



Transportation Study at Dunboyne & Environs

Meath County Council

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Quality information

Prepared by

John Humphreys
Shane Dunny

Checked by

Philip Shiels

Approved by

Shane Dunny

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Prepared for:

Meath County Council

Prepared by:

AECOM Ireland Limited
4th Floor
Adelphi Plaza
Georges Street Upper
Co. Dublin
Ireland

T: +353 1 238 3100
aecom.com

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Strategy Overview

This Transport Strategy seeks to ensure that Dunboyne & Environs will develop as a sustainable community with strong links to the town centre and Dublin City. The Strategy sets out a package of measures for all modes to deliver on this objective. Dunboyne's location alongside the rail and the National Road network provides Dunboyne with an enviable position in terms of accessibility and connectivity. The provision of high quality transport infrastructure and services is an essential component in the functioning of urban and rural areas, and in the delivery of sustainable and accessible development. For a sustainable community to develop strong planning policies and delivery on transport infrastructure and services will be required early in the development of the area.



20.2km

20.2km of new dedicated pedestrian/cyclist paths, the majority delivered as fully segregated routes for both commuting and leisure purposes.



2.7km

2.7km extension to existing bus routes, to expand the bus catchment area and encourage PT usage.



98%

Public transport catchment (bus & rail) improves significantly from serving only 25% of the population to 60% whilst the percentage of jobs within the PT catchment increases from 53% to 98%. The proposed PT routes also serve the majority of the proposed zoned lands in the area.



131%

The Strategy delivers a 131% increase in the number of residents within the Dunboyne rail station catchment through investment in pedestrian/cycle infrastructure and by breaking down connectivity barriers.



25%

A 25% increase in the mode share for active/PT trips to/from Dunboyne through investment in the PT network and improved connectivity to stations/stops.



3,500

The Strategy identifies a transport plan to allow the delivery of 3,500 residential units to provide much needed housing for the Greater Dublin Area.



3,000

Provides transport to assist in the creation of nearly 3,000 jobs to encourage a live/work sustainable lifestyle for existing and future residents of Dunboyne.



9

9 walls or fences removed to enable cyclist/pedestrian movement, improve communities and encourage sustainable travel behaviours.



4

4 new dedicated pedestrian/cyclist bridges, to improve connections and break down active mode barriers.



-4

Removal of 4 roundabouts to be replaced with signalled junctions with high quality pedestrian and cyclist facilities to improve accessibility and safety for all modes.



All heavy goods vehicles and significant volumes of vehicles removed from the town centre to allow for urban renewal and continued economic growth.



44 km

Introduction of a new 44km bus service between Navan and Blanchardstown to serve the significant existing and future demand along the corridor.

The background is a solid blue color. Two thin white lines cross each other. One line starts from the bottom left and goes towards the top right. The other line starts from the middle left and goes towards the top right, crossing the first line.

Introduction

01

1. Introduction

1.1 Overview

AECOM has been commissioned by Meath County Council to complete a transport strategy for the Dunboyne area. The Transport Strategy is intended to address current and future issues on the transport network and therefore represents the opportunity for a single coordinated approach to planning improvements and upgrades to the transport network and will form a key transport policy document for Meath County Council. The Transport Strategy presents a comprehensive analysis of the current transport situation in Dunboyne, the effect of future development on transportation and presents potential solutions to improve conditions across the network for walking/cycling, driving and public transport services.

The provision of high quality transport infrastructure and services is an essential component in the functioning of urban and rural areas, and in the delivery of sustainable and accessible development. Transport helps facilitate journeys from home to work, to school, for leisure purposes and for access to vital services such as healthcare. Businesses are reliant upon an efficient, safe and reliable transport system in order to attract employees and customers, and to transport goods and services across the country. As well as catering for existing requirements, investment in transport (or a lack thereof) can also help unlock or be a constraint on new opportunities, both for economic development and for individual wellbeing.

Good planning practices can help identify the conditions needed to operate an efficient transport system and facilitate development growth proposals. If the process of planning is not equipped to deal with these requirements, the delivery of sustainable development could be delayed or even prevented, and this could therefore have lasting negative consequences on towns and communities.

Dunboyne and the wider Meath area is experiencing high levels of housing and employment growth which are expected to have an impact on the county's transport system in the short, medium and long term. In a post-recession economy, delivering economic growth has become one of the Irish Government's main priorities. However, this is set against a backdrop of increasing competition for funding to help invest in new infrastructure, with significantly less money available for local authorities to spend today than in the past.

The transport needs of large-scale residential and employment development coming forward within Dunboyne and surrounding areas may be reliant upon seeking vital funding from Central Government and elsewhere, and this funding may only be obtained if a good case is made for investment which is based on robust evidence, positive collaborative planning and can demonstrate compliance with national, regional and local planning policy.

A review of the current Meath County Development Plan 2013-2019 has commenced in December 2016. It is envisaged that the key actionables emerging from this study, where applicable, will be incorporated into the draft Development Plan.

1.2 Background

Dunboyne is located in south-east Meath and has a population of 7,272 people (CSO settlement, 2016) as per 2016 which was an increase of 27% on 2006. Dunboyne is strategically located in an access rich environment that it is adjacent to the M3 Motorway and is served by two rail stations. Access to the rail stations has somewhat hindered passenger demand in the past and will need to be

improved in the future to take advantage of the existing rail infrastructure and planned enhancements to the services. As a result, section 3.7.5 of the Regional Planning Guidelines, 2010-2022 state that Dunboyne *“has yet to realise its long term potential but plays an important role in this economic growth area given its status and location on a developing rail line.”*

In terms of economic growth, Dunboyne has been identified as a Secondary Economic Growth Town in the current Regional Planning Guidelines alongside Ashbourne¹. The long term population growth projection for the settlement is 25,000 by 2033. The limited employment base in Dunboyne at present is highlighted by the fact that in 2011, 85% commuted out of the town to work².

The strategic location of Dunboyne is further supported by the investment in capital infrastructure in the town over the last 10 years. This includes the construction of Phase 1 of the Dublin-Navan Rail line and associated infrastructure including 2 railway stations and a park and ride facility, and the construction of the Clonee-Kells Motorway. The completion of this infrastructure will assist in the settlement achieving its status as a Secondary Economic Growth Town in the coming years.

The attractiveness of Dunboyne as an employment location is endorsed through recent high profile announcements of significant FDI employment in the area by Facebook, Shire, and Aramark (Avoca). In particular, 400 highly skilled jobs will be created in the first phase of the Shire bio-pharma manufacturing facility over the next four years. Up to 200 jobs will be created at the Facebook Data Centre in Portan, Clonee. This is in addition to the 1,300 jobs created during the construction phase. Aramark (Avoca) has recently opened its largest retail facility in Ireland in Dunboyne which has resulted in the creation of 80 jobs. There has also been significant development at Bracetown Business Park.

The Meath County Development Plan 2013-2019 identified two key socio economic deficiencies i.e. the extent of outbound commuting and the lack of employment opportunities in the County. The Council embarked on an evidence based approach to addressing these issues by firstly preparing an Economic Strategy which was completed in 2014. This Strategy identified a number of existing trends within the County which impact on the economic performance of the County including:

- A narrow base of economic activities in largely traditional areas;
- A Foreign Direct Investment (FDI) deficit;
- Low penetration of knowledge-orientated activities; and
- Substantial skills leakage due to commuting trends out of the County.

Together with setting evidence-based measures aimed at accelerating the economic transformation, revitalisation and sustainable development of County Meath, the Strategy also assesses spatial planning opportunities, in the form of identified sites around the county, and the ‘fit’ of these locations in the context of achieving a re-balance of economic activity. Dunboyne is identified as one of five key settlements within the county where the advancement of strategic sites is recommended.

On 23rd May 2016, the Elected Members of Meath County Council approved variation No 3 of the Meath County Development Plan which comprised the spatial implementation element of the Strategy. On 17th June 2016, notice was received from the Office of the Minister for the Environment, Community and Local Government of a Notice of Intent to Issue a Direction relating to Variation No.3 of the Meath County Development Plan 2013-2019 as it related to lands at Dunboyne North (Pace).

On 26th August 2016, the Chief Executive of Meath County Council received correspondence from the Minister for Housing, Planning, Community and Local Government which stated as follows:

¹ Section 3.7.5 of the Regional Planning Guidelines.

² Report of the Meath Economic Development Strategy 2014

'Having carefully considered the Chief Executive's report, recommendations and submissions received relating to the draft direction on Variation No. 3 to the Meath County Development Plan 2013-2019 I have made the decision not to issue the direction to Meath County Council given:

- *The lack of new housing supply coming forward in the Dunboyne area, in particular, development on lands already zoned residential phase 1, despite considerable demand, including as a prerequisite for attracting new FDI;*
- *The objectives of the Economic Development Strategy for County Meath, including the development of Dunboyne as a "live work " community and one of 5 strategic sites for the County;*
- *The projected demographic patterns for the area as anticipated in the RPGs and need to provide adequate housing and other infrastructure to serve the potential growth;*
- *The proximity of the lands in question to transport infrastructure, including 2 railway stations;*
- *The work undertaken on a transport study (Aecom Transport Consultants) jointly by Meath County Council, Fingal County Council and Transport Infrastructure Ireland to examine the capacity and operation of M3 junctions/interchanges;*
- *The commitment from Meath County Council that the master planned "live work" community will be front loaded so that other development (including residential) will be contingent upon initial employment investment (i.e. no speculative residential development is anticipated without underpinning economic development and CE anticipates a number of imminent investment decisions); and*
- *The fact that the variation will not bring Meath County Council beyond Core Strategy numbers for residential development. '*

Following the withdrawal of the Draft Direction, an immediate need existed to put a process in action which would identify and deliver transport solutions promptly to address multi-modal movement and connectivity issues in the Dunboyne area. In early June 2016, AECOM Consulting Engineers were appointed by the Transport Directorate of Meath County Council to complete an independent transport assessment to identify whether a sustainable transport solution existed to cater for the forecast demand in a sustainable manner and to recommend measures which would facilitate the settlement fulfilling its growth potential and projected population of circa 25,000 persons if appropriate.

Separately, in October 2016 the Council established and led a steering group chaired by Mr Brian Hunt, formerly of An Bord Pleanála, comprising representatives from the Transportation Directorate and AECOM Consulting Engineers. Planning inputs from MCC's Planning Directorate were provided on an occasional basis as the need arose. Having regard to the content of the Draft Direction which pertained solely to lands at Dunboyne North, Systra Consulting Engineers (representing the major land owner in the Dunboyne North area) were invited to attend a number of meetings of the group to ensure any future masterplan for this site took account of the overall transport strategy for the Dunboyne area. The outcomes that the group were required to deliver comprised the following:

1. Prioritisation of the immediate advancement of lands where existing capacity allows;
2. Examination of remaining undeveloped zoned lands identified by Variation No 3 in the M3 corridor to assess the quantum of development, the impact of the development of these lands in terms of transport access and to ensure sustainable access can be provided;
3. Identification of network improvements where appropriate for all modes;
4. Provision of a timescale for delivery of any improvements;
5. Exploration of funding mechanisms for any improvements.

This report seeks to respond to the above items in addition to responding to the original remit to develop a transport study for the Dunboyne area.

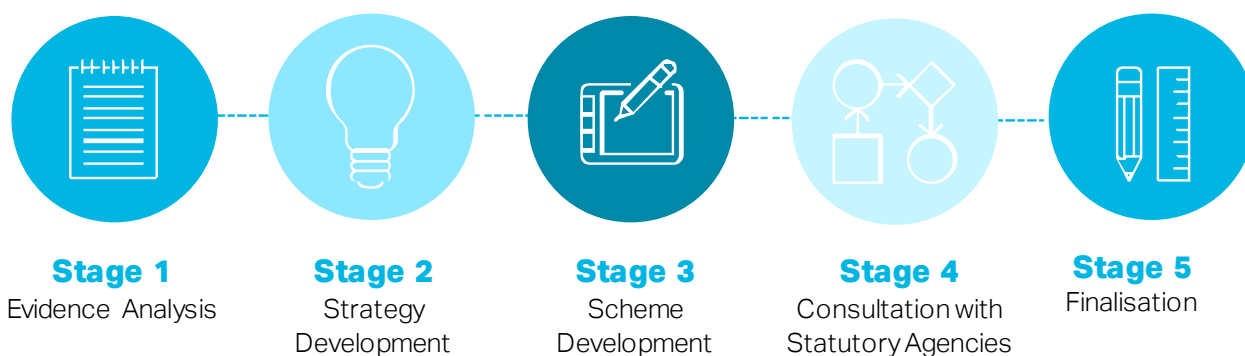
1.3 Report Structure

The report is structured into the following sections:

- **Section 2: Transport and Development Context** - This section presents a review of Dunboyne in respect to transport infrastructure, employment, travel choices, the local transport network and future development sites.
- **Section 3: Analysis Tools** - This section describes the analysis tools used to undertake the Dunboyne Transport Assessment.
- **Section 4: Non-Motorised Interventions** - This section presents a number of potential pedestrian/cyclist paths to improve accessibility to M3 Parkway, Dunboyne train station, Dublin Bus services and across Dunboyne town.
- **Section 5: Road Transport Interventions** - This section evaluates options for road transport measures in Dunboyne, amalgamates them into combined strategy and assesses their impact using the Dunboyne Local Area Model.
- **Section 6: Public Transport Interventions** - This section outlines several options to enhance public transport services in Dunboyne.
- **Section 7: Implementation** - This section presents the plan to integrate transport interventions with land-use development.
- **Section 8: Summary**

1.4 Approach

An overview of the approach taking in developing this transport strategy is provided below.



1.5 Strategy Objectives

A set of objectives for the strategy were formed based on an extensive review of the overarching policy documents for Meath along with the existing transport issues in Dunboyne and input from the Meath County Council Steering Group. The intention of the objectives is to guide the development of the strategy, including the assessment of the suitability of potential transport schemes in Dunboyne.

The final set of strategy objectives are listed and described in Table 1.1.

Table 1.1. List of Strategy Objectives

Objective	Description
<p>Improve transport connectivity and accessibility within Dunboyne</p>	<p>This is focused on making it easier to access and move around Dunboyne. It supports the regeneration of the town centre and accommodating future growth and also supports the need to ensure access for all levels of mobility within the town. Key issues to be resolved include access to the rail stations, underutilisation of rail, the lack of permeability for active modes and high car use. The Strategy needs to ensure that new growth areas in Dunboyne are well connected by all transport modes.</p>
<p>Improve accessibility to other urban centres and new growth areas outside Dunboyne</p>	<p>This is focused on improving existing transport links and providing more mode options to connect to surrounding urban centres. This would improve access to jobs for the local population both within Dunboyne and to other urban centres and enable growth. In addition, this objective seeks to ensure that developments such as those in Dunboyne North, along the R147 and Bracetown are knitted into the fabric of the town centre to ensure its continued economic success through the provision of attractive, high quality connections for all modes. Barriers identified for travel to external urban areas include a lack of frequent and reliable bus services to other towns and poor east-west connections. Internally within Dunboyne, internal linkages to rail were identified as being poor in some locations and barriers such as the rail lines and busy roads were identified along some key future desire lines.</p>
<p>Contribute to improved air quality by minimising the growth in traffic levels and congestion</p>	<p>Peak period congestion levels on some roads in the Dunboyne area such as the R147 have been identified as an issue. Therefore an important consideration of the Transport Strategy will be to ensure that the future growth of Dunboyne does not make this issue noticeably worse and that transport infrastructure for new development is designed to encourage public transport and walking/cycling travel over private vehicle trips.</p>
<p>Improve journey time reliability</p>	<p>In order to achieve generally consistent journey times and therefore reliability on the local road and transport network, the strategy should consider ways to manage demand and improve the network capacity to meet the demands of growth. Providing a reliable journey time on the network will attract more investment in the town and therefore support economic growth. All users should be considered in this objective and transport improvements should reflect a holistic strategy that considers priority for different users on the various road corridors, such as providing more priority for buses on existing inner roads, when new outer road links have been built for private car and freight traffic.</p>
<p>Make it easier and more attractive to travel by active and public transport modes</p>	<p>Supporting and working with the other objectives of the strategy, this is focussed on reducing car use and encouraging the uptake of active and public transport modes for more trips. This will include improvements to infrastructure to provide a well-connected, easy to use and safe public transport and walking/cycling network that is also equally accessible to those of limited mobility and improvements to public transport coverage, accessibility and service levels.</p>

1.6 Study Area

The Study area for the Dunboyne Transport Study is shown in Figure 1.1.



Figure 1.1. Study Area

1.7 Dunboyne Development Plan

The current development plan map for Dunboyne, including Variation 3, is shown in Figure 1.2.

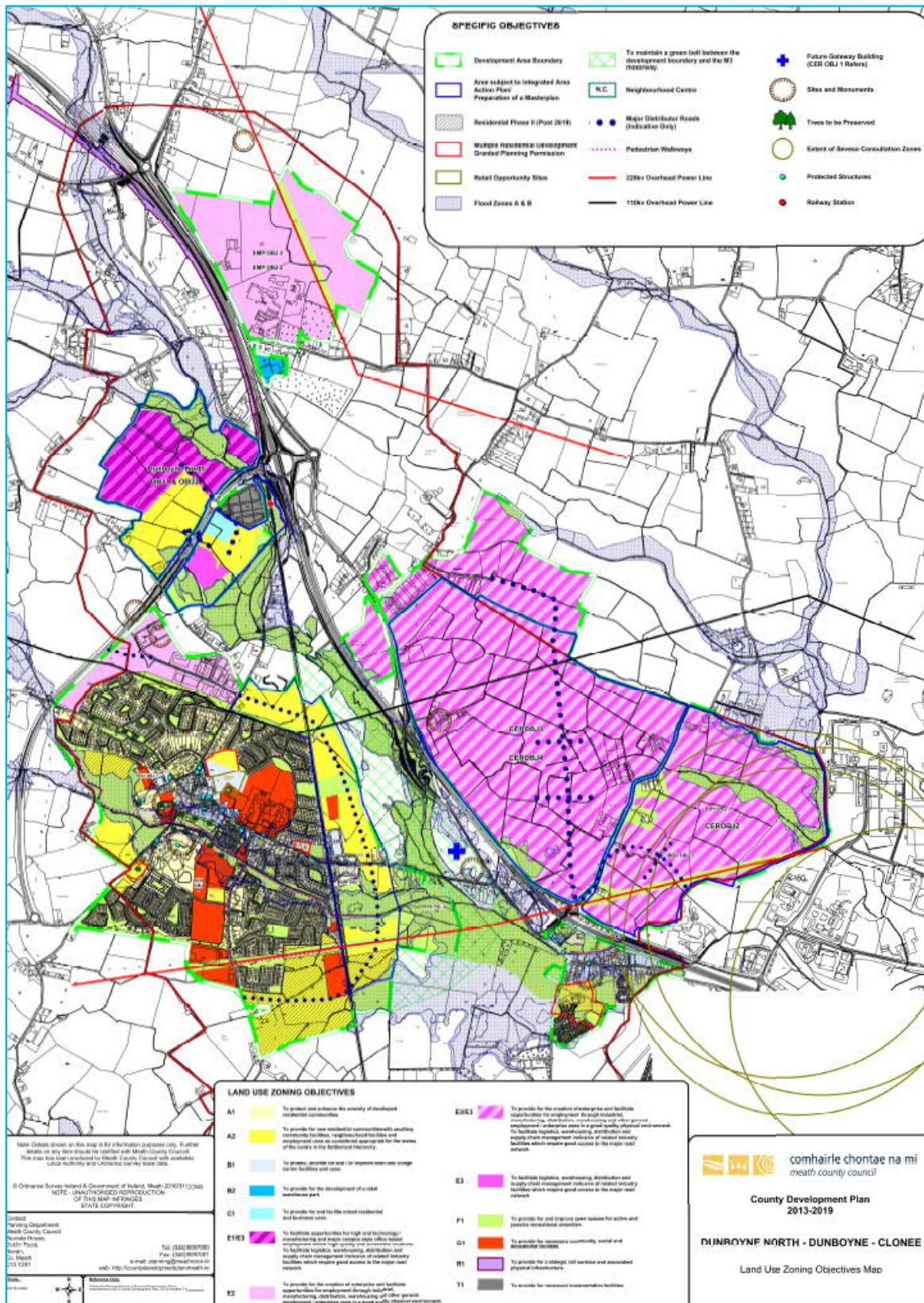


Figure 1.2. Dunboyne Development Plan Map

The background is a solid blue color. Two thin white lines cross each other diagonally. One line starts from the bottom left and goes towards the top right. The other line starts from the middle left and goes towards the top right, crossing the first line.

**Transport and
Development
Context**

02

2. Transport and Development Context

This Chapter describes the development and transport context in Dunboyne and highlights several issues to be considered as part of the assessment.

2.1 National Policy Context

2.1.1 National Planning Framework and National Development Plan

The Irish Government recently announced “Project Ireland 2040³”. This is a long-term, overarching policy initiative covering a broad range of Government activities and a long term time horizon. It is made up of:

- The National Planning Framework to 2040, which covers spatial planning;
- National Development Plan 2018-2027, which sets out the programme of public capital investment for the next ten years.

The NPF is a framework to guide sustainable public and private investment and to accommodate the additional one million people expected to be living in Ireland by 2040. Critically, the NPF is linked to a new ten year investment strategy, the National Development Plan (NDP; 2018-2027), which directs investment toward national objectives in respect of transport, climate action, water resources, communications and other infrastructure areas.

Key elements of the NPF in relation to this report are outlined below;

Transport Infrastructure

In terms of projects which impact upon Dunboyne, the N3 Clonee to M50 project is included as a scheme to be progressed through pre-appraisal and early planning in 2018. In relation to rail there are plans to reintroduce additional carriages on the network in 2019 whilst new diesel electric trains will be delivered in 2022. The NDF also sets out the ambition to deliver priority elements of the DART Expansion Programme including investment in new train fleet, new infrastructure and electrification of existing lines including the M3 Parkway line. There are also plans to expand the Park-and-Ride Programme through investment in parking facilities at rail, Luas and bus locations with Dunboyne specifically mentioned.

Enhanced Regional Accessibility

The NPF acknowledges the importance of connectivity and linkages both within and between Regions in relation to maintaining competitiveness and the movement of goods, people, and services. The NPF and NDP set out National Strategic Outcomes (NSO) which include compact growth, a strong economy, enhanced regional accessibility.

In relation to regional accessibility the NPF states that: *‘A co-priority is to enhance accessibility between key urban centres of population and their regions. This means ensuring that all regions and urban areas in the country have a high degree of accessibility to Dublin, as well as to each other. Not every route has to look east and so accessibility and connectivity between places like Cork and Limerick, to give one example, and through the Atlantic Economic Corridor to Galway as well as access to the North-West is essential.’*

Integration of Land Use and Transport Planning

The importance of aligning land use and transport planning with in prioritising future areas for growth is regarded as essential in ensuring such growth takes place in a sustainable and

³ Project Ireland and its supporting policies including the National Planning Framework 2040 and the National Development Plan 2018-2027 are at: <http://www.gov.ie/en/project-ireland-2040>

environmentally appropriate manner. Dunboyne sits within Eastern Regional Area which is planned to experience significant growth in population and jobs under the NPF.

Strategic Importance of the M3

In the context of Meath, the M3 Motorway provides a vital link between the county's key growth centres and Dublin City Centre, the Airport and the Port in addition to connecting the county with the Motorway network via the M50. The M3 performs a key role in providing accessibility to the North-West and will enhance the competitiveness and attractiveness of areas most exposed to the potential impacts from Brexit. The M3 therefore plays a key role in terms of connectivity and driving economic development in the county. Such links also enhance the accessibility of the County and make it a more attractive location for potential investors and employers with regard to the movement of people, goods, and services.

2.2 Development Context

2.2.1 Population and Employment

The preliminary results of the Census 2016 show that the population of Dunboyne continues to increase and at a rate of 5-10% during 2011-2016 (Figure 2.1). Most of the surrounding electoral districts (EDs) are also experiencing growth and this is particularly the case in the Blanchardstown area.

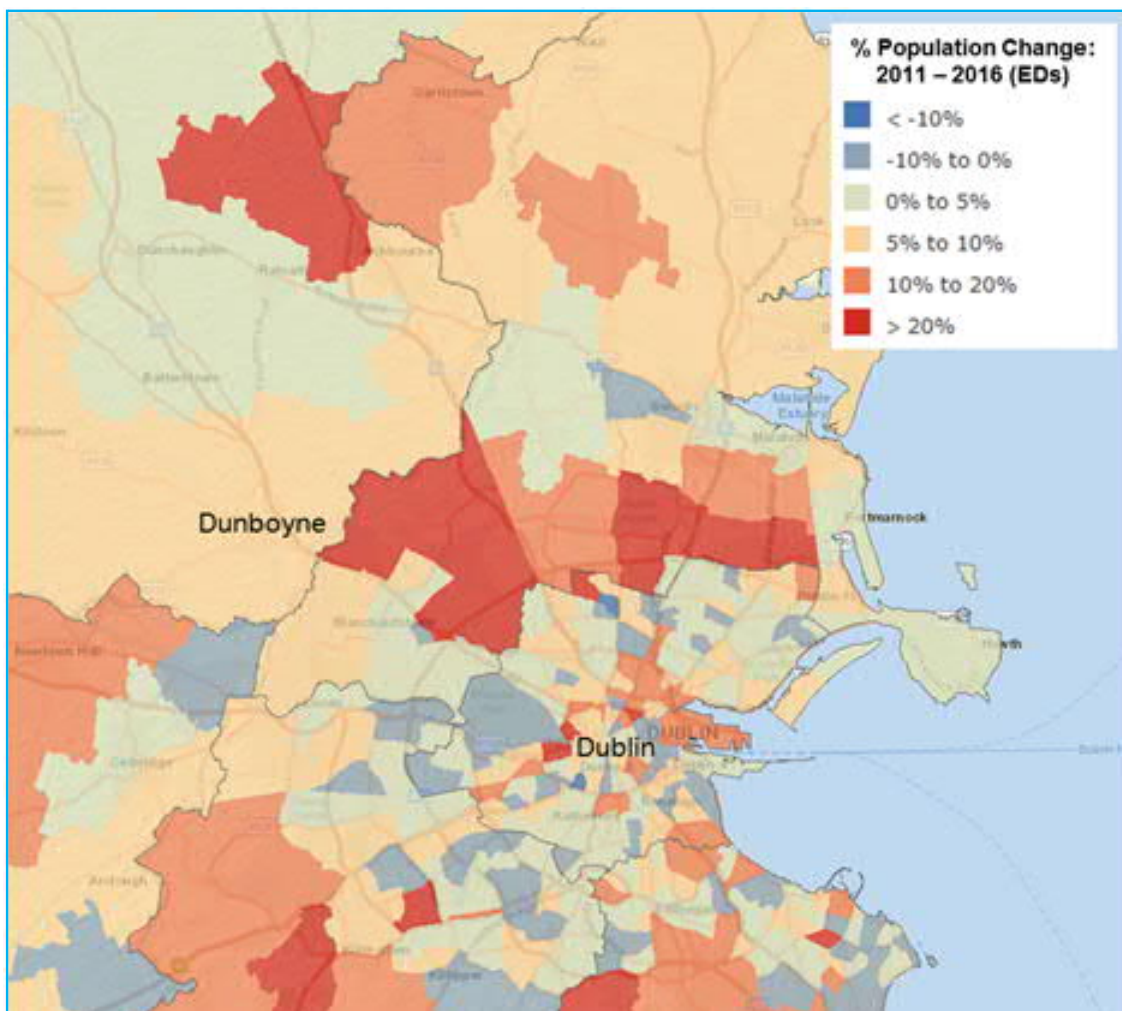


Figure 2.1. Percentage Population Change 2011 – 2016 (Census, 2016, Electoral Districts)

According to the Census 2011, the Dunboyne population is concentrated in densities representative of 500-1000+ persons per square kilometre near the town centre. Population densities reduce

considerably outside the settlement boundary, falling to <100 people per square kilometre in the surrounding rural hinterland with the exception of Clonee village (Figure 2.2).

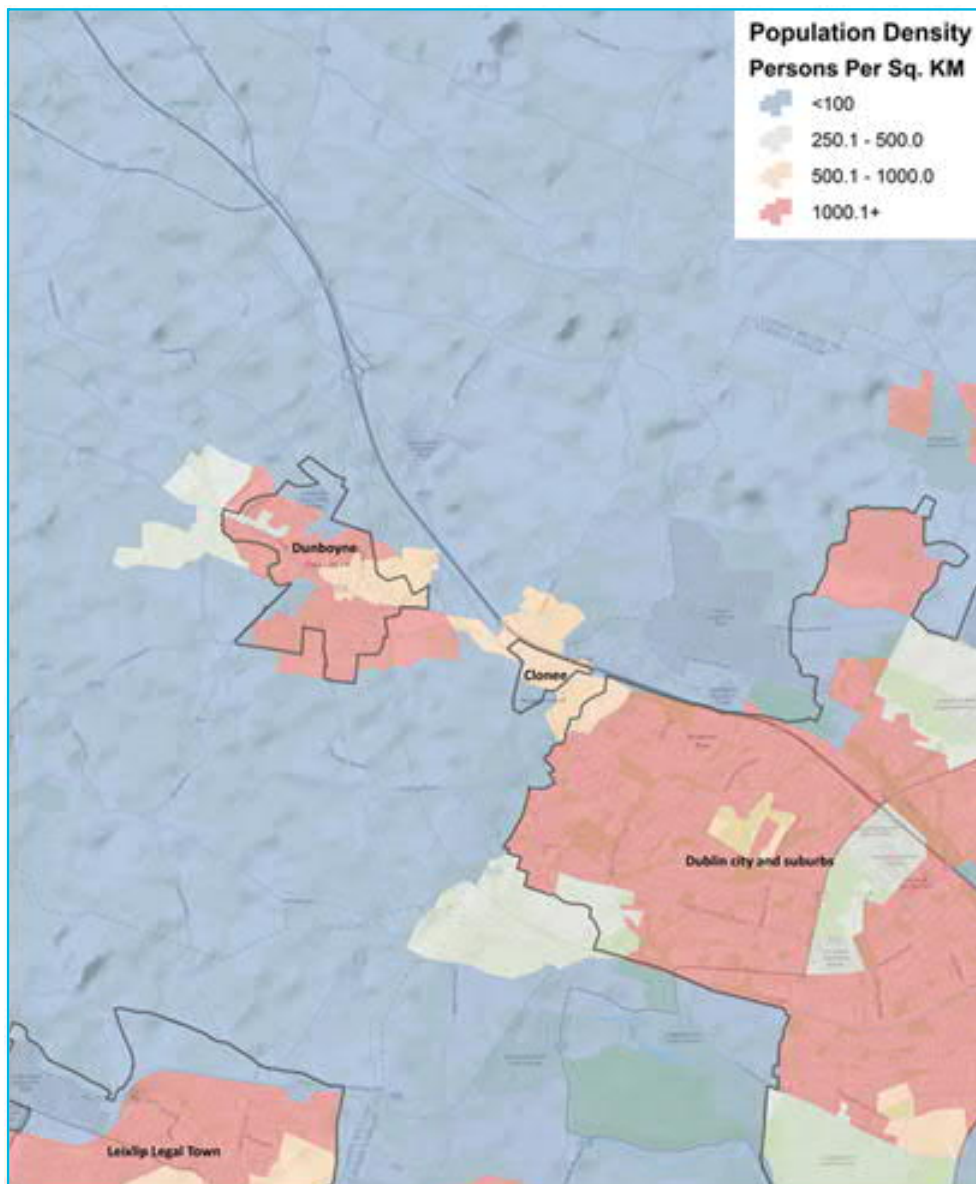


Figure 2.2. Population Density (Per Sq. KM) - Census 2011

In respect to housing density, residential units are sparsely distributed (Figure 2.3) with housing densities as low as <10 units per hectare (UPH) being the most common form. The Sustainable Residential Development in Urban Areas Guidelines (2009) recommend minimum densities of at least 50 units per hectare along public transport corridors and strongly discourage development under 30 units per hectare. This indicates the need for significant intensification of residential uses to support public transport patronage in the Dunboyne area.

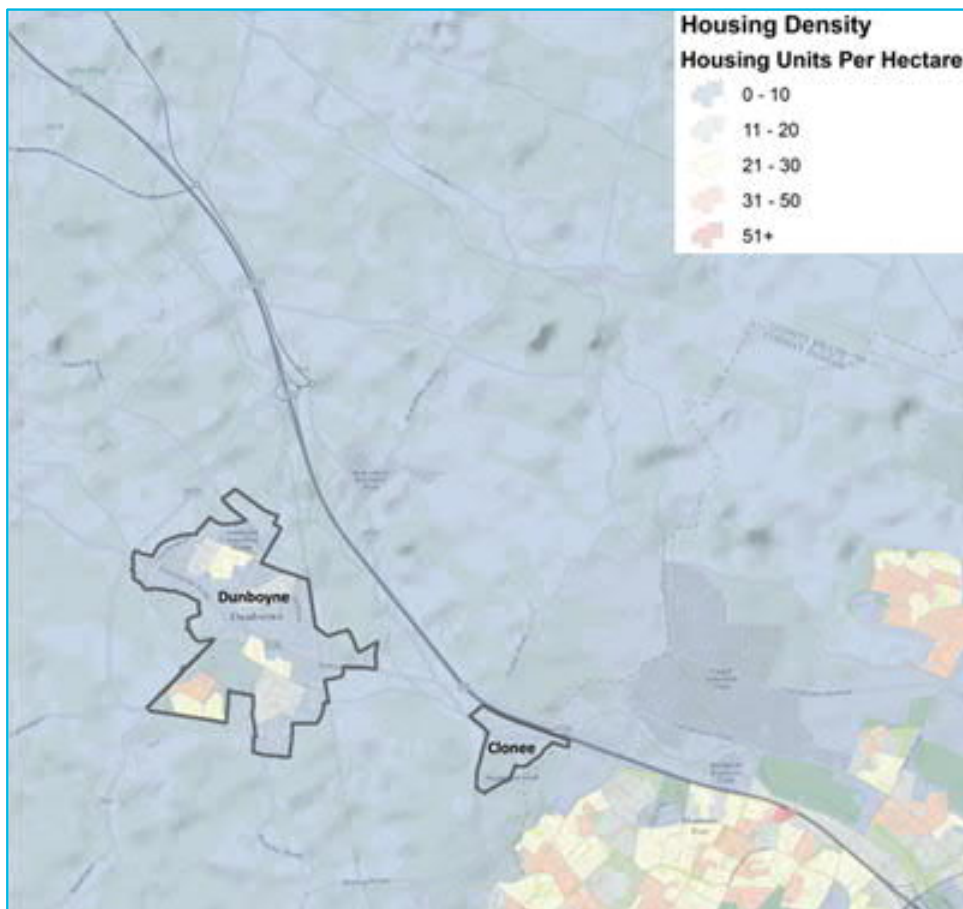


Figure 2.3. Housing Density (Units per Hectare) - Census 2011

In respect to employment (Figure 2.4), there are a reasonable number of local jobs within or nearby to Dunboyne town. Significant employment concentrations are also located in the industrial estates to the north-east of Clonee village in Damastown/Blanchardstown and on the edge of the Dublin suburbs.

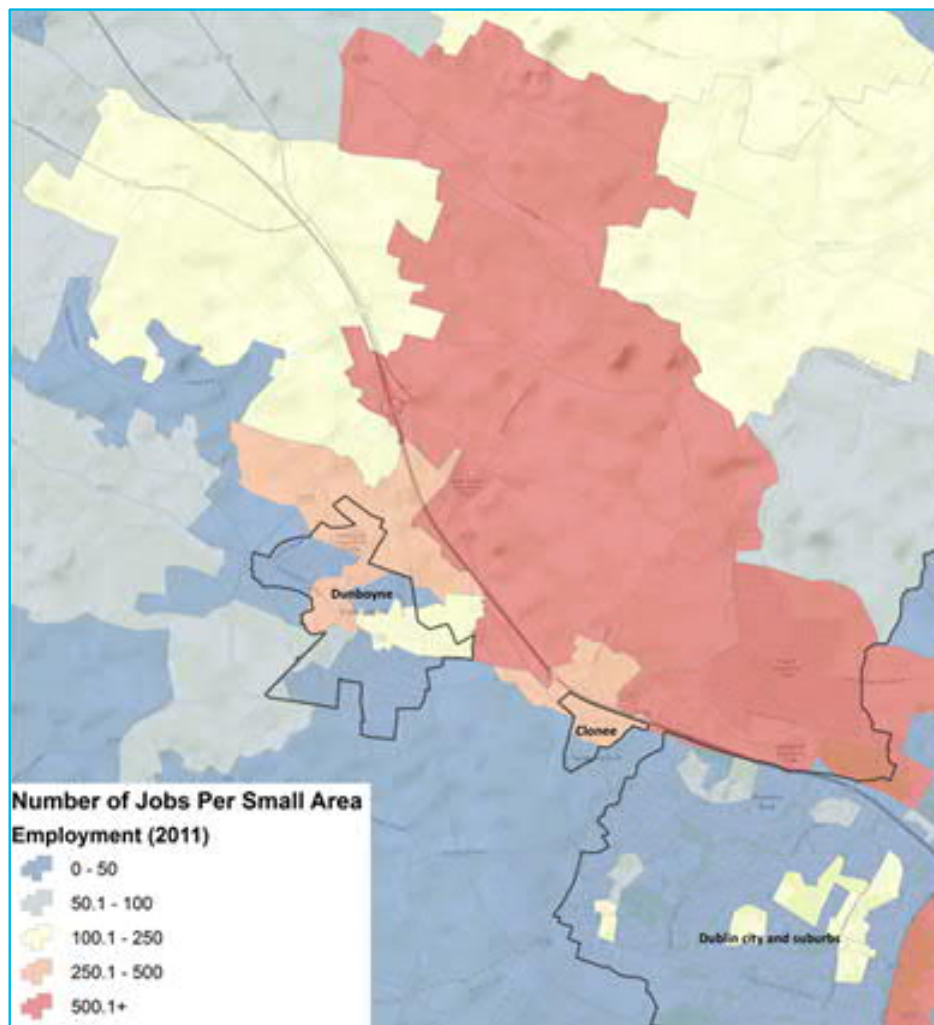


Figure 2.4. Employment in the Dunboyne Area (POWSCAR, 2011)

2.2.2 Future Development in Dunboyne

This assessment took the Meath County Council land use forecasts from Variation 3 of the Meath County Development Plan as the starting point for the development of future year forecasts. Details of the total quantum of additional development proposed in the Dunboyne area are provided in Table 2.1.

Table 2.1. Projected Increase in Key Variables in Dunboyne

Year	Population	Jobs
2025	10,750	3,000

It should be noted that the Meath County Development Plan 2013-2019 states that the final intended population for the Dunboyne area is 25,000 persons by 2033.

Whilst there are plans to develop various zones in the study area, there are three key significant proposed development sites in Dunboyne:

1. *The Shire Site* - Planned development of a biologics manufacturing campus on the R147 with long term plans for up to 550 employees. The Shire site is currently under construction with 400 highly skilled jobs expected to be created in the first phase of the bio-pharma manufacturing facility over the next 4 years.

2. *Dunboyne North* - A mixed use development hub near the M3 Parkway railway station. Dunboyne North will include approximately:
 - 500 additional residential units,
 - 1,554 new jobs
 - 10,294 sq. metres of warehousing, 21,217 sq. metres of industrial uses, 39,912 sq. metres of office space and 2,000 sq. metres of retail development.
3. *Bracetown lands east of the M3* – A low employment, FDI focussed land bank for development. Given the scale of the zoned land, the assessment assumed that the large area of zoned development lands to the west of the M3 adjacent to the existing Bracetown Business Park will be developed with a similar land/jobs ratio as the Facebook data centre which is proposed to provide 200 jobs.

In relation to Bracetown, the Meath County Development Plan 2013 – 2019 includes an objective 'CER OBJ 3: To facilitate the development of lands between Portan Clonee and Bracetown for E2 "General Industry & Employment" and E3 "Warehousing and Distribution" purposes solely for the development of major employment proposals, primarily FDI, requiring a significant site area, having regard to this strategic location within the county, as provided for in Volume 1 of the County Development Plan. A Master Plan and a detailed Roads Needs Assessment of said lands shall accompany any planning application for the development of these lands. This Master Plan shall obtain the prior written agreement of the Executive of the Planning Authority. The Master Plan shall accompany any application for planning permission on these lands and shall address land use, transportation, connectivity, urban design, recreation, environmental impacts including flood risk, phasing and implementation issues to the satisfaction of the Executive of the Planning Authority. Development shall be contingent on the phased delivery of the distributor road. The Master Plan shall address the following:

- A Design Concept for the lands;
- Guidance for high quality design throughout the development;
- Building heights and densities;
- A landscape plan for the development and landscape management plan (post-completion of the development);
- Flood Risk Assessment which takes account of the most up to date available CFRAM data
- A Transport Assessment which addresses the following issues:
 - I. Access arrangements to the Development Site;
 - II. Provision of safe cycle ways and pedestrian routes throughout the Development Site;
 - III. Provision and access for Service Vehicles to the Site.

The Master Plan shall be agreed in writing with the Executive of the Planning Authority in advance of the lodging of any planning application'

The spatial location of these sites is shown in Figure 2.5.

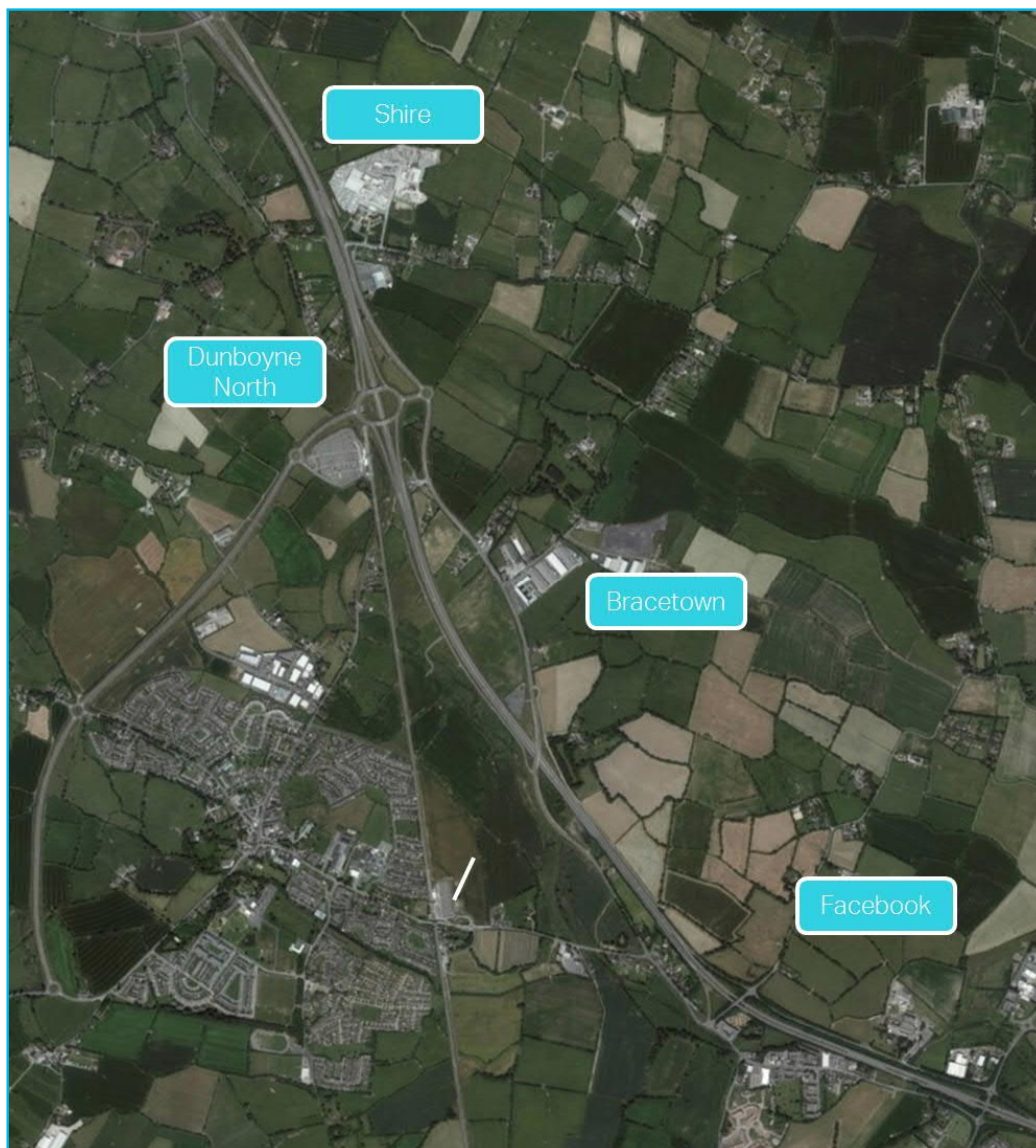


Figure 2.5. Significant Development Sites in Dunboyne

Statutory and non-statutory plans such as the Dunboyne Local Area Plan (LAP), Dunboyne Integrated Action Area Plan (IAAP) and the 'Dunboyne/Clonee Growth Corridor - Strategic Framework Guidance' document put a clear focus on the intensification of housing densities and activities in the town centre or near the railway stations. The expected increases in population and employment will lead to increased traffic across the Dunboyne area in the near future. This will require road infrastructure mitigation measures as well as cycling/walking measures to enhance access to improved public transport services.

2.3 Transport Context

2.3.1 Road Transport

Dunboyne has excellent road based transport links and high quality public transport infrastructure but this infrastructure currently only provides reasonable levels of public transport services. The M3 provides private vehicle access to the city centre and the greater Dublin area via two motorway junctions, Pace and Clonee, located near Dunboyne (Figure 2.6).



Figure 2.6. M3 Junctions and Regional Roads near Dunboyne

The Pace Interchange provides access to the M3 in both directions while at Clonee; access is divided between two half junctions on either side of the village. The Pace interchange currently operates reasonably well with some congestion on the northbound off slip in the PM peak period due to traffic wishing to access the R147. At Clonee West there is a northbound entry slip and a southbound exit slip, while at Clonee East there is a southbound entry slip and a northbound exit slip. The Clonee junction currently experiences significant congestion in both the AM and PM due to the layout of the junction which was not designed for current traffic patterns, its proximity to a number of congested junctions and the presence of Clonee Village. The M3 operates significantly below capacity north of Clonee but demand increases significantly as you travel further south towards the M50.

As can be seen below in Figure 2.7, the M3 south of Pace has experienced growth of 5% per annum since January 2014 with overall growth of 10% between 2014 and 2016. North of Pace the increase has been more pronounced with growth of 8-10% per annum and overall growth of 18% since 2014, however AADT/AAWT flows are significantly lower than those experienced further south on the M3. It should be noted however that this growth is significantly lower on the southbound diverge to the north of Pace which has only experienced a 10% growth over the same period suggesting that growth in North Dunboyne has been slower than areas further south. Whilst the M3 south of Pace (2 lanes plus Auxiliary lane) carries some 36,500 AADT, the N3 south of Clonee (2 lanes) carries some 53,000 AADT increasing to 96,000 AADT north of the M50 Interchange (2 lanes plus Auxiliary lane).

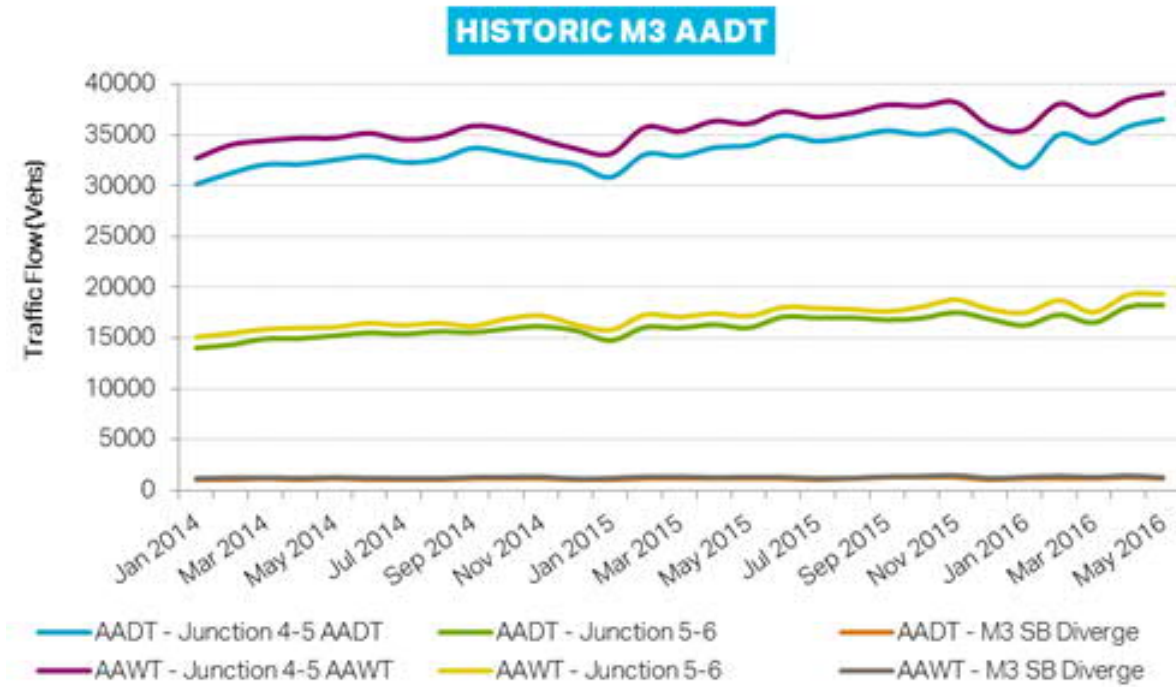


Figure 2.7 Historic AADT/AAWT on the M3 adjacent to Dunboyne

Source: TII Traffic Counters

Figure 2.8 presents daily traffic flow by hour on the M3 south of Pace for the month of April 2016 together with the practical capacity of the road based on previous research by TII⁴ which found that the Practical Capacity of an unmanaged lane in a traffic stream can be defined at between 1,800 and 1,850 Passenger Car Unit's (PCU) per lane per hour (equates to approximately 1,700 vehicles/lane/hour).

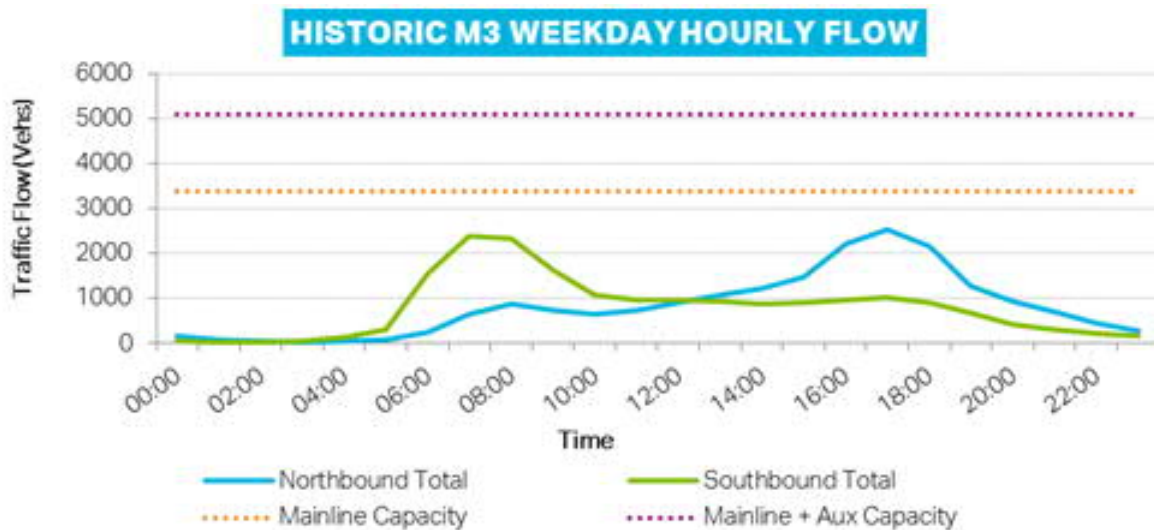


Figure 2.8 Historic Weekday Hourly Flow on the M3 adjacent to Dunboyne

Source: TII Traffic Counters

As outlined above the current peak hour flows on the M3 mainline are significantly lower than the safe operational capacity, suggesting that spare capacity exists on the mainline and the existing congestion issues are largely due to the operation of the junctions or downstream issues. The data in

⁴ A Study of Lane Capacity in the Greater Dublin Area: TII: February 2012

Figure 2.9, reinforces the point with between 60-85% of traffic throughout the day being catered for by the middle lane only which decreases to 45% during the AM peak.

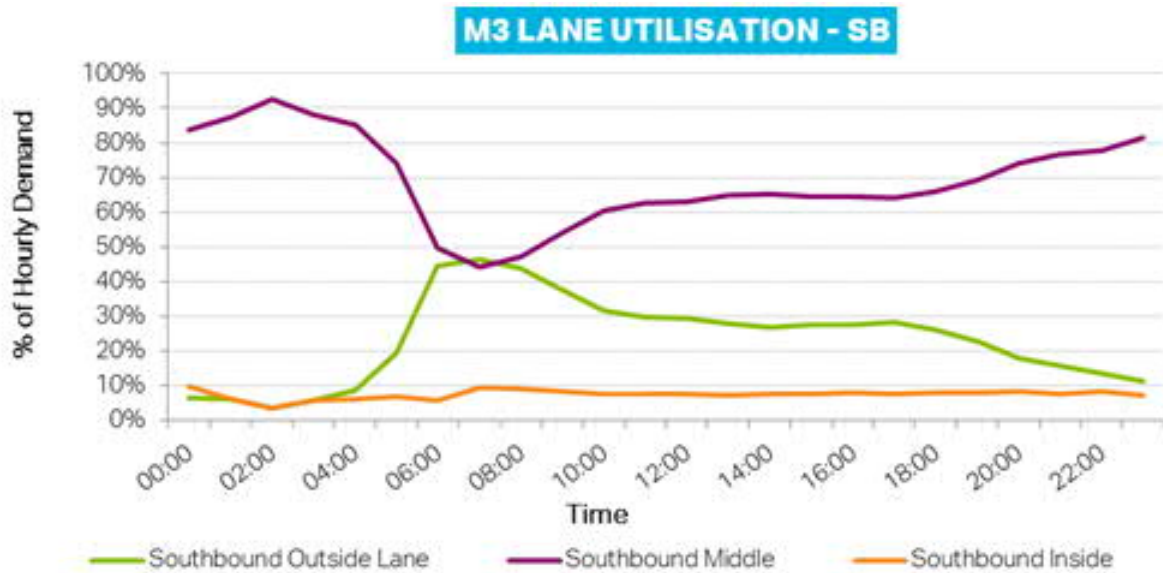


Figure 2.9. Lane utilisation on the M3 south of Pace adjacent to Dunboyne – Southbound

Source: TII Traffic Counters

The graph in Figure 2.10 represents the lane utilisation patterns of northbound traffic on the M3 to the south of Pace. A vastly different profile is evident due to the significant proportion of M3 northbound traffic which exits at the Pace interchange across the day.

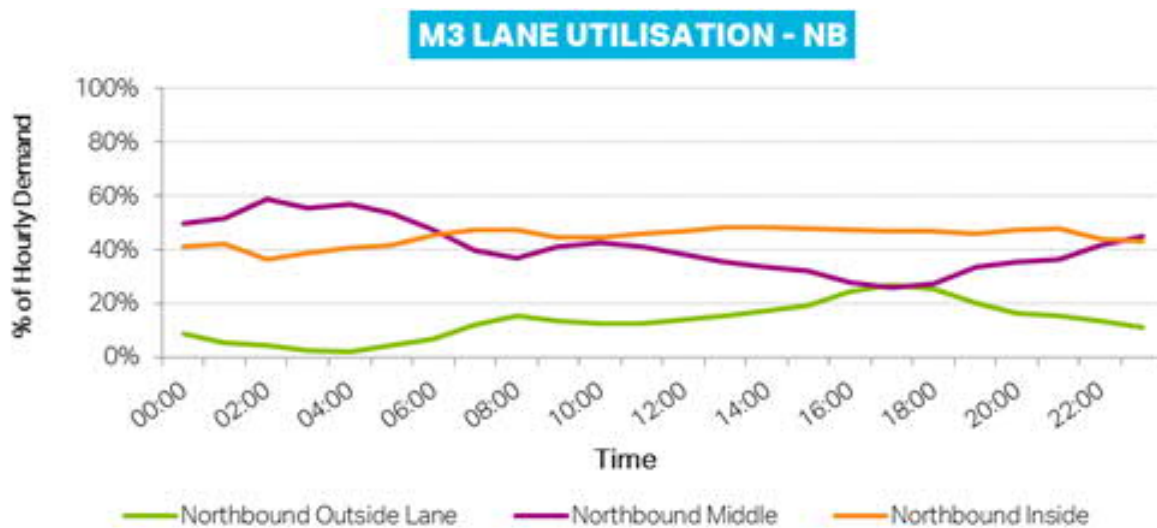


Figure 2.10. Lane utilisation on the M3 south of Pace adjacent to Dunboyne – Northbound

Source: TII Traffic Counters

The two main Regional Roads are the R157 which borders the west of the town and the R147 (Old N3) to the east which runs parallel to the M3. The R147 north of Pace Interchange carries significant traffic levels (~24,700 AADT in April 2017) that are higher than the adjacent M3 (tolled section) which carried approximately 20,400 AADT during the same period. The flow on the R147 will be under increased pressure following the opening of Avoca early 2017 and planned opening of Shire Pharmaceuticals in 2018. The National Development Plan (NDP) 2018 – 2027 states that the R157 is undergoing appraisal for a safety upgrade by local authorities.

2.3.2 Public Transport

Dunboyne has a range of public transport options provided by Irish Rail, Dublin Bus and Bus Éireann. In the case of rail travel, there are two stations; one located to the east of the town and another to the north at M3 Parkway which has a 1,200 space park & ride facility (Figure 2.11). There are two regular Dublin Bus services; the most frequent is route 70 which runs radially to/from the city centre and the less frequent route 270⁵ operating hourly between Dunboyne and Blanchardstown. Dublin Bus also provides a single outbound service on the 70d from Dunboyne to Dublin City University (DCU) in the morning at 7.15am with a return service at 5.05pm. A Nitelink service (70N) is also provided on Friday and Saturday nights from the city centre. Bus Éireann operates route 105 which provides an hourly service linking Drogheda, Ashbourne, Ratoath, Dunboyne and Blanchardstown.

While the east of the town is well served by public transport options, there is limited access to these services in the west and the south of the settlement. Poor rail station and bus stop accessibility for walking/cycling is a significant issue due to a lack of permeability across residential estates and the location of new developments outside the public transport catchment.



Figure 2.11. Public Transport in Dunboyne

Rail services to M3 Parkway vary depending on the time of day:

⁵ From late 2018, Dublin Bus route 270 will be operated by Go-Ahead under a franchise agreement with the NTA.

- At peak times, M3 Parkway rail services travel on a continuous route to/from the Docklands Station in Dublin city centre and bypass Drumcondra.
- Outside peak times, trains to/from M3 Parkway operate from Clonsilla and passengers change onto the Maynooth line for services scheduled to facilitate this transfer. This allows travel to the main city centre stations; Connolly, Tara Street, Pearse Street and Grand Canal Dock.
- The extension of the Luas Green Line to Broombridge allows for interchange between train and tram services for passengers from Dunbooyne. This greatly enhances accessibility to the city centre as it allows trips to O'Connell Street, College Green and Stephens Green rather than the more distant Docklands Station.

These locations on the rail network are shown in Figure 2.1.2.

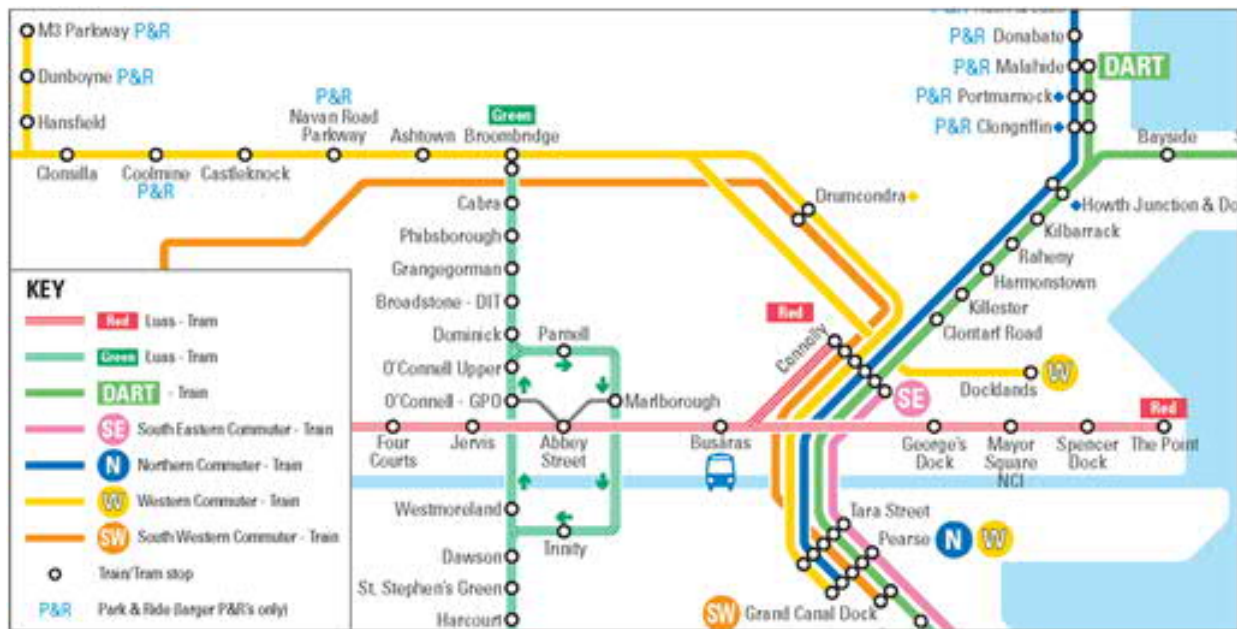


Figure 2.1.2. Dunbooyne Stations and Opportunities for Interchange on the Rail Network

The NDP 2018 – 2027 states that the railway from M3 Parkway to Clonsilla will be upgraded to cater for both diesel and electric trains. This will take place as part of the DART expansion programme which will electrify the Maynooth line and the Phoenix Park tunnel. In respect to the extension of the railway line from M3 Parkway to Navan; the NDP states that the National Transport Authority (NTA) will reappraise this project as part of mid-term review of the Greater Dublin Area Transport Strategy before 2021. This reappraisal will take into consideration the scale of new and planned developments along the route.

A comparison of the frequency of public transport services originating in Dunbooyne and travelling towards Dublin is shown in Figure 2.1.3 for hourly periods. This highlights that the most frequent services are Dublin Bus route 70 and Irish Rail during peak times but that most routes operate an hourly frequency. In combination, Dunbooyne has at least four public transport services per hour in the direction of Dublin throughout most of the day.

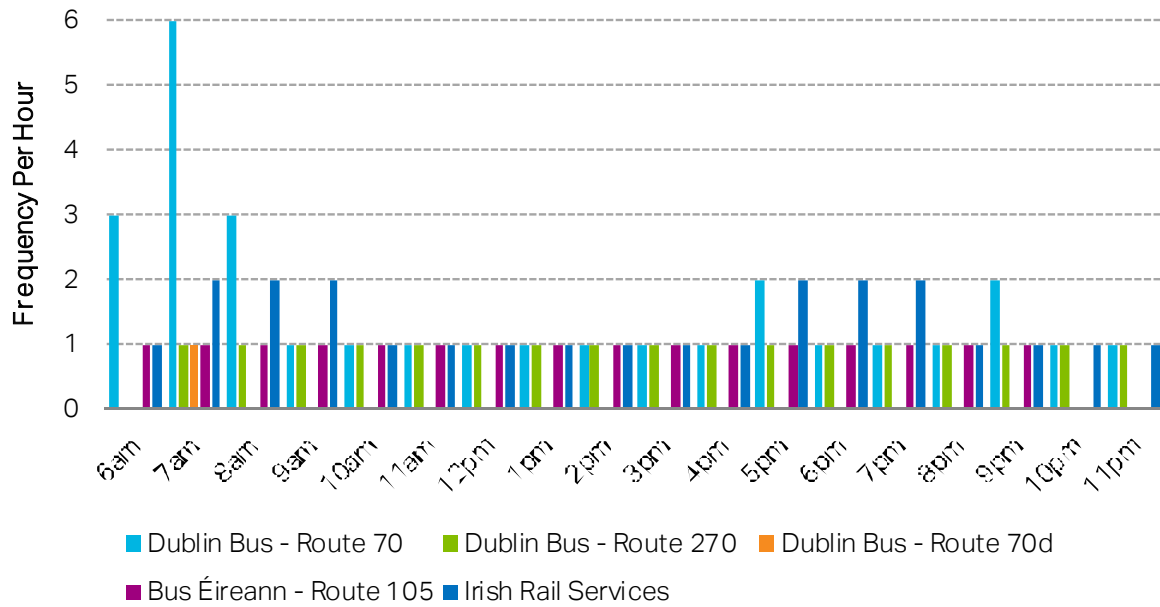


Figure 2.13. Comparison of Public Transport Frequency per Hour for Services towards Dublin

Site visits undertaken in 2016 and 2017 suggested that the P&R facility at the M3 Parkway (Figure 2.14) is underutilised with approximately 400 vehicles parked on an average day which represents 33% of total capacity. The Dunboyne P&R attracts in the region of 90 vehicles on an average day which represents 45% of total capacity.



Figure 2.14. M3 Parkway - Park & Ride in May 2017 (Source: Google)

The 2016 Heavy Rail Census shows a weekday use of 400 boardings and 344 alightings at M3 Parkway and 279 boardings and 228 alightings at Dunboyne. Table 2.2 shows the Heavy Rail Census results for 2012-2016. This highlights that boardings have increased by 57.6% in Dunboyne and 77% in M3 Parkway since 2012 however the capacity is still underutilised.

Table 2.2. Comparison of Heavy Rail Census Data for Dunboyne and M3 Parkway

	2012	2013	2014	2015	2016	% Increase 2012 - 2016
M3 Parkway - Boardings	226	206	174	298	400	77.0%
M3 Parkway - Alightings	231	231	215	283	344	48.9%
Dunboyne - Boardings	177	171	220	184	279	57.6%
Dunboyne - Alightings	185	138	211	202	228	23.2%

2.3.3 Mode Choice

In respect to modal split, the Census (2011) shows that the majority of residents commute using the private car as either a driver or passenger (Figure 2.15). A significant amount of people commute on foot (27%) but public transport use is relatively low at 6% for bus services and 4% for rail. Cycling is very much a minority mode for commuting (1%) in Dunboyne.

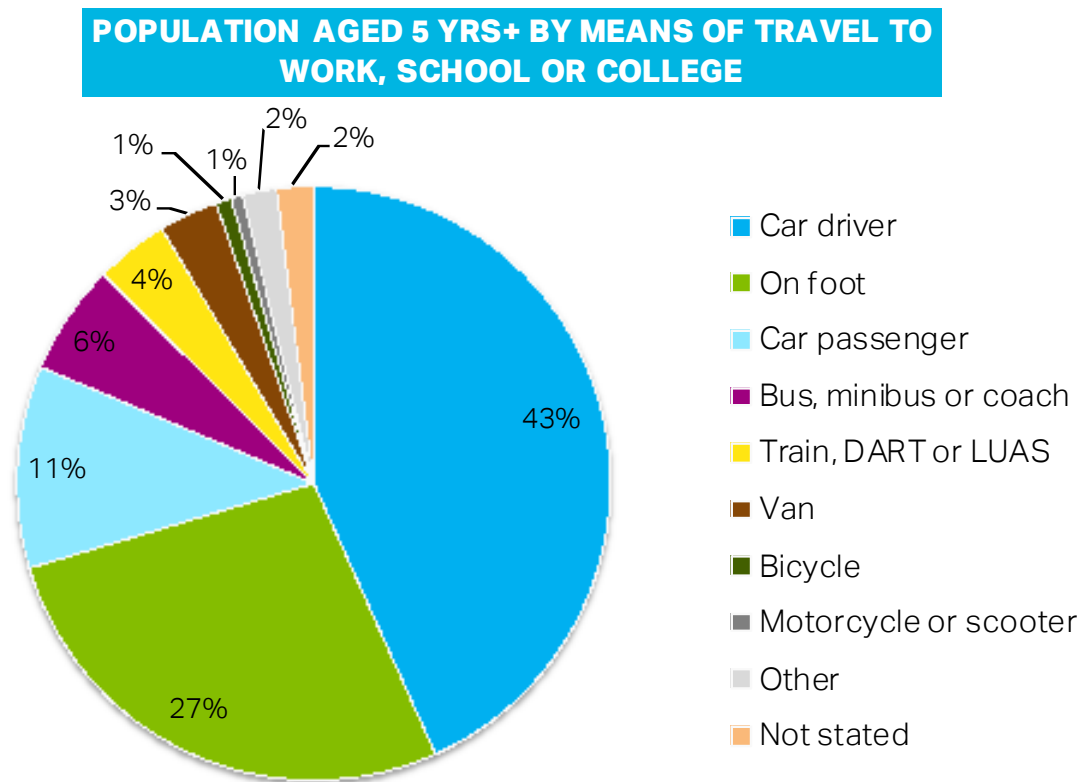


Figure 2.15. Modal Split in Dunboyne CSO Settlement (Census, 2011)

Figure 2.16 displays the percentage of residents in each CSO Small Area which commute using sustainable modes (walk, cycle, bus or rail). In general, sustainable travel users are in a minority across the town with the exception of one CSO Small Area to the south of the railway station.

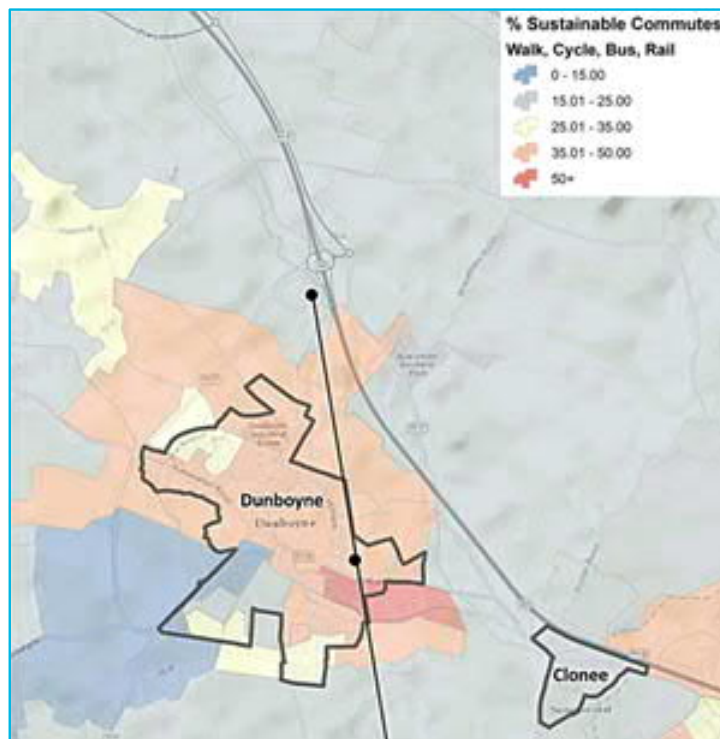


Figure 2.16. Percentage of Sustainable Commutes per Small Area - Census 2011

Further analysis of the Census 2011 modal split data shows that there are 15+ rail commuters per CSO Small Area in locations near to Dunboyne train station (Figure 2.17). However, overall rail utilisation is quite low across the town especially for users outside the current 1 km catchment area.

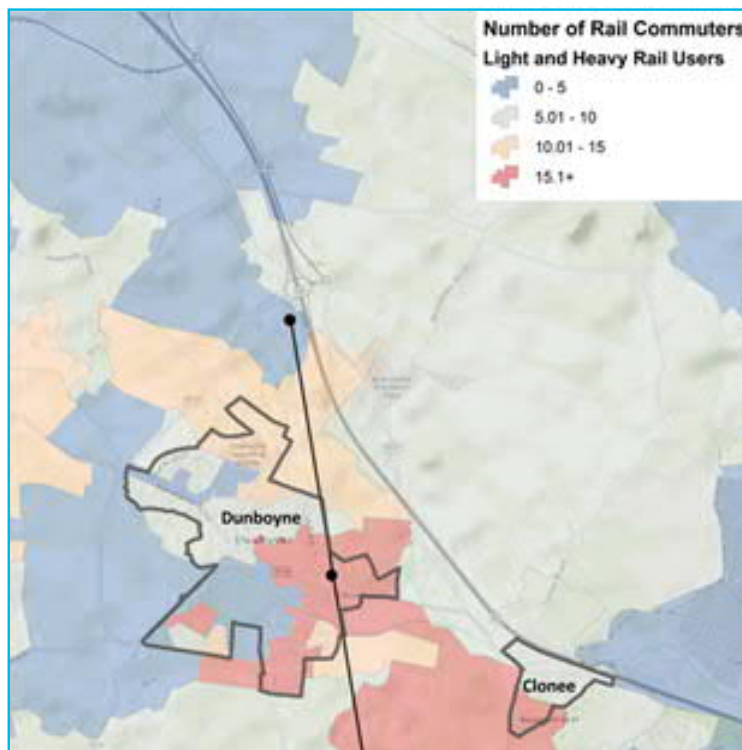


Figure 2.17. Number of Rail Commuters in Dunboyne – Census 2011

2.3.4 Trip Patterns

The trips (~1950 in total) made by residents of Dunboyne CSO settlement for either education or work commutes were analysed using 250 metre * 250 metre POWSCAR grid travel data.

In relation to education commutes, Section 2.2.3 noted that a reasonably high number of trips are completed on foot and this is partly explained by the large proportion of local education trips to the town's schools (Figure 2.18). Other notable education institutions attended by Dunboyne residents include the universities of Maynooth, DCU, UCD and Trinity.



Figure 2.18. Destination of Education Trips for Dunboyne Residents

In relation to employment commutes, there are a significant amount of trips (~2,400 in total) made to local jobs within Dunboyne and its immediate surrounds (Figure 2.19). Outside the town, the main clusters of work trip destinations are to locations along M3/N3 corridor or Dublin city centre. A key destination for employees is the Blanchardstown area which suggests that a high frequency, reliable route serving this corridor would generate demand. Beyond these locations, commuting destinations are quite scattered, representing the diverse movement associated with suburban car travel.

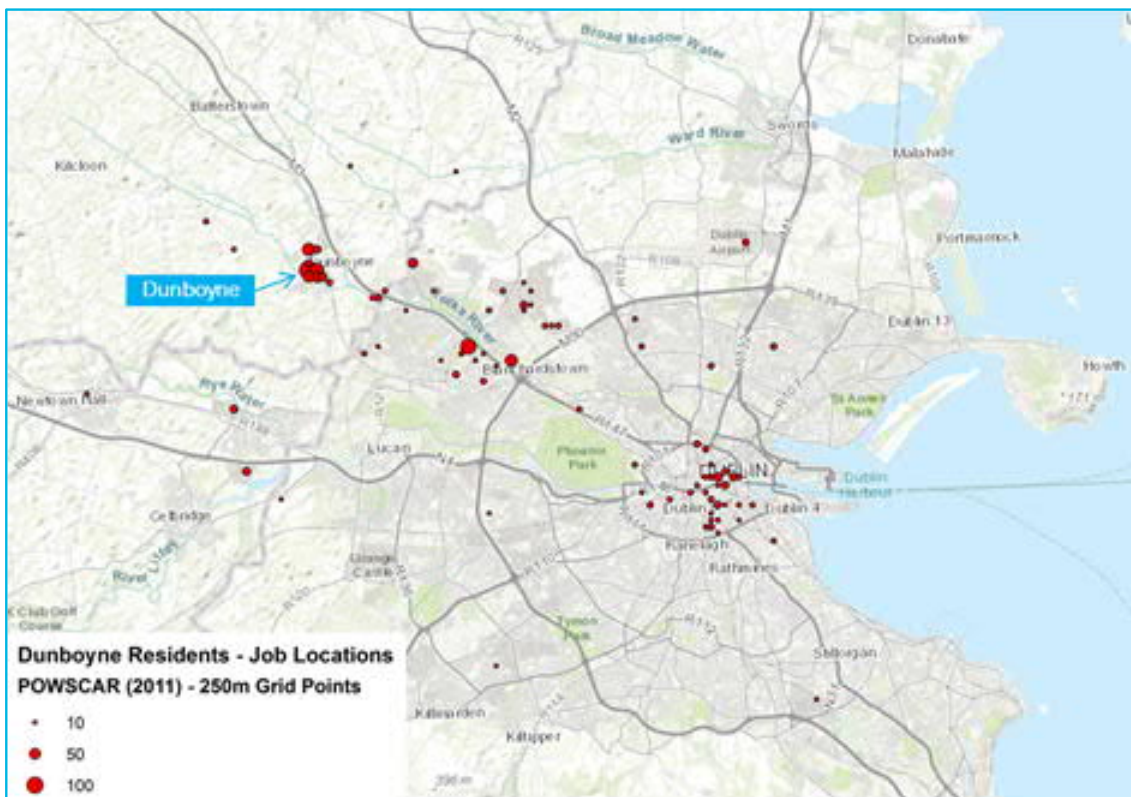


Figure 2.19. Destination of Employment Trips for Dunboyne Residents

2.3.5 Road Network Capacity

A cordoned area of the National Transport Model (NTpM) was updated to 2016 demand in the study area and a volume/capacity analysis of road links was undertaken to identify current issues in the Dunboyne road network. The volume/capacity ratio provides insight to the performance of the link in terms of available capacity and whilst it does not account for localised issues such as conflict points at merges, inefficient junctions or other road layout issues it provides a reasonable estimate of link performance. This showed that in the AM peak (Figure 2.20), the road network in Dunboyne is operating well within capacity in most cases with the exception of sections of the R147, the Pace Interchange, the R157 and the Clonee junction. The volume/capacity analysis for links in the PM peak is shown in Figure 2.21.



Figure 2.20. 2016 Traffic Conditions (Volume/Capacity) in the AM Peak

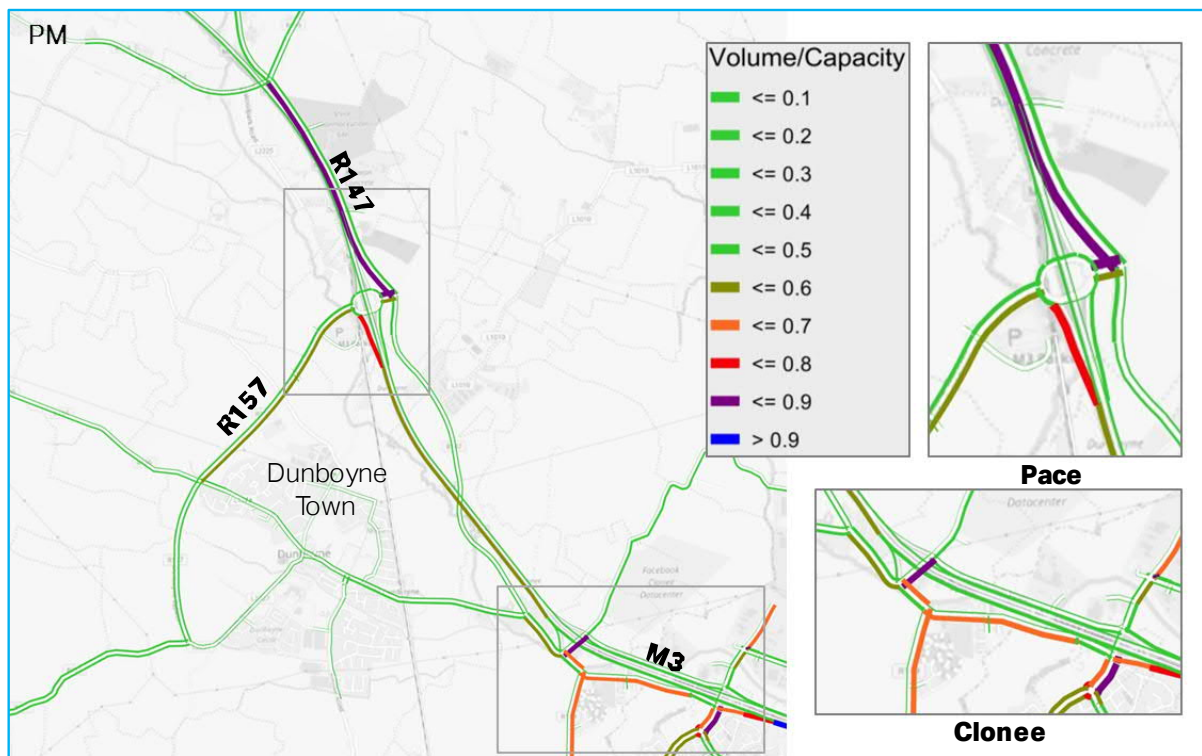


Figure 2.21. 2016 Traffic Conditions (Volume/Capacity) in the PM Peak

Clonee Interchange is made up of two sections; Clonee West (4b) which provides access onto the M3 in the westbound direction and access off the M3 in the eastbound direction linked by a two-way overbridge with roundabouts at each end and Clonee East (4a) which provides access onto the M3 in the eastbound direction and access off the M3 in the westbound direction linked by a one-way northbound overbridge with signalised junctions at each end. There are two R156 link roads on both

sides of the M3 linking Junctions 4a and 4b on both sides of Clonee village. The R156 to the south of the M3 runs through Clonee village. The R149 between junction 4b and Clonee village provides access to Leixlip/Clonsilla. The interchange experiences congestion during the peak periods due to the conflict between the design and the traffic patterns which have emerged. A capacity assessment of the junctions based on 2016 flows using ARCADY found that the junctions were operating close to, or over, capacity during the peak periods.

There are existing congestion issues on the R147 and at the Pace Interchange in the AM and PM peaks. A significant proportion of R147 traffic has an alternative to use the M3 and capacity exists to accommodate these vehicles should they transfer to the M3. To fully understand the traffic patterns in this area, Automated Number Plate Recognition Surveys (ANPR) were undertaken at 8 sites in the Dunboyne, Dunshaughlin and Navan area during April 2017. The results suggest that during the AM (7.30-9.30), IP (12-14) and PM (16-19) periods some 20-35% of total traffic recorded within the study area (which included traffic on all roads leading to the R147 except M3 through traffic) could reasonably be considered to have the M3 as a viable alternative. Analysis undertaken using VISSIM suggests that the rebalancing of traffic on the R147 to remove a significant proportion of this through traffic would alleviate a lot of the current congestion issues on the R147 and Pace. Further information on the ANPR surveys is included in Appendix B.



Figure 2.22. Alternative M3 Route via the R147

2.3.6 Road Network Safety

Analysis of the collisions which occurred between 2007 and 2013 in Dunboyne, highlighted a significant number of minor, and some serious, incidents in the local area with the highest proportion taking place in the town centre (Figure 2.23). It is notable that all three 'serious' collisions near the town centre involved incidents between cars and pedestrians or goods vehicles and pedestrians in under 50kph zones. The single fatal collision occurred outside the town on the northbound slip of the Pace Interchange in a 100kph zone. A serious incident also took place on the R147 junction at the Pace Interchange which involved a motorcyclist. A cluster is also apparent in Clonee Village.

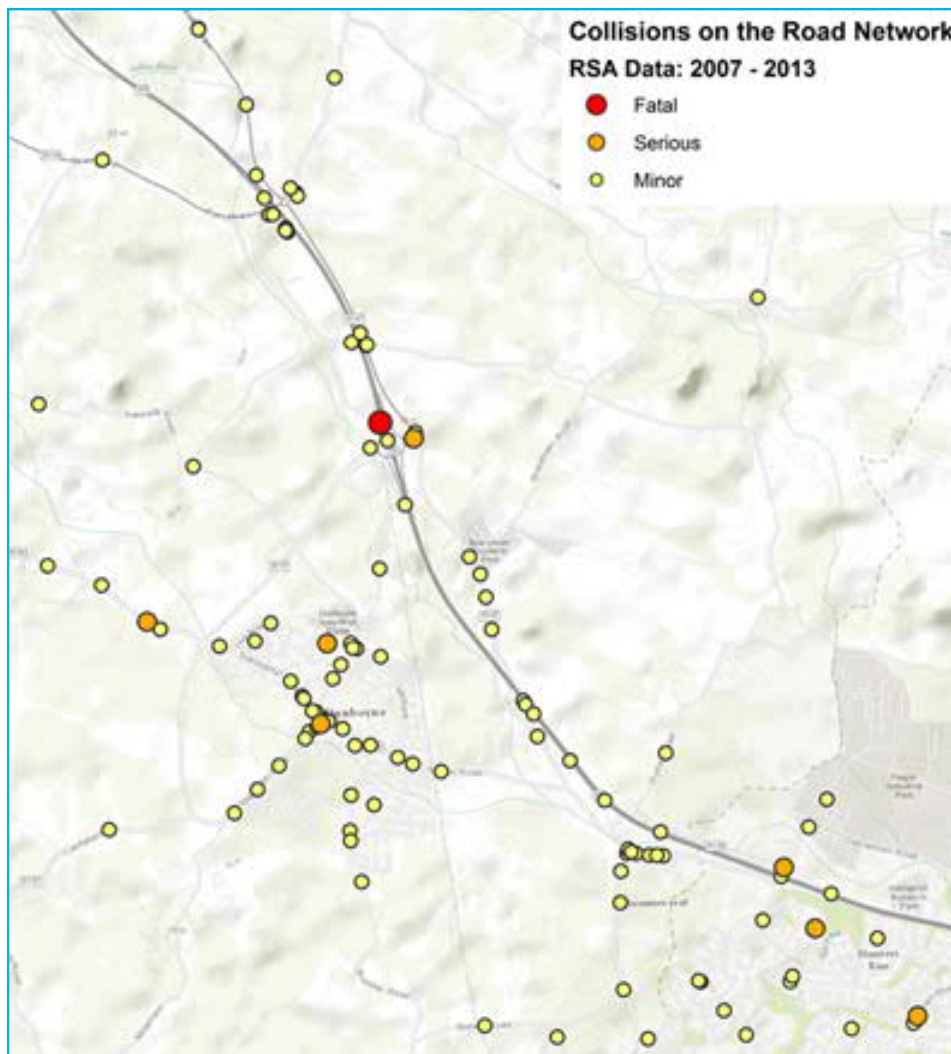


Figure 2.23. Road Collisions on the Dunboyne Road Network

The data supports the need to reduce traffic volumes in the town centre to improve safety for pedestrians/cyclists and suggests that a HGV ban in built up areas would have some merit. The data also shows that the separation of active mode trips from general traffic trips through the provision of greenways and segregated infrastructure would provide significant safety benefits for residents and visitors of the town.

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Analysis Tools

03

3. Analysis Tools

This section describes the analysis tools used in the Dunboyne Transport Assessment and the purpose of each individual model in anticipating and developing solutions to transport problems. The tools and their use in developing the Study are listed below;

- **NTA Eastern Regional Model** – Used to develop future year forecasts for Dunboyne which take account of the NTA's GDA Transport Strategy. The model provides insight to the potential mode share achievable for the Dunboyne area.
- **VISSIM Models** – Used to assess the operation of individual junctions such as the R147 accesses and the Pace interchange. Provides a means to inform the design of junctions and to ensure the junction types assumed are appropriate.
- **VISUM Model** – Used to inform the development of the roads strategy for the Dunboyne area and to assess the performance of the road network as a whole.

3.1 Eastern Regional Model (ERM) Forecast - 2035

The National Transport Authority is the transport authority for Greater Dublin and the public transport licensing agency for Ireland. The NTA's responsibilities include strategic transport planning, integrated public transport network development, walking and cycling promotion, public transport infrastructure provision and the management of transport demand. The national remit of the NTA requires a system of regional models to help it deliver on its planning and appraisal needs.

The Eastern Regional Model (ERM) is one of five models in the NTA's Regional Modelling System and focuses on the Greater Dublin Area (GDA). The ERM is represented by 1844 detailed zones in the GDA while the rest of Ireland is covered by 7 external zones (Figure 3.1). The model covers all surface access modes for personal travel and goods vehicles including private vehicles (taxis and cars), public transport (bus, rail, Luas, BRT, Metro), active modes (walking and cycling) and goods vehicles (light goods vehicles and heavy goods vehicles).



Figure 3.1. Eastern Regional Model - Internal and External Zones

In this study, the ERM was used to forecast the trip growth, trip distribution and modal split data for the year 2035 in Dunboyne as a result of planned residential and commercial developments. Detailed planning data from Meath County Council (MCC) was inputted into the ERM to produce this travel

information for each zone of the Dunboyne Local Area Model. The ERM assumed the NTA's GDA Transport Strategy was in place in addition to extended bus routes and improved frequencies to the Dunboyne area details of which are included in Section 6.

The MCC projected increase in key land-use characteristics is summarised in Table 3.1. Of note in the development of future trip generation was the assumption that the lands zoned north of the M3 at Bracetown/Gunnocks were assumed to be built out with a low employment density similar to the under construction data centre as opposed to high density employment use. Future development on this zone would need to heed by this assumption for the findings contained in this report to be valid.

Table 3.1. Projected Increase in Key Variables in Dunboyne

Year	Population	Schools	Office Space	Industrial	Housing
2035	10,751 People	6 Primary Schools 3 Secondary Schools	135,566 Sq. M.	162,550 Sq. M.	3,583 Units

The locations where demand increased are shown graphically below, which highlights the growth in the North Pace area, the Shire Site and residential areas to the south and east of Dunboyne (Figure 3.2).

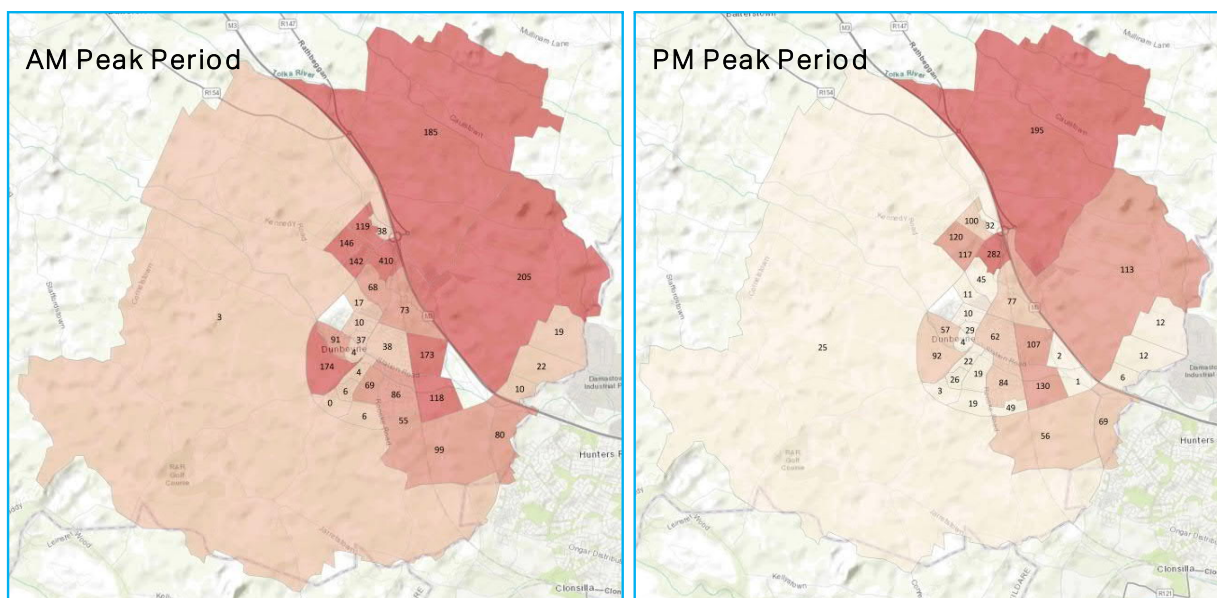


Figure 3.2. Growth in Light Vehicle Demand by ERM Zone

The road based trip demand from the ERM was used to develop growth rates for each zone in the Study Area which were applied to the calibrated 2016 VISSIM and VISUM models to develop future year demand matrices for assessment purposes. The NTA ERM was used to assess the potential mode shares in the future with various public transport options in place.

3.2 VISSIM Models (2016 and 2025)

VISSIM is a transport modelling tool used to analyse transport impacts on the local network at particular stretches of road or junctions. The aims of the VISSIM models developed as part of this project are set out below:

- To assess the impact of different traffic signals and junction arrangements along the R147 from the Black Bull roundabout to the Pace Interchange using 2016 traffic flows.
- To assess the operation of the Pace Interchange in 2025 using the ERM forecast traffic data and incorporating the future land use plans from MCC including the Dunboyne North development.

An example of a VISSIM model network from the R147 study is shown below in Figure 3.3.



Figure 3.3. Example of Vissim Modelling at the Pace Interchange

3.3 VISUM Dunboyne Local Area Model (LAM)

In order to accurately reflect traffic movements within Dunboyne and its environs, it was necessary to construct a Local Area Model (LAM) which contained a greater level of network detail than the ERM or other available models could provide. The Dunboyne LAM was developed using the VISUM strategic transport modelling software and the initial base network was cordoned from Transport Infrastructure Ireland's (TII) National Transport Model (NTpM). The road network of the Dunboyne LAM is also shown in Figure 3.4.



Figure 3.4. TII National Transport Model and Dunboyne LAM Extents

The Dunboyne LAM provides analysis of the AM and PM peaks in the base year 2016 and the forecast year 2025. Traffic data for 2025 is based on the 'trip ends' produced by the ERM which were disaggregated to LAM zones to provide future demand. The zone structure of the LAM encompasses a larger area than just Dunboyne town in order to assess the wider impact of local road network changes on strategic roads such as the M3 or M50 or vice versa (Figure 3.5).

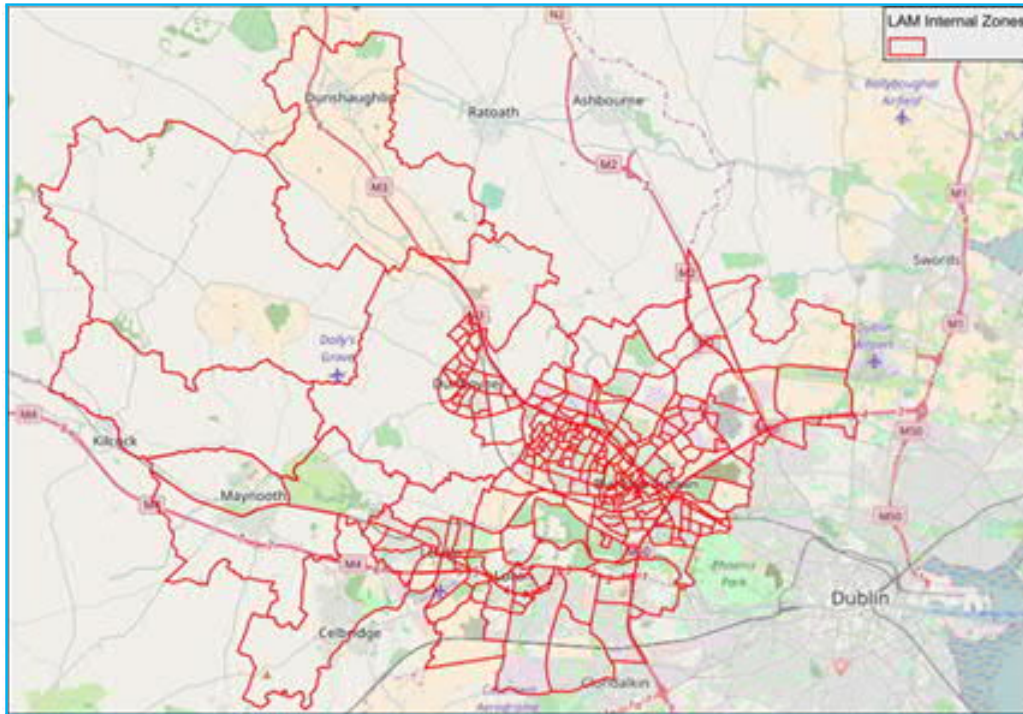


Figure 3.5. Dunboyne LAM Zone Structure

The growth in light vehicle demand between 2016 and 2025 is shown in Figure 3.6. These outputs show that the significant growth in people and jobs in Dunboyne translates into lower comparative growth rates in road based transport demand due to the improvements in the future transport network, in particular rail.

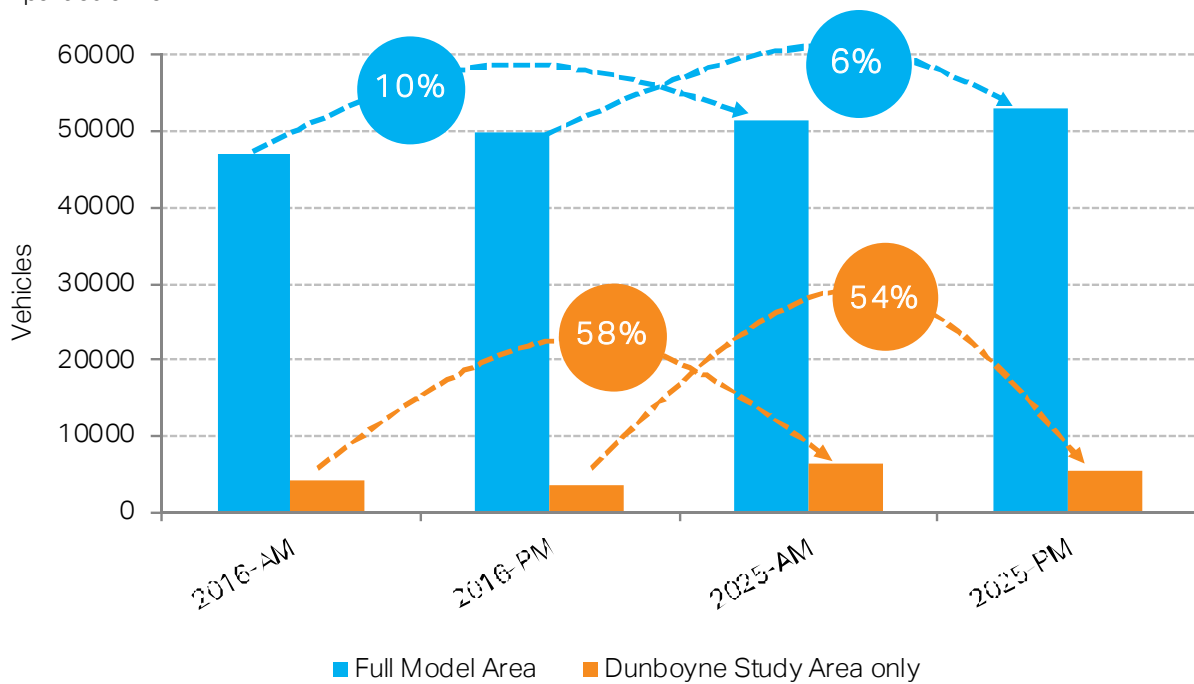
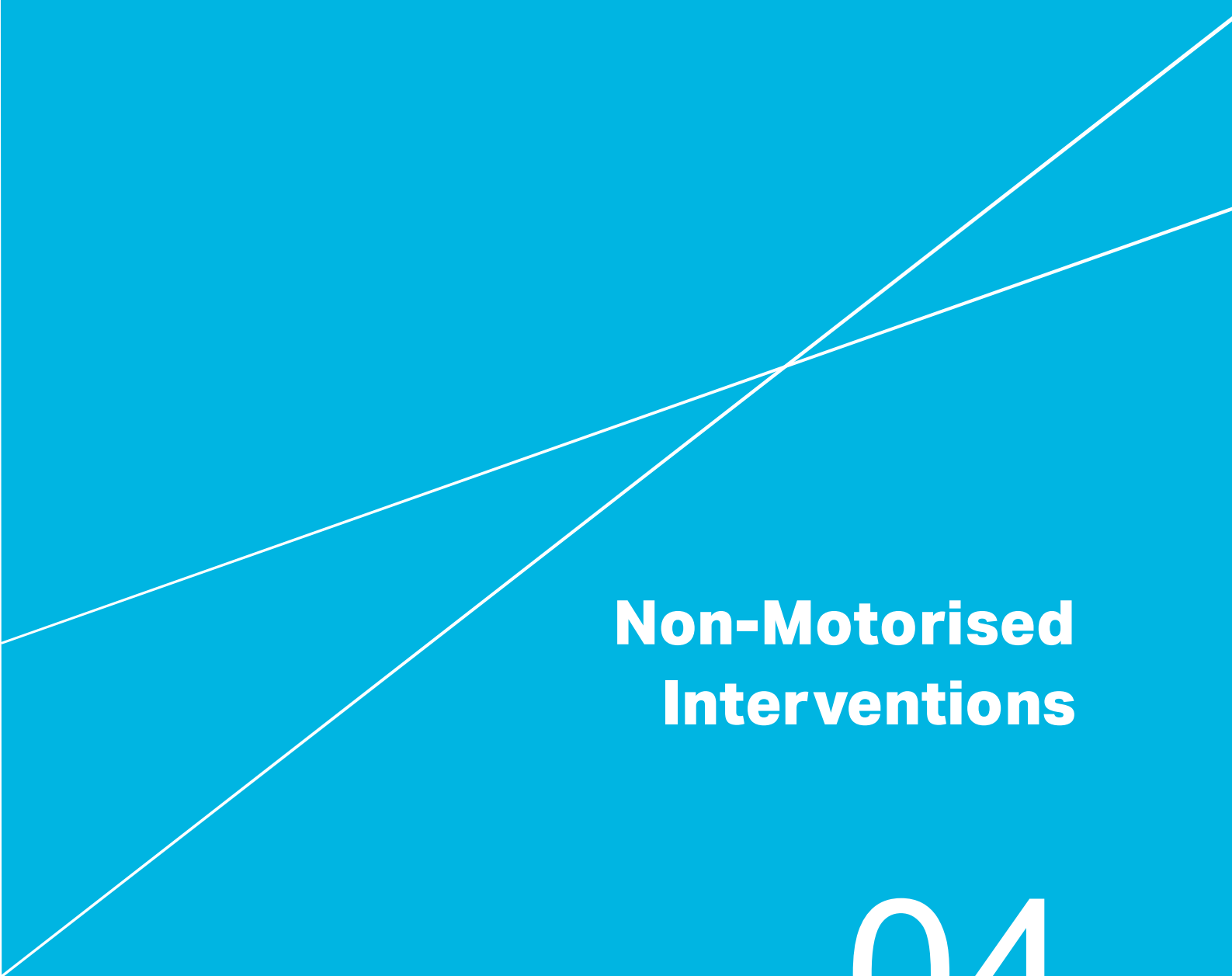


Figure 3.6. Growth in Light Vehicle Demand

The Dunboyne LAM assessed capacity and congestion issues in the base year and in 2025 due to traffic growth resulting from planned development. This model was used to identify issues and test potential solutions to problems in the existing or future road network. In order to protect the investment in the model, the model will be maintained on an annual basis to allow ongoing assessment of transport conditions and impacts of individual schemes/developments to be quantified. Details of the Dunboyne LAM calibration and validation process are provided in Appendix A.

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Non-Motorised Interventions

04

4. Non-Motorised Interventions

An assessment of existing infrastructure and future development aspirations concluded that Dunboyne requires a number of short-term and medium-term interventions to improve walking and cycling permeability throughout the study area and facilitate access to public transport services. The objectives were two fold;

1. To deliver a safe pedestrian/cyclist network which provides a high level of service
2. To improve connections to the rail stations and bus stops

This Chapter draws on the proposals made in the Greater Dublin Area Cycle Network Plan (2013) and the Dunboyne Cycle Network Plan (2015) as well as new proposals developed by AECOM.

4.1 Dunboyne Rail Station Accessibility

Dunboyne station is located to the east of the town, on the far side of the railway line. There is a single crossing point to reach the station and this creates a significant accessibility barrier which limits the potential catchment area. This contributes to the relatively small number of rail commuters recorded in the Census (2011) and the modest 279 boardings at the station on the day of the Heavy Rail Census (2016). While limited pedestrian/cyclist permeability is not the sole reason for low patronage, improving access and extending the catchment area is likely to have a positive effect on demand. This section proposes a number of interventions to improve walking/cycling access to Dunboyne train station.

4.1.1 Elton Grove Footbridge and Path Network

It is proposed that a footbridge be constructed to create a western pedestrian/cyclist entrance to the station for the residents in Elton Grove/Crescent as per Figure 4.1. This would reduce the distances travelled by local residents to the station and significantly increase the number residences within a 1km walking catchment area. Furthermore, the footbridge would create an opportunity to develop a network of paths to link the numerous cul-de-sacs in the local housing estate with the school, the church and the train station as indicated in Figure 4.1. In combination, this network of paths would provide an alternative to Station Road for non-motorised modes, potentially delivered through planning conditions. These proposals incorporate a 'feeder route' from the GDA Cycle Network Plan (2013).

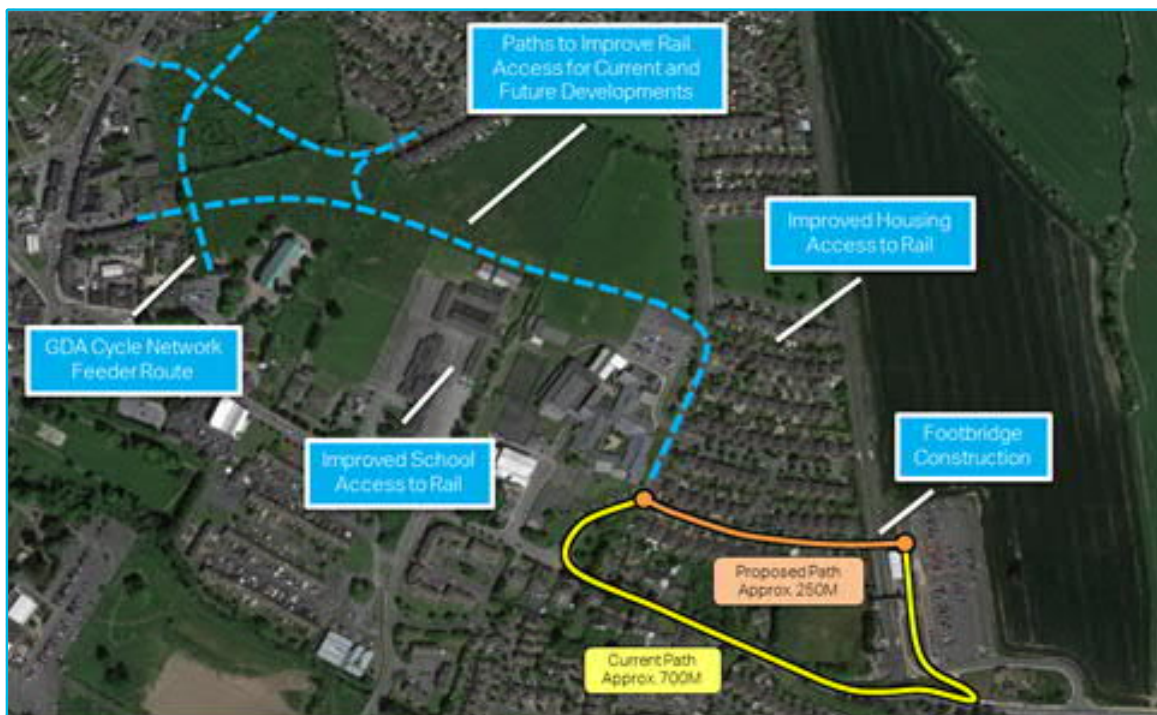


Figure 4.1. Proposed Footbridge Access to Dunboyne Train Station

4.1.2 Beechdale Footbridge and Greenway

Dunboyne Stream restricts north-south accessibility to the station and it is proposed that a footbridge be constructed to connect the Larchfield and Beechdale estates as proposed in the Dunboyne Cycle Network plan. This would increase the number of houses within comfortable walking distance of the train station (Figure 4.2) and could be integrated with the following measures:

- A greenway along Dunboyne Stream and a 'feeder route' connecting cul-de-sacs in Beechdale estate as specified in the GDA Cycle Network Plan (2013).
- An extension of the feeder route to link with the proposed footbridge and greenway.
- A small path across the large green field in the Beechdale estate to link with the footbridge.

These proposals are shown spatially in Figure 4.2 and the GDA Cycle Network Plan (2013) greenway is described in more detail in Section 4.4.



Figure 4.2. Proposed Southern Pedestrian/Cycle Access to Dunboyne Train Station

4.1.3 Existing and Potential Catchment Area for Dunboyne Station

A GIS study was completed to quantify the existing 1km railway walking catchment and the potential railway catchment which could be achieved with the creation of the paths proposed in Sections 4.1.1-4.1.2. A distance of 1km is used to represent the length people are willing to walk to heavy rail services as per the Department’s ‘Sustainable Residential Development in Urban Areas’ (2009) guidelines. Figure 4.3 shows the streets and buildings approximately within the 1km catchment of Dunboyne railway station when walking/cycling on existing paths. This highlights that roughly only a quarter of the town is within comfortable walking distance of the station and that the catchment area has been limited by poor pedestrian/cyclist permeability.



Figure 4.3. Existing 1km Dunboyne Station Catchment

The approximate number of additional buildings brought into the rail catchment area through the proposed paths is shown spatially in Figure 4.4 and numerically in Table 4.1. The extra paths more than double the existing residential catchment and integrate the rail station with the town through a network of active mode paths.

Table 4.1. Number of Buildings within 1km Dunboyne Rail Station Catchment

	No. Residential Units	No. Commercial Units
Existing 1km Catchment via Current Paths	357	34
Additional 1km Catchment via Proposed Paths	+ 507	+ 6
Total Potential Catchment	864	40



Figure 4.4. Comparison of 1km Rail Catchment on Existing and Proposed Paths

4.2 M3 Parkway Rail Station Accessibility

At present, there is no continuous segregated pedestrian/cyclist link between M3 Parkway and the employment opportunities across the M3 at the Shire, Avoca or Kilsaran sites (Figure 4.5).



Figure 4.5. Cessation of Pedestrian Facilities after the Pace Interchange on the R147 Northbound

The pedestrian/cyclist tunnel under the R157 to M3 Parkway is currently blocked off by steel fencing and is not connected to the existing path network to Woodpark Road (Figure 4.6).



Figure 4.6. Blocked Access to Pedestrian/Cyclist tunnel under R157

Improving accessibility for non-motorised modes is vital to increasing rail patronage at M3 Parkway. The following interventions are proposed to enhance access (Figure 4.7):

- Creation of a continuous pedestrian/cyclist path between M3 Parkway and the employment opportunities on the R147 via the Pace Interchange through an upgrade of existing facilities.

This will also make use of the proposed signalised junctions at the Shire and Avoca/Kilsaran sites to provide crossing points.

- Removal of the fence blocking access to the tunnel under the R157.
- Addition of lighting to the pedestrian/cyclist tunnel under the R157.
- Creation of M3 Parkway access to the housing on Woodpark Road to the north by connecting the pedestrian/cyclist tunnel under the R157 with the existing path network.
- Creation of a footbridge linking Woodpark Road with the R147 over the M3.
- Integration with the pedestrian/cyclist routes proposed in the Dunboyne North development.
- Completion of the pedestrian/cyclist link between the Navan Road and M3 Parkway proposed in the Dunboyne Cycle Network plan along a road which is currently fenced and gated as a private road.

The distance between M3 Parkway and the entrance to the Kilsaran site is approximately 1.8km which is not ideal for pedestrians but it will provide access for longer distance walkers and cyclists.

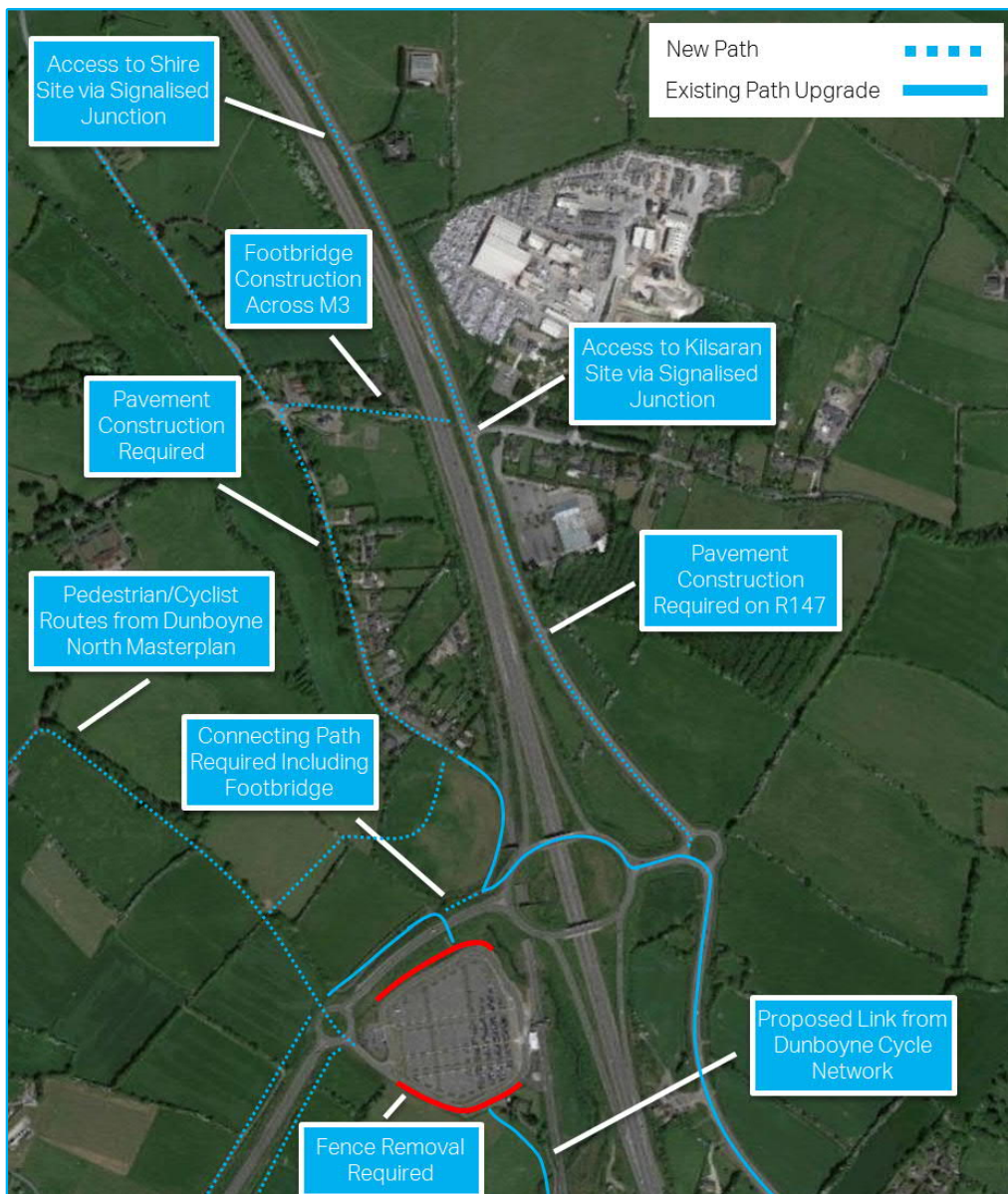


Figure 4.7. Proposed Pedestrian Access to R147 from M3 Parkway

As outlined above, the layout of the R147 is proposed to be changed to a suburban arterial road due to the change in land use from rural/single dwelling to employment orientated use. To facilitate this, a pedestrian/cyclist facility is proposed along the full length of the R147 between Black Bull and Clonee (the northern section is shown above). Some elements of this are already under construction as part of the ongoing construction of the Shire development, and will be continued for example at Avoca and the existing Bracetown Business Park.

Figure 4.8 considers the number of residences within 1km distance of M3 Parkway and shows the limited scope to expand the rail catchment beyond the measures proposed in Figure 4.7. In the future, the Dunboyne North development to the west and future development to the south will increase the population within walking/cycling distance of M3 Parkway but the current residential catchment is very limited and this station's primarily role will remain as a park & ride facility in the short-term. There is however a potential opportunity to enhance the potential for interchange at the station if bus routes are altered to stop at the station.



Figure 4.8. M3 Parkway 1km Catchment

4.3 Permeability Barriers in West Dunboyne

West Dunboyne has significant permeability issues due to extensive cul-de-sac neighbourhood designs and walled housing estates which greatly reduce opportunities for walking and cycling to the town centre and public transport services. In Figure 4.9, housing estate boundaries are shown indicatively in four examples to highlight that most residential areas have limited accessibility between

them with typically only one entrance. This type of neighbourhood design creates unnecessarily long circular routes which eliminate walking/cycling trips in cases where short distances should be involved. The example used in Figure 4.9, shows that Housing Estate A is spatially adjacent to the Business Park but the lack of integrated paths and the presence of barriers means that long circuitous travel is required to access these jobs or services.

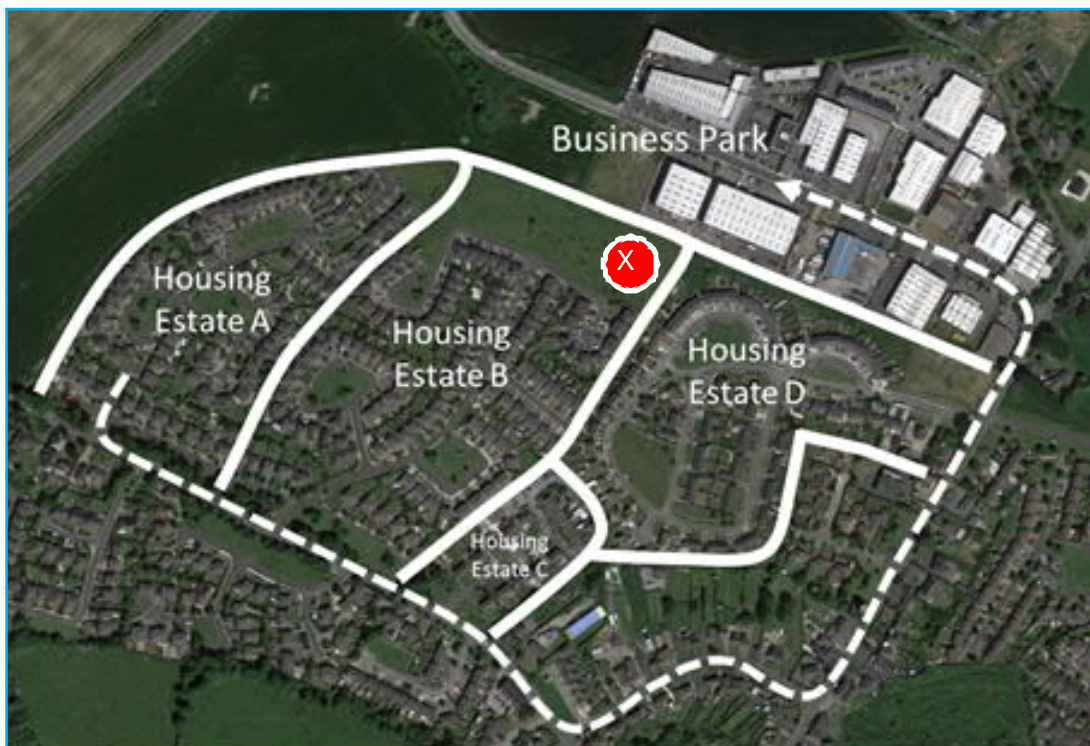


Figure 4.9. Indicative Map of Permeability Issues due to Cul-De-Sac Housing in West Dunboyne

Figure 4.10 shows a photo from Lutterell Hall (Housing Estate B) where a path ends due to the land segregation created by estate walls which block access to the Business Park on the left and Kilbrena Estate (Housing Estate D) on the right.



Figure 4.10. Lack of Pedestrian/Cyclist Permeability in the Lutterell Hall Estate

There is the potential to link housing estates A, B and D from Figure 4.9 by creating the walking/cycling path proposed in the Dunboyne Cycle Network plan (Figure 4.11). To complement this initiative, it is proposed that an additional access point should be created between this path and Dunboyne Business Park. This will provide walking/cycling access for residents to jobs, services and Dunboyne

College of Further Education in the business park and improve overall permeability. Furthermore, Chapter 6 proposes the extension of bus routes through the Business Park and these paths will facilitate access to public transport stops.



Figure 4.11. Proposed Dunboyne Business Park and Housing Estate Pedestrian Paths

A potential concern in relation to a pedestrian/cyclist route between the Lutterell Hall estate and the Business Park is the presence of Thornton’s recycling centre at the western edge and the volume of HGV traffic (Figure 4.12). In this regard, the creation of the ‘Business Park Link’ road to the R157 and the town centre HGV ban proposed in Chapter 5 will mean that heavy vehicles accessing the Thornton’s site will no longer use the Business Park road. This will greatly improve safety in the Business Park, however this issue should be monitored during implementation and associated measures introduced if required to improve conditions for pedestrians and cyclists.

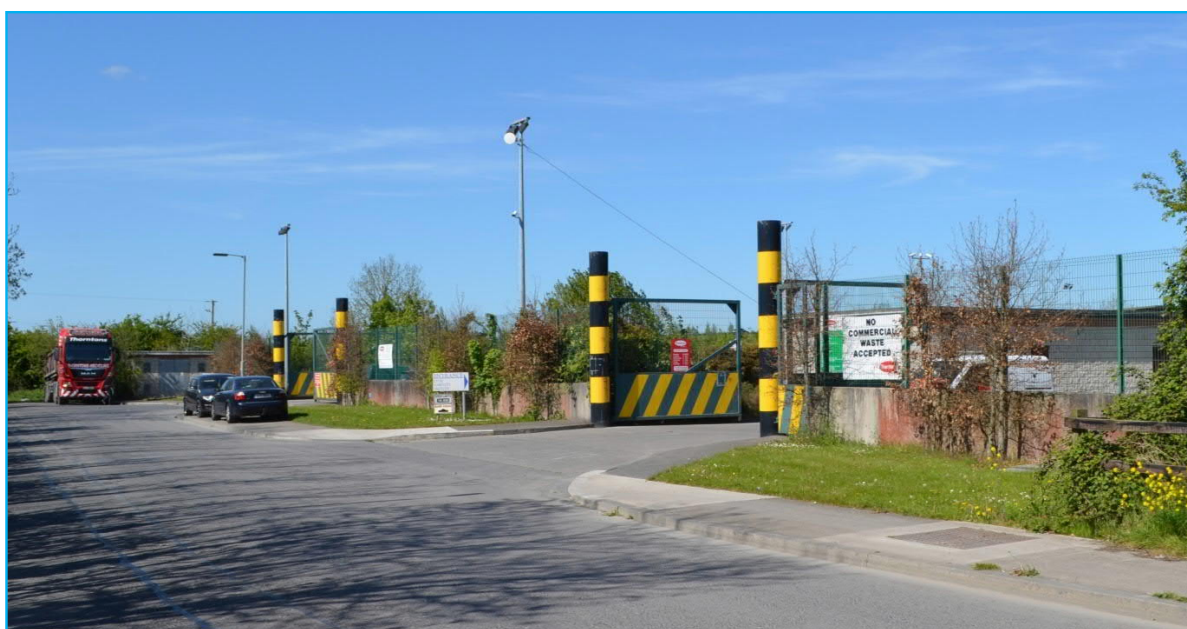


Figure 4.12. Thornton's Recycling Limited at the Western Side of the Business Park

4.4 East-West Accessibility for Non-Motorised Roads

The GDA Cycle Network Plan (2013) includes a design for a greenway which runs parallel to Dunboyne Stream between the R157 and Station Road (Figure 4.13). The GDA Cycle Network shows the greenway on the northern side of Dunboyne Stream and the strategy adopts this design as it provides greater permeability between the Hamilton Hall and Larchfield housing estates. It must be noted that the Dunboyne Cycle Network plan considers an alternative design for a greenway on the southern side of the stream. This report considers the strategic role of east-west greenway in Dunboyne as specified in the GDA Cycle Network but acknowledges that a preferred route will emerge during implementation which will likely incorporate elements from both designs.

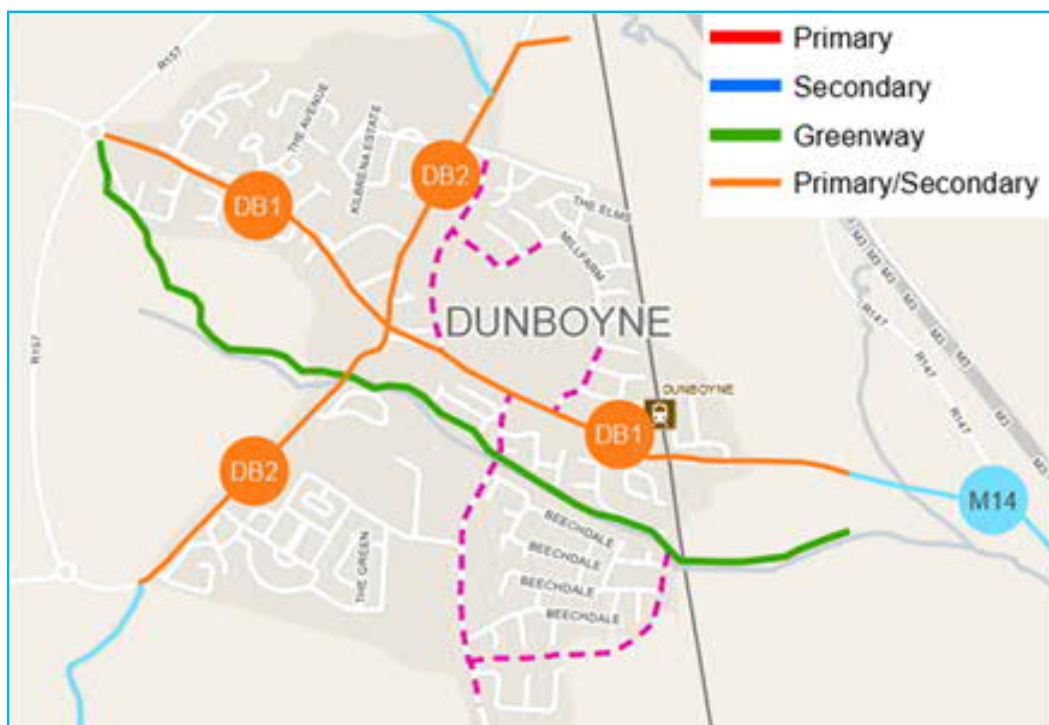


Figure 4.13. GDA Cycle Network Plan (2013) for Dunboyne

The creation of Dunboyne Stream greenway would provide a dedicated pedestrian/cyclist route along the east-west axis of the town to complement the other proposed paths and create a network of low traffic alternatives to the main road. Figure 4.14 shows the path of the greenway as proposed in the GDA Cycle Network Plan (2013) and the potential movements facilitated in white arrows to locations such as; the town centre, St. Peter’s National School/Church, Dunboyne Library and the Gaelscoil. Key design considerations will be the provision of a new crossing point over the railway line and limiting environmental impact along the stream.



Figure 4.14. Dunboyne Greenway and Facilitated Movements

As can be noted in Figure 4.14, some modifications are suggested to enhance the effectiveness of the greenway at each end point. In the west, the planned entrance to the greenway is at a roundabout which is not ideal for a cyclist route and so it is proposed that a short spur should be added to create a preferred low traffic access point through the housing estate at Garnett Hall (Figure 4.15). In the east, the greenway, as designated in the GDA Cycle Network Plan (2013), ends at an unpaved track access to Station Road. This Strategy proposes that the greenway should be extended to provide full pedestrian/cyclist access to Station Road to facilitate users with all levels of mobility (Figure 4.14).



Figure 4.15. Proposed Greenway Spur to Gamett Hall

4.5 Overview of Non-Motorised Interventions

A list of all proposed non-motorised interventions is provided in Table 4.2 and a map of the locations is shown in Figure 4.16.

Table 4.2. List of Proposed Non-Motorised Interventions

Location	Intervention	Details
M3 Parkway	Footbridge	Link over M3 between Woodpark Road and the R147 by Kilsaran Site
	Paths	Linking M3 Parkway to Woodpark Road, R147, Navan Road and Dunboyne North
R147, Navan Road and R157	Paths	Addition of pedestrian/cyclist paths
Business Park	Paths	Linking Dunboyne Business Park with the three housing estates to the south
Dunboyne National School	Paths	Linking Dunboyne National and Secondary Schools to the railway footbridge, Station Road, Navan Road, The Meadows and Old Fairgreen
Dunboyne Station	Footbridge	Linking the train station to Elton Grove over the railway line
Greenway	Paths	Link along Dunboyne Stream from Summerhill Road to Station Road
Beechdale	Footbridge	Link between Larchfield and Beechdale estates over Dunboyne Stream
	Paths	Feeder route linking cul-de-sacs across Beechdale to the footbridge
	Paths	Creation of a short path across the green in Beechdale to link to the footbridge



Figure 4.16. Summary of Non-Motorised Interventions in Dunboyne

The background is a solid blue color. There are several thin white lines that intersect to form a geometric pattern. One line is vertical, another is horizontal, and several others are diagonal, creating a series of triangles and quadrilaterals across the page.

**Road Transport
Interventions**

05

5. Road Transport Interventions

This Chapter describes the development of a road transport strategy for Dunboyne to support the future road based travel requirements identified for the area. This was undertaken through the evaluation of different potential measures using the analysis tools described in Chapter 3.

5.1 Do-Minimum Scenario

The Do-Minimum (DM) Scenario incorporates two new roads which are likely to be completed before 2025 within the study area boundary. The DM is the comparison scenario against which all potential Do-Something (DS) Scenarios are assessed. The changes to the network which are included in the Do-Minimum Scenarios are shown spatially in Figure 5.1.

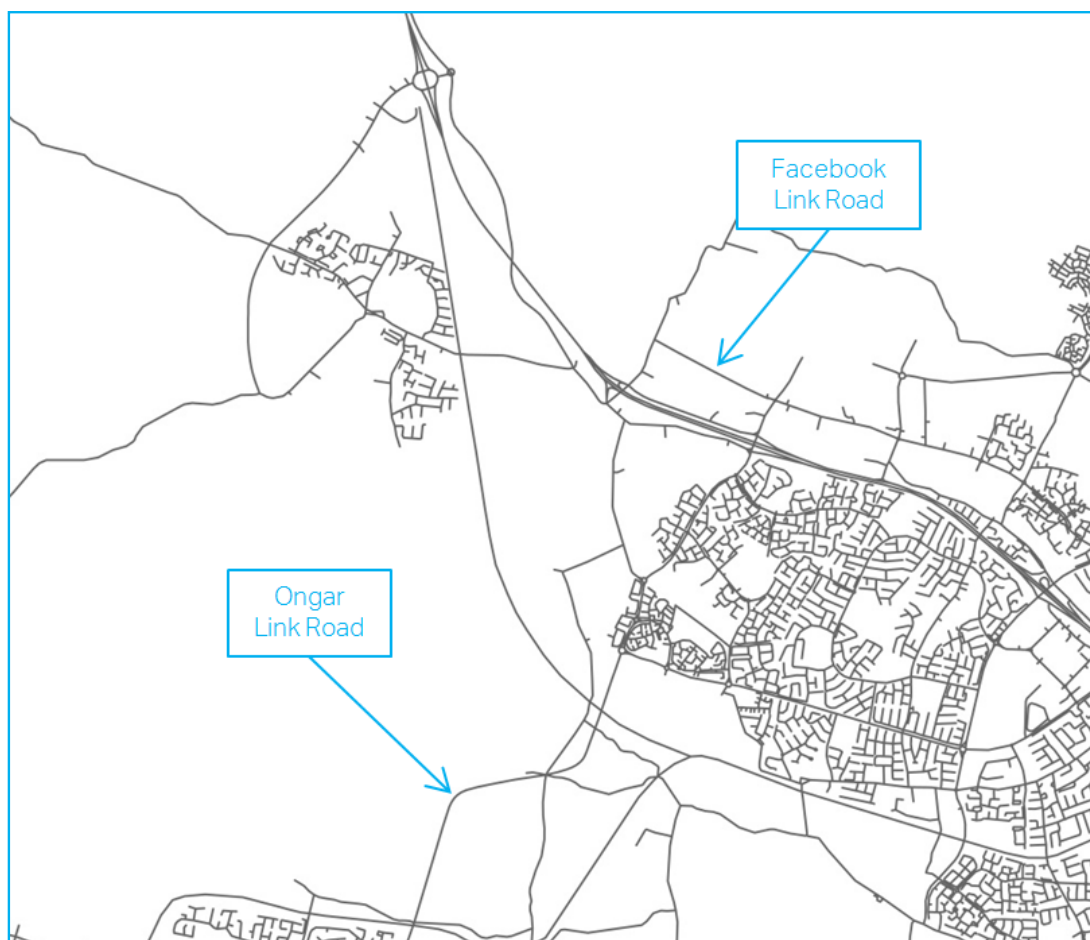


Figure 5.1. Do-Minimum Scenario Sites

The details of the Do-Minimum Scenario measures are provided in Table 5.1.

Table 5.1. Do-Minimum Scenario Measures

Type	Location	Details
Road	Facebook Site	Link road connecting Damastown Road and the Facebook site
Road	Ongar	Link road connecting N4 and Ongar proposed in various studies. Some sections are built or under construction at present

A volume/capacity analysis of the Do-Minimum Scenario in 2025 is shown in Figure 5.2 for the AM peak and Figure 5.3 for the PM peak. This shows that present day issues on the R157, Pace Interchange, Clonee and the R147 have become problematic in future years and require mitigation.

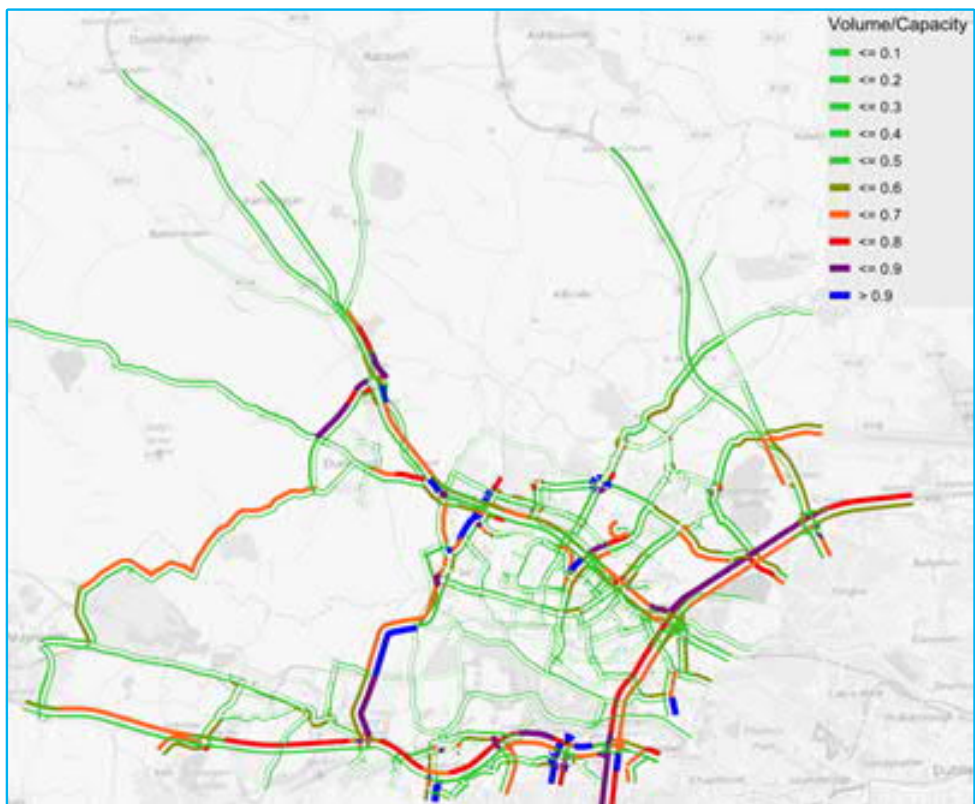


Figure 5.2. Do-Minimum AM Scenario in 2025 - Volume/Capacity

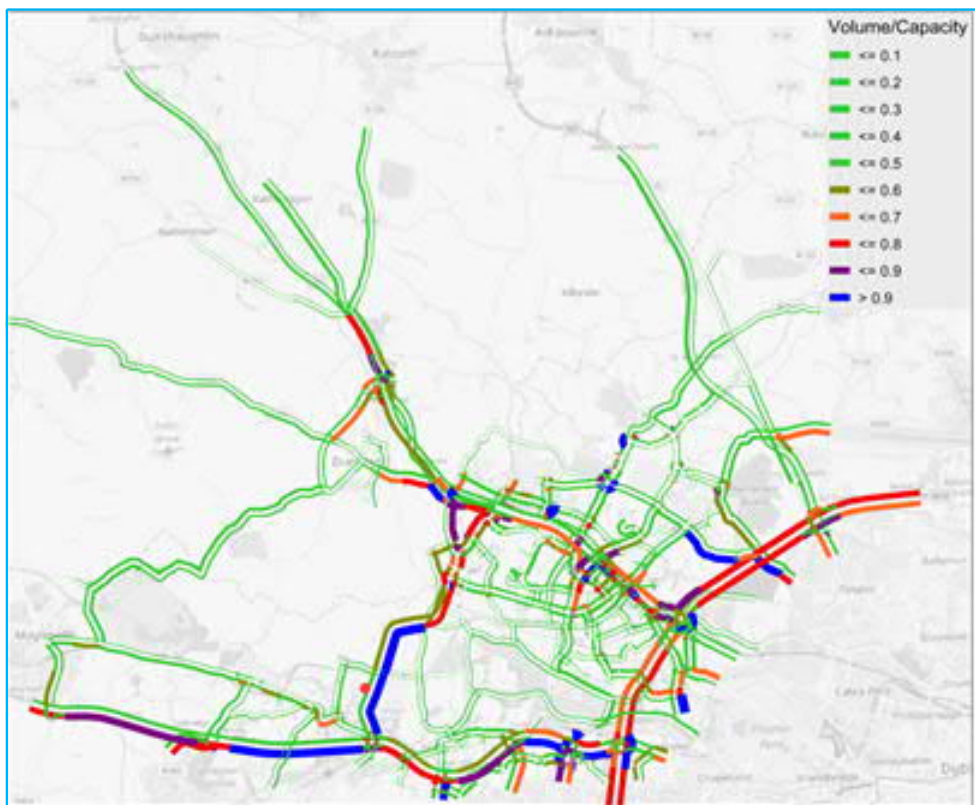


Figure 5.3. Do-Minimum PM Scenario in 2025 - Volume/Capacity

5.2 Road Strategy Development

This section divides the Dunboyme LAM into four specific areas for consideration (Figure 5.4); the R147 corridor (Section 5.2.1), the Pace Interchange (Section 5.2.2), Dunboyme Town (Section 5.2.3) and

Clonee West (Section 5.2.4). In each case study area, the traffic issues in the 2025 DM Scenario are established and mitigation measures are evaluated for potential inclusion in the Do-Something Scenario/Strategy in Section 5.3.

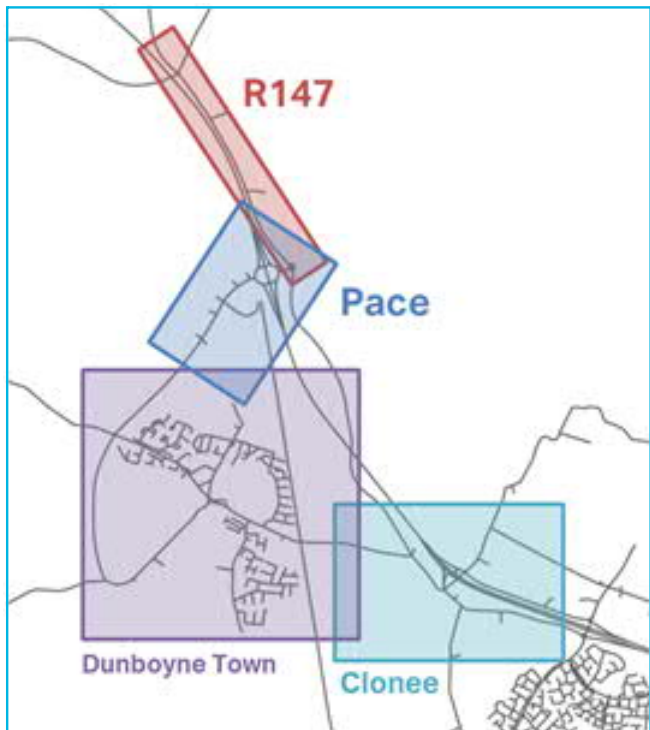


Figure 5.4. Case Study Areas in Strategy Development

5.2.1 R147 Corridor

Given the plans for development along the corridor, this Strategy envisages that the function and form of the R147 between Black Bull and Clonee will evolve over the coming years into a suburban arterial road with signalised junctions, reduced speeds and high quality pedestrian and cyclist facilities. A potential cross section for the R147 between Black Bull and Pace is presented below in Figure 5.5.

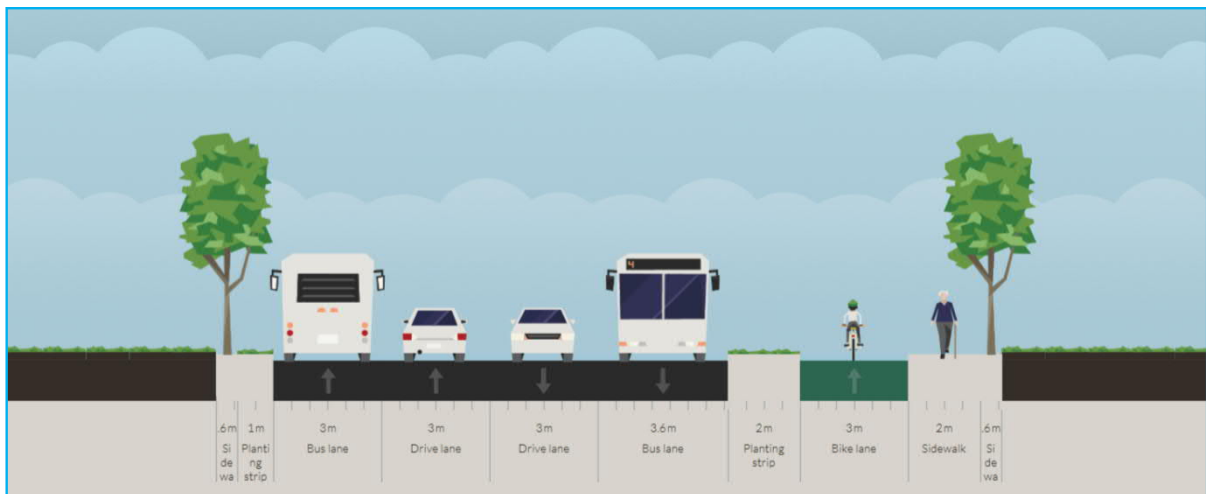


Figure 5.5. Potential Cross Section for the R147 (Partially Under Construction) between Black Bull and Pace

Chapter 2 described how the R147 and the Pace Interchange are experiencing increased congestion on the adjacent minor junctions largely due to increasing traffic demand on the R147 corridor. The 2025 Do Minimum model shows that, in the absence of any interventions in this area, this trend continues into the forecast year with the negative impacts becoming particularly severe in the case of

the southbound slip at Pace which causes queuing onto the R147, R157 and the roundabout to the east of the Pace interchange. These locations have reached capacity limits in the AM peak and similar themes are shown in reverse for the PM peak (Figure 5.6).

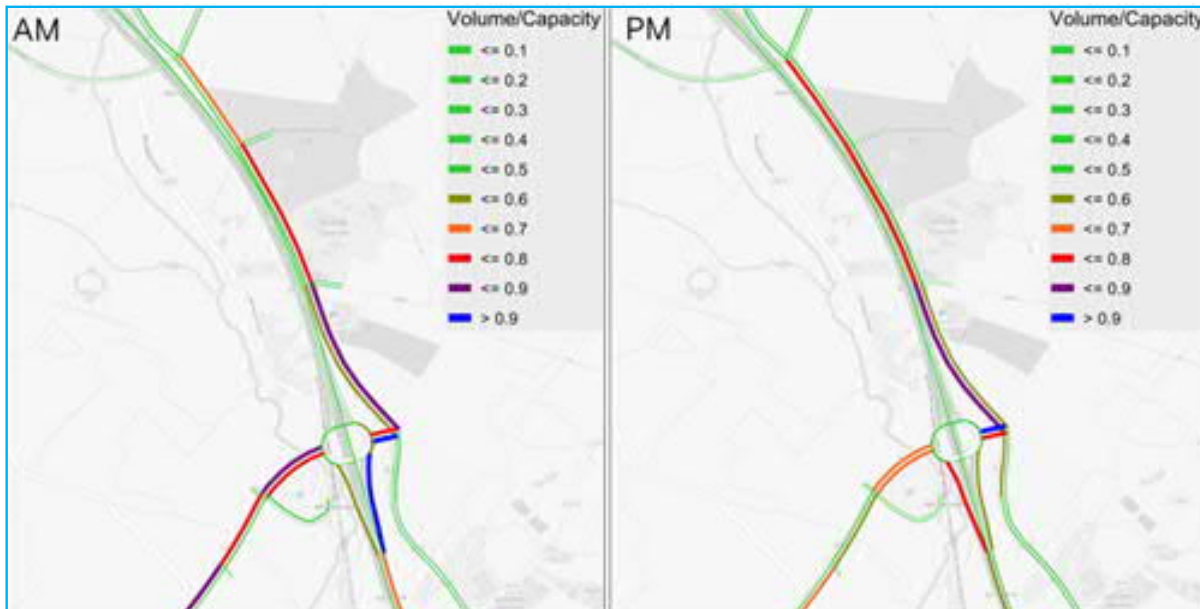


Figure 5.6. Volume/Capacity on R147 - DM 2025 AM and PM

In addition to its regional role to provide a link between Navan, Dunshaughlin and Dunboyne, the R147 provides access to two large trip generators at the Shire and Kilsaran/Avoca sites. The use of this road by traffic as an alternative to the tolled M3, while the parallel M3 mainline operates well below capacity, requires some form of intervention to allow the R147 to cater for the anticipated local demand and to encourage the use of the M3 where appropriate.

To understand the potential benefits and impacts of any interventions, a VISSIM model was developed to better understand traffic patterns in the area (Figure 5.7). A number of scenarios were tested with varying junction types/layouts to identify the optimum design for the junctions along the corridor. In order to improve the operation of the R147 and rebalance traffic usage; the following interventions are proposed.



Figure 5.7. Black Bull Signalised Junction in Vissim Modelling

- Replace the Black Bull Roundabout with a signalised junction which could cater for the increased traffic volumes resulting from the Shire site (Figure 5.7). This would ensure the even distribution of capacity across all arms of the junction.
- The Shire access is to be built as a signalised junction to improve the management of traffic along the R147 and enhance pedestrian/cyclist access.
- Signalisation of the existing Kilsaran/Avoca site junction to improve traffic control along the route and pedestrian/cyclist access.
- Replace the existing R147 Roundabout at the eastern arm of the Pace Interchange with a signalised junction/expanded roundabout (dependent on impact of above measures on R147 demand).

In combination, the provision of signals and junctions along the route will provide greater safety for cyclists and pedestrians accessing employment sites on the R147 while also reducing speeds in order to make the M3 a more attractive choice for those travelling between Dunboyne and destinations north such as Dunshaughlin and Navan. A representation of reduced demand on the R147 and transference to the M3 is shown in Figure 5.8.



Figure 5.8. Relocation of Trips from the slower R147 to the M3 Mainline

In addition to above, an assessment was undertaken to assess the potential to provide additional access points onto the M3 in the vicinity of Black Bull to alleviate congestion at Pace. The assessment found that irrespective of the contractual and financial issues involving the M3 toll, there was insufficient space to deliver a safe access point to the M3 in line with guidelines given the proximity of the Pace interchange and the toll booths, which would provide sub-standard weaving distance as per Section 7.9.1 of TII design publication DN-GEO-0360.

5.2.2 Pace Interchange and Dunboyne North

The Dunboyne 2025 Do Minimum (DM) forecast highlights the increasing pressure on the Pace Interchange as a result of traffic growth (Figure 5.9). Potential problems at the on/off slips and the eastern arm of the interchange have been discussed in Section 5.2.1. Based on this analysis, the main ring of the interchange does not require intervention at this time as sufficient road space capacity is provided. However, there are clear volume/capacity concerns on the R157 between Summerhill Road and the Pace Interchange and on the R147. This is particularly the case in the AM peak and an obvious contributing factor has been the Dunboyne North development which is proposed to have two access junctions along this stretch of the R157, at the existing M3 Parkway roundabout and another a few hundred metres to the south.

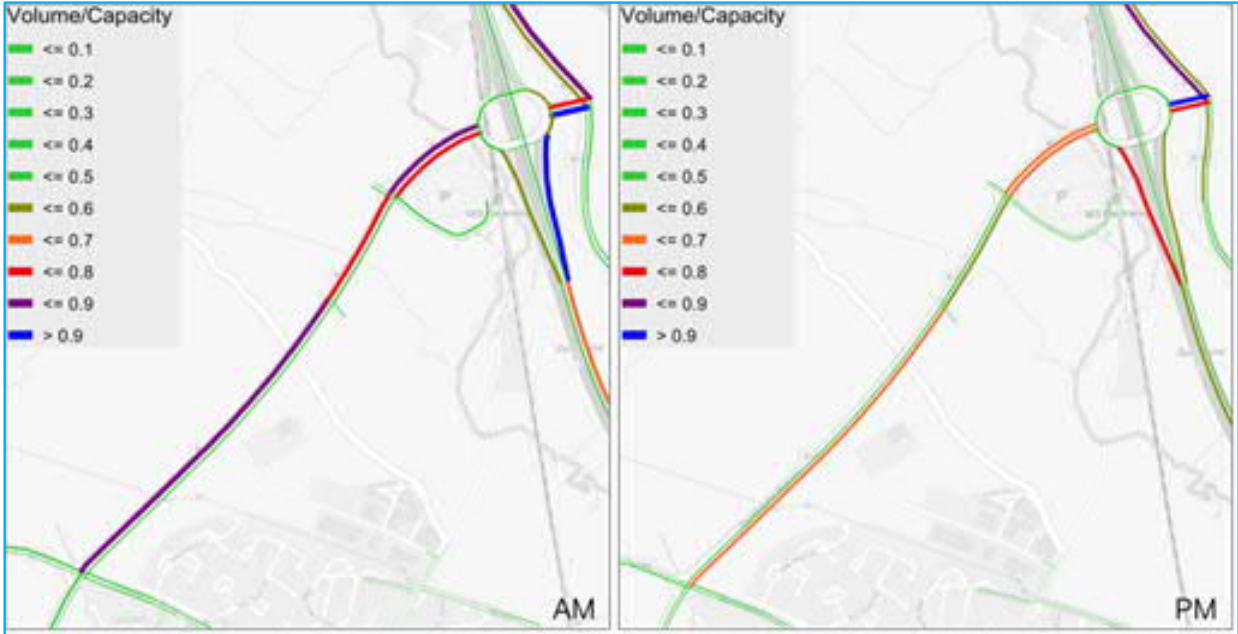


Figure 5.9. Volume/Capacity on the R157 and Pace Interchange - DM 2025 AM and PM

In order to maintain effective operation of the R157 after the construction of the Dunbooyne North development, it is clear that the operation of this route should be upgraded between Summerhill Road and the Pace Interchange. It is proposed that both Dunbooyne North access points are signalised to ensure the future residents/employees provided with high quality infrastructure to encourage the use of active modes for trips to/from the town centre, public transport and other amenities. In addition to provided safe passage across the R157 for pedestrians and cyclists, the signals will also regulate the entry of traffic to the main ring and facilitate clearing of traffic build up. The impact of an extra lane in each direction, required to facilitate right turning traffic, along the R157 in combination with signalisation was tested against the Do-Minimum Scenarios in the AM and PM peaks. The positive impact of these measures, in road space capacity and in asset protection terms, is shown in Figure 5.10 and they are incorporated into the Do-Something Strategy in Section 5.3 as a result.

The issues on the R147 still remain as a result of traffic using the R147 to access the M3, however it is envisaged that the interventions outlined in Section 5.2.1 will reduce demand on this route.



Figure 5.10 Volume/Capacity on the R157 with proposed signalised junctions - 2025 DS AM & PM

The Dunboyne North junctions will be designed to ensure safe and efficient crossing point for pedestrians and cyclists. It is envisaged that away from the junctions, the R157 pedestrian/cycle facilities on either side of the R157 will be provided within the development lands due to the raised vertical alignment of the existing road compared to the adjacent lands (Figure 5.11). It should be noted that these facilities will be incorporated into the junctions in a safe manner to allow crossing movements.

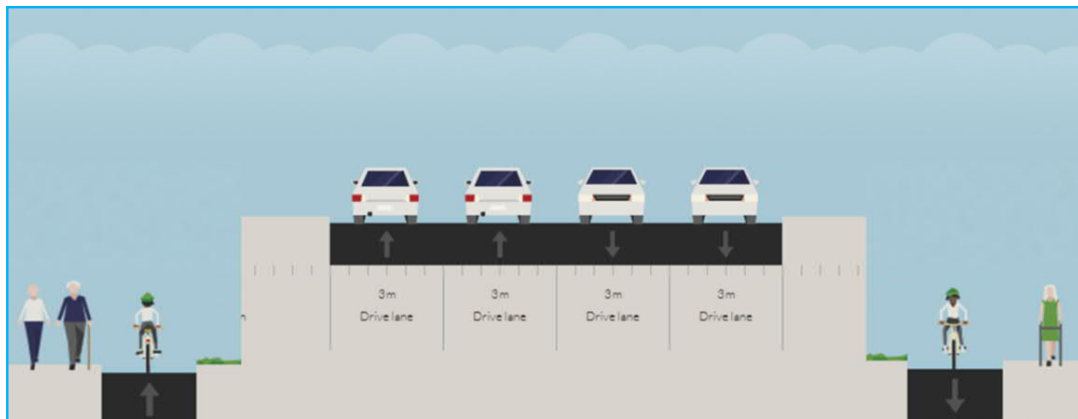


Figure 5.11. Potential Cross Section for the R157 between Summerhill and North Dunboyne Accesses

The R157, south of the Castlefarm Roundabout, is a road which suffers from poor horizontal alignment and in recent years has experienced an increase in injury incidents. The traffic demand along this section of road, which links Dunboyne to Maynooth, has experienced significant growth in recent years which may be linked to congestion on the M50 and other major roads. In this regard, it is suggested that some form of safety remedial measures will be required to improve the safety of the route. In time, the completion of the Ongar Link Road may attract a significant proportion of this traffic.

In order to ensure that these interventions do not have any unforeseen knock on effects on the Pace Interchange, extensive VISSIM modelling was also undertaken which showed that the interchange was protected in the future.

In addition to above, due to existing safety and alignment issues, it is proposed that access to the proposed Dunboyne North development is not provided onto Kennedy Road.

5.2.3 Dunboyne Town

The main volume/capacity issues in Dunboyne town in the 2025 Do-Minimum Scenario can be observed along the eastern side of Station Road (Figure 5.12). Chapter 2 highlighted that a reasonably high number of minor and serious collisions have occurred in Dunboyne town centre between pedestrians and light/heavy vehicles (Figure 2.23). Therefore, the focus in the Dunboyne town area is to reduce the volume of through-traffic movements to improve safety for pedestrians/cyclists, to free up road space to allow for urban realm measures and to lessen the capacity issues on Station Road.

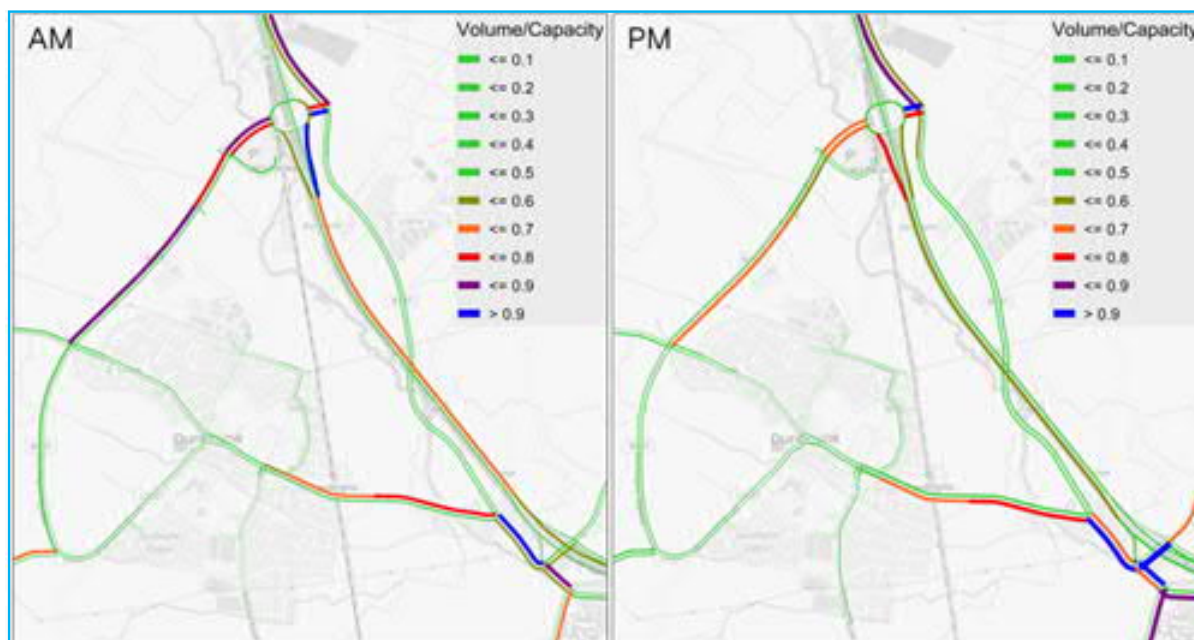


Figure 5.12 Volume/Capacity in Dunboyne town - DM 2025 AM and PM

Firstly, to improve safety conditions in the town centre for active modes; a Heavy Goods Vehicle (HGV) ban is proposed in central areas to reduce potentially serious collisions and enhance the quality of the urban environment. In order to provide an alternative to the built up town centre roads for HGV's to access Dunboyne Business Park, three new road links are proposed (Figure 5.13):

- Dunboyne Business Park link to the R157;
- Eastern Distributor Road (EDR) between Station Road and Dunboyne Business Park; and
- Link between the R157 and the Old Navan Road to provide a direct connection to Dunboyne town centre to ensure connectivity between the areas.

There will be no direct access between Dunboyne North and the Kennedy Road which passes under the R157 from the Old Navan Road.



Figure 5.13. Proposed Dunboyne Town Centre Road Links

The function of these links is not to provide additional road based capacity but to provide improved access to suitable roads and to reduce the level of traffic through the town centre. In combination, these three roads create an eastern-northern alternative which allows for Business Park traffic to completely avoid the town centre when accessing the M3 at Pace or Clonee. The function and form of the EDR and the R157-Old Navan Road Link will be urban to provide balanced level of service to both active modes and motorised modes (Figure 5.14). Whilst the EDR is not anticipated to require a bus lane in the short term, given its route, the population/employment catchments it will serve in the coming years and the journey time savings it offers, it is considered prudent to provide for a verge which could be converted into a potential bus lane in the future (Figure 5.14).

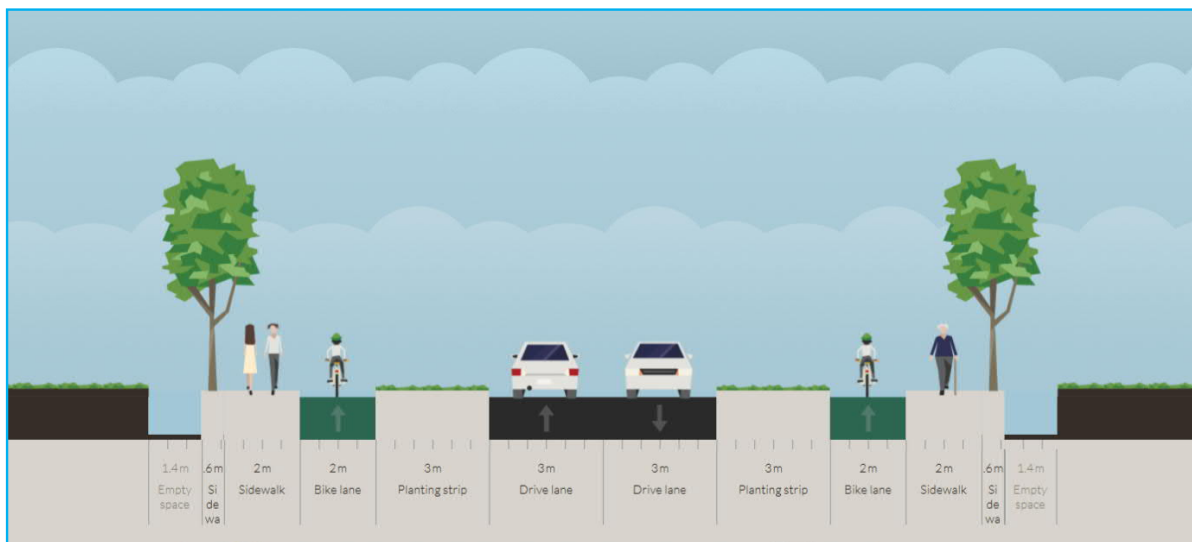


Figure 5.14. Potential Cross Section for the R157 to Old Navan Road Link and EDR

Given the role of the Business Park Link in providing for heavy good vehicles together with providing an alternative access into the Business Park and Dunboyne, it is envisaged the road will take a slightly different form albeit with high quality pedestrian and cyclist provision.

The EDR is deliverable as part of the development of the residential zone to the east of the town centre whilst the Business Park link is relatively minor as the majority of the link is already in place. In Figure 5.15, the impact of these interventions on the town centre is shown to be positive with a notable reduction in traffic using Station Road or residential areas to access the business park as traffic makes use of the Eastern Distributor Road. An additional measure to complement these measures is an upgrade of the Rooske Road/Station Road junction to include an extra lane on the eastern/western arms of the intersection to improve traffic flow and safety near the primary and secondary schools.

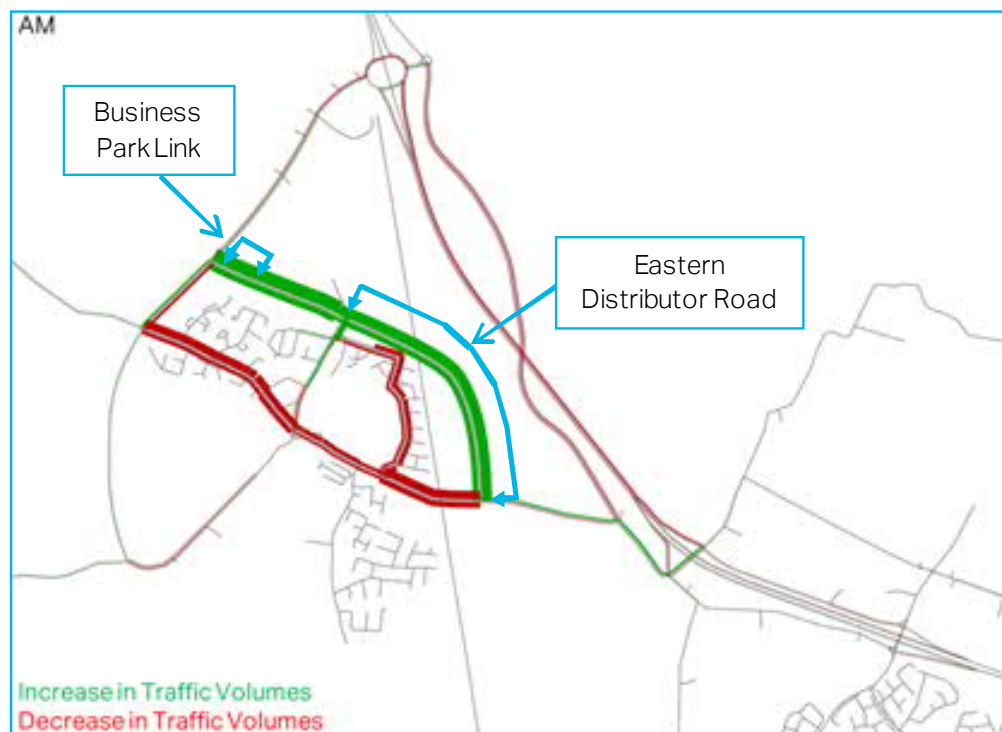


Figure 5.15. Impact of the Business Park Link and the Eastern Distributor in the DM Scenario (AM)

5.2.4 Clonee

The M3 Clonee interchange has been identified as requiring interventions as part of various strategies as the traffic demands and movements have evolved significantly since its construction in the early 1990's. The Transport Strategy for the Greater Dublin Area 2016 – 2035⁶ sets out the government's plans for transport during the period 2016 – 2035 and in relation to the National Road network it states its intention to deliver various projects including the "widening of the N3 between Junction 1 (M50) and Junction 4 (Clonee), plus related junction and necessary changes to the existing National Road network". The recently published Project Ireland 2040: National Development Plan 2018 – 2027⁷ also makes mention of the N3 upgrades at Clonee. Whilst not included for delivery within the 2018 – 2027 timeframe the N3 Clonee to M50 scheme is referenced as a project to be "progressed through pre-appraisal and early planning during 2018 to prioritise projects which are proceeding to construction in the National Development Plan". Fingal, as sponsoring agency, supported by TII as sanctioning authority, are currently in the process of undertaking a study to improve the capacity of the N3 between Clonee and the M50 the findings of which will set out the future plans for the corridor. It is noted that the 5 year mid-term review of the NDP will provide further clarity on the funding and timescale for delivery of future phases of the N3 Clonee to M50 scheme.

The Clonee West junction is currently catering for high peak traffic volumes and the DM forecast shows that the junction has reached, or is approaching, capacity in 2025 at the following locations (Figure 5.16):

- R147 between Station Road and Clonee West during the AM and PM peaks;
- R156 in the AM and PM peaks;
- Clonee West M3 Bridge in the PM peak; and
- Clonee Village in the PM peak.

⁶ https://www.nationaltransport.ie/wp-content/uploads/2016/08/Transport_Strategy_for_the_Greater_Dublin_Area_2016-2035.pdf

⁷ <https://static.rasset.ie/documents/news/2018/02/5569359-ndp-strategy-2018-2027-web.pdf>

In response to these issues, the most immediate requirement is a capacity upgrade at the section of the R147 between Station Road and Clonee West to deal with the congestion projected in the 2025 Do-Minimum Scenario and to ensure the effective operation of the Clonee/M3 junction.

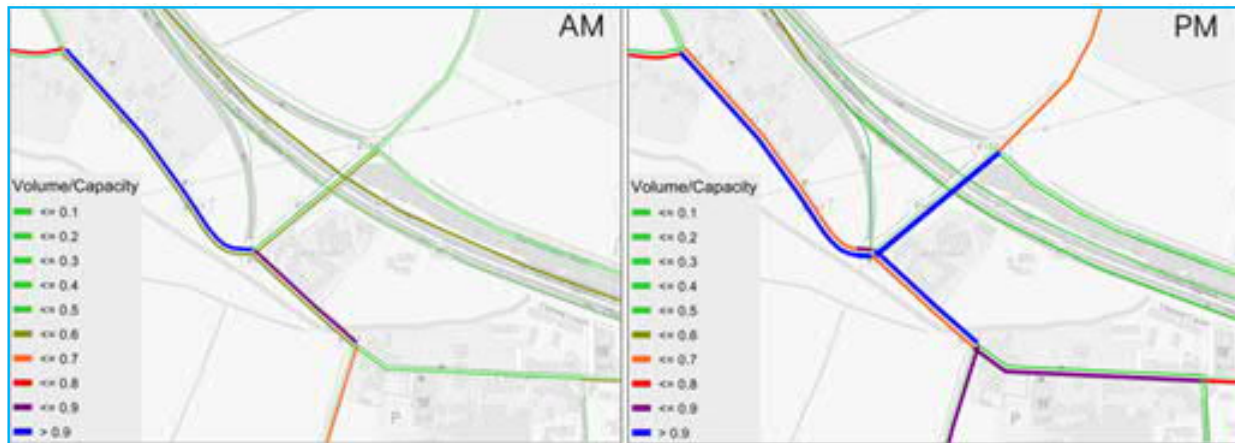


Figure 5.16. Volume/Capacity in Clonee West - DM 2025 AM and PM

Beyond this capacity upgrade, it is important to consider the strategic role of the Clonee West junction. Crucially, this junction does not include a northbound exit slip or a southbound entry slip as these are located at Clonee East on the other side of the village. This creates a situation where traffic exiting the M3 to access Dunboyne has to leave the motorway at the eastern junction and travel through Clonee Village to reach the town (Figure 5.17). This greatly increases traffic volumes in the village, reducing the quality of its urban realm and increasing local congestion.

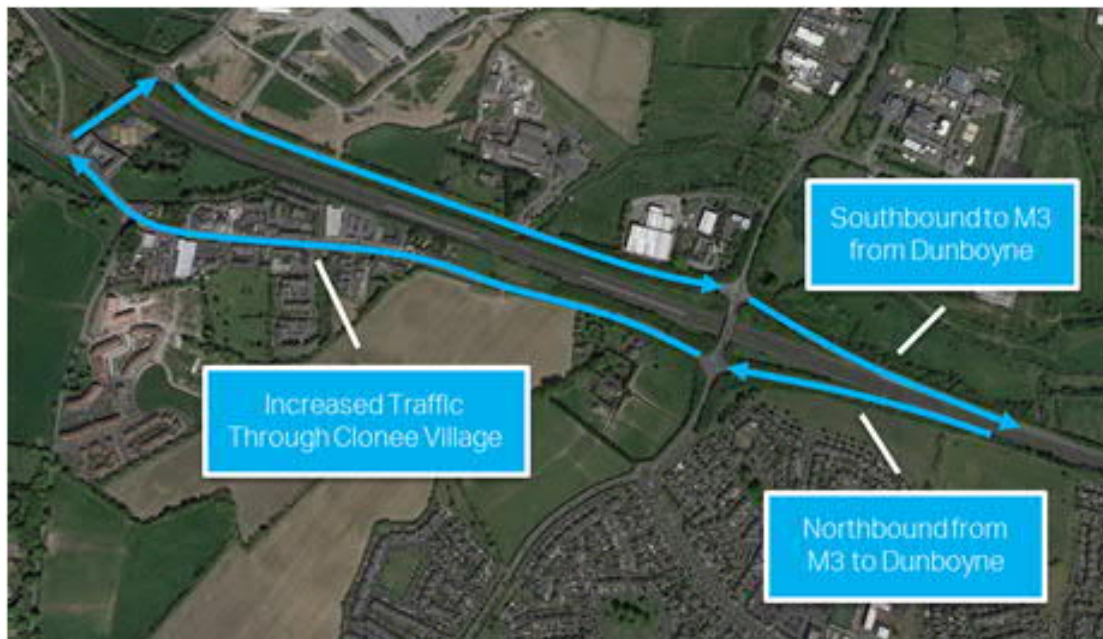


Figure 5.17. Access to and from Dunboyne via the Clonee Interchange

The traffic arrangements on the two bridges of the Clonee interchange also increase traffic volumes through Clonee village and exacerbate the capacity issues. This is as a result of the bridge at the eastern junction only allowing northbound traffic, meaning that vehicles travelling south from Damastown Industrial Park must make a longer circular journey via Clonee West and Clonee village (Figure 5.18).



Figure 5.18. Lack of Two-Way Bridge Increasing Traffic in Clonee Village for Southbound Trips

To resolve these issues previous studies have suggested that additional entry/exit slips could be added to Clonee West to reduce through-traffic in the village. The final designs for the interventions will emerge from the ongoing N3 Clonee to M50 Study. To accommodate this future upgrade and to improve the layout from the safety perspective, the R147/R149 junction will be realigned to separate the operation of the Clonee interchange from local traffic between Dunboyne and Ongar. A further potential measure to improve safety is the implementation of a HGV ban in the centre of Clonee village to ensure use of the M3 via the new slips at Clonee West.

Figure 5.19 demonstrates how the junction redesign and the Clonee interchange upgrade could be completed in a two stage process. Stage 1 would involve the realignment of the R147/R149 junction to produce the following benefits:

- The inclusion of the Stage 1 infrastructure would remove at least 30-50% of traffic from the existing Clonee West roundabout which would significantly improve the operation of the interchange. Development sites within the study area that are likely to impact upon the Clonee junctions include sites to the east and south east of Dunboyne village and north of the M3 at Bracetown/Gunnocks. The removal of one arm of the existing Clonee West roundabout would also significantly increase the capacity of the junction (~30%). The reduced demand and improved capacity would allow for all traffic growth associated with the scale of development likely to occur for the period up to the delivery of Stage 2 infrastructure.
- Facilitates the required capacity upgrade of the R147 between Station Road and Clonee West;
- Provides a separate route for Dunboyne-Ongar traffic which does not impact on the junction which could represent significant demand should the proposed Ongar Link Road be delivered;
- Creates an improved environment for R147 residents through the creation of a cul-de-sac;
- Reduces through-traffic in Clonee village to increase safety and the quality of the urban realm; and
- Delivery can be completed in advance of a potential Southern Distributor Road (SDR), which may be required in the future if demand increases (Described in Section 5.4).

Stage 2 (Figure 5.19) would involve the upgrade of the Clonee west interchange to produce the following benefits:

- Allows for the delivery of additional entry and exit slips on the M3 at Clonee west;
- Slips serve varying purposes; northbound off slip would remove Bracetown bound traffic from Clonee whilst southern on slip would relieve pressure on the southern signalised junctions of Clonee Interchange.



Figure 5.19. Proposed Alternative Junction Layout at Clonee West

The realignment of the R147/R149 junction and the Clonee West interchange upgrade were tested against the Do-Minimum to understand their local impact (Figure 5.20). The key change is that the new junction layout has removed substantial volumes of north-south traffic between Dunboyne and Ongar from Clonee West so that the junction can accommodate the additional demand using the junction as a result of the new entry/exit slips. Furthermore, the revised design has lessened through traffic in Clonee Village and transferred this to the M3 mainline. Through-traffic in Clonee village has reduced by around 360 trips in the AM peak and there has been a small reduction (260 trips southbound and 120 trips northbound) in mainline flow between Clonee and Pace.



Figure 5.20. Impact of Clonee West Re-design in Comparison with DM Scenario (AM)

To complement the alternative junction design and the HGV ban in Clonee village, some further changes are also required to the existing bridge configuration as part of the Clonee interchange upgrade:

- An additional northbound lane on the bridge at Clonee West is required to resolve the capacity issues highlighted in the 2025 Do-Minimum Scenario and to cater for the increased demand from the additional southbound on-slip. Site surveys showed that this bridge is 12.5m wide and could accommodate an additional lane if pedestrian/cyclist access is removed. In this case, an alternative pedestrian/cyclist footbridge would be required to facilitate access.
- The current bridge layout at Clonee East is one-way northbound and it is proposed that this should be restructured to accommodate two northbound lanes and one southbound lane. The creation of a two-way bridge would reduce pressure on Clonee West and allow for HGVs to bypass Clonee village.

The key advantages of the R147/R149 junction realignment and the Clonee Interchange upgrade are that the revised layout encourages the use of the Ongar Link Road (instead of the R157 which has existing safety issues), it allows traffic to follow desire lines rather than forcing traffic to undertake longer more onerous journeys to access the M3 at less congested locations, it increases the attractiveness of the N2-N3 Link Road and significantly improves the ambience and safety of Clonee Village. While the R147/R149 junction realignment could potentially be delivered in the short term to provide immediate relief of congestion issues in Clonee, the interchange upgrade would require more substantial funding and is subject to the findings of a separate N3 Clonee to M50 Study.

5.3 Do-Something Strategy

The Do-Something Scenario (DS) incorporates all of the elements of the Do-Minimum Scenario with the addition of the road transport interventions proposed in Section 5.2. The Do-Something modifications are listed in Section 5.3.1 and their impact is described in Section 5.3.2.

5.3.1 Do-Something Scenario Interventions

Each of the Do-Something road transport interventions are listed with additional detail in Table 5.2.

Table 5.2. List of Do-Something Scenario Interventions

Type	Location	Details
Junction with Signals	Black Bull	Conversion of existing roundabout into a signalised junction
"	Shire Site	"
"	Dunboyne North – M3 Parkway Northern Entrance	"
"	Dunboyne South – Old Navan Road Link Southern Entrance	"
New Signals	Kilsaran Site	Signalisation of existing junction
Junction Upgrade	Pace Interchange – R147	Increased roundabout width to support higher capacity.
"	Rooske Rd/ Station Rd	Additional slips on east and west junction axis
"	M3 - Clonee West	Additional on and off slips at Clonee West with additional northbound lane provided on the bridge
"	Clonee West	Junction redesigned to accommodate traffic from Ongar Link Road
"	Clonee East	Bridge redesigned to accommodate two-way traffic
Capacity Upgrade	R147	Capacity upgrade between Station Road and Clonee West
	R157	Capacity upgrade between Summerhill Road and Pace
HGV Ban	Dunboyne	HGV ban on the Station Road in the town centre
"	Clonee	HGV ban in the village centre
Road	Business Park - R157	New link between Dunboyne Business Park and the R157
"	Business Park - Station Rd	EDR between Dunboyne Business Park and Station Road
"	Old Navan Road – R157	New link between old Navan Road and R157

The spatial location of the road interventions are shown in Figure 5.21.



Figure 5.21. Spatial Location of Road Transport Interventions

5.3.2 Do-Nothing and Do-Minimum Network Statistics

In order to quantitatively assess the impact of the proposed interventions, the 2025 VISUM Local Area Model was used. The AM network statistics for the Do-Nothing (DN) and Do-Minimum (DM) models are shown in Table 5.3.

Table 5.3. DN and DM Network Statistics (AM)

Year	Scenario	Total Trips (Vehs/hr)	Total Travel Time (hrs)	Travel Time per Vehicle (mins)	Total Distance (km)	Total Delay (hrs)
2016	DN AM	48,983	10,352	12.68	507,338	3,337
2025	DN AM	53,728	12,690	14.17	566,717	4,824
2025	DM AM	53,728	12,457	13.91	565,733	4,610

The percentage change between the 2025 network statistics and the base model (AM) are shown in Table 5.4.

Table 5.4. Percentage Change in DN and DM Network Statistics (AM)

Percentage Change (versus 2016 Base Year AM)					
Year	Scenario	Total Travel Time (hrs)	Travel Time per Vehicle (mins)	Total Distance (km)	Total Delay (hrs)
2025	DN AM	+23%	+12%	+12%	+45%
2025	DM AM	+20%	+10%	+12%	+38%

PM network statistics for the Do-Nothing (DN) and Do-Minimum (DM) models are shown in Table 5.5.

Table 5.5. DN and DM Network Statistics (PM)

Year	Scenario	Total Trips (Vehs/hr)	Total Travel Time (hrs)	Travel Time per Vehicle (mins)	Total Distance (km)	Total Delay (hrs)
2016	DN PM	51,454	11,976	13.97	565,747	4,144
2025	DN PM	54,747	13,808	15.13	599,994	5,440
2025	DM PM	54,747	12,958	14.20	596,881	4,680

The percentage change between the 2025 network statistics and the base model (PM) are shown in Table 5.6.

Table 5.6. Percentage Change in DN and DM Network Statistics (PM)

Percentage Change (versus 2016 Base Year PM)					
Year	Scenario	Total Travel Time (hrs)	Travel Time per Vehicle (mins)	Total Distance (km)	Total Delay (hrs)
2025	DN PM	+15%	+8%	+6%	+31%
2025	DM PM	+8%	+2%	+6%	+13%

5.3.3 Do-Something Network Statistics

AM network statistics for the Do-Something Scenario models are shown in Table 5.7.

Table 5.7. Do-Something Network Statistics

Year	Scenario	Total Trips (Vehs/hr)	Total Travel Time (hrs)	Travel Time per Vehicle (mins)	Total Distance (km)	Total Delay (hrs)
2025	DS AM	53,728	11,950	13.3	564,937	4,144
2025	DS PM	54,747	12,320	13.5	595,311	4,085

The percentage change between the 2025 DS network statistics and 2025 DN Scenario is shown in Table 5.8.

Table 5.8. Percentage Change in DS Network Statistics with 2025 DN

Percentage Change (versus 2025 Do-Nothing)					
Year	Scenario	Total Travel Time (hrs)	Travel Time per Vehicle (mins)	Total Distance (km)	Total Delay (hrs)
2025	DS AM	-6%	-6%	-0.3%	-14%
2025	DS PM	-6%	-6%	-1%	-14%

The percentage change between the 2025 DS network statistics and 2025 DM Scenario are shown in Table 5.9.

Table 5.9. Percentage Change in DS Network Statistics with 2025 DM

Percentage Change (versus 2025 Do-Minimum)						
Year	Scenario	Total Travel Time (hrs)	Travel Time per Vehicle (mins)	Total Distance (km)	Total Delay (hrs)	
2025	DS AM	-4%	-4%	-0.1%	-10%	
2025	DS PM	-5%	-5%	-0.3%	-13%	

As shown above, the proposed interventions have a positive impact on road conditions with average travel times reducing by 1-2mins per vehicle (4-5%). These network statistics are for the full modelled area as shown in Figure 3.5, so they significantly underestimate the local impact of the schemes in Dunboyne itself.

5.3.4 Impact of DS Strategy on Link Flows and Capacity

The link flows in the 2025 AM peak of the Do-Something Strategy are shown in Figure 5.21.

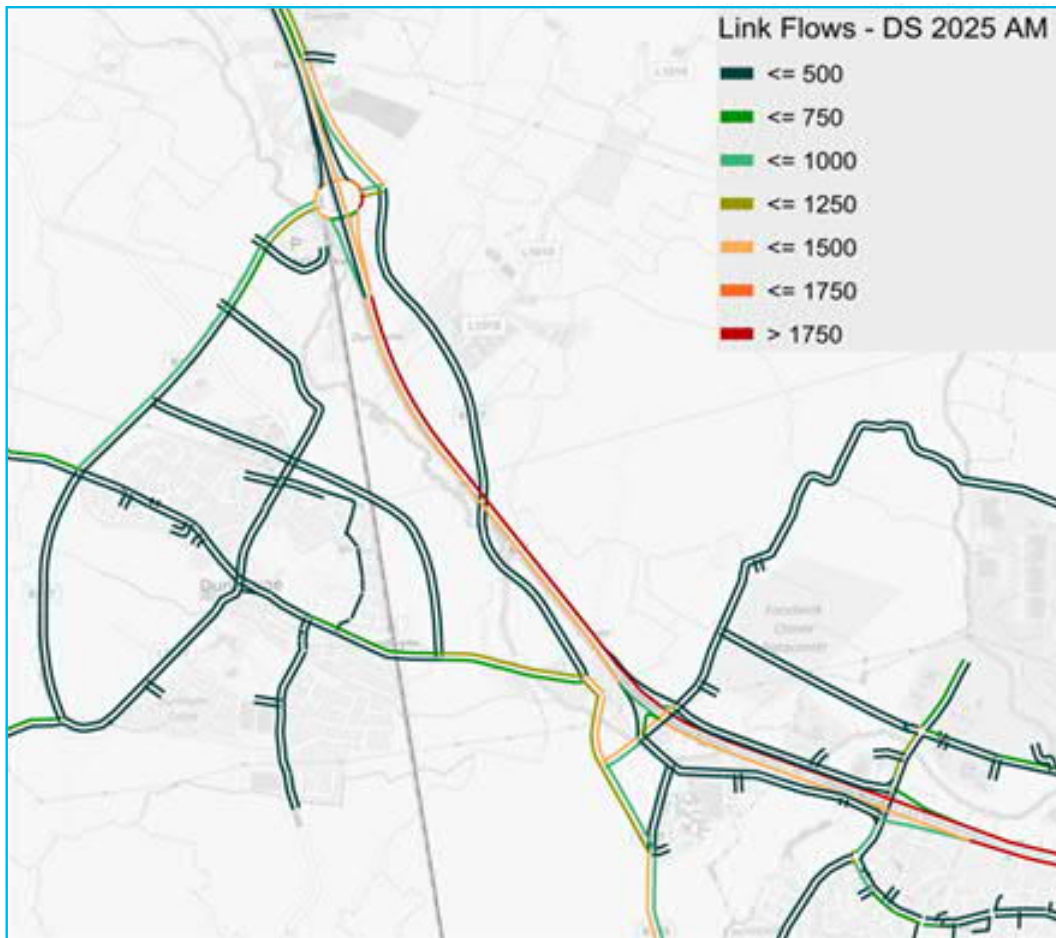


Figure 5.21. 2025 DSAM - Link Flows

The link flows in the 2025 PM peak of the Do-Something Strategy are shown in Figure 5.22.

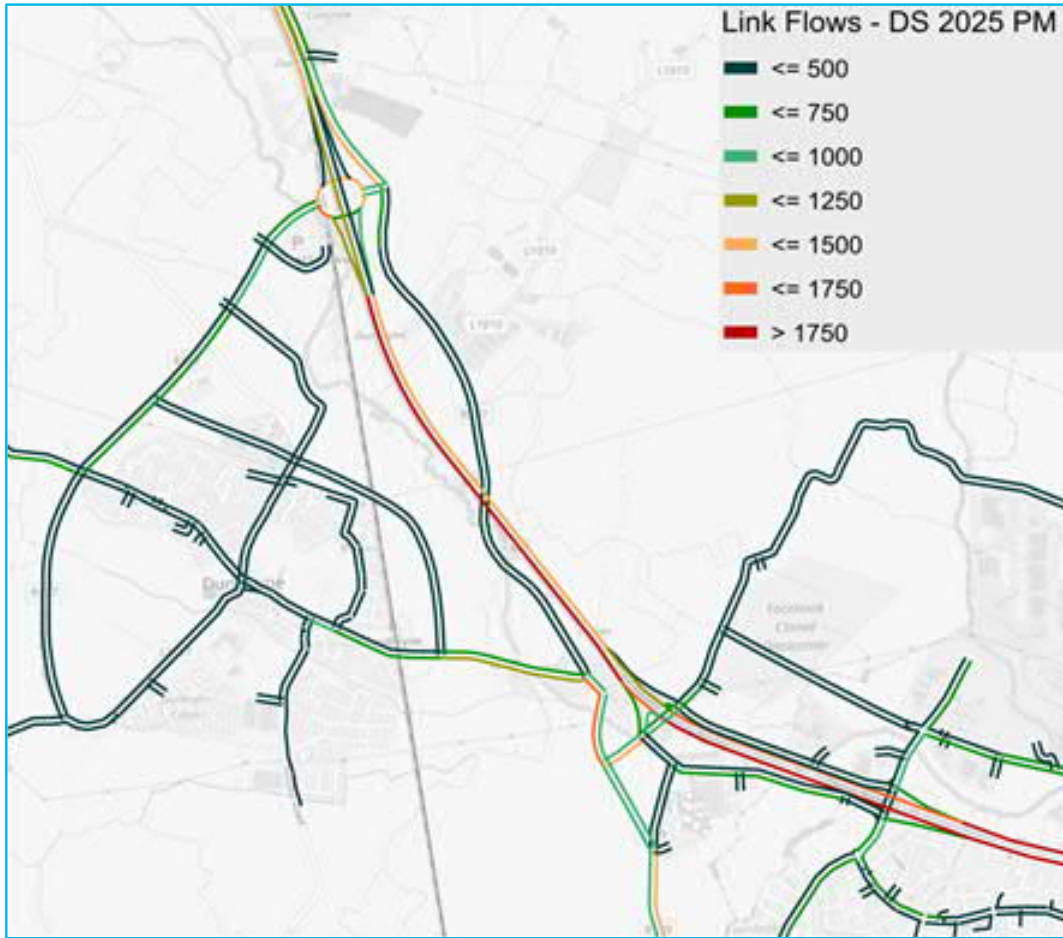


Figure 5.22. 2025 DS PM - Link Flows

The volume/capacity of links in the 2025 in the AM and PM peaks of the Do-Something Strategy are shown in Figure 5.23.

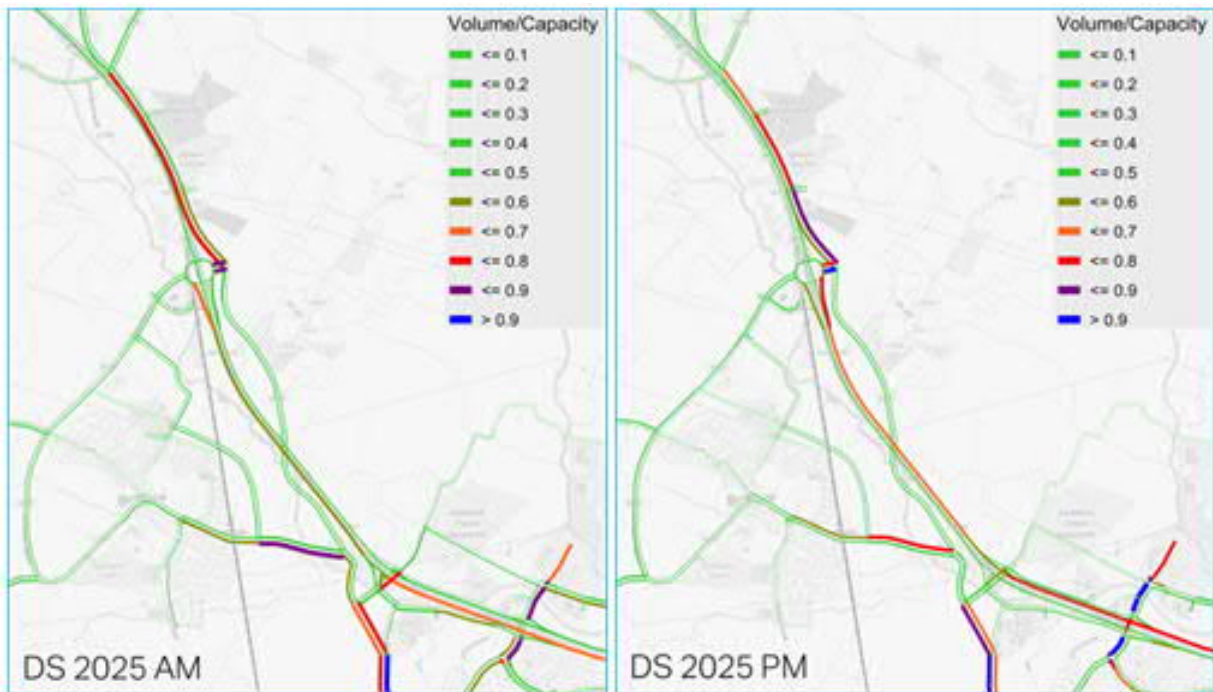


Figure 5.23. 2025 DS AM and PM - Volume/Capacity on Links

5.4 Potential Long Term Road Transport Intervention

The construction of additional entry/exit slips at Clonee West will reduce pressure on the R157/Pace Interchange but it will put greater pressure on the R147 and Station Road. If flows increase significantly and lead to unsafe conditions for active models in the town centre in the future, then it may be necessary to create a Southern Distributor Road (SDR) which would reduce through-traffic in Dunboyne town centre, complement the HGV ban and create an east-west route across the railway line for south Dunboyne (Figure 5.24). This scheme is considered a longer term aim and is linked to the upgrade of Clonee, town centre conditions and access requirements for lands south of Dunboyne. Should this be delivered in the future, complimentary public transport measures would be required to serve the corridor and provide alternative transport options to the private car.



Figure 5.24. Potential Southern Distributor Road Corridor

The impact of the potential SDR in addition to the DS strategy is shown in Figure 5.25 and this indicates a significant reduction in traffic flows at the Pace Interchange and Station Road.

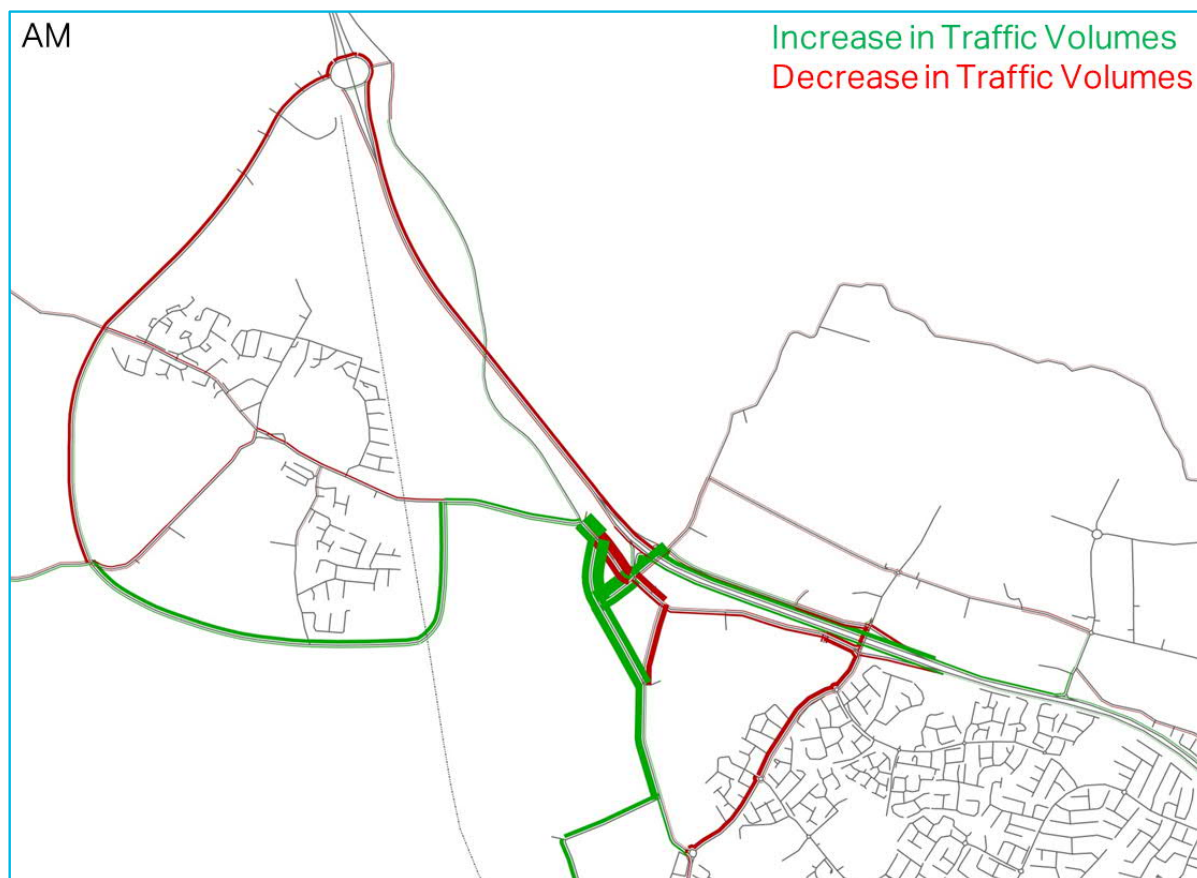


Figure 5.25. Strategic Impact of Clonee West Redesign and the Potential Southern Distributor Road (AM)

5.5 Smart Mobility

Given that the full development of the proposed land use is likely to occur some way into the future it is important that transport planners take account of potential changes in travel patterns, behaviours and travel usage that may occur in the future as a result of technology and behaviour advancements such as smart connected/autonomous vehicles and the mobility as a service (MaaS) concept which may allow us to more efficiently utilise road space. In this regard this roads strategy is focussed on improving accessibility and performance of the existing network as opposed to providing additional capacity to cater for demand based on current finite capacity assumptions. In addition, the aim is to develop a town where the use of active modes is encouraged so in that regard this plan for road based transport has aimed to cater for the demand which cannot use active models or public transport.

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**Public Transport
Interventions**

06

6. Public Transport Interventions

Dunboyne town centre is currently served by Dublin Bus, Irish Rail and some Bus Éireann services but further measures are required to cater for future demand, to provide access to the adjacent suburbs and to integrate routes with the Dunboyne North site.

6.1 Extending Dublin Bus Services to M3 Parkway

Dublin Bus routes terminate in the town centre and would need to be extended to provide access to existing and planned residential areas and Dunboyne North. It is proposed that the terminus should be relocated in, or close to, the large park & ride facility at M3 Parkway to create a multi-modal interchange. The revised Dublin Bus route would make use of the proposed Business Park - R157 link to provide access to residents and jobs in northern Dunboyne as demonstrated in Figure 6.1. This extension would also serve students and staff of Dunboyne College of Further Education which is located in the Business Park. Bus reliability should also be improved by the measures described in Chapter 5 to relieve congestion in the town centre while the removal of a central bus terminus should enhance the quality of the urban realm.



Figure 6.1. Proposed Extension of Dublin Bus Services to M3 Parkway

In the future, as the population of Dunboyne expands there will need to be greater frequency on the bus routes 70 and 270 routes to cater for additional demand and bus priority measures to deal with congestion. The NTA's BusConnects initiative is redesigning the bus network at present and this envisions that the 70 and 270 bus routes will become feeder routes to a major bus service hub at Blanchardstown shopping centre in the future. Residents of Dunboyne will take a feeder bus, which will match current peak frequencies, to Blanchardstown and then transfer for city centre or regional

journeys. The BusConnects project will also encompass upgrades to existing bus priority infrastructure, stop shelters, ticketing and network accessibility across the Greater Dublin Area.

6.2 Navan-Blanchardstown Bus Service via Dunboyne

A study of residents living along the R147 corridor between Navan town and the Black Bull roundabout on the R147 highlighted a reasonable number of work trips to jobs in the Blanchardstown area (Figure 6.2). Furthermore, it has already been noted in Figure 2.19 that a reasonable number of work trips by Dunboyne residents are made to the Blanchardstown area.



Figure 6.2. Work Trip Destinations for Residents along the R147 Corridor (POWSCAR, 2011)

At present, the Bus Éireann route 109 provides a public transport service between Kells – Navan – Dunshaughlin – Bracetown Business Park – Clonee – Blanchardstown Shopping Centre and Dublin. This provides access to the significant employment destinations near Blanchardstown and Connolly Hospital but it does not cater for work trips to Dunboyne, Damastown Industrial Park, Ballycoolin IDA Business Park, Northwest Business Park or the Institute of Technology Blanchardstown (Figure 6.3). Furthermore there is no interchange with heavy rail for passengers who wish to make a continued journey into Dublin City Centre or other locations on the rail network.

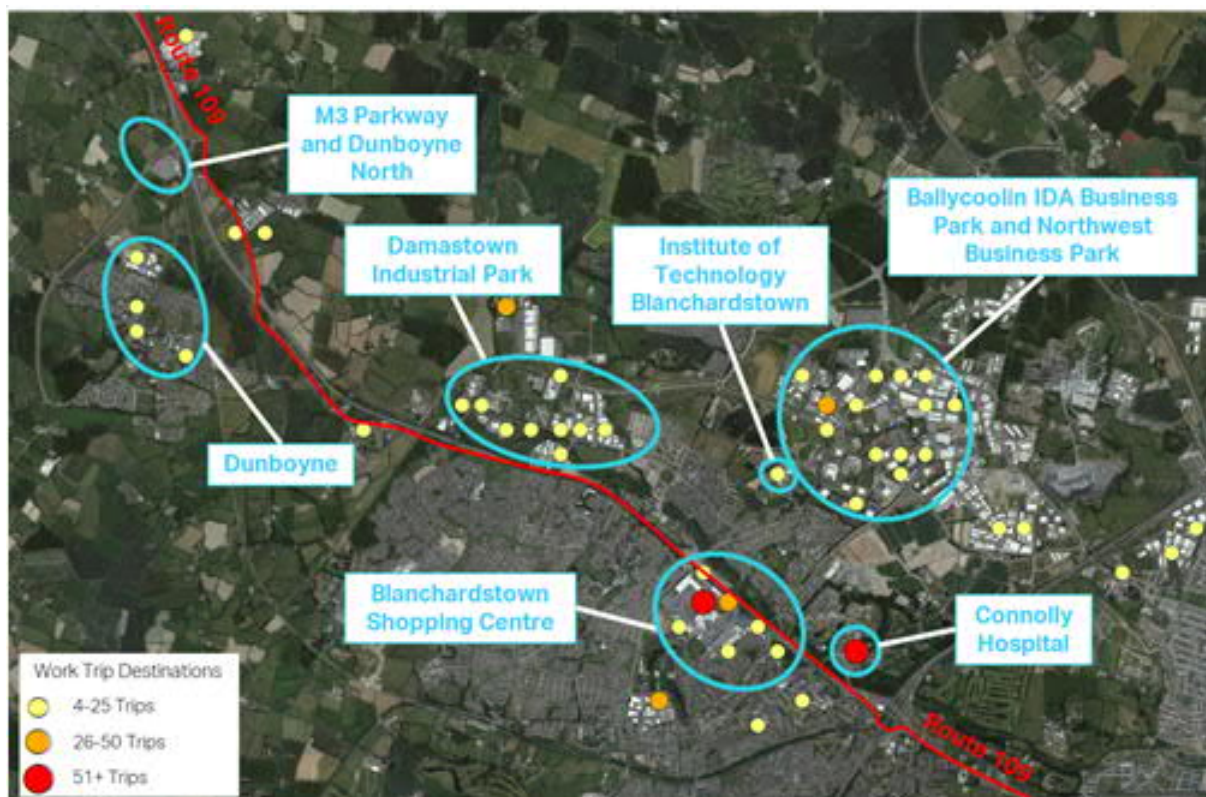


Figure 6.3. Bus Éireann Route 109 and Major Employment Centres

This presents a potential opportunity to introduce a new bus service to link Navan with the major industrial estates near Blanchardstown that are not currently served by route 109. It is suggested that there is merit in assessing the potential of a route along the R147 between Navan and Pace similar to the 109 but travelling via M3 Parkway to provide an interchange with heavy rail and provide access to the Dunboyne north development. Travelling south through Dunboyne via the Eastern Distributor Road (Figure 6.4), the route could then provide an important employment and student link to Clonee, Damastown Industrial Park, the Institute of Technology Blanchardstown, Ballycoolin Business Park and the Northwest Business park. This study has shown that there is already significant employment demand to these locations for residents along the R147 corridor and the new bus service would provide the opportunity for mode transfer. Furthermore it would provide an important multi-modal interchange for Meath via M3 Parkway and Dunboyne Station. It will also expand public transport capacity to facilitate the residential and commercial development at Dunboyne North.

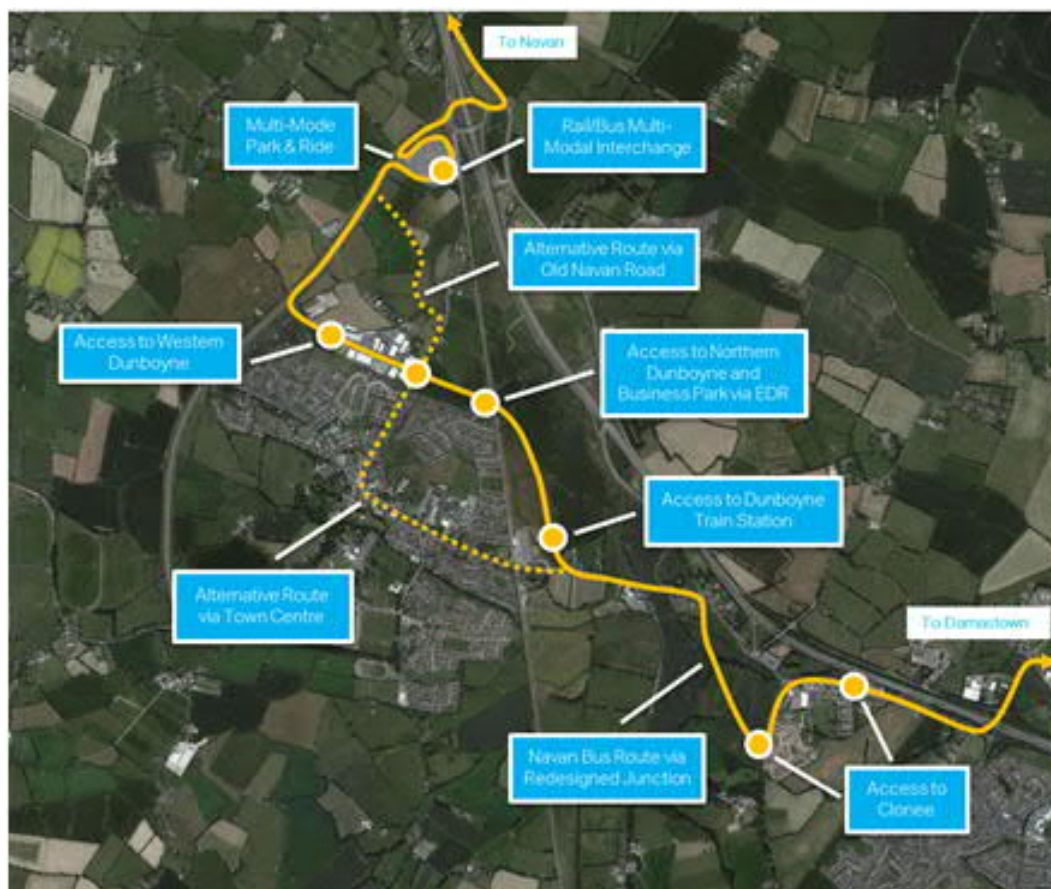


Figure 6.4. Route of Navan Bus Service in Dunboyne and Clonee

Our assessment has assumed that the extended Dublin Bus routes as per Figure 6.1 and the Navan-Blanchardstown bus service are both in place as part of the needs assessment and future demand analysis. The route could potentially be delivered via a private operator should a licence be issued. Details of the potential impact of this route is contained in Section 6.4.5.

6.3 Multi-Modal Park & Ride Interchange

The preceding sections have proposed the extension of Dublin Bus services and the creation of a new Navan bus service which all pass through M3 Parkway. This presents the opportunity to establish a multi-modal interchange for bus-rail services which makes use of the existing 1,200 park & ride facility. At present, M3 Parkway is underutilised with only 400 people boarding a train at the station on the day of the Heavy Rail Census in 2016 and site visits suggesting the car park is only 40% used. The integration of rail with bus services would create a key transfer point in the Meath public transport network which would boost demand at the station and promote park & ride behaviour (Figure 6.5).

This interchange could be further enhanced by changing the route of the existing Route 109 Bus Éireann service to stop at M3 Parkway to provide for transfer between heavy rail and bus services. This would allow passengers on the 109 from Kells to transfer to heavy rail into the city centre, or for heavy rail passengers to transfer to the 109 to access Connolly Hospital or Blanchardstown shopping centre. While this would be advisable to improve inter-modal connectivity, such a route change would be subject to discussions with the National Transport Authority and other stakeholders.



Figure 6.5 Illustration of a Potential Multi-Modal Interchange at M3 Parkway

It must be noted that the underperformance of the M3 Parkway park & ride facilities may be related to their location after the toll plaza on the M3 mainline which results in motorway users from Meath having to pay a €1.40 toll in each direction in order to access the service. This additional €2.80 daily toll on top of a return train ticket greatly reduces the attractiveness of the rail service as it adds €14 to weekly commuting costs. Methods to reduce the cost of park & ride travel for regular public transport users and increase the competitiveness of rail or bus travel to/from this location should be investigated by the relevant authorities.

6.4 Catchment Analysis

6.4.1 Overview

The catchment analysis uses data on the location of existing residences and commercial premises provided by An Post based on 2016 data. The assessment uses GIS software to quantify the catchments of services based on industry accepted maximum walking or cycling distances to various services. It should be noted that this assessment does not include for future development proposals.

6.4.2 Dublin Bus

At the present, the existing 500m Dublin Bus catchment is focused on the town centre and housing estates with entrances on Station Road. The approximate 500m catchment is shown spatially in Figure 6.6 and this represents roughly 825 residential units and 174 commercial/community units across Dunboyne and Clonee within the county boundary.

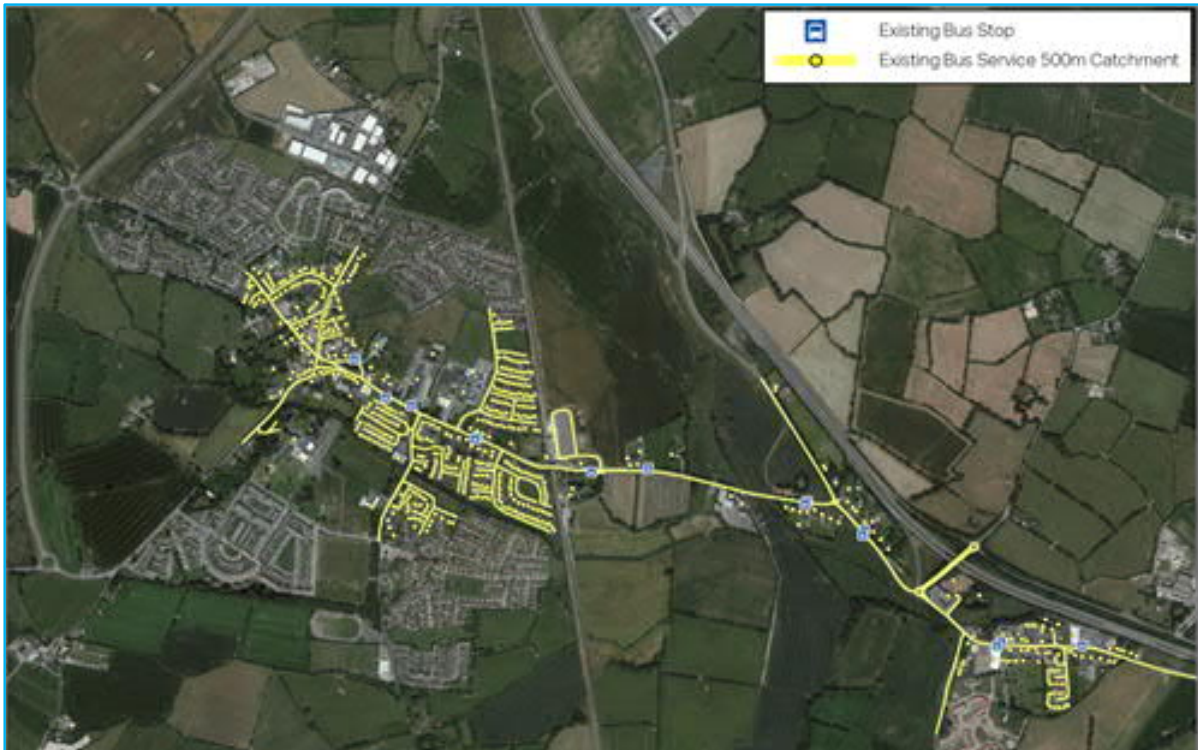


Figure 6.6. 500m Catchment for Existing Bus Services

The catchment achieved by extending Dublin Bus services with three extra bus stops in the north of the town is shown in Figure 6.7. This would add approximately 296 residential units and 98 commercial units to the catchment using the existing path layout for walking/cycling access. This accounts for existing developments only and does not take account of the significant development planned for Dunboyne North which would add some 3,000 residents and 1,500 employees to the area.



Figure 6.7. 500m Catchment for Extended Bus Services on Existing Paths

This catchment could be further enhanced by the delivery of the proposed walking/cycling paths described in Chapter 4 to improve access to existing and extended bus services. This would add another 328 residential units to the catchment through the elimination of cul-de-sacs, improved access to the Business Park and provision of a footbridge across Dunboyne Stream as shown in Figure 6.8.

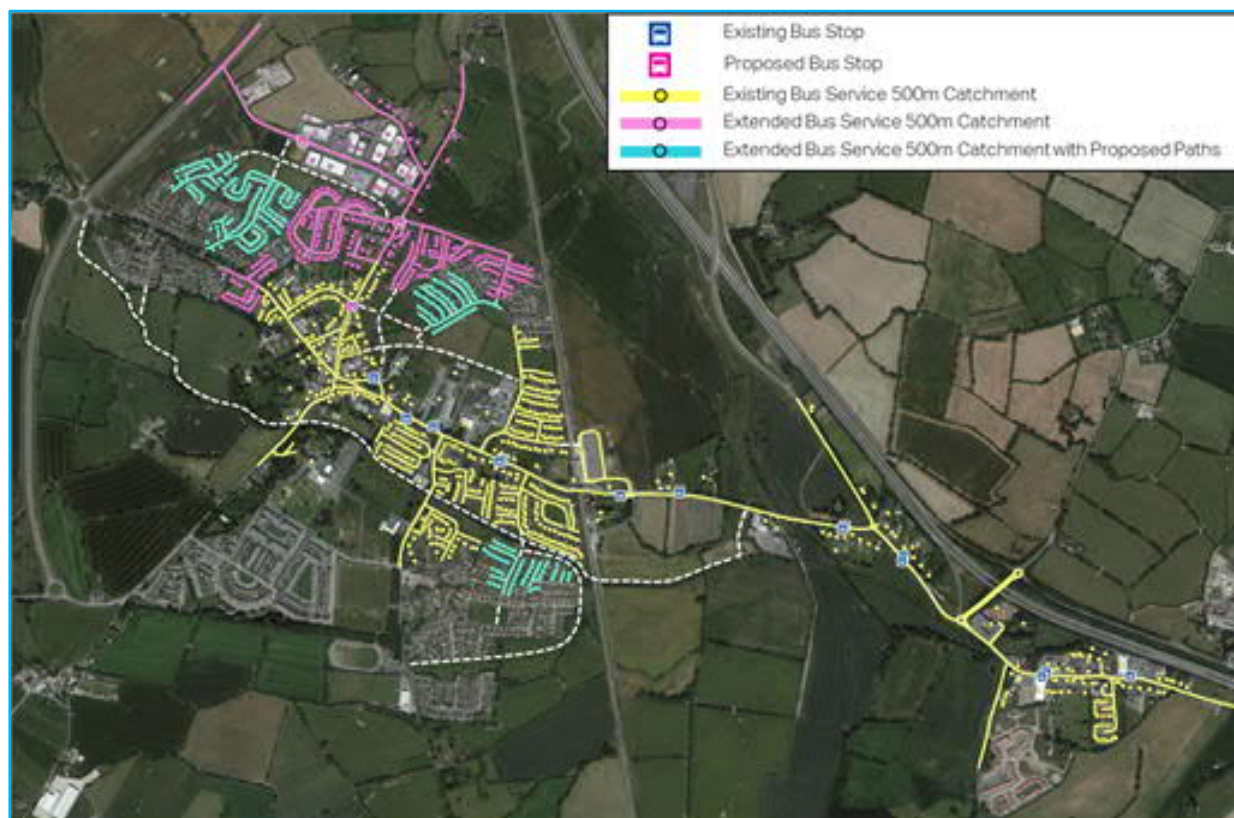


Figure 6.8. 500m Catchment for Extended Bus Services with Proposed Paths

The catchment estimates are summarised in Table 6.1 and this clearly demonstrates the benefits that can be achieved with modest changes to the walking/cycling network and extending bus routes. Again it should be noted that this is based on existing settlements and does not account for the significant growth in residents and employees planned for the area.

Table 6.1. Bus Service Catchment Analysis

Catchment Type	Residential Units	Commercial/Community Units
Existing 500m Dublin Bus Catchment	825	174
Additional Catchment from Extending Bus Services	+ 296	+ 98
Additional Catchment from Extending Bus Services with Provision of Proposed Walking Cycling Paths	+ 328	+ 0
Total Potential Catchment	1,449 (+75%)	272 (+56%)

6.4.3 Navan – Blanchardstown Bus

Figure 6.9 shows the catchment analysis for the Navan – Blanchardstown bus service using the planned path network in Dunboyne and Clonee. In total, there will 797 residential premises and 113 commercial premises within the catchment area of this public transport service.

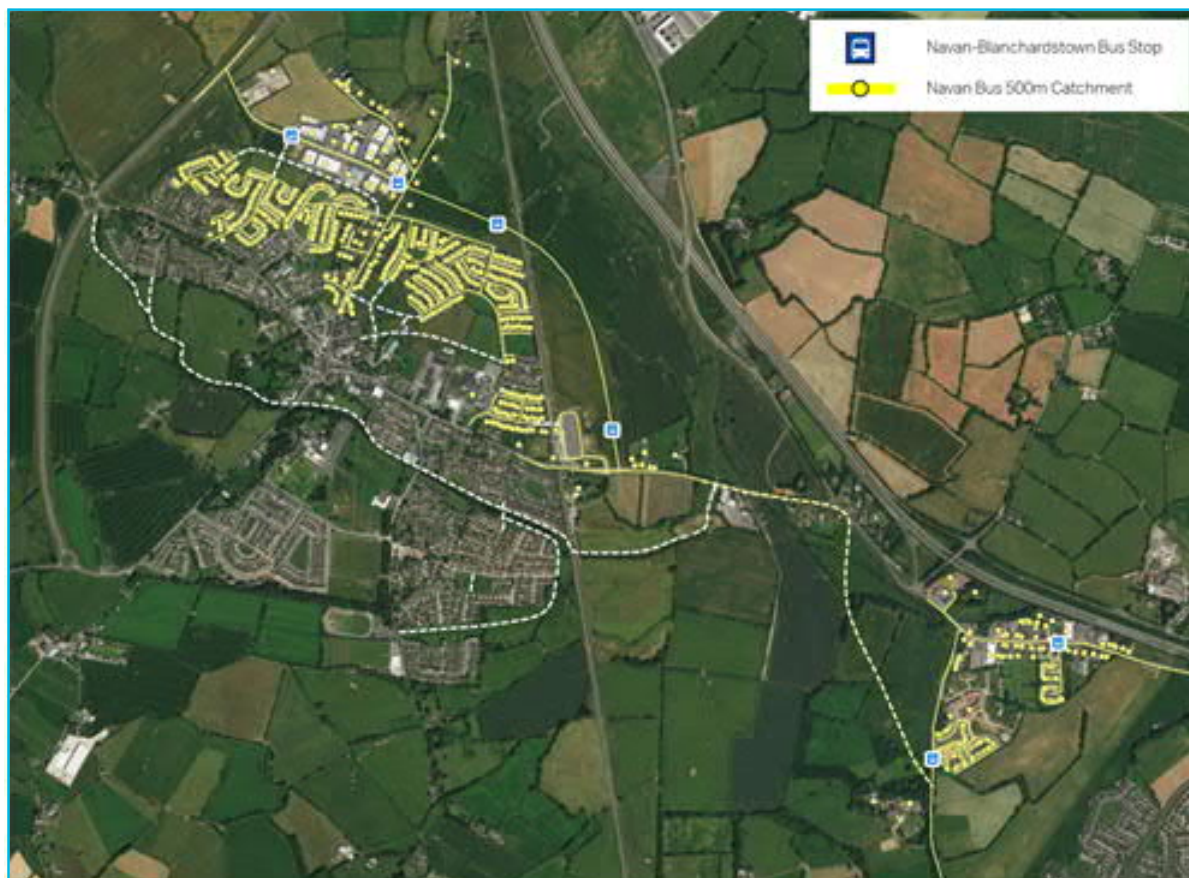


Figure 6.9. Catchment Area for the Navan-Blanchardstown Bus Service in Dunboyne

6.4.4 Total Public Transport Catchment

A summary of the total bus/rail catchment area achieved in Dunboyne through the extension of bus services and the provision of all proposed walking/cycling paths is shown in Figure 6.10. This shows that the majority of the town can be brought into the public transport catchment area by completing these measures but that some housing areas will remain without services due to the distances involved. This figure should also be viewed in conjunction with the future development plans for the area. The proposed public transport network will serve the key development areas in Dunboyne North and the zoned lands north and east of Dunboyne town centre.



Figure 6.10. Public Transport Access with Combined Bus and Path Measures

In cases where residents are outside the public transport walking catchment, the main option will be travelling to rail stations by bike. The approximate 3km cycling catchment area for the Dunboyne and M3 Parkway train stations is shown in Figure 6.11 and this encompasses the whole town. However, this situation is far from ideal and highlights the need for stronger planning controls to limit developments which do not have, and will probably never have, access to public transport services. In addition, it points to the importance of delivering high density development adjacent to rail stations and other public transport services to encourage sustainable modes of travel.

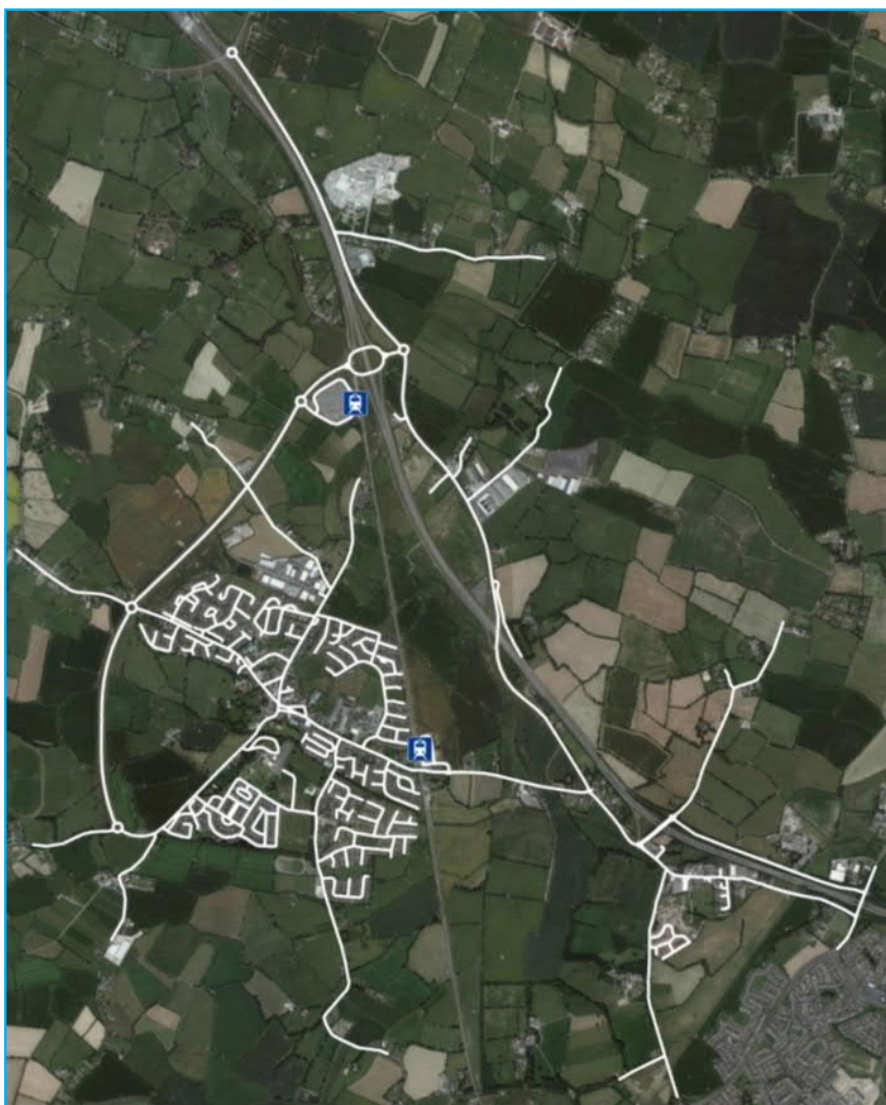


Figure 6.11. 3km Rail Station Catchment on Existing Paths

6.4.5 Eastern Regional Model Projections

The NTA's Eastern Regional Model was used to forecast the effect of extending Dublin Bus services (70 and 270) to M3 Parkway with increased frequencies and introducing a Navan-Blanchardstown bus service. The results for 2035 incorporate the demand associated with the build out of Dunboyne North and other planned developments proposed by Meath County Council in addition to background growth contained in the NTA ERM. The model assumes the full GDA Transport Strategy measures are in place however the impact of these measures on Dunboyne is limited. The overall modal split results for the base year (2012) NTA model for the Dunboyne area are shown in Figure 6.12.

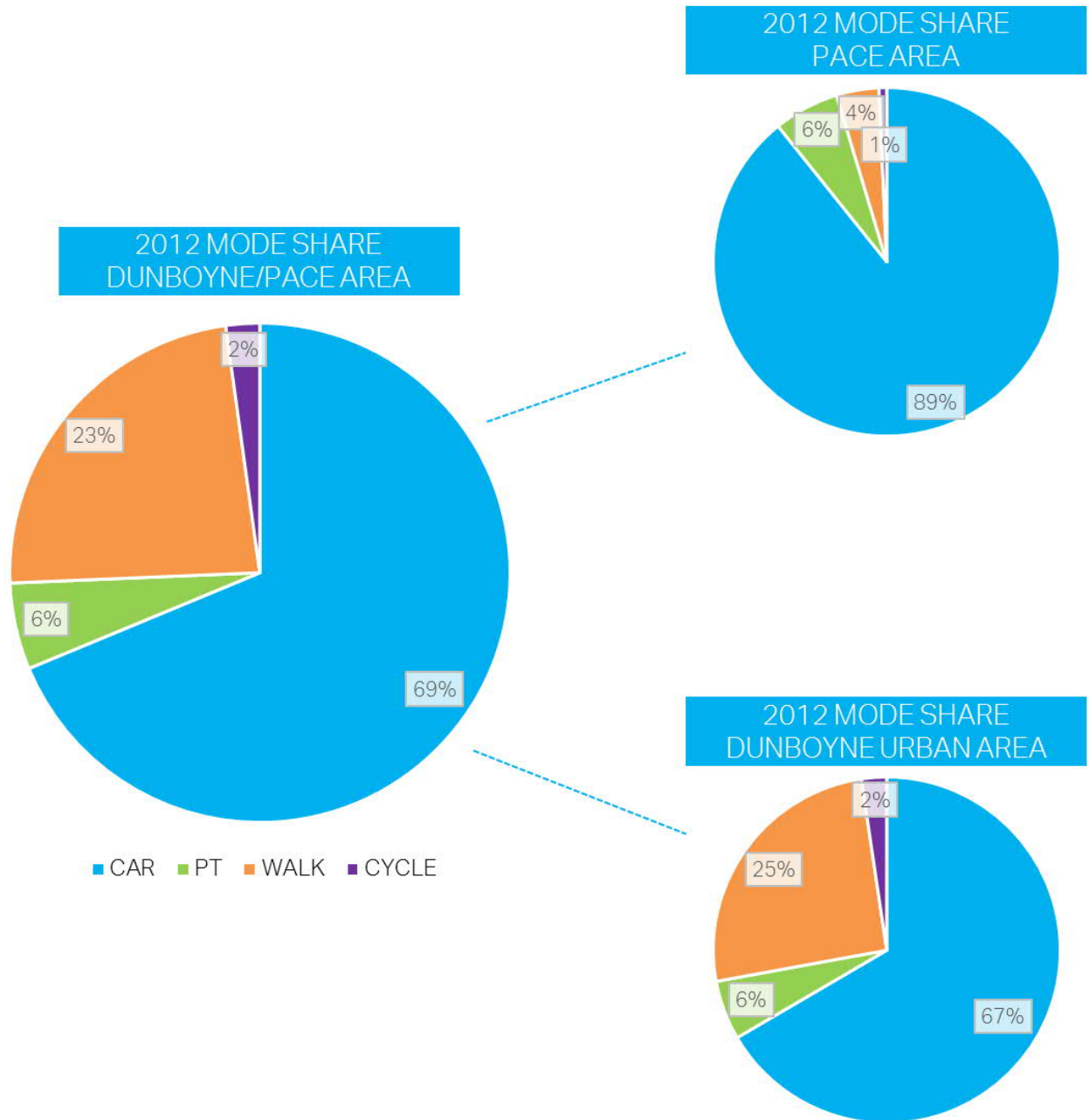


Figure 6.12. Modal Split for Trips in the Dunboyne and Pace Areas in 2012⁸

The mode share results for the 2035 NTA ERM with the full demand in place in addition to the extension of the Dublin Bus services (70 and 270) to M3 Parkway with increased frequencies and the introduction of a Navan-Blanchardstown bus service are presented in Figure 6.13. It should be noted that these forecasts should only be used to provide an indication of the potential impact of future PT interventions. The future mode share forecasts do not include for the significant walking and cycling proposals for the area which will make the various PT options more accessible and could improve the PT mode share further. This is especially relevant for the Pace area where walking and cycling links are assumed to be the same as the current situation within the NTA ERM. It is important to note that the majority of new development proposed within the study area, in terms of transport demand, is located adjacent to the existing railway stations.

⁸ Source: All NTA ERM runs undertaken by Systra in line with NTA guidelines in consultation with MCC and AECOM.

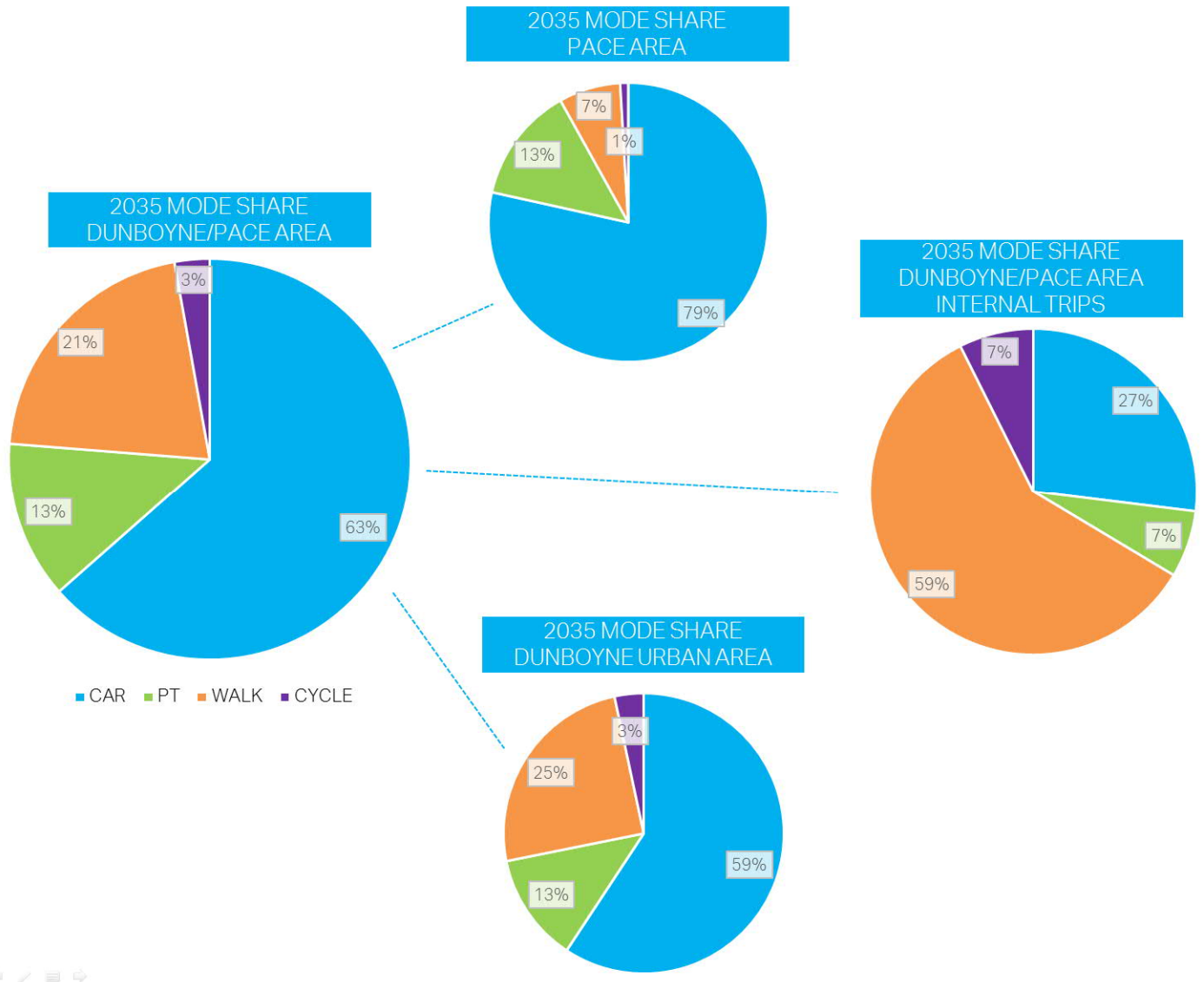


Figure 6.13. Modal Split for Trips in the Dunboyne and Pace Areas in 2035 with the proposed PT intervention in place

The results for the overall study area suggest that the primary mode of travel will continue to be the private car but that significant levels of public transport/active modes will be observed with the % of all trips made by active/PT modes increasing from 31% to 37% against of background of significant growth in trips. In the case of Pace/Dunboyne North, the public transport modal share doubles to 13% whilst the level of walking and cycling increases to 8%. In Dunboyne town, significant levels of walking can be observed for internal trips with active/PT modes representing 73% of all internal trips, reflecting the mixed-use composition of the urban centre.

6.5 Facilitating Expanded Rail Services in Dunboyne and M3 Parkway

The National Development Plan (2018 – 2027) states that the rail spur from the Maynooth line to M3 Parkway will be upgraded to support diesel/electric trains by 2027. The National Transport Authority is in the process of developing plans for the expansion of the Dublin Area Rapid Transit (DART) network and it is likely that the electrification of the railway lines will take place during the latter stages of the Dunboyne Transport Strategy. The NTA states that in the future, the Docklands Station will be moved to Spencer Dock to provide improved access to the city centre and greater integration with the Luas

Red Line. It is also likely that direct services will be introduced from M3 Parkway to Connolly to remove the need for transfer at Clonsilla. As a result of these changes, it is expected that the modal share for rail among residents of Dunboyne and Pace will increase significantly due to frequency and destination improvements.

This Strategy has described a series of measures to improve accessibility to the rail stations at M3 Parkway and Dunboyne. It is vital that access to the rail stations is optimised to facilitate growth in passenger rail demand. In the case of both stations, it is important that surrounding land is protected to provide for additional entrances, extended platforms and improved station facilities in the years to come.

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Implementation

07

7. Implementation

This strategy presents a range of private, non-motorised and public transport interventions to improve travel across Dunboyne. In respect of the delivery of the transport network proposed in this report, the over-riding imperative of the sequencing requirements is to ensure that mode choice for future residents evolves in a sustainable manner. Accordingly, there should be a strong emphasis on the up-front delivery of active transport modes in tandem with high levels of public transport accessibility and managing traffic demand onto the national road network. The rail connection has capacity to support a growing town. Meanwhile, the effective use of bus infrastructure and services, internal pedestrian and cycle facilities, as well as external walking and cycle links with the wider environs, are essential to ensure a sustainable modal share in Dunboyne. This Chapter describes the proposed interventions, sets out the delivery cost of each as well as phasing and provides commentary on the impacts and dependencies. The Chapter also highlights the importance of monitoring and responding to changing circumstances, as well as the need for high quality design in future developments.

It is considered that in addition to the interventions and principles set out in this report, the Meath County Council development management process will provide control and further inform the sequencing of development and transport infrastructure interventions.

7.1 Summary of Proposed Interventions

The full set of proposed interventions is presented in Figure 7.1 and in larger format in Appendix C. It should be noted that this does not include for any local infrastructure required to access development.



Figure 7.1. Location of all Road, Walk/Cycle and Public Transport Interventions

Table 7.1 provide details on the schemes shown above in terms of development dependencies, priority, likely funding source and cost estimates. In general the following timeframes are assumed for each level of priority (which should be read in conjunction with Development Dependencies and Comments columns in Table 7.1).

- Immediate – Required within 0 -3 years otherwise some dependents will be delayed. Note that these schemes are generally required to address existing issues regardless of future development in Dunbooyne and Environs. Not all of these measures are related to road capacity issues.
- Short Term/Prior to Occupation – Planning needed within 1-3 years with delivery in 3-5 years in tandem with the delivery dependencies/comments shown in Table 7.1. Active measures included as short term in priorities to reflect sustainable transport policy and commitment to improving active mode share.
- Medium Term – Planning needed within 3-5 years with delivery in 5-10 years.
- Long Term - Planning needed within 1-10 years with delivery in 10+ years.

Table 7.1 – Implementation Plan Overview

Ref.	Description	Development Dependency	Priority	Funding Source	Preliminary Estimate	Comments
Road Schemes						
R1	Black Bull Signalised Junction	Future R147 development and to assist in resolving Pace I/C issues to allow development in Dunboyne North.	Immediate – Currently under design	MCC	€1 million	Key infrastructure to improve the operation of the R147 and Pace to cater for development along the R147. Provides MCC with control over R147 and transforms road into a suburban arterial road with high quality pedestrian/cyclist facilities.
R2	Shire Site Signalised Junction		Under Construction	Under Construction	-	
R3	Signalisation of Kilsaran Site Junction		Immediate – Currently under design	MCC	<€500k	
R4	Signals/Larger Roundabout at R147-Pace Junction	In the absence of a significant reduction in toll diversion traffic on the R147; this intervention will be required in tandem with development at Dunboyne North.	Short Term -linked to R1, R2, R3	MCC	€1 million	This upgrade is subject to requirements in the future.
R5	Northern Signalised Dunboyne North Junction	Required prior to occupancy in Dunboyne North.	Prior to Occupancy	Private	<€1 million	Directly linked to the development of Dunboyne North.
R6	Southern Signalised Dunboyne North Junction		Prior to Occupancy	Private	<€1 million	
R7	Old Navan Road Link Extension to R157	Required prior to any residential occupancy at Dunboyne North.	Prior to Occupancy	Private	-	
R8	Business Park Link Road	Further development in the Business Park would require this link. In addition, it would complement the Eastern Distributor Road and support growth.	Immediate	Private	<€1 million	This link is vital to the extension of the existing bus routes to serve the business park, M3 Parkway and Dunboyne North.
R9	Eastern Distributor Road	Development along the EDR dependent on the commencement of the EDR before occupation of development.	Delivery in short term or immediate upon	MCC/Private	€3-5million	The design of the EDR corridor should be future proofed for a potential bus lane. In addition, given the location adjacent to the

			commencement of development on adjacent lands. Potential for phased delivery.			rail station, any development along this corridor should be high density in nature to encourage sustainable travel in the town.
R10	Dunboyne Town Centre HGV Ban	-	Short Term - Dependant on some of the other measures	MCC	-	The delivery of the EDR and Business Park Link will remove significant volumes of through traffic from Dunboyne town centre. This will allow road space to be reassigned to pedestrians/cyclists. A HGV ban will play a key role in creating a safe environment.
R11	Rooske Road – Station Road Junction Upgrade	Development of the lands to the south of Dunboyne is currently dependent on this junction.	Short Term	MCC	<€500k	Any upgrade should allow for dedicated right turn lanes as appropriate to improve the operation of the junction whilst providing a high level of service to pedestrian/cyclist movements given its location adjacent to schools.
R12	Clonee West R147/R149 Junction Realignment	Immediate requirement due to existing congestion issues at the junction.	Short Term	Private/MCC	€1-3million	The junction realignment would be delivered in advance of the Clonee interchange upgrade (R13 and R15) to alleviate delays and safety issues in Clonee Village as well as improving access to the Ongar Link Road.
R13	Clonee West Additional M3 Slips and Overpass Capacity	Required to improve operation of the interchange and alleviate through-traffic in Clonee Village.	Long Term	TBC	€7-14million	The completion of the interchange upgrade at Clonee West will be completed when funding is available. Subject to findings of ongoing N3 Clonee to M50 Study.
R14	Clonee Village Centre HGV Ban	-	Short Term	MCC	-	Scheme could be implemented in tandem with R13 above.
R15	Clonee East Junction Upgrade for Two-Way Traffic	Developed in tandem with R13 as part of interchange upgrade.	Long Term	TBC	<€1 million	The creation of a two-way bridge would reduce pressure on Clonee West and allow for HGVs to bypass Clonee village.

Public Transport Schemes

PT1	Navan-Blanchardstown Bus	-	Medium Term	NTA or Private	-	Key component of the transport network to serve the strong link that currently exists between Navan-Dunboyne-Blanchardstown.
PT2	Dublin Bus Extension to M3 Parkway	Key component to encourage the use of PT for the proposed new mixed use development at Dunboyne North.	Short Term	NTA	-	The creation of a PT interchange at the M3 Parkway station would significantly improve access for Dunboyne residents and increase the attractiveness of the currently underutilised Park & Ride facilities.

Active Mode Schemes

A1	Footbridge over M3 in North Pace	To be delivered in conjunction with the completion of the Shire/Kilsaran/Avoca developments	Short Term	MCC	€2 – 3 million	Will provide a strong link between employment/retail on the R147, the proposed residential at Dunboyne North and the rail station. Key benefit in removing some ped/cycle movements from the Pace I/C.
A2	Paths from Woodpark Road to M3 Parkway including footbridge over the River Tolka	Interaction between residents/workers at Dunboyne North and R157 employment/retail depends on a safe pedestrian/cycle route.	Immediate on commencement of the Dunboyne North development	MCC/NTA	<€250k	Some sections of this path are constructed however will require resurfacing.
A3	Pedestrianisation of Northern R147 and Pace	Future development along the R147 is dependent on safe access for pedestrians/cyclists.	Commenced and ongoing	MCC/Private	<€250k	Multi modal facilities key to delivering on the objective to turn the R147 into a suburban arterial road.
A4	Pedestrianisation of Southern R147	Future development along the R147 is dependent on safe access for pedestrians/cyclists	-	MCC/Private	-	-
A5	Dunboyne North Pedestrian/Cycle Network	Future development in Dunboyne North is dependent on high quality infrastructure being delivered for pedestrians/cyclists prior to occupation.	Immediate on commencement of the Dunboyne North development	Private	<€1 million	Given the greenfield site the design should aim for LOS A for pedestrian/cyclist facilities. Well thought-out design with regard to the interaction with junctions on the R157 is key to the success in encouraging walking and cycling.
A6	Old Navan Road Pedestrian/Cycle Link		Immediate on commencement of	Private		

	to M3 Parkway		the Dunboyne North development			
A7	Potential Future Tolka River Greenway	-	Long Term	MCC/NTA	€1 million	Delivery would provide the area with an attractive amenity and link into the Tolka Greenway downstream in Fingal.
A8	Business Park Permeability Paths	-	Medium Term	MCC/NTA	<€100k	A link into the business park would significantly improve access to PT for numerous residential estates. Delivery would require consultation with residents and a safety review in terms of exposure to traffic.
A9	Pedestrian/Cycle Link to the Eastern Distributor Road	-	Medium Term	MCC/NTA	<€100k	-
A10	Walking/Cycling Permeability for Rail and Bus	Development in the town centre is dependent on strong access to schools and the rail station.	Short Term	MCC/NTA	<€500k	-
A11	Greenway and Western Housing Estate Spur	-	Medium Term	NTA	<€500k	The spur provides a safer route for pedestrians/cyclists than the previous proposals to join at a large roundabout.
A12	Footbridge to Dunboyne Railway Station	Development in the town centre is dependent on strong non-motorised access to schools and the rail station.	Short Term	MCC/NTA	<€1 million	Footbridge would provide significantly improved access to the rail station for the numerous residential areas west of the rail line. It would allow provide access to education for the proposed residential development along the EDR.
A13	Footbridge over Dunboyne Stream		Short Term	MCC/NTA	<€1 million	
A14	Greenway Eastern Spur to Station Road	Development south of the town centre is dependent on strong non-motorised access to schools and the rail station.	Medium Term	MCC/NTA	<€250k	Proposed footbridge and paths would significantly reduce the walking/cycling distance to the rail station.
A15	Pedestrian/Cycle Path Across Beechdale		Short Term	MCC/NTA	<€250k	

	Green				
A16	Southern Dunboyne Walking/Cycling Path to Greenway		Medium Term	MCC/NTA	<€250k

7.2 Future Development Principles

The non-motorised interventions proposed in this strategy seek to remedy permeability and public catchment access issues that have emerged through the poor design of residential and commercial areas. In many cases, housing and commercial estates have been constructed with a single entrance and surrounding walls to stop walking and cycling to surrounding areas. While the proposed interventions will solve many of the existing problems, it is vital that the planning system encourages the use of active travel modes.

In future, it is advisable that the following planning concepts are adopted:

- Residential or commercial estates should have multiple entrances to facilitate permeability for walking and cycling to public transport, jobs and services.
- National guidance and Development Plan standards should be applied in future construction to end the creation of housing estates with high perimeter walls and indirect travel paths.
- New residential development should be encouraged to locate within the 1 km catchment of rail services or within 500m of bus services when travelling on the path network.
- Higher densities should be encouraged within a 1 km walking distance of Dunboyne railway station and M3 Parkway to boost patronage and build-up rail demand on the corridor.
- Mixed-use development in Dunboyne town centre will be vital to eliminate longer car journeys and the provision of a local supermarket will be a key part of reducing car-based retail trips.
- Land segregation caused by long tracts of river, railway line or road; reduce opportunities for walking/cycling and should be mitigated with regular crossing points.
- Cycle parking should be provided as part of all new developments and public transport stops in accordance with the standards set in the National Cycle Manual (2011).
- The use of Kennedy Road should not be used for access to the Dunboyne North site for any mode in the interest of traffic hazard and public safety.
- Dunboyne North must be connected to the centre of Dunboyne via Old Navan Road extended through the site to the R157 junction. This connection, for all modes of transport, must be in place prior to the occupation of any residential units at Dunboyne North.
- All foot/cycle paths within the Dunboyne North site, with the exception of the two crossing points of the R157, should be constructed within the site boundaries and not impact upon the verge provided for the future development of the R157.
- A foot/cycle bridge should be constructed access the M3 at Piercetown linking the Woodpark Road with the R147 at Kilsaran/Avoca to encourage non private vehicle access to the area.
- Developments on the land zoned in Bracetown/Gunnocks should be restricted to densities similar to that currently being constructed by Facebook in terms of traffic impact.
- The small parcel of land zoned E1/E3 adjoining the Woodpark Road cul-de-sac to the east of Dunboyne North should be considered for rezoning as its development would require the construction of a new road across the flood plain of the River Tolka in an area where there is already significant interference in the flood plain due to the rail line and M3.

Further elaboration on these concepts and best practice in planning residential areas can be found in the Department's 'Sustainable Residential Development in Urban Areas' (2009) guidelines or the National Transport Authority's 'Planning and Development of Large-Scale, Rail Focussed Residential Areas in Dublin' (2013).

Future development proposals within the Transportation Study area will be assessed using the model developed for the transport study, to ensure proposals are consistent with the assumptions made in the Dunboyne and Environs Transport Study and to identify requirements for the necessary transport interventions included in the Study.

8. Summary

8.1 Summary & Conclusion

This report contains a set of evidence based recommendations to deliver a multi-modal strategy which will ensure that Dunboyne & Environs develop as a sustainable community with strong transport links to Dunboyne town centre, Dublin City and the surrounding area.

The Meath County Development Plan (2013-2019) sets the ambitious target of a population of 25,000 for the Dunboyne area by 2033. A proportion of this population will be accommodated through the development of Dunboyne North which will include 500 housing units and over a 1,500 new jobs in the first phase. It is however noted that these growth assumptions may alter as part of the ongoing development of the Regional Spatial and Economic Strategies which support the NDP. This Strategy has therefore aimed to focus on connecting people and places irrespective of quanta to ensure the longevity of the plan. In this context it should also be noted that Dunboyne is located in the Dublin Metropolitan area and will form part of the future Metropolitan Area Strategic Plan and growth targets set out in this document. The Strategy also seeks to improve multi-modal links between Dunboyne North and Dunboyne town centre, while also seeking to mitigate existing accessibility issues and improve the urban realm for residents. It should be noted that the majority of new development in the study area, in terms of transport demand generation, is located in areas of high public transport accessibility such as the development sites adjacent to the Dunboyne and M3 Parkway rail stations ensuring that development occurs in a sustainable manner.

The initial review of the town considered the situation for all travel modes in Dunboyne. This found that active modes were unnecessarily constrained by perimeter walls and land segregation resulting from unpassable streams and railway lines. While facilitated by two railway stations and multiple bus services, the town's public transport catchment was clearly constrained by poor urban design and suffered from low patronage. In respect to road transport, limited accessibility forced all commercial traffic through the town centre in order to access the business park and the local road network near Pace was unnecessarily impacted by increasing traffic flows, of which a large proportion is through traffic, on the R147 as some traffic continues to choose the R147 over the M3.

In response to these issues, the strategy identified five key objectives and subsequently numerous interventions which responded to those objectives as outlined below.

Table 8.1. Assessment of Impacts against Objectives

Objective	Proposed Measures	Impacts
1. Improve transport connectivity and accessibility within Dunboyne	<ul style="list-style-type: none"> • Approximately 20km of dedicated pedestrian/cyclist paths including 2 greenways. • Replacement of roundabouts with pedestrian/cyclist accessible junctions 	<ul style="list-style-type: none"> • In terms of active mode trips, existing residential units within 1km/15min of the rail stations and/or bus routes increases from 25% to 60% with the proposed interventions in place. • The PT mode share for the Study Area is forecast to increase by at least 25%. • The road network will reduce travel times by 4-5% throughout the Study Area and reduce travel distances by circa 1%
2. Improve accessibility to other urban centres and new growth areas outside Dunboyne	<ul style="list-style-type: none"> • Extension of Dublin Bus services by 2.7km to Dunboyne North • 4 new pedestrian/cyclist bridges to reduce trip distances 	
3. Contribute to improved air quality by minimising the growth in traffic levels and congestion	<ul style="list-style-type: none"> • Introduction of a Navan-Dunboyne - Blanchardstown bus service • The creation of a public transport 	

Objective	Proposed Measures	Impacts
4. Improve journey time reliability	hub for rail/bus at M3 Parkway • Reduce through traffic on the R147 to improve local access for jobs and residents. Achieved through the conversion of the Black Bull Roundabout to a signalised junction and the provision of signal controlled accesses on the R147.	over the Do Min scenario. • All HGV's and a significant proportion of vehicles will be removed from the town centre which will provide a safer and more attractive area for active modes.
5. Make it easier and more attractive to travel by active and public transport modes	• HGV bans in Dunboyne and Clonee to enhance pedestrian/cyclist safety • Multiple junction upgrades to improve the safety, reliability and capacity including significant upgrades at the Clonee Interchange. • An eastern distributor road to facilitate rail-focused development, new bus routes and reduce traffic levels in the town centre by providing a local bypass • Removal of 9 physical barriers to allow for greater pedestrian/cyclist movement • Targeted road capacity upgrades to eliminate congestion blackspots • Provision of 2 new junctions to facilitate access to Dunboyne North for all modes from a high quality regional road and not Kennedy Road, an unsuitable local link near the site • Development Policy proposals will ensure that new developments actively encourage the use of active/PT modes through the delivery of infrastructure.	• The design of the R157 and R147 links will protect the role of the Pace Interchange and ensure it provides a high level of service in the future. • The proposed redesigns for Clonee Interchange will create more efficient junction which responds to current and future traffic patterns and demands, • The redesign of a number of existing rural, high speed links as suburban arterials routes with signalised junctions and ped/cycle facilities will bring new development areas within the fabric of the town centre. • Planned interventions on the R149 at Clonee and the R157 at Pace will assist in the delivery of an alternative M50 route between the N3 and M4.

The strategy places clear emphasis on the prioritisation of walking/cycling and public transport. In cases where additional road links are required, the strategy ensures that these are multi-purpose connections which provide benefits for all modes. For instance, the combination of the business park link road, permeability paths and extended Dublin Bus services; results in quantifiable gains, such as the Dublin Bus catchment increasing from 25% to 60% for residential homes and from 53% to 98% for commercial properties.

The proposed transport measures, combined with the future development policies outlined in Section 7.2 will ensure Dunboyne & Environs develops as a sustainable area and meets the transport needs of the large-scale residential and employment development coming forward within Dunboyne and surrounding areas. Some road based schemes, such as the eastern distributor road and Business Park Link Road are designed to remove extraneous traffic from the town centre to allow for reprioritisation of road space to sustainable models and for urban realm investment. Overall, the strategy presents a suite of measures which will enhance conditions for all modes, but provides particular focus on categorically improving the experience of using sustainable modes in the Dunboyne area.

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Appendices

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Appendix A

Dunboyne Local Area Model
Development

Appendix A – Dunboyne Local Area Model Development

LAM Base Model Calibration and Validation

In order to develop the 2016 base model, 2015 demand matrices for the Dunboyne LAM were cordoned from the NTpM and factored and calibrated to 2016 levels using available traffic count data. Traffic count data was obtained from TII Traffic Monitoring Units (TMUs), May 2015 survey data and May 2016 survey data. Calibration and validation was completed in line with the requirements of the TII Project Appraisal Guidelines (PAG).

Link Calibration

A total of 95 links flows were used in the calibration process and the results are summarised in Table A.1 and Table A.2.

Table A.1 - Link Calibration Results: Individual Flows

% of Calibration Sites Meeting Individual Flow Criteria				
Time Period	Link Flows			Required
	Total Traffic	Lights	Heavies	
AM Peak	100%	100%	100%	>85%
PM Peak	100%	100%	100%	>85%

Table A.2 - Link Calibration Results: GEH Values

% of Calibration Sites with GEH < 5				
Time Period	Link Flows			Required
	Total Traffic	Lights	Heavies	
AM Peak	100%	100%	95%	>85%
PM Peak	100%	100%	96%	>85%

The comparison of modelled and observed flows demonstrates that the AM and PM Peak period models match the flow criteria for all user classes. Likewise, the GEH results show that the AM Peak and PM Peak period models also match the criteria for all user classes. The results therefore confirm that the models have been calibrated to a standard compliant with the PAG criteria.

Link Validation

Model validation comprises the comparison of calibrated flows against an independent data set which was not used as part of the calibration process.

The results of the validation check for 65 links are outlined below. Using the same criteria as link flow calibration above, the link flow validation statistics are shown in Tables A.3 and A.4.

Table A.3 - Validation Results: Link Flows

% of Validation Sites Meeting Individual Flow Criteria				
Time Period	Link Flows			Required
	Total Traffic	Lights	Heavies	

AM Peak	100%	100%	100%	>85%
PM Peak	98%	98%	100%	>85%

Table A.4 - Validation Results: GEH Values

% of Validation Sites with GEH < 5				
Time Period	Link Flows			Required
	Total Traffic	Lights	Heavies	
AM Peak	100%	100%	89%	>85%
PM Peak	98%	98%	94%	>85%

The comparison of modelled and observed flows demonstrates that the AM and PM peak period models exceed the flow criteria for all user classes. Likewise, the GEH results show that the AM Peak and PM Peak period models also exceed the criteria for all user classes. Therefore, the model is deemed validated in terms of link flows.

Turning Flow Validation

The observed and modelled turning volumes for 45 turning flows were compared at each of the validation sites. The permissible difference was calculated for each value (based on the observed figure) and compared with that which had been modelled. Validation results are summarised in Tables A.5 and A.6 below:

Table A.5. - Validation Results: Turning Flows

% of Validation Sites Meeting Individual Turning Flow Criteria				
Time Period	Link Flows			Required
	Total Traffic	Lights	Heavies	
AM Peak	100%	100%	100%	>85%
PM Peak	100%	100%	100%	>85%

Table A.6 - Validation Results: Turning Flow GEH Values

% of Validation Sites with GEH < 5				
Time Period	Link Flows			Required
	Total Traffic	Lights	Heavies	
AM Peak	100%	100%	91%	>85%
PM Peak	100%	100%	96%	>85%

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Appendix B

R147/M3

ANPR Analysis

Appendix B – R147 and M3 Journey Time and ANPR Analysis

The traffic patterns in the vicinity of the R147 were investigated through Automatic Number Plate Recognition (ANPR) survey analysis.

B.1. ANPR Survey Locations

ANPR surveys were completed on Thursday 6th April, 2017 by Nationwide Data Collection. The survey site locations are shown spatially in Figure B.1.

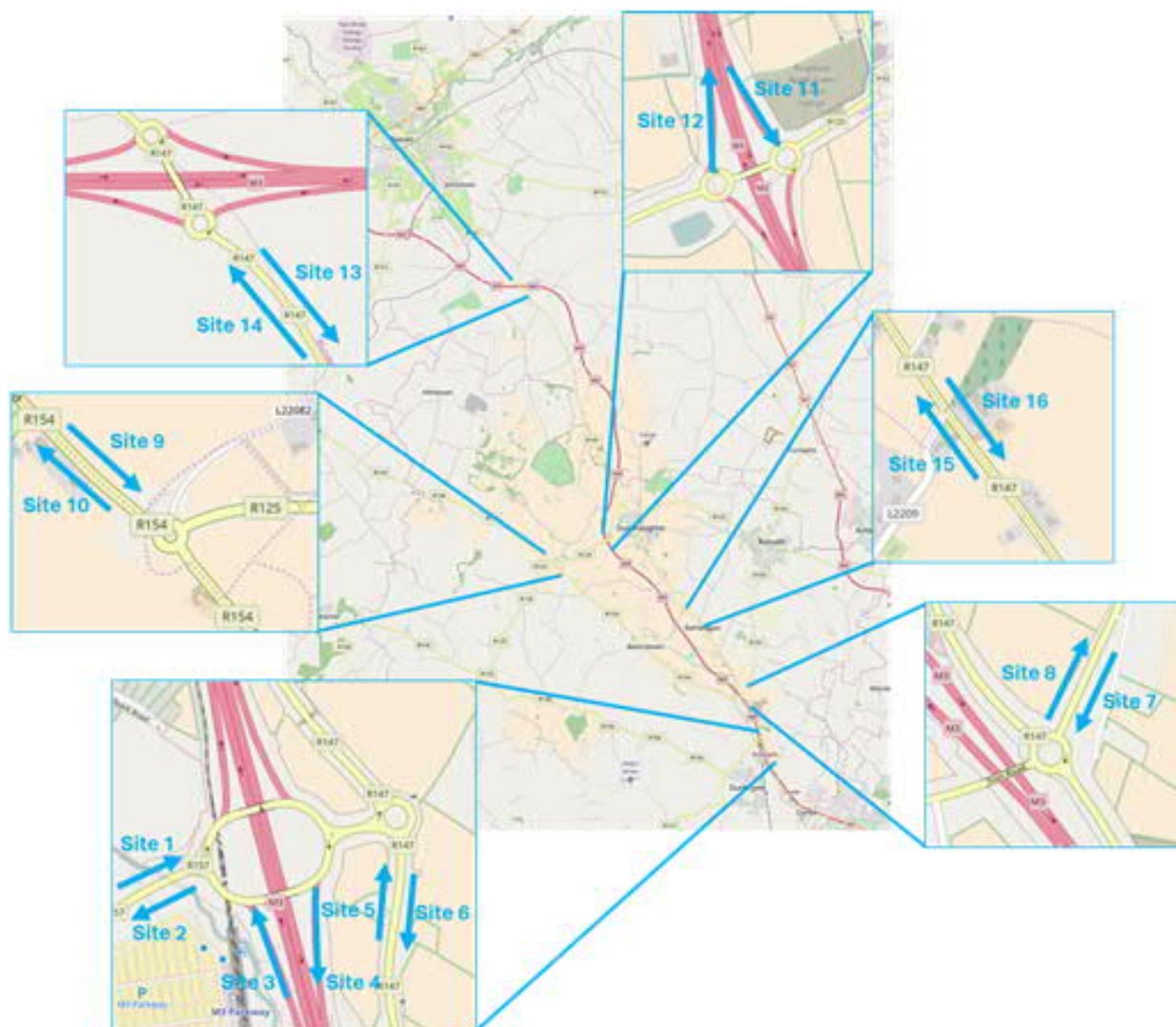


Figure B.1 Geographic Locations of ANPR Survey Sites

The location of each survey site is listed in Table B.1.

Table B.1. ANPR Survey Locations

Site No.	Location
1	R157 - Eastbound – Pace
2	R157 – Westbound – Pace
3	M3 Northbound Slip Road – Pace
4	M3 Southbound Slip Road - Pace
5	R147 – Northbound – Pace

Site No.	Location
6	R147 – Southbound – Pace
7	R155 – Southbound – Black Bull
8	R155 – Northbound – Black Bull
9	R154 – Southbound
10	R154 - Northbound
11	M3 Southbound Slip Road – Dunshaughlin
12	M3 Northbound Slip Road - Dunshaughlin
13	R147 - Southbound – Navan
14	R147 – Northbound – Navan
15	R147 - Northbound - Between Black Bull and Dunshaughlin
16	R147 – Southbound – Between Black Bull and Dunshaughlin

B.2. ANPR Survey Analysis

The ANPR survey results for the AM peak are shown in Table B.2 below. The survey data shows that up to 20 - 30% of traffic in the survey study area currently uses the regional road network when capacity exists on the M3 to provide a viable alternative route for their journey.

Table B.2. ANPR Survey Results for the AM Peak

Site	2	3	4	6	8	10	12	14	15	16
1	13		1043	155	198	11	2	13	29	
3	326		12	80	112	109	9	47	148	
5	39		23	9	49	17	5	14	26	
7	226		212	172	19	2		1	9	
9	28		235	49	24	11	25	1		5
11	4		26	15	1	30	3	2		18
13	23		108	63	5	3	1	28		54
15						2	3	18		
16	60		258	109	10					

The ANPR survey results for the IP peak are shown in Table B.3 below. The survey data shows that up to 23 - 32% of traffic in the survey study area currently uses the regional road network when capacity exists on the M3 to provide a viable alternative route for their journey.

Table B.3. ANPR Survey Results for the IP Peak

Site	2	3	4	6	8	10	12	14	15	16
1	8		208	45	74	8		10	20	1
3	201		23	49	169	125	4	47	98	
5	29		34	10	50	9	1	10	18	
7	74		140	44	5	16	2	1	1	
9	5		68	17	4	6	7	1		3
11			6	2		16	1	1		5
13	4		41	20		2		17		23
15						3	5	20		
16	13	1	88	24	3					

The ANPR survey results for the PM peak are shown in Table B.4 below. The survey data shows that up to 25 - 35% of traffic in the survey study area currently uses the regional road network when capacity exists on the M3 to provide a viable alternative route for their journey.

Table B.3. ANPR Survey Results for the PM Peak

Site	2	3	4	6	8	10	12	14	15	16
1	5		421	62	304	63	4	40	64	
3	946		28	74	484	549	30	200	342	
5	177		75	3	183	106	12	84	99	
6									2	
7	156		217	133	14	55	3	3	4	
9	14		145	20	2	9	30	4		3
11	2		23	11		36	6	1		6
13	10		89	32	1	3		24		32
15						7	15	105		
16	37		181	64	10					



Appendix C

Scheme Map

