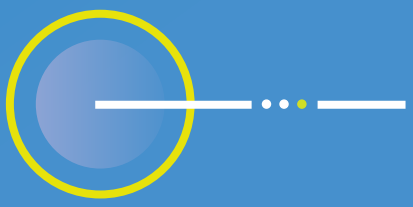
NTA
Údarás Náisiúnta Iompair
National Transport Authority

Jacobs SYSTRA

Greater Dublin Area Transport Strategy 2022 2042



Greater Dublin Area Transport Studies

Naas Road

November 2021

Contents

Executive Summary

Introduction

The National Transport Authority (NTA) commissioned Jacobs Engineering Ireland Limited (Jacobs) in collaboration with Systra to complete a series of Area Based Studies for the Greater Area (GDA). This report focuses on the Naas Road study area.

This study was commissioned in order to inform the NTA's review of the Transport Strategy for the Greater Dublin Area (2016 – 2035), which will consider the future development of the transport system in the Greater Dublin Area (GDA) for the period up to 2042.

This report details the findings for the Naas Road study area, which is located approximately 6km south-west of Dublin city centre and lies within the South Dublin County Council (SDCC) and Dublin City Council (DCC) local authority areas.

The methodology for this study is based on the Area Based Transport Assessment (ABTA) process. The ABTA approach has been adapted for the purposes of this study and comprises the following key steps:

- Policy Context – understand the planning and transport policy context within which this study sits;
- Baseline Assessment – provide a clear understanding of the existing spatial characteristics, land uses, transport conditions and constraints in the study area;
- Establish Context – understand the future growth proposals for the study area as well as future travel patterns which proposed transport options need to serve;
- Options Development and Assessment – identify high-level transport options to serve demand in the study area and assess them via a multi-criteria analysis against the objectives of the study; and
- Final Summary – present the options to be taken forward and investigated further.

Policy context

A comprehensive review of existing national, regional and local level legislation, policy and guidance relevant to this study has been undertaken in order to provide context for the identification of interventions which align with wider policy goals. Key documents include:

- Project Ireland 2040 – National Planning Framework;
- Project Ireland 2040 – National Development Plan;
- Strategic Investment Framework for Land Transport (2014);
- Draft National Investment Framework for Transport in Ireland;
- Smarter Travel: A Sustainable Transport Future (2009 to 2020);
- The Climate Action Plan (2019);
- The Regional Spatial and Economic Strategy for the Eastern and Midland Region (2019 to 2031);
- Dublin Metropolitan Area Strategic Plan; and
- Transport Strategy for the Greater Dublin Area (2016 to 2035).

Baseline assessment

The study area is predominantly employment (industrial estates and business parks) and industrial lands, which is bounded to the north by the Kildare railway line, to the west by the M50 and has a direct Luas (Red Line) connection. To the east and south of the study area lies the mainly residential areas of Inchicore, Drimnagh,

Walkinstown, Greenhills and Crumlin. The M50 provides an orbital road connection around Dublin and provides strategic access to areas such as Lucan, Tallaght, Clondalkin, Swords and the national road network.

The Naas Road study area is located on a key economic transport corridor. The study area's regional road network comprises mainly radial routes connecting the city centre to the national road network and wider environs, while the local road network provides key links to employment and local attractions.

The study area is connected by both heavy rail and light rail lines, as well as bus services, which predominantly provide for key radial movements across the study area. Orbital connectivity by public transport is less well defined in the study area, particularly for north-south movements. The study area does have cycle infrastructure in place along main routes, however connectivity could be further improved to promote interchange with existing public transport services and connectivity into the city centre.

50% of residents travel to work via car, which is better in comparison to 58% in the GDA, however there is still some way to go to achieve the 38% car use seen in the wider Dublin south-central area. Over 70% of households own 1 car or less, compared to just under 60% across the GDA.

9% of residents from the study area travel to work via train or Luas, higher than Dublin south-central and GDA, with a further 13% of residents from the study area travel to work via bus. 16% of people from the area travel to work on foot or by cycling, with 35% of trips to school/college to the area are by foot or by cycling.

The Naas Road study area is predominantly brownfield land or industrial/employment and retail land uses, with limited green open space. Key watercourses include the River Camac and the Grand Canal (within SDCC area). There are also air pollution elements of concern identified[1] related to traffic emissions, along with noise pollution, the majority of which occurs along the national, regional and distributor road network.

Context

Chapter 4 provides the context of the transport demand and supply in the forecast year, 2042. It considers the proposed growth in the area, transport proposals, travel patterns and forecast demand if modal shift was to occur. It demonstrates how the Naas Road study area is planned to undergo considerable transformational change by 2040 and beyond to develop the area into an urban quarter/district, creating new homes, jobs, schools and community facilities. Population, employment and education levels are expected to experience considerable levels of growth, as outlined in both the Dublin City Council (DCC) and South Dublin County Council (SDCC) Development Plans.

The assessment of future travel demand to 2042 was based on the outputs from the NTA Eastern Regional Model (ERM), assessing a range of peak periods and mode classes. The model run represents a 'do minimum' scenario which includes proposed development, all existing transport provision, plus the changes to bus services and frequency service related to the New Dublin Area Bus Network. While the bus network operates in line with the New Dublin Bus Network timetable, the model did not include any of the of the associated Bus Connects infrastructure proposals which would improve journey times. No other transport proposals were included in the model.

A key issue within the study area is the high car mode share, with many of those journeys covering a short distance. The data analysis indicates some interventions will be required to make car a less attractive option, and other modes more attractive, particularly as the mode share for cycling in particular is low. The road network is shown by the 2042 ERM to perform poorly with many junctions approaching or being over capacity, specifically on the key inbound route to the city centre along the N7 and R110/R810 Naas Road. This is likely to affect car journeys at busy times and the reliability of bus services as a competitive alternative to car.

[1] SDCC Strategic Environmental Assessment accompanying their Development Plan (Draft 2016-2022) https://www.southdublindevplan.ie/sites/default/files/documents/2_%20Environmental%20Report.pdf

However analysis of data from the 2042 ERM shows that car journey times in the area generally remain quicker than public transport services for the same origin/destination pairs, making public transport trips less attractive to users. This indicates an intervention to make car travel less attractive and/or improve public transport times would make travel by public transport a competitive alternative to car.

The existing rail and Luas services are approaching or over capacity to/from the city centre in the AM and PM peaks by 2042, with some BusConnects services also experiencing high volumes on sections of the route. Public transport interventions will be required as overcapacity services are a deterrent to existing public transport users and provide a constraint to encouraging more public transport trips. The potential for users having to wait for the next available service due to overcrowding and longer journey times make car journeys favourable over public transport.

The cycling mode share is low. Cyclists and pedestrians have limited opportunities to safely cross key infrastructure due to the severance in the area caused by R110/R810 Naas Road, Luas Red line and the Grand Canal. There are also barriers such as the M50 and the railway which limit connectivity externally for all modes. An intervention to reduce this level of severance and improve accessibility within the Naas Road study area will make active travel more attractive.

A high number of short-distance car trips, and a large number of car trips internal to the Naas Road study area, shows there are opportunities to encourage these journeys to be undertaken more sustainably by providing interventions which facilitate safe and easy sustainable travel. The majority of the existing public transport routes are mainly radial, providing links into the city centre. There is an opportunity to improve orbital public transport provision to connect the north and south of the study area.

An analysis of future demand for trips from the Naas Road area, including an element of mode shift from car to public transport has been undertaken. To achieve a mode shift of 25% of car trips to public transport modes for east-west movement to the city centre, provision is required for a further 1,000 public transport trips across the M50 (with total public transport demand circa 6,000 in the AM peak). Provision for an additional 500 trips across the Kylemore Road screenline will be also be required.

Option development

To identify options to serve travel demand in the study area in 2042, the following steps have been completed:

- A review of relevant planning and transport policies and strategies has provided the overall context for options, and identified current thinking in relation to the future transport network;
- A baseline analysis of the existing transport network identified existing network issues and opportunities;
- An analysis of planning and travel data from the 2040 Planning Sheet and a DM run of the ERM for 2042 provided insights into future travel demand and network capacity constraints; and
- A review of the GDA strategy objectives against which all options should be aligned.

This option generation process included two main categories of options:

- Those to enhance existing infrastructure and services and/or improve access to existing infrastructure and services; and
- New sustainable transport (public transport and active mode) infrastructure and services which could supplement the existing network to deliver a more holistic sustainable transport offering in the Naas Road study area.

Where enhancements and interventions have been identified for existing infrastructure and services, options previously proposed within existing local and regional strategies have been considered. Additionally, new options have been proposed for existing infrastructure where further enhancements could be beneficial to the wider accessibility of the study area, particularly due to the level of change proposed.

The above steps resulted in the preparation of an options long-list to serve demand in the study area. Alongside the key public transport, cycle link and local highway options that have been taken through the qualitative multi-criteria analysis (MCA) process, a number of other supplementary options have been identified as part of the long list. These consist of smaller scale sustainable transport interventions to enhance connectivity and improve journey times within the study area, as well as demand management proposals to be considered at a wider strategy level. It is recommended that these options be taken forward for further consideration as part of the GDA strategy work but are not considered as part of the MCA within this report.

A number of public transport and supplementary options for future intervention within the study area were considered as part of the MCA, these are outlined in the table below.

Reference	Type of Option	Location/Description
Based on Existing Strategy or Proposal		
1	Rail	DART+
2	Rail	New Kylemore station (assumes DART+ in place)
4	Luas	Luas Red line enhancements (e.g. increase frequency, capacity)
5	Luas	Luas Red line new stop (R110 Naas Road/R134 Nangor Road)
6	Luas	Lucan Luas line
7a	Public Transport	Orbital PT corridor (conventional bus)
7b	Public Transport	Orbital PT corridor (bus with priority measures)
7c	Public Transport	Orbital PT corridor (LRT)
11a	Highway	SDCC Dev Plan link road: Oak Road to Robinhood Road (road)
New Proposals		
11b	Active	SDCC Dev Plan link road: Oak Road to Robinhood Road (NMU link)
11c	Bus/Active	SDCC Dev Plan link road: Oak Road to Robinhood Road (Bus/NMU)
13	Luas	Multi-storey P&R at Red Cow (assumes Luas Red line enhancements)
14	Active	Cycle Super-highway (into the city centre)
15	Active	Cycle Super-highway (NE to SW)
20	Bus	Improvement of bus links North-South through study area (Ballyfermot to Walkinstown) (pre-Orbital PT corridor)
21	Bus	Orbital bus route A (Ballyfermot - Greenhills via Walkinstown)
22	Bus	Orbital bus route B (Ballyfermot - Greenhills - Kilnamanagh, assumes bus/NMU link)

Option assessment

The shortlisting of options is carried forward into chapter 6 for a qualitative multi-criteria analysis, providing a high-level assessment based on professional judgement. Building on the key themes of the Common Appraisal Framework, a set of criteria which sit within these overarching themes were developed to enable a more detailed assessment of options to be undertaken. The criteria were based on the objectives for the Transport Strategy, as provided by the NTA.

Consideration of options against demand found that it is unlikely that an individual option alone would have sufficient capacity to accommodate demand on the radial movements in 2040, the further capacity required for mode shift, as well as in the longer term as a result of the transformational change and growth proposed beyond 2040.

Whilst all the combined options are viable options to accommodate the radial trips within the study area, the options that performed best at the MCA are as follows:

- Reference 32 - DART+/Kylemore Station, Luas Red line enhancements and new stop, Lucan Luas line and primary cycle route; and
- Reference 33 - DART+/Kylemore Station, Luas Red line enhancements, new stop and Red Cow P&R expansion, Lucan Luas line and primary cycle route.

Using the modelling outputs, mode shift analysis and assumptions on public transport capacity, it is considered the demand in 2040 can be accommodated with DART+ and Luas Red line improvements (reference 30), however capacity from the Lucan Luas line could also support a mode shift away from car.

Summary

This study provides a comprehensive review of the Naas Road study area in relation to proposals for future land use and transport networks and identifies a series of transport options to serve future travel demand. Demand analysis has been undertaken, incorporating both modelled public transport demand and additional demand from car mode shift to identify the most appropriate options to serve the study area.

Overall, it is considered that the demand in 2040 can be accommodated with combined option of DART+ and Luas Red line improvements (reference 30). However as all combined options align with the Transport Strategy objectives, and in particular when considering the transformative change proposed in the study area, it is recommended that the options that performed best at the MCA are also included for further consideration:

- Reference 32 - DART+/Kylemore Station, Luas Red line enhancements and new stop, Lucan Luas line and primary cycle route; and
- Reference 33 - DART+/Kylemore Station, Luas Red line enhancements, new stop and Red Cow P&R expansion, Lucan Luas line and primary cycle route.

Further, a number of other supplementary options have been identified. These consist smaller scale sustainable transport interventions to enhance connectivity and improve public transport journey times within the study area. Alongside the public transport and active travel interventions, demand management proposals have been identified for further consideration at a GDA strategy-wide level, particularly if delivered to encourage mode shift targets. These proposals could include tolling of the M50, use of modal filters or traffic cells, and travel demand management measures (such as congestion charging or workplace parking levies).

1. Introduction

1.1 Background to the study

The National Transport Authority (NTA) commissioned Jacobs Engineering Ireland Limited (Jacobs) in collaboration with Systra to complete an Area Based Study for Naas Road.

This study was commissioned in order to inform the NTA's review of the Transport Strategy for the Greater Dublin Area (2016 – 2035), which will consider the future development of the transport system in the Greater Dublin Area (GDA) for the period up to 2042. In this context, the purpose of this study is to:

- Provide a comprehensive assessment of future travel demand in the Naas Road area;
- Identify realistic potential options to meet future travel demand to and from this area, and in particular to cater for demand into Dublin City Centre and other key destinations;
- Focus in particular on options for public transport and active modes provision, taking account of emerging proposals;
- Assess potential options using a multi-criteria assessment framework; and
- Recommend options which can be taken forward for further assessment as part of the development of the revised Transport Strategy.

1.2 Overview of the study area

The Naas Road study area is located 6km south west of Dublin city centre and lies in both Dublin City Council (DCC) and South Dublin County Council (SDCC) local authority areas (Figure 1.1).

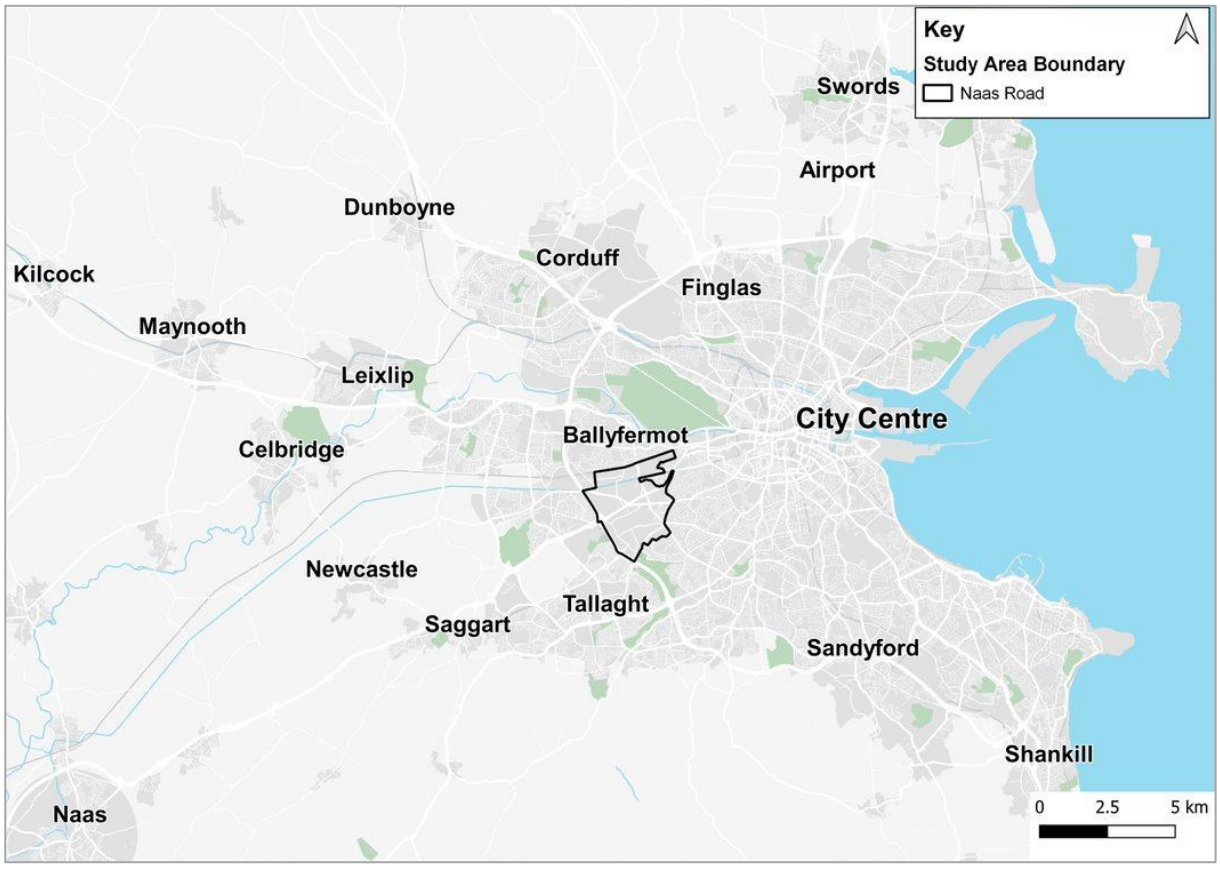


Figure 1.1: Study area overview (wider context)

The area is bounded to the north by the Kildare railway line, and the west by the M50. To the south and east of the study area lies predominantly residential land uses. The R110/R810 Naas Road runs through the middle of the site providing direct access to the M50 junction 9, the Luas Red Line also runs along this same alignment.

The study area is predominantly industrial-based at present, including Ballymount Industrial Estate and Park West Business Park,along with a collection of brownfield sites and employment areas as presented in Figure 1.2. The area also contains small pockets of residential areas. It should be noted that the land south of the R110 Naas Road is also commercial & industrial, however the existing land use information from OpenStreetMap is incomplete.

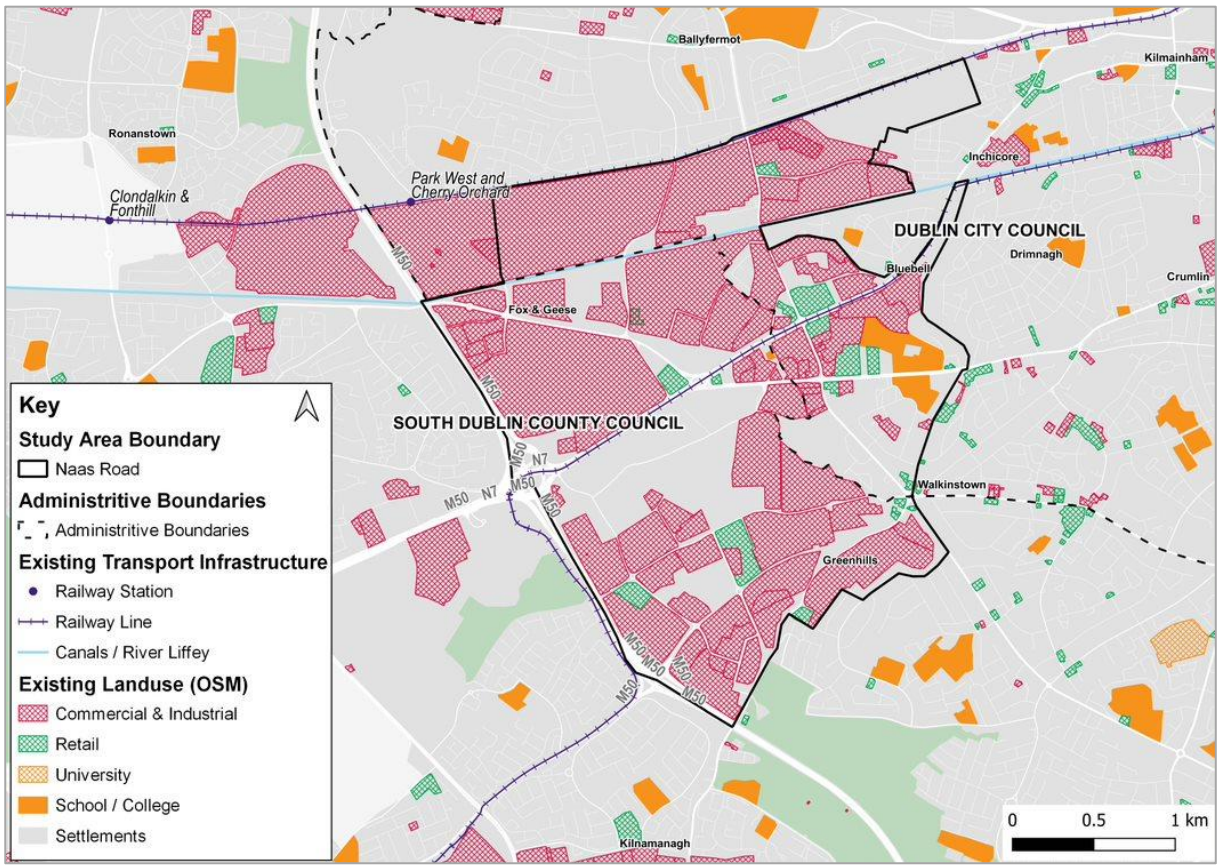


Figure 1.2: Naas Road study area (context)

1.3 Study methodology

The methodology for this study is based on the Area Based Transport Assessment (ABTA) process, which has been developed by both the NTA and Transport Infrastructure Ireland (TII). This approach ensures that movement and accessibility of all forms, across all modes of travel, is considered in the development of areas at a local level. The ABTA approach has been adapted for the purposes of this study and comprises the following key steps:

- Policy context – understand the planning and transport policy context within which this study sits;
- Baseline assessment – provide a clear understanding of the existing spatial characteristics, land uses, transport conditions and constraints in the study area;
- Establish context – understand the future growth proposals for the study area as well as future travel patterns which proposed transport options need to serve;
- Options development and assessment – identify high-level transport options to serve demand in the study area and assess them via a multi-criteria analysis against the objectives of the study; and
- Final summary – present the options to be taken forward and investigated further.

1.4 Report structure

This report is comprised of the following chapters:

- Chapter 2 – Policy context
- Chapter 3 – Baseline assessment;
- Chapter 4 – Future context;
- Chapter 5 – Options development;
- Chapter 6 – Options assessment; and
- Chapter 7 – Summary.

2. Policy Context

This section provides a comprehensive review of existing national, regional and local level legislation, policy, and guidance relevant to this study. It examines plans, policies and objectives at all levels in order to provide the broad context for this area study. It therefore frames the development of the study and provides a context for the identification of interventions which align with wider policy goals.

2.1 National policy

2.1.1 Project Ireland 2040 - National Planning Framework

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

- National Planning Framework (NPF) - shaping development in economic, environmental and social terms to 2040; and
- National Development Plan (NDP) - setting out the investment priorities that will underpin the NPF from 2018 to 2027.

Project Ireland 2040 provides the framework for future development and investment in Ireland and is the overall Plan from which other, more detailed plans will take their lead, including city and county development plans and regional strategies. The NPF is a tool to assist the achievement of more effective regional development.

The objectives of the NPF, in brief, are to:

- Guide the future development of Ireland, taking into account a project 1 million increase in population and create 660,000 additional jobs and 550,000 more homes by 2040;
- Direct 25% of this growth to Dublin, 25% across Cork, Limerick, Galway and Waterford and the remaining 50% across key regional centres, towns and villages (as set out in the Regional Spatial and Economic Strategy (RSES));
- Co-ordinate delivery of infrastructure and services in tandem with growth, helping to tackle congestion and quality of life issues.

The NPF represents the overarching national planning policy document and is underpinned by a series of core principles named National Strategic Outcomes (NSO) which include:

- NSO 1 Compact Growth;
- NSO 2 Enhanced Regional Accessibility;
- NSO 4 Sustainable Mobility;
- NSO 7 Enhanced Amenity and Heritage; and
- NSO 8 Transition to a Low Carbon and Climate Resilient Society.

These principles are translated by supporting policies and actions at sectoral, regional and local level.

In relation to Dublin, the NPF requires the preparation of the Dublin Metropolitan Area Strategic Plan (part of the RSES, and notes that the identification of infrastructure required to sustain growth is a key priority of this Plan. In relation to Dublin, the NPF itself sets a clear focus on:

- Supporting future growth by better managing growth and ensuring it can be accommodated within and close to the city. This includes a focus on underutilised land within the canals and M50 ring, and a more compact urban form.
- Enabling significant population and jobs growth in the Dublin metropolitan area, together with better management of the trend towards overspill into surrounding counties.

- There will be a requirement for significant greenfield development on sites which have good integration with the city and can be served by high-capacity public transport. Some existing sites have already been designated as Strategic Development Zones (SDZ).
- Addressing infrastructural bottlenecks, improving quality of life and increasing housing supply in the right locations.

Key transport-related growth enablers for Dublin include:

- Delivering key rail projects set out in the Transport Strategy for the GDA including Metro Link, DART expansion (also known as DART+) and the Luas green line link to Metro Link;
- The development of an improved bus-based system, with better orbital connectivity and integration with other transport networks;
- Delivering the metropolitan cycle network set out in the GDA Cycle Network Plan, including key commuter routes and urban greenways; and
- Improving access to Dublin Airport, including public transport

This policy sets the context for the development of transport interventions, including those considered through this study. It highlights that there will be significant growth to 2040 and that improvements to public transport and active mode provision are key to supporting the levels of planned development.

2.1.2 Project Ireland 2040 - National Development Plan

The NDP sets out the enabling investment to implement the strategy set out in the NPF, for the period 2018 to 2027. Under the NDP, investment in public transport infrastructure will be accelerated to support the development of an integrated and sustainable national public transport system consistent with the NPFs NSOs of Sustainable Mobility and Company Growth. Projects with allocated funding within the NDP include:

- Continued investment in bus and train fleets and infrastructure;
- The delivery of the Dublin BusConnects programme;
- The complete construction of Metro Link;
- Delivery of the priority elements of the DART Expansion Programme;
- A Park & Ride programme; and
- Cycling and walking networks in key urban areas.

These projects will deliver significant improvements. This study, and other work the NTA is doing to review the Transport Strategy for the Greater Dublin Area will consider other longer-term interventions required to support the NPF to 2040 and beyond.

2.1.3 Urban Regeneration and Development Fund[2]

The Urban Regeneration and Development Fund (URDF) is a fund established under the Department of Housing, Planning and Local Government to support compact and sustainable development. The fund aims to deliver residential and mixed development sites, in line with the objectives of the NPF and the NDP. Of the successful applications, those in the Naas Road study area are:

- Dublin City Council – Park West/Cherry Orchard Industrial Lands Analysis – to scope development potential for high density residential and employment uses
- Dublin City Council – Naas Road Lands Local Area Plan – a study of the barriers to development of key lands in Naas Road area

[2] https://www.gov.ie/en/publication/56ef8-urban-regeneration-and-development-fund-urdf/?referrer=http://www.housing.gov.ie/sites/default/files/publications/files/urdf_-_2019_funding_allocations_0.pdf

- South Dublin County Council – Naas Road/ Ballymount – to develop a plan to develop brownfield lands into sustainable, mixed use urban quarter

2.1.4 Investing in Our Transport Future: Strategic Investment Framework for Land Transport (2014)

The Strategic Investment Framework for Land Transport (SIFLT) sets out the strategic framework to consider the role of transport in the future development of the Irish economy and estimate the appropriate level of investment required in the land transport system. The framework establishes:

- High-level priorities for future investment in land transport; and
- Key principals, reflective of those priorities, to which transport investment proposals will be required to adhere.

Priorities include:

- Achieve steady state maintenance – emphasising the importance of efficient maintenance and management;
- Addressing urban congestion – recognising that improvements to the efficiency and sustainability of urban transport systems are a key priority. The document specifically notes that this "must be guided by demand/capacity assessments and recognise the role of urban centres as key drivers of economic activity, nationally and regionally." It goes on to say that measures should include improve and expanded public transport capacity, walking and cycling infrastructure as well as Intelligent Transport Systems to improve efficiency and capacity; and
- Maximising the contribution of land transport networks to national development.

2.1.5 Project Ireland 2040 - National Investment Framework for Transport in Ireland (NIFTI)

NIFTI is the Department of Transports new high-level strategic framework for prioritising future investment in the land transport network. At the time of writing, the public consultation for NIFTI is currently underway and expected to conclude in May 2021. Once published, NIFTI will replace SIFLT as the framework for future land transport investment. NIFTI is intended to ensure that transport investment is aligned with and supports the NPF and its NSOs. NIFTI outlines key investment priorities that future transport projects must align with to be considered for funding.

Priorities include:

- Decarbonisation – Recognises the fact transport accounts for approximately one-fifth of Irish greenhouse gas emissions, therefore decarbonisation is an urgent priority in the context of climate change targets;
- Protection and renewal – many of the challenges faced by the network can be addressed, at least partially, through protection and renewal. Adequate maintenance is necessary to ensure safety, make sustainable modes an attractive option, deliver connectivity and accessibility and ensure the resilience of key pieces of infrastructure;
- Mobility of people and goods in urban areas – requires prioritisation in order to facilitate compact and sustainable growth in towns and cities. Support will be given to projects that reduce urban congestion, especially through the use of sustainable mobility measures; and
- Enhanced regional and rural connectivity – through addressing priority bottleneck and network constraints as well as ensuring all parts of the country are well-served with access to major ports and airports.
- This framework highlights the need for this study to identify measures to address issues such as climate change and urban congestion through model shift and improved provision for sustainable modes.

2.1.6 Smarter Travel: A Sustainable Transport Future (2009 to 2020)

Smarter Travel: A Sustainable Transport Future presents an overall policy framework for sustainable transport in Ireland. The policy sets out a vision, goals and targets to be achieved and outlines 49 actions that form the basis of achieving a more sustainable transport future.

Smarter Travel acknowledges that continued growth and dependency on the private car is not sustainable and therefore sets on objective to promote a significant mode shift in favour of public transport, walking and cycling. A key target in this regard is to *reduce the proportion of travel to work trips by car from 65% to 45%*.

Key goals of Smarter Travel include:

- Improving quality of life and accessibility to transport for all;
- Improving economic competitiveness through maximising the efficiency of the transport system and alleviating congestion and infrastructural bottlenecks;
- Minimising the negative impacts of transport on the environment through reducing air pollution;
- Reducing overall travel demand and commuting distances in the private car; and
- Reducing reliance on fossil-fuel-based transport modes.

Please note, this policy is currently under review as part of the Sustainability Mobility Policy Review. Consultation on the review closed in early 2020. The consultation documents emphasised that the purpose of the review was to put in place a new policy which supports:

- A shift away from the private car to greater use of active travel and public transport;
- Travel by cleaner and greener transport; and
- Comfortable and affordable journeys to and from work, home, school, college, shops and leisure.
- The new policy will align with the NPF and will replace the Smarter Travel policy, plus the National Cycle Network Policy Framework.

This policy highlights the need for this study to place key emphasis on identifying the interventions required to support mode shift.

2.1.7 National Cycle Policy Framework (2009 to 2020)

Ireland's first *National Cycle Policy Framework 2009-2020* vision is that all cities, towns, villages and rural areas will be bicycle friendly. The overarching mission of the Framework is to create a strong national cycling culture to align with *Smarter Travel's* objective that 10% of all trips will be by bike by 2020.

The Framework sets out a comprehensive package of interventions – both 'hard' (planning and infrastructure) and 'soft' (communication and education) – to make cycling a convenient and safe option for everyone. The approach recommended is a hierarchy of measures, including:

- Reducing volumes of through-traffic, especially HGVs, in urban centres and in the vicinity of schools and colleges;
- Calming traffic/ enforcing low traffic speeds in urban areas; and
- Making junctions safe for cyclists and removing multi-lane one-way street systems.

A number of objectives relevant to this study include:

- Support the planning and design of urban centres to support cyclists and pedestrians;
- Improve integration between cycling and public transport to enable multi-modal travel;
- Provide secure parking for bikes; and

- Evaluate and monitor the implementation of measures.

Please note, this policy is currently under review as part of the Sustainability Mobility Policy Review (as detailed above). This policy highlights the need for this study to proactively identify the cycle infrastructure required to support future growth.

2.1.8 Building on Recovery: Infrastructure and Capital Investment (2016 to 2021)

Building on Recovery: Infrastructure and Capital Investment 2016-2021, published by the Department of Public Expenditure and Reform in 2016, presents the Government's new €42 billion framework for infrastructure investment in Ireland over the period 2016 to 2021.

The Exchequer transport capital allocation is largely framed by the recommendations and priorities set out in the *Strategic Investment Framework for Land Transport* (superseded by the *Planning Land Use and Transport Outlook 2040* in 2018). These priorities are threefold:

- Maintain and renew the strategically important elements of existing land transport system;
- Address urban congestion; and
- Improve the efficiency and safety of existing transport networks.

Under the Plan, €100 million is being committed to smarter travel and carbon reduction measures, including Greenways, to ensure that the transport sector makes a major contribution to climate change mitigation targets.

2.1.9 Climate Action Plan (2019)

The *Climate Action Plan: To Tackle Climate Breakdown* was published by the Government in June 2019. The Plan identifies how Ireland will achieve its 2030 targets for reduction in carbon emissions and a pathway towards achieving a net zero emissions by 2050.

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

The *Climate Action Plan* sets a target reduction of 45-50% in Ireland's transport emissions by 2030. The projected increase in population and economic activity and the resulting increased travel demand from the movement of people and goods will further intensify Dublin's current decarbonisation challenge. In 2017, transport accounted for a significant proportion of Ireland's greenhouse gas emissions – approximately 20%.

Other targets in relation to transport include:

- Increasing the number of electric vehicles;
- Building the electric vehicle charging network at the rate required to meet demand;
- Require at least one recharging point in new non-residential buildings with more than 10 parking spaces;
- Raise the blend proportion of biofuels in road transport.

2.1.10 Road Safety Strategy (2013 to 2020)

The Road Safety Strategy sets out targets to be achieved in terms of road safety in Ireland, with the primary target defined as follows:

'A reduction of road collision fatalities on Irish roads to 25 per million population or less by 2020 is required to close the gap between Ireland and the safest countries. This means reducing deaths from 162 in 2012 to 124 or

fewer by 2020. A provisional target for the reduction of serious injuries by 30% from 472 (2011) to 330 or fewer by 2020 or 61 per million population has also been set.'

The Strategy goes on to state that 'the attractiveness of walking depends strongly on the safety of the infrastructure provided. Collisions involving pedestrians account for 1 in 5 fatalities annually.' It also notes that 'collisions involving cyclists account for 1 in 25 road deaths annually, and many collisions involving cyclists lead to serious head injuries.'

The RSA undertook a consultation on their new strategy 2021-2030, which closed in Nov 2020. The new strategy is proposed to have an end date of 2030 to align with the EU Road Safety Policy. The review document notes that while the long-term trend shows that roads in Ireland have become safer for road users overall, this has not been the case for all road user groups. It notes that the biggest decrease in fatalities was among pedestrians and that there were 68% fewer pedestrian casualties in 2019 compared to 2000, but that pedestrians are still the second largest fatality group, behind car occupants. The new strategy will look at how to further reduce fatalities and serious injuries and how to deal with new issues in road safety.

2.1.11 UN Convention for the Rights of People with Disabilities

In March 2019, Ireland ratified the *UN Convention on the Rights of People with Disabilities*. Article 9 of the 'UNCPRD' includes the right to transport and creating an accessible end to end journey, with the user focus central to this approach. Its focus is:

"To enable persons with disabilities to live independently and participate fully in all aspects of life, States Parties shall take appropriate measures to ensure to persons with disabilities access, on an equal basis with others, to the physical environment, to transportation, to information and communications, including information and communications technologies and systems, and to other facilities and services open or provided to the public, both in urban and in rural areas. These measures, which shall include the identification and elimination of obstacles and barriers to accessibility, shall apply to, inter alia:

Buildings, roads, transportation and other indoor and outdoor facilities, including schools, housing, medical facilities and workplaces.

Information, communications and other services, including electronic services and emergency services."

Article 9 for the first time enshrines the right to transport within Irish legislation. The focus on Usability and Accessibility has implications and opportunities across transport planning and provision, including the National Planning Framework and the way that schemes are appraised to capture wider benefits associated with ensuring this Right.

2.1.12 Other national guidance

The following national guidance has also been considered:

- Area Based Transport Assessment Guidance (ABTA), NTA/TII, 2018;
- Design Manual for Urban Roads and Streets (DMURS), Department of Transport, Tourism and Sport, 2013 (updated 2019);
- National Physical Activity Plan, Healthy Ireland, 2019 (updated 2021);
- National Cycle Manual, National Transport Authority, 2011;
- Permeability: A Best Practice Guide, National Transport Authority, 2015;

- Achieving Effective Workplace Travel Plans; Guidance for Local Authorities, National Transport Authority[3].

2.2 Regional policy

2.2.1 Regional Spatial and Economic Strategy for the Eastern and Midland Region (2019 to 2031)

The *Regional Spatial and Economic Strategy for the Eastern and Midland Region* (RSES) translates the objectives of the NPF at a regional level and provides a link between the NPF and local plans. Overall, it provides a framework for investment to better manage spatial planning and economic development throughout the Region to 2031, and beyond to 2040.

The RSES identifies 16 regional strategic outcomes (RSOs). Integrated transport and land use is one of these, aiming to promote best use of transport infrastructure and promote sustainable and active modes of travel. The key challenge facing the region is identified as the transition to a low carbon society. The RSES therefore identified a number of primary areas of transition – with sustainable transport systems being one of these.

Chapter 4 of the RSES sets out the settlement strategy and hierarchy for growth up to 2031 and beyond. The RSES supports continued growth in Dublin and its suburbs and recognises the opportunity to promote public transport and active travel (considered via the MASP).

Dublin Metropolitan Area Strategic Plan

Chapter 5 of the RSES is the Metropolitan Area Strategic Plan (MASP) for Dublin. This sets out a strategic planning and investment framework for the Dublin metropolitan area covering the short term (to 2026), medium term (to 2031) and longer term (to 2040). It includes a vision for future growth to 2031 including large scale development opportunities and a sequence of infrastructure priorities. It envisages a 250,000 increase in population of the metropolitan area between 2016 and 2031.

The vision is underpinned by a spatial framework in line with the overall settlement strategy focussed on:

- Consolidation of Dublin City and suburbs;
- Key towns of Swords, Maynooth and Bray; and
- Planned development in strategic development areas in Donabate, Dunboyne, Leixlip and Greystones.

Figure 2-1: Strategic development areas and corridors highlighted in the MASP

The MASP includes a number of guiding principles for development, with a key focus on integrated transport and land use, focussing growth on public transport corridors and nodes. It aims to see 50% of all new homes within or adjoining the existing built-up area in Dublin and 50% in other settlements.

The MASP identifies five strategic development corridors as shown in Figure 2-1, and for each, highlights the:

- Population capacity (as opposed to targets) in the short, medium, and longer term;

[3] https://www.nationaltransport.ie/wp-content/uploads/2012/03/Achieving-Effective-Workplace-Travel-Plans-Guidance-for-Local-Authorities11.pdf

- The strategic residential development opportunities;
- The strategic employment opportunities;
- The infrastructure required to enable this development in the short-medium and medium-longer term.

The MASP for Dublin identifies strategic residential and employment corridors along key public transport corridors existing and planned, that contain development opportunities. The Naas Road study area lies along the south-west corridor identified in the MASP. It has the long-term potential to become a major district centre. To achieve this however, the area requires significant investment and site assembly efforts to enable activation.

- The strategic development of this corridor includes the consolidation of the western suburbs of Clonburris, Clondalkin (Kilcarbery lands) and Adamstown. Along the south-west corridor, the western suburbs short- to medium-term strategic plan are set out Table 2.1. The developments highlighted in blue below represent the developments most likely to impact on the study area.
- The development and re-intensification of lands at Naas Road will likely increase population and employment within the area, as well as trips through the area. By proposing upgrades to existing public transport infrastructure and delivering new sustainable infrastructure and services, this will facilitate better sustainable access within and through the area during and after these periods of growth

Table 2.1: Strategic Development Areas and corridors, capacity infrastructure and phasing

Corridor	Residential	Employment/Mixed-use	Phasing/enabling infrastructure
City Centre within the M50 (multi-modal) Population capacity – total 60,000 short 35,000 medium 10,000 long 15,000	Naas Road /Ballymount – significant brownfield lands in South Dublin and Dublin City Council areas, with potential for residential development and more intensive employment/ mixed uses	Re-intensification of underutilised lands including Naas Road and older industrial estates, subject to feasibility study.	Medium- to long-term multi-modal public transport, new Luas stop, site assembly and connection to services.
South western corridor (Kildare line/ DART and Luas Red line) Population capacity short 45,000 medium 21,000	Western suburbs - continued development of Adamstown SDZ and the phased development of Clonburris. New residential community at Kilcarbery near Clondalkin.	Promotion of high tech, manufacturing and research and development in Grange Castle Business Park	Short- to medium-term new roads and railway bridge, new rail station, DART expansion. Access, local network, public transport and services upgrades.
	Luas Red line - Regeneration of brownfield lands in Tallaght. New district at Fortunestown near emerging town of Saggart/Citywest	Re-intensification of older industrial estates at Naas Road/ Ballymount, Intensification of industrial lands and mixed-use development at Tallaght Town Centre/Cookstown	Short- to medium-term Brownfield conditions and site assembly upgrades

2.2.2 Transport Strategy for the Greater Dublin Area (2016 to 2035)

The *Transport Strategy for the Greater Dublin Area 2016-2035* provides a framework for the planning and delivery of transport infrastructure and services in the GDA up to 2035. It provides a transport planning policy around which other agencies involved in land use planning, environmental protection, and delivery of other infrastructure such as housing, water and power, can align their investment priorities.

The GDA's transport infrastructure must be planned for and invested in on the basis of the following:

- Assumed sustained economic growth;
- Substantial population growth;

- Full employment;
- That no one is excluded from society, by virtue of the design and layout of transport infrastructure and services or by the cost of public transport use; and
- That the environment in the GDA is protected and enhanced.

The Strategy sets out high-level proposals for the walking, cycling, public transport and road networks, as well as parking management measures and other supporting measures for the entire GDA.

2.2.3 Transport Strategy for the Greater Dublin Area Review

The NTA is required by legislation to review the Transport Strategy for the Greater Dublin Area every six years. The ongoing review will assess the implementation of the current plan and look to produce an updated strategy which will set out the framework for investment in transport infrastructure and services, through to 2042. The NTA aims to complete the review by the end of 2021, so that the new strategy can be approved by the Minister for Transport in early 2022.

The review process recognises that the following are particular challenges and considerations for the new strategy:

- Climate change and the environment – recognising the need for transport to lead the way towards a net zero emissions future;
- Growth and change – ensuring the public transport investment aligns with changes in the location of population, jobs and schools;
- Health and quality – recognising that transport can open up opportunities and have a positive impact on health and wellbeing;
- The economy – with effective public transport being a major driver of economic activity; and

This transport study will feed into the review process currently being undertaken by the NTA.

2.2.4 Greater Dublin Area Cycle Network Plan

The Greater Dublin Area Cycle Network Plan was adopted by the NTA in early 2014 and is identified as a key future growth enabler for Dublin in the NPF.

The plan forms the strategy for the implementation of a high quality, integrated cycle network for the GDA. This involves the expansion of the urban cycle network from 500km to 2,480km, comprising a mix of cycle tracks and lanes, cycle ways and infrastructure-free cycle routes in low traffic environments. Within the urban network this will consist of a series of routes categorised as follows:

- **Primary** – main cycle arteries that cross the urban area and carry most cycle traffic – target quality of service (QoS) of two abreast plus overtaking width = 2.5m
- **Secondary** – link between principle cycle routes and local zones – target QoS of single file plus overtaking width = 1.75m
- **Green** – provide tourist, recreational and leisure routes through amenity areas and along water courses
- **Feeder** – cycle routes within local zones and/or connection from zones to the network levels above.

2.3 Local policy

The Planning and Development Act (2000 to 2012) introduced the concept of local area plans within the framework of higher-level plans (such as Regional Planning Guidelines and City and County Development Plans). Local area plans provide more detailed planning policies for areas where significant development and change is anticipated.

There are two SDZs to the west of the M50 and Naas Road study area, Adamstown and Clonburris. These SDZs have plans, over the next 20 years, for delivering new homes, parks and open spaces, community, retail and employment floor space. The plans will encourage pedestrians, cyclists and public transport use, and reduce the reliance on car trips.

The Naas Road study area is proposed to undergo significant and transformation change, these plans are currently under review and further development. However, existing proposals and plans are summarised in a number of local documents, including:

- South Dublin County Council Development Plan (2016 – 2022);
- South Dublin County Council Development Plan (2022 – 2028);
- Dublin City Council Development Plan (2016 – 2022); and
- Dublin City Council Naas Road Lands Local Area Plan (2013).

3. Baseline Assessment

3.1 Description of the study area

3.1.1 General

The Naas Road study area is located approximately 6km south-west of Dublin city centre and lies within the South Dublin County Council (SDCC) and Dublin City Council (DCC) local authority areas. The area is bounded to the north by the Kildare railway line, and to the west by the M50. To the east and south of the study area lies the mainly residential areas of Inchicore, Drimnagh, Walkinstown, Greenhills and Crumlin. The M50 provides an orbital road connection around Dublin and provides strategic access to areas such as Lucan, Tallaght, Clondalkin and Swords.

The study area is located on a key economic transport corridor with a Luas (Red Line) connection providing direct access to Tallaght / Saggart and Dublin city centre, including the Docklands. Several bus links run through the study area into central Dublin and nearby towns / settlements such as Clondalkin, Ballyfermot, Tallaght and Crumlin. Located to the north west, just outside of the study area, the Park West and Cherry Orchard railway station provides access to Dublin to the north east and Kildare and Portlaoise to the south west, and all suburban stations along this line.

The railway, Grand Canal, R110 / R810 Naas Road and Luas Red Line act as barriers to permeability in the study area, in particular limiting north / south and orbital movements throughout the study area. The key north / south link runs from Walkinstown roundabout, north across the R110 / R810 Naas Road / Luas Red Line and the Grand Canal to Ballyfermot. The Grand Canal runs from Dublin city centre to the River Shannon through the study area. It lies approximately 0.5km south of the Kildare railway line and provides walking and cycling facilities as part of the developing strategic green network.

3.1.2 Transport network and services

3.1.2.1 Road network

The national road network provides the basis for Dublin's wider national-level and inter-regional connectivity. There are a number of Motorway and National roads in proximity to/within the study area including:

- **M50:** Forms the western boundary of the study area. Runs north / south and connects to the west of Naas Road at Junction 9 and Junction 1 of the N7. The M50 provides an orbital route around Dublin city centre and has annual average daily traffic (AADT) flows[4] of 150,000 vehicles per day between junction 5 (N2) and junction 9 (N7). Of these trips, heavy goods vehicles (HGVs) make up around 8% of vehicles. The M50 historically operates poorly at peak times, with flows being unstable and breaking down leading to high levels of congestion, particularly between Junctions 7 and 10.
- **N7:** The N7 connects Dublin to the M7 and M9 to west, providing a key link to Limerick and Kilkenny, through the town of Naas. The N7 between the town of Naas and the M50 is the second busiest road in the country. Between junction 1 (M50) and junction 1A, the N7 has AADT flows of 106,750 and a HGV percentage of 8.8%, making it the second busiest inner radial route to Dublin. Further out, the N7 west of junction 7 has AADT flows of 84,250 and a HGV percentage of 8.2%, making it Dublin's busiest outer radial route. Between junctions 1 and 1a, the N7 experiences unstable flows and flow breakdown during peak periods in the inbound direction; this leads to poor road performance. At other times of the day, the N7 is relatively free flowing.

[4] https://www.tii.ie/tii-library/strategic-planning/tii-road-network-indicators/TII-National-Roads-Network-Indicators-2019.pdf

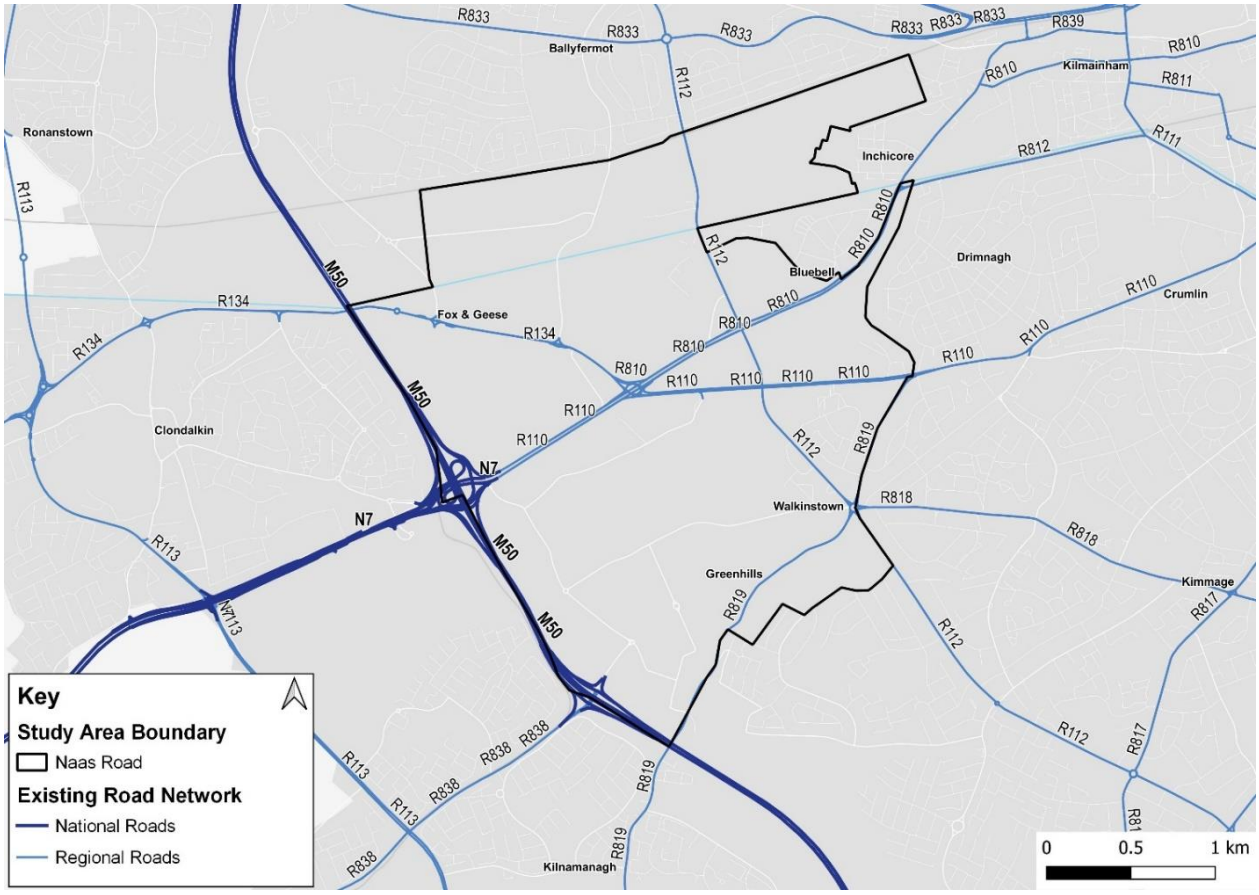


Figure 3.1: Naas Road study area national and regional road network

The regional road network within the study area comprises mainly of radial routes connecting the city centre to the national road network and wider environs, including:

- **R110 Naas Road**: western extents of Naas Road – runs from N7 at M50 junction 9 to R110/R810 Naas Road/R110 Long Mile Road junction;
- **R810 Naas Road:** eastern extents of Naas Road – provides access from R110/R810 Naas Road/R110 Long Mile Road junction to Inchicore;
- **R110 Long Mile Road:** runs east-west between Western Industrial Estate at R110/R810 Naas Road/R110 Long Mile Road junction to Crumlin and Drimnagh;
- **R112 Kylemore Road:** runs north-south through the study area between Ballyfermot and R810 Naas Road;
- **R112 Walkinstown Avenue:** continues from R112 Kylemore Road south to Walkinstown Roundabout and Manor Estate;
- **R134 Nangor Road:** provides access from Clondalkin Industrial Estate on the west of the M50, to R110/R810 Naas Road/R110 Long Mile Road junction;
- **R819 Walkinstown Road:** runs from Walkinstown roundabout to R110 Long Mile Road, and
- **R819 Greenhills Road:** continues from R819 Walkinstown Road south to Tallaght.

3.1.2.2 Rail Network

3.1.2.3 InterCity and commuter rail services

InterCity and commuter rail services provide connections through the Naas Road study area, stopping at Park West and Cherry Orchard railway station, which is located just outside the study area. The station provides access to rail links from Dublin Heuston through to Portlaoise, Waterford and Cork. It is also served by the commuter services which terminate and Heuston and those that run via the Phoenix Park Tunnel to Grand Canal Dock. The railway line and stations can be seen in Figure 3.2.

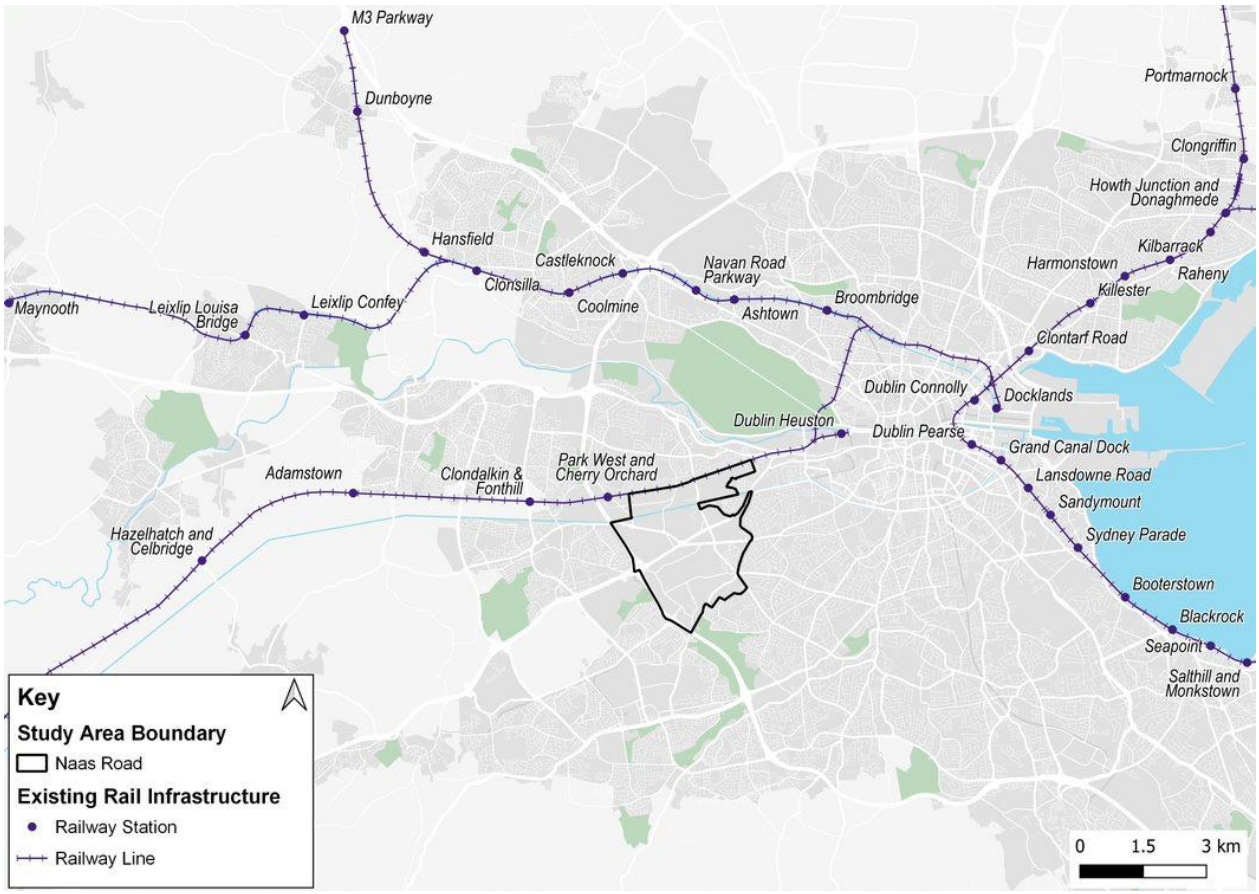


Figure 3.2: Existing rail lines

Park West and Cherry Orchard railway station has no car or bicycle parking available and has no facilities such as toilets for passengers. Table 3.1 shows the services and frequency of the existing rail routes through Park West and Cherry Orchard station, the closest railway station to the Naas Road study area.

Table 3.1: Rail service frequency[5]

Operator	Service	Route	Service frequency		
			Weekday	Saturday	Sunday
Irish Rail	01b	Dublin Heuston – Cork	44 services a day 7 services 07:00 – 10:00 10 services 16:00 – 19:00	17 services a day 3 services 07:00 – 10:00 3 services 16:00 – 19:00	5 services a day between 10:00 and 19:00

[5] https://www.irishrail.ie/

Operator	Service	Route	Service frequency		
			Weekday	Saturday	Sunday
Irish Rail	04	Dublin Heuston – Waterford	1 service a day	N/A	N/A
Irish Rail	16	Grand Canal Dock – Dublin Heuston – Portlaoise	44 services a day 7 services 07:00 – 10:00 10 services 16:00 – 19:00	17 services a day 3 services 07:00 – 10:00 3 services 16:00 – 19:00	5 services a day between 10:00 and 19:00

The National Heavy Rail Census Report 2018[6] shows peak hour flows by radial corridor, and reports that the maximum flows on the Heuston lines during the AM peak period (08:00-09:00) were between Park West and Cherry Orchard and Heuston railway stations for both the commuter and InterCity services. In the PM peak period (17:00 – 18:00) the maximum flow on the commuter service was between Park West and Cherry Orchard and Clondalkin / Fonthill stations.

South Dublin County Development Plan (2016-2022) ET1 Objective 6 aims to direct people to enterprise and employment uses within 800m walking distance of railway and Luas stations. Figure 3.3 illustrates the level of access to the existing railway network from the Naas Road study area and shows that the majority of the study area is over 800m from a railway station.

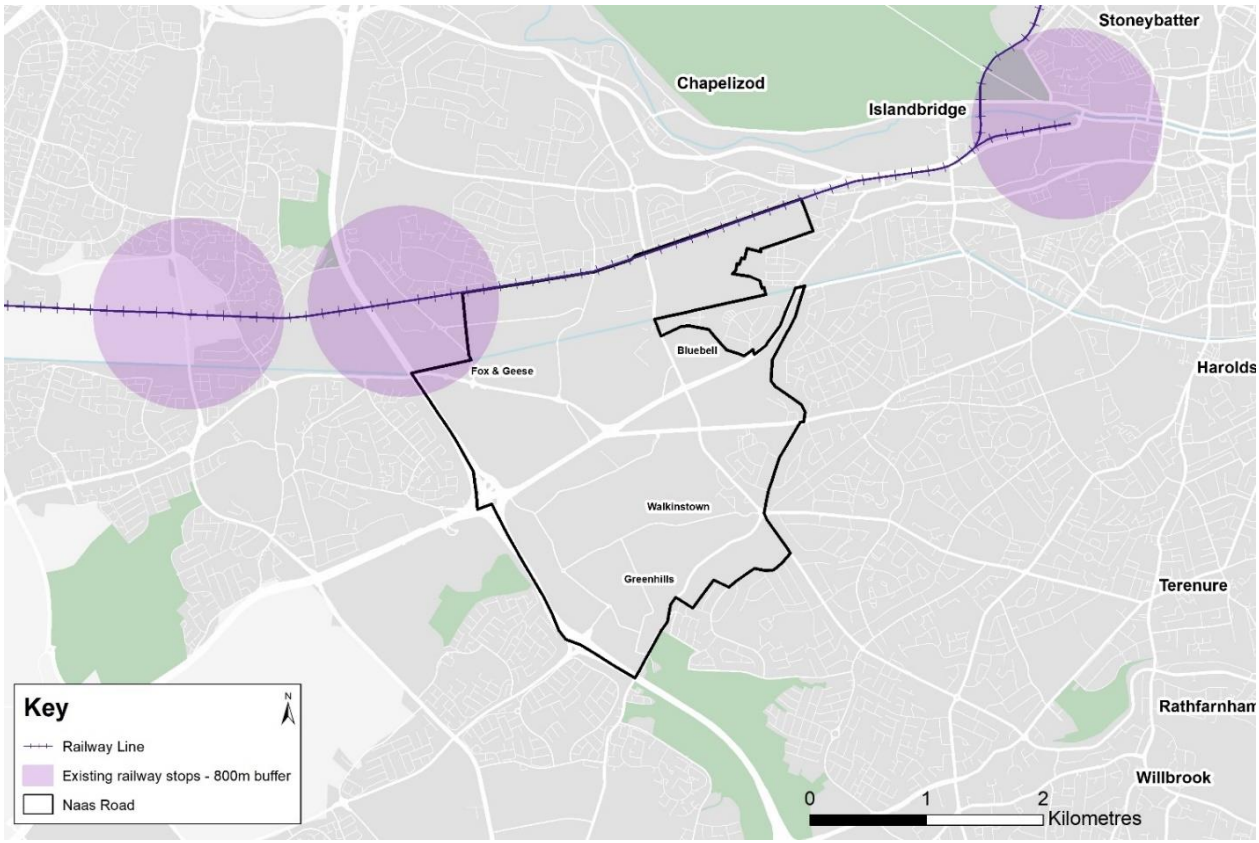


Figure 3.3: Access to the existing railway network (area within 800m of a rail station)

[6] https://www.nationaltransport.ie/wp-content/uploads/2019/07/National_Heavy_Rail_2019_FA_ONLINE.pdf

3.1.2.4 **Luas network**

The Luas[7] Red Line is a light-rail system which extends from Tallaght and Saggart through the city centre to Dublin Docklands. The line is 21km long and consists of 32 stops, the route can be seen in Figure 3.4. The Luas Red Line intersects with the Luas Green Line at Abbey Street in the city centre.

The Luas Red Line has three Park & Ride facilities, one of which is located at the Red Cow stop, to the west of the Naas Road study area, adjacent to M50 junction 9. The Red Cow Luas Station has a capacity of 727 parked vehicles.

The Red Line creates a barrier to north-south movement across the middle of the study area, running along R110 / R810 Naas Road from Inchicore to the north east, to the south of the M50 at Red Cow interchange. There are three Luas stops within the Naas Road study area, Bluebell, Kylemore and Blackhorse. Red Cow Luas stop lies just outside of the study area on the western side of the M50.

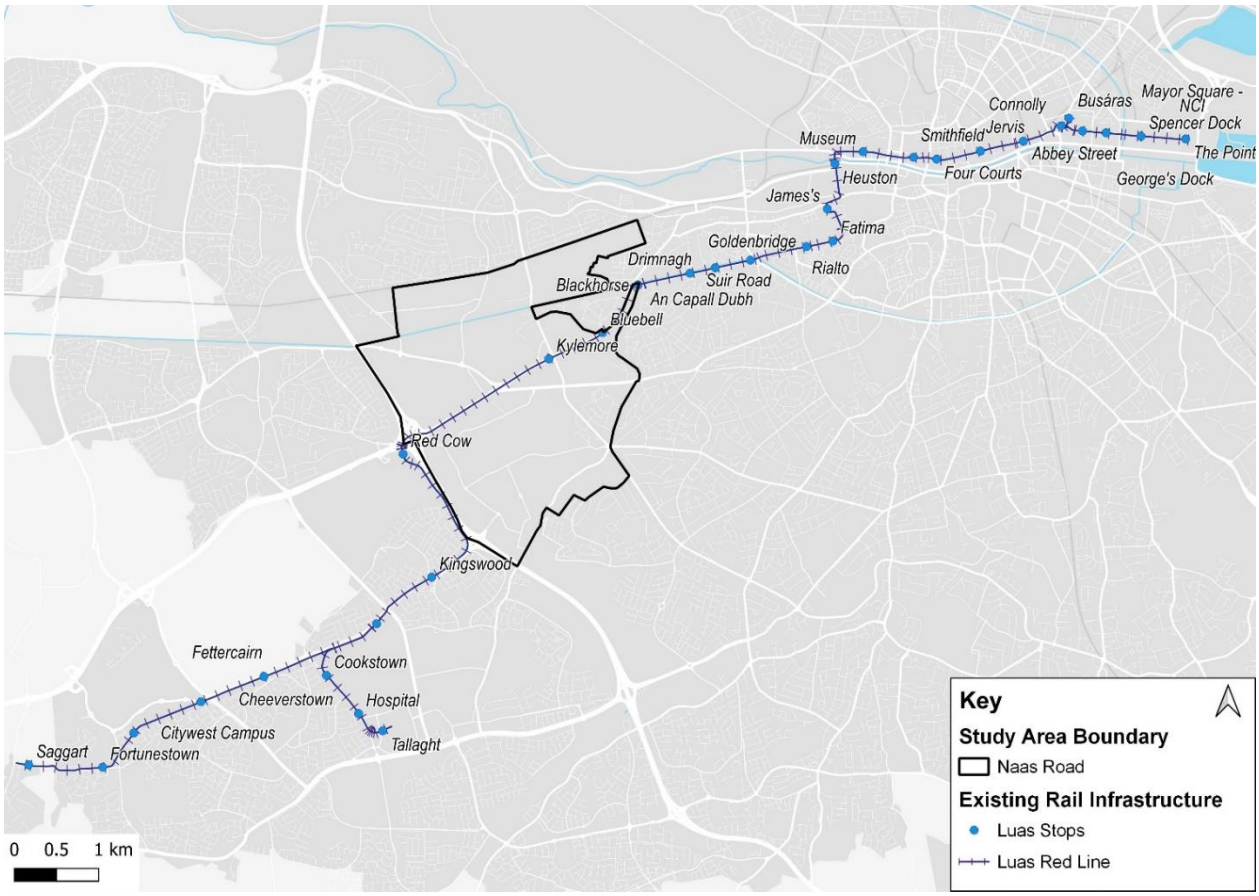


Figure 3.4: Red Luas line route

The Luas Red Line runs seven days a week, from 05:30–00:30 on Monday to Friday, 06:30–00:30 on a Saturday and 07:30–00:00 on a Sunday. The service runs regularly throughout the day, with trams up to every four minutes during peak periods, and approximately every 10 minutes outside of rush hour. During early mornings and late evenings, service frequencies can be reduced to up to every 20 minutes.

South Dublin County Development Plan (2016-2022) ET1 Objective 6 aims to direct people to enterprise and employment uses within 800m walking distance of railway and Luas stations. Figure 3.5 illustrates the level of access to the Luas Red Line service across the Naas Road study area, it shows the areas that are within 800m of a

[7] https://www.dublinpublictransport.ie/dublin-trams

Luas stop (as the crow flies). This shows that a large proportion of the study area to the north and south in particular are over 800m from a Luas stop.

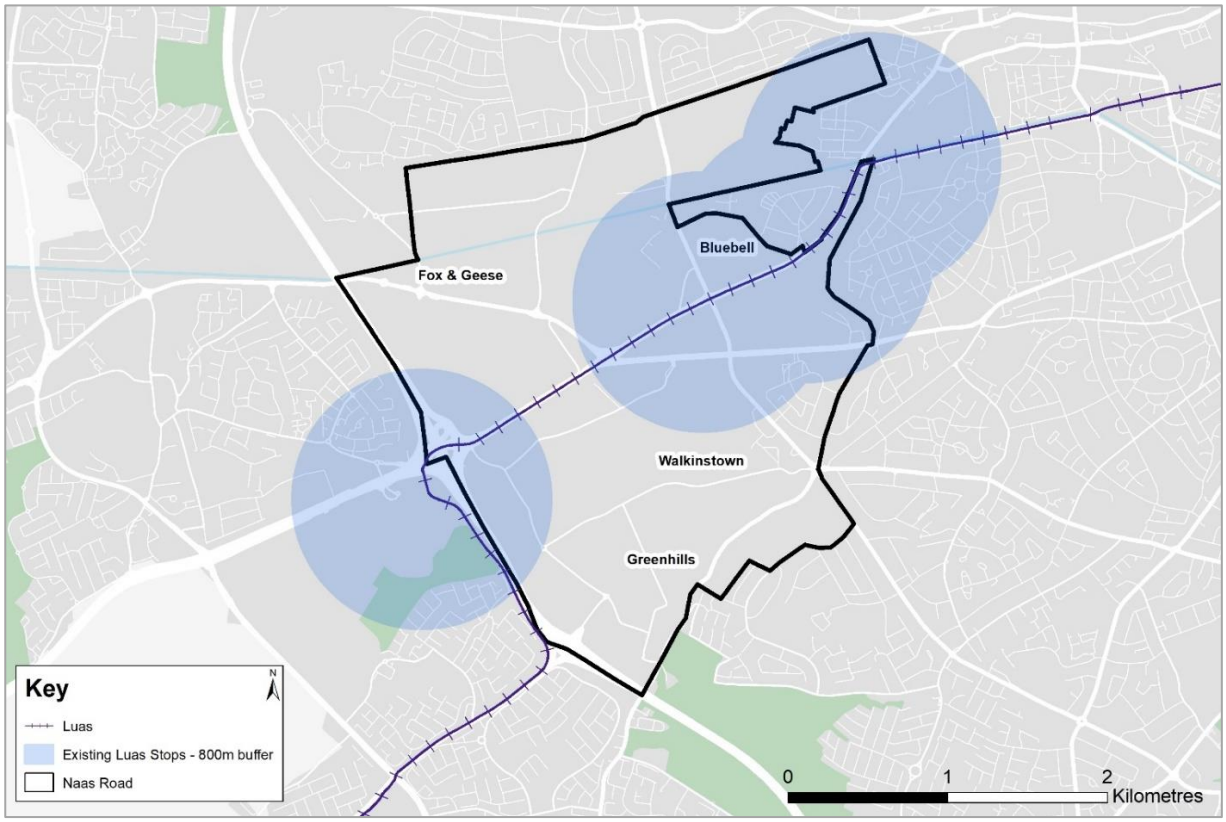


Figure 3.5: Access to the Luas network (area within 800m of a Luas stop)

3.1.2.5 Bus network

BusConnects is the NTA's programme to improve bus and sustainable transport services in Ireland. The programme has several key elements including:

- The Core Bus Corridors – 16 radial routes into the city centre with full bus priority and provision for cyclists;
- Dublin Area Bus Network redesign;
- Improvements to bus livery; and
- New bus stops and shelters and improved information.

As part of the BusConnects programme, a redesign of the bus network in the GDA is proposed to provide a more coherently planned network. The implementation of the New Dublin Area Bus Network will be completed in phases commencing in 2021, as such the proposed network is set out here as part of the baseline bus network. The new network features:

- **Spines** – frequent routes made up of bus services timetabled to work together along a radial corridor and branch off to serve different areas;
- **Orbitals** – providing connections between the suburbs, town centres and key transport interchanges without requiring travel into the city centre;
- **Other city-bound routes** – other routes which operate on their own timetables outside of spine routes;
- **Local routes** – routes providing connections within local areas;
- **Peak only** – services operating during peak periods to provide additional capacity on key corridors; and

- **Express** – direct services from outer suburbs to city centre at peak times.

The routes proposed to run through the Naas Road study area are detailed in Table 3.2.

Table 3.2: Dublin Area Network Redesign Routes

Route Type	Service	Route	Weekday Frequency
Spinal Routes	D1	Clongriffin – City Centre – Grange Castle	15 – 30 minutes
	D2	Clare Hall – City Centre – Citywest	15 – 30 minutes
	D3	Clongriffin – City Centre – Clondalkin	15 – 30 minutes
	D4	Swords Road – City Centre – Killinarden	30 – 60 minutes
	D5	Edenmore – City Centre – Tallaght	30 – 60 minutes
	F3	Charlestown – City Centre – Greenhills	10 – 30 minutes
	G1	Red Cow – City Centre – Spencer Dock	12 – 30 minutes
Orbital	S4	Liffey Valley – Ballyfermot – Crumlin – Milltown – UCD	10 – 20 minutes
Other city-bound routes	58	Rathcoole – City Centre – Dublin Port	60 minutes
	60	Red Cow – Cherry Orchard – Spencer Dock	60 minutes
	71	Tallaght – Ballymount – East Wall	30 – 60 minutes
	73	Marino – City Centre – Walkinstown	15 – 30 minutes
Peak-only/express route	X55	Clondalkin – City Centre – Ringsend	3 services in AM peak hour 2 services in PM peak hour
	X58	Rathcoole – City Centre	2 services in AM peak hour 1 service in PM peak hour

A map of these proposed routes and others in the vicinity of the study area can be seen in Figure 3.6.

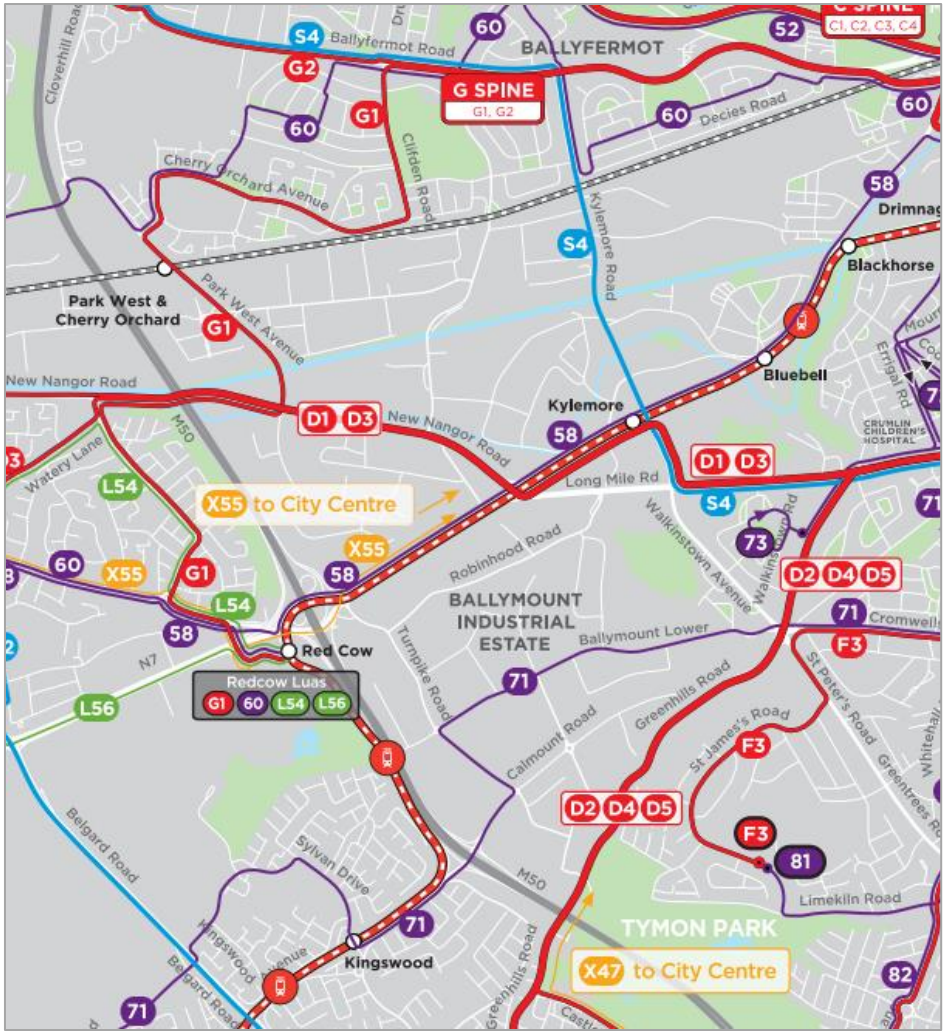


Figure 3.6: BusConnects Route Map

South Dublin County Development Plan (2016-2022) ET1 Objective 6 aims to direct people to enterprise and employment uses within a 400m walking distance of high-capacity public transport nodes. Figure 3.7 illustrates the level of access to a bus stop across the Naas Road study area, it shows that the majority of the study area is within walking distance to a bus stop, however it should be noted that the services in the north of the study area are more limited.

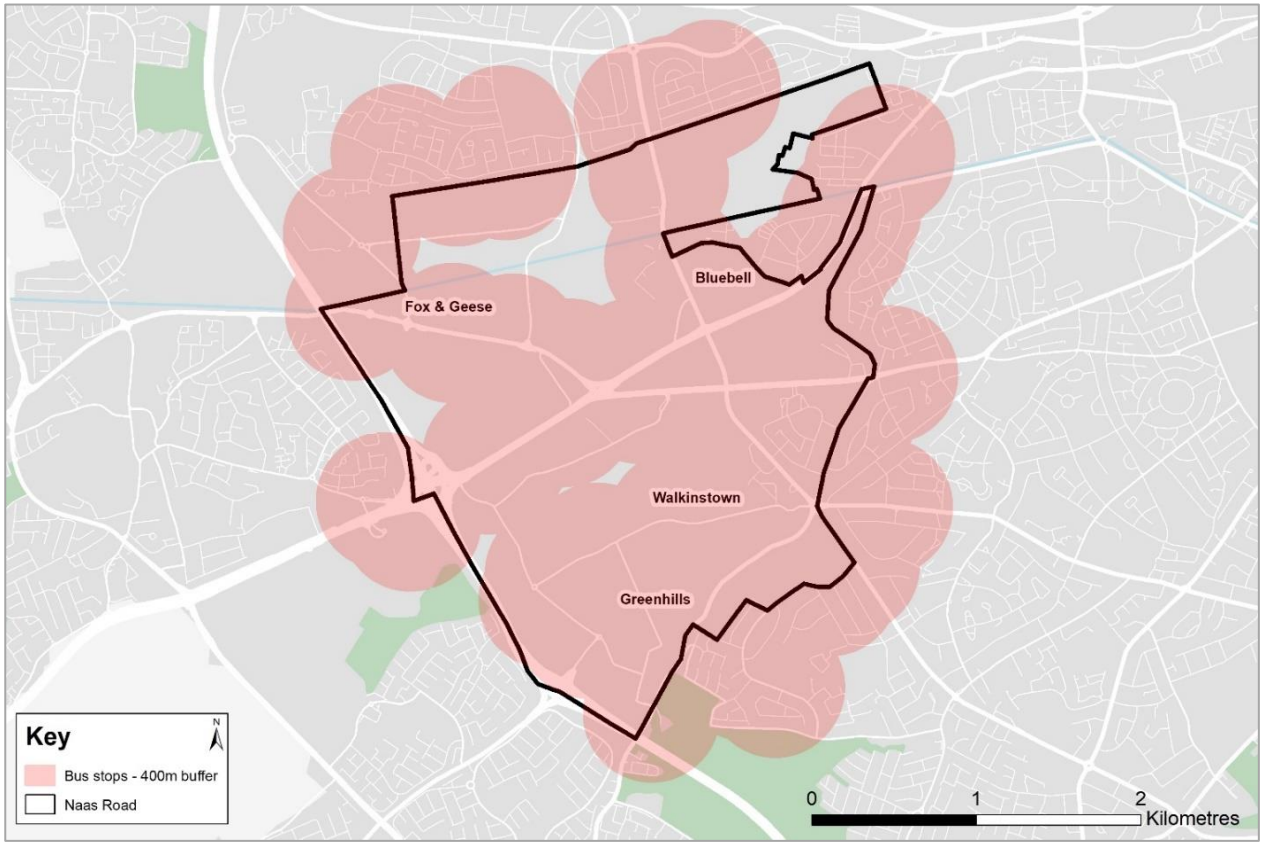


Figure 3.7: Bus network coverage (area within 400m of a bus stop)

3.1.2.6 Walking and cycling network

The majority of roads within the study area have footpaths on at least one side of the carriageway. Main routes such as R110 / R810 Naas Road, R134 Nangor Road, R110 Long Mile Road, R112 Kylemore Road and R112 Walkinstown Avenue all have footpaths on both sides of the carriageway, and lighting columns throughout. A pedestrian footbridge which crosses R110 Naas Road is available near the M50 Junction 9.

Figure 3.8 shows the existing cycle network in and around the study area. A mix of on-carriage and shared-use cycling facilities are available along most of R110 / R810 Naas Road and R110 Long Mile Road. These facilities would not be consistent with best practice today. Additionally, facilities are not continuous within the study area. R819 Greenhills Road has an on-carriageway cycle lane in both directions. The southern side the Grand Canal has an illuminated shared cycleway which provides access between the west of M50 junction 9 and the city centre to the east. From outside the study area, cycle paths are available which link the study area to Kilnamanagh, Newlands Cross, Rathfarnham, Drimnagh, and Inchicore.

Other than the radial cycle routes on the regional roads in the study area, there are very limited additional cycle and pedestrian facilities available to provide access through the study area in an orbital direction. The limited access through the site means that there is a potential that walking distances to public transport facilities in particular may be longer than desirable.

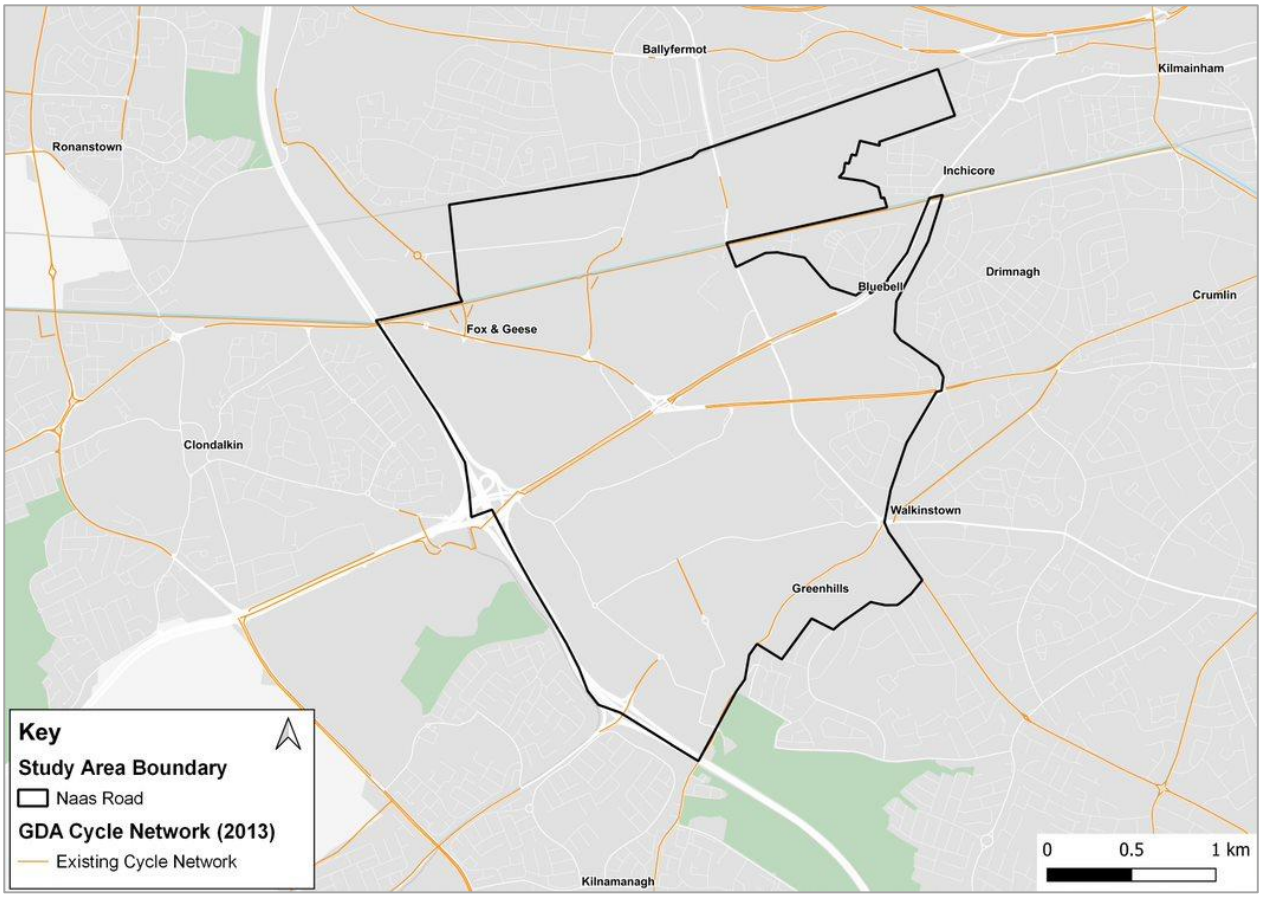


Figure 3.8: Existing cycle network

Table 3.3 provides details of the available crossing points of the key barriers to access within the study area.

Table 3.3: Pedestrian and cycling crossing points within study area

Barrier to access	Crossing Point	Pedestrian Accessibility	Cycle Accessibility
Grand Canal	Park West Avenue	Footpath available	Dedicated cycle lane
	Killeen Road	Footpath available	Dedicated cycle lane
	R112 Kylemore Road	Footpath available	Dedicated cycle lane
	R810 Naas Road at Davitt Road/Goldenbridge Walk	Footpath available	With traffic
Railway line	Park West Avenue	Footpath available	Dedicated cycle lane
	Footbridge between Lavery Avenue and Cherry Orchard Avenue	Footbridge	
	Le Fanu Road	No footpath available	With traffic
	R112 Kylemore Road	Footpath available	With traffic
R110/R810 Naas Road/Luas red line	Footbridge at Red Cow Interchange	Footbridge across R110 Naas Road and Luas.	
	Club Road to Knockmitten Lane	Signalised crossing of R110 Naas Road. Uncontrolled crossing of Luas.	
	R110 Long Mile Road junction	Signalised pedestrian crossing of R110/R810 Naas Road. Uncontrolled crossing of Luas.	
	Robinhood Road to John F Kennedy Drive	Signalised pedestrian crossing of R810 Naas Road. Uncontrolled crossing of Luas.	
	R112 Walkinstown Avenue/R112 Kylemore	Signalised pedestrian crossing of R810 Naas Road. Uncontrolled	

Barrier to access	Crossing Point	Pedestrian Accessibility	Cycle Accessibility
	Road junction	crossing of Luas.	
	Muirfield Drive/Old Naas Road junction	Signalised pedestrian crossing of R810 Naas Road. Uncontrolled crossing of Luas.	
R110 Long Mile Road	Robinhood Road	Signalised pedestrian crossing.	
	R112 Walkinstown Avenue	Signalised pedestrian crossing.	
	Walkinstown Parade	Signalised pedestrian crossing.	
	Drimnagh Castle Primary School	Uncontrolled pedestrian crossing.	
	R819 Walkinstown Road to Slievebloom Park	Signalised pedestrian crossing.	
	Slievebloom Road to Balfe Road	Signalised pedestrian crossing.	

The locations of these crossings are shown in Figure 3.9. Having a small number of crossing points along heavily trafficked roads such as R110 / R810 Naas Road and R110 Long Mile Road increases the risk that non-motorised users (NMUs) will attempt to cross the carriageway at points where there are no crossing facilities. Therefore, even though there are crossing provisions in the area, severance and safety issues still exist.

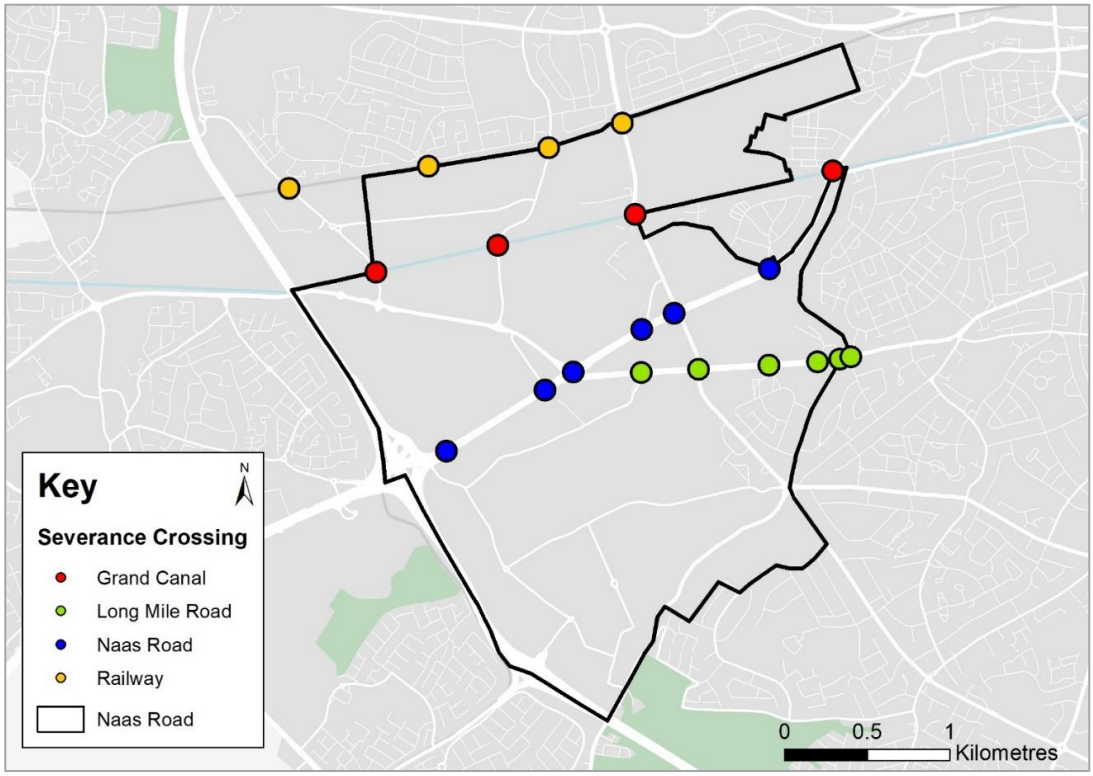


Figure 3.9: Crossing points and key barriers to access

3.2 Existing Travel Patterns

3.2.1 Key trip attractors

The largest residential area within the study extents is situated north and west of the Walkinstown Roundabout, however pockets of residential areas are located throughout the site. The study area is predominantly employment and industrial lands. There are four main industrial estates in the study area:

- Western Industrial Estate & Business Park;
- John F. Kennedy Industrial Estate;
- Ballymount Industrial Estate; and

- Park West Business Park.

Other key trip attractors identified in or just outside the area include:

- Drimnagh Castle Primary School;
- Drimnagh Secondary School;
- Assumption Junior National School, Walkinstown;
- Assumption Secondary School, Walkinstown;
- Assumption Senior Girls' National School;
- Children's Health Ireland Hospital, Crumlin;
- St James's Hospital;
- New Children's Hospital;
- Coombe Women's Hospital; and
- Tallaght Hospital

3.2.2 Car Ownership

Car ownership data has been obtained from the Census 2016 Small Area Population Statistics (SAPS). Table 3.4 displays car ownership data for the GDA, Dublin South-Central and the Naas Road study area. The study area has a higher proportion of households with no cars (25%) compared with the GDA. However, this is less than the Dublin South-Central constituency with 36% of households with no cars. Naas Road has a low proportion of households with two cars, and almost half the census population has one car per household at 46%.

Table 3.4: Naas Road car ownership data (2016 Census)

Settlement	Total Households	Cars per household					Not Stated
		0	1	2	3	4+	
Greater Dublin Area	666,724	18%	41%	31%	5%	2%	4%
Dublin South Central	46,853	36%	42%	14%	2%	1%	5%
Naas Road Study Area	**2,111**	**25%**	**46%**	**20%**	**4%**	**1%**	**4%**

3.2.3 Travel data

2016 Census data has been analysed for the Naas Road study area. There are 6,196 people who live in the study area, of which approximately 19% remain within the area for work/school/college. Of the trips leaving the study area to travel to work/school/college, destinations with the largest demand are Clondalkin, Tallaght, Drumfinn and Chapelizod. Of trips that travel to the study area for work/school/college, origins with the largest demand are predominantly from Clondalkin, Lucan, Tallaght and Blanchardstown.

3.2.3.1 Travel to Work/School/College by mode

As shown in Table 3.5, the population of Naas Road travel to work via sustainable travel modes (on foot, bicycle, bus and train/DART/Luas), more often than the GDA and Dublin South-Central constituency. A lower proportion of the population (47%) travel to work via car in comparison to the GDA, however Dublin South-Central has an even lower proportion at 36%. This shows the study area compares positively to the national target of 45% trips to work by car, but still has a way to go to achieve the proportion in Dublin South-Central.

Table 3.5: Naas Road Travel to Work Data (2016 Census)

Settlement	Total Work	On foot	Bicycle	Bus, minibus or coach	Train, DART or LUAS	M/cycle or scooter	Car / van driver	Car passenger	Other / Not Stated
Greater Dublin Area	835,694	10%	5%	10%	7%	1%	55%	3%	9%
Dublin South Central	53,754	17%	11%	16%	6%	1%	36%	2%	10%

Settlement	Total Work	On foot	Bicycle	Bus, minibus or coach	Train, DART or LUAS	M/cycle or scooter	Car / van driver	Car passenger	Other / Not Stated
Naas Road Study Area	**2,627**	**9%**	**7%**	**13%**	**9%**	**1%**	**47%**	**3%**	**11%**

Table 3.6 displays travel to school/college data by mode. In general, Naas Road follows similar proportions of modal use in comparison to the GDA and Dublin South-Central. A slightly lower proportion of car passengers at 30% in Naas Road and 24% in Dublin South-Central are seen in comparison to 35% in the GDA, this could be due to the lower number of cars per household. The proportion of people who travel to school/college on foot within the study area (35%) is slightly higher than the proportion for the Greater Dublin Area (31%), but again not as high at Dublin South-Central at 39%.

Table 3.6: Naas Road Travel to School / College Data (2016 Census)

Settlement	Total School / College	On foot	Bicycle	Bus, minibus or coach	Train, DART or LUAS	M/cycle or scooter	Car / van driver	Car passenger	Other / Not Stated
Greater Dublin Area	427,946	31%	4%	18%	4%	0%	4%	35%	5%
Dublin South Central	21,695	39%	6%	19%	3%	0%	3%	24%	6%
Naas Road Study Area	**1,077**	**35%**	**3%**	**18%**	**4%**	**0%**	**3%**	**30%**	**6%**

3.2.3.2 Journey time to Work/School/College

Table 3.7 displays travel times to work/school/college. In line with the GDA, the majority of trips to work/school/college in the study area have a journey time under 30 minutes.

Table 3.7: Naas Road Journey Time to Work / School / College Data (2016 Census)

Settlement	Travel to Work / School / College	Under 15 minutes	15 minutes to under 30 minutes	30 minutes to under 45 minutes	45 minutes to under one hour	1 hour to under 1.5 hours	1.5 hours and over	Not stated
Greater Dublin Area	1,237,858	24%	29%	21%	8%	8%	2%	8%
Dublin South Central	74,596	19%	33%	24%	7%	6%	1%	11%
Naas Road Study Area	**3,670**	**20%**	**31%**	**22%**	**6%**	**6%**	**2%**	**13%**

Table 3.8 displays time leaving home to travel to work/school/college data. In line with the figure for the GDA and Dublin South-Central, the majority of trips in the study area take place between 08:00 and 09:00.

Table 3.8: Naas Road Time Leaving Home to Travel to Work / School / College Data (2016 Census)

Settlement	Travel to Work/ School/ College	Before 06:30	06:30 - 07:00	07:01 - 07:30	07:31 - 08:00	08:01 - 08:30	08:31 - 09:00	09:01 - 09:30	After 09:30	Not stated
Greater Dublin Area	1,237,858	6%	8%	11%	16%	22%	19%	5%	8%	6%
Dublin South Central	74,596	5%	7%	10%	15%	22%	18%	5%	10%	8%
Naas Road Study Area	**3,670**	**7%**	**9%**	**11%**	**14%**	**20%**	**18%**	**4%**	**8%**	**10%**

3.3 Environmental conditions

The Naas Road study area is predominantly brownfield land or currently industrial/employment and retail land uses. Key environmental considerations are outlined in the Strategic Environmental Assessments (SEA) accompanying DCC's Development Plan (2016-2022[8]) and SDCC's Development Plan (Draft 2016-2022[9]). There are no Special Areas of Conservation (SAC) or Special Protection Area (SPA) designations within the study area.

Key environmental considerations in the study include:

- Pockets of biodiversity along the Grand Canal, River Camac and Kildare railway line;
- The Grand Canal, within SDCC area, has been proposed as a Natural Heritage Area and has received good quality rating by the EPA and SDCC (2013-2018)[10];
- A number of National Monuments and National Monument Zones designations[11] within the study area, including Drimnagh Castle;
- Limited open space in the study area, the key location being Walkinstown Avenue Park;
- A number of EPA Regulated Activities within the study area, including industrial emissions licencing and controls as well as waste licensing and permitting;
- The River Camac, which flows through the study area is monitored by the EPA and SDCC, with a previous poor-quality status (2013-2018);
- The SDCC SEA outlines the flood plains within the study area. Medium probability of river flood extents[12] have been identified within the study area (Fox and Geese Common, Robinhood and parts of Drimnagh);
- The SDCC SEA outlines that the air pollution elements of concern are those related to traffic emissions; and
- While the EPA's noise mapping indicated that traffic congestion and movement were the issues of concern regarding noise pollution, the majority of noise occurs along the national, regional and distributor road network.

[8] https://www.dublincity.ie/sites/default/files/2020-08/dcco_developmentplan_vol5.pdf
[9] https://www.southdublindevplan.ie/sites/default/files/documents/2_%20Environmental%20Report.pdf
[10] https://gis.epa.ie/myenvironment#/location/309796.929233765/231634.06337325618/buffer/3
[11] http://map.geohive.ie/
[12] https://www.floodinfo.ie/map/floodmaps/

3.4 Summary of baseline assessment

The review of existing transport infrastructure and services, and travel demand patterns in Naas Road has concluded the following:

- **Highways** – the study area is served from the west by the M50 at junction 9 and the N7. The M50 operates over capacity in peak hours. R110 / R810 Naas Road runs from junction 9 towards the city centre and is a major barrier to movement through the study area. 50% of residents travel to work via car or car passenger, this is moving towards the objective set out in section 2.1.5 of 45%. This is better in comparison to 58% in the GDA, however there is still some way to go to achieve the 38% car use seen in the wider Dublin south-central area. Over 70% of households own 1 car or less, compared to just under 60% across the GDA.
- **Public transport** – the Kildare railway line runs across the northern extents of the study area, however, is not within preferred walking distance of most of the study area creating a potential accessibility issue. The Luas Red Line runs east to west through the middle of the study area along R110 / R810 Naas Road. 9% of residents from the study area travel to work via train or Luas, higher than Dublin south-central and GDA. Several bus services run regularly on weekdays and provide access to nearby towns and the city centre, there are however some accessibility limitations north-south through the site and to wider locations. 13% of residents from the study area travel to work via bus.
- **Active travel** – a high proportion of roads in the study area have illuminated pedestrian footpaths available. A mix of on-carriageway and shared use cycling facilities are available along the major roads in the area. 16% of people from the area travel to work on foot or by cycling. 35% of trips to school/college to the area are by foot or by cycling. Several key infrastructure routes inhibit the permeability of the study area and act as barriers to active travel movements, these include the Grand Canal, the railway line, R110/R810 Naas Road/Luas Red Line and the M50.

4. Context

This section sets out the context of the transport demand and transport supply in the forecast year of 2040. It builds on the baseline (2016) assessment to consider proposed growth and predicted future travel patterns and anticipated travel demand across the study area. This data forms the basis of the assessment of the future year issues and opportunities, and the basis for identifying potential options for intervention.

4.1 Future Land Use

4.1.1 Overview

The future land use scenario presented here is based on a Planning Sheet for 2040 provided by the NTA in discussion with relevant local authorities. It reflects the 2016 and 2040 population, employment, and education places across the study area in line with regional and local planning aspirations. It is aligned with the overall objectives of the NPF and the RSES.

Table 4.1 presents the population, employment and education growth statistics for the Naas Road study area and the entire GDA. The Naas Road study area is anticipated to undergo considerable transformational change by 2040 and beyond to develop the area into an urban quarter / district, creating new homes, jobs, schools and community facilities. As shown in Table 4.1, the population of the study area is anticipated to triple by 2040, and percentage growth (population, employment and education) in the Naas Road study area being higher than the percentage growth across the whole GDA area.

Table 4.1: Population, employment and education statistics

Area	2016	2040	Growth	
			Absolute	Percentage
Population				
Naas Road	6,196	18,290	12,094	195%
GDA	4,761,865	5,790,237	1,028,372	22%
Employment				
Naas Road	25,967	38,538	12,571	48%
GDA	1,468,093	1,996,002	527,909	36%
Education				
Naas Road	1,813	2,479	666	37%
GDA	982,185	1,186,472	204,287	21%

Due to the scale of the change expected in the Naas Road study area, work being undertaken on the quantum and location of development is constantly evolving; therefore the data in the Planning Sheet is a snapshot of time and is expected to be refined as the strategy develops.

4.1.2 Population

The projected population growth in the study area between 2016 and 2040 is shown in Figure 4.1. indicates the majority of the growth is expected in the eastern extents of the study area. This is in line with the locations of the granted development sites in the current Dublin City Council Development Plan and South Dublin County Development Plan. Substantial population growth is also projected to the north-west of the study area. It should also be noted that significant population growth is projected outside the study area extents, to the north-west, along the Kildare rail line and to the west of the study area due to the Clonburris SDZ.

Overall, the population in the Naas Road study area is expected to grow from 6,196 to 18,290 which is an increase of 195%.

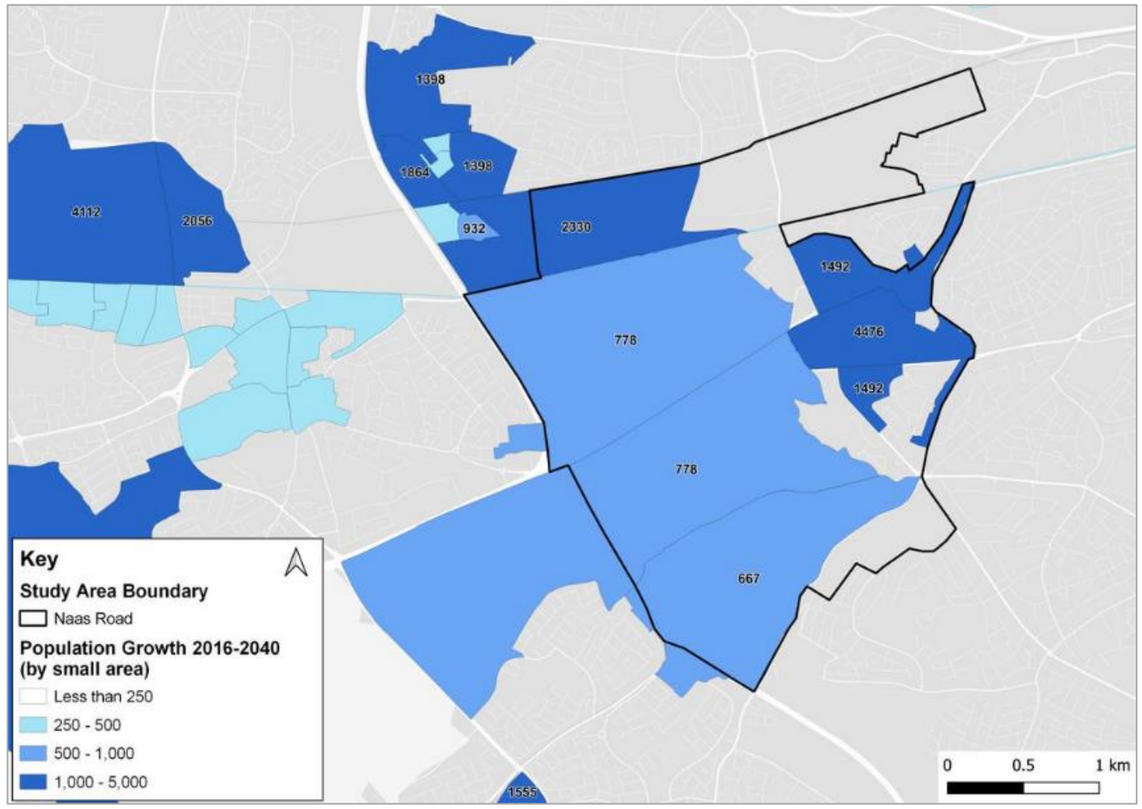


Figure 4.1: 2016-2040 population growth in the Naas Road study area

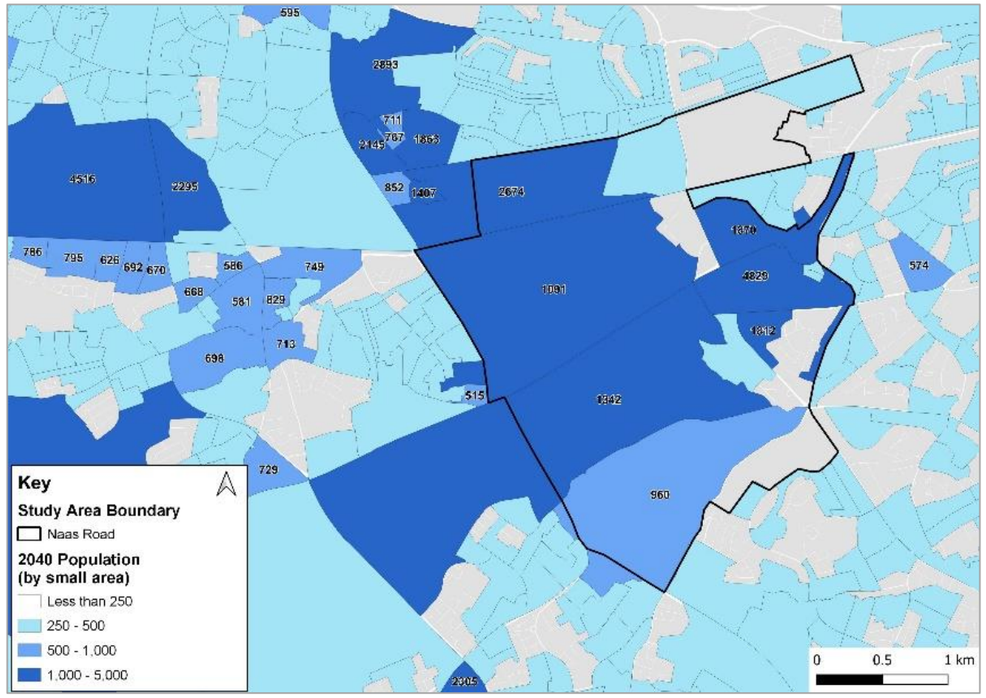


Figure 4.2: 2016 population in the Naas Road study area

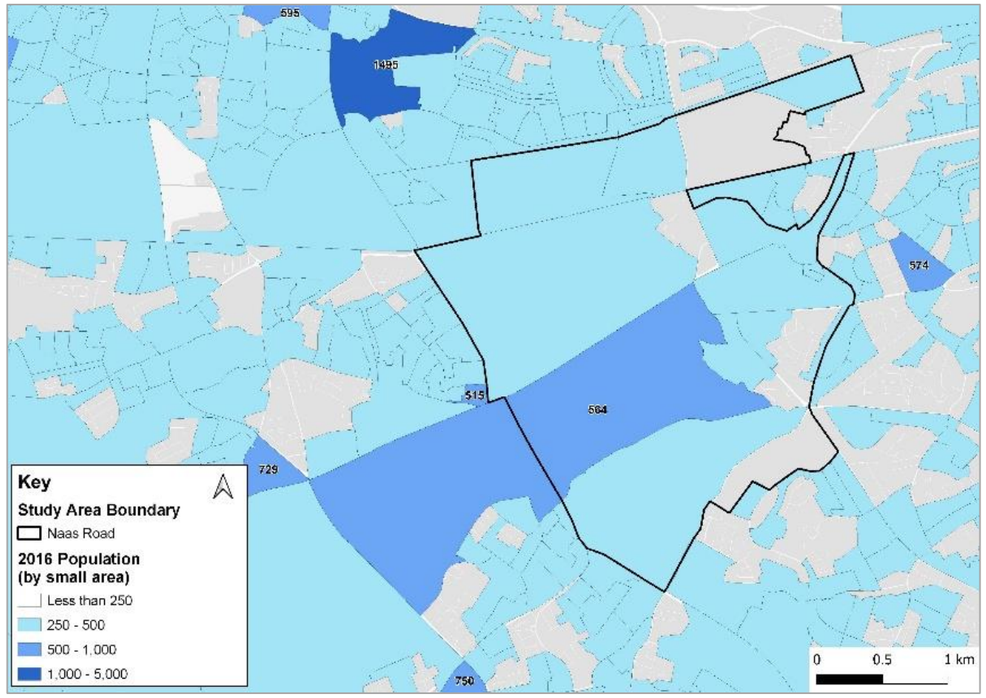


Figure 4.3: 2040 population in the Naas Road study area

4.1.3 Employment

Figure 4.4 shows the projected employment growth in the study area between 2016 and 2040. The largest employment growth is projected in the centre and west of the study area. This is in line with the locations of industrial and employment areas of John F Kennedy Industrial Estate, Fox and Geese, Ballymount Industrial Estate and Bluebell. It should be noted that although the type of employment is not known at this stage, a shift from industrial to office jobs may have an impact on commuting travel patterns due to potential changes from shift work to standard office hours (i.e. 0900-1700).

Overall, the employment in the Naas Road study area is expected to grow from 25,967 to 38,538, which is an increase of 48%.

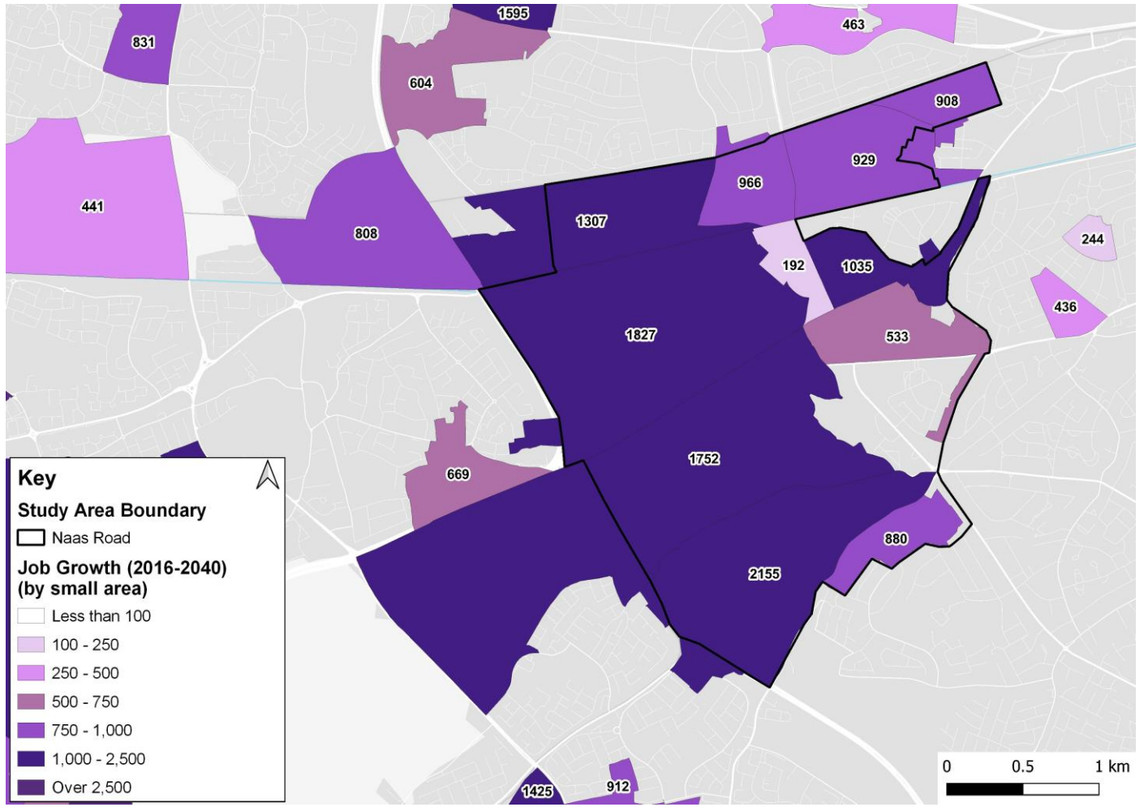


Figure 4.4: 2016-2040 employment growth in the Naas Road study area

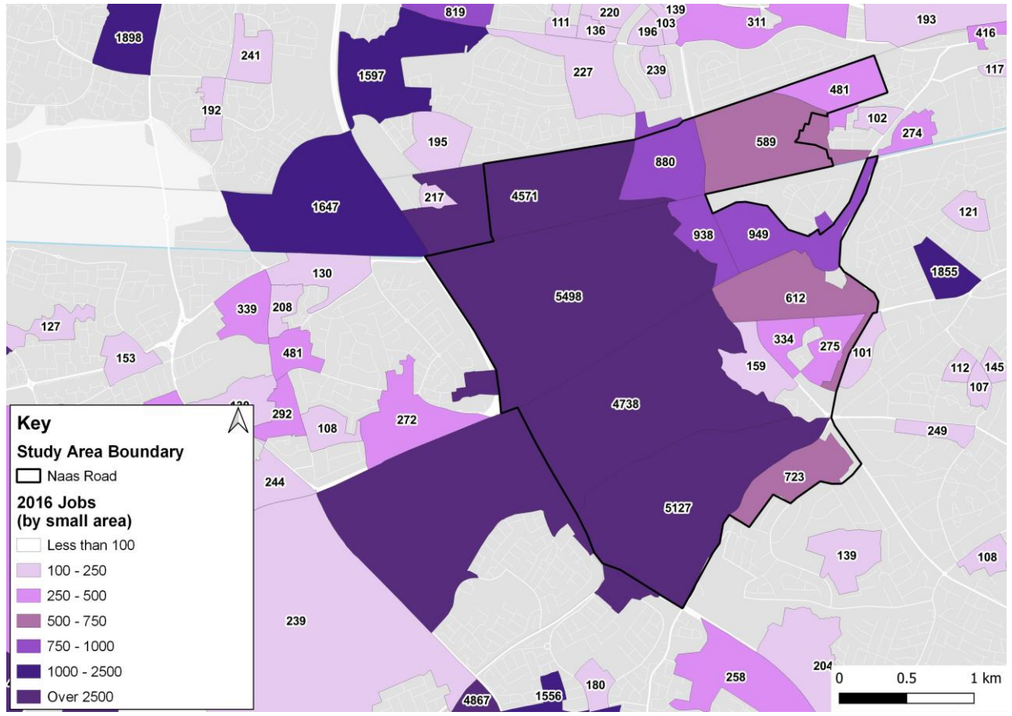


Figure 4.5: 2016 employment in the Naas Road study area

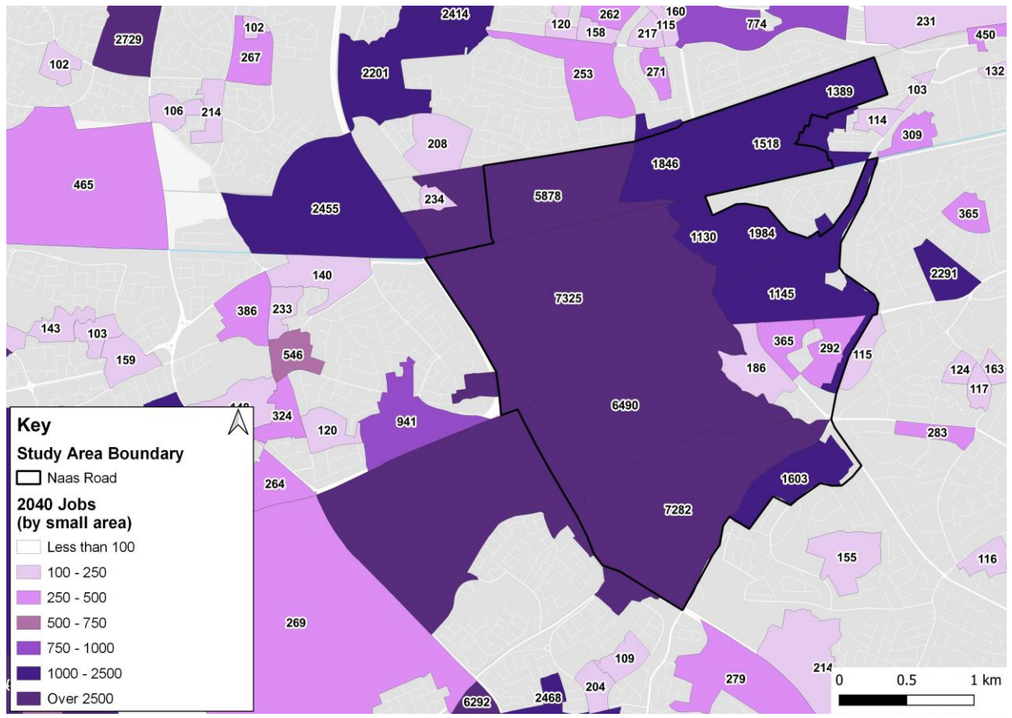


Figure 4.6: 2040 employment in the Naas Road study area

4.1.4 Education

As per section 3.2.1, there are two schools located within the study area. The projected education growth between 2016 and 2040 is shown in Figure 4.7.

Overall, the number of educational places (e.g. school places) in the Naas Road study area is expected to grow from 1,813 to 2,479, which is an increase of 37%. The only education increases are projected to be located in the zones where the existing schools are in the study area (Drimnagh Castle Primary and Secondary Schools and Assumption Junior and Secondary Schools), both located in the east of the Naas Road study area.

Following discussions with the NTA, it is understood that the increase in education trips in the planning sheet is not proportional to the increase in population. Further consideration, beyond the scope of this study, will be required to revise the number of education places to meet the needs of the future population.

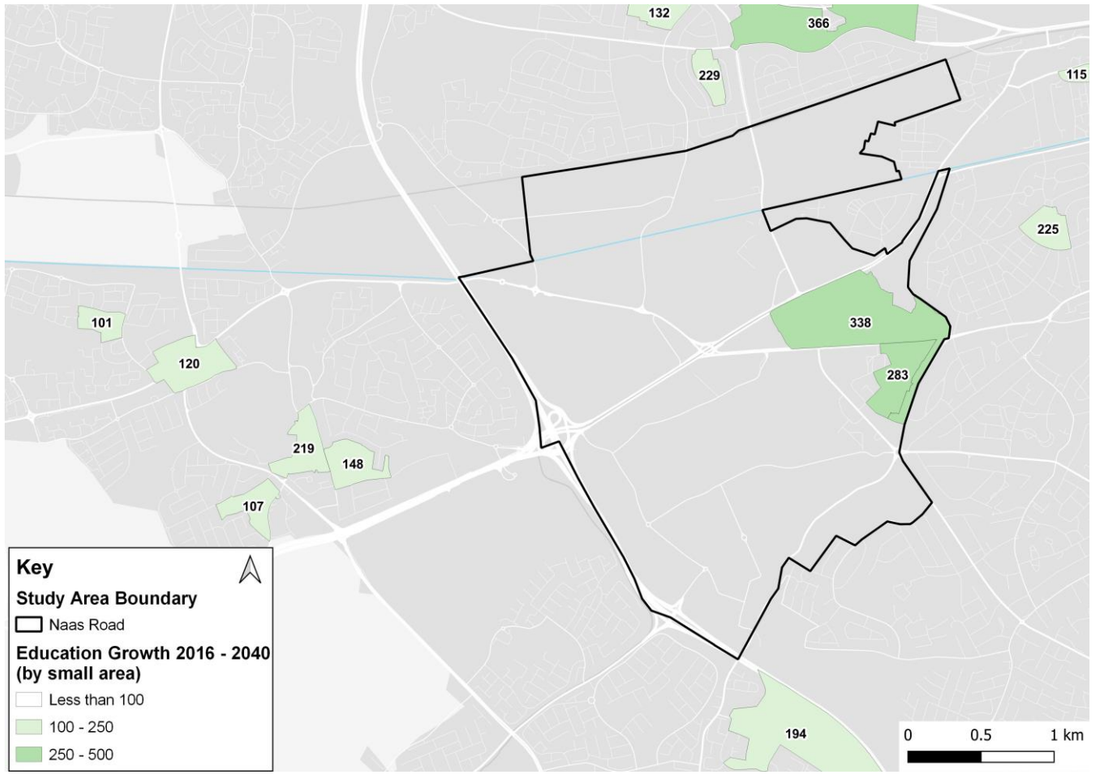


Figure 4.7: 2016-2040 education growth in the Naas Road study area

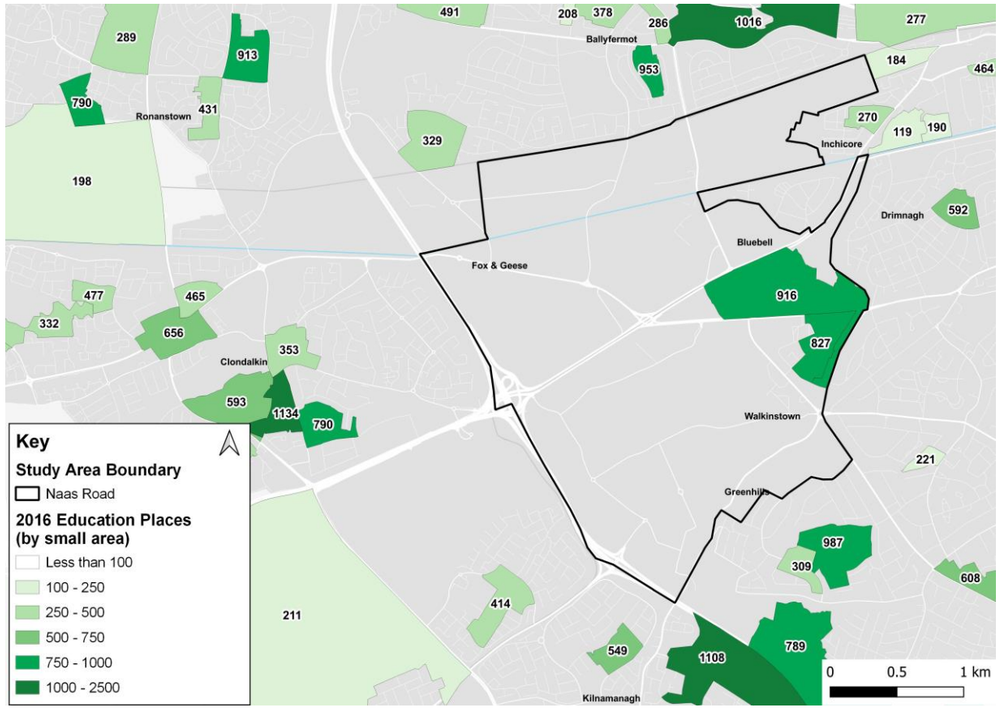


Figure 4.8: 2016 education in the Naas Road study area

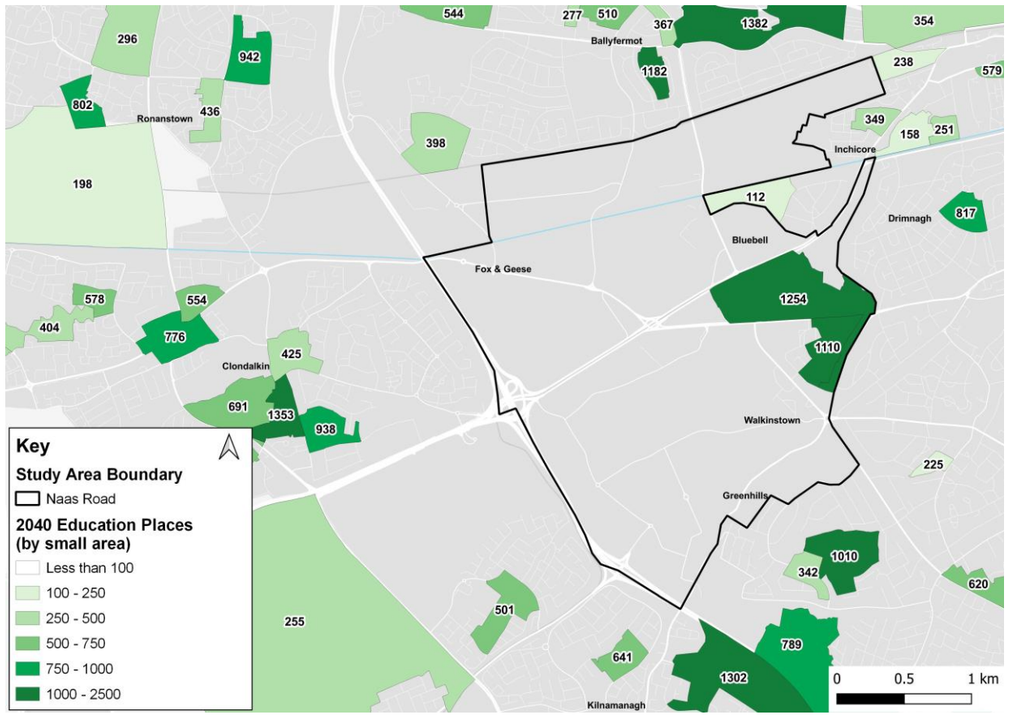


Figure 4.9: 2040 education in the Naas Road study area

4.2 Future Travel Patterns

4.2.1 Model assumptions

The assessment of future travel demand is based on the outputs from the NTA Eastern Regional Model (ERM). The ERM represents a 2042 scenario including:

Five time periods:

- AM 07:00 to 10:00
- Lunch time 10:00 to 13:00
- School run 13:00 to 16:00
- PM 16:00 to 19:00; and
- Off peak 19:00 to 07:00.

Three mode classes;

- Public transport (bus, Luas, rail and light rail);
- Road (cars, LGV, HGV and taxi); and
- Active modes (walk and cycle).

Five trip purposes:

- Employers Business;
- Education;
- Commute;
- Other; and
- Retired

4.2.2 Do Minimum

The model run represents a 'Do Minimum' scenario which includes proposed development, all existing transport provision, plus a number of changes to the transport network. Details of the transport schemes included are provided in Appendix A.

The model trips are assigned to a constrained network, meaning route choice of each trip is affected by capacities and journey times (e.g. impacts from queuing) in the model in relation to all the other trips. This means there is a likelihood that due to the volume of trips in the model, some journeys use routes through local roads, instead of using the key strategic movements which are the focus of this study.

The ERM has been used to understand some of the key transport patterns in 2042 such as mode share, trip lengths, origins and destinations, route capacity and volume to capacity. These are described in the subsequent paragraphs in this section, and this information will be used to support the option development process.

4.2.3 Assessment of Future Development

The future development underpinning the 2042 model is based on the 2040 planning sheet prepared by the NTA with the Naas Road development divided by Small Areas. Some Small Areas overlap the Naas Road study area boundary. Developments inside an overlapping Small Area, but outside of the study area have been adjusted in the analysis so the development lies within the Naas Road study area.

Since the assignment of the ERM, the planning sheet has been revised to include more development in the Naas Road study area. Therefore, the ERM is an underestimate of the planning assumptions used to compile the planning sheet. The differences are provided in Table 4.2.

Table 4.2: Differences between Planning Sheet and ERM

Naas Road	2016	2040 Planning Sheet	Development in ERM (2042)
Population	6,196	18,290	13,085
Employment (jobs)	25,697	38,538	34,533
Education (places)	1,813	2,479	2,477

For the assessment of transport provision in 2042, the travel demand will be taken from the planning sheet to ensure the latest planning assumptions are utilised. The planning sheet includes an additional 5,200 people and 4,000 jobs when compared to the ERM, which is noteworthy, given the size and extent of the Naas Road study area. It has been assumed that trip patterns are retained from the ERM for the surplus demand, for example the trip distribution and the mode share.

4.2.4 Origins and destinations

Spatial analysis has been undertaken on trips that have an origin and/or destination within the study area, using the trip distribution from the model and the quantum of demand in the Naas Road study area from the planning sheet.

4.2.4.1 Trips from the Naas Road study area

Figure 4.10 shows the destination of trips which originate in the study area in the AM peak.

For trips which originate in the study area in the AM peak, the main destinations are:

- Dublin City Centre;
- Directly north to Ballyfermot;
- Directly east to Drimnagh; and
- North-east to Dublin Airport and its surrounding area.

The trip movements in the PM peak have also been analysed. Overall, the main destinations for trip from the study area in the PM peak are to:

- North east to Lucan;
- South West to Saggart;
- Directly west to Clondalkin; and
- Directly north to Ballyfermot.

The trip demand analysis shows that there is a key radial commuter route through Naas Road. In the AM peak, the majority of trips head east into the city centre, as residents from the Naas Road study area travel into the city centre for work. In the PM peak, trips go west in the opposite direction leaving the place work in the Naas Road study area returning to their residence further out of the Greater Dublin Area.

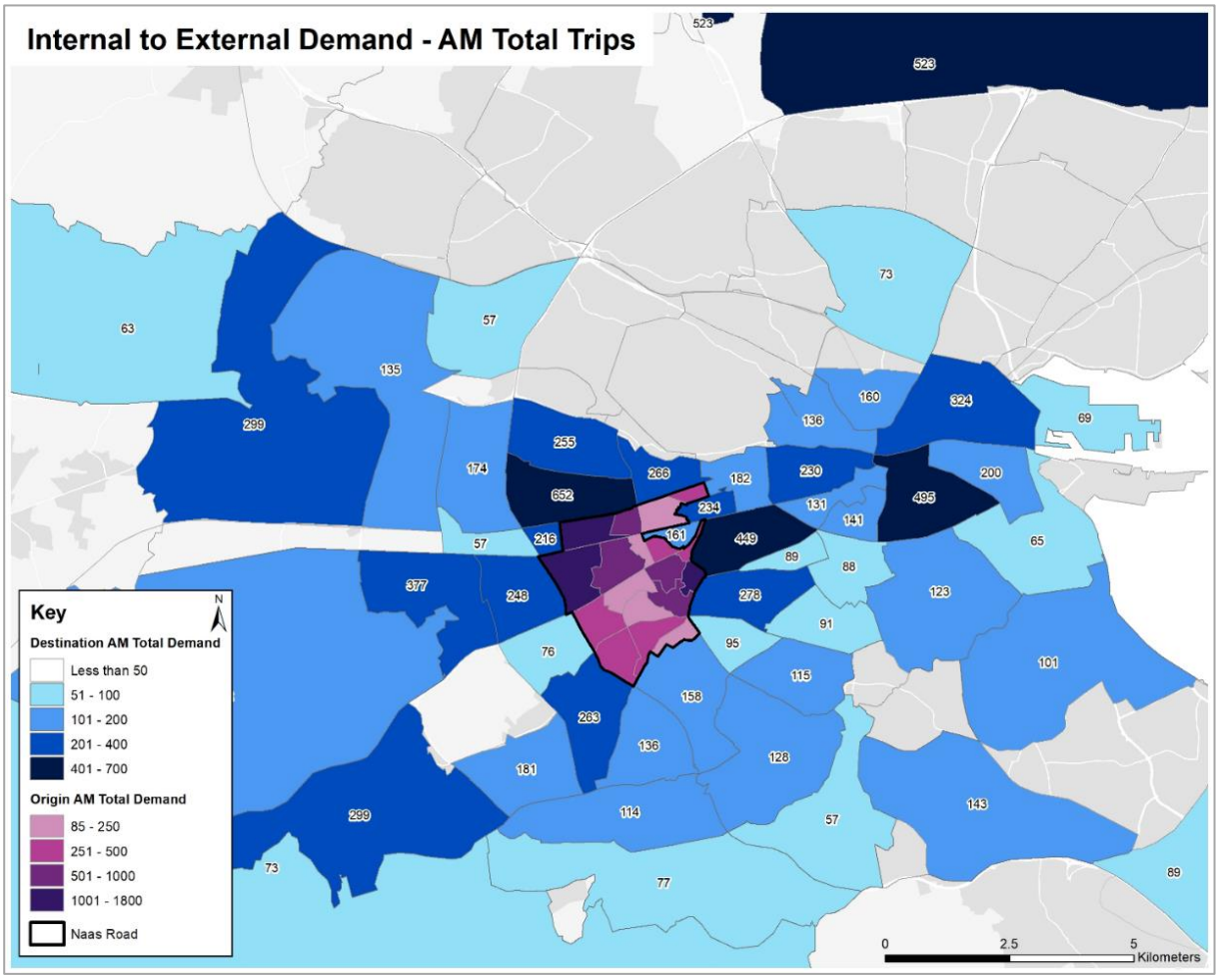


Figure 4.10: Total trips from the study area

4.2.4.2 Trips to the Naas Road study area

Figure 4.11 shows the origin of trips which have a destination in the study area in the AM peak.

The figure shows that the main movements to the study area overall originate:

- Directly north from Ballyfermot
- Directly east from Drimnagh;
- Directly east from Kimmage;
- Directly west from Clondalkin; and
- North west from Lucan.

The trip movements in the PM peak have also been analysed. Overall, key movements to the study area in the PM peak originate:

- North west from Lucan;
- Dublin City Centre;
- Directly north from Ballyfermot;
- North-east to Dublin Airport and its surrounding area;
- Directly east from Drimnagh; and
- Directly west from Clondalkin.

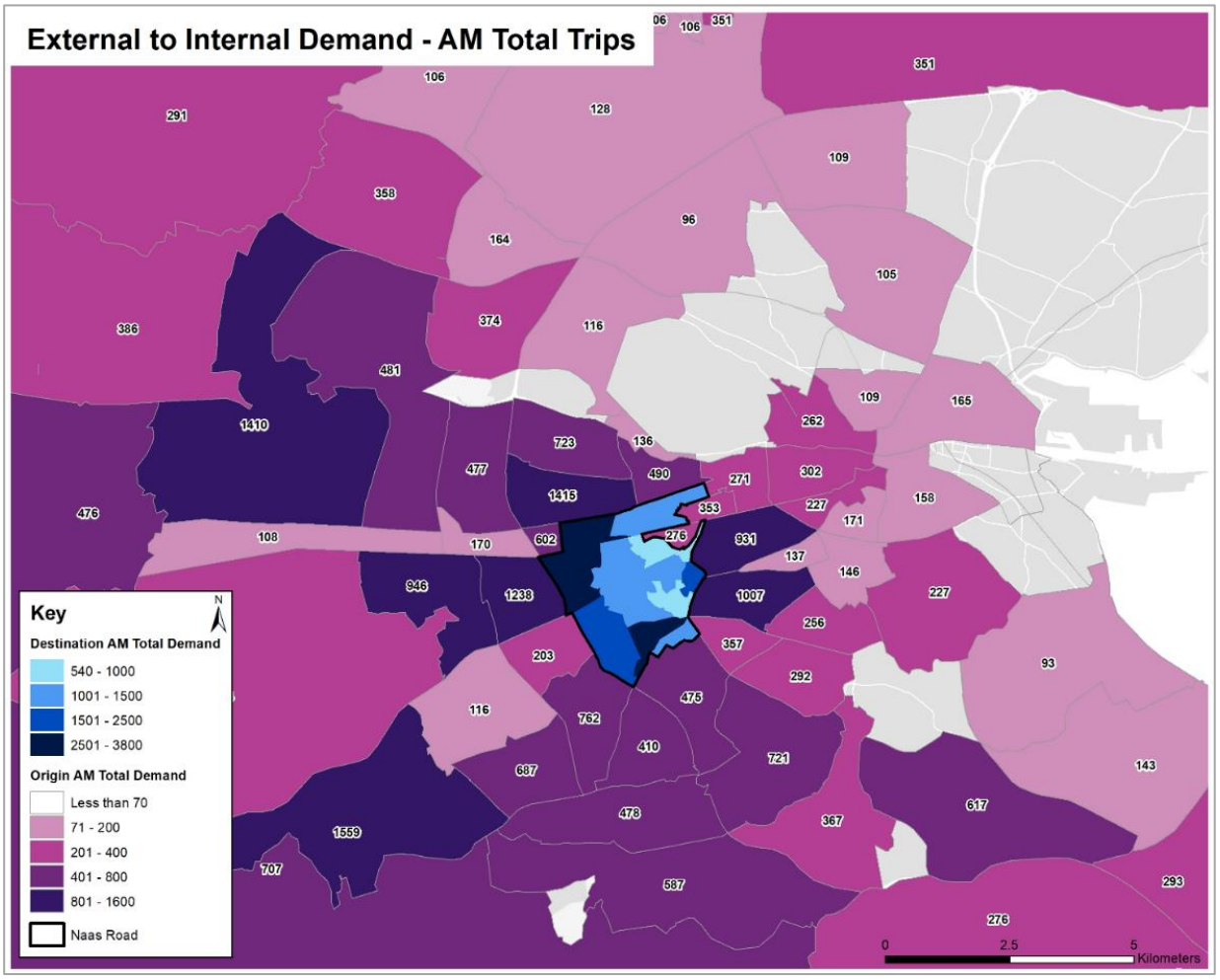


Figure 4.11: Total trips to the study area

4.2.4.3 Trips within the Naas Road study area

Figure 4.12 shows the internal movements in the Naas Road study area for all modes in the AM peak.

The internal movements are predominantly in the east of the study area with many short journeys to other parts of the study which are in close proximity. There are also some large movements in the north west of the study area. Similarly, to the AM peak, the majority of the largest internal trip movements remain in the east and north west of the study area.

Car, cycling, public transport and walking origin and destination maps are shown in Appendix B for internal trip movements. There are many car trips between the east and south of the study area, however these are also popular movements for trips by public transport. Cycling trips follow a similar pattern, although there are far fewer of them. This analysis shows there is an opportunity to shift short car journeys to public transport, and car and public transport trips to cycling, if appropriate provision is enabled.

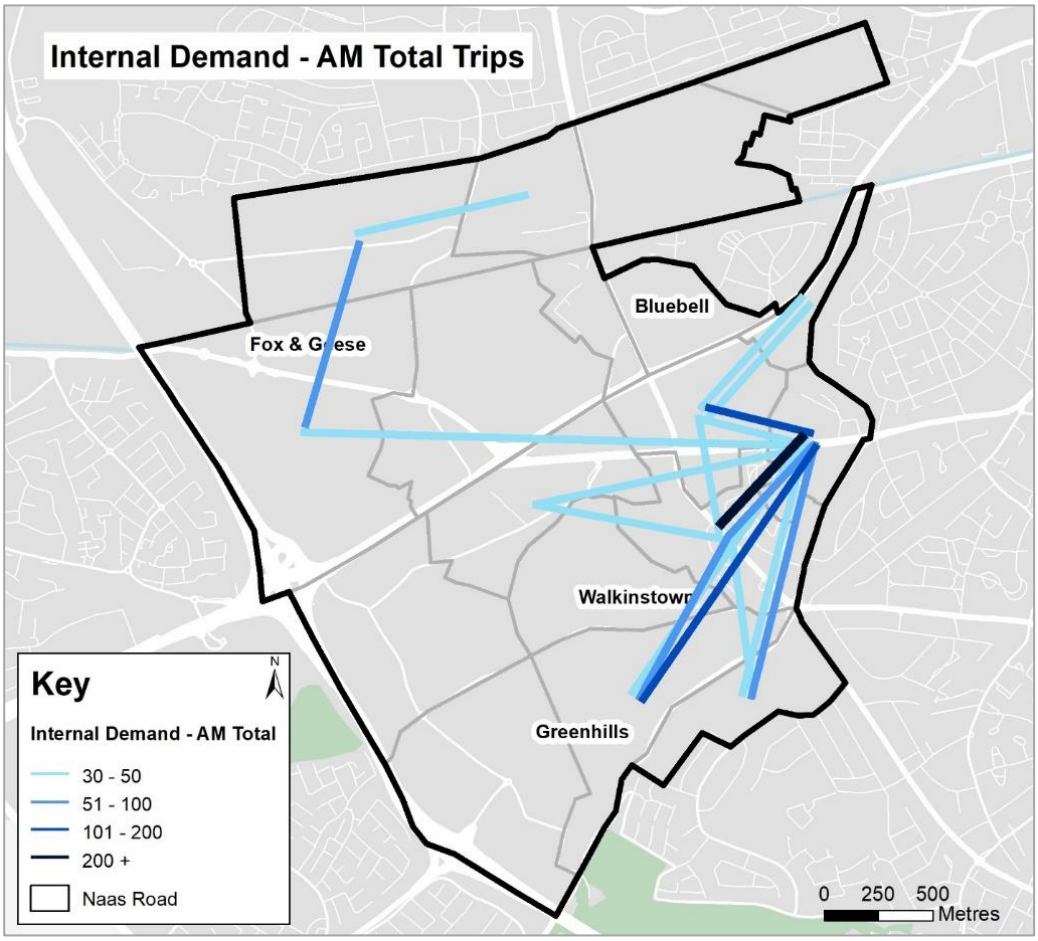


Figure 4.12: Total trips within the study area

4.2.4.4 Origins and destinations by mode

Trip patterns have been disaggregated by mode where either the origin or destination is within the Naas Road study area and the other origin or destination is outside the study area. Trips have been categorised as car, public transport, cycle or walking trips. Maps are provided in Appendix B for the AM peak.

Walking trips are mostly between zones adjacent to the study area and study area itself, including Ballyfermot, Inchicore, Drimnagh and Kimmage. It is clear there are many cycling journeys between the study area and the city centre, as well as within a 10km radius to the west of the study area.

In terms of public transport, the main journeys are between the Naas Road study area and the city centre, journeys to Dublin airport and its surrounding area, as well as to the west of the study area, with trips longer than 10 km. There are many car journeys to and from the Naas Road study area of varying distances to other locations. Some of the key locations are to and from Lucan, Clondalkin, Ballyfermot and Dublin Airport.

This suggests there is an opportunity to shift some car trips to more sustainable modes, as for many of the journeys made my car there are similar journeys which are made using public transport, walking or cycling.

4.2.5 Mode Share

Mode share data has been extracted from the model for trips originating in the Naas Road study area for car, public transport, cycling and walking trips. For each mode, the percentage of trips originating in each model zone in the Naas Road study area is provided in Figure 4.13 for the AM peak for all trip purposes combined.

Overall, the AM peak data shows:

- Car is the dominant mode in most areas, with 50-60% of the mode share by car.
- Public transport trips are highest (20-25%) next to the Luas Red Line which runs through the middle of the study area, as well as to east where there the BusConnects services route through the study area.
- Walking trips are highest (30%+) to the east of the study area and aligns Figure 4.12 for internal trips. The mode share for walking is lower to the west of the study area.
- Cycling is generally low overall within the study area (less than 5%), although there are some areas where cycling is more in line with the 7% from the 2016 census travel to work data, for example in Bluebell and in the northwest of the study area.

The model outputs indicate there is an issue with a high car mode share for trips from the study area, suggesting there is an opportunity to increase the public transport and active travel mode share in the area, reducing the dominance of car trips.

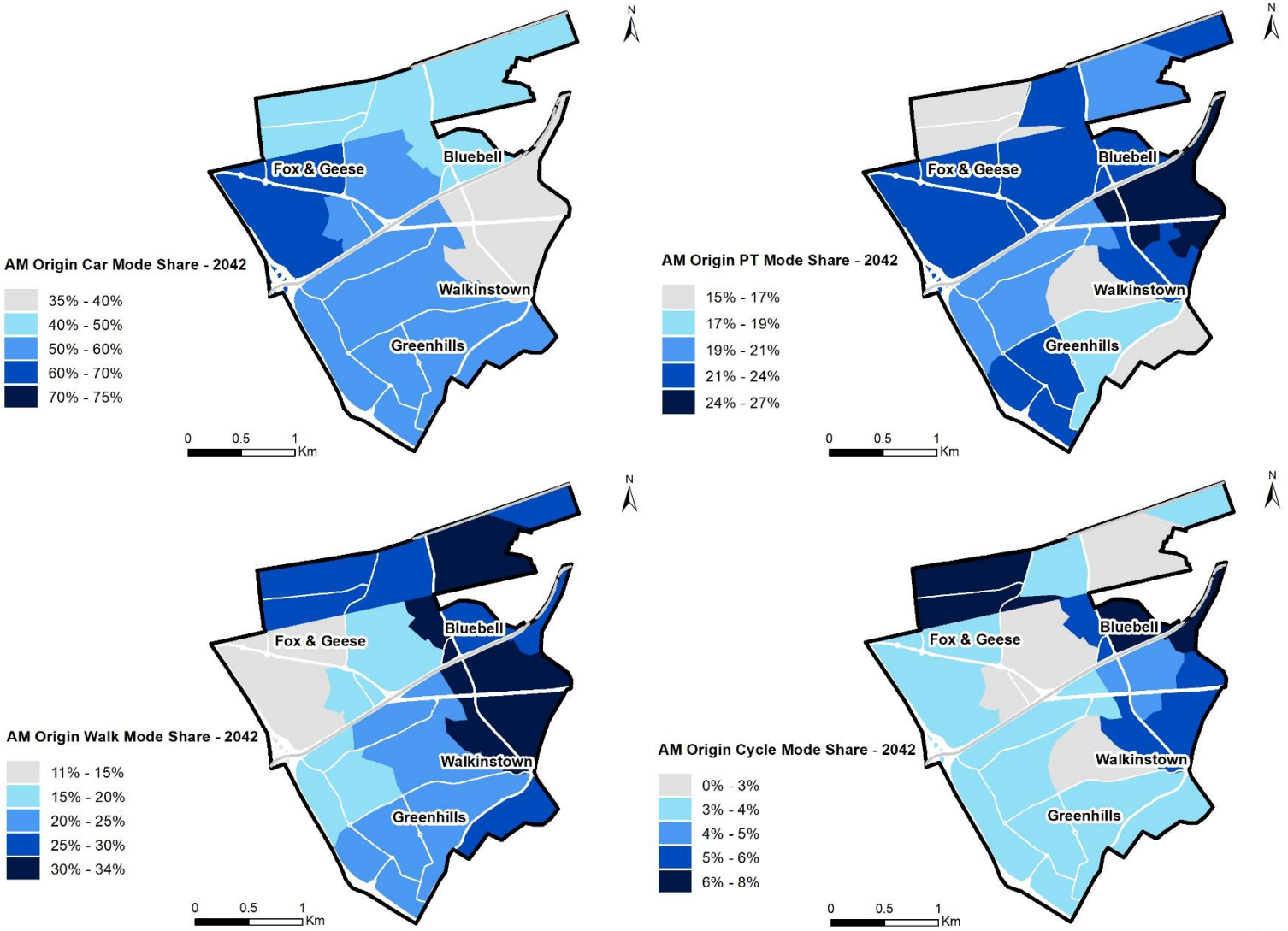


Figure 4.13: Mode share in the Naas Road study area

4.2.6 Capacity by mode

4.2.6.1 Roads

Figure 4.14 shows the volume over capacity (V/C) ratio at junctions on the road network within the study area and surrounding areas from the ERM.

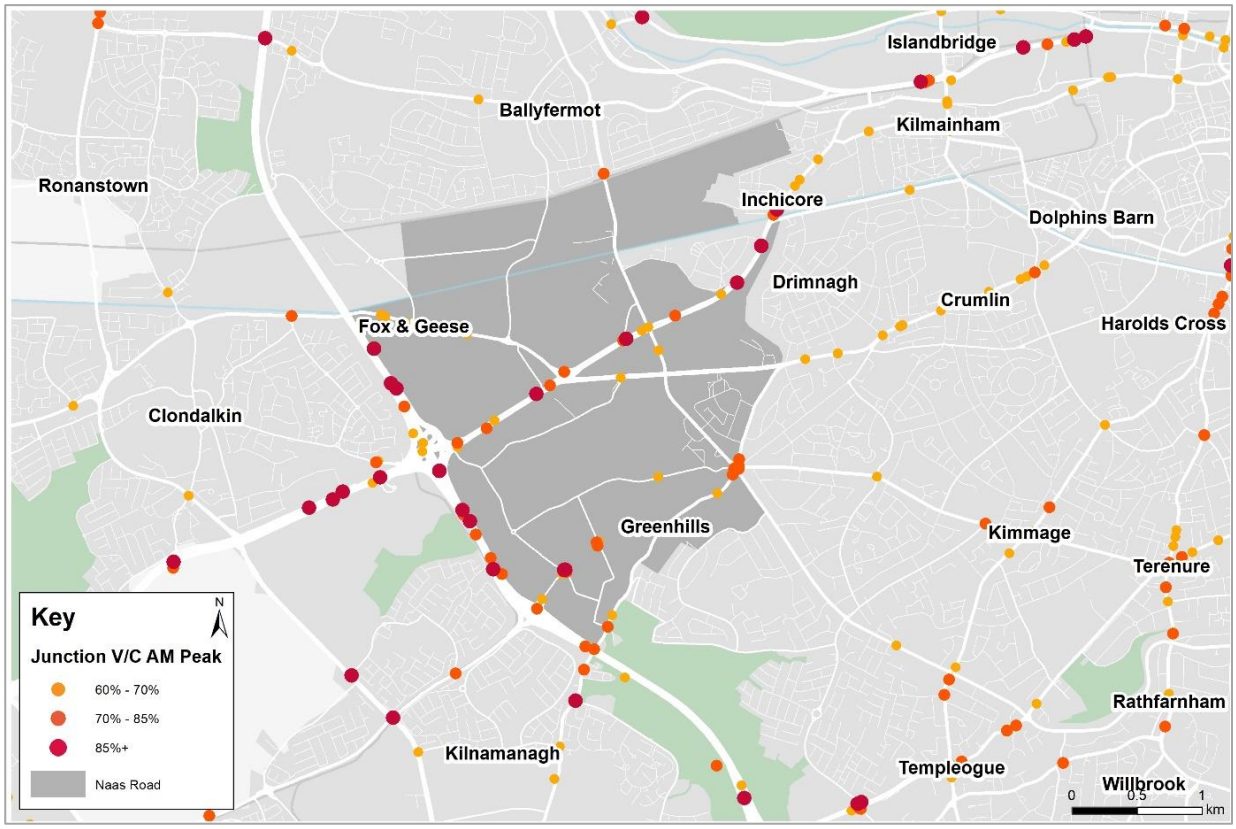


Figure 4.14: Volume over capacity of junction on the ERM road network

Figure 4.14 shows there are several points on the network where the V/C is greater than 85% which is close to the highway capacity, which indicates that drivers experience queues and delays at busy times. The worst performing areas are on the M50 on the western boundary of the Naas Road study area, on the N7 heading into the city centre to the west of the N7/M50 (Red Cow) junction and to a lesser extent along R110/R810 Naas Road.

The model output suggests there will be performance issues on the road network in 2042, particularly for journeys along the M50 and N7, and the radial route of the R110/R810 Naas Road into the city centre. The analysis indicates that alternatives will be needed to take traffic off the road to avoid the network reaching capacity. In addition, the performance of the road network will impact bus users by increasing the journey time and reducing service reliability.

4.2.6.2 Rail

The Kildare line runs between Kildare and the Grand Canal Dock. At Park West and Cherry Orchard station, in the north west of the Naas Road study area, the maximum capacity on the rail line is 1,673 passengers eastbound (one hourly service and two 90 mins services) and 1,133 westbound (one two-hourly service and two 90 mins services). This is the same for both the AM and PM peak periods.

Figure 4.15 shows the average ratio of volume to crush capacity (V/CC) on the Kildare line from the 2042 ERM in the AM peak.

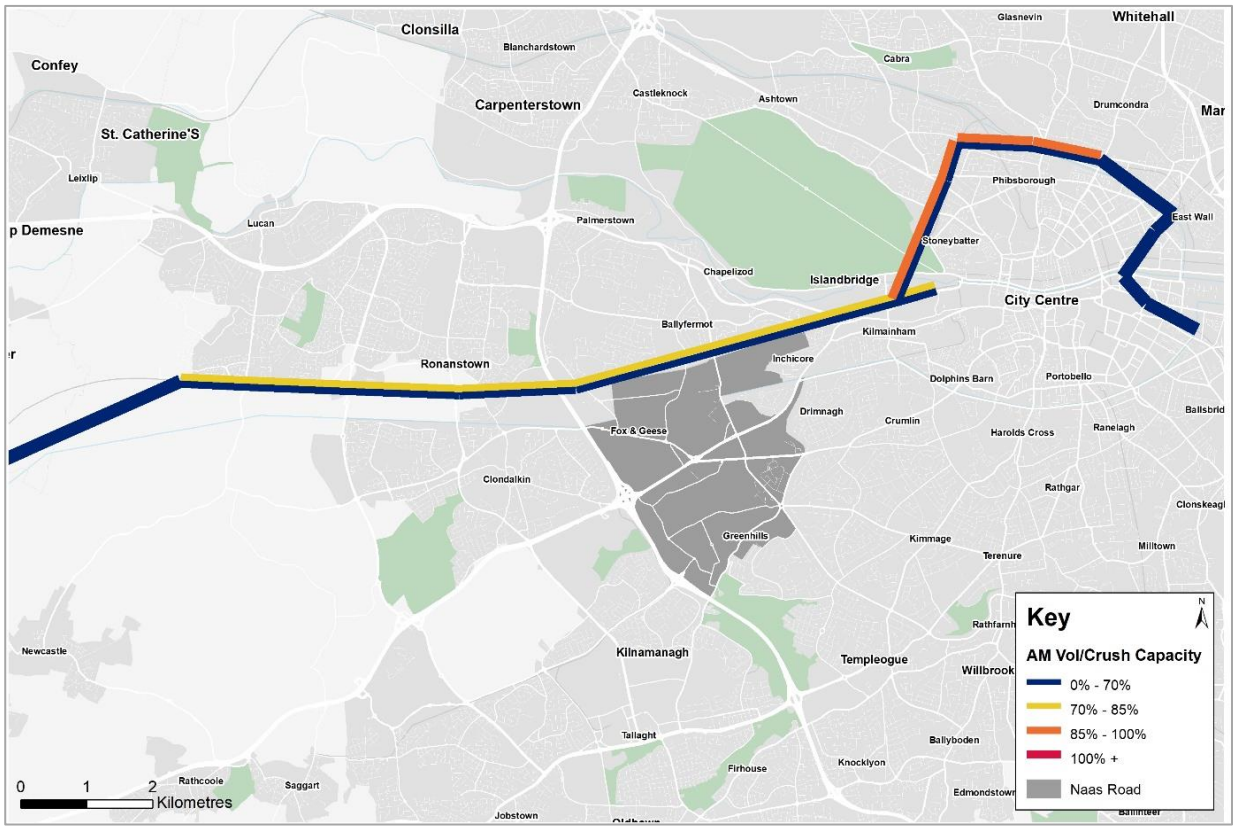


Figure 4.15: Volume over crush capacity on Kildare rail line

The data shows that inbound services on the railway line in 2042 have V/CC between 70% and 85% from Adamstown to the city centre canal cordon, and a V/CC between 85% and 100% inside the city centre canal cordon. In the PM peak, outbound rail services have a V/CC greater than 100% inside the city centre canal cordon, a V/CC between 70% and 85% through to Park West and Cherry Orchard station, and a V/CC between 85% and 100% to the west.

The model output demonstrates a need for capacity enhancements in both peak periods to cater for the increase in demand and population in the area, as the current rail capacity is an issue for attracting public transport trips. There is also an opportunity to improve accessibility to rail services as the rail line runs adjacent to the Naas Road study area boundary, and Park West and Cherry Orchard station is also situated just outside.

4.2.6.3 Luas

In the AM peak, the capacity of the Luas line is 4,672 comprising 16 services per hour (average frequency of every four minutes). In the PM peak, the capacity of the Luas line inbound to the city centre is 3,796, comprising 13 services per hour (average frequency of every five minutes).

Figure 4.16 shows the average ratio of volume to crush capacity (V/CC) on the Luas Red line from the 2042 ERM in the AM peak.

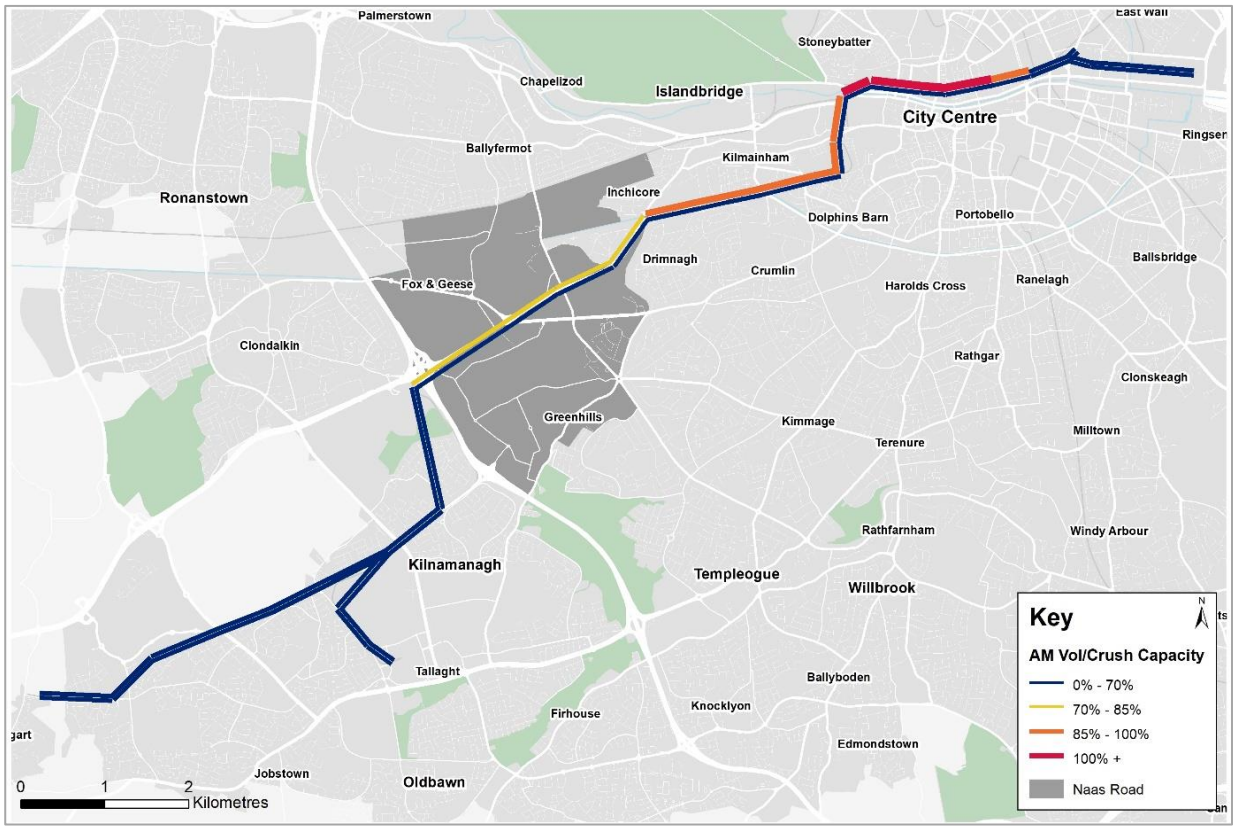


Figure 4.16: Volume over crush capacity on Luas red line

Figure 4.16 shows that the Luas Red line has a V/CC between 70-85% from Red Cow to Inchicore in the AM peak. Further into the city centre Luas Red line reaches a V/CC over 85% and then 100%. Due to the tidal nature of trips, the same pattern occurs in the PM peak but in the outbound direction.

The frequency of the Luas Red line is already less than every four minutes in the AM peak period, with sections close to, and over, capacity in 2042. Therefore, the Luas Red line has limited ability to provide for additional public transport trips on the radial route into the city centre without further enhancements. There is also an opportunity to increase the accessibility to Luas services within the study area, particularly as there is a 3km interval between Red Cow stop (to the west, outside of the study area) and the Kylemore Luas stop.

4.2.6.4 Bus

The BusConnects services have been included in the 2042 ERM. Figure 4.17 shows the average ratio of volume to crush capacity (V/CC) of the BusConnects routes that serve the Naas Road study area for the AM peak. For each link within the map, the V/CC is an average of the V/CC of all services which use that link. Table 4.3 shows the frequency of each service in the AM peak from the ERM.

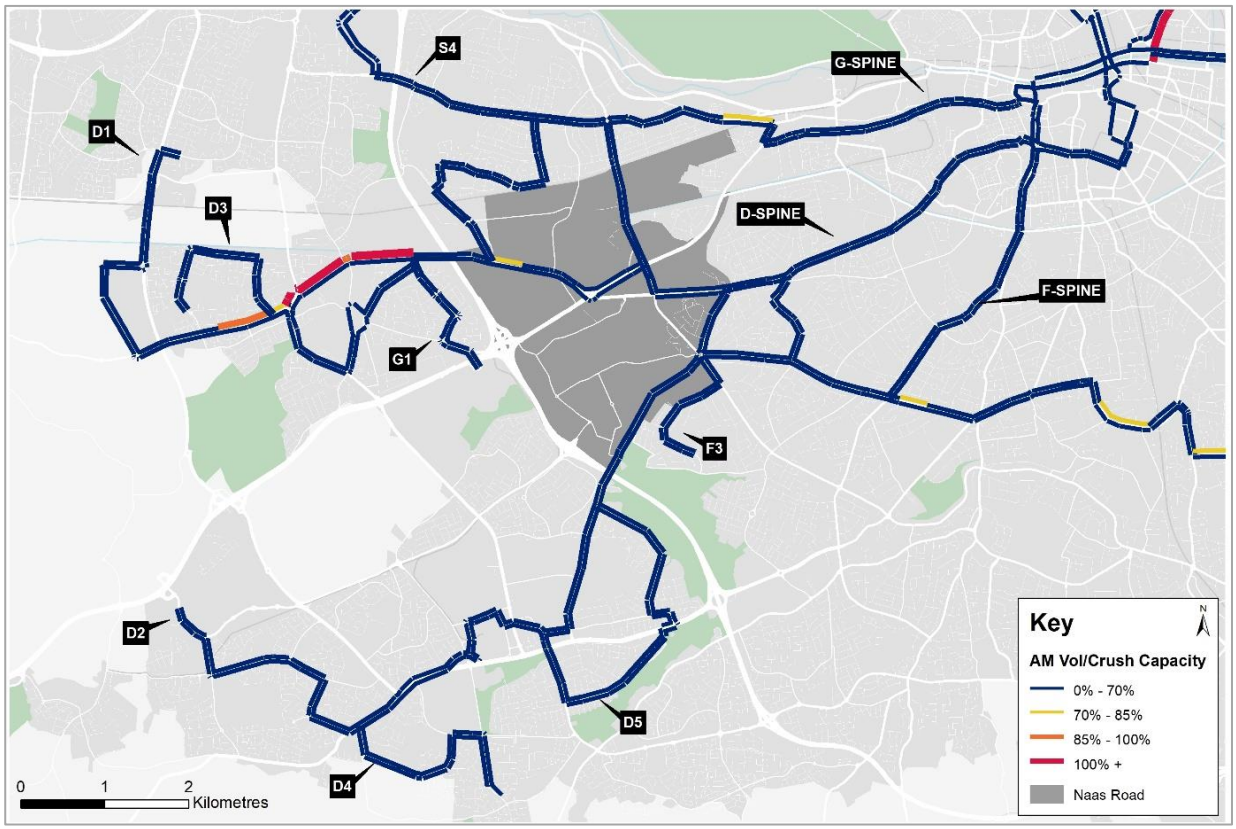


Figure 4.17: Volume over crush capacity of bus services

Table 4.3: Bus service frequency, AM peak

Service	Frequency (buses per hour)
D1	4
D2	4
D3	4
D4	2
D5	2
F3	6
G1	5
S4	6

The BusConnects services provide core "spines" into the city centre, which continue to branch out into individual services further away. For instance, services D1 and D3 follow a similar route from the far north west of the study area at the top of R134 Nangor Road. These services also share similar routes to D2, D4 and D5 into the city centre from the junction with R819 Walkinstown Road and R110 Long Mile Road. Service D1 also shares a small section of R134 Nangor Road with service G1, providing more alternative routes into the city centre.

The data shows that in general, most routes are within capacity with a V/CC of less than 70%. However, D1 spine travelling into the city centre is over capacity on R134 Nangor Road in the Naas Road study area and to the west. This is also the case in the PM peak for the outbound service. Despite service D1 being over capacity in the peaks, the composition of the bus network means there are multiple services available closer to the city centre which operate within capacity.

In the PM peak, service G1 is also reaching capacity outbound from the city centre through Kilmainham and Ballyfermot.

Although there are several bus services linking up areas to the city centre, there are some key gaps in the network, particularly a route connecting the north of the Naas Road study area to the south which provides an opportunity for improved orbital services within the area. Analysis in section 4.2.4 shows there is demand for this movement. In addition, the performance of the road network will continue to impact the journey times and reliability of bus services, with Figure 4.14 illustrating there could be some constraints due to high V/C at junctions on the bus routes.

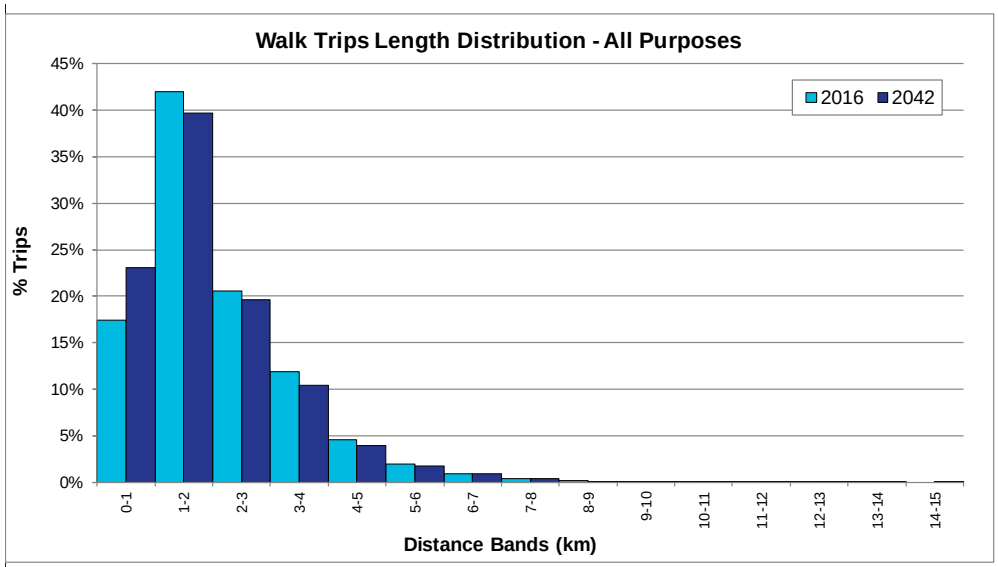
4.2.7 Trip lengths

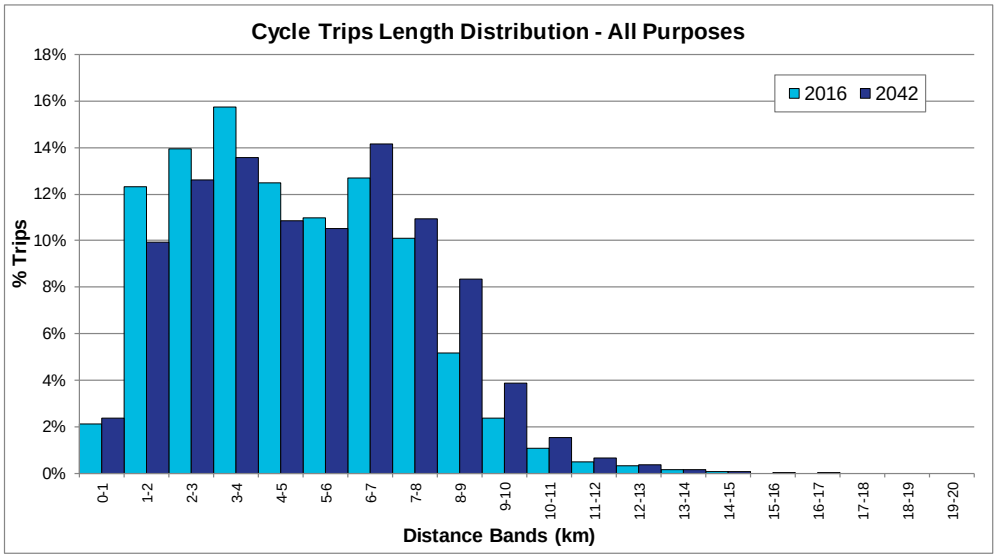
Data on the distribution of trip lengths for the Naas Road study area has also been extracted from the ERM. The trip length distributions for the years 2016 and 2042 are presented in Figure 4.18 for all modes for the Naas Road study area.

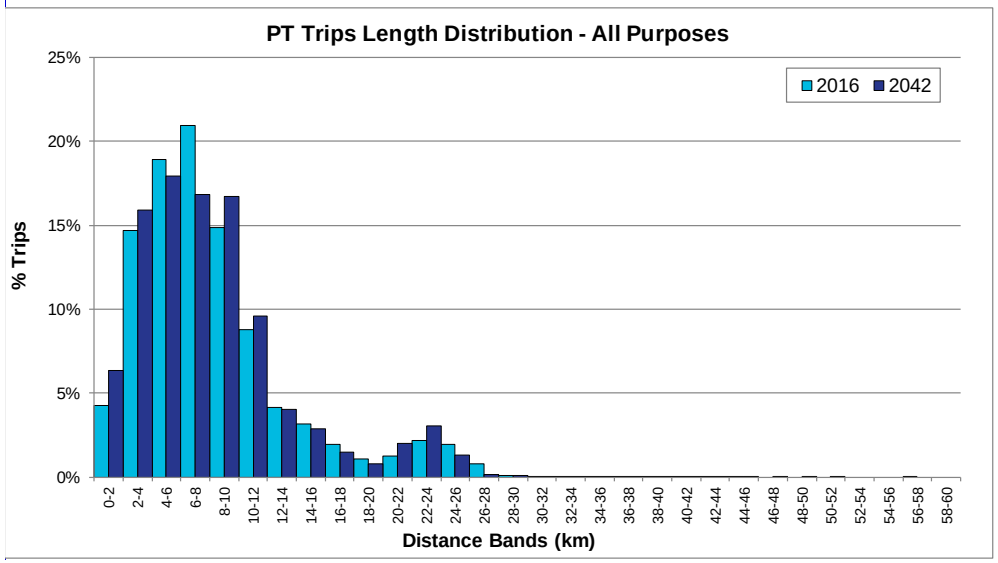
Overall, the data shows:

- Car – increase in short distance car trips between 2016 and 2042. Over 50% less than 6km, 35% less than 4km and 12% less than 2km – these distances lend themselves to more sustainable modes, particularly walking and cycling, but also public transport.
- Walking – most walking trips are short with over 75% less than 3km.
- Public transport and cycling – an increase in longer trips made in 2042 compared to 2016, however the mode share for public transport and cycling is low as shown in section 4.2.5.

A low mode share for public transport and cycling and a large proportion of short trips being made via car creates an opportunity to shift trips from car to public transport or active mode travel.







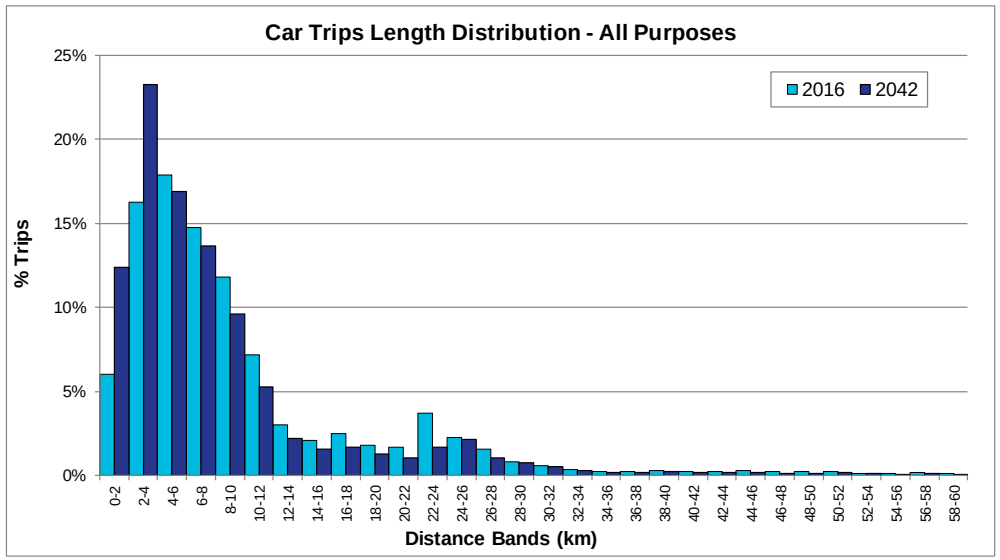


Figure 4.18: Naas Road study area trip length distributions

4.2.8 Journey time by mode

Journey times for several origin/destination pairs were selected based on the location of existing Luas, rail and bus stops and their destination into the city centre. In all cases selected, trips made via car were faster than trips made via public transport in some cases by more than two minutes. This identifies an opportunity to make public transport trips more attractive and travelling by car less attractive to the user, in order to shift trips from car to public transport.

Given the short distances of many trips, and their origins and destinations identified in the above sections there is also an opportunity to provide improvements to make walking and cycling more attractive, thereby reducing the number of short distance car trips in the study area.

4.3 Mode shift analysis

4.3.1 Overview

The previous section has considered the estimated travel demand and pressures on transport provision in 2042. As well as the public transport network needing to accommodate the 2042 public transport travel demand, there is also an ambition to cater for a mode shift from private car to sustainable modes, such as walking, cycling and public transport.

This section outlines an example showing what different levels of mode shift for particular key movements through the study area could mean for sustainable travel demand. It has been used to demonstrate the potential level of increase in demand for public transport services if additional mode shift from car travel is applied.

4.3.2 Methodology

A process has been developed to simulate how a mode shift could increase the demand for sustainable travel infrastructure and services. A flow chart to summarise the process is included in Appendix C.

The potential number of public transport trips from this shift can then be used to indicate the level of public transport improvements which would be needed to accommodate a mode shift. To inform this process, model sectors have been grouped into districts as shown in Figure 4.19.

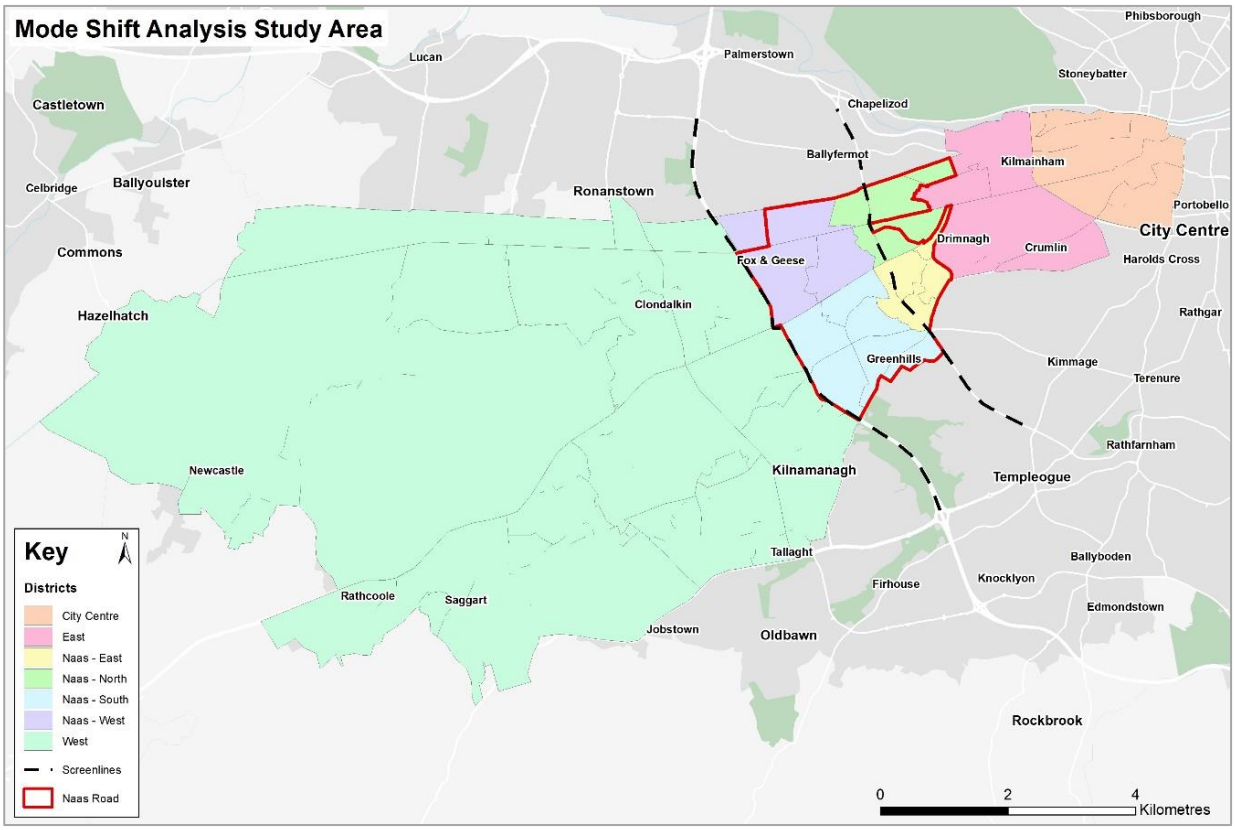


Figure 4.19: Wider study area mode shift analysis

The mode share from the 2042 model and the development from the 2040 planning sheet has been combined to provide a baseline number of trips between each pair of districts for car, public transport, cycle and walk. For any percentage car mode shift, the process estimates how many of the car trips could become walk, cycle or public transport trips.

The distance between each pair of districts has been calculated using the crow fly distance between the centroids of each district. This provides a proxy for the mode shift to be based on a function of distance, as shorter trips are more likely to become walking trips and longer trips are more likely to become public transport trips. The distances have been divided into three bands based on the trip length distribution information in section 4.2.7. Each sector-to-sector movement is then allocated one distance band.

For each band, the shifted car trips have been converted to another mode, using the proportions in Table 4.4.

Table 4.4: Mode splits by distance band (without car)

Distance band (km)	Walk	Cycle	Public transport
0-2.6	71%	4%	25%
2.6-7.1	19%	9%	72%
7.1+	1%	6%	94%

Therefore, for all the captured car trips with a trip length longer than 7.1km, 94% of them are converted to a public transport trip as a consequence of the process.

4.3.3 Results

The number of public transport trips for different levels of mode shift have been calculated for and between all the districts in Figure 4.19 and summarised in Table 4.5.

Table 4.5: Car mode shift – all districts, AM peak

Car Mode Shift	Car Demand*	Existing PT demand*	Shifted PT demand	Total PT demand after mode shift
0%	38,750	24,250	0	24,250
25%	29,000	24,250	4,750	29,000
50%	19,250	24,250	9,500	33,750

*Data obtained from ERM from sectors highlighted in Figure 4.19

To consider public transport capacity on existing services, movements across two screenlines have been analysed in more detail. A screenline is an imaginary line which enables movements which cross the line to be captured. The two screenlines, shown in Figure 4.19, have been chosen to capture radial movements into the city centre via the Naas Road study area following the Luas Red and Kylemore rail lines:

- West of the M50 to the east of the M50.
- West of Kylemore Road to the east of Kylemore Road.

Movements between districts that cross each of the screenlines have been extracted for the analysis for the whole area, with the results provided in Table 4.6 and Table 4.7.

Table 4.6: Car mode shift – M50 screenline, AM Peak, inbound

Car Mode Shift	Existing PT demand*	Shifted PT demand	Total PT demand after mode shift
0%	5,800	0	5,800
25%	5,800	1,000	6,800
50%	5,800	2,000	7,800

*Data obtained from ERM from sectors highlighted in Figure 4.19

To achieve a mode shift of around 25%, provision for a further 1,000 public transport trips across the M50 dotted line is required, which is an increase in demand of almost 17% compared to the demand in the model.

Table 4.7: Car mode shift – Kylemore Road screenline, AM Peak, inbound

Car Mode Shift	Existing PT demand*	Shifted PT demand	Total PT demand after mode shift
0%	4,250	0	4,250
25%	4,250	500	4,750
50%	4,250	1,000	5,250

*Data obtained from ERM from sectors highlighted in Figure 4.19

To achieve a mode shift of around 25%, provision for a further 500 public transport trips across the Kylemore Road dotted line is required, which is an increase in demand of around 12% compared to the demand in the model.

The information in this section provides indicative results of the impacts of a mode shift, based on the current planning sheet and model run. As the project progresses and the modelling is refined the mode shift can be explored further – such as considering a wider study area than shown in Figure 4.19, exploring other movements (e.g. orbital) through the study and using the model to assess the impacts of mode shift – to greater understand the changes in public transport demand as a consequence of mode shift. The work undertaken here provides the order of magnitude of changes in demand, which is sufficient to inform option development at this stage.

4.4 Summary

4.4.1 Issues

A large transformational change is expected in the Naas Road study area to 2040 and beyond. This includes large increases in population and employment in the area. Future transport provision will need to be able to accommodate this growth and change of land use.

A key issue within the study area is the high car mode share, with many of those journeys covering a short distance. The data analysis indicates some interventions will be required to make car a less attractive option, and other modes more attractive, particularly as the mode share for cycling in particular is low.

The road network is shown by the 2042 ERM to perform poorly with many junctions approaching or being over capacity, specifically on the key inbound route to the city centre along the N7 and R110/R810 Naas Road. This is likely to affect car journeys at busy times and the reliability of bus services as a competitive alternative to car.

4.4.2 Constraints

The existing rail and Luas services are approaching or over capacity to/from the city centre in the AM and PM peaks by 2042, with some BusConnects services also experiencing high volumes on sections of the route. Public transport interventions will be required as overcapacity services are a deterrent to existing public transport users and provide a constraint to encouraging more public transport trips. The potential for users having to wait for the next available service due to overcrowding and longer journey times make car journeys favourable over public transport.

The cycling mode share is low. Cyclists and pedestrians have limited opportunities to safely cross key infrastructure due to the severance in the area caused by R110/R810 Naas Road, Luas Red line and the Grand Canal. There are also barriers such as the M50 and the railway which limit connectivity externally for all modes. An intervention to reduce this level of severance and improve accessibility within the Naas Road study area will make active travel more attractive.

Analysis of data from the 2042 ERM shows that car journey times in the area are generally quicker than public transport services for the same origin/destination pairs, making public transport trips less attractive to users. This indicates an intervention to make car travel less attractive and/or improve public transport times would make travel by public transport a competitive alternative to car.

4.4.3 Opportunities

A high number of short-distance car trips, and a large number of car trips internal to the Naas Road study area, shows there are opportunities to encourage these journeys to be undertaken more sustainably by providing interventions which facilitate safe and easy sustainable travel.

The majority of the existing public transport routes are mainly radial, providing links into the city centre. There is an opportunity to improve orbital public transport provision to connect the north and south of the study area.

Due to the increase in development in all parts of the Naas Road study area, there is an opportunity to improve the accessibility of existing public transport services to the increase in people residing, working and travelling to/from the area.

5. Option Development

5.1 Introduction

To guide the identification of options for the Naas Road study area, the NTA have outlined a set of overarching themes, outcomes and objectives for the GDA Transport Strategy; these are outlined in Table 5.1.

Table 5.1: GDA Transport Strategy theme, outcomes and objectives

Strategy theme	Strategy outcome	Strategy objective
Environment	An enhanced natural and built environment	To meet our environmental obligations by transitioning to a clean, low emission transport system through reducing car dependency and increasing walking, cycling and public transport use.
Community	Connected communities and better quality of life	To improve health and quality of life of our society by improving connectivity between people and places, delivering safe and integrated transport options, and increasing opportunities for walking and cycling.
Economy	A strong sustainable economy	Supporting economic activity and growth by improving the opportunity for people to travel for work or business where and when they need to and facilitating the efficient movement of goods.
Accessibility	An inclusive transport system	To deliver a high quality, equitable and accessible transport system, which caters for the needs of all members of society.

5.2 Options development

To identify options to serve travel demand in the study area in 2042, the following steps have been completed:

- A review of relevant planning and transport policies and strategies has provided the overall context for options, and identified current thinking in relation to the future transport network;
- A baseline analysis of the existing transport network identified existing network issues and opportunities;
- An analysis of planning and travel data from the 2040 Planning Sheet and a DM run of the ERM for 2042 provided insights into future travel demand and network capacity constraints; and
- A review of the GDA strategy objectives against which all options should be aligned.

The flow diagram outlined in Figure 5.1 summarises this option generation process. Two main categories of options were considered:

- Those to enhance existing infrastructure and services and/or improve access to existing infrastructure and services; and
- New sustainable transport (public transport and active mode) infrastructure and services which could supplement the existing network to deliver a more holistic sustainable transport offering in the Naas Road study area.

Where enhancements and interventions have been identified for existing infrastructure and services, options previously proposed within existing local and regional strategies have been considered. Additionally, new options have been proposed for existing infrastructure where further enhancements could be beneficial to the wider accessibility of the study area, particularly due to the level of change proposed.

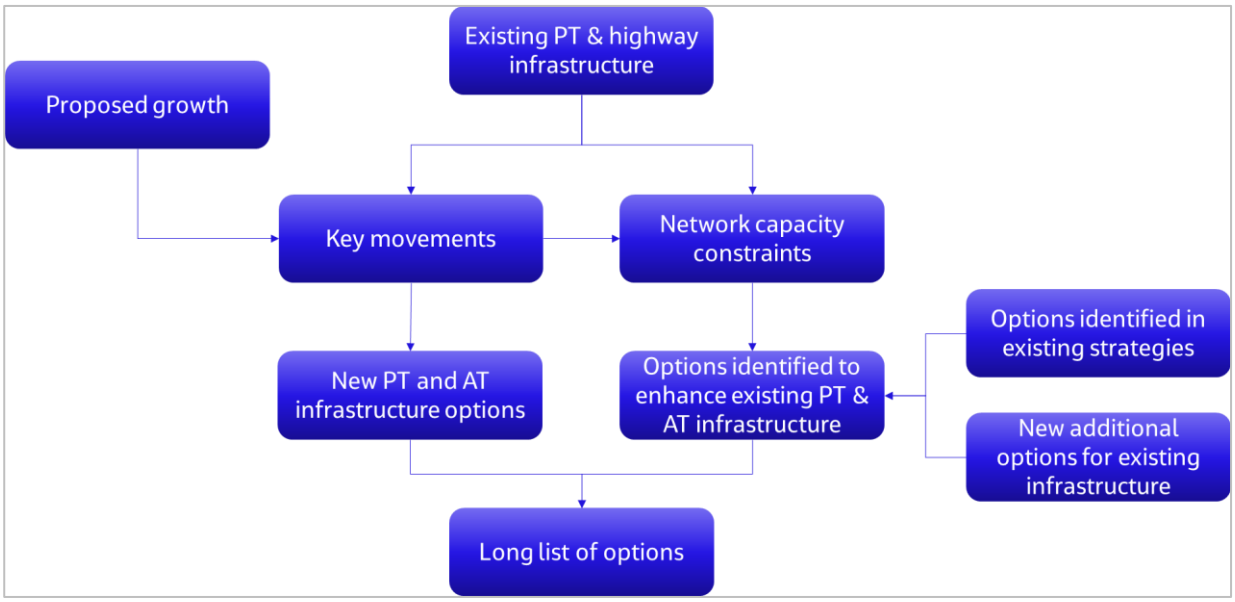


Figure 5.1: Option generation process flow diagram

5.2.1 Future proposals for transport interventions

The Transport Strategy for the GDA (2016-2035) sets out the following proposed sustainable transport infrastructure improvements within that would benefit the Naas Road study area. The 2042 ERM transport network does not include these proposals. Appendix A outlines the future changes to the transport network included within the Do Minimum model run.

5.2.1.1 Rail

Key rail improvements within the study area are associated with the DART+. The aim of the DART+ programme is to provide a faster, more reliable service, with increased capacity by increasing to eight carriages, and increase train frequencies from every ten minutes to five minutes across the network. The increase in network capacity also includes the doubling of tracks between Park West and Cherry Orchard and Heuston stations, which would involve the section of railway serving the Naas Road study area.

Initial proposals included two additional railway stations on the Kildare Line between Heuston and Hazelhatch: to be located at Kishoge, which has been built but yet to be opened; and Kylemore, which is located within the study area.

5.2.1.2 Light Rail

As set out in the GDA Transport Strategy, it is intended to develop the light rail network. Proposals of relevance to the study area include the proposed extension from the Luas Red line to Lucan. The Luas Lucan line is proposed to run from Lucan via Liffey Valley and Ballyfermot, where it joins the Luas Red Line at the Blackhorse stop in Inchicore, before continuing into the city centre.

5.2.1.3 Public transport (bus)

As noted in Chapter 3, the new Dublin Area Bus Network is being rolled out as part of the BusConnects programme from early 2021 and has been taken as the 'base' situation within this study.

The BusConnects programme has also identified 16 Core Bus Corridors which require enhanced walking, cycling and bus infrastructure. The Naas Road study area has two corridors within it: Core Bus Corridor 8 (D) and Core Bus Corridor 9 (D). Two corridors, Core Bus Corridor 7 (G) and Core Bus Corridor 11 (F), run along the north and south-east of the study area respectively.

The 16 Core Bus Corridors have been combined into 12 schemes for progression through to the planning application and construction phases. According to the BusConnects programme, construction of supporting infrastructure will commence on a phased basis for the 12 schemes from 2022, each scheme taking approximately two years to construct, with all schemes constructed by 2027.

The NTA's BusConnects proposals are summarised in section 3.1.2.5, with the New Dublin Area Bus Network considered as part of the baseline in this study. However, the associated BusConnects bus priority infrastructure proposals are not assumed within the assessment. These proposals, which would improve journey times, along with enhanced bus stops and interchange infrastructure aim to make bus travel more attractive and legible within Dublin.

The GDA Transport Strategy outlines challenges to reducing congestion on the M50 and improving orbital public transport movements by public transport. Core orbital bus routes have been proposed within the strategy, including a north-south route through the Naas Road study area along Kylemore Road through to Walkinstown to the south of Dublin. Additionally, the NTA have undertaken studies to inform the GDA Transport Strategy, which have considered orbital public transport corridors, including the Dublin Metropolitan Inner Orbital Corridor Study for longer term orbital public transport movements.

5.2.1.4 Cycling and Walking

The GDA Cycle Network Plan outlines a number of proposed cycle routes within the Naas Road study area. There are considerable improvements to access through the area, including continuous routes along major roads and an additional route across the M50 to the west.

Other key walking and cycling measures include:

- Sufficient cycle parking at key destinations and interchanges points;
- Development of strategy pedestrian network plans; and
- Reducing waiting times at pedestrian crossings.

5.2.1.5 Highways

The GDA Transport Strategy considers complementary travel demand measures along with strategic public transport proposals. These include multi-point tolling and ramp-metering on the M50, as well as parking restrictions, to discourage the use of the M50 and other orbital routes by car, to increase the attractiveness of public transport alternatives.

At a more local level, the current SDCC Development Plan (2016 – 2022) proposes three new link roads to help improve accessibility through the Naas Road study area, these are located between:

- Oak Road and Robinhood Road;
- R134 Nangor Road and Chestnut Road; and
- R110 Long Mile Road and Ballymount Avenue.

5.2.2 Optioneering

The steps outlined in Figure 5.1 resulted in the preparation of a long-list of options for key transport patterns, as well as supplementary options to provide a more holistic sustainable transport network within the Naas Road study area, as detailed in Table 5.2. The long list of options are discussed in more detail below.

Table 5.2: Long list of options

Reference	Type of Option	Location/Description
Based on Existing Strategy or Proposal		
1	Rail	DART+
2	Rail	New Kylemore station (assumes DART+ in place)
3	Bus	BusConnects infrastructure
4	Luas	Luas Red line enhancements (e.g. increase frequency, capacity)
5	Luas	Luas Red line new stop (R110 Naas Road/R134 Nangor Road)
6	Luas	Lucan Luas line
7a	Public Transport	Orbital PT corridor (conventional bus)
7b	Public Transport	Orbital PT corridor (bus with priority measures)
7c	Public Transport	Orbital PT corridor (LRT)
8	Demand Management	M50 tolling
9	Highway	SDCC Dev Plan link road: R134 Nangor Road to Chestnut Road
10	Highway	SDCC Dev Plan link road: Ballymount Avenue to R110 Long Mile Road
11a	Highway	SDCC Dev Plan link road: Oak Road to Robinhood Road (road)
New Proposals		
11b	Active	SDCC Dev Plan link road: Oak Road to Robinhood Road (NMU link)
11c	Bus/Active	SDCC Dev Plan link road: Oak Road to Robinhood Road (Bus/NMU)
12	Rail	Extended or new car parking at existing railway stations on Kildare Line (assume DART+ in place)
13	Luas	Multi-storey P&R at Red Cow (assumes Luas Red line enhancements)
14	Active	Primary Cycle Route (into the city centre)
15	Active	Primary Cycle Route (NE to SW)
16	Active	Cycle facility improvements
17	Active	Additional ped/cycle crossing points on R110/R810 Naas Road and R110 Long Mile Road
18	Active	Provision for e-bikes & e-scooters
19	Active	Additional active travel crossing point over Grand Canal
20	Bus	Improvement of bus links North-South through study area (Ballyfermot to Walkinstown) (Pre-Orbital PT corridor)
21	Bus	Orbital bus route A (Ballyfermot - Greenhills via Walkinstown)
22	Bus	Orbital bus route B (Ballyfermot - Greenhills - Kilnamanagh, assumes bus/NMU link)
23	Bus	Bus priority at signals
24	Bus	Improve connectivity of dedicated bus lanes
25	Demand Management	Modal filters
26	Demand Management	Travel demand management e.g. congestion charging, workplace parking levy (WPL)

Alongside the key public transport, cycle link and local highway options that have been taken through the MCA process, a number of other supplementary options have been identified as part of the long list. These consist of smaller scale sustainable transport interventions to enhance connectivity and improve journey times within the study area (highlighted in yellow above), as well as demand management proposals to be considered at a wider

strategy level (in red above). It is recommended that these options be taken forward for further consideration as part of the GDA strategy work but are not considered as part of the MCA within this report.

5.3 Justification of options

5.3.1 DART+ and new Kylemore station

The proposed DART+ interventions will help towards mitigating existing rail capacity constraints into and out of the city centre. The addition of the new Kylemore station increases accessibility to a railway station in the north of the study area (see Figure 5.2). The electrification of the Kildare railway line is also likely to have a positive impact on the environment by assisting in decarbonisation. A benefit of DART+ and a new Kylemore railway station is that they incorporate existing infrastructure and integrate well with each other.

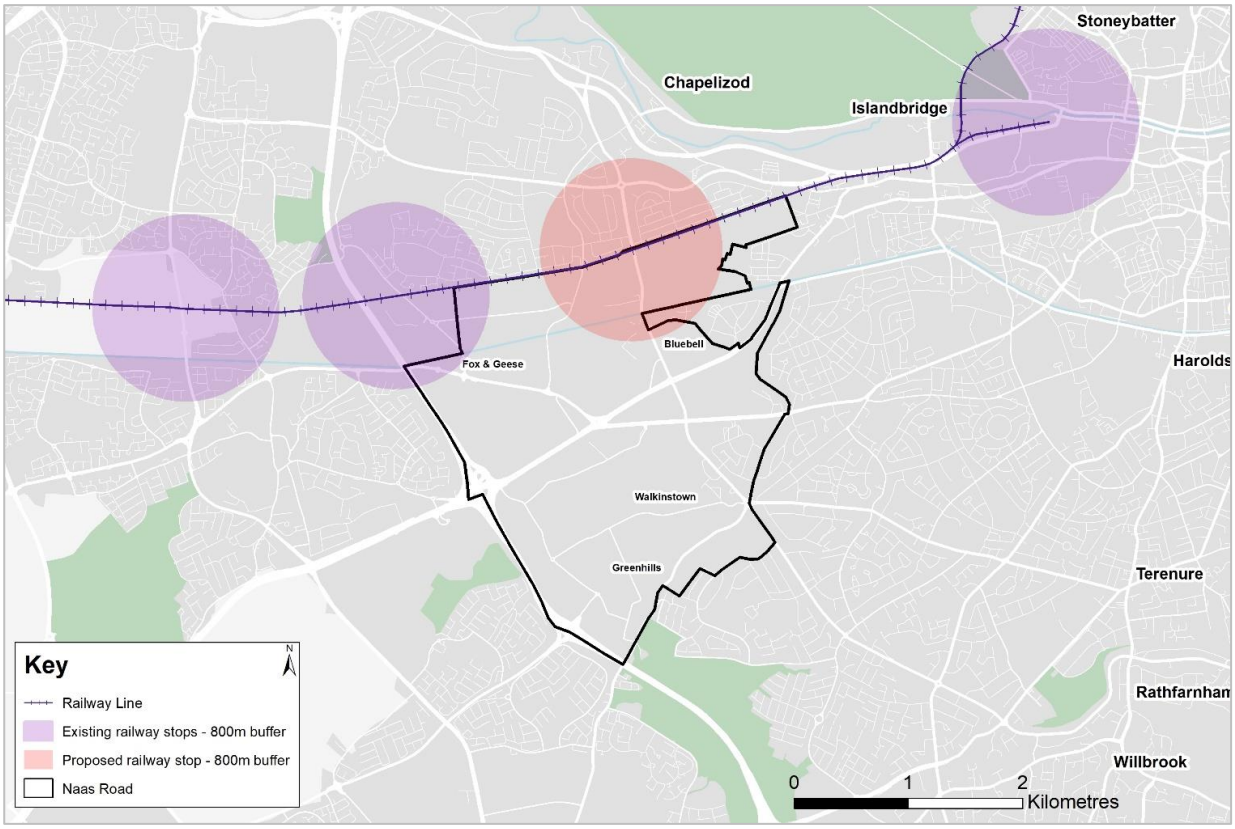


Figure 5.2: Access to improved rail services and proposed Kylemore station (area within 800m of a railway station)

5.3.2 Luas Red line enhancements and new stop at R110 Naas Road/R134 Nangor Road

Increasing the frequency and/or capacity (longer light-rail vehicles) of the Luas Red line would provide mitigation towards the tidal capacity constraints, expected particularly in the peak periods in 2042. The implementation of a new Luas stop at R110 Naas Road/R134 Nangor Road (see Figure 5.3) substantially increases the proportion of the study area within walking distance to Luas services (see Figure 5.4), improving public transport accessibility within the study area and promoting of mode shift. The new stop will serve the west of the study area, where substantial population and employment growth is forecast.

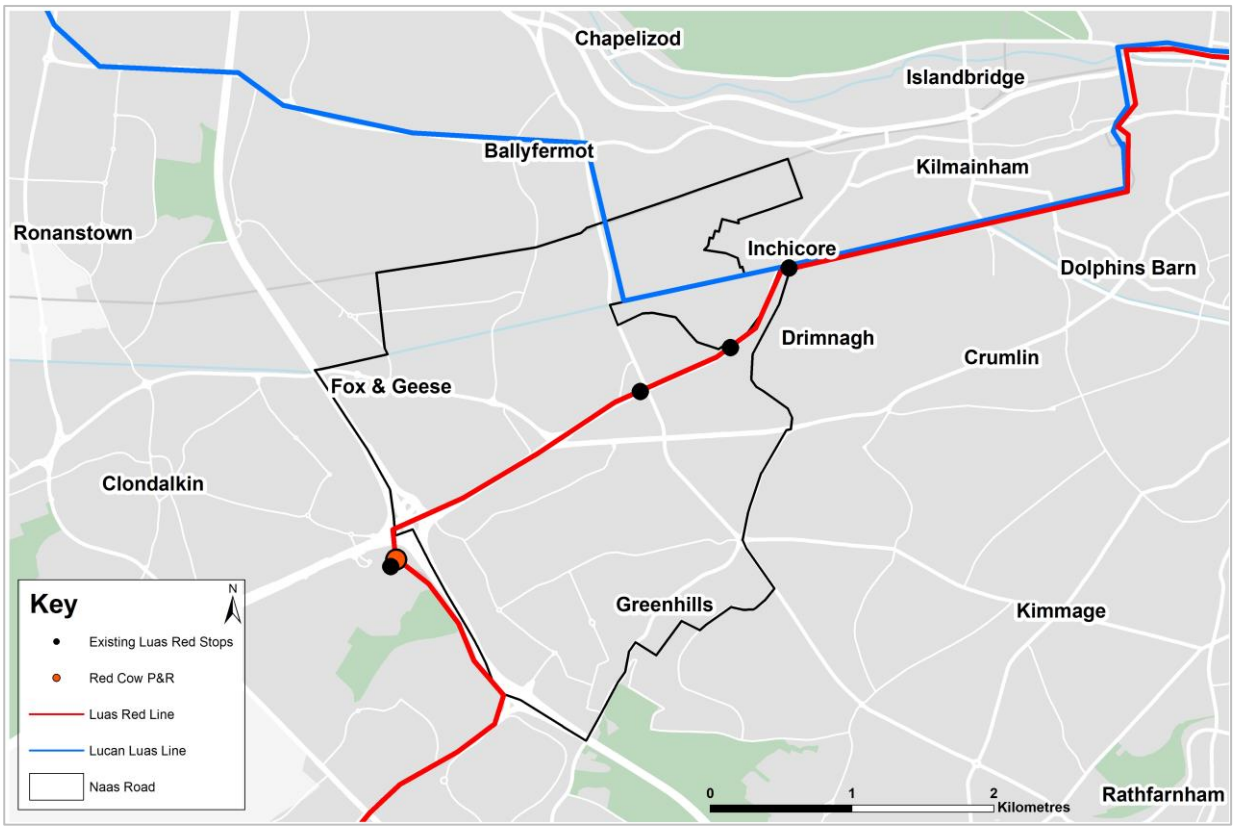


Figure 5.3: Proposed new Luas interventions (Red line enhancements, new stop and Lucan Luas line)

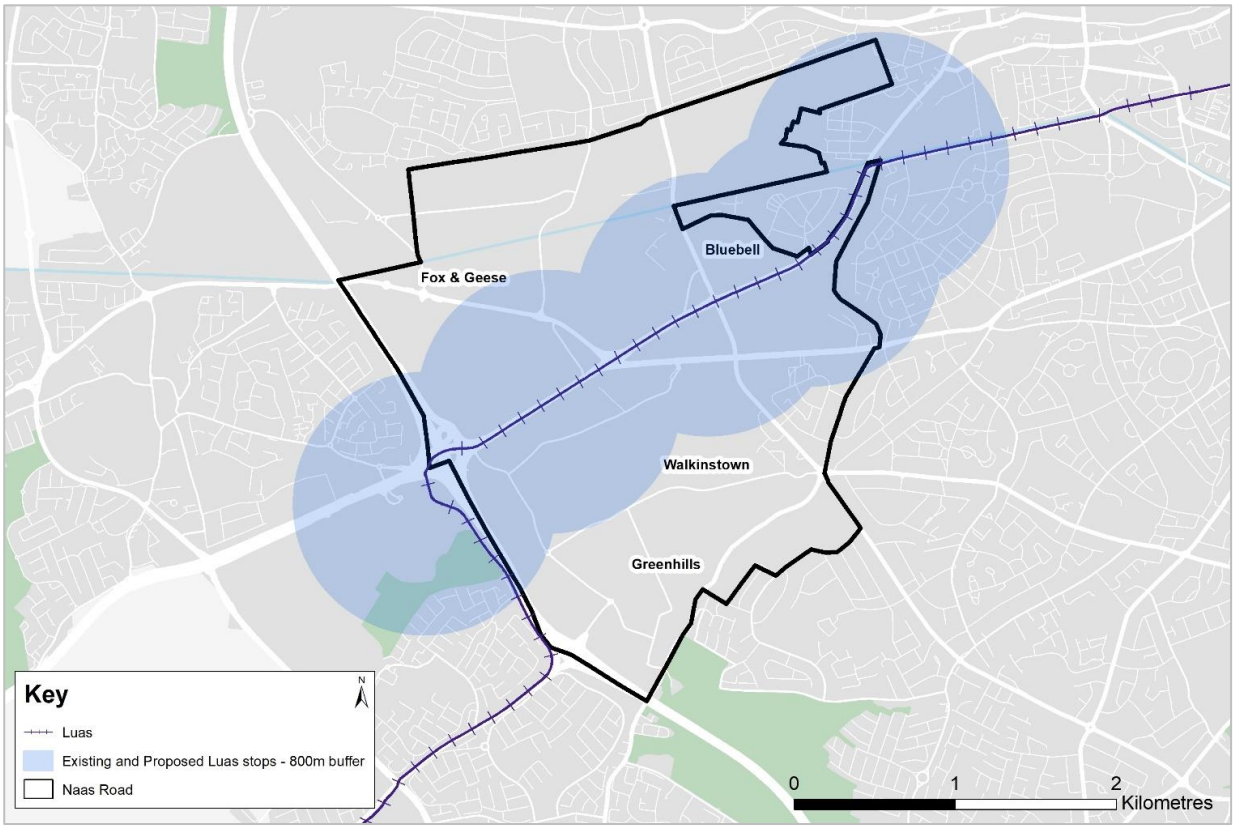


Figure 5.4: Access to improved Luas services and proposed new Luas stop (area within 800m of a Luas stop)

5.3.3 Orbital public transport corridor

The orbital public transport corridor will encourage more orbital journeys to be made via public transport rather than car. This is likely to help to reduce congestion on the M50 during peak periods and enable improved accessibility between north and south of the study area. The orbital public transport corridor will also provide an alternative route from the mostly radial existing public transport services and has the potential to create a public transport interchange/hub with the possible Kylemore railway station. Several levels of service for the corridor have been suggested at this time: conventional bus, bus with priority and light rail transit (LRT). The capacity range for each mode is presented in Table 5.3 and based on UITP's 'Making the right mobility choices.' It should be noted that the capacity range for these modes have significant overlaps and are approximate.

Table 5.3: Public transport mode capacity range

Mode		Min	Max
1	Conventional bus	0	2,400
2	Bus with priority infrastructure	2,400	4,000
3	Light rail	3,600	7,000
4	Heavy rail	5,000	50,000
5	Metro	7,500	25,000

The initial suitability of service is likely to be driven by the level of potential demand on the route and the level of mode shift the corridor initiates, this will need further consideration as part of the GDA strategy work and testing within the ERM model. As shown in Appendix B, the proposed number of car trips from the north and the south of the study area along the proposed orbital public transport corridor route are both over 1,000 trips in the AM peak. Conversely the number of public transport trips are proposed to be low in comparison, however this demonstrates that there is an opportunity to encourage a high level of mode shift on these movements if provision of an orbital route were to be introduced.

5.3.4 Lucan Luas

The strategic proposal for an additional Luas line to Lucan has been considered (see Figure 5.3). Given the large car demand between Lucan, Ballyfermot and the study area in both peak periods, the Lucan Luas line was considered to provide additional public transport access both within and outside of the area. The proposed intervention may also alleviate future overcrowding and capacity issues on the Kildare rail line and Luas red line, by providing additional radial capacity. However, this will need further consideration as part of the GDA strategy work and testing within the ERM model.

As shown in Appendix B, over 1,500 car trips are forecast to be undertaken from Lucan and Ballyfermot in the AM peak to the study area, and over 500 car trips from the study area to Lucan and Ballyfermot. There are also currently limited public transport services that provide direct access between the study area and Lucan. The Lucan Luas line will provide improved access between these areas and encourage mode shift to public transport. The Lucan Luas line will also provide an increased capacity to/from the city centre from the north east of the study area.

The alignment of the proposed Lucan Luas line approaching the city centre may require further consideration as part of the GDA strategy work, so the capacity of the Lucan Luas and Luas Red Line do not restrict or compete with each other.

5.3.5 Multi-storey Park & Ride at Red Cow Luas stop

It is proposed to increase the capacity of the existing Park and Ride at the Red Cow Luas stop, potentially by decking the current car park to reduce further land-take, to help reduce car trips into the city centre and work towards mode shift towards public transport. By providing an increased level of parking, this is also likely to

improve the accessibility of the existing Luas Red line. However the analysis of future Luas Red line capacity in section 4.2.6 shows the average ratio of volume to crush capacity (V/CC) between Red Cow and Inchicore to be 70-85% inbound in the AM peak, increasing to 100% as it reaches the city centre. Therefore it is unlikely that increasing car parking at Red Cow would be as successful in encouraging mode shift without the capacity enhancements of the Luas Red line.

5.3.6 Cycle proposals

A substantial number of car trips are projected to undertake trips that are within distances suitable for cycling, between the study area locations such as Clondalkin, Drimnagh, Ballyfermot and Liffey Valley Shopping Centre. Providing improved cycle facilities, in the form of a fully-segregated primary route, as outlined in the GDA Cycle Network Plan, is likely to improve journey times and attractiveness, which can help to shift short distance car trips to cycling. A high-quality cycle route to the city centre holds the potential to provide the fastest journey time in comparison to car and potentially public transport trips during peak periods.

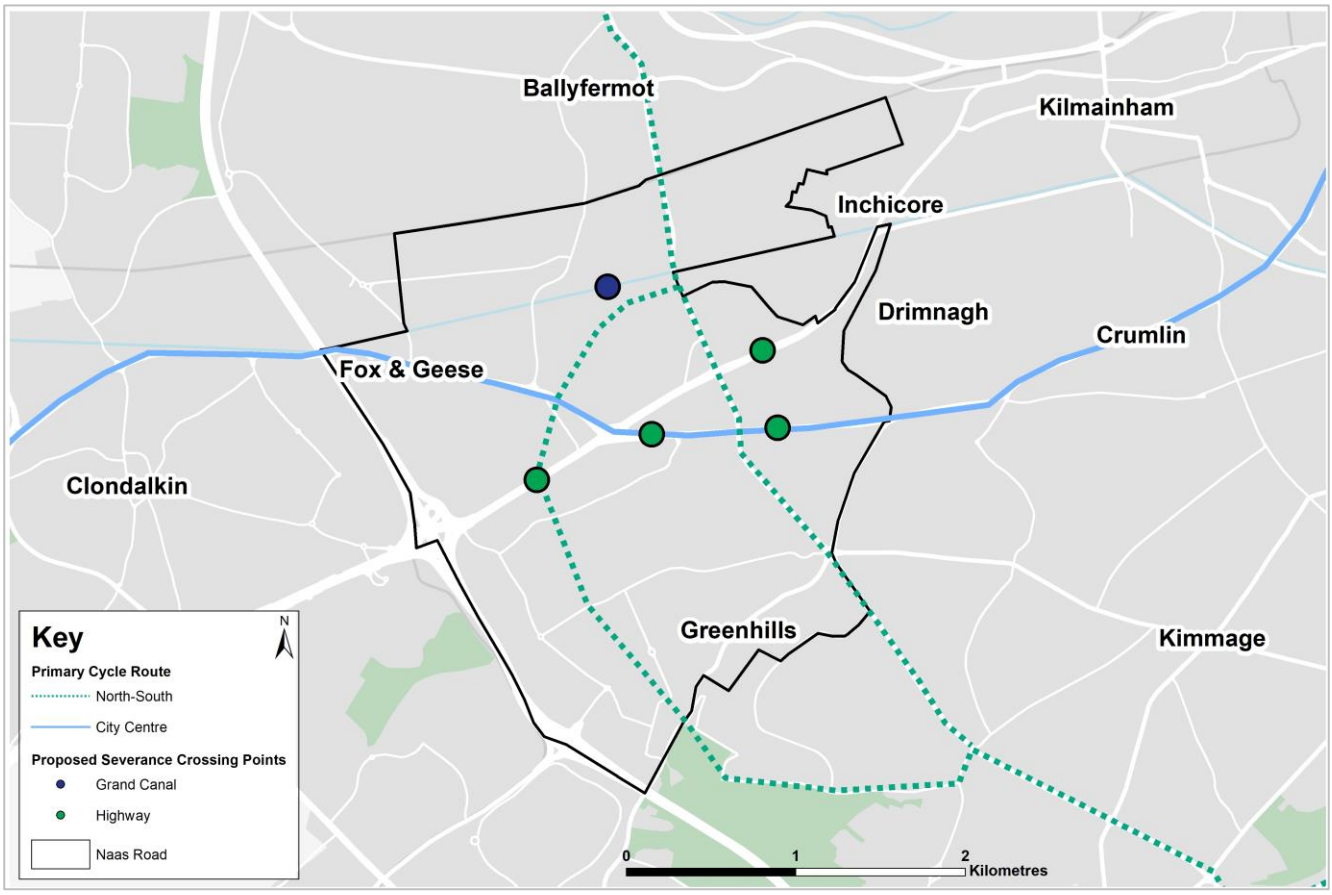


Figure 5.5: Proposed fully-segregated primary cycle route (and proposed additional pedestrian/cyclist crossings)

The proposed north-east to south-west route may partially mitigate the lack of available orbital public transport and active mode movements through the area. This route could also link into the proposed Kylemore station, the proposed orbital public transport corridor and the proposed non-motorised user (NMU) link road between Oak Road to Robinhood Road.

5.3.7 Additional bus services

The existing highway network structure within the south west of the study area currently limits permeable access through site to existing public transport services (see Figure 5.7). By providing additional bus services connecting Greenhills and Ballymount within the study area to Ballyfermot and Kilnamanagh brings more of the study area within 400m of a bus service and reduces the need to interchange between different services. This could make sustainable travel more attractive and competitive to car travel.

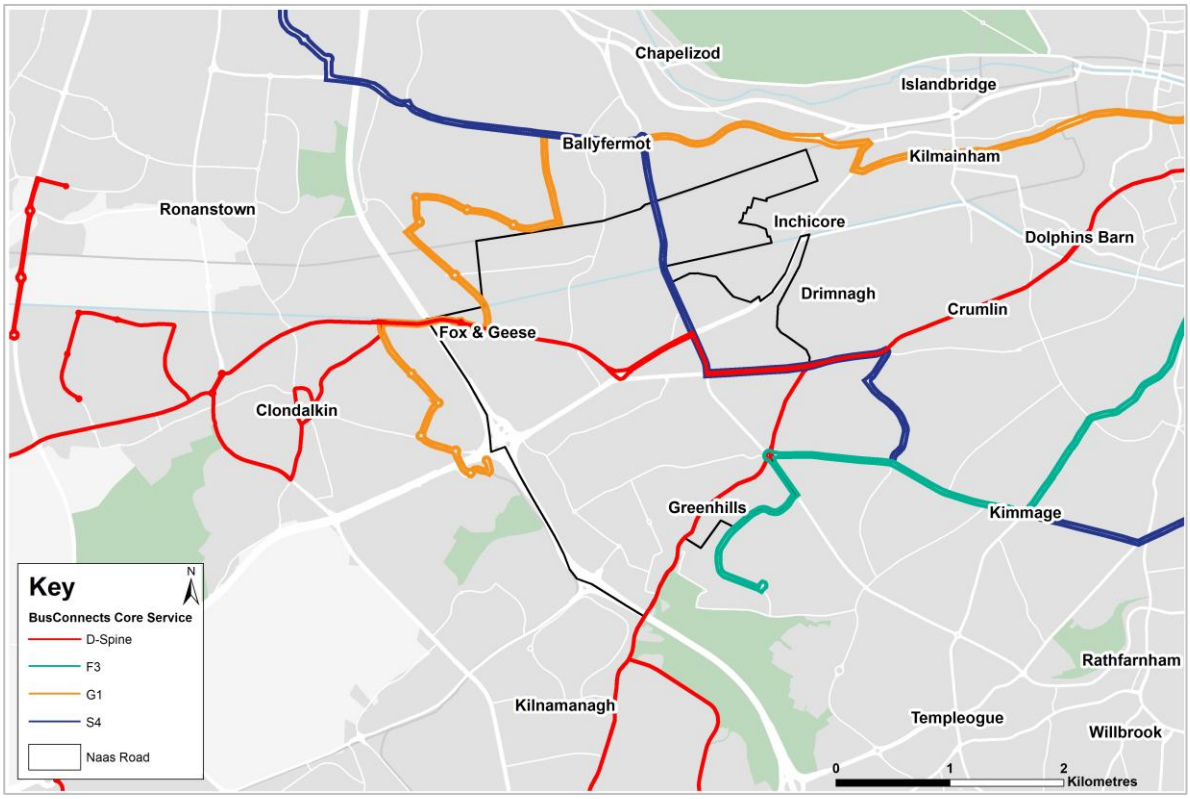


Figure 5.6: BusConnects core services

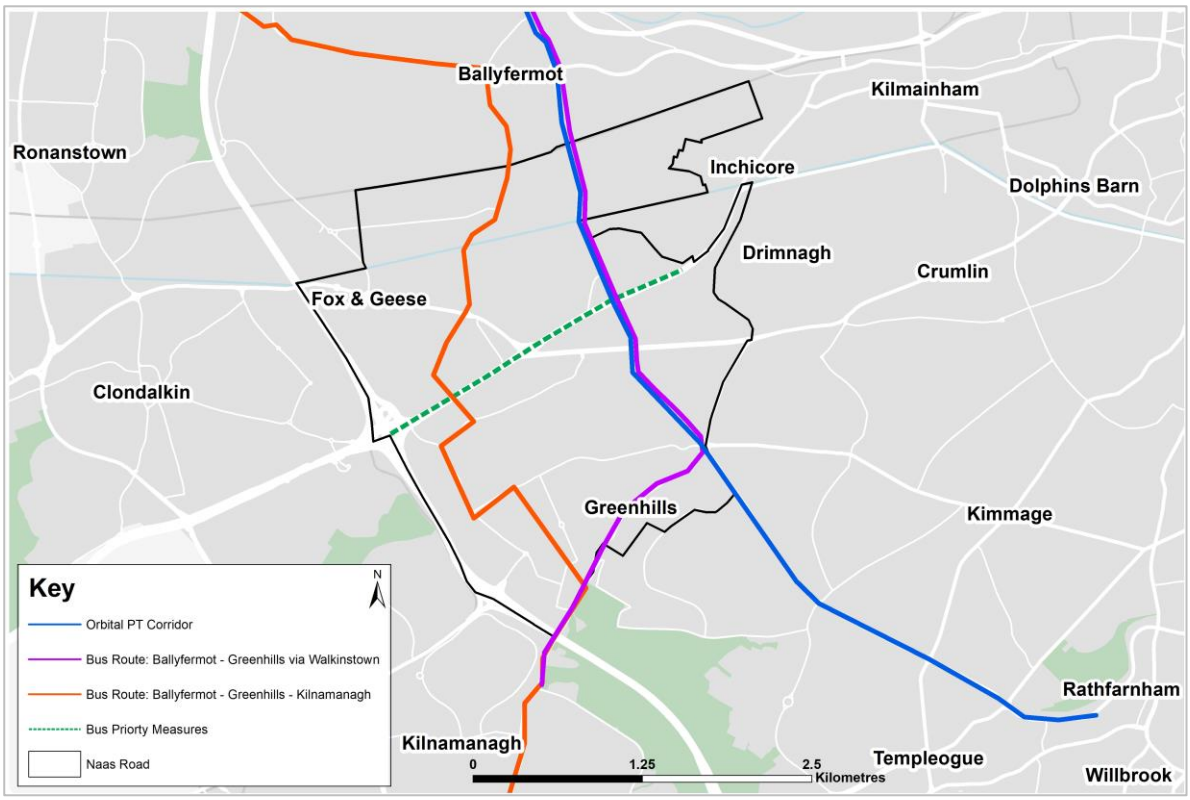


Figure 5.7: Proposed additional bus services

The additional services would also provide increased capacity for public transport trips within the study area and has the potential to tie into the proposed link road between Oak Road and Robinhood Road, if a highway or

bus/NMU link is considered. The improvement to north-south bus services, particularly along R112 Kylemore Road could provide further improved access to the proposed Kylemore railway station.

It is acknowledged that these supplementary bus options have been identified based on outputs from the do minimum model run, which does not contain any of the bus priority infrastructure proposed by BusConnects. Therefore, further testing is required to determine the necessity and performance of these additional services in the context of the BusConnects infrastructure. However, it is noted that these additional services cover areas that are not specifically covered by the new Dublin bus network proposals.

5.3.8 Highway interventions

It is acknowledged that the local highway network within the Naas Road study area is likely to undergo change resulting from the considerable redevelopment proposed. Following the existing strategy review, three new link roads have been proposed in the current SDCC Development Plan (see Figure 5.8) to help improve accessibility through the site, these are located between:

- Oak Road and Robinhood Road;
- R134 Nangor Road and Chestnut Road; and
- R110 Long Mile Road and Ballymount Avenue.

Of these potential interventions, the new link road between Oak Road and Robinhood Road has been retained within the list of options for further consideration. Additionally, the link has been considered as a non-motorised user (NMU) only link, a bus and NMU link or an all mode highway link. This proposed link provides the opportunity to tie into the proposed new Luas Red Line stop or the cycle superhighway, which would promote public transport or active travel within the site.

The two remaining proposed roads have not been retained in the list of options, as it has been assumed that as part of the wider transformational redevelopment of the study area the local highway network will be reconsidered for further links. It is recommended that as part of the GDA strategy work, potential highway changes are considered across the study area.

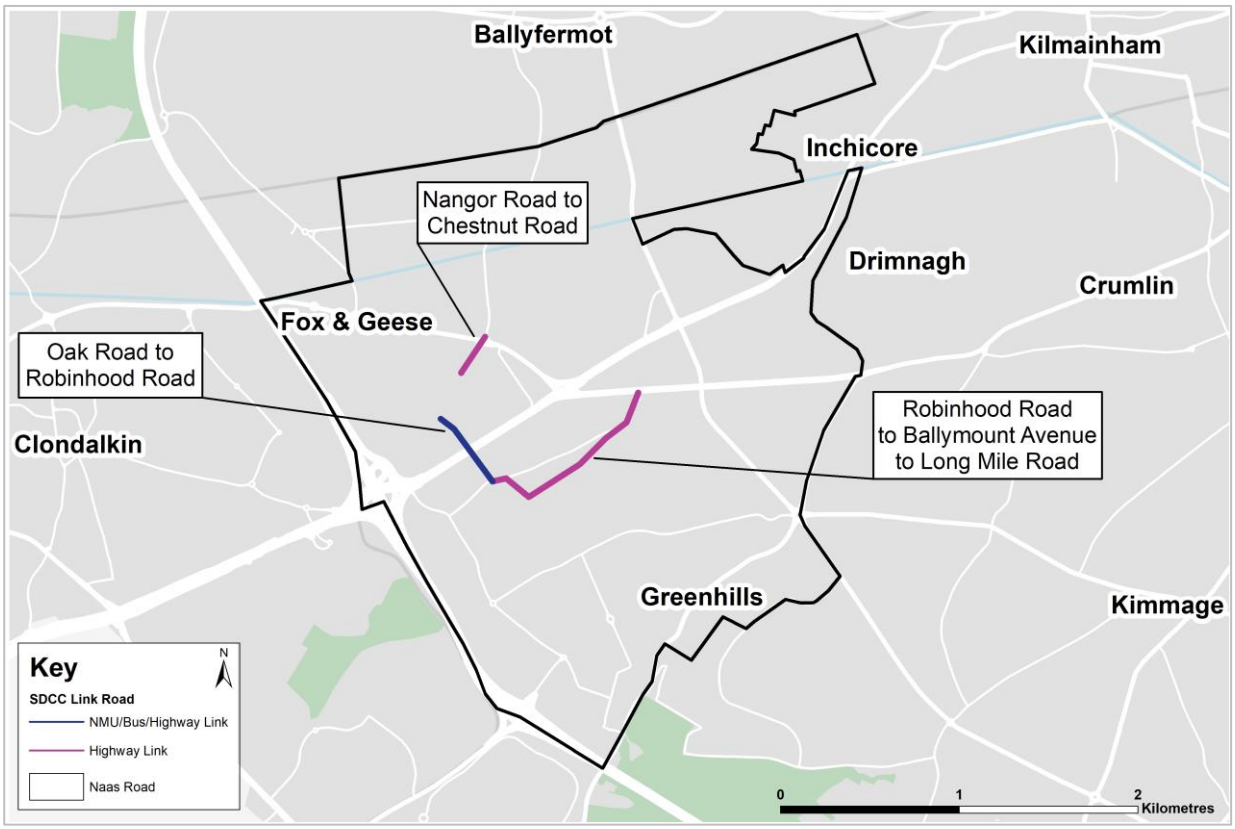


Figure 5.8: Proposed SDCC Development Plan highway links

Other highway interventions such as modal filters/bus gates and bus priority are recommended to help mitigate the issue of junctions approaching capacity in 2042. For example, giving bus priority at signalised junctions or limiting certain routes to buses only will help improve public transport journey times, promote mode shift to public transport modes and therefore reduce capacity issues within the study area. It is recommended that these options be taken forward for further consideration as part of the GDA strategy work but are not considered as part of the MCA within this report.

5.3.9 Demand Management

In order to further encourage travel by sustainable travel options, in line with GDA policies and targets, demand management measures could be implemented (alongside improved public transport services and active travel infrastructure) to make car travel less attractive. Several measures have been identified from existing strategies as having the potential to encourage significant mode shift to public transport and active travel, including more area-based measures, such as workplace parking levies (WPL), to GDA-wide measures such as congestion charging or M50 tolling. Car journey times, particularly for shorter trips have been shown to be quicker than public transport in the 2042 ERM model run, therefore methods to discourage unnecessary travel by private car are likely necessary to achieve substantial mode shift to sustainable transport options.

The implementation of tolling on the M50 could aid in deterring short-hop (junction-hopping) trips on the strategic network and therefore reduce congestion. If delivered in combination with public transport enhancements, tolling may also provide the opportunity to make travel via public transport more attractive. However, it should be noted that the M50 tolling may cause car trips to route through local areas instead, which could impact the study area.

The introduction of a Workplace Parking Levy or congestion charging aim to reduce the number of car trips into and through the study area, which if delivered in combination with improvements to public transport and active travel provision, could encourage travel by sustainable modes, reduce congestion and improve capacity constraints at junctions.

Complementary demand management options will need further consideration on an area-wide basis as part of the GDA strategy work, as well as testing within the ERM model. Therefore, these proposals have not been considered further as part of the MCA.

5.4 Options taken forward for further consideration

Following the above justification analysis, the options taken forward for further MCA consideration through are summarised in Table 5.4.

Table 5.4: Options taken forward for further consideration

Reference	Type of Option	Location/Description
Based on Existing Strategy or Proposal		
1	Rail	DART+
2	Rail	New Kylemore station (assumes DART+ in place)
4	Luas	Luas Red line enhancements (e.g. increase frequency, capacity)
5	Luas	Luas Red line new stop (R110 Naas Road/R134 Nangor Road)
6	Luas	Lucan Luas line
7a	Public Transport	Orbital PT corridor (conventional bus)
7b	Public Transport	Orbital PT corridor (bus with priority measures)
7c	Public Transport	Orbital PT corridor (LRT)
11a	Highway	SDCC Dev Plan link road: Oak Road to Robinhood Road (road)
New Proposals		
11b	Active	SDCC Dev Plan link road: Oak Road to Robinhood Road (NMU link)
11c	Bus/Active	SDCC Dev Plan link road: Oak Road to Robinhood Road (Bus/NMU)
13	Luas	Multi-storey P&R at Red Cow (assumes Luas Red line enhancements)
14	Active	Primary Cycle Route (into the city centre)
15	Active	Primary Cycle Route (NE to SW)
20	Bus	Improvement of bus links North-South through study area (Ballyfermot to Walkinstown) (pre-Orbital PT corridor)
21	Bus	Orbital bus route A (Ballyfermot - Greenhills via Walkinstown)
22	Bus	Orbital bus route B (Ballyfermot - Greenhills - Kilnamanagh, assumes bus/NMU link)

6. Option Assessment

6.1 Methodology

The approach to the assessment of options is guided by the 'Guidelines on a Common Appraisal Framework (CAF) for Transport Project and Programmes October 2020' (Department of Transport). This requires all schemes to be appraised under the general themes of:

- Economy;
- Environment;
- Safety;
- Integration; and
- Accessibility / Social Inclusion.

Given the early nature of this study, a largely qualitative Multi Criteria Analysis (MCA) was considered to be an appropriate tool to guide the assessment of options. The MCA undertaken is a high-level assessment based on professional judgement.

Building on the key themes of the CAF, a set of criteria which sit within these overarching themes have been developed to enable a more detailed assessment of options to be undertaken. These criteria have been based on the GDA Transport Strategy objectives provided by the NTA (and presented in section 2.2), as outlined in Table 6.1.

Table 6.1: Assessment criteria

Theme	Criteria	Description
Environment	Decarbonisation	Supporting the decarbonisation of transport by encouraging mode shift away from private car.
	Environmental Impact	Provides positive impact on the local built and natural environment e.g. landscape, air quality etc.
Economy	Sustainable growth	Support sustainable development and facilitate growth to 2040 by providing capacity aligned with demand.
	Journey Times	Improves time it takes to undertake similar end to end journey.
	Value for Money	Potentially provides good value for money.
	Resilience	Provide resilience for the future (beyond 2040).
Integration	Integration	Provides integration with the existing and future proposed transport network.
Accessibility and Inclusion	Accessibility and Inclusion	Improves accessibility to public transport services and enhances inclusion, catering for the needs of all members of society.
Safety	Road Safety	Improves road safety.
Health	Physical Activity	Increases physical activity.

The options identified have been assessed relative to each other against the aforementioned criteria using the rating scale outlined in Table 6.2.

Table 6.2: Rating scale

Colour	Definition
	The option has significant advantages over other options
	The option has some advantages over other options
	The option is comparable to others
	The option has some disadvantages over other options
	The option has significant disadvantages over other options

6.2 Assessment of individual options

Options have been grouped initially by mode and later by trip movement (e.g. radial, orbital) and assessed against each other using the framework outlined in section 6.1.

6.2.1 Rail

Table 6.3: Assessment of rail options

Theme	Criteria	DART+	DART+ and New Kylemore Station
Environment	Decarbonisation		
	Environmental Impact		
Economy	Sustainable growth		
	Journey Times		
	Value for Money		
	Resilience		
Integration	Integration		
Accessibility + Inclusion	Accessibility + Inclusion		
Safety	Road Safety		
Health	Physical Activity		

It should be noted that the new Kylemore station option has not been considered without DART+ in place, as without the capacity and frequency uplift resulting from the DART+ programme, the existing services would likely be over capacity by 2042, particularly in the peaks. In particular, passengers from the Naas Road area would struggle to access services, diminishing the opportunities for delivering sustainable development in the Naas Road study area.

Both options would deliver increased benefits in terms of journey time improvements, decarbonisation and capacity uplift in order to facilitate additional trips. Whilst DART+ is critical to provide the capacity needed to accommodate the demand in 2042, the addition of Kylemore station improves integration with existing and future transport proposals, as well as accessibility to the rail services for the forecast demand and supporting the proposed sustainable growth within the Naas Road study area to 2040 and beyond.

Dart+ with the new Kylemore station is proposed for consideration as part of the combined option analysis in section 6.3.

6.2.2 Luas

Table 6.4: Assessment of Luas options

Theme	Criteria	Luas Red line Enhancements	Luas Red line enhancements and New Stop	Luas Red line enhancements, New Stop and Multi-storey P&R at Red Cow
Environment	Decarbonisation			
	Environmental Impact			
Economy	Sustainable growth			
	Journey Times			
	Value for Money			
	Resilience			
Integration	Integration			
Accessibility + Inclusion	Accessibility + Inclusion			
Safety	Road Safety			
Health	Physical Activity			

The Luas Red line enhancements which could include increased frequencies, longer light-rail vehicles or a combination of both, would provide additional capacity towards accommodating proposed growth within the Naas Road study area, particularly for trips heading into the city centre at peak times. Additionally, the new stop proposed would increase sustainable access to and from the study area. The new stop has not been considered without the capacity and frequency enhancements as the existing services would likely be over capacity by 2042, particularly in the peaks, and facilitating better access to an overcrowded service may make it less attractive to those travelling from the Naas Road study area.

The Luas Red line enhancements would deliver increased benefits in terms of journey time improvements, decarbonisation and provide additional capacity in order to facilitate future trips. The inclusion of the new stop within the study area would facilitate sustainable growth, however an additional stop on the route may have a slight impact on journey times, with a small delay due to boarding and alighting passengers. The possible option to increase the capacity of the existing Red Cow Park & Ride would support additional mode shift to public transport, particularly for trips originating outside the Naas Road study area and removing car journeys from inside the M50.

When compared against each other, the Red line enhancements and new stop option and the Red line enhancements, new stop and multi-storey car park option score similarly, therefore these options are proposed for consideration as part of the combined option analysis in section 6.3.

A new Lucan Luas line, whilst linking to the north of the Naas Road study area, serves different demand and therefore has not be compared against the Red line options. The service would provide additional public transport capacity on the wider corridor and contribute to accommodating proposed growth by the likely abstraction of existing public transport trips to the Lucan Luas prior to reaching the Naas Road study area. Therefore the Lucan Luas line option has been proposed for consideration as part of the combined option analysis in section 6.3.

6.2.3 Active travel

Table 6.5: Assessment of active travel options

Theme	Criteria	Primary cycle route (into the city centre)	Primary cycle route (NE to SW)
Environment	Decarbonisation		
	Environmental Impact		
Economy	Sustainable growth		
	Journey Times		
	Value for Money		
	Resilience		
Integration	Integration		
Accessibility + Inclusion	Accessibility + Inclusion		
Safety	Road Safety		
Health	Physical Activity		

When compared against each other, the primary cycle route between the M50 and the city centre has substantial advantages over the north-east to south-west option, as it would deliver access for key demand movements and also provide infrastructure to enable safer and more direct cycling journeys. This in turn could encourage those travelling by car (over 50% from the Naas Road study area travel less than 6km in 2042) to shift to an active mode as the distance is short enough to cycle.

Therefore, the primary cycle route to the city centre has been proposed for consideration as part of the combined option analysis, as well as recommended to be taken forward for further consideration as part of the GDA strategy work.

The NE-SW primary cycle route provides the ability to make a movement which is currently difficult to undertake. It has not been taken through for consideration as part of the combined radial option analysis, however it is recommended to be taken forward for further consideration as part of the GDA strategy work.

6.2.4 Orbital connectivity

In addition to supplementary bus measures identified to be taken forwards as part of further consideration within the GDA strategy, outside of this MCA assessment, an orbital public transport corridor has been considered with different technologies to provide variable levels of intervention and service. A broad corridor alignment has only been considered within the Naas Road study area; therefore, it is recommended the corridor is considered further as part of the GDA strategy work and tested within the ERM model.

Table 6.6: Assessment of orbital connectivity options

Theme	Criteria	Orbital PT corridor (conventional bus)	Orbital PT corridor (bus with priority measures)	Orbital PT corridor (LRT)
Environment	Decarbonisation			
	Environmental Impact			
Economy	Sustainable growth			
	Journey Times			
	Value for Money			
	Resilience			
Integration	Integration			
Accessibility + Inclusion	Accessibility + Inclusion			
Safety	Road Safety			
Health	Physical Activity			

When compared against each other, the conventional bus is scoring slightly higher than other technologies/levels of service due to value for money and ability to integrate with existing infrastructure and services. Additionally, the demand for an orbital corridor at 2042 suggests a conventional bus would be more than sufficient at this stage.

However, it is recognised that the Naas Road study area is proposed for further development post 2040 and therefore there is the potential to phase the level of orbital services dependent on growing demand – including bus priority measures when required to increase the attractiveness of bus. The public transport corridor has not been taken through for consideration as part of the combined option analysis, however it is recommended to be taken forward for further consideration as part of the GDA strategy work.

6.2.5 Internal connectivity – SDCC Dev Plan link road

Theme	Criteria	Road	Bus/NMU	NMU only
Environment	Decarbonisation			
	Environmental Impact			
Economy	Sustainable growth			
	Journey Times			
	Value for Money			
	Resilience			
Integration	Integration			
Accessibility + Inclusion	Accessibility + Inclusion			
Safety	Road Safety			
Health	Physical Activity			

When compared against each other, the proposed link scores better when considered as a non-motorised user (NMU) link, as it delivers improved connectivity across Naas Road and the Luas Red line, encouraging active travel via a segregated route. However, it is noted that if internal orbital bus connectivity is to be improved, a bus/NMU link may be beneficial to the area. Therefore both the NMU only and Bus/NMU link are recommended to be taken forward for consideration as part of the wider GDA study, particularly if they link in with a proposed new Luas Red line stop.

6.2.6 Internal connectivity - bus

Theme	Criteria	**Improvement of bus links North-South** (Ballyfermot to Walkinstown - pre-Orbital PT corridor)	**Bus route A** (Ballyfermot - Greenhills via Walkinstown)	**Bus route B** (Ballyfermot - Greenhills – Kilnamanagh)	**Combined bus routes (N-S bus links, A+ B)**
Environment	Decarbonisation				
	Environmental Impact				
Economy	Sustainable growth				
	Journey Times				
	Value for Money				
	Resilience				
Integration	Integration				
Accessibility + Inclusion	Accessibility + Inclusion				
Safety	Road Safety				
Health	Physical Activity				

When compared against each other, the combined option of all three bus routes scores better, as it provides more coverage than an individual route. Greenhills, in particular when undertaking the baseline assessment, was

identified as an area with limited accessibility by bus, which would have implications for public transport access as the proposed development growth is delivered. Potential links with a new Luas Red line stop and/or a new Kylemore station would also improve integration with public transport services, which both routes A and B provide.

It is recommended that the combined bus route option is considered further as part of the wider GDA strategy.

6.3 Assessment of combined options

6.3.1 Demand for public transport radial movements

Section 4.3 provides an indicative level of demand using outputs from the transport model for the radial movements travelling through the Naas Road study area into the city centre. The 2042 analysis shows there are currently around 5,800 public transport trips crossing the M50 screenline and 4,250 public trips crossing the Kylemore Road screenline, increasing to 6,800 and 4,750 respectively if a car mode shift of 25% can be achieved. It is unlikely that an individual option alone would have sufficient capacity to accommodate demand on the radial movements in 2042, the further capacity required for mode shift, as well as in the longer term as a result of the transformational change and growth proposed beyond 2042.

Therefore combinations of the interventions from section 6.2 have been assessed to begin to understand which options may be required to accommodate the future demand for radial movements. In addition, the combined interventions look to improve sustainability, increase accessibility and integrate with opportunities for active travel. Therefore, combinations which have been considered for the radial movements and are outlined in Table 6.7.

Table 6.7: Radial combined options

Option	Combined option reference			
	30	31	32	33
DART+/Kylemore Station	✓	✓	✓	✓
Luas Red line enhancements + new stop	✓		✓	
Luas Red line enhancements + new stop + Red Cow P&R				✓
Lucan Luas line		✓	✓	✓
Primary Cycle Route (to city centre)			✓	✓

6.3.2 Assessment of radial combinations

Theme	Criteria	Combined option reference			
		30	31	32	33
Environment	Decarbonisation				
	Environmental Impact				
Economy	Sustainable growth				
	Journey Times				
	Value for Money				
	Resilience				
Integration	Integration				
Accessibility + Inclusion	Accessibility + Inclusion				
Safety	Road Safety				
Health	Physical Activity				

Whilst the DART+, Red line Luas improvements and new Lucan Luas line increase the public transport capacity into the city centre; Kylemore station, the new Red line Luas stop and the Red Cow P&R improvements improve accessibility and integration with the wider transport network. From the MCA assessment, both the combination that includes all six interventions (33) and the combination that includes all interventions but the Red Cow P&R expansion (32) score highest.

Using the modelling outputs, mode shift analysis and assumptions on public transport capacity, it is considered the demand in 2042 can be accommodated with DART+ and Luas Red line improvements (reference 30), however capacity from the Lucan Luas line could also support a mode shift away from car. It would be expected that as travel demand increases beyond 2042, the Lucan Luas line would play a role in supporting that demand and is likely to be required further into the future.

Further analysis will be required, including assessing the options within the ERM transport model, to provide a more robust conclusion. For example, further understanding of the potential abstraction of existing public transport trips to the Lucan Luas prior to reaching the Naas Road study area, in order to quantify the remaining capacity, if any, that could accommodate peak hour demand into the city centre.

6.3.3 Other opportunities

In addition to the combinations to accommodate the radial demand, other combinations of individual options from section 6.2 could provide opportunities for an attractive and holistic public transport network, connectivity with active travel infrastructure and create interchanges for simple transition between modes.
It would be envisaged that Kylemore station would become a key public transport interchange connecting DART+, the Lucan Luas line, BusConnects services and the NE-SW primary cycle route allowing an easy transition between different modes. In addition, the new stop on the Luas Red line could become a key public transport interchange for the Red Line Luas services, BusConnects services and the primary cycle route.

To assess these in more detail, further development of interventions within the transport model would be required to understand the multi-modal trips.

6.4 Summary

This section has outlined the multi-criteria assessment process, before presenting the results of the multi-criteria assessment on interventions by mode and journey movement. Analysis of the demand from the model indicates that more than one option needs to be taken forward to be able to serve the travel demand in 2042, with combinations of options also assessed against the MCA framework. Further assessment work using the transport model will help validate which interventions are required and which interventions are a priority for delivery.

7. Summary

This report has outlined the approach and results from the study of the Naas Road area, as defined by the NTA for the purposes of providing input into the preparation of the Transport Strategy. The existing public transport network is shown to be approaching or over capacity in the peaks by 2042, in particular the radial inbound AM and outbound PM movements between the study area and Dublin city centre. Additionally, the study area is reliant on the existing road network, particularly for short car journeys, which is forecast to operate with a moderate level of congestion in 2042.

These issues, alongside the study area's proposed transformational change to an urban/district centre, provide opportunities to shift car trips to public transport and active modes through the provision of enhanced or additional, high-quality infrastructure and services. From the demand analysis, a key radial corridor of trips continues to along the existing east-west N7 and public transport corridor travelling through the study area, from Clondalkin/Lucan to the city centre.

7.1 Public transport options

Given the early nature of this study, a qualitative multi-criteria analysis (MCA) was considered to be an appropriate tool to guide the assessment of public transport options. Building on the key themes of the CAF, a set of criteria which sit within these overarching themes has been developed to enable a more detailed assessment of options to be undertaken. These criteria have been based on the GDA Transport Strategy objectives provided by the NTA.

7.1.1 Combined radial options

Following the development of a long list of public transport options for the radial corridor, a high level sift was undertaken taking cognisance of forecast trips from the Eastern Regional Model against the context of the operational capacity of the options included on the long list. This consideration against demand found that it is unlikely that an individual option alone would have sufficient capacity to accommodate demand on the radial movements in 2042, the further capacity required for mode shift, as well as in the longer term as a result of the transformational change and growth proposed beyond 2042.

Therefore, a number of combinations of the interventions have been assessed to begin to understand which options may be required to accommodate the future demand for radial movements. In addition, the combined interventions look to improve sustainability, increase accessibility and integrate with opportunities for active travel.

These options are expected to provide for the forecast demand in 2042 whilst also providing resilience for potential demand beyond 2042. Whilst all the combined options are viable options to accommodate the radial trips within the study area, the options that performed best at the MCA are as follows:

- Reference 32 - DART+/Kylemore Station, Luas Red line enhancements and new stop, Lucan Luas line and primary cycle route; and
- Reference 33 - DART+/Kylemore Station, Luas Red line enhancements, new stop and Red Cow P&R expansion, Lucan Luas line and primary cycle route.

Using the modelling outputs, mode shift analysis and assumptions on public transport capacity, it is considered the demand in 2042 can be accommodated with DART+ and Luas Red line improvements (reference 30), however capacity from the Lucan Luas line could also support a mode shift away from car.

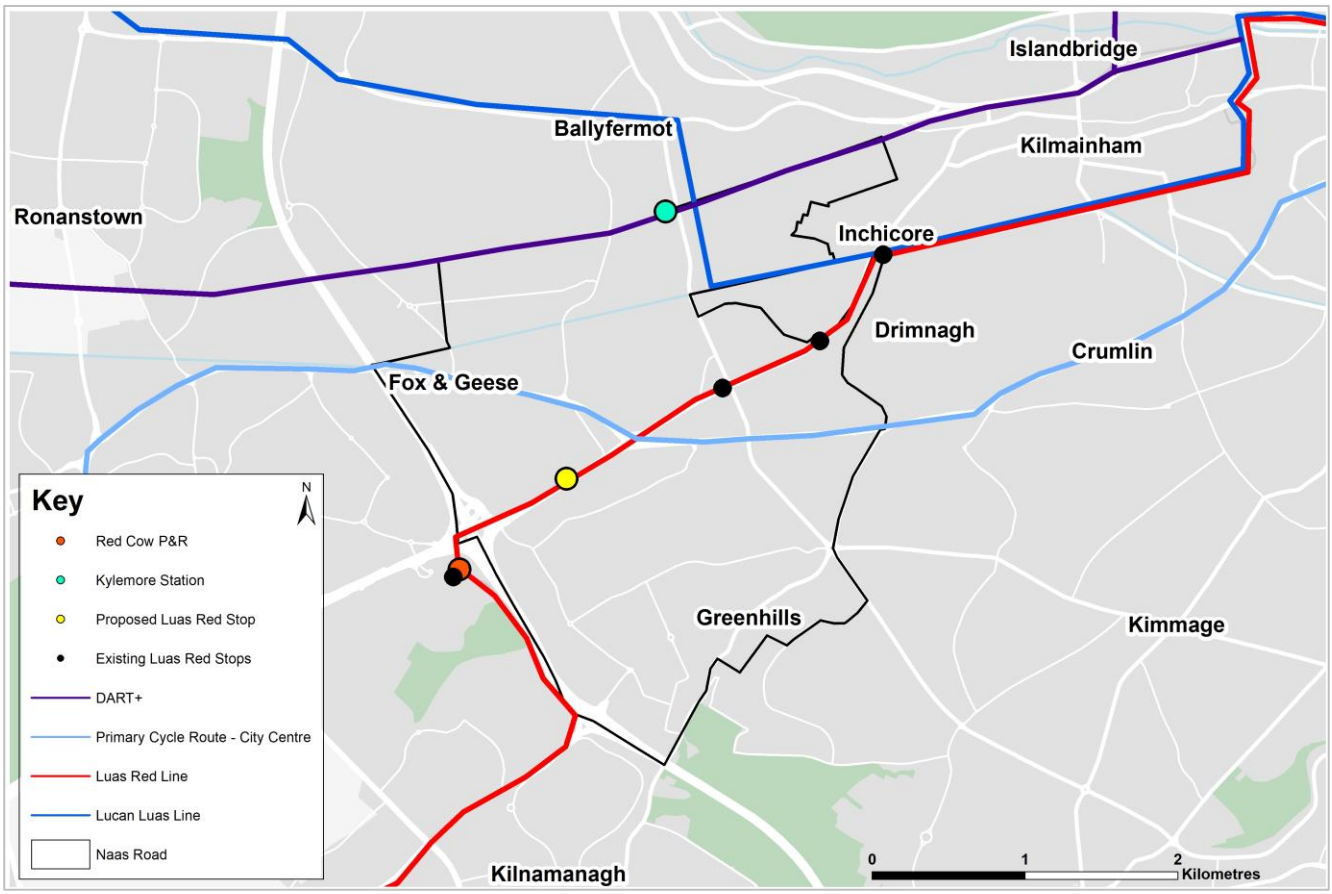


Figure 7-1: Combined radial options

7.1.2 Orbital and internal bus connectivity

Whilst the radial corridor generates the main volume of trips to and from the city centre area, it is worth noting that the ERM also generated a low to moderate level of trip distribution on the north and south orbital corridors across the study area. Therefore, given the available information does suggest some demand for orbital movements exists, a public transport corridor option is retained and suggested to be taken forward for further consideration.

The volume of trip generation is likely due to the fact that the methodology adopted in this study has only considered sectors within or in proximity to Naas Road study area; therefore, it only captures relatively short distance trips. Further analysis to assess demand for these orbital movements across a larger area is likely to be required in order to identify the type of public transport intervention which is most likely to be required to serve wider orbital demand.

The existing highway network structure within the south west of the study area currently limits permeable access through site to existing public transport services. By providing additional bus services connecting Greenhills and Ballymount within the study area to Ballyfermot and Kilnamanagh brings more of the study area within 400m of a bus service and reduces the need to interchange between different services. It is acknowledged that these supplementary bus options have been identified based on outputs from the do minimum model run, which does not contain any of the bus priority infrastructure proposed by BusConnects. Therefore, further testing is required to determine the necessity and performance of these additional services in the context of the BusConnects infrastructure. However, it is noted that these additional services cover areas that are not specifically covered by the new Dublin bus network proposals.

7.2 Supplementary options

Additionally to the public transport options, two key complementary sustainable travel options have also been taken through the MCA process, including proposals for two cycle superhighways and an additional access across the R110 Naas Road (as a NMU or bus/NMU link) connecting to a proposed Luas Red line new stop.

Alongside the public transport options that have been taken through the MCA process, a number of other supplementary options have been identified. These consist smaller scale sustainable transport interventions to enhance connectivity and improve public transport journey times within the study area, these include:

- BusConnects infrastructure;
- Bus priority at signals and improvement connectivity of dedicated bus lanes;
- Extended or new car parking facilities at existing railway stations on Kildare line (assuming Dart+ is in place);
- Cycle facility improvements – parking at public transport interchanges, local network connectivity to existing and proposed infrastructure ;
- Additional pedestrian and cycling crossing points on R110/R810 Naas Road and R110 Long Mile Road;
- Provision for e-bikes and e-scooters; and
- Additional active travel crossing point over Grand Canal.

Alongside the public transport and active travel interventions, demand management proposals have been identified for further consideration at a GDA strategy wide level, particularly if delivered to encourage mode shift targets. These proposals include tolling of the M50, use of modal filters or traffic cells and travel demand management measures (such as congestion charging or workplace parking levies).

These options are recommended to be taken forward for further consideration as part of the GDA strategy work but are not considered as part of the MCA within this report.

Appendix A. Do Minimum Model Run Transport Scheme

A.1 Road Schemes

The Do Minimum model run contains the following road schemes:

- N3 Castaheany Interchange Upgrade;
- N3-N4 Barnhill to Leixlip Interchange;
- North-South Road – west of Adamstown SDZ linking the N7 to N4 and on to Fingal;
- Glenamuck District Distributor Road;
- Leopardstown Link Road Phase 2;
- Porterstown Distributor Link Road;
- R126 Donabate Relief Road: R132 to Portrane Demesne;
- Oldtown-Mooretown Western Distributor Link Road;
- Swords relief Road at Lord Mayors;
- Poolbeg development roads;
- Cherrywood development roads;
- Widening of the M7 between Junction 9 (Naas Norther) and Junction 11 (M7/M9) to provide an additional lane in each direction; and
- Capacity enhancement and reconfiguration of the M11/N11 from Junction 4 (M50) to Junction 14 (Ashford) inclusive of ancillary and associated road schemes, to provide additional lanes and upgraded junctions, plus service roads and linkages to cater for local traffic movements.

A.2 Bus schemes

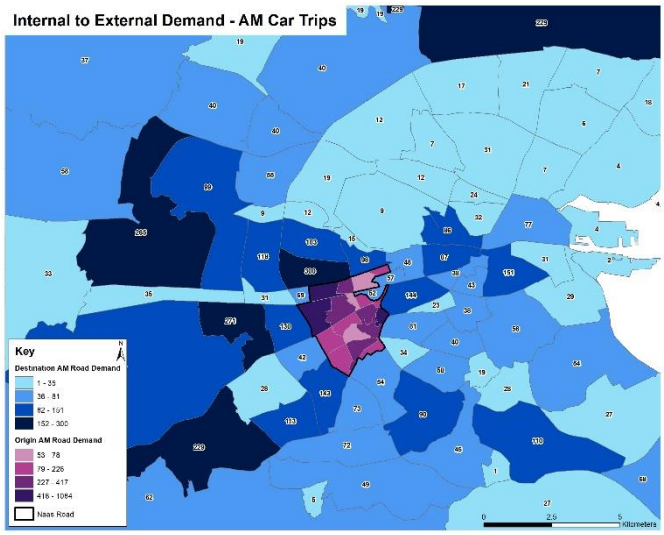
The Do Minimum model runs contains the bus services and frequencies related to the New Dublin Area Bus Network. The model does not include any of the of the associated BusConnects bus priority infrastructure proposals which would improve journey times.

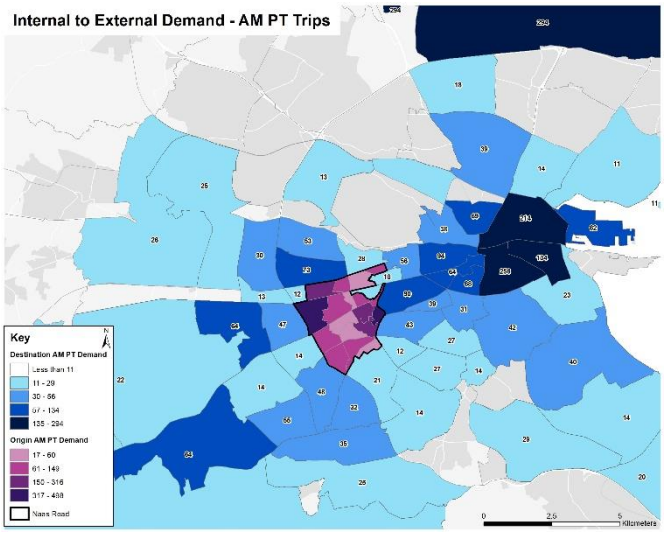
A.3 Rail schemes

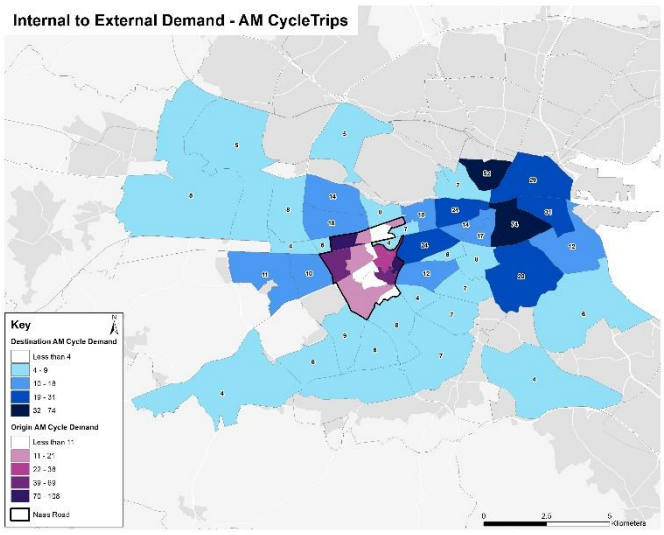
The Do Minimum model runs contains the following rail schemes:

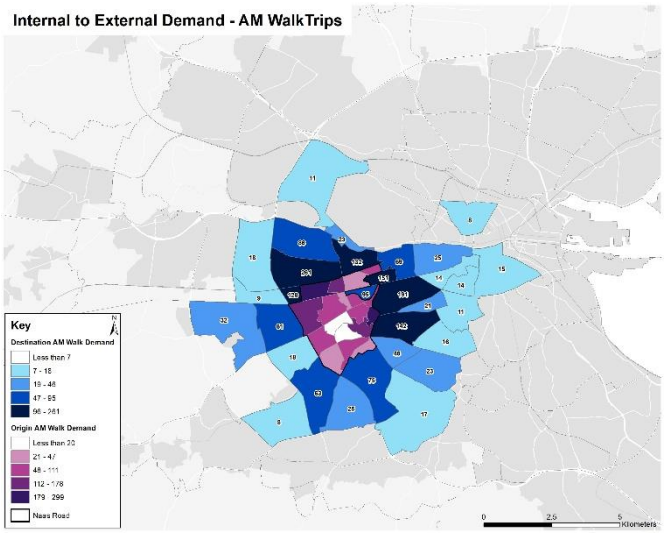
- Revised Irish Rail timetable;
- Interim DART Expansion Programme (non-tunnel elements) including additional stations at Kishogue and Pelletstown; and
- Luas Cross City incorporating LUAS Green Line Capacity Enhancement - Phase 1.

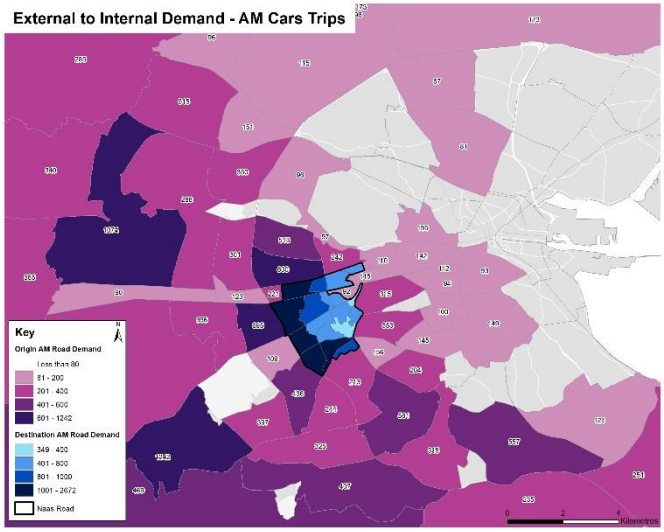
Appendix B. Mode Split Demand Maps

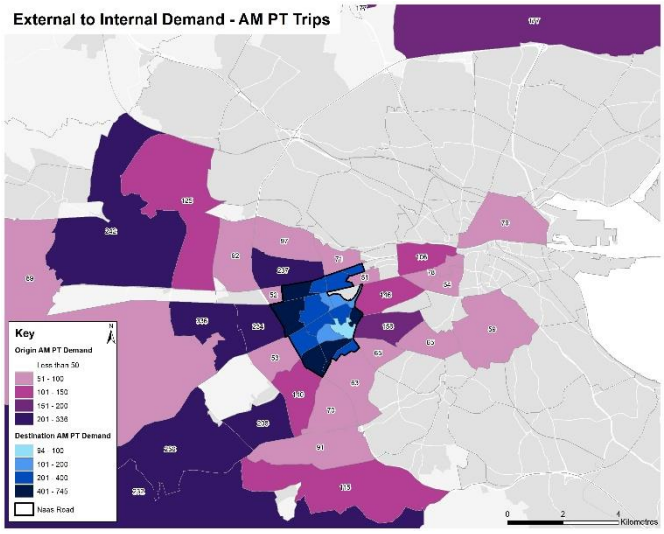


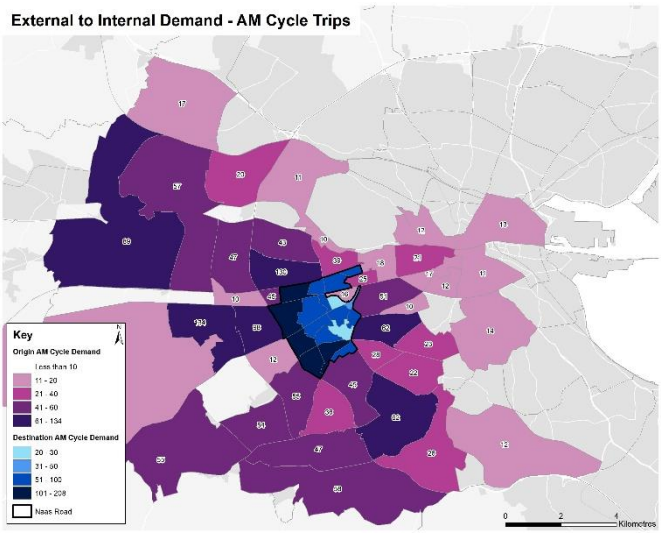


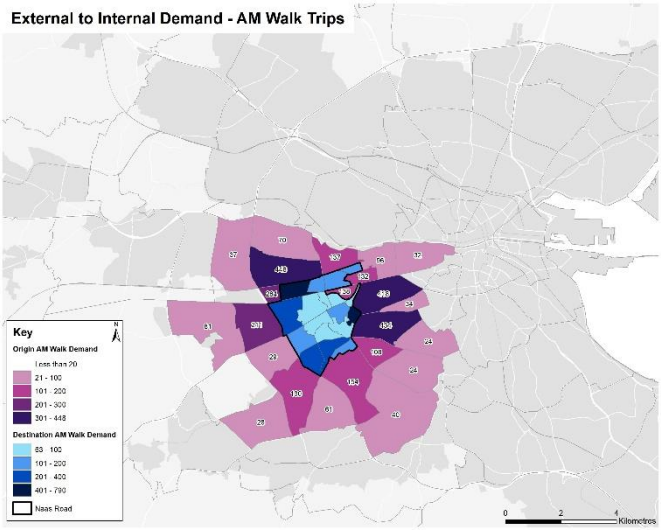


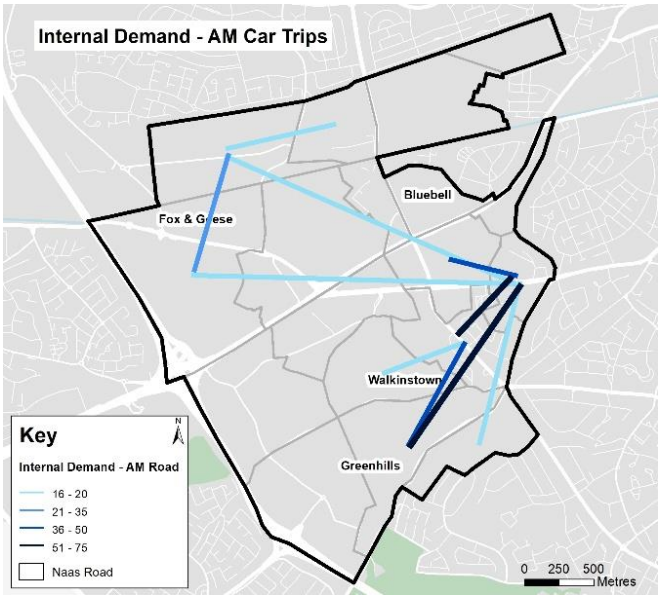

Internal to External Demand - AM WalkTrips
Key
Destination AM Walk Demand
Less than 7
7 - 18
19 - 46
47 - 95
96 - 261
Origin AM Walk Demand
Less than 20
21 - 47
48 - 111
112 - 178
179 - 299
Naas Road
0
2.5
5
Kilometers

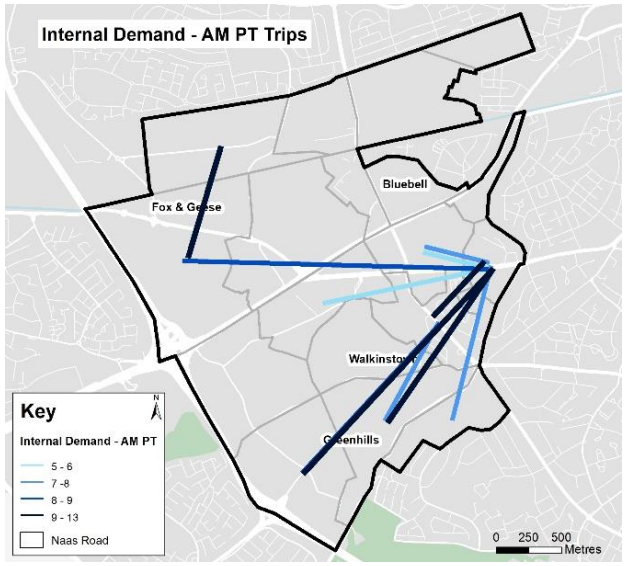

External to Internal Demand - AM Cars Trips
Key
Origin AM Road Demand
Less than 80
81 - 200
201 - 400
401 - 800
801 - 1242
Destination AM Road Demand
349 - 400
401 - 800
801 - 1000
1001 - 2672
Naas Road
0
2
4
Kilometres

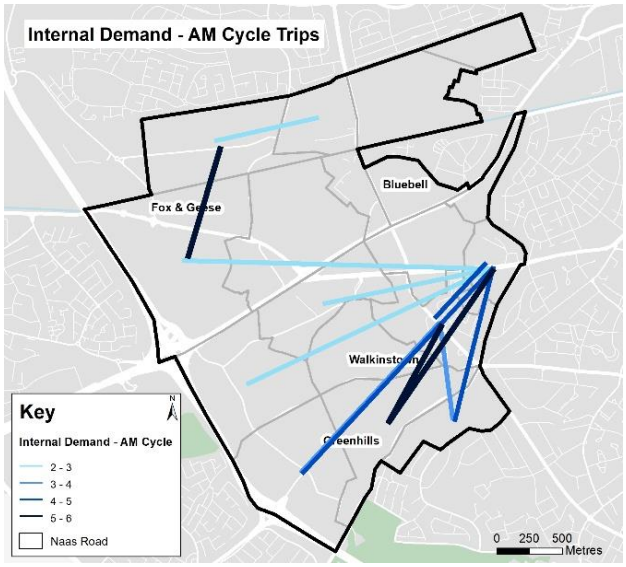

External to Internal Demand - AM PT Trips
Key
Origin AM PT Demand
Less than 50
51 - 100
101 - 150
151 - 200
201 - 336
Destination AM PT Demand
94 - 100
101 - 200
201 - 400
401 - 745
Naas Road
0
2
4
Kilometres

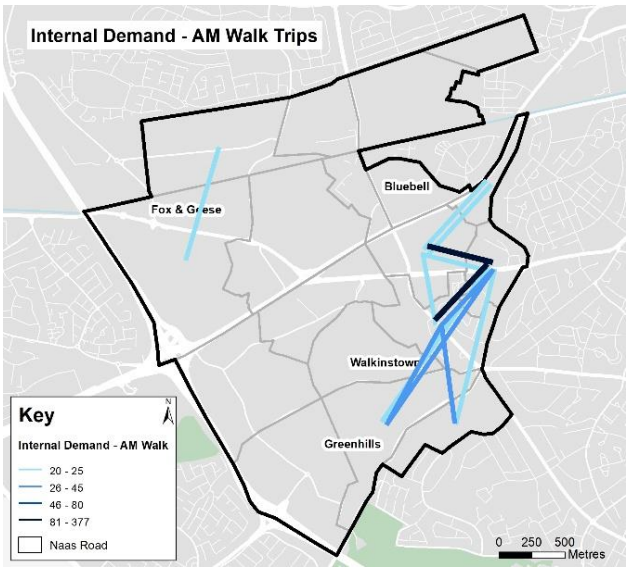

External to Internal Demand - AM Cycle Trips
Key
Origin AM Cycle Demand
Less than 10
11 - 20
21 - 40
41 - 60
61 - 134
Destination AM Cycle Demand
20 30
31 90
91 100
101 - 208
Naas Road
0 2 4
Kilometres


External to Internal Demand - AM Walk Trips
Key
Origin AM Walk Demand
Less than 20
21 - 100
101 - 200
201 - 300
301 - 448
Destination AM Walk Demand
63 100
101 - 200
201 - 400
401 - 790
Naas Road
0 2 4
Kilometres


Internal Demand - AM Car Trips
Bluebell
Fox & Geese
Walkinstown
Greenhills
Key
Internal Demand - AM Road
16 - 20
21 - 35
36 - 50
51 - 75
Naas Road
0 250 500
Metres


Internal Demand - AM PT Trips
Bluebell
Fox & Geese
Walkinstown
Greenhills
Key
Internal Demand - AM PT
5 - 6
7 -8
8 - 9
9 - 13
Naas Road
0 250 500
Metres


Internal Demand - AM Cycle Trips
Bluebell
Fox & Geese
Walkinstown
Greenhills
Key
Internal Demand - AM Cycle
2 - 3
3 - 4
4 - 5
5 - 6
Naas Road
0 250 500
Metres

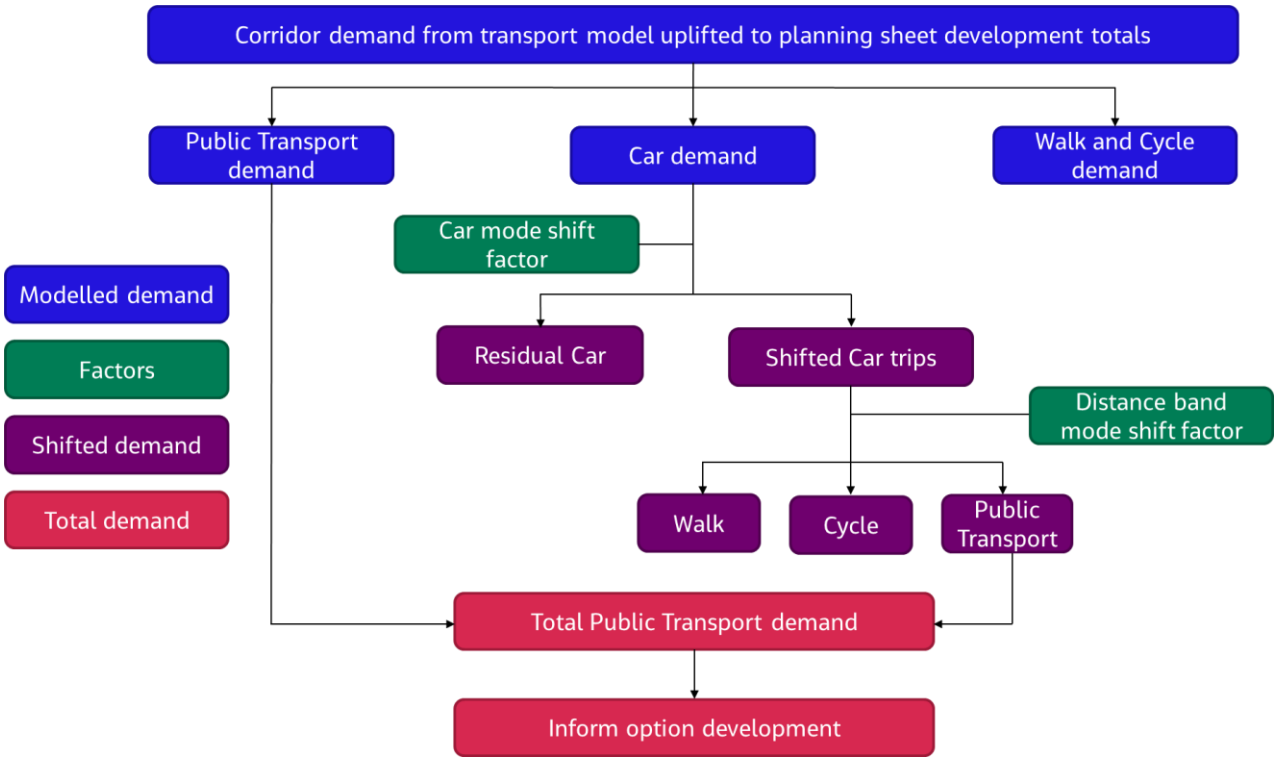

Internal Demand - AM Walk Trips
Bluebell
Fox & Geese
Walkinstown
Greenhills
Key
Internal Demand - AM Walk
20 - 25
26 - 45
46 - 80
81 - 377
Naas Road
0 250 500
Metres

Appendix C. Mode shift analysis methodology

This technical note explains the mode shift calculation used to inform the option development process for each area being considered as part of the Greater Dublin Area Transport Studies. The mode shift calculation is based on the Eastern Regional Model (ERM) and the planning sheets provided by the NTA with the results providing an indicative number of additional public transport trips which need to be catered for if a mode shift away from car is achieved.

This method produces an indicative set of results which provides the order of magnitude of changes in demand which is considered sufficient to inform option development at this early stage. It is noted that the results are affected by the underlying assumptions of the planning sheet and ERM i.e. demand is assigned to a constrained network and that no model run has been undertaken to identify mode shift.

This exercise has been undertaken for the AM period only when there is the largest car demand in the ERM. The flow chart below shows the overall process underpinning the mode shift calculation.



First a corridor is identified (e.g. outside the M50 into the city centre) and the transport demand using the corridor is obtained from the ERM, disaggregated by mode – public transport, car and walk and cycle.

A factor is then applied to the car demand to create the mode shift away from car to one of the other modes. Two factors for mode shift have been applied in this study: 25% of car trips shift and 50% of car trips shift. This aims to provide a broad order of magnitude of demand to inform option development and assessment.

The shifted car trips are then allocated to become either a new walking, cycling or public transport trip. This decision is based on the trip lengths of the shifted car trips as it is assumed that shorter trips are more likely to become walking trips and longer trips are more likely to become public transport trips. The trip length distributions for each mode are obtained from the ERM.

Three bands were defined:

- A lower band bounded a distance which 75% of walking trips in the ERM are shorter than or equal to;
- A middle band bounded by a distance which 75% of cycling trips in the ERM are shorter than or equal to; and
- An upper band for any trips with a longer distance.

For the Naas Road study area, the following bands and mode shares by distance are obtained from the ERM:

Distance band (km)	Walk	Cycle	Public transport
0-2.6	71%	4%	25%
2.6-7.1	19%	9%	72%
7.1+	1%	6%	94%

In the lower band of trips less than 2.6km, 72% of the trips in the ERM are walking trips, but there are still 4% of trips which are cycle trips and 25% of trips which are public transport trips.

The proportion of trips in each band made by walk, cycle and public transport were derived from the ERM, and applied to the shifted car trips. This gives a number for the shifted public transport trips which can be added to the public transport trips from the ERM to provide a total public transport demand for the corridor. This number can then be used to inform the development of options to support the estimated demand along the corridor.