

Appendix A

Transport Demand



Straitéis Iompair na Gaillimhe
Galway Transport Strategy



Modelling Services Framework
Integrated Transport Management Programme for Galway
Demand for Travel

September 2015

National Transport Authority,
Dun Scéine,
Harcourt Lane,
Dublin 2.

DOCUMENT IDENTIFICATION TABLE

Client/Project owner	National Transport Authority
Title of Document	ITMP for Galway – Demand for Travel
Task Order	
Task	
Deliverable Code	
Version	2
Document Status	Final Draft

DOCUMENT STATUS TABLES

Version 1

	Name	Position	Date
Originated by	Sadbh Hanley	Analyst	21-07-2015
	Sinéad Canny	Associate Director	27-07-2015
Checked by	David Conlon	Senior Consultant	27-07-2015
Approved by	Andrew Archer	Projects Director	05-08-2015
NTA Reviewer	Eoin Farrell		11-08-2015

Version 2

	Name	Position	Date
Originated by	David Conlon	Senior Consultant	09-09-2015
Checked by	Sinéad Canny	Associate Director	28-09-2015
Approved by	Andrew Archer	Projects Director	28-09-2015
NTA Reviewer			

Contents

Page

1	Introduction	4
1.1	Background	4
1.2	Purpose of this Report	4
2	Methodology	5
2.1	Data Sources	5
2.2	Methodology for Establishing Demand	5
3	Galway Travel Characteristics Overview	6
3.1	National Household Travel Survey, 2012	6
3.2	POWSCAR Walk and Cycle Trip Patterns	8
4	Sector to Sector Movements	11
4.1	Overview	11
5	Corridor Demand	13
5.1	Overview	13
5.2	Corridor Demand Methodology	14
5.3	Corridor Demand Across Screenlines	15
6	Cross City Demand	18
6.1	Overview	18
6.2	Quincentenary Bridge	19
6.3	University Road/Salmon Weir Bridge	20
6.4	Bridge Street/O'Brien's Bridge	21
6.5	Father Griffin Road/Wolfe Tone Bridge	22
7	Major Trip Attractors	23
7.1	Overview	23
7.2	Ballybrit Industrial Estate	23
7.3	Mervue Business Park	26
7.4	NUIG & University College Hospital	27
7.5	GMIT & Galway Hospital	29
8	Potential Modal Switch	30
8.1	Overview	30
8.2	Short Distance Car Trips	32
Appendix A - NTA Zone to Zone Demand		
Appendix B - Corridor Screenline Select Link Analysis		

1 Introduction

1.1 Background

Galway City Council, in conjunction with the National Transport Authority (NTA), are developing an Integrated Transport Management Programme (ITMP) for the Galway City area. The ITMP will set out the delivery of transport improvements for Galway City and surrounding settlements within a boundary broadly delineated by, and including, the towns/villages of Bearna, Moycullen, Baile Chláir (Claregalway) and Oranmore. The study area boundary is shown in Figure 1.

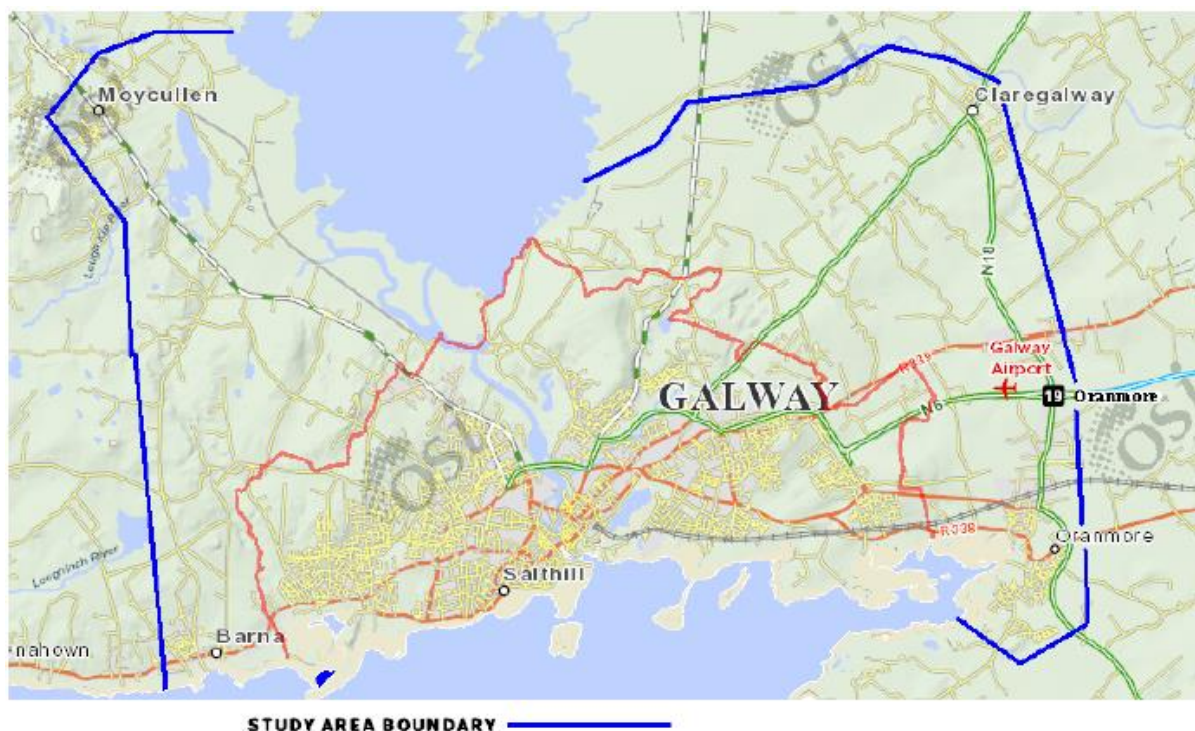


Figure 1 Integrated Transport Management Programme (ITMP) Study Area

1.2 Purpose of this Report

An initial task in the preparation of the ITMP is to undertake a comprehensive analysis of travel demand. This report details the findings of that analysis.

The aim of this report is to provide a thorough understanding of the existing level of demand for travel in Galway City and its surrounds. Travel patterns across all modes have been examined using available data. Consideration has been given to all trip purposes, with a particular emphasis on travel to work and education which constitutes 70% of all trips within the study area during the peak periods.

2 Methodology

2.1 Data Sources

The following primary data resources were used in compiling information on transport demand patterns within the study area:

- National Household Travel Survey, 2012
- Census 2011 Place of Work, School or College – Census Anonymised Records
- Galway Interim Model

2.2 Methodology for Establishing Demand

Demand analysis was conducted using the National Household Survey and POWSCAR in conjunction with the Galway Interim Model, to ascertain an understanding of current travel characteristics within Galway City and County. The National Household Survey is conducted by the CSO and represents travel patterns throughout the day whereby POWSCAR and the Interim Model look at peak movements. The movements are broken down by mode used and trip purpose.

2.2.1 National Household Travel Survey

The national household travel survey was undertaken between April and November 2012. The survey data provides information on people's day to day travel behaviour for the participant households.

2.2.2 POWSCAR

Census 2011 provides extensive information on travel patterns to work and education for the entire population. Information was extracted from the POWSCAR dataset for Galway City and County covering the following elements of travel demand:

- Volume of work and education trips;
- Origin and destination patterns;
- Mode of travel; and
- Time of departure.

2.2.3 Galway Interim Model

Future demand profiles have been considered by examining the data contained within the 2034 Do Minimum Galway Interim Transport model. The GIM predicts changes to travel patterns based on the population and employment forecasts and changes in travel costs (for example, changes in congestion).

3 Galway Travel Characteristics Overview

3.1 National Household Travel Survey, 2012

3.1.1 Trip Purposes

The peak period is dominated by trips to work and education. A total of 1,636 weekday trips within the study area were recorded in the National Household Travel Survey, 2012. Overall, the study area exhibits the same profile as is seen nationally with 70% of trips during the AM peak (07:00 to 10:00) relating to work and education. The proportion is slightly lower in Galway City (66%) and higher in Galway County (76%).

Within a 24 hour weekday period, home to work and education makes up 36.3% of all trips. This is slightly lower than the national average of 41.6%. Generally, within urban areas there is a slightly higher proportion of other trip purposes than in rural areas (60% versus 56.8%). However, even when compared to the national figures for cities and large urban towns, the study area exhibits a higher than average proportion of non-work / education trips (63.7%).

3.1.2 Profile of Trip Volumes throughout the Day

Figure 2 below outlines the trip volumes for each hour for 'home to work', 'home to education', 'work to home', 'education to home', other trip purposes and all trip purposes combined.

The highest concentration of trips occurs between 8am and 9am. Home to work comprises the largest concentration of trips during this peak hour, making up 40% of the total. Home to education is similarly high at 35%. Other trip purposes account for the remaining 25%.

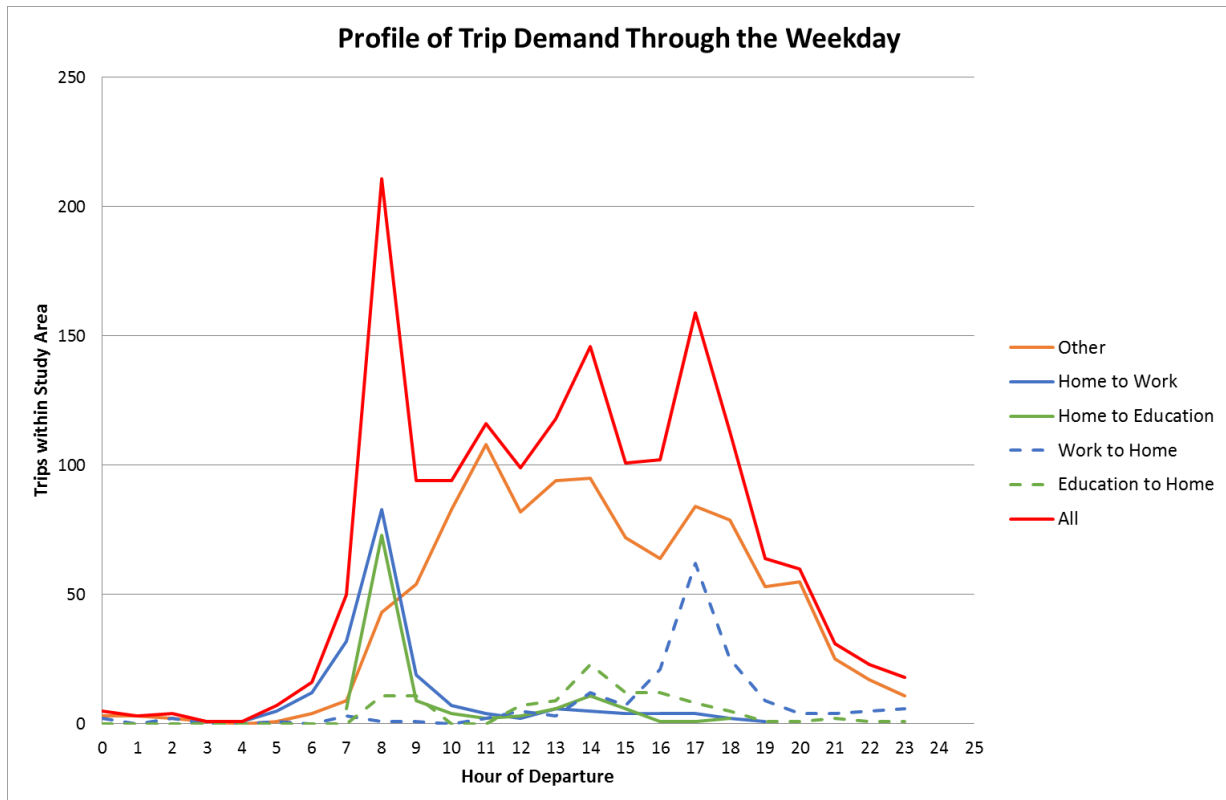


Figure 2 Profile of Trip Volumes in Galway City and County throughout Weekdays

Travel volumes reduce considerably mid-morning, with hourly trip volumes between 11am and 2pm being approximately half of the peak hour demand. The number of trips between 2pm and 3pm is 69% of the peak hour and correlates to the end of the school day. Whilst traffic congestion in Galway in the PM peak is perceived to be comparable to the AM peak, total trip demand between 5pm and 6pm is 75% of the AM peak hour volume. In this regard, it is worth noting that levels of congestion are not only related to trip volumes, but are also related to trip length distribution and mode.

3.1.3 Mode Split

The mode share by trip purpose, obtained from the National Household Travel Survey 2012, is shown in Table 1 and illustrated for all trip purposes in Figure 3.

Car is the dominant mode, accounting for three quarters of all trips. Walking provides for a high proportion of trips, amounting to nearly 18% overall mode share. It is noteworthy that the proportion of other trips facilitated by walking is relatively high (19%).

The bus caters for nearly 10% of home to education trips within Galway City and County in the dataset and probably reflects the role of school bus services, particularly in rural areas.

Mode	All trip Purposes	Home to Education	Home to Work	Other
Car	74.3%	71.4%	78.2%	74.0%
Walk	17.8%	16.7%	10.7%	19.0%
Bus	3.4%	9.9%	2.5%	2.9%
Train	0.1%	0.0%	0.3%	0.0%
Cycle	1.1%	0.5%	2.5%	0.9%
Taxi	0.5%	0.0%	0.0%	0.6%
Motorbike	0.2%	0.0%	0.9%	0.1%
Truck or Van	2.6%	1.6%	4.7%	2.3%

Table 1 Mode Share by Trip Purpose (Source: National Household Travel Survey, 2012, Galway City and County)

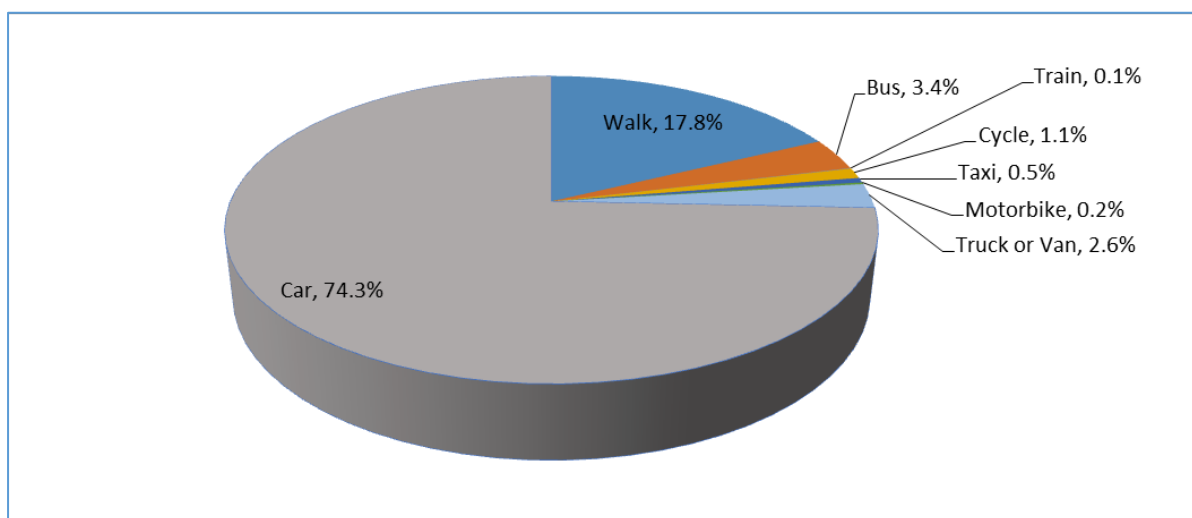


Figure 3 Mode Share for all Trip Purposes (Source: National Household Travel Survey, 2012, Galway City and County)

3.2 POWSCAR Walk and Cycle Trip Patterns

POWSCAR data was extracted for walk and cycle trips to work and education with a stated time of departure of between 8am and 9am. The data was then formatted to align with the Galway Interim Model zonal structure and the demand was assigned on an unconstrained network to show the possible distribution of trips.

In interpreting the data, the following should be taken into account:

- the GIM is a road based model and there will be existing walk and cycle links only that are not coded within the model;
- whilst delays are not taken into account in the unconstrained model, speed limits are and the routes to which the demand is assigned may not be the shortest path; and
- there is a significant number of walk and cycle trips destined for the zone that correlates to NUIG's buildings on Nun's Island. It may be that trips destined for NUIG's main campus were miss-coded in the POWSCAR database.

The flows will give an indication as to where there is most need for pedestrian and cycle infrastructure.

3.2.1 Modelled Distribution of Cycle Trips

The modelled distribution of POWSCAR cycle trips is shown in Figure 4. A small number of trips were between origins and destinations that seemed illogical for daily cycling and the data was cleaned to remove trip lengths above 20km as the crow flies.

The total number of cycle trips departing between 8am and 9am is quite low (~ 1,200) and relatively dispersed as shown in Figure 4. There are reasonable volumes of potential cycle movements on the N6, particularly on the west side of the City. The highest concentration of cycle movements is predicted to occur in the vicinity of NUIG.

3.2.2 Modelled Distribution of Walk Trips

The modelled distribution of POWSCAR walk trips is shown in Figure 5. A small number of trips were between origins and destinations that seemed illogical for daily walking and the data was cleaned to remove trip lengths above 10km as the crow flies.

The total number of walk trips departing between 8am and 9am is quite high (~ 7,400) and relatively concentrated as shown in Figure 5 with a significant number of walk trips on the Galway City side of the N6. There are significant volumes of walk trips shown to be in the vicinity of:

- NUIG and Nun's Island;
- Within the City Centre
- Along the Headford Road;
- Through Shantalla;
- From Salthill;
- Around GMIT;
- Past Mervue Business Park along the Tuam Road.

A significant volume of walk trips are modelled to cross Salmon Weir Bridge and Wolfe Tone Bridge.



Figure 4 POWSCAR 2011 Cycle Trips to Work and Education (departure time 08:00 to 09:00) Modelled within the Galway Interim Model



Figure 5 POWSCAR 2011 Walk Trips to Work and Education (departure time 08:00 to 09:00) Modelled within the Galway Interim Model

4 Sector to Sector Movements

4.1 Overview

The National Transport Authority (NTA) divided the Study Area into 31 zones using the CSO Small Area structure. Figure 6 illustrates the zonal structure. POWSCAR data was extracted and processed in accordance with the 31 zone structure. The resulting origin – destination matrix for the 31 zones is included in Appendix A.

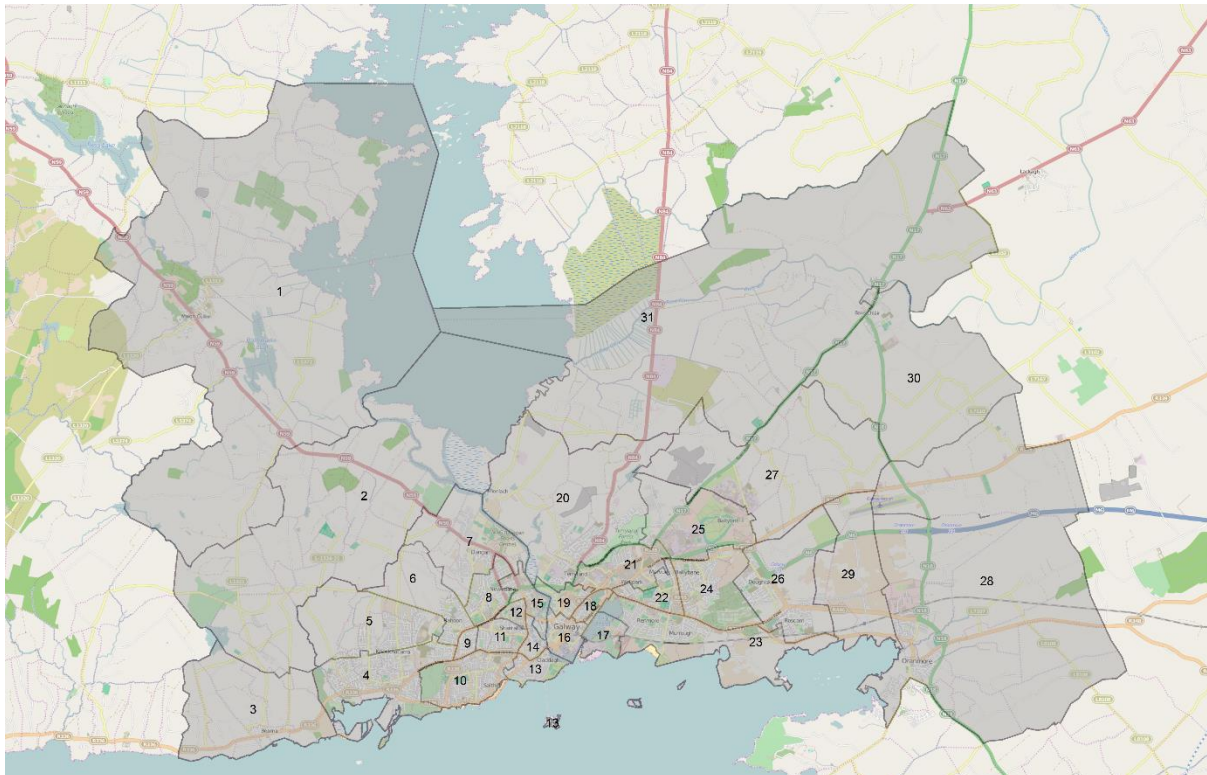


Figure 6 NTA 26 Study Area Zones

Just over 45,000 trips are recorded within POWSCAR for the 31 zones (45,024). Over on eighth of trips (13%) are internal within zones. The destinations with the highest trip volumes (work and education, including internal) are shown in Table 2.

Destination	Zone	Total Trips
NUIG	15	6,500
City Centre	16	5,600
Ballybrit	25	4,000
Salthill	10	3,400
Mervue Industrial Estate	21	3,375
GMIT	22	2,600

Table 2 Destination Zones with Highest POWSCAR Trip Volumes

The origins with the highest trip volumes (work and education, including internal) are shown in Table 3.

Origin	Zone	Total Trips
Knocknacarra South	4	4,800
Tirellan	20	3,550
Doughiska	26	3,500
Knocknacarra North	5	3,000
Merlin Park Hospital	24	2,800
Oranmore	28	2,600

Table 3 Destination Zones with Highest POWSCAR Trip Volumes

5 Corridor Demand

5.1 Overview

The Galway Interim Model was used to plot projected travel demand for the year 2034 across three levels of screenlines. The model contains data on car, light goods vehicles and heavy goods vehicles movements with the data presented in passenger car units (PCUs). The screenlines used are shown in Figure 7 and comprise:

- **Screenline 1: City Boundary Screenline:** points on all main corridors crossing the Galway City Boundary line;
- **Screenline 2 N6 Screenline:** points on corridors that cross the N6; and
- **Screenline3 City Centre Screenline:** points on corridors entering the core City Centre.

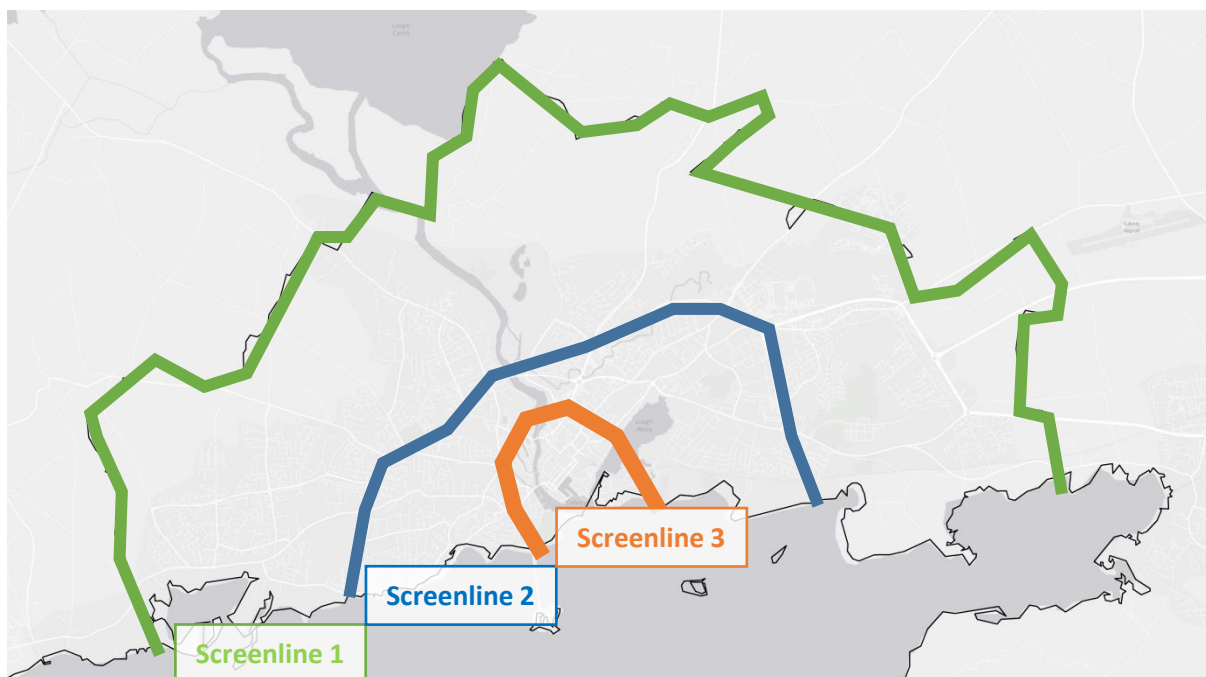


Figure 7 Map of Screenlines

The main roads crossing each screenline were identified and used to develop a series of corridors comprising:

- Bearna;
- Ragoon;
- Moycullen;
- Headford;
- Baile Chláir (Claregalway);
- Dublin; and
- Oranmore.

Figure 8 illustrates the points at which these corridors cross the three screenlines.

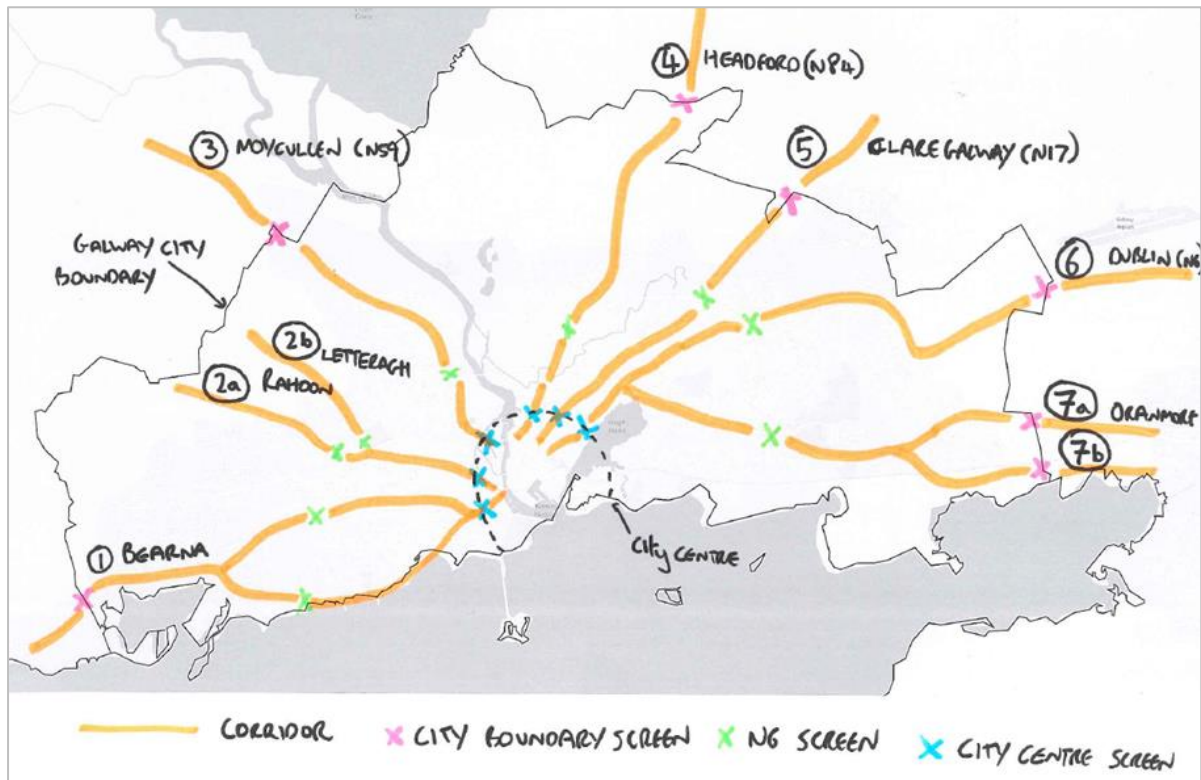


Figure 8 Map of Screenline Point locations

5.2 Corridor Demand Methodology

The Galway Interim Model was used to examine the future demand patterns for 2034 based on a Do Minimum scenario.

The process to develop future year matrices based on the population and employment forecasts can be summarised as follows:

- future year trip ends generated using the version of the National Trip End Model (NTEM) developed specifically for GIM;
- growth rates calculated between base and future year NTEM trip ends;
- growth rates applied to the validated base year trip ends to generate target future year trip ends (taking account of changes to car occupancies)
- base year trip matrices factored using a row and column balancing procedure, to produce future year 'unconstrained' trip matrices
- run the DIADEM demand model in order to constrain the trip matrices to future year costs (such as changes in values of time, vehicle operating costs and congestion levels)

The GIM predicts changes to travel patterns based on the population and job forecasts and the changes in travel costs (for example changes in congestion). The strongest change is a re-distribution of trips as people change their destination (e.g. where they work or shop) based on the changes in travel costs over a number of years.

It should be noted that, in the 2034 Do Minimum Scenario, the overall growth in car trips (compared to the 2012 base year) to/from/through Galway city is 20%. However the re-distribution impacts result in the growth in car trips crossing the River Corrib of just 11%. This is because capacity constraints to cross the river suppress some of the cross-river demand.

5.3 Corridor Demand Across Screenlines

Demand was analysed through select link analysis at the three screenlines for each corridor. The select link plots showing the volume and distribution of trips are included in Appendix 2. Figure 9 and Figure 10 summarise the demand volumes during the 8 to 9 peak hour. The data is for all users classes in PCUs.

There are two apparent patterns to the demand. The first shows a decline in demand as the corridors approach the City Centre. This occurs in the case of the Moycullen, Baile Chláir, Dublin Road and Oranmore corridors. The second trend shows the highest corridor demand across Screenline 2 which occurs for the Bearna, Ragoon and Headford corridors. This second trend occurs where there is substantial residential development located outside of the N6 screenline.

Significant volumes of trips are from beyond the City boundary and cross Screenline 1. The destinations for these trips are dispersed around the City and volumes of trips across Screenline 3, the City Centre, are considerably lower. Whilst, there are a number of routes carrying low levels of traffic that are not included for in Figure 9 and Figure 10, the demand generally illustrates the spread of trip destinations across Galway City. The select links plots in Appendix 2 further illustrate the trip patterns from the main corridors.

Generally, the trip patterns are challenging to serve by public transport and a significant volume is of a length that is not conducive to walking or cycling.

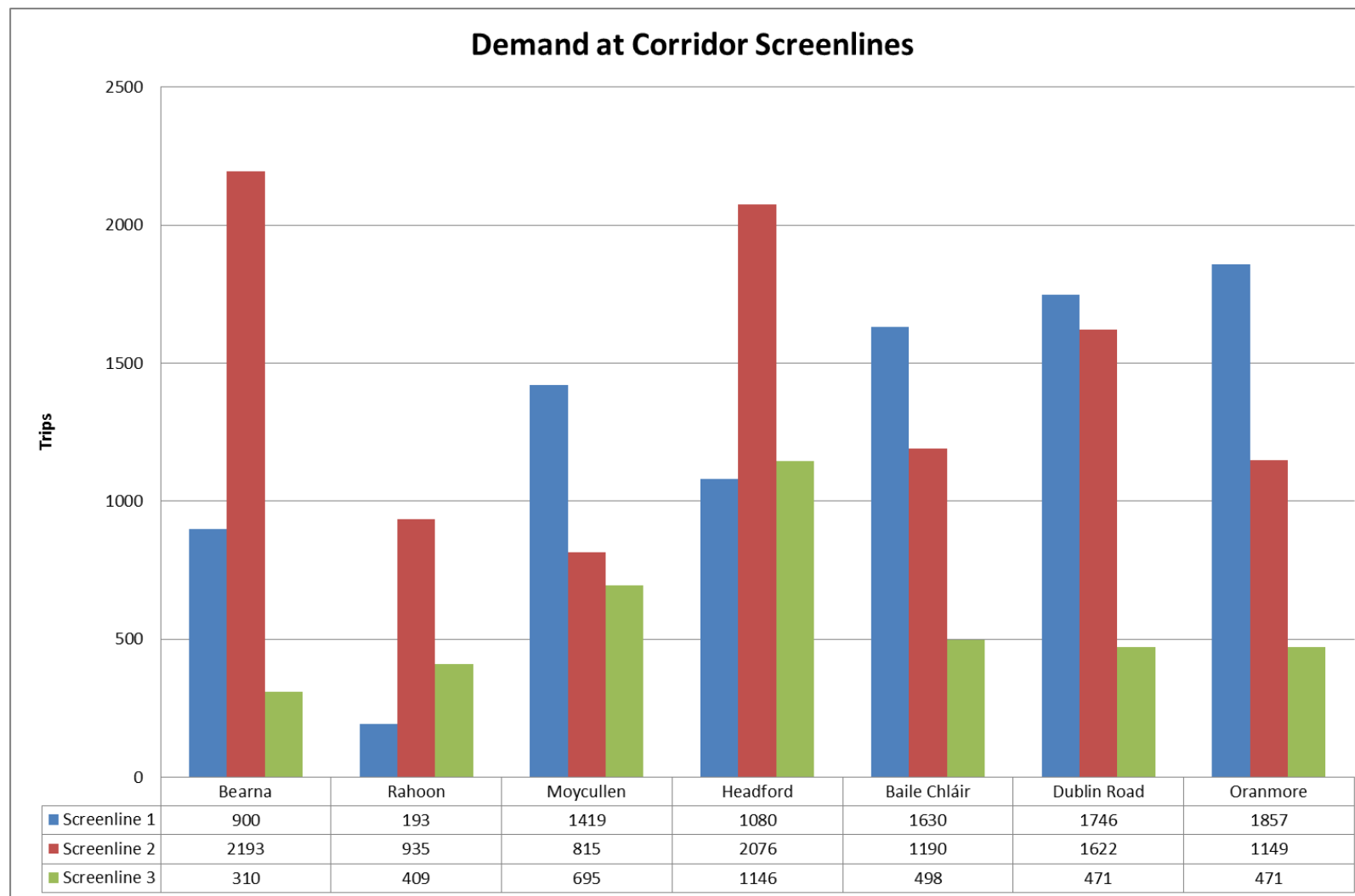


Figure 9 Demand at Corridor Screenlines

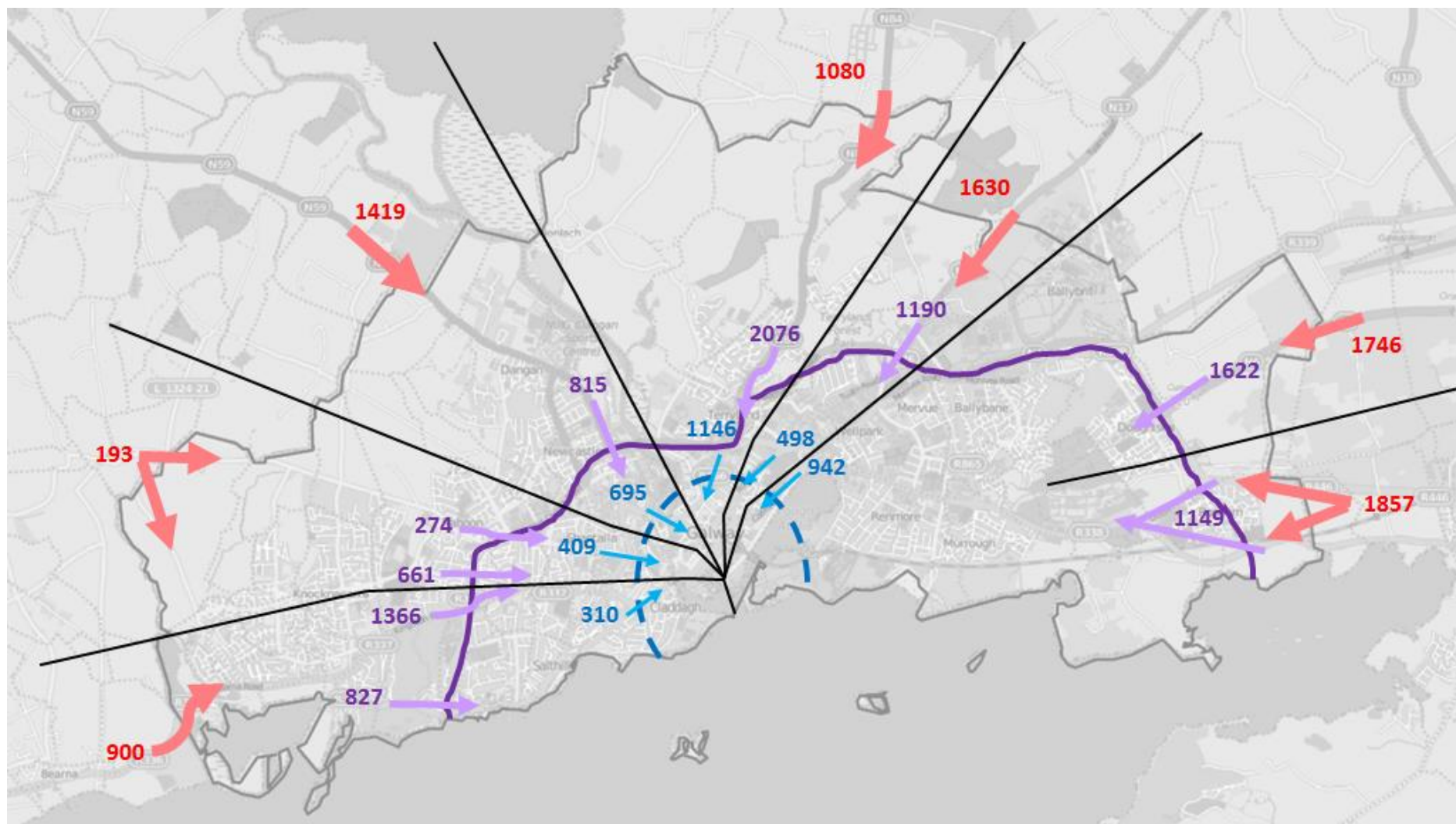


Figure 10 Demand at Corridor Screenlines

6 Cross City Demand

6.1 Overview

This section looks at modelled demand levels across the four City bridges. The Galway Interim Model was used to assess future demand at each of the four bridge crossings for the year 2034 during the 8 to 9 AM peak hour. For this exercise, an unconstrained network was used for the demand assignment. This unconstrained assignment shows what travel patterns are like in the absence of traffic delay and demonstrates the most direct (shortest) route for each trip in the network. The modelled flows are shown in Figure 11.

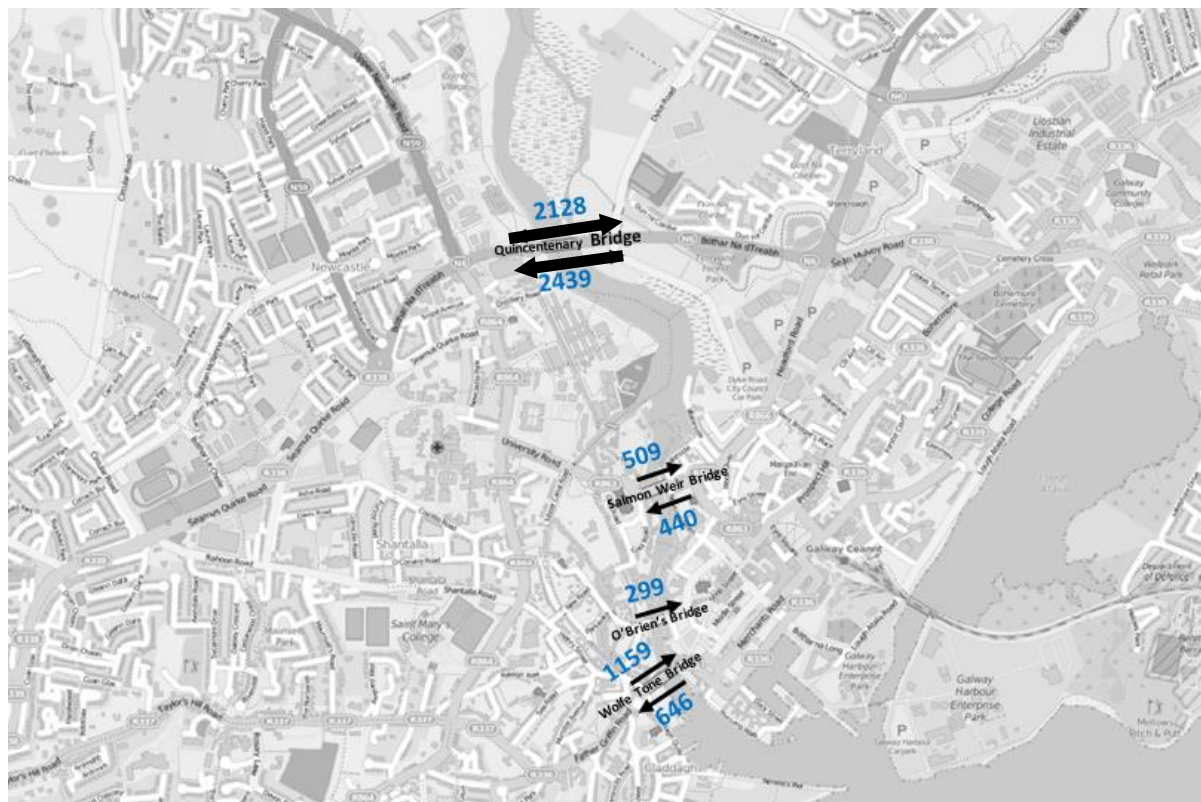


Figure 11 Modelled Demand Across Galway City's Bridge Crossings

Quincentenary Bridge attracts the largest volume of trips. It is interesting to note that, whilst a larger volume of traffic is heading west to east (~4,400), there are a significant number of trips east to west (~3,200).

A select link analysis displays graphically origin-destination trips which pass a particular point. In the examples shown below, select link analysis has been used to extract the distribution of trips that cross all existing bridges in Galway City. The following sections show the select link analysis, for each bridge, for both the westbound and eastbound directions.

6.2 Quincentenary Bridge

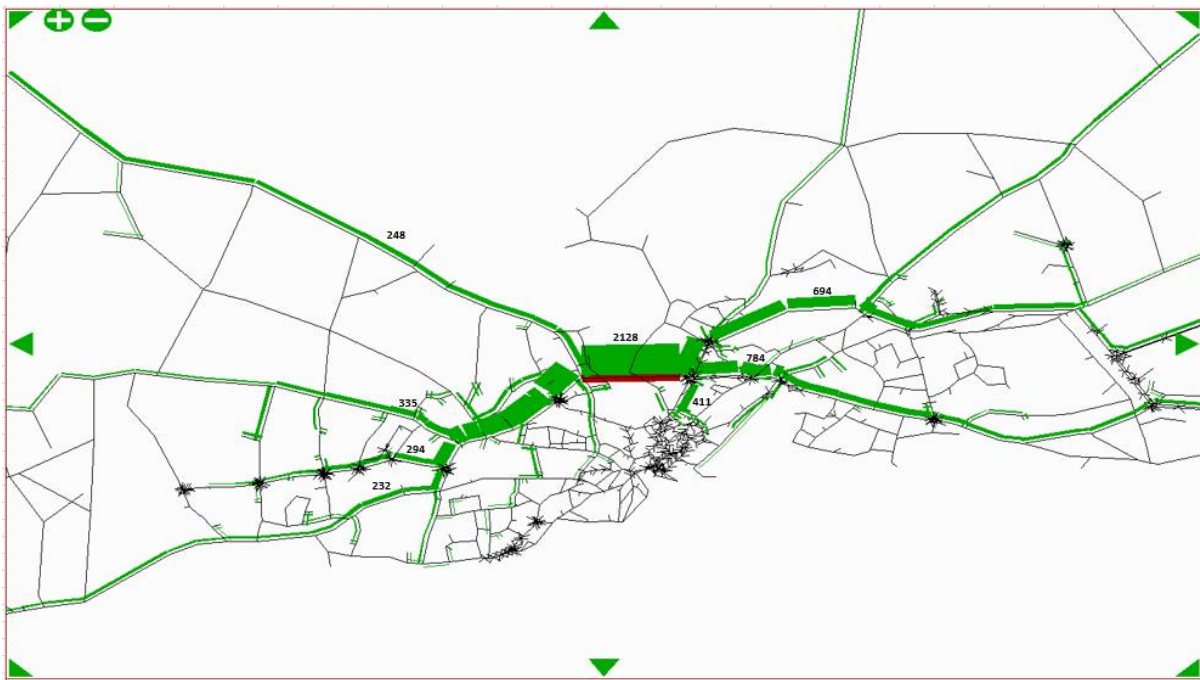


Figure 12 Quincentenary Bridge: Eastbound Demand (Galway Interim Model)

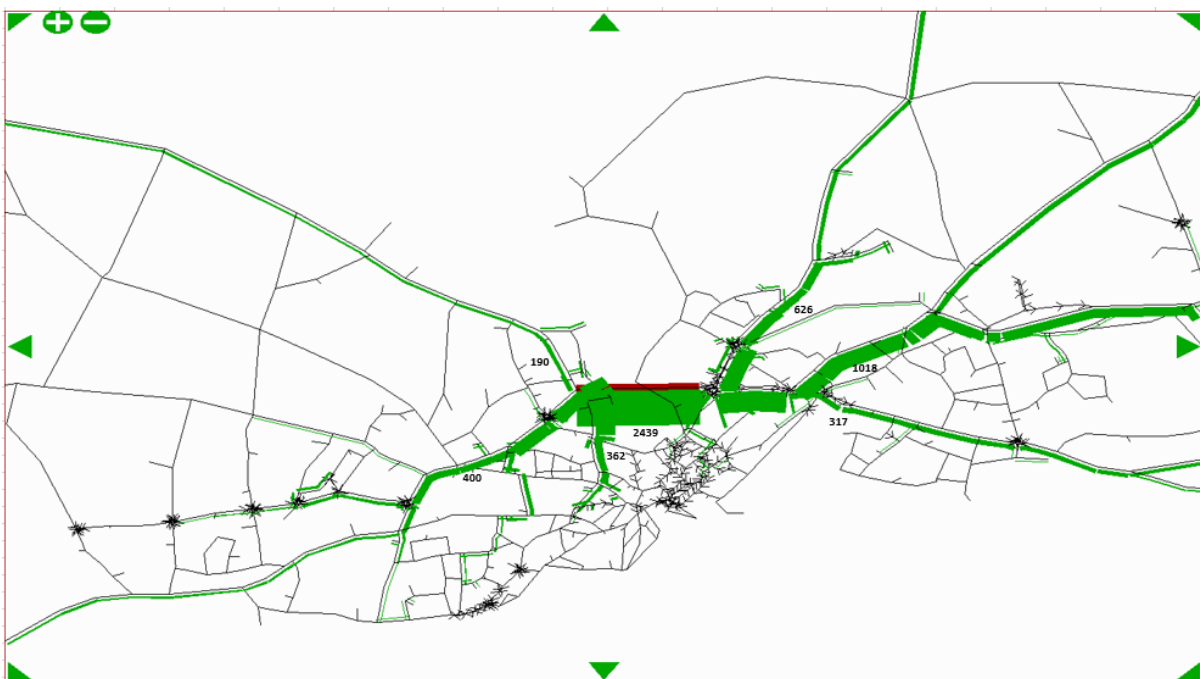


Figure 13 Quincentenary Bridge: Westbound Demand (Galway Interim Model)

Figure 12, above, illustrates 2128 vehicles traveling eastbound on the Quincentenary bridge between 8-9am. The origin of this traffic is relatively evenly split among the main distributor roads on the western side of the city (N59, Rahoo Rd, Western Distributor Rd and R33&). These Vehicle then travel on to the N6, R338 and R866 to complete their journey.

Figure 13 shows 2439 vehicles crossing the Quincentenary Bridge in a westbound direction. The majority of this traffic use the N6/ R336, N89 and R338 to access the Bridge.

6.3 University Road/Salmon Weir Bridge

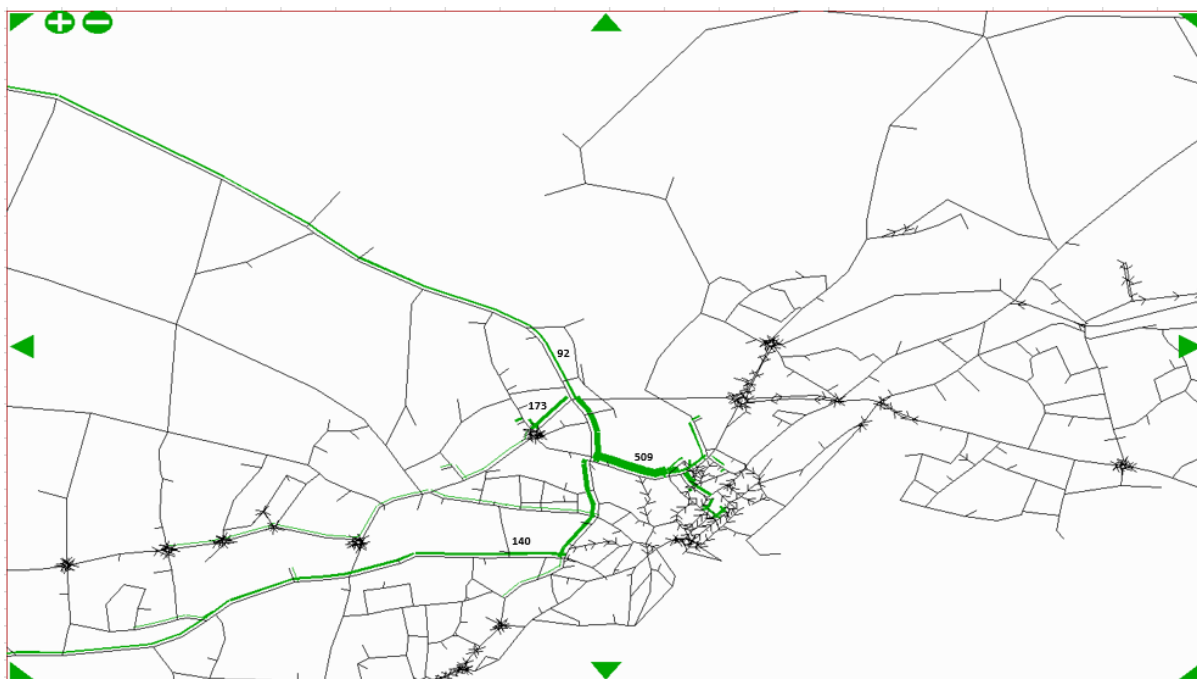


Figure 14 Salmon Weir Bridge: Eastbound Demand (Galway Interim Model)

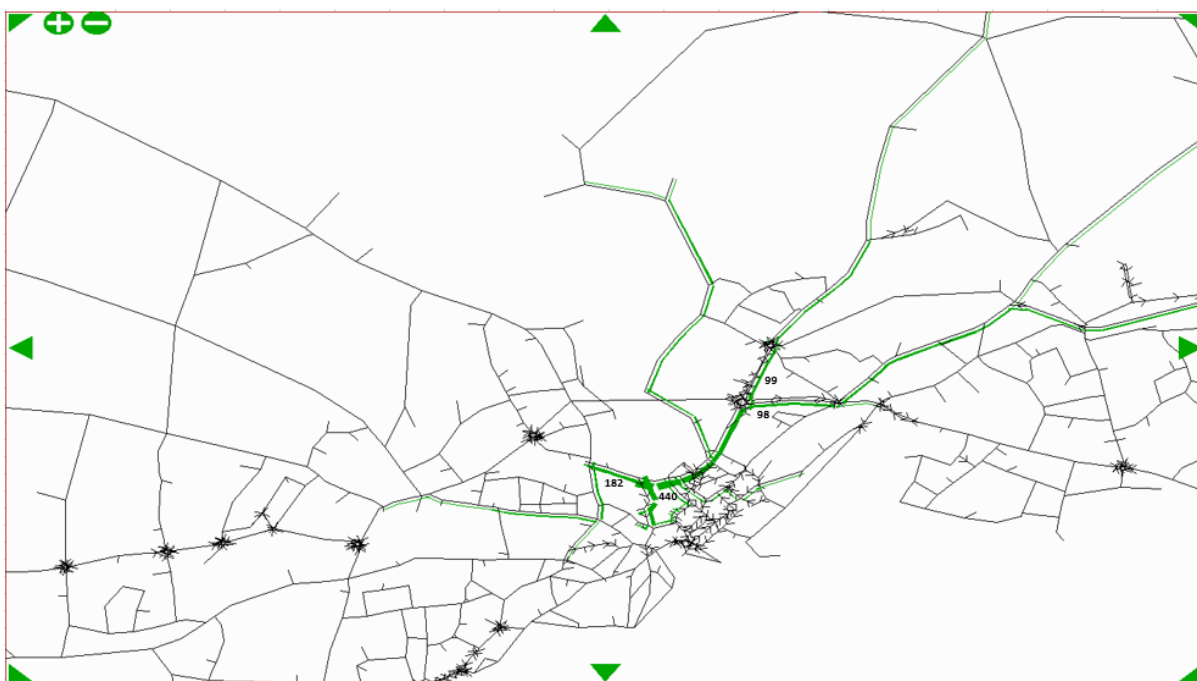


Figure 15 Salmon Weir Bridge: Westbound Demand (Galway Interim Model)

The select link analysis of the Salmon Weir Bridge shows 509 vehicles travelling eastbound and 440 vehicles travelling westbound during the 2034 08:00-09:00 period. The majority of the eastbound traffic use the N59 and R337 to access the bridge. In the westbound direction, the N89 and N6/R336 are the main routes used. The destinations for vehicles using the Salmon weir bridge are, by and large, close to the city centre. This is in contrast to the Quincentenary Bridge which facilitates longer, cross city, trips.

6.4 Bridge Street/O’Brien’s Bridge

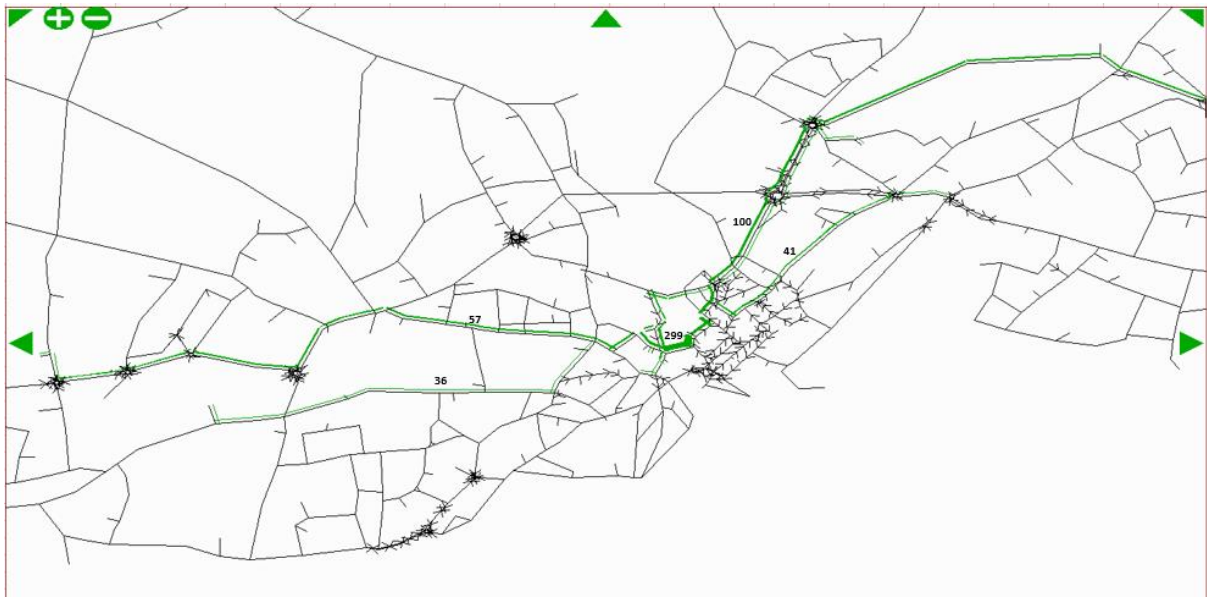


Figure 16 O’Brien’s Bridge: Eastbound Demand (Galway Interim Model)

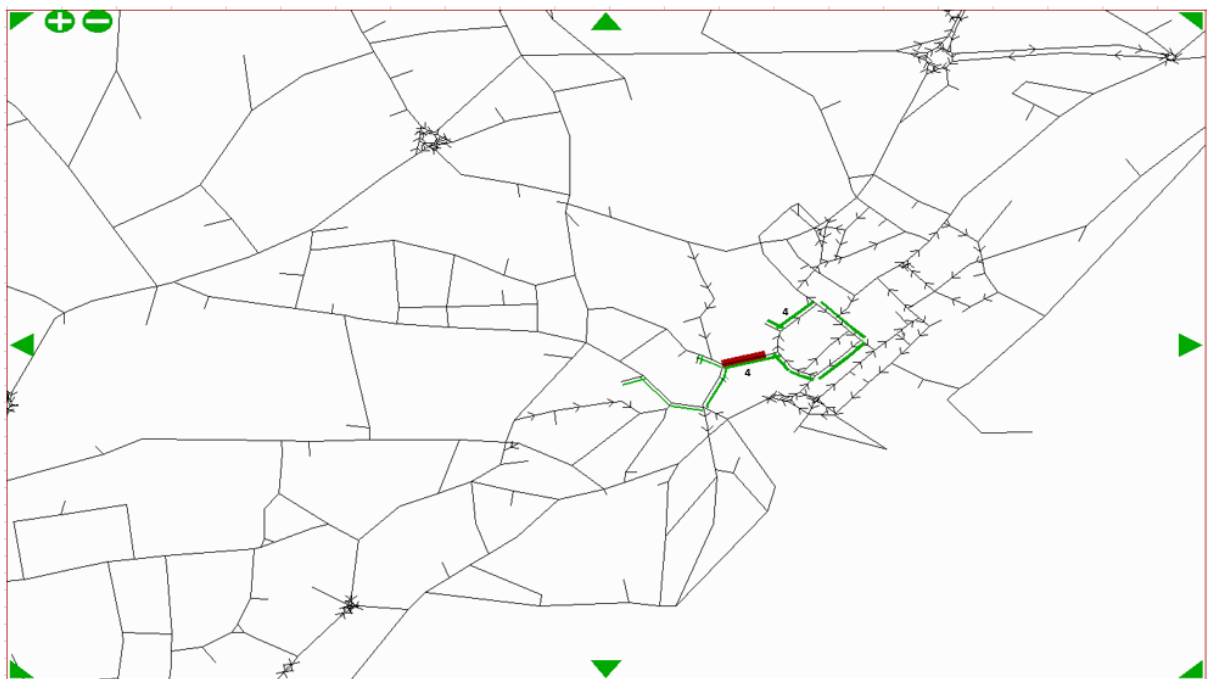


Figure 17 O’Brien’s Bridge: Westbound Demand (Galway Interim Model)

The select link analysis for O’Brien’s Bridge shows 299 vehicles travelling eastbound and a very small amount (4) travelling westbound. It should be noted here that these flows represent the “unconstrained” demand on the network and are not indicative to how traffic would travel on a congested network. In this unconstrained scenario O’Brien’s Bridge represents the most direct route for only a small amount of westbound trips in the network.

Those trips that use O’Brien’s Bridge in an eastbound direction mostly originate along the Western Distributor Road and the R337 and have destinations in the City Centre, along the N6 and R336.

6.5 Father Griffin Road/Wolfe Tone Bridge

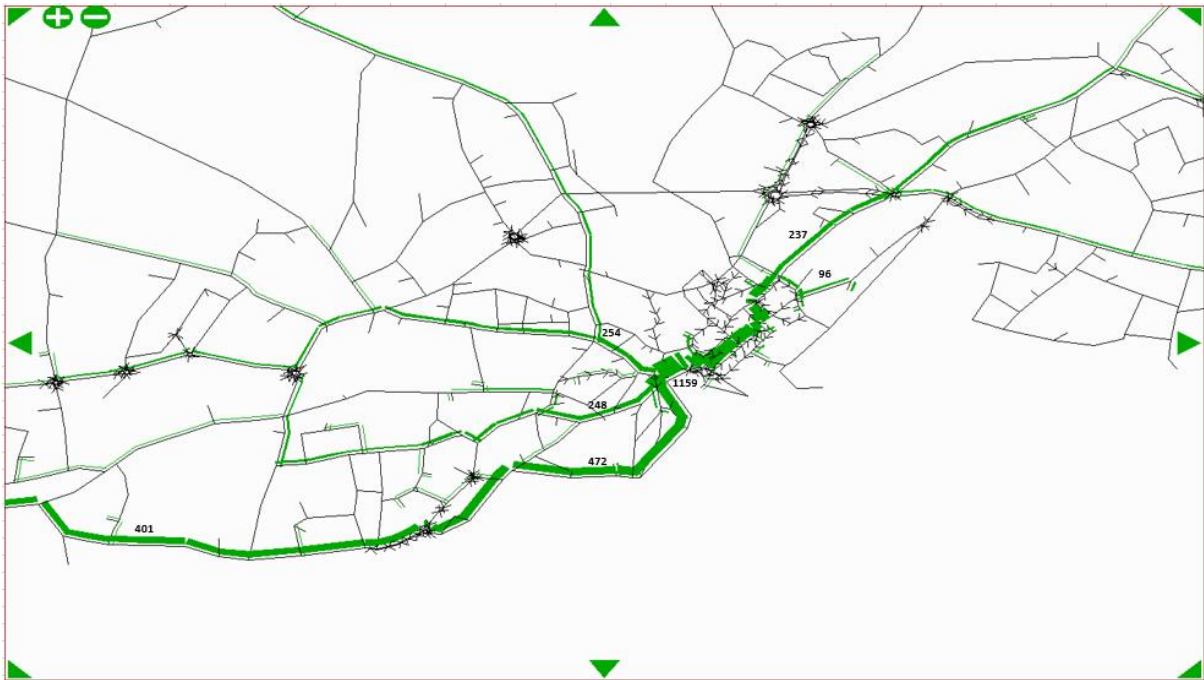


Figure 18 Wolfe Tone Bridge: Eastbound Demand (Galway Interim Model)

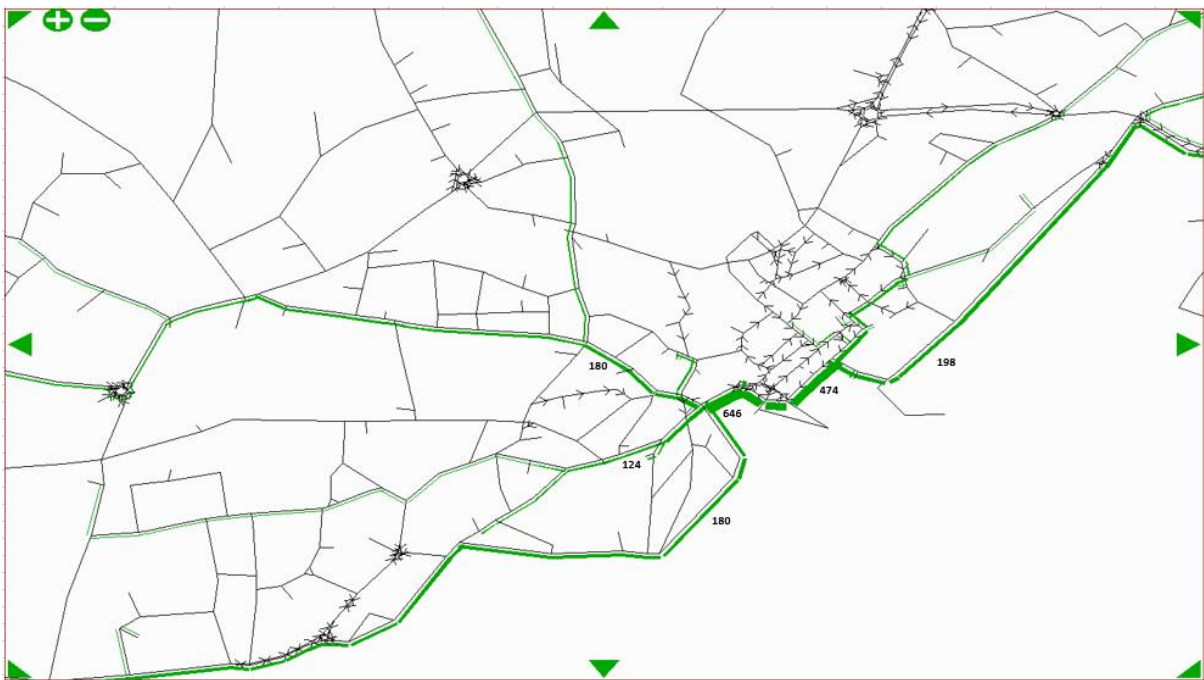


Figure 19 Wolfe Tone Bridge: Westbound Demand (Galway Interim Model)

The Select Link analysis for the Wolfe Tone Bridge shows that a relatively large number of trips will use this link, both eastbound (1159) and westbound (646), on an unconstrained network. The majority of the eastbound traffic at this location is destined for the city centre or industrial estates on the east of the city. The westbound traffic at this location originates close to the city centre or uses Lough Atalia Road to access Wolfe Tone Bridge and then disperses along the main radial routes to the west of the city.

7 Major Trip Attractors

7.1 Overview

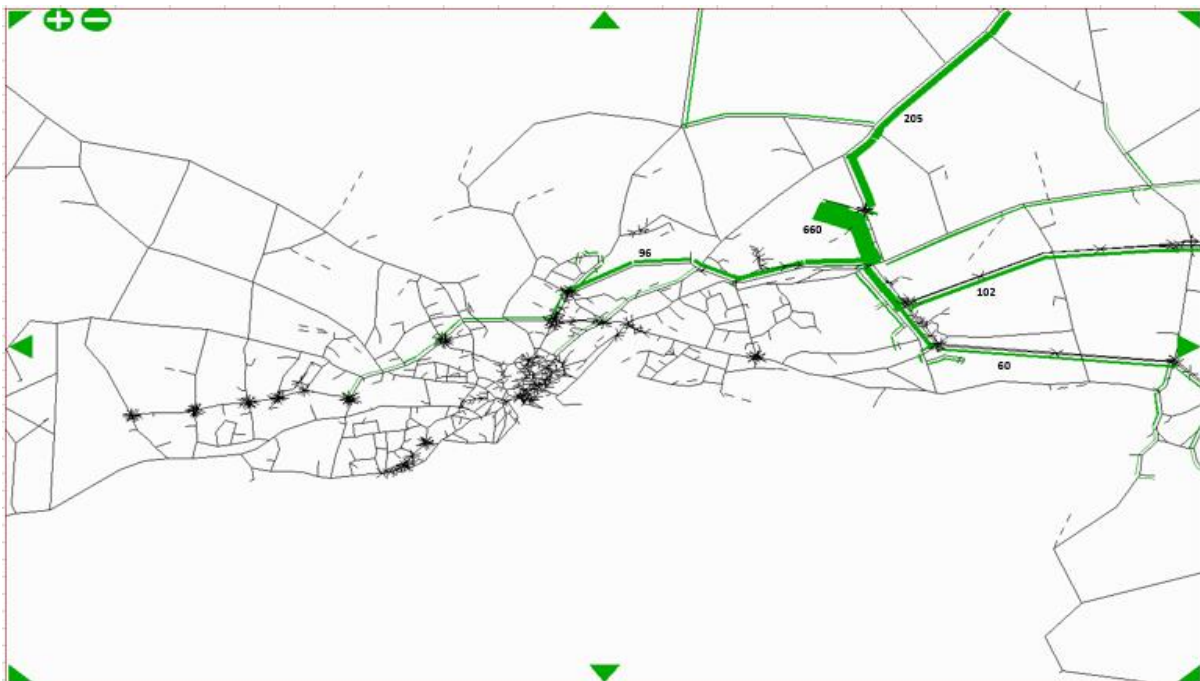
Areas of trip concentrations were looked at separately to gain an understanding of demand to these areas. Four areas were identified and future demand was established using the Galway Interim Model:

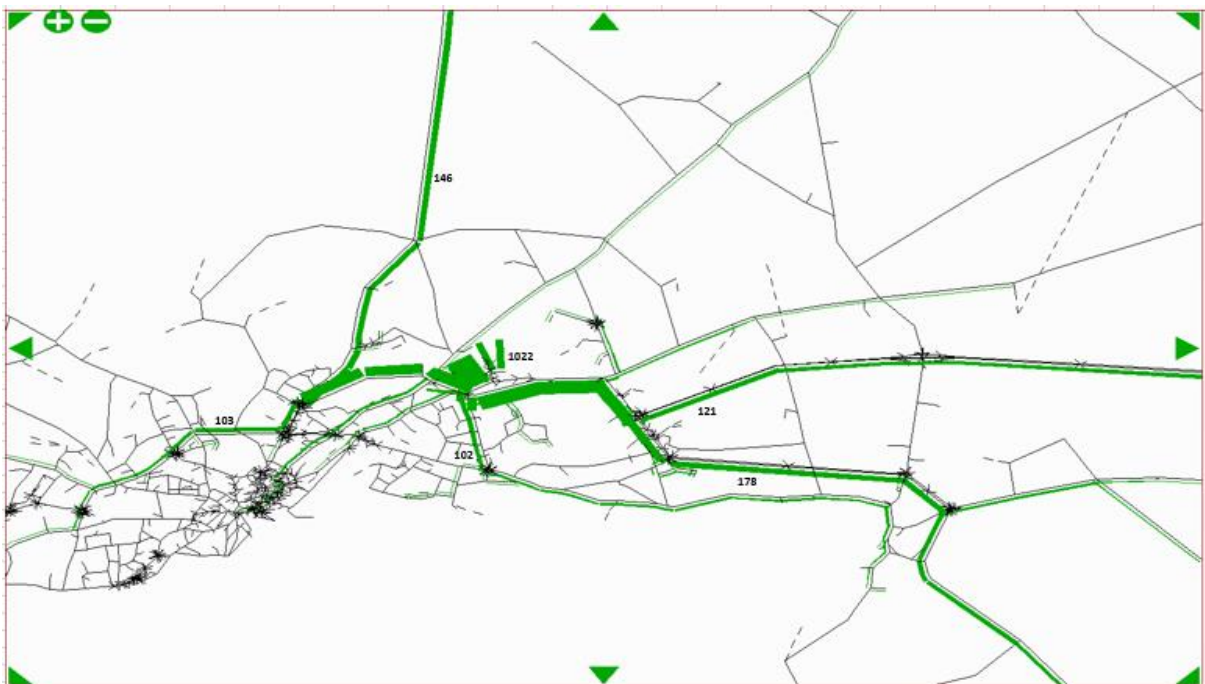
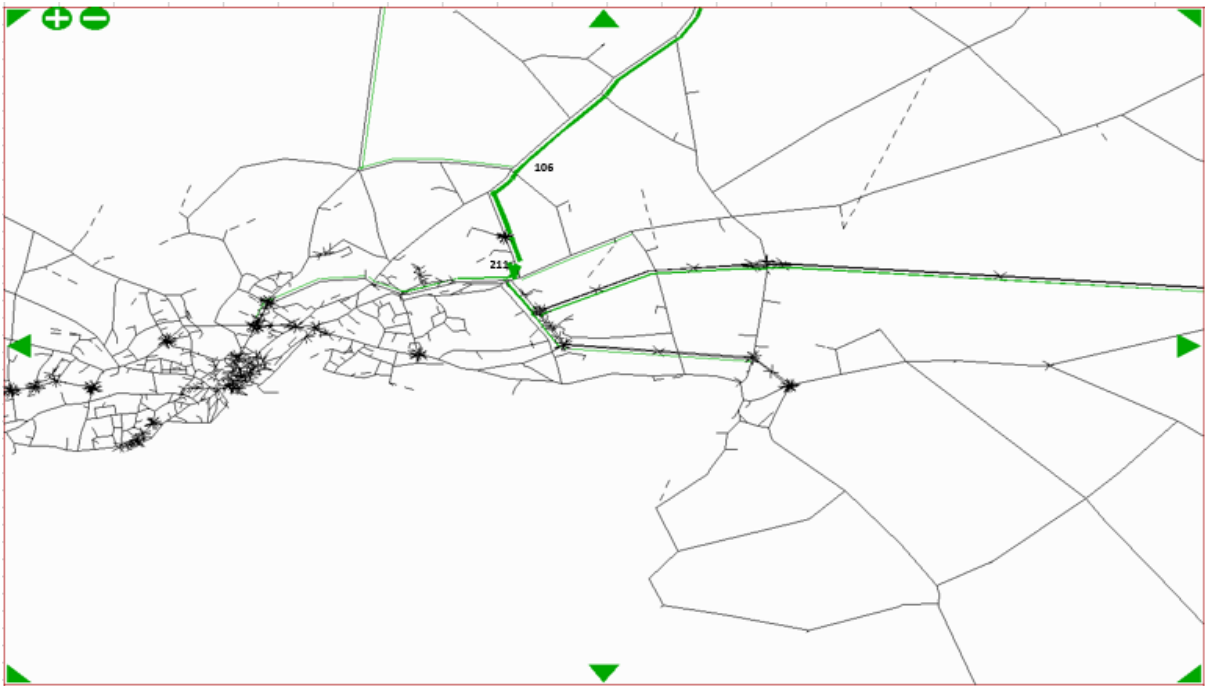
- Ballybrit Industrial Estate / Parkmore;
- Mervue Business Park;
- NUIG & University College Hospital; and
- GMIT & Galway Hospital.

Each Trip Attractor was used as a destination only.

7.2 Ballybrit Industrial Estate

Within the traffic model, there are 5 zones for the Ballybrit area. The following screenshots indicates the trip distribution for each of these zones.





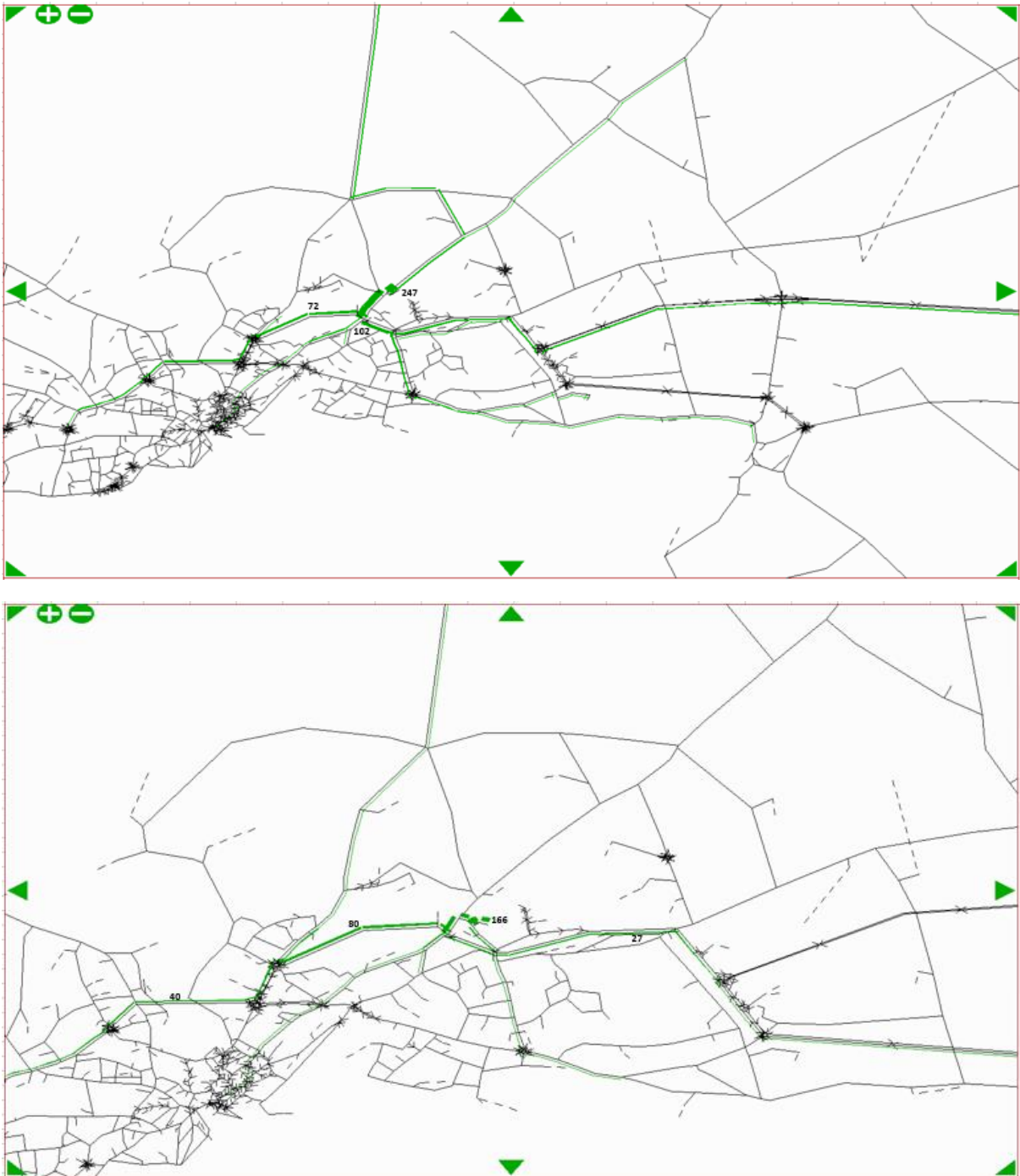


Figure 20 Ballybrit Industrial Estate: Trip Attraction Demand (Galway Interim Model)

7.3 Mervue Business Park

Within the traffic model, there are 2 zones for the Mervue Business Park area. The following screenshots indicates the trip distribution for each of these zones.

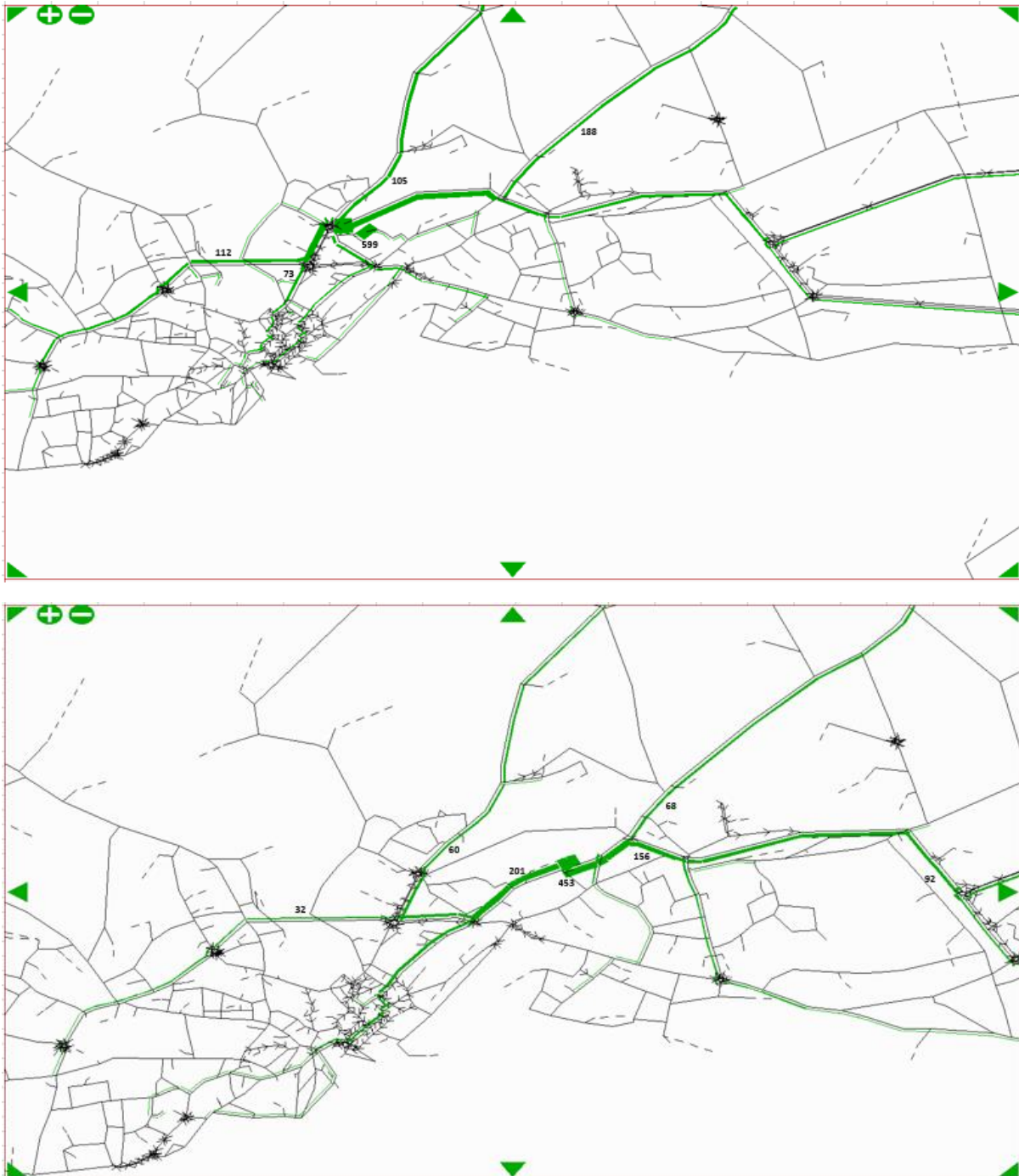
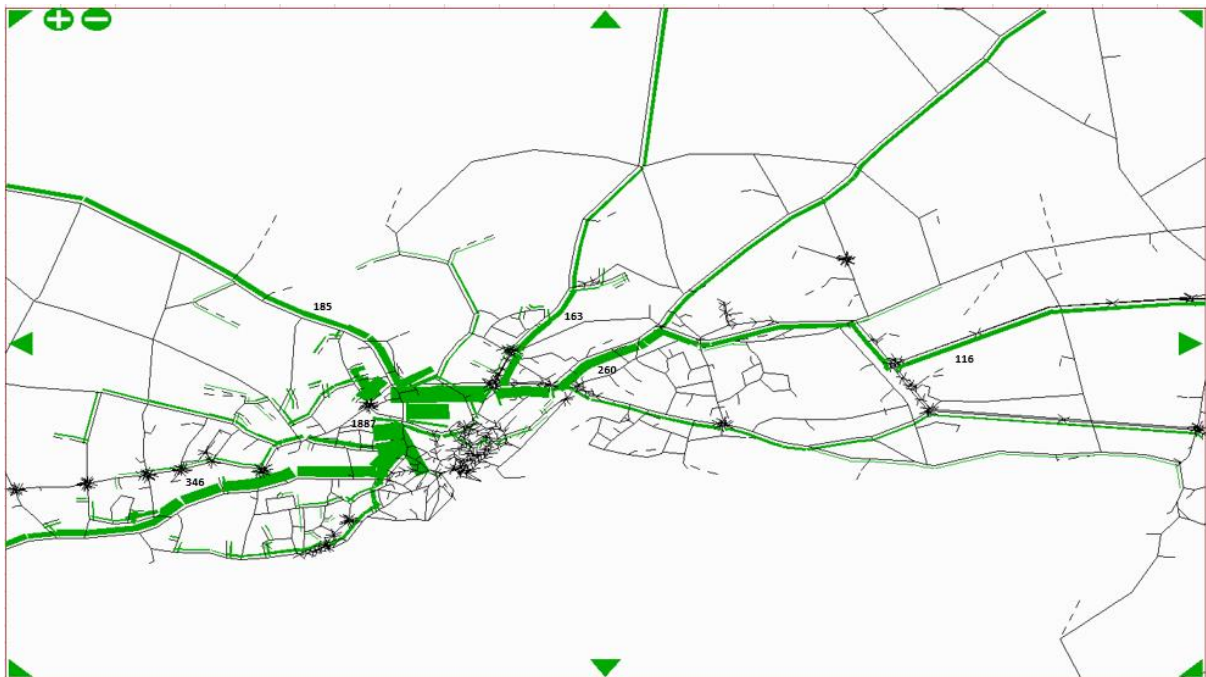
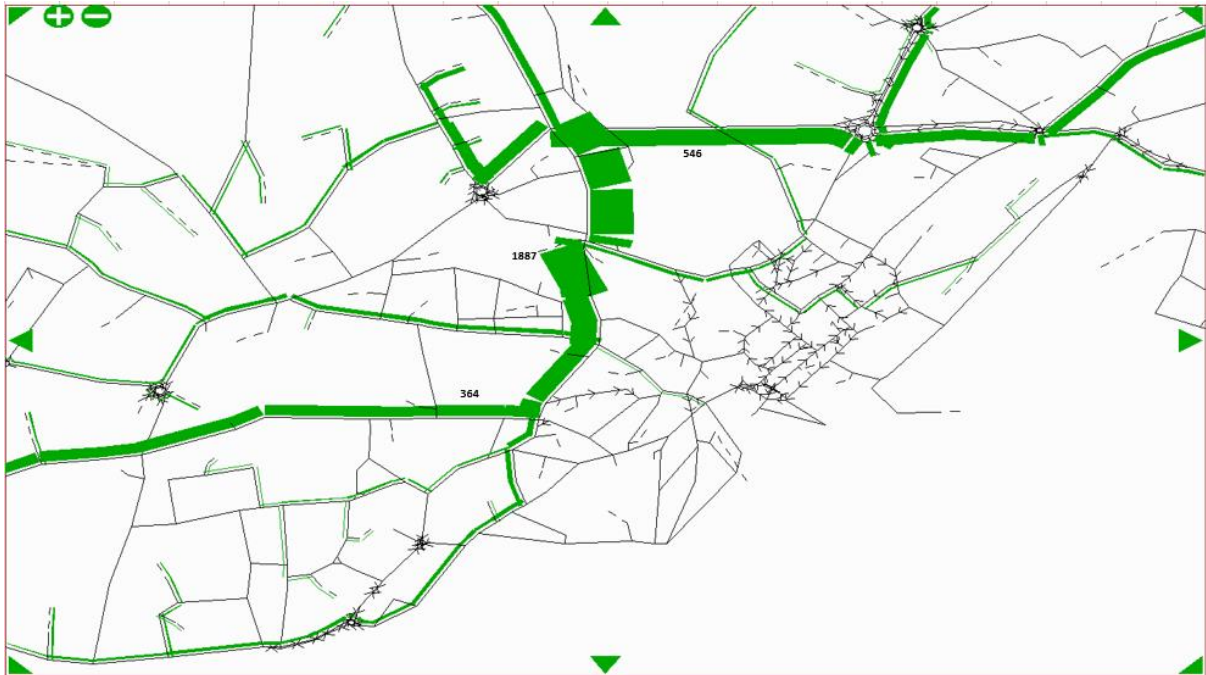


Figure 21 Mervue Business Park: Trip Attraction Demand (Galway Interim Model)

7.4 NUIG & University College Hospital

Within the traffic model, there are 4 zones for the NUIG & University College Hospital area. The following screenshots indicates the trip distribution for each of these zones.



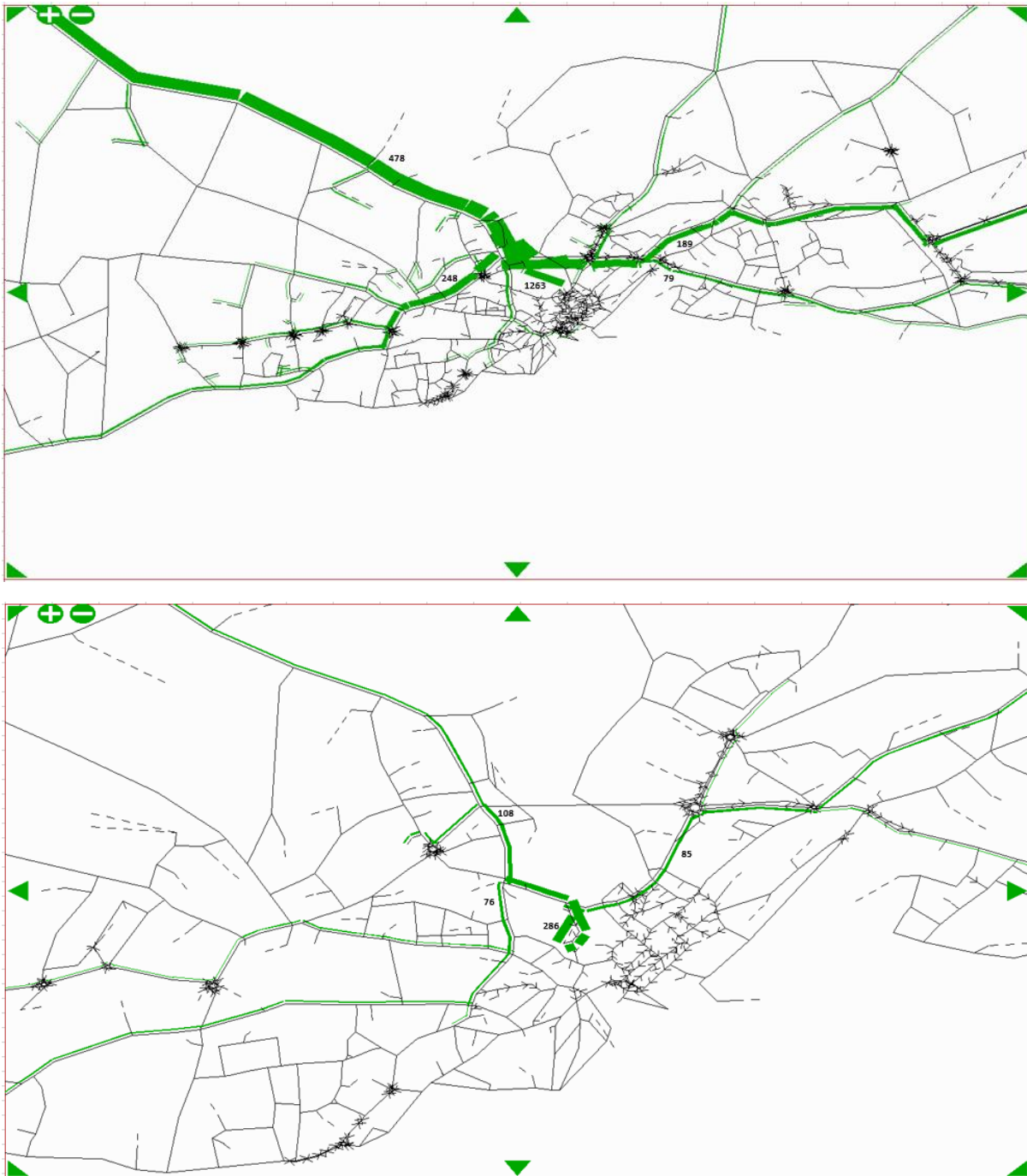


Figure 22 NUIG and University College Hospital: Trip Attraction Demand (Galway Interim Model)

7.5 GMIT & Galway Hospital

Within the traffic model, there are 2 zones for the GMIT & Galway Hospital area. The following screenshots indicates the trip distribution for each of these zones.

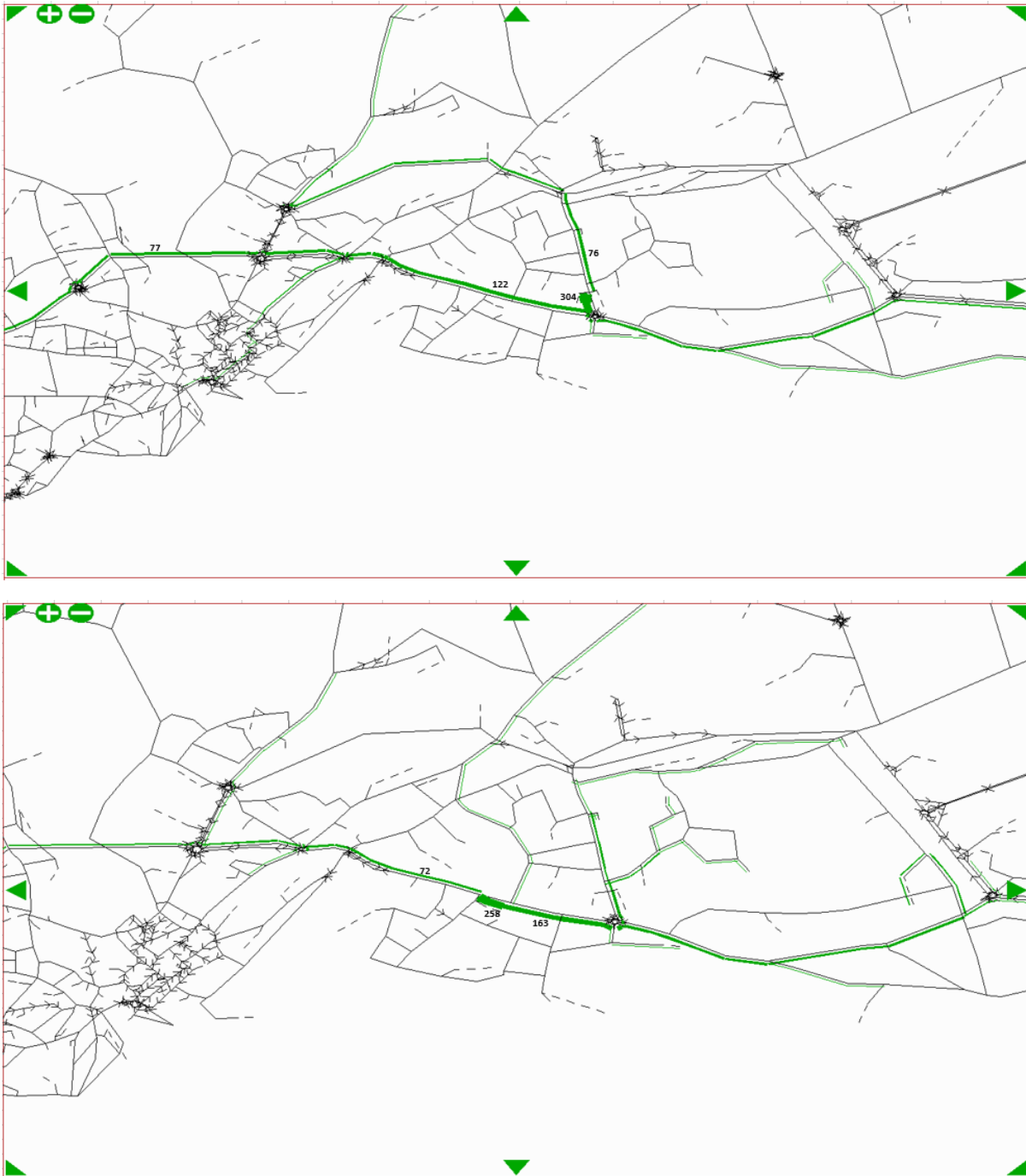


Figure 23 GMIT & Galway Hospital: Trip Attraction Demand (Galway Interim Model)

8 Potential Modal Switch

8.1 Overview

There is an obvious trend towards private vehicle usage within Galway. To get a further understanding of the scale of demand from the private car, the 2012 car trip matrix was assigned to an unconstrained network within the Galway Interim Model. In this context, capacity constraints and congestion do not influence route choice and the profile of trip demand illustrates where car traffic would travel by choice.

The below Galway Interim Model Analysis is of All Car Trip Demand within Galway.

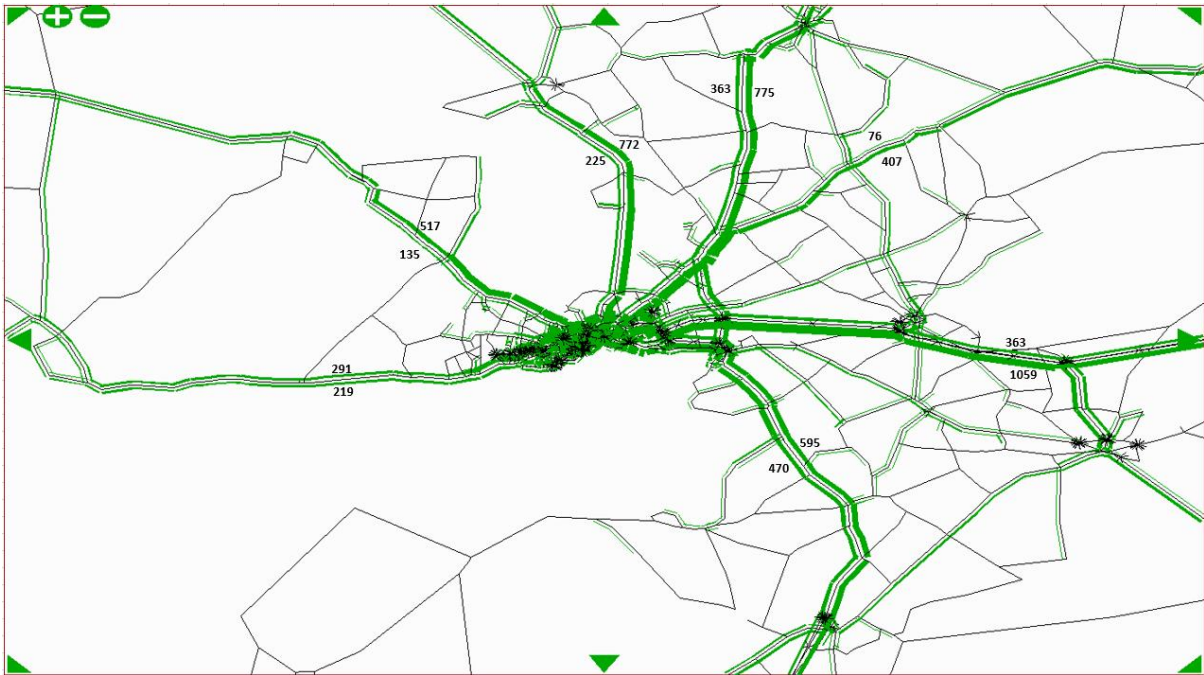


Figure 24 2012 Car Demand Assigned to Unconstrained network – Demand on the Approaches to Galway City

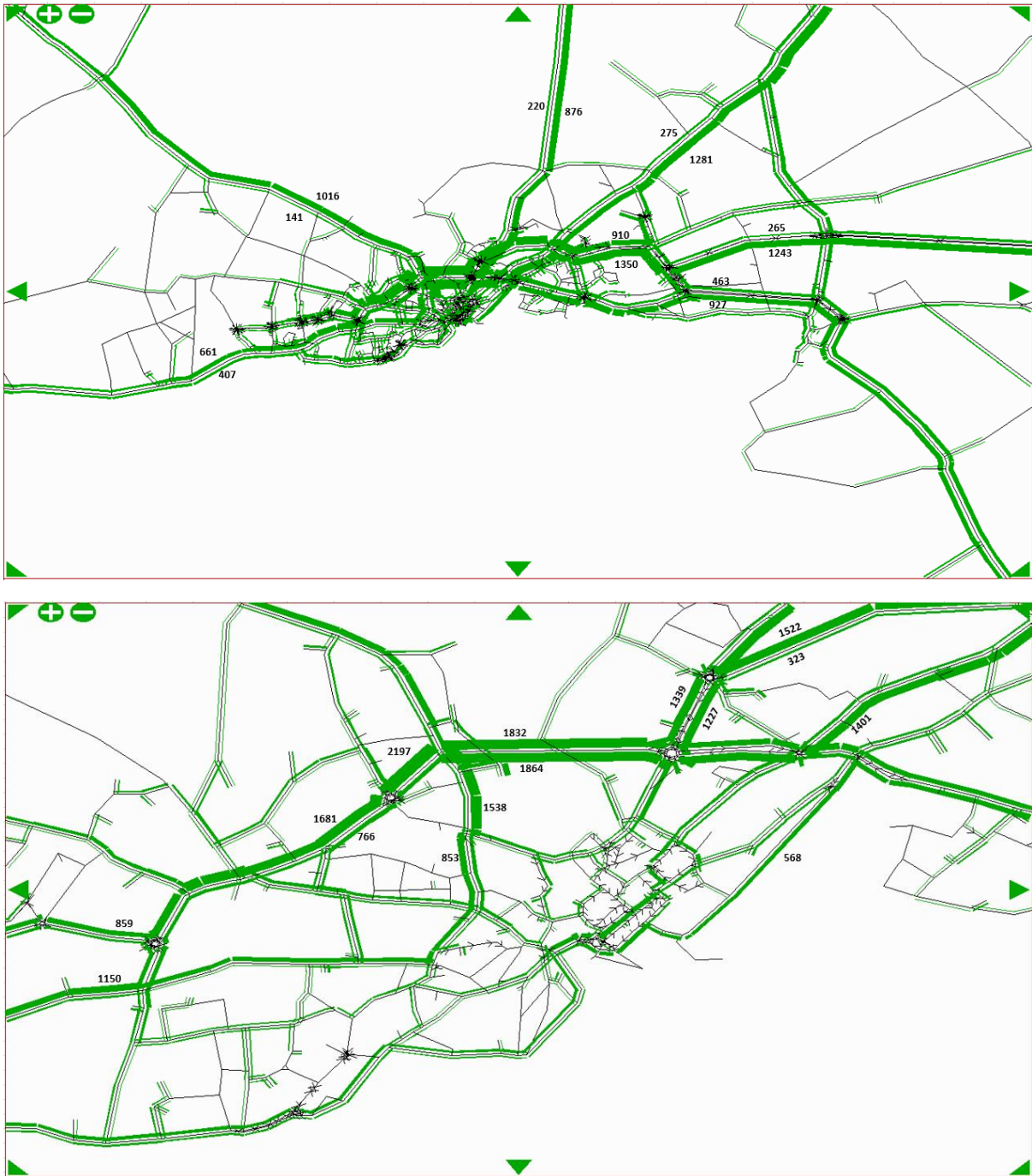


Figure 25 2012 Car Demand Assigned to Unconstrained network – Demand within Galway City

8.2 Short Distance Car Trips

There are a significant number of short distance car trips (less than 3km in length) within the demand matrix. These trips would have particular potential to be undertaken by active modes given the short distance involved. Interventions which improve the pedestrian and cycle infrastructure and environment where the volume of these short car trips is high would probably bring about the best outcome in terms of mode shift to active modes.

By far, the highest volume of short car trips appears between NUIG / University College Hospital and the residential areas to the north. There are also significant volumes of short trips along the Western Distributor Road, the Dublin Road and Doughiska Road.



Figure 26 Galway Interim Model Plot of Car Trips <3km

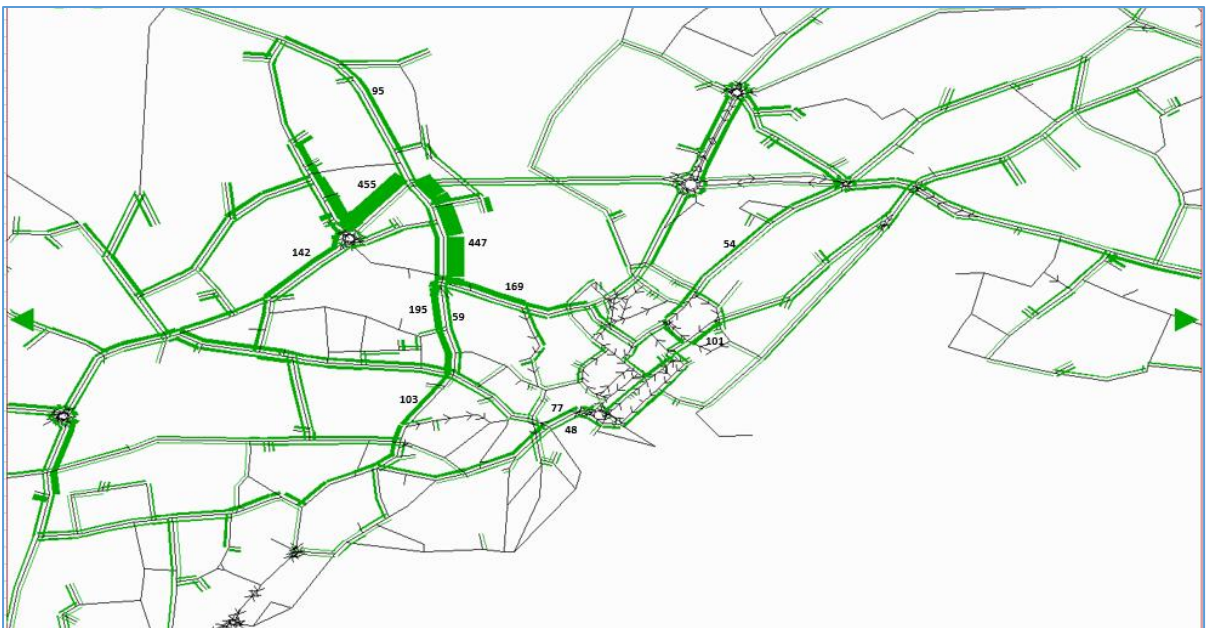


Figure 27 Galway Interim Model Plot of Car Trips <3km – City Centre Extract

Appendix 1: NTA Zone to Zone Demand

	Zone Number	Moycullen	Oranswell	Barna	Knocknacarra South	Knocknacarra North	Rahoon	Dangan	Newcastle	Gleann Dara	Salthill	Shantalla	University Hospital	Claddagh	Henry St	NUIG	City Centre	Mellows Park	City Hall	Galway Shopping	Tirellan	Mervue Industrial	GMIT	Renmore	Merlin Park Hospital	Ballybrit	Doughiska	Parkmore	Oranmore	Ardaun	Baile Chláir	Carrowbrowne	Total as Origin	Rank as Origin
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		
Moycullen	1	595	3	15	7	6	2	55	14	1	167	54	86	32	93	324	151	9	16	26	5	91	47	31	15	118	14	30	15	0	0	3	2025	9
Oranswell	2	19	20	62	43	30	1	59	9	0	105	14	46	9	61	110	70	5	11	9	7	55	17	13	9	43	3	8	9	0	0	0	847	21
Barna	3	8	5	213	59	15	2	18	3	0	113	18	70	17	76	143	124	4	19	11	2	62	26	10	10	44	10	22	6	0	0	6	1116	14
Knocknacarra South	4	22	13	57	393	109	5	99	42	4	685	111	305	127	321	664	603	18	82	87	16	289	133	82	51	290	24	86	49	0	2	14	4783	1
Knocknacarra North	5	12	8	41	256	117	7	83	40	2	435	103	177	80	169	325	355	14	36	54	12	179	64	43	30	191	23	55	29	0	4	12	2956	4
Rahoon	6	5	5	5	37	37	4	59	31	3	205	108	124	50	107	275	213	10	18	29	12	87	40	25	16	100	14	27	20	0	3	17	1686	10
Dangan	7	4	3	1	4	8	0	114	3	0	80	20	59	13	41	252	94	1	13	19	2	57	25	18	11	50	6	13	6	0	1	3	921	20
Newcastle	8	5	0	3	14	10	1	109	43	1	127	92	120	42	89	459	160	12	18	26	6	94	36	19	15	72	3	15	21	0	0	2	1614	11
Gleann Dara	9	1	1	1	15	13	2	22	6	7	69	69	34	25	41	169	67	0	5	6	2	25	17	4	6	29	1	6	8	0	0	3	654	25
Salthill	10	6	5	9	20	15	1	32	12	0	475	49	156	64	240	399	360	4	26	37	8	136	63	30	23	123	14	47	24	0	0	5	2383	7
Shantalla	11	3	1	5	4	3	1	11	15	0	94	71	80	25	119	253	145	4	14	21	2	66	22	13	11	43	5	13	10	0	1	1	1056	16
University Hospital	12	0	0	0	0	0	0	1	1	0	1	1	7	1	6	54	9	0	1	2	0	7	2	3	1	1	0	1	1	0	0	0	100	31
Claddagh	13	0	2	1	7	6	0	12	4	0	67	26	55	72	118	180	178	3	14	22	2	66	30	20	7	61	8	19	19	0	2	0	1001	18
Henry St	14	2	1	0	7	4	0	9	2	3	21	9	46	18	95	259	120	2	6	18	0	46	19	8	7	23	10	21	8	0	0	1	765	23
NUIG	15	1	0	0	1	0	0	15	0	0	10	5	19	7	14	246	34	0	1	5	2	13	9	1	1	9	1	2	0	0	0	0	396	27
City Centre	16	0	1	2	2	6	0	17	6	1	29	2	45	35	29	452	382	4	7	33	6	44	53	6	3	80	8	31	17	0	2	1	1304	12
Mellows Park	17	1	0	0	0	1	0	0	2	0	8	2	5	1	5	6	22	6	2	3	2	16	11	14	1	8	4	3	3	0	1	0	127	30
City Hall	18	2	2	1	0	1	0	5	2	0	22	12	27	14	14	134	222	4	27	36	4	69	51	24	5	57	7	25	8	0	0	0	775	22
Galway Shopping Centre	19	1	2	0	2	2	1	8	3	0	13	14	21	12	5	131	204	2	6	45	6	55	30	5	4	53	4	23	8	0	0	0	660	24
Tirellan	20	9	2	5	12	14	0	56	20	3	143	62	121	43	98	624	514	14	46	125	430	343	136	99	34	405	30	74	50	0	9	29	3550	2
Mervue Industrial Estate	21	1	0	4	3	5	1	6	2	0	40	7	32	18	26	100	187	6	21	37	34	205	83	37	15	141	8	39	24	0	1	5	1088	15
GMIT	22	6	1	0	3	8	0	6	9	0	19	5	26	16	27	61	125	5	9	37	4	131	181	89	18	137	14	36	20	0	1	5	999	19
Renmore	23	1	1	3	3	5	0	15	6	0	77	20	60	31	34	170	244	25	18	47	16	234	448	354	64	183	18	54	79	0	4	5	2219	8
Merlin Park Hospital	24	6	1	3	10	17	1	20	12	1	96	69	55	28	69	141	274	17	15	38	36	277	507	313	66	398	57	133	106	0	3	7	2776	5
Ballybrit	25	0	0	2	0	0	0	3	2	0	18	2	4	1	7	23	34	4	2	5	6	35	22	8	2	68	4	17	8	0	2	2	281	28
Doughiska	26	10	1	6	9	18	1	24	13	2	92	30	101	30	90	139	352	22	29	61	42	334	300	255	48	703	221	325	204	0	14	18	3494	3
Parkmore	27	0	0	0	3	1	0	0	2	0	36	9	18	3	11	41	27	13	5	5	2	30	23	20	10	42	2	77	37	0	22	3	442	26
Oranmore	28	6	0	1	2	5	1	19	13	1	41	4	77	12	30	143	170	24	24	37	6	163	106	84	56	299	60	91	1102	0	16	11	2604	6
Ardaun	29	0	0	0	0	1	0	0	1	0	7	1	1	0	5	9	8	1	2	3	2	8	5	8	4	8	4	13	37	1	1	2	132	29
Baile Chláir	30	2	0	1	6	4	0	15	3	0	51	15	48	7	19	103	77	7	14	22	4	80	37	30	28	158	19	50	185	0	228	44	1257	13
Carrowbrowne	31	2	1	1	4	4	0	7	5	1	70	26	38	10	21	95	72	6	16	24	31	78	45	24	21	124	12	30	66	0	119	60	1013	17
Total as Destination		730	79	442	926	465	31	899	326	30	3416	1030	2063	843	2080	6484	5597	246	523	930	709	3375	2588	1690	592	4061	608	1386	2179	1	436	259		
Rank as Destination		17	28	23	14	22	29	15	25	30	4	12	9	16	8	1	2	27	21	13	18	5	6	10	20	3	19	11	7	31	24	26		

Table 4 26 Zones – All POWSCAR Demand

Appendix 2: Corridor Screenline Select Link Analysis

Corridor 1: Bearna

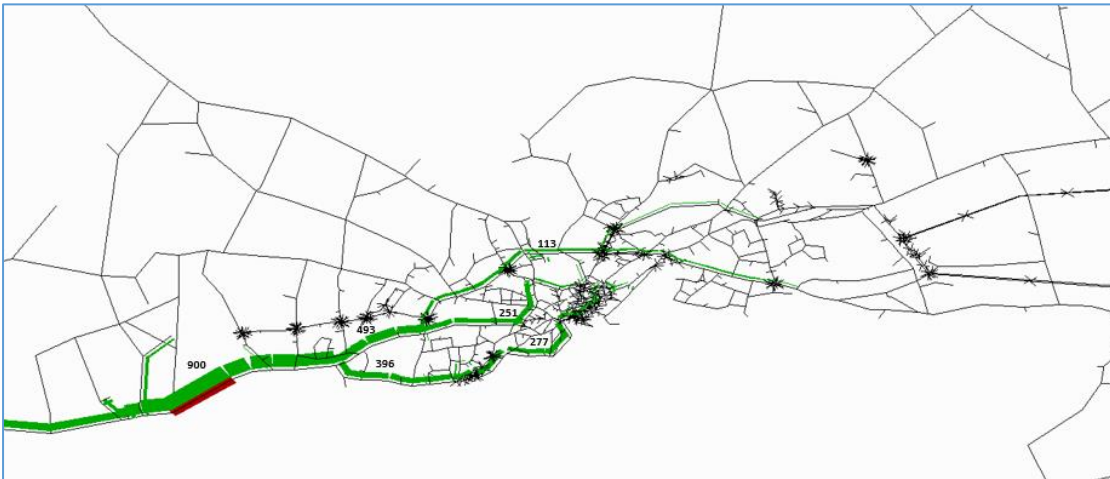


Figure 28 Screenline 1.1: 900 Trips

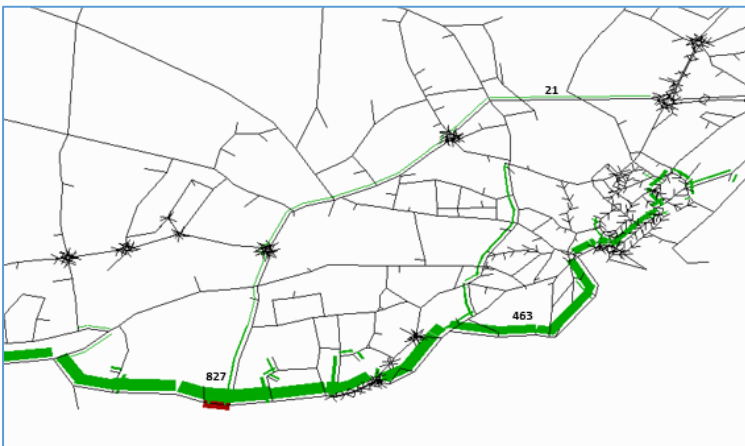


Figure 29 Screenline 1.2a: 827 Trips

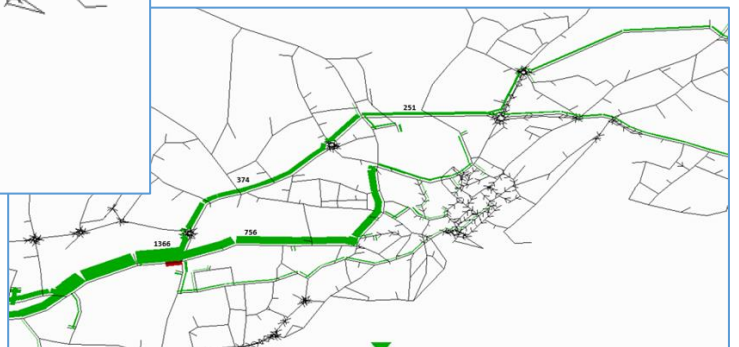


Figure 30 Screenline 1.2b: 1,366 Trips

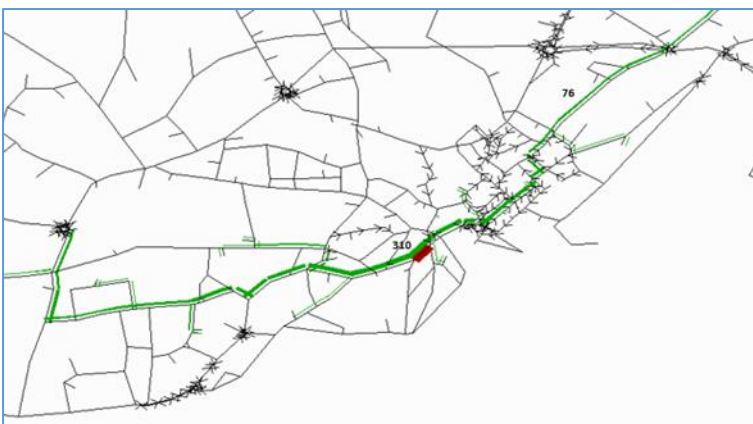


Figure 31 Screenline 1.3: 310 Trips

Corridor 2: Ragoon

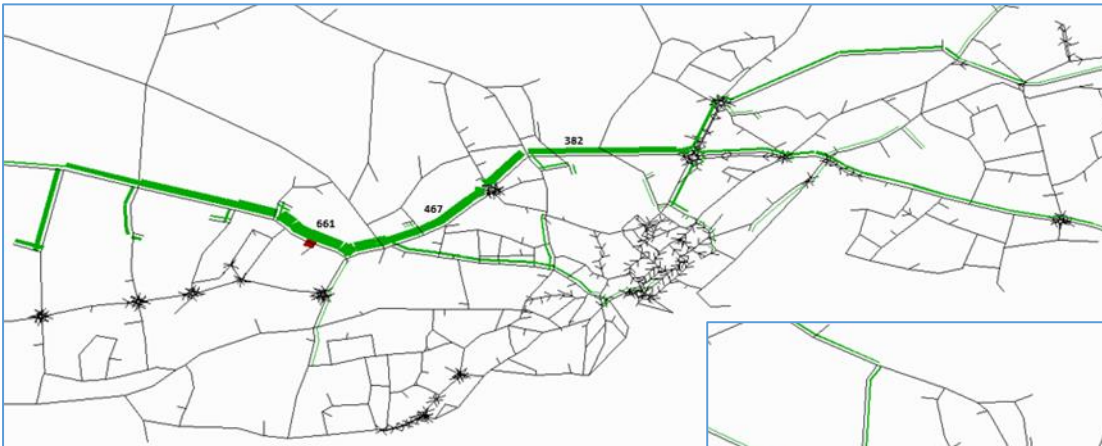


Figure 32 Screenline 2.2a: 661 Trips

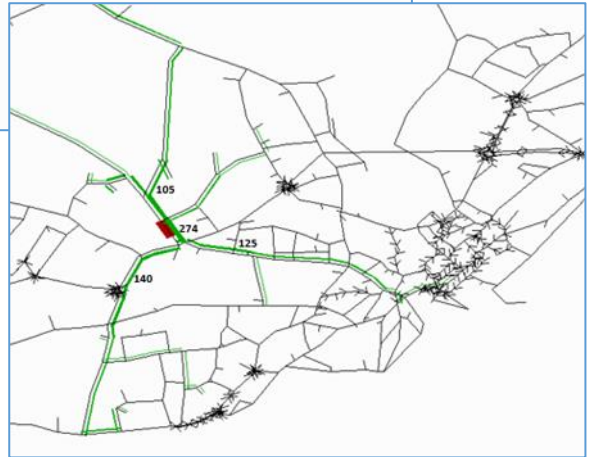


Figure 33 Screenline 2.2b: 274 Trips



Figure 34 Screenline 2.3: 409 Trips

Corridor 3: Moycullen

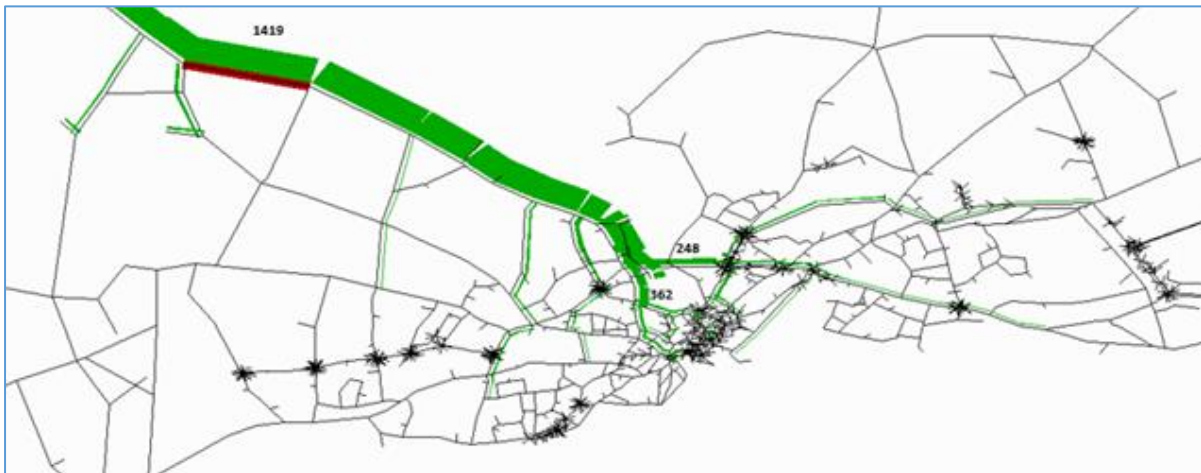


Figure 35 Screenline 3.1: 1,419 Trips

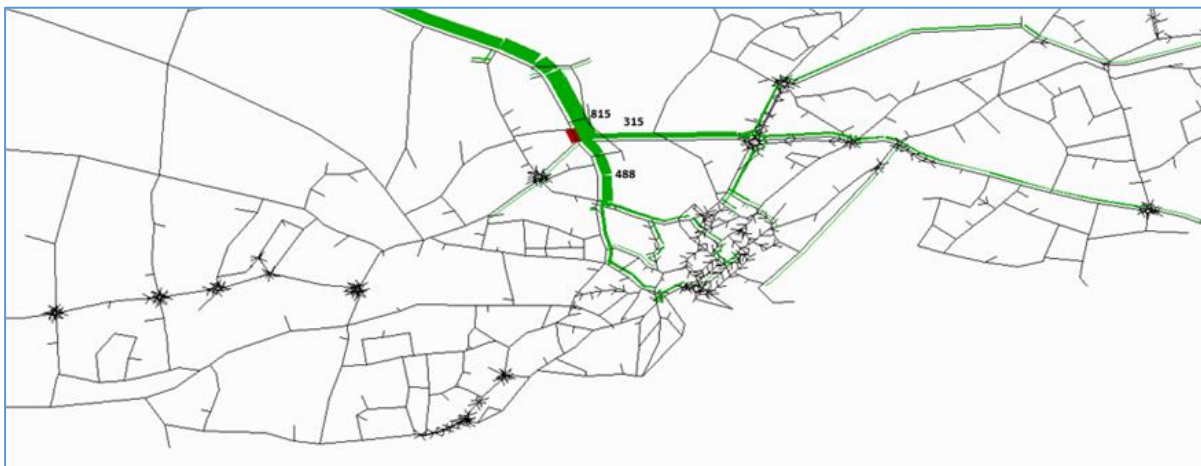


Figure 36 Screenline 3.2: 815 Trips

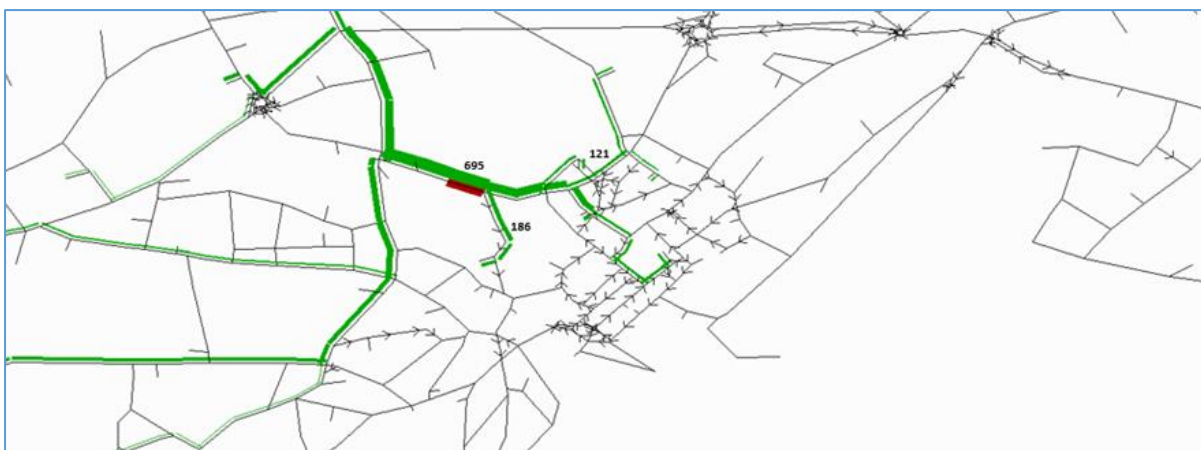


Figure 37 Screenline 3.3: 695 Trips

Corridor 4: Headford



Figure 38 Screenline 4.1: 1,080 Trips

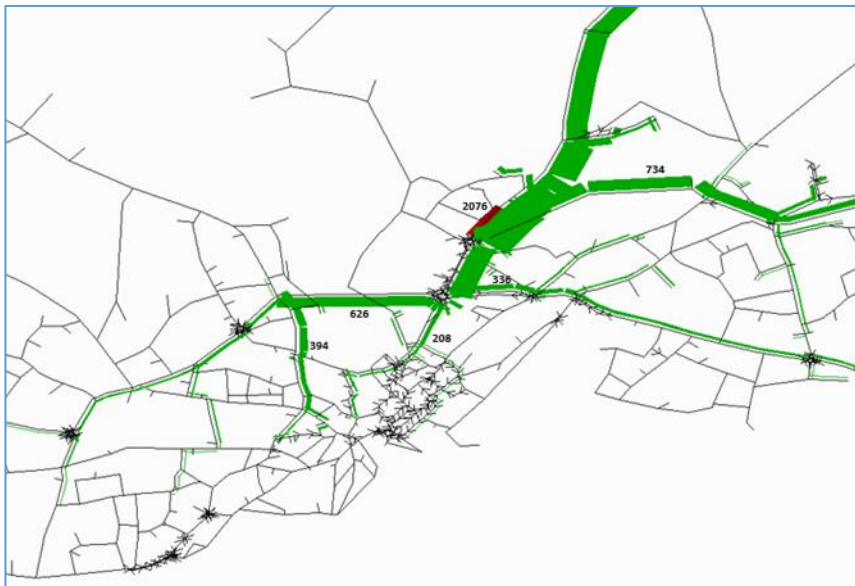


Figure 39 Screenline 4.2: 2,076 Trips

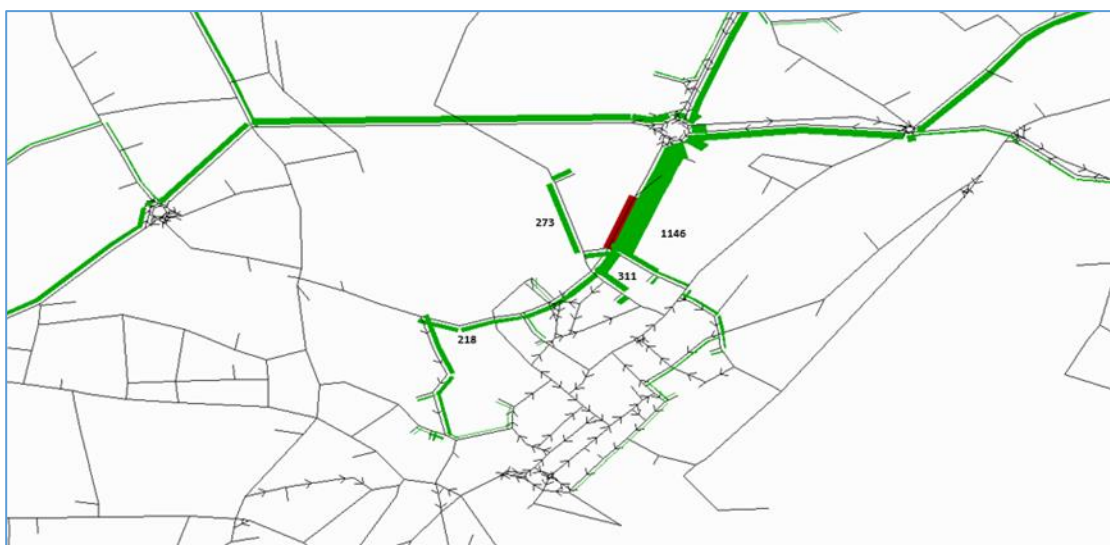


Figure 40 Screenline 4.3: 1,046 Trips

Corridor 5: Baile Chláir

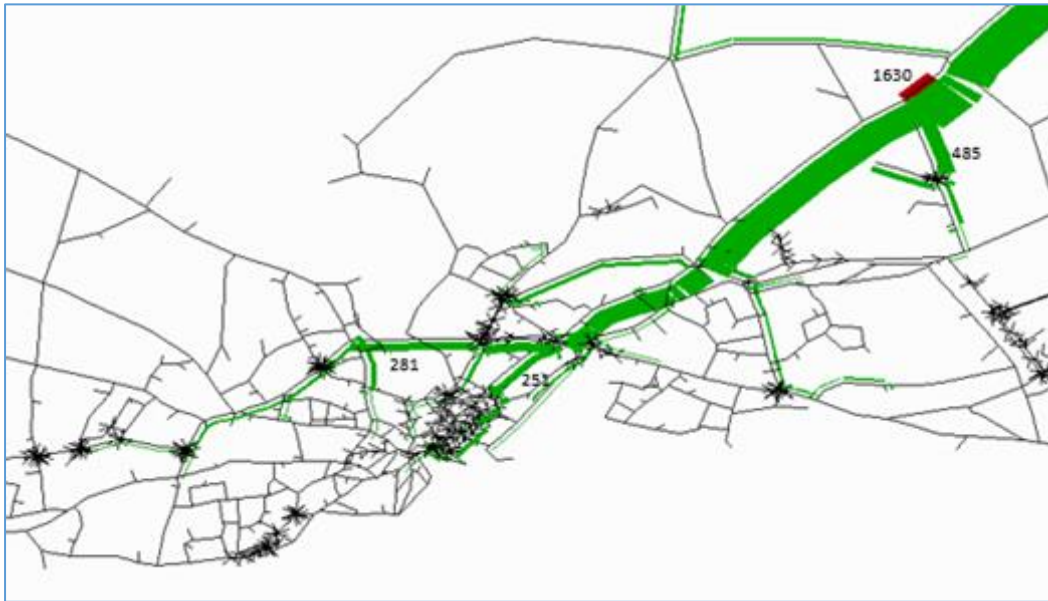


Figure 41 Screenline 5.1: 1,630 Trips

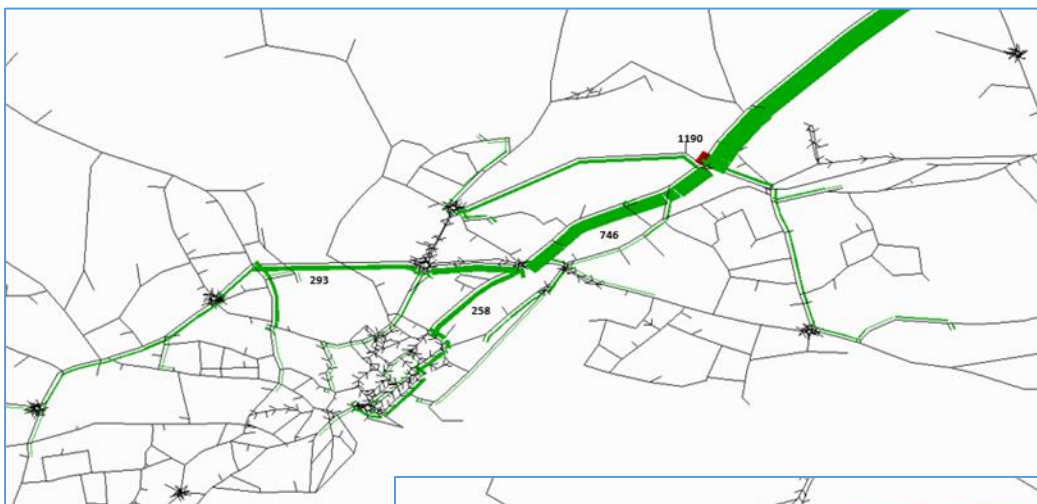


Figure 42 Screenline 5.2: 1,190 Trips

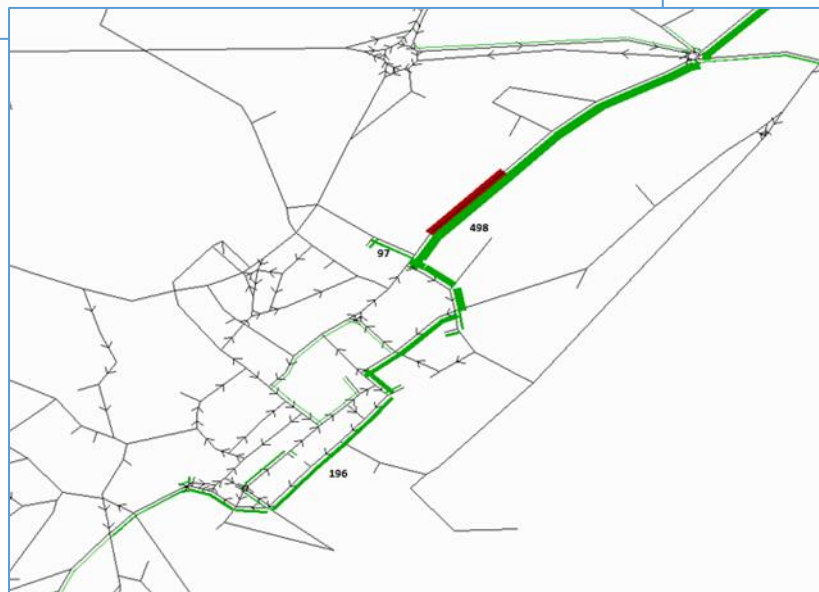


Figure 43 Screenline 5.3: 498 Trips

Corridor 6: Dublin Road



Figure 44 Screenline 6.1: 1,746 Trips

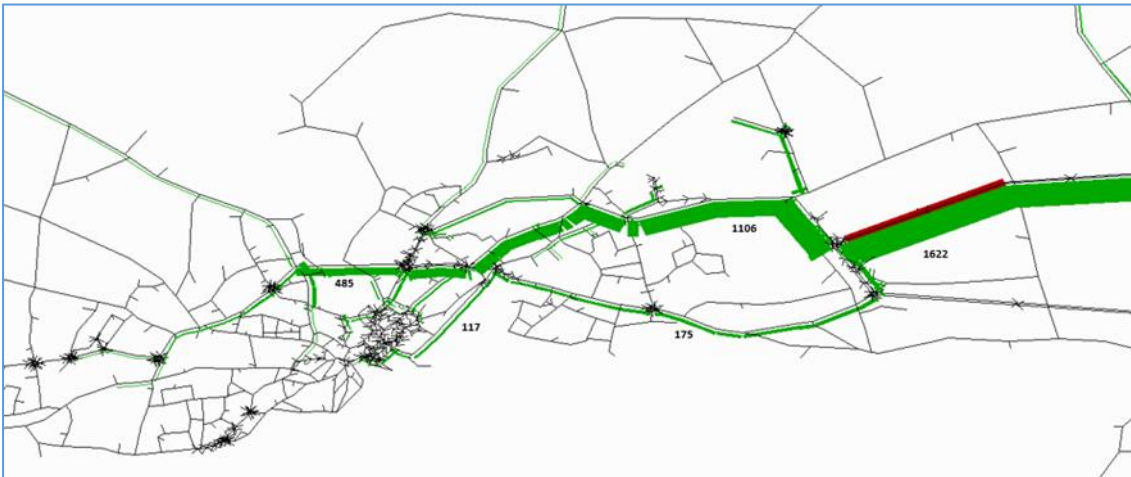


Figure 45 Screenline 6.2: 1,622 Trips

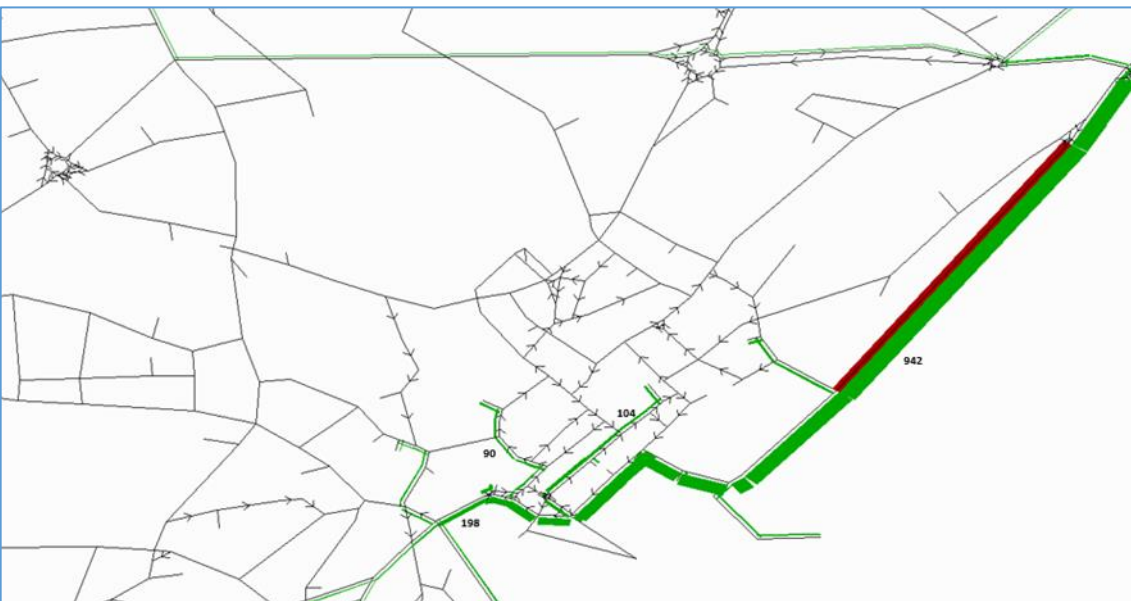


Figure 46 Screenline 6.3 and 7.3: 942 Trips (Combined with Corridor 7 Oranmore)

Corridor 7: Oranmore



Figure 47 Screenline 7.1a: 1,452



Figure 48 Screenline 7.1b: 405 Trips



Figure 49 Screenline 7.2: 1,126