APPENDIX 1

TRAFFIC REPORT

Comhairle Chontae Roscomain
ROSCOMMON COUNTY COUNCIL
&
NATIONAL ROADS DESIGN OFFICE
(ROSCOMMON)

N5 STRATEGIC CORRIDOR TRAFFIC STUDY

TRAFFIC MODELLING REPORT

April 2009

ROSCOMMON COUNTY COUNCIL
NATIONAL ROADS DESIGN OFFICE (ROSCOMMON)

N5 STRATEGIC CORRIDOR TRAFFIC STUDY

TRAFFIC MODELLING REPORT

APRIL 2009

PREPARED BY:

Transportation Planning (International) Ltd
TPi House
Civic Offices Extension
Tallaght
Dublin 24

Tel No: 01 459 6533
Fax No. 01 459 6570
E-mail: info@tpi-dublin.net

Document Control

Project Title: N5 Strategic Corridor Traffic Study

Project No: 22186

Document Ref: 22186 14-04-09.rpt

Document Status:

Document Approval:

Project Director	Alan Bailes
Project Manager	Wayne Garside

Issue Date and History: April 2009 – Final Report

Distribution: Internal TPi Dublin
External: NRDO, Roscommon

ROSCOMMON COUNTY COUNCIL **APRIL 2009**
NATIONAL ROADS DESIGN OFFICE (ROSCOMMON)

N5 STRATEGIC CORRIDOR TRAFFIC STUDY

TRAFFIC MODELLING REPORT

Contents

Figures

Tables

1.0 INTRODUCTION

Traffic Modelling Report

1.1 The purpose of this Traffic Modelling Report is to describe the work that has been undertaken relating to the transport model for the N5 Strategic Corridor Scheme in accordance with the NRA Project Appraisal Guidelines. The basis and methods used to forecast the scheme design year Traffic Model will also be addressed in this report.

1.2 The following is a brief overview of the deliverables required from the Appraisal process for major schemes as set out in the NRA Project Appraisal Guidelines:

- Project Brief;
- Traffic Modelling Report;
- Cost Benefit Analysis;
- Project Appraisal Balance Sheet;
- Business Case; and
- Post Project review.

1.3 The Traffic Modelling Report (TMR) describes the techniques that have been used to model the existing and future situations, and summarises the forecast effects of the scheme. The data collection process is also discussed in order to provide information on how the model was built.

Background

1.4 This Traffic Modelling Report relates to the proposed N5 Scramoge to Ballaghadreen, scheme, which is being prepared on behalf of Roscommon County Council (RCC). The scheme consists of an improvement of a section of the N5 Westport to Longford National Primary Route, of approximately 35km in length between Strokestown and Frenchpark. Currently this section almost entirely comprises single carriageway road with intermittent hardshoulders of various widths. The existing route passes through several settlements, including Strokestown, Tulsk, Bellanagare and Frenchpark. The study area is shown graphically in **Figure 1.1**.

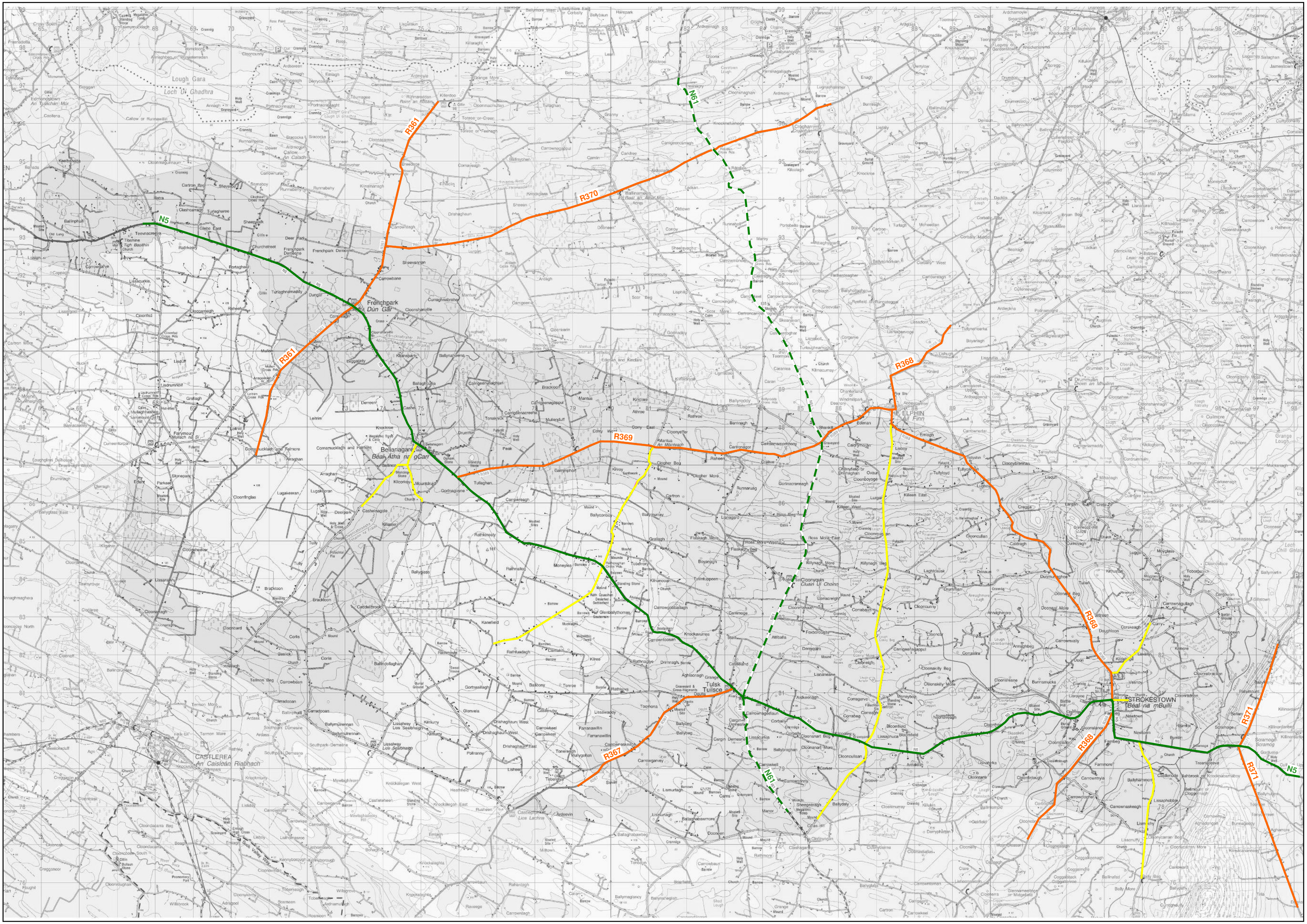
1.5 Roscommon National Roads Design Office have identified seven feasible route corridors for the scheme. These corridors are shown in **Figure 1.2**.

1.6 This report is produced in accordance with the NRA Project Appraisal Guidelines and describes the traffic modelling and forecasting which has been undertaken prior to assessing the potential economic performance of the route corridor options. The Route Corridor Selection Phase is defined in the NRA Project Management Guidelines as being Phase 3 of the preparation and planning of a road scheme. The environmental and engineering assessments of the route corridor options are presented in a separate Route Corridor Selection Report, together with a summary of the results from the Traffic Modelling Report.

Scheme Objectives

1.7 The scheme is required to achieve the objectives of the National Development Plan and the Transport 21 Policy; namely

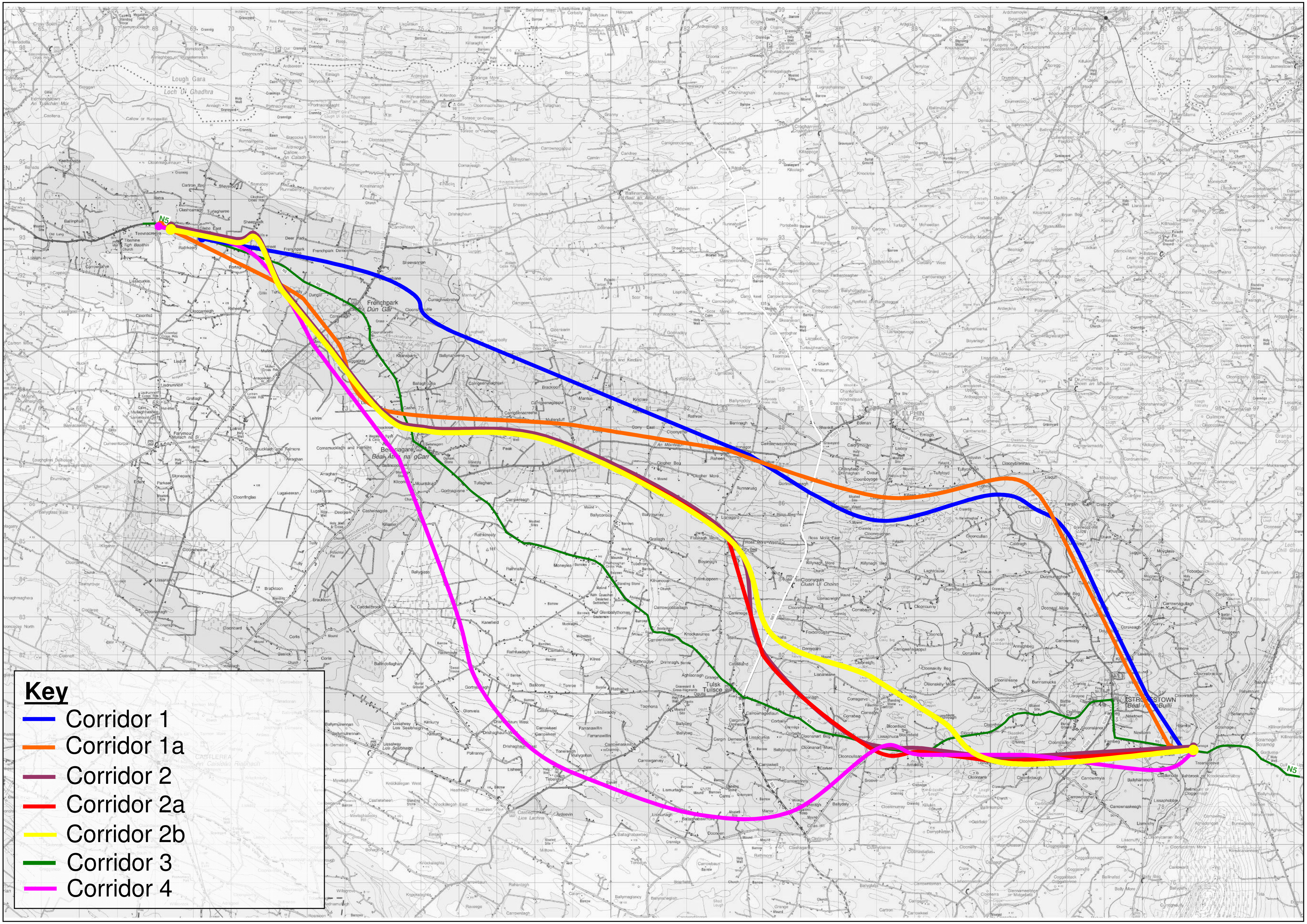
- To improve the reliability of the road transport system;
- To improve international road transport infrastructure between and within regions;



22186
April 2009

N5 Strategic Corridor Study Area

Figure 1.1



22186
April 2009

Corridor Options

Figure 1.2

- To contribute to balanced regional development and economic competitiveness/ growth;
- To contribute to sustainable transport policies, while enduring a high level of environmental protection; and
- To assist in achieving a Governmental objective of the Road Safety Strategy.

1.8 Ultimately, it is expected that the provision of the new scheme will cut travel time and provide a safer transport route.

Need for the Scheme

1.9 At present, the N5 between Strokestown and Frenchpark is in a poor condition and is in places unsafe for drivers driving at high speeds. It is also apparent drivers no longer experience the minimum acceptable 'Level of Service D'. The 'Level of Service D' is defined in documents TD 9 'Road Link Design' and TA43 'Guidance on Road Link Design' within the NRA Design Manual for Roads and Bridges, and equates to an average journey speed of 80 kilometres per hour.

1.10 The new scheme would improve journey times. The impact of traffic through communities along the route will be reduced and access to everyday facilities for non-motorised users will be improved. Safety will be improved for all road users. The local economy would improve also due to better access and transport for goods and services.

Scope of the Model

1.11 The SATURN (Version 10.8.17) suite of programs have been used in the model development, as they are considered the most accurate tools available to measure the effects of changes in traffic levels and the highway infrastructure on both a link and junction basis.

1.12 Assigment of the base year 2007 vehicle trip matric onto the SATURN network has been carried out using a 'Waldrop Equilibrium Assigment' technique. This method assumes that drivers behave rationally, making their route choice between origin and destination on the principle of minimising travel costs. The alternative 'Stochastic User Equilibrium' approach, which assumes some variability in route choice, has not been used in this study.

1.13 Generalised travel cost, for each O/D trip movement in the base model, comprises time and distance values, which have a positive linear relationship, and is known as the generalised cost function. Coefficients are applied to the time and distance values in seeking to minimise this function. In SATURN, the coefficients are 'Pence Per Minute (PPM) and Pence Per Kilometre (PPK)', applied to time and distance respectively.

1.14 The ratios of PPM and PPK have been calculated based on the COBA 11 values of time along with fuel and non-fuel costs for Ireland and local parameters such as journey purpose and vehicle occupancy. The values calculated for this study are listed below:

- Car PPM 1.00/ PPK 0.26
- LGV PPM 1.00/ PPK 0.18
- OGV PPM 1.00/ PPK 0.83

1.15 Numbers of trips by different vehicle categories in the SATURN trip matrix have been converted to all-vehicle PCU's using the following factors:

- Car/ light goods vehicle = 1.0 pcu;
- OGV1 = 1.5 pcu;

- OGV 2 = 2.3 pcu; and
- Bus/ coach = 2.0 pcu.

1.16 Calibration/ validation of the base SATURN model has required the calculation of a 'GEH error statistic'. The GEH is an accepted measure of the correspondence between observed and modelled data. It indicates the accuracy of certain calibration measurements and makes allowance for the fact that an apparently considerable difference between two large flows can be insignificant in terms of percentage difference. Conversely, it takes account of the fact that an apparently large percentage difference between two small flows can be insignificant in absolute terms. The GEH statistic has been used in the calibration of trip matrices, network flows and network journey times in N5 Strategic Corridor model. GEH is calculated according to the following formula:

$$GEH = \sqrt{\left[\frac{(\text{observed} - \text{modelled})^2}{(\text{observed} + \text{modelled}) \times 0.5} \right]}$$

1.17 Use has been made of speed/ flow/ capacity parameters in the simulation network. This gives a more accurate representation of route capacity and travel cost on roads where an upstream link is more restricted than its downstream junction. Speed flow parameters have been used, categorised by road type, which correspond to parameters in COBA.

1.18 Three representative average weekday time periods were selected for modelling in SATURN at base year 2007, namely:

- AM Peak (0900-1000);
- Average Off Peak (1100-1400); and
- PM Peak (1700-1800).

1.19 These time periods were chosen to reflect the heaviest directional traffic flows through the study area. All three models are representative of a neutral 2007 weekday for the associated time period. The main purpose of the average Off peak hour model is to provide data (for economic assessment) that can be extended to represent the whole Off peak period. All three models are representative of an average weekday for the associated time period.

Fixed Trip Matrix Appraisal

1.20 The introduction, or otherwise of the N5 Strategic Corridor Scheme will have no perceptible impact on overall traffic volumes. Hence, the traffic and economic appraisals have been undertaken using a 'fixed trip matrix' approach. The 'trip matrix' of origin-destination, zone to zone, movements in a future year is assumed to comprise two components, namely:

- existing base year trip movements; and
- background growth in the number of vehicles making these existing movements, as the economy expands.

1.21 The magnitude of these future movements in the trip matrix has been forecast in the Transport Assessment and is not dependent upon the proposed N5 Strategic Corridor scheme going ahead. Traffic growth will proceed independently of the road scheme.

1.22 The proposed scheme will involve the construction of a link over its entire length and will, consequently, lead to an increase in National Primary Road provision and thus an increase mainline capacity. Nevertheless, the Do-Something scheme is not likely to cause significant ‘induced’ traffic flows, that is to say, traffic which would not otherwise be present in the Do-Minimum. This is because there are no similar well used parallel routes to the N5, from which vehicles could transfer (or be ‘induced’ on to the scheme), as the N5 is improved. Also, there is unlikely to be any suppression of traffic (i.e., people re-arranging their journeys as a result of congestion) if the scheme is not built.

Report Structure

1.23 The report is arranged into the following chapters:

- Chapter 2 - Data Sources;
- Chapter 3 - Model Building;
- Chapter 4 - Model Calibration and Validation;
- Chapter 5 - Forecasting; and
- Chapter 6 - Summary.

2.0 DATA SOURCES

Introduction

2.1 This chapter summarises the traffic surveys conducted for the purpose of building and validating the N5 Strategic Corridor Traffic Model. **Figure 2.1** indicate the location and type of survey used for calibration purposes. Surveys were undertaken during neutral months in 2007 and 2008.

Types of Transport Surveys Undertaken

2.2 The following is a list of the traffic and transport surveys which were undertaken in order to develop the 2007 base SATURN traffic model;

- ANPR - Automatic Number Plate Recognition;
- Automatic Traffic Counts;*
- Manually Classified Junction Counts (MCJC) to identify weekday turning movements at key intersections;
- Vehicle journey times along the N5 and on other well-used routes within the study area; and
- Roadside Interview Surveys.

* NRA traffic counters were also used for comparison purposes

2.3 The results from each of the above items of data collection are discussed in the remainder of this chapter.

Automatic Number Plate Recognition

2.4 Automatic Number Plate Recognition was undertaken at 10 two - way locations within the study area as illustrated in **Figure 2.1.** Vehicle registrations were recorded during a 12 - hour period along with a vehicle count undertaken from the videos in each direction through the survey sites.

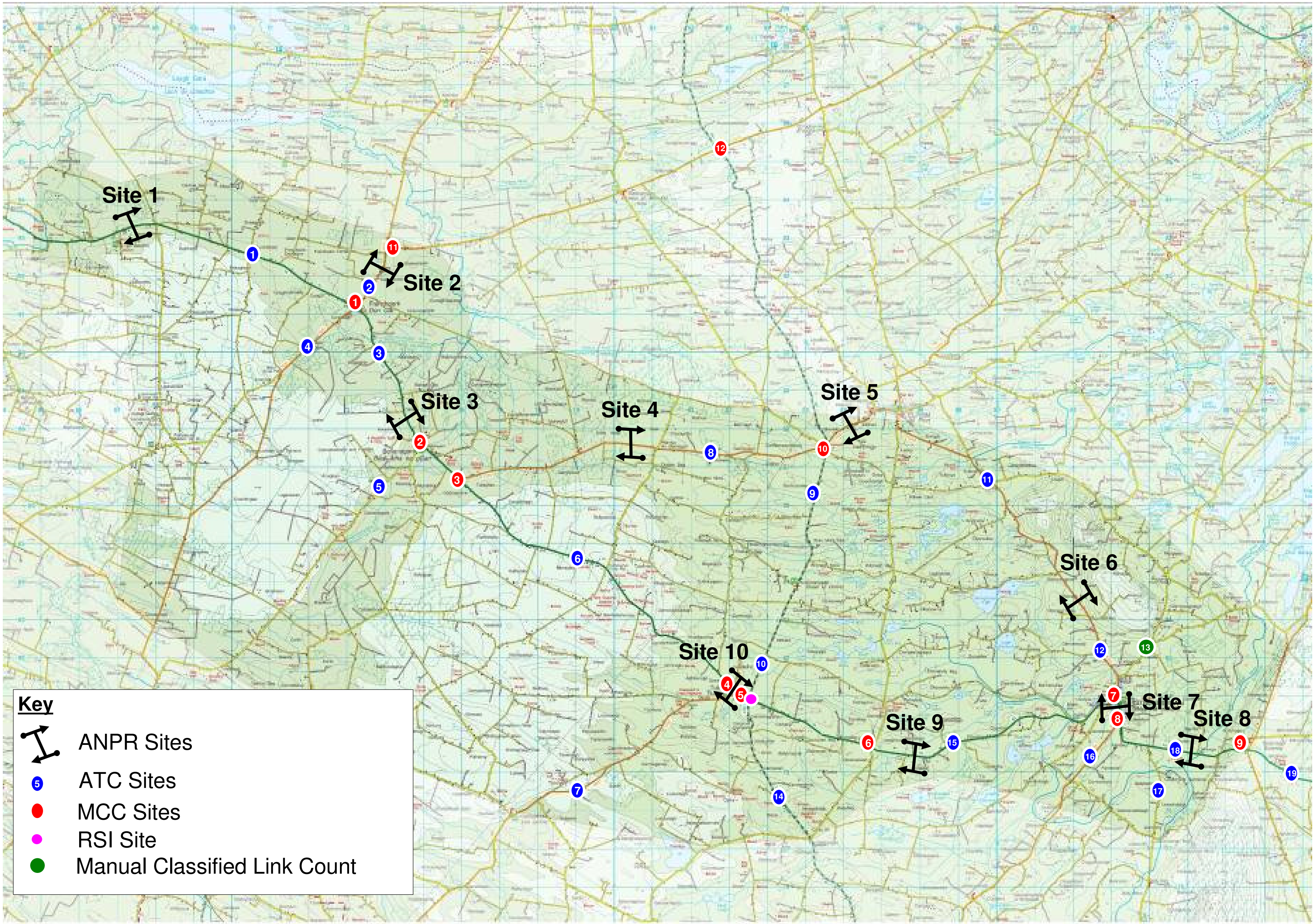
2.5 The sample rates recorded were of a very high standard averaging 96% over all sites. The lowest sample rate at any individual site was 89% of full registrations.

Automatic Traffic Counts

2.6 Automatic Traffic Counters (ATC's) were placed at 19 locations across the study area over a two week period.

2.7 Locations of the ATC's are as shown in **Figure 2.1**, namely:

- Site 1 N5 northwest of Frenchpark;
- Site 2 R361 northeast of Frenchpark;
- Site 3 N5 southeast of Frenchpark;
- Site 4 R361 southwest of Frenchpark;
- Site 5 Local Road south of Bellanagare;
- Site 6 N5 at Moneylea;
- Site 7 R367 at Slevin;
- Site 8 R369 at Raheen;
- Site 9 N61 at Gortnacrannagh;



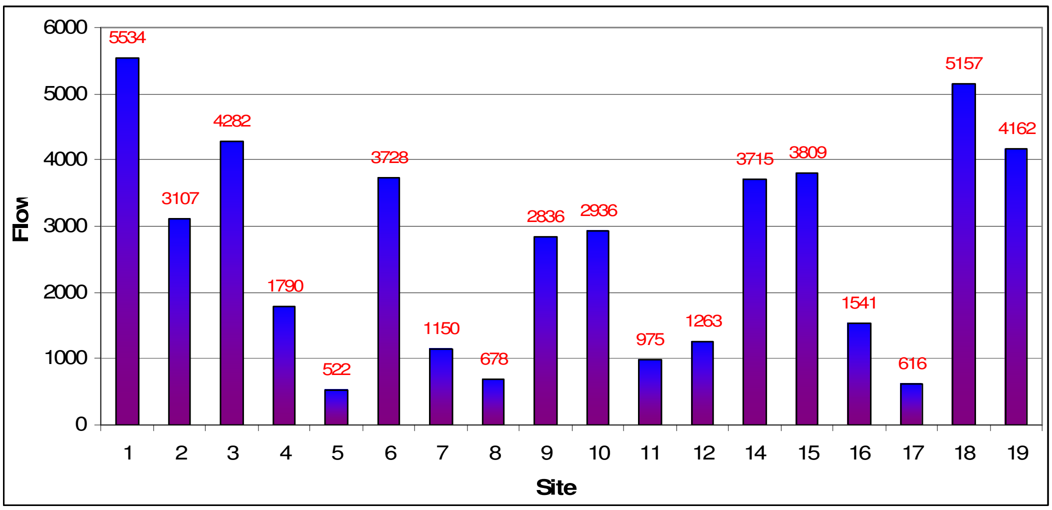
N5 Strategic Corridor MCC Survey Locations

Fig 2.1

- Site 10 N61 at Castleland;
- Site 11 R368 at Lugboy;
- Site 12 R368 at Doughloon;
- Site 14 N61 at Sheegeeragh;
- Site 15 N5 at Cloonfree;
- Site 16 R368 at Franbeg;
- Site 17 Local Road at Ballyhammon;
- Site 18 N5 at Bumlin; and
- Site 19 N5 west of Cloonshannagh.

2.8 Flows were recorded for a period of two weeks in both directions. **Figure 2.2** illustrates the 2-way 24 hour average weekday flow by site.

Figure 2.2 Two- way Average 24 Hour Weekday Flow by Site (Vehicles)



2.9 **Figure 2.2** illustrates the highest traffic flows occur at site 1 which is the N5 mainline at Churchstreet. It should be noted that the results show that around 1300 vehicles over 24 hours leave the N5 at Frenchpark.

Manual Classified Count Surveys

2.10 Traffic counts were undertaken for 12 hours (7am-7pm) at a series of important links and road junctions to establish the current turning movements. The flows were classified by vehicle type. The MCC data is vital for calibrating the traffic model of the study area and for ensuring that the base model output is a reliable representation of current conditions.

2.11 The objective of these surveys was to record the total number of vehicles passing a given point or making a particular turn at a junction. Counts were broken down by vehicle type and time period. Turning counts classified by vehicle type were undertaken by video.

2.12 Counting was broken into 15-minute time intervals and vehicle classification was in the following format, which all enumerators were familiar with before commencement of the surveys:

- Private Vehicles - Cars, Taxis;
- Light Goods Vehicles - Goods Vehicles, (2 axle, single tyre);
- Other Goods Vehicles 1 - Goods Vehicles, (2 axle, twin tyres, 3 axle rigid);
- Other Goods Vehicles, (4 axle or more rigid, or articulated); and

- Buses.

2.13 MCC turning count surveys were undertaken at 12 junctions within the study area. The locations of TPi's classified turning counts are as shown in **Figure 2.1**, namely:

- Site 1 N5 /R361 Castlerea Road;
- Site 2 N5 /Local Road to Ballincool;
- Site 3 N5 /R369;
- Site 4 N5 /R367;
- Site 5 N5 /N61;
- Site 6 N5 /Local Road to Elphin;
- Site 7 N5/R368;
- Site 8 N5 /R368;
- Site 9 N5 /R371;
- Site10 N61/R369;
- Site 11 R361/ R370; and
- Site 12 N61/ R370.

2.14 An MCC link count survey was undertaken at 1 location within the study area. This count was undertaken manually because the location was unsuitable to be carried out by an automatic traffic counter. The location of this classified link count is as shown in **Figure 2.1**, namely:

- Site 13 Local Road at Lavally.

2.15 The surveys were undertaken without any major problems. No serious accidents or major incidents occurred which disrupted traffic during the surveys.

2.16 The composition of traffic at key locations by time period and site within the study area is shown in **Tables 2.1 - 2.3** below. Private motor vehicles make up the majority of traffic in the study area during all peaks between 71% and 77%. It is noticeable that during the Off Peak period, there are more Heavy Goods Vehicles (15%) than Light Goods vehicles (13%).

Table 2.1 Traffic Compositions - AM peak by Site

Site	Car	LGV	OGV1	OGV2	Bus
Site 1	70%	19%	3%	7%	1%
Site 2	76%	13%	3%	7%	1%
Site 3	78%	9%	4%	8%	0%
Site 4	72%	16%	7%	6%	0%
Site 5	73%	14%	6%	7%	0%
Site 6	68%	12%	9%	10%	1%
Site 7	75%	14%	5%	5%	1%
Site 8	71%	17%	5%	7%	1%
Site 9	69%	20%	4%	7%	0%
Site 10	77%	11%	5%	6%	1%
Site 11	72%	16%	7%	6%	0%
Site 12	68%	21%	6%	4%	1%
Average	**72%**	**15%**	**5%**	**7%**	**0%**

Source: TPi

Table 2.2 Traffic Compositions - Off Peak by Site

Site	Car	LGV	OGV1	OGV2	Bus
Site 1	64%	17%	6%	12%	0%
Site 2	72%	9%	6%	12%	1%
Site 3	71%	8%	7%	14%	1%
Site 4	74%	13%	4%	8%	0%
Site 5	70%	12%	8%	9%	0%
Site 6	72%	12%	8%	7%	0%
Site 7	70%	15%	7%	7%	0%
Site 8	69%	15%	7%	8%	0%
Site 9	65%	17%	6%	11%	0%
Site 10	73%	11%	8%	7%	1%
Site 11	74%	13%	4%	8%	0%
Site 12	85%	10%	3%	2%	0%
Average	**72%**	**13%**	**6%**	**9%**	**0%**

Source: TPi

Table 2.3 Traffic Compositions - PM Peak by Site

Site	Car	LGV	OGV1	OGV2	Bus
Site 1	70%	21%	4%	4%	0%
Site 2	78%	14%	3%	5%	0%
Site 3	82%	7%	4%	7%	0%
Site 4	82%	11%	3%	4%	0%
Site 5	71%	17%	7%	4%	0%
Site 6	73%	16%	7%	4%	0%
Site 7	76%	16%	3%	5%	0%
Site 8	71%	18%	6%	5%	0%
Site 9	79%	10%	6%	6%	0%
Site 10	79%	12%	4%	5%	0%
Site 11	82%	11%	3%	4%	0%
Site 12	84%	11%	3%	2%	0%
Average	**77%**	**14%**	**4%**	**5%**	**0%**

Source: TPi

2.17 The MCC data was used for the purposes of model validation and the counts were converted to PCUs by applying the factors presented in Table 2.4.

Table 2.4 Vehicle to PCU Factors

Vehicle Type	Factor
Car/Taxi	1.0
LGV	1.0
OGV 1	1.5
OGV 2	2.3
Bus/Coach	2.0

Source: TPi

Vehicle Journey Time Surveys

2.18 Vehicle journey time surveys were undertaken, because it was essential to gain an accurate and current picture of typical travel times on highway routes through the study area. This data will ensure that the following aims are achieved:

- The base 2007 traffic model will show a true assignment routing of present trips; and
- The economic evaluation will give robust assessment of the relative costs and benefits of alternative schemes.

2.19 In view of the importance of the journey time data, a survey of routes was undertaken, as shown in **Figure 2.3**. There are 5 different routes, each of which were timed in both directions from end to end, during AM, PM and Off peak periods on a typical weekday.

2.20 The routes were devised so as to include wide coverage of routes across the study area.

2.21 Journey times were measured using the "moving observer" method. The routes consisted, principally, of the N5, N61, R368, R369 and R361, routes. Details recorded during the surveys comprised free running time, queuing and delay arising from junction control.

2.22 Journey time surveys were undertaken using the floating car method. The surveys were undertaken without any major problems. No serious accidents or major incidents occurred which disrupted traffic during the surveys.

2.23 Summaries of each total route journey time measurement, by average run across all time periods, are contained below in Table 2.5, for routes 1-5 respectively, by direction.

Table 2.5 Journey Time Summary

Route	Direction	Average Travel Time (Secs) - All Peaks	AM Average Travel Time (secs)	Inter Peak Average Travel Time (secs)	PM Average Travel Time (secs)
1	Southbound	647 (70kph)	632 (72kph)	643 (71kph)	665 (68kph)
	Northbound	611 (74kph)	618 (73kph)	617 (74kph)	599 (76kph)
2	Eastbound	486 (74kph)	461 (77kph)	460 (77kph)	536 (66kph)
	Westbound	487 (74kph)	480 (74kph)	534 (67kph)	446 (80kph)
3	Southbound	522 (79kph)	572 (72kph)	501 (82kph)	493 (83kph)
	Northbound	490 (83kph)	500 (82kph)	486 (84kph)	485 (84kph)
4	Northbound	533 (77kph)	532 (77kph)	542 (75kph)	526 (78kph)
	Southbound	541 (76kph)	558 (73kph)	539 (76kph)	525 (78kph)
5	Westbound	1869 (75kph)	1952 (72kph)	1750 (80kph)	1905 (74kph)
	Eastbound	1889 (75kph)	2045 (69kph)	1703 (82kph)	1920 (73kph)

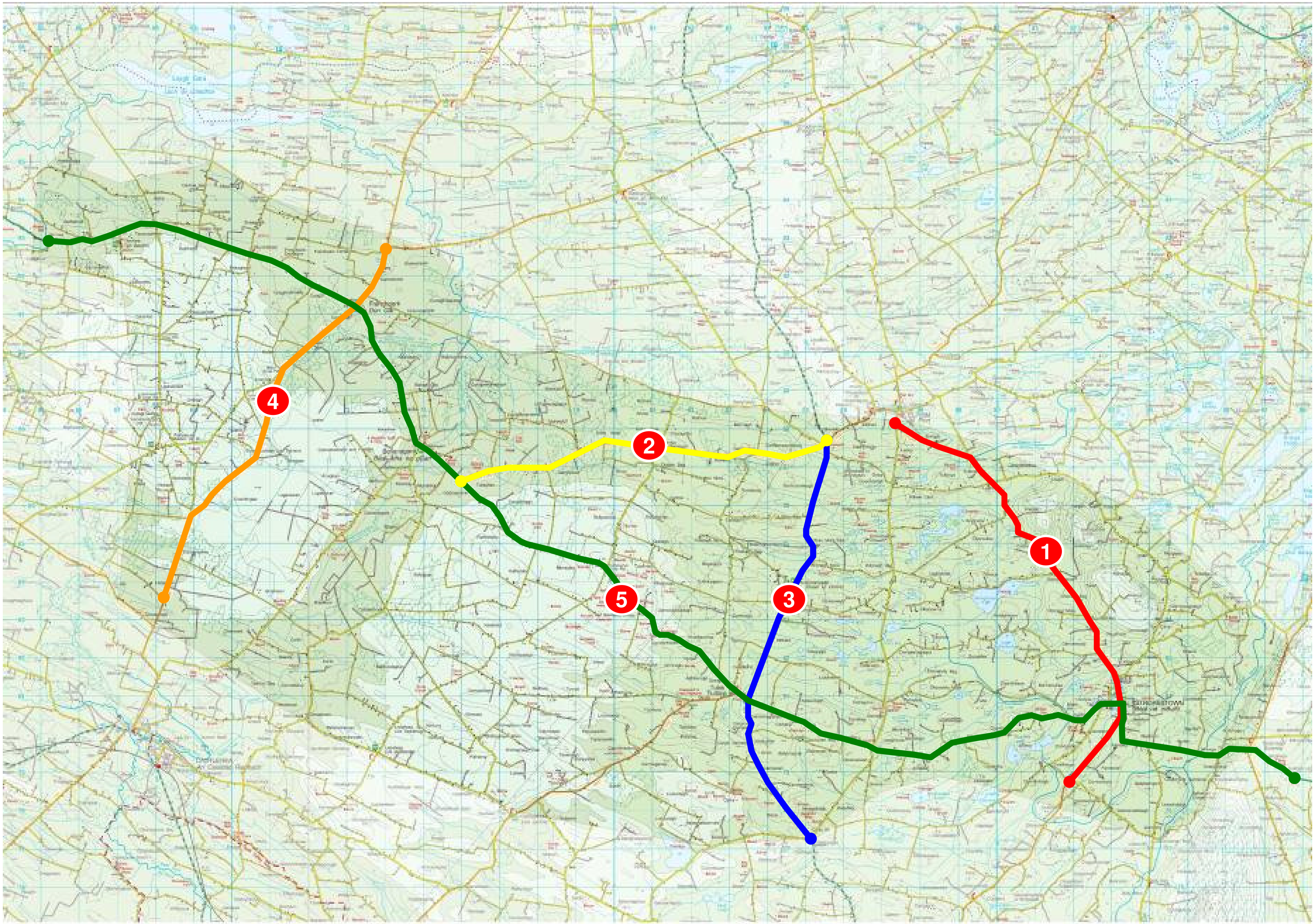
Source: TPi

2.24 The longest journey times existed on routes 5 and 6 which were the routes travelling along the extent of the study area on the N5 from Frenchpark to Strokestown and vice versa.

Level of Service

2.25 The adequacy and performance of the network of national roads are assessed on the basis of the ability of roads to deliver a quality level of service consistent with the efficient movement of traffic. The National Road Needs Study, published by the National Roads Authority (NRA) in 1998, represents a comprehensive assessment of the network against the level of service objective equivalent to level of service D.

2.26 The carriageway types which make up a road network are chosen on the basis of capacity and level of service (LOS). The capacity of a road link is the ability of that section of road to carry the maximum number of vehicles in safety at an appropriate LOS. The LOS is a technical concept which attempts to describe the travel experience in terms of operating speed, the ability to overtake traffic in safety, traffic congestion, overall safety



22186
April 2009

N5 Strategic Corridor Journey Time Route Locations

Fig 2.3

and driver and passenger comfort. In Ireland, the capacity of a road link is determined in accordance with the principles defined in the US Highway Capacity Manual (HCM).

2.27 The manual describes six levels of service from A (best) to F (worst) and are classified with the following minimum average speeds:

- LOS A – 93kph;
- LOS B – 88kph;
- LOS C – 84kph;
- LOS D – 80kph;
- LOS E – 72kph; and
- LOS F - <72kph.

2.28 In the Road Needs Study the Authority's objective for road planning purposes was to achieve a minimum LOS of D on the network. This was in keeping generally with the LOS objective defined in the Operational Programme for Transport (OPT), 1994-1999. The level of service concerned is relatively modest entailing a degree of vehicle platooning and limitation on passing opportunities. Internationally this service objective would be regarded as a minimum acceptable standard for new national road schemes. Adaptation of LOS D (and the defined improvement needs) resulted in the identification of a mix of carriageway types for the national road network as indicated in the Study ranging from two lane roads to motorways. The overall target objective is to provide an average journey speed of 80kph on the National Primary Road network.

2.29 It can be seen from the journey time surveys undertaken for the study that the existing N5 through the study area is currently operating at around LOS E under average conditions and at LOS F through the peak periods.

Roadside Interview monitoring

2.30 Roadside Interviews (RSI) were undertaken at a prescribed site to establish vehicle trip origin-destination movements through the study area. The roadside survey was carried out at the N5/N61 Intersection at Tulsk, shown in **Figure 2.1**.

2.31 The purpose of collecting the Roadside Interview information was to produce a part matrix of vehicle with strategic Origin/Destinations (O/D) movements, by time period, using the major N5 and N61 routes for use in the transport model.

<u>RSI Survey Time Periods</u>

2.32 The Survey was undertaken from 7am-7pm and was undertaken without any major problems, and no serious accidents or major incidents occurred which disrupted traffic during the survey.

<u>RSI Classified Traffic Counts/Sample Rates</u>

2.33 A classified count was undertaken, for each direction of traffic flow. The traffic count records were used to measure the total volume to which the RSI sample of trip O/D data should be 'expanded' in the direction of the survey.

2.34 Analysis of the number of interviews, in relation to counted traffic flow, is shown in **Table 2.6** below. The sample rates are given in comparison to the flow collected on the day of the survey.

Table 2.6 Interview Sample Rates at RSI Site

Survey Site	Survey Direction	12-Hour Counted Flow	Interviews	Sample Rate
Site 1 - N61	Southbound	1212	954	79%
Site 2 - N5	Westbound	1527	1162	76%
Site 3 - N61	Northbound	1391	965	70%
Site 4 - N5	Eastbound	2050	1245	61%

Source: TPi

2.35 Overall, a representative and reliable picture of O/D movements through the study area has been gained from the RSI survey. Also, a good impression of trip patterns made by different vehicle types has been produced.

2.36 The RSI sample of study area trips will be expanded to the scale of the accompanying highway link counts. This will produce full site trip matrices for use in the traffic model. Expansion factors for scaling the O/D interviews will be calculated, by time period, as the ratio of counted flow to recorded O/D movements.

Trip O/D Characteristics at RSI Site

2.37 A broad analysis has been made of the principal trip patterns that emerged from the RSI origin/destination survey. The aim is to identify the relative proportions of trips, which are 'external' and 'internal' to the study area and also to highlight the largest zone-to-zone movements passing through the RSI site.

2.38 To do this, the analysis has been done in two stages the first looks to identify the trip patterns that wholly external to Roscommon County (1362 (31%)). The second looks to identify the trips patterns of movements whose origin or destination is within Roscommon County (2995 (69%)).

Non Roscommon County Trip Analysis (1362 (31%) observed trips)

2.39 The 15 largest trips with origins/destinations wholly external to Roscommon County observed during the 12-hour period were:

	Origin County	Destination County	Trips/Proportion
1	Mayo	Dublin	205 (15%)
2	Dublin	Mayo	197 (15%)
3	Longford	Mayo	97 (7%)
4	Mayo	Longford	69 (5%)
5	Westmeath	Mayo	67 (5%)
6	Mayo	Westmeath	47 (4%)
7	Sligo	Westmeath	46 (4%)
8	Leitrim	Westmeath	35 (3%)
9	Galway	Leitrim	27 (2%)
10	Meath	Mayo	26 (2%)
11	Westmeath	Sligo	24 (2%)
12	Mayo	Kildare	20 (2%)
13	Galway	Sligo	20 (2%)
14	Leitrim	Galway	19 (1%)
15	Sligo	Galway	17 (1%)

Roscommon County Trip Analysis (2995 (69%) observed trips)

2.40 The 15 largest movements with an origin or destination within Roscommon County observed during the 12-hour period were:

Roscommon County Trips

	Origin Townland	Destination Townland	Trips/Proportion
1	Boyle	Roscommon	104 (4%)
2	Roscommon	Boyle	80 (3%)
3	Elphin	Roscommon	71 (2%)
4	Tulsk	Tulsk	64 (2%)
5	Roscommon	Elphin	64 (2%)
6	Roscommon	Tulsk	55 (2%)
7	Carrick-on-Shannon	Roscommon	48 (2%)
8	Roscommon	Sligo	44 (2%)
9	Sligo	Roscommon	44 (2%)
10	Strokestown	Tulsk	42 (1%)
11	Tulsk	Roscommon	40 (1%)
12	Frenchpark	Roscommon	39 (1%)
13	Roscommon	Ballaghaderreen	38 (1%)
14	Ballaghaderreen	Roscommon	37 (1%)
15	Roscommon	Frenchpark	31 (1%)

3.0 MODEL BUILDING

Introduction

3.1 This section outlines the scope and format of the N5 Strategic Corridor SATURN traffic model. An indication is also given of the model's capabilities and limitations. Important assumptions made in developing the model are also documented.

3.2 The scope of the base model is a representation of conditions during an AM peak, PM peak and average off peak hour for a typical weekday in 2007. The model comprises three Passenger Car Unit (PCU) matrices, one each for cars, light goods and heavy goods vehicles. It is considered that these three vehicle classifications are most representative of those vehicles using the highway network within the study area.

Traffic Model Format

3.3 SATURN is a dynamic, congested assignment and simulation model. It operates by loading a matrix of zone-to-zone origin-destination (O/D) trip movements onto a link and junction (node) network. The O/D trips are assigned to network routes taking into account the travel time, distance and congestion delay costs of using each route. SATURN functions by performing a number of iterations, whereby zone-to-zone routings are adjusted and traffic between each origin and destination may be loaded onto several different routes.

3.4 The end-state of each model run is an 'equilibrium assignment', in which, taken together, all trips in the network are assigned onto the lowest cost routes. This end-state is a reasonable reflection of how traffic distributes through a network in reality.

3.5 The study area is modelled in detail using SATURN 'simulation' coding, which enables an accurate assessment of the traffic issues and effects of junction operation. The simulated area includes those junctions considered particularly sensitive to congestion and the effects of the improvement proposals.

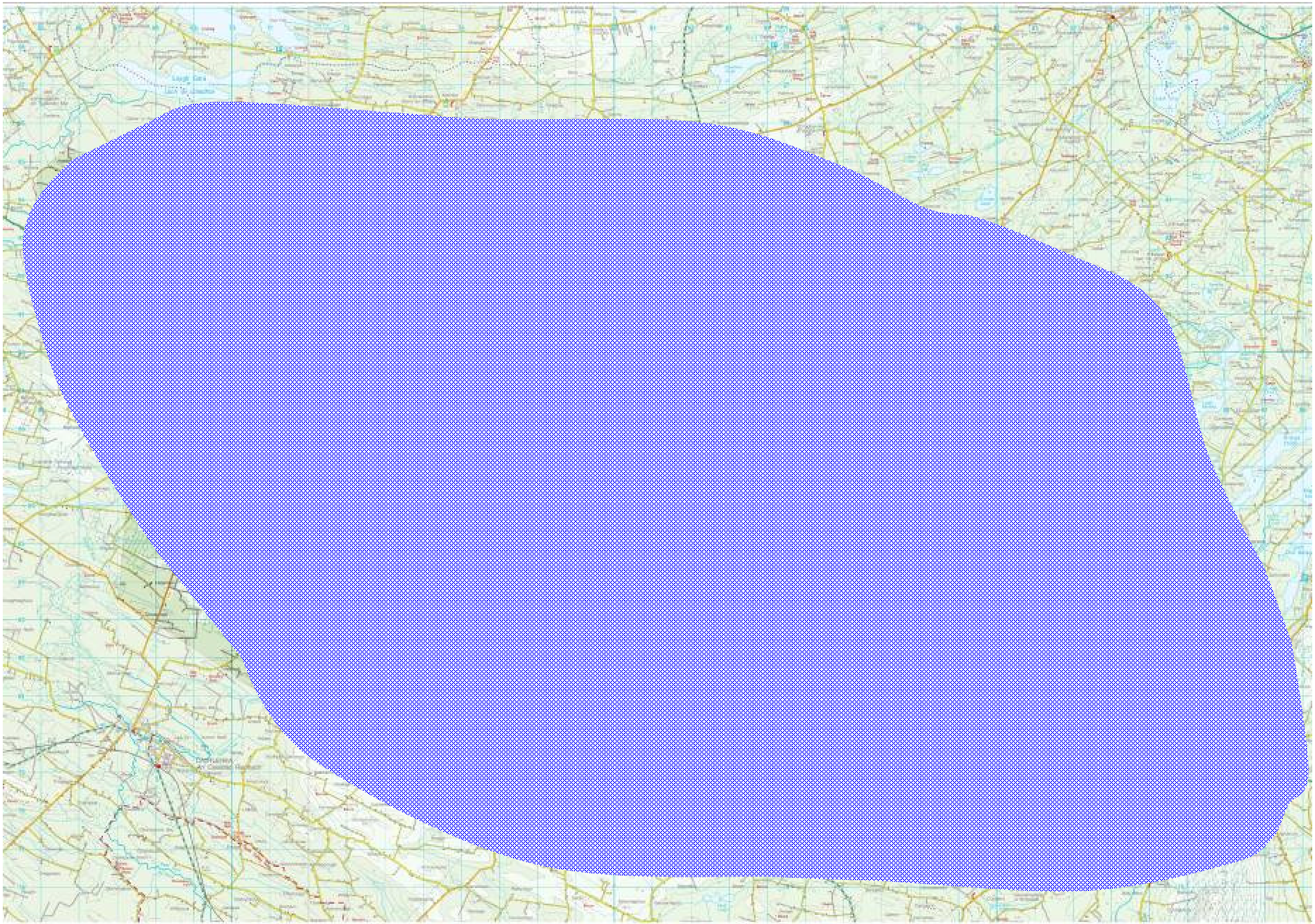
3.6 An alternative to simulation network coding is buffer coding. Buffer coding allows areas to be represented in a more simplified manner with traffic being assigned in accordance with link characteristics, exclusive of junction operability. It has been considered more robust to model the whole network as a simulation network.

3.7 Outputs from the assignment model include link flows and junction turning movements, least cost zone-to-zone paths and journey times along particular network routes (with delays and distance travelled). This information can be readily compared against observed data in order to calibrate/validate the model.

3.8 The SATURN package can also be used for 'matrix estimation', whereby unobserved O/D movements in the model trip matrix can be synthesised on the basis of traffic counts.

Model Network

3.9 The highway network included in the model extends from the N5 at Teevnacreeva in the North West to the N5 at Strokestown in the south east. This area is considered of sufficient scope to incorporate the likely traffic impacts of the scheme. The approximate extent of the model area is shown in **Figure 3.1**.



22186
April 2009

N5 Strategic Corridor Model Area

Fig 3.1

3.10 Junctions are modelled in SATURN as one or more nodes in a network control file. This control file is then simulated within the modelling package in conjunction with a matrix of traffic demand. Nodes in this case are the points where two or more links (road sections) meet causing a conflict between traffic streams that is subject to junction control. SATURN allows nodes to be modelled as junctions with different types of control including priority junctions, simple roundabouts and traffic signals. More complex junctions, for example grade separated junctions, are generally coded using a group of nodes which allow the junction to be broken down into the different points of conflict, e.g. one node for each point where an approach road meets the circulating carriageway.

3.11 To aid the visual presentation of the network and the accurate calculation of link lengths, the modelled nodes were given co-ordinates.

3.12 Link lengths used in the model were checked against Ordnance Survey (OS) mapping using AutoCAD software.

3.13 Site visits were carried out to check the coding of junctions in the simulation network (number of turning lanes, etc) and junction geometry was verified.

3.14 Link capacity indices have been defined based on the COBA 11 (DMRB Vol. 13, Section 1, Part 5, Chapter 9) speed-flow relationships, used to represent the performance of the road network under capacity constrained conditions. The capacities defined by the COBA 11 speed-flow curves were converted from vehicles to PCUs.

3.15 Following the assignment of the final AM, Inter and PM peak trip matrices, routeing checks were carried out on the network. The Trees facility within the SATURN P1X programme was used to illustrate paths between zones to ensure that trips were taking the most logical route, based on local knowledge.

3.16 The base network consists of 96 nodes, of which 35 are priority junctions, 1 roundabout, 18 dummy nodes and 42 external nodes.

3.17 Extensive checks have been made on the network configurations defined in the SATURN models, to ensure there is proper connectivity, consistent link distances and speeds and realistic capacities and permitted manoeuvres.

Model Trip Matrix

3.18 The AM, Off peak and PM trip matrices, have been derived from observations collected specifically for this study by means of Automatic Number Plate Recognition (ANPR) Surveys, as described in Chapter 2.

3.19 Roadside interview data was also collected in order to infill the strategic traffic along the N5 and N61 corridors. The matrix building process is described in more detail below;

- Registration plate matching to a coarse zoning system to 9 zones;
- Furnessing the matrix to match observed trip ends;
- Matrix expansion to detailed model zoning system (38 zones);
- Addition of any unobserved movements that can be identified from junction counts at external points on the network;
- Division and factoring of total vehicle matrix into individual vehicle types (i.e. car, LGV and HGV) as pcu's; and
- Matrix estimation.

Observed Matrix Development

3.20 The registration plate survey consisted of vehicle flow counts and accompanying sample records of vehicle registrations, passing in both directions through 10 monitoring sites, covering the major strategic routes as shown in previously in **Figure 2.1**.

3.21 For each possible origin to destination movement, a list of the registration matching sites that would be passed through was drawn up. This was done using a map and local knowledge to identify the possible routes between the origin and destination, and noting the survey stations passed through on each route.

3.22 The survey data was subsequently coded into an ASCII text file, checked for errors and imported into the MICROMATCH program. An analysis of the data was then carried out by matching registration numbers through a number of survey sites for all possible origin and destination movements at a coarse 9-zone level.

3.23 As part of the matrix building process, unmatched registrations (i.e. registration plate numbers that are only observed at a single site) were also used to estimate the volume of shorter distance trips in the matrix (i.e. intra zonal trips).

Furnessing

3.24 Once the registration plate matching was complete, the process of Furnessing was used to factor the ANPR matrix to meet target trip origin and destination totals for each zone. The application of an average factor to the whole matrix was not appropriate, as it would not meet either the origin or destination targets. In the process of Furnessing a factor was applied to each row and column so that both the origin and destination totals were correct.

Matrix Expansion

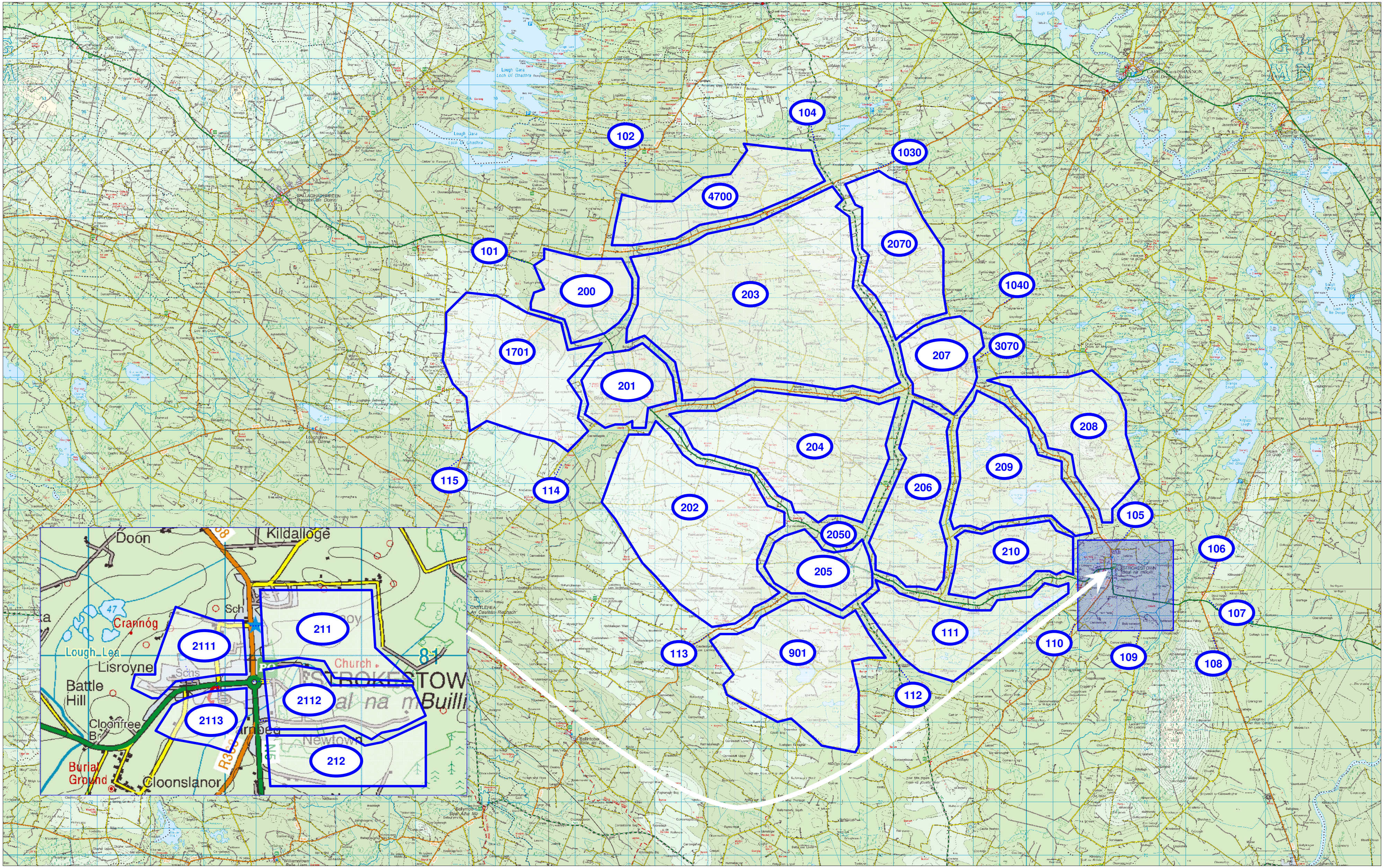
3.25 Following the Furnessing process, the coarse matrix was expanded to the model zoning system (see **Figure 3.2**) using the MX matrix manipulation program with SATURN. **Table 3.1** below illustrates how the coarse zoning system was expanded.

Table 3.1 Coarse Zoning System Expanded to 38 Zones

Coarse Zone Number	New Zone numbers after expansion from 9 zones to 38 zones
1	Zones 106, 107, 108 **(3 zones)**
2	Zones 109, 110, 212 **(3 zones)**
3	Zones 209, 210, 211, 2111, 2112, 2113, 105 **(7 zones)**
4	Zones 207, 208, 1040, 3070 **(4 zones)**
5	Zone 104,111, 112, 204, 206, 1030, 2070 **(7 zone)**
6	Zone 113, 114, 201, 202, 203, 205, 901, 2050 **(8 zones)**
7	Zone 115, 200, 1701 **(3 zones)**
8	Zone 101 **(1 zone)**
9	Zone 102, 4700 **(2 zone)**

Unobserved Matrix Development

3.26 The O-D surveys do not provide full details of all trip movements within the study area. Those trips not surveyed are referred to as 'unobserved' movements and are generally very short distance. These unobserved movements were infilled using individual movements observed from junction counts at external counts.



TPi

22186
April 2009

N5 Strategic Corridor - Zoning System

Fig 3.2

Matrix Division

3.27 The penultimate process involved the division of the total vehicle matrices into separate vehicle classes (i.e. Car, LGV and HGV) and conversion from vehicles to PCU, this was done using factors taken from the manual classified count database, namely:

AM Peak 0900-1000

Car	=	total vehicle matrix	x	0.73;
LGV	=	total vehicle matrix	x	0.15;
HGV	=	total vehicle matrix	x	0.12; and
HGV to pcu	=	HGV matrix	x	1.94.

Average Off Peak 1100-1400

Car	=	total vehicle matrix	x	0.70;
LGV	=	total vehicle matrix	x	0.14;
HGV	=	total vehicle matrix	x	0.16; and
HGV to pcu	=	HGV matrix	x	1.94.

PM Peak 1700-1800

Car	=	total vehicle matrix	x	0.76;
LGV	=	total vehicle matrix	x	0.15;
HGV	=	total vehicle matrix	x	0.09; and
HGV to pcu	=	HGV matrix	x	1.94.

SATURN Prior Trip Matrix

3.28 The O/D trip totals in the SATURN prior matrices were as follows (in PCU'S):

- AM peak hour 09:00 – 10:00 - 2113 pcu;
- Average Off peak hour 11:00 – 14:00 - 1683 pcu; and
- PM peak hour 17:00 – 18:00 - 2364 pcu.

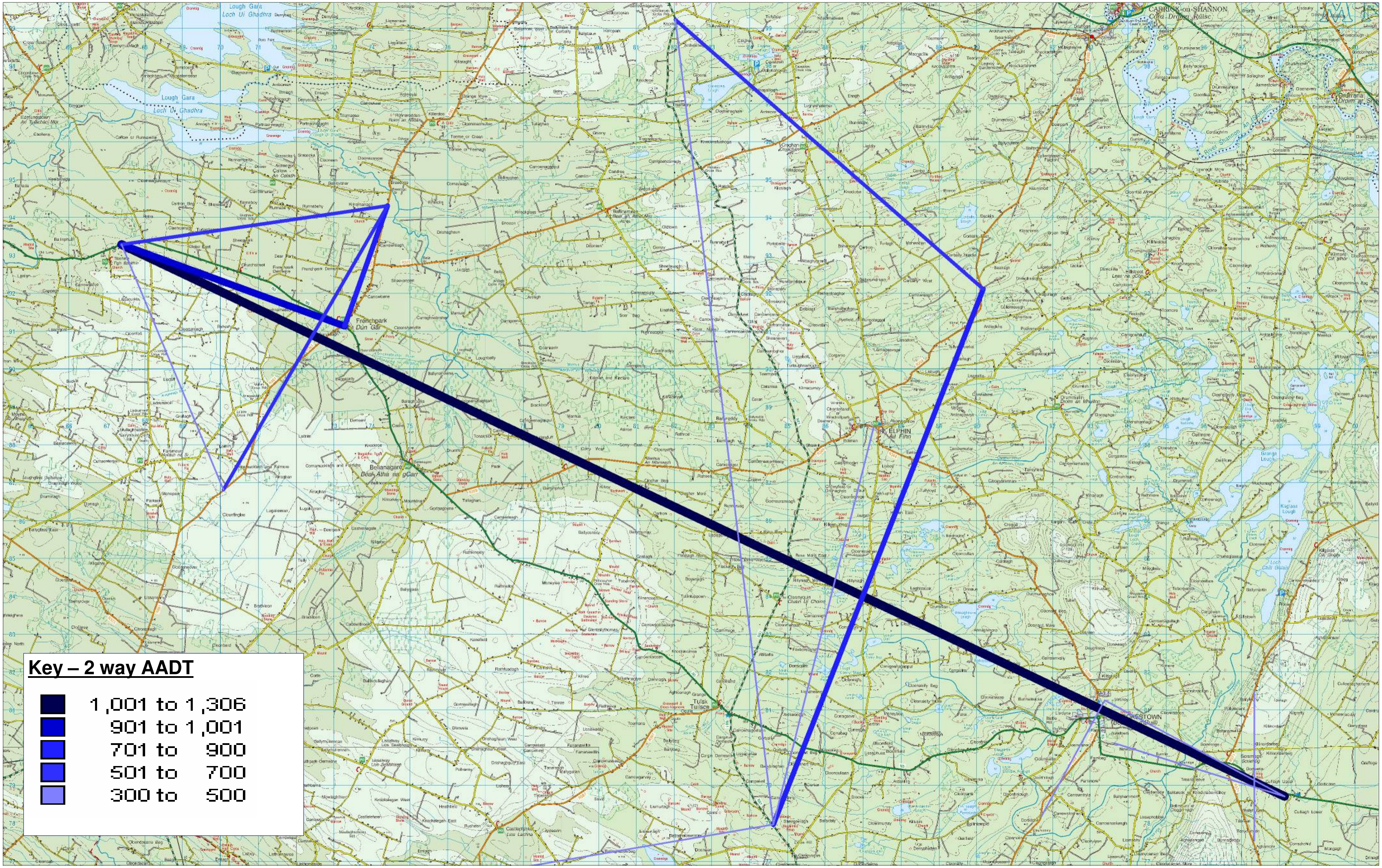
3.29 It can be seen that the PM prior matrix contained the most trips. The PM peak O/D movements were about 11% greater than in the AM peak and 39% greater than in the Off peak.

3.30 A sector to sector analysis of the matrices has been carried out to provide a general picture of observed traffic movements through and around the study area. **Figure 3.3** illustrates movements with AADT's over 200 within the study area.

3.31 It can be seen that the most popular movements were the strategic movements of the N5 East of Strokestown to West of Frenchpark and vice versa. The movement between the R368 and N61 was also popular as were movements between the N5 West of Frenchpark to Frenchpark and R361 to Frenchpark. All expected movements are illustrated in the figure and no illogical movements appear.

Matrix Estimation

3.32 In the final stage of creating the traffic model, the SATURN matrix estimation option (SATME2) has been used to infill any remaining unobserved O/D cell values in the base trip matrix. This technique was applied, even though matrix estimation is not the



Key – 2 way AADT
1,001 to 1,306
901 to 1,001
701 to 900
501 to 700
300 to 500
CARRICK-on-SHANNON
Frenchpark
Dún Gar
ELPHIN
Bellanagare
Lough Gara

optimum method to 'infill' cell values, (DMRB, Volume 12, Section 2, Part 1). The reasons for this decision were as follows:

- Matrix estimation is the easiest and most efficient method of representing unobserved O/D movements;
- The cell values that are infilled by matrix estimation are only important for representing the correct volumes of base year flow on specific links; they do not need to be accurate O/D's because all critical corridor movements have been extracted from the ANPR survey; and
- There are sufficient traffic counts available to enable matrix estimation to work effectively.

3.33 SATURN matrix estimation operates by 'seeding' empty O/D cells with a specified number of prior trips, then by identifying logical zone-to-zone routes that pass through observed count locations and finally by matching the trip movements in the matrix to the counted volumes at particular links and junctions along these routes.

3.34 Parameters used in the SATURN matrix estimation (SEED and XAMAX) were derived on the basis of achieving the best matrix calibration against observed traffic counts.

Model Convergence Criteria

3.35 Appropriate measures for judging model convergence and stability are defined in DMRB Volume 12 (Section 2, Part 1, Chapter 4, Table 4.1). These criteria have been applied to the N5 Strategic Corridor AM peak, Off peak and PM peak SATURN models, and are all achieved.

Stability of Assigned Network Flows

3.36 Flow stability was assessed by monitoring the SATURN 'P' parameter, or the proportion of assigned link flows that were within 5% of the volume recorded during the preceding model iteration. In each of the AM peak, Off peak and PM peak base models, a high 'P' value of over 98% was achieved on the final SATURN iteration. The DMRB criterion is for 95% of flows to be within 5% of the previous iteration. The convergence results are summarised below:

- AM Peak – final iteration 100% (preceding 3 iterations 100%, 100%, 100%);
- Off Peak – final iteration 100% (preceding 3 iterations 100%, 100%, 100%); and
- PM Peak – final iteration 100% (preceding 3 iterations 100%, 100%, 100%).

3.37 The results above show that convergence has been achieved to an acceptable level.

4.0 MODEL CALIBRATION AND VALIDATION

Introduction

4.1 A key indicator of the dependability of the N5 Strategic Corridor traffic model is how close the modelled network flows compare against observed counts and how close the conformity is between travel times and speeds in the SATURN model and those observed on the road network. This section describes the SATURN model validation of both traffic flows, speeds and journey times.

4.2 Assigned traffic movements in the model have been extracted as 'actual' flows, rather than 'demand' flows. This means that flows that arrive at certain points in the network during each model period, (rather than all trips contained in the O/D matrix), have been compared against counted flow. This comparison is realistic, because it takes account of traffic that is queued at congested points in the network.

Model Calibration

4.3 The 2007 prior matrix was loaded on to the SATURN network for AM peak, Inter peak and PM peak periods. Matrix estimation (SATME2) was then undertaken. Output (2007) synthesised matrices were produced with O/D trip totals as shown in Table 3.1.

Table 4.1 Base Matrix Trip Totals Before/After Matrix Estimation (SATME2)

Time Period	Total Matrix Trips (PCU's)		% change with SATME2
	Before SATME2	After SATME2	
AM peak hour	2113	2184	+3.3%
Off peak hour	1683	1692	+0.5%
PM peak hour	2364	2352	-0.5%

Source: TPi

4.4 As indicated in **Table 4.1** the ME2 process has had a limited impact on the final matrix totals.

4.5 Accuracy of the estimated matrix O/D movements has been assessed, by comparing matrix trip volumes against target counted flows. In accordance with the SATURN manual, a good level of accuracy was achieved, as indicated by the high proportion of matrix movements with a GEH of 4.0 or less. The calibration results were as shown in **Table 4.2**

Table 4.2 Calibration of Estimated Matrix Trips Against Target Counts

SATURN Model Period	% of O/D movements with GEH ≤ 4.0
AM peak hour	Car –99.72% LGV –100.00% HGV –99.48%
Off peak hour	Car –99.72% LGV –100.00% HGV –99.93%
PM peak hour	Car –99.03% LGV –100.00% HGV –100.00%

Matrix Checks

4.6 A manual examination of the trip movements within the matrix was carried out, and a judgement made, based on local knowledge, as to whether these numbers were reasonable. No illogical traffic movements were evident.

Validation Standards

4.7 It is expected that a reliable Highway Traffic Model should pass several validation tests. These tests are defined in DMRB volume 12 (Section 2, Part 1, Chapter 4, Table 4.2) and have been applied to the AM, PM and Inter Peak Saturn Highway Models.

4.8 The flow validation tests applicable to the SCM highway model are summarised below:

- Test 1 - the total percentage of assigned flows in each model that have a 'GEH' value of 5.0 or less, when compared to observed counts, should be 85%;
- Test 2 - the overall GEH value for all flows combined in each count set should be 4.0 or less, for at least 85% of count sets;
- Test 3 - each count cordon/screen-line data set should have a total modelled flow within 5% of observed, in at least 85% of cases;
- Test 4 - For movements less than 700 veh/hr, the proportion of flows modelled within 100pcu/hr of observed should be 85%;

4.9 The journey time validation test applicable to the SCM highway model is:

- The percentage of all journey time routes, which have a modelled time within 15% of observed, should be 85%.

Model Validation

4.10 The main findings from the flows validation are summarised below:

Test 1

The total percentages of assigned flows in each model that have a 'GEH' value of 5.0 or less, when compared to observed counts, are as follows (target = 85%):

- AM peak - 98%;
- Off peak - 100%; and
- PM peak - 100%.

Test 2

The proportions of count sets with overall GEH of specified value, for all flows combined in each count set, are as follows (target = 85% with GEH of 4.0 or less):

- AM peak - GEH < 4.0 = 100%;
- Off peak - GEH < 4.0 = 100%; and
- PM peak - GEH < 4.0 = 100%.

Test 3

The proportions of count cordon/screen-line data sets with a total modelled flow within 5% of observed, are as follows (target = 85%):

- AM peak - 89% within 5%;
- Off peak - 100% within 5%; and
- PM peak - 95% within 5%.

Test 4

For movements less than 700 veh/hr, the proportions of flows modelled within 100pcu/hr of observed are as follows (target = 85%):

- AM peak - 100%;
- Off peak - 100%; and
- PM peak - 100%.

4.11 The proportions of all journey time routes that have a modelled time within 15% of observed are as follows:

- AM peak - 100%;
- Inter Peak - 100%; and
- PM peak - 100%.

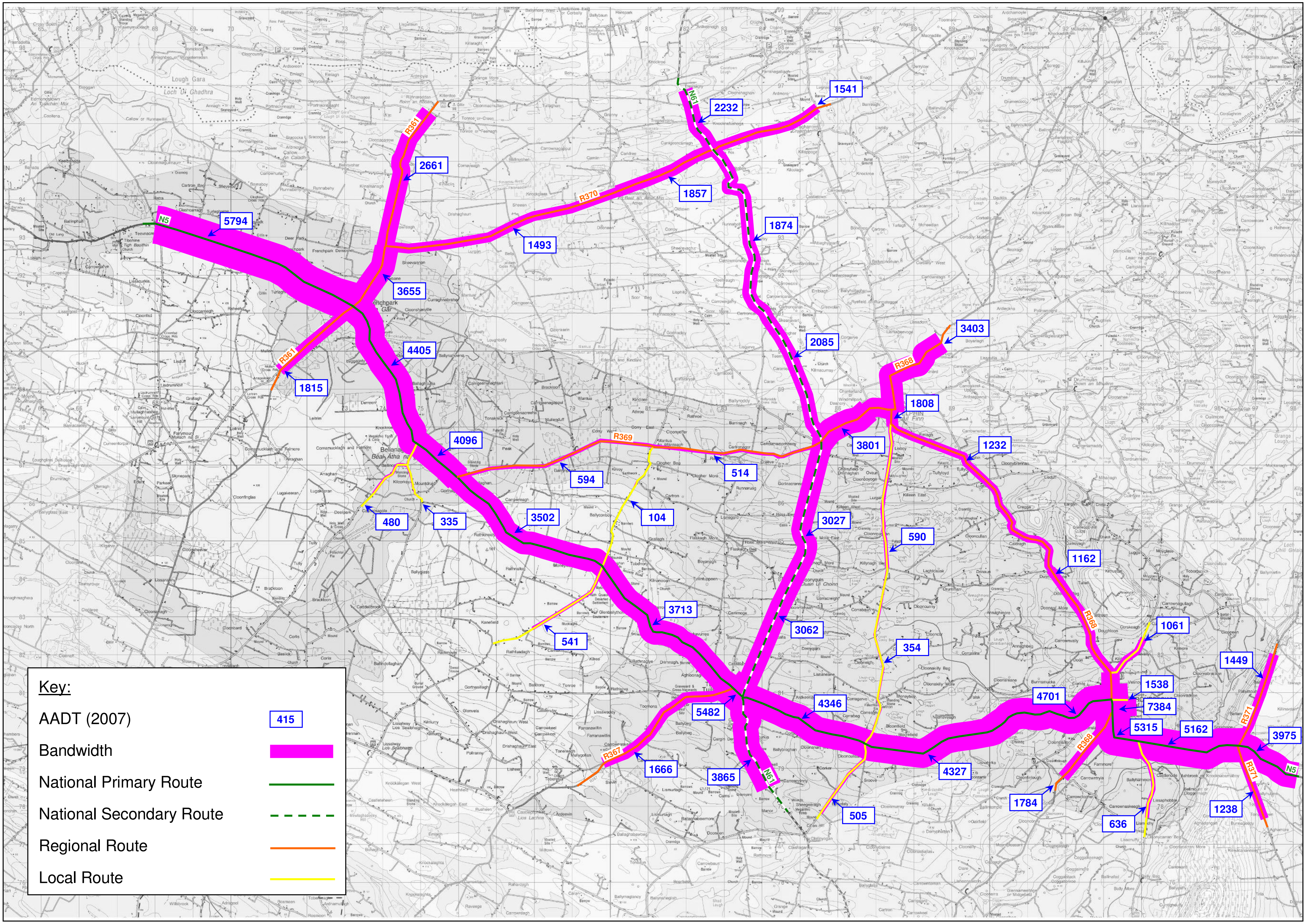
4.12 Based on the criteria set out above, it can be therefore be concluded that the SCM traffic model provides a good level of validation.

Base Year AADT

4.13 Flows have been factored from AM peak, inter peak, and PM peak model periods to 24 hour annual average daily traffic flow (AADT) equivalent, using a method which uses observed flow factors.

4.14 The Base Year (2007) AADT estimates across the study area as output from the SATURN traffic model is shown graphically in **Figure 4.1**.

4.15 To further check the accuracy of the AADT model output a comparison has been made against the NRAs available long term traffic count data for 2007. Shown below in Table 4.3.



Base Year (2007) AADTs and Bandwidths

Figure 4.1

Table 4.3 Comparison of Modelled AADT against NRA Observations

Site Reference	NRA Counter AADT	Model Output AADT	Diff (%)
Frenchpark N05-11	4855	4405	-9%

4.16 It can be seen from the comparison outlined in Table 4.2 that the model AADTs are dependable and fit for use in further stages of the study.

5.0 FORECASTING

Introduction

5.1 Once a satisfactory representation of the transport system at base year 2007 was achieved, a forecast of the future year movement at years 2015 (Opening Year), 2030 (Design Year) and 2040 (Horizon Year) was developed both with and without options for the proposed scheme. The predicted pattern and volume of movement is used to assess the effectiveness of an N5 Strategic Corridor scheme.

Traffic Growth

5.2 Traffic growth from base year 2007 has been accounted for in all of the model forecasts. Traffic growth is considered to be inevitable in response to economic and demographic change. However, the rate of traffic growth and the amount of movement between particular zones is uncertain. Therefore, a range of growth forecasts has been developed corresponding to the 'pessimistic' and 'optimistic' cases, respectively.

5.3 For simplicity, the range of growth forecasts has been identified as follows:

- Low growth (equivalent to pessimistic situation); and
- High growth (equivalent to optimistic situation).

5.4 Components of the respective growth scenarios have been assumed to include the following:

- Low Growth
  - application of background growth using NRA Low traffic growth; and.
- High Growth
  - application of background growth using NRA High traffic growth.

NRA Traffic Growth

5.5 Traffic growth from base year 2007 has been accounted for in all of the model forecasts. Traffic growth is considered to be inevitable in response to economic and demographic change. Therefore in accordance with NRA guidelines the NRA Future Traffic Forecasts 2002-2040 (August 2003) have been rebased and are reproduced below in Table 5.1.

Table 5.1 Future Traffic Growth Factors Rebased to 2007

Road Type/Growth Scenario	2007		2015		2030		2040	
	PC	HV	PC	HV	PC	HV	PC	HV
National Primary (NRA High Traffic Growth)	1.00	1.00	1.22	1.24	1.50	1.63	1.60	1.88
All Roads (NRA Low Growth)	1.00	1.00	1.16	1.18	1.36	1.46	1.44	1.63

Source: NRA Future Traffic Forecasts 2002-2040 (August 2003)

Matrix Totals

5.6 A summary of the PCU trip totals for future years in accordance with the two growth scenarios is shown in Table 5.1.

Table 5.2 Forecast Matrix Totals

	Matrix Totals		
	2015	2030	2040
AM Peak - Low Growth	2547	3018	3232
AM Peak - High Growth	2673	3326	3623
OFF Peak - Low Growth	1975	2347	2521
OFF Peak - High Growth	2074	2589	2832
PM Peak - Low Growth	2741	3237	3454
PM Peak - High Growth	2876	3564	3864

Highway Network Schemes

5.7 The projects traffic objectives include the provision of better strategic movement across the study area to reduce journey times and reduce accidents.

5.8 The calibrated base year 2007 highway model network has formed the foundation for the forecast year schemes. The route options under consideration are outlined below and are shown graphically in **Figure 5.1**:

- **Corridor 1 (Blue Route)** – Corridor 1 begins at the intersection of the N5 with Teevnacreeva and is the only route which remains North of the existing N5 for its entirety. The new route meets the R361 slightly to the North of Frenchpark and continues Eastbound where it follows the R369 for a time near Mantua before crossing the N61 at Gortnacrannagh. Moving Eastbound, the corridor dissects rural roads until meeting the R368 at Lugboy at which point it travels South and mirrors the present R368 but bypassing Strokestown on its Eastern edge before arriving at the N5;

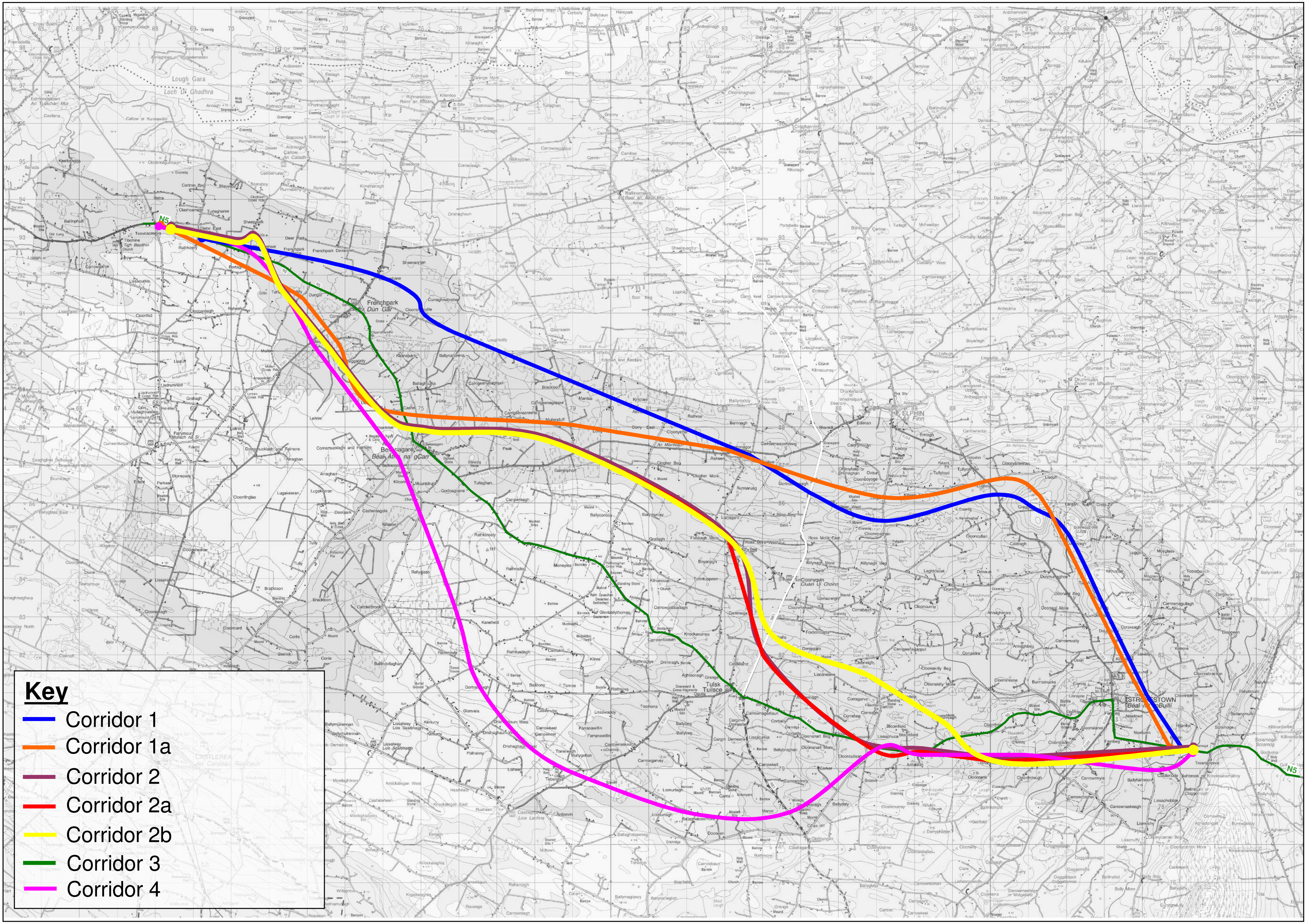
- **Corridor 1A (Orange Route)** – Corridor 1A also begins at the intersection of the N5 with Teevnacreeva but veers to the South of the existing N5 AT Frenchpark Demesne. The corridor then intersects with the R361 South of Frenchpark before merging with the existing N5 North of Bellanagare. Corridor 1A then follows a similar route as Corridor 1 North of the N5 through the R369, N61 and R368;

- **Corridor 2 (Purple Route)** – Route Option 2 is the option which has the closest alignment with the existing N5. The initial route from Teevnacreeva follows corridor 1A to South of the N5 until North of Bellanagare. After Bellanagare, the route alignment transfers to North of the N5 and dissects the R369 and local roads before meeting the N61 near Tulsk. After Tulsk the new route follows the existing alignment of the N5 until Ardakillin where it travels South of Cloonfree Lough and through the R368 before merging with the N5 East of Strokestown at Farnbeg;

- **Corridor 2A (Red Route)** – Option 2A follows a similar alignment to that of Option 2 however the route travels to the South of the existing N5 from the outset until it reaches North of Bellanagare. From this point onward, Corridor 2A mirrors Corridor 2 apart from the fact that it merges with the N5 further to the East than option 2 ;

- **Corridor 2B (Yellow Route)** – Option 2B is a mixture of both options 2 and 2A with it initially following the alignment of Option 2 until Ardakillin but then following the alignment of option 2A as it merges with the N5 further to the East of Strokestown at Bumlin;

- **Corridor 3 (Green Route)** – Corridor 3 is representative of a Do Nothing Scenario whereby the existing alignment of the N5 will remain; and



22186
April 2009

Corridor Options

Figure 5.1

- **Corridor 4 (Pink Route)** – Route Option 4 is the only route with its entirety aligned to the South of the existing N5. At Churchstreet the new route travels slightly South and meets the R361 at Mullen before travelling Eastbound until it meets the local roads South of Bellanagare. At this point, the road travels further away from the N5 and dissects local roads until it reaches the R367 at Toberelva. Corridor 4 continues moving Eastbound and passes the N61 near Cloonyogan before heading further North and following the existing N5 for a short period. At Ardakillin, Option 4 follows the alignments of options 2A and 2B.

Model Outputs

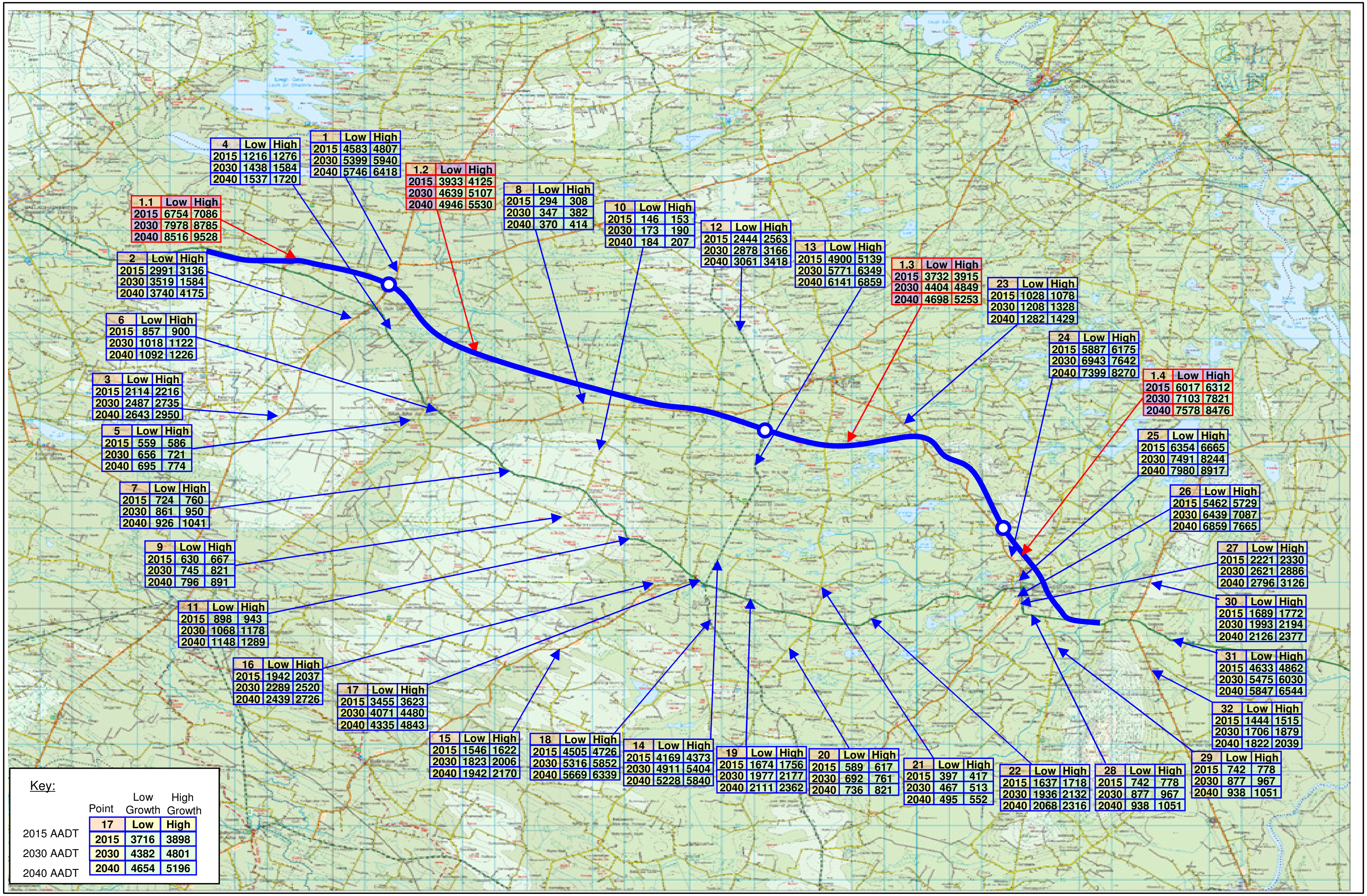
5.9 The results produced by the SATURN modelling need careful analysis and interpretation to produce a clear and concise picture of the network effects of each corridor option. The model statistics for each of the forecast years demonstrates a good level of convergence.

5.10 The protocol adopted in this report is to display results for the Do Minimum and all seven alternative Corridor Options together wherever possible. We believe this will aid interpretation and allow easy comparison across all model runs. We also provide results for each of the three model time periods to provide a complete picture.

Flow Volumes

5.11 Model output flow volumes have been factored from AM peak, Off peak, and PM peak model periods to 24 hour annual average daily traffic flow (AADT) equivalent.

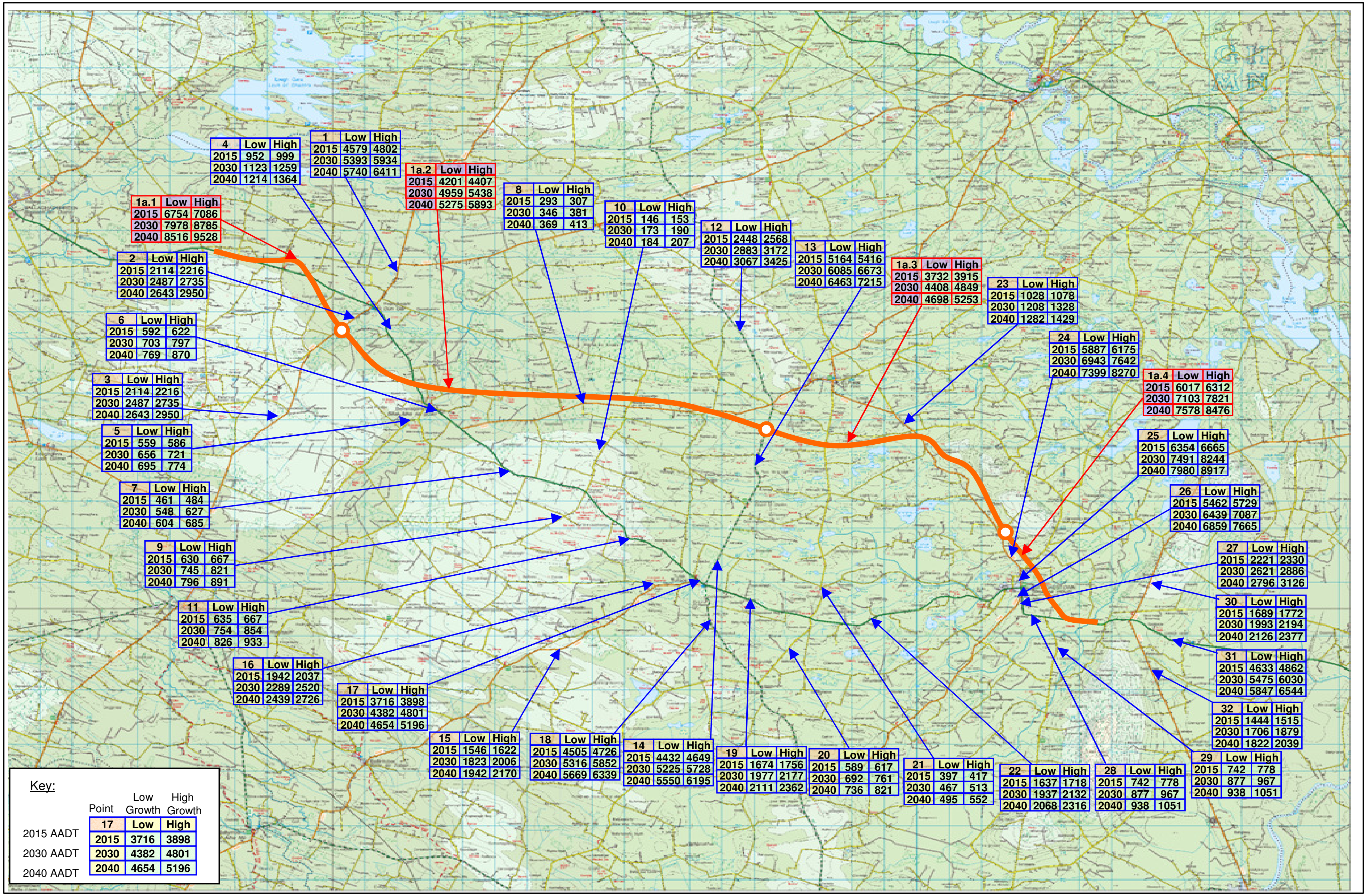
5.12 The output AADT's from the model are shown in **Figures 5.2 - 5.8**.



TPi 22186
April 2009

Route Option 1 - AADTs

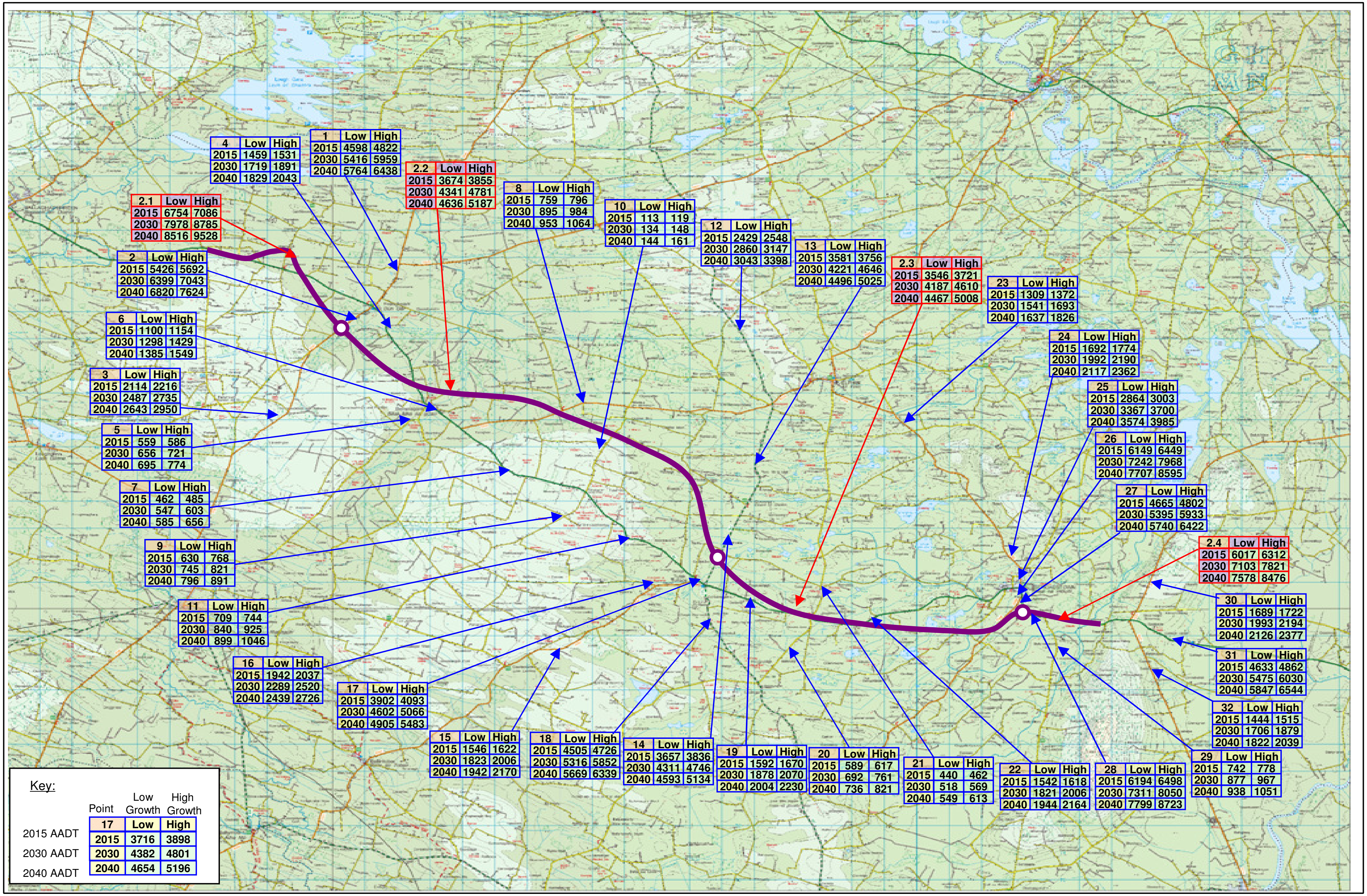
Figure 5.2



TPi 22186
April 2009

Route Option 1A - AADTs

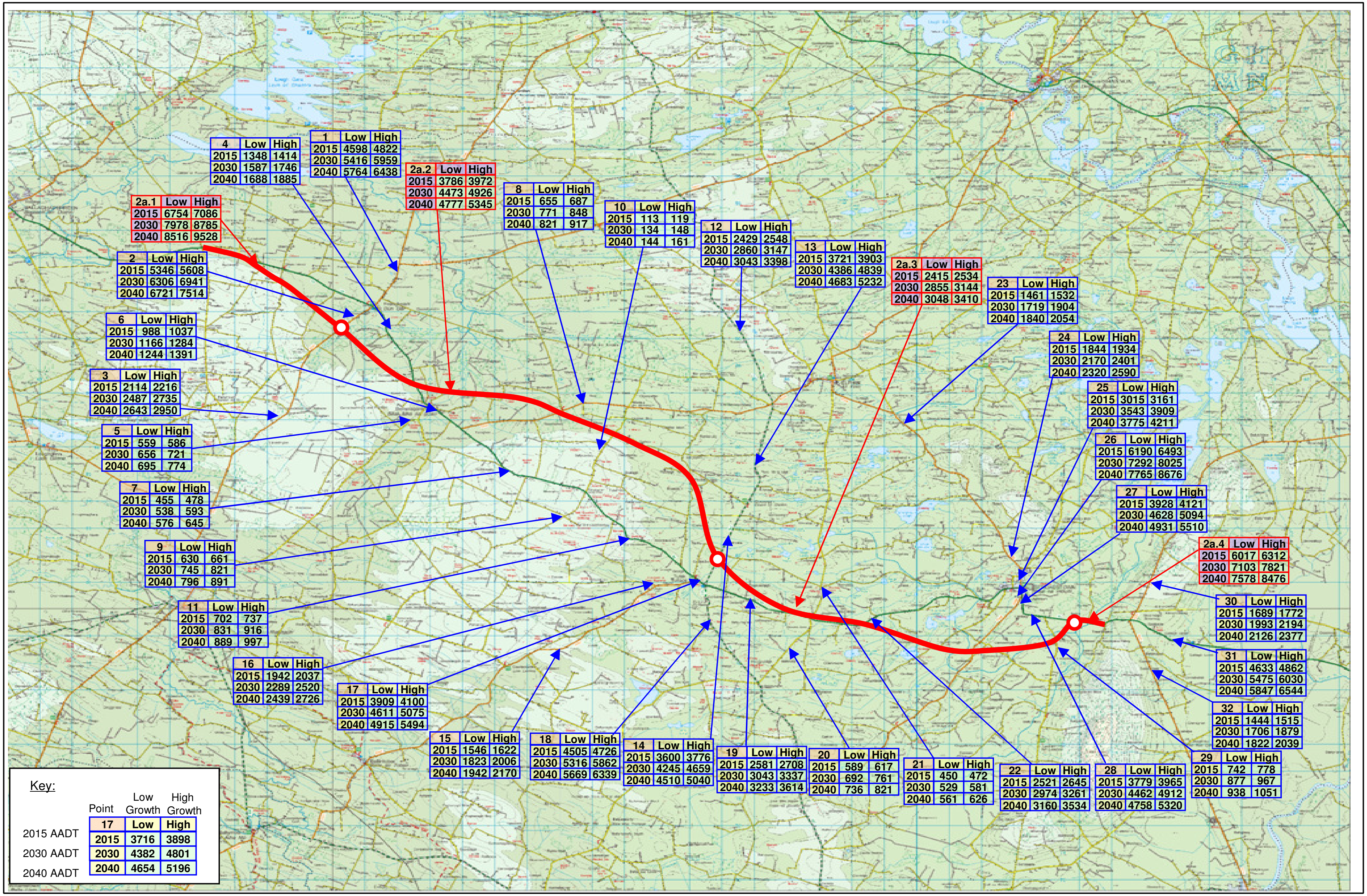
Figure 5.3



TPi 22186
April 2009

Route Option 2 - AADTs

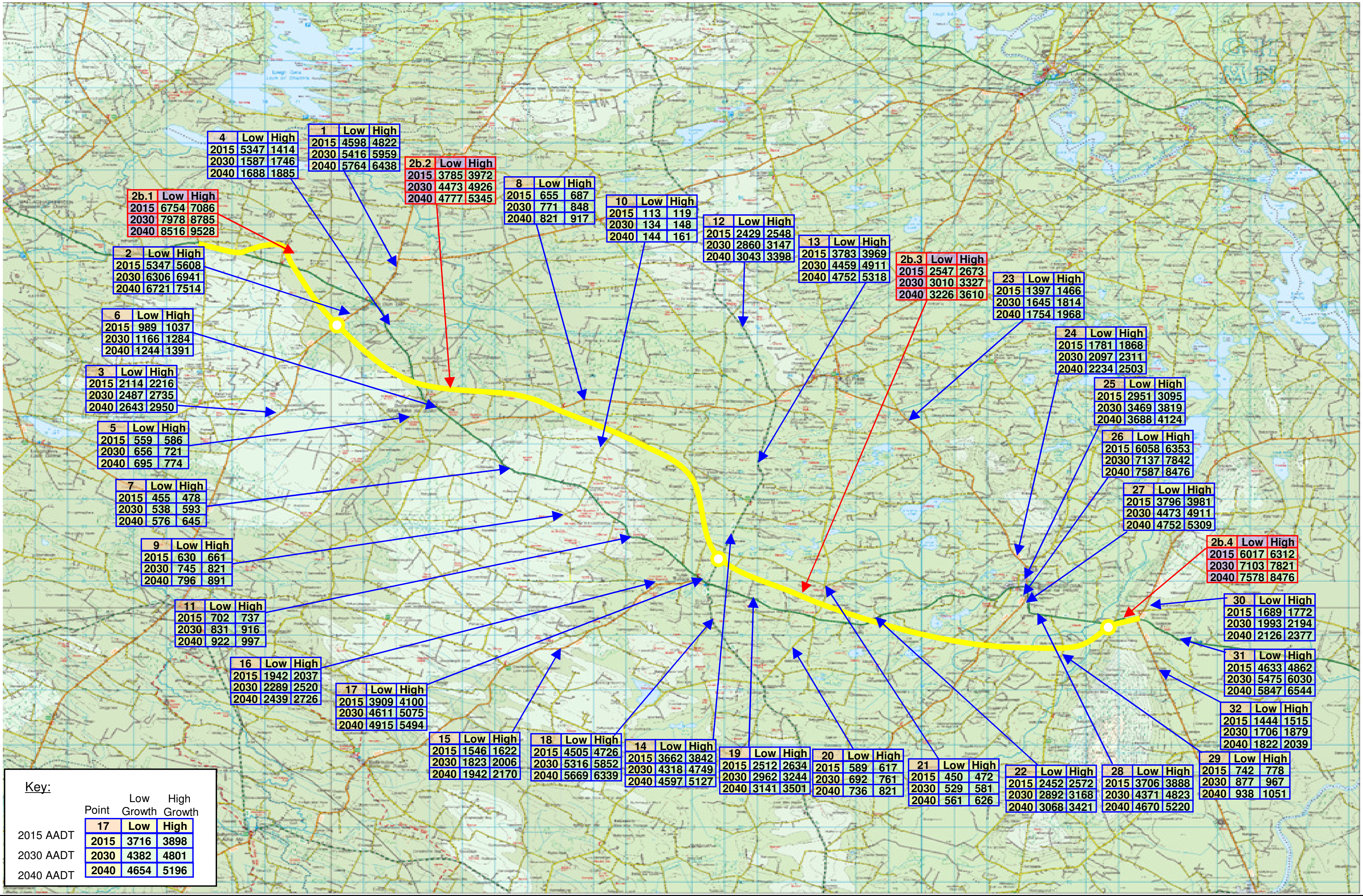
Figure 5.4



TPi 22186
April 2009

Route Option 2A - AADTs

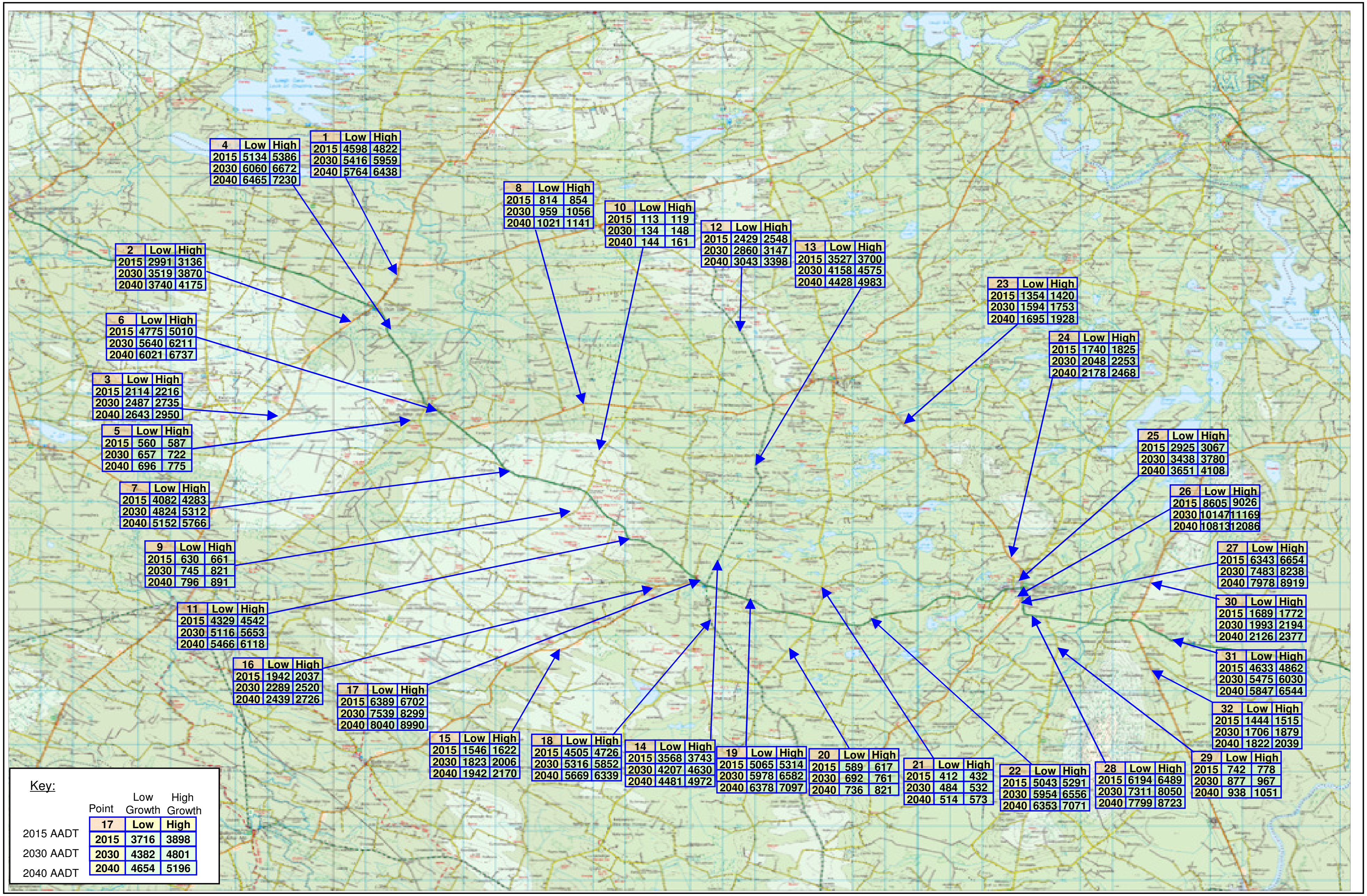
Figure 5.5



TPi 22186
April 2009

Route Option 2B - AADTs

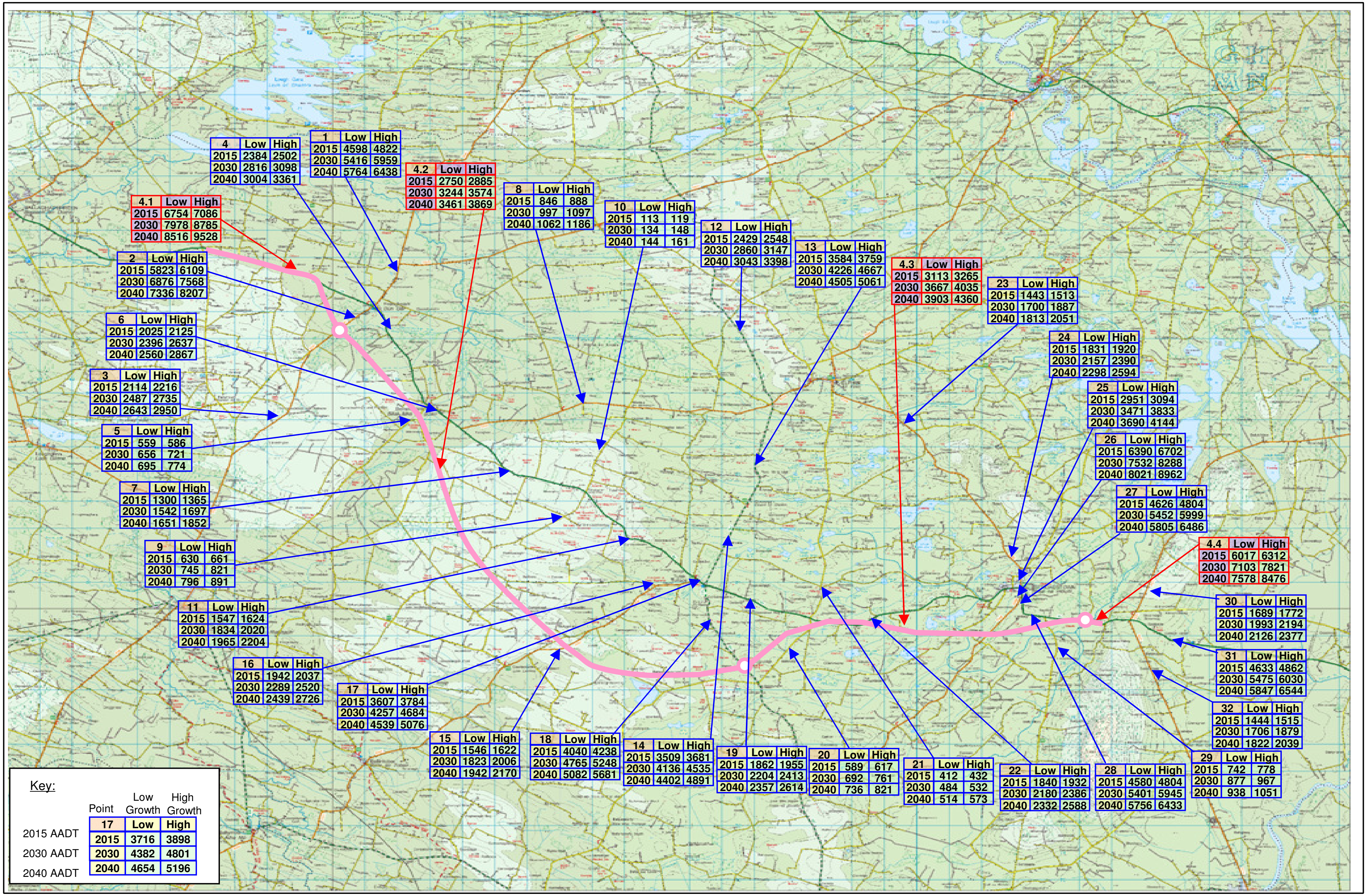
Figure 5.6



TPi 22186
April 2009

Route Option 3 - AADTs

Figure 5.7



Route Option 4 - AADTs

Figure 5.8

6.0 SUMMARY

Introduction

6.1 This report has presented information on the development, validation and forecasting of the N5 Strategic Corridor traffic model.

Data Sources

6.2 In order to produce a quality model for the study area, it was deemed necessary to collect different types of traffic data for the area of interest. These included:

- ANPR - Automatic Number Plate Recognition;
- Automatic Traffic Counts;*
- Manually Classified Junction Counts (MCJC) to identify weekday turning movements at key intersections;
- Vehicle journey times along the N5 and on other well-used routes within the study area; and
- Roadside Interview Surveys.

Model Building

6.3 The SATURN (Version 10.8.17) suite of programs has been used in the model development, as it is considered to be the most accurate tool available to measure the effects of changes in traffic levels and the highway infrastructure, on both a link and junction basis.

6.4 The focus for the study is the route of the N5 and the towns and townlands connecting to the route. Thus, the network within the study area has been represented entirely as a 'simulation' network. This incorporates detailed layouts of links and junctions.

6.5 The highway network included in the model extends from the N5 at Teevnacreeva in the North West to the N5 at Strokestown in the south east. This area is considered of sufficient scope to incorporate the likely traffic impacts of the scheme.

6.6 Extensive checks have been made on the network configurations defined in the SATURN models, to ensure there is proper connectivity, consistent link distances and speeds and realistic capacities and permitted manoeuvres.

Model Calibration and Validation

6.7 The assignment validation results can be summarised as follows:

- The SATURN models for each peak period have converged well, meeting all DMRB criteria;
- The correlation between the observed and modelled link counts meet DMRB guidelines for each modelled period; and
- The models reproduce observed year 2007 junction turning counts to a satisfactory degree of accuracy for all three models.

6.8 The AM peak, Off peak and PM peak models all show accurate comparison to observed conditions. The models are reliable in the critical areas, in terms of matrix O/D movements, assigned traffic flows, route choice and network journey times.

6.9 Based on the results of the validation, it is considered that the N5 Strategic Corridor model represents a robust basis for use in future year traffic forecasting and is suitable for operational, economic and environmental assessments of the route options.

Forecasting

6.10 The report also considers the development of the future year networks, namely:

- Corridor 1;
- Corridor 1A;
- Corridor 2;
- Corridor 2A;
- Corridor 2B;
- Corridor 3; and
- Corridor 4

6.11 Future year forecasts for 2015 and 2030 have been produced for each network option under both Low and High Growth Conditions.

6.12 The model statistics for each of the forecast years demonstrates a good level of convergence. The estimates of future year traffic are considered robust for use in assessing the proposed route options.