North)			✓			✓	Negligible	Not Significant
		Clonsaugh Road / R139	✓			✓			Negligible	Not Significant

Road Name	Road Sensitivity	Junction Name	DM Max V / C Ratio			DS Max V / C Ratio			Magnitude of Impact	Significance of Effects	
			<85%	85% - 100%	>100%	<85%	85% - 100%	>100%			
		Clonshaugh Avenue / Glin Road	✓			✓			Negligible	Not Significant	
		Clonshaugh Road / Clonshaugh Avenue	✓				✓		Low	Negative Moderate	
		Riverside Park / Clonshaugh Road	✓			✓			Negligible	Not Significant	
		Clonshaugh Road / Newbury Wood	✓			✓			Negligible	Not Significant	
		Clonshaugh Avenue / Clonshaugh Heights	✓			✓			Negligible	Not Significant	
		Baskin Lane / Clonshaugh Road / Stockhole Lane		✓					✓	Medium	Negative Significant
		Clonshaugh Road / Dublin Airport Hotel / Clonshaugh Service Station	✓			✓				Negligible	Not Significant
Riverside Park	High	Riverside Park / Riverside Drive	✓			✓			Negligible	Not Significant	
		Greencastle Road / Greencastle Road / Barryscourt Road /	✓			✓			Negligible	Not Significant	
M50	Negligible	M50 Northbound / Junction 2 On-slip	✓				✓		Low	Not Significant	
		M50 Northbound / Junction 3 Off-slip	✓			✓			Negligible	Imperceptible	

The results of the junction analysis illustrated in Table 6.55 demonstrate that the majority of junctions continue to operate with a maximum V / C ratio of below 85% during the PM Peak Hour in the 2043 Design Year and the Proposed Scheme.

It is noted that capacity issues arise at the following seven junctions:

- **Clontarf Road / Seaview Avenue North three-arm signalised junction (13112)** – operates above 100% during both the Do Minimum and Do Something scenarios;
- **St Lawrence Road / Clontarf Road three-arm priority junction (13173)** – operates above 100% during both the Do Minimum and Do Something scenarios;
- **Grace Park Road / Beaumont Road / Collins Avenue four-arm signalised junction (13196)** – operates above 100% during both the Do Minimum and Do Something scenarios;
- **Oscar Traynor Road / Kilmore Road three-arm signalised junction (13463)** – operates between 85% – 100% during the Do Minimum and above 100% during the Do Something scenario;
- **Clonshaugh Road / R139 Northern Cross Extension three-arm signalised junction (17115)** – operates above 100% during both the Do Minimum and Do Something scenario;
- **R139 / Clonshaugh Road (North) three-arm roundabout (17118)** – operates above 100% during both the Do Minimum and Do Something scenario; and
- **Baskin Lane / Clonshaugh Road / Stockhole Lane three-arm priority junction (35656)** – operates between 85% – 100% during the Do Minimum and above 100% during the Do Something scenario.

At five out of seven of the junctions above, the impact is considered to be negligible as performance is similar in the Do Minimum and Do Something scenarios (above 100% V / C). A **Negative, Moderate and Long-term effect** is predicted at the Oscar Traynor Road / Kilmore Road three-arm signalised junction. A **Negative, Significant and Long-term effect** is predicted at the Baskin Lane / Clonshaugh Road / Stockhole Lane three-arm priority junction and the maximum Do Something V / C ratio is predicted to be above 100%. As a result, further analysis into this junction has been undertaken.

Overall, when combining the road sensitivity with the magnitude of the impact, the effect of redistributed traffic associated with the Proposed Scheme is deemed **Not Significant and Long-term** at 85 of the junctions assessed and **Imperceptible and Long-term** at one junction. A **Positive, Slight and Long-term effect** is predicted at one junction (Grangemore Road / Grange Road three-arm priority junction). **Negative, Slight and Long-term effects** and **Negative, Moderate and Long-term effects** are predicted at two junctions respectively.

Further Analysis at the Baskin Lane / Clonsaugh Road / Stockhole Lane Priority Junction

A detailed analysis was undertaken of the Baskin Lane / Stockhole Lane priority junction. The Baskin Lane arm is subject to a high flow of traffic in the Do Minimum scenario, which increases in the Do Something PM Peak Hour scenario.

As illustrated in the redistributed traffic flow difference plots for the 2028 PM Peak Hour (Diagram 6.28) traffic is predicted to be displaced at the northern end of the corridor near the R139 Northern Cross junction (R139 / R107 Malahide Road). The flow difference plots indicate approximately 400 and 580 PCUs travelling outbound being dispersed off the Clongriffin corridor at this location during the AM and PM Peak hour respectively. This can be attributed to the Do Something proposals at the R139 Northern Cross junction, which include removal of left turn slips, improved pedestrian, cycle and bus priority infrastructure and optimised cycle times for sustainable modes.

The proposed infrastructure and reduced cycle times at the Northern Cross junction has the effect of reducing the capacity for general traffic at this junction in the Do Something scenario. Therefore, the modelling is indicating that alternative routes provide more favourable journey times by bypassing the Northern Cross Junction, and ultimately resulting in increased traffic at the Baskin Lane / Clonsaugh Road / Stockhole Lane priority junction in comparison to the Do Minimum scenario.

The design of the R139 Northern Cross junction and the signal timing arrangements have been reviewed and subject to iterations with a view to rationalising the general traffic capacity at the junction whilst still maintaining the pedestrian, cycling and bus priority. Increasing the cycle time at the Northern Cross junction in the Do Something from 120s to 160s was considered to match the Do Minimum cycle time, which would reduce traffic dispersion. Whilst this assessment determined that vehicular capacity was improved, however, this was at the detriment to sustainable modes in particular pedestrian and cycle modes and thus was deemed to not be an appropriate solution in line with the scheme objectives.

Potential mitigation to minimise / discourage traffic from travelling along Baskin Lane, is to amend the proposed signal timings to give greater green time to the R107 Malahide Road, for traffic turning onto the R139. This amendment would attract more traffic through the junction and reduce rat running onto Baskin Lane, thus minimising the impact at Baskin Lane / Stockhole Lane junction.

A review of the estimated impacts at Baskin Lane was also undertaken. The Baskin Lane junction was assessed using Junctions 9 PICADY (Version. 9.0.1.4646) modelling software for the PM Peak period in the 2028 and 2043 Do Minimum and Do Something scenarios. The findings from the junction analysis indicate that the junction is operating over capacity in the Do Minimum for both 2028 and 2043 scenarios. The Do Something proposals have a minor impact in the AM Peak Hour (less than 5%). In 2043 the ratio of flow to capacity (RFC) of the Baskin Lane arm increases from 1.87 (DoMinimum) to 2.07 (Do Something). Based on the methodology used for the general traffic impact assessment, this result (i.e. junction performance is similar with or without the Proposed Scheme) would equate to a negligible impact that is a **Not Significant and Long-term effect**.

As noted previously, reasonable mitigation measures were explored within the Proposed Scheme to enhance vehicular traffic capacity at the R139 Northern Cross junction to minimise traffic dispersion and reduce the impact of the scheme. It was concluded that reasonable mitigation measures such as increasing cycle times would compromise the scheme objectives of enhancing pedestrian, cycle and bus priority infrastructure. The Proposed Scheme impacts, therefore, are considered acceptable when considered against the Proposed Scheme Objectives.

It is not proposed to apply any short-term mitigation measures for the opening year at the Baskin Lane / Clonsaugh Road / Stockhole Lane priority junction as part of the Proposed Scheme.

6.4.6.2.8.6 Night-time Traffic Redistribution

The night-time period is defined as between 23:00 and 07:00. An analysis of traffic data during this period indicates that traffic levels are considerably lower and that junctions have a higher capacity for vehicular movement². 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.

6.4.6.2.8.7 General Traffic Impact Assessment Summary – Indirect Study Area

Given the improvements to bus priority, walking and cycling as a result of the Proposed Scheme, there will likely be an overall reduction in operational capacity for general traffic along the direct study area. This may in turn result in some level of redistribution of general traffic away from the main corridor onto the surrounding road network.

Using the TII guidelines as an indicator for best practice, the LAM Opening Year 2028 model results were used to identify the difference in traffic flows between the Do Minimum and Do Something scenarios. The following thresholds have been used to identify where a Transport Assessment is required:

- **Local / Regional Roads:** Traffic redistribution results in an increase above 100 combined flows (i.e. in a two-way direction) along residential, local and regional roads in the vicinity of the Proposed Scheme in the AM and PM peak hours; and
- **National Roads:** Traffic exceeds 5% of the combined turning flows at junctions with/ on/or with national roads in the AM and PM peak hours as a result of traffic redistribution comparing the Do Minimum to the Do Something scenario with the Proposed Scheme in place.

The threshold impact assessment identified the following roads that required further traffic analysis:

- **AM Peak Hour:** Grange Road, R104 Tonlegee Road, Harmonstown Road, R105 Howth Road, Vernon Avenue, R105 Clontarf Road, Clonshaugh Road, Clonshaugh Avenue, M1 Southbound (at Junction 3), Baskin Lane, and M1 Junction 2 Circulatory; and
- **PM Peak Hour:** R106 Main Street, R106 Coast Road, R123 Moyne Road, R809 Grange Road, Millbrook Avenue, R104 Tonlegee Road, Kilbarrack Road, R807 James Larkin Road, R807 Clontarf Road, R807 Dublin Road, R105 Howth Road, Chapel Road, Beaumont Road, Skellys Lane, Kilmore Road, R104 Oscar Traynor Road, Coolock Drive, Clonshaugh Road, Riverside Park, M50, and Baskin Lane.

In terms of the National roads 5% threshold impact assessment, the highest impact predicted for total turning flows between the Do Minimum and Do Something scenarios in both the AM and PM Peak Hours is a 1% increase at the M1 Junction 2. At the other three junctions, either no increase or a decrease in turning flows is predicted as a result of the Proposed Scheme.

The general traffic impact assessment was undertaken by extracting operational capacities from the LAM at the key junctions along the above road links. To undertake a robust assessment, the operational capacity outputs have been presented with reference to the worst performing arm of a junction that experiences the maximum V / C ratio. Mitigation measures 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 for the additional general traffic volumes redistributed, as a result of the Proposed Scheme and the effect is deemed **Imperceptible to Not Significant and Long-term**.

² Less pedestrian, cycling and bus demand requirements leading to higher level of general traffic green time allocation per typical signal cycle

- At the small number of junctions indicating capacity constraints, the majority operate with a maximum V / C ratio of above 100% in both the Do Minimum and Do Something, therefore, the performance is similar with or without the Proposed Scheme and impact is considered to be negligible and have a **Not Significant and Long-term effect**. This level of congestion is acceptable according to national guidance. Section 3.4.2 of DMURS (2019) recognises that a certain level of traffic congestion is an inevitable feature within urban networks and that junctions may have to operate at saturation levels for short periods of time during the peak hours of the day. Chapter 1 of the Smarter Travel Policy Document also acknowledges that it is not feasible or sustainable to accommodate continued demand for car use. It should therefore be considered that the traffic congestion that is outlined in the impact assessment is acceptable with regard to the urban location of the area in the context of the increased movement of people overall and on sustainable modes in particular.
- A **Negative, Significant and Long-term effect** is only predicted at the Baskin Lane / Clonshaugh Road / Stockhole Lane three-arm priority junction in the 2043 Design Year during the PM Peak Hour, where further investigation has been undertaken. Redistributed traffic at the Baskin Lane junction can be attributed to the Do Something proposals at the R139 Northern Cross junction, which include removal of left turn slips, improved pedestrian, cycle and bus priority infrastructure and optimised cycle times for sustainable modes. The Baskin Lane junction was assessed using Junctions 9 PICADY modelling software for the PM Peak period in the 2028 and 2043 Do Minimum and Do Something scenarios. The findings from the junction analysis indicate that the junction is operating over capacity in the Do Minimum for both 2028 and 2043 scenarios. The Do Something proposals have a minor impact in the AM Peak Hour (less than 5%). The proposed impacts are considered acceptable when considered against the Proposed Scheme Objectives.

Accordingly, across the study area as a whole, it is determined that there will be an overall **Negative, Slight and Long-term effect** from the redistributed general traffic as a result of the Proposed Scheme. This impact is considered acceptable in line with the scheme objectives and the considerable improvements for sustainable modes in the direct study area, with the consequential reduction in capacity for general traffic leading to some level of traffic redistribution.

Given that the redistributed traffic will not lead to a significant deterioration of the operational capacity on the surrounding road network, no additional mitigation measures, beyond what is included already in the design, have been considered to alleviate the impact outside of the direct study area.

During the night-time lower traffic flows aligned with more vehicular capacity at junctions will reduce or eliminate traffic redistribution from the Proposed Scheme corridor. Thus, the impact during this period will be **Negligible and Long-term**.

It should therefore be considered that the traffic congestion outlined in the impact assessment is acceptable when considering the urban location of the area and in the context of the increased movement of people overall and by sustainable modes along the Proposed Scheme.

6.4.6.3 Operational Phase Summary

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

- Enhance the capacity and potential of the public transport system by improving bus speeds, reliability and punctuality through the provision of bus lanes and other measures to provide priority to bus movement over general traffic movements; and
- Enhance the potential for cycling by providing safe infrastructure for cycling, segregated from general traffic wherever practicable;
- Support the delivery of an efficient, low carbon and climate resilient public transport service, which supports the achievement of Ireland's emission reduction targets;
- Enable compact growth, regeneration opportunities and more effective use of land in Dublin, for present and future generations, through the provision of safe and efficient sustainable transport networks;

- Improve accessibility to jobs, education and other social and economic opportunities through the provision of improved sustainable connectivity and integration with other public transport services; and
- Ensure that the public realm is carefully considered in the design and development of the transport infrastructure and seek to enhance key urban focal points where appropriate and feasible.

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

- **Pedestrian Infrastructure:** The Proposed Scheme consists of measures to enhance the existing pedestrian infrastructure along the direct study area. All proposed facilities have been designed in accordance with BusConnects Preliminary Design Guidance which has been developed with cognisance to the relevant accessibility guidance. 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 D / E ratings, with the exception of 10 Cs. 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 four Cs. Overall, the improvements to the quality of the pedestrian infrastructure will have a **Positive, Significant and Long-term effect** in Section 1 and a **Positive, Moderate and Long-term effect** in Section 2 of the Proposed Scheme.
- **Cycling Infrastructure:** The Proposed Scheme also consists of measures to enhance the potential for cycling by providing safe infrastructure for cycling, segregated from general traffic (and pedestrians) wherever practicable along the direct study area. A LoS assessment was undertaken using an adapted version of the NTA's National Cycle Manual Quality of Service (QoS) Evaluation criteria. The results of the assessment demonstrate that the LoS during the Do Minimum scenario consists of C ratings. In the Do Something scenario, the LoS consists predominantly of the highest A / A+ ratings, with the exception of one B (along the proposed quietly trafficked cycle route section via Brian Road). Given the quality of the cycling infrastructure along the Proposed Scheme, the improvements will have a **Positive, Very Significant and Long-term effect** in Sections 1 and 2.
- **Bus Infrastructure:** The implementation of the Proposed Scheme will result in improvements in the quality of bus infrastructure provision along the direct study area. All proposed facilities have been designed in accordance with BusConnects Preliminary Design Guidance which has been developed with cognisance to the relevant accessibility guidance. A qualitative impact assessment has been undertaken based on the provision of bus priority, bus stop provision and changes to 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 and Section 2 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 66 spaces within the redline boundary of the Proposed Scheme (-29 spaces in Section 1 and -37 spaces in Section 2). 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 1 and a **Negative, Moderate and Long-term effect** in Section 2 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 15% and 16% 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 27% in the number of people travelling along the

Proposed Scheme during the AM and PM Peak Hours. 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 9.6% and 10.8% 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 14.1% 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 modelling assessment has been developed and network performance indicators of the bus operations along the 'end to end' corridor. The results of the assessment demonstrate that the total bus journey times on all modelled bus services will improve by between 20% and 23% during the AM and PM Peak hours of the 2028 Opening Year and 2043 Design Year. The Proposed Scheme will reduce total bus journey times along the Proposed Scheme by up to 18% in 2028 and 17% in 2043. Based on the AM and PM peak hours alone, this equates to **6 hours of savings in 2028 and 5.7 hours in 2043**. When compared to the Do Minimum combined across all buses. On an annual basis this equates to approximately 4,500 hours of bus vehicle savings in 2028 and 4,300 hours in 2043, when considering weekday peak periods only. Journey time variation and reliability are shown to improve in all Do Something scenarios compared to the Do Minimum. Overall, it is anticipated that the improvements in journey times and reliability for bus users along the Proposed Scheme will have a **Positive, 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 V / C ratios. The results are presented in terms of the significance of the impact to the V / C ratio for each junction based on its sensitivity and magnitude of impact.

The results of the assessment demonstrate that the surrounding road network largely has the capacity to accommodate the redistributed general traffic as a result of the Proposed Scheme. The majority of assessed junctions that required further traffic analysis have V / C ratios that are broadly similar before and after the Proposed Scheme implementation, resulting in a **Not Significant and Long-term effect**, with the exception of the Baskin Lane / Clonsaugh Road / Stockhole Lane Junction. Redistributed traffic at the Baskin Lane junction can be attributed to the Do Something proposals at the R139 Northern Cross junction, which include removal of left turn slips, improved pedestrian, cycle and bus priority infrastructure and optimised cycle times for sustainable modes. The findings from the additional detailed junction analysis indicate that the junction is operating over capacity in the Do Minimum for both 2028 and 2043 scenarios. The Do Something proposals have a minor impact in the AM Peak Hour (less than 5%). It has been determined that this impact is acceptable in line with the Scheme Objectives and the considerable improvements for sustainable modes in the direct study area, with the consequential reduction in capacity for general traffic leading to some level of traffic redistribution in an already congested urban environment.

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 in 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.

The contents of Table 6.56 present a summary of the potential impacts of the Proposed Scheme during the Operational Phase.

Table 6.56: Summary of Potential Operational Phase Impacts

Assessment Topic	Effect	Potential Impact
Pedestrian Infrastructure	Improvements to the quality of the pedestrian infrastructure along the Proposed Scheme.	Positive, Moderate to Significant and Long-term
Cycling Infrastructure	Improvements to the quality of the cycling infrastructure along the Proposed Scheme.	Positive, Very Significant and Long-term
Bus Infrastructure	Improvements to the quality of the bus infrastructure along the Proposed Scheme.	Positive, Very Significant and Long-term
Parking and Loading	A total loss of 78 parking / loading spaces along the Proposed Scheme.	Negative, Moderate and Long-term
People Movement	Increases to the total number of people travelling through 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, Significant and Long-term
General Traffic Network Performance Indicators	Reduction in general traffic flows along the Proposed Scheme.	Positive, Moderate and Long-term
	Redistributed general traffic along the surrounding road network in the indirect study area as a result of the reduction of reserve capacity along the Proposed Scheme.	Negative, Slight and Long-term

As outlined within Section 6.4 and summarised in Table 6.56 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 movement, mitigation and monitoring measures have not been considered beyond those already incorporated as part of the Proposed Scheme.

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

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

6.6 Residual Impacts

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

6.7 References

- CIRIA (2015). Environmental Good Practice on Site Guide, 4th Edition.
- DCC (2009). Local Area Plan for the Liberties Area.
- DCC (2016). Dublin City Development Plan.
- DCC and NTA (2016). Transport Study.
- DHLGH (2018). Project Ireland 2040 National Planning Framework.
- DPER (2015). Building on Recovery: Infrastructure and Capital Investment (2016-2021).
- DPER (2018). National Development Plan (2018- 2027).
- DTTS (2009). National Cycle Policy Framework.
- DTTS (2019). Smarter Travel: A Sustainable Transport Future (2009 – 2020).
- DTTS (2019). Traffic Management Guidelines.
- DTTS (2019). Traffic Signs Manual.
- DTTS (2019). Temporary Traffic Management Design Guidance.
- DTTS (2021). Draft National Investment Framework for Transport in Ireland.
- DTTS (2019). Design Manual for Urban Roads and Streets.
- DTTS (2019). Statement of Strategy.
- DTTS (2019). Traffic Signs Manual – Chapter 8, Temporary Traffic Measures and Signs for Roadworks.
- DCCAIE (2018). Sustainable Development Goals National Implementation Plan.
- DCCAIE (2019). Climate Action Plan 2019.
- DCCAIE (2021). Climate Action Plan 2021.
- Eastern and Midland Regional Assembly (2019). Regional Spatial and Economic Strategy (2019-2031).
- EPA (2017). Guidelines on the Information to be Contained in Environmental Impact Assessment Reports. Draft. August 2017.
- NAVTEQ (2011). The NavStreets Reference Manual.
- NDA (2020). Building for Everyone: A Universal Design Approach.
- NTA (2011). National Cycle Manual.
- NTA (2013). Greater Dublin Area Cycle Network Plan.
- NTA (2016). Transport Strategy for the Greater Dublin Area (2016 – 2035).
- RSA (2019). Road Safety Strategy (2013-2020).
- TRB (2000) Highway Capacity Manual.

TRB (2013) Transit Capacity and Quality of Service Manual.

Transport for London (2010) Traffic Modelling Guidelines.

TII (2014) Traffic and Transport Assessment Guidelines.