

Southport SATURN Model Update Highway Assignment Model Report

December 2014

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1. Introduction

1.1. Purpose of the Model

Sefton Council has commissioned Atkins to develop a SATURN traffic model of the Southport area of Sefton to support future transport assessments and carry out scenario testing of the transport impacts of new developments and associated mitigation measures. The strategic model will also help develop business cases for future major schemes and route strategies.

This local model validation report documents the development, calibration and validation of the strategic highway model. It provides an overview of the development of the base year traffic models; the extent to which the base year traffic models reflect existing conditions on the highway network and their suitability as a tool for future year forecasting.

1.2. Scope and Contents of this Report

Following this introduction, the remainder of the report is structured as follows:

- Chapter Two – Description of the Model;
- Chapter Three - Trip Matrix Development;
- Chapter Four – Model Standards;
- Chapter Five – Model Calibration;
- Chapter Six – Model Validation; and,
- Chapter Seven – Summary and Conclusions.

2. Description of the Model

2.1. Background

A SATURN traffic model of the Southport area is already in existence which was validated to a base year of 2001 with a single forecast year of 2010. The model has two modelled time periods (a weekday AM peak hour 0800-0900 and a Saturday peak hour 1300-1400) with a single user class.

Given the age of the existing Southport model, it was decided to update and re-validate the traffic model to a new/current base year, as well as model the weekday inter-peak and weekday evening peak periods.

Journey purpose data was collected to convert the model from a single user class model to a five User Class, model.

2.2. Temporal Coverage

In order to robustly assess traffic conditions at different times of day, the following time periods were modelled:

- **Morning Peak Hour:** The AM peak hour model represents the busiest hour in the morning peak period (between 0700 & 1000). Traffic count data indicates the peak hour occurs in the period 0800-0900;
- **Inter-Peak Average Hour:** The inter-peak hour model is an average hour model representing weekday traffic conditions between 1000 & 1600. The use of an average hour model is justified on the basis that the flow profile is relatively stable during this period; and
- **PM Peak Hour:** The PM peak hour model represents the busiest hour during the weekday PM peak period (between 1600 and 1900). The traffic count data shows that the peak hour occurs during the period 1700-1800.

For the morning peak and evening peak hour, a previous shoulder peak period is also modelled (although this is not separately validated), queues which build up during this period are carried over to the start of the peak hour using the SATURN PASSQ option.

2.3. Base Year

This Southport highway traffic model has been validated to a base year of October 2013. The model is developed using the SATURN suite of software, version 10.9.24,

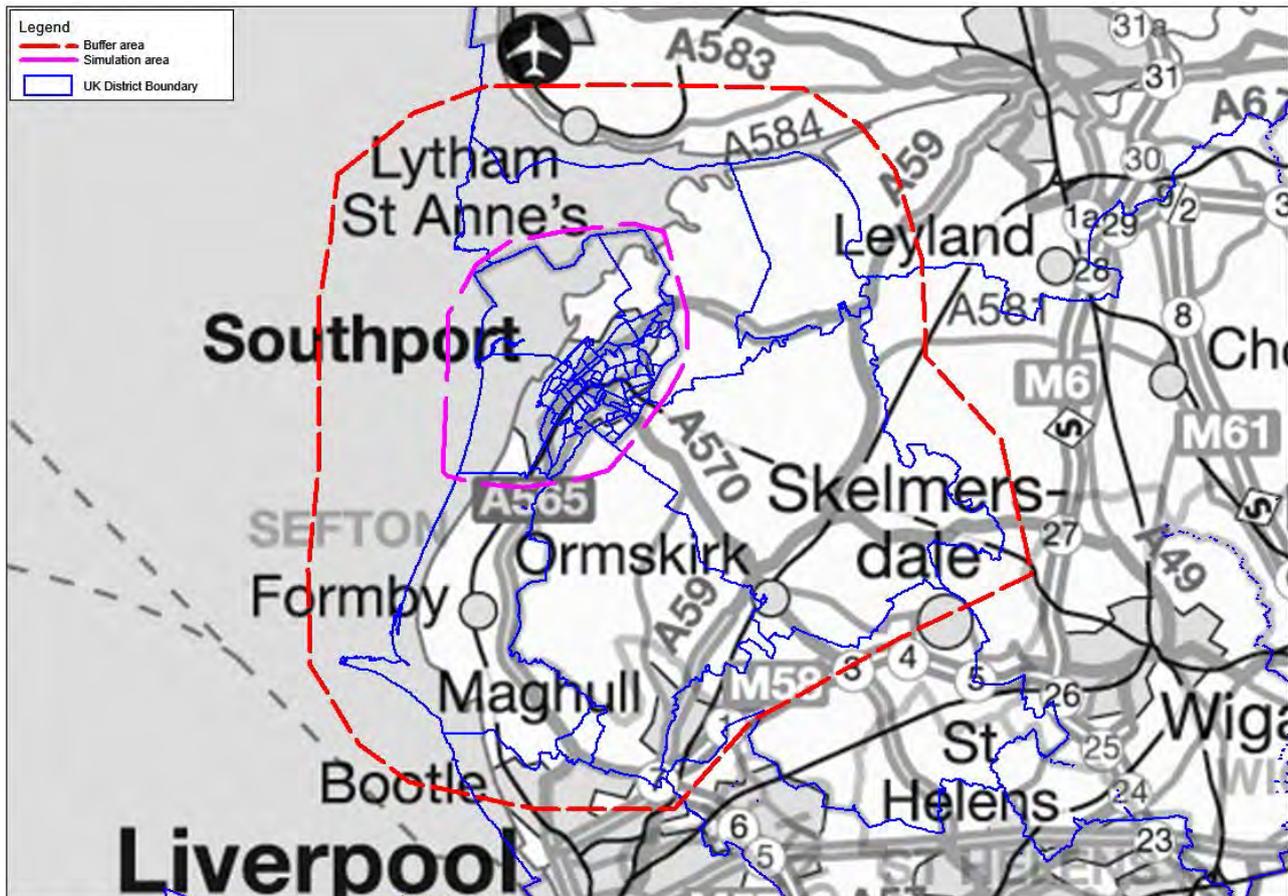
2.4. Modelled Area

TAG Unit M3.1 states that the geographic coverage of highway assignment models generally need to:

- Allow for the strategic re-routeing impacts of interventions;
- Ensure that areas outside the main area of interest, which are potential alternative destinations are properly represented; and
- Ensure that the full lengths of trips are represented for the purpose of deriving costs. The modelled area therefore needs to be large enough to include these elements.

.The extent of the simulation and buffer elements of the highway network is displayed in Figure 2-1.

Figure 2–1 Geographic Coverage of the Southport Traffic Model



2.5. Development of Detailed Traffic Model

The highway traffic model has been developed at two levels of detail:

- Simulation coding of junctions/links in the urban area; and
- Buffer coding of links in outer rural area.

The Southport traffic model simulation area covers the majority of the Southport town area, the buffer area covers the outer rural areas of the town

Simulation coding enables detailed modelling of junctions and allows representation of queuing and delays for each movement through the junction. This level of detail requires specific data on the junctions operation including geometry and lane usage plus where traffic signals are used the phasing and staging data relating to the signal operation. As a result simulation coding is data intensive but provides a robust basis for detailed network operations and is suitable for urban networks.

Buffer coding is simpler and relies on speed flow curves to represent link and junction delay. Buffer coding is ideally used to represent rural elements of a network where junctions are infrequent and delays arising from junctions are likely to be small.

2.5.1. Capacity Restraint

Capacity restraint is modelled in the simulation area predominantly through junction modelling. All modelled junctions in the simulation area have been assessed and modelled as a respective junction type of either a:

- Priority Junction:
- Roundabout: or;
- Signalised Junction.

Within the buffer area, capacity restraint is controlled primarily based on the speed-flow relationship of COBA speed flow curves.

2.5.2. Link Coding

The existing traffic model of Southport, validated to a 2001 baseline was used as a basis for highway network development.

A thorough audit of the general network structure and junction details across the entire modelled area has been undertaken using internet based satellite imagery, any changes to the data has been incorporated to update the Southport highway networks to reflect a base year of 2013

The link coding includes link length and road standard. The link lengths of roads are based on the measurements taken from GIS (MapInfo) by reshaping the highway network and checked against Google Earth distances. Distances coded are also checked against the crow-fly distance to ensure that the distance is greater than or equal to the crow-fly distance.

Link speeds within the simulation area are coded based on actual road speed limits obtained from internet based satellite imagery. Link speeds within the buffer network are also coded based on speed limits obtained from internet based satellite imagery, but are controlled with standard Cost Benefit Analysis (COBA) speed flow curves.

2.5.3. Link Saturation flow

Junction saturation flows were calculated according to standard formulae which have been adopted and enhanced based on experience of highway traffic model development by Atkins.

Saturation flows adopted for the Southport highway model for signalised junction, priority junction and roundabout junctions are presented in Table 2–1 to Table 2–3 respectively below.

Table 2–1 Saturation Flow for Signalised Junctions (pcu/hr)

Entry Arm Type	Left Turn	Straight	Right Turn
Single Lane Narrow <3m	1650	1900	1700
Single Lane Normal ~3.5m	1750	1950	1800
2 Lanes Narrow <6m	3500	3950	3600
2 Lanes Normal ~7m	3600	4100	3700
3 lanes ~10m	N/A	6200	N/A

Table 2–2 Saturation Flow for Priority Junctions (pcu/hr)

Turn Link Type	Approach Lane Type	Left	Ahead	Right
Major Arm -No Marker	Full lane (No Flare)	1,500	1800	1,500
Major Arm X Major arm	Full lane (No Flare)	n/a	1200	900
Minor Arm -Gives way	Full lane (No Flare)	1,200	950	875
Major Arm -No Marker	Main plus Flare	1,650	1900	1,650
Major Arm X Major arm	Main plus Flare	n/a	1,250	1,250
Minor Arm -Gives way	Main plus Flare	700	675	675
Minor Arm -Merge	Full lane (No Flare)	1,200	n/a	n/a

Table 2–3 Saturation Flow for Roundabouts (pcu/hr)

Entry Arm Type	Mini	Small	Medium	Large
Inscribed Diameter	~20m	~40m	~60m	~80m
Single Lane Narrow <3m, No Flare	900	950	1000	N/A
Single Lane Narrow <3m, Flare To 2 Lanes	1225	1325	1400	N/A
Single Lane Normal 3.5m, No Flare	1050	1075	1150	1200
Single Lane Normal 3.5m, Flare To 2 Lanes	1475	1550	1625	1700
Dual No Flare	N/A	2325	2400	2475
Dual Flare To 3 Lanes	N/A	2725	2850	2950

2.5.4. Link Speeds

Free flow speeds are coded based on the actual speed limit of the roads being modelled, Internet based street viewers have been used to obtain the speed limits of roads in the modelled network.

Standard COBA speed flow curves were applied to links in the buffer network. The COBA speed flow curves are presented in Table 2–4.

Table 2–4 COBA Speed Flow Curves.

SFC No.	Road Type	Free Flow Speed (kph)	Speed at Capacity (kph)	Capacity (pcu/hr)	Power of the Curve
5	RURAL -D2AP	100	73	4199	2.80
6	RURAL -S2 10m TD9/81	93	55	1686	2.15
7	RURAL -S2 7.3m TD9/81	87	58	1328	1.99
9	SUB-URBAN-Dual (slight development)	75	35	3540	2.56
10	SUB-URBAN-Dual (typical development)	71	35	3540	1.42
12	SUB-URBAN-Single (light development)	65	25	1680	2.63
13	SUB-URBAN-Single (typical development)	61	25	1680	1.58

2.5.5. Signal Timings

Detailed signal data including cycle times, green times phasing/staging arrangements, as well as inter-greens times are coded into the model based on data provided by Sefton MBC.

2.6. Model Zoning System

The zoning system used to represent the spatial properties of urban areas is a fundamental basic of all aggregate traffic models and has a critical impact on the quality and credibility of model outputs.

The zoning system for the Southport model is based on the TEMPRO and ONS Output Areas, which are generally aggregated based on population size and mutual proximity.

Table 2–5 shows the number of zones contained in the Southport model, the model consists of 91 zones in total. 81 zones represent the town of Southport whilst the remaining 10 zones represent the external rural areas of the town and the rest of Great Britain.

Figure 2–2 and 2-3 show the zoning system of the Southport traffic model graphically.

Table 2-5 Southport model Zoning System

Area	No. of Zones
Southport Town (1-81)	81
Rural and Rest of GB (82-91)	10
Total	91

Figure 2-2 Southport Internal Zones

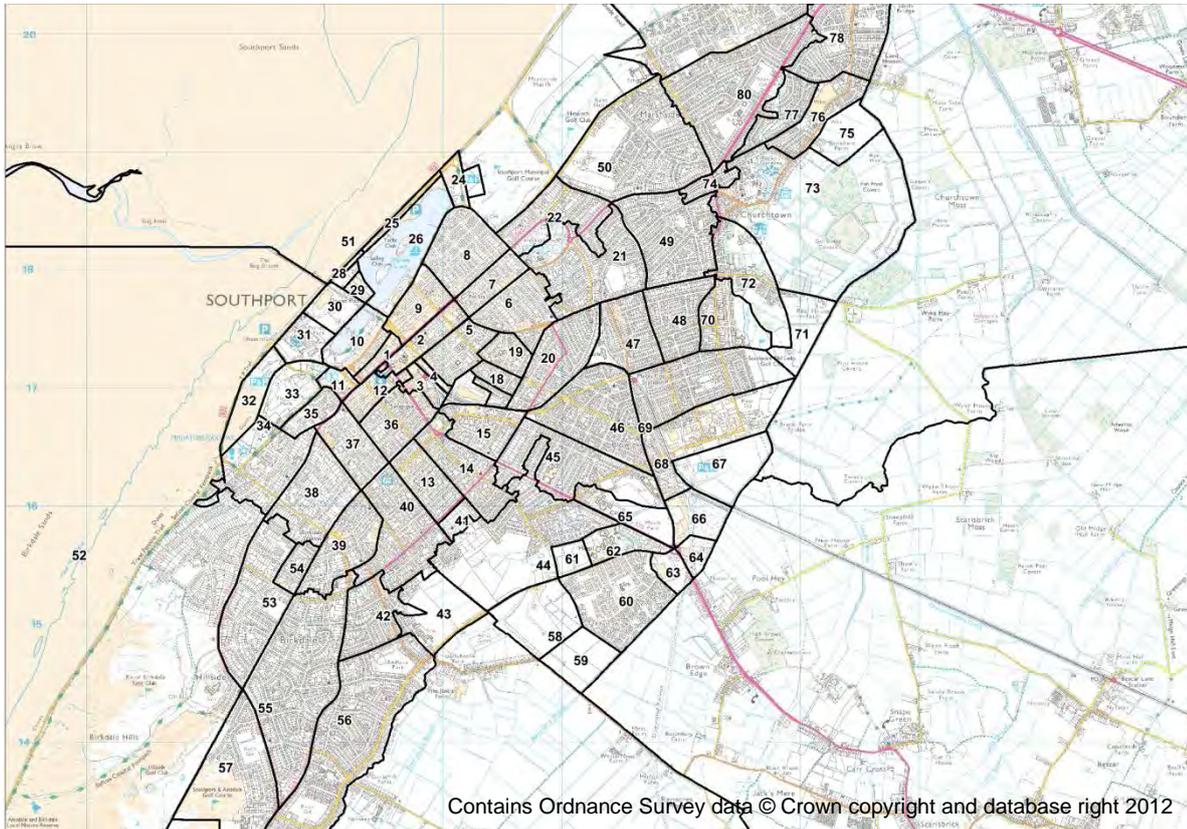
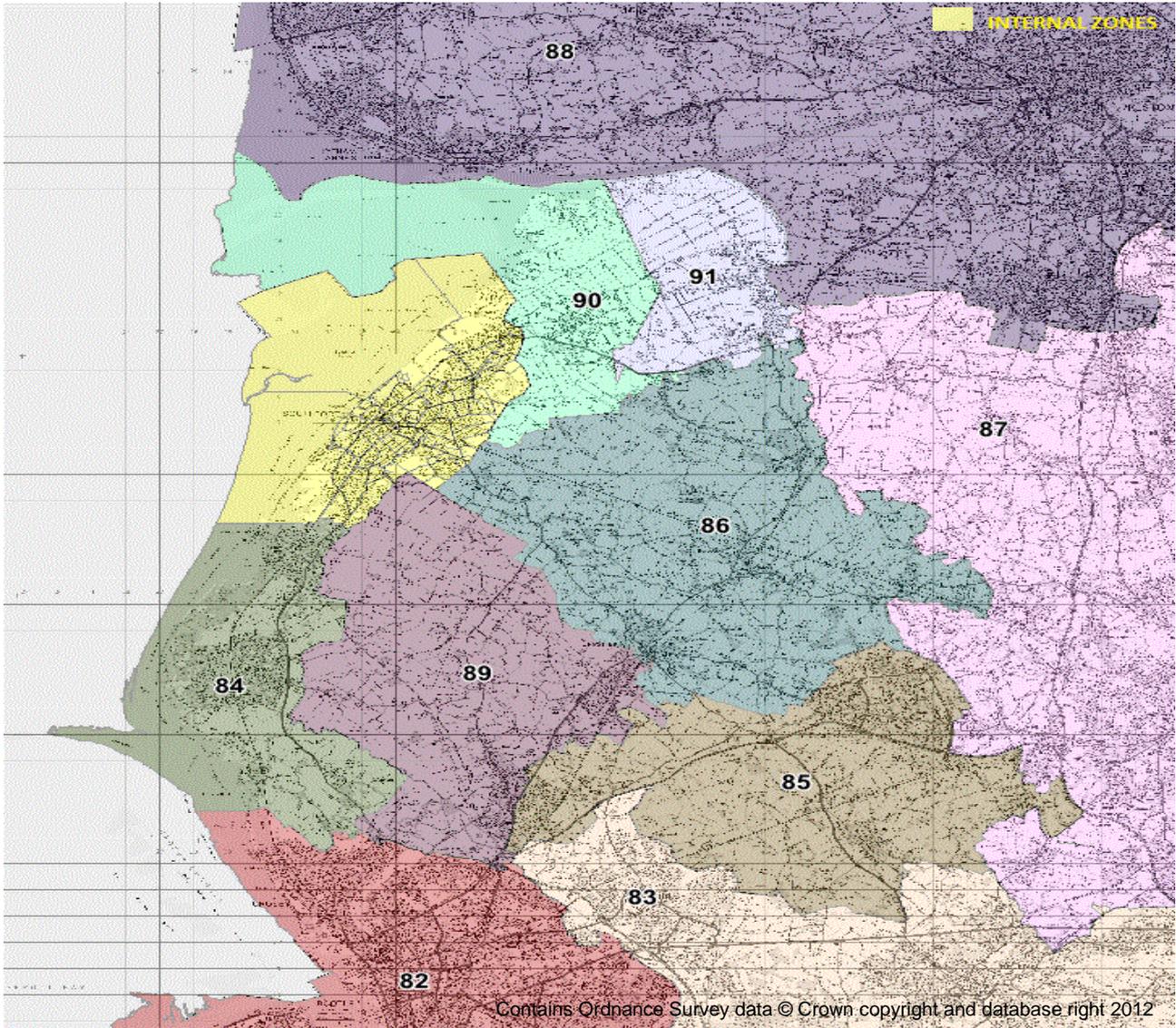


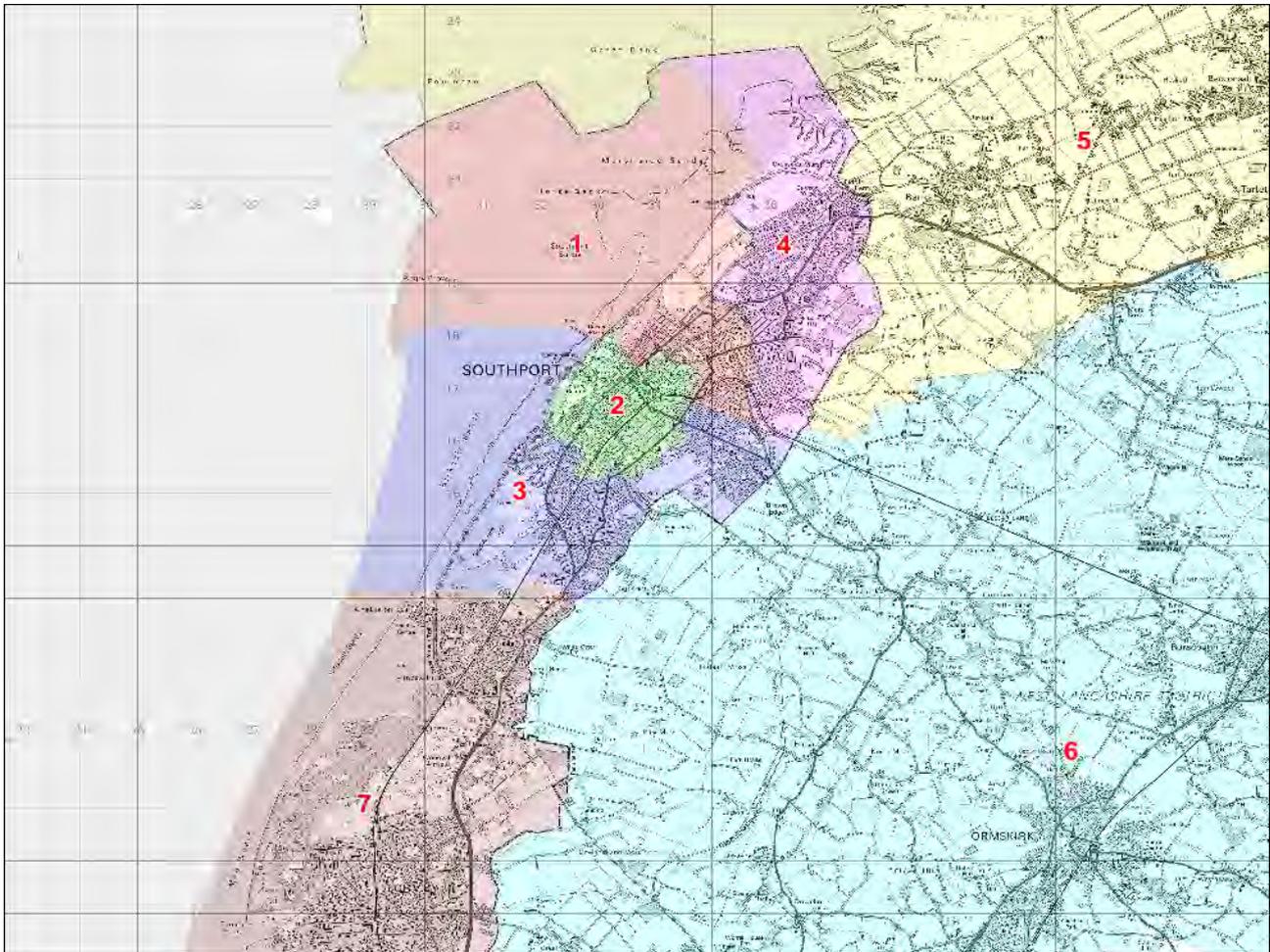
Figure 2-3 Southport External zones



2.6.1. Sectoring System

During the development of Southport highway assignment model, a seven sector system was developed to assist with matrix manipulation, as well as analysis and comparisons at an aggregated level. The sectors are made up of the zones which comprise the Southport model. Figure 2–4 shows the Southport sector system.

Figure 2–4 Southport Zone Sector System



2.7. User Classes

The highway assignment model represents highway demand with five user classes as detailed below:

- User Class 1 - Car Commuting (HBW)
- User Class 2 - Car Employers Business (HBEB)
- User Class 3 - Car Other (HBO)
- User Class 4 - Light Goods Vehicles (LGV); and
- User Class 5 - Heavy Goods Vehicles (HGV).

2.8. PCU Factors

Passenger car units (pcus) are used as standard unit for demand and capacities rather than vehicles. This allows the effect of longer/slower vehicles that occupy more road space and take longer to clear junctions to be represented accurately. The conversion factors used for the various vehicle types are summarised below in Table 2–6.

Table 2–6 Vehicle to PCU Conversion Factors

Vehicle Type	Equivalent PCUs	Comment
Car	1.0	Private cars
LGV	1.0	Goods Vehicles using car-based chassis
HGV	2.3 ⁽¹⁾	For both OGV1 & OGV2 vehicle types

2.9. Assignment Methodology

The assignment of trips to the highway network was undertaken using a standard ‘Wardrop User Equilibrium’ approach, which seeks to minimise travel costs for all vehicles in the network. The Wardrop User Equilibrium is based on the following proposition:

“Traffic arranges itself on congested networks such that the cost of travel on all routes used between each O-D pair is equal to the minimum cost of travel and all unused routes have equal or greater cost”

The Wardrop User Equilibrium as implemented in SATURN is based on the ‘Frank-Wolfe Algorithm’, which employs an iterative process. This process is based on successive ‘All or Nothing’ iterations, which are combined to minimise an ‘Objective Function’. The travel costs are recalculated on each iteration, and then compared to the previous iteration. The process is terminated once successive iteration costs have not changed significantly. This process results in possible multi-routeing between any origin-destination pair.

2.10. Generalised Cost Coefficients

The cost of travel is expressed in terms of generalised cost minutes, which can be related back to values of time and out-of-pocket costs in accordance with the TAG Unit A1.3.

The coefficients for the individual components of generalised costs were calculated using TAG Unit A1.3.

The model base year is 2013 with all monetary values calculated and based at 2010 prices.

2.10.1. Values of Time

Perceived values of times are used to calculate costs in the Southport model. Cars, LGV’s and HGVs travelling in work time have the same perceived and resource values times. The calculation of values of time is summarised below:

1. Equivalent 2013 values are calculated by applying the specified growth in working and non-working values of time (Annual Parameters in TAG Unit A1.3);
2. The relative proportions of Car Non-Work, Other and Commuting are calculated from the RSI surveys;
3. The equivalent values for vehicles are calculated by applying the occupancies obtained from the RSI surveys;
4. HGV travel is assumed to be in work time with the split between OGV1 and OGV2 recorded from the RSI surveys; and
5. Values are converted from pounds per hour to pence per minute.

2.10.2. Vehicle Operating Costs

Vehicle Operating Costs are calculated using TAG A1.3 (January 2014) and defined separately for fuel and non-fuel elements before being combined for use in the SATURN assignment. Non-fuel costs are only applied to business travellers.

⁽¹⁾ TAG Unit 3.19c provides two pcu values for HGVs: either 2.3 pcu for motorways and all-purpose dual carriageways or 2.0 pcus for all other road types.

2.10.2.1. Fuel Costs

The consumption of fuel (in litres per km), adjusted by the fuel efficiency factors, is multiplied by the cost per litre to provide the cost per km in the model base year (2013). For trips made on employers business i.e. work trips, fuel duty is included in the calculations as a perceived cost as businesses are not able to reclaim the duty. However, VAT is excluded as this is reclaimable by businesses. For non-work purposes, the perceived cost of the fuel Vehicle Operating Cost is the market price. LGV fuel costs were derived using the work/non-work proportions obtained from the RSI surveys and used in the calculation of average Value of Time.

2.10.2.2. Non-Fuel Costs

The non-fuel cost element is derived using the formulae set out in TAG A1.3 Table A1.3.14 and is a function of average network speed. No further adjustments are required as the non-fuel costs are assumed to remain constant in real terms, over time. As noted above, the non-fuel cost element is only included for business travellers.

The resulting cost coefficients of pence per minute (PPM) and pence per kilometre (PPK) are presented in Table 2–7 below.

Table 2–7 Generalised Cost Coefficients

Category	VoT (pence/min) (PPM)	VOC, Fuel+Non-fuel (PPK)
Morning Peak(7:00-10:00)		
Car Work	44.66	12.62
Car Commuting	12.90	6.93
Car Others	14.04	6.93
LGV	17.82	15.66
HGV	20.05	31.72
Inter Peak(10:00-16:00)		
Car Work	48.66	12.77
Car Commuting	13.12	6.93
Car Others	15.74	6.93
LGV	18.93	15.66
HGV	20.05	31.72
Evening Peak(16:00-19:00)		
Car Work	49.20	12.73
Car Commuting	13.83	6.93
Car Others	17.42	6.93
LGV	17.82	15.66
HGV	20.05	31.72

3. Trip Matrix Development

3.1. Introduction

Vehicle trip matrices for each modelled hour were developed using information from a range of sources listed below:

- Road Side Interview (RSI) surveys;
- 2011 National Census 'Journey to Work' data;
- Car Park Survey Data;
- Traffic Master Data;
- Automated Traffic Count Data (ATC) and,
- Manual Classified Count Data (MCC).

The following sections of the report describe the sources of data and the methodology adopted for the development of the highway demand matrix:

Travel Demand Data

- Collecting, processing and expansion of Road Side Interview (RSI) survey data, Traffic Master data and Car Park survey data.
- Processing of 2011 Census Journey to Work data;
- Collecting and processing of Automatic Traffic Counts (ATC), Manual Classified Counts (MCC);

Partial Trip Matrices

- Creation of partial Car, LGV and HGV trip matrices from observed Travel Demand Data;
- Expanding partial trip matrices against screen-line and cordon counts at a sector level;

Matrix Estimation

- Matrix Estimation to ensure greater consistency of the trip matrices with the count data;
- Adjustment of prior trip matrices if the magnitudes of the changes brought about by matrix estimation are regarded as significant; and
- Adjustments of prior trip matrices as a result of traffic rerouting with regards to journey time validations.

3.1.1. Traffic Master Data:

Traffic Master data was provided for the internal movements around Southport town centre covering a period of 60 days from the beginning of September 2012 to the end of November 2012.

The Traffic Master data was rezoned to correspond with the Southport model zoning system.

The data was split into journey purpose, Home Based Work (HBW), Home Based Employers Business (HBEB) and Home Based Other (HBO) based on observed RSI data proportions. Peak period to peak hour factors were then calculated from ATC count data to obtain peak hour matrices.

3.1.2. Census 2011 Journey to Work Data:

2011 Census Journey to Work (commuting data HBW) is available for home to place of work trip direction only. As this data does not include the return trips, these are calculated by applying 'DIADEM initial tour proportions' to the transposed journey to work matrices. The 2011 Census zones are rezoned to Southport zones and return trips added in to calculate the Home Based Work (HBW) car matrices for all the three time periods. Peak period to peak hour factors are applied to derive the peak hour HBW car matrices.

3.1.3. Car Park Surveys:

Car Park Interview surveys were carried out for a 12 hour period from 7am to 7pm at 6 car park locations around Southport town centre. At each site, trip origin, trip destination, trip purpose, vehicle type and time of travel were recorded during the interview. Origin and Destination postcodes collected during the survey were geo-coded into MapInfo and were converted to the Southport zoning system.

It was observed that the car park survey data was primarily 'home based other trips' (HBO) and hence only HBO journey purpose was considered from the car park survey data. Expansion factors were calculated using the car park count data for each time period and for HBO purpose. The subsequent HBO matrix generated was merged with the HBO matrix generated from Traffic Master data to form the final HBO I-I trip matrices.

3.1.4. RSI Processing:

Road Side Interview (RSI) surveys were carried out for a 12 hour period from 7am to 7pm at 7 locations on the main approaches into Southport. At each RSI site the trip origin, trip destination, trip purpose, vehicle type and time of travel were recorded during the survey. Manual classified counts (MCC) and/or automatic traffic counts (ATC's) were also undertaken at the same locations to enable the calculation of expansion factors to be applied to the RSI data, as not all vehicles passing through the RSI site can be stopped for interview.

Logical checks of the RSI data were undertaken to ensure no counterintuitive trips were included in the data set. For example, where the origin and destination had been incorrectly stated by the respondent, or inaccurately recorded by the interviewer, these records were removed from the data set.

Expansion factors were applied to the RSI survey data for each site to obtain Origin-Destination matrices for all purposes.

As all the RSI site locations are located on the outer cordon around the periphery of Southport, it was deemed appropriate to use the RSI data for Internal to External, External to Internal and External to External movements only.

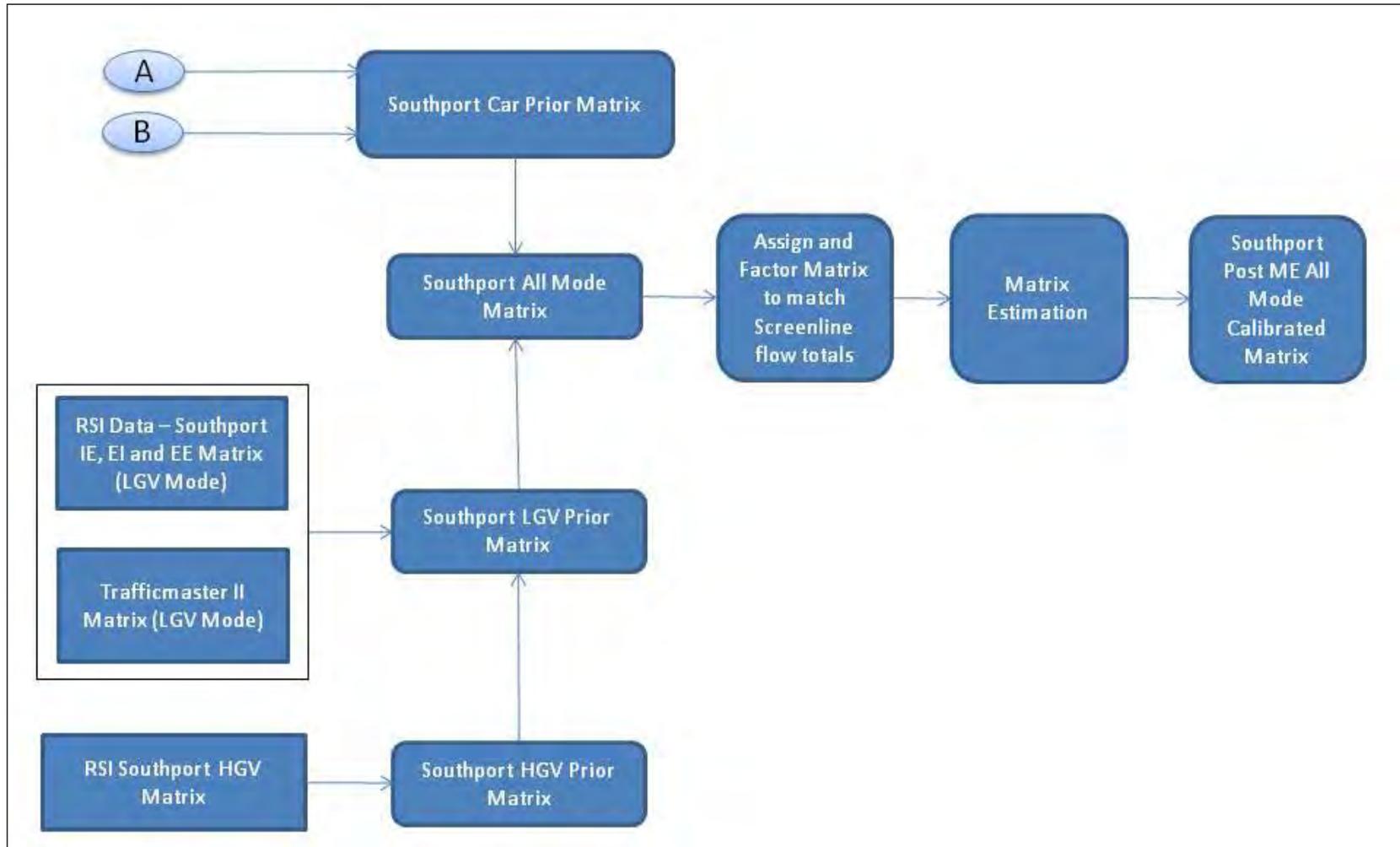
3.1.5. TEMPRO Trip-ends:

Population and Employment data was estimated for the Southport zones using the ONS 2011 Census data. An average trip rate for Southport was calculated from TEMPRO 6.2 trip-ends and planning data. This trip rate was then applied to each of the Southport zones (using census planning variables) to calculate the base year trip-ends.

3.2. Development of Trip Matrices

The highway matrix development process is summarised in the flow chart shown in Figure 3–1 below. The key steps (as marked in the flow chart) are described in the following bullet points:

- a) Rezone Traffic Master raw data and create Internal - Internal (I-I) Car and LGV matrices by time period;
- b) Calculate I-I trip-ends based on TEMPRO planning variables and 2011 census demographic data (for Car mode for all three time periods).
- c) Data from steps a & b is furnished to arrive at Southport I-I car matrix. This matrix is split into 'Commuter', 'Work' and 'Other' purposes based on observed RSI proportions.
- d) Process 2011 census 'journey to work' data to create, Home Based Work (HBW) I-I Car matrix. Add in return trips by transposing the journey to work data using DIADEM return proportions.
- e) Process car park survey data to derive partial Home Based Other (HBO) matrix for Southport I-I movements; Merge this data with HBO matrix from Traffic Master data.
- f) Combine HBW from 2011 census journey to work data, with Home Based Employers Business (HBEB) from Traffic master data and merged HBO matrix from step-e to form Southport I-I car matrix.
- g) Process RSI data to get Internal – External (I-E), External – Internal (E-I) and External – External (E-E) Car, LGV and HGV matrices.
- h) Combine Car I-I (from step-f) and I-E, E-I and E-E (from step g) to produce Southport car matrix for all three time periods.
- i) Combine LGV I-I (from step-a) and I-E, E-I and E-E (from step- g) to produce Southport LGV matrix for all three time periods.
- j) Combine Car and LGV matrices (from steps h and i) and HGV matrix (from step g) to form Southport all mode trip matrices for all three time periods.



3.2.1. Car matrix:

Tables 3-1 to 3-6 show the matrix totals obtained from the various data sources described above for all time periods for the Partial Car matrices (I-I, I-E, E-I and E-E). The matrices are presented as the seven sector system which is shown graphically in Table 2-4 earlier in this report.

Table 3–1 I-I car matrix for AM peak

Sector	1	2	3	4	5	6	7	Total
1	427	429	181	196				1232
2	354	764	390	171				1679
3	336	752	877	194				2159
4	644	691	374	775				2483
5								
6								
7								
Total	1761	2637	1821	1335				7554

Table 3–2 I-E, E-I and E-E car matrix for AM peak

Sector	1	2	3	4	5	6	7	Total
1					114	112	179	405
2					172	128	387	687
3					172	106	152	429
4					211	155	241	607
5	71	232	203	125	5	24	65	725
6	54	272	69	71	8	0	3	478
7	74	361	119	192	73	9	6	835
Total	199	865	392	389	755	534	1034	4167

Table 3–3 I-I car matrix for IP peak

Sector	1	2	3	4	5	6	7	Total
1	244	290	122	132				787
2	261	598	287	179				1326
3	186	469	564	107				1326
4	356	392	227	515				1490
5								
6								
7								
Total	1047	1749	1199	934				4929

Table 3–4 I-E, E-I and E-E car matrix for IP peak

Sector	1	2	3	4	5	6	7	Total
1					67	51	108	225
2					180	214	472	867
3					115	36	81	231
4					102	86	146	334
5	66	177	111	98	14	11	51	529
6	58	237	38	96	11	1	5	446
7	104	465	82	148	50	5	5	858
Total	227	879	230	343	540	404	868	3491

Table 3–5 I-I car matrix for PM peak

Sector	1	2	3	4	5	6	7	Total
1	266	346	216	219				1047
2	300	692	448	335				1775
3	245	467	574	189				1475
4	343	408	251	559				1562
5								
6								
7								
Total	1155	1913	1488	1303				5859

Table 3–6 I-E, E-I and E-E car matrix for PM peak

Sector	1	2	3	4	5	6	7	Total
1					89	58	128	275
2					295	276	485	1056
3					295	60	111	466
4					182	113	222	517
5	111	185	183	239	7	13	112	850
6	171	120	93	215	35	2	10	646
7	195	349	145	313	87	7	10	1105
Total	477	654	421	767	991	527	1078	4916

3.2.2. LGV matrix:

Matrix totals for LGV partial matrices (I-I, I-E, E-I and E-E) obtained from various sources described above for all time periods are presented in the seven sector system in Table 3–7 to Table 3–12.

Table 3–7 I-I LGV matrix for AM peak

Sector	1	2	3	4	5	6	7	Total
1	91	149	39	70				349
2	150	516	155	67				888
3	62	159	332	43				597
4	59	89	60	216				423
5								
6								
7								
Total	362	913	586	396				2256

Table 3–8 I-E, E-I and E-E LGV matrix for AM peak

Sector	1	2	3	4	5	6	7	Total
1					18	0	42	61
2					48	31	102	182
3					53	24	21	99
4					24	26	27	76
5	15	30	46	10	0	4	12	117
6	15	2	13	10	0	0	0	39
7	10	45	9	21	13	1	0	100
Total	41	76	68	42	156	86	205	674

Table 3–9 I-I LGV matrix for IP peak

Sector	1	2	3	4	5	6	7	Total
1	64	94	32	57				246
2	102	287	101	70				560
3	30	103	181	34				348
4	52	59	33	158				302
5								
6								
7								
Total	249	542	347	319				1457

Table 3–10 I-E, E-I and E-E LGV matrix for IP peak

Sector	1	2	3	4	5	6	7	Total
1					13	10	21	44
2					39	7	65	112
3					31	9	20	60
4					18	19	18	55
5	11	39	27	17	0	0	9	104
6	10	8	8	22	0	0	0	49
7	21	64	17	18	9	0	1	129
Total	42	111	52	57	110	45	135	553

Table 3–11 I-I LGV matrix for PM peak

Sector	1	2	3	4	5	6	7	Total
1	30	40	24	36				131
2	31	102	55	38				227
3	16	60	71	28				176
4	27	47	24	80				179
5								
6								
7								
Total	105	250	175	183				712

Table 3–12 I-I -E, E-I and E-E LGV matrix for PM peak

Sector	1	2	3	4	5	6	7	Total
1					15	9	9	32
2					25	3	40	68
3					37	9	10	56
4					9	6	15	30
5	16	31	40	19	0	0	13	119
6	0	22	16	18	3	0	0	59
7	30	65	7	16	10	0	1	129
Total	47	119	64	53	99	27	88	495

3.2.3. HGV matrix:

The HGV matrix totals derived from the RSI data is shown in the seven-sector system for all time periods in Table 3–13 to Table 3–15

Table 3–13 HGV matrix for AM peak

Sector	1	2	3	4	5	6	7	Total
1	0	0	7	0	0	7	46	61
2	0	0	1	0	24	7	48	80
3	5	0	11	0	2	8	6	34
4	0	0	0	0	22	21	34	77
5	0	26	0	26	0	13	6	71
6	7	5	5	21	11	0	0	50
7	36	47	0	27	3	0	0	113
Total	48	79	25	75	61	57	140	485

Table 3–14 HGV matrix for AM peak

Sector	1	2	3	4	5	6	7	Total
1	0	0	0	0	0	0	46	46
2	0	0	1	0	20	8	17	46
3	0	1	6	0	2	9	4	22
4	0	0	0	0	18	29	47	95
5	0	30	2	28	0	14	11	84
6	0	8	9	29	9	0	0	55
7	34	15	4	35	9	0	0	97
Total	34	53	21	92	58	60	126	445

Table 3–15 HGV matrix for PM peak

Sector	1	2	3	4	5	6	7	Total
1	0	0	0	0	0	7	41	48
2	0	0	1	0	15	0	36	52
3	3	1	9	0	2	1	7	23
4	0	0	0	0	13	21	28	62
5	0	23	2	21	0	10	0	56
6	7	3	4	21	6	0	0	41
7	30	23	5	19	3	0	0	79
Total	39	49	20	60	39	40	112	359

3.2.4. Prior matrix

The partial matrices are factored at sector level to match with screen line totals. Prior matrices are then derived from merging these factored matrices. The factored merged Prior matrices are presented at the seven sector level in Table 3–16 to Table 3–24.

Table 3–16 Car Prior Matrix for AM peak

Sector	1	2	3	4	5	6	7	Total
1	422	421	148	525	112	109	171	1907
2	514	771	226	883	389	111	1164	4058
3	32	2	891	177	172	96	172	1542
4	437	493	186	736	256	130	217	2455
5	91	291	248	353	5	25	72	1085
6	51	623	72	76	8	0	3	834
7	73	920	127	226	74	10	6	1437
Total	1620	3521	1898	2976	1016	481	1806	13318

Table 3–17 LGV Prior Matrix for AM peak

Sector	1	2	3	4	5	6	7	Total
1	89	65	38	46	16	0	42	296
2	46	524	41	28	48	16	61	764
3	13	2	345	41	53	22	27	503
4	54	37	35	213	124	31	21	515
5	16	37	61	37	0	4	16	171
6	15	2	23	13	0	0	0	53
7	11	174	9	23	13	1	0	231
Total	244	841	553	401	254	74	168	2534

Table 3–18 HGV Prior Matrix for AM peak

Sector	1	2	3	4	5	6	7	Total
1	0	0	7	2	1	7	46	63
2	0	0	2	1	27	7	45	83
3	8	1	10	0	2	9	5	35
4	1	1	0	0	22	21	32	77
5	1	37	0	35	0	13	6	91
6	7	29	30	26	11	0	0	103
7	40	47	0	28	3	0	0	117
Total	57	115	50	91	65	58	134	569

Table 3–19 Car Prior Matrix for IP peak

Sector	1	2	3	4	5	6	7	Total
1	281	8	149	399	192	21	58	1109
2	129	570	510	194	230	496	356	2485
3	150	823	714	90	118	48	66	2010
4	338	124	278	774	128	343	79	2063
5	180	199	135	63	6	17	46	645
6	108	497	60	303	18	12	5	1002
7	56	509	65	71	45	5	3	754
Total	1241	2730	1911	1895	738	941	612	10068

Table 3–20 LGV Prior Matrix for IP peak

Sector	1	2	3	4	5	6	7	Total
1	68	4	15	102	46	2	5	242
2	3	281	71	3	24	17	50	449
3	14	68	239	14	38	26	10	408
4	67	22	16	246	25	29	7	413
5	26	27	35	20	0	0	4	113
6	2	11	34	27	0	0	0	75
7	10	79	6	5	8	0	1	108
Total	190	492	416	418	141	74	77	1807

Table 3–21 HGV Prior Matrix for IP peak

Sector	1	2	3	4	5	6	7	Total
1	0	0	0	1	1	0	23	25
2	0	0	4	0	13	26	16	59
3	0	2	7	0	1	11	3	24
4	2	1	0	0	22	60	32	116
5	1	32	1	13	0	11	7	66
6	0	6	16	22	9	0	0	54
7	11	14	2	14	8	0	0	49
Total	14	55	31	51	52	108	82	393

Table 3–22 Car Prior Matrix for PM peak

Sector	1	2	3	4	5	6	7	Total
1	251	592	196	563	181	96	199	2079
2	834	430	77	843	714	477	942	4318
3	275	534	584	217	472	38	112	2233
4	349	585	260	678	392	105	221	2589
5	205	198	211	278	7	13	112	1025
6	226	164	84	173	35	2	10	693
7	323	567	162	362	87	7	10	1518
Total	2464	3071	1574	3115	1888	738	1605	14455

Table 3–23 LGV Prior Matrix for PM peak

Sector	1	2	3	4	5	6	7	Total
1	30	40	18	40	73	15	15	231
2	32	103	5	35	50	6	104	335
3	19	52	72	30	75	8	9	264
4	24	35	12	90	30	5	15	212
5	22	34	32	23	0	0	13	125
6	0	23	13	20	3	0	0	59
7	27	72	8	12	11	0	1	130
Total	155	360	160	248	241	34	157	1356

Table 3–24 HGV Prior Matrix for PM peak

Sector	1	2	3	4	5	6	7	Total
1	0	0	0	0	2	5	41	48
2	0	0	3	0	22	0	34	59
3	3	3	9	0	2	2	7	25
4	1	1	0	0	13	16	23	54
5	1	22	2	8	0	10	0	44
6	5	2	4	16	6	0	0	34
7	33	23	5	16	3	0	0	80
Total	43	51	22	41	48	34	105	345

4. Model Standards

4.1. Overview

Calibration, validation and convergence standards for highway assignment models are specified in TAG Unit M3.1. The advice in TAG Unit M3.1 applies to models created for both general and specific purposes.

The calibration of the Southport SATURN highway model network has been undertaken using a standard approach to ensure that the model provides realistic routing, flows and speeds across the network.

The process incorporated matrix estimation to aid in the development of trip matrices, which contain travel patterns that reflect the observed traffic counts. The results of the matrix estimation process have been closely monitored to ensure that the match between observed and modelled traffic flows has been achieved to improve model routing and travel patterns, whilst not significantly affecting the structure of the matrices.

4.2. Interpretation of the Guidelines

TAG Unit M3.1 states that the achievement of the validation acceptability guidelines specified in Table 4-2, Table 4-3 and Table 4-4 does not guarantee that a model is 'fit for purpose' and likewise a failure to meet the specified validation standards does not mean that a model is not 'fit for purpose'.

Furthermore, in some models, particularly models of large congested areas, it may be difficult to achieve the link flow and journey time validation acceptability guidelines set out in Table 4-2 and Table 4-3 (without matrix estimation bringing about changes greater than the limits shown in Table 5 (of TAG Unit M3.1)). In these cases, the limits set out in Table 5 should be respected, the impacts of matrix estimation should be reduced so that they do not become significant, and a lower standard of validation reported.

4.3. Validation Criteria and Acceptability Guidelines

4.3.1. Screen Line Validation

Comparisons at screen-line level provide information on the quality of the trip matrices. TAG Unit M3.1 describes the validation criterion and acceptability guidelines which are shown in Table 4-1.

Table 4-1 Screenline Flow Validation Criterion and Acceptability Guidelines

Criterion and Measure	Acceptability Guideline
Differences between modelled flows and counts should be less than 5% of the counts	All or nearly all screen-lines

Source: TAG Unit M3.1 Table 1

With regard to screen-line validation, the following should be noted:

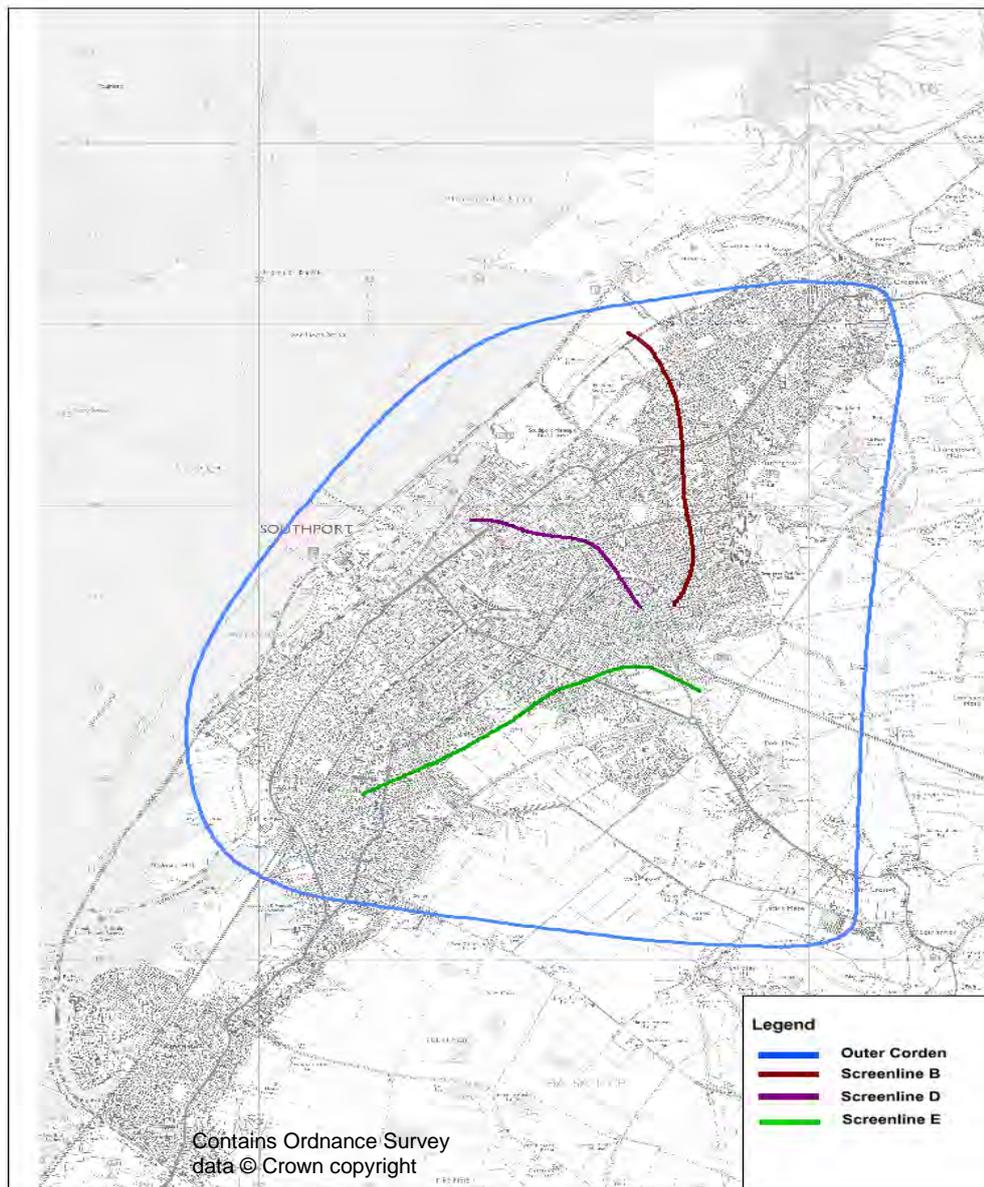
- Screen-lines should ideally be made up of 5 links or more;
- The comparisons for screen-lines containing high flow routes such as motorways should be presented both including and excluding these links;
- The comparison should be presented separately for Road Side Interview screen-lines where they exist, other screen-lines (made up of ATC for example) to be used as constraints in matrix estimation, and screen-lines used for independent validation.
- The comparisons should be presented by vehicle type (cars, light goods vehicles and other goods vehicles)
- The comparisons should be presented separately for each modelled period.

Four calibration screen-lines/cordons have been derived across the Southport highway assignment model, which are listed below:

- Outer Cordon,
- Screenline B,
- Screenline D and,
- Screenline E (Validation Screenline)

The location of the screen-lines are shown in Figure 4.1.

Figure 4-1 Screenlines Locations



4.3.2. Link Flow and Turning Movement Validation

There are two measures which are used for individual link validation which are link flow and the GEH statistic. The flow measure of validation is based on the difference between modelled flows and observed counts, with three different criteria set depending on the magnitude of the observed flows. The GEH statistic

is also based on the comparison between modelled and observed flow. The form of the GEH statistic is as follows:

$$GEH = \sqrt{\frac{(M - C)^2}{(M + C)/2}}$$

Where :

M is the modelled flow, and

C is the observed flow.

TAG Unit M3.1 describes the Link Flow and Turning Movements Validation Criteria and Acceptability Guidelines which are given in Table 4–2.

Table 4–2 Link Flow and Turning Movements Validation Criteria and Acceptability Guidelines

Criteria and Measures	Acceptability Guideline
Individual flows within 100 veh/hr for flows less than 700 veh/hr	> 85% of cases
Individual flows within 15% for flows from 700 to 2,700 veh/hr	> 85% of cases
Individual flows within 400 veh/hr for flows more than 2,700 veh/hr	> 85% of cases
GEH <5 for individual flows	> 85% of cases

Source: TAG Unit M 3.1 Table 2

With regard to flow validation, the following should be noted:

- The above criteria should be applied to both link flows and turning movements;
- The comparisons should be presented for cars and all vehicles but not for light and other goods vehicles unless sufficiently accurate link counts have been obtained; and
- The comparisons should be presented separately for each modelled period.

4.3.3. Journey Time Validation Criterion and Acceptability Guidelines

The Southport traffic model has also been validated against observed journey time data to establish the extent to which travel times and delays are accurately represented in the model.

The observed journey time data used to validate the model have been obtained from Traffic Master data.

TAG Unit M3.1 describes the Journey Time Validation Criterion and Acceptability Guidelines, which are given in Table 4–3.

Table 4–3 Journey Time Validation Criterion and Acceptability Guideline

Criterion and Measure	Acceptability Guideline
Modelled times along routes should be within 15% of surveyed times (or 1 minute, if higher than 15%)	> 85% of routes

Source: TAG Unit M 3.1 Table 3

4.3.4. Convergence Criteria and Standards

Advice on model convergence is set out in TAG Unit M3.1 (Table 4) and is reproduced in Table 4–4.

The convergence of the assignment is measured with respect to two criteria.

- **Convergence Stability**, which is the condition ‘P>90%’, where ‘P’ is the proportion of modelled links showing a change in flows of less than 5% for four successive iterations; and
- **Convergence Proximity**, which requires the value of the delta parameter to be less than 1%. The delta parameter measures the total cost of excess travel for all origin-destination pairs in the model. The smaller the value of delta, the closer is the model to choosing the minimum cost route and thereby achieving Wardrop user equilibrium in the assignment.

Table 4–4 Summary of Convergence Criteria

Convergence Measures	Type	Base Model Acceptable Values
Delta & %GAP	Proximity	Less than 0.1% or at least stable with convergence fully documented and all other criteria met
Percentage of links with flow change (P1) < 1%	Stability	Four consecutive iterations greater than 98%
Percentage of links with cost change (P2) < 1%		Four consecutive iterations greater than 98%
Percentage change in total user costs (V)		Four consecutive iterations less than 0.1% (SUE only)

Source: TAG Unit M3.1 Table 4

5. Model Calibration

5.1. Introduction

This section of the report provides details of the techniques used and the changes made during the model calibration process.

5.2. Network Calibration

The calibration of the highway model has been undertaken using a standard approach where the network is adjusted to ensure that the model gives plausible and expected traffic flows, routing and speeds.

The calibration procedure involved the following activities:

- Checks to ensure that link speeds on the network are realistic, and speed/flow calculations are operating as expected;
- Checks to ensure that delay calculations at junctions are realistic; and,
- Adjustment and checking of the network to ensure plausible and realistic routing of traffic.

Highway network calibration is undertaken to achieve observed traffic characteristics in terms of speeds, traffic throughputs and delays by investigating pinch points and problem areas highlighted by the initial model assignments.

The process involved checking and adjusting the highway network principally along the major corridors. Checks are undertaken to ensure that link lengths, turn saturation flows and capacities are correct. Adjustments are also made to speed/flow curves and to centroid connector loading points where appropriate.

The allocation of centroid connectors for internal zones is examined to verify that trips are loading onto the network at locations that are both sensible and realistic.

Other checks carried out include:

- **Counts in excess of capacity** – where an observed count is noticeably higher than the coded network capacity, the capacities are checked and amended if necessary;
- **Excessive junction delays** – the largest node delays and the largest differences between the link travel times and the observed data from Traffic Master are checked;
- **Low/High flows** – where the modelled flow is substantially different from the observed count; this indicates the possibility of locations where traffic was either restricted at an upstream junction, where a competing route was more attractive, or where delays at junctions are not well represented in the model, these can then be investigated to ensure that the coding in the model is correct;
- **Poor reproduction of observed travel times** - detailed comparisons of modelled travel times against the observed journey time routes reveal locations where additional modifications to junction parameters may be necessary in order to replicate the observed levels of delay.

5.3. Route Choice Calibration

The ability of the model to robustly represent route choice within the network depends on:

- Correct zone sizing and definition, network structure and the realism of the zone connections to the modelled network (centroid connectors);
- The accuracy of the network coding;
- The accuracy with which delays at junctions and link cruise speeds are modelled; and
- The accuracy of the trip matrices, which, when assigned, will impact the route choice process (via the flow/delay and speed/flow relationships).

Routing was checked between twenty selected OD pairs in the model by comparing modelled routing against the routing observed from internet based journey planners.

The model was observed to route favourably compared with the internet based journey planners. Route choice is presented in 7.4.Appendix B of this report.

5.4. Matrix Estimation

TAG Unit M3.1 advises that the primary purpose of matrix estimation is to refine estimates of trips not intercepted in surveys which have been synthesised, usually by means of a gravity model. The Southport model has utilised Traffic Master data to provide an additional source of data to the RSI surveys and gravity models, it is recognised however, that matrix estimation is still required to calibrate the matrices..

The development of the prior matrix was described in the previous section and the modelled flows were compared to the observed counts for the calibration cordons and screen-lines to determine whether further matrix calibration was required using matrix estimation.

The comparison of the observed and modelled flows across the screen-lines is summarised in Table 5–1 to Table 5–3 for the prior trip matrices (including external to external movements) for all time periods.

Although the difference between modelled and observed flows for the calibration cordons and screen-lines is outside of the TAG targets (as defined in Table 1 of TAG unit M3.1) for all three time periods, it is felt that the model achieves a good degree of validation for the prior matrix. This essentially means that the refinements done by matrix estimation would not be significant so as to cause major alternations to the observed trip patterns.

Table 5–1 Summary of Screenline and Cordon Validation (Prior Matrix) – AM Peak hour

Cordon	Direction	Percent Difference
Outer cordon	In bound	2%
	Out bound	8%
Screenline D	East bound	9%
	West bound	-13%
Screenline E	North bound	2%
	South bound	-17%

Table 5–2 Summary of Screenline and Cordon Validation (Prior Matrix) – Inter Peak hour

Cordon	Direction	Percent Difference
Outer cordon	In bound	26%
	Out bound	26%
Screenline D	East bound	-13%
	West bound	19%
Screenline E	North bound	1%
	South bound	-2%

Table 5–3 Summary of Screenline and Cordon Validation (Prior Matrix) – PM Peak hour

Cordon	Direction	Percentage Difference
Outer cordon	In bound	-4%
	Out bound	8%
Screenline D	East bound	9%
	West bound	-14%
Screenline E	North bound	-5%
	South bound	4%

Matrix estimation was applied to the prior trip matrix to improve the matrix calibration using the SATURN SATME2 process and the following principles were adopted:

- Counts used as constraints in matrix estimation were derived from two-week ATCs or 1 day MCC counts; and
- Constraints were applied at the Car, LGV and HGV level.

5.5. The SATME2 Process

The SATURN modules SATME2 and SATPIJA are used for matrix estimation and in combination attempt to match assigned link flows in the model with observed traffic counts. The matrix estimation process forms part of the calibration process and is designed to modify the origin-destination volumes by reference to the observed traffic counts. Trips are adjusted in the prior matrix to produce the estimated matrix, which is most likely to be consistent with the traffic counts. The equation used may be written as:

$$T_{ij} = t_{ij} \prod_a X_a^{P_{ija}}$$

where:

- T_{ij} is the output estimated matrix of OD pairs ij;
- t_{ij} is the prior matrix of OD pairs ij;
- \prod_a is the product over all counted links a;
- X_a is the balancing factor associated with counted link;
- P_{ija} is the fraction of trips from I to j using link a.

This process is dependent on several factors, and therefore must be monitored closely to ensure that:

- The trip matrix is converging to a stable solution;
- Travel patterns at a sector level are reasonable;
- Changes should not be significant; and
- Trip length distributions are reasonable.

Using the SATPIJA control file, checks are made to ensure that the overall trip distribution of the original prior trip matrix is maintained by limiting the change to cell values for Cars, LGV and HGV.

The matrix estimation process is applied to adjust the car matrix followed by light vehicle matrix and then followed by heavy vehicle matrix. In total six matrix estimation iterations are implemented. As described previously, the link counts used in the matrix estimation process are formed as a series of calibration screen-lines for Car, LGV and HGV matrices. In addition, diligence is exercised to ensure that the quality and consistency of the input count data is high.

5.6. Impact of Matrix Estimation

TAG unit M3.1 states that the changes brought by matrix estimation should not be significant. The criteria by which the significance of changes is measured is presented in Table 5–4.

Table 5–4 Significance of Matrix Estimation Changes

Measure	Significance Criteria
Matrix zonal cell values	Slope within 0.98 and 1.02 Intercept near zero R^2 in excess of 0.95
Matrix zonal trip ends	Slope within 0.99 and 1.01 Intercept near zero R^2 in excess of 0.98
Trip length distributions	Means within 5% Standard deviations within 5%
Sector to sector level matrices	Differences within 5%

Source: TAG Unit M3.1 Table 5

5.6.1. Matrix totals

To show the impacts of the SATME2 on the matrices, a comparison of matrix totals before and after the SATME2 process is presented in Table 5–5.

There is no current guidance set out in TAG unit M 3.1 on the acceptability of the amount of change brought about by matrix estimation to the matrix totals.

Table 5-5 shows that the matrix estimation process does not significantly alter the trip totals for Car and LGV's. Matrix estimation has some impact on the HGV matrices with the totals changing by around 30% for the AM and PM peaks and 80% for the Inter Peak.

The main reason for the larger change in the HGV matrices is that the source data for the HGV movements around Southport is more limited than for Cars and LGV's, this requires the matrix estimation process for HGV movements is given more flexibility than that for Cars and LGV's.

Table 5–5 Comparison of Matrix Totals – Prior and Post ME2

Time Period	Cars			Lights			Heavies		
	Prior	Post ME2	% Change	Prior	Post ME2	% Change	Prior	Post ME2	% Change
AM	13318	14675	9%	2534	2692	6%	569	760	34%
IP	10068	9025	-10%	1807	1570	-13%	393	710	81%
PM	14455	15447	7%	1356	1443	6%	345	458	33%

5.6.2. Matrix Zonal Values

Matrix zonal changes by time period are presented in Table 5–6. This analysis demonstrates that matrix estimation has an impact at an individual matrix cell level as values do not meet the TAG criteria.

This can be attributed to the following:

- Traffic Master data/census journey to work data were the primary sources of car data for the internal to internal movements. These are available at an aggregate zonal level and had to be rezoned and trips be reallocated to the smaller Southport zones. Population and employment data from 2011 census data also had to be disaggregated to the smaller Southport zones.
- An average trip rate was worked out for the entire Southport TEMPRO zone (based on NTEM trip-ends and demographic data) and was applied to each of these Southport zones.
- Traffic Master data was used to build the LGV matrices, however, expansion factors had to be calculated at sector level.
- The HGV data was not as comprehensive as the data for Cars and LGV's. Road Side Interviews at an outer cordon level was the only source of data for HGV movements, this meant that the HGV Internal to Internal matrix had to rely solely on traffic count data.

Table 5–6 Matrix Estimation Changes by Time Period

Measure	Significance Criteria	AM	IP	PM
Matrix Zonal Cell Values	Slope within 0.98 and 1.02	0.81	0.79	0.80
	Intercept near zero	0.00	0.00	0.00
	R ² in excess of 0.95	0.60	0.63	0.62
Matrix Zonal Trip Ends (Rows)	Slope within 0.99 and 1.01	0.98	0.84	0.97
	Intercept near zero	0.00	0.00	0.00
	R ² in excess of 0.98	0.71	0.85	0.78
Matrix Zonal Trip Ends (Columns)	Slope within 0.99 and 1.01	0.98	0.83	0.93
	Intercept near zero	0.00	0.00	0.00
	R ² in excess of 0.98	0.69	0.78	0.65

5.6.3. Matrix Trip Length Distribution

The comparison of trip length distribution between the pre and post matrix estimation matrices is contained in 7.4.Appendix D of this reportTable 5–1 for each time period and user class. This analysis demonstrates

that matrix estimation has a fairly small impact on the trip matrices. Table 5-7 presents the Mean and Standard Deviation for Trip Length Distribution by time period for all user class.

Table 5–7 % Change (post vs prior) in Mean and Standard Deviation for Trip Length Distribution

Time Period	Car		LGV		HGV	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
AM	-17%	-5%	-25%	-12%	-6%	-5%
IP	-17%	-8%	-18%	-4%	-8%	-10%
PM	-14%	-3%	-28%	-14%	-12%	-8%

5.6.4. Sector changes

Tables 5-8 to 5-10 show the impact of the matrix estimation process at a sector to sector level. The analysis below uses a three sector system developed from seven sector system shown in Figure 2–4. Sectors 1, 4, 5 are named North, Sectors 2, 3, 7, South and Sector 6 as East. All values are presented in PCUs.

Table 5–8 Impact of Matrix Estimation at Sector to Sector Level – AM Peak

Sector	North	South	East
North	976 (27%)	538 (20%)	-71 (-21%)
South	-43 (-1%)	463 (8%)	3 (1%)
East	-86 (-42%)	-74 (-9%)	0 (0%)

Table 5–9 Impact of Matrix Estimation at Sector to Sector Level – IP

Sector	North	South	East
North	-546 (-18%)	-195 (-15%)	-16 (-3%)
South	-219 (-18%)	211 (5%)	-165 (-26%)
East	-36 (-7%)	2 (0%)	0 (0%)

Table 5–10 Impact of Matrix Estimation at Sector to Sector Level – PM

Sector	North	South	East
North	396 (12%)	307 (11%)	76 (29%)
South	-504 (-11%)	902 (23%)	0 (0%)
East	-79 (-16%)	92 (31%)	0 (0%)

Sector to sector changes brought about by matrix estimation process meets the WebTAG criteria for certain sector movements. However, some sector to sector movements do show significant percentage changes. For the sector movements where the WebTAG criteria is not met, the change brought about by matrix estimation can be attributed to the absence of ‘water-tight screen-lines’ due to a lack of suitable count data at certain locations to aid matrix factoring, leading to partial control in the factoring of the prior matrices.

It should also be noted however that the absolute change in the matrix sector totals is not significantly high and the movements which do not meet the WebTAG criteria in general do not contribute to more than 20% of the matrix totals.

5.7. Matrix Calibration

Calibration of the post matrix estimation matrices was undertaken by comparing total screen-line and cordon modelled flows and counts by vehicle type and time period. The assessment criteria follows those defined in TAG Unit M3.1 Table 1, which states that the differences between modelled flows and counts should be less than 5% of the counts for all or nearly all screen-lines. The results of this assessment are shown in Table 5–11 and are summarised below.

Table 5–11 Summary of Screenline and Cordon Calibration (Post Matrix Estimation)

Cordon	Direction	AM Total	IP Total	PM Total
Outer cordon	Inbound	-9%	-4%	-6%
	Outbound	-3%	-5%	-3%
Screenline-D	Eastbound	7%	-5%	-2%
	Westbound	-3%	7%	2%
Screenline-E	Northbound	-5%	-9%	-5%
	Southbound	-4%	-8%	1%
Validation Screen line (Screen line-B)	Eastbound	4%	-3%	-6%
	Westbound	5%	-3%	-2%

Note – Total flows represent sum of all user classes, bus flows and PassQ flows

Morning peak

- Four out of six of the screen-lines meet acceptability guidelines for all vehicles.
- The outer cordon inbound direction fails to meet the criteria with a flow difference of –9% and a GEH of 7 for all vehicles. This flow difference is in particular observed on the A565-Water Lane and Marshside Road which form the outer cordon boundary. It is however, noted that A565-Water lane meets the WebTAG criteria for link flow difference. This indicates that these small changes at a link level combine to form a larger change at the screen-line level.
- The validation screen-line meets the acceptability guidelines across all vehicles.

Inter-peak:

- Three out of six calibration screen-lines meet acceptability guidelines for all vehicles.
- Screenline D in the westbound direction fails with a flow difference of 7% for all vehicles. The absolute flow difference in this case is very low at only 32 pcus.
- Screen-line E fails to meet acceptability guidelines for all vehicles in both directions, however, all individual links on this screen-line meet the WebTAG criteria. Again the small changes at a link level combine to form a larger change at the screen-line level.
- The validation screen-line meets acceptability guidelines for all vehicles.

Evening peak:

- Five out of six calibration screen-lines meet acceptability guidelines for all vehicles.
- The outer cordon inbound direction fails to meet the criteria with a flow difference of –6% but has a GEH of 5 for all vehicles. This flow difference is observed in particular for A565-Water Lane and Guildford Road which form the outer cordon boundary, however the A565-Water Lane meets the WebTAG criteria for GEH and link flow difference. This indicates that the small changes at a link level combine to form a larger change at the screen-line level.
- The validation screen-line meets the acceptability guidelines across all vehicles in the westbound direction; the eastbound direction fails marginally with a difference of -6% but with a GEH value of 3.

6. Model Validation

6.1. Overview

The validation of a traffic model is undertaken to demonstrate that the model reproduces the existing travel patterns within the study area in a robust manner. As such, analysis of the model assignments is required to summarise the accuracy of the base model and establish that it is suitable as a basis from which to prepare forecasts:

Validation of the model encompasses:

- Network validation in terms of range checking and routing;
- Assignment validation (link based validation); and,
- Journey time validation.

6.2. Ad-Hoc Flow Validation

Flow validation was undertaken by comparing modelled flows and counts on individual links for all time periods. The assessment criterion follows those defined in TAG Unit M3.1 Table 2.

Results of the model calibration/validation are shown in Table 6–1 to Table 6–3. A summary of the analysis is given below:

Table 6–1 Summary of individual links (Post Matrix Estimation) – AM Peak hour

	Direction	Number of counts	Flow criteria (% pass)	GEH (% pass)
Calibration	Outer Cordon-Inbound	12	92%	83%
	Outer Cordon-Outbound	12	92%	75%
	Screenline D -East bound	5	100%	100%
	Screenline D -West bound	5	60%	60%
	Screenline E North bound	5	100%	100%
	Screenline E South bound	5	100%	100%
Validation	Screenline B East bound	5	80%	60%
	Screenline B West bound	5	100%	100%

Table 6–2 Summary of individual links (Post Matrix Estimation) – IP hour

	Direction	Number of counts	Flow criteria (% pass)	GEH (% pass)
Calibration	Outer Cordon-Inbound	12	92%	75%
	Outer Cordon-Outbound	12	92%	83%
	Screenline D -East bound	5	100%	100%
	Screenline D -West bound	5	100%	100%
	Screenline E North bound	5	100%	80%
	Screenline E South bound	5	100%	100%
Validation	Screenline B East bound	5	100%	100%
	Screenline B West bound	5	100%	100%

Table 6–3 Summary of individual links (Post Matrix Estimation) – PM Peak hour

	Direction	Number of counts	Flow criteria (% pass)	GEH (% pass)
Calibration	Outer Cordon-Inbound	12	92%	92%
	Outer Cordon-Outbound	12	100%	100%
	Screenline D -East bound	5	60%	60%
	Screenline D -West bound	5	100%	100%
	Screenline E North bound	5	100%	100%
	Screenline E South bound	5	100%	100%
Validation	Screenline B East bound	5	100%	80%
	Screenline B West bound	5	100%	100%

AM Peak,

- Calibration, the percentage of individual links which comply with the DMRB flow criteria is 91% and 84% comply on GEH criteria.
- Validation, the percentage of individual links which comply with the DMRB flow criteria is 90% and 80% comply on GEH criteria.

Inter Peak,

- Calibration, the percentage of individual links which comply with the DMRB flow criteria is 95% and 86% comply on GEH criteria.
- Validation, the percentage of individual links which comply with the DMRB flow criteria is 100% with 100% complying on GEH criteria.

PM Peak,

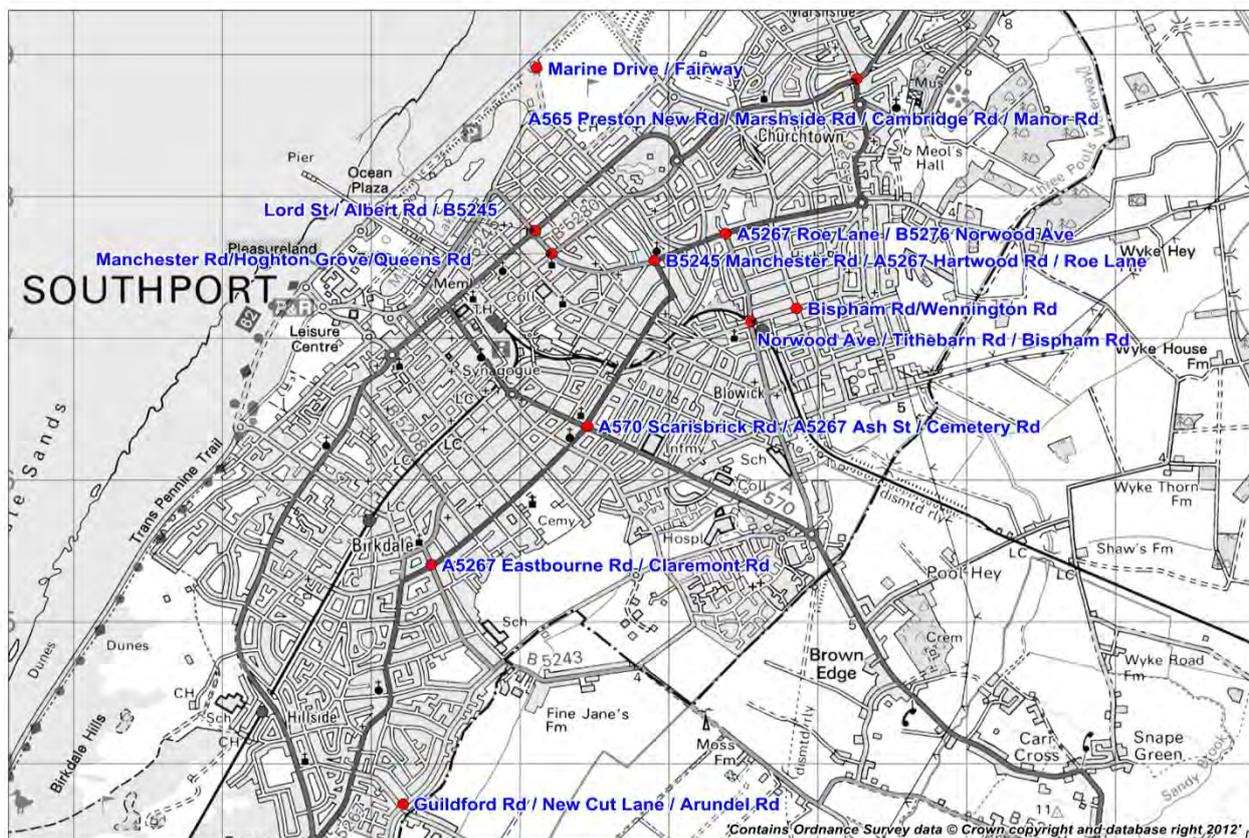
- Calibration, the percentage of individual links which comply with the DMRB flow criteria is 93% with 93% complying on GEH criteria.
- Validation, the percentage of individual links which comply with the DMRB flow criteria is 100% and 90% comply on GEH criteria.

6.3. Turning Flow Validation

Turning count validation was undertaken by comparing modelled turn flow and junction turn counts at individual junctions across the model for all time periods. The assessment criterion follows that defined in TAG Unit M3.1 Table 2, which states that 85% of the modelled links should meet acceptability guidelines for flow criteria and GEH criteria.

Figure 6-1 shows the location of the junctions used in the analysis.

Figure 6-1 MCC Turn Count Locations



Results of the junction calibration is shown in Table 6-14. A summary of the analysis is also given below:

- AM Peak - The percentage of individual turns which comply with the DMRB flow criteria is 80%;
- Inter Peak - The percentage of individual turns which comply with the DMRB flow criteria is 65%;
- PM Peak - The percentage of individual turns which comply with the DMRB flow criteria is 83%.

Table 6–4 Summary of Junction Turning Calibration (Post Matrix Estimation) – All time periods

Calibration or Validation	Time Period	Number of junction/turns	Flow criteria (% pass)
Calibration	AM Peak	11 Junctions (121 individual turns)	80%
	Inter Peak	9 Junctions (97 individual turns)	65%
	PM Peak	11 Junctions (121 individual turns)	83%

It is observed that the turn flows marginally fail to achieve the WebTAG criteria during all three time periods at certain locations. It should be noted however that WebTAG does recognise that the acceptability criteria for turning movements can be difficult to achieve.

WebTAG does not specifically request validation at an individual junction level (rather asks for all turns to be put together).

The detailed turn validation is given in Table 6-5.

Table 6–5 Summary of Individual Turns (Post Matrix Estimation) – AM Peak.

Calibration or Validation	Junction Location	Number of turns	Flow criteria (% pass)
Calibration	A565 Preston New Rd / Marshside Rd / Cambridge Rd / Manor Rd	12	92%
	Marine Drive / Fairway	9	67%
	Lord St / Albert Rd / B5245	16	83%
	B5245 Manchester Rd / A5267 Hartwood Rd / Roe Lane	6	83%
	A5267 Roe Lane / B5276 Norwood Ave	6	50%
	Norwood Ave / Tithebarn Rd / Bispham Rd	12	92%
	A570 Scarisbrick Rd / A5267 Ash St / Cemetery Rd	12	92%
	A5267 Eastbourne Rd / Claremont Rd	12	83%
	Guildford Rd / New Cut Lane / Arundel Rd	12	83%
	Bispham Rd/Wennington Rd	12	92%
Manchester Rd/Hoghton Grove/Queens Rd	12	92%	

Table 6–6 Summary of Individual Turns (Post Matrix Estimation) – IP hour

Calibration or Validation	Junction Location	Number of turns	Flow criteria (% pass)
Calibration	A565 Preston New Rd / Marshside Rd / Cambridge Rd / Manor Rd	12	58%
	Marine Drive / Fairway	9	67%
	Lord St / Albert Rd / B5245	16	75%
	B5245 Manchester Rd / A5267 Hartwood Rd / Roe Lane	6	50%
	A5267 Roe Lane / B5276 Norwood Ave	6	33%
	Norwood Ave / Tithebarn Rd / Bispham Rd	12	83%
	A570 Scarisbrick Rd / A5267 Ash St / Cemetery Rd	12	67%
	A5267 Eastbourne Rd / Claremont Rd	12	83%
	Guildford Rd / New Cut Lane / Arundel Rd	12	83%

Table 6–7 Summary of Individual Turns (Post Matrix Estimation) – PM Peak hour

Calibration or Validation	Junction Location	Number of turns	Flow criteria (% pass)
Calibration	A565 Preston New Rd / Marshside Rd / Cambridge Rd / Manor Rd	12	58%
	Marine Drive / Fairway	9	100%
	Lord St / Albert Rd / B5245	16	100%
	B5245 Manchester Rd / A5267 Hartwood Rd / Roe Lane	6	67%
	A5267 Roe Lane / B5276 Norwood Ave	6	50%
	Norwood Ave / Tithebarn Rd / Bispham Rd	12	92%
	A570 Scarisbrick Rd / A5267 Ash St / Cemetery Rd	12	92%
	A5267 Eastbourne Rd / Claremont Rd	12	92%
	Guildford Rd / New Cut Lane / Arundel Rd	12	92%
	Bispham Rd/Wennington Rd	12	100%
	Manchester Rd/Hoghton Grove/Queens Rd	12	100%

6.4. Model Convergence

The model convergence for each time period is summarised in Table 6–8. Table 6-8 shows that the model has achieved a high level of convergence for all three time periods, the delta and %gap values comfortably exceed the criteria specified in DMRB of 0.1%. Similarly, the %flow change achieved is higher than 98% in most cases, as required by DMRB.

Table 6–8 Summary of Model Convergence

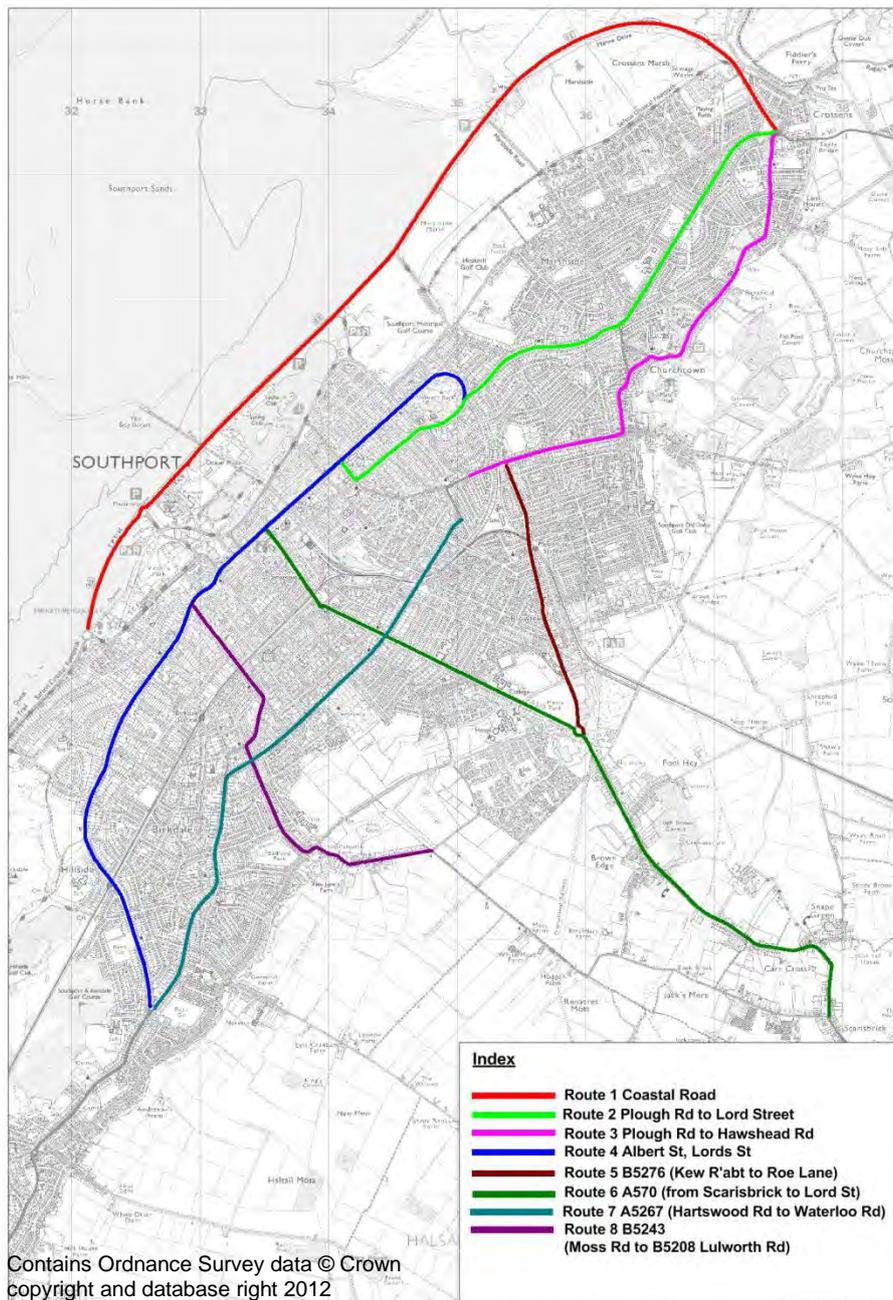
Time Period	Assignment - Simulation Loop	Delta (%)* (δ)	%Gap	% Flow Change (P)
AM	37	0.0088	0.048	98.0
	38	0.0058	0.01	97.0
	39	0.0076	0.01	98.2
	40	0.0039	0.009	98.3
IP	11	0.0160	0.021	98.0
	12	0.0136	0.015	98.0
	13	0.0137	0.011	98.8
	14	0.0131	0.009	98.7
PM	25	0.0105	0.007	99.5
	26	0.0070	0.012	99.0
	27	0.0032	0.009	99.2
	28	0.0030	0.004	99.4

6.4.1. Journey Time Validation

Journey time validation has been undertaken using Traffic Master data. A total of 8 survey routes around the Southport area have been used to assess the accuracy of the modelled journey times.

Figure 6-2 shows the extent of the journey time analysis.

Figure 6-2 Journey Time Routes



Modelled journey times are compared against observed data for all three modelled periods. Summaries of the overall modelled and observed journey time comparisons for each route are provided in Table 6–9 to 6–11 for the AM Peak, Inter Peak and PM Peak periods respectively. Detailed section by section journey time plots are presented in 7.4.Appendix A of this report.

Table 6–9 AM Peak Journey Time Validation

Route No.	Route Name	Direction	Observed	Modelled	Difference in Seconds	% difference	Compliance with DMRB criteria
Route 1	NB Coastal Road	NB	00:07:58	00:08:40	42	9%	✓
	SB Coastal Road	SB	00:08:08	00:08:56	48	10%	✓
Route 2	NB Plough Roundabout to Lord Street A565 to Town Centre	NB	00:07:24	00:08:16	52	12%	✓
	SB Plough Roundabout to Lord Street A565 to Town Centre	SB	00:08:51	00:07:44	-67	-13%	✓
Route 3	NB Plough Roundabout to Hawshead Rd via B5244	NB	00:08:02	00:07:06	-56	-12%	✓
	SB Plough Roundabout to Hawshead Rd via B5244	SB	00:06:55	00:06:35	-20	-5%	✓
Route 4	NB Albert St, Lord St, Waterloo Rd to Liverpool Rd	NB	00:10:24	00:09:57	-27	-4%	✓
	SB Albert St, Lord St, Waterloo Rd to Liverpool Rd	SB	00:11:20	00:10:29	-51	-8%	✓
Route 5	NB B5276 Kew Roundabout to Roe Lane	NB	00:05:27	00:06:11	44	13%	✓
	SB B5276 Kew Roundabout to Roe Lane	SB	00:05:54	00:05:36	-18	-5%	✓
Route 6	NB A570 from Scarisbrick to Lord St	NB	00:11:06	00:10:28	-38	-6%	✓
	SB A570 from Scarisbrick to Lord St	SB	00:11:13	00:09:54	-79	-12%	✓
Route 7	NB A5267 Hartswood Rd to Waterloo Rd Roundabout	NB	00:11:23	00:10:21	-62	-9%	✓
	SB A5267 Hartswood Rd to Waterloo Rd Roundabout	SB	00:12:22	00:09:54	-148	-20%	✗
Route 8	NB B5243 Moss Rd to B5208 Lulworth Rd	NB	00:06:18	00:05:36	-42	-11%	✓
	SB B5243 Moss Rd to B5208 Lulworth Rd	SB	00:06:45	00:05:20	-85	-21%	✗

Table 6–10 Inter Peak Journey Time Validation

Route No.	Route Name	Direction	Observed	Modelled	Difference in Seconds	% difference	Compliance with DMRB criteria
Route 1	NB Coastal Road	NB	00:08:47	00:08:38	-9	-2%	✓
	SB Coastal Road	SB	00:08:40	00:08:56	16	3%	✓
Route 2	NB Plough Roundabout to Lord Street A565 to Town Centre	NB	00:07:47	00:07:21	-26	-6%	✓
	SB Plough Roundabout to Lord Street A565 to Town Centre	SB	00:07:36	00:07:17	-19	-4%	✓
Route 3	NB Plough Roundabout to Hawshead Rd via B5244	NB	00:07:27	00:06:44	-43	-10%	✓
	SB Plough Roundabout to Hawshead Rd via B5244	SB	00:06:49	00:06:38	-11	-3%	✓
Route 4	NB Albert St, Lord St, Waterloo Rd to Liverpool Rd	NB	00:11:33	00:09:44	-109	-16%	✗
	SB Albert St, Lord St, Waterloo Rd to Liverpool Rd	SB	00:11:25	00:10:18	-67	-10%	✓
Route 5	NB B5276 Kew Roundabout to Roe Lane	NB	00:04:47	00:04:23	-24	-8%	✓
	SB B5276 Kew Roundabout to Roe Lane	SB	00:04:45	00:04:19	-26	-9%	✓
Route 6	NB A570 from Scarisbrick to Lord St	NB	00:11:20	00:09:41	-99	-15%	✓
	SB A570 from Scarisbrick to Lord St	SB	00:10:56	00:09:46	-70	-11%	✓
Route 7	NB A5267 Hartswood Rd to Waterloo Rd Roundabout	NB	00:09:45	00:09:59	14	2%	✓
	SB A5267 Hartswood Rd to Waterloo Rd Roundabout	SB	00:09:58	00:09:18	-40	-7%	✓
Route 8	NB B5243 Moss Rd to B5208 Lulworth Rd	NB	00:06:23	00:05:16	-67	-17%	✗
	SB B5243 Moss Rd to B5208 Lulworth Rd	SB	00:06:07	00:05:11	-56	-15%	✓

Table 6–11 PM Peak Journey Time Validation

Route No.	Route Name	Direction	Observed	Modelled	Difference in Seconds	% difference	Compliance with DMRB criteria
Route 1	NB Coastal Road	NB	00:08:58	00:08:46	-12	-2%	✓
	SB Coastal Road	SB	00:08:31	00:08:56	25	5%	✓
Route 2	NB Plough Roundabout to Lord Street A565 to Town Centre	NB	00:07:24	00:07:41	17	4%	✓
	SB Plough Roundabout to Lord Street A565 to Town Centre	SB	00:07:26	00:07:32	6	1%	✓
Route 3	NB Plough Roundabout to Hawshead Rd via B5244	NB	00:08:34	00:08:43	9	2%	✓
	SB Plough Roundabout to Hawshead Rd via B5244	SB	00:06:46	00:06:45	-1	0%	✓
Route 4	NB Albert St, Lord St, Waterloo Rd to Liverpool Rd	NB	00:10:45	00:09:55	-50	-8%	✓
	SB Albert St, Lord St, Waterloo Rd to Liverpool Rd	SB	00:11:44	00:10:29	-75	-11%	✓
Route 5	NB B5276 Kew Roundabout to Roe Lane	NB	00:05:47	00:05:02	-45	-13%	✓
	SB B5276 Kew Roundabout to Roe Lane	SB	00:04:44	00:04:27	-17	-6%	✓
Route 6	NB A570 from Scarisbrick to Lord St	NB	00:10:55	00:09:55	-60	-9%	✓
	SB A570 from Scarisbrick to Lord St	SB	00:11:40	00:10:01	-99	-14%	✓
Route 7	NB A5267 Hartswood Rd to Waterloo Rd Roundabout	NB	00:10:07	00:11:06	59	10%	✓
	SB A5267 Hartswood Rd to Waterloo Rd Roundabout	SB	00:10:10	00:11:57	107	18%	✗
Route 8	NB B5243 Moss Rd to B5208 Lulworth Rd	NB	00:06:20	00:05:28	-52	-14%	✓
	SB B5243 Moss Rd to B5208 Lulworth Rd	SB	00:06:32	00:05:18	-74	-19%	✗

Tables 6-9 to 6-11 show that the validation of the modelled journey times against observed journey times is excellent, with only Routes 7 and 8 failing in the southbound direction during the AM and PM peak periods and only Routes 4 and 8 northbound failing during the IP peak period.

7. Summary and Conclusions

7.1. Overview

The Southport Highway Assignment Model has been developed to simulate the movement of traffic on the strategic road network within the Southport area. The model includes Southport town in detail along with the wider hinterland area surrounding Southport coded as buffer network.

The model represents a typical weekday (Monday – Thursday) in October, 2013. It covers the AM peak hour (08:00 – 09:00), an average inter-peak hour (10:00 – 16:00) and the PM peak hour (17:00 - 18:00).

The model has utilised data from a number of local and national sources, which includes Traffic Master data, 2011 ONS Census data and local traffic counts.

This Local Model Validation Report has described the development of the modelled networks and trip matrices, and the calibration and validation of the SATURN traffic models.

The model has been tested against WebTAG Unit M3.1 and DMRB calibration and validation criteria for:

- Link flows across selected screen-lines and individual link flows;
- Model convergence;
- Journey Time comparison;
- Significance of Matrix Estimation Changes;
- Trip Length Distribution.

7.2. Model Development and Calibration

Traffic demand matrices were developed using roadside interview survey data and 2011 census journey to work data. Traffic count data was included in the process of matrix estimation to ensure that a robust and accurate set of demand matrices were developed for use in model assignments

The calibration monitoring process confirmed that the model network, matrices and assignments had converged to a satisfactory level.

7.3. Model Validation

Model validation was undertaken by comparing modelled traffic flows across screen-lines and at a number of ad-hoc junctions around the Southport area.

Validation across screen-lines and at the ad hoc sites, showed an excellent goodness of fit across the majority of the modelled area.

The models have been through a rigorous model development, calibration and validation process, using the latest available source data to provide accurate representations of current traffic conditions in and around Southport.

The journey time validation showed that the majority of journey time routes were very accurately modelled.

7.4. Conclusions

All three time period models are shown to calibrate and validate well against observed traffic data across the majority of the traffic model. The models are therefore deemed an accurate representation of current network conditions and suitable for use in future forecasting.

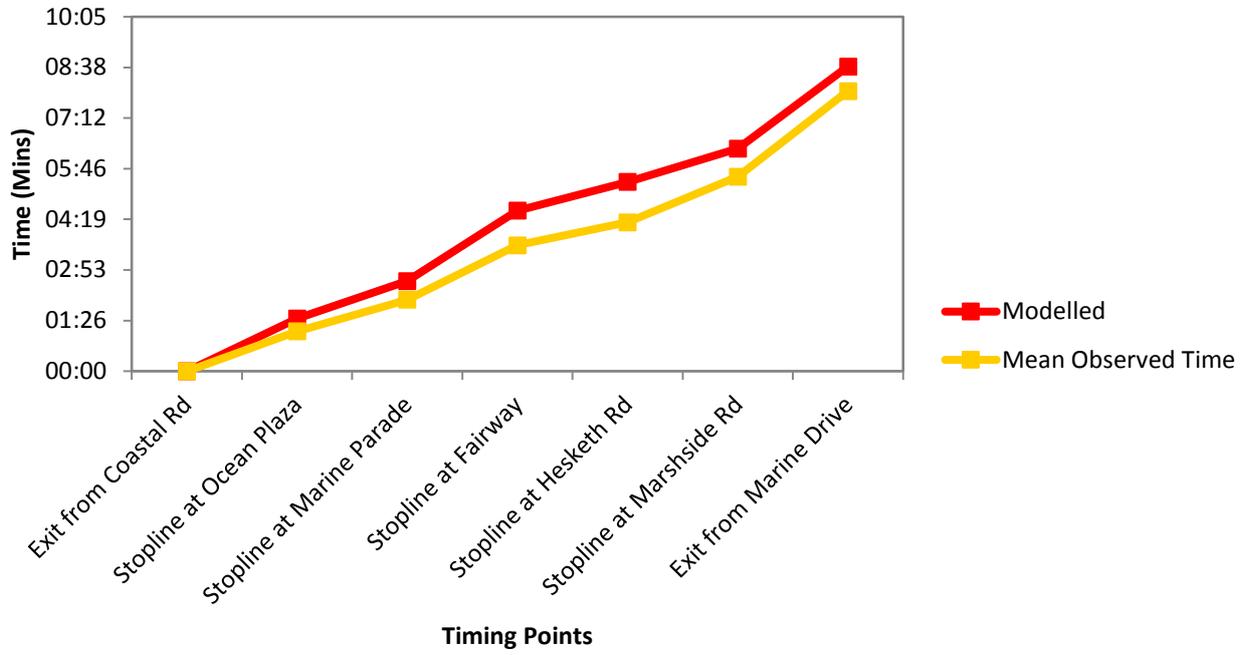
Appendices

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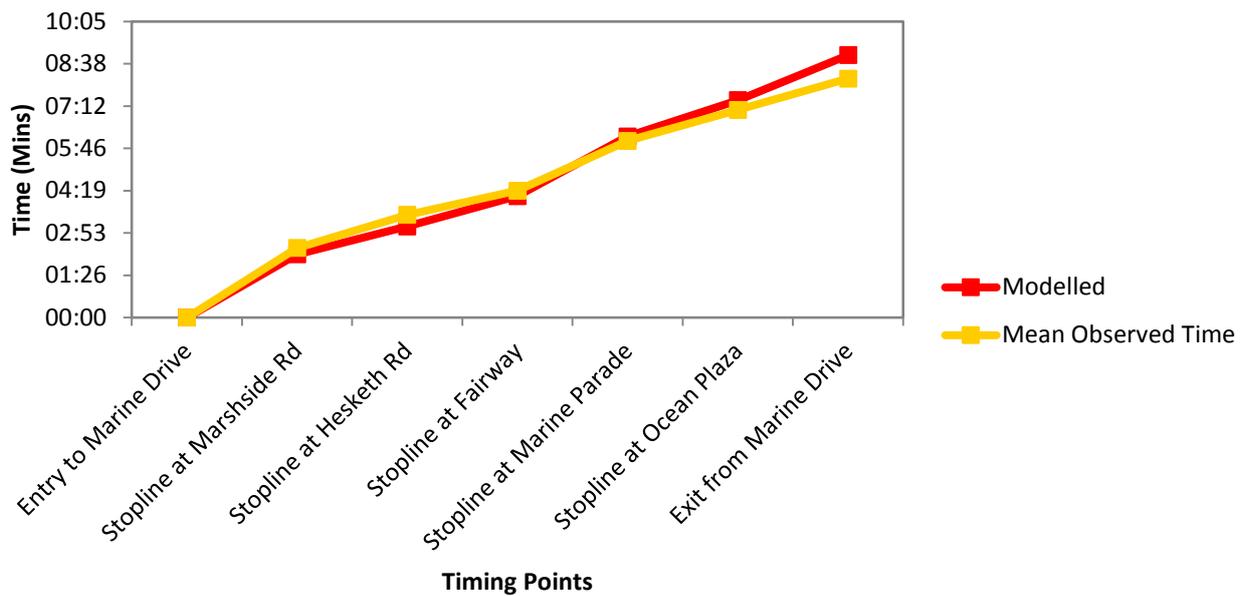
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Appendix A. Journey time

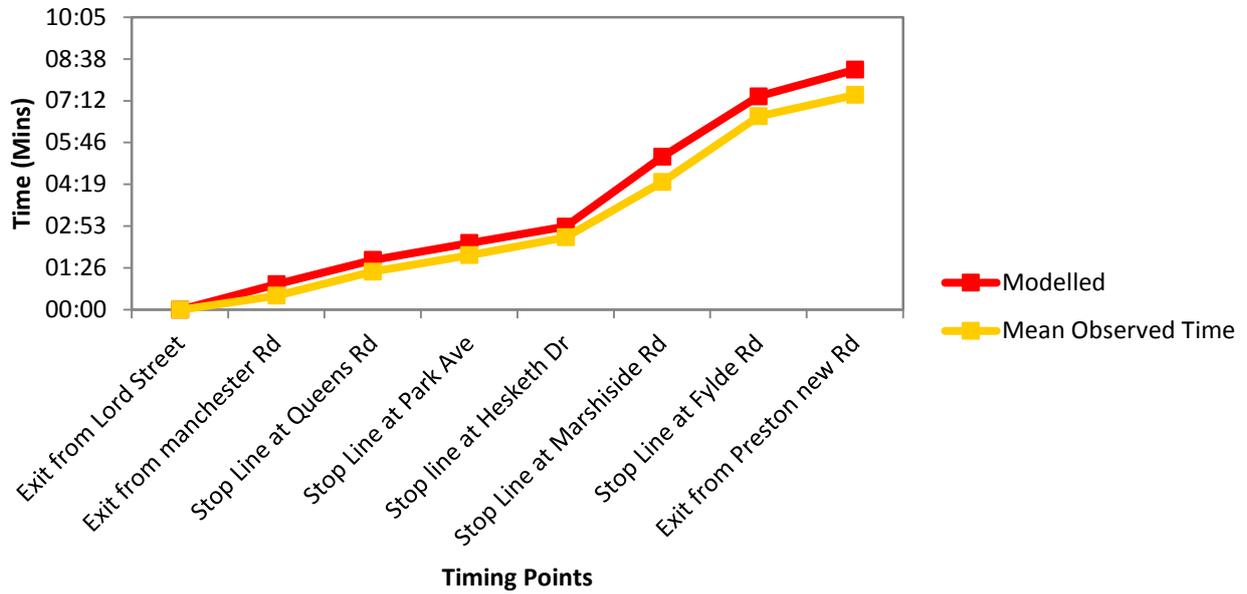
Route 1: NB Coastal Road - AM Peak (08:00-09:00)



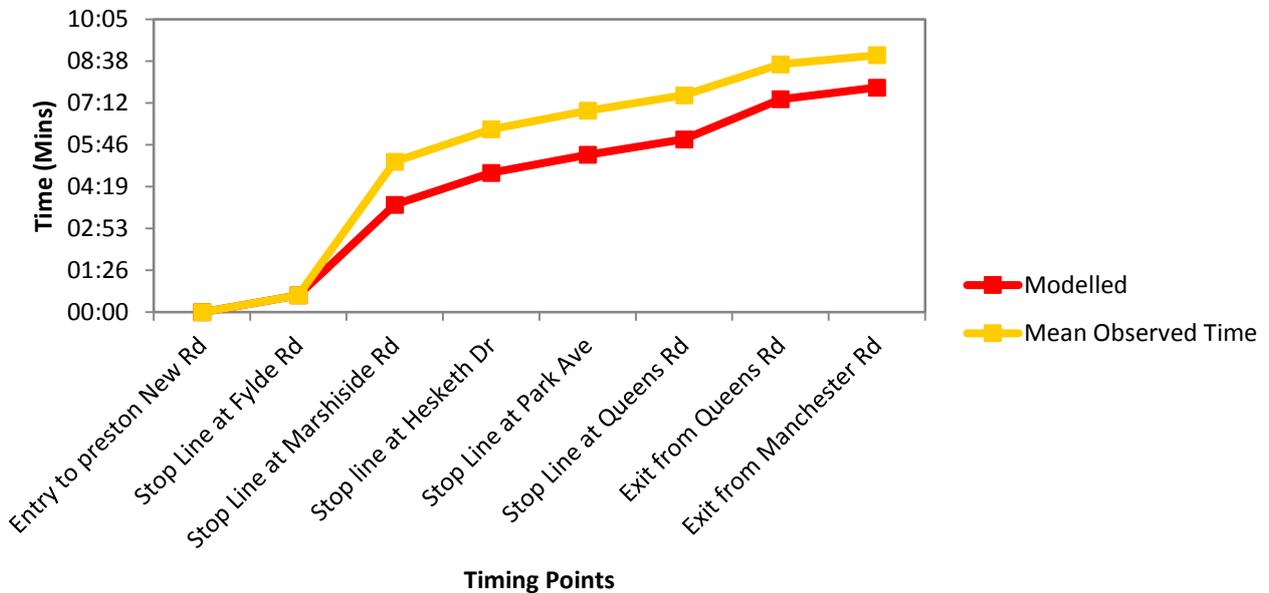
Route 2: (SB Coastal Road) - AM Peak (08:00-09:00)



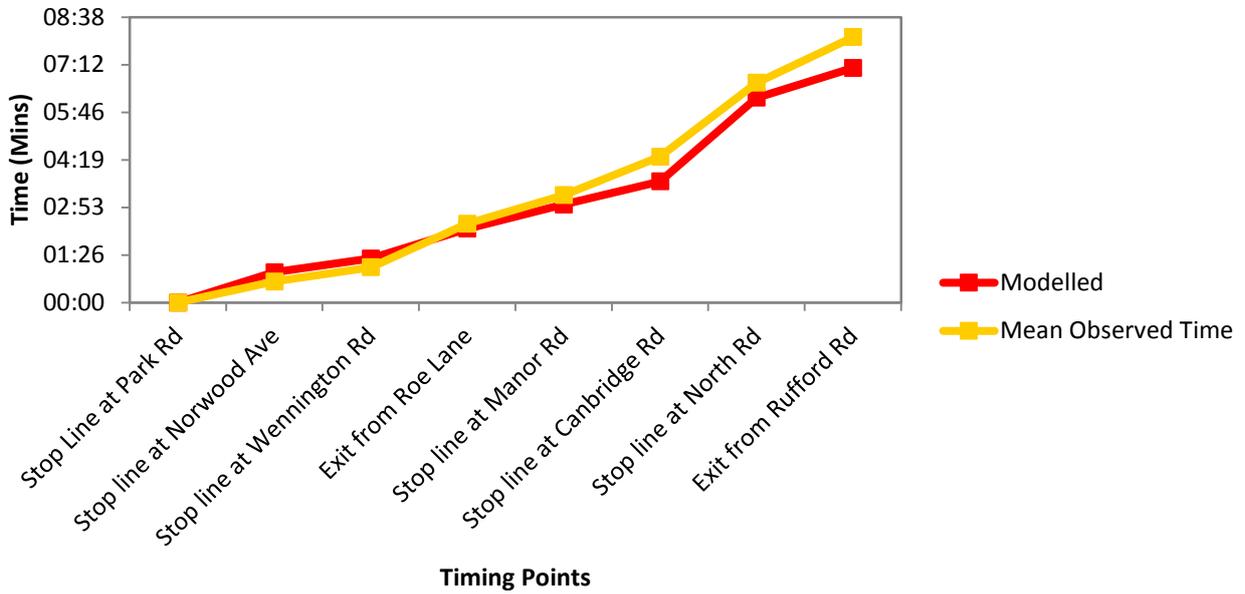
Route 3: (NB Plough Roundabout to Lord Street (A565 to Town Centre) - AM Peak (08:00-09:00)



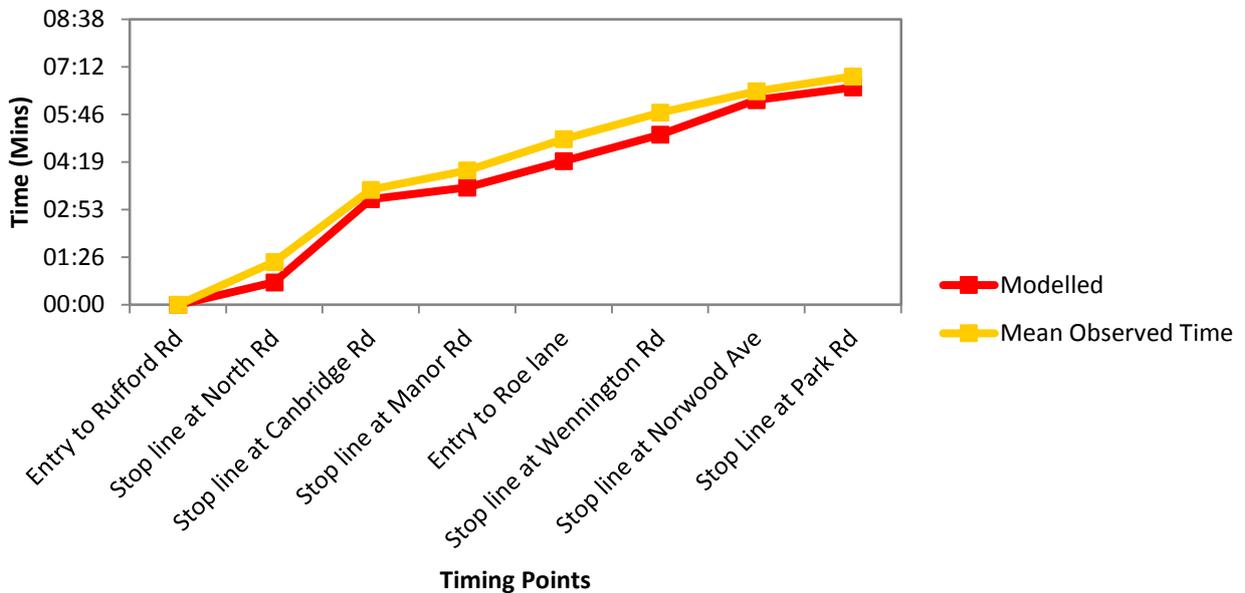
Route 4: (SB Plough Roundabout to Lord Street (A565 to Town Centre) - AM Peak (08:00-09:00)



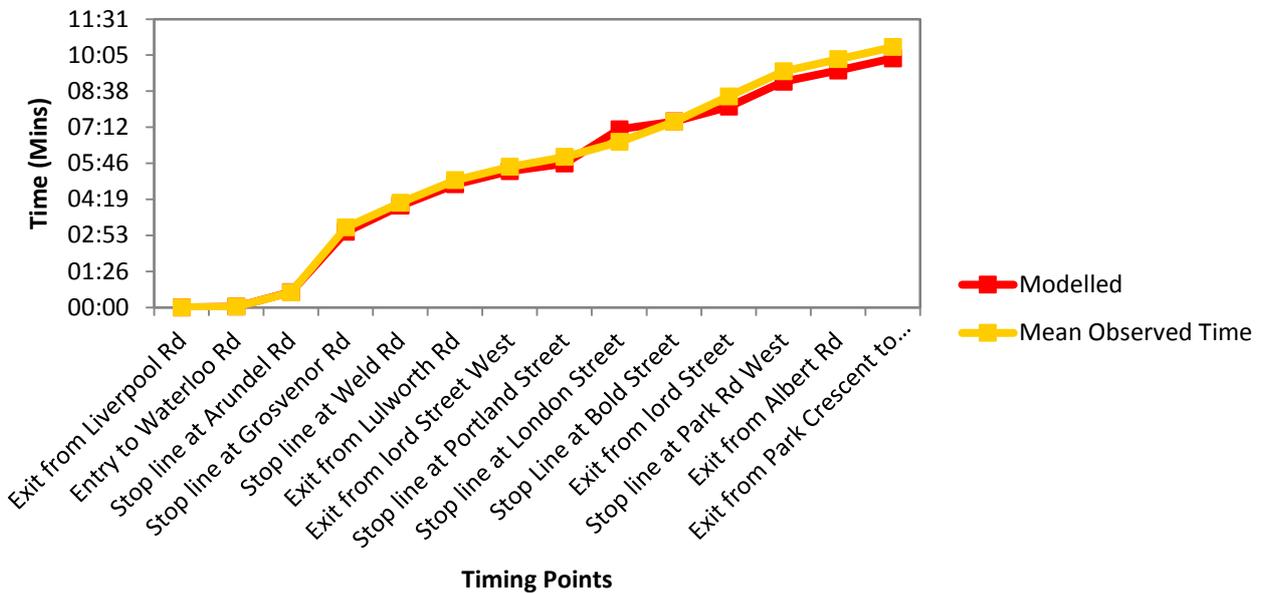
Route 5: (NB Plough Roundabout to Hawshead Rd (via B5244) - AM Peak (08:00-09:00)



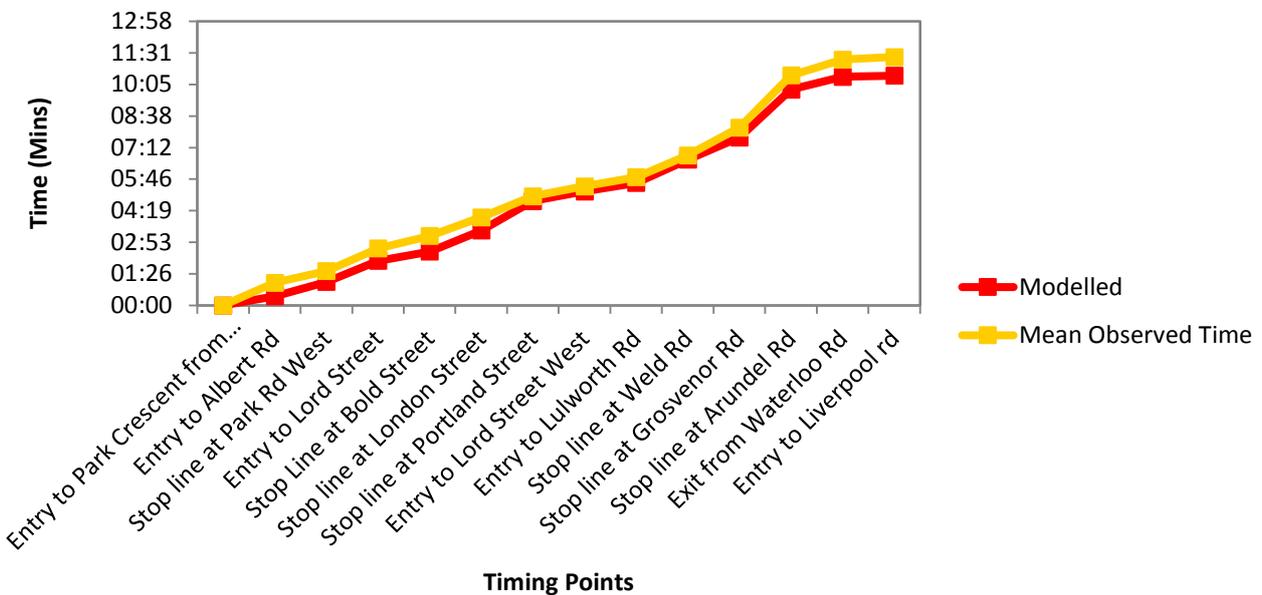
Route 6: (SB Plough Roundabout to Hawshead Rd (via B5244) - AM Peak (08:00-09:00)



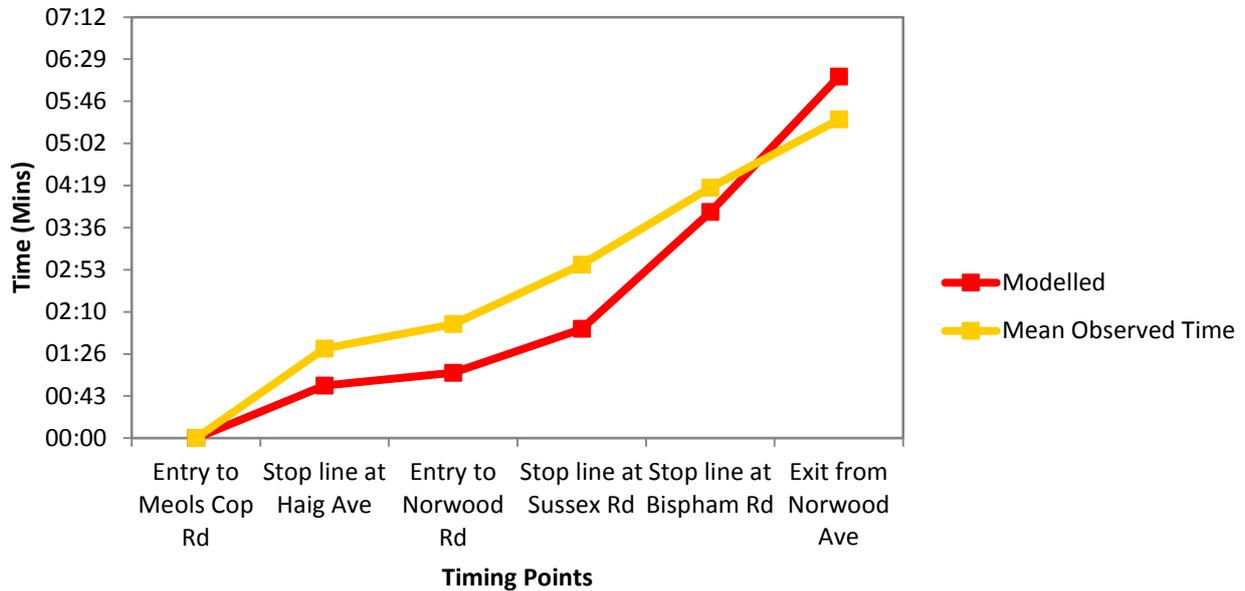
Route 7: (NB Albert St, Lord St, Waterloo Rd to Liverpool Rd) - AM Peak (08:00-09:00)



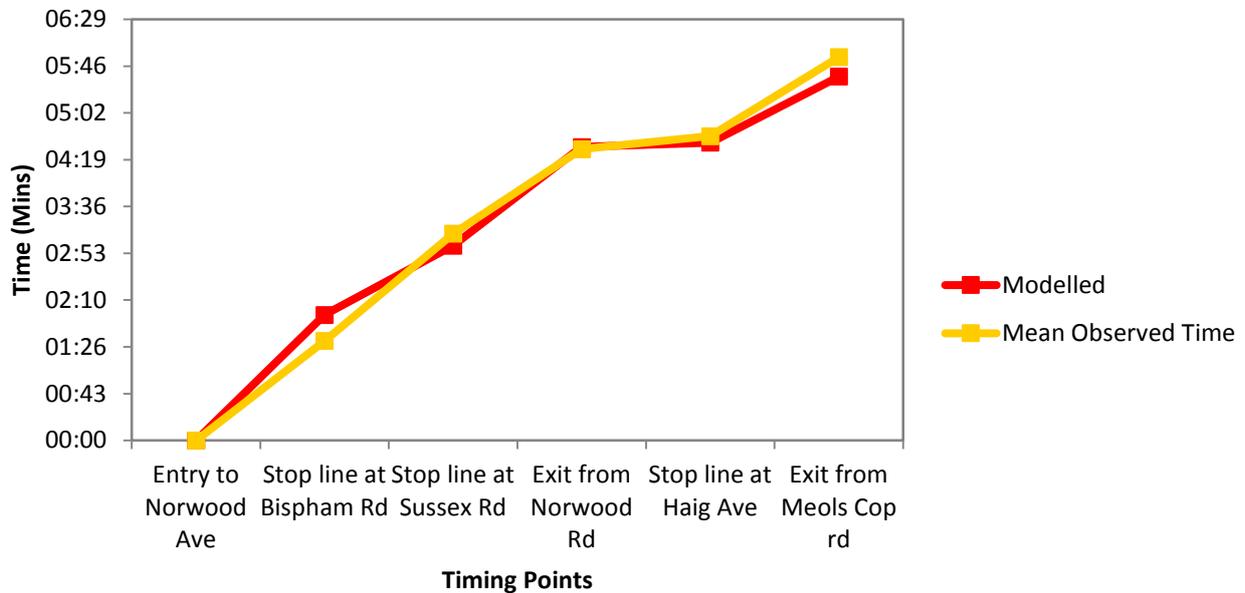
Route 8: (SB Albert St, Lord St, Waterloo Rd to Liverpool Rd) - AM Peak (08:00-09:00)



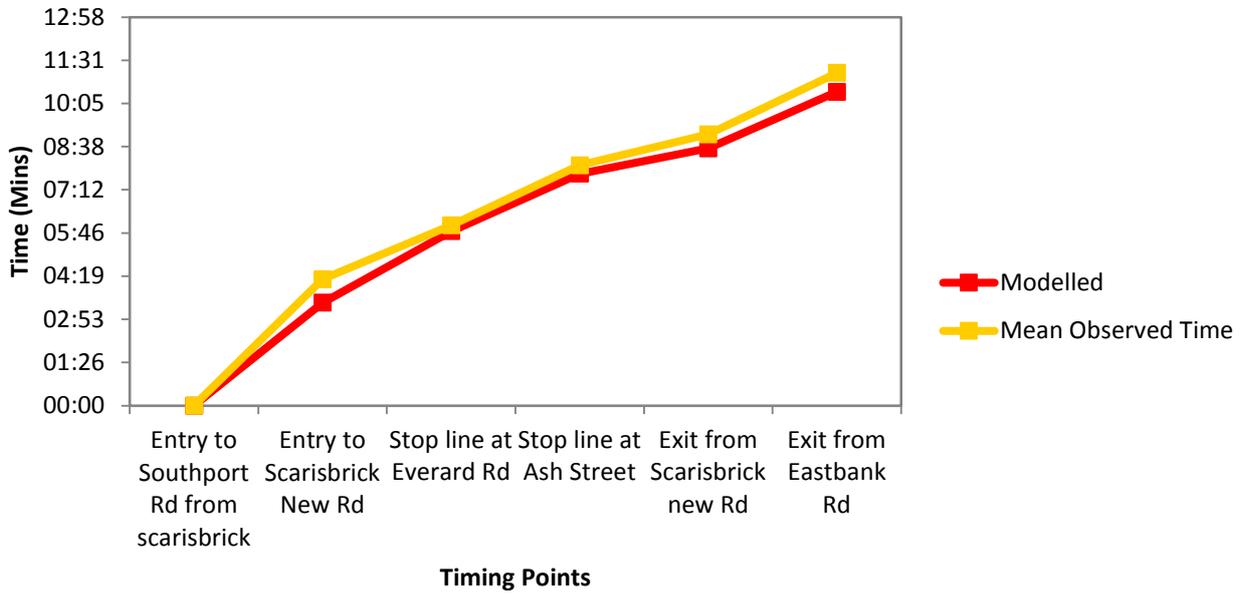
Route 9: (NB B5276 (Kew Roundabout to Roe Lane) - AM Peak (08:00-09:00))



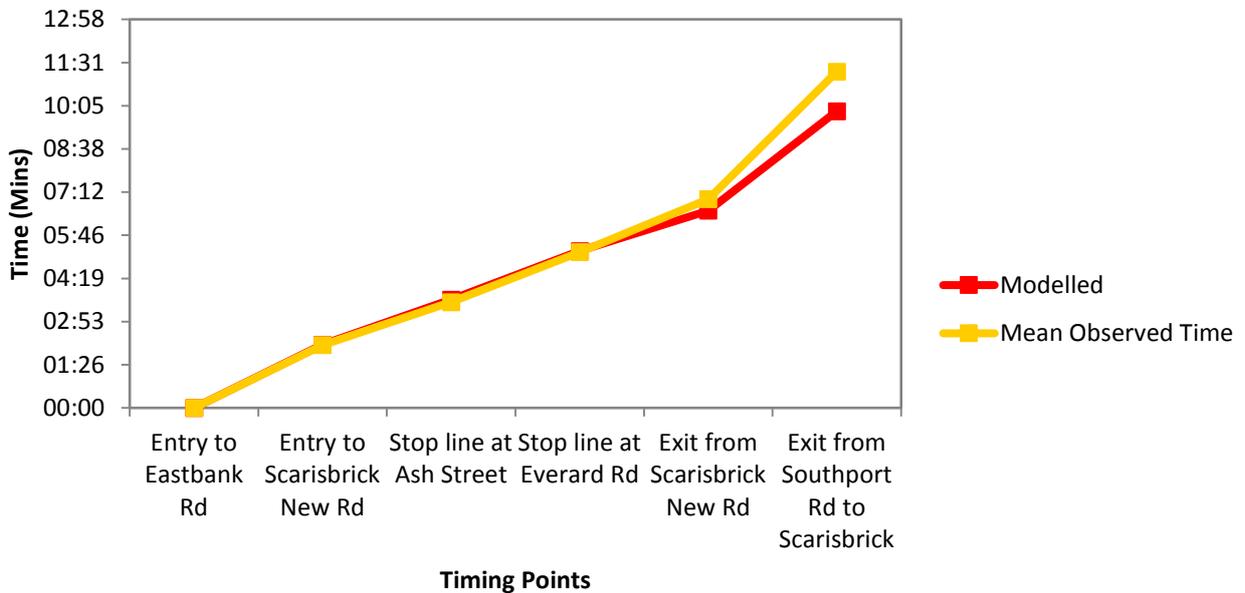
Route 10: (SB B5276 (Kew Roundabout to Roe Lane) - AM Peak (08:00-09:00))



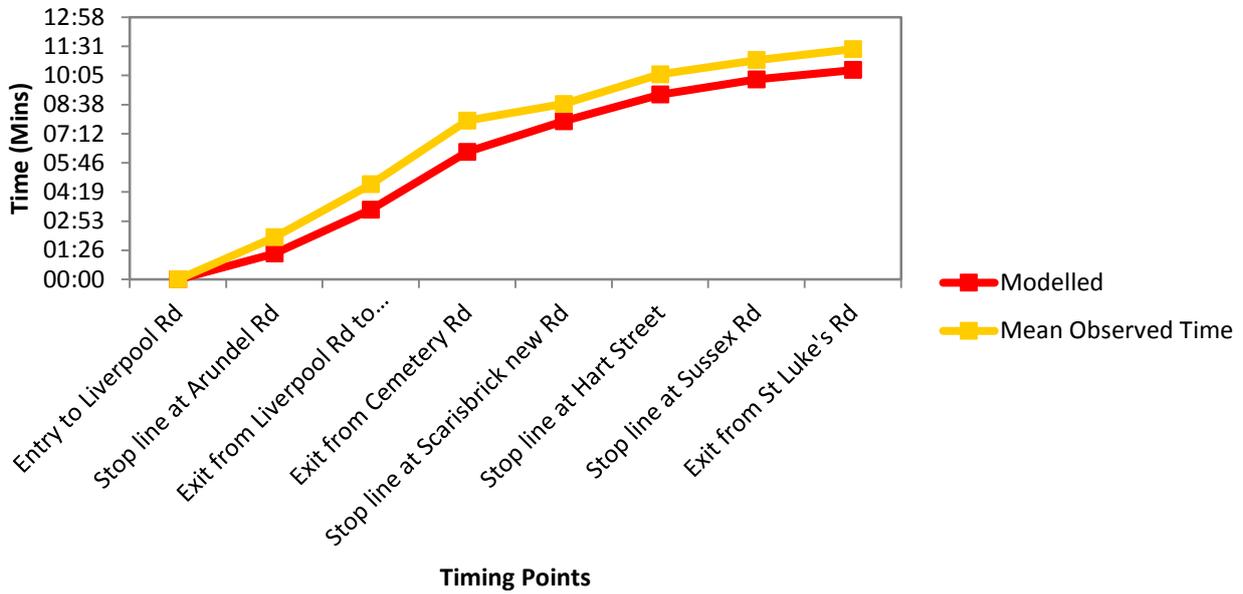
Route 11: (NB A570 (from Scarisbrick to Lord St)) - AM Peak (08:00-09:00)



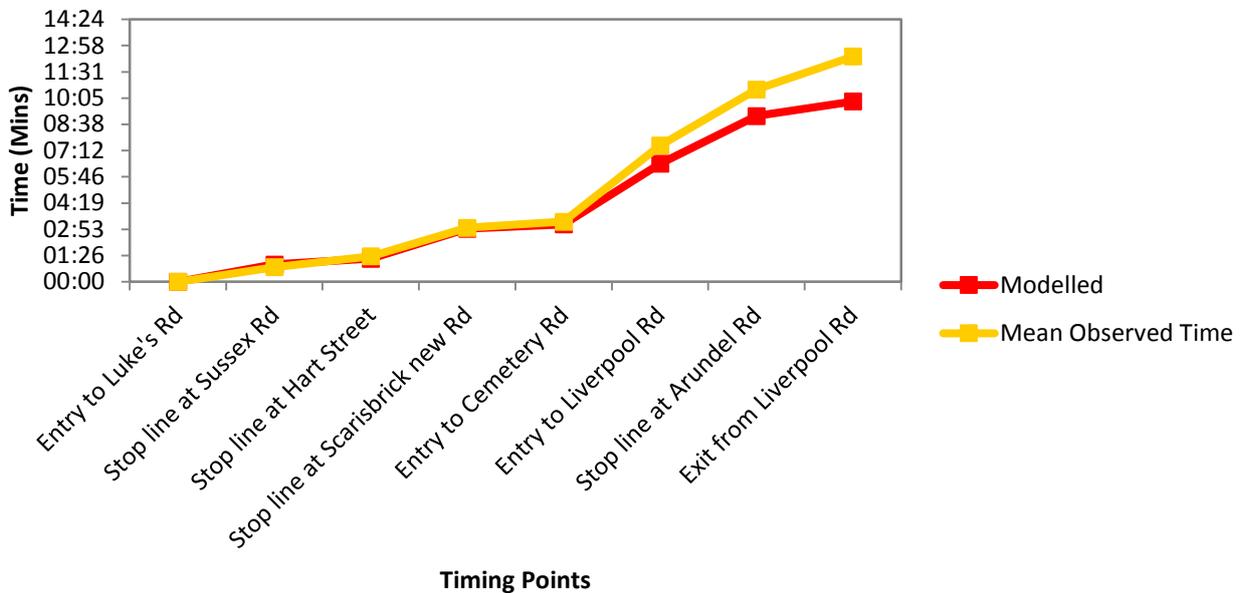
Route 12: (SB A570 (from Scarisbrick to Lord St)) - AM Peak (08:00-09:00)



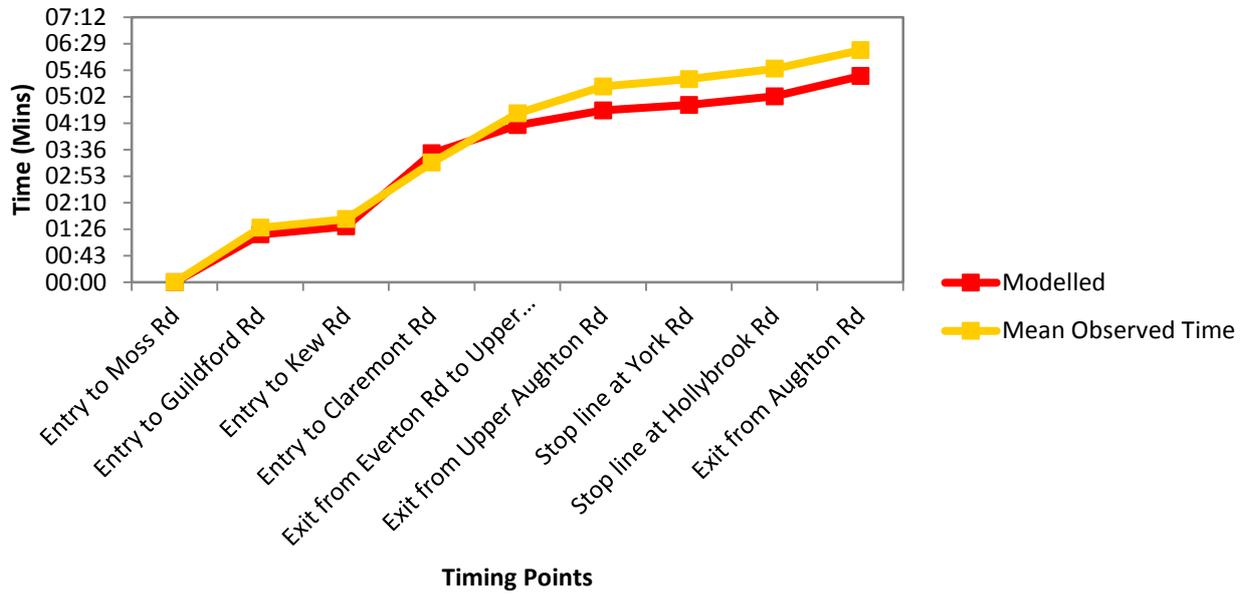
Route 13: (NB A5267 (Hartswood Rd to Waterloo Rd Roundabout) - AM Peak (08:00-09:00)



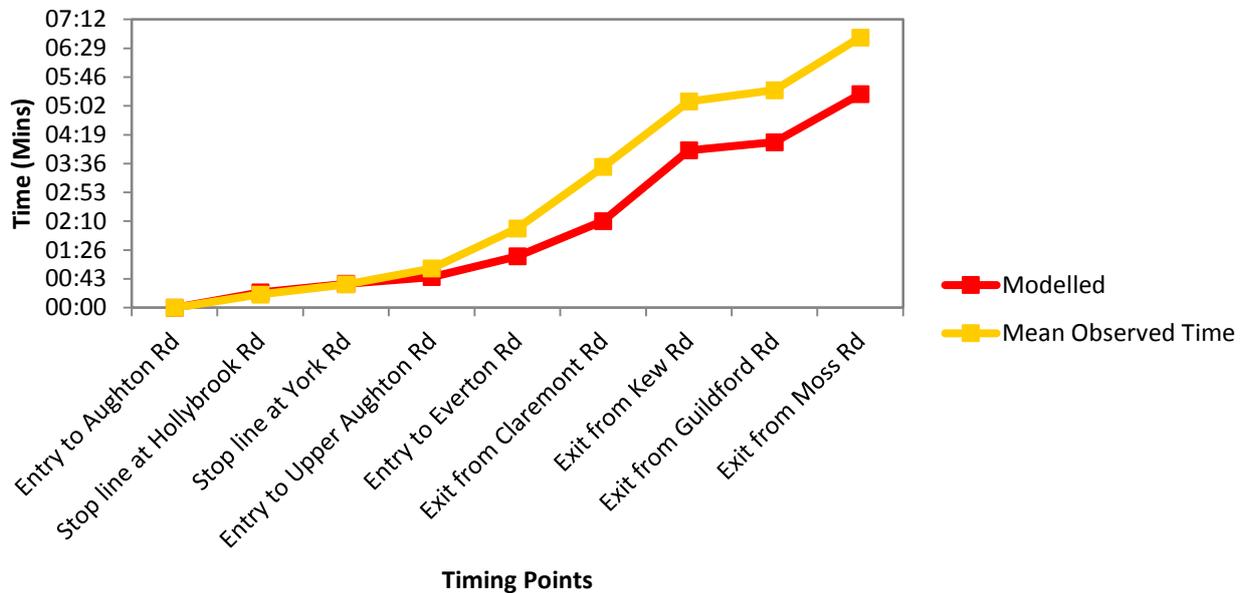
Route 14: (SB A5267 (Hartswood Rd to Waterloo Rd Roundabout) - AM Peak (08:00-09:00)



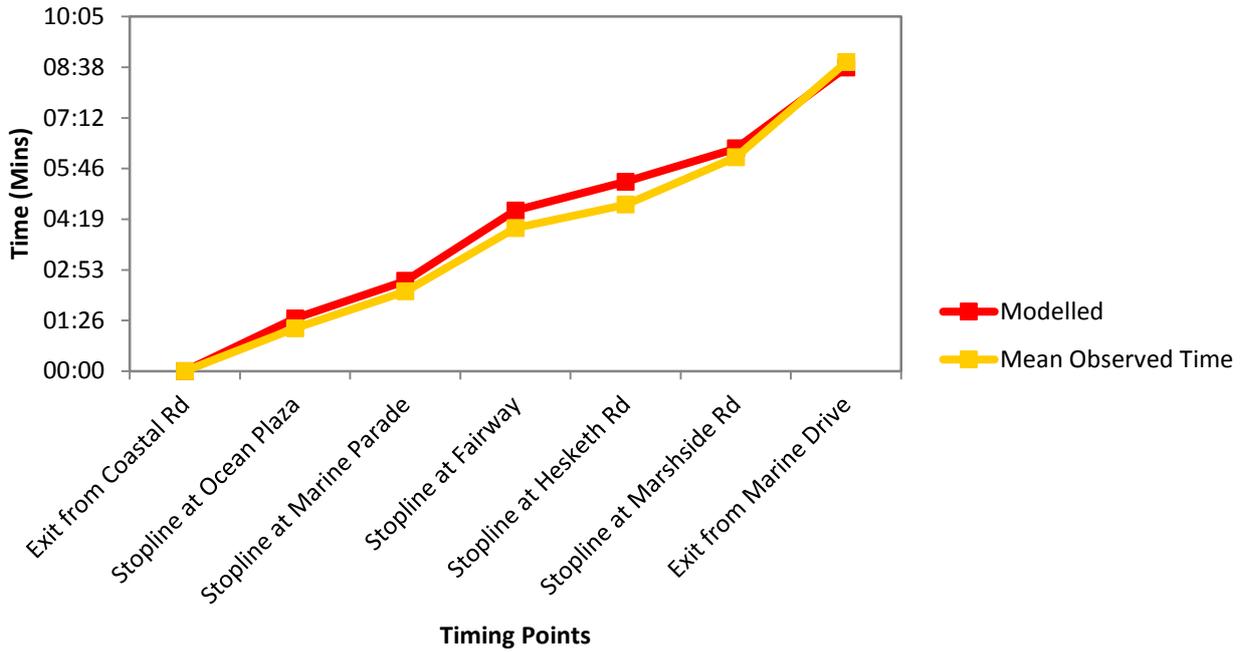
Route 15: (NB B5243 (Moss Rd to B5208 Lulworth Rd) - AM Peak (08:00-09:00)



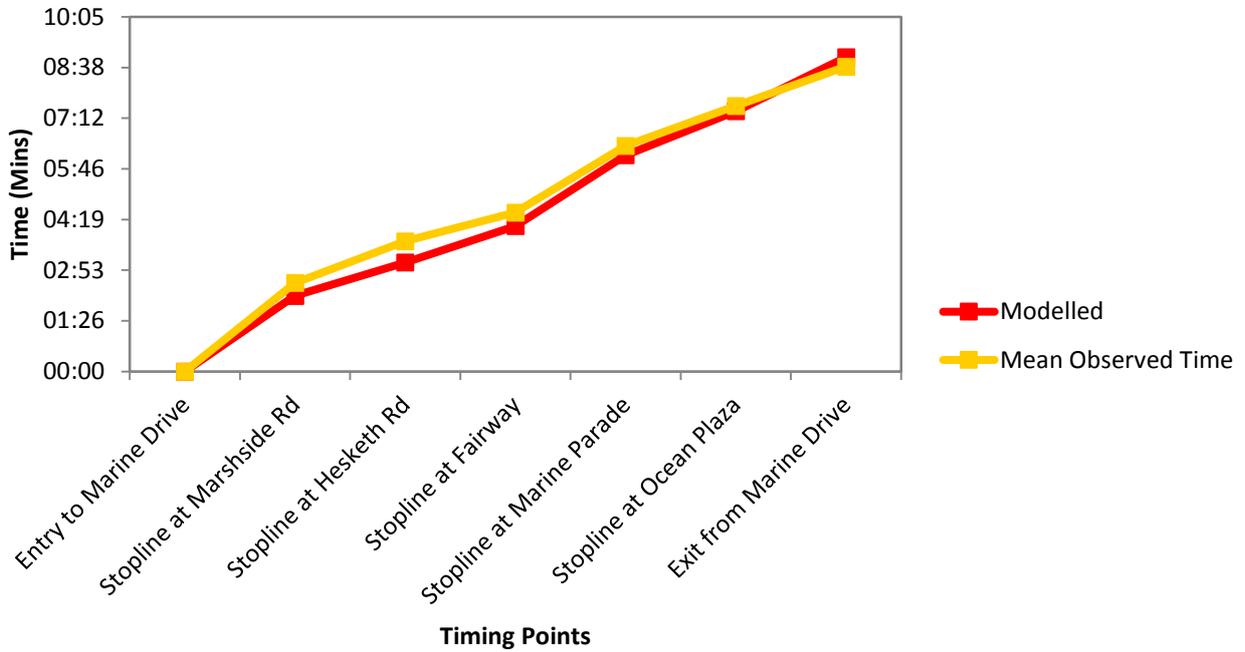
Route 16: (SB B5243 (Moss Rd to B5208 Lulworth Rd) - AM Peak (08:00-09:00)



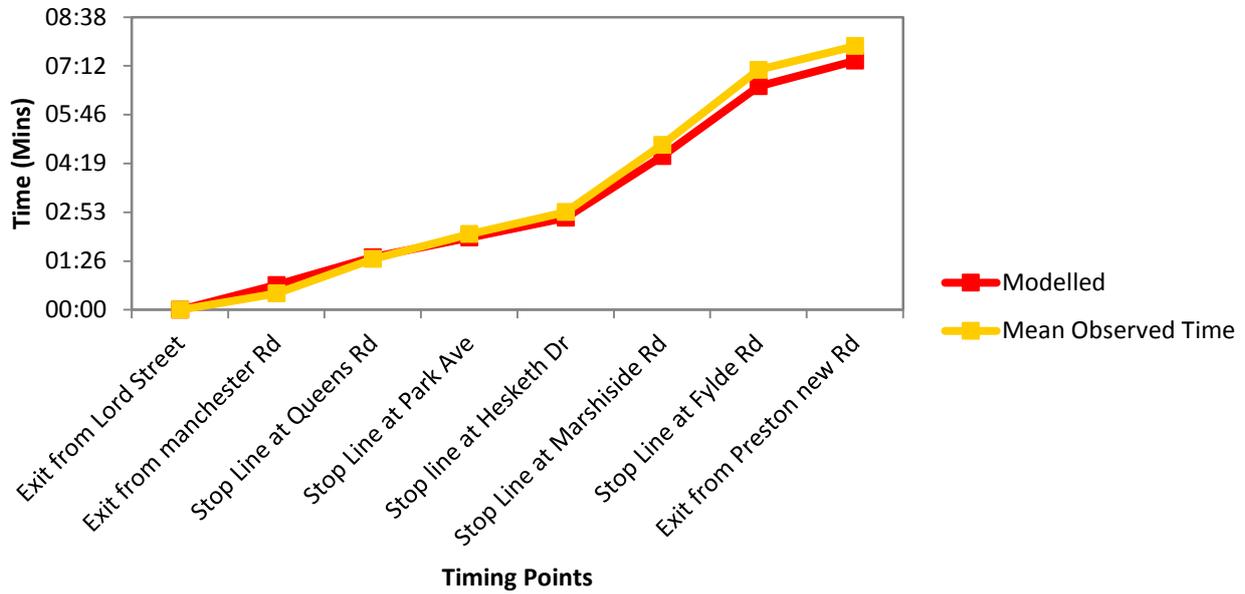
Route 1: NB Coastal Road - IP Peak (10:00-16:00)



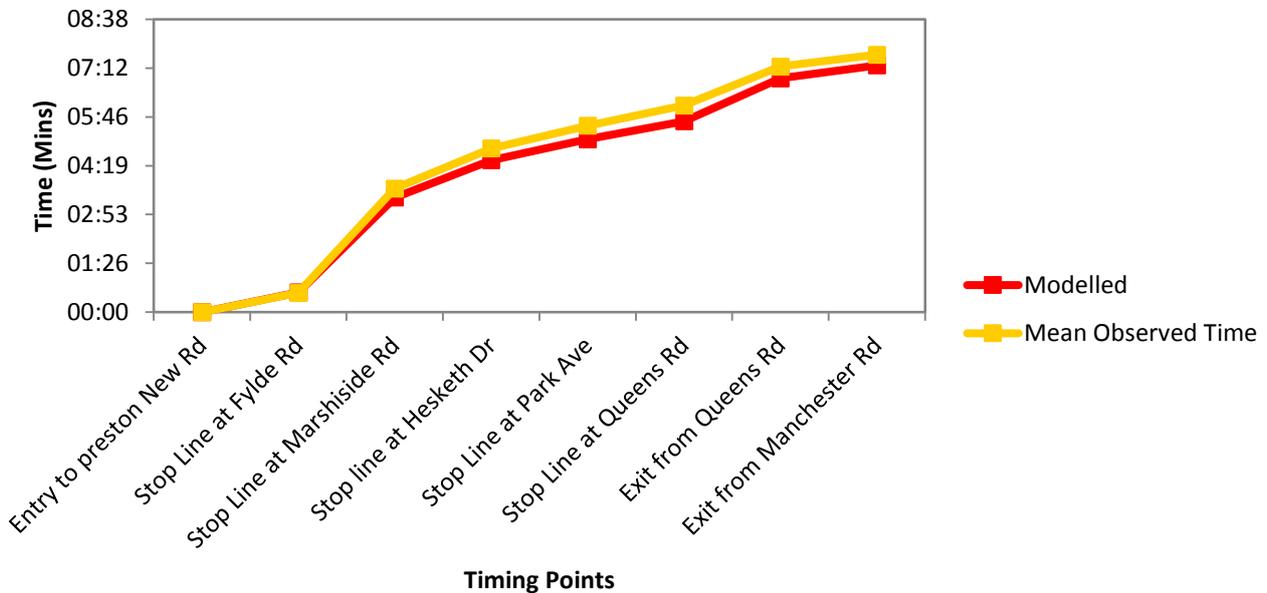
Route 2: (SB Coastal Road) - IP Peak (10:00-16:00)



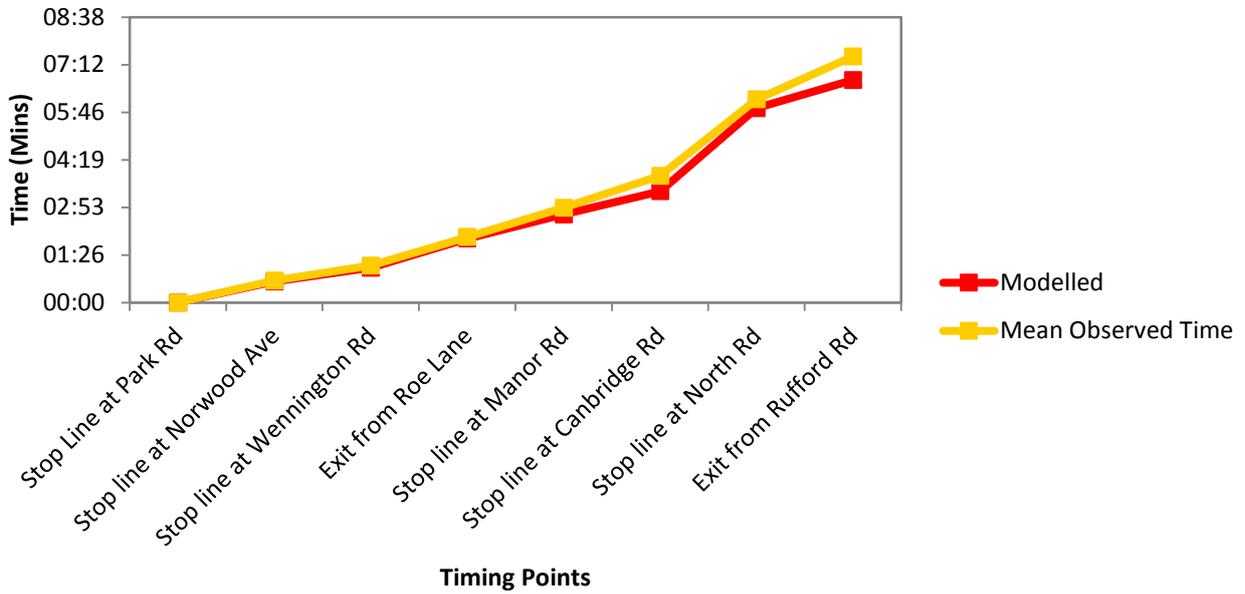
Route 3: (NB Plough Roundabout to Lord Street (A565 to Town Centre) - IP Peak (10:00-16:00)



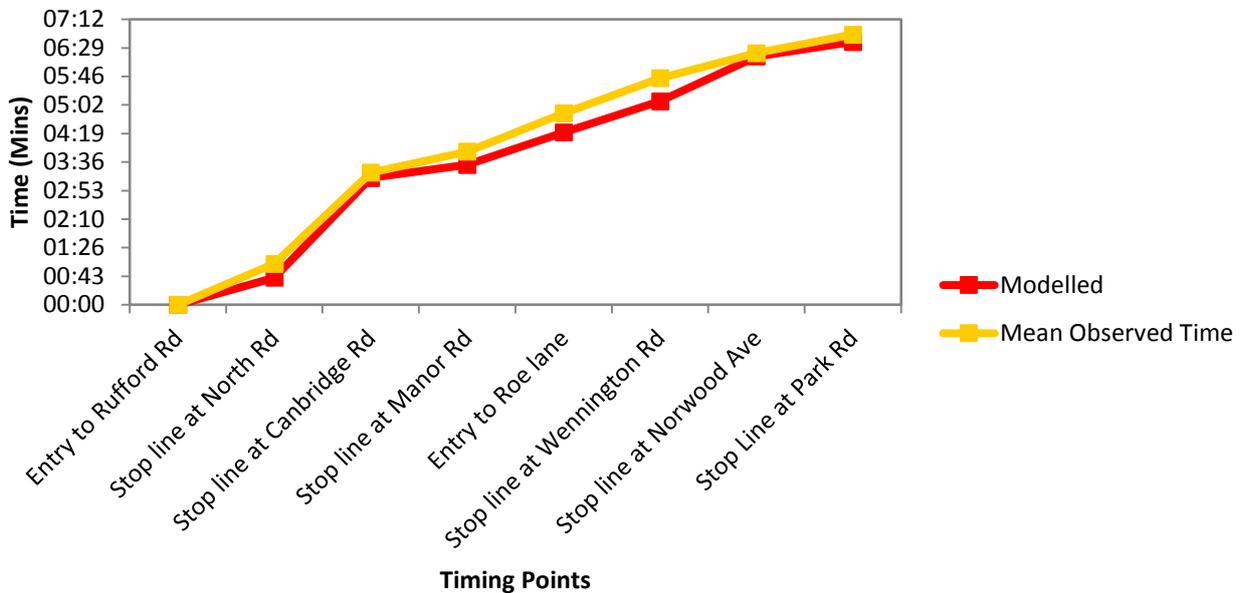
Route 4: (SB Plough Roundabout to Lord Street (A565 to Town Centre) - IP Peak (10:00-16:00)



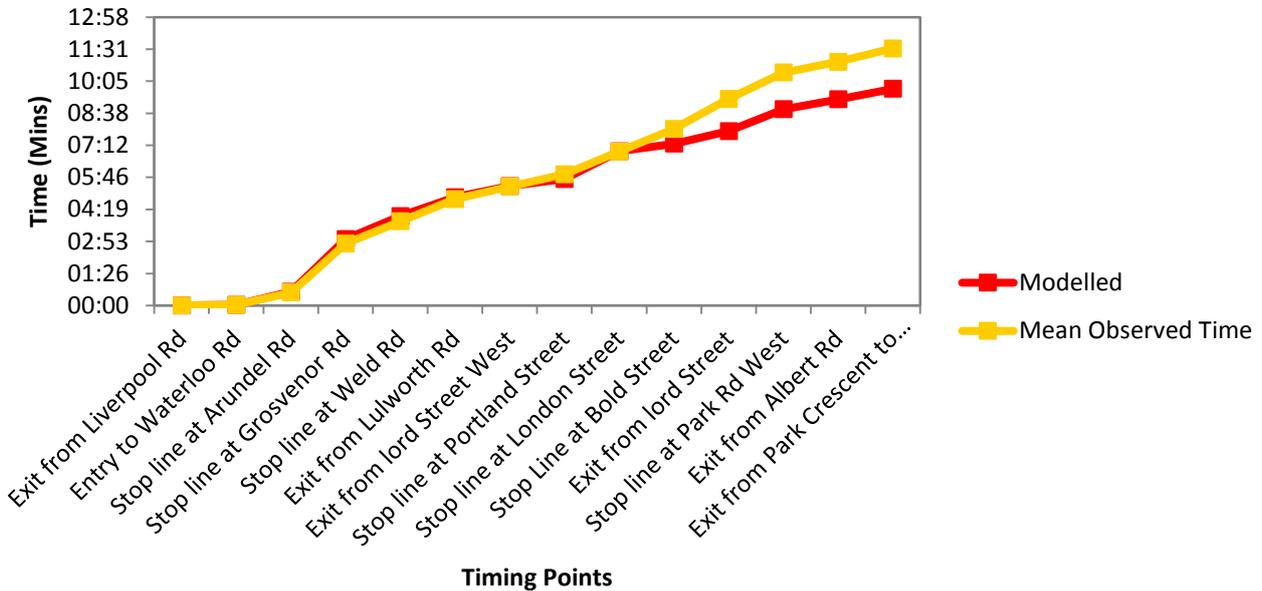
Route 5: (NB Plough Roundabout to Hawshead Rd (via B5244) - IP Peak (10:00-16:00))



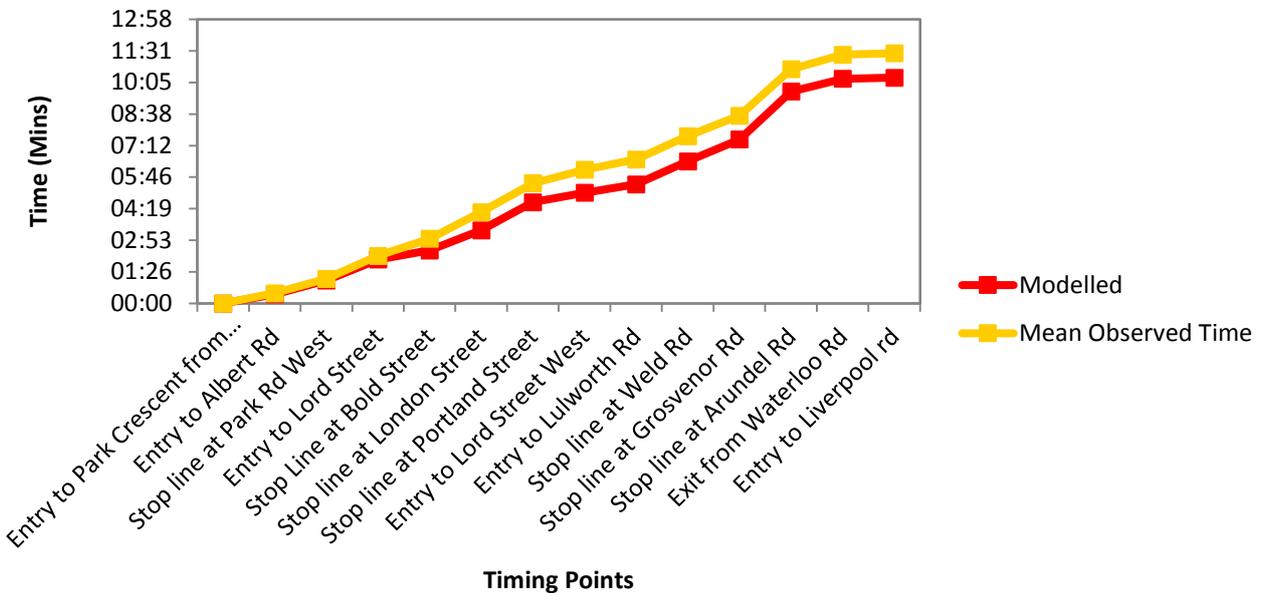
Route 6: (SB Plough Roundabout to Hawshead Rd (via B5244) - IP Peak (10:00-16:00))



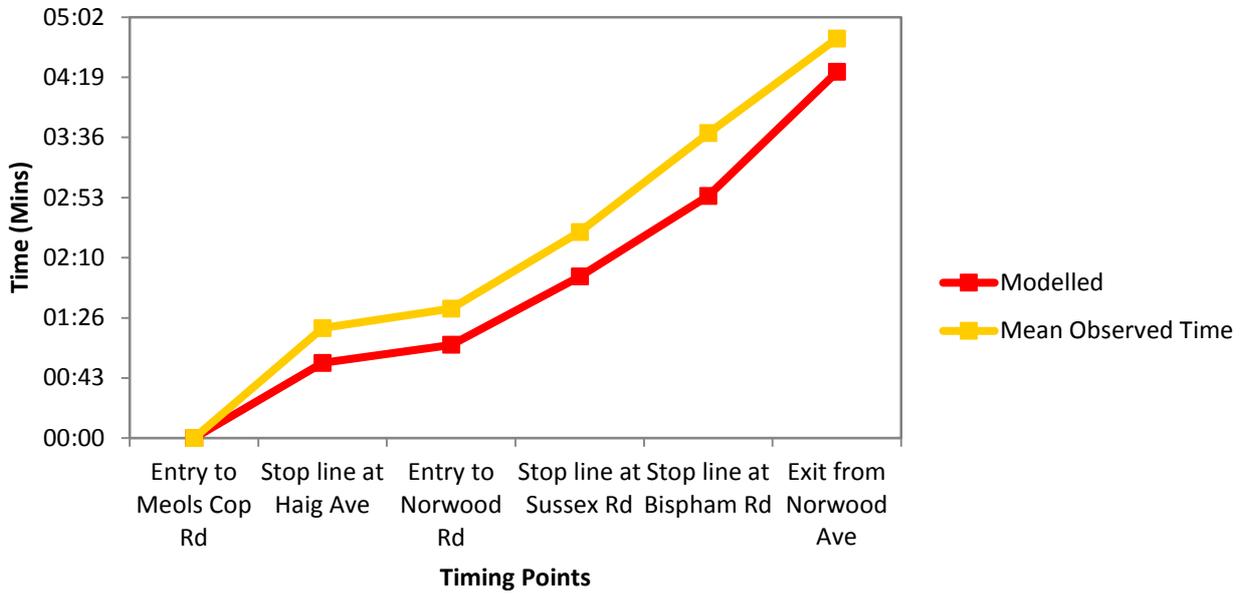
Route 7: (NB Albert St, Lord St, Waterloo Rd to Liverpool Rd) - IP Peak (10:00-16:00)



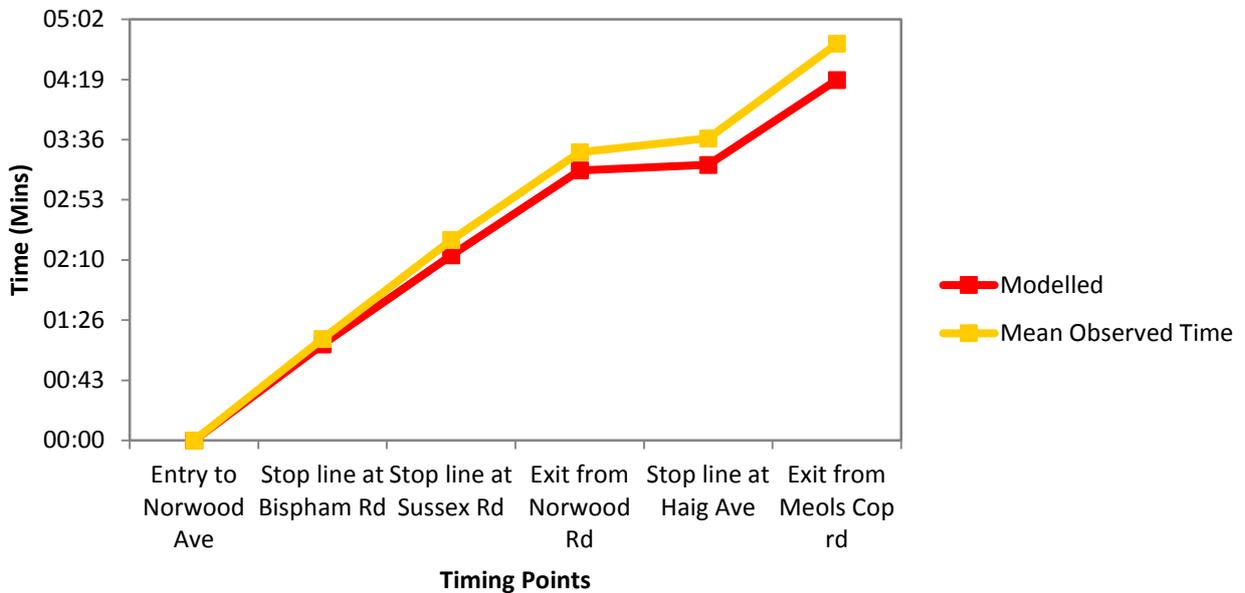
Route 8: (SB Albert St, Lord St, Waterloo Rd to Liverpool Rd) - IP Peak (10:00-16:00)



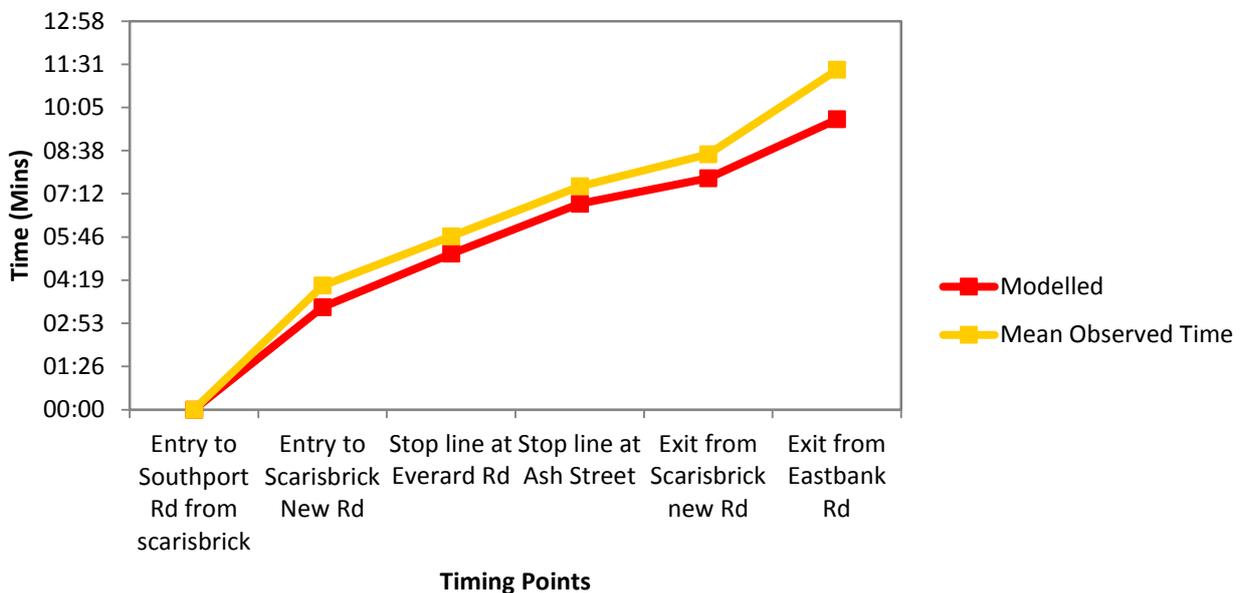
Route 9: (NB B5276 (Kew Roundabout to Roe Lane) - IP Peak (10:00-16:00))



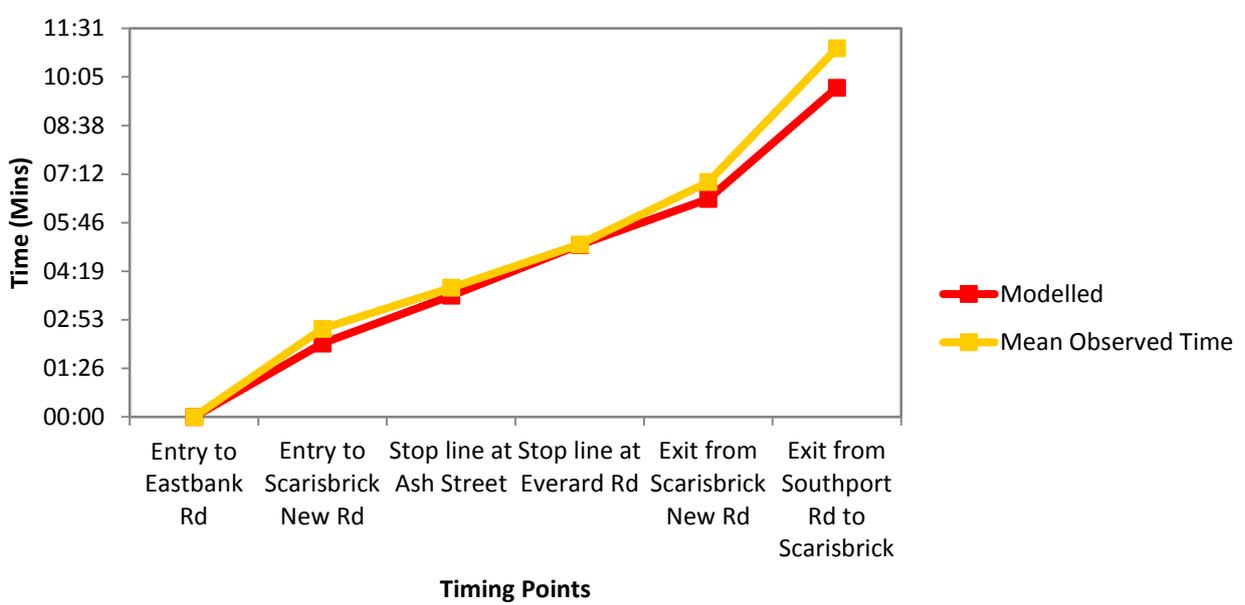
Route 10: (SB B5276 (Kew Roundabout to Roe Lane) - IP Peak (10:00-16:00))



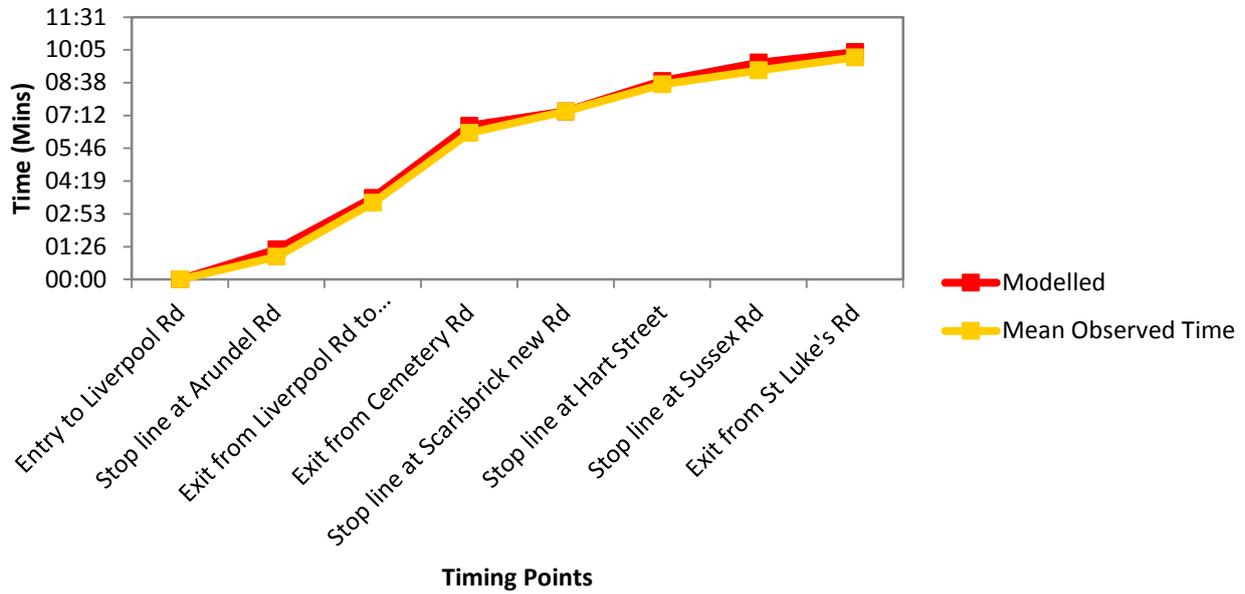
Route 11: (NB A570 (from Scarisbrick to Lord St) - IP Peak (10:00-16:00))



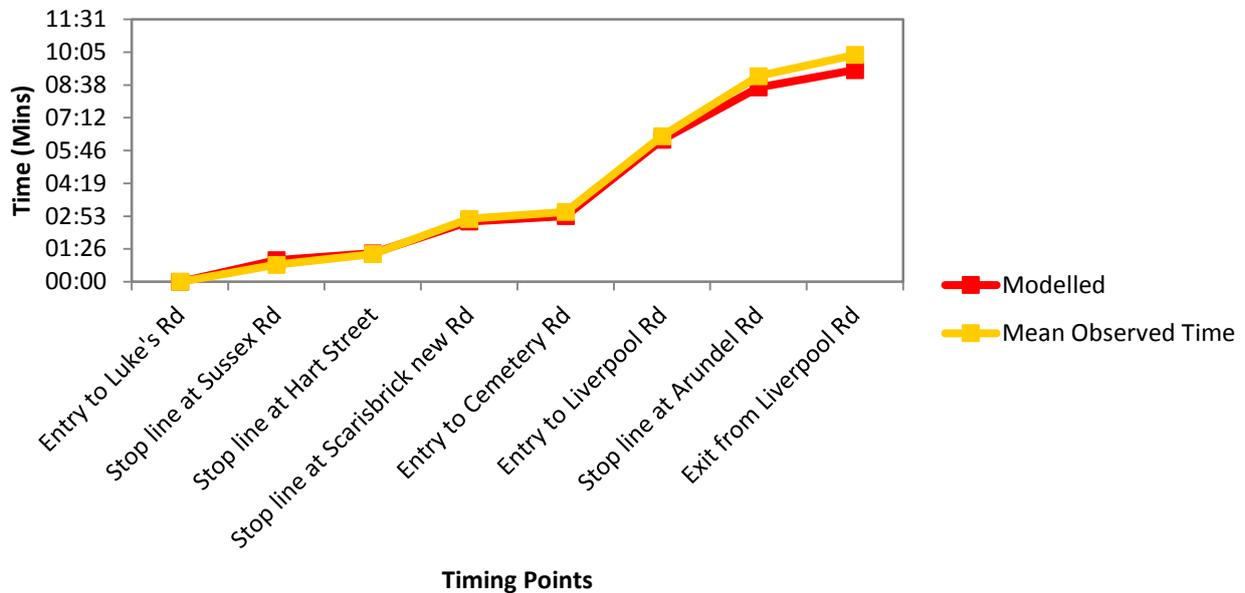
Route 12: (SB A570 (from Scarisbrick to Lord St) - IP Peak (10:00-16:00))



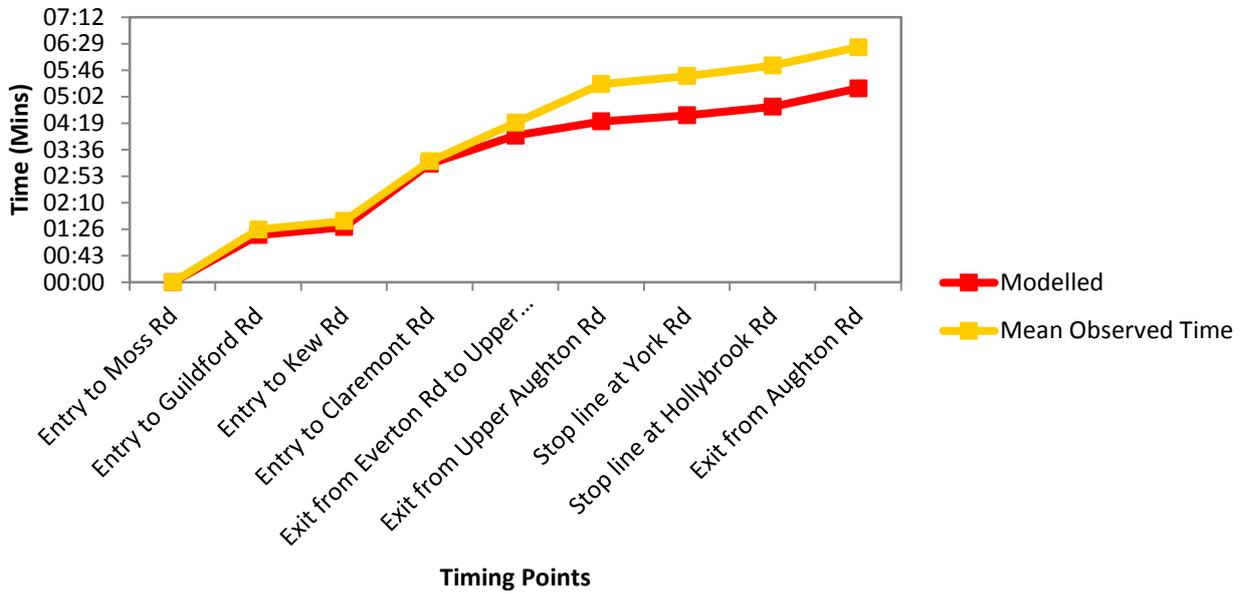
Route 13: NB A5267 (Hartswood Rd to Waterloo Rd Roundabout) - IP Peak (10:00-16:00)



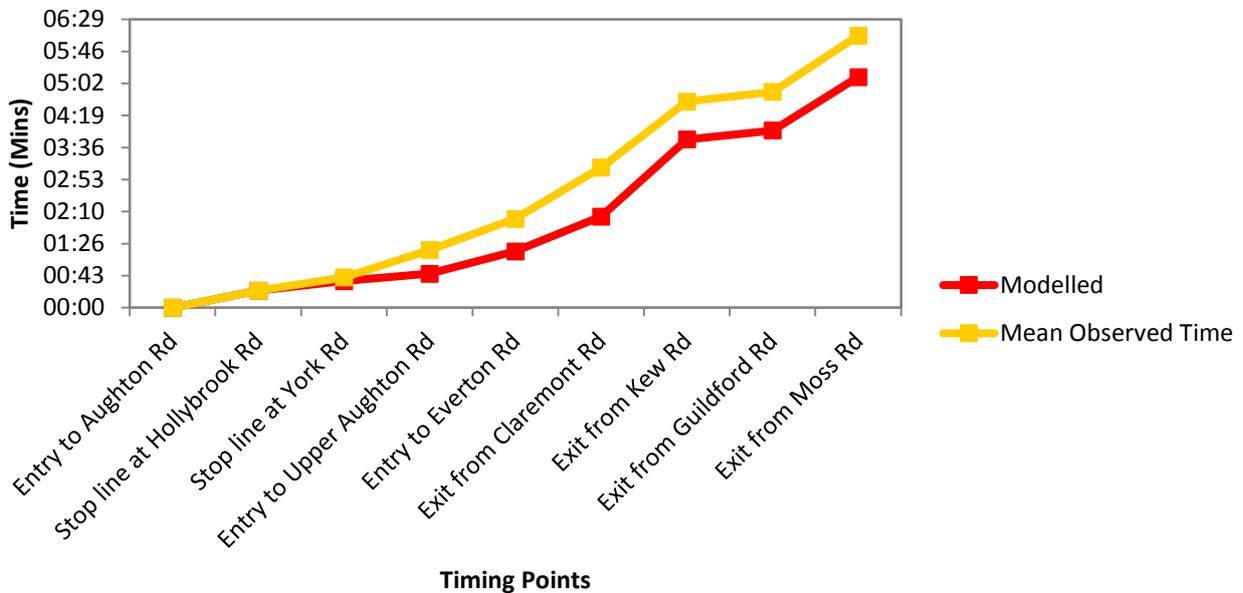
Route 14: SB A5267 (Hartswood Rd to Waterloo Rd Roundabout) - IP Peak (10:00-16:00)



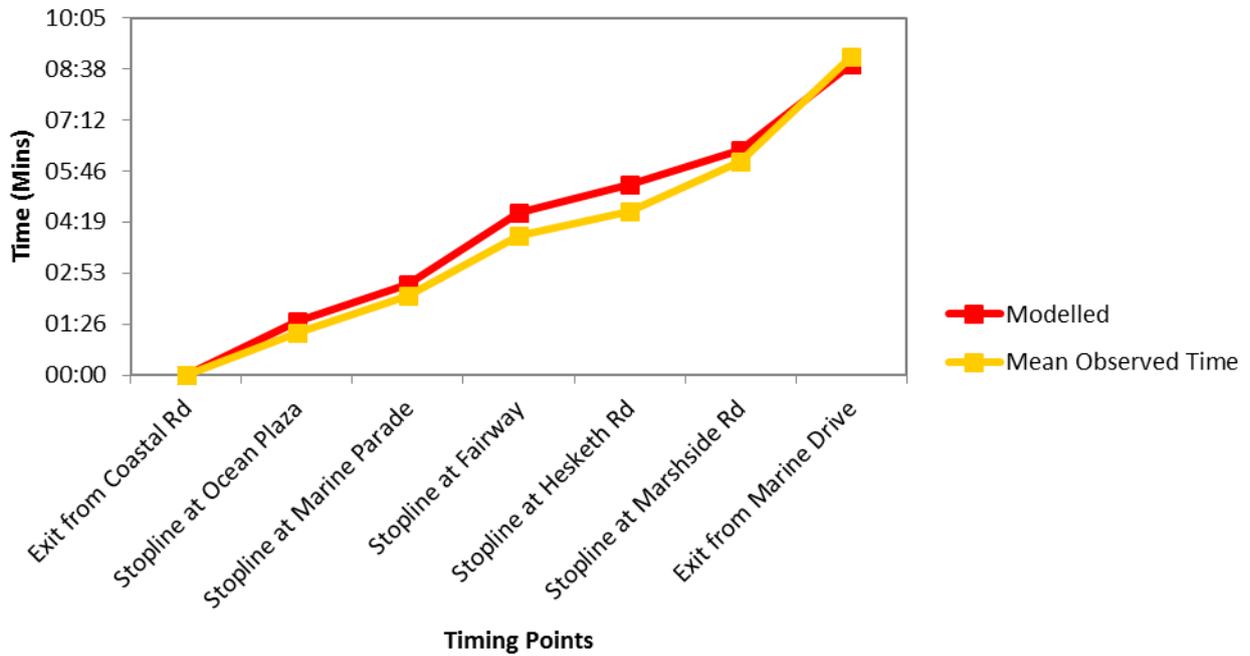
Route 15: NB B5243 (Moss Rd to B5208 Lulworth Rd) - IP Peak (10:00-16:00)



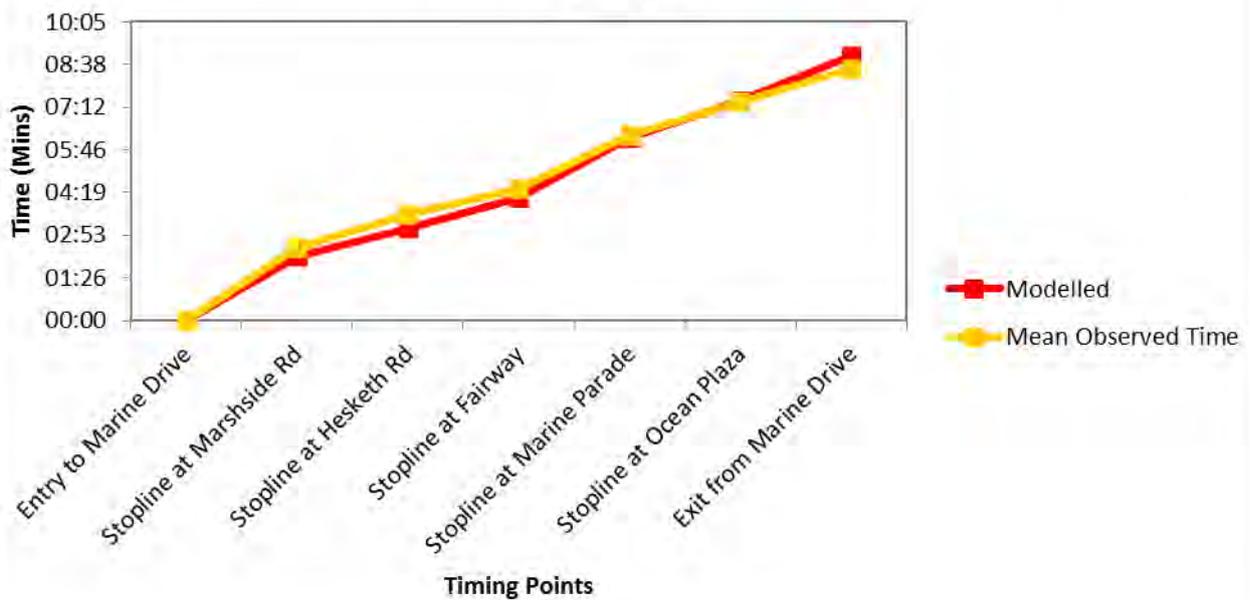
Route 16: SB B5243 (Moss Rd to B5208 Lulworth Rd) - IP Peak (10:00-16:00)



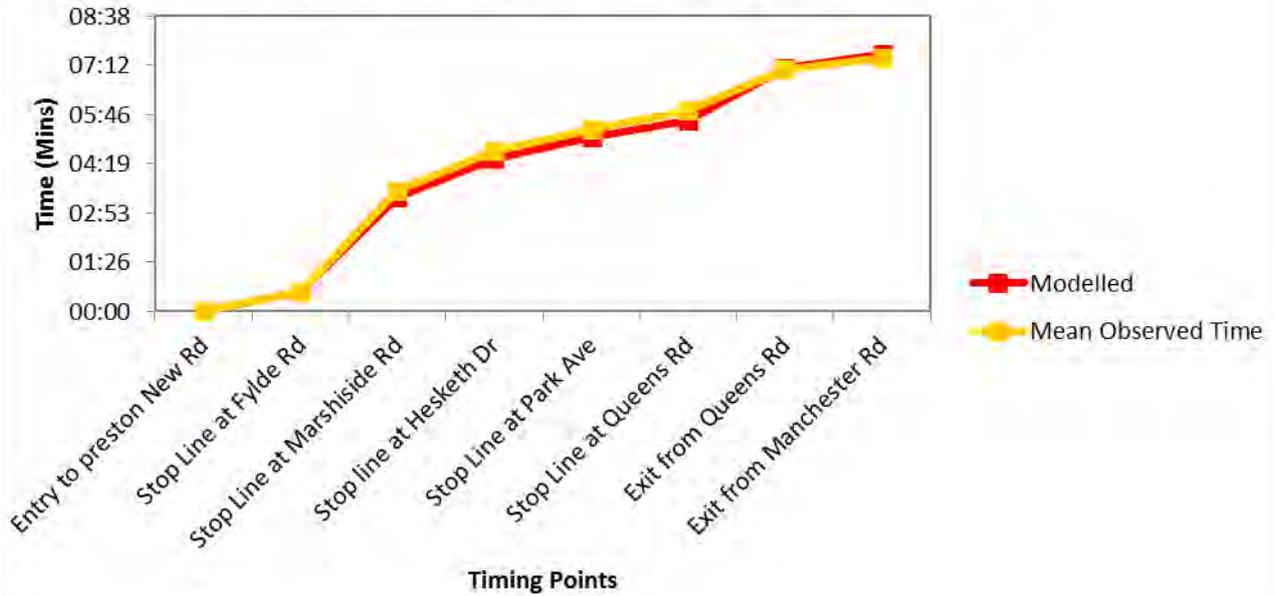
Route 1: NB Coastal Road - PM Peak (17:00-18:00)



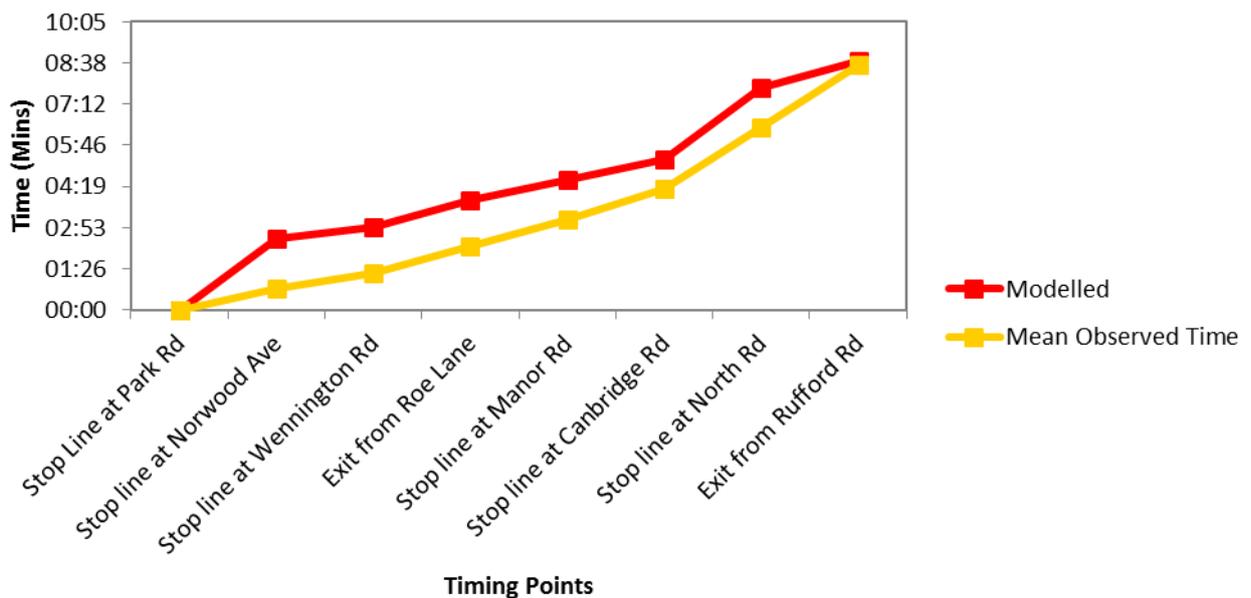
Route 2: (SB Coastal Road) - PM Peak (17:00-18:00)



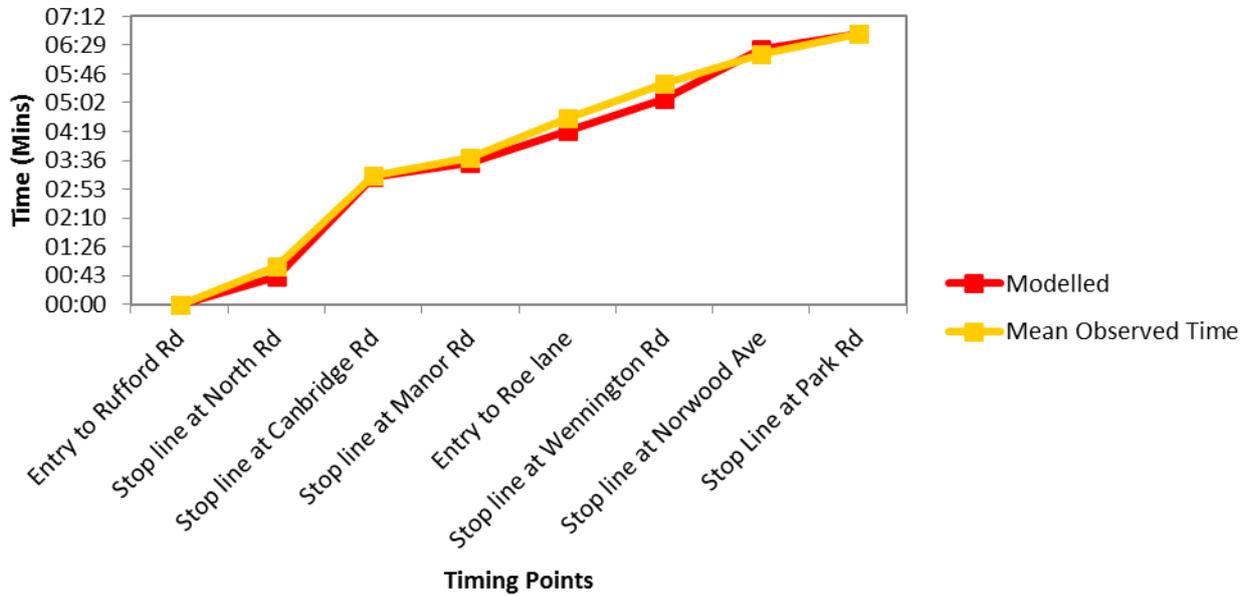
Route 4: (SB Plough R'abt to Lord Street (A565 to Town Centre)) - PM Peak (17:00-18:00)



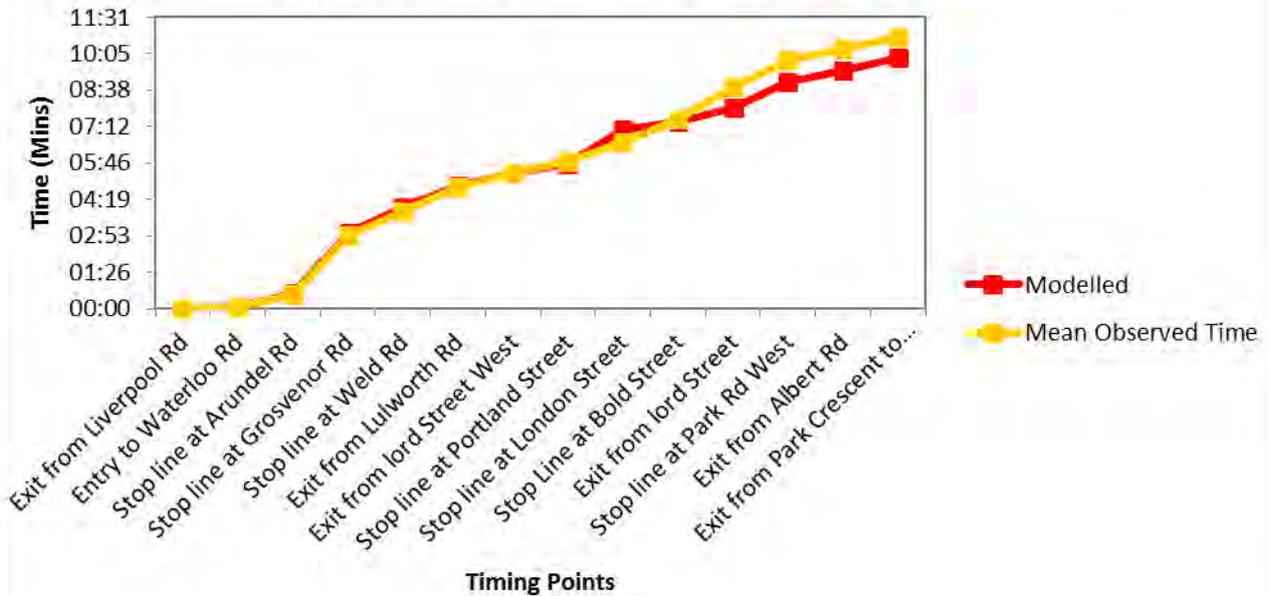
Route 5: (NB Plough R'abt to Hawshead Rd (via B5244)) - PM Peak (17:00-18:00)



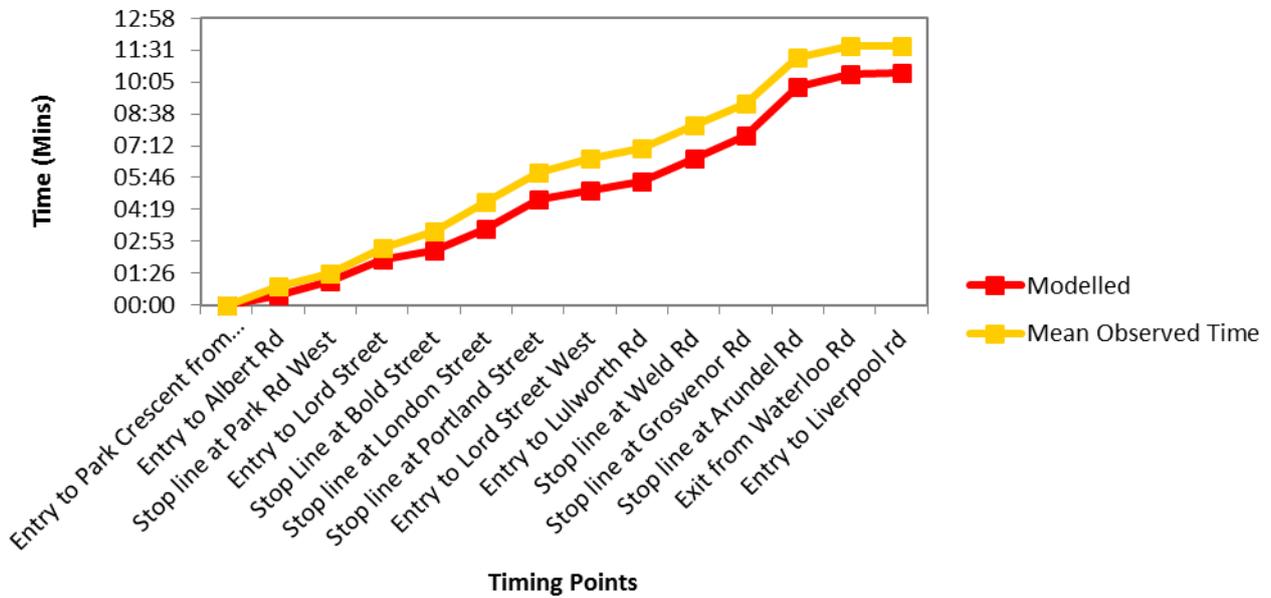
Route 6: (SB Plough R'abt to Hawshead Rd (via B5244)) - PM Peak (17:00-18:00)



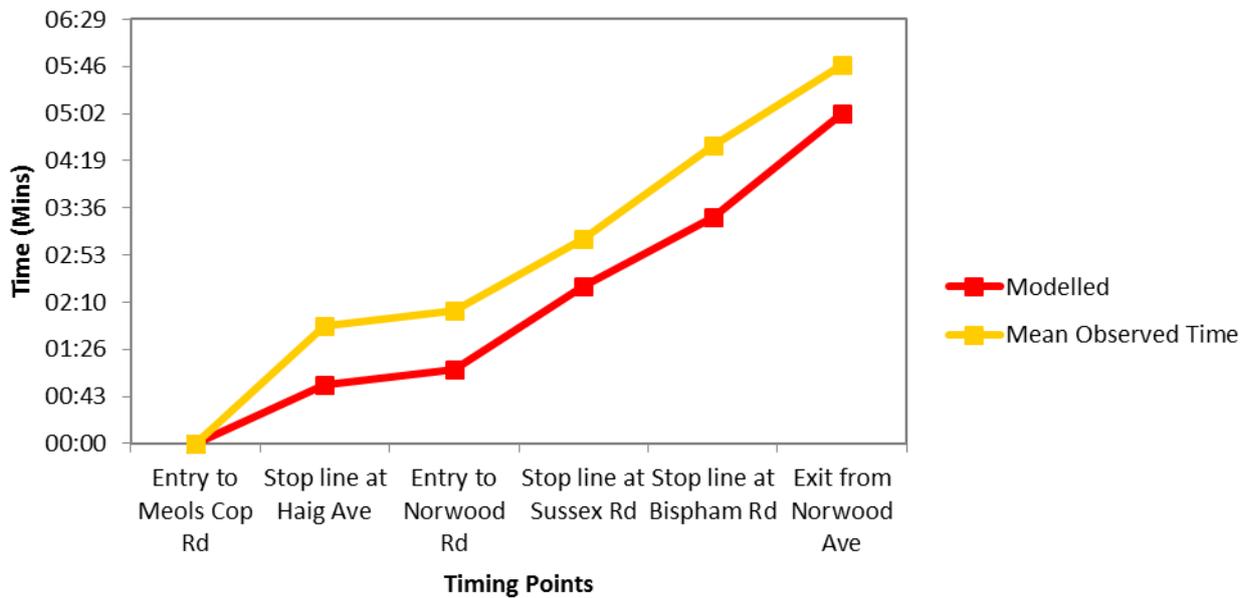
Route 7: (NB Albert St, Lord St, Waterloo Rd to Liverpool Rd) - PM Peak (17:00-18:00)



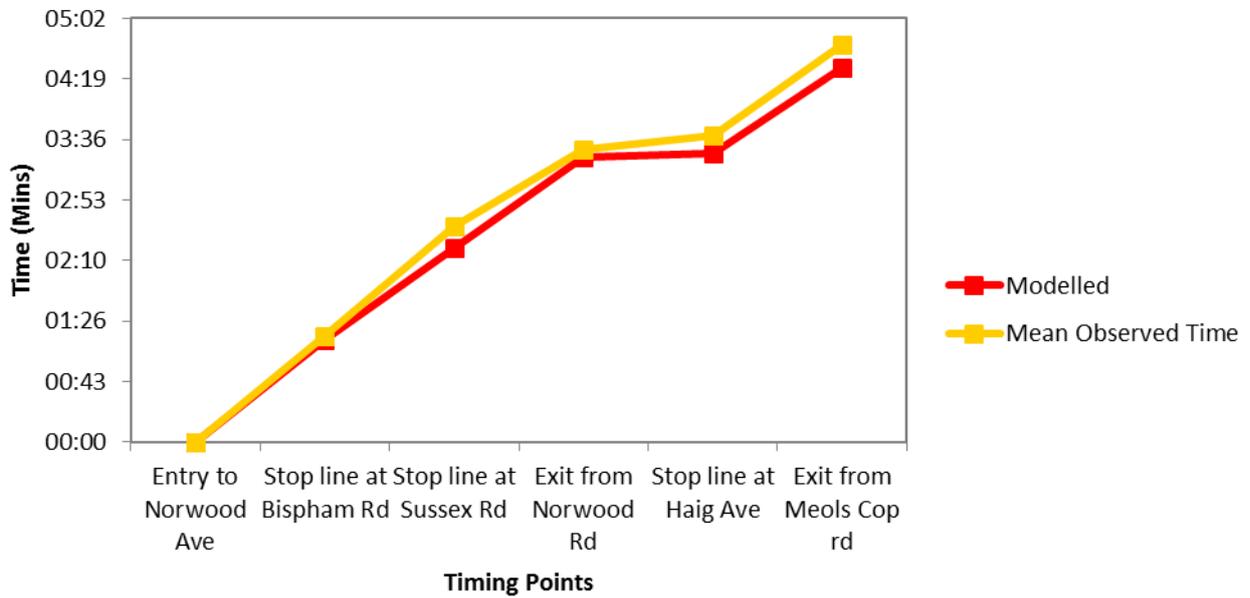
Route 8: (SB Albert St, Lord St, Waterloo Rd to Liverpool Rd) - PM Peak (17:00-18:00)



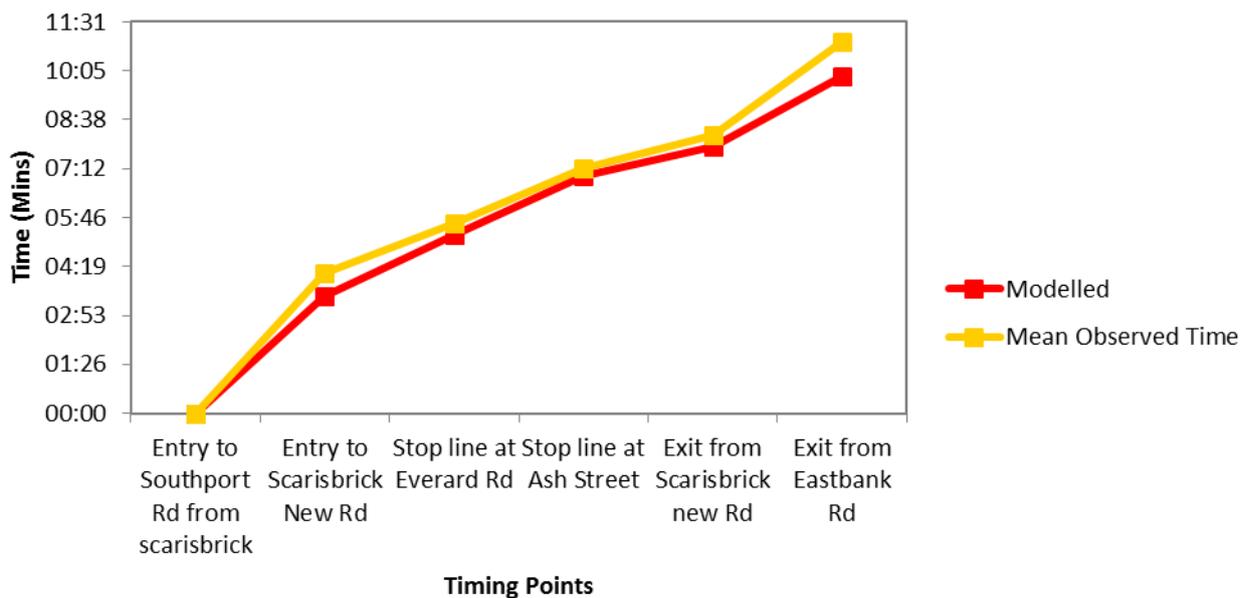
Route 9: (NB B5276 (Kew R'abt to Roe Lane)) - PM Peak (17:00-18:00)



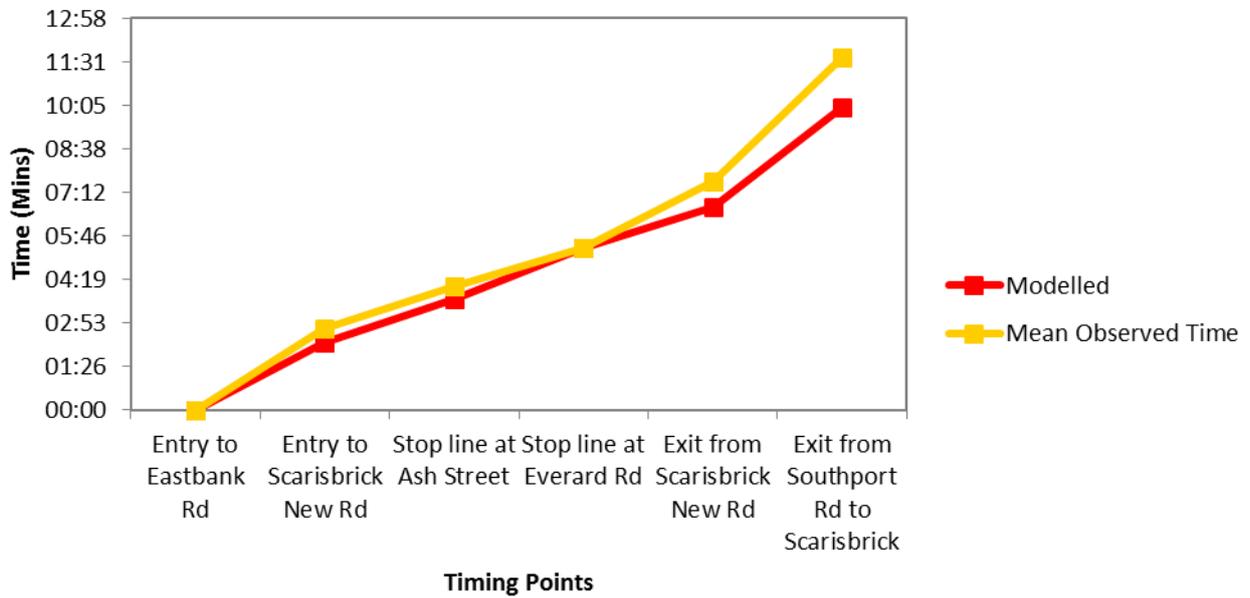
Route 10: (SB B5276 (Kew R'abt to Roe Lane)) - PM Peak (17:00-18:00)



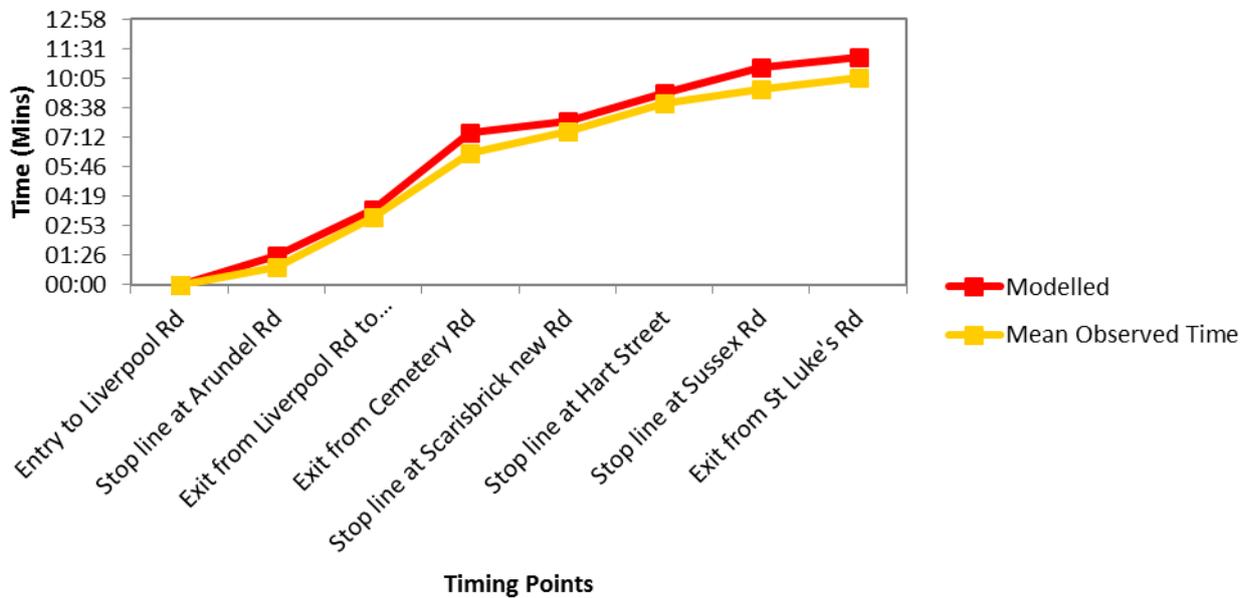
Route 11: (NB A570 (from Scarisbrick to Lord St)) - PM Peak (17:00-18:00)



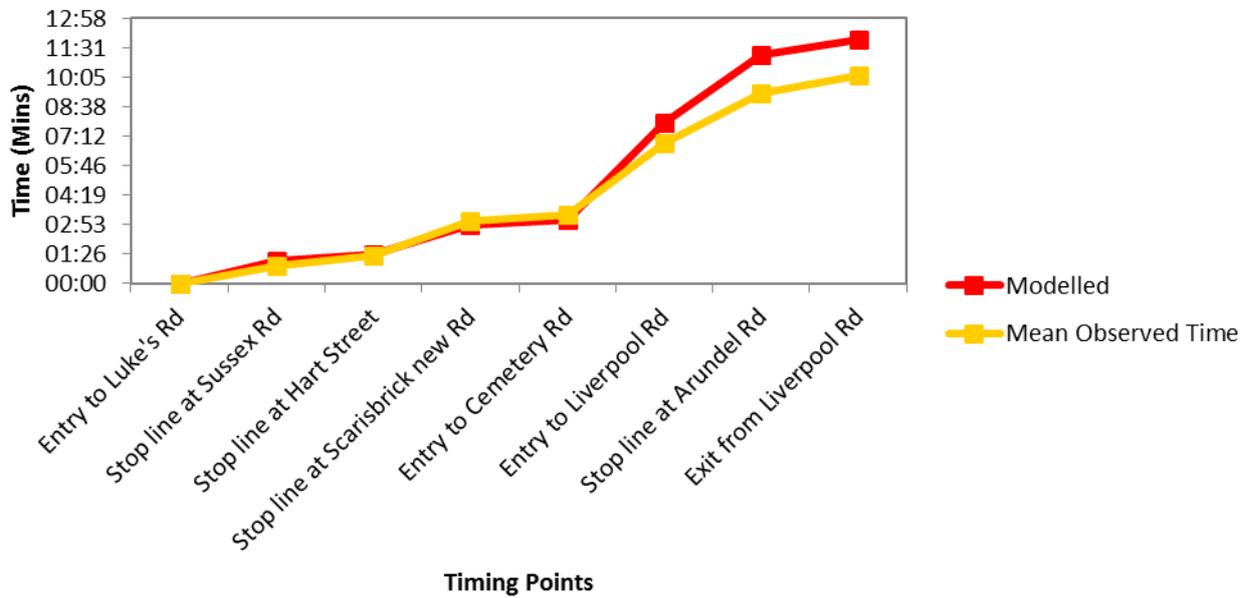
Route 12: (SB A570 (from Scarisbrick to Lord St)) - PM Peak (17:00-18:00)



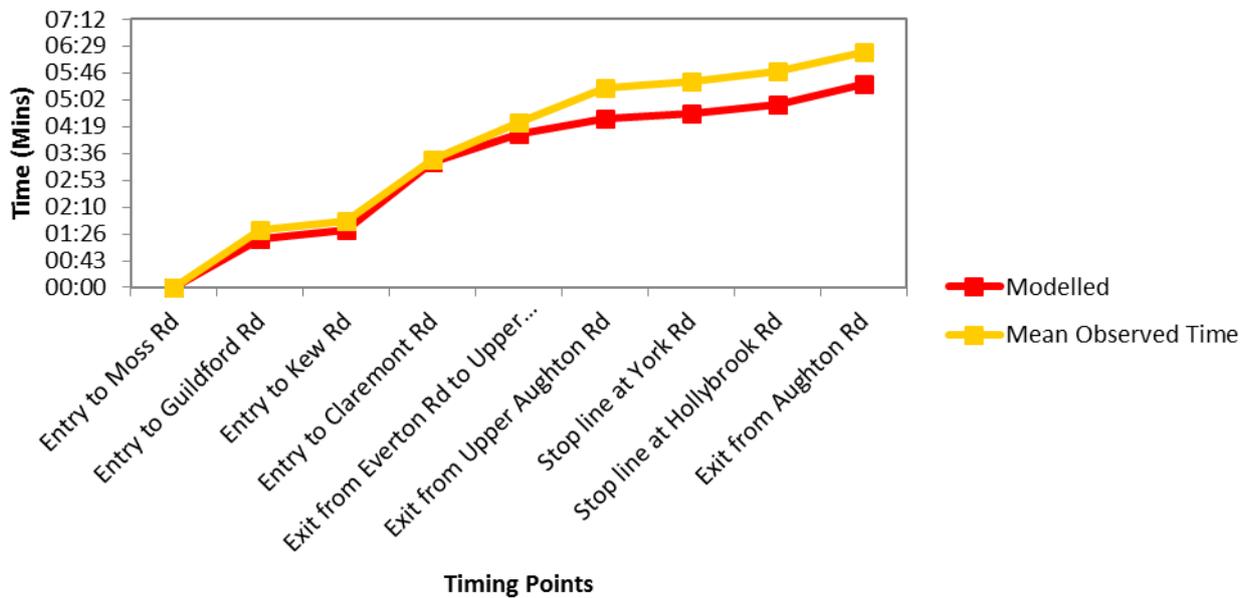
Route 13: (NB A5267 (Hartswood Rd to Waterloo Rd R'abt)) - PM Peak (17:00-18:00)



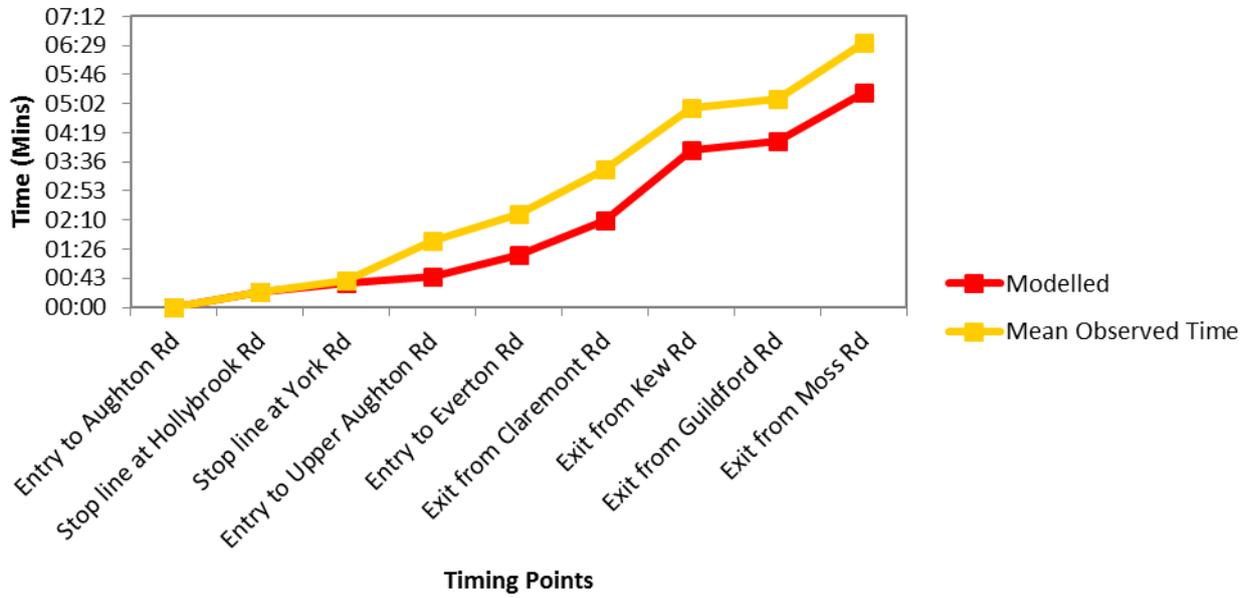
Route 14: (SB A5267 (Hartswood Rd to Waterloo Rd R'abt)) - PM Peak (17:00-18:00)



Route 15: (NB B5243 (Moss Rd to B5208 Lulworth Rd)) - PM Peak (17:00-18:00)

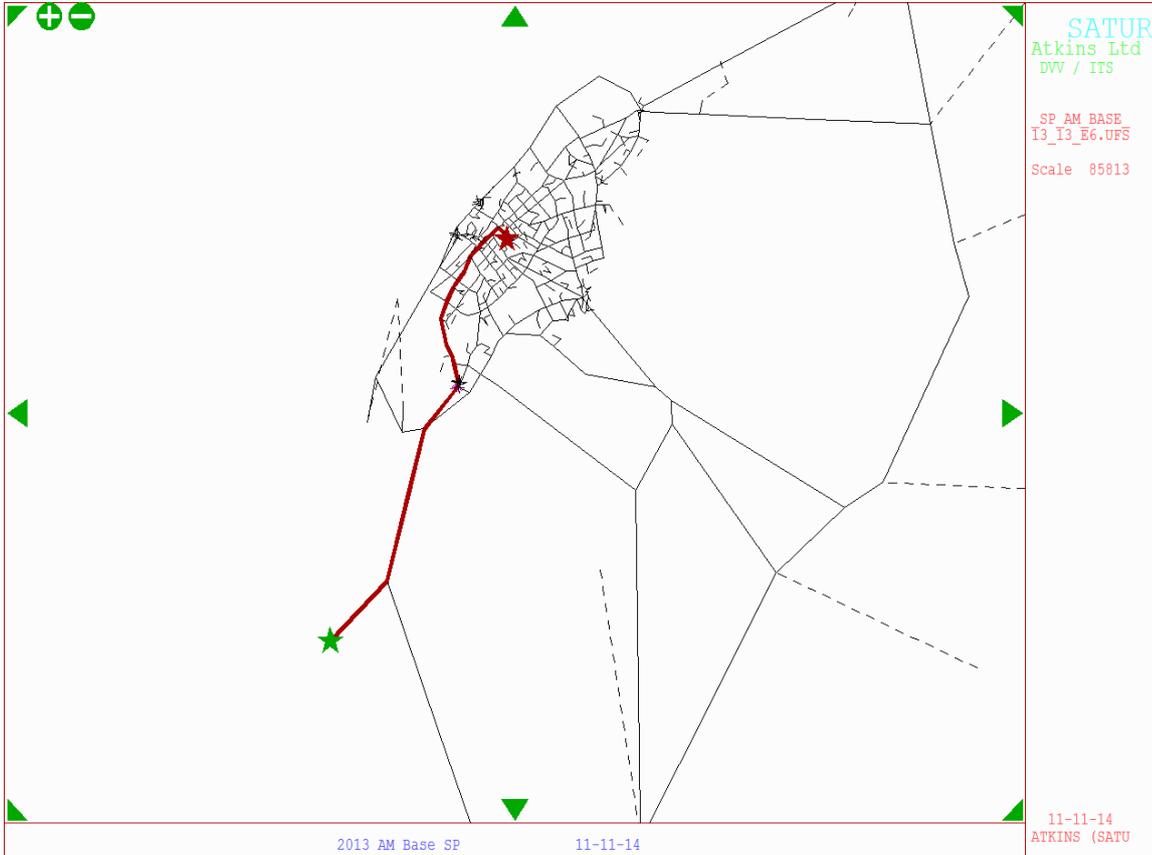


Route 16: (SB B5243 (Moss Rd to B5208 Lulworth Rd)) - PM Peak (17:00-18:00)

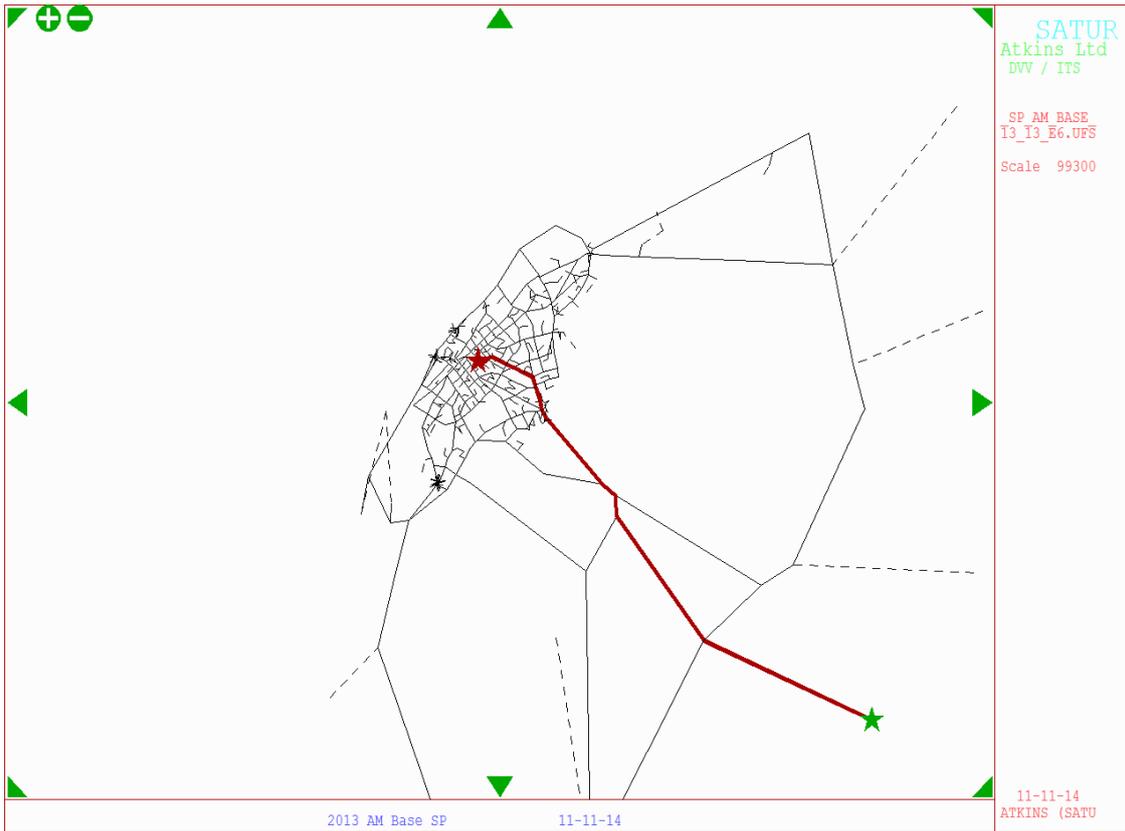


Appendix B. Route Choice

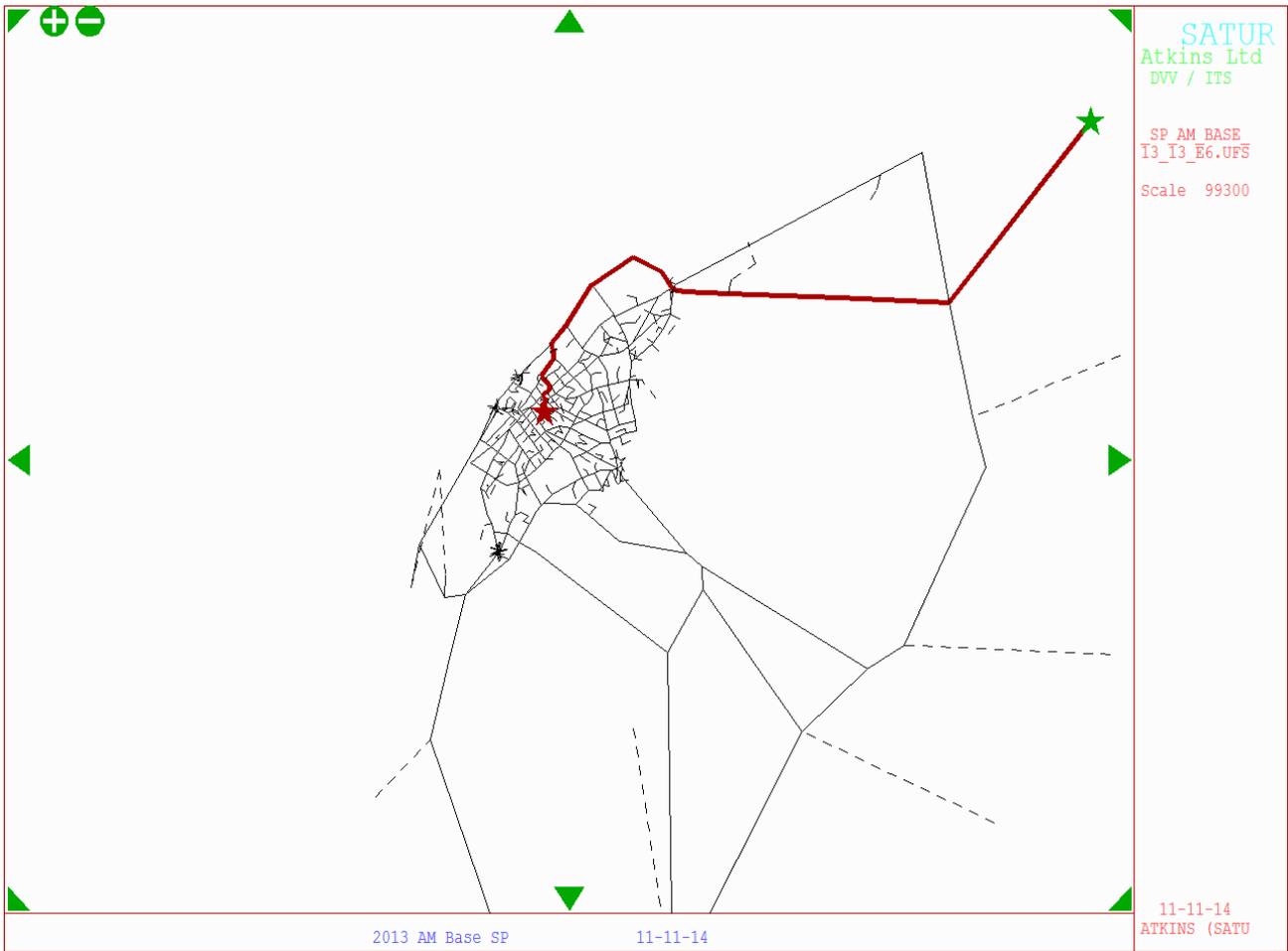
Liverpool to Southport (London Street)



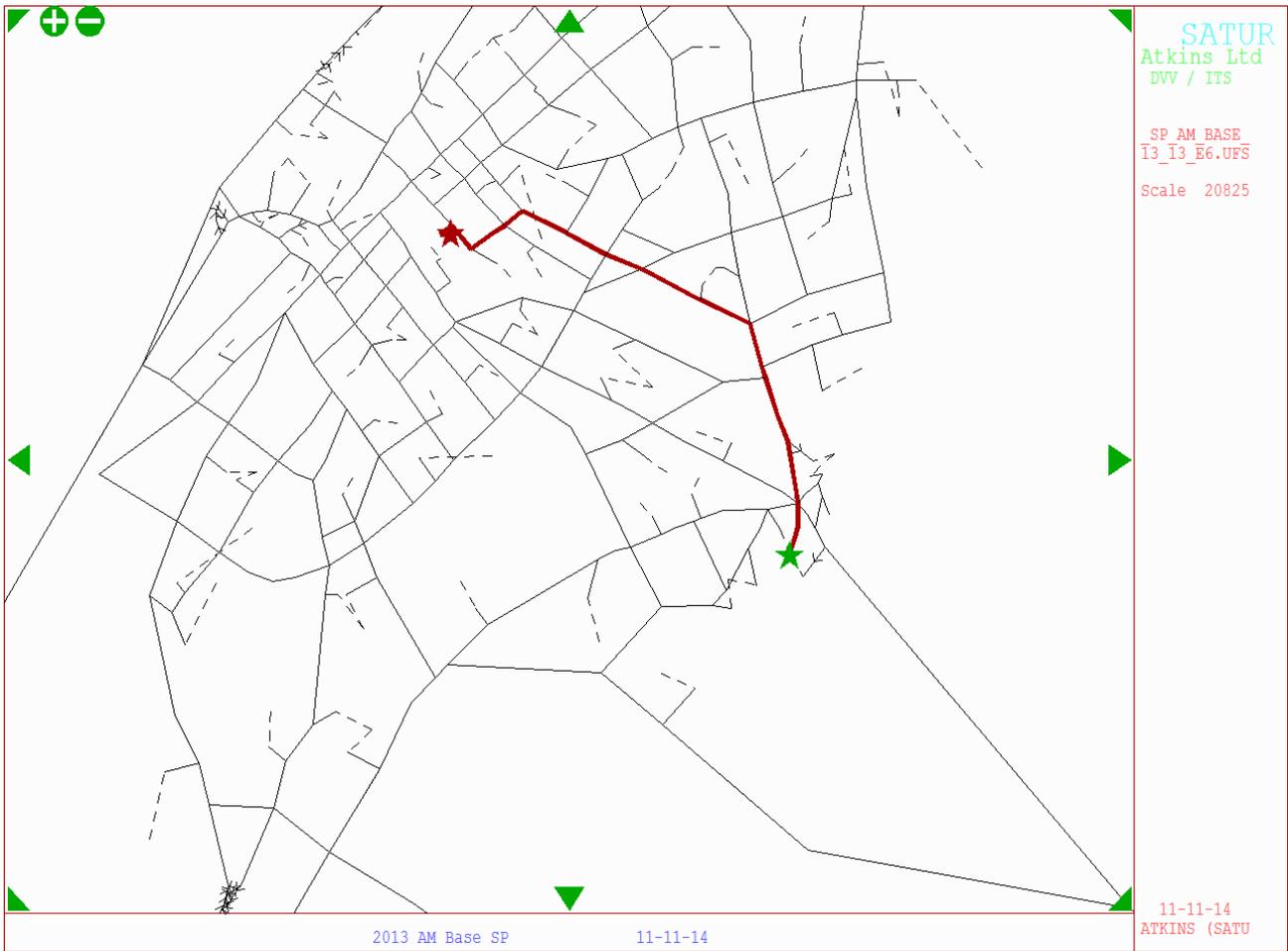
Ormskirk to Southport (London Street)



Preston to Southport (London Street)



Meols cop, Retail Park to Southport (London Street)



Appendix C. Detailed Link Flow Data

Calibration - AM															
Location	Dir	Saturn Link	Count				Modelled				Diff	% Diff	GEH	DMRB	
			Car	LV	HV	Total	Car	LV	HV	Total				Flow	GEH
A565 / Marine Drive / The Plough	EB	1002-229	231	31	14	276	217	32	12	261	-15	-6%	1	✓	✓
A565 / Marine Drive / The Plough	WB	229-1002	405	47	25	477	428	60	9	497	20	4%	1	✓	✓
A565 / Marine Drive / The Plough	SB	1064-229	306	49	16	371	306	49	16	371	0	0%	0	✓	✓
A565 / Marine Drive / The Plough	NB	229-1064	101	27	23	151	101	22	15	138	-13	-9%	1	✓	✓
Water lane	EB	1003-229	596	91	181	867	594	90	76	760	-107	-12%	4	✓	✓
Water lane	WB	229-1003	688	110	150	947	681	110	90	882	-66	-7%	2	✓	✓
L7134 A570 Southport Road, at LC48, Scarisbrick	WB	1139-1130	381	57	88	526	402	57	88	547	21	4%	1	✓	✓
L7134 A570 Southport Road, at LC48, Scarisbrick	EB	1130-1139	321	48	110	478	472	86	110	670	192	40%	8	✗	✗
B5243 Jacksmere Lane, W of Blackmoss Lane at LC13, Scarisbrick	WB	1139-1122	115	20	23	158	112	12	2	126	-32	-20%	3	✓	✓
B5243 Jacksmere Lane, W of Blackmoss Lane at LC13, Scarisbrick	EB	1122-1139	107	19	23	150	62	13	6	82	-68	-45%	6	✓	✗
Guildford Rd / New Cut Lane / Arundel Rd	NB	1110-310	328	33	21	382	301	33	21	355	-26	-7%	1	✓	✓
Guildford Rd / New Cut Lane / Arundel Rd	SB	310-1110	185	27	23	235	180	26	23	229	-6	-2%	0	✓	✓
Guildford Rd / New Cut Lane / Arundel Rd	EB	311-310	391	65	46	502	385	30	46	462	-40	-8%	2	✓	✓
Guildford Rd / New Cut Lane / Arundel Rd	WB	310-311	515	37	18	570	489	36	39	567	-3	-1%	0	✓	✓
A565 Waterloo Rd / A5267 Liverpool Rd	NB	1105-314	273	31	12	316	173	31	12	224	-91	-29%	6	✓	✗

A565 Waterloo Rd / A5267 Liverpool Rd	SB	314-1105	256	51	28	335	177	27	28	240	-95	-28%	6	✓	*
A565 Waterloo Rd / A5267 Liverpool Rd	NB	1108-327	463	49	18	530	419	48	33	502	-28	-5%	1	✓	✓
A565 Waterloo Rd / A5267 Liverpool Rd	SB	327-1108	424	46	14	484	402	46	37	487	3	1%	0	✓	✓
Costal road	SB	525-295	296	25	33	355	297	26	16	338	-17	-5%	1	✓	✓
Costal road	NB	295-525	377	82	55	514	373	83	16	472	-42	-8%	2	✓	✓
Marine Dr	SB	210-209	582	65	58	705	599	67	16	682	-22	-3%	1	✓	✓
Marine Dr	NB	209-210	361	40	15	416	346	38	13	397	-20	-5%	1	✓	✓
Marshside Rd / Fleetwood Rd / Flyde Rd	SB	210-211	257	17	2	276	129	6	1	136	-140	-51%	10	*	*
Marshside Rd / Fleetwood Rd / Flyde Rd	NB	211-210	217	25	7	249	171	8	7	185	-64	-26%	4	✓	✓
Lord St / Albert Rd / B5245	WB	124-476	180	16	5	201	293	18	3	314	113	56%	7	*	*
Lord St / Albert Rd / B5245	EB	476-124	185	11	5	201	192	10	6	208	8	4%	1	✓	✓
Lord St / Albert Rd / B5245	EB	124-480	256	28	18	302	271	27	19	325	22	7%	1	✓	✓
Lord St / Albert Rd / B5245	WB	480-124	366	32	14	412	348	29	28	411	-1	0%	0	✓	✓
Manchester Rd/Hoghton Grove/Queens Rd	EB	125-482	108	13	117	238	192	13	52	263	25	10%	2	✓	✓
Manchester Rd/Hoghton Grove/Queens Rd	WB	482-125	205	47	9	261	194	47	9	257	-4	-1%	0	✓	✓
B5245 Manchester Rd / A5267 Hartwood Rd / Roe Lane	EB	150-149	369	49	18	436	409	62	0	477	41	9%	2	✓	✓
B5245 Manchester Rd / A5267 Hartwood Rd / Roe Lane	WB	149-150	511	61	21	593	407	48	5	467	-126	-21%	5	*	*
Norwood Ave / Tithebarn Rd / Bispham Rd	EB	236-234	215	31	9	255	226	29	0	255	-1	0%	0	✓	✓
Norwood Ave / Tithebarn Rd / Bispham Rd	WB	234-236	249	41	7	297	236	21	0	257	-40	-14%	2	✓	✓
Liverpool Road	NB	316-319	441	68	82	592	429	70	11	518	-74	-12%	3	✓	✓
Liverpool Road	SB	319-316	369	77	93	539	374	78	52	512	-27	-5%	1	✓	✓
Kew road	NB	307-306	139	24	31	194	182	19	21	228	34	18%	2	✓	✓

Kew road	SB	306-307	163	28	43	234	169	26	25	225	-9	-4%	1	✓	✓
SOUTHBANK ROAD	NB	264-502	219	33	47	298	224	32	0	256	-42	-14%	3	✓	✓
SOUTHBANK ROAD	SB	502-264	277	41	42	360	296	45	22	363	2	1%	0	✓	✓
Scarisbrick New Rd	SB	8904-250	403	60	64	527	426	55	42	527	0	0%	0	✓	✓
Scarisbrick New Rd	NB	250-8904	370	55	59	484	358	42	42	447	-37	-8%	2	✓	✓
B2576 MEOLS COP ROAD	NB	1141-1145	536	80	124	740	532	111	99	744	4	1%	0	✓	✓
B2576 MEOLS COP ROAD	SB	1145-1141	704	105	151	960	680	108	89	885	-75	-8%	2	✓	✓
PERCENTAGE OF INDIVIDUAL LINKS COMPLYING WITH DMRB														91%	84%

Validation - AM															
Location	Dir	Saturn Link	Count				Modelled				Diff	% Diff	GEH	DMRB	
			Car	LV	HV	Total	Car	LV	HV	Total				Flow	GEH
Marshside Rd / Fleetwood Rd / Flyde Rd	EB	415-211	319	24	7	350	235	25	19	279	-71	-20%	4	✓	✓
Marshside Rd / Fleetwood Rd / Flyde Rd	WB	211-415	170	19	2	191	211	25	7	243	52	27%	4	✓	✓
Cambridge Rd	EB	201-202	387	53	49	489	505	84	56	656	167	34%	7	✗	✗
Cambridge Rd	WB	202-201	535	73	72	680	527	75	35	650	-30	-4%	1	✓	✓
Roe Ln	EB	204-513	244	33	38	315	330	66	0	403	87	28%	5	✓	✓
Roe Ln	WB	513-204	298	41	46	385	338	53	0	397	12	3%	1	✓	✓
Bispham Rd/Wennington Rd	EB	221-220	410	53	16	479	347	38	9	400	-80	-17%	4	✓	✓
Bispham Rd/Wennington Rd	WB	220-221	209	40	7	256	198	31	16	251	-5	-2%	0	✓	✓
Bispham Rd/Wennington Rd	WB	1149-221	69	7	0	76	95	18	9	122	46	60%	5	✓	✓
Bispham Rd/Wennington Rd	EB	221-1149	50	11	0	61	17	5	0	22	-39	-64%	6	✓	✗
PERCENTAGE OF INDIVIDUAL LINKS COMPLYING WITH DMRB														90%	80%

Summary Turns - AM															
Location	Saturn Node	Saturn Turn	Count				Modelled				Diff	% Diff	GEH	DMRB	
			Car	LV	HV	Total	Car	LV	HV	Total				Flow	GEH
A565 Preston New Rd / Marshside Rd / Cambridge Rd / Manor Rd	215	214-215-413	28	1	2	31	23	3	0	26	-5	-17%	1	✓	✓
	215	214-215-1067	227	20	2	249	215	20	0	235	-14	-6%	1	✓	✓
	215	214-215-1006	102	6	12	120	23	1	0	30	-89	-74%	10	✓	✗
	215	1006-215-214	43	5	7	55	0	0	0	4	-51	-93%	9	✓	✗
	215	1006-215-413	243	34	28	305	247	38	56	348	43	14%	2	✓	✓
	215	1006-215-1067	41	3	0	44	61	13	0	74	30	68%	4	✓	✓
	215	1067-215-1006	32	4	2	38	65	2	0	66	28	73%	4	✓	✓
	215	1067-215-214	153	17	5	175	232	23	0	255	80	46%	5	✓	✗
	215	1067-215-413	206	32	12	250	226	16	0	242	-7	-3%	0	✓	✓
	215	413-215-1067	245	22	21	288	111	20	0	131	-157	-55%	11	✗	✗
	215	413-215-1006	289	46	39	374	295	50	35	387	12	3%	1	✓	✓
	215	413-215-214	34	3	2	39	0	0	0	0	-39	-100%	9	✓	✗
Marine Drive / Fairway	145	462-145-209	295	30	9	334	229	20	13	262	-72	-22%	4	✓	✓
	145	462-145-464	63	4	2	69	15	1	0	16	-53	-77%	8	✓	✗
	145	464-145-462	55	4	2	61	37	1	0	38	-24	-38%	3	✓	✓
	145	464-145-209	51	6	2	59	127	17	0	144	85	143%	8	✓	✗
	145	209-145-464	174	14	5	193	285	14	0	299	106	55%	7	✗	✗
	145	209-145-462	461	62	12	535	318	55	16	389	-146	-27%	7	✗	✗
Lord St / Albert Rd / B5245	124	476-124-480	23	1	5	29	39	1	1	42	13	46%	2	✓	✓
	124	476-124-125	84	5	0	89	99	7	0	106	17	19%	2	✓	✓

Lord St / Albert Rd / B5245	124	476-124-411	77	5	0	82	53	2	5	60	-22	-26%	3	✓	✓
	124	411-124-476	37	6	2	45	58	5	0	63	18	39%	2	✓	✓
	124	411-124-480	186	20	14	220	228	26	18	279	59	27%	4	✓	✓
	124	411-124-125	65	11	12	88	192	20	0	223	135	154%	11	✗	✗
	124	411-124-411	1	0	2	3									✗
	124	125-124-411	152	21	9	182	63	6	2	82	-100	-55%	9	✗	✗
	124	125-124-476	113	8	0	121	156	10	0	167	46	38%	4	✓	✓
	124	125-124-480	47	6	0	53	4	0	0	4	-49	-93%	9	✓	✗
	124	480-124-125	79	3	2	84	21	0	0	21	-63	-75%	9	✓	✗
	124	480-124-411	258	26	9	293	248	27	25	305	12	4%	1	✓	✓
	124	480-124-476	29	2	2	33	79	3	3	84	51	153%	7	✓	✗
B5245 Manchester Rd / A5267 Hartwood Rd / Roe Lane	150	126-150-149	190	23	14	227	229	23	0	258	31	14%	2	✓	✓
	150	126-150-484	21	4	0	25	76	14	0	90	65	259%	9	✓	✗
	150	484-150-126	18	1	0	19	51	7	0	59	40	209%	6	✓	✗
	150	484-150-149	167	24	2	193	180	39	0	220	26	14%	2	✓	✓
	150	149-150-484	189	25	16	230	217	25	5	247	17	7%	1	✓	✓
	150	149-150-126	313	35	5	353	190	23	0	219	-133	-38%	8	✗	✗
A5267 Roe Lane / B5276 Norwood Ave	223	235-223-204	228	38	9	275	313	44	0	363	88	32%	5	✓	✓
	223	235-223-437	155	11	9	175	209	24	0	233	58	33%	4	✓	✓
	223	437-223-235	165	25	14	204	271	10	0	281	77	38%	5	✓	✓
	223	437-223-204	185	33	28	246	81	20	0	102	-144	-59%	11	✗	✗
	223	204-223-437	228	21	16	265	131	30	0	161	-104	-39%	7	✗	✗
	223	204-223-235	381	48	7	436	292	37	0	335	-101	-23%	5	✗	✗
Norwood Ave / Tithebarn Rd / Bispham Rd	234	237-234-221	11	4	7	22	24	3	0	27	5	23%	1	✓	✓
	234	237-234-233	387	33	21	441	275	33	0	308	-133	-30%	7	✗	✗
	234	237-234-236	92	11	0	103	102	7	0	109	6	6%	1	✓	✓
	234	236-234-237	163	19	5	187	89	10	0	99	-88	-47%	7	✓	✗
	234	236-234-221	78	22	2	102	134	19	0	154	51	50%	5	✓	✓

Norwood Ave / Tithebarn Rd / Bispham Rd	234	236-234-233	8	0	0	8	2	0	0	2	-6	-74%	3	✓	✓
	234	233-234-236	6	0	2	8	0	0	0	0	-8	-99%	4	✓	✓
	234	233-234-237	291	45	30	366	309	29	0	338	-28	-8%	1	✓	✓
	234	233-234-221	46	6	2	54	115	7	0	128	74	136%	8	✓	✗
	234	221-234-233	75	6	5	86	57	17	16	96	11	13%	1	✓	✓
	234	221-234-236	117	20	7	144	137	14	0	150	6	4%	1	✓	✓
	234	221-234-237	11	3	2	16	6	1	0	7	-9	-55%	3	✓	✓
A570 Scarisbrick Rd / A5267 Ash St / Cemetery Rd	130	488-130-129	27	4	2	33	7	0	0	7	-27	-80%	6	✓	✗
	130	488-130-251	186	23	18	227	214	10	20	248	20	9%	1	✓	✓
	130	488-130-131	33	5	2	40	30	1	0	35	-6	-14%	1	✓	✓
	130	131-130-488	25	2	0	27	0	0	0	3	-24	-89%	6	✓	✗
	130	131-130-129	276	47	14	337	58	14	0	72	-265	-79%	19	✗	✗
	130	131-130-251	74	17	7	98	78	26	0	104	6	6%	1	✓	✓
	130	251-130-131	39	8	5	52	21	13	0	34	-17	-34%	3	✓	✓
	130	251-130-488	268	34	18	320	234	1	0	239	-82	-25%	5	✓	✓
	130	251-130-129	101	5	2	108	42	28	0	70	-38	-35%	4	✓	✓
	130	129-130-251	51	6	5	62	124	8	1	134	72	117%	7	✓	✗
	130	129-130-131	382	59	23	464	341	58	22	420	-44	-9%	2	✓	✓
	130	129-130-488	22	3	2	27	19	0	0	19	-8	-30%	2	✓	✓
	A5267 Eastbourne Rd / Claremont Rd	305	304-305-303	31	3	0	34	7	0	0	7	-27	-78%	6	✓
305		304-305-306	23	7	0	30	68	12	9	89	59	197%	8	✓	✗
305		304-305-320	1	0	0	1	0	0	0	2	1	100%	1	✓	✓
305		320-305-304	11	2	0	13	1	0	0	3	-10	-76%	3	✓	✓
305		320-305-303	345	51	9	405	210	37	0	247	-158	-39%	9	✗	✗
305		320-305-306	91	6	7	104	15	4	0	20	-84	-81%	11	✓	✗
305		306-305-320	77	8	7	92	29	1	0	29	-62	-68%	8	✓	✗
305		306-305-304	41	8	5	54	149	14	12	175	121	226%	11	✗	✗
305		306-305-303	72	20	0	92	69	21	9	105	13	14%	1	✓	✓

A5267 Eastbourne Rd / Claremont Rd	305	303-305-306	122	26	14	162	103	17	12	137	-24	-15%	2	✓	✓
	305	303-305-320	261	48	25	334	286	59	17	362	27	8%	1	✓	✓
	305	303-305-304	18	4	0	22	9	1	0	10	-12	-57%	3	✓	✓
Guildford Rd / New Cut Lane / Arundel Rd	310	314-310-309	49	1	0	50	58	2	1	61	11	22%	1	✓	✓
	310	314-310-1110	200	19	7	226	165	12	3	181	-45	-20%	3	✓	✓
	310	314-310-311	51	3	0	54	0	0	0	0	-54	-100%	10	✓	✗
	310	311-310-314	44	8	0	52	0	0	0	0	-52	-100%	10	✓	✗
	310	311-310-309	417	22	18	457	379	30	46	463	6	1%	0	✓	✓
	310	311-310-1110	54	7	0	61	5	0	0	5	-56	-92%	10	✓	✗
	310	1110-310-311	43	8	12	63	18	0	0	18	-44	-71%	7	✓	✗
	310	1110-310-314	91	15	7	113	149	22	0	171	58	52%	5	✓	✓
	310	1110-310-309	51	4	5	60	134	10	21	166	106	178%	10	✗	✗
	310	309-310-1110	74	7	14	95	9	14	20	43	-52	-54%	6	✓	✗
	310	309-310-311	297	54	35	386	471	36	39	555	169	44%	8	✗	✗
	310	309-310-314	24	3	0	27	14	8	1	23	-4	-16%	1	✓	✓
	Bispham Rd/Wennington Rd	221	1149-221-234	22	3	0	25	0	0	0	0	-25	-100%	7	✓
221		1149-221-222	28	2	0	30	18	4	0	23	-7	-24%	1	✓	✓
221		1149-221-220	19	2	0	21	77	13	9	99	78	372%	10	✓	✗
221		234-221-222	21	2	0	23	38	9	0	47	24	105%	4	✓	✓
221		234-221-220	146	35	7	188	228	20	0	253	66	35%	4	✓	✓
221		234-221-1149	17	4	0	21	4	0	0	4	-17	-83%	5	✓	✓
221		222-221-220	44	3	0	47	42	5	0	47	0	0%	0	✓	✓
221		222-221-1149	25	6	0	31	4	1	0	4	-27	-86%	6	✓	✗

Bispham Rd/Wennington Rd	221	222-221-234	26	15	0	41	52	14	0	66	25	60%	3	✓	✓
	221	220-221-1149	8	1	0	9	10	4	0	14	5	53%	1	✓	✓
	221	220-221-234	354	44	14	412	148	18	16	188	-224	-54%	13	✗	✗
	221	220-221-222	48	8	2	58	40	9	0	49	-9	-16%	1	✓	✓
Manchester Rd/Hoghton Grove/Queens Rd	125	124-125-482	13	0	2	15	57	0	0	61	46	299%	7	✓	✗
	125	124-125-531	139	14	7	160	231	27	0	264	104	65%	7	✗	✗
	125	124-125-410	72	8	0	80	25	0	0	25	-55	-68%	8	✓	✗
	125	482-125-531	21	7	2	30	3	0	0	3	-27	-90%	7	✓	✗
	125	482-125-410	153	27	7	187	183	43	7	236	49	26%	3	✓	✓
	125	482-125-124	31	13	0	44	8	4	2	18	-26	-59%	5	✓	✓
	125	531-125-410	57	9	0	66	62	0	0	62	-4	-6%	1	✓	✓
	125	531-125-124	192	48	0	240	183	12	0	202	-38	-16%	3	✓	✓
	125	531-125-482	22	1	0	23	7	1	0	8	-15	-67%	4	✓	✓
	125	410-125-124	61	15	2	78	32	0	0	32	-46	-59%	6	✓	✗
	125	410-125-482	73	12	115	200	128	12	52	194	-6	-3%	0	✓	✓
	125	410-125-531	30	7	0	37	7	0	0	7	-30	-81%	6	✓	✗
PERCENTAGE OF INDIVIDUAL LINKS COMPLYING WITH DMRB														80%	53%

Additional Counts - AM															
Location	Dir	Saturn Link	Count				Modelled				Diff	% Diff	GEH	DMRB	
			Car	LV	HV	Total	Car	LV	HV	Total				Flow	GEH
Aughton Rd	EB	299-300	113	20	12	144	109	18	9	138	-6	-4%	0	✓	✓
Aughton Rd	WB	300-299	109	19	14	143	194	18	14	228	85	60%	6	✓	✗
Cemetery Rd	NB	133-132	466	70	56	592	377	71	9	461	-132	-22%	6	✗	✗
Cemetery Rd	SB	132-133	518	77	70	665	529	81	29	642	-23	-4%	1	✓	✓
Coastal Rd	EB	8928-525	486	54	51	590	117	11	16	144	-446	-76%	23	✗	✗
Coastal Rd	WB	525-8928	422	47	28	497	164	47	16	227	-270	-54%	14	✗	✗

EastBank St	EB	106-529	298	45	68	411	251	45	20	328	-83	-20%	4	✓	✓
EastBank St	WB	529-106	249	37	49	335	171	37	0	220	-115	-34%	7	✗	✗
Liverpool Rd M	NB	350-1103	491	73	45	610	593	79	45	717	107	18%	4	✗	✓
Liverpool Rd M	SB	1103-350	495	74	68	638	578	73	65	716	78	12%	3	✓	✓
Lord St	NB	298-138	528	52	70	651	535	58	44	649	-2	0%	0	✓	✓
Lord St	SB	138-298	440	43	40	523	437	43	41	531	8	2%	0	✓	✓
New Cut Ln	EB	1110-2100	292	36	23	351	180	26	23	229	-122	-35%	7	✗	✗
Waterloo Rd	NB	324-1074	495	47	69	612	460	47	33	541	-71	-12%	3	✓	✓
Waterloo Rd	SB	1074-324	353	45	86	484	350	46	36	433	-51	-10%	2	✓	✓
Meol's cop road	NB	1143-1141	443	69	82	593	532	111	99	744	151	25%	6	✗	✗
Meol's cop road	SB	1141-1143	605	84	82	771	661	98	89	855	84	11%	3	✓	✓
Scarisbrick New Rd	EB	8905-250	446	81	118	645	361	36	43	446	-199	-31%	9	✗	✗
Scarisbrick New Rd	WB	250-8905	382	35	86	503	412	46	42	506	3	1%	0	✓	✓
FYLDE ROAD	NB	425-228	165	18	37	221	171	17	38	229	8	4%	1	✓	✓
FYLDE ROAD	SB	228-425	300	33	45	379	315	33	45	395	16	4%	1	✓	✓
A565 PRESTON NEW ROAD	NB	413-227	347	43	105	494	360	44	43	454	-41	-8%	2	✓	✓
A565 PRESTON NEW ROAD	SB	227-413	443	55	175	673	267	35	0	309	-364	-54%	16	✗	✗
BANKFIELD LANE	NB	1059-230	102	13	48	163	91	30	0	128	-35	-22%	3	✓	✓
BANKFIELD LANE	SB	230-1059	267	33	88	388	269	31	3	309	-79	-20%	4	✓	✓
A565 / Marine Drive / The Plough	EB	1001-229	544	61	74	679	547	61	81	692	14	2%	1	✓	✓
A565 / Marine Drive / The Plough	WB	229-1001	469	59	41	569	438	34	45	520	-50	-9%	2	✓	✓
A565 / Marine Drive / The Plough	NB	8917-229	276	52	18	346	241	41	12	294	-52	-15%	3	✓	✓
A565 / Marine Drive / The Plough	SB	229-8917	120	29	2	151	257	47	38	342	190	126%	12	✗	✗
A565 Preston New Rd / Marshside Rd / Cambridge Rd / Manor Rd	NB	215-214	230	25	14	269	232	23	0	259	-10	-4%	1	✓	✓

A565 Preston New Rd / Marshside Rd / Cambridge Rd / Manor Rd	SB	214-215	357	27	16	400	262	24	0	292	-108	-27%	6	*	*
A565 Preston New Rd / Marshside Rd / Cambridge Rd / Manor Rd	EB	1006-215	423	56	53	532	308	51	56	425	-106	-20%	5	*	✓
A565 Preston New Rd / Marshside Rd / Cambridge Rd / Manor Rd	WB	215-1006	327	42	35	404	380	52	35	479	76	19%	4	✓	✓
A565 Preston New Rd / Marshside Rd / Cambridge Rd / Manor Rd	NB	1067-215	513	45	23	581	522	41	0	563	-18	-3%	1	✓	✓
A565 Preston New Rd / Marshside Rd / Cambridge Rd / Manor Rd	SB	215-1067	391	53	18	462	382	52	0	434	-28	-6%	1	✓	✓
A565 Preston New Rd / Marshside Rd / Cambridge Rd / Manor Rd	EB	215-413	477	67	41	585	493	57	55	612	26	5%	1	✓	✓
A565 Preston New Rd / Marshside Rd / Cambridge Rd / Manor Rd	WB	413-215	568	71	62	701	406	70	35	517	-184	-26%	7	*	*
Marshside Rd / Fleetwood Rd / Flyde Rd	NB	213-212	300	28	16	344	304	28	0	336	-8	-2%	0	✓	✓
Marshside Rd / Fleetwood Rd / Flyde Rd	SB	212-213	355	34	16	405	351	34	0	389	-16	-4%	1	✓	✓
Marshside Rd / Fleetwood Rd / Flyde Rd	EB	212-425	199	25	9	233	204	25	20	252	19	8%	1	✓	✓
Marshside Rd / Fleetwood Rd / Flyde Rd	WB	425-212	253	32	18	303	268	32	14	318	15	5%	1	✓	✓
Marine Drive / Fairway	EB	462-145	516	66	14	596	244	22	13	278	-318	-53%	15	*	*
Marine Drive / Fairway	WB	145-462	358	34	12	404	355	55	16	427	23	6%	1	✓	✓
Marine Drive / Fairway	NB	464-145	238	18	7	263	164	18	0	182	-81	-31%	5	✓	*
Marine Drive / Fairway	SB	145-464	107	10	5	122	299	15	0	315	193	159%	13	*	*
Marine Drive / Fairway	EB	145-209	347	36	12	395	356	38	13	406	12	3%	1	✓	✓
Marine Drive / Fairway	WB	209-145	636	76	16	728	603	69	16	688	-41	-6%	2	✓	✓
Lord St / Albert Rd / B5245	EB	411-124	488	52	21	561	479	51	18	565	4	1%	0	✓	✓
Lord St / Albert Rd / B5245	WB	124-411	289	37	30	356	364	35	32	448	92	26%	5	✓	✓

Lord St / Albert Rd / B5245	NB	125-124	228	19	14	261	223	17	2	252	-9	-3%	1	✓	✓
Lord St / Albert Rd / B5245	SB	124-125	312	35	9	356	313	27	0	350	-6	-2%	0	✓	✓
B5245 Manchester Rd / A5267 Hartwood Rd / Roe Lane	EB	126-150	352	38	5	395	305	36	0	348	-47	-12%	2	✓	✓
B5245 Manchester Rd / A5267 Hartwood Rd / Roe Lane	WB	150-126	223	30	14	267	241	31	0	278	11	4%	1	✓	✓
B5245 Manchester Rd / A5267 Hartwood Rd / Roe Lane	NB	484-150	359	50	21	430	232	47	0	278	-151	-35%	8	✗	✗
B5245 Manchester Rd / A5267 Hartwood Rd / Roe Lane	SB	150-484	258	37	5	300	293	39	5	337	37	12%	2	✓	✓
A5267 Roe Lane / B5276 Norwood Ave	EB	235-223	546	73	21	640	522	68	0	596	-44	-7%	2	✓	✓
A5267 Roe Lane / B5276 Norwood Ave	WB	223-235	383	49	18	450	557	46	0	609	159	35%	7	✗	✗
A5267 Roe Lane / B5276 Norwood Ave	NB	437-223	383	32	25	440	352	30	0	382	-58	-13%	3	✓	✓
A5267 Roe Lane / B5276 Norwood Ave	SB	223-437	350	58	41	449	340	54	0	394	-56	-12%	3	✓	✓
A5267 Roe Lane / B5276 Norwood Ave	EB	223-204	413	71	37	521	392	64	0	462	-59	-11%	3	✓	✓
A5267 Roe Lane / B5276 Norwood Ave	WB	204-223	609	69	23	701	423	67	0	496	-205	-29%	8	✗	✗
Norwood Ave / Tithebarn Rd / Bispham Rd	NB	234-237	465	67	37	569	395	39	0	434	-135	-24%	6	✗	✗
Norwood Ave / Tithebarn Rd / Bispham Rd	SB	237-234	490	48	28	566	400	44	0	444	-122	-22%	5	✗	✗
Norwood Ave / Tithebarn Rd / Bispham Rd	NB	233-234	470	39	25	534	424	36	0	466	-68	-13%	3	✓	✓
Norwood Ave / Tithebarn Rd / Bispham Rd	SB	234-233	343	51	35	429	328	50	16	400	-29	-7%	1	✓	✓
Norwood Ave / Tithebarn Rd / Bispham Rd	EB	234-221	135	32	12	179	269	29	0	304	126	70%	8	✗	✗
Norwood Ave / Tithebarn Rd / Bispham Rd	WB	221-234	203	29	14	246	200	32	16	254	8	3%	1	✓	✓

A570 Scarisbrick Rd / A5267 Ash St / Cemetery Rd	NB	130-488	315	39	21	375	251	1	0	259	-115	-31%	6	*	*
A570 Scarisbrick Rd / A5267 Ash St / Cemetery Rd	SB	488-130	246	32	23	301	251	11	20	289	-12	-4%	1	✓	✓
A570 Scarisbrick Rd / A5267 Ash St / Cemetery Rd	EB	131-130	454	72	30	556	136	40	0	179	-377	-68%	20	*	*
A570 Scarisbrick Rd / A5267 Ash St / Cemetery Rd	WB	130-131	375	66	21	462	392	72	22	489	27	6%	1	✓	✓
A570 Scarisbrick Rd / A5267 Ash St / Cemetery Rd	NB	251-130	311	46	30	387	297	42	0	343	-44	-11%	2	✓	✓
A570 Scarisbrick Rd / A5267 Ash St / Cemetery Rd	SB	130-251	408	47	25	480	414	44	21	483	2	1%	0	✓	✓
A570 Scarisbrick Rd / A5267 Ash St / Cemetery Rd	EB	130-129	404	56	18	478	105	41	0	146	-332	-69%	19	*	*
A570 Scarisbrick Rd / A5267 Ash St / Cemetery Rd	WB	129-130	455	68	30	553	484	66	23	573	21	4%	1	✓	✓
A570 Scarisbrick New Rd / Main Retail Park Rbout / A570 / B5276	NB	260-1143	583	79	55	717	532	111	99	744	27	4%	1	✓	✓
A570 Scarisbrick New Rd / Main Retail Park Rbout / A570 / B5276	SB	1143-260	726	90	48	864	661	98	89	855	-9	-1%	0	✓	✓
A570 Scarisbrick New Rd / Main Retail Park Rbout / A570 / B5276	NB	260-1142	452	53	30	535	434	39	43	522	-12	-2%	1	✓	✓
A570 Scarisbrick New Rd / Main Retail Park Rbout / A570 / B5276	SB	1142-260	409	66	46	521	436	58	42	542	21	4%	1	✓	✓
A570 Scarisbrick New Rd / Main Retail Park Rbout / A570 / B5276	EB	416-260	622	66	28	716	506	54	54	624	-91	-13%	4	✓	✓
A570 Scarisbrick New Rd / Main Retail Park Rbout / A570 / B5276	WB	260-416	450	37	23	510	443	37	21	515	5	1%	0	✓	✓
A570 Scarisbrick New Rd / Main Retail Park Rbout / A570 / B5276	NB	403-260	163	41	5	209	58	23	0	81	-127	-61%	11	*	*
A570 Scarisbrick New Rd / Main Retail Park Rbout / A570 / B5276	SB	260-403	205	48	16	269	155	22	0	177	-92	-34%	6	✓	*

A570 Scarisbrick New Rd / Main Retail Park Rbout / A570 / B5276	NB	1132-260	689	91	83	863	402	57	88	549	-314	-36%	12	*	*
A570 Scarisbrick New Rd / Main Retail Park Rbout / A570 / B5276	SB	260-1132	747	85	60	892	472	86	110	672	-220	-25%	8	*	*
A570 Scarisbrick New Rd / Main Retail Park Rbout / A570 / B5276	EB	260-1133	91	17	2	110	90	16	0	106	-4	-4%	0	✓	✓
A570 Scarisbrick New Rd / Main Retail Park Rbout / A570 / B5276	WB	1133-260	63	21	9	93	63	21	0	84	-9	-10%	1	✓	✓
A5267 Eastbourne Rd / Claremont Rd	NB	305-304	70	14	5	89	159	15	12	187	99	112%	8	✓	*
A5267 Eastbourne Rd / Claremont Rd	SB	304-305	55	10	0	65	76	12	9	99	34	52%	4	✓	✓
A5267 Eastbourne Rd / Claremont Rd	EB	320-305	339	56	32	427	226	42	0	270	-157	-37%	8	*	*
A5267 Eastbourne Rd / Claremont Rd	WB	305-320	447	59	16	522	315	59	17	393	-129	-25%	6	*	*
A5267 Eastbourne Rd / Claremont Rd	NB	306-305	236	39	21	296	246	35	21	309	13	5%	1	✓	✓
A5267 Eastbourne Rd / Claremont Rd	SB	305-306	190	36	12	238	187	33	20	246	8	4%	1	✓	✓
A5267 Eastbourne Rd / Claremont Rd	EB	305-303	448	74	9	531	286	58	9	360	-172	-32%	8	*	*
A5267 Eastbourne Rd / Claremont Rd	WB	303-305	401	78	39	518	397	76	29	509	-9	-2%	0	✓	✓
Guildford Rd / New Cut Lane / Arundel Rd	NB	310-314	159	26	7	192	162	31	1	194	2	1%	0	✓	✓
Guildford Rd / New Cut Lane / Arundel Rd	SB	314-310	300	23	7	330	223	15	5	242	-88	-27%	5	✓	*
Guildford Rd / New Cut Lane / Arundel Rd	EB	310-309	517	27	23	567	572	42	68	690	123	22%	5	*	✓
Guildford Rd / New Cut Lane / Arundel Rd	WB	309-310	395	64	48	507	493	58	60	621	113	22%	5	*	✓
A565 Waterloo Rd / A5267 Liverpool Rd	NB	312-313	590	91	41	722	593	79	45	727	4	1%	0	✓	✓
A565 Waterloo Rd / A5267 Liverpool Rd	SB	1109-312	646	74	30	750	578	73	65	726	-24	-3%	1	✓	✓

Norwood Ave / Tithebarn Rd / Bispham Rd	WB	221-234	203	29	14	246	200	32	16	254	8	3%	1	✓	✓
Norwood Ave / Tithebarn Rd / Bispham Rd	EB	234-221	135	32	12	179	269	29	0	304	126	70%	8	✗	✗
Bispham Rd/Wennington Rd	NB	221-222	95	24	0	119	96	23	0	119	0	0%	0	✓	✓
Bispham Rd/Wennington Rd	SB	222-221	97	12	2	111	98	19	0	117	6	5%	1	✓	✓
Manchester Rd/Hoghton Grove/Queens Rd	EB	410-125	164	34	117	315	167	12	52	234	-82	-26%	5	✓	✓
Manchester Rd/Hoghton Grove/Queens Rd	EB	125-410	282	44	7	333	271	43	7	323	-9	-3%	1	✓	✓
Manchester Rd/Hoghton Grove/Queens Rd	EB	531-125	271	58	0	329	252	13	0	271	-58	-18%	3	✓	✓
Manchester Rd/Hoghton Grove/Queens Rd	EB	125-531	190	28	9	227	240	27	0	274	46	20%	3	✓	✓
A565 Southport New Road, Eastbound at LC74, Banks	EB	1003-8922	809	121	64	994	681	110	90	882	-112	-11%	4	✓	✓
A565 Southport New Road, Westbound at LC79, Banks	WB	8922-1003	603	90	125	818	594	90	76	760	-59	-7%	2	✓	✓
L7135 A570 Southport Road, at LC120, Scarisbrick	WB	2103-2102	267	40	71	378	336	0	12	348	-30	-8%	2	✓	✓
L7135 A570 Southport Road, at LC120, Scarisbrick	EB	2102-2103	241	36	80	357	241	36	29	306	-50	-14%	3	✓	✓
B5243 Moss Road, West of Birkdale Cop, Halsall	EB	266-265	74	13	6	94	73	14	7	93	0	0%	0	✓	✓
B5243 Moss Road, West of Birkdale Cop, Halsall	WB	265-266	56	10	3	69	57	12	3	72	3	4%	0	✓	✓
PERCENTAGE OF INDIVIDUAL LINKS COMPLYING WITH DMRB														71%	70%

Calibration - IP															
Location	Dir	Saturn Link	Count				Modelled				Diff	% Diff	GEH	DMRB	
			Car	LV	HV	Total	Car	LV	HV	Total				Flow	GEH
A565 / Marine Drive / The Plough	SB	1002-229	66	8	25	99	156	11	10	177	78	1	7	✓	✗
A565 / Marine Drive / The Plough	NB	229-1002	71	7	17	96	165	16	12	192	97	1	8	✓	✗

A565 / Marine Drive / The Plough	SB	1064-229	54	9	10	73	54	9	12	75	2	0	0	✓	✓
A565 / Marine Drive / The Plough	NB	229-1064	50	9	12	70	42	9	12	63	-7	0	1	✓	✓
Water lane	EB	1003-229	437	76	192	706	439	54	114	607	-99	0	4	✓	✓
Water lane	WB	229-1003	466	89	125	680	473	57	110	639	-41	0	2	✓	✓
L7134 A570 Southport Road, at LC48, Scarisbrick	WB	1139-1130	684	68	69	822	682	60	86	828	7	0	0	✓	✓
L7134 A570 Southport Road, at LC48, Scarisbrick	EB	1130-1139	561	56	100	717	554	52	100	706	-11	0	0	✓	✓
B5243 Jacksmere Lane, W of Blackmoss Lane at LC13, Scarisbrick	WB	1139-1122	74	13	23	111	69	13	8	90	-21	0	2	✓	✓
B5243 Jacksmere Lane, W of Blackmoss Lane at LC13, Scarisbrick	EB	1122-1139	57	10	21	88	58	10	9	77	-11	0	1	✓	✓
Guildford Rd / New Cut Lane / Arundel Rd	NB	1110-310	40	5	8	53	45	5	8	58	5	0	1	✓	✓
Guildford Rd / New Cut Lane / Arundel Rd	SB	310-1110	43	6	17	66	43	6	17	65	-1	0	0	✓	✓
Guildford Rd / New Cut Lane / Arundel Rd	EB	311-310	99	11	24	134	98	11	31	142	9	0	1	✓	✓
Guildford Rd / New Cut Lane / Arundel Rd	WB	310-311	102	14	29	144	100	13	41	155	11	0	1	✓	✓
A565 Waterloo Rd / A5267 Liverpool Rd	NB	1105-314	63	12	25	100	63	15	27	113	13	0	1	✓	✓
A565 Waterloo Rd / A5267 Liverpool Rd	SB	314-1105	58	10	30	98	58	10	23	99	1	0	0	✓	✓
A565 Waterloo Rd / A5267 Liverpool Rd	NB	1108-327	77	8	18	103	145	26	18	191	88	1	7	✓	*
A565 Waterloo Rd / A5267 Liverpool Rd	SB	327-1108	80	12	21	113	98	18	21	139	26	0	2	✓	✓
Costal road	SB	525-295	289	32	35	356	289	32	16	337	-19	0	1	✓	✓
Costal road	NB	295-525	359	44	49	452	361	45	19	426	-27	0	1	✓	✓
Marine Dr	SB	210-209	338	38	32	408	190	18	13	220	-187	0	11	*	*
Marine Dr	NB	209-210	316	35	27	378	198	16	13	227	-151	0	9	*	*

Marshside Rd / Fleetwood Rd / Flyde Rd	SB	210-211	42	5	6	53	42	5	3	50	-3	0	0	✓	✓
Marshside Rd / Fleetwood Rd / Flyde Rd	NB	211-210	43	5	1	49	25	2	1	28	-21	0	3	✓	✓
Lord St / Albert Rd / B5245	WB	124-476	55	4	2	61	55	4	0	59	-2	0	0	✓	✓
Lord St / Albert Rd / B5245	EB	476-124	50	7	5	61	47	7	0	54	-7	0	1	✓	✓
Lord St / Albert Rd / B5245	EB	124-480	116	12	35	162	108	12	35	162	0	0	0	✓	✓
Lord St / Albert Rd / B5245	WB	480-124	95	12	17	124	95	12	39	152	28	0	2	✓	✓
Manchester Rd/Hoghton Grove/Queens Rd	EB	125-482	47	6	6	59	48	6	12	72	13	0	2	✓	✓
Manchester Rd/Hoghton Grove/Queens Rd	WB	482-125	55	6	5	66	55	6	5	73	7	0	1	✓	✓
B5245 Manchester Rd / A5267 Hartwood Rd / Roe Lane	EB	150-149	143	17	28	187	144	17	0	167	-20	0	1	✓	✓
B5245 Manchester Rd / A5267 Hartwood Rd / Roe Lane	WB	149-150	104	17	16	136	106	17	14	143	7	0	1	✓	✓
Norwood Ave / Tithebarn Rd / Bispham Rd	EB	236-234	46	8	8	62	46	5	0	52	-10	0	1	✓	✓
Norwood Ave / Tithebarn Rd / Bispham Rd	WB	234-236	54	12	7	73	54	10	0	65	-8	0	1	✓	✓
Liverpool Road	NB	316-319	336	57	79	472	338	57	39	443	-29	0	1	✓	✓
Liverpool Road	SB	319-316	315	56	107	478	316	56	51	431	-47	0	2	✓	✓
Kew road	NB	307-306	150	21	31	202	89	17	4	116	-86	0	7	✓	*
Kew road	SB	306-307	139	21	35	195	112	21	19	158	-38	0	3	✓	✓
SOUTHBANK ROAD	NB	264-502	185	18	40	243	187	18	0	205	-38	0	3	✓	✓
SOUTHBANK ROAD	SB	502-264	217	21	34	272	216	21	8	245	-27	0	2	✓	✓
Scarisbrick New Rd	SB	8904-250	394	39	57	490	390	39	36	469	-21	0	1	✓	✓
Scarisbrick New Rd	NB	250-8904	447	44	54	546	446	44	31	525	-20	0	1	✓	✓
B2576 MEOLS COP ROAD	NB	1141-1145	591	58	122	771	589	58	86	735	-36	0	1	✓	✓
B2576 MEOLS COP ROAD	SB	1145-1141	610	60	141	812	603	59	97	761	-51	0	2	✓	✓
PERCENTAGE OF INDIVIDUAL LINKS COMPLYING WITH DMRB														95%	86%

Validation - IP																
Location	Dir	Saturn Link	Count				Modelled				Diff	% Diff	GEH	DMRB		
			Car	LV	HV	Total	Car	LV	HV	Total				Flow	GEH	
Marshside Rd / Fleetwood Rd / Flyde Rd	EB	415-211	34	4	5	42	37	4	3	44	3	0	0	✓	✓	
Marshside Rd / Fleetwood Rd / Flyde Rd	WB	211-415	30	2	5	37	31	2	5	38	1	0	0	✓	✓	
Cambridge Rd	EB	201-202	399	60	62	520	398	60	46	515	-5	0	0	✓	✓	
Cambridge Rd	WB	202-201	440	66	71	577	441	66	53	573	-4	0	0	✓	✓	
Roe Ln	EB	204-513	269	40	34	343	269	40	0	316	-27	0	2	✓	✓	
Roe Ln	WB	513-204	221	33	34	288	223	33	0	262	-26	0	2	✓	✓	
PERCENTAGE OF INDIVIDUAL LINKS COMPLYING WITH DMRB													100%	100%		

Summary Turns - IP																
Location	Saturn Node	Saturn Turn	Count				Modelled				Diff	% Diff	GEH	DMRB		
			Car	LV	HV	Total	Car	LV	HV	Total				Flow	GEH	
A565 Preston New Rd / Marshside Rd / Cambridge Rd / Manor Rd	215	214-215-413	28	6	2	35	0	0	0	0	-35	-100%	8	✓	✗	
	215	214-215-1067	126	15	10	150	66	9	0	75	-75	-50%	7	✓	✗	
	215	214-215-1006	51	11	3	64	1	1	0	8	-57	-88%	9	✓	✗	
	215	1006-215-214	42	7	1	50	0	0	0	4	-46	-92%	9	✓	✗	
	215	1006-215-413	266	41	51	358	101	22	46	176	-181	-51%	11	✗	✗	
	215	1006-215-1067	42	6	1	49	18	4	0	23	-26	-54%	4	✓	✓	
	215	1067-215-1006	43	7	3	53	13	1	0	15	-38	-72%	7	✓	✗	
	215	1067-215-214	140	17	7	163	41	7	0	48	-115	-70%	11	✗	✗	

A565 Preston New Rd / Marshside Rd / Cambridge Rd / Manor Rd	215	1067-215- 413	241	29	22	291	86	5	24	115	-176	-60%	12	*	*
	215	413-215- 1067	176	20	13	208	56	4	0	60	-148	-71%	13	*	*
	215	413-215- 1006	266	41	28	334	103	17	53	180	-154	-46%	10	*	*
	215	413-215- 214	27	4	0	30	0	0	0	0	-30	-100%	8	✓	*
Marine Drive / Fairway	145	462-145- 209	244	28	16	288	110	9	13	132	-156	-54%	11	*	*
	145	462-145- 464	54	6	2	62	3	0	0	3	-59	-95%	10	✓	*
	145	464-145- 462	57	4	2	63	3	0	0	3	-60	-95%	10	✓	*
	145	464-145- 209	57	9	3	69	71	7	0	77	8	12%	1	✓	✓
	145	209-145- 464	60	10	2	72	84	4	0	88	16	22%	2	✓	✓
	145	209-145- 462	282	24	10	316	98	13	13	124	-192	-61%	13	*	*
Lord St / Albert Rd / B5245	124	476-124- 480	29	4	1	34	24	2	0	26	-7	-22%	1	✓	✓
	124	476-124- 125	78	14	2	94	14	4	0	18	-76	-81%	10	✓	*
	124	476-124- 411	42	5	1	47	9	1	0	10	-37	-79%	7	✓	*
	124	411-124- 476	29	3	1	33	8	0	0	8	-24	-75%	5	✓	*
	124	411-124- 480	248	28	29	304	84	10	35	136	-169	-55%	11	*	*
	124	411-124- 125	76	9	7	92	32	5	0	47	-45	-49%	5	✓	*
	124	125-124- 411	120	16	12	147	32	4	0	46	-100	-68%	10	*	*
	124	125-124- 476	111	8	1	120	32	3	0	34	-85	-71%	10	✓	*
	124	125-124- 480	70	3	5	77	0	0	0	0	-77	-100%	12	✓	*
	124	480-124- 125	67	8	0	75	0	0	0	0	-75	-100%	12	✓	*

Lord St / Albert Rd / B5245	124	480-124-411	194	25	17	235	79	11	39	135	-100	-43%	7	*	*
	124	480-124-476	24	2	0	26	16	1	0	17	-9	-34%	2	✓	✓
B5245 Manchester Rd / A5267 Hartwood Rd / Roe Lane	150	126-150-149	215	28	15	258	65	9	0	80	-178	-69%	14	*	*
	150	126-150-484	20	7	3	29	10	3	0	13	-17	-56%	4	✓	✓
	150	484-150-126	17	4	1	21	20	5	0	25	4	18%	1	✓	✓
	150	484-150-149	201	21	13	234	79	8	0	87	-147	-63%	12	*	*
	150	149-150-484	114	19	13	145	56	9	14	79	-66	-46%	6	✓	*
	150	149-150-126	189	29	3	221	50	8	0	64	-157	-71%	13	*	*
	150	149-150-126	189	29	3	221	50	8	0	64	-157	-71%	13	*	*
A5267 Roe Lane / B5276 Norwood Ave	223	235-223-204	291	76	15	381	148	24	0	177	-204	-53%	12	*	*
	223	235-223-437	136	12	18	166	29	5	0	34	-131	-79%	13	*	*
	223	437-223-235	146	16	10	172	76	8	0	84	-88	-51%	8	✓	*
	223	437-223-204	205	19	22	245	18	3	0	21	-224	-91%	19	*	*
	223	204-223-437	143	21	13	176	90	7	0	97	-79	-45%	7	✓	*
	223	204-223-235	243	29	10	282	68	17	0	91	-191	-68%	14	*	*
	223	204-223-235	243	29	10	282	68	17	0	91	-191	-68%	14	*	*
Norwood Ave / Tithebarn Rd / Bispham Rd	234	237-234-221	11	2	3	16	2	1	0	3	-13	-82%	4	✓	✓
	234	237-234-233	264	28	25	317	100	8	0	108	-209	-66%	14	*	*
	234	237-234-236	64	9	5	77	13	3	0	17	-60	-78%	9	✓	*
	234	236-234-237	71	14	5	89	27	3	0	30	-59	-66%	8	✓	*
	234	236-234-221	84	17	2	103	15	2	0	17	-86	-83%	11	✓	*
	234	236-234-233	8	5	0	13	4	0	0	4	-8	-66%	3	✓	✓

Norwood Ave / Tithebarn Rd / Bispham Rd	234	233-234-236	7	2	0	9	6	0	0	6	-3	-36%	1	✓	✓
	234	233-234-237	323	27	29	378	75	7	0	82	-295	-78%	19	✗	✗
	234	233-234-221	49	7	3	58	30	5	9	50	-8	-14%	1	✓	✓
	234	221-234-233	52	7	9	67	25	3	14	48	-19	-29%	3	✓	✓
	234	221-234-236	67	14	3	84	35	7	0	42	-42	-50%	5	✓	✗
	234	221-234-237	8	1	1	10	13	3	0	16	6	63%	2	✓	✓
	130	488-130-129	30	4	1	34	0	0	0	0	-34	-100%	8	✓	✗
A570 Scarisbrick Rd / A5267 Ash St / Cemetery Rd	130	488-130-251	264	32	18	314	97	6	0	107	-207	-66%	14	✗	✗
	130	488-130-131	33	3	1	37	12	1	8	24	-13	-36%	2	✓	✓
	130	131-130-488	26	3	1	30	0	2	0	5	-25	-84%	6	✓	✗
	130	131-130-129	231	49	23	302	24	13	23	59	-243	-80%	18	✗	✗
	130	131-130-251	70	8	13	90	96	7	0	103	13	15%	1	✓	✓
	130	251-130-131	44	8	6	57	13	1	0	14	-43	-75%	7	✓	✗
	130	251-130-488	348	31	20	399	132	8	0	144	-254	-64%	15	✗	✗
	130	251-130-129	70	9	7	85	87	7	0	94	9	10%	1	✓	✓
	130	129-130-251	49	10	1	59	38	3	27	68	8	14%	1	✓	✓
	130	129-130-131	277	56	24	357	83	17	15	115	-242	-68%	16	✗	✗
	130	129-130-488	25	5	3	33	0	0	0	0	-33	-100%	8	✓	✗
	A5267 Eastbourne Rd / Claremont Rd	305	304-305-303	29	3	0	32	15	1	0	16	-16	-50%	3	✓
305		304-305-306	30	6	0	36	59	10	11	80	45	127%	6	✓	✗

A5267 Eastbourne Rd / Claremont Rd	305	304-305-320	3	2	1	6	9	2	8	21	16	276%	4	✓	✓
	305	320-305-304	12	1	1	14	1	0	0	3	-11	-79%	4	✓	✓
	305	320-305-303	251	49	22	321	85	14	25	125	-197	-61%	13	✗	✗
	305	320-305-306	48	8	1	57	8	1	0	9	-48	-84%	8	✓	✗
	305	306-305-320	57	6	5	67	2	0	0	2	-65	-97%	11	✓	✗
	305	306-305-304	35	6	2	43	62	8	0	70	27	63%	4	✓	✓
	305	306-305-303	65	17	3	84	6	7	0	20	-65	-77%	9	✓	✗
	305	303-305-306	92	15	9	116	17	4	4	31	-85	-73%	10	✓	✗
	305	303-305-320	215	42	17	274	93	16	15	124	-150	-55%	11	✗	✗
	305	303-305-304	31	6	1	38	3	1	10	14	-24	-64%	5	✓	✓
	Guildford Rd / New Cut Lane / Arundel Rd	310	314-310-309	24	3	3	30	10	2	1	13	-18	-58%	4	✓
310		314-310-1110	62	9	2	73	28	3	6	37	-36	-49%	5	✓	✓
310		314-310-311	26	3	1	30	0	0	0	0	-30	-100%	8	✓	✗
310		311-310-314	24	3	1	27	0	0	0	0	-27	-100%	7	✓	✗
310		311-310-309	255	36	24	315	88	11	31	138	-178	-56%	12	✗	✗
310		311-310-1110	27	3	3	33	11	0	0	11	-23	-68%	5	✓	✓
310		1110-310-311	28	3	8	39	8	0	0	8	-30	-78%	6	✓	✗
310		1110-310-314	70	12	5	86	32	3	8	43	-43	-50%	5	✓	✗
310		1110-310-309	31	5	5	40	4	2	0	7	-33	-83%	7	✓	✗
310		309-310-1110	31	4	2	36	4	2	11	18	-19	-51%	4	✓	✓

Guildford Rd / New Cut Lane / Arundel Rd	310	309-310-311	242	27	15	284	91	13	41	153	-131	-46%	9	*	*
	310	309-310-314	11	2	2	15	4	1	0	5	-10	-65%	3	✓	✓
PERCENTAGE OF INDIVIDUAL LINKS COMPLYING WITH DMRB														65%	28%

Additional Counts - IP															
Location	Dir	Saturn Link	Count				Modelled				Diff	% Diff	GEH	DMRB	
			Car	LV	HV	Total	Car	LV	HV	Total				Flow	GEH
Aughton Rd	EB	299-300	122	21	14	157	123	21	11	157	0	0%	0	✓	✓
Aughton Rd	WB	300-299	121	21	15	157	121	21	15	159	3	2%	0	✓	✓
Cemetery Rd	NB	133-132	435	65	61	561	223	40	25	291	-271	-48%	13	*	*
Cemetery Rd	SB	132-133	405	61	41	507	271	40	29	343	-164	-32%	8	*	*
Coastal Rd	EB	8928-525	301	33	33	368	207	27	16	250	-118	-32%	7	*	*
Coastal Rd	WB	525-8928	315	35	22	372	224	35	19	278	-93	-25%	5	✓	*
EastBank St	EB	106-529	314	31	58	403	131	31	0	174	-229	-57%	13	*	*
EastBank St	WB	529-106	365	36	58	459	155	36	0	203	-256	-56%	14	*	*
Liverpool Rd M	NB	350-1103	420	63	55	538	209	41	45	294	-244	-45%	12	*	*
Liverpool Rd M	SB	1103-350	411	61	62	534	156	28	44	228	-306	-57%	16	*	*
Lord St	NB	298-138	432	48	59	539	432	48	18	510	-29	-5%	1	✓	✓
Lord St	SB	138-298	400	44	48	493	401	44	16	471	-22	-4%	1	✓	✓
New Cut Ln	EB	1110-2100	118	15	16	148	43	6	17	65	-83	-56%	8	✓	*
Waterloo Rd	NB	324-1074	313	31	48	392	313	31	18	364	-28	-7%	1	✓	✓
Waterloo Rd	SB	1074-324	275	30	75	381	275	29	21	327	-54	-14%	3	✓	✓
Meol's cop road	NB	1143-1141	550	72	101	722	589	58	86	735	13	2%	0	✓	✓
Meol's cop road	SB	1141-1143	474	62	101	636	547	48	97	694	58	9%	2	✓	✓
Scarbrick New Rd	EB	8905-250	344	43	73	460	305	32	31	374	-86	-19%	4	✓	✓
Scarbrick New Rd	WB	250-8905	383	51	71	505	356	38	36	436	-69	-14%	3	✓	✓

FYLDE ROAD	NB	425-228	191	21	42	254	108	21	42	173	-81	-32%	6	✓	✗
FYLDE ROAD	SB	228-425	176	20	41	237	171	22	53	249	12	5%	1	✓	✓
A565 PRESTON NEW ROAD	NB	413-227	395	54	114	563	183	27	70	286	-277	-49%	13	✗	✗
A565 PRESTON NEW ROAD	SB	227-413	358	49	121	528	53	5	0	65	-463	-88%	27	✗	✗
BANKFIELD LANE	NB	1059-230	94	13	37	143	94	13	0	113	-30	-21%	3	✓	✓
BANKFIELD LANE	SB	230-1059	117	16	59	192	114	15	7	142	-50	-26%	4	✓	✓
A565 / Marine Drive / The Plough	EB	1001-229	119	18	33	170	287	46	112	448	278	164%	16	✗	✗
A565 / Marine Drive / The Plough	WB	229-1001	139	23	60	221	139	23	53	218	-3	-1%	0	✓	✓
A565 / Marine Drive / The Plough	NB	8917-229	34	10	7	51	77	10	0	87	36	69%	4	✓	✓
A565 / Marine Drive / The Plough	SB	229-8917	24	5	7	35	195	26	60	281	246	694%	20	✗	✗
A565 Preston New Rd / Marshside Rd / Cambridge Rd / Manor Rd	NB	215-214	69	9	8	86	41	7	0	52	-34	-39%	4	✓	✓
A565 Preston New Rd / Marshside Rd / Cambridge Rd / Manor Rd	SB	214-215	68	10	16	94	67	10	0	83	-11	-12%	1	✓	✓
A565 Preston New Rd / Marshside Rd / Cambridge Rd / Manor Rd	EB	1006-215	120	19	35	174	119	27	46	203	29	17%	2	✓	✓
A565 Preston New Rd / Marshside Rd / Cambridge Rd / Manor Rd	WB	215-1006	117	18	53	187	117	20	53	203	15	8%	1	✓	✓
A565 Preston New Rd / Marshside Rd / Cambridge Rd / Manor Rd	NB	1067-215	114	13	24	152	141	14	24	178	26	17%	2	✓	✓
A565 Preston New Rd / Marshside Rd / Cambridge Rd / Manor Rd	SB	215-1067	141	17	32	191	141	17	0	158	-33	-17%	2	✓	✓
A565 Preston New Rd / Marshside Rd / Cambridge Rd / Manor Rd	EB	215-413	178	25	75	278	187	28	70	291	14	5%	1	✓	✓

A565 Preston New Rd / Marshside Rd / Cambridge Rd / Manor Rd	WB	413-215	156	21	40	217	159	21	53	240	23	10%	2	✓	✓
Marshside Rd / Fleetwood Rd / Flyde Rd	NB	213-212	55	7	9	71	56	7	0	67	-4	-6%	0	✓	✓
Marshside Rd / Fleetwood Rd / Flyde Rd	SB	212-213	62	8	5	75	61	8	0	73	-2	-2%	0	✓	✓
Marshside Rd / Fleetwood Rd / Flyde Rd	EB	212-425	90	10	6	105	74	10	6	95	-11	-10%	1	✓	✓
Marshside Rd / Fleetwood Rd / Flyde Rd	WB	425-212	57	6	3	66	57	6	6	73	7	10%	1	✓	✓
Marine Drive / Fairway	EB	462-145	113	9	13	135	113	9	13	135	0	0%	0	✓	✓
Marine Drive / Fairway	WB	145-462	100	12	18	129	101	13	13	127	-2	-2%	0	✓	✓
Marine Drive / Fairway	NB	464-145	38	5	5	48	74	7	0	81	33	69%	4	✓	✓
Marine Drive / Fairway	SB	145-464	38	4	6	48	87	4	0	91	43	90%	5	✓	✗
Marine Drive / Fairway	EB	145-209	100	12	20	132	180	16	13	209	77	59%	6	✓	✗
Marine Drive / Fairway	WB	209-145	114	11	13	138	182	17	13	211	74	54%	6	✓	✗
Lord St / Albert Rd / B5245	EB	411-124	124	15	32	171	124	15	35	190	19	11%	1	✓	✓
Lord St / Albert Rd / B5245	WB	124-411	123	14	39	176	121	15	39	191	15	9%	1	✓	✓
Lord St / Albert Rd / B5245	NB	125-124	74	10	9	93	64	7	0	81	-13	-14%	1	✓	✓
Lord St / Albert Rd / B5245	SB	124-125	100	9	17	126	46	9	0	65	-62	-49%	6	✓	✗
B5245 Manchester Rd / A5267 Hartwood Rd / Roe Lane	EB	126-150	75	12	5	91	75	12	0	93	1	2%	0	✓	✓
B5245 Manchester Rd / A5267 Hartwood Rd / Roe Lane	WB	150-126	83	13	18	114	70	13	0	89	-24	-21%	2	✓	✓
B5245 Manchester Rd / A5267 Hartwood Rd / Roe Lane	NB	484-150	71	13	18	103	99	13	0	112	10	10%	1	✓	✓
B5245 Manchester Rd / A5267 Hartwood Rd / Roe Lane	SB	150-484	90	11	16	118	66	12	14	92	-26	-22%	3	✓	✓
A5267 Roe Lane / B5276 Norwood Ave	EB	235-223	130	15	21	165	177	29	0	212	46	28%	3	✓	✓

A5267 Roe Lane / B5276 Norwood Ave	WB	223-235	142	29	33	205	144	25	0	175	-30	-14%	2	✓	✓
A5267 Roe Lane / B5276 Norwood Ave	NB	437-223	93	11	31	135	94	11	0	105	-30	-22%	3	✓	✓
A5267 Roe Lane / B5276 Norwood Ave	SB	223-437	117	12	32	160	119	12	0	131	-29	-18%	2	✓	✓
A5267 Roe Lane / B5276 Norwood Ave	EB	223-204	165	31	37	233	166	26	0	198	-35	-15%	2	✓	✓
A5267 Roe Lane / B5276 Norwood Ave	WB	204-223	129	17	23	168	158	24	0	187	19	12%	1	✓	✓
Norwood Ave / Tithebarn Rd / Bispham Rd	NB	234-237	134	14	35	182	115	13	0	128	-53	-29%	4	✓	✓
Norwood Ave / Tithebarn Rd / Bispham Rd	SB	237-234	113	13	33	159	115	13	0	128	-31	-20%	3	✓	✓
Norwood Ave / Tithebarn Rd / Bispham Rd	NB	233-234	108	13	35	155	111	13	9	138	-17	-11%	1	✓	✓
Norwood Ave / Tithebarn Rd / Bispham Rd	SB	234-233	126	12	32	170	129	12	14	160	-9	-6%	1	✓	✓
Norwood Ave / Tithebarn Rd / Bispham Rd	EB	234-221	48	8	9	65	47	9	9	70	5	8%	1	✓	✓
Norwood Ave / Tithebarn Rd / Bispham Rd	WB	221-234	42	7	14	63	73	13	14	106	43	68%	5	✓	✓
A570 Scarisbrick Rd / A5267 Ash St / Cemetery Rd	NB	130-488	133	13	24	170	132	10	0	149	-21	-12%	2	✓	✓
A570 Scarisbrick Rd / A5267 Ash St / Cemetery Rd	SB	488-130	109	13	21	142	109	7	8	131	-11	-8%	1	✓	✓
A570 Scarisbrick Rd / A5267 Ash St / Cemetery Rd	EB	131-130	118	22	31	171	119	22	23	167	-4	-2%	0	✓	✓
A570 Scarisbrick Rd / A5267 Ash St / Cemetery Rd	WB	130-131	109	20	37	165	108	19	22	153	-13	-8%	1	✓	✓
A570 Scarisbrick Rd / A5267 Ash St / Cemetery Rd	NB	251-130	127	16	32	176	233	16	0	253	77	44%	5	✓	✗
A570 Scarisbrick Rd / A5267 Ash St / Cemetery Rd	SB	130-251	154	16	32	202	231	16	27	277	76	37%	5	✓	✓
A570 Scarisbrick Rd / A5267 Ash St / Cemetery Rd	EB	130-129	110	20	31	161	111	20	23	154	-8	-5%	1	✓	✓
A570 Scarisbrick Rd / A5267 Ash St / Cemetery Rd	WB	129-130	117	24	29	169	121	20	42	182	14	8%	1	✓	✓

A570 Scarisbrick New Rd / Main Retail Park Rbout / A570 / B5276	NB	260-1143	208	20	52	280	589	58	86	735	455	162%	20	*	*
A570 Scarisbrick New Rd / Main Retail Park Rbout / A570 / B5276	SB	1143-260	168	25	72	266	547	48	97	694	428	161%	20	*	*
A570 Scarisbrick New Rd / Main Retail Park Rbout / A570 / B5276	NB	260-1142	153	13	31	196	222	23	31	283	87	44%	6	✓	*
A570 Scarisbrick New Rd / Main Retail Park Rbout / A570 / B5276	SB	1142-260	132	15	36	182	271	27	36	340	157	86%	10	*	*
A570 Scarisbrick New Rd / Main Retail Park Rbout / A570 / B5276	EB	416-260	145	13	28	186	145	14	31	200	14	7%	1	✓	✓
A570 Scarisbrick New Rd / Main Retail Park Rbout / A570 / B5276	WB	260-416	146	8	33	187	144	14	33	200	13	7%	1	✓	✓
A570 Scarisbrick New Rd / Main Retail Park Rbout / A570 / B5276	NB	403-260	114	10	5	129	57	10	0	67	-61	-48%	6	✓	*
A570 Scarisbrick New Rd / Main Retail Park Rbout / A570 / B5276	SB	260-403	147	12	7	166	147	9	0	156	-10	-6%	1	✓	✓
A570 Scarisbrick New Rd / Main Retail Park Rbout / A570 / B5276	NB	1132-260	185	28	86	299	654	60	86	802	503	169%	21	*	*
A570 Scarisbrick New Rd / Main Retail Park Rbout / A570 / B5276	SB	260-1132	171	24	56	251	548	52	100	703	451	179%	21	*	*
A570 Scarisbrick New Rd / Main Retail Park Rbout / A570 / B5276	EB	260-1133	98	7	20	124	39	6	0	45	-79	-63%	9	✓	*
A570 Scarisbrick New Rd / Main Retail Park Rbout / A570 / B5276	WB	1133-260	140	7	16	162	16	3	0	19	-143	-88%	15	*	*
A5267 Eastbourne Rd / Claremont Rd	NB	305-304	26	4	5	34	66	9	10	87	52	151%	7	✓	*
A5267 Eastbourne Rd / Claremont Rd	SB	304-305	20	4	1	25	83	13	19	118	93	370%	11	✓	*

A5267 Eastbourne Rd / Claremont Rd	EB	320-305	92	16	23	131	94	15	25	137	6	5%	1	✓	✓
A5267 Eastbourne Rd / Claremont Rd	WB	305-320	104	19	24	147	103	19	23	147	0	0%	0	✓	✓
A5267 Eastbourne Rd / Claremont Rd	NB	306-305	57	10	10	77	70	15	0	91	15	19%	2	✓	✓
A5267 Eastbourne Rd / Claremont Rd	SB	305-306	52	9	10	72	84	15	15	121	49	68%	5	✓	*
A5267 Eastbourne Rd / Claremont Rd	EB	305-303	115	23	25	163	106	22	25	160	-3	-2%	0	✓	✓
A5267 Eastbourne Rd / Claremont Rd	WB	303-305	113	21	28	161	113	21	29	169	8	5%	1	✓	✓
Guildford Rd / New Cut Lane / Arundel Rd	NB	310-314	35	5	8	48	36	4	8	48	0	0%	0	✓	✓
Guildford Rd / New Cut Lane / Arundel Rd	SB	314-310	37	5	7	49	38	5	7	50	1	2%	0	✓	✓
Guildford Rd / New Cut Lane / Arundel Rd	EB	310-309	103	15	32	150	102	15	32	157	7	5%	1	✓	✓
Guildford Rd / New Cut Lane / Arundel Rd	WB	309-310	95	11	20	125	99	16	52	176	51	41%	4	✓	✓
A565 Waterloo Rd / A5267 Liverpool Rd	NB	312-313	134	21	45	199	209	41	45	304	105	53%	7	*	*
A565 Waterloo Rd / A5267 Liverpool Rd	SB	1109-312	136	18	38	192	156	28	44	238	46	24%	3	✓	✓
Norwood Ave / Tithebarn Rd / Bispham Rd	WB	221-234	42	7	14	63	73	13	14	106	43	68%	5	✓	✓
Norwood Ave / Tithebarn Rd / Bispham Rd	EB	234-221	48	8	9	65	47	9	9	70	5	8%	1	✓	✓
Bispham Rd/Wennington Rd	NB	221-222	0	0	0	0	32	8	0	40	40		9	✓	*
Bispham Rd/Wennington Rd	SB	222-221	0	0	0	0	48	11	0	59	59		11	✓	*
Manchester Rd/Hoghton Grove/Queens Rd	EB	410-125	66	14	12	91	57	6	12	77	-14	-15%	2	✓	✓
Manchester Rd/Hoghton Grove/Queens Rd	EB	125-410	59	7	3	69	44	6	5	57	-12	-18%	2	✓	✓
Manchester Rd/Hoghton Grove/Queens Rd	EB	531-125	44	7	5	55	45	6	0	57	2	4%	0	✓	✓
Manchester Rd/Hoghton Grove/Queens Rd	EB	125-531	47	7	6	59	47	9	0	62	3	4%	0	✓	✓

A565 Southport New Road, Eastbound at LC74, Banks	EB	1003-8922	481	78	87	646	473	57	110	639	-6	-1%	0	✓	✓
A565 Southport New Road, Westbound at LC79, Banks	WB	8922-1003	531	86	94	712	439	54	114	607	-105	-15%	4	✓	✓
L7135 A570 Southport Road, at LC120, Scarisbrick	WB	2103-2102	480	47	61	588	477	16	34	528	-60	-10%	3	✓	✓
L7135 A570 Southport Road, at LC120, Scarisbrick	EB	2102-2103	393	39	87	518	269	10	47	327	-192	-37%	9	✗	✗
B5243 Moss Road, West of Birkdale Cop, Halsall	EB	266-265	69	12	7	88	70	12	9	91	4	4%	0	✓	✓
B5243 Moss Road, West of Birkdale Cop, Halsall	WB	265-266	82	14	8	104	76	14	8	98	-6	-6%	1	✓	✓
PERCENTAGE OF INDIVIDUAL LINKS COMPLYING WITH DMRB													83%	70%	

Calibration - PM															
Location	Dir	Saturn Link	Count				Modelled				Diff	% Diff	GEH	DMRB	
			Car	LV	HV	Total	Car	LV	HV	Total				Flow	GEH
A565 / Marine Drive / The Plough	SB	1002-229	354	36	7	397	355	35	2	394	-3	-1%	0	✓	✓
A565 / Marine Drive / The Plough	NB	229-1002	308	25	7	340	307	33	5	345	5	1%	0	✓	✓
A565 / Marine Drive / The Plough	SB	1064-229	153	29	5	187	174	29	5	208	22	12%	2	✓	✓
A565 / Marine Drive / The Plough	NB	229-1064	279	39	5	323	274	38	5	328	6	2%	0	✓	✓
Water lane	EB	1003-229	742	99	144	985	741	84	39	864	-122	-12%	4	✓	✓
Water lane	WB	229-1003	922	82	87	1091	902	86	67	1097	7	1%	0	✓	✓
L7134 A570 Southport Road, at LC48, Scarisbrick	WB	1139-1130	489	37	41	567	530	37	41	610	43	8%	2	✓	✓
L7134 A570 Southport Road, at LC48, Scarisbrick	EB	1130-1139	757	57	57	871	733	53	55	865	-6	-1%	0	✓	✓
B5243 Jacksmere Lane, W of Blackmoss Lane at LC13, Scarisbrick	WB	1139-1122	133	20	15	169	106	20	10	136	-32	-19%	3	✓	✓

B5243 Jacksmere Lane, W of Blackmoss Lane at LC13, Scarisbrick	EB	1122-1139	77	12	10	99	73	9	10	93	-6	-6%	1	✓	✓
Guildford Rd / New Cut Lane / Arundel Rd	NB	1110-310	224	19	2	245	190	19	11	222	-23	-9%	2	✓	✓
Guildford Rd / New Cut Lane / Arundel Rd	SB	310-1110	307	43	7	357	246	23	8	288	-69	-19%	4	✓	✓
Guildford Rd / New Cut Lane / Arundel Rd	EB	311-310	555	35	5	595	389	35	7	434	-160	-27%	7	*	*
Guildford Rd / New Cut Lane / Arundel Rd	WB	310-311	382	48	14	444	403	44	20	493	49	11%	2	✓	✓
A565 Waterloo Rd / A5267 Liverpool Rd	NB	1105-314	251	31	7	289	210	31	19	268	-21	-7%	1	✓	✓
A565 Waterloo Rd / A5267 Liverpool Rd	SB	314-1105	252	23	5	280	185	14	5	222	-57	-20%	4	✓	✓
A565 Waterloo Rd / A5267 Liverpool Rd	NB	1108-327	349	14	5	368	360	17	23	402	34	9%	2	✓	✓
A565 Waterloo Rd / A5267 Liverpool Rd	SB	327-1108	362	27	14	403	325	26	23	380	-22	-6%	1	✓	✓
Costal road	SB	525-295	421	43	37	500	419	43	27	492	-8	-2%	0	✓	✓
Costal road	NB	295-525	567	31	44	643	561	28	16	615	-28	-4%	1	✓	✓
Marine Dr	SB	210-209	508	44	31	583	506	33	9	565	-18	-3%	1	✓	✓
Marine Dr	NB	209-210	525	46	27	598	526	39	9	576	-22	-4%	1	✓	✓
Marshside Rd / Fleetwood Rd / Flyde Rd	SB	210-211	197	7	7	211	170	4	7	181	-30	-14%	2	✓	✓
Marshside Rd / Fleetwood Rd / Flyde Rd	NB	211-210	208	13	5	226	199	2	4	220	-5	-2%	0	✓	✓
Lord St / Albert Rd / B5245	WB	124-476	228	17	2	247	257	14	1	276	28	11%	2	✓	✓
Lord St / Albert Rd / B5245	EB	476-124	217	21	2	240	232	22	0	255	15	6%	1	✓	✓
Lord St / Albert Rd / B5245	EB	124-480	471	33	12	516	441	39	14	509	-7	-1%	0	✓	✓
Lord St / Albert Rd / B5245	WB	480-124	330	25	9	364	319	28	13	374	9	3%	0	✓	✓
Manchester Rd/Hoghton Grove/Queens Rd	EB	125-482	295	24	7	326	286	29	7	330	4	1%	0	✓	✓
Manchester Rd/Hoghton Grove/Queens Rd	WB	482-125	255	10	5	270	254	10	5	278	8	3%	0	✓	✓

B5245 Manchester Rd / A5267 Hartwood Rd / Roe Lane	EB	150-149	682	51	14	747	518	26	0	560	-187	-25%	7	*	*
B5245 Manchester Rd / A5267 Hartwood Rd / Roe Lane	WB	149-150	375	39	7	421	419	36	4	469	48	11%	2	✓	✓
Norwood Ave / Tithebarn Rd / Bispham Rd	EB	236-234	190	27	2	219	314	28	0	357	138	63%	8	*	*
Norwood Ave / Tithebarn Rd / Bispham Rd	WB	234-236	310	31	7	348	262	24	0	289	-59	-17%	3	✓	✓
Liverpool Road	NB	316-319	433	65	59	557	429	63	28	532	-25	-4%	1	✓	✓
Liverpool Road	SB	319-316	398	43	79	520	371	40	18	476	-44	-8%	2	✓	✓
Kew road	NB	307-306	220	30	37	287	222	30	17	281	-6	-2%	0	✓	✓
Kew road	SB	306-307	184	32	46	263	231	31	15	300	38	14%	2	✓	✓
SOUTHBANK ROAD	NB	264-502	264	20	47	331	209	18	0	294	-37	-11%	2	✓	✓
SOUTHBANK ROAD	SB	502-264	288	22	24	333	318	34	8	365	32	10%	2	✓	✓
Scarisbrick New Rd	SB	8904-250	425	32	41	498	415	29	0	452	-46	-9%	2	✓	✓
Scarisbrick New Rd	NB	250-8904	513	39	42	593	437	32	13	551	-42	-7%	2	✓	✓
B2576 MEOLS COP ROAD	NB	1141-1145	841	63	84	989	864	61	36	967	-22	-2%	1	✓	✓
B2576 MEOLS COP ROAD	SB	1145-1141	627	47	78	753	628	63	69	786	33	4%	1	✓	✓
PERCENTAGE OF INDIVIDUAL LINKS COMPLYING WITH DMRB														93%	93%

Validation - PM															
Location	Dir	Saturn Link	Count				Modelled				Diff	% Diff	GEH	DMRB	
			Car	LV	HV	Total	Car	LV	HV	Total				Flow	GEH
Marshside Rd / Fleetwood Rd / Flyde Rd	EB	415-211	155	12	0	167	159	16	0	176	9	6%	1	✓	✓
Marshside Rd / Fleetwood Rd / Flyde Rd	WB	211-415	220	19	0	239	180	17	3	216	-23	-10%	2	✓	✓
Cambridge Rd	EB	201-202	609	53	44	706	593	48	23	681	-25	-4%	1	✓	✓
Cambridge Rd	WB	202-201	450	39	42	531	450	39	14	518	-13	-2%	1	✓	✓

Roe Ln	EB	204-513	386	38	29	453	377	38	0	441	-12	-3%	1	✓	✓
Roe Ln	WB	513-204	270	27	21	317	272	27	0	307	-11	-3%	1	✓	✓
Bispham Rd/Wennington Rd	EB	221-220	378	48	5	431	372	29	9	426	-5	-1%	0	✓	✓
Bispham Rd/Wennington Rd	WB	220-221	337	34	2	373	335	34	7	384	10	3%	1	✓	✓
Bispham Rd/Wennington Rd	WB	1149-221	110	6	0	116	108	6	0	115	-1	-1%	0	✓	✓
Bispham Rd/Wennington Rd	EB	221-1149	105	14	0	119	24	12	0	36	-83	-70%	9	✓	✗
PERCENTAGE OF INDIVIDUAL LINKS COMPLYING WITH DMRB														100%	90%

Summary Turns - PM															
Location	Saturn Node	Saturn Turn	Count				Modelled				Diff	% Diff	GEH	DMRB	
			Car	LV	HV	Total	Car	LV	HV	Total				Flow	GEH
A565 Preston New Rd / Marshside Rd / Cambridge Rd / Manor Rd	215	214-215-413	22	7	0	29	1	0	0	1	-28	-98%	7	✓	✗
	215	214-215-1067	144	11	0	155	229	22	0	260	105	68%	7	✗	✗
	215	214-215-1006	73	5	2	80	4	0	0	10	-70	-87%	10	✓	✗
	215	1006-215-214	57	2	2	61	0	0	0	4	-57	-93%	10	✓	✗
	215	1006-215-413	457	35	12	504	496	32	23	561	58	11%	3	✓	✓
	215	1006-215-1067	18	2	0	20	58	7	0	66	46	230%	7	✓	✗
	215	1067-215-1006	20	1	0	21	57	2	0	60	39	185%	6	✓	✗
	215	1067-215-214	222	27	0	249	85	6	0	92	-157	-63%	12	✗	✗
	215	1067-215-413	377	34	16	427	221	56	2	284	-144	-34%	8	✗	✗
	215	413-215-1067	248	14	2	264	118	8	0	126	-138	-52%	10	✗	✗
	215	413-215-1006	300	25	9	334	472	39	14	534	200	60%	10	✗	✗

	215	413-215-214	40	3	0	43	0	0	0	0	-43	-100%	9	✓	*
Marine Drive / Fairway	145	462-145-209	401	18	9	428	396	27	9	433	5	1%	0	✓	✓
	145	462-145-464	88	4	0	92	67	0	0	67	-25	-27%	3	✓	✓
	145	464-145-462	70	2	0	72	56	0	0	56	-16	-22%	2	✓	✓
	145	464-145-209	87	6	0	93	118	11	0	130	37	40%	4	✓	✓
	145	209-145-464	80	7	0	87	89	11	0	103	16	19%	2	✓	✓
	145	209-145-462	430	25	7	462	431	22	9	476	14	3%	1	✓	✓
	124	476-124-480	34	7	2	43	86	12	0	98	55	127%	7	✓	*
Lord St / Albert Rd / B5245	124	476-124-125	130	8	0	138	111	4	0	116	-22	-16%	2	✓	✓
	124	476-124-411	52	6	0	58	34	6	0	41	-17	-30%	2	✓	✓
	124	411-124-476	47	6	0	53	48	1	0	49	-4	-7%	0	✓	✓
	124	411-124-480	337	22	9	368	314	27	14	368	0	0%	0	✓	✓
	124	411-124-125	130	12	5	147	169	6	2	190	44	30%	3	✓	✓
	124	125-124-411	135	11	5	151	151	11	2	176	26	17%	2	✓	✓
	124	125-124-476	152	8	0	160	178	12	0	192	32	20%	2	✓	✓
	124	125-124-480	100	4	0	104	42	0	0	42	-62	-59%	7	✓	*
	124	480-124-125	88	6	0	94	6	0	0	6	-88	-94%	12	✓	*
	124	480-124-411	214	16	7	237	282	27	12	334	97	41%	6	✓	*
	124	480-124-476	28	3	2	33	31	1	1	34	1	2%	0	✓	✓
		150	126-150-149	375	31	9	415	422	14	0	446	30	7%	1	✓

B5245 Manchester Rd / A5267 Hartwood Rd / Roe Lane	150	126-150- 484	39	2	0	41	45	5	0	51	10	24%	1	✓	✓
	150	484-150- 126	16	1	0	17	146	12	0	166	149	878%	16	✗	✗
	150	484-150- 149	298	20	5	323	96	12	0	114	-208	-65%	14	✗	✗
	150	149-150- 484	124	19	2	145	178	15	4	199	54	37%	4	✓	✓
	150	149-150- 126	232	17	5	254	241	21	0	270	16	7%	1	✓	✓
	223	235-223- 204	450	33	7	490	204	11	0	241	-249	-51%	13	✗	✗
A5267 Roe Lane / B5276 Norwood Ave	223	235-223- 437	130	14	7	151	247	7	0	278	127	84%	9	✗	✗
	223	437-223- 235	210	5	2	217	267	17	0	289	71	33%	4	✓	✓
	223	437-223- 204	339	19	5	363	29	11	0	41	-322	-89%	23	✗	✗
	223	204-223- 437	160	11	9	180	206	18	0	225	45	25%	3	✓	✓
	223	204-223- 235	300	33	9	342	252	25	0	285	-58	-17%	3	✓	✓
	234	237-234- 221	8	0	5	13	9	2	0	12	-1	-4%	0	✓	✓
Norwood Ave / Tithebarn Rd / Bispham Rd	234	237-234- 233	255	24	12	291	252	20	0	280	-10	-3%	1	✓	✓
	234	237-234- 236	70	11	0	81	64	15	0	81	0	1%	0	✓	✓
	234	236-234- 237	162	13	5	180	86	18	0	109	-70	-39%	6	✓	✗
	234	236-234- 221	138	15	2	155	130	10	0	146	-9	-6%	1	✓	✓
	234	236-234- 233	10	3	0	13	97	0	0	101	88	679%	12	✓	✗
	234	233-234- 236	15	0	0	15	20	0	0	21	6	39%	1	✓	✓
	234	233-234- 237	479	27	7	513	231	22	0	257	-256	-50%	13	✗	✗
	234	233-234- 221	90	4	2	96	81	16	9	114	18	19%	2	✓	✓

Norwood Ave / Tithebarn Rd / Bispham Rd	234	221-234-233	61	9	2	72	122	14	7	149	77	106%	7	✓	✗
	234	221-234-236	105	16	2	123	177	9	0	187	63	51%	5	✓	✗
	234	221-234-237	11	0	2	13	23	2	0	26	13	95%	3	✓	✓
A570 Scarisbrick Rd / A5267 Ash St / Cemetery Rd	130	488-130-129	41	1	2	44	10	0	0	10	-35	-78%	7	✓	✗
	130	488-130-251	313	28	7	348	289	1	0	295	-53	-15%	3	✓	✓
	130	488-130-131	54	2	2	58	30	0	3	36	-22	-38%	3	✓	✓
	130	131-130-488	18	1	2	21	0	0	0	4	-18	-84%	5	✓	✗
	130	131-130-129	307	41	7	355	163	36	16	221	-134	-38%	8	✗	✗
	130	131-130-251	46	7	0	53	87	17	0	107	54	102%	6	✓	✗
	130	251-130-131	60	2	9	71	5	4	0	10	-62	-86%	10	✓	✗
	130	251-130-488	300	14	5	319	300	20	7	366	48	15%	3	✓	✓
	130	251-130-129	106	6	0	112	62	11	0	95	-17	-15%	2	✓	✓
	130	129-130-251	71	6	0	77	80	1	0	82	5	6%	1	✓	✓
	130	129-130-131	379	46	5	430	322	42	5	373	-57	-13%	3	✓	✓
	130	129-130-488	23	0	0	23	77	1	0	79	56	242%	8	✓	✗
	A5267 Eastbourne Rd / Claremont Rd	305	304-305-303	31	2	0	33	5	0	0	5	-28	-84%	6	✓
305		304-305-306	27	3	2	32	125	12	2	141	109	337%	12	✗	✗
305		304-305-320	2	0	0	2	0	0	0	2	0	2%	0	✓	✓
305		320-305-304	7	0	0	7	3	0	0	5	-2	-29%	1	✓	✓
305		320-305-303	277	36	9	322	185	30	16	233	-90	-28%	5	✓	✗

A5267 Eastbourne Rd / Claremont Rd	305	320-305-306	60	4	0	64	35	0	0	36	-28	-45%	4	✓	✓
	305	306-305-320	78	5	0	83	51	8	0	61	-22	-27%	3	✓	✓
	305	306-305-304	44	5	2	51	108	10	8	128	77	150%	8	✓	x
	305	306-305-303	76	13	0	89	50	10	0	67	-22	-24%	2	✓	✓
	305	303-305-306	124	20	7	151	66	10	4	102	-48	-32%	4	✓	✓
	305	303-305-320	261	30	7	298	236	26	8	324	26	9%	1	✓	✓
	305	303-305-304	41	3	0	44	8	2	0	12	-32	-73%	6	✓	x
	310	314-310-309	25	2	2	29	16	6	1	24	-5	-18%	1	✓	✓
Guildford Rd / New Cut Lane / Arundel Rd	310	314-310-1110	112	13	0	125	101	17	1	121	-4	-3%	0	✓	✓
	310	314-310-311	41	7	0	48	24	0	0	25	-23	-48%	4	✓	✓
	310	311-310-314	41	6	0	47	0	0	0	0	-47	-100%	10	✓	x
	310	311-310-309	290	40	12	342	389	35	7	440	99	29%	5	✓	✓
	310	311-310-1110	51	2	2	55	0	0	0	0	-55	-100%	11	✓	x
	310	1110-310-311	69	9	2	80	9	0	0	10	-71	-88%	11	✓	x
	310	1110-310-314	188	23	2	213	150	7	2	160	-53	-25%	4	✓	✓
	310	1110-310-309	50	11	2	63	31	12	9	53	-11	-17%	1	✓	✓
	310	309-310-1110	61	4	0	65	145	7	7	167	102	157%	9	x	x
	310	309-310-311	445	19	2	466	371	44	20	465	-1	0%	0	✓	✓
	310	309-310-314	26	1	2	29	65	2	1	73	43	148%	6	✓	x
	Bispham Rd/Wennington Rd	221	1149-221-234	30	5	0	35	0	0	0	0	-35	-100%	8	✓

Bispham Rd/Wennington Rd	221	1149-221-222	51	0	0	51	23	1	0	25	-26	-51%	4	✓	✓
	221	1149-221-220	29	1	0	30	84	4	0	90	60	199%	8	✓	x
	221	234-221-222	26	2	0	28	13	6	0	20	-8	-28%	2	✓	✓
	221	234-221-220	275	31	2	308	207	23	9	253	-56	-18%	3	✓	✓
	221	234-221-1149	48	7	0	55	0	0	0	0	-55	-100%	10	✓	x
	221	222-221-220	33	2	0	35	81	2	0	84	49	139%	6	✓	x
	221	222-221-1149	19	3	0	22	24	3	0	27	5	24%	1	✓	✓
	221	222-221-234	23	4	0	27	22	2	0	24	-3	-13%	1	✓	✓
	221	220-221-1149	38	4	0	42	0	8	0	8	-34	-80%	7	✓	x
	221	220-221-234	299	39	2	340	301	23	7	338	-2	-1%	0	✓	✓
	221	220-221-222	41	5	2	48	35	2	0	37	-11	-23%	2	✓	✓
Manchester Rd/Hoghton Grove/Queens Rd	125	124-125-482	32	2	0	34	11	0	0	15	-19	-56%	4	✓	✓
	125	124-125-531	224	24	2	250	263	10	2	285	34	14%	2	✓	✓
	125	124-125-410	56	4	2	62	13	0	0	13	-49	-79%	8	✓	x
	125	482-125-531	15	0	0	15	2	1	0	3	-12	-80%	4	✓	✓
	125	482-125-410	196	4	5	205	251	5	3	265	60	30%	4	✓	✓
	125	482-125-124	44	6	0	50	0	4	2	10	-40	-81%	7	✓	x
	125	531-125-410	16	0	0	16	5	0	0	5	-11	-71%	4	✓	✓
	125	531-125-124	194	21	0	215	250	17	0	278	63	29%	4	✓	✓
	125	531-125-482	10	0	0	10	1	1	0	2	-8	-85%	4	✓	✓

Manchester Rd/Hoghton Grove/Queens Rd	125	410-125-124	99	17	0	116	121	2	0	123	7	6%	1	✓	✓
	125	410-125-482	253	22	7	282	274	29	7	314	32	11%	2	✓	✓
	125	410-125-531	33	7	0	40	5	1	0	7	-33	-83%	7	✓	*
PERCENTAGE OF INDIVIDUAL LINKS COMPLYING WITH DMRB														83%	54%

Additional Counts - PM															
Location	Dir	Saturn Link	Count				Modelled				Diff	% Diff	GEH	DMRB	
			Car	LV	HV	Total	Car	LV	HV	Total				Flow	GEH
Aughton Rd	EB	299-300	172	26	9	207	207	28	9	248	40	19%	3	✓	✓
Aughton Rd	WB	300-299	141	21	11	174	138	22	11	177	3	2%	0	✓	✓
Cemetery Rd	NB	133-132	492	55	48	594	275	54	16	360	-234	-39%	11	*	*
Cemetery Rd	SB	132-133	508	56	29	594	430	52	12	600	6	1%	0	✓	✓
Coastal Rd	EB	8928-525	428	37	67	533	343	25	27	395	-137	-26%	6	*	*
Coastal Rd	WB	525-8928	476	41	16	534	196	5	16	220	-314	-59%	16	*	*
EastBank St	EB	106-529	340	26	38	404	207	9	0	230	-174	-43%	10	*	*
EastBank St	WB	529-106	340	26	38	404	328	17	8	381	-23	-6%	1	✓	✓
Liverpool Rd M	NB	350-1103	552	48	42	642	565	48	42	655	13	2%	1	✓	✓
Liverpool Rd M	SB	1103-350	563	49	28	639	510	40	27	592	-47	-7%	2	✓	✓
Lord St	NB	298-138	501	44	46	590	488	41	32	580	-10	-2%	0	✓	✓
Lord St	SB	138-298	570	50	35	655	546	51	30	644	-11	-2%	0	✓	✓
New Cut Ln	EB	1110-2100	174	19	13	206	246	23	8	288	82	40%	5	✓	*
Waterloo Rd	NB	324-1074	341	24	35	401	338	22	23	388	-12	-3%	1	✓	✓
Waterloo Rd	SB	1074-324	417	27	66	511	357	35	22	420	-91	-18%	4	✓	✓
Meol's cop road	NB	1143-1141	744	65	80	890	864	61	36	967	78	9%	3	✓	✓
Meol's cop road	SB	1141-1143	580	39	80	699	624	62	69	781	82	12%	3	✓	✓
Scarbrick New Rd	EB	8905-250	287	17	33	337	272	17	15	311	-26	-8%	1	✓	✓

Scarisbrick New Rd	WB	250-8905	315	28	44	386	408	24	0	452	66	17%	3	✓	✓
FYLDE ROAD	NB	425-228	345	26	43	414	239	18	40	348	-66	-16%	3	✓	✓
FYLDE ROAD	SB	228-425	230	17	26	273	168	17	26	213	-61	-22%	4	✓	✓
A565 PRESTON NEW ROAD	NB	413-227	601	59	92	753	625	36	2	677	-76	-10%	3	✓	✓
A565 PRESTON NEW ROAD	SB	227-413	452	45	80	577	462	46	14	532	-45	-8%	2	✓	✓
BANKFIELD LANE	NB	1059-230	197	20	39	255	250	8	0	267	12	5%	1	✓	✓
BANKFIELD LANE	SB	230-1059	192	19	60	270	185	18	0	210	-60	-22%	4	✓	✓
A565 / Marine Drive / The Plough	EB	1001-229	586	59	14	659	587	45	46	730	71	11%	3	✓	✓
A565 / Marine Drive / The Plough	WB	229-1001	688	64	30	782	520	65	40	628	-153	-20%	6	✗	✗
A565 / Marine Drive / The Plough	NB	8917-229	242	54	7	303	286	47	23	359	56	19%	3	✓	✓
A565 / Marine Drive / The Plough	SB	229-8917	153	13	7	173	139	16	0	156	-17	-10%	1	✓	✓
A565 Preston New Rd / Marshside Rd / Cambridge Rd / Manor Rd	NB	215-214	319	32	2	353	85	6	0	96	-258	-73%	17	✗	✗
A565 Preston New Rd / Marshside Rd / Cambridge Rd / Manor Rd	SB	214-215	239	23	2	264	234	22	0	271	7	3%	0	✓	✓
A565 Preston New Rd / Marshside Rd / Cambridge Rd / Manor Rd	EB	1006-215	393	31	12	436	554	39	23	631	196	45%	8	✗	✗
A565 Preston New Rd / Marshside Rd / Cambridge Rd / Manor Rd	WB	215-1006	532	39	14	585	533	40	14	604	20	3%	1	✓	✓
A565 Preston New Rd / Marshside Rd / Cambridge Rd / Manor Rd	NB	1067-215	410	27	2	439	363	64	2	434	-5	-1%	0	✓	✓
A565 Preston New Rd / Marshside Rd / Cambridge Rd / Manor Rd	SB	215-1067	619	62	16	697	405	37	0	452	-245	-35%	10	✗	✗
A565 Preston New Rd / Marshside Rd / Cambridge Rd / Manor Rd	EB	215-413	856	76	28	960	716	88	26	845	-115	-12%	4	✓	✓

A565 Preston New Rd / Marshside Rd / Cambridge Rd / Manor Rd	WB	413-215	588	42	12	642	590	46	14	660	19	3%	1	✓	✓
Marshside Rd / Fleetwood Rd / Flyde Rd	NB	213-212	266	19	2	287	267	19	0	291	3	1%	0	✓	✓
Marshside Rd / Fleetwood Rd / Flyde Rd	SB	212-213	291	22	0	313	283	20	0	331	18	6%	1	✓	✓
Marshside Rd / Fleetwood Rd / Flyde Rd	EB	212-425	319	18	7	344	223	18	7	253	-91	-26%	5	✓	✗
Marshside Rd / Fleetwood Rd / Flyde Rd	WB	425-212	240	14	7	261	291	19	6	375	114	44%	6	✗	✗
Marine Drive / Fairway	EB	462-145	500	27	7	534	463	27	9	500	-34	-6%	1	✓	✓
Marine Drive / Fairway	WB	145-462	489	22	9	520	487	22	9	532	12	2%	1	✓	✓
Marine Drive / Fairway	NB	464-145	169	11	0	180	173	12	0	186	6	3%	0	✓	✓
Marine Drive / Fairway	SB	145-464	158	8	0	166	156	11	0	170	4	3%	0	✓	✓
Marine Drive / Fairway	EB	145-209	489	25	9	523	513	39	9	563	40	8%	2	✓	✓
Marine Drive / Fairway	WB	209-145	511	33	7	551	521	33	9	579	28	5%	1	✓	✓
Lord St / Albert Rd / B5245	EB	411-124	411	35	12	458	531	34	16	608	150	33%	7	✗	✗
Lord St / Albert Rd / B5245	WB	124-411	524	42	14	580	468	44	14	551	-29	-5%	1	✓	✓
Lord St / Albert Rd / B5245	NB	125-124	349	26	5	380	371	23	2	411	31	8%	2	✓	✓
Lord St / Albert Rd / B5245	SB	124-125	388	23	5	416	286	10	2	312	-103	-25%	5	✗	✗
B5245 Manchester Rd / A5267 Hartwood Rd / Roe Lane	EB	126-150	260	21	5	286	467	19	0	496	211	74%	11	✗	✗
B5245 Manchester Rd / A5267 Hartwood Rd / Roe Lane	WB	150-126	428	36	9	473	388	33	0	436	-37	-8%	2	✓	✓
B5245 Manchester Rd / A5267 Hartwood Rd / Roe Lane	NB	484-150	256	29	2	287	243	24	0	281	-7	-2%	0	✓	✓
B5245 Manchester Rd / A5267 Hartwood Rd / Roe Lane	SB	150-484	391	26	5	422	223	20	4	250	-172	-41%	9	✗	✗
A5267 Roe Lane / B5276 Norwood Ave	EB	235-223	510	38	12	560	451	18	0	482	-78	-14%	3	✓	✓

A5267 Roe Lane / B5276 Norwood Ave	WB	223-235	580	47	14	641	519	43	0	573	-68	-11%	3	✓	✓
A5267 Roe Lane / B5276 Norwood Ave	NB	437-223	290	25	16	331	296	28	0	329	-2	-1%	0	✓	✓
A5267 Roe Lane / B5276 Norwood Ave	SB	223-437	549	24	7	580	450	25	0	501	-79	-14%	3	✓	✓
A5267 Roe Lane / B5276 Norwood Ave	EB	223-204	789	52	12	853	231	22	0	279	-573	-67%	24	✗	✗
A5267 Roe Lane / B5276 Norwood Ave	WB	204-223	460	44	18	522	458	44	0	510	-12	-2%	1	✓	✓
Norwood Ave / Tithebarn Rd / Bispham Rd	NB	234-237	652	40	14	706	340	43	0	392	-314	-45%	13	✗	✗
Norwood Ave / Tithebarn Rd / Bispham Rd	SB	237-234	333	35	16	384	325	37	0	374	-10	-3%	1	✓	✓
Norwood Ave / Tithebarn Rd / Bispham Rd	NB	233-234	326	36	14	376	332	39	9	392	16	4%	1	✓	✓
Norwood Ave / Tithebarn Rd / Bispham Rd	SB	234-233	584	31	9	624	471	34	7	531	-93	-15%	4	✓	✓
Norwood Ave / Tithebarn Rd / Bispham Rd	EB	234-221	236	19	9	264	221	29	9	273	9	3%	1	✓	✓
Norwood Ave / Tithebarn Rd / Bispham Rd	WB	221-234	177	25	7	209	322	25	7	362	153	73%	9	✗	✗
A570 Scarisbrick Rd / A5267 Ash St / Cemetery Rd	NB	130-488	341	15	7	363	376	22	7	448	85	24%	4	✓	✓
A570 Scarisbrick Rd / A5267 Ash St / Cemetery Rd	SB	488-130	408	31	12	451	329	1	3	341	-110	-24%	6	✗	✗
A570 Scarisbrick Rd / A5267 Ash St / Cemetery Rd	EB	131-130	493	50	16	559	250	54	16	332	-227	-41%	11	✗	✗
A570 Scarisbrick Rd / A5267 Ash St / Cemetery Rd	WB	130-131	371	49	9	429	356	46	8	418	-11	-3%	1	✓	✓
A570 Scarisbrick Rd / A5267 Ash St / Cemetery Rd	NB	251-130	430	41	7	478	366	34	7	459	-19	-4%	1	✓	✓
A570 Scarisbrick Rd / A5267 Ash St / Cemetery Rd	SB	130-251	466	22	14	502	456	19	0	484	-18	-4%	1	✓	✓
A570 Scarisbrick Rd / A5267 Ash St / Cemetery Rd	EB	130-129	454	48	9	511	234	47	16	325	-186	-36%	9	✗	✗
A570 Scarisbrick Rd / A5267 Ash St / Cemetery Rd	WB	129-130	473	52	5	530	479	44	5	533	3	1%	0	✓	✓

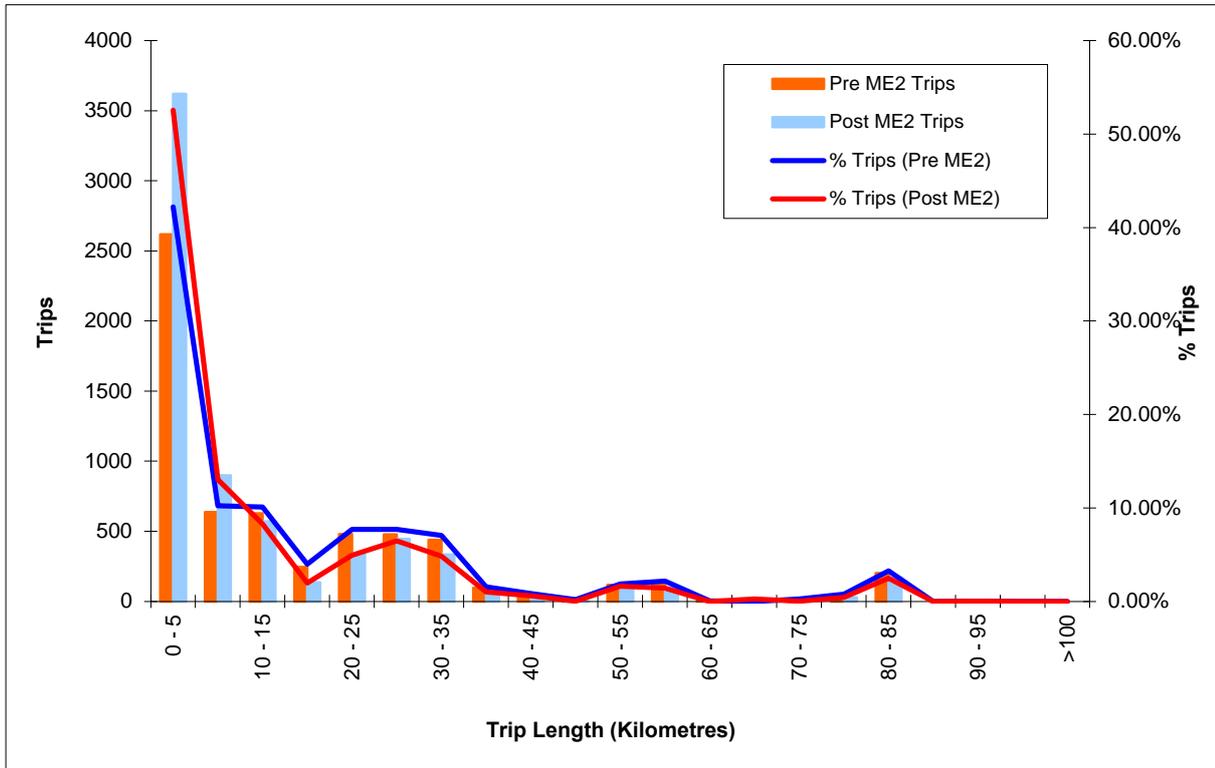
A570 Scarisbrick New Rd / Main Retail Park Rbout / A570 / B5276	NB	260-1143	843	59	25	927	864	61	36	967	40	4%	1	✓	✓
A570 Scarisbrick New Rd / Main Retail Park Rbout / A570 / B5276	SB	1143-260	622	51	16	689	624	62	69	781	92	13%	3	✓	✓
A570 Scarisbrick New Rd / Main Retail Park Rbout / A570 / B5276	NB	260-1142	489	16	14	519	319	16	15	358	-161	-31%	8	✗	✗
A570 Scarisbrick New Rd / Main Retail Park Rbout / A570 / B5276	SB	1142-260	442	28	5	475	443	24	0	486	12	2%	1	✓	✓
A570 Scarisbrick New Rd / Main Retail Park Rbout / A570 / B5276	EB	416-260	447	32	9	488	444	31	10	499	11	2%	1	✓	✓
A570 Scarisbrick New Rd / Main Retail Park Rbout / A570 / B5276	WB	260-416	472	29	12	513	470	32	13	536	23	5%	1	✓	✓
A570 Scarisbrick New Rd / Main Retail Park Rbout / A570 / B5276	NB	403-260	278	16	2	296	137	10	0	147	-150	-51%	10	✗	✗
A570 Scarisbrick New Rd / Main Retail Park Rbout / A570 / B5276	SB	260-403	482	18	0	500	38	8	0	47	-453	-91%	27	✗	✗
A570 Scarisbrick New Rd / Main Retail Park Rbout / A570 / B5276	NB	1132-260	823	59	16	898	530	37	41	612	-286	-32%	10	✗	✗
A570 Scarisbrick New Rd / Main Retail Park Rbout / A570 / B5276	SB	260-1132	727	54	28	809	706	53	55	840	32	4%	1	✓	✓
A570 Scarisbrick New Rd / Main Retail Park Rbout / A570 / B5276	EB	260-1133	142	14	0	156	58	11	0	70	-86	-55%	8	✓	✗
A570 Scarisbrick New Rd / Main Retail Park Rbout / A570 / B5276	WB	1133-260	277	16	7	300	277	16	0	293	-7	-2%	0	✓	✓
A5267 Eastbourne Rd / Claremont Rd	NB	305-304	92	8	2	102	119	12	8	145	43	42%	4	✓	✓
A5267 Eastbourne Rd / Claremont Rd	SB	304-305	60	5	2	67	130	12	2	148	81	120%	8	✓	✗

A5267 Eastbourne Rd / Claremont Rd	EB	320-305	341	35	7	383	223	30	16	273	-110	-29%	6	*	*
A5267 Eastbourne Rd / Claremont Rd	WB	305-320	344	40	9	393	287	34	8	387	-7	-2%	0	✓	✓
A5267 Eastbourne Rd / Claremont Rd	NB	306-305	211	27	9	247	210	28	8	256	9	4%	1	✓	✓
A5267 Eastbourne Rd / Claremont Rd	SB	305-306	198	23	2	223	225	22	6	278	55	25%	3	✓	✓
A5267 Eastbourne Rd / Claremont Rd	EB	305-303	384	51	9	444	240	40	16	305	-139	-31%	7	*	*
A5267 Eastbourne Rd / Claremont Rd	WB	303-305	426	53	14	493	311	38	12	439	-54	-11%	3	✓	✓
Guildford Rd / New Cut Lane / Arundel Rd	NB	310-314	255	30	5	290	215	9	3	233	-57	-20%	4	✓	✓
Guildford Rd / New Cut Lane / Arundel Rd	SB	314-310	178	22	2	202	141	22	2	170	-32	-16%	2	✓	✓
Guildford Rd / New Cut Lane / Arundel Rd	EB	310-309	365	53	16	434	437	52	18	517	83	19%	4	✓	✓
Guildford Rd / New Cut Lane / Arundel Rd	WB	309-310	532	24	5	561	580	53	28	701	140	25%	6	*	*
A565 Waterloo Rd / A5267 Liverpool Rd	NB	312-313	592	48	16	656	570	48	42	670	14	2%	1	✓	✓
A565 Waterloo Rd / A5267 Liverpool Rd	SB	1109-312	578	43	9	630	510	40	27	603	-28	-4%	1	✓	✓
Norwood Ave / Tithebarn Rd / Bispham Rd	WB	221-234	177	25	7	209	322	25	7	362	153	73%	9	*	*
Norwood Ave / Tithebarn Rd / Bispham Rd	EB	234-221	236	19	9	264	221	29	9	273	9	3%	1	✓	✓
Bispham Rd/Wennington Rd	NB	221-222	75	9	0	84	72	10	0	83	-1	-2%	0	✓	✓
Bispham Rd/Wennington Rd	SB	222-221	118	7	2	127	126	7	0	135	7	6%	1	✓	✓
Manchester Rd/Hoghton Grove/Queens Rd	EB	410-125	385	46	7	438	401	32	7	444	6	1%	0	✓	✓
Manchester Rd/Hoghton Grove/Queens Rd	EB	125-410	268	8	7	283	269	5	3	283	0	0%	0	✓	✓
Manchester Rd/Hoghton Grove/Queens Rd	EB	531-125	220	21	0	241	255	18	0	284	43	18%	3	✓	✓
Manchester Rd/Hoghton Grove/Queens Rd	EB	125-531	272	31	2	305	271	12	2	295	-11	-4%	1	✓	✓

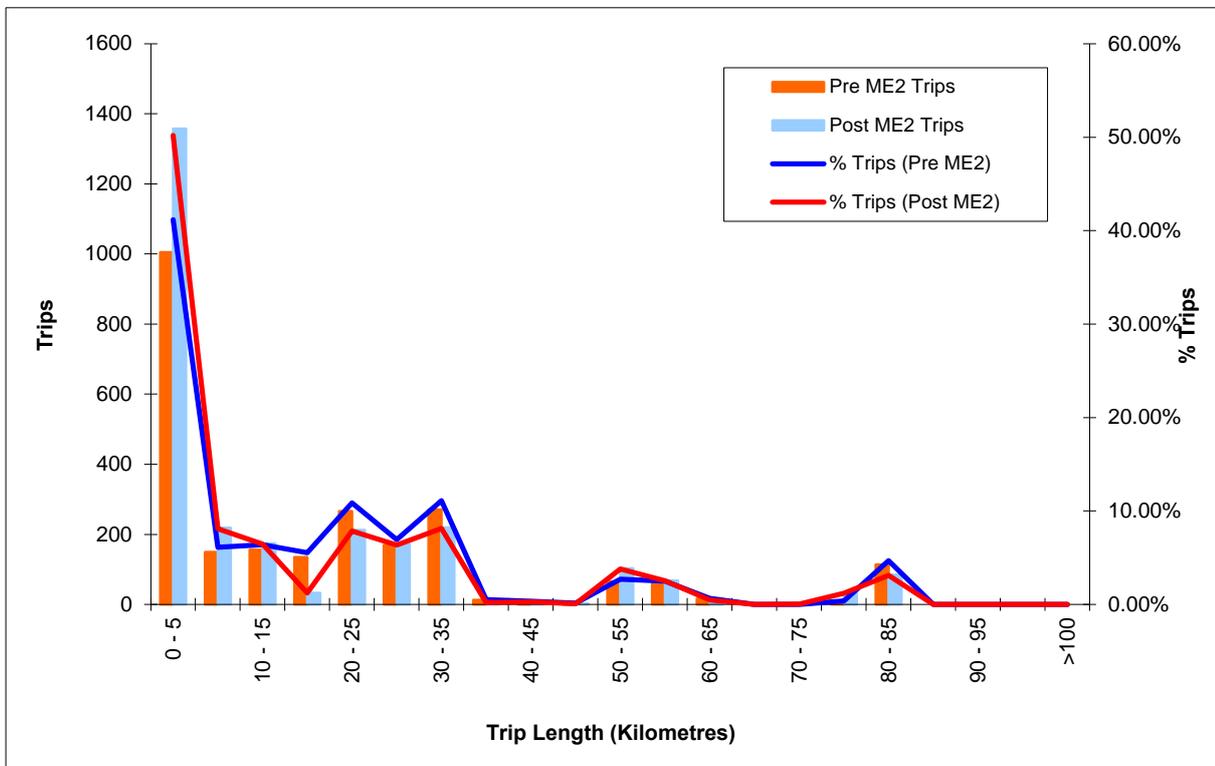
A565 Southport New Road, Eastbound at LC74, Banks	EB	1003-8922	721	89	61	871	902	86	67	1097	226	26%	7	*	*
A565 Southport New Road, Westbound at LC79, Banks	WB	8922-1003	1001	124	66	1191	741	84	39	864	-327	-27%	10	*	*
L7135 A570 Southport Road, at LC120, Scarisbrick	WB	2103-2102	377	28	34	439	361	25	12	398	-42	-9%	2	✓	✓
L7135 A570 Southport Road, at LC120, Scarisbrick	EB	2102-2103	559	42	42	644	495	8	30	548	-95	-15%	4	✓	✓
B5243 Moss Road, West of Birkdale Cop, Halsall	EB	266-265	72	11	3	86	75	11	10	98	12	13%	1	✓	✓
B5243 Moss Road, West of Birkdale Cop, Halsall	WB	265-266	108	16	5	128	121	20	10	152	24	19%	2	✓	✓
PERCENTAGE OF INDIVIDUAL LINKS COMPLYING WITH DMRB														75%	71%

Appendix D. Trip length Distribution

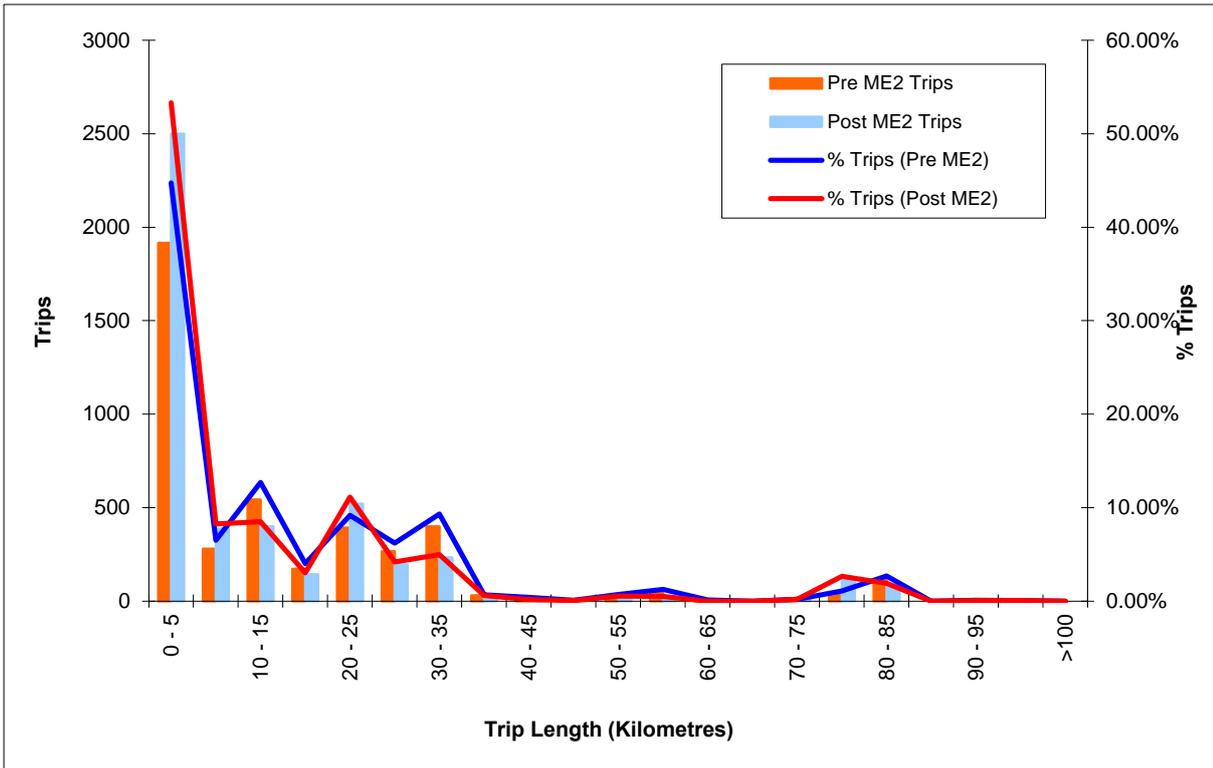
Trip Length Distribution for AM Peak (UC1 Car-HBW)



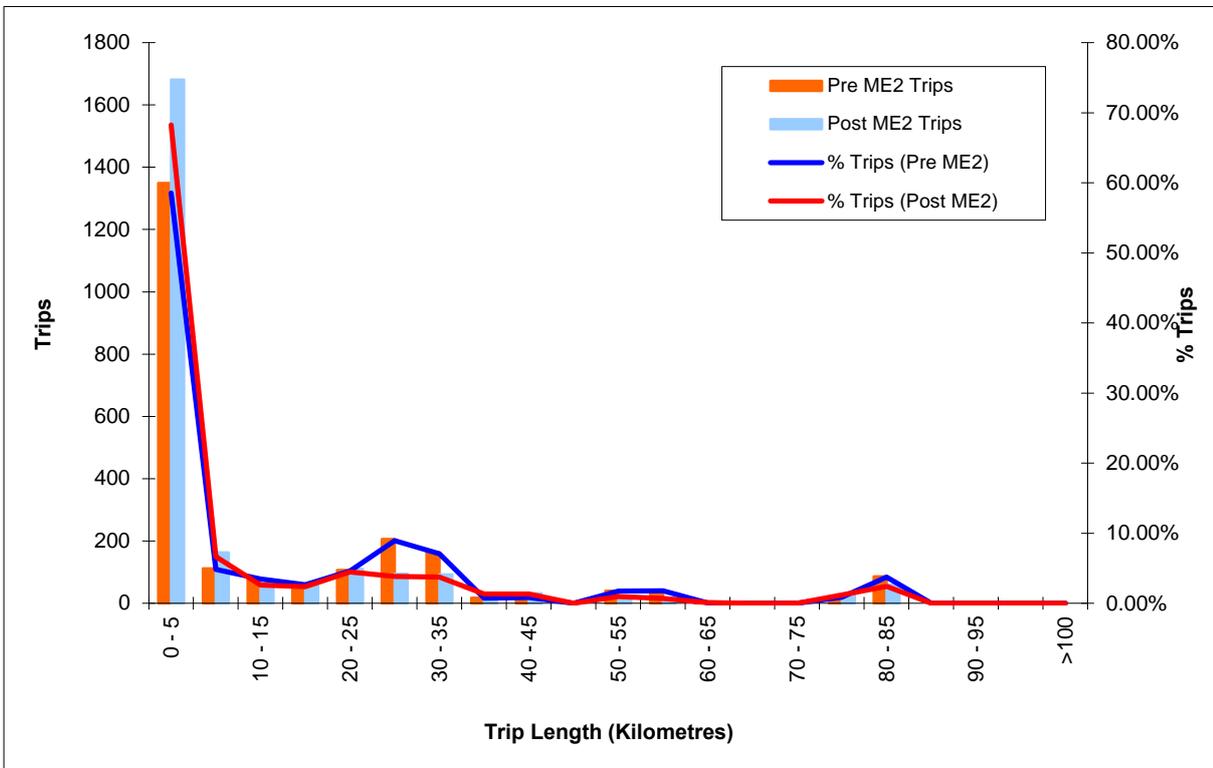
Trip Length Distribution for AM Peak (UC1 Car-HBEB)



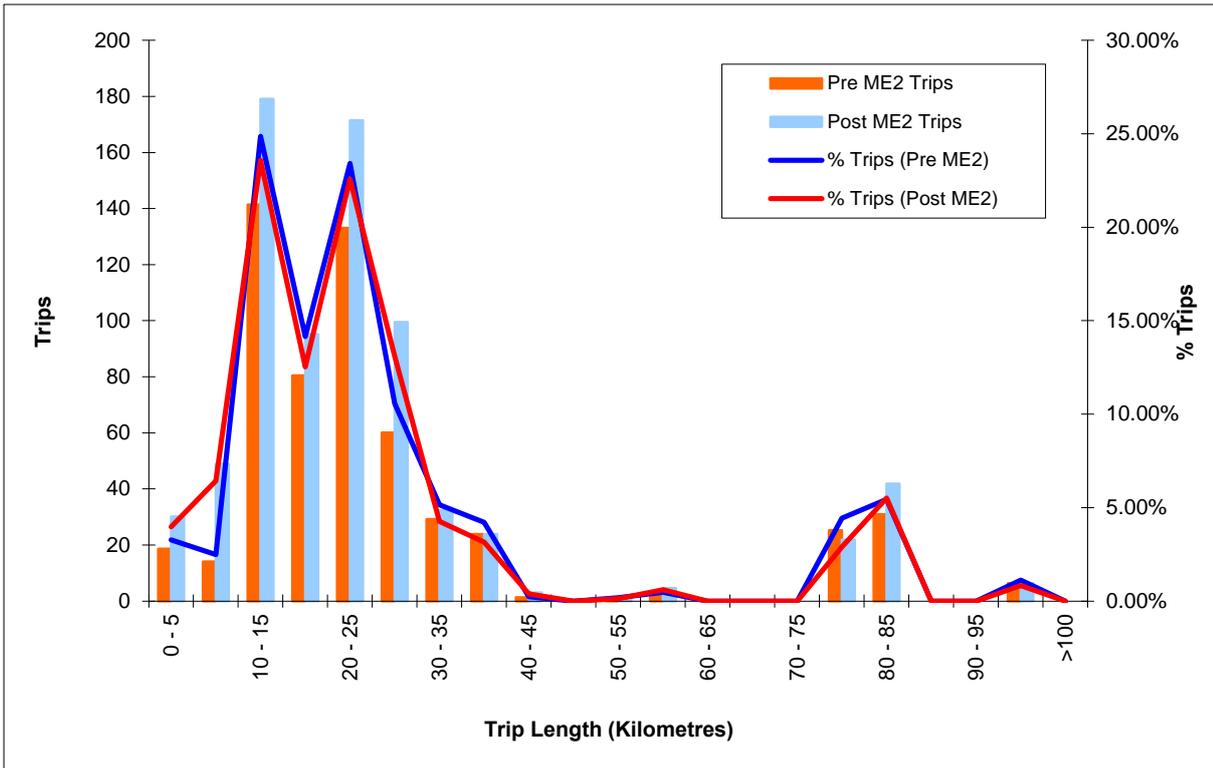
Trip Length Distribution for AM Peak (UC1 Car-HBO)



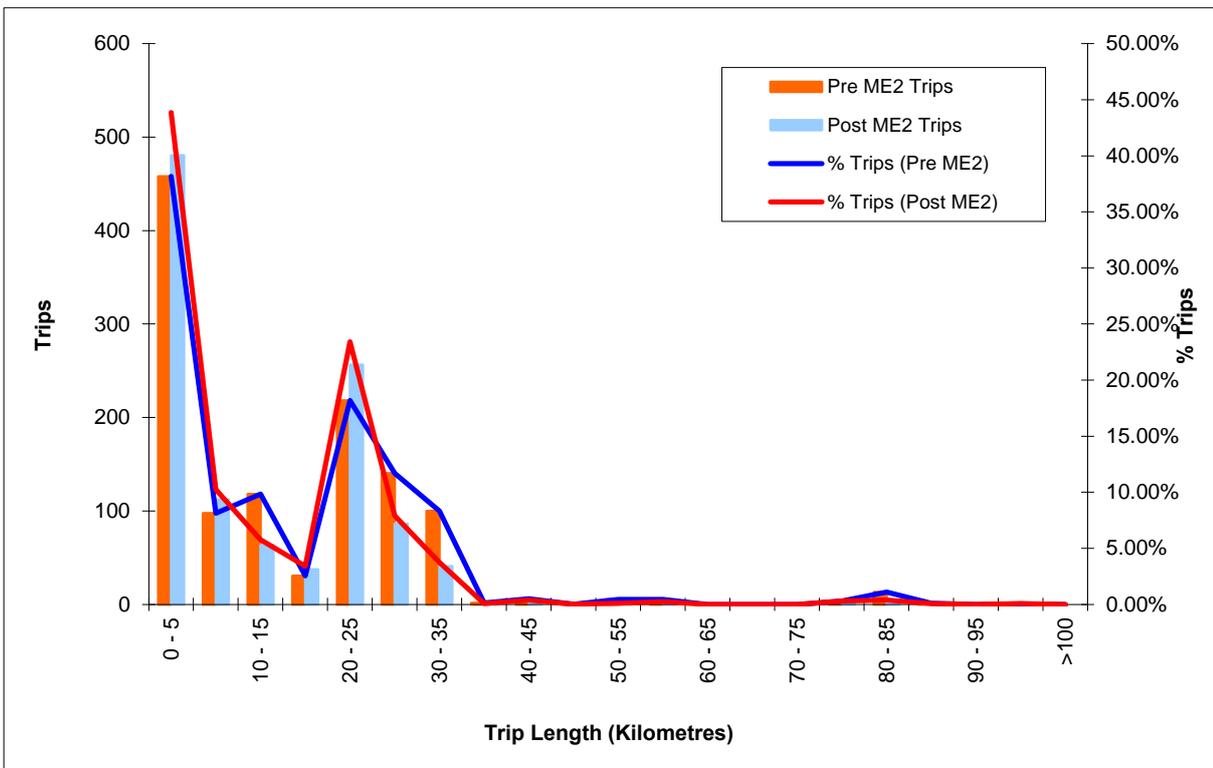
Trip Length Distribution for AM Peak (UC4 LGV)



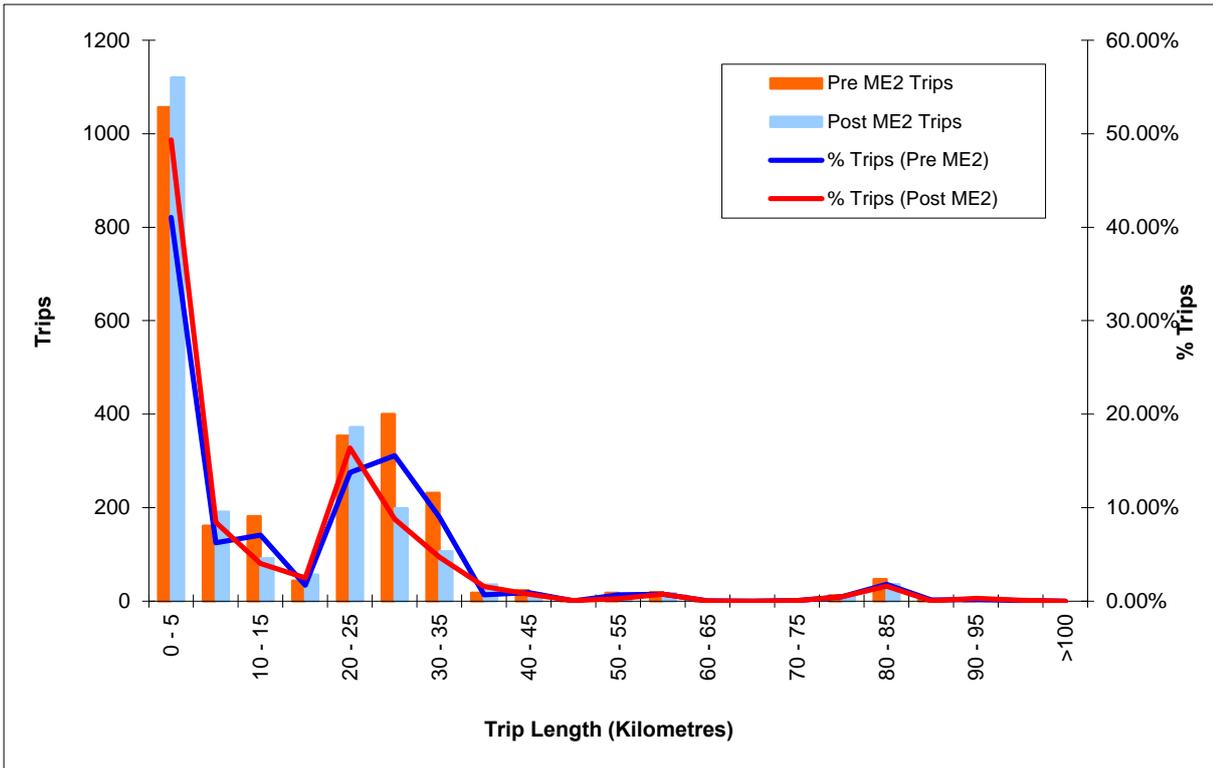
Trip Length Distribution for AM Peak (UC5 HGV)



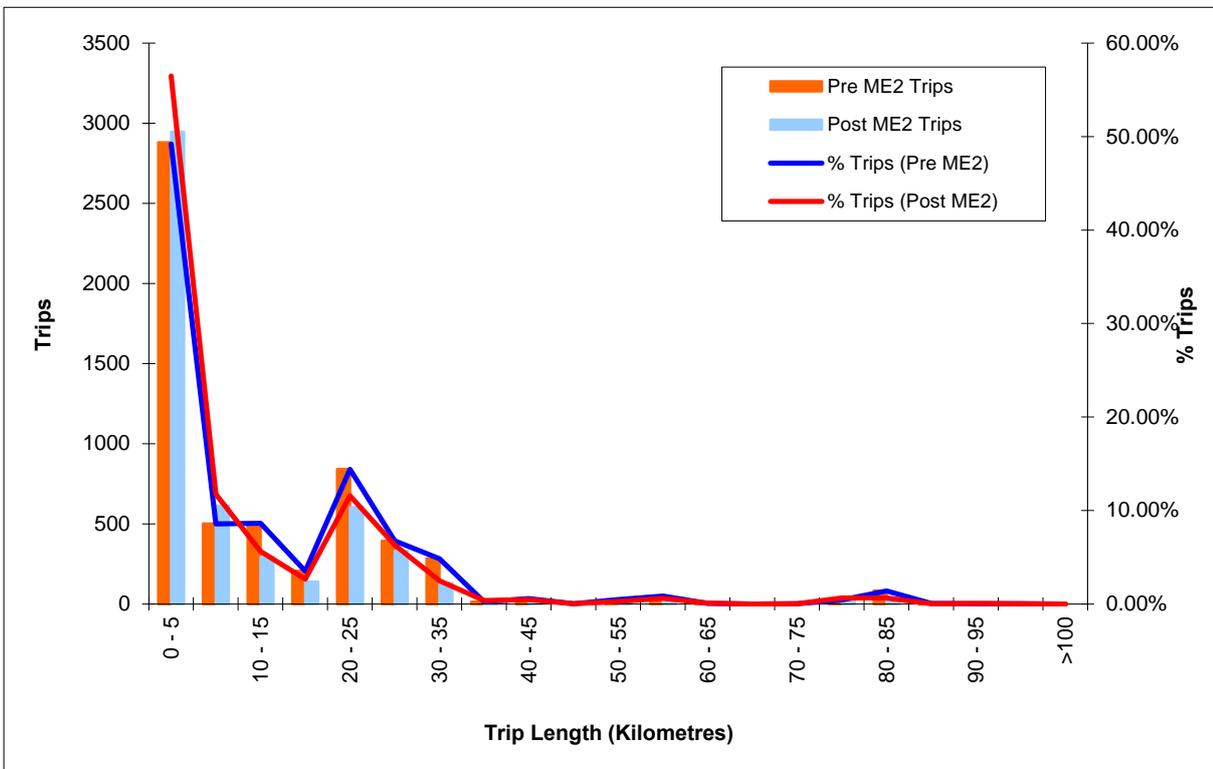
Trip Length Distribution for IP Peak (UC1 Car-HBW)



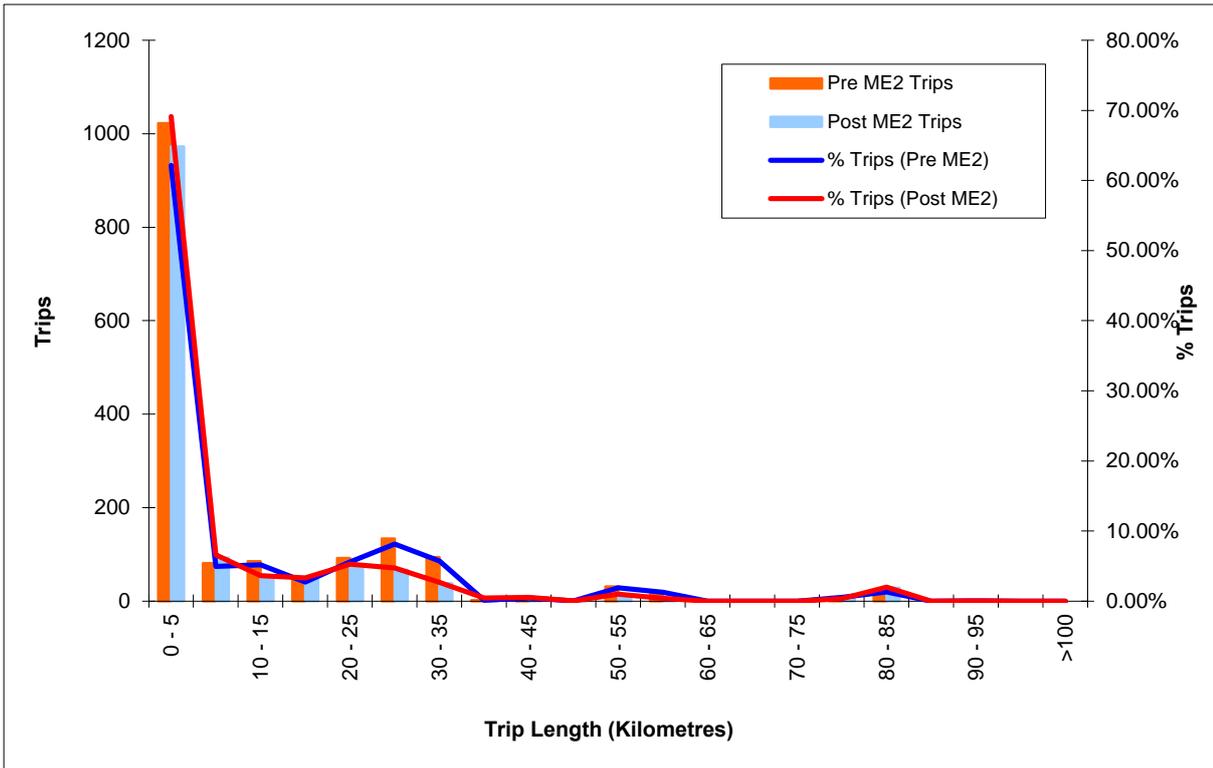
Trip Length Distribution for IP Peak (UC1 Car-HBEB)



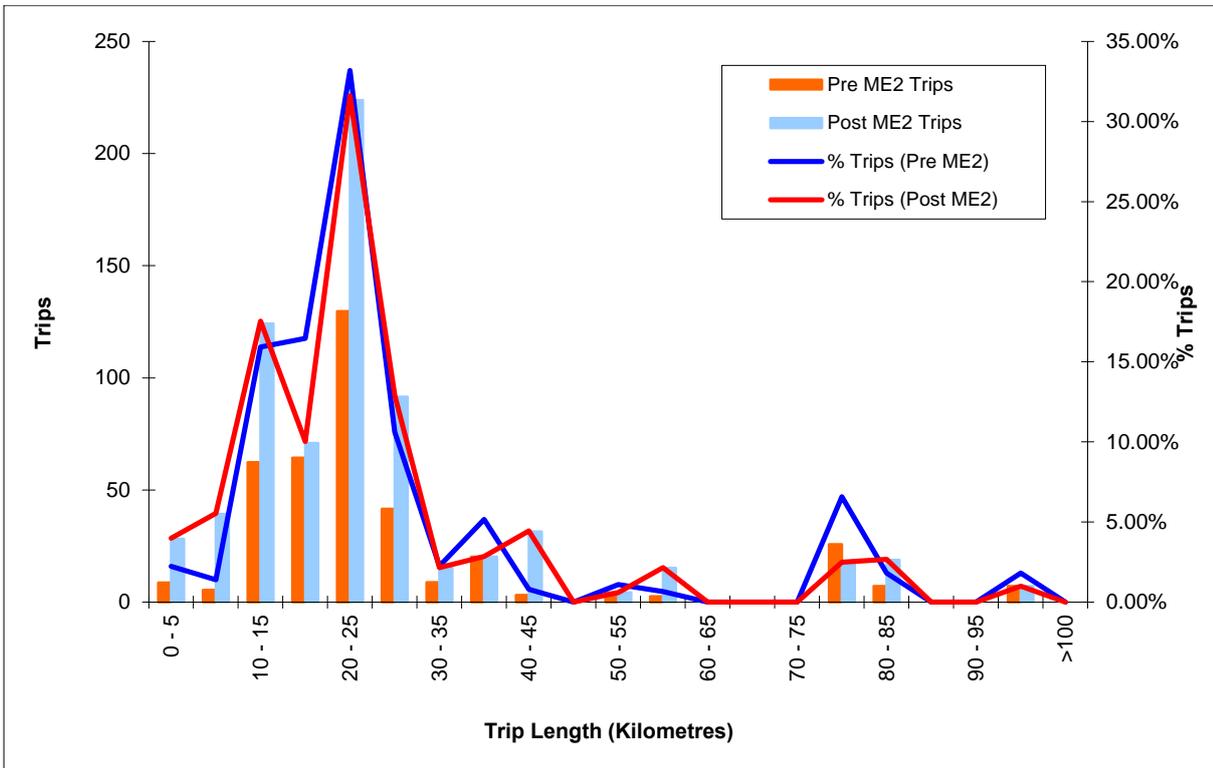
Trip Length Distribution for IP Peak (UC1 Car-HBO)



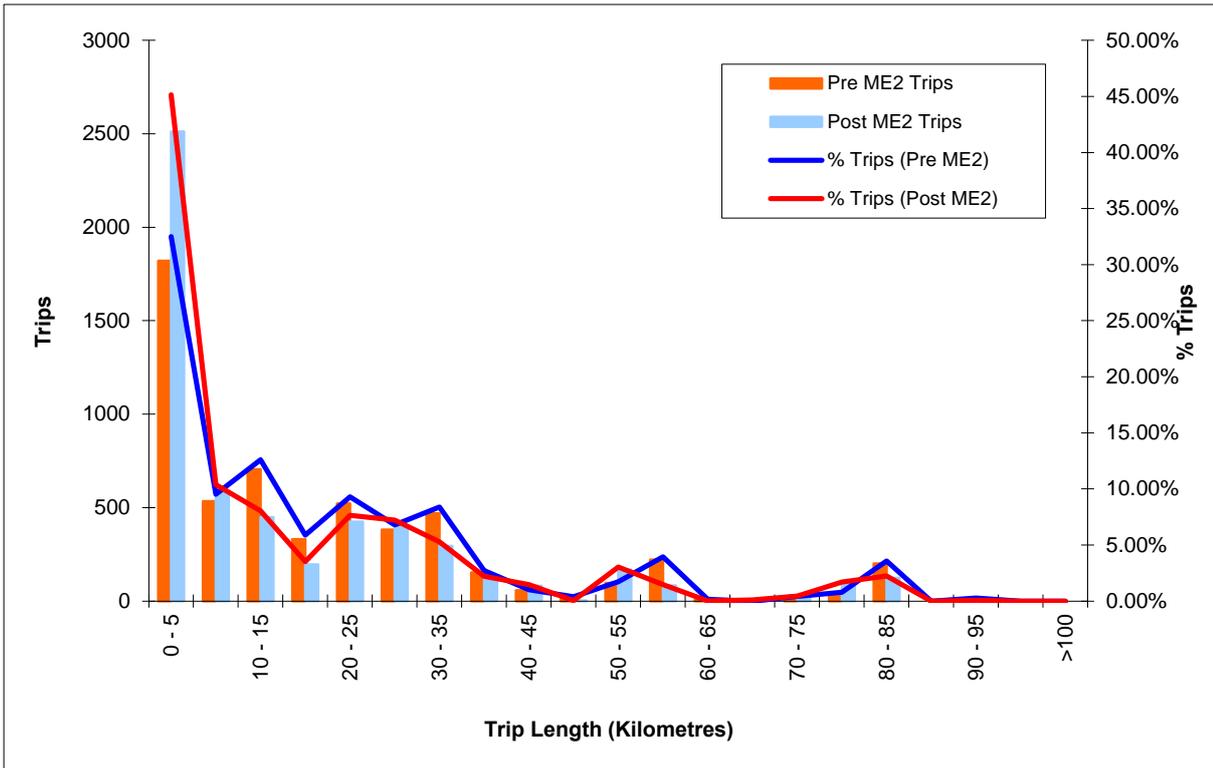
Trip Length Distribution for IP Peak (UC4 LGV)



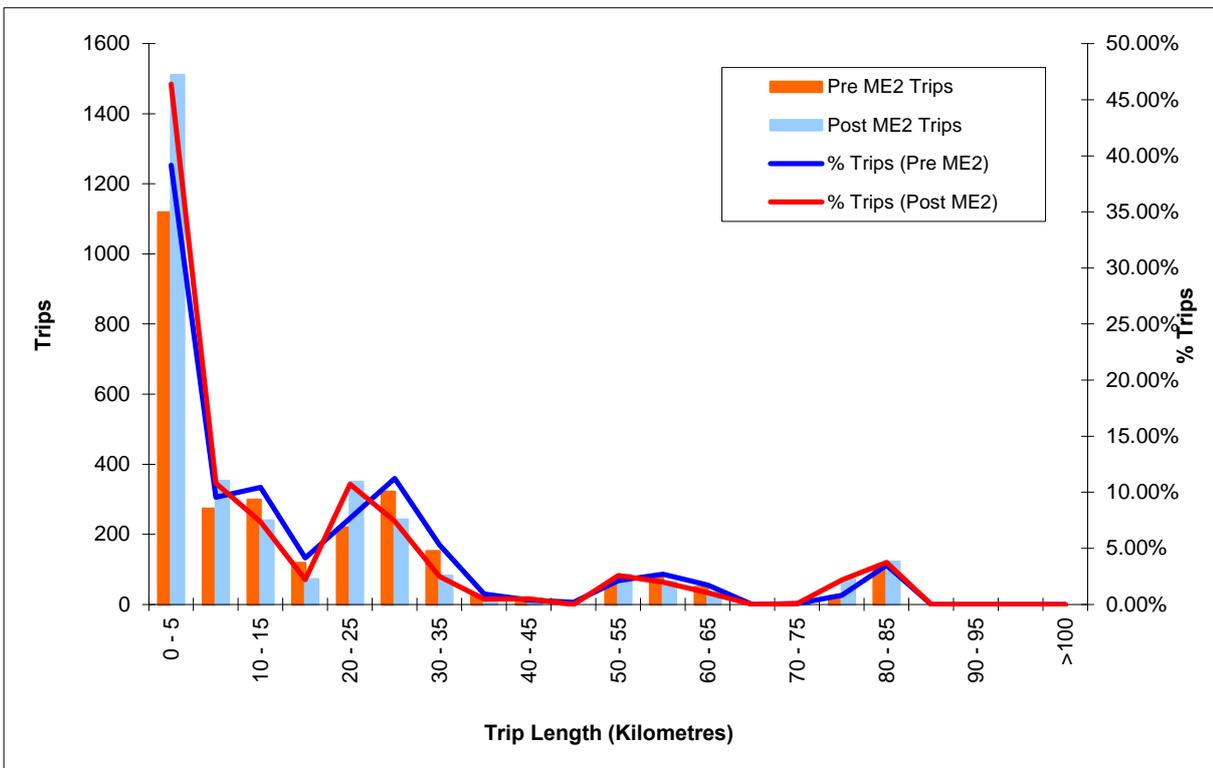
Trip Length Distribution for IP Peak (UC5 HGV)



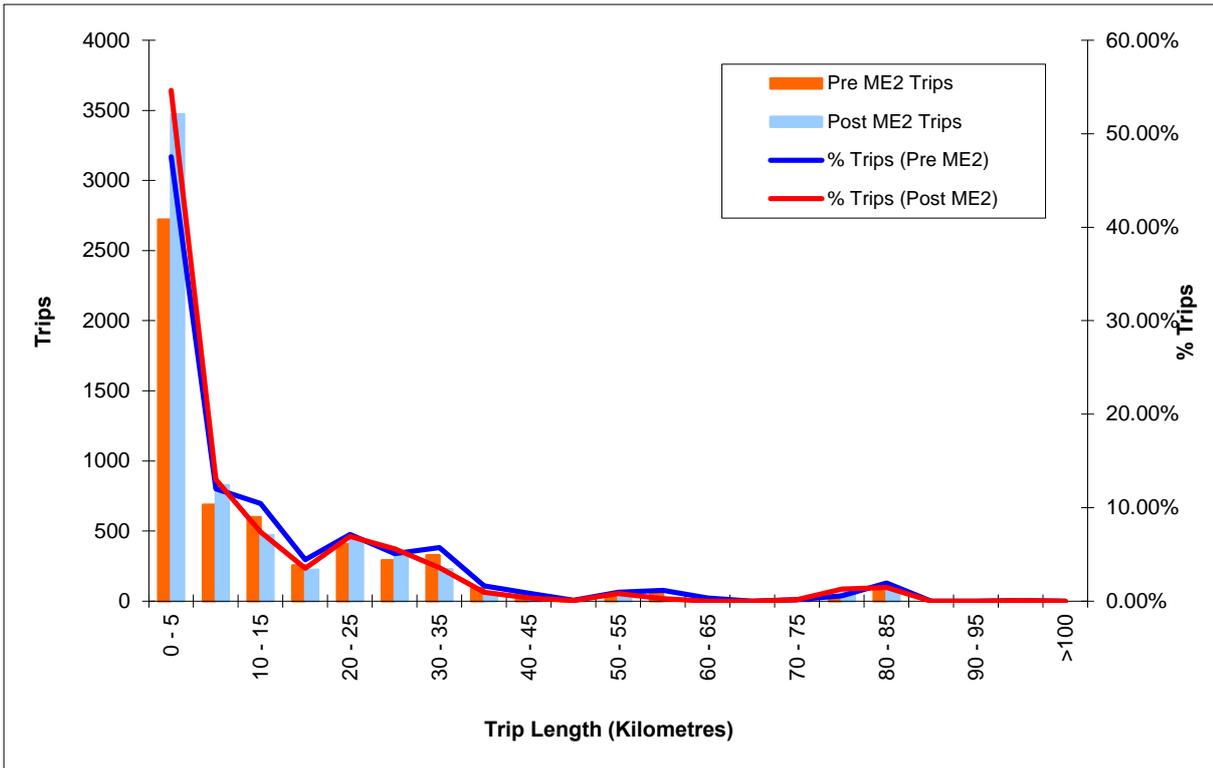
Trip Length Distribution for PM Peak (UC1 Car-HBW)



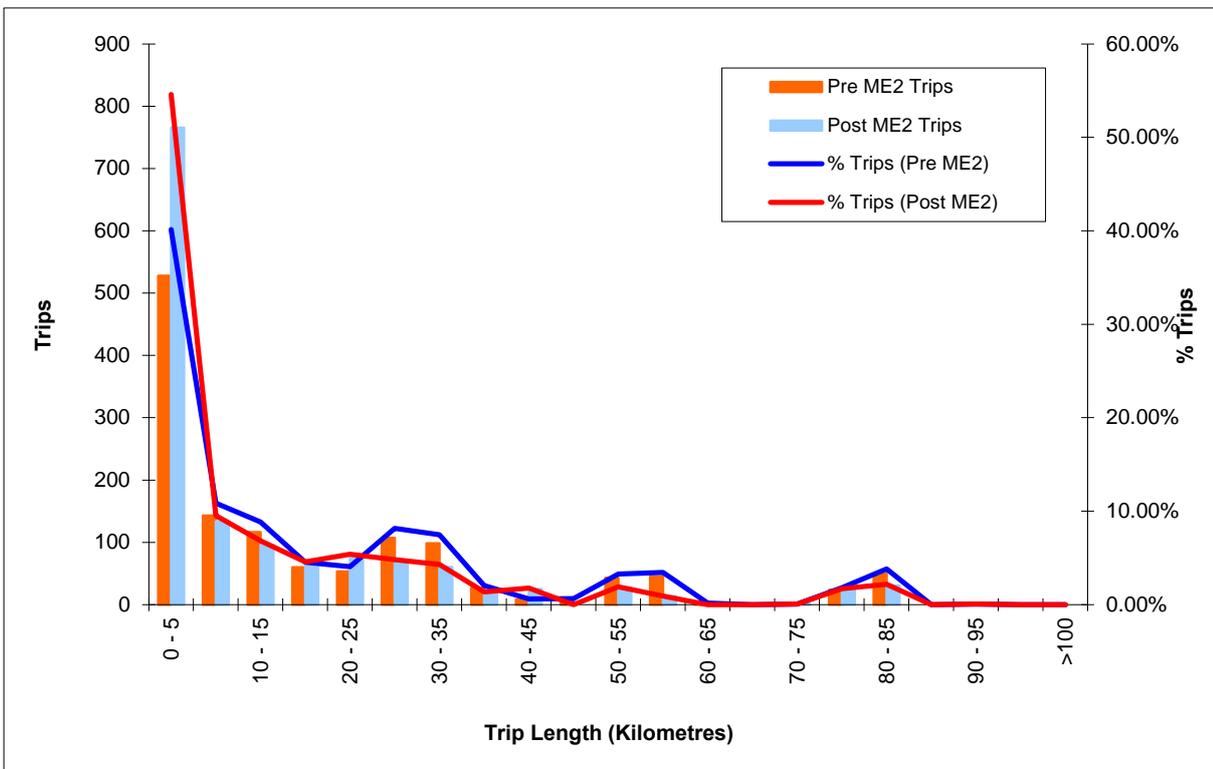
Trip Length Distribution for PM Peak (UC1 Car-HBEB)



Trip Length Distribution for PM Peak (UC1 Car-HBO)



Trip Length Distribution for PM Peak (UC4 LGV)



Trip Length Distribution for PM Peak (UC5 HGV)

