METROLINK

Integrated Transport. Integrated Life.

NTA'S ERM Model

March 2024

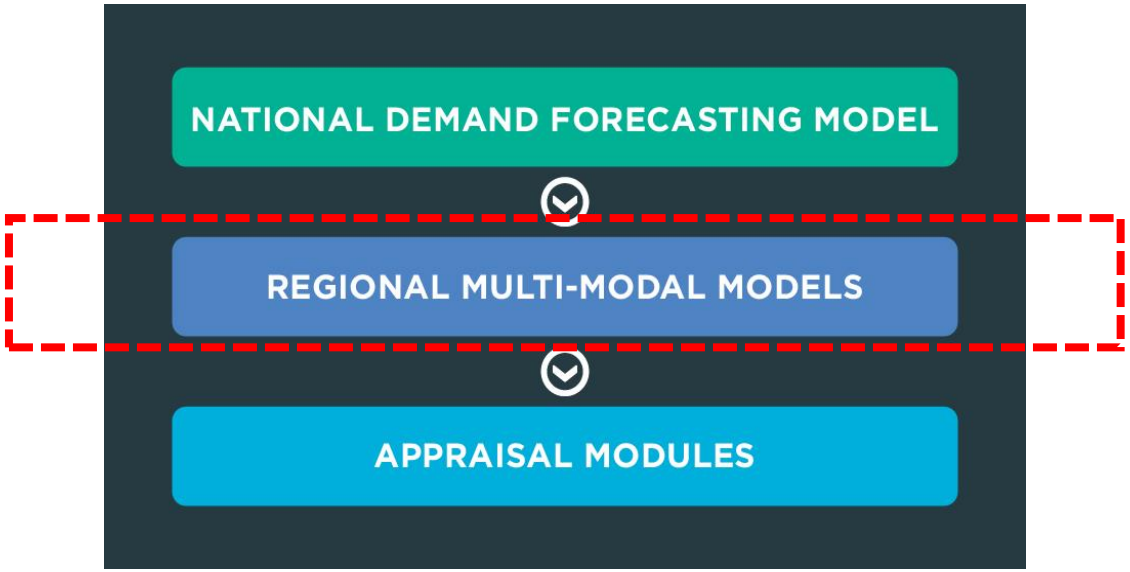
Bonneagar Iompair Éireann
Transport Infrastructure Ireland

NTA
Údarás Náisiúnta Iompair
National Transport Authority

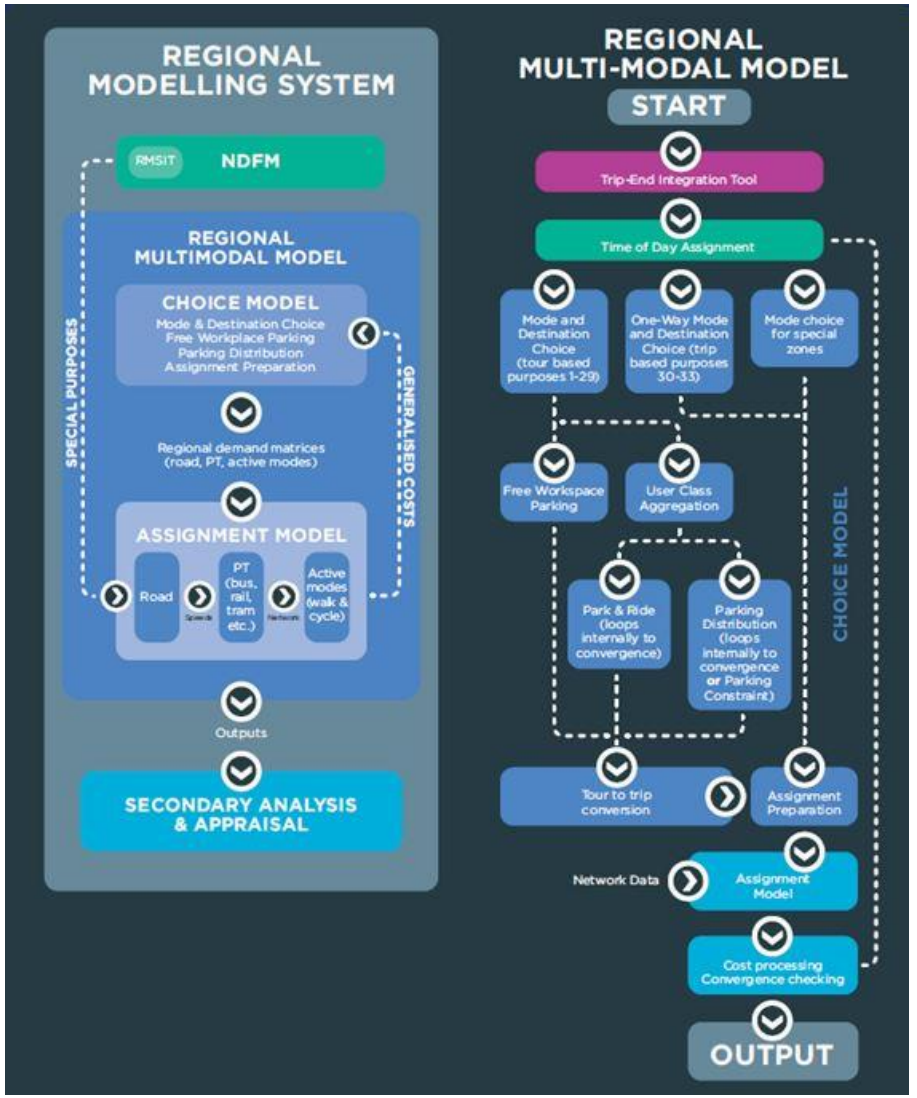
Rialtas na hÉireann
Government of Ireland

Tionscadal Éireann
Project Ireland 2040

Regional Modelling System



The National Transport Authority (NTA) employs a sophisticated Regional Modelling System (RMS) as its strategic transport planning tool. This system utilizes a classic four-stage transport modelling framework to forecast future-year transport demand based on population and employment scenarios, subsequently assigning this demand to networks and services. Within the RMS, there are five Regional Multi-Modal Models (RMM), which convert the 24-hour demand produced by the National Demand Forecasting Model (NDFM) into time, mode, and destination-specific matrices for assignment. The RMM includes detailed representations of factors such as destination parking availability and cost, as well as the impact of tours to understand the true costs influencing decision-making.

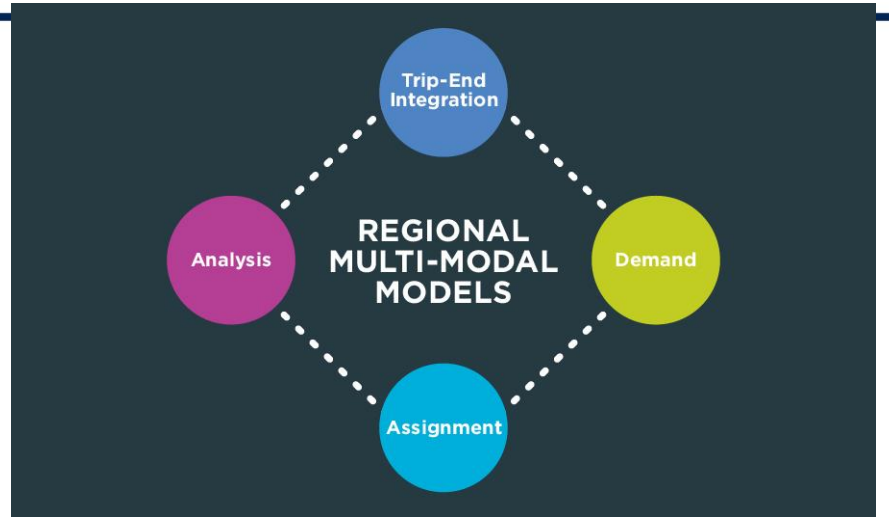


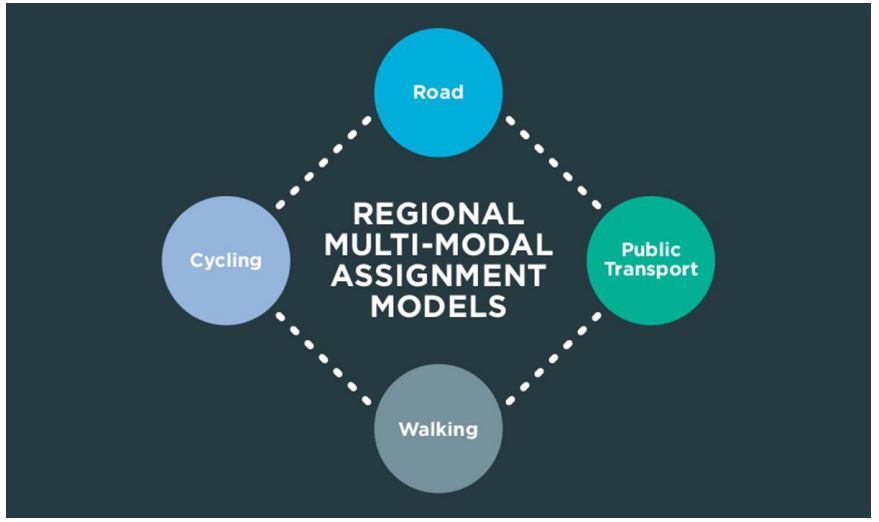
Regional Multi Modal Models

The modelling approach involves several key stages:

- Projected Land Use and Population Distribution: Agreed upon for a future year, the area under examination is divided into zones.
- Trip Generation: Based on projected land use, the number of trips generated by and attracted to each zone is calculated.
- Trip Distribution: The number of trips between each origin and destination is calculated, along with the mode share for each pair.
- Trip Assignment: These trips are assigned to the future year transport network.
- Impact Evaluation: The impacts of these trips are then evaluated in terms of travel time, congestion, environmental impacts, and road safety.

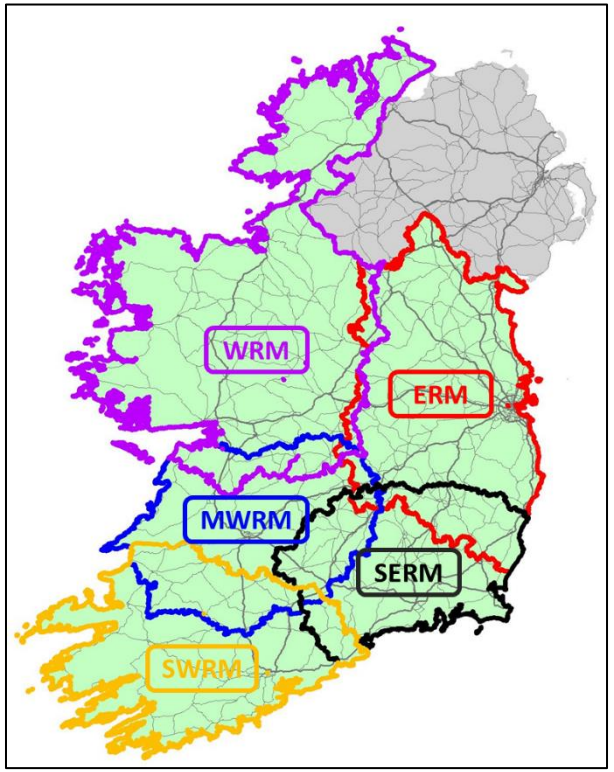
The system includes an integrated suite of appraisal tools for assessing social, environmental, and economic impacts of transport schemes.





Regional Multi Modal Models

- The NTA RMS has five regional multi modal models
- These models are based around the larger city settlements in the state
- They are designed to reflect catchment areas (with some overlap)
- Balance of model size, avoid boundary effects and other complexities, and to minimize Internal ←→ External trips
- Modelled area does not directly included Northern Ireland

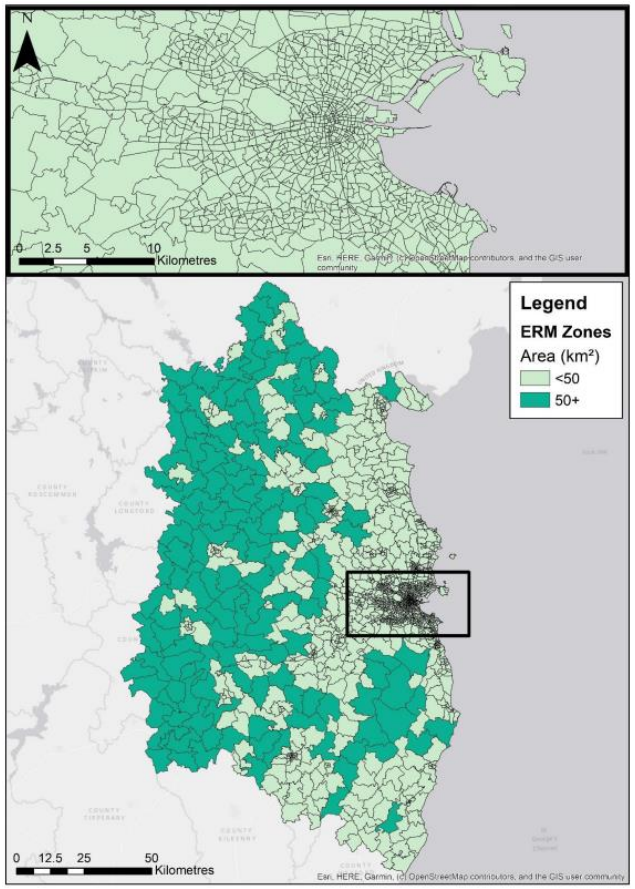


East Regional Model

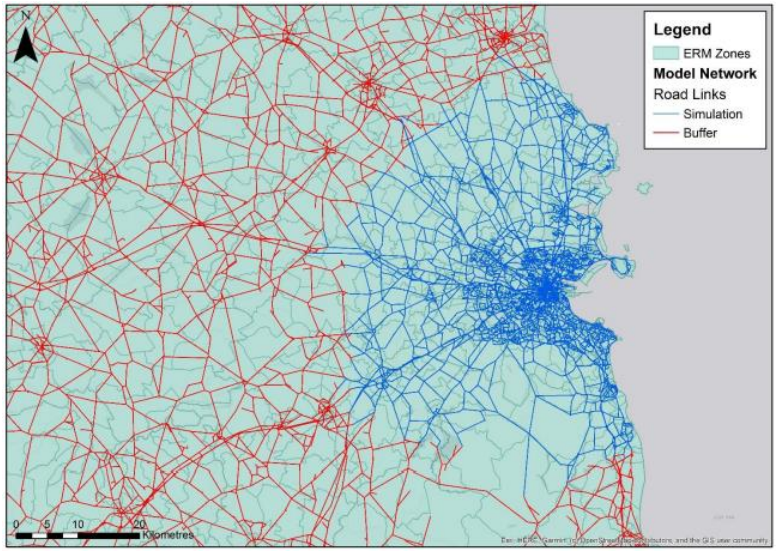
- **The ERM covers the counties within Leinster and the Greater Dublin Area (GDA):**
  - Carlow
  - Cavan
  - Dublin
  - Kildare
  - Laois
  - Louth
  - Meath
  - Monaghan
  - Offaly
  - Wicklow
  - Westmeath
  - Wexford

ERM normally run 60-72 hours to reach convergence or maximum loops on a very powerful machine. It generates 100g-200g data outputs depending on user's choice.

- **These areas are represented by 1,953 zones as follows:**
  - 1,907 Geographic Zones. Of these, 3 are defined as Special Zones (Dublin Airport and Ports).
  - 46 External zones.



- **The highway network in ERM consists of:**
  - More than 50,000 assignment nodes
  - More than 78,000 assignment links
  - About 7,000 Priority Junctions
  - More than 1,000 Signalised Junctions



- **The public transport network in ERM consists of:**
  - DART: 17 services+
  - Rail: 60 services+
  - Luas: 15 services+
  - Dublin Bus: 360 services+
  - Bus Éireann: 395 services+
  - Other buses: 295 services+

Data of NTA's RMS

To support its transport planning function and further development of the transport models, the NTA collects and collates a wide range of data types. The RMS was developed using a wide range of data sources to ensure that it provides the best possible representation of travel demand and patterns throughout Ireland. The model was calibrated and validated via these data.

Data NTA collected including:

- The National Household Travel Survey
- The GDA Education Survey
- The Airport Travel Survey

Key Data Applied in the Model

- GTFS Public Transport Network Data
- Public Transport Surveys
- Port Passenger Data
- NAPTAN Bus Stop Database
- Traffic Signal Data from Urban Traffic Control Systems
- Journey Time Data
- Over 6,000 Traffic counts from NTA, TII, Local Authorities
- The Geo Directory
- HERE Road Network Data
- MyPlan Land Use Database
- The CSO Census
- CSO HGV Data
- The Valuations Office Parking Data

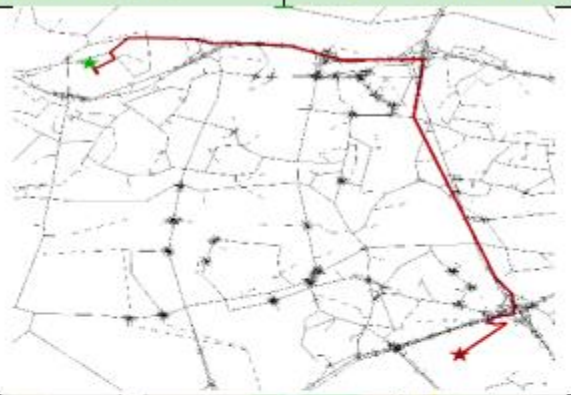
Other Data for ERM:

- LEAP Card Data
- Topographical Road Network Data
- Rail Bridge Height Data
- Heavy Goods Vehicle Restriction Data
- Tolling Data
- Traffic Signal Data
- TII and other authority Traffic Count Data
- Luas Census Data
- Rail Census
- Dublin Bus boarding Data
- Regional Bus Survey
- Bus Eireann Annual Passenger Data
- Annual Rail Ticket Data
- Tax Saver Rail Ticket Data
- Dublin Canal Cordon Bus Passenger Counts
- Dublin Cannal cordon Active Modes Counts
- Road journey Time Data
- Public Transport Journey Time Data
- Train Capacity Data
- Greater Dublin Area Cycle Network
- Other data Sources …

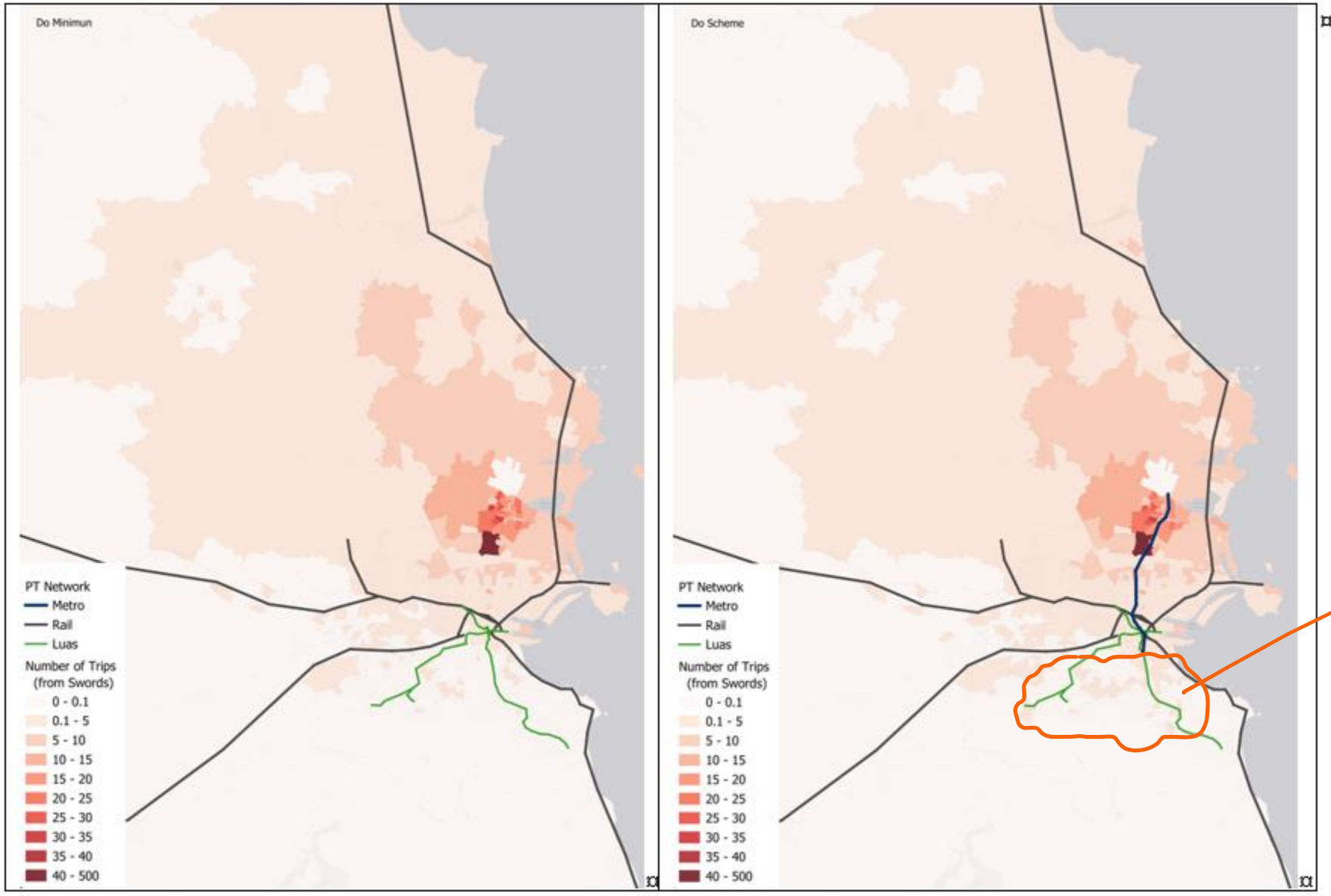
Modelled Results

A number of origin-to-destination(OD) pairs are examined to ensure that choice between them is logical. Here is an example: The route choice in the model between Lucan and the Red Cow Park and Ride shows commuting traffic via the N4 to the M50. Traffic joins the N4 at Junction 3 to avoid the high volume to capacity sections o the N4. Google maps indicate that while this is one potential route, the preferred route would be to join the N4 at Junction 4. this is an example to demonstrate that for these particular OD pairs route choice is sensible for the chosen user class.

The similar exercises to ensure the model produce the sensible results across all modelled modes (Road, PT, Park and Ride, Active modes)

Lucan to Red Cow	25053 to 24048	Car Commute (UC2)
Road Assignment Model		
Google Maps		

Destination change – Metrolink Example – Better Accessibility Swords to South Dublin



Increase in trips to south Dublin area

Level of Detail – Within the ERM model – Walking Network –Dublin City Council