

# South Fingal Transport Study

FINGAL/DUBLIN FRINGE STUDY

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**SYSTRA**

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# 1 Fingal/Dublin Fringe

## 1.1 Introduction

This report forms part of the South Fingal Transport Study (SFTS), covering the study sub-area Fingal/Dublin Fringe.

Fingal/Dublin Fringe<sup>1</sup> (F/DF) is a newly developing area situated 7km north-east of Dublin City Centre at the border between Dublin City Council and Fingal. Containing several distinct growth areas, forming an expansive new urban area stretching between Clarehall Junction in the west and Baldoyle in the east. In Fingal, the growth areas include Baldoyle, Balgriffin, and Belcamp. The largest development zone is located in DCC, comprising Clongriffin and Belmayne, which were initially designated for development in 1999/2000. In Fingal, Balgriffin, Baldoyle and South Portmarnock are mainly residential. Greenfield areas west of the R107 in Belcamp and R139 HT Zoned Lands are zoned in the Fingal Development Plan for employment and residential uses.

The main road link from the Fingal/Dublin Fringe to the City Centre is the R107 Malahide Road, running north to south through the area. The other main link is the R139, which connects the directly to the M1 and M50 in an east to west direction. The two routes form the Clarehall Junction – the key junction in this area. The local distributor network includes the Hole in the Wall Road between Clongriffin and Belmayne, the R123 North of Balgriffin and the R124 in South Portmarnock. Transport provision is challenging due to the constrained road network, with the M1/ M50 at the area’s western boundary, and limited direct road access into the city on the Malahide Road. The M1 is recognised under EU regulation as a TransEuropean Transport Network (TEN-T), linking Dublin, Dublin Airport and Belfast. The sections of motorway leading to the M1/M50 junction are the amongst busiest sections of road in the country, and as such must be protected from development related traffic generation as far as possible.

Fingal/Dublin Fringe is well served by bus and rail. Several Dublin Bus lines (15, 27X and 43) serve the area along the Malahide Road Quality Bus Corridor (QBC). The Malahide Road QBC provides partial bus priority to the City Centre, crossing the canal at Newcomen Bridge. NTA QBC Monitoring Report 2016 provides the journey times for both bus and car along the route. Both bus and car speeds average around 15km/h, with the car generally slightly faster. However, at the canal, of the approximately 13,000 person journeys crossing Newcomen Bridge between 7am and 10am, buses passengers account for 56% of the person journeys into the city, while car accounts for just over 20%.

The Fingal/Dublin Fringe area is also served by the Northern Line at Clongriffin. This heavy rail service extends northwards from Connolly Station, providing an electrified DART service from Malahide and Howth (Howth is served by a branch line from Howth Junction), diesel commuter services from Drogheda / Dundalk, and an Intercity service linking to Belfast, with DART currently operating 3 trains per hour at peak hour at the Clongriffin station. According to the NTA 2017 Rail Census, the Northern Line DART is the busiest commuter service, with a peak hourly passenger flow of over 5,000 between Clontarf and Connolly and a peak train load of over 1,000 passengers. Around 17,000 boardings were made on the Northern Line inbound per day in 2017, about 4,000 of which come from the Malahide, Portmarnock and Clongriffin Stations.

The future DART Expansion programme will see in the additional services on the line, as well as increased frequency. It is expected that by 2027 the future system will greatly increase peak hourly capacity to nearly 12,000 inbound to the city, thus catering for a significant proportion of the future travel demand generated in the F/DF area.

The next section examines existing travel demand generated by the area, followed by a section on future travel demand and the future operation of the transport network under a variety of scenarios.

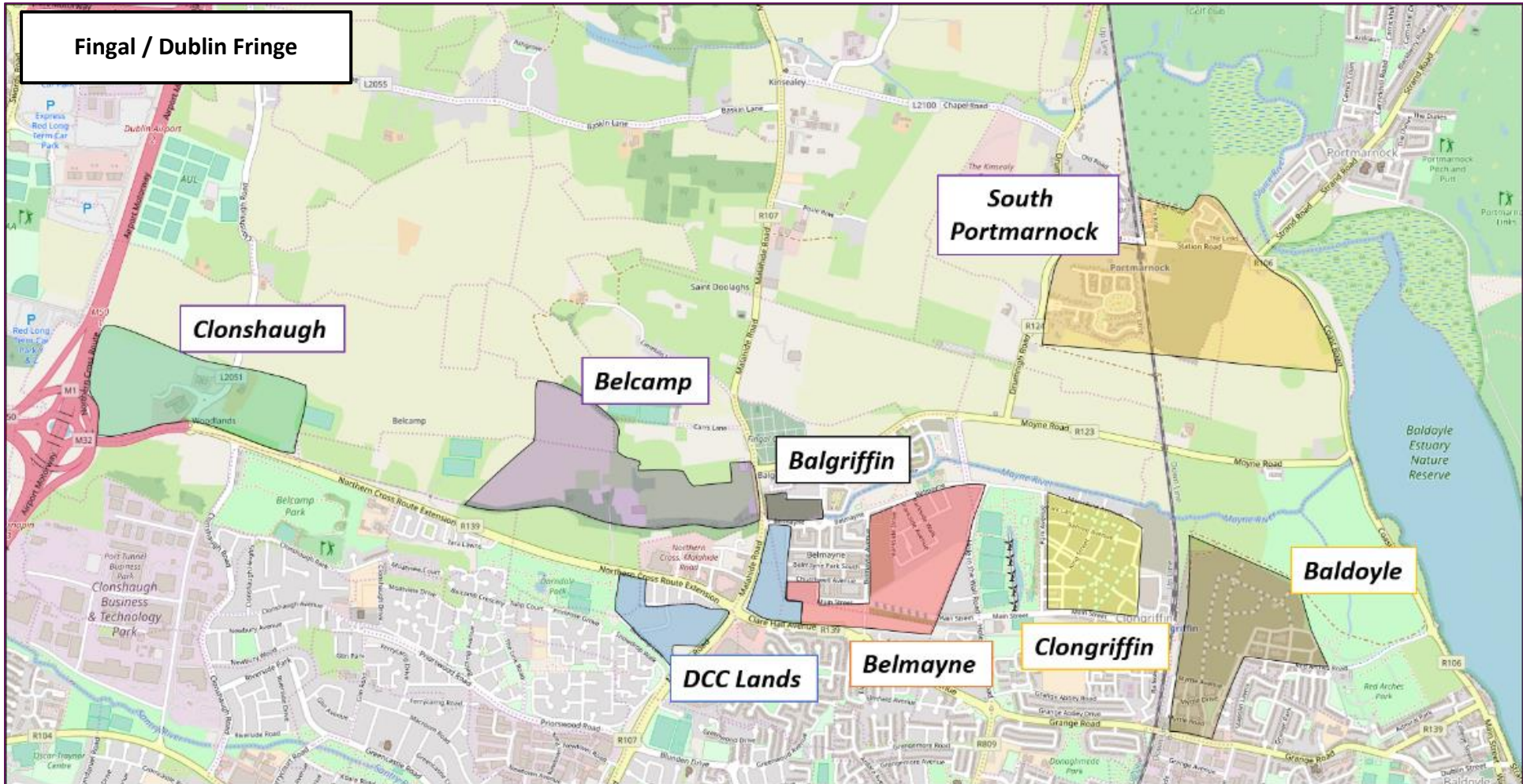
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<sup>1</sup> The term ‘Fingal/Dublin Fringe’ is used in the South Fingal Transport Study to refer to the adjacent growth areas at the fringe of Dublin City and at the southern boundary of Fingal.





Figure 1.1 Fingal/Dublin Fringe Map



## 2 2016 Travel Demand Analysis

### 2.1 Fingal/Dublin Fringe Sectors

For the purposes of this assessment Fingal/Dublin Fringe has been grouped into 3 main sectors, shown below, to enable description of its key population and employment areas using census data.

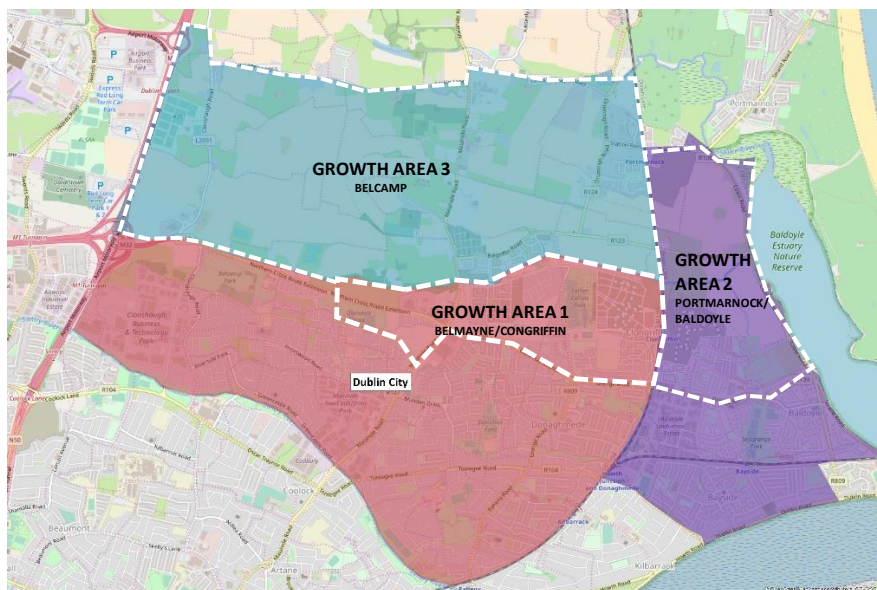


Figure 2.1 Fingal/Dublin Fringe Sectors

### 2.2 Population and Employment

This section presents an analysis of Fingal/Dublin Fringe population and typical daily travel behaviour. According to the 2016 Census around 63,500 people live in the area defined within the three main Fingal and Dublin sectors (as defined

above), with around 48,000 residing in the Dublin City Council area and 15,500 in the Fingal area, as shown in Table 7 below.

Table 2.1 POWSCAR Sectors – 2016 Population/Employment

Fingal/Dublin Fringe Sectors	2016 Population	2016 Employment
Fingal/Dublin Fringe	<b>48,000</b>	<b>7,500</b>
Belcamp	<b>3,500</b>	<b>200</b>
Baldoyle	<b>12,000</b>	<b>2,500</b>
Grand Total	<b>63,500</b>	<b>10,200</b>

In terms of the growth areas identified in Figure 2.1, in 2016 there were 17,500 people living within the developing areas. Around 10,000 of these are in the Dublin City Council area, and 7,500 in the Fingal area. The table below provides the population and employment for each growth area. The main areas of employment are in the DCC area with the Census POWSCAR<sup>2</sup> indicating over 1,700 jobs in the Dublin City Council area, and around 500 jobs in the Fingal area.

Table 2.2 Growth Areas – 2016 Population/Employment

Growth Areas	2016 Population	2016 Employment
Growth Area 1 (Belmayne/Congriffin)	<b>10,000</b>	<b>1,700</b>
Growth Area 2 (Belcamp)	<b>3,500</b>	<b>300</b>
Growth Area 3 (Portmarnock/Baldoyle)	<b>4,000</b>	<b>200</b>

<sup>2</sup> Census POWCAR provides a record of responses to the Census questions ‘what is your usual place of travel to work or school’ on a typical day in April 2016, with home and destination locations defined at the Census Small Area level.

<i>Growth Areas</i>	<i>2016 Population</i>	<i>2016 Employment</i>
Grand Total	<b>17,500</b>	<b>2,200</b>

The main areas of employment are in the DCC area with the Census POWSCAR indicating over 1,700 jobs in the Dublin City Council area, and around 500 jobs in the Fingal area.

## 2.3 Travel Patterns to Wider Destinations

### 2.3.1 Strategic Overview

This section presents an analysis of travel patterns of work and school trips from Fingal/Dublin Fringe, as per the 2016 Census POWSCAR dataset.

Figure 2.2 and Figure 2.3 show the total numbers of work and school related trips segment by their destination area.

The data shows the population of Fingal/Dublin Fringe generates total work and school trips of around 17,500 and 11,500 respectively. Of the 17,500 work trips, nearly 3,250 stay within the Fingal/Dublin Fringe. Over 5,000 travel to within the M50, and around 5,000 travel to the City Centre. Of the 11,500 school trips, 5,000 stay within the Fingal/Dublin Fringe, and 5,000 travel to within the M50. Of the 8,000 work and school trips that stay within F/DF, 52% are active modes, 41% car, and 7% public transport.

Of the nearly 5,500 work related trips that are to within the M50 and north of the city centre, 71% travel by car. Over 5,000 are destined to the city centre, however just 28% of these go by car, and 66% take public transport. Just under 2,000 trips continue further to the south of the city but inside the M50.

Work trips to other Fingal areas (Airport, F/DF, Malahide) are comparatively small, amounting combined to only around 1,750, with an 80% car mode share, and 15% PT mode share. School Trips to Fingal areas area also relatively small accounting to 500 Trips for F/DF and Malahide combined.

Overall, the data shows that there is a significant share of the working population of F/DF who travel relatively long distances to various locations throughout Dublin for work. Given the dispersed destinations and longer distances involved, such trips will be relatively car dependant (the overall car mode share at 58% for Fingal/Dublin Fringe in 2016). For example, as shown in Figure 2.2, around 85% of trips to Dublin inside the M50 (but not the city centre) are by car. It is not surprising that the area’s working population is not highly city centric, since there is easy access by car to the wider road network and its many employment opportunities, via the nearby M50. This fact will mean that in future, car is very likely to continue to play a large role supporting the areas transport requirements. However, with improved public transport and possible demand management on the M50, the share of workers going to the city centre is likely to increase, which is supportive of public transport.

A more extensive analysis of future travel patterns based on ERM transport modelling is presented in later sections, accompanied by an analysis of the corresponding network operation.





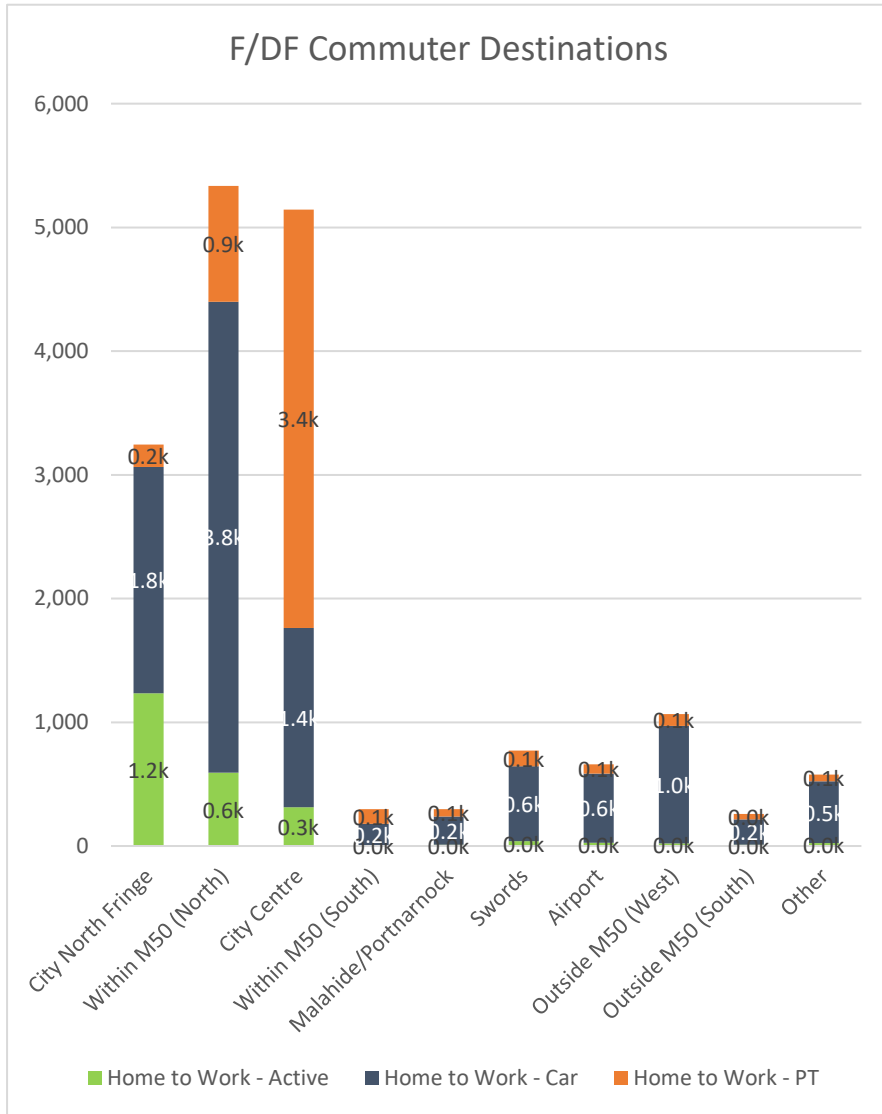


Figure 2.2 POWSCAR Commuter Destinations by Mode

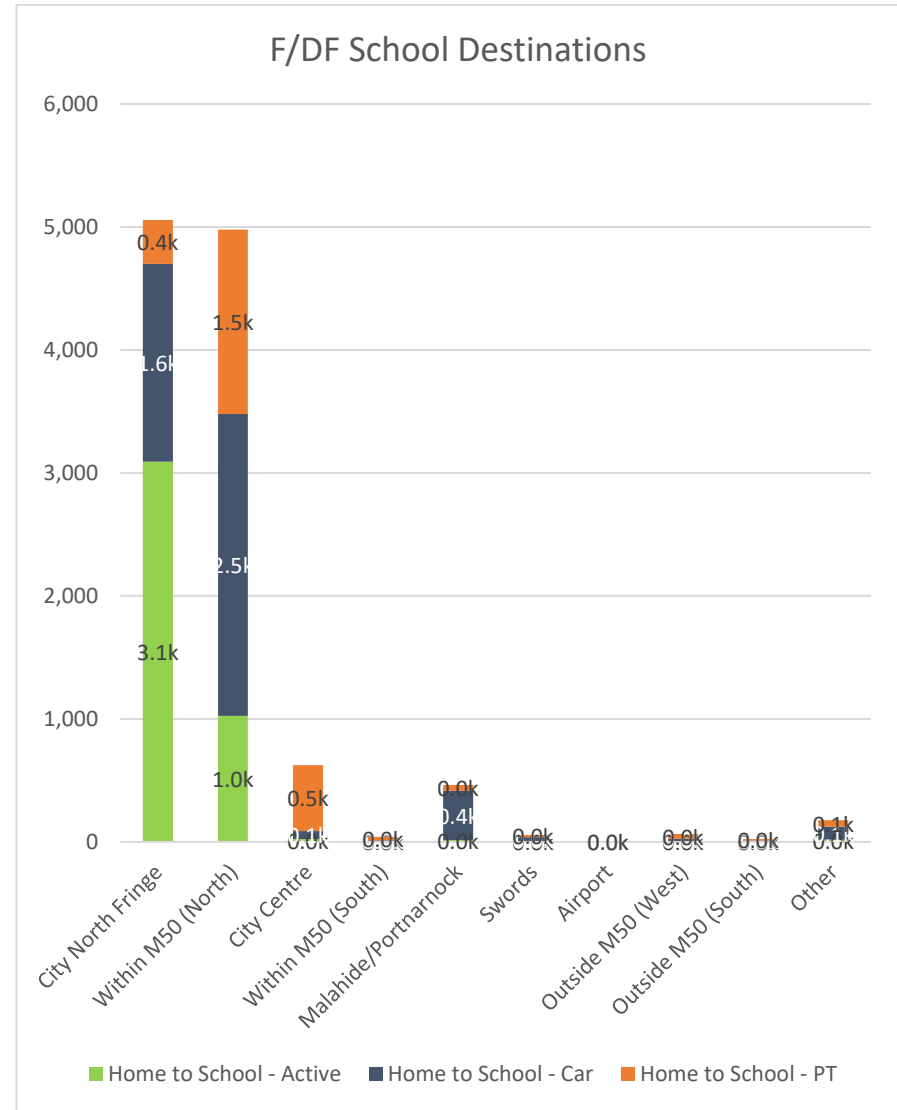


Figure 2.3 POWSCAR Education Destinations by Mode



### 3 Future F/DF Transport and Land Use

#### 3.1 Overview

A common theme in the objectives of the various LAPs governing development in the Fingal/Dublin Fringe area is to provide a coherent urban structure with distinct identity and to integrate new and existing communities.

Within the F/DF area Clongriffin is recognised in the National Planning Framework as a growth area of metropolitan Dublin, with an overall settlement strategy of consolidation and integration of land-use and transportation. In total three LAPs (Clongriffin-Belmayne, South Portmarnock and Baldoyle), were established between 2012 and 2013, which set out zoned lands for housing development as well as employment growth objectives.

In addition to the consolidation of the areas cited in the LAPs, the greenfield areas West of the R107 in Belcamp are zoned in the FDP for significant potential housing and high-technology employment facilities. The latter zoning is located along the R139 in Fingal, and could provide office, research and development and high technology/high technology manufacturing type employment. Applications for uses such as these nearer the M1/M50 junction were recently refused planning permission, noting that potential access by non-car modes was insufficient for such development to comply with national and regional sustainable transport policies.

In terms of housing provision, to ensure continuity of supply of zoned residential land, the FDP 2017-2023 provides for enough residentially zoned land for nine years from the start of the plan. In addition to the FDP, Dublin City Council also provides a number of residential zoned land in the F/DF area. Combined, an additional 9,050 housing units is provided for the F/DF Area, which could accommodate nearly 25,000 people.

As part of the Bus Connects scheme the NTA in conjunction with the relevant Dublin Local Authorities is progressing the design of radial routes into the city,

including one from the Clongriffin rail station via the City Centre and Malahide Road. At the time of writing, Bus Connects is undergoing public consultation. It should be noted that Bus Connects supersedes the Bus Rapid Transit (BRT) and Quality Bus Corridor (QBC) schemes noted as transport objectives in the FDP. However, the Core Bus Corridor (CBC) concept of Bus Connects aims to provide comparable levels of priority and reliability as would have been delivered by a BRT scheme.

The FDP, as well as the Clongriffin Belmayne LAP also identifies further transport network improvements which would be required, in addition to Bus Connects, to enable the sustainable growth of F/DF in line with the projected growth forecasts; these include:

- Implementing the GDA Cycle Network Strategy
- The East-West Distributor Road
- Modifications to Clarehall Junction to support the full development of the F/DF Area, including a C-ring bypass of the junction.
- Improvements to the pedestrian and cycle networks such as “green-way” are mentioned;
- To improve integration between the developing areas in both Dublin City Council and Fingal Council either side of the of the Dublin to Belfast railway line

The next section reviews the key LAPs and developing areas of F/DF. These plans were used to developing the future scenarios in F/DF for input to the transport modelling. These different areas, as well of the number of housing units proposed, are shown on the map below.



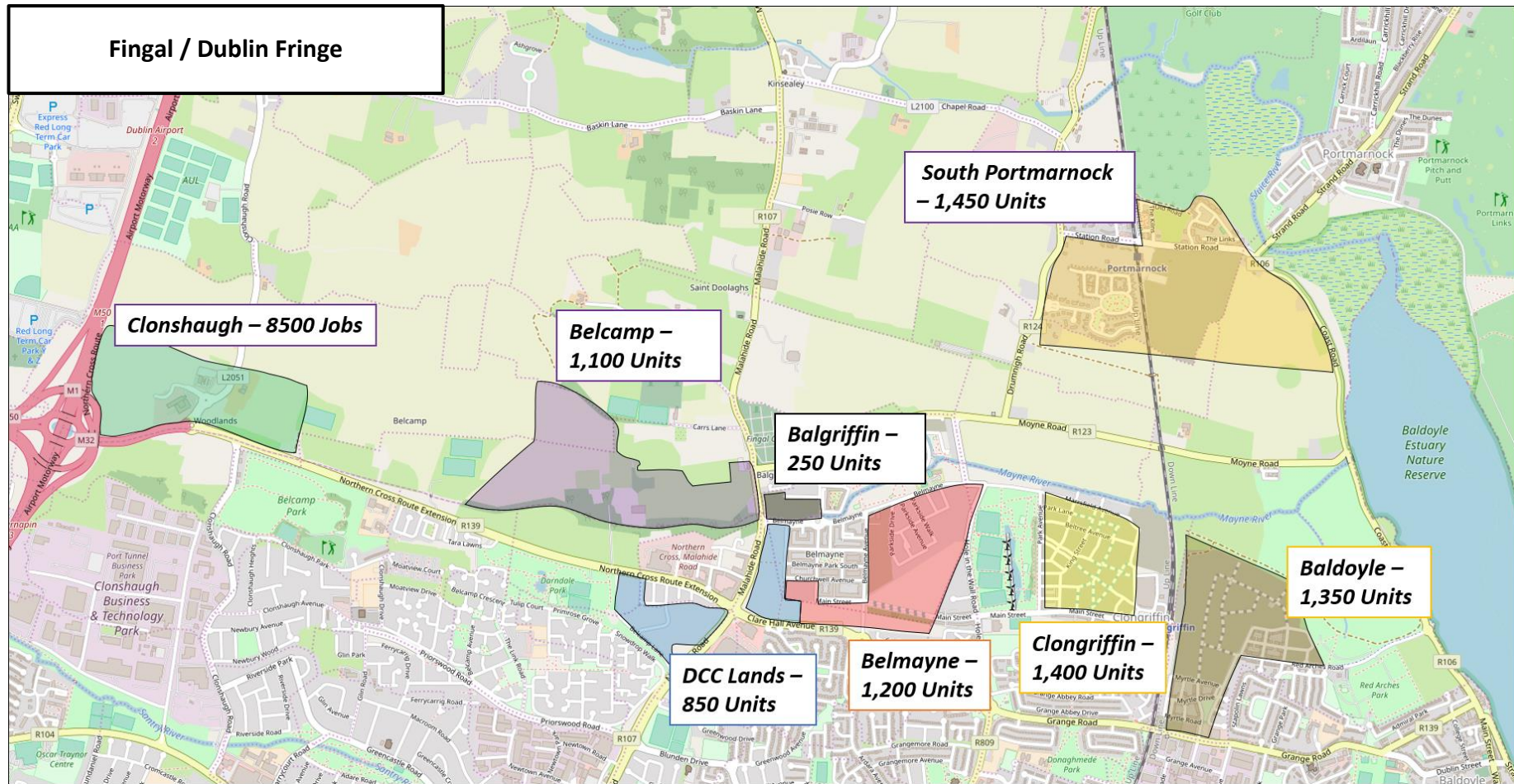


Figure 3.1 F/DF Growth Areas with number of Housing Units





### 3.2 LAP Developments

#### 3.2.1 Dublin City (2012 LAP)

The Clongriffin–Belmayne Local Area Plan (LAP) development area constitutes a large scale urban expansion project with over 200 ha of zoned land. Due to its strategic location on an intercity rail and on a QBC bus route, Dublin City Council’s vision is to facilitate the development of a highly sustainable, mixed use urban neighbourhood, with a distinct identity, based around high quality public transport nodes (rail/bus).

Census 2016 indicates that the population of the LAP area is 9,572, with a housing stock of 4,047 units. In view of the strategic nature of this area which is well served by public transport, and in view of the urban design objectives of creating high density urban forms at Clongriffin and Belmayne, and having regard also to the current housing crisis, it is considered that higher density development should be sought at Clongriffin and Belmayne in the order of an average of 100 units per hectare in respect of the remaining undeveloped lands that do not have planning permission.

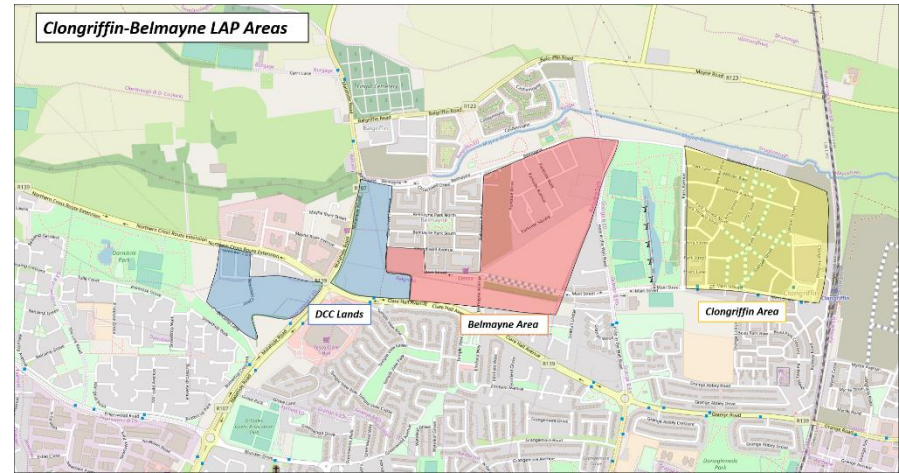
This would equate to a population in excess of 24,400 but with a full build-out stage that is likely to be post-2027. The South Fingal Transport Study has maintained a projection of approximately 18,300 additional population in 2027.

Three distinct areas are defined in the LAP, as presented in Figure below.

The Clongriffin Zoned Land Area (25.6 ha) is delimited by Collins Park to the West and the Dublin-Belfast Railway Line to the East. The LAP proposes the development of 1,353 units after the completion of phase 4.

The Belmayne Zoned Land Area (24.6 ha) is adjacent to delimited to the East by the Hole in the Wall Road and adjacent to the existing housing area in Belmayne. The LAP proposes the development of a residential area, with housing units ranging from 963 units to 1,296 units depending on the mix with other uses which would impact the housing density. The lands on the north east and south west corners of the N32/R107 junction are in DCC ownership (17ha) and are located

within the designated KDC area, with an associated estimate of between 1,080 to 1,250 housing units.



**Figure 3.2 Clongriffin-Belmayne LAP Areas**

#### 3.2.2 Baldoyle – Stapolin LAP (2013 LAP)

Baldoyle–Stapolin Local Area Plan (LAP) lands are located on the Southern boundary of Fingal where they meet the administrative area of Dublin City along the Dublin-Belfast railway.

Within the Development Plan, 41 hectares of land zones have the following zoning objectives:

*-Provide for new residential communities in accordance with approved local area plans and subject to the provision of the necessary social and physical infrastructure.*

The LAP lands are the last remaining large scale undeveloped residential land bank within the Baldoyle area. They will provide a large number of homes with a mix of different types and sizes and a range of community and other facilities to form a complete and vibrant neighbourhood. When completed it is envisaged that the entire development will provide between 1500 to 2000 new homes.

A Preferred Masterplan has been set out where density and building form will vary between medium and higher density, within a range of 38-80+ units per hectare. The Preferred Masterplan would allow for the development of approximately 1100 new units in addition to the 636 built and 205 under construction (total of 841 in existing development).

### 3.2.3 Portmarnock South LAP

The Portmarnock South LAP lands (86 ha) are strategically positioned along the DART commuter service and the Dublin-Belfast railway line. Portmarnock train station immediately adjoins the plan lands to the northwest with Clongriffin train station further to the south adjoining the Baldoyle-Stapolin LAP lands.

The residential [RA] zoned lands within the Local Area Plan have the potential to achieve up to approximately 1,200 residential units based on a density of c.42 units per hectare which accords with airport safety zone criteria. This would equate to a potential population of approx. 3360 persons. The entire plan lands are within 1km of Portmarnock train station.

## 3.3 Other Committed Development (Non LAP)

### 3.3.1 Belcamp

In the Belcamp area, west of the R107, 262 Housing Units have already been given Planning permission, with a maximum of 1,106 Housing Units which could be provided in the Area.

### 3.3.2 Balgriffin

In the Balgriffin area, East of the R107 and North of Belmayne, 246 Housing Units are currently in construction.

### 3.3.3 Portmarnock South

A number of residential areas have been given planning permission nearby the area covered by the LAP. Next to the LAP area, north of Station Lane 113 Housing Units are committed. On the other side of the Dublin-Belfast Railway Line, 328 Housing Units have been given outline permission.

### 3.3.4 R139 HT Zoned Lands

The area is zoned as High Technology Development area with the intent to provide for office, research and development and high technology/high technology manufacturing type employment in a high quality built and landscaped environment.



### 3.4 Transport Plans

This section presents the key schemes and transport plans awaiting implementation and/or further evaluation in the F/DF Area. The NTA GDA Strategy 2035 will have a major effect on F/DF within the next decade, with the flagship infrastructural project Bus Connects / Core Bus Corridors planned for full implementation by 2027. The DART Expansion programme will also be implemented by 2035, while by 2027 DART frequencies will already have been increased. The FDP also proposes two large scale road schemes in the area – the R107 Malahide Road / Kinsealy Bypass, and the East-West Distributor Road.

#### 3.4.1 NTA Greater Dublin Area Transport Strategy 2035

##### 3.4.1.1 GDA Cycle Network Plan

The GDA Cycle Network Plan identifies urban and inter-urban networks in accordance with The National Cycle Policy Framework (NCPF). The plan sets out a range of actions required to develop a strong cycling culture in Ireland to the extent that, by 2020, 10% of all journeys will be by bicycle. It forms a key part of the NTA’s integrated strategy to deliver sustainable transport infrastructure throughout the GDA. The target in the Dublin City and Suburban areas is an increase in the overall cycling mode share (for all purposes and distances) from approximately 3% to 10% over the 10-year horizon of the plan (from 2014).

In the F/DF area, an extensive network of primary routes is identified in the Cycle Plan. Two primary cycle routes (in red on the map) are connecting F/DF to the City Centre, via Malahide Road and Grange Road. The plan proposes Secondary Cycle routes (in blue on the map) along the R139, Hole in the Wall, as well as the R809 in direction of Dublin Road. Most cycle routes would generally consist of a two-abreast lane per direction that is 2 to 2.5m wide with minimal conflicts along the route. On the Eastern limit of F/DF, a Greenway is also proposed along the Coastal Road in direction of Howth.

This report examines which sections should be prioritised for implementation based on where main development is anticipated and where the greatest benefits could be expected. The key routes/schemes of the plan are shown in Figure 3.3.

Figure 3.3 GDA Cycle Network Plan in F/DF (Key Routes)

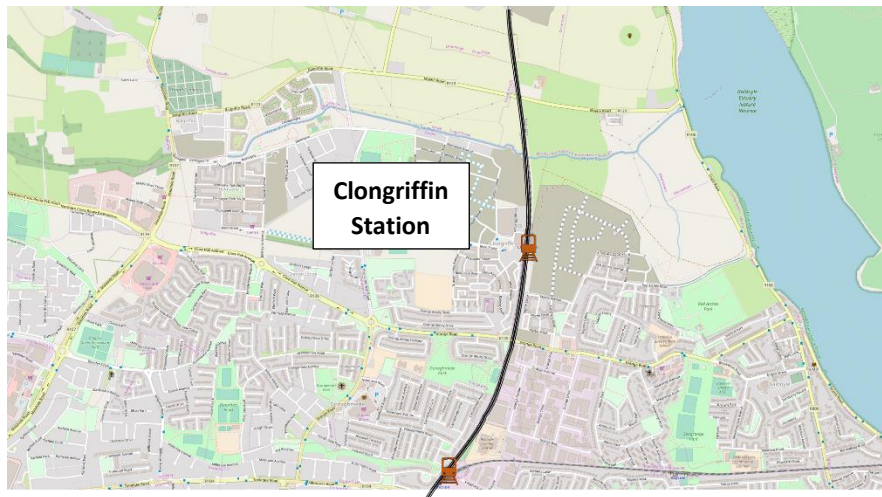


**3.4.1.2 DART Expansion Programme**

The DART Expansion Programme which consists of a number of investment projects that will significantly expand the heavy rail capacity, frequency and connectivity in Dublin city centre and throughout the GDA will be in place for 2035. In the F/DF area, it will mean additional services and increased frequencies.

In particular, it has been assumed in the modelling that by 2027 DART will operate every 10 minutes between Howth Junction, Dublin city centre, and Bray, and every 20 minutes on the branches to Howth, Malahide, and Greystones

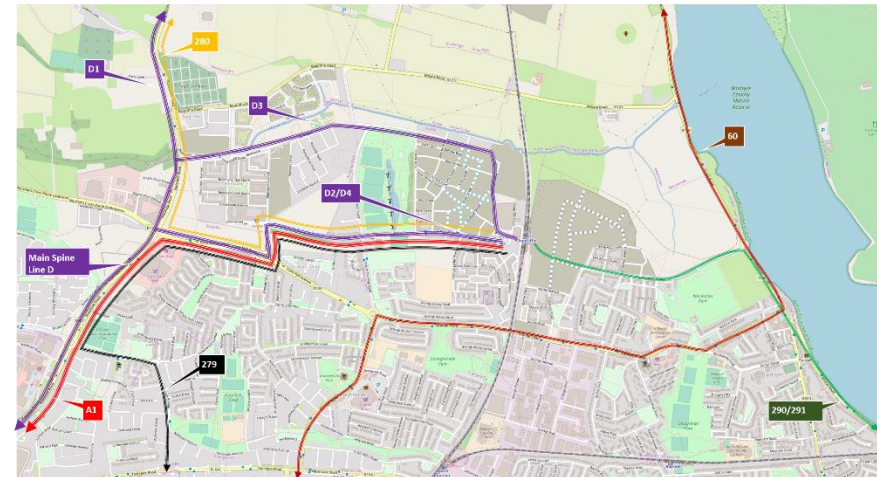
As shown, in the Figure 3.2 below, the main F/DF station is the Clongriffin station, which is also a main interchange point with Bus Services. The Clongriffin station provides direct connectivity to the City Centre for the areas West of the station (Clongriffin) and East of the station (Baldoyle).



**Figure 3.4 DART Line and Stations in F/DF**

**3.4.1.3 Dublin Area Bus Network Redesign**

Bus Connects is a public transport improvement programme that aims to overhaul the national urban bus systems. The Dublin Area Bus Network Redesign document has been recently published for public consultation, with the proposed new routes as shown below in F/DF.



**Figure 3.5 Bus Connects Proposed High Frequency Bus Services**

All but one branch of the D Spine ends at Clongriffin, providing city centre services along the Malahide Road. Branches of the D Spine cover both Belmayne (D3) and Main Street (D2 and D4). The D Spine continues along the Malahide Road to Clontarf and then access City Centre via Amiens Road to Connolly Station and then Tara Station. The Line then goes on in the South-West direction to Tallaght. On the Malahide Road, the service frequency is under 5min.

The A1 is one of four “A” routes that would converge into the new corridor around Whitehall. The A1 is proposed as high frequency all-day services running every 10-15 minutes. Clongriffin’s dense centre gets a major expansion of midday service reflecting its recent and ongoing development, serving as a major terminus with comprehensive connectivity to surrounding areas. In addition to the main routes previously mentioned, Route 280 extends north and west to F/DF, similar to today’s Route 43, while Routes 290 and 291 provide direct service to all parts of Howth.

Route 60 is a radial service, needed from the city centre to the areas between Malahide Road and Dublin Bay, but which are not into immediate proximity from a DART Station.

The table below details the services, in addition to the other lower frequency services.

**Table 3.1 Bus Connects Proposed Services and Headways F/DF**

Service	Headway	Weekly Midday Hourly Frequency (max)
D1	30	2
D2	10-15	5
D3	10-15	5
D4	30	2
A1	10-15	5
60	10-15	5
279	30	2

Service	Headway	Weekly Midday Hourly Frequency (max)
280	40	2
290	60	1
291	60	1

### 3.4.2 Road Schemes

In addition to aiding the NTA and TII in implementing their transport strategies, plans and policies in Fingal, it is an objective of Fingal Council to provide the additional public transport, walking/cycling and road infrastructure required for the sustainable economic development of the County. The following road schemes in F/DF are listed in the FDP:

**Table 3.2 FDP Road Schemes**

Potential Future Scheme	Description
R107 Malahide Road Realignment, Kinsealy Bypass	See detailed description below
R123 Moyne Road realignment	See detailed description below
East-West Distributor Road: Malahide Road to Stockhole Lane	A 2.5km new link through lands zoned as High Technology
East West Distributor Road Extension: Stockhole Lane to Cherryhound	A 1.5 km new link from Stockhole Lane to the R132, an upgrade/realignment of the existing Airport perimeter road (Collinstown Lane)



The FDP states that all schemes will be subject to assessment against the criteria set out in Section 5.8.3 of the NTA Transport Strategy for the GDA; which states:

- That there will be no significant increase in road capacity for private vehicles on radial roads inside the M50 motorway;
- That each proposed road scheme is consistent with this Strategy and with Government policies related to transport;
- That the travel demand or the development needs giving rise to the road proposal are in accordance with regional and national policies related to land use and development planning;
- That the development of the road scheme does not diminish in any significant way the expected beneficial outcomes of the Strategy;
- That the road scheme, other than a motorway or an express road proposal, will be designed to provide safe and appropriate arrangements to facilitate walking, cycling and public transport provision; and
- That alternative solutions, such as public transport provision, traffic management or demand management measures, cannot effectively and satisfactorily address the circumstances prompting the road proposal or are not applicable or appropriate.

Following from the table (left), the R107 Malahide Road Realignment and East West Distributor Road schemes are assessed below.

### 3.4.2.1 R107 Malahide Road Realignment

Objectives of the R107 Malahide Road Realignment could include the following:

- Divert traffic away from the Clarehall Junction, which is already over-saturated to prevent increased congestion in the future
- Provide alternative North-South route for trips commuting through F/DF
- Allow for a reconfiguration of the Clarehall Junction into an active mode friendly intersection and accompany the development of the F/DF area into a mixed-use neighbourhood
- Ensure East-West connectivity by limiting traffic delays at Clarehall junctions from/to Eastern and Western arms.

Outline plans for the R107 Malahide Road Realignment (proposed in 2009) which were not progressed past initial design stage would have seen a major expansion of road-network in the area. This would have involved a new alignment of the R107 extending through the rural areas between the old R107 and Stockhole Lane to bypass Kinsealy and tie-in to the original R107 to its north. Changes to the R139 were envisaged to provide a new motorway-style junction with the new R107 alignment. Additionally, there was to be new section of road along the Maybe River.

The South Fingal Transport Study has re-evaluated the previous 2009 concept of the R107 Malahide Road Realignment with respect to the objectives mentioned above. The use of multi-modal transport modelling enables a new look at how these objectives can be achieved considering the needs of all road users, including public transport users, walking and cycling, as well as efficient operation of traffic in the area as it grows.

### 3.4.2.2 The East-West Distributor Road (EWDR)

The EWLR has the potential to provide much needed additional capacity to the areas' road network, and in particular afford a more direct route to the F/DF Road and Dublin Airport with the opportunity to provide high levels of priority to bus and bicycle users as part of the scheme.

The main objectives of the EWDR from Malahide Road to Stockhole Lane are, as follows:

- Provide a more direct and efficient route from the Airport Box to the F/DF area via Stockhole Lane
- Improve the connectivity between F/DF and F/DF by providing alternative route to the R106/R107 Route
- Reduce traffic on the R139 by providing alternative access to F/DF
- reduce traffic on the M1 [south of the Dryman interchange], and
- improve access to Dublin Airport.



This study examines the need for the EWDR against the above objectives, and against the FDP/NTA objectives in relation to road scheme assessment noted above.

The main objectives of the EWDR Extension from Stockhole Lane to Cherryhound are, as follows:

- Improve Connectivity between F/DF and the Airport
- Reduce traffic on the R139





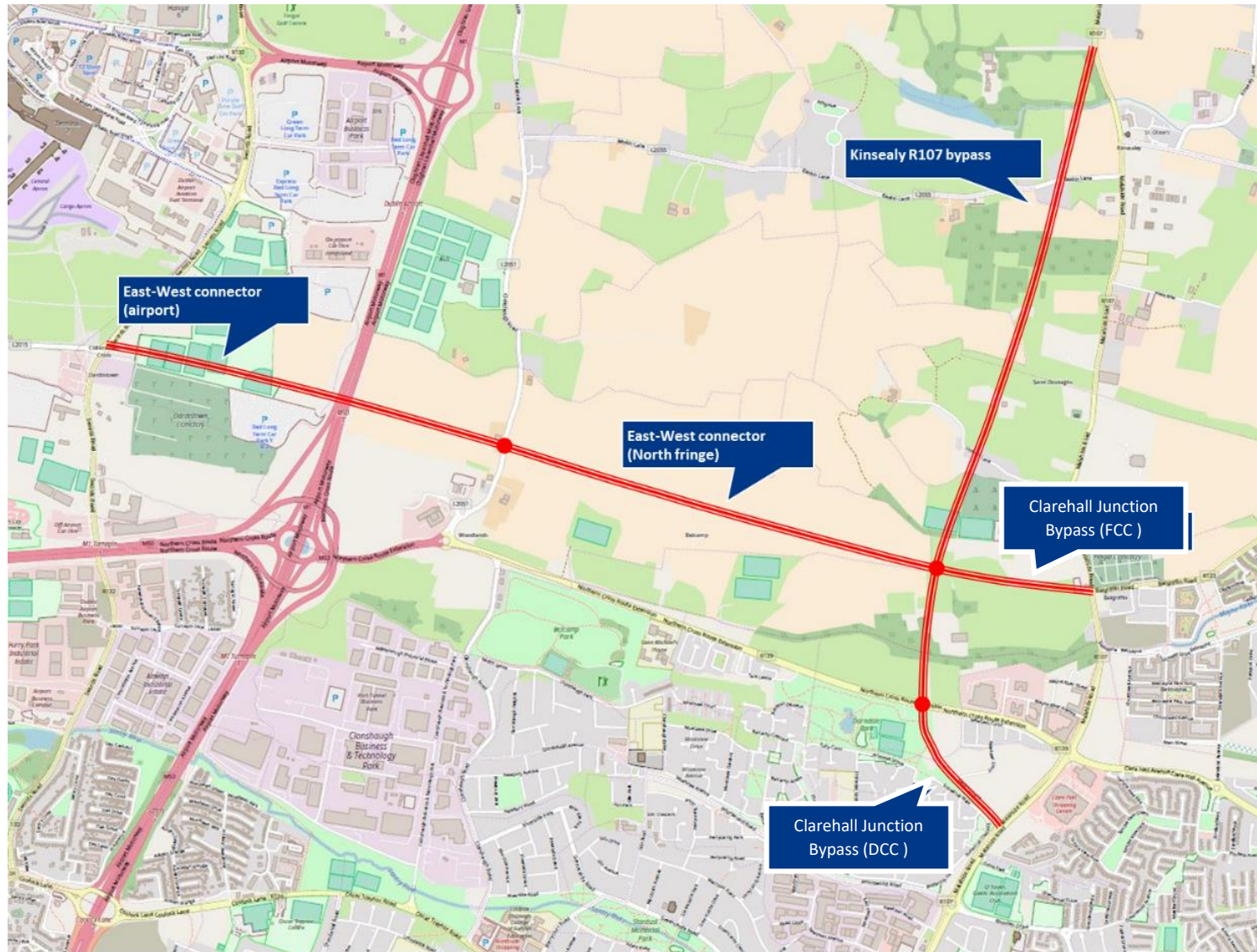


Figure 3.6 Map of Proposed Road Schemes in F/DF



### 3.5 Future Land Use Assumptions

This section presents the growth assumptions applied in F/DF with respect to a 10-year timeframe to 2027.

#### 3.5.1 Recognised Development

The Recognised Development scenario was derived from the following sources:

- as envisaged in the relevant 2010 LAPs;
- development with planning permissions or currently underway; and
- areas identified by Fingal County Council where near-term potential exists for infill development.

The table on the right presents the numbers of units assumed in each growth area. An average household occupancy of 2.75 occupants per unit has been assumed throughout this study.

Based on the assumptions around the number of units and the household occupancy, the population in F/DF under the Recognised Development scenario is 43,000 an increase of 25,500 above its Census 2016 population.

**Table 3.3 F/DF Recognised Development (Housing Units)**

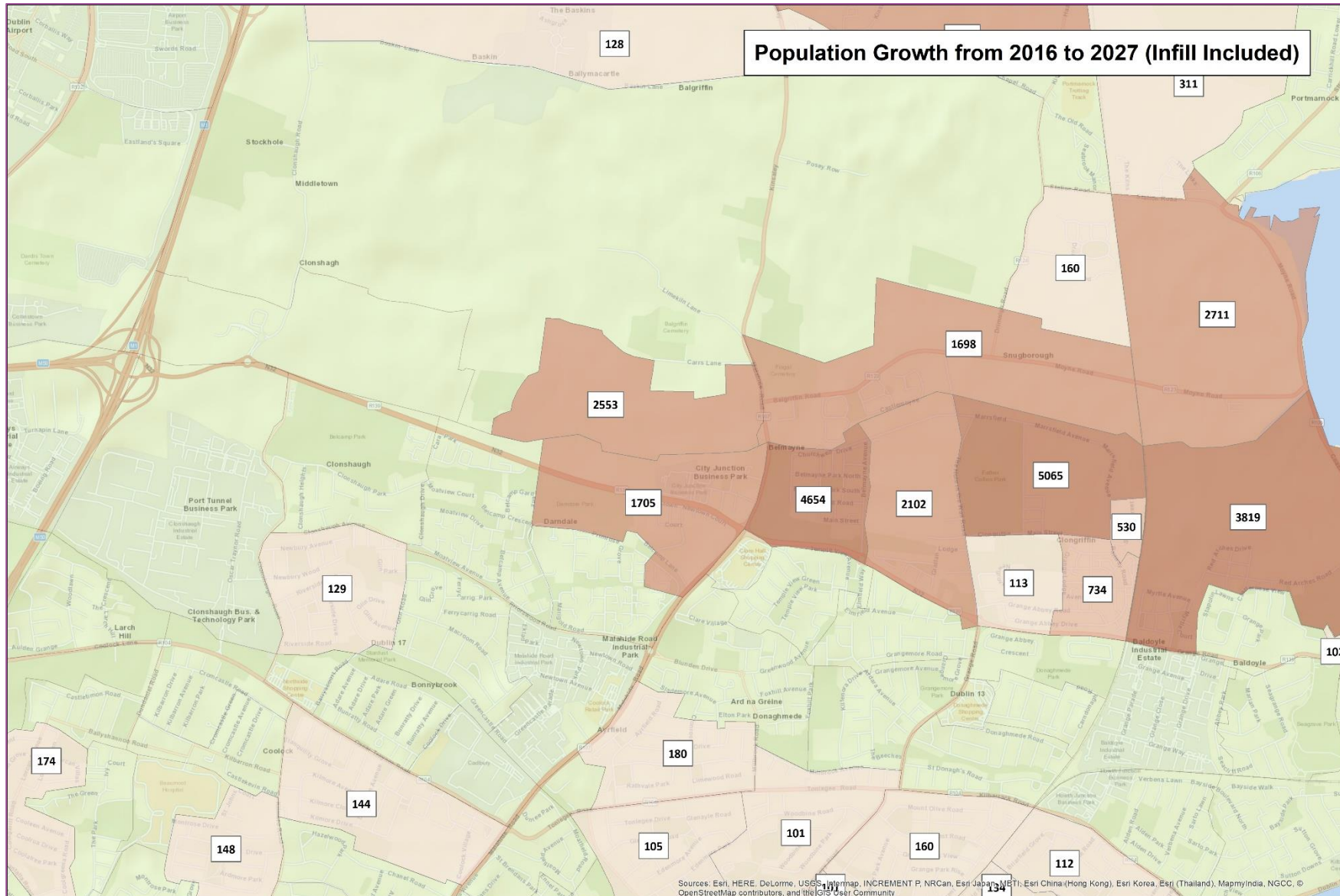
Site	Units allowed by LAP	Units assumed in 2027 Baseline	Comment
Clongriffin	1,350	1,400	Dublin City LAP
Belmayne	950-1,300	1,200	Dublin City LAP
DCC Lands	1,080-1,250	850	Dublin City LAP

Site	Units allowed by LAP	Units assumed in 2027 Baseline	Comment
Lands outside of LAP phasing strategy	1,450	1,450	Dublin City LAP
Belcamp	n/a	1,100	Outside of LAP
Balgriffin	n/a	250	Outside of LAP
Baldoyle LAP	1,500-2,000	1,350	LAP Expired. Revisions possible. Masterplan in progress.
South Portmarnock LAP	1,200	1,000	
Non LAP – Portmarnock	n/a	450	
<b>Total</b>		<b>9,050</b>	

Under the Recognised Development scenario, the DCC F/DF neighbourhoods increase from 10,000 to a total population of around 24,500. This increase is mainly driven by the consolidation of the Clongriffin and Belmayne neighbourhoods, comprising about 2,600 housing units in the LAP phasing, with an addition of 1,450 units outside of this LAP phasing. Around 850 units are also considered on the DCC Lands, on both sides of the Clarehall Junction. The Baldoyle and South Portmarnock LAP provide for respectively 1,350 and 1,000 units. In addition, 450 units are considered in South Portmarnock outside of LAP scope, as well as 250 units in Balgriffin, just North of Belmayne. To the West of Malahide Road, 1,100 units are considered in the Belcamp greenfield area.







**Figure 3.7** Population Growth Map – Recognised Development



## 4 Modelling Assessment

### 4.1 Overview

A key aim of the South Fingal Transport Study is to examine where issues arise in transport network as a result of the assumed population growth. The effects of constrained network capacity and/or over-development of certain areas are thus estimated using transport modelling of the future scenarios. The East Regional Model takes forecasts of planning data and estimates future levels of trip generation, travel patterns, modes chosen, and routing through the networks.

The study recommends potential solution, with respect to a range of policy objectives, that provide Fingal with an evidence base for deciding how its transport networks should evolve to meet the needs of its growing population and economy over the next decade.

Questions pertaining to the immediate future in F/DF include:

- To which extent, the GDA Strategy implementation is able to support the growth of the F/DF area.
- Which road infrastructures schemes are needed to allow the F/DF road network to withstand the increase in population (25,500).
- Which cycle routes should be prioritised to best provide access to local services for the existing and new population.

### 4.2 Assessment Structure

The assessment of the impacts of future development on the transport network in F/DF is structured as follows:

#### 1) Trip Generation by Mode

Trips generated by each mode resulting from future development in F/DF is discussed first. Trip generation is segmented by mode and sector, so that the effects of the introducing various levels of public transport and/or other schemes can be understood at a general level. Trip generation data is presented in charts below which enable a comparison of the 2016 modelled data and the 2027 Recognised Development Scenario, for both the Do-Min

network (meaning that no additional transport infrastructure is included in the model), and the NTA GDA Strategy without Metro (i.e. Bus based improvements). **Note that the period examined is from 7am to 10am.**

#### 2) Trip Patterns by Mode

This section expands on the information in (1) with analysis of key destinations of trips from F/DF, and the modes used (in terms of Sector-Sector movements). **Note that the period examined is from 7am to 10am.**

#### 3) Network Analysis

Having described the level of trips generated, where they are travelling and by what mode, the network is then assessed in terms of the impact this travel has on its future performance. In Network Assessment, the period examined is the **peak hour 8am to 9am.**

Insights into the impacts of future development on trip generation and travel patterns are provided in the first two sections. The final Network Analysis stage provides recommendations based on the effects of increasing development on the road network, building on the insights in the preceding sections.

Analysis is presented for the sectors in which the most significant development is expected to occur; that is DCC (containing Clongriffin/Belmayne). Belcamp/Balgriffin and Baldoyle/Portmarnock

### 4.3 Scenarios Tested

The following table presents the key East Regional Model scenarios undertaken to perform the F/DF assessment.

The relevance of each of the above scenarios is explained below.

**Do-Min** assumes no changes are made to the transport network; this scenario, therefore, represents what could happen on the transport network due to population and employment growth if no improvements were made to accommodate the increased travel;



**GDA Strategy** assumes the NTA GDA Strategy is implemented with respect to its bus network improvement programme, MetroLink and increased DART frequencies as part of DART expansion.

**FDP Roads** includes all potential future road schemes in the main strategic model run, on top of the GDA Strategy scenario above.

Scenario Name	Growth	Bus Connects / DART Expansion etc.	Additional Roads
DoMin 2016	No Growth (2016)		
DoMin 2027	Recognised Development		
GDA Strategy	Recognised Development	✓	
FDP Roads	Recognised Development	✓	✓

**Figure 4.1** Matrix of Model Scenarios

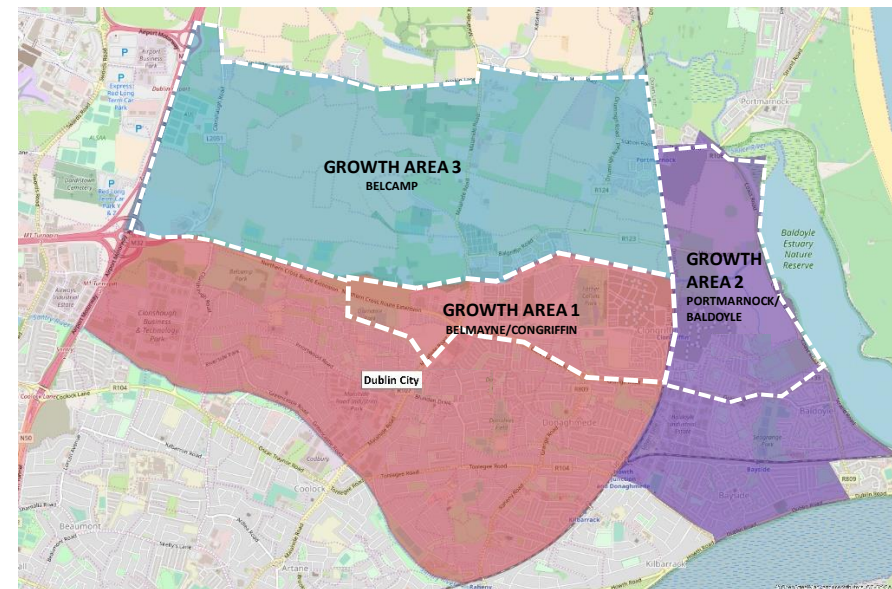
## 4.4 Recognised Development Assessment

### 4.4.1 Population Growth

The table below summaries the growth by sector. The sector system is shown in Figure 4.2. This sector system is used throughout the rest of the report to summarise results for F/DF at an appropriate level. Further analysis of the scenario is presented on the following page.

**Table 4.1 F/DF Population by Sector (Recognised Development)**

F/DF Sectors	2016 Population	Increase	Units	2027 Population
Growth Area 1 DCC (Belmayne/Clongriffin)	10,000	14,500	4,900	24,500
Growth Area 2 (Belcamp)	3,500	4,500	1,350	8,000
Growth Area 3 (Portmarnock/Baldoyle)	4,000	6,500	2,800	10,500
<b>Grand Total</b>	<b>17,500</b>	<b>25,500</b>	<b>9,050</b>	<b>43,000</b>



**Figure 4.2** F/DF Sector System



### 4.4.2 Trip Generation

This section examines increased trip generation by mode for the Recognised Development forecasts with no intervention (Do-Min) and with GDA Strategy up to 2027 (Bus Connects and Cycle Network Plan but no Metro).

#### 4.4.2.1 Growth Area 1 (DCC side of Fingal/Dublin Fringe)

This sector is examined first as it contains most of the future growth under the Recognised Development scenario, i.e. in Clongriffin and Belmayne.

Between 2016 and 2027 in Growth Area 1 total trip making increases from around 6,600 total productions in the morning (7-10am) to over 16,000. This is due mainly to population increase in the Clongriffin and Belmayne development. The different levels of trip making by mode are shown in the chart below.

For the Do-Min 2027 Network, (e.g. without any network intervention to 2027), the largest increase is in overall car trip generation, from just under 3,500 trips in 2016 to over 7,500 in 2027 in the AM Period. This will result in increased pressures on the F/DF internal network, the Clarehall Junction, the R139 and Malahide Road.

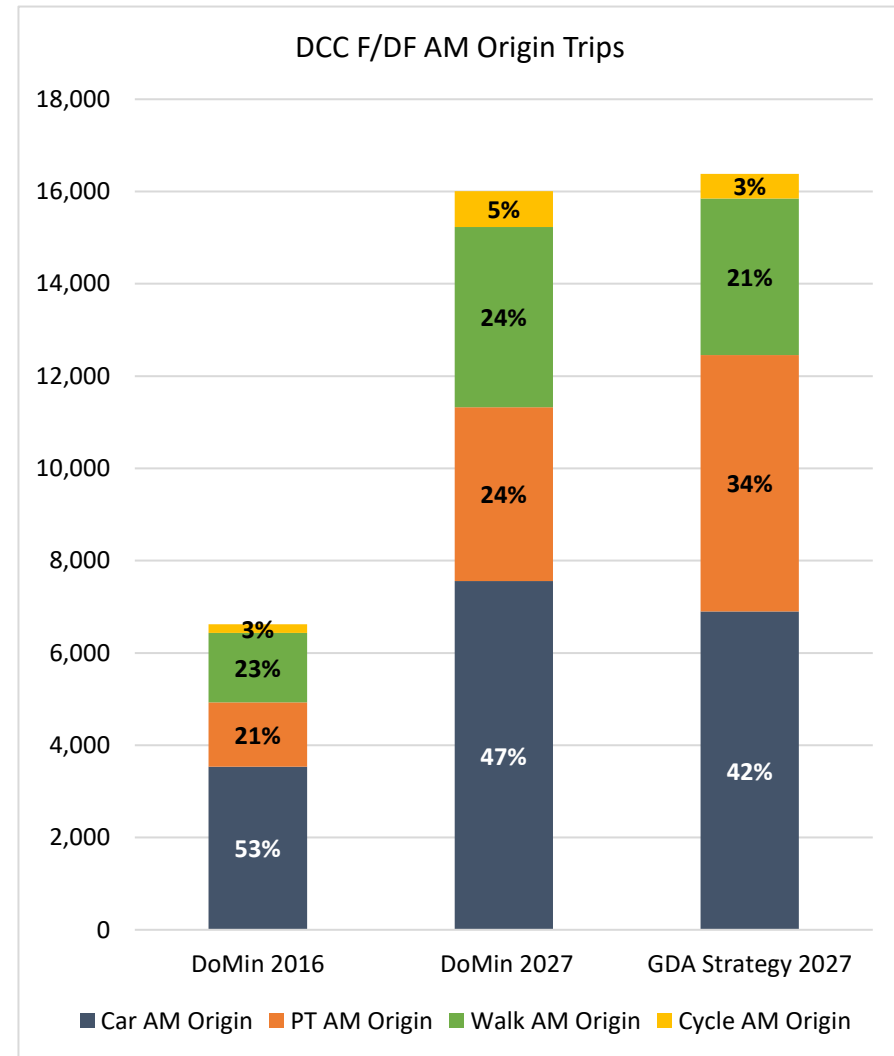
In the GDA Strategy scenario with increased bus frequency extended into the key areas, car trips reduce from 7,500 to 6,900 and public transport trip increase from 3,700 to 5,500. Car mode share is reduced from 53% in the existing situation to 42% with the influence of the Bus Connects scheme, while PT Mode Share increases from 21% to 34%.

The level of car usage (6,900 AM Period trips), however, remains well above 2016 levels (3,500) despite the large increase in public transport mode share.

Insight: Car Mode Share reduces significantly with the implementation of the GDA Strategy.

Insight: Overall, the level of car trips still increases significantly, despite reduced mode share

Figure 4.3 Trip Generation by Mode, DCC F/DF

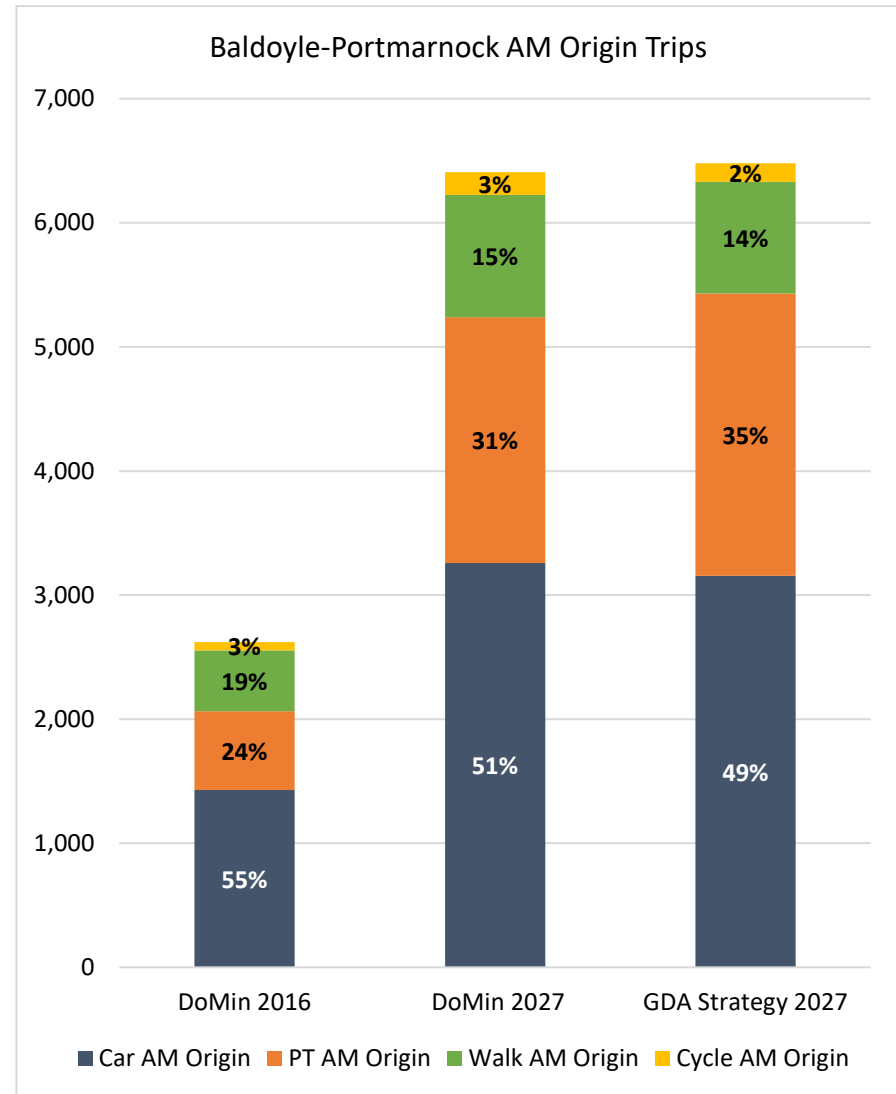


**4.4.2.2 Growth Area 2 (Baldoyle/Portmarnock)**

Baldoyle - Portmarnock, where 2,800 new units are assumed, witnesses an increase of more than 100% in trip making overall above the 2016 levels, from 2,600 to 6,400 trips. Car trips increase from 1,400 to 3,300. Public transport trips grow from 600 to 2,000.

With the introduction of the GDA Strategy, the reduction in car mode share is relatively small compared to other areas (especially the Clongriffin/Belmayne area), due to the lesser influence of Bus Connects in the area, with car trips only dropping from 3,300 to 3,200 trips. PT Trips only grew from 2,000 to 2,300 trips.

Insight: The area is less dependent on bus improvement schemes than the Clongriffin/Belmayne area. However, it relies heavily on improving DART commuter rail frequencies in line with population growth, as intended by the GDA Strategy.



**Figure 4.4** Trip Generation by Mode, Baldoyle - Portmarnock

**4.4.2.3 Growth Area 3 (Belcamp/Balgriffin)**

Between 2016 and 2027 trips from Belcamp - Balgriffin also increase substantially, from over 2,500 trips to 6,000. As shown in the figure on the right, there is a decrease in the proportion of trips by car but in absolute terms, car trips could double from 1,700 to 3,500. Public transport trips increase from 600 to 1,500 in the Do-Min scenario. Walking and cycling increase in line with the increase in trip making, but their share of travel does not increase substantially. The walk/cycle mode share predictions should be regarded a lower end estimates as the strategic modelling can tend to underrepresent the increased attractiveness of new cycling infrastructure.

Insight: The area is less dependent on GDA Strategy bus schemes (e.g. Bus Connects) than the Clongriffin/Belmayne area.

Insight: Car Trips, while reducing in proportion, more than double between 2016 and 2027, even the implementation of the GDA Strategy.



Figure 4.5 Trip Generation by Mode, Belcamp - Balgriffin



### 4.4.3 Trip Destinations by Mode

#### 4.4.3.1 Overview

This section briefly examines the general patterns of travel by mode within F/DF and from F/DF to the rest of the modelled area. Model data is presented in 3 separate charts (1 per F/DF sector), in Figure 4.6 to Figure 4.7 below. The charts provide a comparison of the Do-Min and GDA Strategy networks in terms of where trips are going to and by what mode, for the Recognised Development land use scenario.

#### 4.4.3.2 Growth Area 1 (DCC Sector)

The key trip destinations from the DCC sector are shown in the Figure 4.6. The chart shows that of trips originating from DCC, most of the trips travel outside of the area, with 5,500 car trips and 3,500 PT trips in the Do-Min situation. The implementation of the GDA Strategy has a significant impact on these long-distance trips with an increase of their overall value from 11,400 trips to 12,200 trips, but also a mode shift to PT (with 1,700 more PT Trips and 400 Trips). It should be noted, however that a portion of this mode shift in the estimate is from Active Trips (500 Trips). Increasing the opportunities for travel outside an area by improving the public transport system tends to increase the number such trips, and this is reflected in the model estimates.

A high proportion of trips are internal to the DCC sector, with an absolute value of 3,100 trips. Most of these trips are made using active mode (1,900 trips) and very few by public transport. The implementation of the GDA Strategy slightly reduces the overall number of internal trips (3,100 trips to 2,800 trips).

Local trips to other areas from Belcamp/Baldoyle sectors are relatively low, with only 1,000 trips in both scenarios.

**Insight:** Most of the trips originating from DCC F/DF are in destination of outside F/DF.

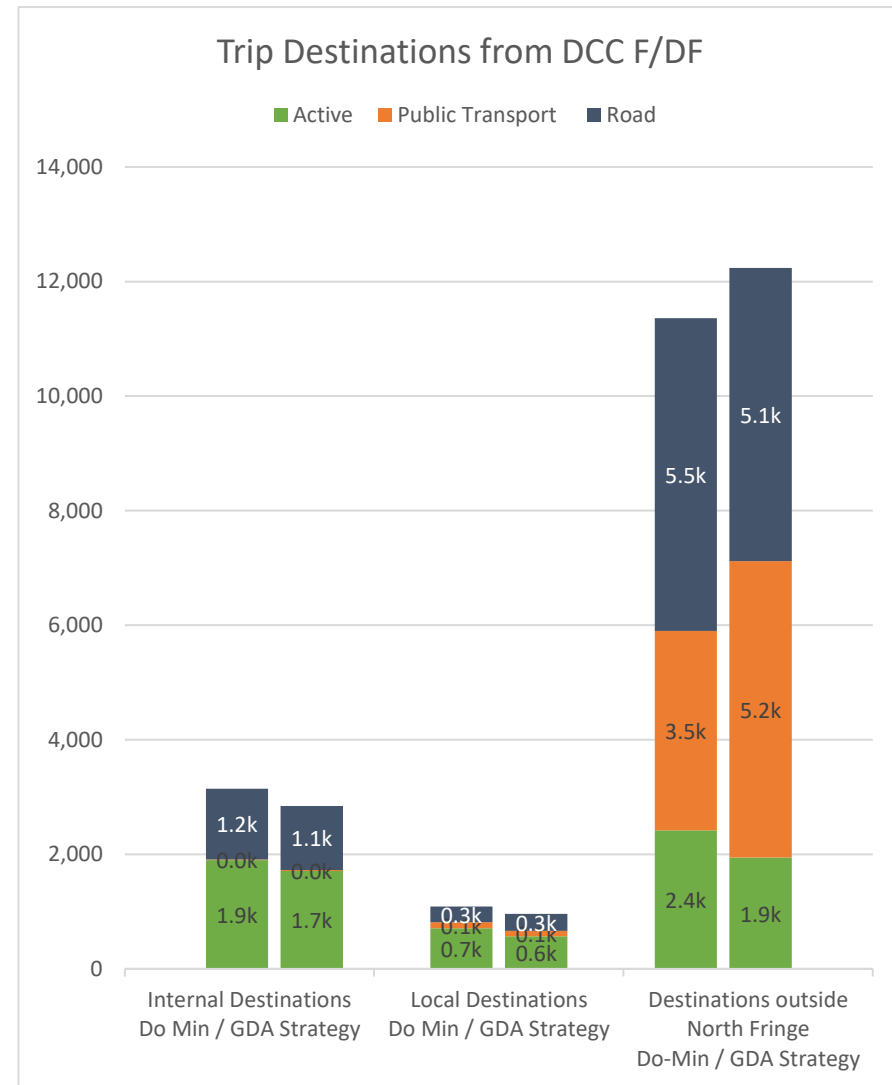


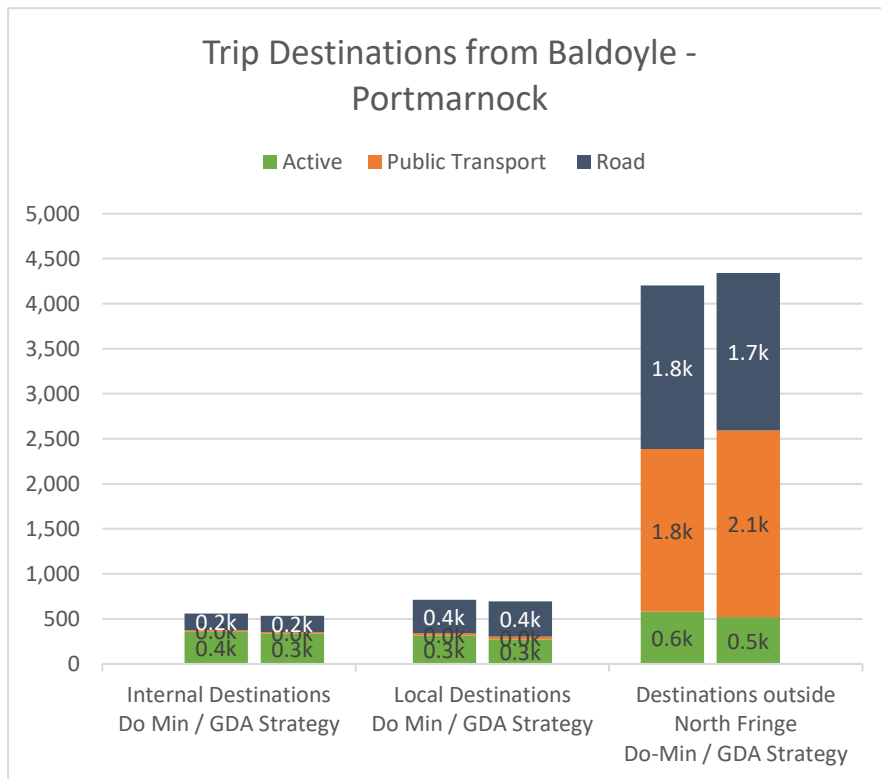
Figure 4.6 Trips Destinations from DCC F/DF



**4.4.3.3 Growth Area 2 (Baldoyle/Portmarnock)**

Most of the trips (4,200) originating from Baldoyle/Portmarnock are Long-Distance Trips (Destination outside of F/DF, while only 1,200 trips are internal or local (Destination inside of F/DF). Bus Connects has a relatively small impact on the area, with an increase of only PT Trips, and only 100 of these trips coming from car trips. With the GDA Strategy in place, 2,600 trips are PT/Active trips, while 1,700 are car trips.

Insight: Most of the trips originating from Baldoyle/Portmarnock have a destination outside the F/DF area, and a high PT mode share.

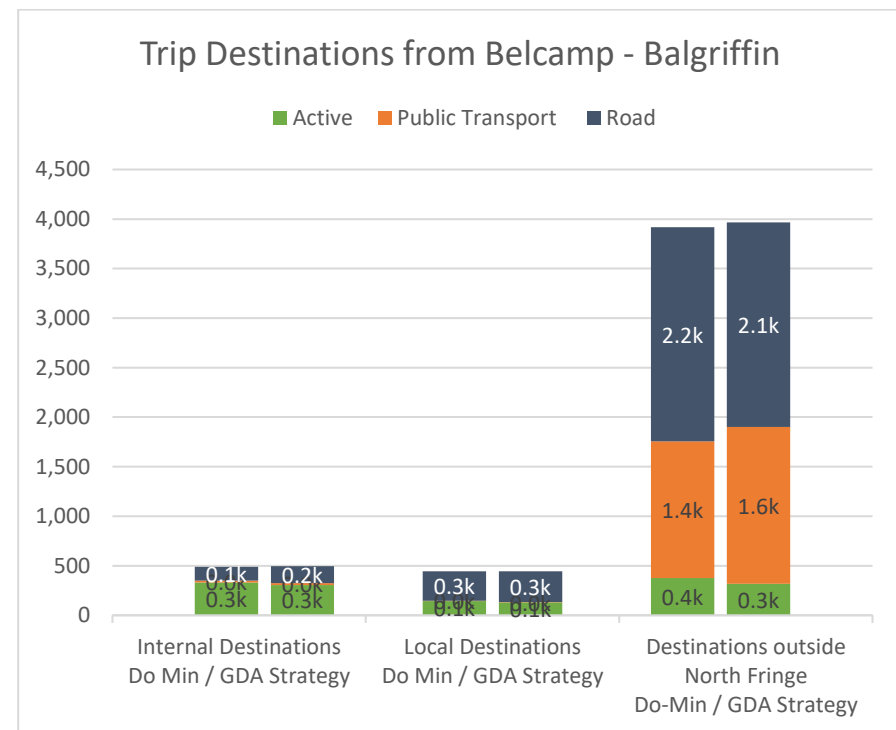


**Figure 4.7** Trips Destinations from Baldoyle - Portmarnock

**4.4.3.4 Growth Area 3 (Belcamp/Balgriffin)**

Trip making behaviour from Belcamp - Balgriffin is less affected than on the DCC side of F/DF area by the GDA Strategy. Most of the trips are long-distance trips (outside of the F/DF area): 3,900 Long Distance trips vs 900 internal and local trips combined. The proportion of car trips is quite significant (2,200 car trips vs 1,400 PT trips) while the proportion of active mode trips is low (400 trips). The GDA Strategy scheme only increases the PT Trips by 200 trips, with only 100 of them coming from the car users.

Insight: Most of the trips originating from Belcamp/Balgriffin have a destination outside the F/DF area, and a moderate PT mode share.



**Figure 4.8** Trips Destinations from Belcamp - Balgriffin





#### 4.4.4 Network Analysis

This section examines impacts on the road network due to the growth in population and employment under the Recognised Development scenario in the Fingal/Dublin Fringe area. Network analysis is performed generally by comparing the difference between one network and another for a certain measure, such as flows or delays. These measures can be shown as increases / decreases on the links and at junctions, in one network relative to the other, usually the Do-Min vs Scenario.

The analysis in this section is a synthesis of the various “Studies” presented in the Appendix and of the insights developed in the previous sections. Each Study represents a specific analysis of the network in terms of changing delays / traffic volumes / volume/capacity ratios etc. Each includes an image of the network relevant outputs from the modelling software SATURN and interpretation of the impacts. A list of all the Studies is provided in the initial Table of Contents.

The high-level trip generation modelling indicates that private vehicular demand will rise substantially over the 2016 modelled levels, almost doubling in the general Fingal/Dublin Fringe area as the population grows to its full potential. There is a high demand for public transport within this population growth, but the capacity of the system and the fact that many trips are not city-centre bound, place a limit on the share of future travel demand that public transport is capable of accommodating. Therefore, it is prudent to begin planning now for significant upgrades to the road network, incorporating public transport priority, in order to provide relief of the impacts associated with the full build-out of both the Fingal and Dublin City lands comprising this growth area.

##### 4.4.4.1 Potential Local Network Issues

As shown in the SATURN model analysis in the Appendix Study 1, there is a significant increase in traffic on the internal F/DF network, especially near the developing areas in Clongriffin-Belmayne, with the development of housing in the area to 2027. While increase in traffic flow on the R139 and the Malahide Road is relatively low, delay and congestion are estimated to significantly worsen, including the Clarehall Junction, due to over-capacity demand, as shown in Study 5. As they are straining under the anticipated level of demand, many junctions

exhibit significant increases in delay even with the implementation of the GDA Strategy, as shown in Study 6.

For example, there is a significant increase in delay on the northern arm of the R123/R124 Junction, due to increased traffic coming from South Portmarnock new development areas. The arm already shows a V/C of 103 in 2016 and it increases to 115 in 2027, even in the GDA Strategy Scenario, inducing a large increase in delay. As the junction approach from the north is a no flare, give-way, single lane, it exhibits additional congestion in the Recognised Development scenario.

New development areas in Clongriffin also produce a significant increase in delay at the Hole in the Wall Road junction from Clongriffin Main Street. The junction configuration is single-lane, no flare and a bus lane at the approach of the signalised junction. The existing layout is a 1-single lane with 1 long left flare, providing two lanes on the approach to the signalised junction.

The Hole in the Wall Road/Main Street junction should be monitored as the area develops to ensure efficient, effective operation for all modes is maintained. The performance of this junction could be managed through an adaptive traffic signal control system.

The R107 Malahide Road/R123 Balgriffin Road northern arm also exhibits a significant increase in delay in 2027. It is already at saturation with a V/C of 102 in 2016 and the increase in traffic brings this V/C at 115 in 2027, even with the Bus Connects/CBC scheme. The approach at the signalised junction is a single-lane with no turning flares. As shown in Study 7, the addition of a left flare on the northern arm of the R107/R123 junction helps reduce delay significantly with a 5.5-minute reduction in delay.

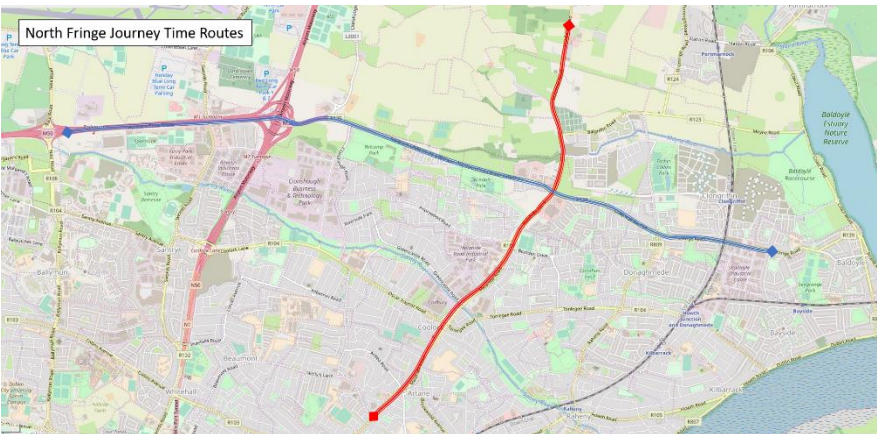
**Recommendation:** The R107/ Balgriffin Road junction should be upgraded to include additional left turning capacity for the southbound movement (e.g. adding a left turn flare), while also providing a safe and attractive environment for pedestrians and cyclists.



**4.4.4.2 Journey Time Analysis**

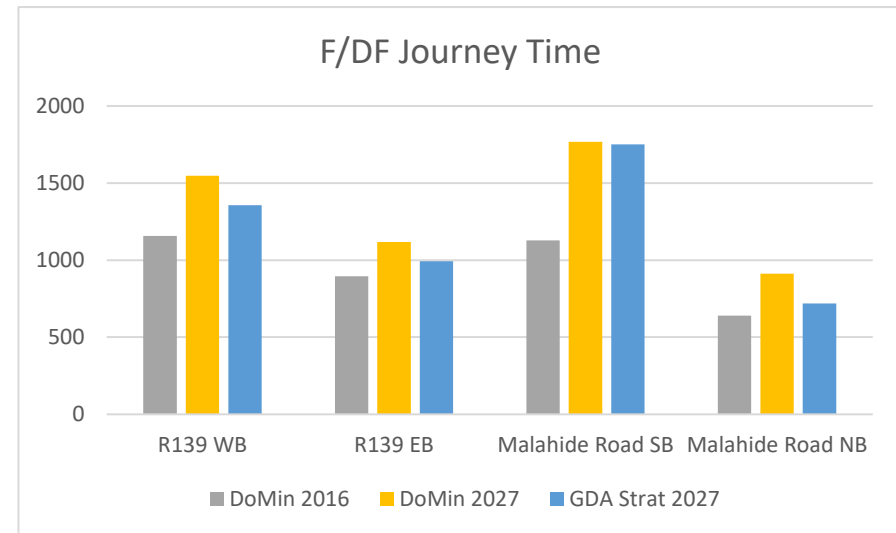
The Do-Minimum modelling suggests significantly increased car journey times are likely to occur from 2016 to 2027. Routes which are already close to saturation in 2016 are unable to handle additional trips and therefore there will be an increase in delay in peak periods, without key public transport interventions (as in the Do-Min scenario). The R139 WB and Malahide Road SB Journeys are critical to the F/DF area as they represent the main road links to the City Centre (Malahide Road) and the rest of the main network (R139), and therefore an increasing delay on these routes creates a significant challenge for the development of F/DF.

With the implementation of the GDA Strategy, however, there is a significant reduction in Journey Time on these routes. However, the impact is quite different depending on the route, and none of the journey times reduce back to 2016 level even with the GDA Strategy in place, suggesting the need for additional road network enhancements.



**Figure 4.9 Journey Time Routes in Fingal/Dublin Fringe**

The following chart summarizes Journey time for the 2 Routes, both directions. For the R139 WB Route, the Journey Time is reduced by 3 minutes, with the implementation of GDA Strategy, from 26 minutes to 23 minutes. It is, however, still higher than in 2016, when the Journey Time is 19 minutes.



**Figure 4.10 F/DF Journey times**

For the Malahide Road SB, the implementation of the GDA Strategy doesn't impact the Journey Time, which is 29 minutes, 10 minutes more than in 2016.

A large part of the delay encountered on both routes comes from delay at the Clarehall Junction, which is already at saturation in 2016, especially from Northern arm (100 seconds) and Eastern arm (113 seconds), and even with the implementation of the Bus Connects scheme, reaches higher saturation in 2027 with a V/C of 104 from Northern arm, 121 from Eastern arm and 106 from Western arm.

As a potential remedy, an increase of the junction size is neither practical nor desirable, at it would create an even more car-dominated environment. On the contrary, a reconfiguration of the junction is envisaged into a 2-lane and bus lane approach on all arms of the signalised junction without left turning flares. This reconfiguration reflects DCC and NTA objectives to create a more active and public transport mode focussed urban area, and providing the bus priority required for Bus Connects.



**4.4.4.3 Clarehall Junction Analysis**

The Clarehall Junction currently operates at capacity and given further traffic growth 2027 the delay on its approaches will worsen, particularly on its approach from the east. Delays on this approach could double, with very little additional traffic above present-day levels getting through the junction in the hour due to capacity constraints. As shown in Figure 4.11 below, several turn movements are at a critical level of delay in the 2027 Scenario, even with the inclusion of the GDA Strategy. The East-West straight-ahead movement along the R139 is the more congested turn with significant flow and delay, however movements from the Western and Northern Arm are also over-capacity. Movement from the southern arm, however, is relatively free-flowing in this AM peak analysis.



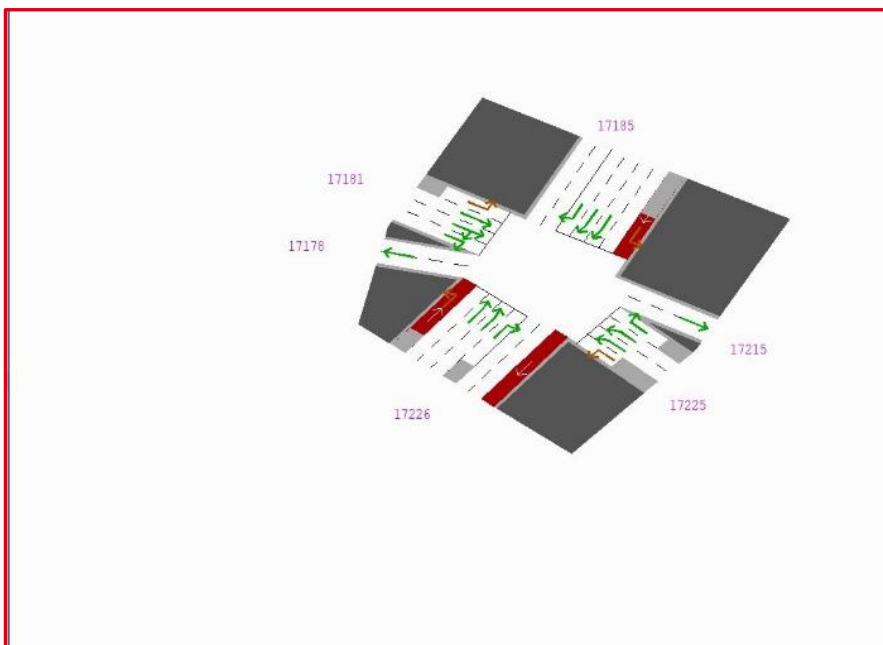
**Figure 4.11 Congestion Level at Clarehall Junction (GDA Strat 2027)**

One of the objective of the study in F/DF area is to support walking and cycling modes. The size, traffic and layout (shown in Figure 4.12 below) of Clarehall Junction is a potential hindrance to the development of actives modes

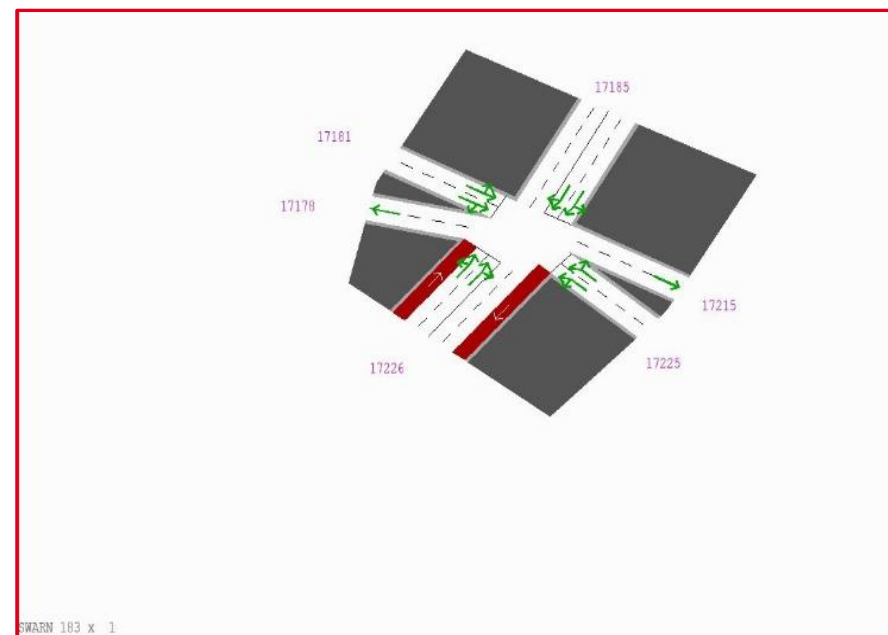


**Figure 4.12 Clarehall Junction Satellite view**

The impact of the reconfiguration into a 2-arm approach signalised junction has been tested in the road model. The Figure 4.13 represents the existing junction layout modelling in Saturn, while the Figure 4.14 represents the reconfigured junction layout modelling.



**Figure 4.13** Saturn modelling of the existing Clarehall Junction

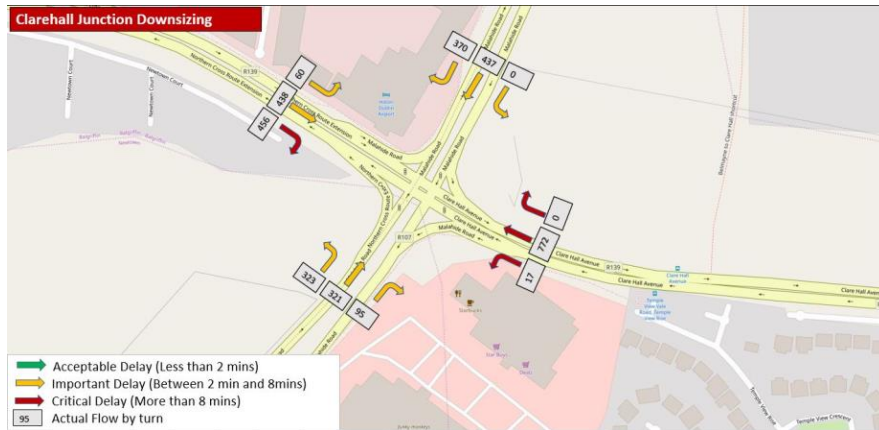


**Figure 4.14** Saturn modelling of the reconfigured Clarehall Junction

While implementing the reduction of scale of the Clarehall Junction to create a more active mode friendly environment, the level of congestion is consequently increased as shown in Figure 4.15 below, as well as in Saturn Study 14 in Appendix. All movements would be congested with the East-West movement witnessing more than 8 minutes of delay. Delay from the Southern arm is now also over 2 minutes.







**Figure 4.15 Congestion Level Clarehall Junction (with Downsizing)**

As shown in the Saturn Study 13 in Appendix, the flows in and out of the Clarehall Junction are significantly reduced, allowing for a more pedestrian-friendly environment which would favour active modes. However, as noted above, delays and congestion would worsen.

The modelling also suggests some of the additional traffic generated in the area will travel toward the city via Belmayne Avenue and the Hole in the Wall Road and onward through Donaghmede and the Grange Road, due to excessive demand at Clarehall Junction.

To mitigate the above effects, various bypasses of the Clarehall Junction in combination with reductions in scale of the main junction were tested in the modelling. This analysis is presented in the following section.

## 4.5 Mitigation of Network Issues

### 4.5.1 Road Assignment Scenarios Tested

To examine ways to alleviate the over-capacity issues at the Clarehall Junction, in addition to accommodating some reduction in traffic capacity to accommodate the Bus Connects Core Bus Corridor, a wide range of additional road model scenarios were developed. These included variations in the R107 and East-Road

schemes to first examine if lower capacity type upgrades might provide enough mitigation of the future impacts. Lower capacity alternatives are a main objective of national and regional roads policy, and it is necessary for road upgrades to provide additional capacity for walking, cycling, and public transport.

As such the SFTS has investigated alternatives to the R107 Malahide Road Bypass and full East-West Link Road which adopt some aspects of the original scheme but with a focus on a reduced scale level of intervention, to mitigate the increases in journey time and delay exhibited in the area through the Clarehall Junction.

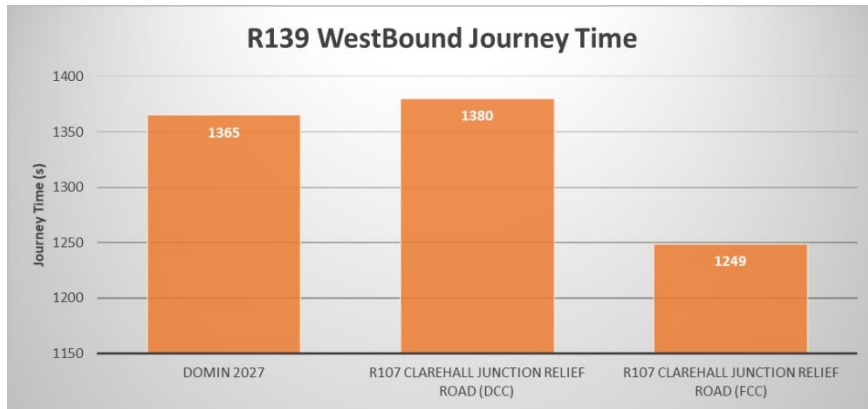
Figure 4.16 to Figure 4.21 present a range of model outputs for the following scenarios:

- Do Minimum: No Mitigation of Impacts
- DCC Relief Road (e.g. partial Clarehall Junction Relief Road)
- DCC and FCC Relief Road (full Clarehall Junction Relief Road)
- Clarehall Junction Relief Road with East-West Link to Stockhole Lane

These scenarios have been run with the implementation of the Clarehall Junction Relief Road to assess the impact on the local traffic.

As shown in Figure 4.18 to Figure 4.21 as well as in Study 15 in Appendix, delay levels are drastically reduced at Clarehall Junction, especially from the Eastern arm.

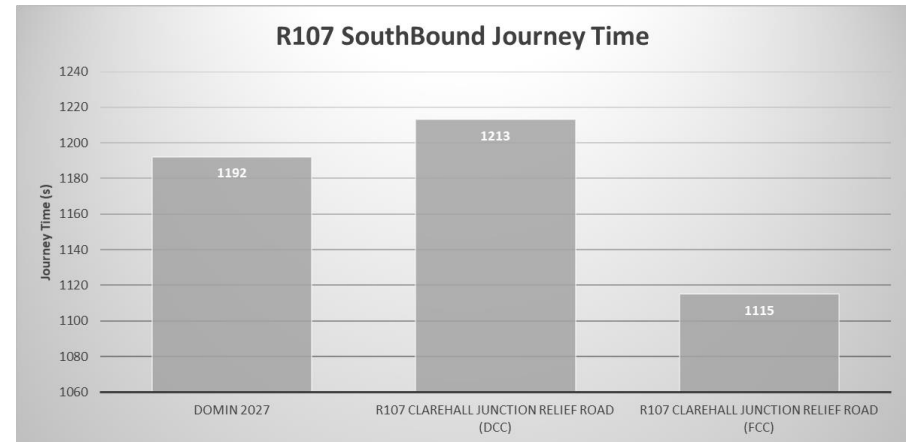
The R107 Clarehall Relief Road does therefore reduce delay along the R139 in the westbound direction, as shown in the Figure 4.16 below.



**Figure 4.16** AM Peak Hr R139 Westbound Journey Time

This figure indicates that flow and delay can be reduced on the Clarehall approach from the north by a third as part of a capacity rebalancing at the junction and diverted to the Relief Road. Importantly there would still be available capacity on the Relief Road, should a further reduction be required. Creating this new link in the network does however attract more westbound trips, which under the assumed alignment leads directly to the FCC section of the scheme forming a 4-arm junction. However, different alignments will need to be considered in bringing such a scheme through to the actual design stage. It is recommended that the any future junction be limited in scale to avoid creating a car dominated environment, instead designing in favour pedestrians and cyclists.

It does also reduce the Journey Time along the R107, as shown in Figure 4.17



**Figure 4.17** R107 Southbound Journey Time

Also, as shown in Figure 4.19 and Figure 4.20 as well as in Study 16 in Appendix, the Full FCC Clarehall Junction Relief Road brings significantly more time benefits than the Partial DCC Clarehall Junction Relief.

**Recommendation:** Additional means of traffic distribution within and around the areas adjacent to Clarehall Junction, particularly to its north is recommended through construction of a small-scale bypass in the context of the need to reconfigure the existing Clarehall junction to rebalance capacity towards public transport and/ or pedestrians and cyclists. It is recommended that future junctions be limited in scale as far as possible to avoid creating a car dominated environment, instead designing in favour of pedestrians and cyclists.

The figures 4.18 to 4.21 show further detail regarding the performance of the Clarehall Junction for the range of scenarios noted above. As can be seen in the first figure, the junction is severely over-capacity in 2027 with no further intervention. The subsequent figures show how V/C improves with the introduction of each element of the road proposals. Figure 4.21 shows a network that is reasonably adjusted to the higher levels of traffic demand envisaged, albeit with a slightly over-capacity junction where the CJRR meets Balgriffin Road. This however may be resolved with signal and/or layout optimisation.

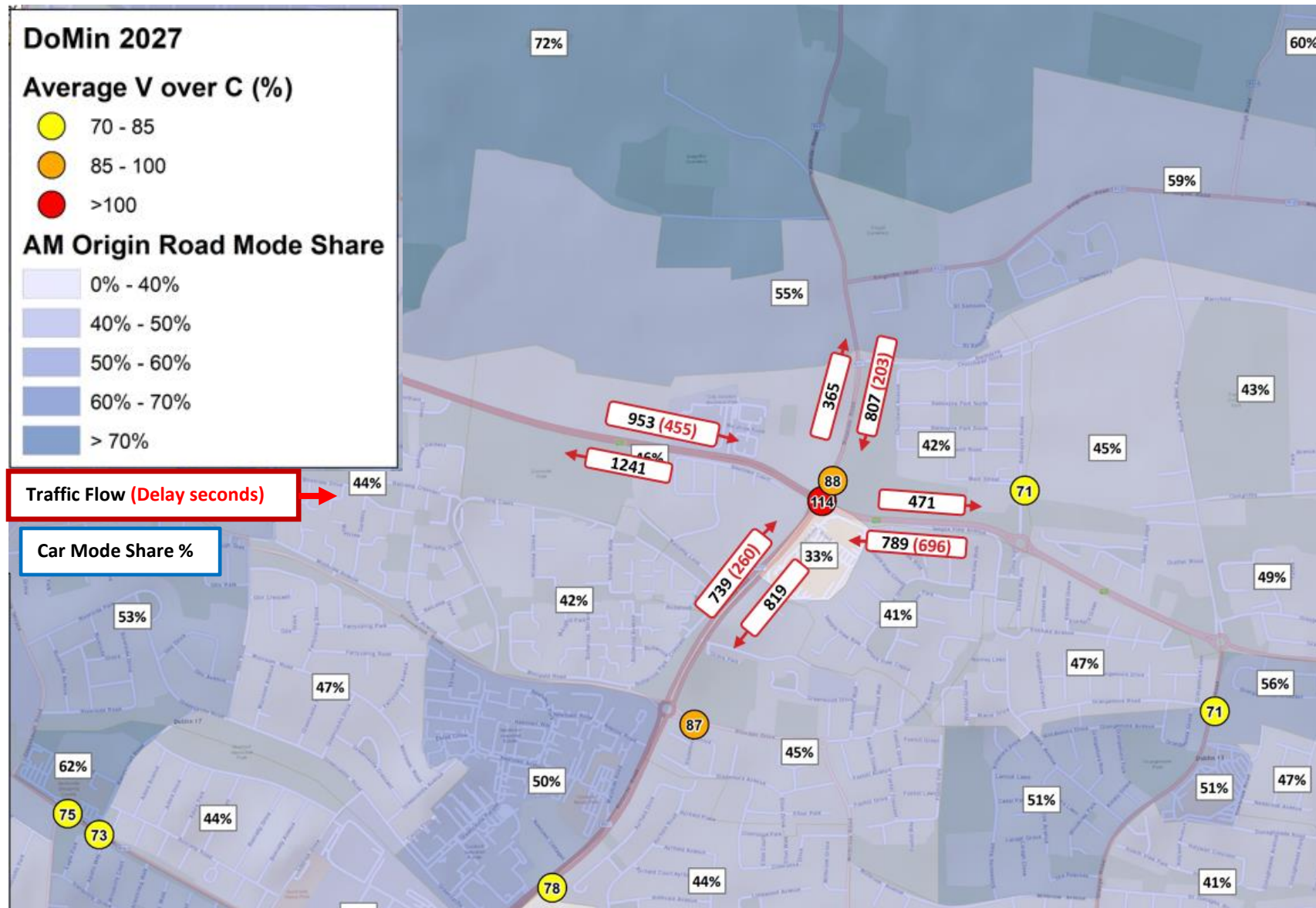


Figure 4.18 Clarehall Junction Do Min 2027



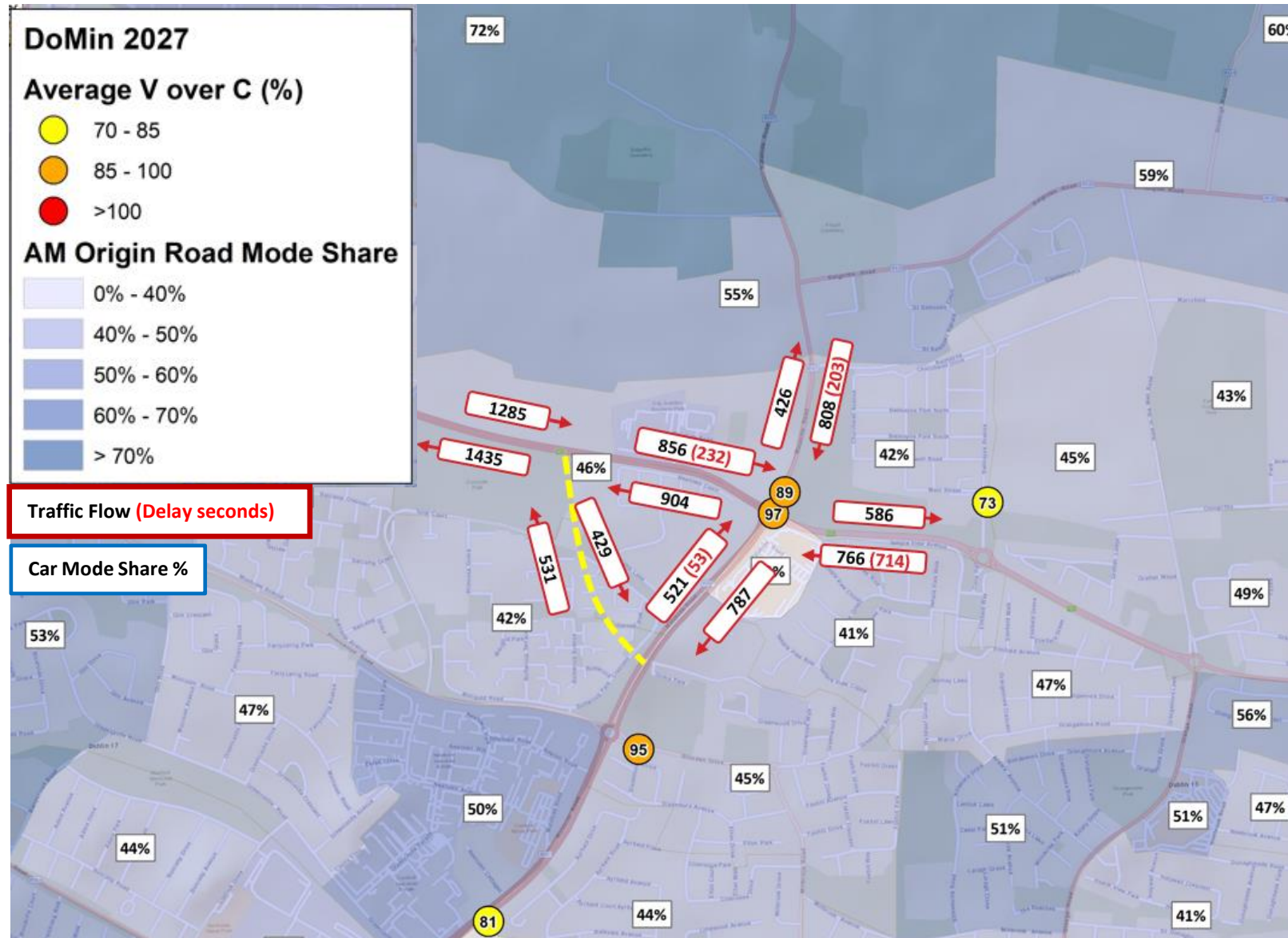


Figure 4.19 Clarehall Junction DCC Relief Road



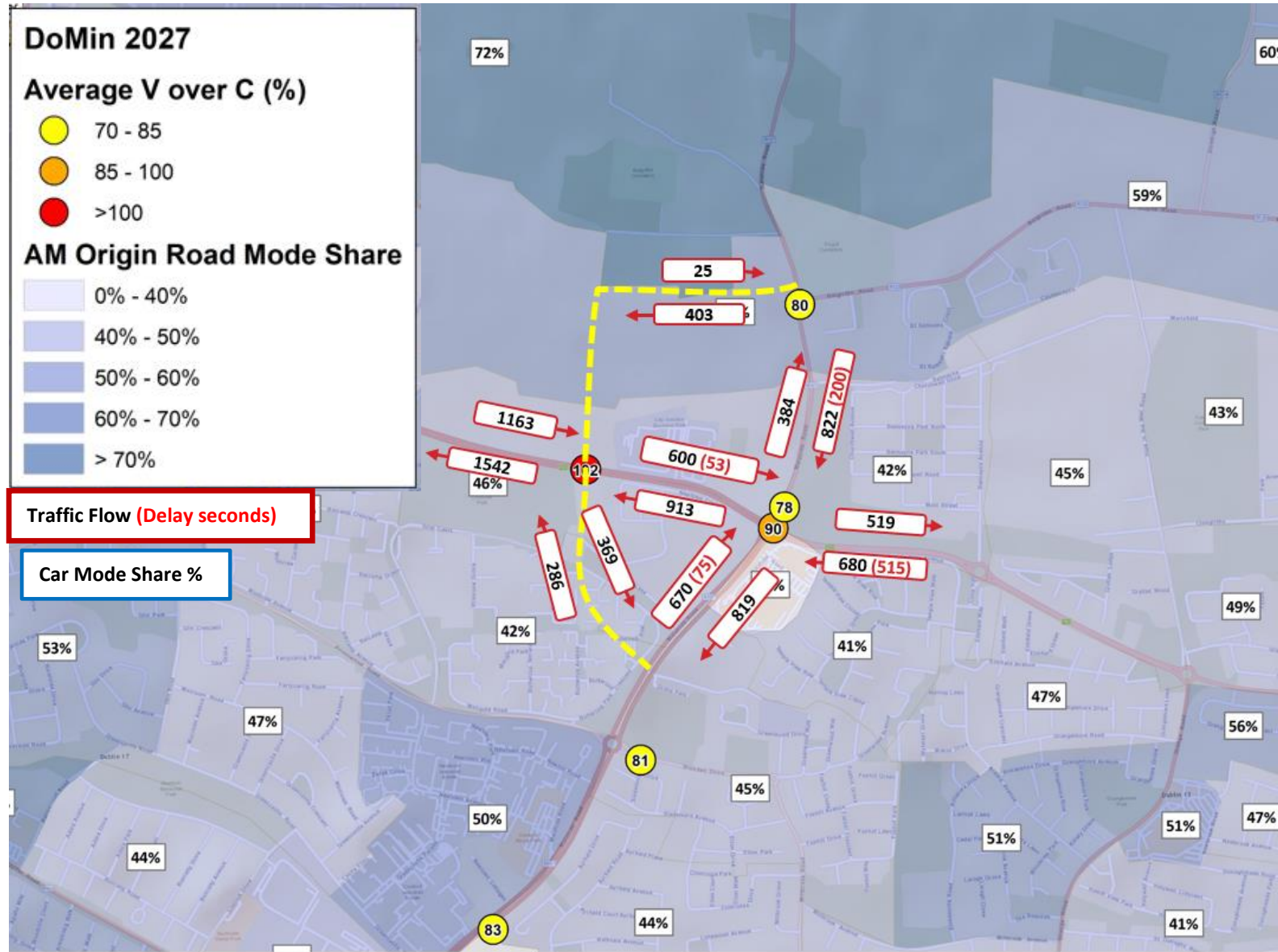


Figure 4.20 Clarehall Junction DCC&FCC Relief Road



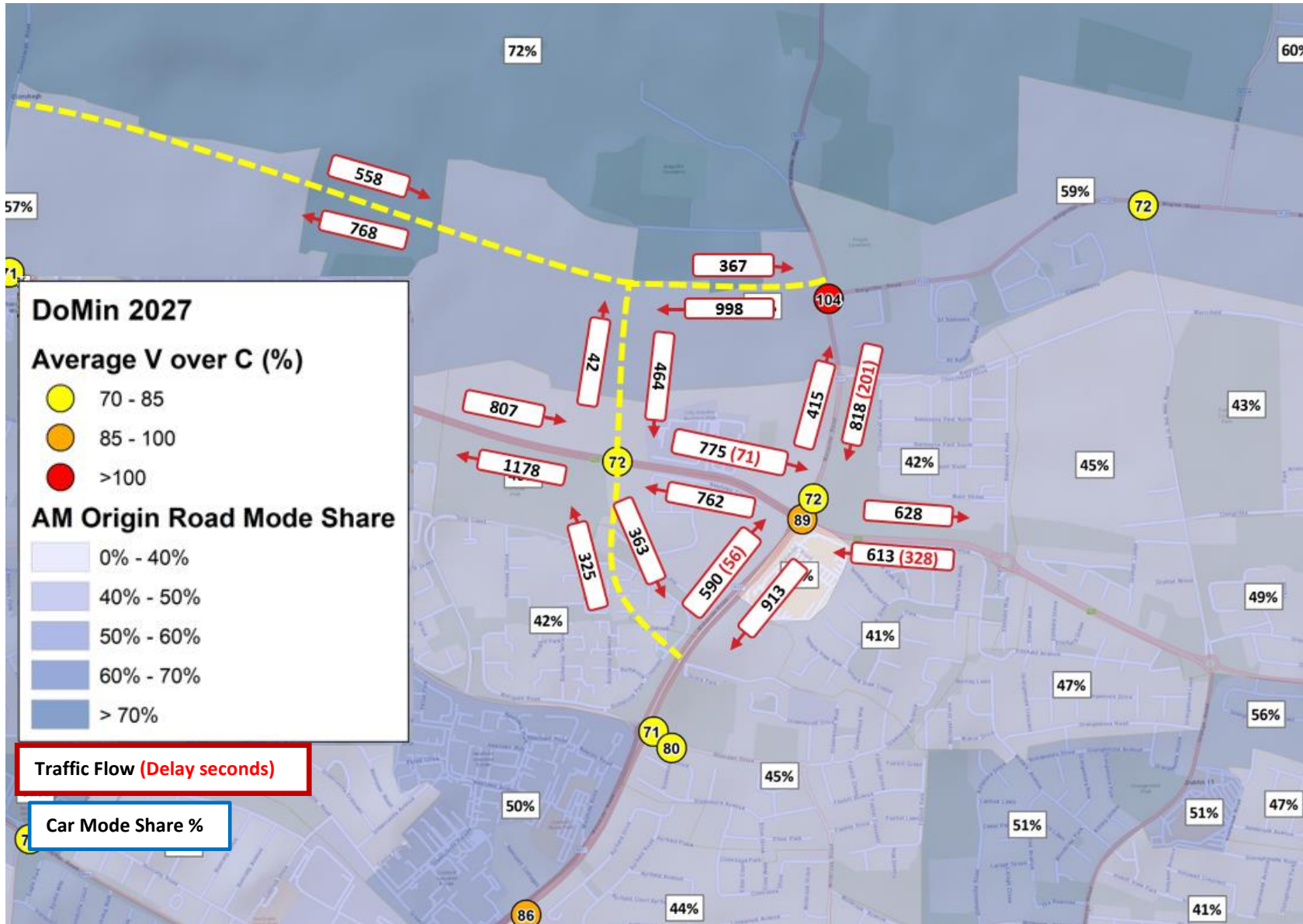


Figure 4.21 Clarehall Junction Relief Road & East-West Link



### 4.5.2 East-West Link Road

The East West road has the potential to provide much needed additional capacity to the areas’ road network, and afford a more direct route to the F/DF Road and the Airport with the opportunity to provide high levels of priority to bus and bicycle users as part of the scheme.

In this section, a road-only model has been used to allow more options to be tested. Therefore, some of the outputs numbers could vary slightly from results coming from the multi-modal model, as above in Figures 4.18 to 4.21. However, the multi-modal model provides the input flow for the road-only model and therefore, the variations shall be negligible.

It is assumed that the EWLR would be aligned with and essentially form a continuation of the FCC section of the Clarehall Junction Relief Road, as volumes are estimated at around 800 vehicle units in the peak hour, as shown in Table 4.2 AM Peak Hr Flows below.

A single traffic lane on the EWLR per direction is sufficient for traffic demand based on these estimates. The scheme should be developed to include continuous bus and segregated cycle priority, in total providing two lanes per direction and a cycleway.

As shown in the Table 4.2, as well as in Study 18 and Study 20 in Appendix, the introduction of the Clonshaugh section East-West Link Road results in a reduction in flow on the R139.

**Table 4.2 AM Peak Hr Flows (mitigation scenarios)**

Link	Clarehall Junction Relief Road only		EWL Road (R139 HT Zoned Lands Section)		EWL Road (R139 HT Zoned Lands and Airport Section)	
	EB/SB	WB/NB	EB/SB	WB/NB	EB/SB	WB/NB
<b>Malahide Road (North of Balgriffin)</b>	636	855	383	479	361	397
<b>Malahide Road (South of Relief Road)</b>	1,098	1,128	1,071	1,151	1,176	1,159
<b>R139 (West of Bypass)</b>	1,163	1,542	807	1,178	995	1,425
<b>EWLR (Clonshaugh section)</b>	–	–	558	768	701	892
<b>East-West Link Road (Airport Section)</b>	–	–	–	–	463	601

Additionally, as shown in Table 4.2 above, as well as in Study 17 and Study 19 the modelling shows that the capacity for traffic to leave the F/DF area is increased with both sections of the East-West Link Road. In the DoMin situation, the R139 is the only link to join areas West of F/DF and it supports a flow of 1550 pcu/hr. When adding the Clonshaugh section of the East-West Link Road, the flow on the R139 Westbound is only 1180 pcu/hr, however the flow on the East-West Link Road is 770 pcu/hr, which gives a total of 1950 pcu/hr leaving F/DF to the M50/Airport/F/DF area.

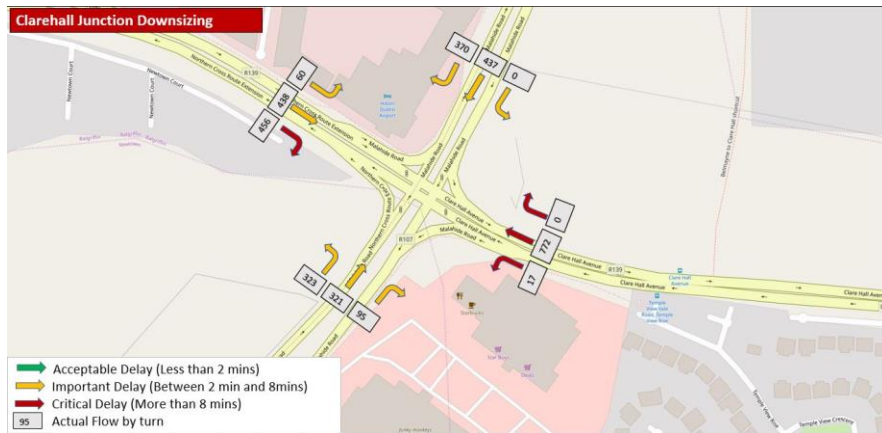
When completing the East-West Link Road with its Airport section, the flows on the East-West Link Road only go up by around 10% to 890 pcu/hr. However, the flow on the R139 WB grows back to 1430 pcu/hr, which gives a total of 2320 pcu/hr traveling to the west from the F/DF area.





If only this section was to be progressed, ideally a public transport only link would be developed to connect Stockhole Lane with the M1 Airport Spur, thus creating a relatively direct link to the Airport to serve the substantial population of the area.

In terms of network efficiency, the effects of the EWLR are most apparent at the Clarehall Junction on its eastern and western approaches. Delays still increase substantially (to over 10 minutes on approach from Eastern arm) in these directions even with the Clarehall Junction Relief Road as shown in Figure 4.23 below (Figure 4.22 shows the situation without the Clarehall Junction Relief Road). Movement from the Southern arm is already less congested as the Clarehall Junction Relief Road provides an alternative route for South-North traffic.



**Figure 4.22** Congestion Level at Clarehall Junction (without CJRR)



**Figure 4.23** Congestion Clarehall Junction (with CJRR)

The partial or full EWLR, however, substantially reduces congestion to levels comparable to current conditions (to around a minute from the west, and five minutes from the east) as shown in Figure 4.24 and Figure 4.25 below.



**Figure 4.24** Congestion at Clarehall Junction (EWLR Clonsaugh)







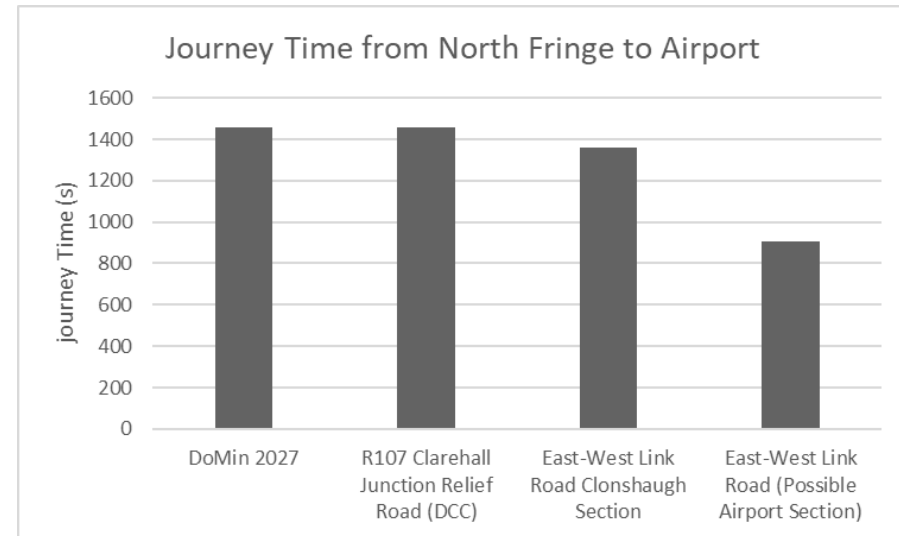
**Figure 4.25 Congestion Level Clarehall Junction (Full EWLR)**

The level of congestion at Clarehall Junction are quite similar between the two EWLR Scenarios (Clonshaugh section or Full EWLR).

As shown in Figure 4.26 below, Journey times to the Airport from the Fingal/Dublin Fringe Area are substantially reduced if the EWLR is developed all the way to the R132 F/DF Road (from around 20 to 15 minutes).

In summary:

- Accessibility to the Airport from F/DF is improved with the full EWLR;
- Most of the traffic using it comes from F/DF area;
- With the full EWLR, trips from the Airport may encounter congestion at EWLR/R132 F/DF Road Intersection, thus resulting in some increase in southbound flow on the M1;
- The EWLR Clonshaugh section reduces traffic at Clarehall Junction significantly and similarly to the full route;
- Journey Time along the R107 is reduced with EWLR (Clonshaugh section), not with Full EWLR, due to additional induced traffic.



**Figure 4.26 Journey Time from the D/DF Area to the Airport**

**Recommendation:** Developing a new link between the Clarehall Junction Relief Road and Stockhole lane to improve options for vehicular traffic entering/leaving the overall Fingal/Dublin Fringe area is recommended. This link would potentially cater for an orbital bus service linking the employment zoned lands north of the R139 with Dublin Airport and Swords. In the longer term this link would also cater for high quality walking and cycling trips via a more direct and safe route to Dublin Airport and for interchange with the future Swords CBC.

### 4.5.3 Kinsealy Section of the R107 Bypass

It is acknowledged that the extension of the Clarehall Junction Relief Road north of Kinsealy would provide some local relief to the village of Kinsealy. However, with respect to the objectives of Fingal/Dublin Fringe outlined previously, the modelling indicates that there is no added net benefit to developing this bypass section of road from the perspective of traffic efficiency within the Fingal/Dublin Fringe area. The benefits of this route would be entirely allocated to vehicular journeys travelling south towards the city. Journey times are shown below in Figure 4.27.

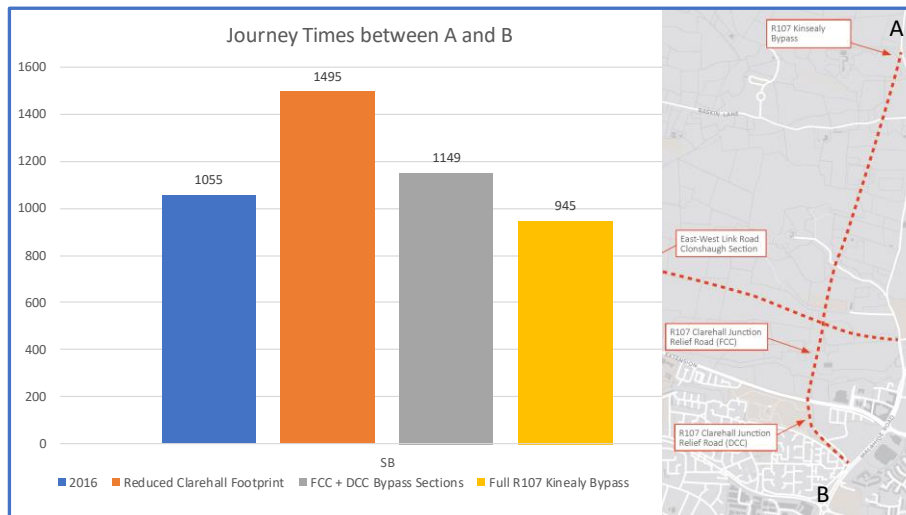


Figure 4.27 Vehicular AM Journey Times with/without R107 Bypass

This shows that Clarehall Relief Road brings the journey time back near to present day levels. Adding the Kinsealy section improves journey times to better than present day levels. However, as shown in Figure 4.28 below, no benefits are realised at the crucial Clarehall Junction in terms of traffic reduction. On this basis, the Kinsealy section of the R107 is not recommended.



Figure 4.28 Congestion Level at Clarehall Junction (Kinsealy Bypass)

**Table 4.3 East West Link Road Assessment**

Scheme Objectives	KPI's	Assessment
Reduce traffic on the R139	Reduction in peak hour traffic volumes on R139, V/C at critical junction	Traffic is reduced with the EWL Road (Clonshaugh section). However, the traffic grows back to DoStrat level when implementing full scheme
Reduce traffic at the M1/M50 Junction	V/C, Delay at M1/M50 Junction	The model doesn't adequately represent the level of congestion at the M1/M50 Junction
Reduce traffic at Clarehall Junction	V/C, Delay at M1/M50 Junction	The EWL Road (Clonshaugh section or Full EWLR) provide reduction in delay and V/C at the Clarehall Junction
Provide additional capacity between F/DF and external network	Combined flows on East-West Link Road/R139	Both Schemes provide additional capacity between F/DF and the external network with the Full EWLR providing an additional 50% capacity
<b>Conclusion</b>		<b>Both scheme options (Clonshaugh section and Full EWL Road) provide reduction of congestion levels at the Clarehall Junction as well as along the R139, while also proving additional capacity between F/DF and the external network, especially the airport. The Full EWL Road provides additional connectivity to the external network but it also increases pressure on the M50 at Ballymun.</b>

**Table 4.4 R107 Clarehall Junction Relief Road Assessment**

Scheme Objectives	KPI's	Assessment
Relieve pressure on the Clarehall junction	V/C, Delay at the Clarehall Junction	The Clarehall Relief Road Assessment provides reduction of the level of congestion at the Clarehall Junction
Improve North-South connectivity between Malahide, F/DF and the City Centre	Journey Time along the R107	Journey Time along the R107 is improved with the implementation of the Clarehall Relief Road Assessment
Support reconversion of F/DF into an active mode friendly neighbourhood	Enhance pedestrian and cyclist network in the F/DF Area	The reconfiguration of the Clarehall Junction into a smaller, calmer intersection allows for an environment more favourable to walking and cycling modes
<b>Conclusion</b>	<b>The Clarehall Junction Relief Road provides congestion relief at the Clarehall Junction, while also improving North-South connectivity. In combination of the Clarehall Junction reconfiguration, this scheme is recommended to maintain an adequate level of road capacity in the F/DF Area whilst also accommodating active travel infrastructure improvements.</b>	



## 4.6 M1/M50 Junction Assessment / R139 Development Lands

### 4.6.1 Overview

The area (shown in Figure 1.1) is zoned HT with opportunity for the creation of a high number of jobs in a High Technology Business Park. The modelling undertaken assumes an additional 8,500 jobs in the area. This assumption was made in the modelling to determine the effects of land use scenario with close to maximum levels of build-out, based on a gross floor area of over 200,000 square meters.

### 4.6.2 Trip Attraction Estimates

Unlike other F/DF areas, where the focus was population increase, for the R139 HT Zoned Lands it is employment increase which would create additional traffic in the area. These trips will be attracted to (as opposed to generated) to the area in the AM Peak, and generated from the area in the PM peak.

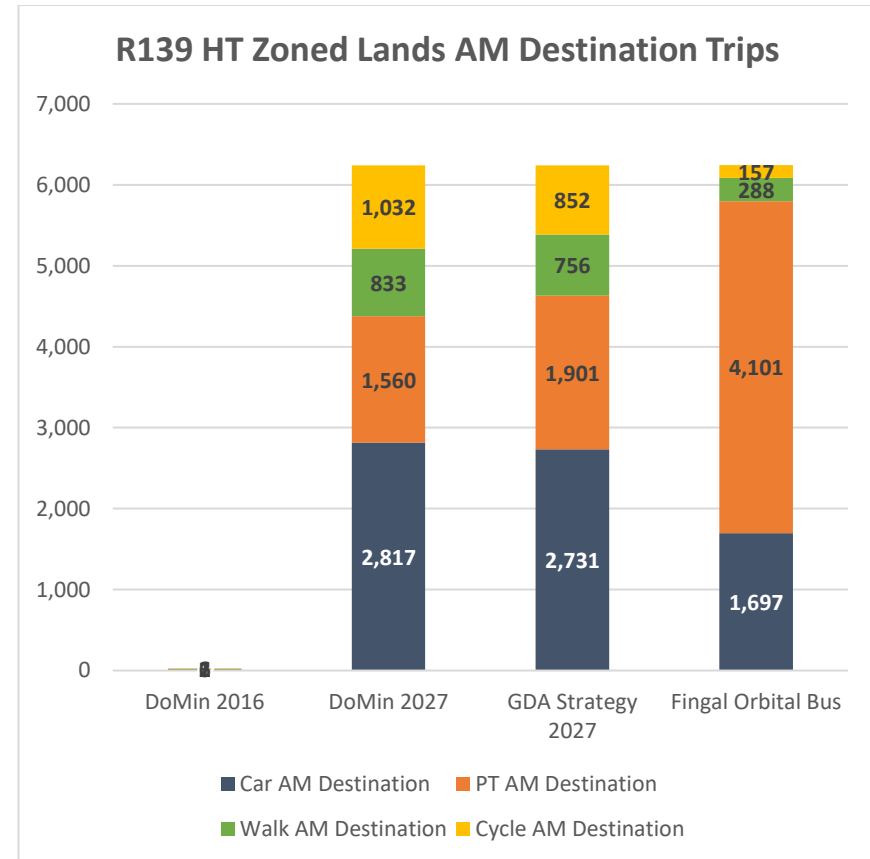
The following chart summarizes the trip segmentation by mode for 3 Scenarios: Do-Min 2027, GDA Strategy 2027, and ‘Fingal Orbital Bus’. The 2016 trips are not visible on the chart as they are negligible due to the current low employment numbers.

In the AM Peak, around 6,250 total trips (which represent around 2,450 Trips in the AM Peak Hr 8-9) are attracted by the R139 HT Zoned Lands Development Site. This includes nearly 3,000 car trips in period, or around 1,200 in the peak hour trying to get into the site.

If only the GDA Strategy was implemented the PT Mode share would increase from 25% in the DoMin situation to 30% (+350 Trips). However, only a small portion of the trips are coming from road users (-100 Trips), while a sizeable portion of the mode shift is coming from cyclists (-200 Trips). This is because the GDA Strategy does not provide any additional service directly to the R139 HT Zoned Lands area, which explains the relatively small influence of the scheme here.

All new major development must be highly accessible by public transport and/or active modes and not car dependant, as per the national and regional policy. A test was undertaken in the ERM to test if a new bus service on the R139 could help the HT zoned in its catchment develop in line with policy guidelines. The route that

was tested links employment and population nodes in Clongriffin, R139 HT Zoned Lands the Airport and Swords and provides a high frequency, high priority service. Trip segmentation by mode with the inclusion of this orbital bus service is presented in Figure 4.29 the below.



**Figure 4.29 R139 HT Zoned Lands AM Destination Trips**

The inclusion of the orbital bus shows significant potential to remove car trips given its high frequency and the level of parking. Public transport mode share increases



from 30% (1,900 Trips) to 66% (4,100 Trips). The mode shift to public transport comes from both active modes which would be reduced to 8% of the total trips (compared to 26% before) and road trips which decrease from 2,700 Trips to 1,700 Trips.

The sustainable mode shift is quite significant and shows that orbital bus as proposed could support the sustainability of the HT zoned lands along the R139. These results however, should be considered with the fact the parking capacity policies should be deployed at the R139 HT Zoned Lands to ensure growth in car travel is limited and PT is supported. Furthermore, the feasibility of the bus services would be enhanced by having direct access through the area and to the Airport, and hence it is recommended that it uses the proposed section of the East West Link Road, rather than the R139, and that it proceeds from the HT employment areas towards the Airport as directly as possible.

## 4.7 Public Transport Mitigations

### 4.7.1 Malahide Road CBC

The CBC on the Malahide Road and an appropriate high frequency bus service is crucial for the growth of the overall area. Southbound in the AM the modelling indicates that demand for bus travel could be as much as 3,500 people an hour on the outermost sections of the Malahide Road CBC going towards the city centre. In reality, the route may fall short of this level of flow if sufficient bus capacity and priority through the road network is not provided, which would have negative knock-on effects on the road network.

### 4.7.2 Fingal/Dublin Fringe – Dublin Airport – Swords Bus Route

As discussed in section 4.6, the modelling analysis in the ERM shows there is strong demand for an orbital public transport route running between Clongriffin, Dublin Airport and Swords with the future land uses assumed for the SFTS. In addition to the bus services proposed by the NTA GDA Strategy.

it is recommended that this future orbital connectivity is provided to help reduce car dependency for trips not travelling to the city, but to major employment areas potentially along the R139. It will also serve Dublin Airport and Swords, where large scale future employment generating developments will be driven by

MetroLink but will attract trips from the wider areas including from Fingal/Dublin Fringe.

The level of demand suggests a high frequency bus service (every five to ten minutes) would be required to meet peak period demand. However, a relatively direct and reliable service would require the development of the EWLR Clonshaugh section and a link over the M1 to Dublin Airport, either by completing the suggested public transport only link over the M1 Dublin Airport spur interchange, or by providing the full EWLR. The relative costs and benefits of these alternatives would have to be carefully assessed.

**Recommendation:** To further consider the feasibility of a Fingal/Dublin Fringe – Dublin Airport – Swords Bus Route when Bus Connects and MetroLink are more advanced. The current phases of planning for these projects must give priority to those services already identified in the NTA GDA Strategy 2016-2035.

However, a review of the NTA GDA Strategy is due to be undertaken by the end of 2022, at which point it would be timely to assess the potential inclusion of the proposed orbital bus service for delivery post 2027.



## 5 Conclusions and Recommendations

### Public Transport Recommendations

- In addition to the bus services proposed by the NTA GDA Strategy, and in the longer term, it is recommended that orbital connectivity is provided to help reduce car dependency for trips not travelling to the city, but to major potential employment areas along the R139, onward to Dublin Airport and to Swords.
- It is recommended that the potential for this route is revisited in the early 2020's with a view to deciding upon its inclusion in the NTA GDA Strategy review in late 2022.

### Cycle Recommendations

- As noted in the discussion above, travel from this area relies heavily on the M1/M50 junction. Less direct access is also possible, for example via the R132 old Dublin Road. This indirectness is likely to result in fewer people opting to cycle than would otherwise be the case. It is therefore important to improve the quality of facilities along the route.
- There is potential for such improvement along the R139 up to and including Stockhole Lane for travel to Dublin Airport and Swords, and along R139 HT Zoned Lands Road for access to the city. The cycle route could extend up and over the M1 to tie in with the R132.

### Road Recommendations

- Progress the design of both the Clarehall Junction Relief Road (CJRR) and the EWLR as a single scheme package due to potential interdependencies between both. The initial feasibility study should examine whether the EWLR section should be delivered as a single scheme between Malahide Road and Stockhole Lane, with the remaining section of the CJRR potentially delivered as a subsequent phase.
- As part of this, a feasibility study should be undertaken to determine what prospect there is of creating a bus (and potentially cycle) only link across the

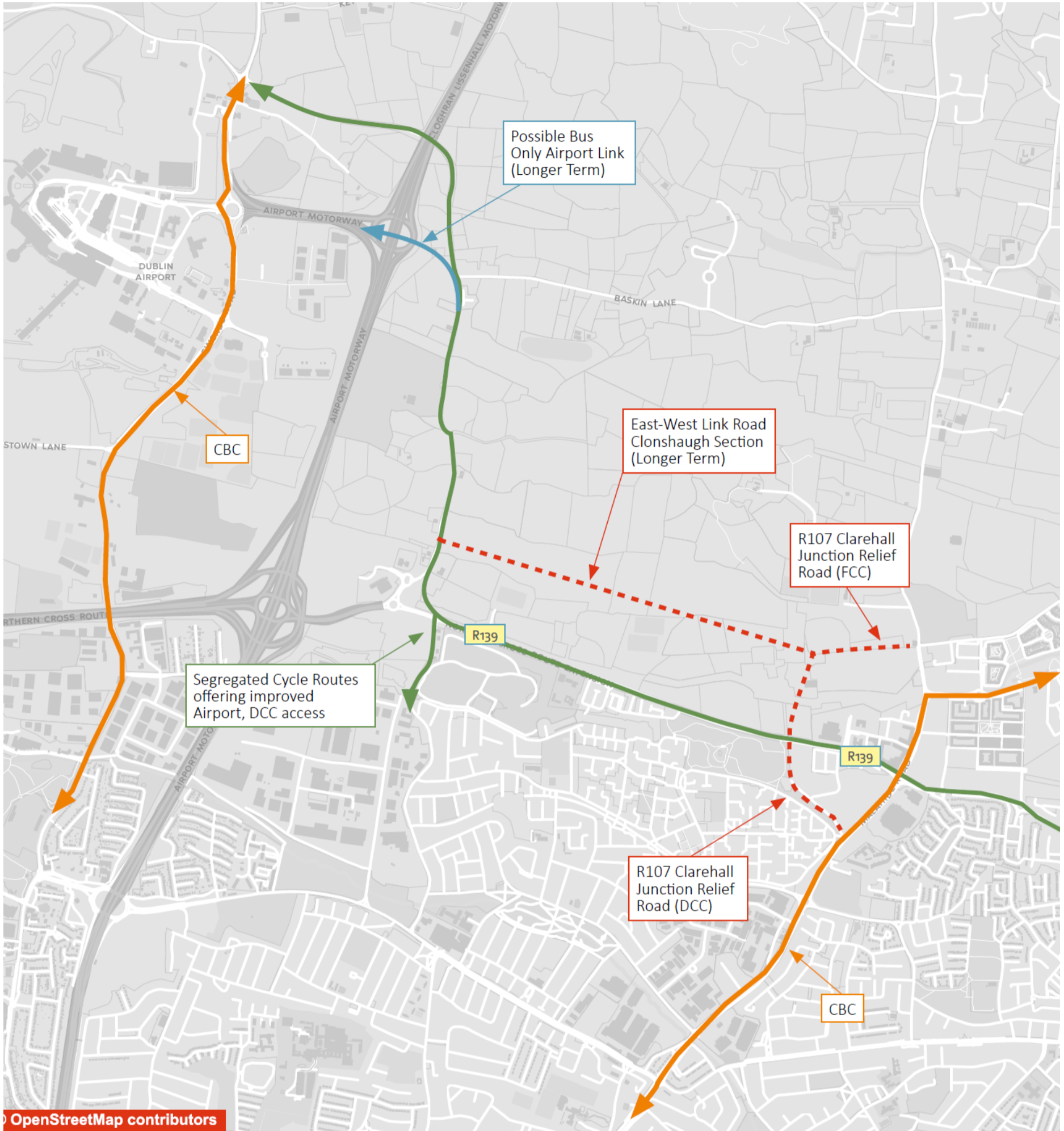
M1 junction and onto the M1 spur into Dublin Airport. } All new road schemes should be DMURS compliant and provide high quality cycle and pedestrian facilities between and through junctions.

- The strategic function of the M1/M50 should be protected and any development near this junction should be carefully assessed for any impacts on its operational capacity. As part of this objective, the nearby roundabouts in R139 HT Zoned Lands should be assessed for potential impacts on the M1/M50 junction if any further trip generating development emerges in this area.

Recommendations are further summarised on the map in Figure 5.1 below.



### 5.1 Recommendations Summary Map



OpenStreetMap contributors

Figure 5.1 Recommendations Summary Map

## 6 Appendix

- Network Analysis Studies
- East-West Link Road Studies
- Clarehall Junction Relief Road Studies





## 6.1 F/DF Road Network – Recognised Development

### 6.1.1 Study 1 Flows; 2016 vs Do-Min 2027

The image below shows the difference in traffic flow with the increase in development in F/DF (i.e., population increasing from 17,500 to 43,000). Traffic increases generally. There is however, slight decrease on some sections of the Malahide Road as well as on the R139



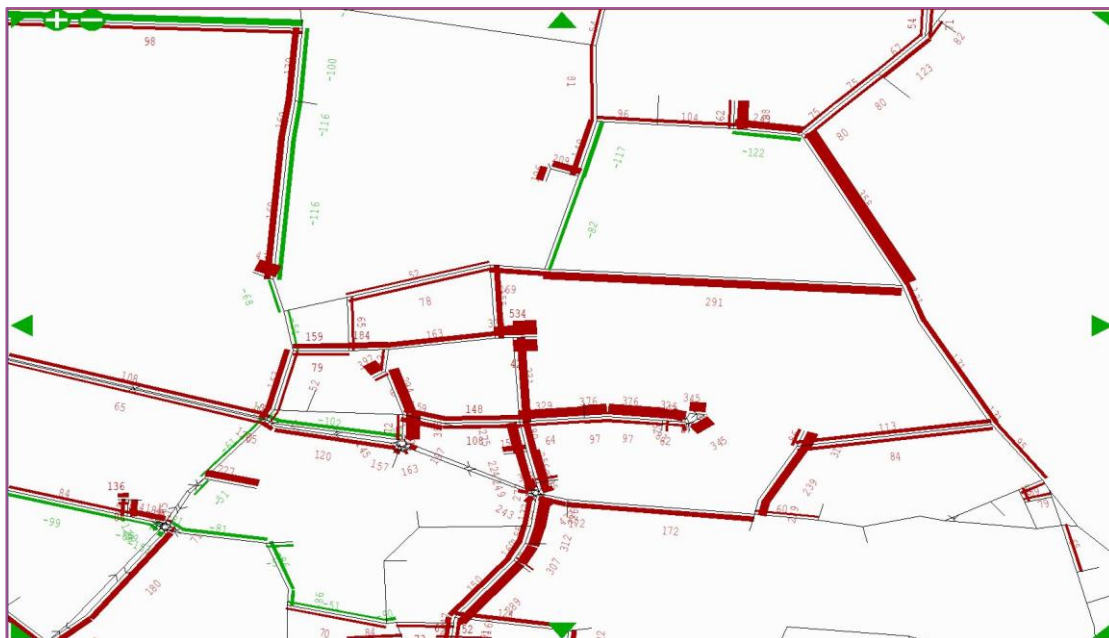
Changes in flow are shown in the table.

	Link	2016	2027
1	R139 EB	1342	1342
2	R139 WB	1485	1604
3	Malahide Road (South of Clarehall) SB	1494	1483
4	Malahide Road (South of Clarehall) NB	1093	1151
5	Malahide Road (northern Section) SB	410	288
6	Malahide Road (northern Section) NB	588	752
7	R123 EB	473	475
8	R123 WB	921	1115
9	Hole in the Wall Road SB	554	817
10	Hole in the Wall Road NB	548	793
11	R139 Belmayne EB	921	1000
12	R139 Belmayne WB	638	513

EB / SB – Eastbound or Southbound  
WB / NB – Westbound or Northbound

### 6.1.2 Study 2 Flows; 2016 vs GDA Strategy 2027

The image below shows where the reduction in flow occurs on the road network with the inclusion of the GDA Strategy (particularly Bus Network Improvements). With the additional Bus services, there is still an increase in traffic in the F/DF area. The red indicates increased traffic flow.



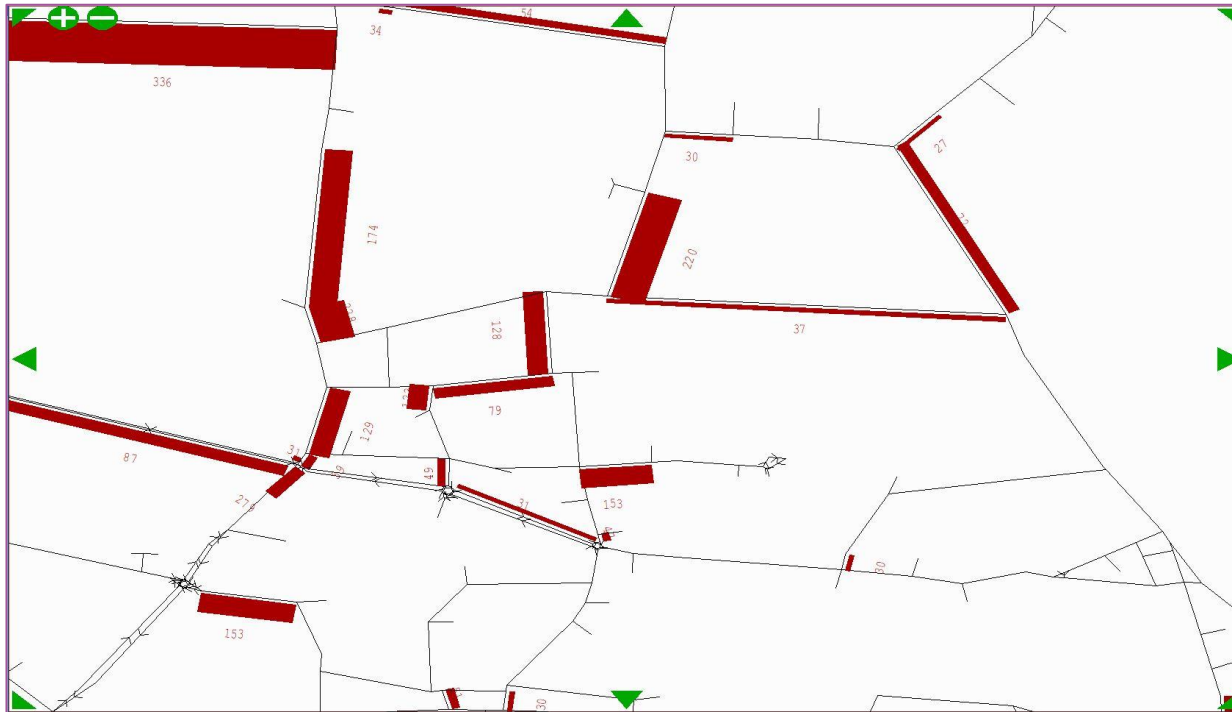
Changes in flow are shown in the table:

	Link	2016	2027
1	R139 EB	1342	1450
2	R139 WB	1485	1550
3	Malahide Road (South of Clarehall) SB	1494	1538
4	Malahide Road (South of Clarehall) NB	1093	1032
5	Malahide Road (northern Section) SB	410	294
6	Malahide Road (northern Section) NB	588	757
7	R123 EB	473	507
8	R123 WB	921	1090
9	Hole in the Wall Road SB	554	788
10	Hole in the Wall Road NB	548	796
11	R139 Belmayne EB	921	962
12	R139 Belmayne WB	638	604

EB / SB – Eastbound or Southbound  
WB / NB – Westbound or Northbound

### 6.1.3 Study 3 Delays; 2016 vs Do-Min 2027

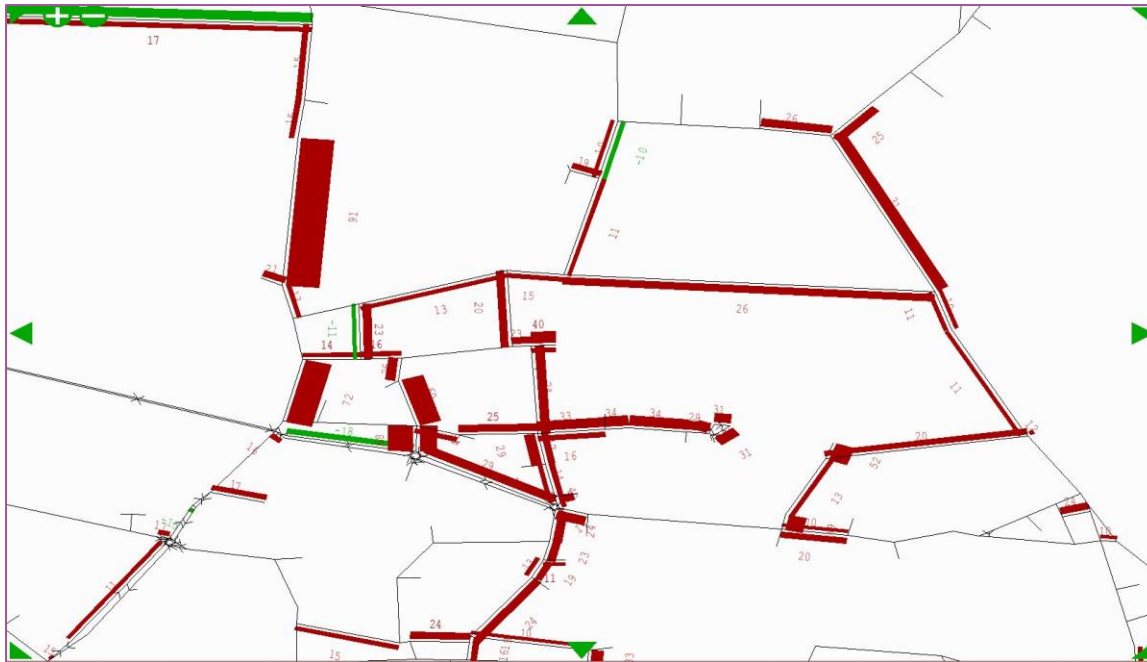
Increased delay is shown in the image below -- given no network improvements and the Recognised Development increase in housing and employment.



- Most of the increase in delay is coming from junctions which are already saturated in 2016, such as the Clarehall Junction
- There is also an increase in delay at the R107/R123 junction, on the northern arm, which was already saturated in 2016.
- On F/DF internal network, there is an increase in delay at different junctions
- The R139 westbound exhibits a large increase in delay

### 6.1.4 Study 4 V/C; 2016 vs Do-Min 2027

The image below shows where volume over capacity increases significantly.

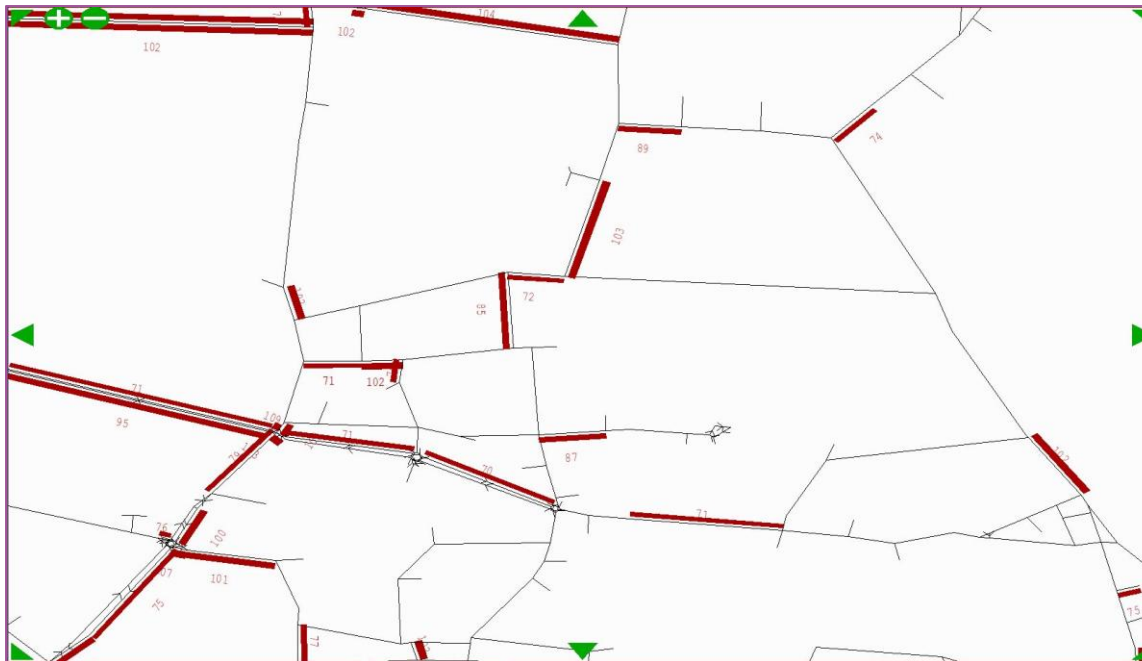


- The new developments in Clongriffin/Belmayne induce a significant increase in V/C on the local network in the area. It doesn't result in large increase in delay yet, but this is showing a pressure on this part of the network
- At already saturated junctions, there is a small increase in V/C, which still result in an increase in delay. For example, there is only a very small V/C increase at the Clarehall Junction
- The R139 still operates at a reasonable Volume to Capacity ratio, especially at the Clarehall Junction Eastern approach.



### 6.1.5 Study 5 V/C; 2016

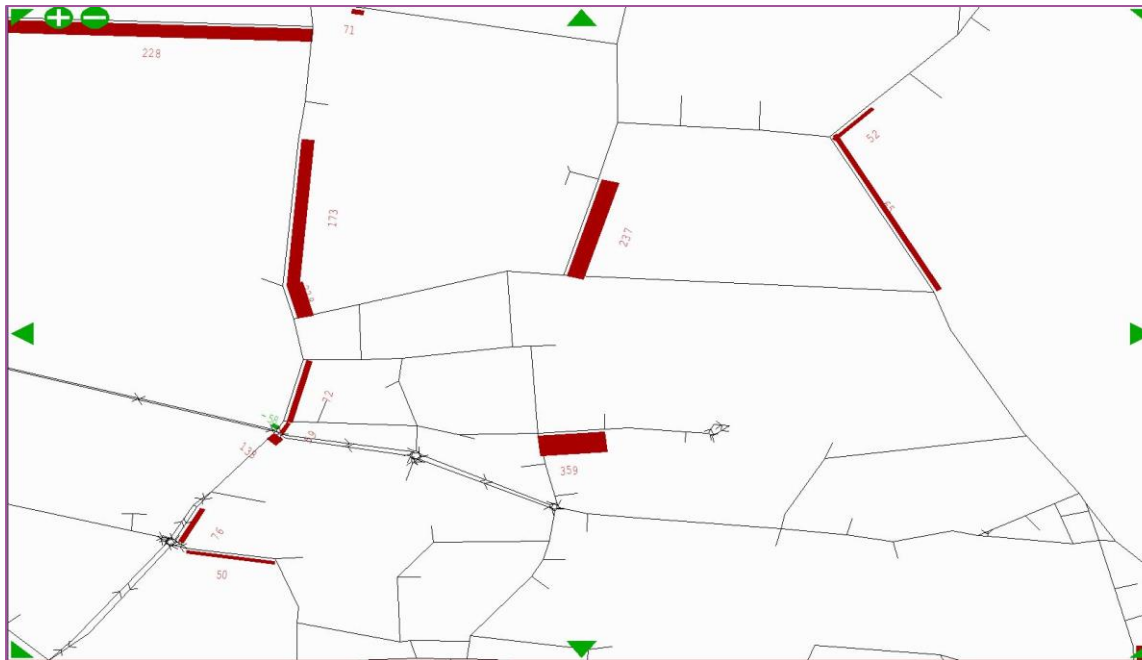
The image below shows the volume over capacity in the existing situation in 2016.



- The Clarehall Junction is already at saturation in the existing situation in 2016, except for traffic coming from its West arm on the R139, which indicates that movement to F/DF in the AM is not constrained. However, movement to the City Centre is already constrained in 2016
- Several junctions on Malahide Road are constrained, including the R107/R123 Junction.
- The internal F/DF area sees a relatively low level of saturation. However, certain links start approaching saturation.

### 6.1.6 Study 6 Delay; 2016 vs GDA Strategy 2027

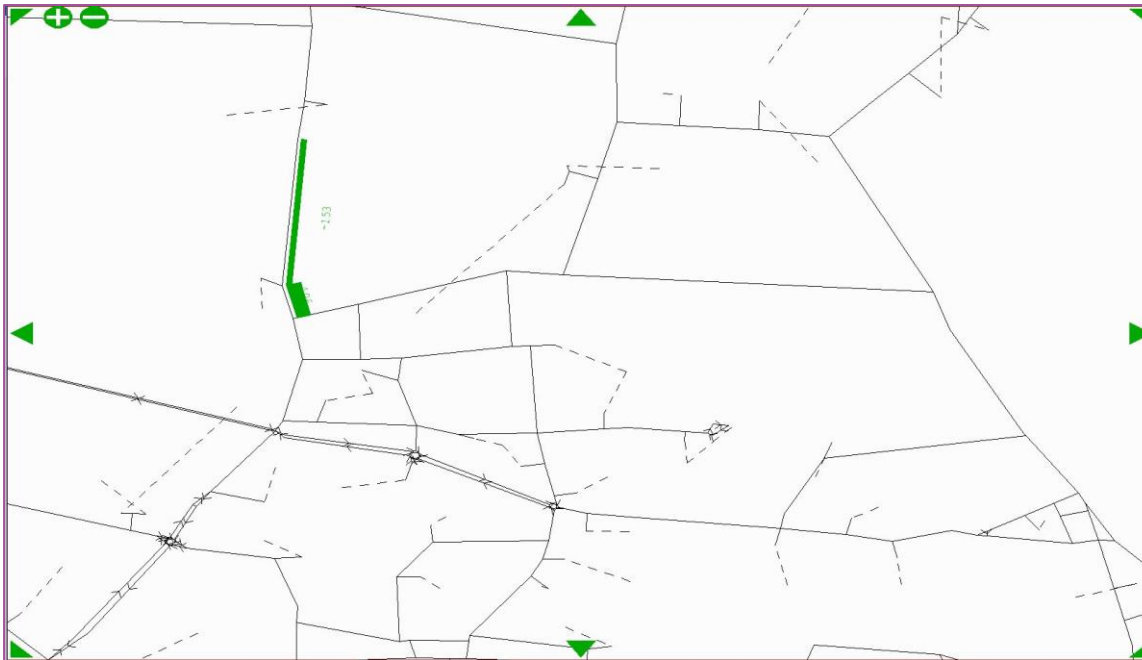
Increased delay is shown in the image below – with the implementation of Bus Connects and the Recognised Development increase in housing and employment.



- Increase in delay is exhibited on the Malahide Road, especially Southbound at the R107/R123 Junction
- There is delay increase at the Clarehall Junction, Eastbound and Southbound, for the movement out of F/DF
- Delay increase is exhibited at the northern arm of the R123/R124 junction, resulting from the additional traffic generated in South Portmarnock
- The additional traffic from Clongriffin also results in additional traffic at the Hole in the Wall Road junction.

## 6.1.7 Study 7 Delay; Malahide Road/R123 junction 2027

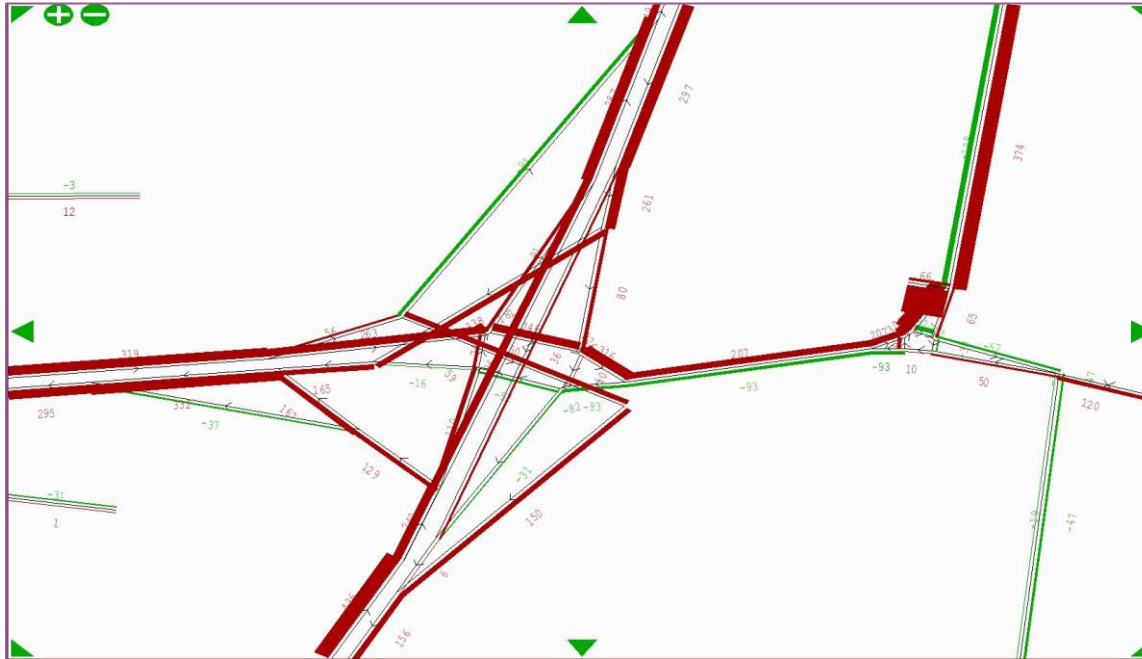
Reduced delay is shown in the image below – with addition of a left flare on the Northern arm of the Malahide Road/R123 junction.



- Delay at the Malahide Road/R123 Junction is reduced massively, with 5 minutes and a half reduction in delay
- Delay at the Belcamp development lands junction is also reduced as traffic was blocking back all the way to this junction

## 6.1.8 Study 8 Flows; 2016 vs DoMin 2027

The image below shows where the increase in flow occur on the road network from 2016 to 2027



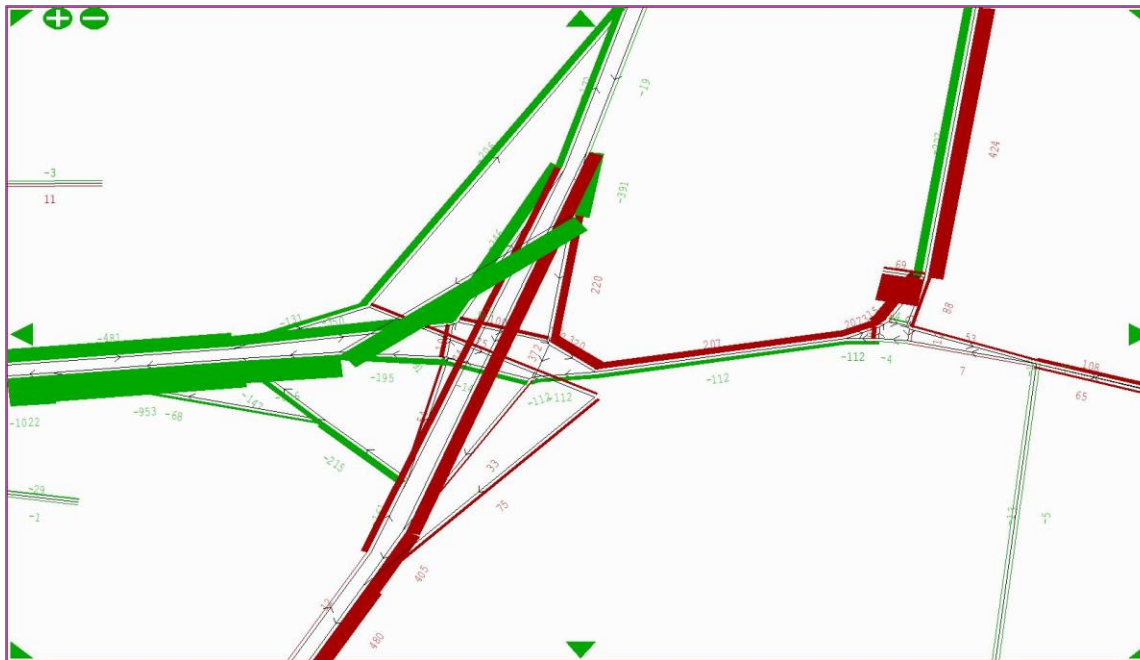
- Flows increase on most of the M1/M50 Junction links (with flows increase ranging from 300 to 400 pcu/hr from northern, southern and western arms)
- The flow reduction on the eastern arm comes from an already saturated link in 2016





## 6.1.9 Study 9 Flows; 2016 vs GDA Strategy 2027

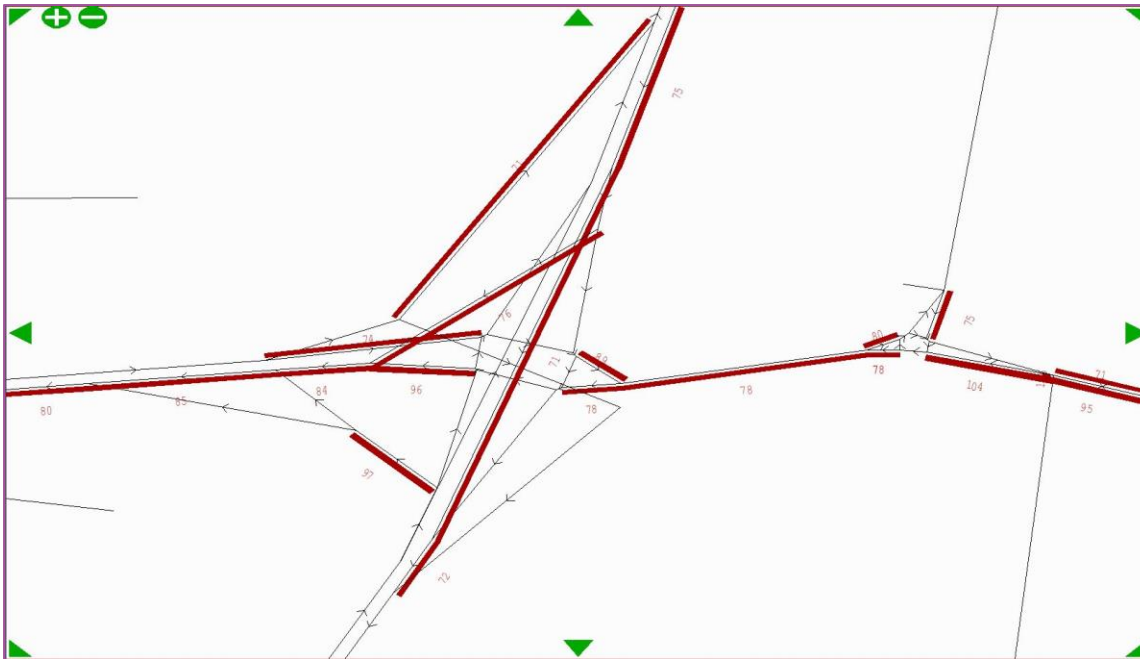
The image below shows where the reduction in flow occur on the road network with the inclusion of the GDA Strategy (particularly Bus Network Improvements)



- With the introduction of the Bus Connects scheme, there is reduction on the M1-M50 axis, with flow reduced up to 950 pcu/hr on the M50 WB
- There is however increased flows to the City Centre

## 6.1.10 Study 10 V/C; 2016

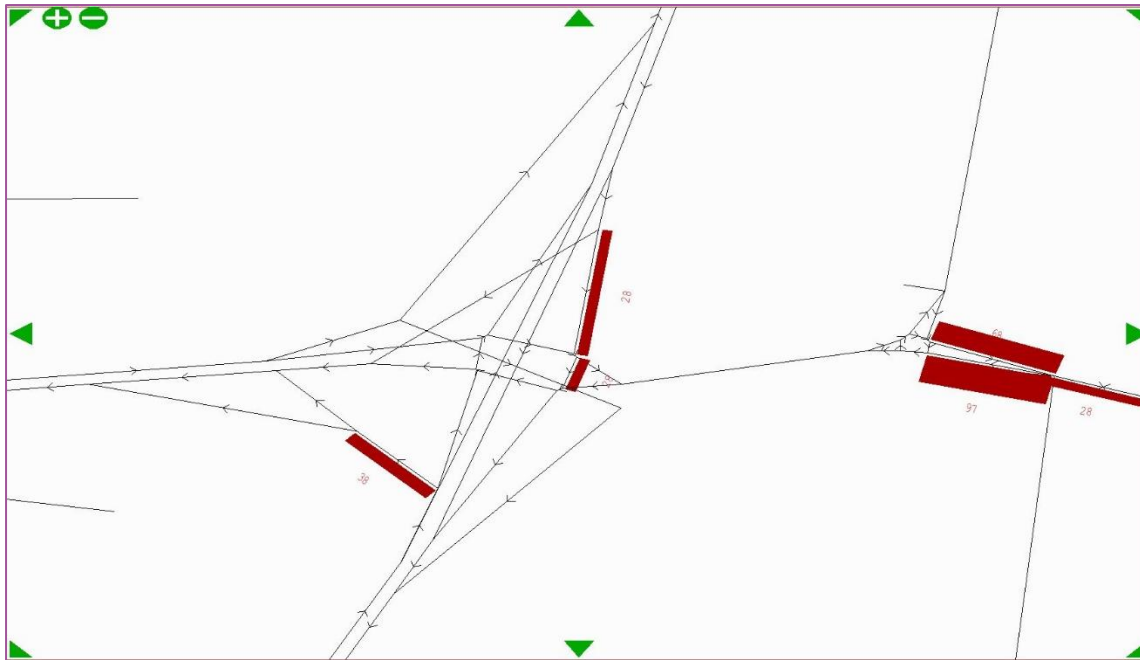
The image below shows the volume over capacity in the existing situation in 2016, focussing on the M1/M50 interchange.



- Several links are close to saturation (V/C between 70 and 100).

## 6.1.11 Study 11 Delay; 2016

The image below shows the delay in the existing situation in 2016.

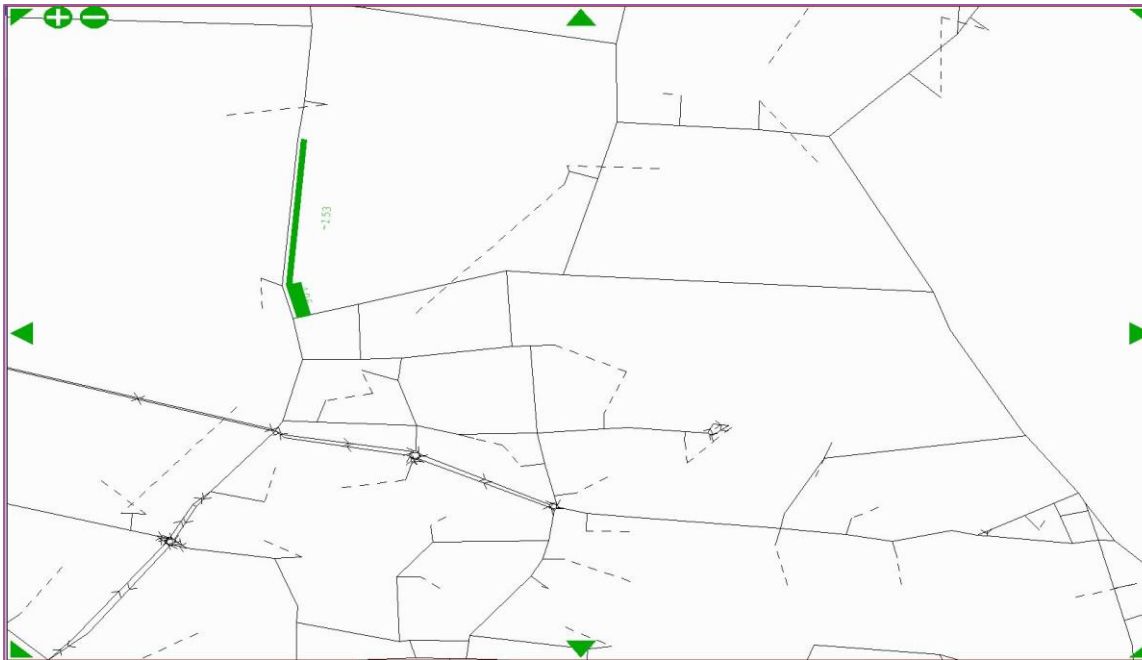


- The M1/M50 is estimated by the modelling as having a relatively low level of delay
- The actual levels of congestion may be worse and therefore it is not suggested by the South Fingal Transport Study that there is spare capacity on at this interchange for growth in traffic.



## 6.1.12 Study 12 Delay; Malahide Road/R123

Reduced delay is shown in the image below – with addition of a left flare on the Northern arm of the Malahide Road/R123 junction.



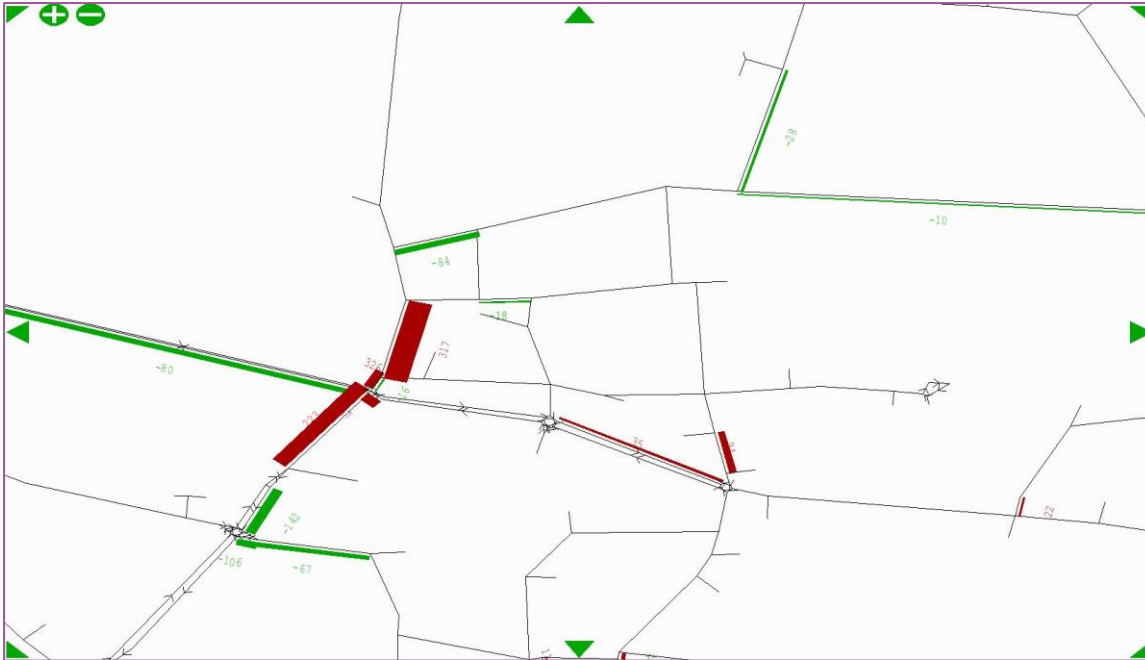
- Delay at the Malahide Road/R123 Junction is reduced massively, with 5 minutes and a half reduction in delay
- Delay at the Belcamp development lands junction is also reduced as traffic was blocking back all the way to this junction





## 6.1.14 Study 14 Delay; Do-Min 2027 vs Clarehall Reconfiguration

The image below shows where delay increase significantly.

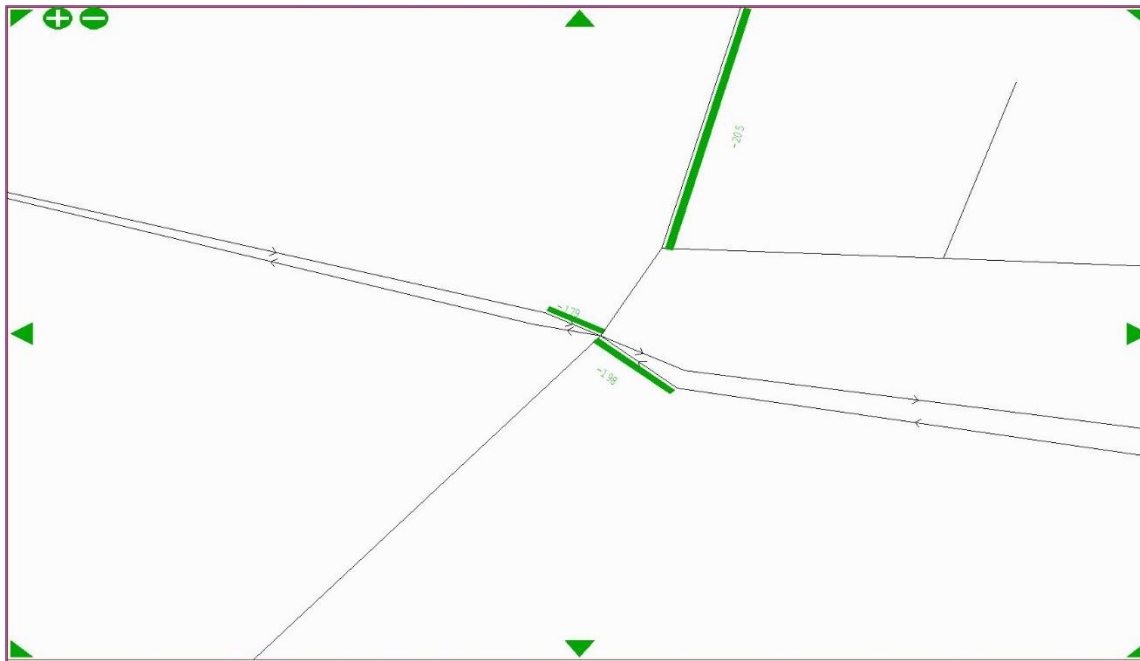


- Delay at Clarehall Junction increases significantly from the south and north when the junction is reconfigured to cater for CBC and/or DCC public realm objectives.



## 6.1.16 Study 16 Delay; Partial DCC CJRR vs Full FCC CJRR

The image below shows the difference in delay between the implementation of the DCC Relief Road and the full FCC implementation of the Relief Road.



- The full implementation of the Clarehall Junction Relief Road (over the partial DCC Relief Road) brings significant reduction in delay on the Western, Eastern and Northern arms of the Clarehall Junction

## 6.1.17 Study 17 Flow; East West Link Road (Clonshaugh section)

The image below shows the actual in the scenario with the introduction of the East West Link Road (Clonshaugh section only).

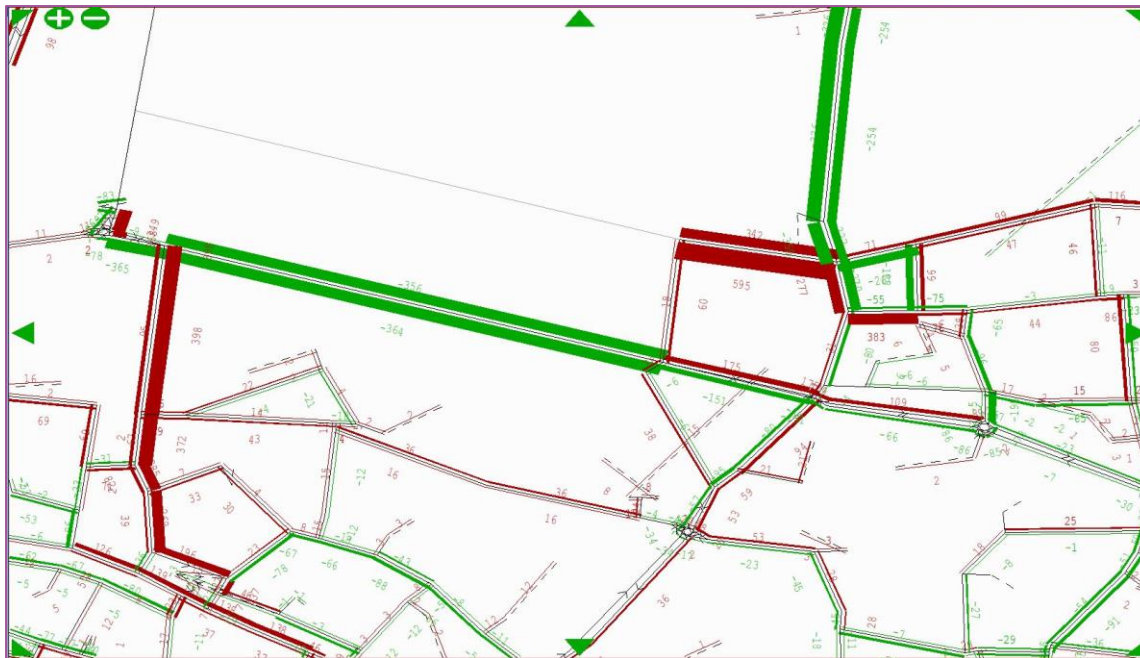


- Flow on the EWLR Westbound are 770 pcu/hr, while the flow Eastbound is 560 pcu/hr



## 6.1.18 Study 18 Flow; East West Link Road (Clonshaugh section)

The image below shows the difference in flow with the introduction of the East West Link Road (Clonshaugh section only).



- The EWL Road brings significant reduction (-350 pcus/hr) in flows on the R139
- The R107, north of the F/DF Area, also witnesses significant reduction in flow (-250 pcus/hr)
- Important increase in flow is witnessed on R139 HT Zoned Lands Road Southbound

## 6.1.19 Study 19 Flow; East West Link Road (Clonshaugh section)

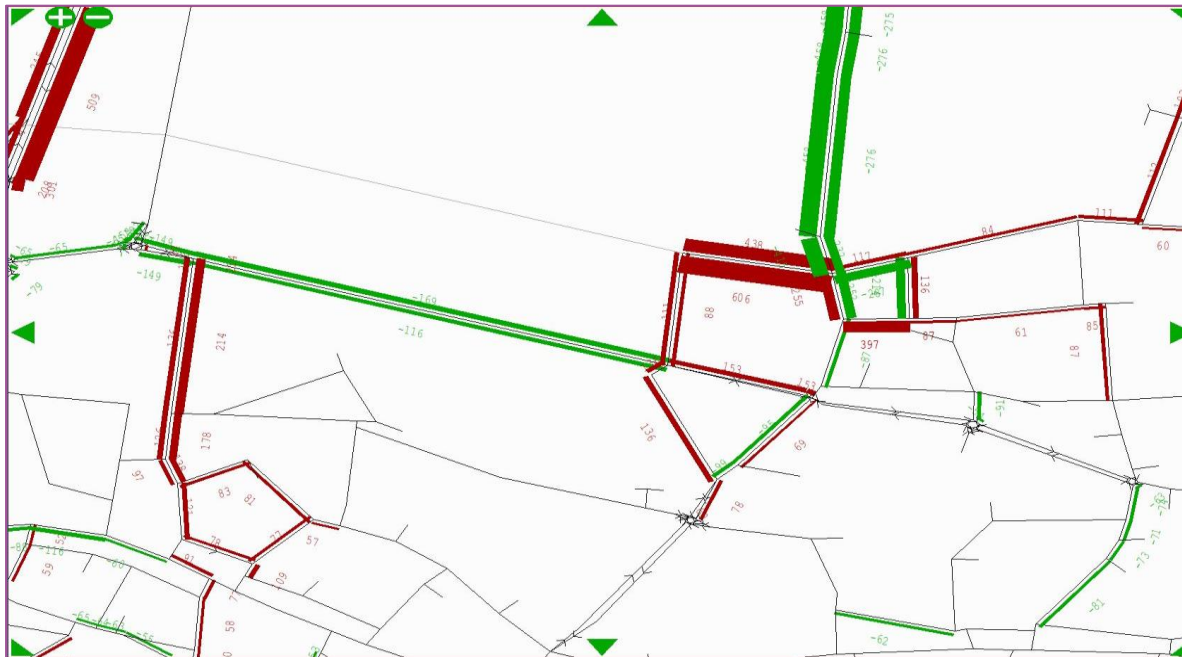
The image below shows the actual in the scenario with the introduction of the East West Link Road (Clonshaugh section only).



- The inclusion of the Airport section of the EWLR brings an additional 10% traffic on the Clonshaugh section of the EWLR, resulting in flows on the EWLR Westbound of 890 pcu/hr, and in flow Eastbound of 700 pcu/hr
- On the Airport section of the EWLR, flow are 600 pcu/hr Westbound and 460 pcu/hr Eastbound

## 6.1.20 Study 20 Flow; Full East West Link Road

The image below shows the difference in flow with the introduction of the Full East West Link Road.



- Compared to the scenario with the implementation of the Clonshaugh section only of the EWLR, the flow reduction on the R139 is less important. This is due to the fact that some of the traffic uses the R139 to access the Airport section of the EWLR and then the Airport
- The R107, north of the F/DF Area, also witnesses significant reduction in flow (-250 pcu/hr)
- Important increase in flow is witnessed on R139 HT Zoned Lands Road Southbound