REGIONAL MODELLING SYSTEM

Modelling Services Framework

East Regional Model (ERM)

Active Modes Model Development Report

Údarás Náisiúnta Iompair
National Transport Authority

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Foreword

The NTA has developed a Regional Modelling System (RMS) for Ireland that allows for the appraisal of a wide range of potential future transport and land use alternatives. The RMS was developed as part of the Modelling Services Framework (MSF) by the National Transport Authority (NTA), SYSTRA and Jacobs Engineering Ireland.

The National Transport Authority's (NTA) Regional Modelling System comprises the National Demand Forecasting Model, five large-scale, technically complex, detailed and multi-modal regional transport models and a suite of Appraisal Modules covering the entire national transport network of Ireland. The five regional models are focussed on the travel-to-work areas of the major population centres in Ireland, i.e. Dublin, Cork, Galway, Limerick, and Waterford.

The development of the RMS followed a detailed scoping phase informed by NTA and wider stakeholder requirements. The rigorous consultation phase ensured a comprehensive understanding of available data sources and international best practice in regional transport model development.

The five discrete models within the RMS have been developed using a common framework, tied together with the National Demand Forecasting Model. This approach used repeatable methods; ensuring substantial efficiency gains; and, for the first time, delivering consistent model outputs across the five regions.

The RMS captures all day travel demand, thus enabling more accurate modelling of mode choice behaviour and increasingly complex travel patterns, especially in urban areas where traditional nine-to-five working is decreasing. Best practice, innovative approaches were applied to the RMS demand modelling modules including car ownership; parking constraint; demand pricing; and mode and destination choice. The RMS is therefore significantly more responsive to future changes in demographics, economic activity and planning interventions than traditional models.

The models are designed to be used in the assessment of transport policies and schemes that have a local, regional and national impact and they facilitate the assessment of proposed transport schemes at both macro and micro level and are a pre-requisite to creating effective transport strategies.

1 Introduction

1.1 Regional Modelling System

The NTA has developed a Regional Modelling System for the Republic of Ireland to assist in the appraisal of a wide range of potential future transport and land use options. The Regional Models (RM) are focused on the travel-to-work areas of the major population centres of Dublin, Cork, Galway, Limerick, and Waterford. The models were developed as part of the Modelling Services Framework by NTA, SYSTRA and Jacobs Engineering Ireland.

An overview of the 5 regional models is presented below in Table 1.1 and Figure 1.1.

Table 1.1 List of Regional Models

Model Name	Standard Abbreviation	Counties
West Regional Model	WRM	Galway, Mayo, Roscommon, Sligo, Leitrim, Donegal
East Regional Model	ERM	Dublin, Wicklow, Kildare, Meath, Louth, Wexford, Carlow, Laois, Offaly, Westmeath, Longford, Cavan, Monaghan
Mid-West Regional Model	MWRM	Limerick, Clare, Tipperary North
South East Regional Model	SERM	Waterford, Wexford, Carlow, Tipperary South
South West Regional Model	SWRM	Cork and Kerry

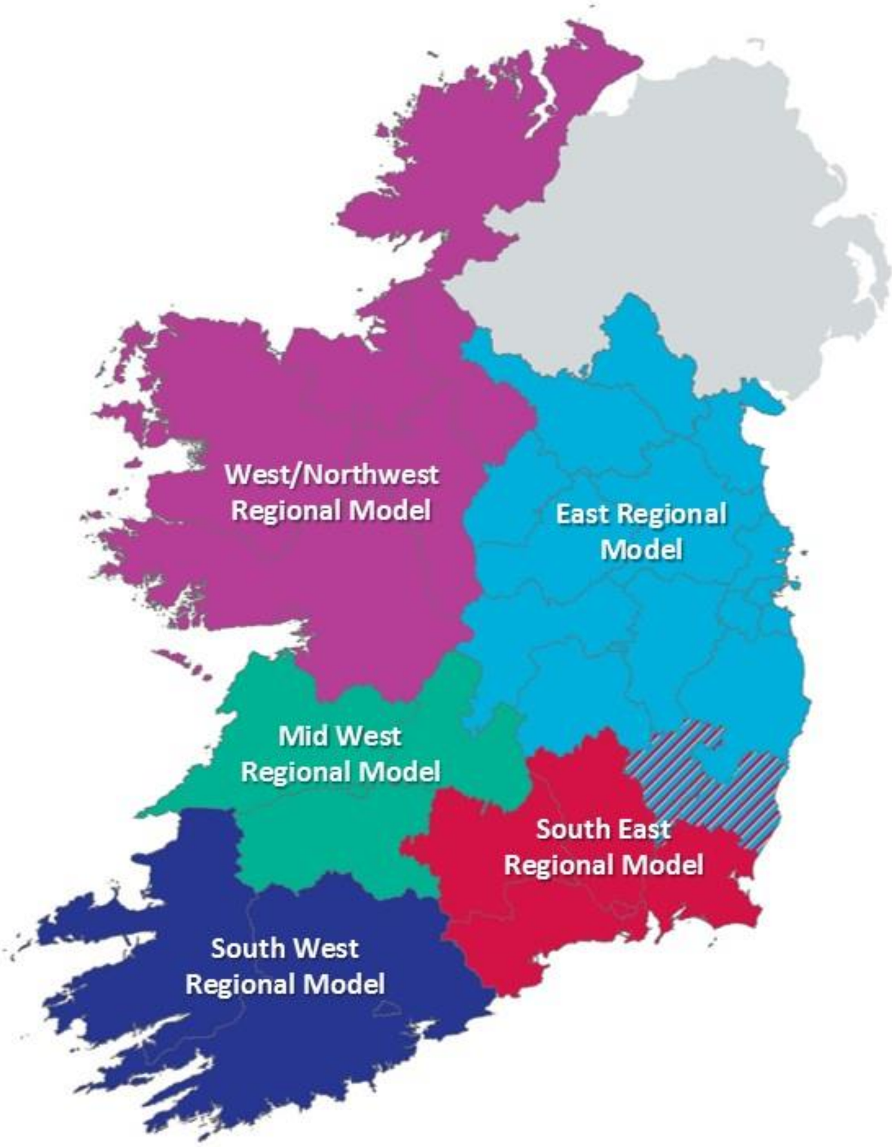

Figure 1.1 Regional Model Areas

1.2 Regional Modelling System Structure

The Regional Modelling System is comprised of three main components, namely:

- The National Demand Forecasting Model (NDFM)
- 5 regional models; and
- A suite of Appraisal Modules

The modelling approach is consistent across each of the regional models. The general structure of the SERM (and the other regional models) is shown below in Figure 1.2. The main stages of the regional modelling system are described below.

1.2.1 National Demand Forecasting Model (NDFM)

The NDFM is a single, national system that provides estimates of the total quantity of daily travel demand produced by and attracted to each of the 18,488 Census Small Areas. Trip generations and attractions are related to zonal attributes such as population, number of employees and other land-use data. See the NDFM Development Report for further information.

1.2.2 Regional Models (RM)

A regional model is comprised of the following key elements:

Trip End Integration

The Trip End Integration module converts the 24 hour trip ends output by the NDFM into the appropriate zone system and time period disaggregation for use in the Full Demand Model (FDM).

The Full Demand Model (FDM)

The FDM processes travel demand and outputs origin-destination travel matrices by mode and time period to the assignment models. The FDM and assignment models run iteratively until an equilibrium between travel demand and the cost of travel is achieved.

See the RMS Spec Full Demand Model Specification Report, RM Full Demand Model Development Report and SERM Full Demand Model Calibration Report for further information.

Assignment Models

The Road, Public Transport, and Active Modes assignment models receive the trip matrices produced by the FDM and assign them in their respective transport networks to determine route choice and the generalised cost for origin and destination pair.

The Road Model assigns FDM outputs (passenger cars) to the road network and includes capacity constraint, traffic signal delay and the impact of congestion. See the RM Spec Road Model Specification Report for further information.

The Public Transport Model assigns FDM outputs (person trips) to the PT network and includes the impact of capacity restraint, such as crowding on PT vehicles, on people’s perceived cost of travel. The model includes public transport networks and services for all

PT sub-modes that operate within the modelled area. See the RM Spec Public Transport Model Specification Report for further information.

Secondary Analysis

The secondary analysis application can be used to extract and summarise model results from each of the regional models.

1.2.3 Appraisal Modules

The Appraisal Modules can be used on any of the regional models to assess the impacts of transport plans and schemes. The following impacts can be informed by model outputs (travel costs, demands and flows):

- Economy;
- Safety;
- Environmental;
- Health; and
- Accessibility and Social Inclusion.

Further information on each of the Appraisal Modules can be found in the following reports:

- Economic Module Specification Report;
- Safety Module Specification Report;
- Environmental Module Specification Report;
- Health Module Specification Report; and
- Accessibility and Social Inclusion Module Specification Report.

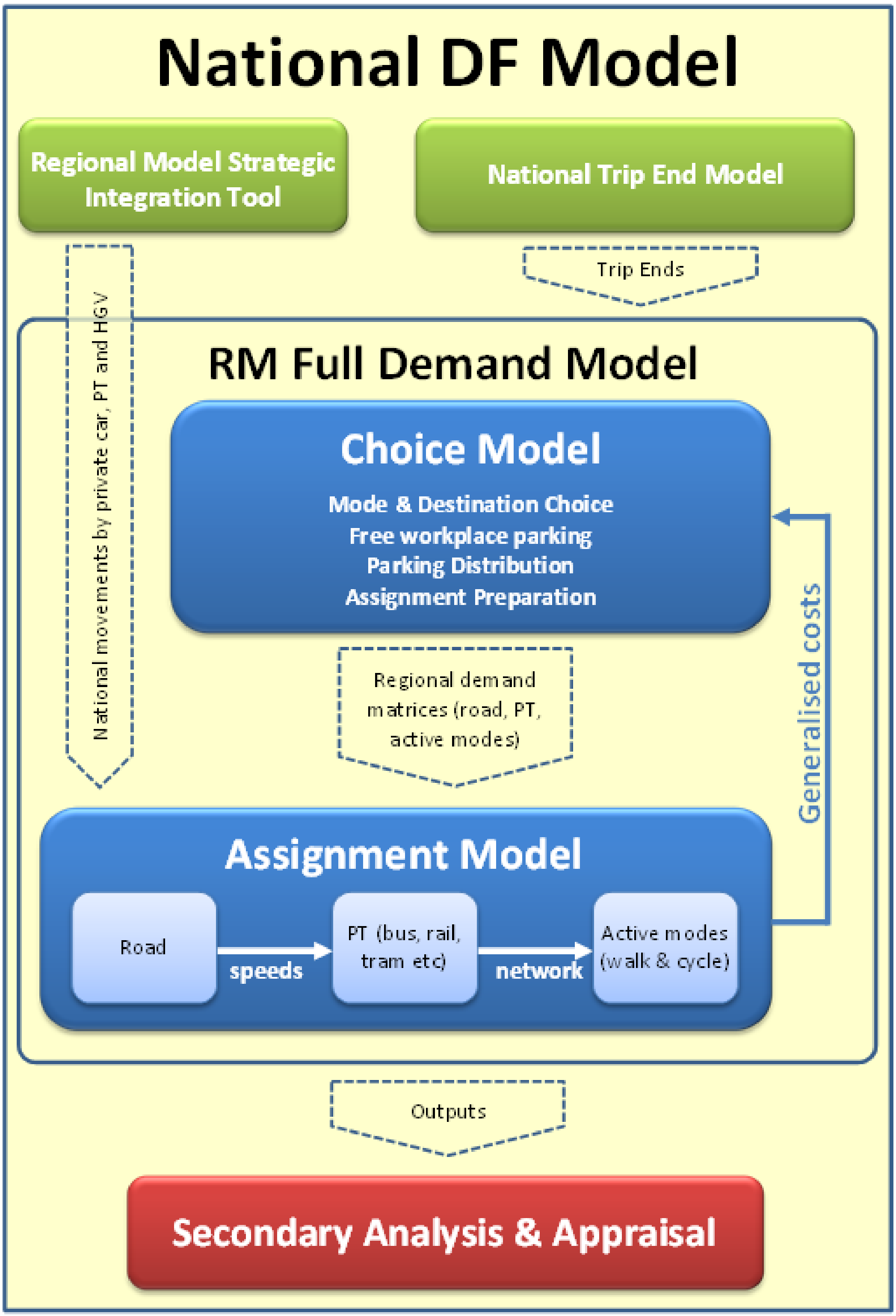

Figure 1.2 National and Regional Model Structure

1.3 ERM Active Modes Model

The development of the East Regional Model (ERM) Active Modes Model (AMM) is based on the specification set out in the *Active Modes Model Specification Report*. The AMM component of ERM differs from this original specification in that it was necessary to reduce the number of time periods to be consistent with the ERM PT Model (see the Public Transport Model Specification Report).

1.3.1 ERM Zone System

The AMM zone system is consistent with the overall ERM as described in the ERM Zone System Development Report, and illustrated in Figure 1.3.

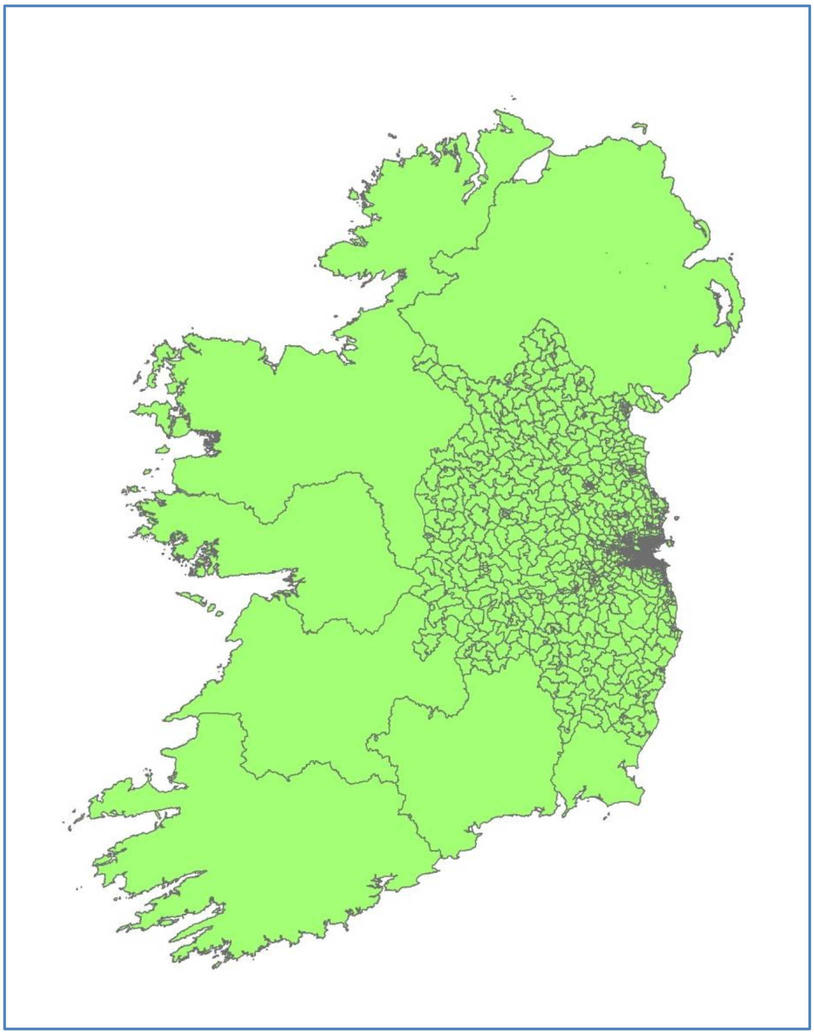

Figure 1.3 ERM Zone System

The key zone system statistics include:

- Total zones: 1,854:
    - Internal zones (County Dublin): 1,140
    - Internal zones (Outside Co. Dublin): 704

- External zones: 7 (including 1 for Northern Ireland)
- Special Zones: 3

The high level of zonal detail allows the AMM to be modelled to a greater degree of accuracy. Increased zonal density in urban areas such as Dublin City allows for the accurate representation of walk and cycle times. This allows the cost of travel by active modes to be calculated with greater accuracy within the model.

1.3.2 Base Year

The base year of the model is 2012 with a nominal month of April. This is largely driven by the date of the Census (POWSCAR) and other travel surveys (e.g. the National Household Travel Survey). It should be noted that the POWSCAR dates to 2011 but the travel patterns are assumed to be broadly the same in 2012.

1.3.3 Time Periods

The five weekday periods modelled in the ERM are detailed in Table 1.2. The periods allow the relative differential in travel cost to be represented. Travel cost by active modes is the same through all time periods as no congestion is represented for walk and cycle in the model. The five time periods have been kept to be consistent with the other assignment models (Road and PT), and to allow mode share comparison across all time periods.

The table below also shows the period to hour factors employed to reduce the period demand (output by the demand model) to the assignment demand (1-hour demand to be assigned to the network). The period to peak hour factors were derived from count data.

Table 1.2 ERM Time Periods

Period	Demand Model Full Period	Assignment Period	Period To Peak Hour Factors (walk)	Period To Peak Hour Factors (cycle)
AM Peak	07:00-10:00	Peak hour (factored from period)	0.54	0.52
Morning Interpeak (IP1)	10:00-13:00	Average hour from full period	0.33	0.33
Afternoon Interpeak (IP2)	13:00-16:00	Average hour from full period	0.33	0.33
PM Peak	16:00-19:00	Peak hour (factored from period)	0.4	0.42
Off Peak	19:00-07:00	Average hour from full period	0.08	0.08

1.4 This Report

This report focuses on the development of the Active Modes Model (AMM) within the East Regional Model (ERM) and includes the following chapters:

- Chapter 2: ERM AMM Development provides information on the specification of the AMM and an overview of its development;
- Chapter 3: ERM AMM Validation sets out the specification and execution of the model validation process; and
- Chapter 4: Conclusion and Recommendations outlines the key points of the AMM development and next steps required to improve the modelling of active modes.

2 ERM AMM Development

2.1 Overview

As per Section 3.9 of the AMM Specification Report, the ERM AMM network comprises a number of input components, as follows:

- Road network links (e.g the same links database that holds the road component of the PT Cube Voyager network);
- Walking links (e.g. any walk links included in the ERM PT model plus any further links that allow walk access);
- Cycle speeds on any cycle accessible link – these were set as per Section 3.9.3 of the AMM Specification Report; and
- Zone connectors (the connection points from zone centroids to 'physical' network) – these are completely consistent with the PT Model; therefore, please see ERM Public Transport Model Development Report for further information.

Figure 2.1 provides a summary of the available Quality of Service and/or link type/characteristic information in the central Dublin area. This indicates where a complete Quality of Service grading is available (green, yellow, orange and red links), where some more limited attributes are available (blue links) or where no attributes are available (grey links). Quality of Service categories are:

- A+: High quality well maintained surface no manholes, gullies other ironworks;
- A: High quality well maintained surface. But manholes, gullies other ironworks;
- B: Surface with deteriorating surface or poorly maintained with debris evident;
- C: Undulating, cracked, generally an unsatisfactory ride experience; and
- D: Very poor ride quality with severe undulations, concrete aprons, and/or very poorly maintained surface. Unsuitable and needs action.

A default cycle speed is defined on the network, which can be overwritten if better information on cycling facilities is available. More details on this in the following sections.

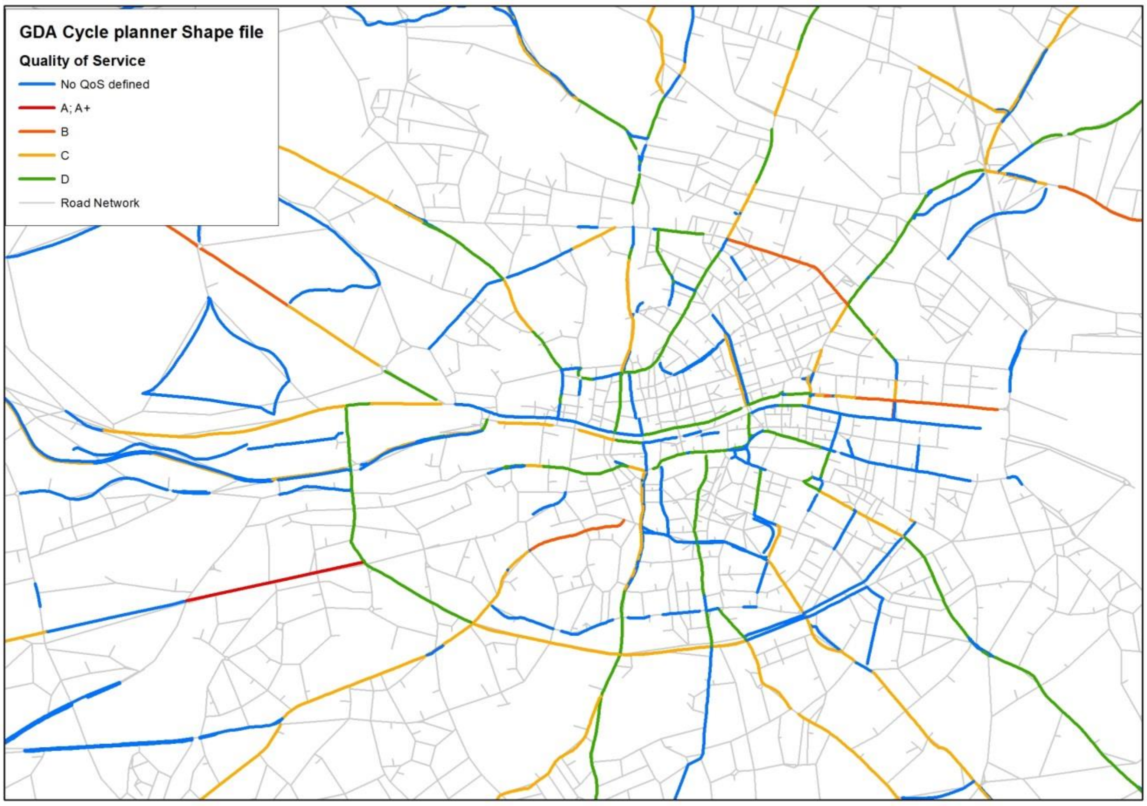

Figure 2.1 Cycle Infrastructure Information

The location and characteristics of cycling facilities are imported from a GIS shape file used in the NTA cycle planner (Introute – see Section 3.2 of the AMM Specification Report for further information).

The "GDA Base Planner" network shapefile (i.e., the relevant geographical area derived from the NTA Journey Planner) was joined to the ERM PT network to include the cycle attributes in the active modes model network. Special care was taken to ensure link directions were coded correctly. Links were added to the AMM where an off-road cycle track was identified from this shapefile.

2.1.1 Cycle Speeds

As detailed in the AMM Specification Report, the "cycle-friendliness" of infrastructure is modelled by an increase in cycle speed. The cost of cycling will then be lower on links with cycle facilities and this will make them more attractive at the assignment stage.

As per the AMM Specification Report, base cycle speed (without any specific cycling infrastructure) was modelled as 12 km/h. Maximum cycle speed was set to 20 km/h. A cycle speed on each cycle facility type, between 12km/h and 20km/h, was assigned based on the rules set out in the AMM Specification Report.

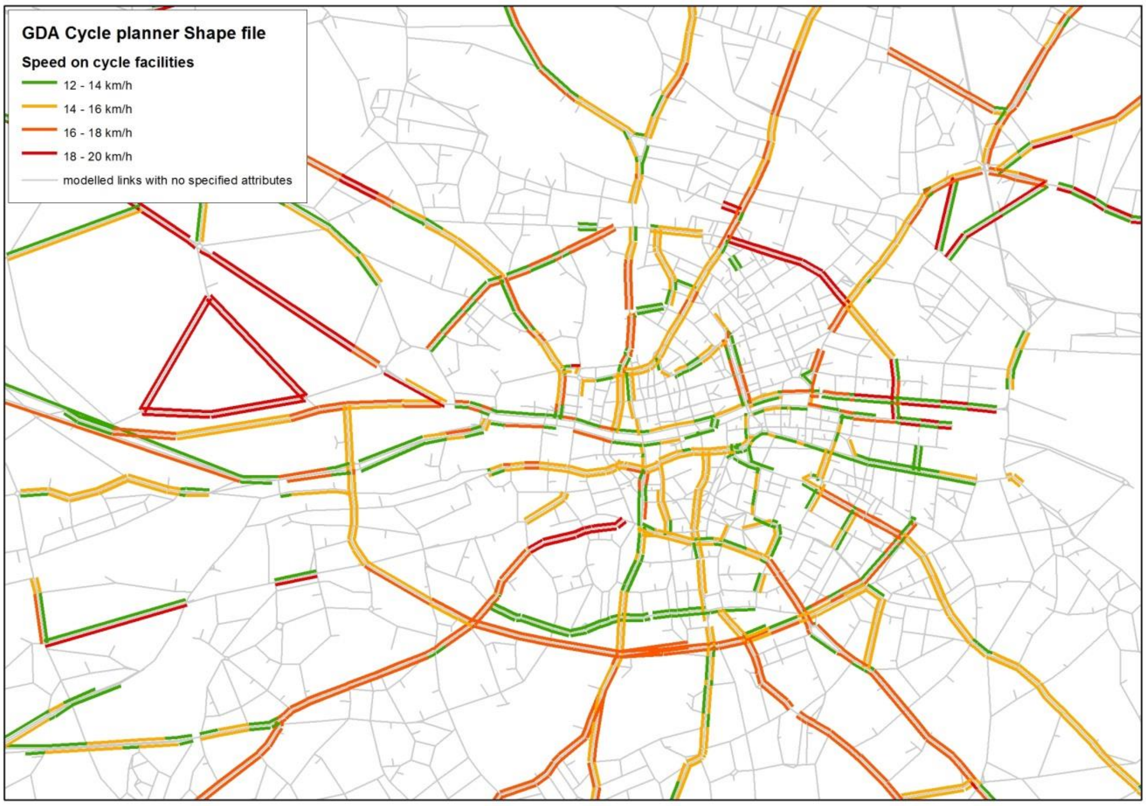

Figure 2.2 Estimated Cycle Speeds based on Infrastructure

Average walk and cycle speeds differ by age. To take this into account in the AMM, three age categories have been defined and average walk and cycle speeds calculated based on NHTS 2012 data. Age categories considered are:

- 0 to 20 years;
- 20 to 60 years; and
- Over 60 years.

Default walk and cycle speeds coded in the AMM are values corresponding to the 20 to 60 years age category. Additional factors are applied to walk and cycle speeds for Education (EDU) and Retired (RET) user classes. The youngest age category (0-20 years) speeds are used for EDU and the oldest age category (over 60 years) speeds are used for RET. Table 2.1 provides walk and cycle speed factors used in the AMM.

Table 2.1 Default Walk and Cycle speed factors coded in the AMM

User Class	WALK SPEED FACTOR	CYCLE SPEED FACTOR
EMP, COM and OTH	1.00	1.00
EDU	0.96	0.83
RET	0.86	0.79

2.1.2 Importing Cycle Data into the Model

Table 2.2 Cycle speed coded on links with Quality of Service data

Quality of Service	Cycle Speed (km/h)
A+	20
A	19.2
B	18.4
C	17.2
D	15.2

Table 2.3 Cycle speed coded on links with Characteristics data

Quality of Service	Mandatory (Solid Line) Cycle Speed (km/h)	Advisory (Dashed Line) Cycle Speed (km/h)
B1 - Bus Lane (no cycle lane)	12.8	12.6
C1 - Cycle Track - separated from road	19.5	17.6
C2 - Cycle Track - immediately adjacent	15.2	14.4
C3 - Cycle Lane (even within Bus Lane)	15.2	14.4
G1 - Cycle Trail or Greenway	19.5	17.6
S1 - Shared with Traffic	12.8	12.6
S2 - Shared Space (Ped's)	12.8	12.6

The link by link cycle speeds are stored in a dbf file, named “Cycle_Speed.dbf”, to be included in the model input folder. This file stores all cycle infrastructure information, and thus any cycle scheme for testing in the model is coded in this file.

2.1.3 Cycle network speed

A total of 5,421 links were identified with cycle facilities across the ERM model area. Data processed from the GIS cycle network shape file is included at the active modes network building stage. The figures below show the Cube network with linked coloured cycle speed.

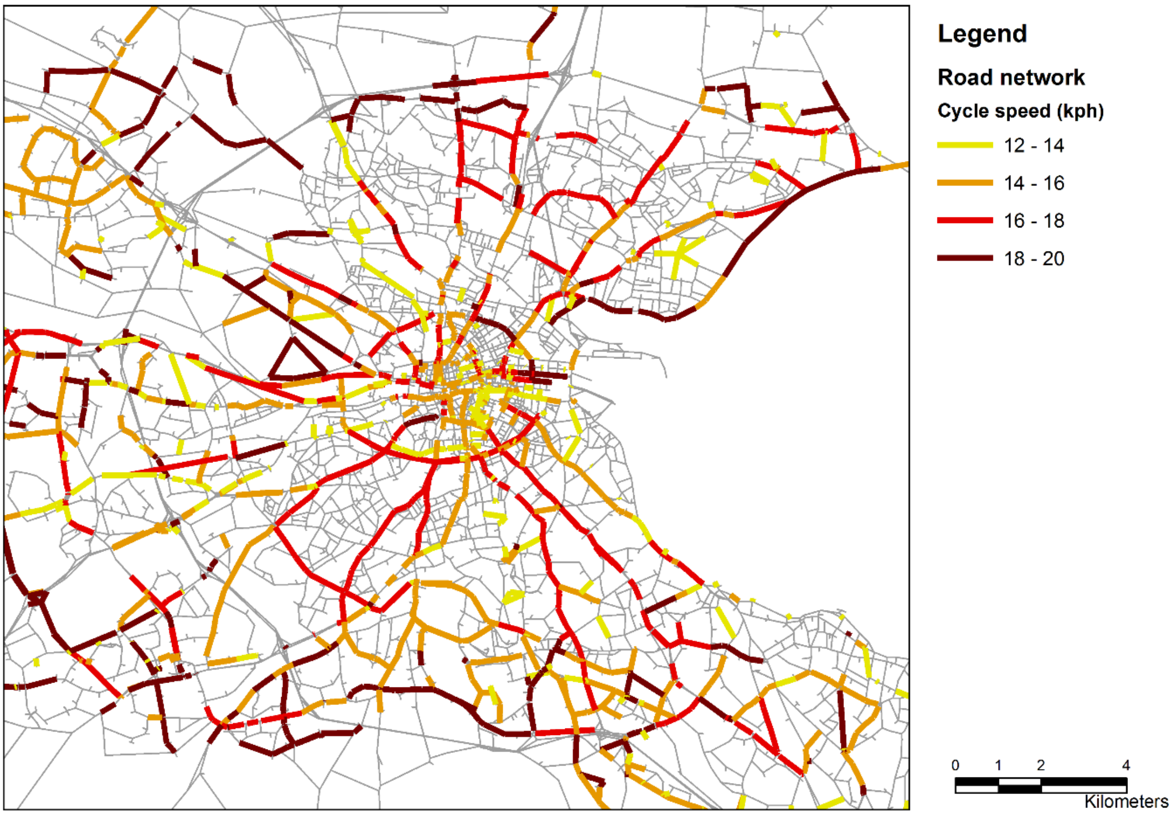

Figure 2.3 Map of the cycle network speed – M50 view

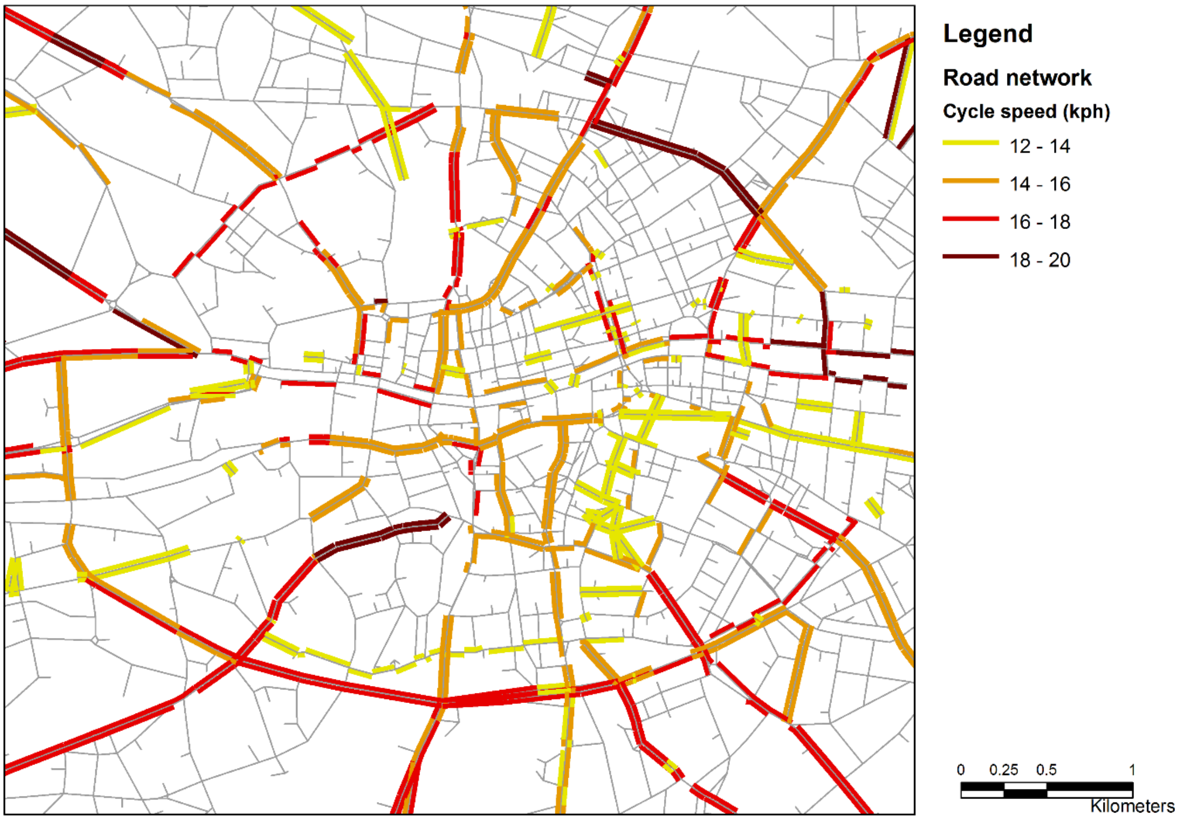

Figure 2.4 Map of the cycle network speed – Canal view

2.1.4 Pedestrian Only Links

Certain links are restricted to pedestrians only, and do not allow access for cyclists. These links are defined as inputs to the model in the file "PED_ONLY.DBF". This information has been coded based on local knowledge, supported by a review of mapping / Street View.

Below is a Dublin city centre map of links modelled as "pedestrian only".

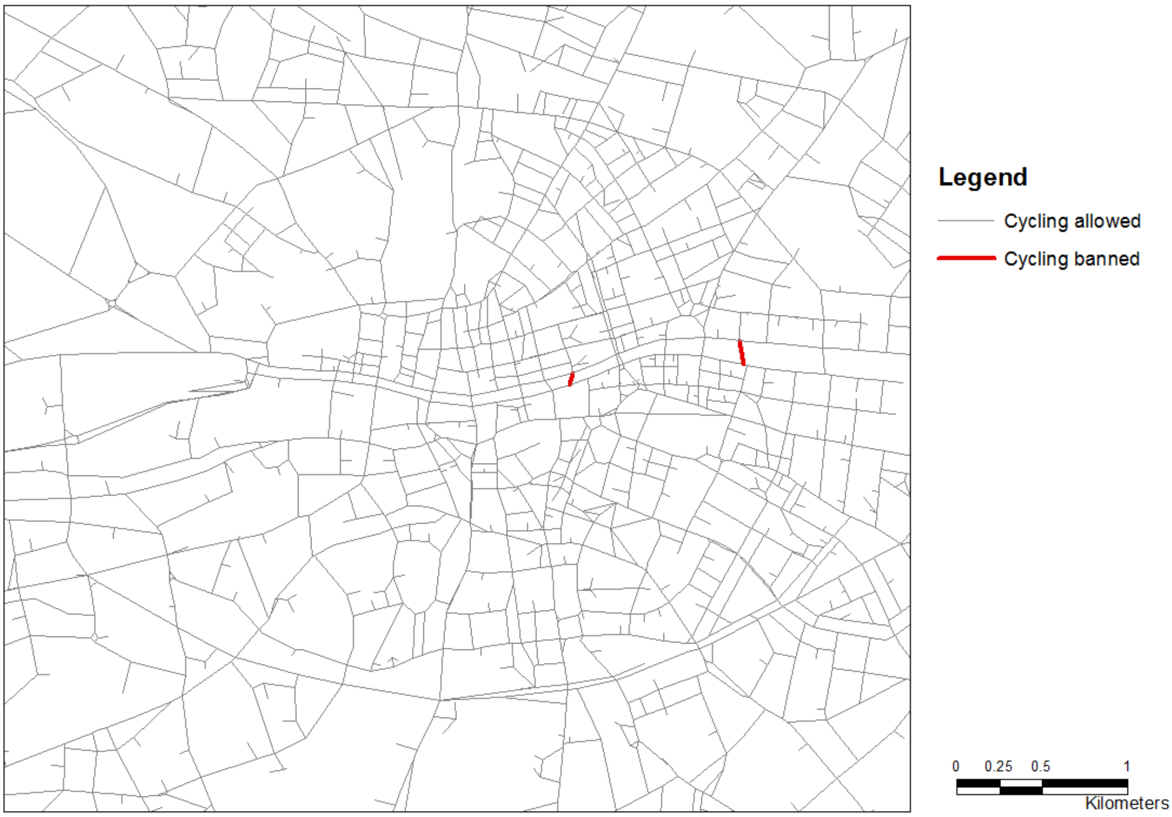

Figure 2.5 ERM - Map of pedestrian only links

2.2 ERM AMM Cube Voyager Implementation

Figure 2.6 below is a screenshot of the AMM Cube Application. It shows the different steps and the sequential order different tasks are executed.

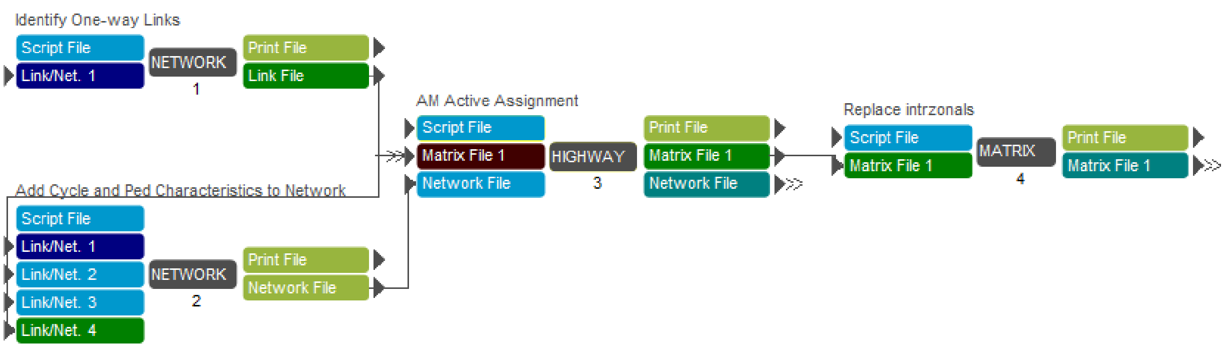

Figure 2.6 Screenshot of the Active Modes Cube application

The role of the Cube application modules shown in Figure 2.6 are detailed below:

- Network module (execution order 1): Take the network links from the PT model, delete the rail links (no walking or cycling on those links) and generate reversed links for walking.
- Network module (execution order 2): Add cycle speeds (when defined) to the network, delete links banned from walking/cycling (such as motorways). Pedestrian only links (as discussed in 2.1.4) and specific Cycle speed (as discussed in 2.1.3) are input at that stage.
- Highway module (execution order 3): All-or-nothing assignment of both walk and cycle matrices onto the network. Fastest path considered. Different speeds by user class (as discussed in 2.1.1) are coded in that module.
    - Matrix module (execution order 4): Calculate intrazonal cost as the minimum between 40% of the quickest route and 30 minutes.

3 ERM AMM Validation

3.1 Introduction

This section presents the validation of the ERM v1 Active Modes Model. As discussed in the AMM Specification report individual link flows are not calibrated and direct matrix estimation is not used. However, the overall active modes demand and total numbers crossing a cordon or screenline can be compared as a sense check. In the case of ERM v1, walking and cycle data were available in a complete cordon around the city centre at the canals. Three years of surveys were processed, all done on weekdays in November, for the years 2010, 2011 and 2012.

3.2 Active Modes demand

The overall walk and cycle demands are compared to the National Household Travel Survey (NHTS) 2012, by time period. For further information on the demand, please refer to ERM FDM Calibration Report.

Figure 3.1 and Figure 3.2 below are extracted from the demand dashboard.

For each time period, total Walk demand modelled is within +/- 15% of the factored NHTS demand, which is used as the reference the model should replicate.

The cycle demand is overestimated in the model for each time period, and overall by 25%.

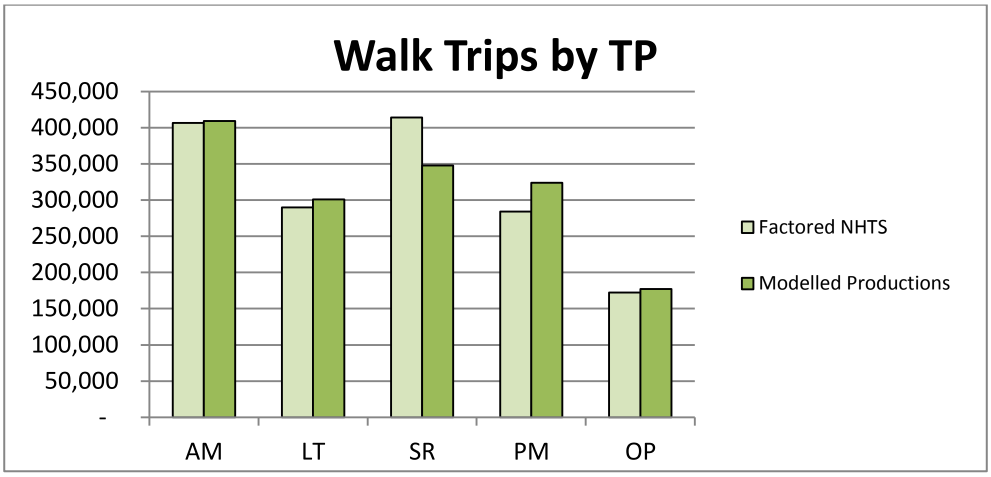

Figure 3.1 Total Walk trips by Time Period – Demand dashboard

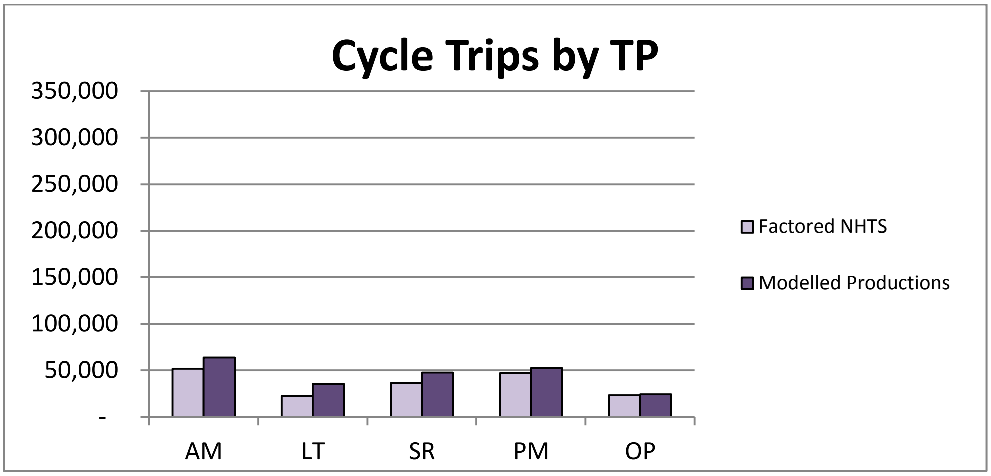

Figure 3.2 Total Cycle trips by Time Period – Demand dashboard

3.3 Pedestrian and Cyclist Flow Comparisons

Two count cordons were defined as follows based on the available data shown in Figure 3.3:

- Inner Dublin Canal cordon; and
- Liffey Screenline.

For the reasons outlined in the specification report Section 2.13, calibration and validation was limited to the canal cordon and Liffey screenline and there was no attempt to match observed flows on specific streets or bridges.

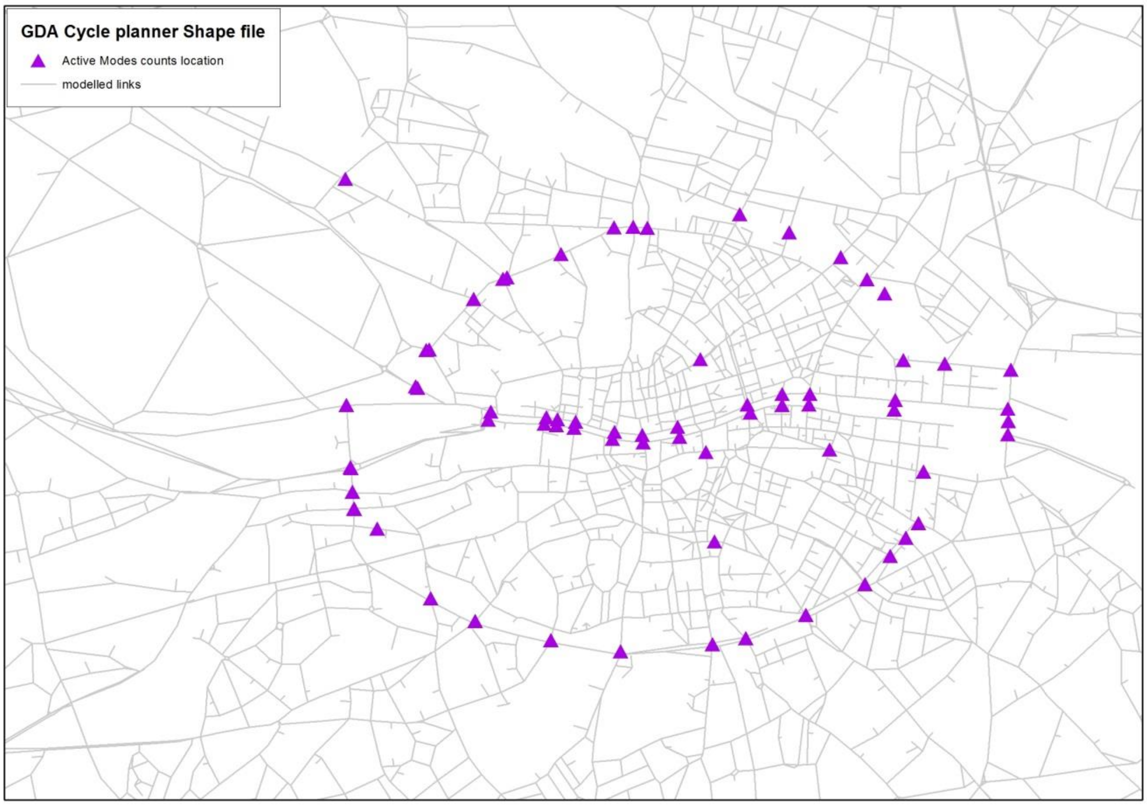

Figure 3.3 Active Modes Count Data

3.4 Walk mode

Walk flows output from the Public Transport model (walk trip between zones and PT stops) have to be considered in the validation process as observed data includes those flows. Both flows (from the AMM and the PT model) are then added and compared against counts, as detailed in table below.

3.4.1 AM Inbound

Table 3.1 Modelled Walk Flows vs. Counts - AM peak hour Inbound

Location	Walk flow (AMM)	Walk flow (PT model)	Total Walk flow	Count	Diff	Diff (%)
Ringsend Road	698	55	753	737	16	2%
Grand Canal Street	317	486	803	630	173	27%
Northumberland	319	31	350	288	62	22%
Huband Bridge	47	1	48	170	-122	-72%
Baggot Street Lower	567	65	632	552	80	15%
Leeson Street Lower	799	222	1,021	477	544	114%
Charlemont Street	421	81	502	488	14	3%
Richmond Street	865	16	881	817	64	8%
Clanbrassil Street	384	8	392	363	29	8%
Donore Avenue	360	16	376	57	319	557%
Dolphin's Barn	298	25	323	118	205	173%
Herberton Road	168	23	191	97	94	98%
South Circular Road	74	6	80	105	-25	-24%
Old Kilmainham	224	8	232	49	183	370%
Kilmainham Lane	127	0	127	42	85	203%
St Johns Road West	32	8	40	35	5	16%
Conyngham Road	46	3	49	122	-73	-60%
Chesterfield Avenue	6	8	14	77	-63	-82%
North Road	32	13	45	53	-8	-15%
Blackhorse Avenue	294	36	330	105	225	213%
Old Cabra Road	130	0	130	113	17	15%
Annamoe Road	165	94	259	97	162	166%
Charleville Road	63	11	74	67	7	11%
N3 at Dalymount	427	86	513	273	240	88%
Phibsborough Road	401	18	419	422	-3	-1%
Royal Canal Bank	243	2	245	75	170	225%
Lower Dorset Street	646	292	938	645	293	45%
Russell Street at the bridge	238	21	259	135	124	92%
Summerhill Parade at the bridge	446	15	461	253	208	82%
North Strand Road at Newcomen Bridge	599	34	633	436	197	45%
Ossary Road	229	29	258	132	126	96%
Sheriff Street Upper at the bridge	168	216	384	210	174	83%
Northwall Quay at the bridge	285	112	397	355	42	12%
TOTAL	**10,118**	**2,041**	**12,159**	**8,596**	**3,563**	**41%**

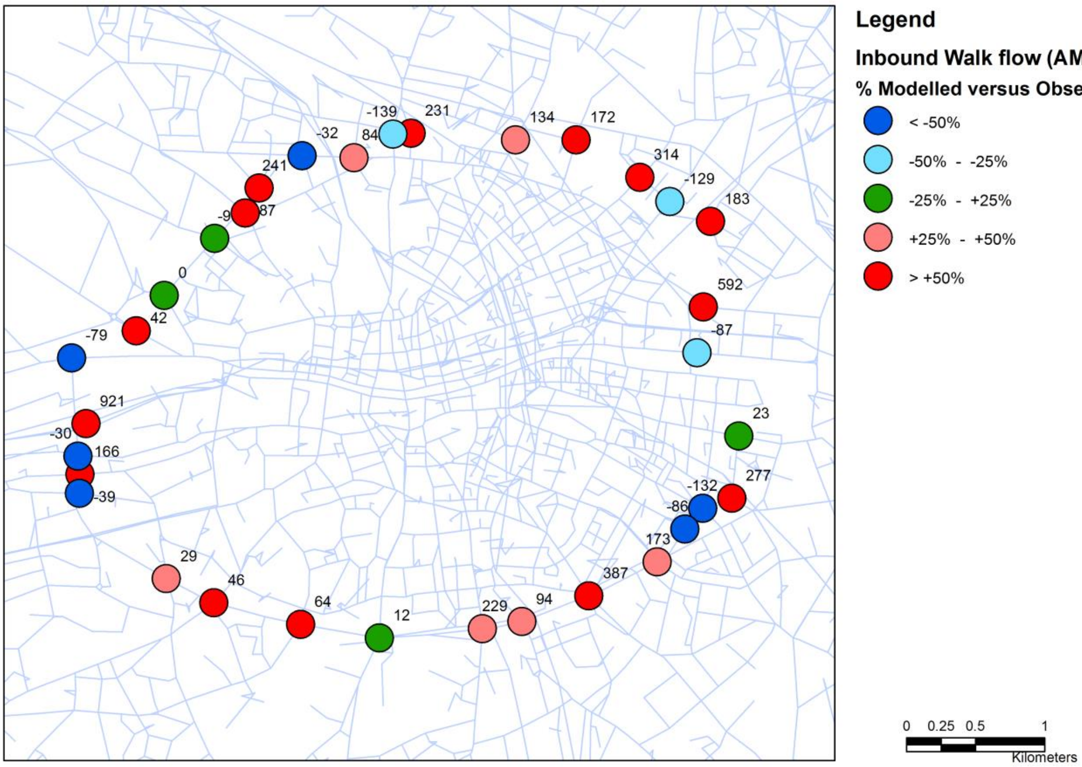

Figure 3.4 Modelled Walk Flows vs. Counts – AM peak hour Inbound

3.4.2 PM Outbound

Table 3.2 Modelled Walk Flows vs. Counts - PM peak hour Outbound

Location	Walk flow (AMM)	Walk flow (PT Model)	Total Walk flow	Count	Diff	Diff (%)
Ringsend Road	410	49	459	478	-19	-4%
Grand Canal Street Upper	190	298	488	427	61	14%
Northumberland Road	231	19	250	227	23	10%
Huband Bridge	28	1	29	104	-75	-72%
Baggot Street Lower	383	17	400	406	-6	-2%
Leeson Street Lower	510	268	778	284	494	174%
Charlemont Street	280	65	345	293	52	18%
Richmond Street South	575	12	587	529	58	11%
Clanbrassil Street Upper	282	7	289	211	78	37%
Donore Avenue	214	9	223	33	190	580%
Dolphin's Barn Street	179	20	199	74	125	170%
Herberton Road	125	21	146	68	78	116%
South Circular Road	54	5	59	87	-28	-32%
Old Kilmainham Road	151	17	168	55	114	208%
Kilmainham Lane	88	1	89	38	52	137%
St Johns Road West	12	4	16	21	-5	-25%
Conyngham Road	17	0	17	62	-45	-72%
Chesterfield Avenue	1	3	4	53	-49	-92%
North Road	27	45	72	38	34	91%
Blackhorse Avenue	178	27	205	59	146	246%
Old Cabra Road	74	8	82	66	16	24%
Annamoe Road	124	120	244	79	165	210%
Charleville Road	39	23	62	42	20	47%
N3 at Dalymount	304	88	392	201	191	95%
Phibsborough Road	263	18	281	348	-67	-19%
Royal Canal Bank	169	0	169	32	137	425%
Lower Dorset Street	411	198	609	518	91	18%
Russell Street at the	172	22	194	107	87	81%
Summerhill Parade at the	281	10	291	180	111	62%
North Strand Road at	393	34	427	368	59	16%
Ossary Road	148	30	178	113	65	58%
Sheriff Street Upper at the bridge	91	190	281	73	208	287%
Northwall Quay at the	158	14	172	253	-81	-32%
TOTAL	**6,562**	**1,643**	**8,205**	**5,924**	**2,281**	**38%**

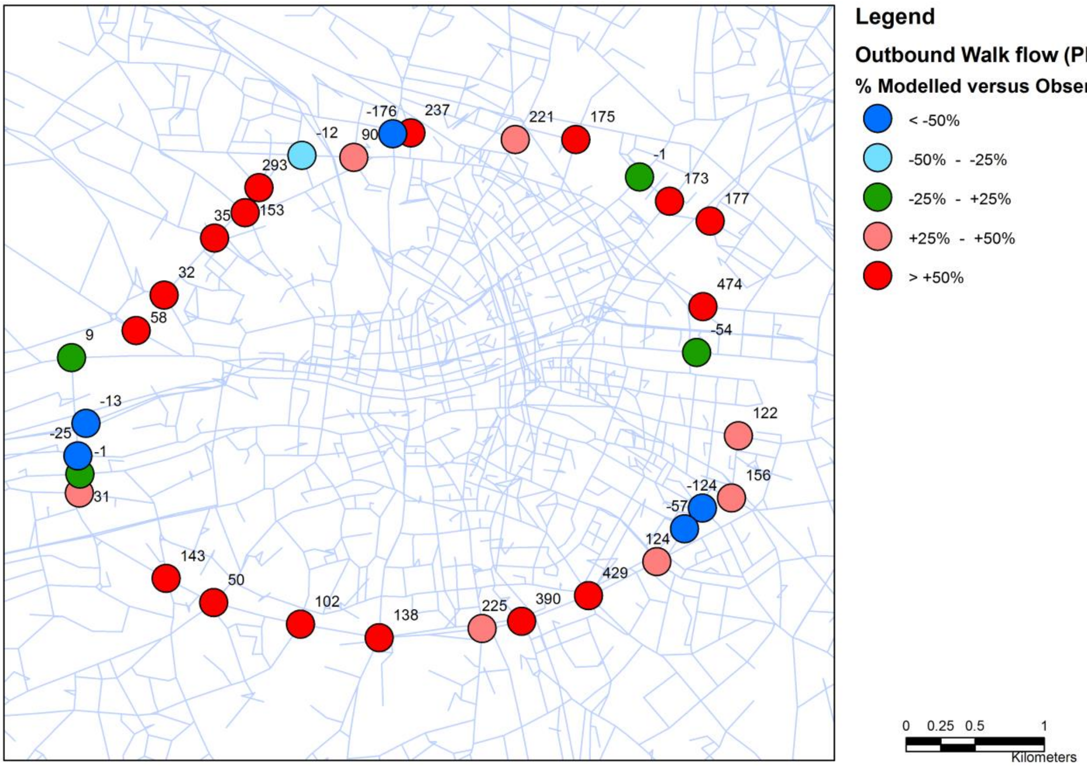

Figure 3.5 Modelled Walk Flows vs. Counts – PM peak hour Outbound

3.5 Cycle mode

Cycle flows considered in the validation are shown in the table below.

3.5.1 AM Inbound

Table 3.3 Modelled Cycle Flows vs. Counts - AM peak hour Inbound

Location	Cycle flow (AMM)	Count	Diff	Diff (%)
Ringsend Road	167	136	31	23%
Grand Canal Street Upper	129	100	29	28%
Northumberland Road	166	163	3	2%
Huband Bridge	9	81	-72	-89%
Baggot Street Lower	195	160	35	22%
Leeson Street Lower	914	349	565	162%
Charlemont Street	227	230	-3	-1%
Richmond Street South	510	473	37	8%
Clanbrassil Street Upper	248	330	-82	-25%
Donore Avenue	75	44	31	70%
Dolphin's Barn Street	311	47	264	557%
Herberton Road	133	76	57	75%
South Circular Road	45	40	5	12%
Old Kilmainham Road	23	20	3	13%
Kilmainham Lane	31	36	-5	-13%
St Johns Road West	20	41	-21	-51%
Conyngham Road	72	55	17	32%
Chesterfield Avenue	19	121	-102	-84%
North Road	18	20	-2	-8%
Blackhorse Avenue	87	29	58	196%
Old Cabra Road	180	70	110	159%
Annamoe Road	57	21	36	174%
Charleville Road	14	28	-14	-50%
N3 at Dalymount	112	74	38	50%
Phibsborough Road	384	155	229	147%
Royal Canal Bank	0	34	-34	-100%
Lower Dorset Street	547	279	268	96%
Russell Street at the bridge	71	55	16	30%
Summerhill Parade at the	62	95	-33	-35%
North Strand Road at	713	440	273	62%
Ossory Road	76	20	56	285%
Sheriff Street Upper at the bridge	41	21	20	97%
Northwall Quay at the bridge	237	92	145	158%
TOTAL	5,893	3,935	1,958	50%

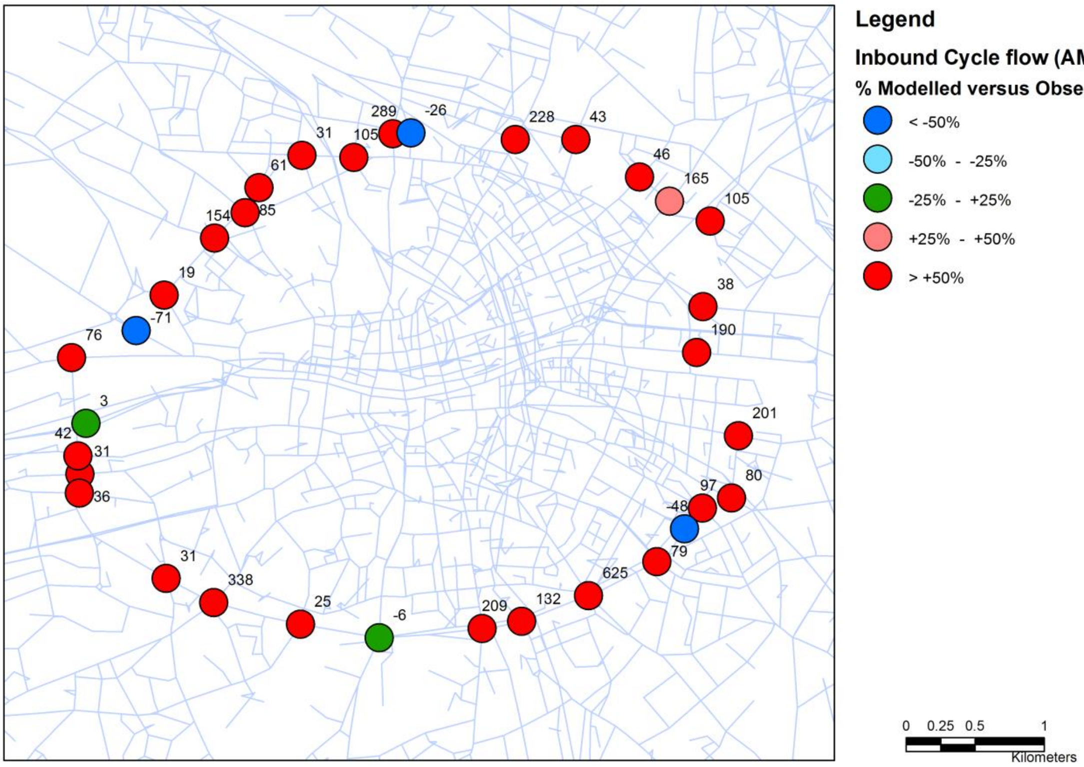

Figure 3.6 Modelled Cycle Flows vs. Counts – AM peak hour Inbound

3.5.2 PM Outbound

Table 3.4 Modelled Cycle Flows vs. Counts - PM peak hour Outbound

Location	Cycle flow (AMM)	Count	Diff	Diff (%)
Ringsend Road	115	96	19	19%
Grand Canal Street Upper	55	85	-30	-35%
Northumberland Road	177	101	76	75%
Huband Bridge	4	49	-45	-92%
Baggot Street Lower	351	95	256	269%
Leeson Street Lower	359	204	155	76%
Charlemont Street	197	196	1	1%
Richmond Street South	244	258	-14	-5%
Clanbrassil Street Upper	211	263	-52	-20%
Donore Avenue	50	41	9	23%
Dolphin's Barn Street	190	60	130	216%
Herberton Road	80	49	31	63%
South Circular Road	9	26	-17	-65%
Old Kilmainham Road	31	18	13	75%
Kilmainham Lane	25	23	2	10%
St Johns Road West	13	36	-23	-64%
Conyngham Road	24	38	-14	-37%
Chesterfield Avenue	38	99	-61	-62%
North Road	17	19	-2	-12%
Blackhorse Avenue	46	18	28	149%
Old Cabra Road	98	39	59	148%
Annamoe Road	40	14	26	176%
Charleville Road	5	14	-9	-64%
N3 at Dalymount	101	57	44	76%
Phibsborough Road	201	90	111	124%
Royal Canal Bank	0	22	-22	-100%
Lower Dorset Street	377	180	197	109%
Russell Street at the	48	56	-8	-14%
Summerhill Parade at the	44	68	-24	-35%
North Strand Road at	439	309	130	42%
Ossory Road	51	18	33	176%
Sheriff Street Upper at the bridge	67	26	41	154%
Northwall Quay at the	76	63	13	20%
TOTAL	**3,783**	**2,731**	**1,052**	**39%**

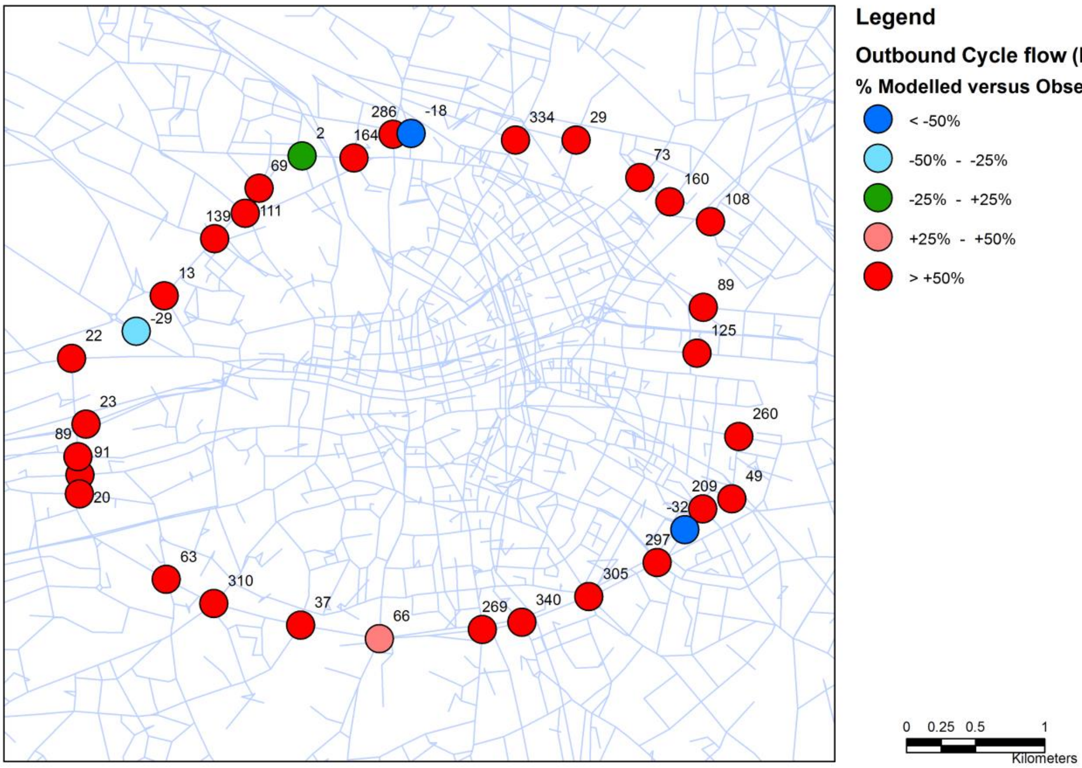

Figure 3.7 Modelled Cycle Flows vs. Counts – PM peak hour Outbound

4 Conclusion and Recommendations

4.1 Overview

This report provides information on the development and validation of the Active Modes Model component of the East Regional Model. This section summarises the key points of the model development, the strength and weakness of the model and a set of recommendations for possible further enhancements.

4.2 Model Development – Key points

The AMM network is the aggregation of different networks (road and walking), with equivalent node, link, zone connectors, and numbering convention.

Network speeds are set based on fixed assumptions for walking, and on a rule-based approach for cycling. Walking is assumed at a constant rate of 5.1kph, independent of link type, for Employee (EMP), Commuter (COM) and Others (OTH) user classes. Following a similar approach as for cycling (see 2.1.1), Education and Retired user classes walk speeds are factored (by 0.96 for EDU and by 0.86 for RET). Assignment is based on a shortest distance path.

For cycling, a system was developed during model specification to assign speeds based on link type, where information on Quality of Service, and/or or descriptions of other characteristics (road type, presence of marked cycle lanes, etc.) were used to assign speeds of between 12kph and 20kph. As for walking, assignment is based on shortest path. For both walk and cycle, no account of congestion is taken account of in determining route choice.

The Active Modes Model is used to output costs skims, based purely on time travelled, to the demand model. Otherwise, it is not intended for analysis of actual walking and cycling journeys, as there is insufficient representation of the on-the-ground conditions that influence the speed and routing of such trips.

4.3 Model Validation

Modelled flows for the cordon screenlines (canal cordon and outer cordon) are substantially higher in both of the peak (AM & PM) periods. No attempt has been made to address this, but is deemed acceptable for this version of the ERM.

4.4 Recommendations

Following the development and the calibration/validation of the overall ERM, some areas have been identified where potential improvements could be made, as follows:

- Conduct surveys of walking and cycling speeds and routing across a range of road users, which would allow development of more refined assignment;
- Conduct surveys which differentiate visitors from the standard modelled journey purposes;

- Consider how cyclists in particular are affected by congestion effects and/or particular characteristics of junctions; and
- Classify links using pedestrian oriented characteristics (pedestrianized area, number of shops, large sidewalks) to reflect their attractiveness for walking in the assignment.

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No. XXXXXXXX 22-12-2016