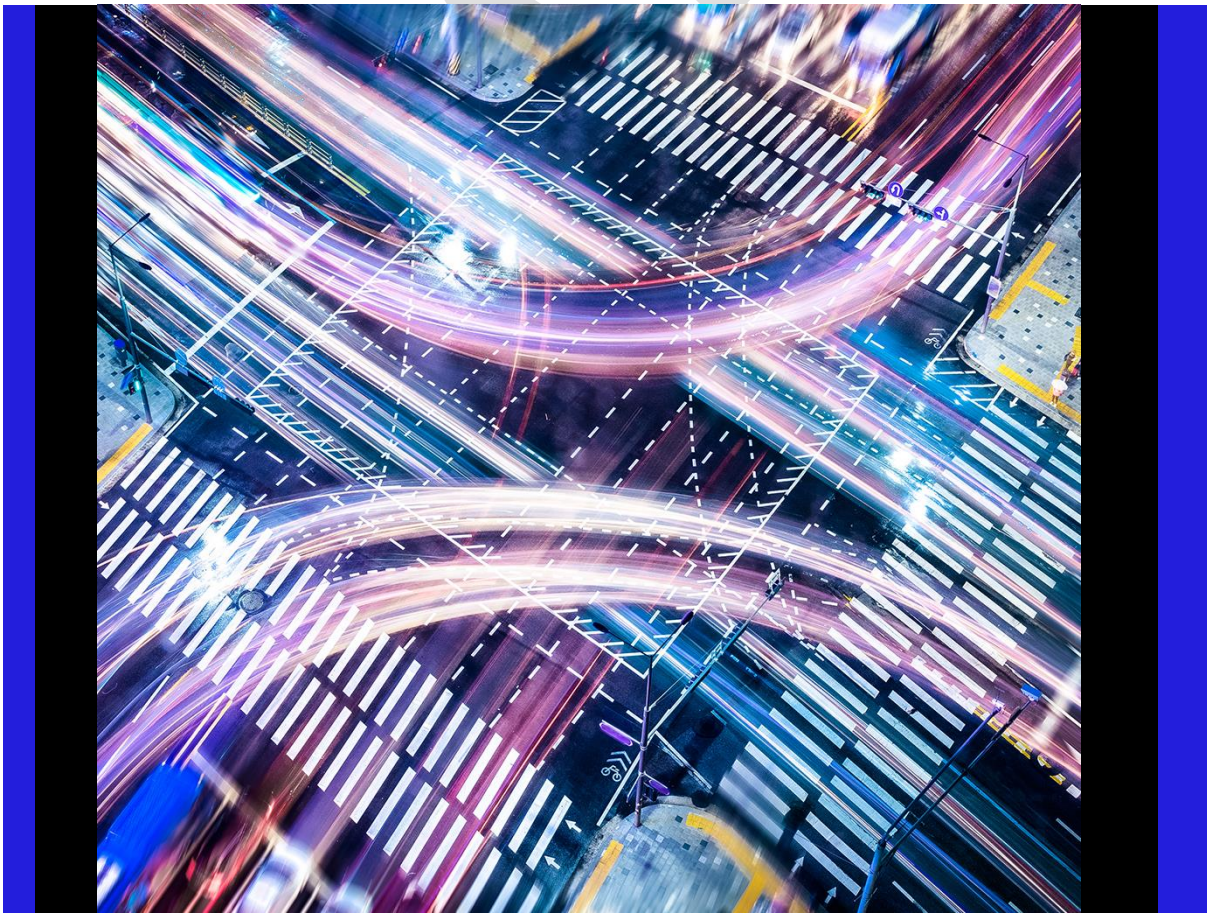
Model Development and Calibration Report

Revision no: 3

Lancashire County Council

Central Lancashire Transport Model Update



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Model Development and Calibration Report

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Project manager:	Sergey Makov		
Revision no:	3	**Prepared by:**	Sabin Karimbil
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Jacobs U.K. Limited

1 City Walk
Leeds, West Yorkshire LS11 9DX
United Kingdom

T +44 (0)113 242 6771
F +44 (0)113 389 1389
www.jacobs.com

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Contents

Appendices

List of Figures

List of Tables

1. Introduction

1.1 Background and Scope

Jacobs have been commissioned by Lancashire County Council (LCC) to upgrade the existing Central Lancashire Highway Traffic Model (CLTM) to a full multi-modal model to support planning and appraisal of sustainable and multi-modal schemes in Central Lancashire.

Building on the discussions with LCC about benefits of a Full Demand Model and in view of the ambitions for implementing sustainable travel in Central Lancashire with a focus on bus priority, the scope of the model upgrade refers to the development of a bus model, recalibrating the Variable Demand Model (VDM) to include Mode Choice between Car, Rail and Bus and transferring the VDM from DIADEM to EMME.

The upgraded model will be used to support Local Plan testing including complementary multi-modal schemes and for the A582 Outline Business Case (OBC), which is currently undergoing changes to become a more multi-modal scheme.

The CLTM was originally calibrated and validated to Autumn 2013 data using 2015 TAG parameters (values of time and vehicle operating costs). In 2018, the model was re-calibrated to 2018 TAG for the purpose of the Preston Western Distributor (PWD) Full Business Case (FBC); nonetheless, the Base Year remained 2013 in the absence of more recent traffic data.

In line with TAG requirements and the feedback received from the Department for Transport (DfT) on the Transforming Cities Fund (TCF) Appraisal Specification Report (July 2019), the CLTM was due for an update since the age of the data used to build the model was reaching six years. For this purpose, a data collection exercise was undertaken to update and re-calibrate the model to Autumn 2019 traffic counts and journey times.

Subsequently, at the request of the DfT as part of the A582 OBC assurance, a Demand Model in Production and Attraction (PA) format was developed to ensure it followed the TAG recommended approach.

The CLTM model was upgraded in 2021 to include a Rail (and Rail Park and Ride) Model in EMME and included mode choice between Rail and Car in DIADEM for the purposes of the Cottam Parkway Station Planning Application.

The updated model consists of the following:

- Highway Assignment Model representing vehicle-based movements across the Lancashire area for a 2019 weekday morning peak hour (08:00-09:00), an average inter-peak hour (10:00-16:00) and an evening peak hour (17:00-18:00);
- Public Transport Assignment Model representing bus and rail-based movements across the same area and time periods to include the Park and Ride sub-mode choice; and,
- Multi-modal incremental VDM that forecasts change in choice of main mode and destination in response to changes in generalised costs.

1.2 Purpose of the Report

This document is an Addendum to the Base Year 2019 Re-Calibration Report and describes the process of the development of the Public Transport (PT) Model. It outlines the model architecture, the data, principles and methods used in model calibration and validation of PT as well as the standards that were achieved.

1.3 Related Documents

This document is accompanied by the following two documents that provide the complete model documentation:

- Traffic Data Collection Report (TDCR) – This report summarises the survey data that was used to re-calibrate the highway model to the 2019 base.
- Base Year 2019 Re-Calibration Report – This report details the data, processes, methodologies and results of the highway model recalibration to 2019 Base Year.

1.4 Report Structure

Following this introduction, the structure of this report is as follows:

- Chapter 2 – Provides an overview of the model, key characteristics, and the design principles.
- Chapter 3 – Summarises the modelling standards and acceptability criteria.
- Chapter 4 – Details the data used for model calibration and validation.
- Chapter 5 – Provides the details of the public transport network development.
- Chapter 6 – Describes the development of the bus trip matrices.
- Chapter 7 – Describes the development of the rail trip matrices.
- Chapter 8 – Documents the bus model calibration and validation.
- Chapter 9 – Documents the rail model calibration and validation.
- Chapter 10 – Documents the highway model validation results.
- Chapter 11 – Details the development and validation of the Variable Demand Model.
- Chapter 12 – Provides a summary of the model and its fitness for purpose.

2. Model Description and Specification

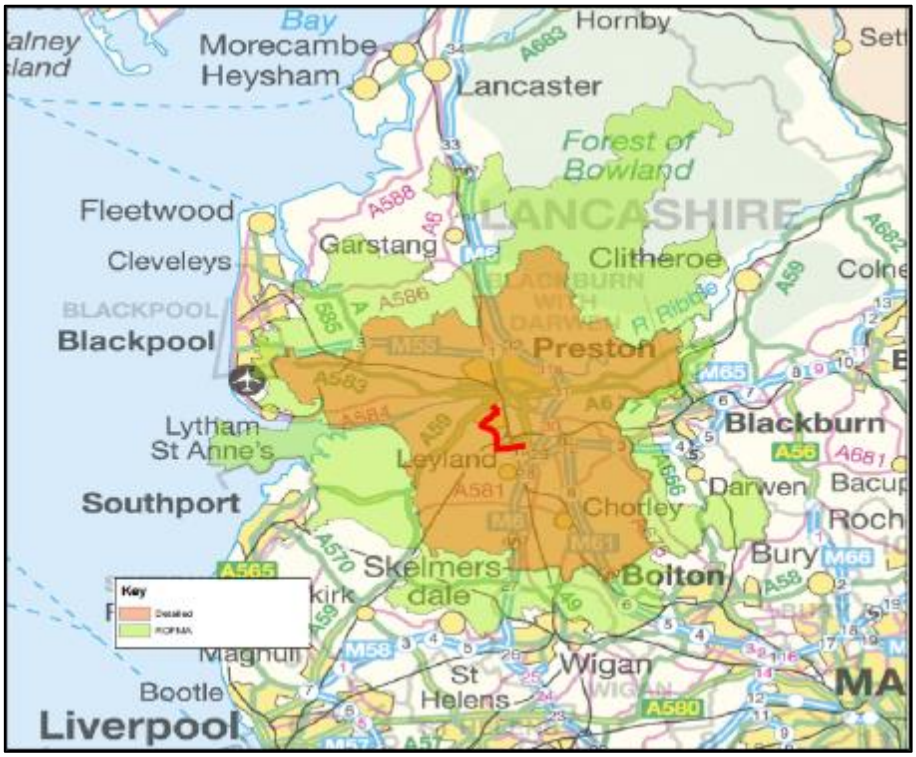
2.1 Modelled Area

The geographical scope and the network of the updated CLTM model are generally consistent with the previous version of the model.

The primary use of the updated model will be the appraisal of the A582 dualling scheme along with planning and supporting assessment of other future transport schemes in and around Preston. Therefore, the geographical scope of the model network and specifically the detailed/simulation area should cover areas of impacts of those schemes.

Figure 2.1 shows the extent of the fully modelled area along with the location of A582 scheme highlighted in red (the rest of Great Britain is classed as the external area).

Figure 2.1 CLTM Fully Modelled Area



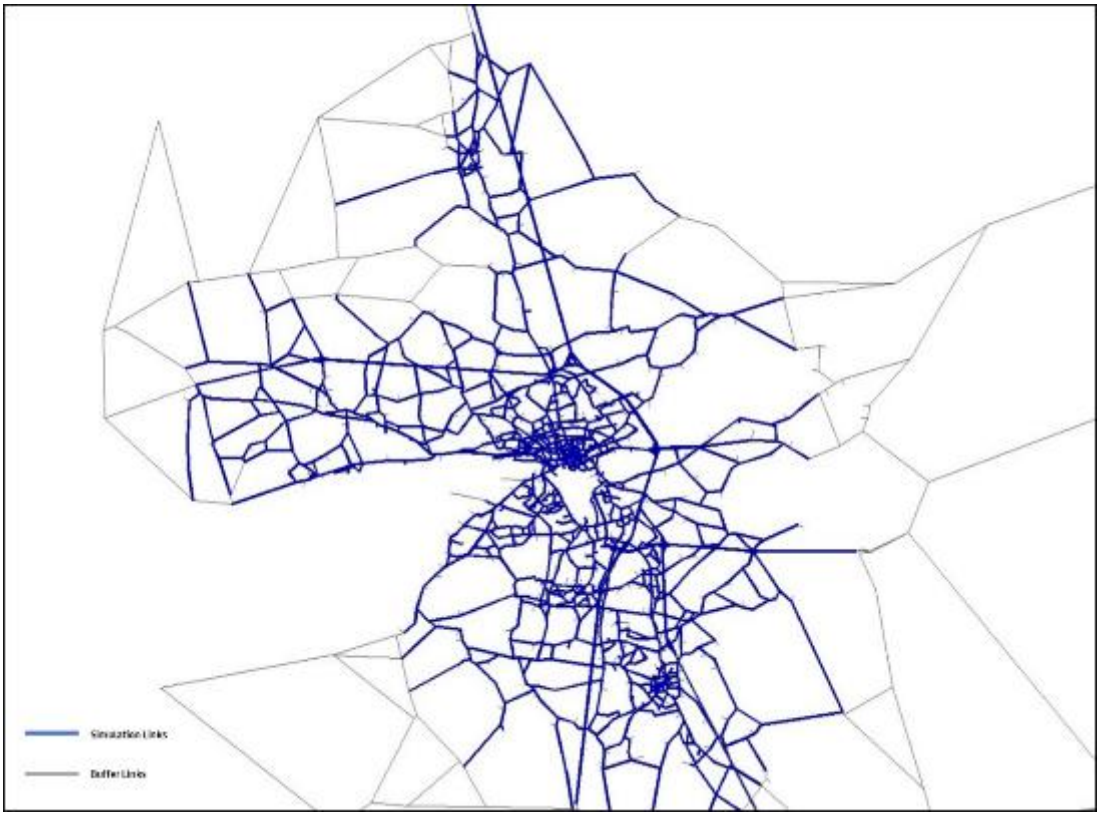
Consistent with the previous version of the model, the modelled area makes use of a three-stage structure with levels of detail of network coding reducing away from the centre of the study area. The breakdown of the modelled area is outlined below:

- Fully modelled area:
  - Area of detailed modelling (AoDM) – highest detail
  - Rest of fully modelled area (ROFMA) – reduced network coverage but variable travel times enabled
  - External Area – lowest network coverage and fixed speeds used

The fully modelled area in the updated model was extended further east to include Samlesbury and south near Tarleton to account for any future aspirational interventions in these areas. Figure 2.2 shows the simulation and buffer network coded in the SATURN model.

The process of using the SATURN highway network to develop the public transport models is discussed further in Chapter 5.

Figure 2.2 CLTM Modelled Network



Outside of the detailed modelled area, typically Motorways, A and B Roads have been modelled, to reflect the more spatially aggregated nature of the zoning system. As these areas are further away from the study area, it is only necessary to have enough detail to ensure that the trips from these areas entering the study area are captured at the appropriate locations. Figure 2.3 shows the entire CLTM model network, covering trip distances, costs and public transport services across the whole of Britain, including the external modelled area. Figure 2.4 and Figure 2.5 then present bus services and rail lines coded in CLTM with the thickness of lines in Figure 2.5 representing the number of bus or rail services on that line. Bus stops or rail stations are represented by red points in Figure 2.4 and Figure 2.5.

Figure 2.3 CLTM Full Network

Figure 2.4 CLTM Bus Services

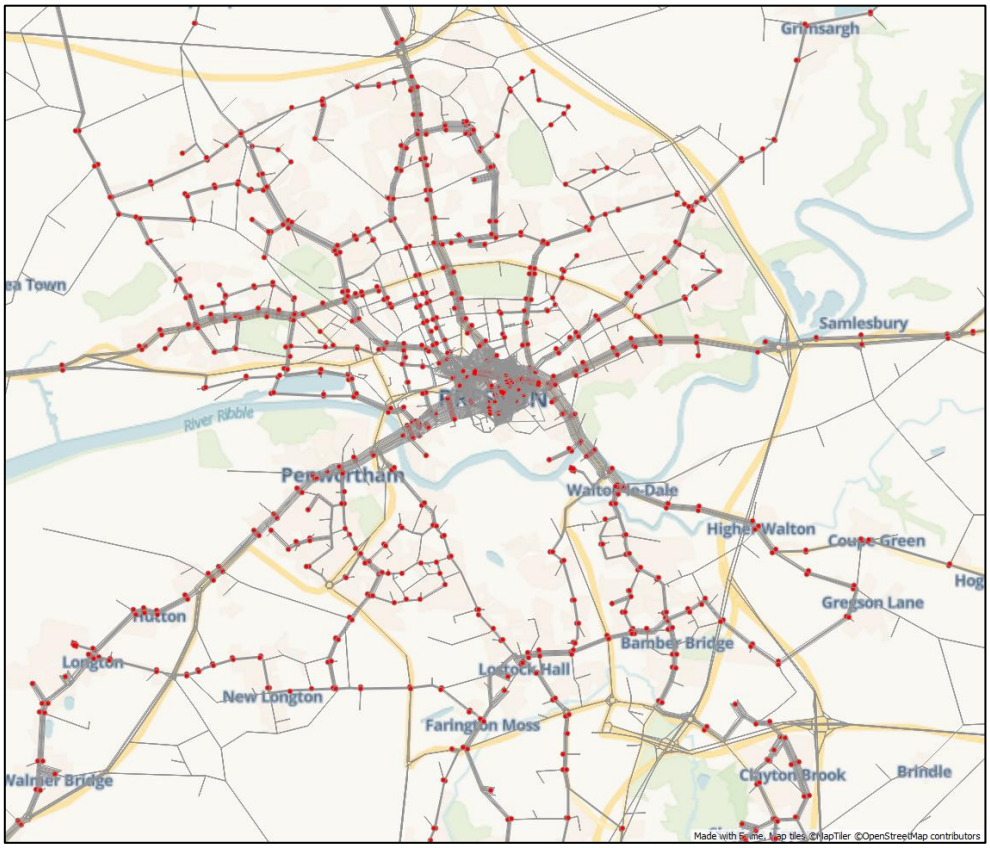
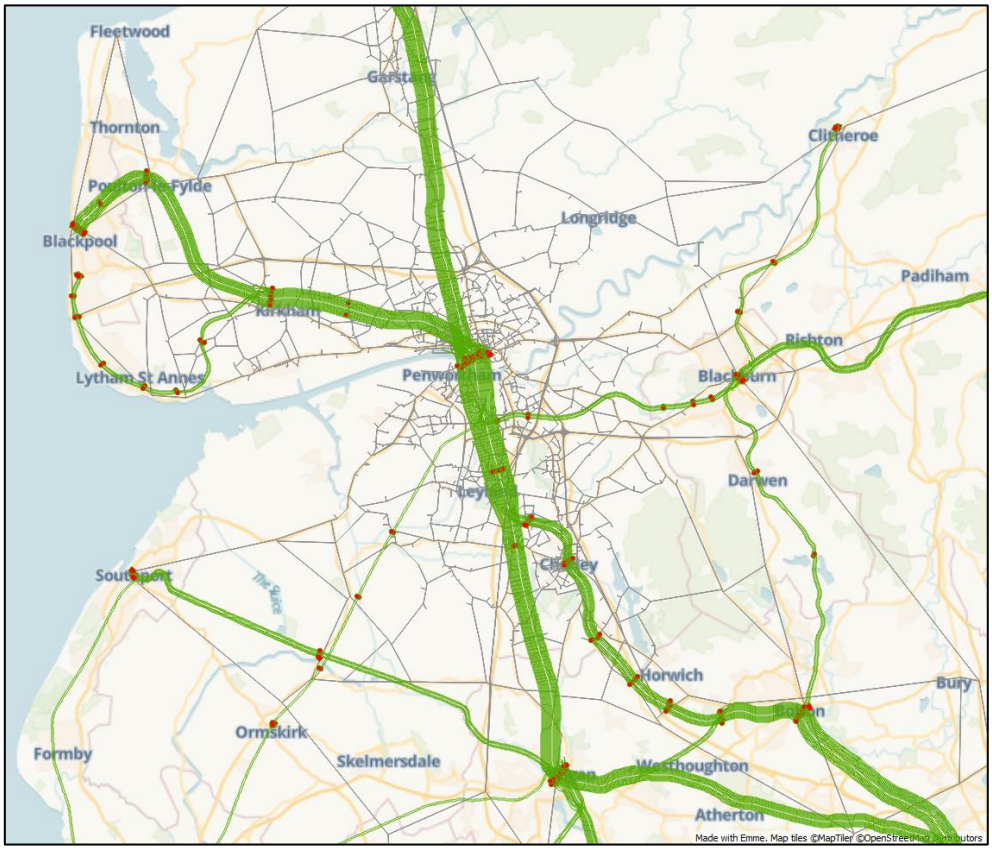


Figure 2.5 CLTM Rail Lines



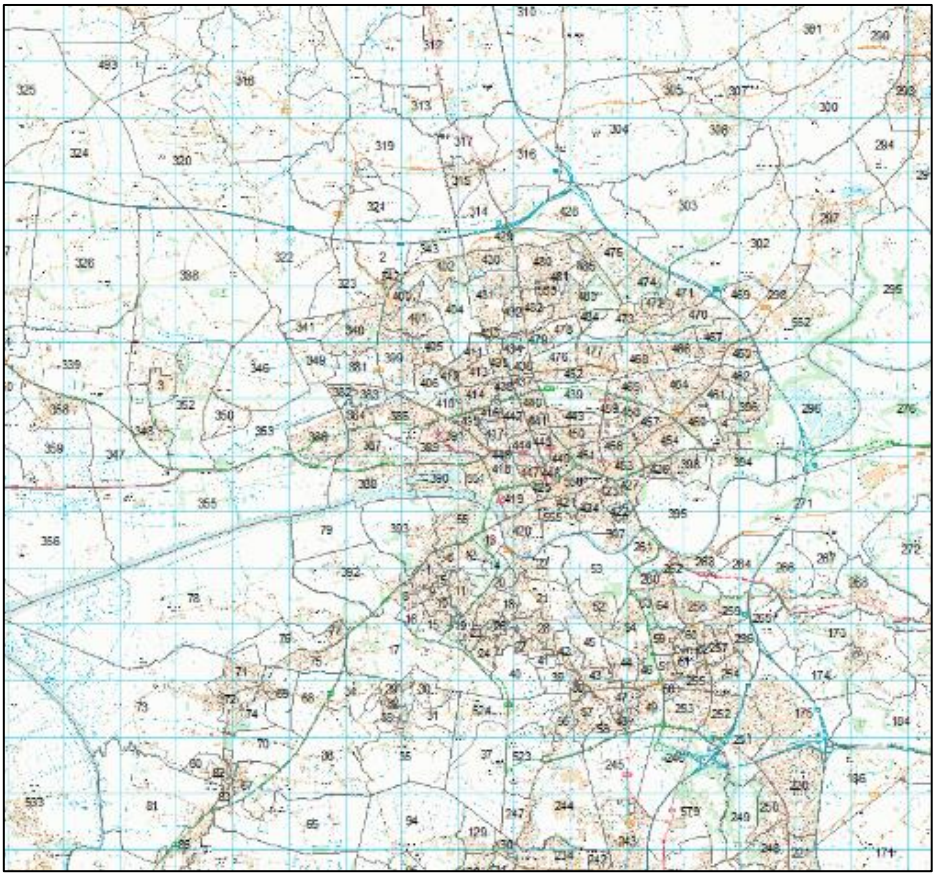
2.2 Zoning System and Centroid Connectors

The original model zone system built from Census Output Areas (COA) has been preserved in the updated model and comprises a total of 579 zones (including 17 spare zones).

Within the detailed model study area (illustrated in Figure 2.6) the zones were comprised of COAs or aggregations thereof. In some instances, zones were based on a disaggregation of COAs in order to isolate individual pockets of land (for example, to separate large industrial land uses from residential uses). The area approximately covered by the Preston City Council boundary was zoned in this way.

Areas further away from the study area, where less spatial detail was required, were based on Middle Layer Super Output Area (MSOA) or district boundaries. In the area immediately surrounding the study area these were mostly comprised of single MSOA. Beyond that point, in the external area of the model, several district zones were aggregated to comprise the modelled zone.

Figure 2.6 Zone System Surrounding Preston



A small number of changes to the zoning system were required in the centre of Preston as part of the model update. They aimed to improve accuracy of demand loading onto the network and either consisted in splitting a zone or adding additional zone connectors.

2.3 Zone Sectoring

For ease of analysis and understanding of the trip making patterns, the zoning system is grouped together into sectors. As with the zoning system itself, the sectors are more refined within the detailed modelled area, becoming coarser further out from the detailed area. The 34 sectors were created taking into account the model screen lines and sector-to-sector movements to, from and within the A582 scheme impact area.

This sector system is shown in Figure 2.7 and Figure 2.8. Table 2.1 includes a further description of the sectors.

Figure 2.7 CLTM Sectors

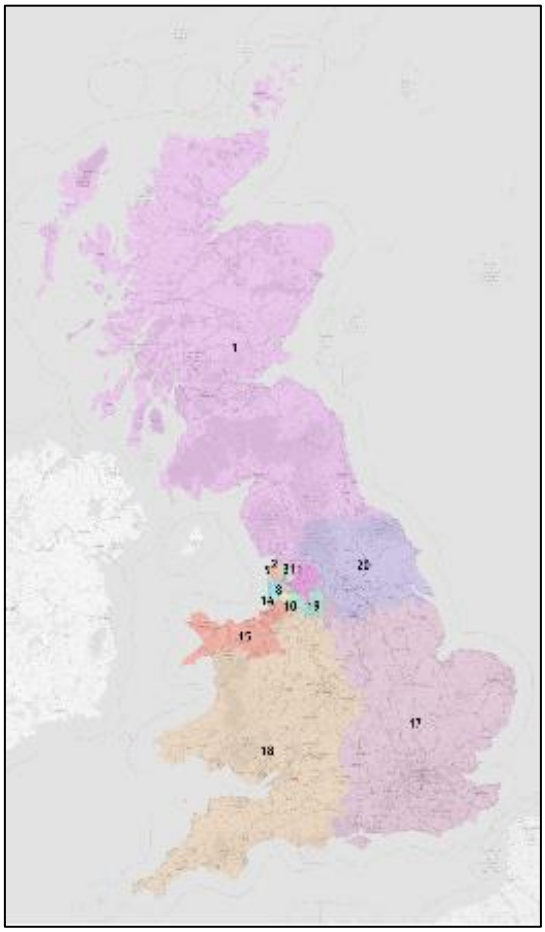


Figure 2.8 CLTM Sectors - Zoomed In

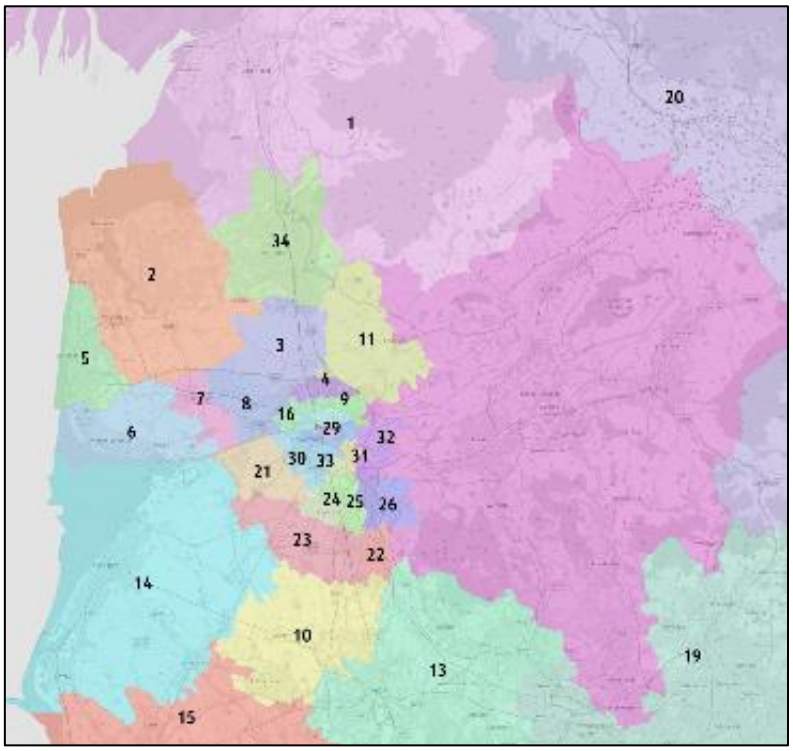


Table 2.1 Sector Description

Sector	Sector Name
1	North of Model
2	North West of Model - Poulton, Fleetwood etc
3	North Outer Screenline
4	North Preston
5	Blackpool
6	West of Model
7	Western Outer Screenline
8	North West Preston
9	Inner North Preston - North East
10	South of Model - Skelmersdale etc
11	North East Outer Screenline
12	East of Model - Blackburn etc
13	South East of Model - Wigan, Bolton etc
14	South West of Model
15	Northern Wales & Merseyside
16	Inner North Preston - North West
17	London, South East, East England & East Midlands
18	South West, West Midlands & Wales
19	Manchester
20	Yorkshire
21	Hutton
22	Chorley
23	South Outer Screenline
24	Leyland
25	East of Leyland
26	South East Preston
27	Inner South Preston
28	Preston City Centre
29	Inner North Preston - North
30	Penwortham and Lostock Hall
31	Bamber Bridge
32	Outer Eastern Screenline
33	Tardy Gate
34	Garstang

For the bus assignment model a different sector definition was used to better align with the data provided by bus operators. This data is outlined in Section 4.3.1, with the sectors presented in Section 4.3.1.4.

2.4 Key Model Components

2.4.1 Modelled Hours

The three modelled hours used in the previous model update (am peak hour, pm peak hour and average interpeak hour) were reconfirmed using the traffic counts collected for the project. More detail on the analysis of peak flows can be found in TDCR Section 5.1 (Jacobs, February 2020).

The modelled hours in the model are therefore:

- AM peak hour (08:00 – 09:00)
- PM peak hour (17:00 – 18:00)
- Average hour in the interpeak/IP (10:00 – 16:00)

The peak hour to peak period factors for the highway assignment were derived using 2019 ATC data at the RSI locations. Traffic counts at RSI screen line were used as they best represent the traffic flows for the study area. Average of two-week ATC bi-directional traffic flows were summed for each of the peak periods and were divided by the total flows for the identified peak hour to estimate the factor.

Bus modelled hour factors were derived from the bus operator data described in Section 4.3. For this purpose, total modelled hour boardings across the study area were extracted and divided by the total boardings in the corresponding time period and adjusted during model calibration to better match the initial synthetic demand matrices to observed travel patterns.

Rail peak hour factors were derived from National Travel Survey (NTS) and are summarised in Table 2.2 below.

The relationship between peak hour and peak period derived from analysis of observed daily traffic flow profiles and census data in the modelled area are as follows:

Table 2.2 Peak Hour to Peak Period Factor

Peak Period	Car Factor	Bus Factor	Rail Factor
AM (07:00 – 10:00)	2.668	2.5725	2.43
IP (10:00 – 16:00)	6.000	6.0000	5.99
PM (16:00 – 19:00)	2.776	2.8837	3.01

2.4.2 User Classes

Following the approach adopted in the original model, the updated CLTM model segregates trips by vehicle type and trip purpose. Different levels of segregation are used at different points of the model building process, as summarised in Table 2.3.

Table 2.3 Purpose/User Class/Vehicle Class Correspondence

Trip Purpose ID	Purpose	User Class (UC)	Vehicle Class (VC)	PCU Factor
1	Home Based Work (HBW)	UC1	VC1	1.0
2	Home Based Employer's Business (HBEB)	UC2		
3	Non-Home Based Employer's Business (NHBEB)			
4	Home Based Education (HBED)	UC3		
5	Home Based Shopping (HBS)			
6	Home Based Other (HBO)			
7	Non-Home Based Other (NHBO)			
8	LGV	UC4	VC2	1.0
9	HGV	UC5	VC3	2.0

These trip purpose and user class splits are consistent with the guidance contained in TAG Unit M3.1 and allow differing vehicle operating costs and values of time to be applied.

2.4.3 Software Packages

The previous version of the highway assignment model was developed using SATURN V11.3.12W and the updated model uses the latest release of SATURN at the time of model calibration – version 11.4.07H (August 2018). The bus and rail assignment model uses EMME version 4.5.0.

The variable demand model was set up in EMME version 4.5.0 with a semi-automated EXCEL VBA front-end.

2.4.4 Base Year

The updated model has been developed with a base year of 2019 with all observed data based on data collection undertaken in November 2019, which as per TAG Unit M1.2 represents neutral month.

The bus operator and bus occupancy data are from October 2019 and the rail Mobile network data (MND data) was collected over a continuous period of 1 month for March 2019.

2.5 Summary of Key Model Components

Table 2.4 provides the summary of key model components used in the updated 2019 CLTM.

Table 2.4 Key Model Components

Characteristic	Model Approach
Model Type	Multi-modal assignment and variable demand model
Software Packages	Highway Assignment – SATURN version 11.4.07H Bus Assignment – EMME 4.5.0 Rail Assignment – Variable Demand Model –
Base Year	2019
Time Periods	AM peak hour (08:00-09:00) Interpeak (average hour 10:00-16:00) PM peak hour (17:00-18:00)
User Classes	Car, PT – Commute Car, PT – Business Car, PT – Other LGV HGV
Zone System	579 zones (including 17 spare zones)
Assignment Methodology	Highway Assignment – SATURN Wardrop Equilibrium. Public Transport Assignment – Frequency based transit assignment, based on Optimal Strategies.
Capacity Restraint Mechanism	Highway Assignment – Capacity Index function on links, defined capacity at junctions, fixed speed buffer network Bus Assignment – None Rail Assignment – None
Variable Demand Model	P-A based VDM using EMME

2.6 Generalised Cost Formulations and Parameter Values

2.6.1 Highway Model

Within the SATURN assignment two parameters are defined for each user class to calculate generalised cost: value of time; and vehicle operating cost. Journey times, distances and any tolls included in the model are then combined into a standard unit of generalised time based on these two parameters.

The values of time (VOT) used in the present year model were taken from the latest available TAG data book (May 2019, v1.12) at the time of model development. The values are provided in Table 2.5.

Calculations were undertaken using perceived values of time and distance (i.e. with VAT for non-business and without VAT for business trips), and as per guidance and processes advised by both TAG and Highways England TPG, using Highways England's VOT/VOC calculation worksheet.

When calculating the Vehicle operating cost (VOC), the average speeds for each user class and each time period were taken from the previously validated CLHTM model (see Table 2.6).

In line with TAG unit M3.1, the HGV VOT were doubled to better take into account the driver's and employer's VOT.

Table 2.5 Generalised Cost Parameters for 2019 in 2010 prices

Vehicle Type	Trip Purpose	Time Period	Value of Time / PPM (p/min)	Vehicle Operating Cost / PPK (p/km)
Car	Commute	AM	20.79	5.75
	Business		31.02	12.08
	Other		14.35	5.75
LGV	Business		21.92	13.84
HGV	Business		44.51	35.69
Car	Commute	IP	21.14	5.67
	Business		31.78	11.89
	Other		15.29	5.67
LGV	Business		21.92	13.76
HGV	Business		44.51	35.69
Car	Commute	PM	20.87	5.81
	Business		31.46	12.22
	Other		15.03	5.81
LGV	Business		21.92	13.91
HGV	Business		44.51	35.69

Table 2.6 Average Speeds

Vehicle Type	Time Period	Average Speed (km/h)
Car	AM	57
LGV		57
HGV		78
Car	IP	60
LGV		60
HGV		78

Car	PM	55
LGV		55
HGV		78

2.6.2 Public Transport Models

Within the public transport models the generalised costs (GCs) are calculated in terms of generalised minutes using the PT model time and distance skims as described below.

$$PTGeneralisedCost_{minutes} = W1 * Walktime + W2 * WaitTime + W3 * Invehicle\ Time + BoadingPenalty$$

Each component can be given its own weight or coefficient in order to convert them to common units and to ensure that the relative importance of each component for passengers is reflected. The components are:

- In-vehicle time.
- Wait time (time spent waiting for services).
- Walk time (time spent walking on-street, PT and zone access and egress).
- Boarding penalty (penalty associate with inconvenience of interchanging.

The parameter weightings used in the bus and rail assignment model are specified in Table 2.7.

Table 2.7 Waiting Time Weights and Boarding Penalty Factors

Mode	Walk time weight (W1)	Waiting time weight (W2)	Boarding time penalty
Bus	2.0	2.0	5.0
Rail	1.5	2.0	10.0

The boarding penalty was defined at a node level and set to 5 for bus and 10 for rail during the calibration process to better represent the inconvenience of transfer and to minimise an excessive/unnecessary number of transfers in places with a high transit frequency such as major roads or transit corridors.

3. Model Standards

3.1 Introduction

The criteria used for calibration and validation for the model, and convergence standards applied to check the stability of the assignment results are based on the guidance set out in TAG Unit M3.1 for the highway model, and TAG Unit 3.2 for the public transport models.

3.2 Highway Assignment

The guidance set out in TAG Unit M3.1 is set out in the following sections.

3.2.1 Validation Criteria and Acceptability Guidelines

The validation of the highway assignment has been quantified using the following measures taken from TAG Unit M3.1 paragraph 3.2.3:

- Assigned flows and counts totalled for each screenline or cordon, as a check on the quality of the trip matrices;
- Assigned flows and counts on individual links as a check on the quality of the assignment; and
- Modelled and observed journey times along routes, as a check on the quality of the network and the assignment.

3.2.1.1 Screenlines

Base matrix validation is defined as the differences between modelled and observed flows along screenlines within the model, the criteria to meet is set out in Table 3.1.

Table 3.1 Screenline Flow Validation Criterion

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

TAG specifies the following, within Unit M3.1 paragraph 3.2.6:

- Screenlines should normally consist of five or more links;
- The comparison of modelled and observed flows for screenlines containing high flow routes (such as motorways) should be presented both with and without such routes;
- The comparison should be presented separately for:
  - Roadside interview screenlines;
  - Other screenlines used as constraints in matrix estimation; and
  - Screenlines used as independent validation.
- The comparison should be presented by vehicle type.

It should be noted here that given a relatively small focus area, it was not always possible to create screenlines consisting of more than five links. This is also in part due to the rural nature of some areas outside Preston and a limited route choice, whilst also making best use of the data that was available.

The GEH value, defined in Section 3.2.1.2, has also been used to assess screenline performance. This is deemed prudent when percentage differences on short or low-flow screenlines, particularly for LGV and HGV, are above 5%.

3.2.1.2 Link Based Calibration and Validation

In addition to validation of total screenline flows, TAG Unit M3.1 also contains guidance on the validation criteria for individual links or turning movements.

These criteria are detailed in Table 3.2 and include reference to the GEH statistic measuring the difference between modelled and observed flows. The GEH statistic is of the form:

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

Where M is the modelled flow and C is the observed count.

Table 3.2 Link Flow and Turning Movement Validation Criteria

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

According to TAG Unit M3.1 paragraph 3.2.9 the above comparison of modelled and observed flows should be presented for total vehicle flows and for car flows, but not for LGV and HGV flows due to there being insufficient accuracy in the individual link counts for these vehicle types. In addition, the above information should be presented by time period and applied to link flows.

Data collection sites used in the validation of the base year, as well as those sites used in the development of the base year model are presented in the CLHTM 2019 Recalibration Report.

3.2.2 Journey Times

TAG also specifies acceptability guidelines for the validation of journey times. The acceptability criterion for journey time validation is given in Table 3.3.

Table 3.3 Journey Time Validation Criterion

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

3.2.3 Impact of Matrix Estimation

Independent validation as specified above quantifies the ability of the model to replicate base year travel conditions within the model area. To ensure these conditions have a sound basis TAG provides guidance as to the acceptable changes to the highway 'prior' matrices that should result from the application of matrix estimation. These have been reproduced in Table 3.4.

Table 3.4 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 zone 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%

TAG Unit M3.1 paragraph 8.3.15 states that all exceedances of the above should be noted and assessed as to their importance to assess the scheme.

3.2.4 Convergence Criteria and Standards

In order for the outcomes of the modelling to be reliable, the stability of the modelled flows needed to be confirmed. This ensures that when modelling the scheme, any flow changes which occur do so directly as a result of the scheme, rather than as a result of random flow changes due to poor convergence. In addition, the model should converge to a point in which routes obey Wardrop's First Principle of Traffic Equilibrium which TAG Unit M3.1 paragraph 2.7.3 defines as:

"Traffic arranges itself on networks such that the cost of travel on all routes used between each OD pair is equal to the minimum cost of travel and all unused routes have equal or greater cost."

This relates to how close the model is to a particular converged solution, which varies depending on the preferences of the user or software package being used. In SATURN this equates to how close the model is to Wardrop's Principle of Equilibrium and is measured using the Gap function.

The gap value therefore represents the excess cost incurred by failing to travel on the route with the lowest generalised cost and is expressed relative to that minimum route cost. The excess cost is summed over each route between each O/D pair and multiplied by the number of trips between each O/D pair. This is divided by the minimum cost summed over each route between each O/D pair, also multiplied by the number of trips between each O/D pair.

For the model to be considered sufficiently well converged, the gap value must be less than 0.1%.

TAG describes other measures for assessing the model convergence, as detailed in Table 3.5; in terms of both stability and proximity measures.

Table 3.5 Convergence Measures

Measure of Convergence	Base Model Acceptable Values
Delta and %Gap	Less than 0.1% or at least with convergence fully documented and all other criteria met
Percentage of links with flow change < 1%	Four consecutive iterations greater than 98%
Percentage of links with cost change < 1%	Four consecutive iterations greater than 98%
Percentage change in total user cost	Four consecutive iterations less than 0.1%

The convergence statistics provided in the LPN output file enable the ability to both check and ensure the model converges within the TAG guidance provided above for the base year.

3.3 Public Transport Assignment

The guidance set out in TAG Unit M3.2 is set out in the following sections.

3.3.1 Validation Criteria and Acceptability Guidelines

TAG Unit M3.2 Chapter 7 suggests that the validation of a public transport passenger assignment model should include:

- Validation of the trip demand matrix;
- Network and service validation and
- Assignment validation.

Validation of the trip matrix should involve comparisons of assigned and observed passengers across screenlines and cordons (as opposed to individual services). At this level of aggregation, TAG recommends that the differences between assigned and observed flows should, in 95% of the cases, be less than 15%.

Validation of the network should involve checks on the accuracy of the coded geometry and transit service speeds in the model (i.e. for in-vehicle, access and interchange times where relevant) and frequency checks. It is also desirable to demonstrate the accuracy of the coding of the public transport routes as this defines the accuracy of the modelled generalised cost of travel by public transport. Validation of the assignment should involve comparing modelled and observed:

- Passenger flows across screenlines and cordons.
- Passengers boarding and alighting in relevant urban centres.

TAG recommends that across modelled screenlines, flows should, in total, be within 15% of the observed values. For individual counts, modelled flows should be within 25% of the counts, except where observed hourly flows are particularly low (less than 150 passengers per hour).

Wherever possible, a check should also be made between the annual patronage derived from the model and annual patronage derived by the operator. Precise comparisons may be difficult but may be sufficiently accurate to provide a cross-check on the general scale of patronage, bearing in mind that operator patronage is likely to be boardings and not trips.

3.3.2 Impact of Matrix Estimation

The guidance as set out in Section 3.2.3 also applies to public transport matrix estimation.

3.3.3 Convergence Criteria and Standards

Model convergence is not applicable to the CLTM public transport assignment model as passenger crowding is not modelled.

3.4 Requirements for the CLTM Model

The level of public transport model validation that can be achieved is limited by the availability of relevant observed data. Comprehensive bus patronage data by service, in particular, is often not accessible for use in transport model development. In these cases, network and service validation can still be undertaken but validation of the trip matrix and assignment is often reduced to high-level benchmarking of flows against secondary data sources, aggregate data source which can be sourced online (publicly available) and local network knowledge and experience. In the case of CLTM model the available datasets are:

- Bus occupancy data for 14 sites (one day); and
- Ticket sales data from 3 bus services operators (one month).

The observed data is discussed further in Sections 4.2 and 4.3.

4. Calibration and Validation Data

4.1 Introduction

This Chapter discusses the observed data used in the calibration of the public transport assignment model.

4.2 Bus Occupancy Data

Bus Occupancy Data was provided for 14 locations within Preston, each having two directions. These locations are shown on Figure 4.1. The single day survey was conducted on Thursday 3rd October 2019 and included the periods 07:00 – 12:00 and 14:00 – 19:00 hrs.

Figure 4.1 Bus Occupancy Data Survey Locations

For each location there is a record of each bus passing, including service number, timestamp, estimated occupancy (0%, 10%, 25%, 50%, 75%, 100%, 100% and standing) and bus type. The assumed seated and standing capacities are outlined in Table 4.1. The estimated number of passengers for each record can be derived from the seated and standing capacity, based on the recorded bus type, multiplied by occupancy estimate. In the case of a "100% and standing" observation, the full standing capacity of the bus type has been assumed.

Table 4.1 Capacity for Bus Types

Bus Type	Seated Capacity	Max Standing Capacity	Total Capacity
Midi	29	18	47
Full Single	41	33	74
Double Decker	73	18	91

The estimated bus occupancies were then combined to form estimated link flows for use during model calibration, and these are outlined in Table 4.2.

Table 4.2 2019 Bus Occupancy Data Survey Results, per Hour

Site ID	Bus Stop (NAPTAN)	Direction	AM		IP (average)		PM	
			No. journeys	Passengers	No. journeys	Passengers	No. journeys	Passengers
1	2500LA00096	EB	3	35	4.8	48	5	30
1	2500LA00097	WB	6	55	3.0	56	3	93
2	2500IMG1322	NB	14	522	5.8	67	12	113
2	250012759	SB	6	90	7.0	125	5	115
3	25001074	EB	9	223	7.5	65	7	65
3	2500LAA16124	WB	8	98	7.0	46	5	36
4	25001136	WB	19	390	12.5	239	11	439
4	25001140	EB	14	321	11.8	205	8	51
5	250014500	SEB	7	53	9.0	118	11	154
5	250014971	NWB	13	298	8.5	63	8	34
6	2500LA00147	SEB	7	208	7.8	120	8	57
6	2500LA00401	NWB	8	58	6.8	62	6	64
7	2500DCL3213	WB	16	158	14.0	243	13	370
7	2500DCL3214	EB	16	273	13.0	166	16	75
8	2500DCL3193	NWB	7	7	5.8	54	5	33
8	2500DCL3194	SEB	5	21	6.0	14	5	19
9	2500DCL3188	NWB	7	214	6.8	151	6	216
9	2500DCL3189	SEB	7	169	7.5	134	10	105
10	250020123	NWB	9	358	7.5	120	8	100
10	250020124	SEB	11	68	8.0	158	10	152
11	2500IMG1360	SB	14	265	15.0	209	14	224
11	250014369	NB	15	274	13.5	166	18	142
12	25001182	NEB	12	45	15.3	227	14	265
12	2500DCL3135	SWB	16	365	14.3	163	19	118
13	2500RIB0001	NEB	17	117	19.5	199	21	282
13	2500IMG1354	SWB	17	187	19.8	101	22	90
14	2500IMG1318	SEB	16	447	14.3	184	19	389
14	2500DCL3129	NWB	11	646	14.0	216	12	69

Sites 2 and 5 are both located on Leyland Road, approximately 2.3 km apart with no significant employment or residential areas in between. The observation at Site 2 in the Northbound direction in the AM is 522, whereas at Site 5 the observation is 298 passengers. In the other time periods this difference is significantly smaller, as outlined below:

- IP site 2 – 45 passengers, site 5 – 42 passengers
- PM site 2 – 113 passengers, site, 5 – 34 passengers

As a result of the observed difference in the AM, less confidence has been placed on the observation from Site 2 in the AM.

The processed occupancy data was also used to validate the number of journeys (services) for each of the locations. This was an additional check to confirm the number of bus services in each time period.

4.3 Bus Operator Data

4.3.1 Ticket Sales Data

Ticket sales data from 3 bus services operators was also acquired. A summary of each data set and selected peak hours for calibration is discussed in the following sections.

Table 4.3 Summary of Bus Operator Data

Operator	Data type	Selected peak hours		
		AM	IP	PM
Stagecoach	Boardings for fare stages, 30-minute intervals	7:30 – 8:30	10:00 – 16:00 (average)	16:30 – 17:30
Preston Bus	Boardings for NAPTAN stops, actual timestamps	7:40 – 8:45	10:00 – 16:00 (average)	16:40 – 17:50
Arriva Bus	Boardings, data for whole day (no timestamps or intervals)	PH hour factors derived from Stagecoach and Preston Bus		

4.3.1.1 Stagecoach

Data provided by Stagecoach consisted of ticket sales data for the whole of October 2019, aggregated to 30-minute intervals. Aggregations were by day (Mon-Fri, Saturday or Sunday), ticket type, service number, boarding stage and alighting stage.

For bus ticket types that would not have an alighting stage, such as day or weekly tickets, the alighting stage was recorded the same as the boarding stage, and therefore the dataset couldn't be used to derive alightings accurately. The aggregation to boarding stage by the operator also meant that boardings for individual stops could not be derived. In total there were 424 boarding stages identified in the dataset.

The number of passengers for each stage and modelled hour were summed and divided by number of workdays in October 2019 (23 days) to derive an average number of boardings per stage. For the interpeak the total number of boardings for the six-hour period were summed and then divided by 6 to calculate an average hour.

Table 4.4 Aggregated Data for Stagecoach Boardings, Example

Boarding Stage	Boardings [passengers/h]		
	AM	IP	PM
Preston Bus Stn	472	741	906
Gamull Ln/Mway Bridg	68	14	12
Spar/RomanWy/RedScar	6	15	48
All Stops Grimsargh	23	3	2
Grimsargh ALL STOPS	12	6	3
Longridge ALL STOPS	71	57	46
All Stops Longridge	10	19	6
Chatburn Rd	112	43	26
Skeffington Rd	143	45	31
Alston Church	1	1	1
Alston White Bull	0	2	1
STONE X	7	1	1
Plocks Farm	1	1	0
Lindle lane	7	3	5
Hutton Anchor Inn	9	9	5
Lngtn Golden Ball	16	4	1
Hoole Smithy Inn	9	2	1
Tarleton Trfc Lights	2	1	2
Tarleton C&B/P.O	9	7	6
Fshrgt Hl Surgery	31	23	15
Lngtn The Rams	11	7	4
Meth Burial Grnd	2	1	1
Hoole Jct A59	2	1	0
Penwortham	7	10	7

Boarding Stage	Boardings [passengers/h]		
	AM	IP	PM
Hall Lane	3	2	1
Walmer Bridge Inn	17	4	2
Carlton Dr/Blasw Ln	4	6	2

Figure 4.2 Stagecoach Bus Boardings (Stages), AM Peak

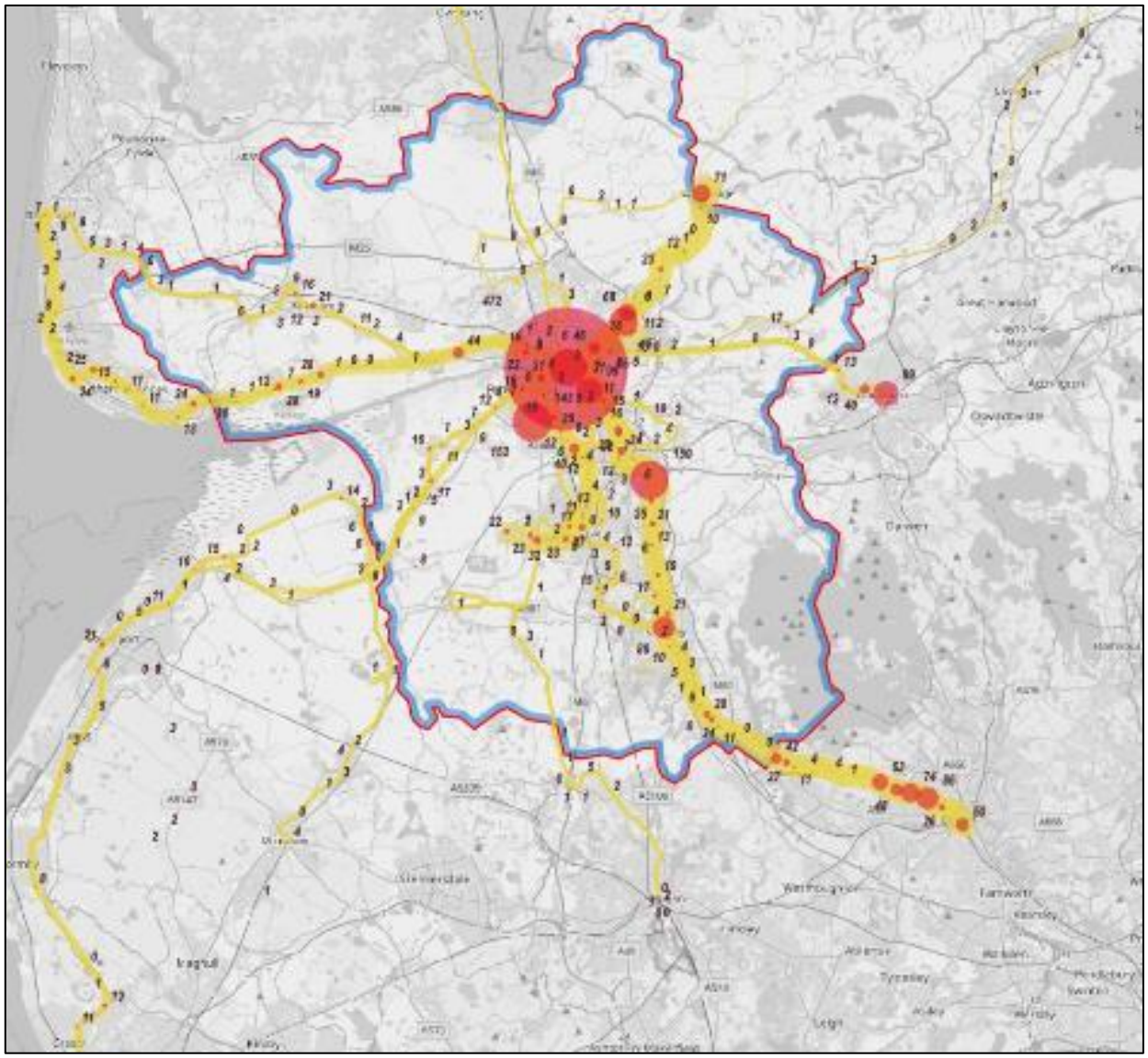


Figure 4.3 Stagecoach Bus Boardings (Stages), Preston City Centre, AM Peak

4.3.1.2 Preston Bus

Data provided by Preston Bus consisted of aggregated ticket sales data for whole of October 2019, and included the timestamp, ticket type, route and boarding stop. The data does not contain the alighting stop.

The number of passengers for each bus stop, identified by its National Public Transport Access Nodes (NAPTAN) code and peak hour was summed and divided by number of workdays in October 2019 (23 days) to get an average. For the interpeak the total number of boardings for the six-hour period were summed and then divided by 6 to calculate an average hour.

Table 4.5 Aggregated Data for Preston Bus Boardings, Example

Bus stop (NAPTAN)	AM	IP	PM
2500DCL3183	18	4	4
2500JB29	152	77	75
2500DCL3211	16	5	4
2500DCL3185	28	8	6
250015652	18	4	3
2500IMG1196	3	5	3
2500IMG1198	13	11	9
2500IMG842	36	11	7
2500LA00502	21	4	4
250011679	11	4	2
250012107	32	13	6
25001157	10	6	1
250020166	24	11	7
250010808	5	3	1

Bus stop (NAPTAN)	AM	IP	PM
2500DCL3253	52	53	82
2500DCL2010	8	9	4
2500GCS10057	11	5	3
2500GCS10081	8	10	6
2500DCL3010	15	7	5
2500JB60	4	3	1

Figure 4.4 Preston Bus Boardings (Stops), Preston City Centre, AM Peak

4.3.1.3 Arriva

The data received from Arriva didn't have timestamps or timeframes for each record. Therefore, the number of passengers was estimated by using factors derived from Stagecoach and Preston Bus datasets. The only service retained from the Arriva data was service 362 which runs from Chorley to Wigan. Data for this service was aggregated to the appropriate NAPTAN bus stops.

Total boardings from data for all stops of this line were 2,474 passengers in both directions. Data was aggregated into EMME nodes and multiplied by the Time Period factors and then Peak Hour Factors as set out in Table 4.6. For interpeak these were also divided by 6 to calculate an average hour.

Table 4.6 Peak Hour Factors used for Processing of Arriva Bus Data

Peak	Time period	Preston Bus boardings		Stagecoach boardings		Factors		
		Time period	Peak hour	Time period	Peak hour	24H -> TP	TP -> Peak	24H -> Peak
AM	7:00 - 10:00	136,169	65,605	208,294	92,558	21.7%	45.9%	10.0 %
IP	10:00 - 16:00	287,718	-	453,229	-	46.7%	16.7%	7.8%
PM	16:00 - 19:00	104,925	46,683	173,265	68,562	17.5%	41.4%	7.3%
OP	-	132,242	-	89,899	-	14.0%	-	-

Table 4.7 Boardings Derived from Arriva Data using 24H to Peak Hour Factors

EMME Node No.	Location	9.97%	7.79%	7.27%	74.97%
		AM	IP	PM	OP
1355	Chorley (AoDM)	44	34	32	327
4106		3	2	2	23
3081		1	1	1	7
3163		7	5	5	53
3189		1	1	1	6
3168		1	1	1	9
3096		2	1	1	12
3093		4	3	3	33
3193		5	4	3	36
8065		7	5	5	50
8226		1	1	1	6
8214		0	0	0	1
3095	Coppul (AoDM)	11	9	8	85
8512		6	5	5	48
8215		10	8	8	77
8216		4	3	3	30
8102		1	1	1	10
8068		0	0	0	0
4182		1	1	1	9
8517	Standish and Wigan (outside AoDM)	19	15	14	146
4044		25	20	18	190
4216		6	5	5	47
4227		87	68	63	651

4.3.1.4 Merged Data for all Operators

Due to the variability of the received data and its different levels of aggregation, there was a need to aggregate the data further into sectors that could be used to compare the observed data with model results, and this is presented in Figure 4.5. Sector borders were designated based on Stagecoach stages as well as obstacles like rivers or railroads. Each stage from the Stagecoach data has been assigned to the sector in which it lies, as has each EMME node and NAPTAN stop.

Sectors 1 – 32 are located within the AoDM, with sectors 100 onwards located outside the AoDM.

Table 4.8 Bus Patronage Data, Aggregation for Sectors - Stagecoach, Preston Bus and Arriva

Sector ID	Sector name	Bus patronage data boardings		
		AM	IP	PM
1	Preston Bus Station	460	442	474
2	Preston City Centre	1,628	1,438	1,592
3	Cottam	219	117	75
4	Fulwood	465	364	365
5	Longsands	305	130	169
6	Moor Nook	164	48	33
7	Bamber Bridge	201	131	102
8	Lostock Hall	111	51	31
9	Lower Penwortham	199	108	55
10	Penwortham	42	70	33
11	Ashton-on-Ribble	262	164	102
12	Leyland	196	196	132
13	Buckshaw Village	50	15	26
14	Clayton Brook	164	51	75
15	Whittle Woods	64	26	19
16	Clayton-le-Woods	17	9	6
18	Chorley	408	398	273
19	Chorley Bus Station	51	59	48
20	Walmer Bridge/Longton/Hutton	136	56	45
21	Samlesbury/Myerscough	37	7	11
22	Grimsargh	43	13	8
23	Red Scar Business Park	8	20	60
24	Longridge	90	85	55
25	Whittingham	25	5	1
26	Kirkham	85	46	38
27	Newton-with-Scales/Clifton	20	7	5
28	Warton	100	33	39
29	Barton/Broughton	3	6	59
30	Eccleston	12	11	8
31	Wheelton	0	0	0
32	Elswick	0	0	0
100	Liverpool	129	131	131
101	Southport	146	168	153
102	Blackpool	265	299	221
103	Skelmersdale	163	171	127
104	Bolton/Manchester	353	249	264
105	Blackburn	165	57	29
106	Chatburn/Skipton/Barnold	63	61	34
107	Ormskirk	170	178	179

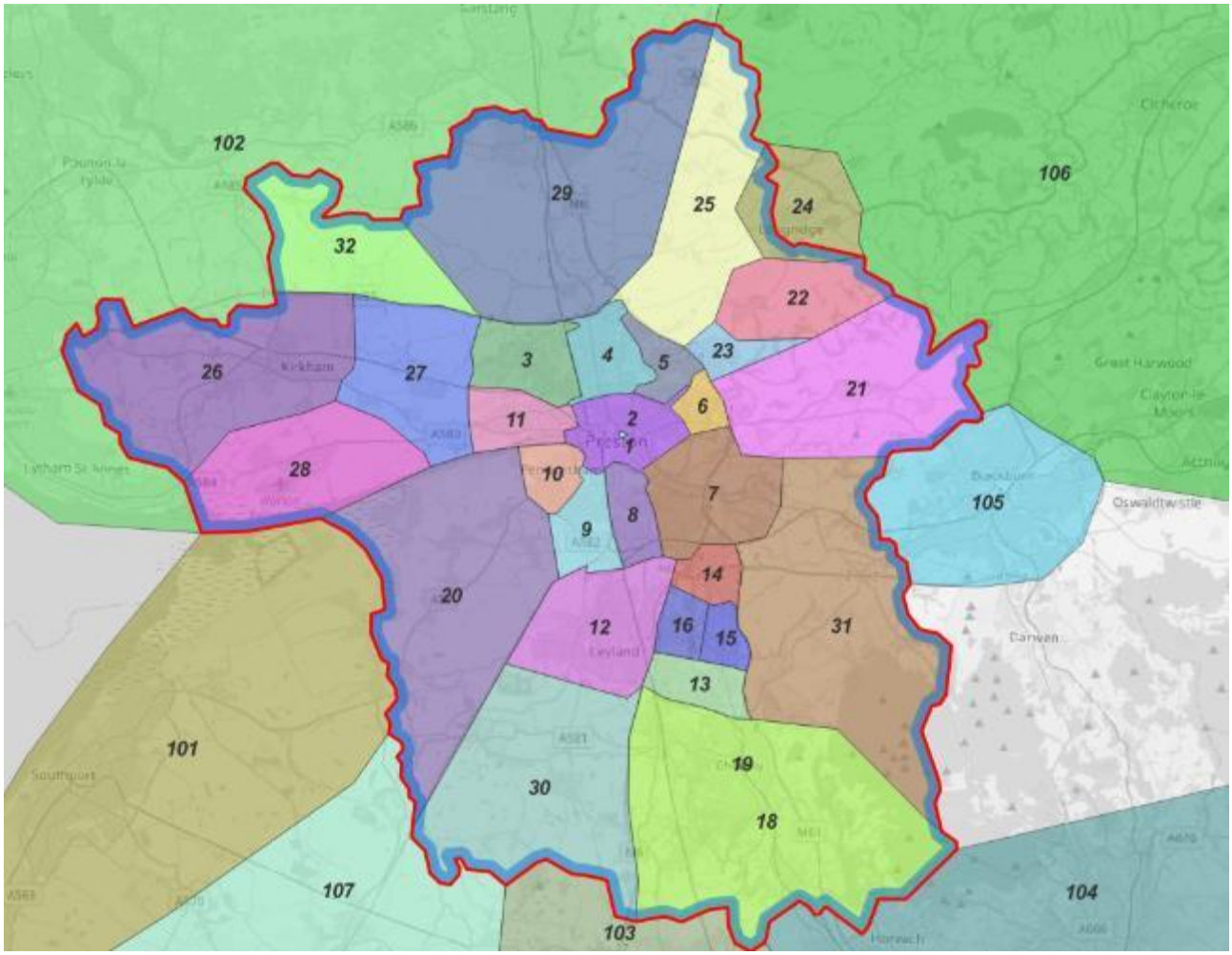
Some sectors like Preston Bus Station (1) or Chorley Bus Station (19) were further merged with their closest sectors, these being Preston City Centre (2) and Chorley (18) respectively. Due to the fare stages in use by Stagecoach, there was a need to merge Moor Nook (6) with Preston City Centre (2) as one Stagecoach stage was present in both of these sectors.

The extracted numbers from the patronage data do not represent all boardings within a sector because the available datasets do not cover all operators. As the number of boardings from the observed data was also very low compared to the prior matrices, factors were derived to uplift the observed patronage data to account for the missing operators. Uplift factors were derived by establishing the proportion of services operated by Stagecoach, Preston Bus and Arriva divided by total number of routes in a sector. The process for quantifying the total number of routes (bus services) in each time period can be found in Section 5.2.1.

Table 4.9 Factors and Uplifted Number of Boardings and Merged Sectors

Sector ID	Sector name	Uplift factor			Boardings [passengers/h]		
		AM	IP	PM	AM	IP	PM
2	Preston City Centre	104%	104%	104%	2,331	2,000	2,177
3	Cottam	113%	117%	121%	248	137	90
4	Fulwood	102%	101%	101%	473	368	370
5	Longsands	103%	101%	101%	314	131	171
7	Bamber Bridge	117%	120%	118%	236	157	121
8	Lostock Hall	100%	101%	100%	111	51	31
9	Lower Penwortham	100%	101%	100%	199	109	55
10	Penwortham	102%	101%	100%	43	71	33
11	Ashton-on-Ribble	105%	106%	107%	276	174	110
12	Leyland	102%	101%	102%	199	198	134
13	Buckshaw Village	107%	105%	102%	54	15	26
14	Clayton Brook	102%	102%	100%	167	52	75
15	Whittle Woods	102%	101%	100%	65	26	19
16	Clayton-le-Woods	100%	102%	100%	17	9	6
18	Chorley	114%	114%	112%	551	567	397
20	Walmer Bridge/Longton/Hutton	105%	102%	100%	143	58	45
21	Samlesbury/Myerscough	109%	102%	104%	40	7	12
22	Grimsargh	106%	103%	100%	45	13	8
23	Red Scar Business Park	104%	102%	100%	8	20	60
24	Longridge	104%	101%	100%	93	85	55
25	Whittingham	100%	100%	100%	25	5	1
26	Kirkham	133%	133%	129%	113	62	49
27	Newton-with-Scales/Clifton	100%	100%	100%	20	7	5
28	Warton	125%	123%	119%	125	41	46
29	Barton/Broughton	109%	110%	110%	3	6	65
30	Eccleston	111%	103%	105%	14	12	8

Figure 4.5 Sectors for Data Aggregation



5. Network Development

5.1 Network Basis

The public transport model was constructed using EMME software version 4.5.0.0. The public transport network includes two components:

- The bus network, which is consistent with the Saturn highway model, for buses and coaches; and
- The rail network, which covers Great Britain and is connected to the bus network in Lancashire.

5.2 Bus Network

5.2.1 Timetable Coding

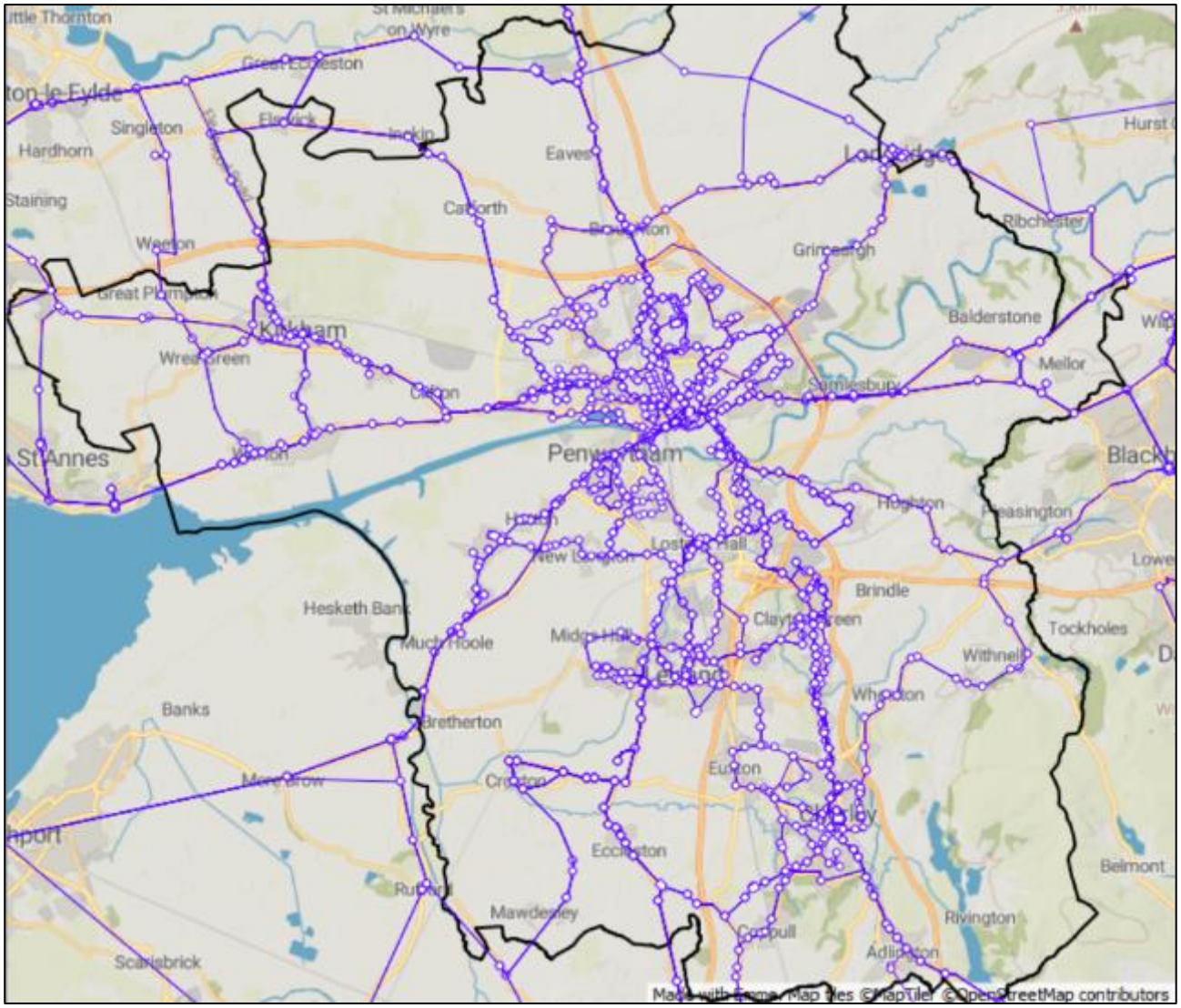
The modelled bus network across Lancashire is represented at high level and has been based on October 2019 ATCO-CIF timetable files available from the Datacutter1 service. The ATCO files include geographic information about bus stops in Lancashire, the name and code of each bus stop served by the bus line route, arrival time, departure time, and the days when the service operates. The file includes information for all bus services in Lancashire. School buses were excluded from data processing, as well as coaches.

An automated process has been developed to convert the CIF data into a format suitable for EMME. The process operates in two main steps; time period classification and bus route classification. CIF files contain records uniquely identifying each service. Each service was classified to a time period by its departure time. The frequency of bus routes was determined by the number of services operating in the time periods (AM: 7 – 10, IP: 10 – 16, PM: 16 – 9), divided by number of hours of the time period.

The second step identifies similar bus services of a given bus operating company and merges them into routes that run along the same path, with the same stopping pattern. For each service on the route, times between stops have been averaged and average frequencies for the route calculated. Figure 5.1 shows the bus network and service coverage in the Lancashire area.

[1] https://datacutter.basemap.co.uk

Figure 5.1 Modelled Bus Network – Lancashire, Area of Detailed Modelling



In-vehicle times for the bus routes have been coded at two levels. Within the AoDM, in-vehicle times have been linked to congested highway journey times resulting from the traffic model assignment. In the rest of the model, in-vehicle times were based on the times extracted from the bus operating timetables. The incorporation of highway congested journey time into in-vehicle times is essential for a realistic representation of bus times in the congested areas. The details of the functionality and its calibration are discussed in Chapter 8.

5.2.2 Approach to Modelling Bus Speeds

The stop-to-stop bus journey times are based on the timetabled time between stops. This value is saved as a transit segment attribute (us3) in EMME. The stop-to-stop time is then split proportionally to length and applied to all links that make up the route between the two stops.

Bus speeds were restricted to the congested highway bus link speeds if bus speed calculated from CIF files was greater than an upper limit of 90 km/h. This process removes the possibility of excessive or erroneous bus speeds arising on very short links.

5.2.3 Walk Links

Walk links have been reviewed in key City and Town Centres, especially within the AoDM. Where the original highway network links are one-way streets, checks were made to ensure walking in the opposite direction is possible. This is particularly important in central areas where the pedestrian network is key to the routing of

the access and egress to the zone. In addition, walk links are coded to connect stations with the on-street walk network to allow a full range of interchange possibilities between public transport services.

5.2.4 Modes, Vehicle Types and Transit Services

Each transit and walk mode permitted in the model has been given a unique mode identification. In the case of walking or other auxiliary modes, this definition includes assumptions about average speeds that these links represent. These are summarised in Table 5.1.

Table 5.1 Public Transport Model Modes

Mode	Description	Type	Speed (km/h)
b	Bus	Transit	Timetable
t	National Rail	Rail	Timetable
w	Walk	Walk	5

Vehicle types were determined by a review of the observed data. Table 5.2 below describes the coded vehicle types in the model and their respective seated and total vehicle capacities.

Table 5.2 Public Transport Model Vehicle Types

Vehicle	Mode	Description	Seated capacity	Total capacity
13	b	Bus	52	78
14	b	SC_Bus	65	90
15	b	Volvo_Bus	82	131

Vehicle capacities for bus vehicle types were taken from operators' websites, vehicle manufacturers' technical data and other online resources. Based on available data, the number of buses of certain models for each line was determined. Vehicle 13 (Bus) has an average capacity based on this data. "SC_Bus" and "Volvo_Bus" represents double decker buses which have higher capacity and were assigned to routes where there are observations of double decker buses in use.

5.3 Rail Network

Railway station details were sourced from NaPTAN (National public transport access nodes data) data. For stations within Preston District, all stations were coded and for external areas, only stations connected to zones were coded. Shape files of the National Rail network were used to define the network and were simplified for the external model areas. The definition of transit lines (the public transport services included in the model) was coded to represent the service timetable in place in spring 2019. All of which were created in the EMME to create an accurate representation of public transport network in and around Preston.

Electronic data sources of rail transport services were available and were converted into public transport services using macros into EMME readable format such as Network Rail Common Interface Format (CIF files).

The public transport network was reviewed to verify that it is a realistic representation of the rail services as indicated in TAG Unit M3.2. This review also ensured that the model calibration and validation is not affected by routing issues and necessary adjustments of connectors were undertaken during the network validation stage.

The model links were also reviewed to prevent excessively long walking distances on the network and identify any missing walk links from the Highway Model. This exercise focussed mainly on incorporating links that are relevant for the accessibility of the rail transport network. Train operators which operate within the study area have been coded in detail with headway information for each of the model peak hours.

Figure 5.2 shows the extent of the rail network included within the model. As shown, the rail network extends as far as Glasgow to the north, to Holyhead and Cardiff in Wales, to Exeter in the southwest, to the south to Southampton and Brighton/Hove, southeast to Ashford (Kent) and east to Norwich.

Figure 5.2 EMME Rail Network (Full)

The bus and rail model are assigned separately as different user class. The public transport network allows rail users to use bus as an access mode, however the bus users cannot use rail. In the context of A582 OBC project, the emerging scheme does not include any option for rail and therefore this assumption was considered proportionate.

6. Bus Matrix Development

6.1 Introduction

This section describes the process of developing the 2019 demand matrices for the bus model assignment. In line with the Rail and Highway models, bus demand is Production-Attraction (PA) based and transformed into Origin-Destination (OD) format applying a set of factors that produce the hourly demand for three time periods.

6.2 Synthetic Matrix Development

6.2.1 Trip Generation

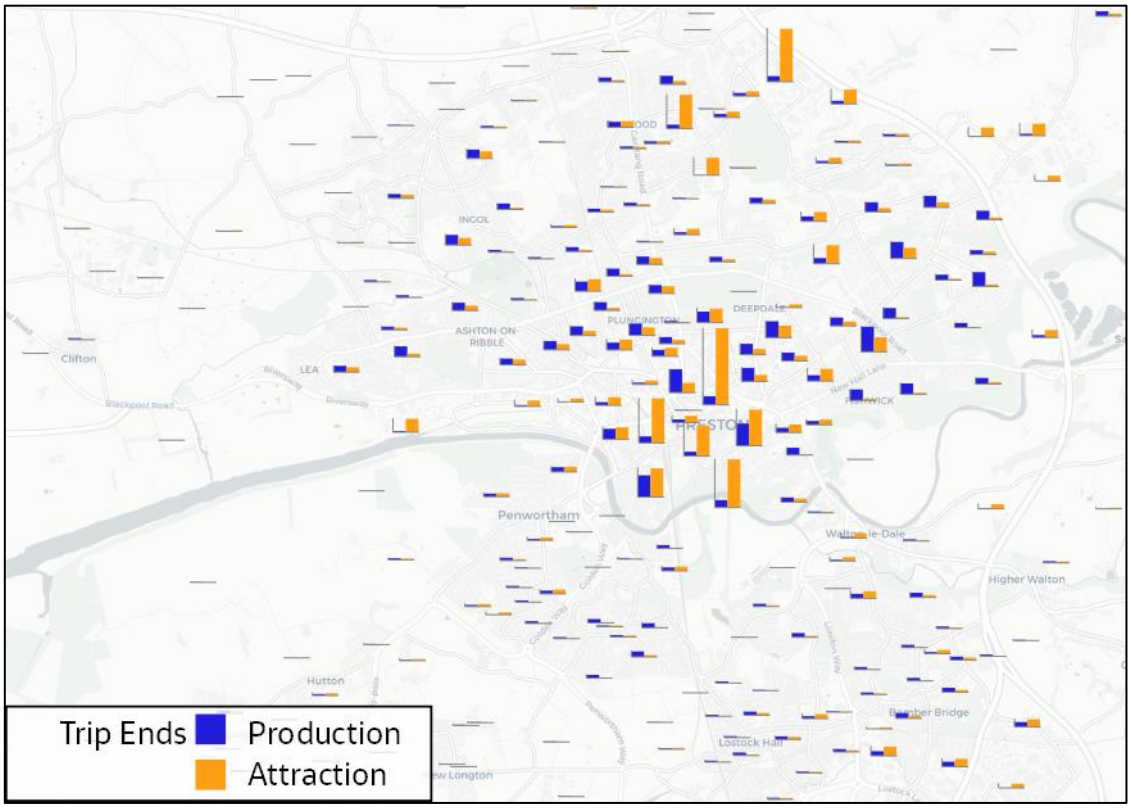
Average weekday PA trip ends were extracted from the National Trip End Model (NTEM) version 7.2 for 2019. Since the model zones are smaller than most NTEM areas within the AoDM, PA totals had to be disaggregated reflecting the land-use in each zone. For this purpose, trip proportions for each zone were estimated using Census 2011 Output Areas (OA). A summary of the datasets used to calculate the disaggregated demand for each trip purpose is provided in Table 6.1.

Table 6.1 Trip Ends Disaggregation

Trip Purpose	Production	Attraction
HB Work	2011 Census Resident Population	2011 Census Workplace Population
HB Employers Business	2011 Census Resident Population	2011 Census Workplace Population
HB Education	2011 Census Resident Population	2011 Census Workplace Population (P Education)
HB Shopping	2011 Census Resident Population	2011 Census Workplace Population (G Wholesale and retail trade; repair of motor vehicles and motorcycles)
HB Other	2011 Census Resident Population	Average of 2011 Census Workplace Population and resident population
NHB Employers Business	2011 Census Workplace Population	2011 Census Workplace Population
NHB Education	Average of 2011 Census Workplace Population and resident population	2011 Census Workplace Population (P Education)
NHB Shopping	Average of 2011 Census Workplace Population and resident population	2011 Census Workplace Population (G Wholesale and retail trade; repair of motor vehicles and motorcycles)
NHB Other	Average of 2011 Census Workplace Population and resident population	Average of 2011 Census Workplace Population and resident population

As shown in Figure 6.1, as expected the disaggregation produced a greater concentration of trip attractions on employment and retail areas e.g. North Preston Employment Area, Royal Preston Hospital, and Preston city centre; while residential areas have a higher proportion of trip productions.

Figure 6.1 Total 24-hours Production and Attraction Trips in Preston



6.2.2 Trip Distribution

A gravity model was applied for trip distribution to produce 24-hour PA matrices by purpose. The main objective of using a gravity model was to obtain trip matrices consistent with the NTEM trip ends and the corresponding Trip Length Distribution (TLD) from the National Travel Survey (NTS).

The gravity model uses the following functional form:

$$T_{ij} = \alpha_i \beta_j P_i A_j f(c_{ij})$$

Where:

- T_{ij} is the number of trips produced by zone i and attracted by zone j
- P_i is the total number of trips produced by zone i
- A_j is the total number of trips attracted by zone j
- $f(c_{ij})$ is a function of the cost of travelling between zone i and zone j, also referred as deterrence function
- α_i and β_j are balancing factors that were estimated using an iterative proportional fitting process

A log-normal functional form was chosen for the deterrence function as it provides a good statistical model to represent the travelled distances, i.e. high proportion of short and medium distance trips, and a small proportion of long distance trips. The deterrence log-normal function is defined as follows:

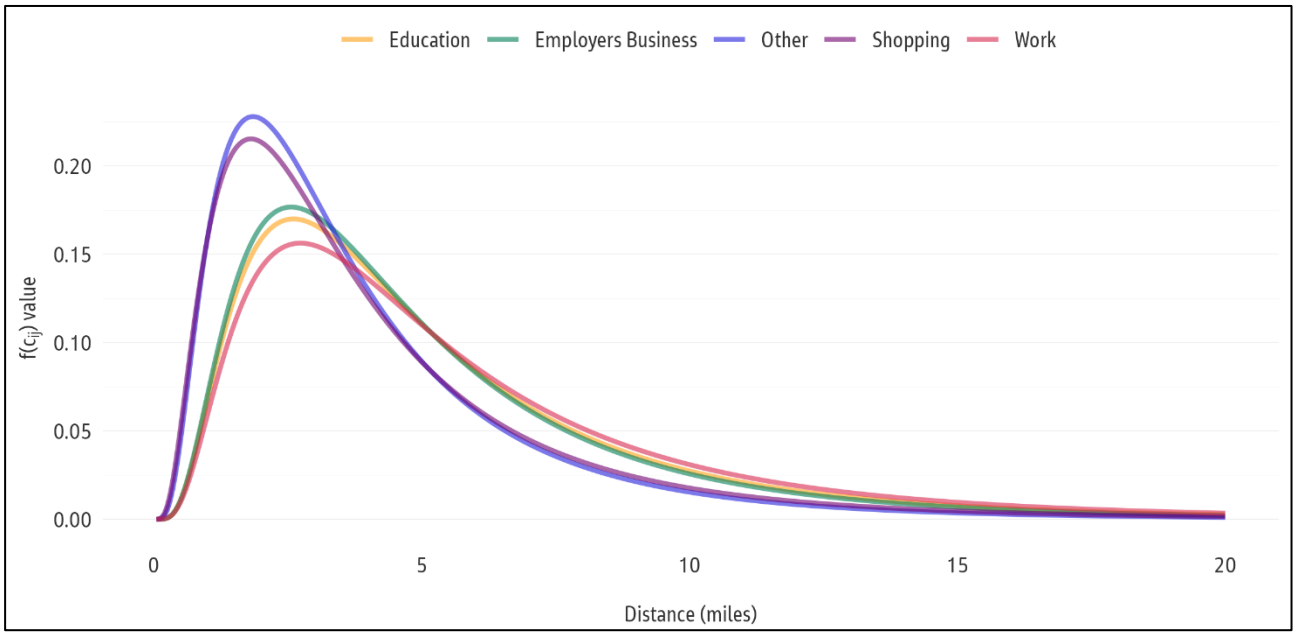
$$f(c_{ij}) = \frac{1}{\sqrt{2\pi} c_{ij}} e^{-(\log(c_{ij}) - \mu)^2 / 2\sigma^2}$$

where:

- μ and σ^2 represent the mean and variance of the log-normal distribution. For each trip purpose, distribution parameters were calculated using 2002-2020 NTS data for local bus trips in non-metropolitan areas of the North West.
- c_{ij} is, in this case, the distance of travelling by bus between zones i and j. Indicative distances by bus were extracted from the bus network. An average distance matrix was calculated taking into consideration all strategies generated by an extended transit assignment in EMME.

Figure 6.2 illustrates the values of the deterrence function for short and medium distance trips for the modelled purposes.

Figure 6.2 Deterrence Function Values for the Modelled Trip Purposes



Once 24-hour PA matrices were produced, time of day factors extracted from NTEM v7 were applied to obtain time period matrices for all purposes. Subsequently, NTEM tour probabilities were applied to obtain the corresponding return matrices for all Home-Based purposes. No change in trip purpose for return trips was assumed.

Demand for all purposes was aggregated by time period and then converted to modelled hour using peak-hour factors obtained from the Bus operator data. The factors that were used to calculate modelled hour matrices are:

- AM Peak Period: 07:00-10:00
  - AM Peak period to AM Peak hour Factor = 0.388717
- Interpeak Period: 10:00-16:00
  - IP Time period to IP hour Factor = 1/6
- PM Peak Period: 16:00-19:00
  - PM Peak period to AM Peak hour Factor = 0.346777

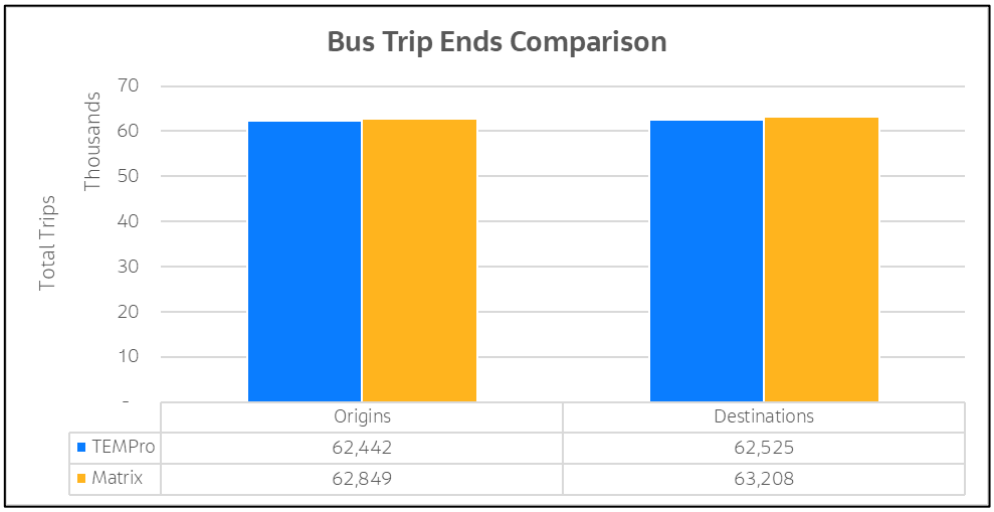
Since the bus model does not include long-distance services (coaches) nor local services outside of the AoDM, all external-to-external cells were assumed to be 0 in the prior matrices.

6.3 Synthetic Matrix Validation

A series of checks were undertaken throughout the prior matrix development process to ensure those matrices were consistent with the NTEM and NTS datasets, and also that they provide a sensible representation of the demand patterns in the AoDM.

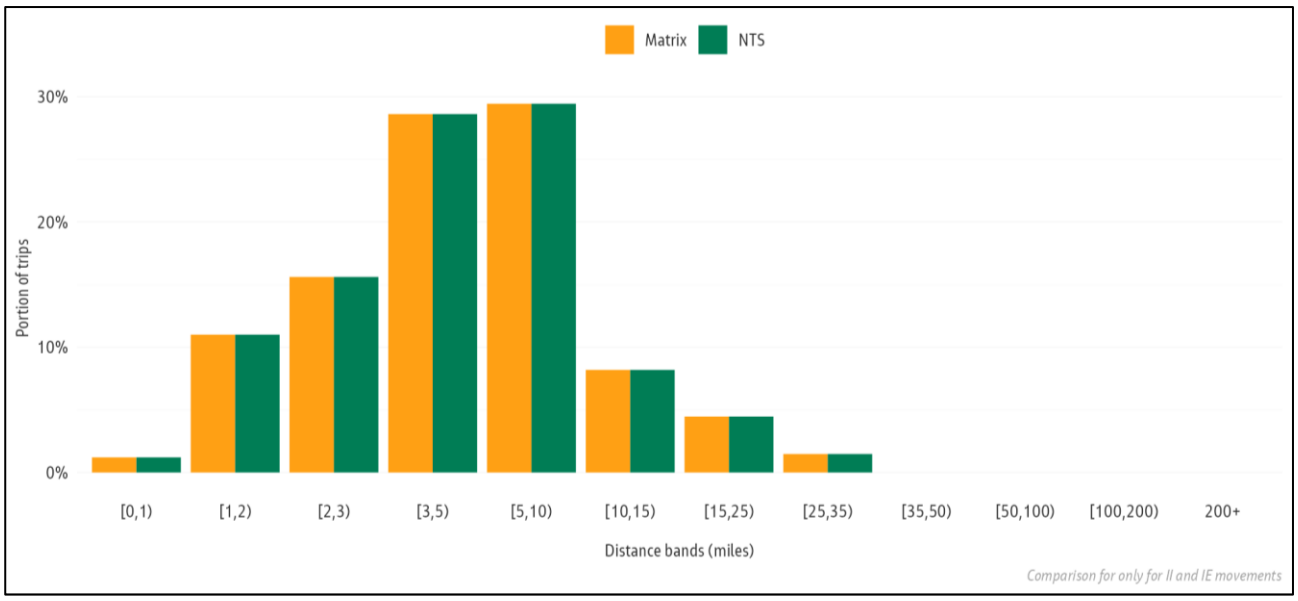
Total productions and attractions were checked after trip distribution at different scales, such as AoDM, Lancashire, Northwest and GB. Figure 6.3 shows the results for the zones in the AoDM, with no major differences found. County, region, national and zone level comparisons are included in Appendix A.

Figure 6.3 Bus Trip Ends Check for the AoDM



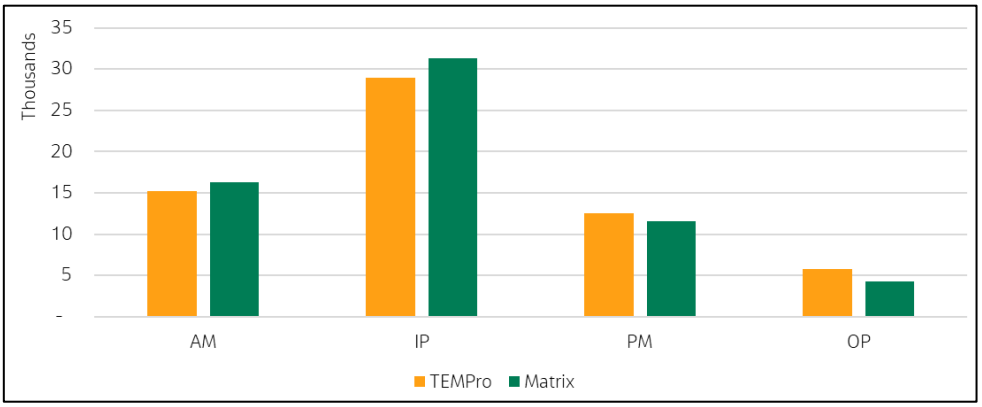
Trip Length Distribution for all NTEM trip purposes were checked as shown in Figure 6.4. No significant differences were found. Plots for all remaining purposes are included in Appendix A.

Figure 6.4 Trip Length Distribution Check – HB Work



OD matrix totals for all time periods were compared to OD NTEM trip ends as shown in Figure 6.5. Differences found in all tie periods are explained by a difference in the assumptions. NTEM tour probabilities assume that a small proportion of Home-Based outward trips are linked to a return with a different trip purpose. However, this leads to unbalanced 24-hour PA outbound and inbound matrices. As mentioned before, NTEM return time period were used but it was assumed that the returning trip is the same.

Figure 6.5 Time Period Split (OD Demand)



6.4 Prior Demand Matrices

Once the priors were produced, an initial sense check was undertaken to identify potential inconsistencies. Prior matrices were assigned to the bus network and load factors were calculated for all links. As shown in the figures below some lines to/from Blackburn present very high load. As Blackburn is represented by a single zone, the high production and attraction result is a high interaction with neighbouring zones, while a significant part of the demand is expected to use the internal services (not incorporated in the CLTM). This is discussed further in Section 8.3.

Figure 6.6 Bus Load Factors AM

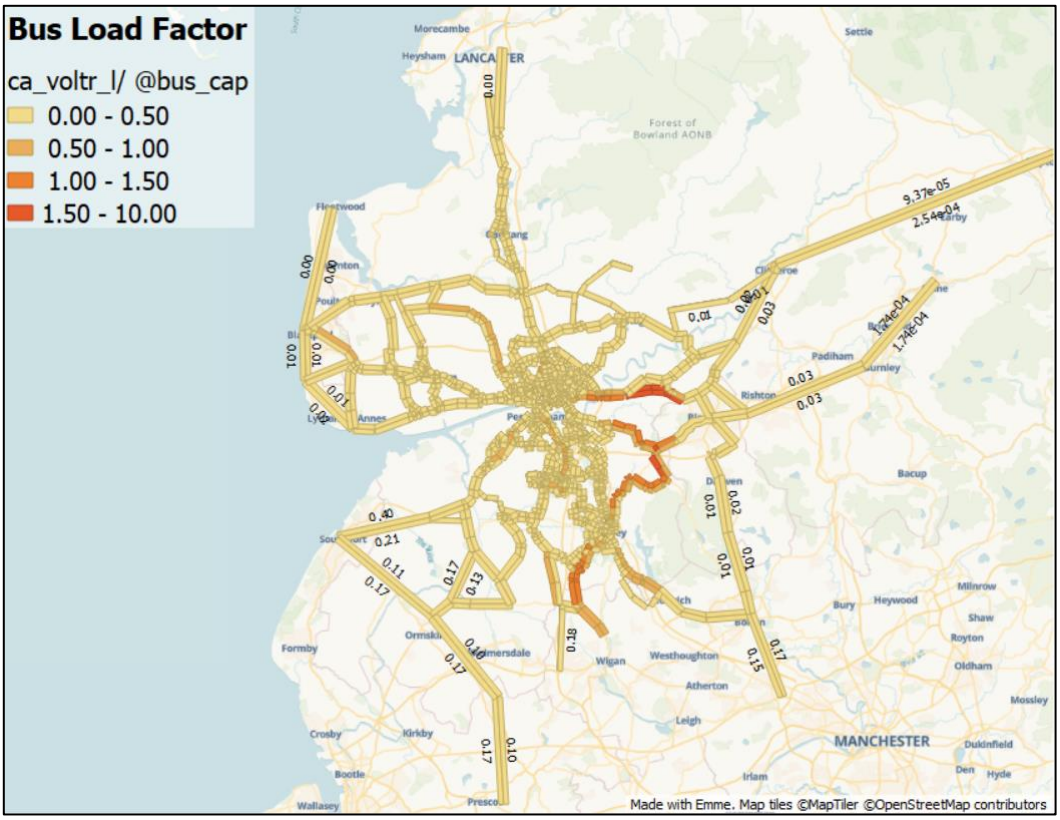


Figure 6.7 Bus Load Factors IP

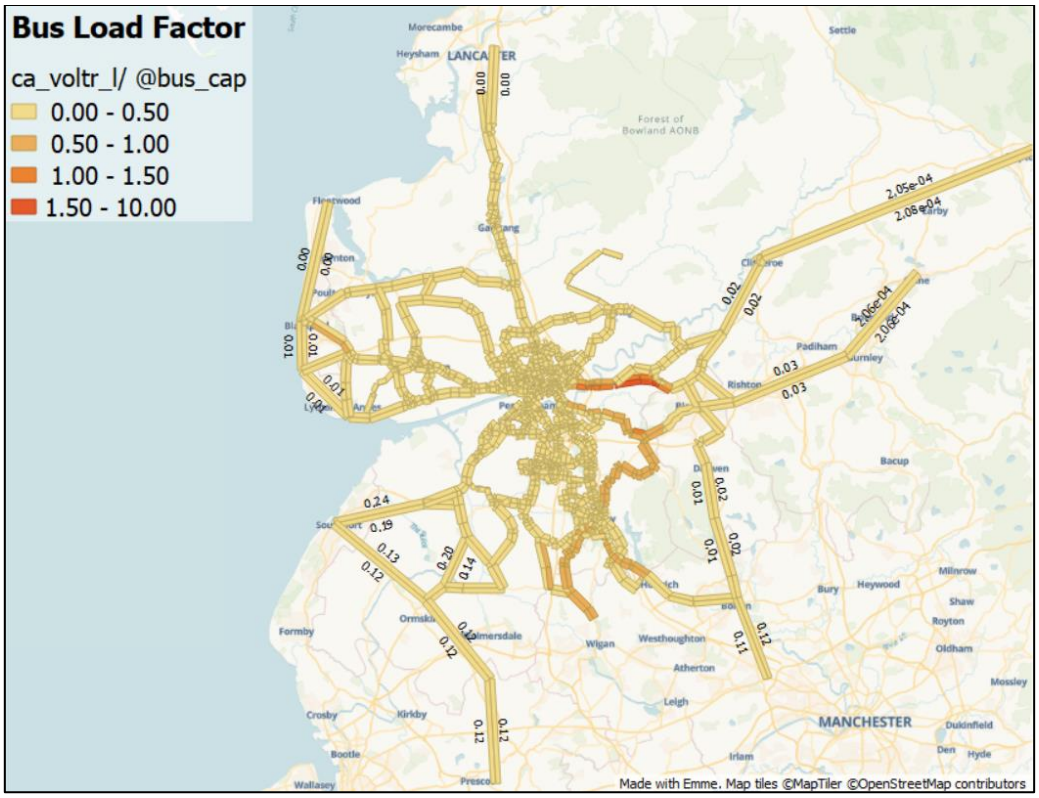
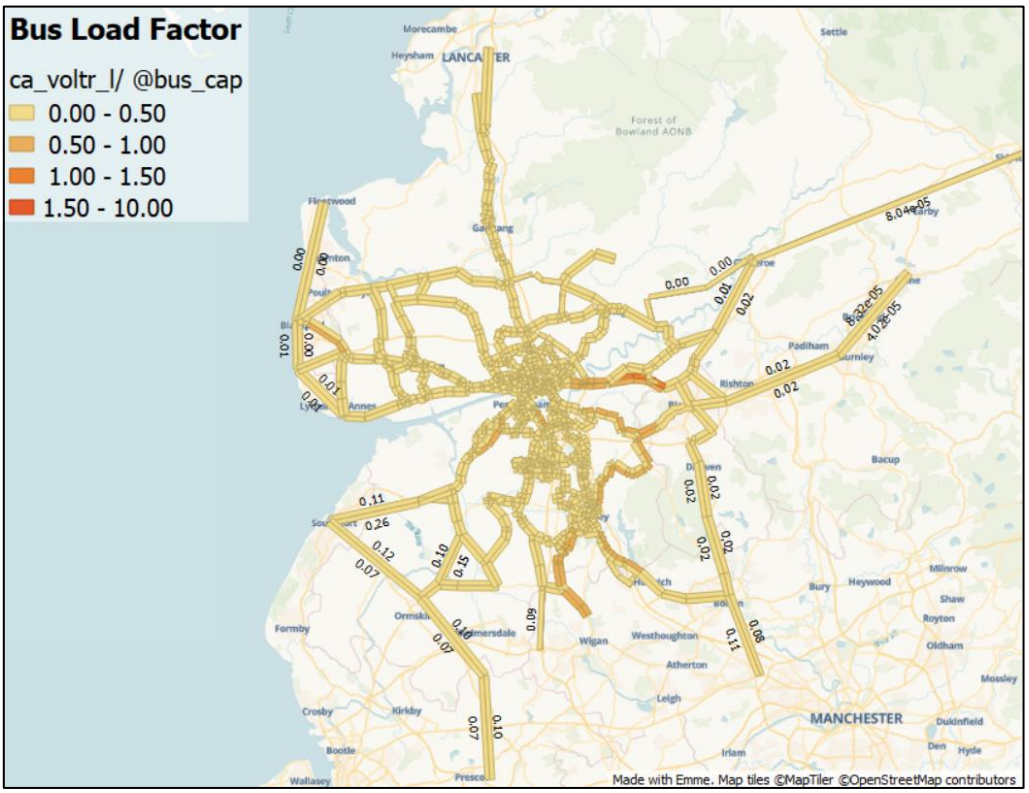


Figure 6.8 Bus Load Factors PM



7. Rail Matrix Development

7.1 Data Sources

Base year, 2019, rail demand is inherited from the Cottam Parkway TA modelling. The demand matrices were derived from MOIRA station-station data and Mobile Network Device (MND) derived journey observations provided by CitiLogik.

The principal sources of OD data used in the matrices were:

- National Rail Travel Survey (NRTS) – used station entries and exits, trip purpose splits and mode of station access;
- Office of Rail Regulation (ORR) station usage estimates – used for station entries and exits;
- MOIRA (rail industry model) – extracts from MOIRA have been used to assist in benchmarking the rail matrices, including annual-to-daily and daily-to-period usage profiles and station-to-station movement calibration; and,
- Mobile Network Data (MND) – provided station-to-station and rail catchment matrices derived from mobile network data;
- National Travel Survey (NTS) – purpose splits, time of day splits;
- National Trip End Model (NTEM) – purpose splits, time of day splits, car availability.

7.2 MOIRA Station-Station Ticket Data

MOIRA provides a front-end interface for rail ticket sales from the LENNON database and as such is considered to be the most accurate representation of annual rail trips between stations. Rail station to station data corresponding to March 2019 were derived from MOIRA NT05 with full data being available only for stations with Northern Rail services (through journeys without Northern Rail legs of a journey are excluded). It should be noted that MOIRA provides only annualised totals without any trip segmentation.

7.3 Mobile Network Data

As part of the Cottam Parkway project, Citi Logik were commissioned to provide station-to-station and rail catchment matrices derived from mobile network data (MND) for trips associated with Preston station (i.e. trips passing through, starting, or ending at Preston station). The data was collected over a continuous period of 1 month for March 2019 and covers 21 weekdays and 10 weekend days. Only movements of Vodafone customers relating to the study area, i.e. trips that traverse through the study area or originate/end their journeys within the study area, are included in the project scope.

The main rationale behind using MND data is the large sample size compared to other survey methods and the ability to provide ultimate origin/destination locations (rather than station to station flows) without relying on demand synthesized from population, employment, and trip rates.

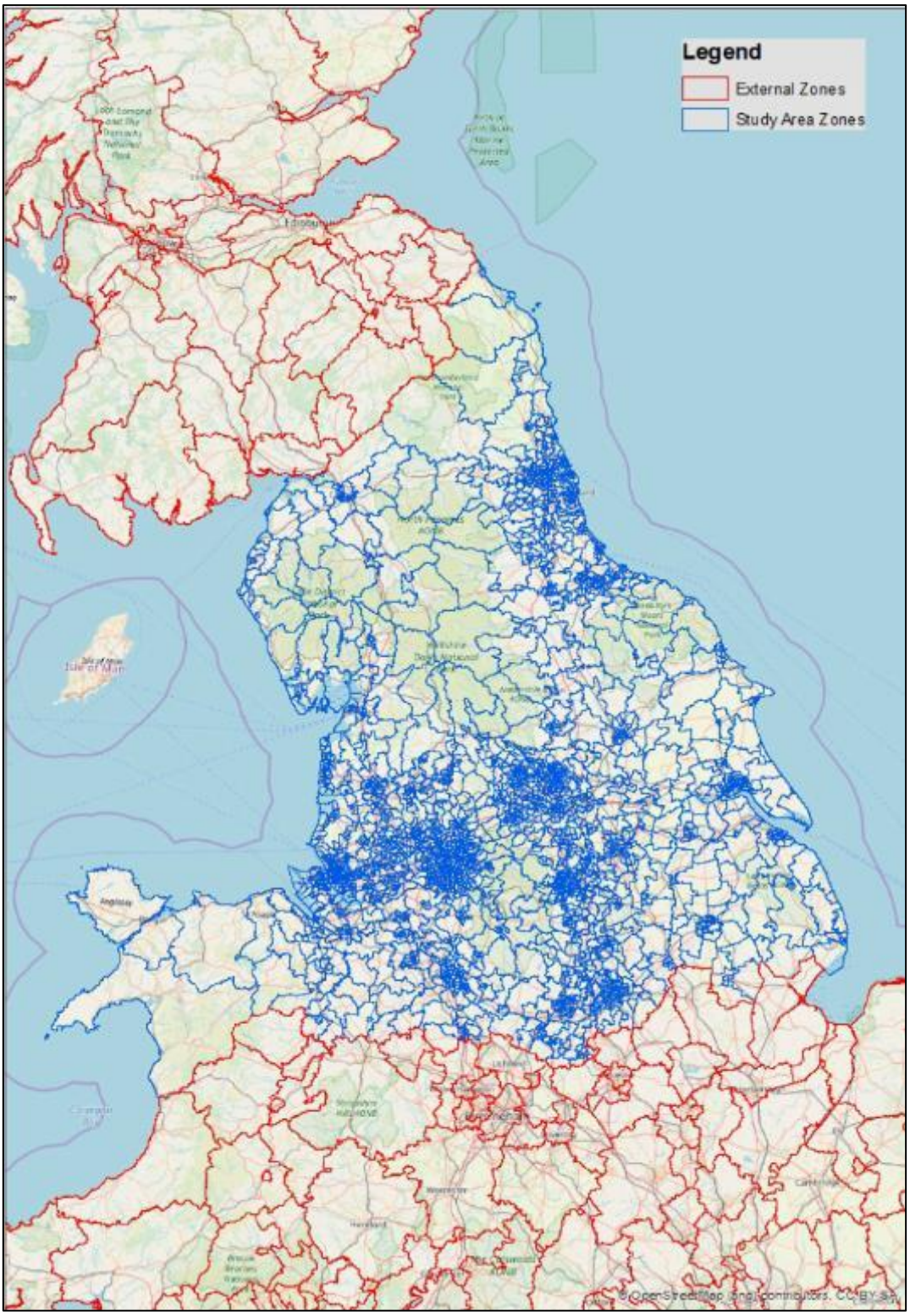
The data collection area for the project is shown in Figure 7.1.

Figure 7.1 Study Area

The zoning considered for the project used MSOA boundaries inside the study area and Planet for external zones as shown in Figure 7.2.

The time-period definition corresponds to the trip start if the trip started inside the study area, or to the time it entered the study area if it started outside the study area.

Figure 7.2 Zoning



7.3.1 Temporal Coverage

The rail matrices data down into the following day and time periods allowing for an aggregate view but also a more detailed view notwithstanding the privacy impacts this might generate:

- Day classification
- Split by weekday/weekend aggregated
- Time classification
- Daily matrix 24 hr

- Period (AM, IP, PM, OP)

Trip-end files were provided by purpose and time period (with the same privacy rules applied as the OD data, but at trip-end level, to help with the correction of the privacy impacts).

7.3.2 Purpose

The identification of the home end is critical to the use of mobile phone data for transport planning purposes as it drives both the definition of the travel purposes and expansion. The inferred day-time (work) and night-time (home) locations of a device were used to assign the trip origin and destination into one of the following:

- Home;
- Work; and,
- Other.

Trip purpose were derived from rules relating to the trip OD combinations, such as home to work, other to home, etc. All trips were allocated one of the following five trip purposes:

- Home Based Work (HBW) including directionality (from home (OB) / to home (IB));
- Home Based Other (HBO) including directionality (from home (OB) / to home (IB));
- Non-Home-Based Work (NHBW);
- Non-Home-Based Other (NHBO); or,
- Unknown.
- The directionality information provided the data for the derivation of PA matrices.

7.3.3 Sample Size and Expansion

The expansion factors were calculated by comparing the number of Vodafone users with the UK census count for each corresponding geographical location. Expansion factors were assigned to each zone and was subsequently applied to the entire chain of trips attributed to mobile devices with an inferred home location (night-time presence) identified in that zone.

The size of the geographical area used to estimate expansion factors has a significant effect on the outcome of expansion. It was therefore important to calculate and use expansion factors at a disaggregated spatial level to account for variation in local mobile phone penetration and market shares.

7.3.4 Citi Logik MND Validation Checks

As part of Citi Logik's quality assurance process, a number of verifications were undertaken on the expanded and unexpanded person trips derived from the mobile phone data. These included:

- Station to station symmetry;
- Station catchment symmetry;
- Catchment distance versus distance travelled by rail;
- Purpose symmetry and time of day analysis;
- Trip length distribution; and,
- Comparison with Census Population and ORR (Office Rail and Road).

The verifications in general showed acceptable correlations between origin and destination stations and catchment areas in the symmetry tests, and satisfactory correspondence between the MND ORR data for trips utilising Preston station.

Overall, the verifications show that the MND rail data provided is suitable for project use with certain limitations that were addressed as part of the base year matrix development. The rail demand validation report produced by Citi Logik is included in Appendix B.

Further checks were undertaken to ensure the quality of the data received. These are discussed in detail in the following sections.

7.3.5 Rail Demand Methodology

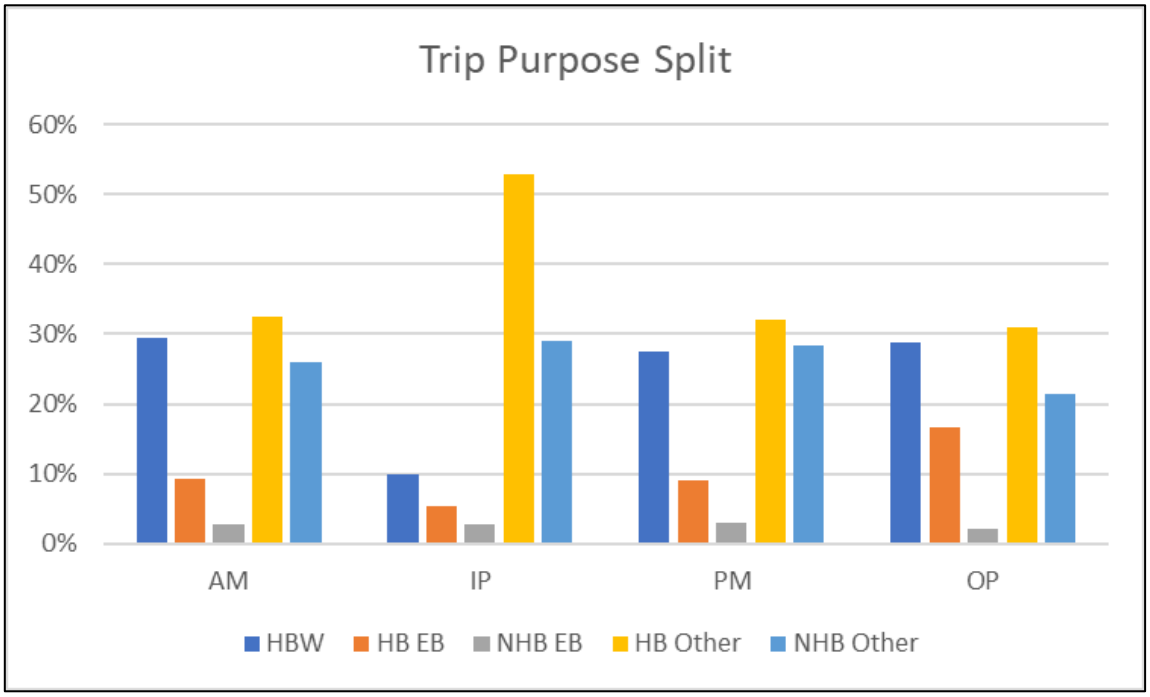
The methodology to develop 2019 rail demand addressed the points raised in the MND Validation Checks section and was designed to create matrices consistent with inputs to the EMME multi-modal model. The steps taken are outlined below:

- Start with MND station-station 24hr matrix
- Apply MOIRA/MND factors to internal stations to adjust daily rail trip totals to MOIRA totals
- Distribute station-station to zone-zone using cleaned catchment areas
- Apply outbound MND time period and purpose splits by zone - 24hr symmetry is needed between outbound and return trips for variable demand modelling (via furness procedure to trip end totals)
- Apply MND return time period proportions to transposed (4) matrices by purpose to get return journeys
- Split Employer's Business from other trips using TEMPro totals at MSOA level
- Split Non-Home Based into Other and Employer's Business using TEMPro at MSOA level
- Split by car availability derived from TEMPro
- Disaggregate to CLHT zones via OAs using population and jobs proportions
- Adjustments for directional OD to 24hr PA

The output rail demand from the above-mentioned process matched MOIRA demand totals by station. All modelled totals for rail stations with more than 200 daily passengers were within 20% of MOIRA and the overall model total was just 1% lower than observed.

Rail demand journey purposes and time of day were further adjusted using the PA outbound, return and tour proportions to ensure consistency with the NTEM and NTS. Final proportions are shown in Figure 7.3.

Figure 7.3 Rail Trip Purpose Split



8. Bus Assignment Calibration and Validation

8.1 Introduction

The public transport model was calibrated in accordance with TAG Unit 3-2 "Public Transport Assignment Modelling". As set out in Section 3.2 TAG recommends that the validation of a public transport model should involve three types of checks:

- Network and service validation.
- Validation of trip matrix.
- Assignment validation.

Each of these areas is covered in this chapter. Section 8.2 discusses the calibration and validation of the bus network. Section 8.3 describes the validation of trip matrix and the calibration of the public transport assignment model.

8.2 Network Calibration and Validation

8.2.1 Bus Journey Times

TAG recommends that the validation checks should focus on the accuracy of the modelled journey times or speeds of the public transport journeys. Generally, public transport journey times are defined by the accuracy of the coded timetables. In addition, in CLTM, the bus speeds are linked to highway speeds to allow the impact of congestion on bus journey times in model forecasts as set out in Section 5.2.2.

Overall, 88% (91.6% for lines passing through Preston City Centre) of bus routes are within 15% (or less than one-minute difference if higher) than the timetabled times in the AM peak. Inter-peak and PM peak network results are equally good with the Preston City Centre area reaching 88.7% and 88.5% respectively as shown in Table 8.1.

Table 8.1 Modelled vs Timetabled Bus Journey Times

Criteria	Full Model	%	Preston City Centre	%
AM Peak				
Total Bus Transit Lines Passing	146	87.95%	65	91.55%
Total Bus Transit Lines Failed	20	12.05%	6	8.45%
Total Transit Lines	166	100.00%	71	100.00%
Inter-peak				
Total Transit lines Passing	115	85.19%	55	88.71%
Total Transit Lines Failed	20	14.81%	7	11.29%
Total Transit Lines	135	100.00%	62	100.00%
PM Peak				
Total Transit lines Passing	108	85.04%	54	88.52%
Total Transit Lines Failed	19	14.96%	7	11.48%
Total Transit Lines	127	100.00%	61	100.00%

Further analysis of the difference between the modelled and the observed bus journey times presented in Table 8.2 shows that the majority of the bus services are within 5% of observed journey times for the whole model area and the Preston City Centre area across all time periods. The complete set of bus journey time summaries are presented in Appendix C.

Table 8.2 Modelled vs Timetabled Bus Journey Times by Band

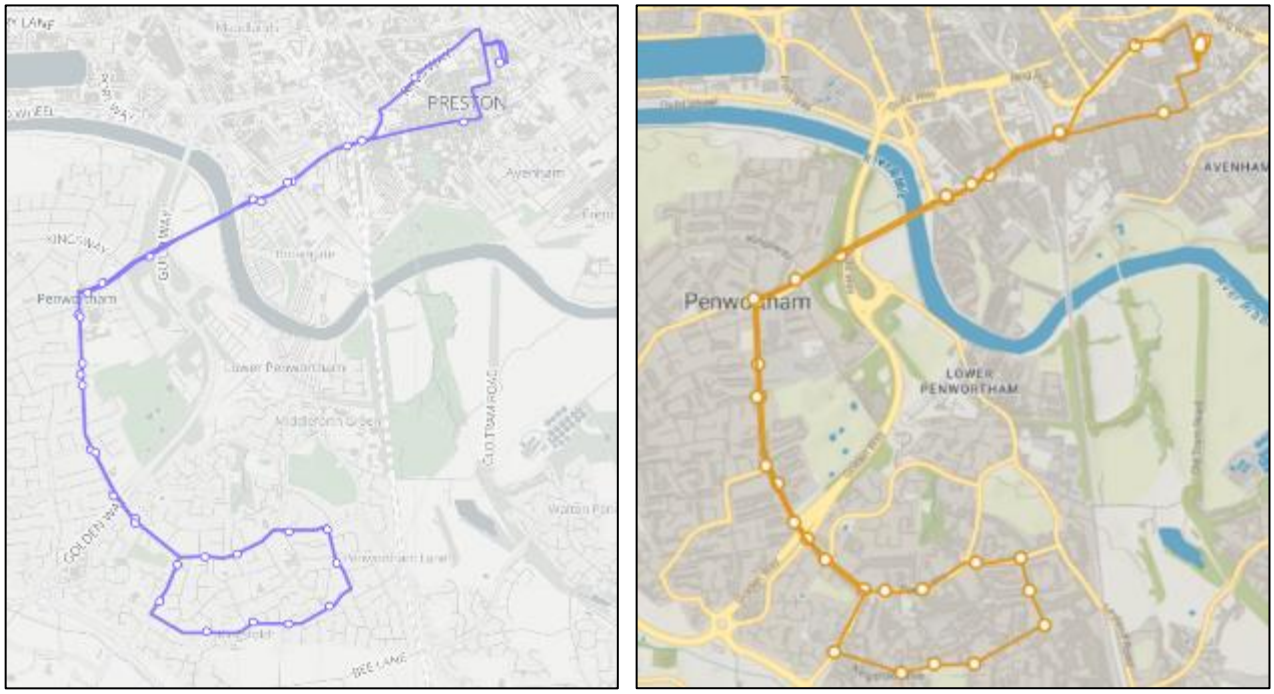
Journey Time Difference [%]		Full Model	%	Preston City Centre	%
AM Peak					
>=0	<=5	115	69.28%	56	78.87%
>5	<=10	24	14.46%	7	9.86%
>10	<=15	7	4.22%	2	2.82%
>15	<=20	5	3.01%	1	1.41%
>20	<=100	15	9.04%	5	7.04%
Total		166	100.00%	71	100.00%
Inter-peak					
>=0	<=5	74	54.81%	38	61.29%
>5	<=10	30	22.22%	10	16.13%
>10	<=15	11	8.15%	7	11.29%
>15	<=20	7	5.19%	3	4.84%
>20	<=100	13	9.63%	4	6.45%
Total		135	100.00%	62	100.00%
PM Peak					
>=0	<=5	70	55.12%	34	55.74%
>5	<=10	26	20.47%	14	22.95%
>10	<=15	12	9.45%	6	9.84%
>15	<=20	2	1.57%	2	3.28%
>20	<=100	17	13.39%	5	8.20%
Total		127	100.00%	61	100.00%

8.2.2 Bus Route Geometry

In addition to the bus journey time validation, the bus route geometry check was performed for the bus routes with high frequency within the AoDM, especially Preston City Centre.

The validation of bus routes was achieved by comparing the mapping of the routes held by a data aggregation website (bustimes.org) with those coded in the model through the automated processes. Figure 8.1 shows an example of the validation check, using Stagecoach service 3 which runs between Preston and Penwortham. All validated routes are presented in Appendix D.

Figure 8.1 Bus Route Validation Stagecoach Line 3



8.3 Calibration and Validation Results

8.3.1 Prior Matrix Calibration

The performance of the prior matrices was measured against the observed at three levels, these being:

- Link flows derived from the bus occupancy data;
- Travel in to and out of Preston City Centre, derived from ticket sales data; and
- Total boardings within each sector, also derived from ticket sales data.

The performance of the final post ME bus matrices is summarized in Table 8.3, Table 8.4, and Table 8.5 respectively. For the tables comparing link flows, percentage differences and GEH values are colour-coded, where red indicates a difference is greater than 50%, yellow indicates where the difference is between 25% and 50%, and green indicates where the difference is less than 25%. It is worth noting that many of the large differences are at sites where the observed hourly flow is low and according to the TAG validation criteria no validation metric needs to be met for these. In case of the GEH statistics, red indicates where GEH is greater than 15, yellow indicates where GEH is between 5 and 10, and green indicates where GEH is less than 5. This is for information only as TAG does not recommend GEH as a validation metric for public transport.

For Table 8.4, which considers cordon flows, TAG suggests that differences between modelled and observed should be less than 15% and the colour coding is adjusted for this.

The link level prior matrix calibration results in Table 8.3 show that there is a reasonable comparison to observed data before any matrix manipulation, with 61% of links in the AM Peak either having an observed flow below the threshold of 150 passengers per hour or meeting the criteria set out in TAG. The Interpeak and PM Peak are equally strong at 71% and 75% respectively.

At a cordon level, the results in Table 8.4 indicate that while the model is generally lower than observed there is still a reasonable comparison to the observed data in most periods and directions, with the PM Peak outbound direction having the largest difference of 41%.

Excluding the sectors of Wheelton and Elswick due to no observations, sector boardings shown Table 8.5 show that there is a strong comparison to the observed data, with 77% of sectors in the AM Peak either having an observed sector boarding total of less than 150 passengers per hour and thus falling below the recommended TAG threshold or meeting the criteria set out in TAG. The Interpeak and PM Peak both have 92% of sectors meeting the criteria.

Table 8.3 Performance of Final Prior Matrices at Links Level, Passengers per Hour

Site ID	Site name	Dir	Preston City Centre Cordon dir.	AM				IP				PM			
				Obs	Mod	diff.	GEH	Obs	Mod	diff.	GEH	Obs	Mod	diff.	GEH
1	Preston New Road	EB	-	35	77	121%	5.64	48	41	-14%	0.97	30	28	-8%	0.44
1	Preston New Road	WB	-	55	49	-11%	0.84	56	49	-12%	0.92	93	54	-42%	4.52
2	Leyland Road	NB	-	522	211	-59%	16.22	67	105	58%	4.17	113	60	-47%	5.65
2	Leyland Road	SB	-	90	89	-1%	0.12	125	104	-16%	1.92	115	126	10%	1.00
3	Preston Road	EB	-	223	48	-79%	15.09	65	32	-50%	4.70	65	24	-63%	6.19
3	Preston Road	WB	-	98	46	-53%	6.18	46	35	-24%	1.71	36	27	-25%	1.60
4	Liverpool Road	WB	Out	390	138	-65%	15.50	239	153	-36%	6.16	439	155	-65%	16.46
4	Liverpool Road	EB	In	321	277	-14%	2.55	205	168	-18%	2.73	51	87	71%	4.35
5	Leyland Road (Lwr Pnwrthm)	SEB	Out	53	84	59%	3.77	118	118	0%	0.01	154	146	-5%	0.61
5	Leyland Road (Lwr Pnwrthm)	NWB	In	298	233	-22%	4.02	63	109	74%	5.00	34	59	72%	3.61
6	Port Way	SEB	In	208	53	-75%	13.57	120	44	-63%	8.32	57	31	-46%	3.98
6	Port Way	NWB	Out	58	66	14%	1.02	62	57	-8%	0.68	64	53	-17%	1.41
7	Fylde Road	WB	Out	158	152	-4%	0.45	243	175	-28%	4.67	370	164	-56%	12.59
7	Fylde Road	EB	In	273	274	0%	0.05	166	152	-8%	1.07	75	88	18%	1.47
8	Brook Street	NWB	Out	7	50	619%	8.09	54	49	-9%	0.65	33	64	93%	4.41
8	Brook Street	SEB	In	21	87	316%	9.02	14	58	329%	7.43	19	33	74%	2.77
9	Adelphi Road	NWB	Out	214	181	-16%	2.38	151	123	-18%	2.37	216	87	-60%	10.51
9	Adelphi Road	SEB	In	169	119	-29%	4.13	134	117	-12%	1.49	105	112	7%	0.71
10	North Road	NWB	Out	358	83	-77%	18.51	120	37	-69%	9.42	100	20	-80%	10.28
10	North Road	SEB	In	68	60	-11%	0.97	158	60	-62%	9.38	152	40	-74%	11.48
11	Deepdale Road	SB	In	265	113	-57%	11.05	209	90	-57%	9.75	224	80	-64%	11.69
11	Deepdale Road	NB	Out	274	177	-35%	6.44	166	117	-29%	4.05	142	84	-41%	5.45
12	New Hall Lane	NEB	Out	45	171	280%	12.12	227	207	-9%	1.34	265	262	-1%	0.18
12	New Hall Lane	SWB	In	365	512	40%	7.01	163	269	65%	7.20	118	158	34%	3.37
13	Ribbleton Lane	NEB	Out	117	148	27%	2.71	199	136	-32%	4.85	282	115	-59%	11.90
13	Ribbleton Lane	SWB	In	187	146	-22%	3.16	101	108	7%	0.70	90	71	-21%	2.10

14	London Road	SEB	Out	447	251	-44%	10.49	184	285	55%	6.64	389	289	-26%	5.45
14	London Road	NWB	In	646	363	-44%	12.60	216	203	-6%	0.85	69	121	75%	5.34

Table 8.4 Performance of Final Prior Matrices at Preston City Centre Cordon Level, Passengers per hour

Direction	AM				IP				PM			
	Obs	Mod	diff.	GEH	Obs	Mod	diff.	GEH	Obs	Mod	diff.	GEH
In	2821	2237	-21%	11.60	1547	1379	-11%	4.40	994	880	-12%	3.74
Out	2121	1502	-29%	14.54	1761	1457	-17%	7.58	2454	1439	-41%	23.01

Table 8.5 Performance of Final Prior Matrices at Sector Level, Boardings per hour

Sector ID	Sector name	AM				IP				PM			
		Obs	Mod	diff.	GEH	Obs	Mod	diff.	GEH	Obs	Mod	diff.	GEH
2	Preston City Center	2331	2345	1%	0.27	2000	2085	4%	1.88	2177	1831	-16%	7.75
3	Cottam	248	165	-34%	5.82	137	122	-11%	1.32	90	69	-24%	2.42
4	Fulwood	473	416	-12%	2.72	368	356	-3%	0.61	370	264	-29%	5.96
5	Longsands	314	249	-21%	3.86	131	249	90%	8.56	171	241	41%	4.87
7	Bamber Bridge	236	371	57%	7.76	157	289	84%	8.83	121	206	71%	6.67
8	Lostock Hall	111	118	6%	0.65	51	78	52%	3.33	31	42	35%	1.81
9	Lower Penwortham	199	132	-34%	5.21	109	84	-23%	2.57	55	42	-23%	1.83
10	Penwortham	43	107	148%	7.38	71	84	18%	1.48	33	47	41%	2.14
11	Ashton-on-Ribble	276	263	-5%	0.79	174	204	17%	2.15	110	129	17%	1.72
12	Leyland	199	563	183%	18.68	198	399	102%	11.65	134	239	78%	7.70
13	Buckshaw Village	54	71	33%	2.25	15	62	306%	7.49	26	41	56%	2.53
14	Clayton Brook	167	110	-34%	4.82	52	91	75%	4.62	75	62	-17%	1.52
15	Whittle Woods	65	83	28%	2.10	26	62	138%	5.40	19	36	87%	3.19
16	Clayton-le-Woods	17	41	144%	4.50	9	30	225%	4.72	6	15	171%	2.97
18	Chorley	551	1005	82%	16.26	567	702	24%	5.38	397	422	6%	1.25
20	Walmer Bridge/Longton/Hutton	143	103	-28%	3.59	58	82	42%	2.90	45	50	10%	0.65
21	Samlesbury/Myerscough	40	62	56%	3.14	7	49	565%	7.88	12	38	224%	5.28

Sector ID	Sector name	AM				IP				PM			
		Obs	Mod	diff.	GEH	Obs	Mod	diff.	GEH	Obs	Mod	diff.	GEH
22	Grimsargh	45	30	-35%	2.58	13	27	110%	3.16	8	17	120%	2.64
23	Red Scar Business Park	8	30	258%	4.95	20	59	189%	6.14	60	68	14%	1.05
24	Longridge	93	75	-19%	1.95	85	57	-33%	3.38	55	32	-41%	3.44
25	Whittingham	25	14	-44%	2.50	5	11	124%	2.15	1	6	547%	2.71
26	Kirkham	113	130	15%	1.50	62	132	114%	7.17	49	91	85%	4.98
27	Newton-with-Scales/Clifton	20	28	40%	1.64	7	21	193%	3.69	5	11	110%	2.01
28	Warton	125	72	-42%	5.33	41	52	26%	1.54	46	36	-21%	1.49
29	Barton/Broughton	3	74	2327%	11.42	6	94	1372%	12.36	65	64	-1%	0.11
30	Eccleston	14	95	598%	11.03	12	81	597%	10.17	8	39	380%	6.35
31	Wheelton	0	68	-	11.63	0	47	-	9.64	0	24	-	6.98
32	Elswick	0	8	-	3.87	0	5	-	3.29	0	2	-	2.18
Total		5914	6827	15%	11.44	4382	5614	28%	17.42	4169	4164	0%	0.07

8.3.2 Matrix Estimation and Significance of Changes

After the initial assignment of the modelled network and initial adjustments to the prior demand matrices, the process of Matrix Estimation (ME) was implemented to better calibrate the model. In this process, the matrices were adjusted by the modelling software algorithms to bring the assigned flows closer to observed data.

TAG Unit M3.1 recommends that the changes brought about by matrix estimation should not be significant. It was noticed that the ME process produced a significant reduction of the demand to and from Blackburn and Wigan. The high demand in the prior matrices can be explained by the limitation of the gravity model to distribute short and medium distance trips for big zones that are close to the AoDM i.e., intrazonal trips are underestimated while the inter-zonal are overestimated. For this reason, changes brought about by matrix estimation have therefore been reported both with and without Blackburn and Wigan trips.

8.3.2.1 Matrix Totals

Although not recommended by TAG, it is important to monitor the changes brought about by matrix estimation at a matrix total level. Table 8.6 and Table 8.7 provide a comparison of matrix totals before and after matrix estimation for each time period.

Nearly all matrix total changes are within 10%, with the IP period being slightly larger at 10.7%. These changes are deemed reasonable given the synthetic nature of the trip matrix creation and trip distribution.

Table 8.6 Matrix Totals

Metric	AM	IP	PM
Prior	8,590	6,880	5,030
Post	7,957	6,180	5,183
Difference	-7.4%	-10.2%	3.0%

Table 8.7 Matrix Totals – Excluding Blackburn and Wigan Trips

Metric	AM	IP	PM
Prior	6,607	5,418	3,851
Post	6,592	5,073	4,112
Difference	-0.2%	-6.4%	6.8%

8.3.2.2 Matrix Regression

TAG provides guidance as to the degree of change expected to the 'prior' matrices resulting from calibration through the process of matrix estimation. Scatter plots of prior and post matrix estimation cell values, origin totals, and destination totals were produced in order to check these. The results of this analysis are summarised in the following tables. Additional graphical outputs can be found in Appendix E.

Table 8.8 and Table 8.9 summarise the matrix zonal cell, matrix origins and matrix destinations regression statistics, comparing the prior and post ME matrices. As outlined in Chapter 3, for matrix zonal cell regression the slope should fall between 0.98 and 1.02, the intercept should be near zero and the R^2 should be greater than 0.95. For origins and destination trip ends the slope should fall between 0.99 and 1.01, the intercept should be near zero and R^2 should be greater than 0.98.

Table 8.8 Matrix Regression Parameters

Time Period and matrix type		Slope	Slope criteria	Intercept	Intercept criteria	R2	R2 criteria
Full matrix	AM	0.709	×	0.006	✓	0.902	×
	IP	0.779	×	0.002	✓	0.937	×
	PM	0.770	×	0.004	✓	0.873	×
Origins matrix	AM	0.798	×	1.886	✓	0.978	×

	IP	0.827	×	0.782	✓	0.984	✓
	PM	0.961	×	0.602	✓	0.991	✓
Destinations matrix	AM	0.811	×	1.685	✓	0.952	×
	IP	0.790	×	1.220	✓	0.974	×
	PM	0.895	×	1.175	✓	0.984	✓

Table 8.9 Matrix Regression Parameters – Excluding Blackburn and Wigan Trips

Time Period and matrix type		Slope	Slope criteria	Intercept	Intercept criteria	R2	R2 criteria
Full matrix	AM	0.898	×	0.002	✓	0.922	×
	IP	0.884	×	0.001	✓	0.926	×
	PM	0.957	×	0.001	✓	0.909	×
Origins matrix	AM	0.955	×	-0.042	✓	0.976	×
	IP	0.916	×	-0.099	✓	0.979	×
	PM	0.980	×	0.482	✓	0.986	✓
Destinations matrix	AM	0.947	×	0.152	✓	0.985	✓
	IP	0.926	×	-0.145	✓	0.980	✓
	PM	0.999	✓	0.402	✓	0.973	×

While the model does not meet the recommended criteria set out in TAG, once Blackburn and Wigan are removed from the comparison the model compares well against the recommended criteria with all R^2 values in excess of 0.90 and nearly all slope values in excess of 0.90.

8.3.2.3 Trip Length Distribution Analysis

Table 8.10 and Table 8.11 provide trip length distribution statistics comparing the prior and post ME matrices. As set out in Chapter 3, TAG recommends that the difference of weighted average and standard deviation of trip length should be below 5%.

The trip length distribution of the prior matrices was benchmarked against NTS data as set out in Section 6.3, but observed trip length data was not available from the ticket sales data used to calibrate and validate the model. Given the scale of the model and data available during calibration the changes to trip length brought about by matrix estimation are reasonable, with most of the weighted average and standard deviation changes below 10% in all time periods.

Table 8.10 Trip Length Distribution Parameters

Time period	Weighted average				Standard deviation			
	Prior	Post	Difference	Criteria	Prior	Post	Difference	Criteria
AM	8.998	9.342	3.8%	✓	7.870	8.681	10.3%	×
IP	8.639	8.651	0.1%	✓	7.890	8.409	6.6%	×
PM	9.139	9.601	5.1%	×	7.884	8.715	10.5%	×

Table 8.11 Trip Length Distribution Parameters – Excluding Blackburn and Wigan Trips

Time period	Weighted average				Standard deviation			
	Prior	Post	Difference	Criteria	Prior	Post	Difference	Criteria
AM	8.348	9.012	8.0%	×	8.542	9.238	8.1%	×
IP	7.972	8.200	2.9%	✓	8.463	8.952	5.8%	×
PM	8.476	9.132	7.7%	×	8.588	9.426	9.8%	×

8.3.2.4 Sector Movements

TAG recommends a check of the matrix changes brought about by matrix estimation on a sector-to-sector basis. The TAG guidance on sector-to-sector comparisons of prior and post ME movements recommends that changes should be within +/-5%. While this may be an unrealistic target, in particular when prior matrices are

purely synthetic and where small absolute changes are considered it is important to monitor the changes. Rather than comparing relative percentage differences between prior and post ME matrices, the GEH statistic was considered to be more informative for the CLTM. Table 8.12 provides a summary of the range of GEH statistics for all user classes and for each time period for movements from, to, and within the study Area. The sector-to-sector GEH matrices upon which this summary is derived can be found in Appendix F – Sector to Sector Movements.

Table 8.12 ME Changes, Sector-to-Sector Movements

Time Period	GEH	Sector-to-Sector Movements in GEH Range	
		Number	%
AM	< 5	1,152	99.65%
	5 to 10	3	0.26%
	> 10	1	0.09%
IP	< 5	1,155	99.91%
	5 to 10	1	0.09%
	> 10	0	0.00%
PM	< 5	1,154	99.83%
	5 to 10	2	0.17%
	> 10	0	0.00%

8.3.3 Performance of Post ME Matrices

The performance of the final post-estimation bus matrices is summarized in Table 8.15, Table 8.16 and Table 8.17, with Figure 8.3, Figure 8.4 and Figure 8.5 illustrating the link by link comparison of modelled versus observed passengers per hour for Preston City Centre. The colour coding is the same as that described for the prior matrix. As before, some of the large differences are at sites where the observed hourly flow is low and according to the TAG validation criteria no validation metric needs to be met for these.

Figure 8.2 shows the sector system defined for analysing the bus model results.

After matrix estimation, Leyland and Chorley sectors showed a higher number of hourly boardings in the model than in the observed data. This difference was investigated, and can be explained by the limited capacity of the synthetic matrices to recreate local travel patterns of these two sectors i.e. variation in departure time, return trip time, and trip length. As described in Chapter 6, synthetic prior matrices were developed using NTEM trip ends at MSOA level, NTS trip length distribution for the region, and standard tour probabilities. It was not possible to refine the matrices further as the only source of local data was the operator data, which did not include complete origin-destination information.

Table 8.15 provides an overall summary of the bus validation summary at link level. The result is summarised separately for links greater and less than 150 passengers per hour. As recommended by TAG link flows greater than 150 have been evaluated using the criterion of a flow difference of less than 25%. Additionally, GEH criteria with a threshold of less than 5 have been employed for values below 150 passengers per hour.

The results demonstrates that after matrix estimation, the model falls short of the required threshold for flows for AM and PM with 65% of links and 44% links meeting the TAG criteria for AM and PM respectively. The Interpeak compare well with 85% link passing the TAG criteria. For links with less than 150 passengers per hour, the links pass the GEH criteria for all peaks.

All Preston City Centre cordon flows meet the TAG criteria with the exception of the PM Peak outbound which is 25% lower than observed passengers per hour.

Bus sector boardings is summarised in Table 8.14. The result is summarised separately for links greater and less than 150 passengers per hour. As recommended by TAG link flows greater than 150 have been evaluated using the criterion of a flow difference of less than 15%. Additionally, GEH criteria with a threshold of less than 5 have been employed for values below 150 passengers per hour.

The findings reveal that for sectors with greater than 150 passengers per hour, model does not meet the required TAG flow threshold for all time periods. It's important to highlight that a considerable portion of

sectors exhibit flows below 150 passengers per hour. In cases where sectors have passenger counts under 150 per hour, the links pass the GEH criteria across all peak periods.

For Sector boardings, summarised in Table 8.17, Pass/Fail criteria for is based on whether the flow is within ±15% or GEH < 5. The results demonstrate that the model compares well against overall sectored ticket sales data is less than15% for AM and PM peak and nearly 15% for IP. For the individual sector, 76% of the sector passes in AM, 71% in IP and 95% in PM.

The summary table highlights sectors in the vicinity of the A582 scheme in yellow. With the exception of Leyland during the AM peak, all sectors meet the GEH criteria for all time periods. The proposed bus scheme for A582 along B5254 is located in the Penwortham and Lostock Hall sector, both of which meet the TAG criteria for all time periods.

Table 8.13 Bus Assignment Validation Summary – Link Level

Inbound	no. link counts meeting criteria	Total	% link counts meeting criteria
AM Peak			
Links with flows > 150 (Criterion: flow difference < 25%)	11	17	65%
Links with flows < 150 (Criterion: GEH <5)	9	11	82%
Links meeting either criteria	20	28	71%
Interpeak			
Criterion: flow difference < 25%	11	13	85%
Criterion: GEH <5	14	15	93%
Links meeting either criteria	25	28	89%
PM Peak			
Criterion: flow difference < 25%	4	9	44%
Criterion: GEH <5	18	19	95%
Links meeting either criteria	22	28	79%

Table 8.14 Bus Assignment Validation Summary – Sector Level

Inbound	no. sectors meeting criteria	Total	% sector meeting criteria
AM Peak			
Criterion: Flows >150 flow difference < 15%	3	10	30%
Criterion: Flows <150 GEH <5	10	11	91%
Seector meeting either criteria	16	21	76%
Interpeak			
Criterion: Flows >150 flow difference < 15%	4	7	57%
Criterion: Flows <150 GEH <5	14	14	100%
Links meeting either criteria	15	21	71%
PM Peak			
Criterion: Flows >150 flow difference < 15%	1	4	25%
Criterion: Flows <150 GEH <5	17	17	100%
Links meeting either criteria	20	21	95%

Table 8.15 Performance of Final Post Matrices at Links Level, Passengers per hour

Site ID	Site name	Dir	Preston City Centre Cordon dir.	AM				IP				PM			
				Obs	Mod	diff.	GEH	Obs	Mod	diff.	GEH	Obs	Mod	diff.	GEH
1	Preston New Road	EB	-	35	69	97%	4.71	48	45	-5%	0.37	30	31	2%	0.12
1	Preston New Road	WB	-	55	52	-6%	0.46	56	57	3%	0.21	93	87	-6%	0.61
2	Leyland Road	NB	-	522	301	-42%	10.89	67	59	-11%	0.93	113	65	-42%	5.06
2	Leyland Road	SB	-	90	77	-15%	1.45	125	100	-20%	2.32	115	99	-14%	1.58
3	Preston Road	EB	-	223	81	-64%	11.48	65	44	-32%	2.81	65	38	-42%	3.80
3	Preston Road	WB	-	98	59	-40%	4.44	46	35	-23%	1.62	36	33	-9%	0.54
4	Liverpool Road	WB	Out	390	278	-29%	6.13	239	213	-11%	1.76	439	336	-23%	5.24
4	Liverpool Road	EB	In	321	299	-7%	1.26	205	197	-4%	0.55	51	79	54%	3.44
5	Leyland Road (Lwr Pnwrthm)	SEB	Out	53	74	39%	2.61	118	111	-5%	0.60	154	123	-20%	2.63
5	Leyland Road (Lwr Pnwrthm)	NWB	In	298	295	-1%	0.17	63	63	0%	0.02	34	59	74%	3.68
6	Port Way	SEB	In	208	83	-60%	10.34	120	73	-39%	4.73	57	35	-39%	3.29
6	Port Way	NWB	Out	58	60	4%	0.29	62	57	-8%	0.64	64	52	-18%	1.54
7	Fylde Road	WB	Out	158	152	-4%	0.50	243	223	-8%	1.33	370	275	-26%	5.29
7	Fylde Road	EB	In	273	257	-6%	0.98	166	159	-4%	0.51	75	92	23%	1.91
8	Brook Street	NWB	Out	7	43	521%	7.26	54	52	-2%	0.17	33	63	89%	4.27
8	Brook Street	SEB	In	21	63	198%	6.42	14	42	210%	5.39	19	29	51%	1.98
9	Adelphi Road	NWB	Out	214	216	1%	0.14	151	138	-8%	1.04	216	133	-38%	6.28
9	Adelphi Road	SEB	In	169	130	-23%	3.21	134	120	-10%	1.21	105	109	3%	0.35
10	North Road	NWB	Out	358	159	-56%	12.37	120	61	-49%	6.24	100	31	-69%	8.46
10	North Road	SEB	In	68	59	-13%	1.08	158	103	-35%	4.82	152	91	-40%	5.50
11	Deepdale Road	SB	In	265	173	-35%	6.25	209	165	-21%	3.20	224	161	-28%	4.52
11	Deepdale Road	NB	Out	274	244	-11%	1.87	166	146	-12%	1.56	142	98	-31%	4.00
12	New Hall Lane	NEB	Out	45	83	84%	4.75	227	158	-31%	5.00	265	216	-19%	3.18
12	New Hall Lane	SWB	In	365	328	-10%	1.98	163	159	-2%	0.32	118	145	23%	2.38
13	Ribbleton Lane	NEB	Out	117	151	29%	2.96	199	173	-13%	1.87	282	190	-33%	6.00
13	Ribbleton Lane	SWB	In	187	159	-15%	2.10	101	103	2%	0.16	90	87	-3%	0.27
14	London Road	SEB	Out	447	351	-21%	4.78	184	168	-9%	1.22	389	330	-15%	3.10
14	London Road	NWB	In	646	610	-6%	1.42	216	211	-2%	0.31	69	103	50%	3.69

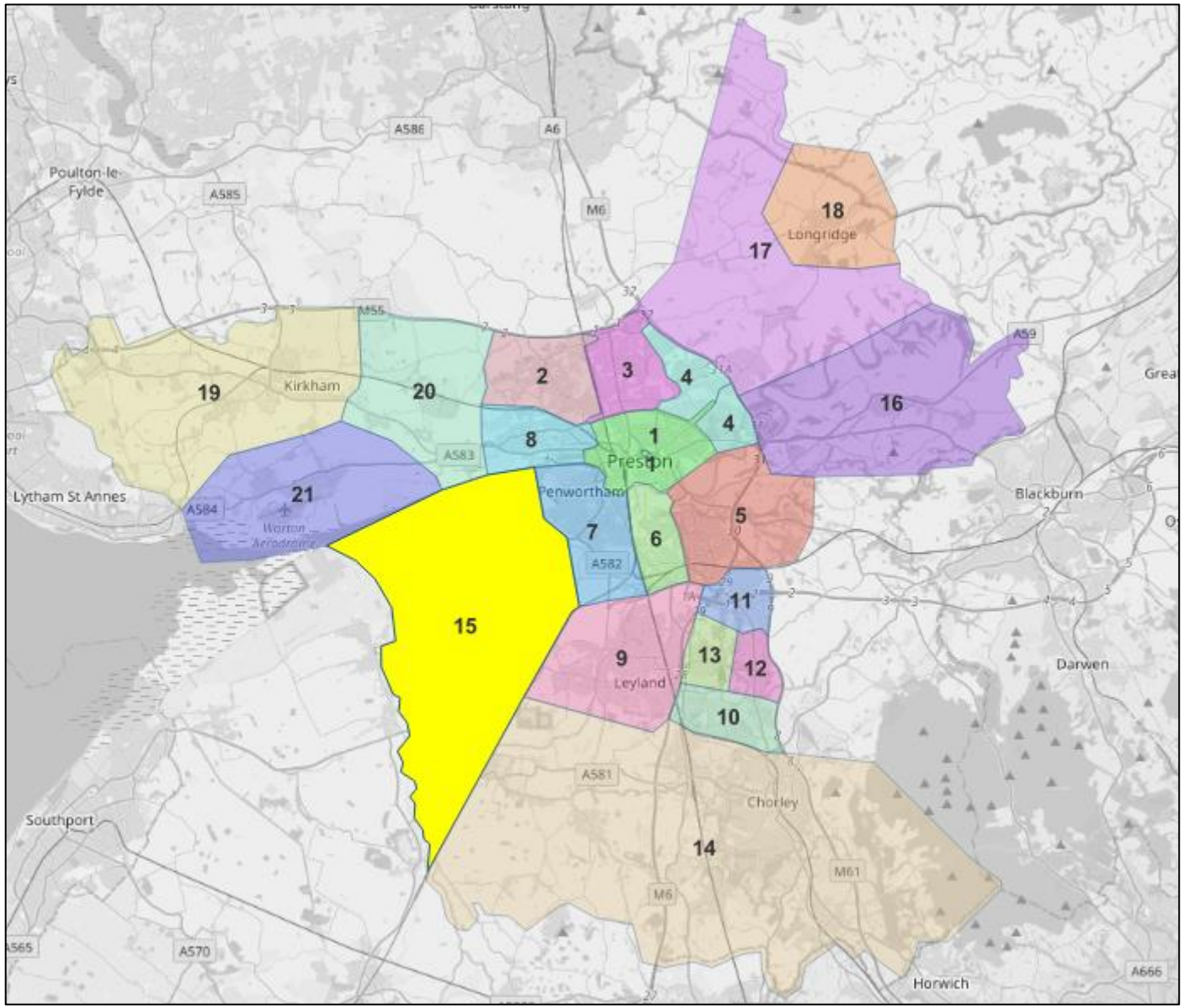
Table 8.16 Performance of Final Post Matrices at Preston City Centre Cordon Level, Passengers per hour

Direction	AM				IP				PM			
	Obs	Mod	diff.	GEH	Obs	Mod	diff.	GEH	Obs	Mod	diff.	GEH
In	2821	2456	-13%	7.10	1547	1395	-10%	3.96	994	991	0%	0.10
Out	2121	1812	-15%	6.97	1761	1499	-15%	6.49	2454	1847	-25%	13.09

Table 8.17 Performance of Final Post Matrices at Sector Level, Boardings per hour

Sector ID	Sector name	AM				Pass/Fail	IP				Pass/Fail	PM				Pass/Fail
		Obs	Mod	diff.	GEH		Obs	Mod	diff.	GEH		Obs	Mod	diff.	GEH	
1	Preston City Centre	2331	2562	10%	4.67	Pass	2000	2042	2%	0.93	Pass	2177	2169	0%	0.17	Pass
2	Cottam	248	147	-41%	7.19	Fail	137	116	-15%	1.87	Pass	90	65	-28%	2.84	Pass
3	Fulwood	473	409	-14%	3.05	Pass	368	379	3%	0.57	Pass	370	299	-19%	3.88	Pass
4	Longsands	314	278	-11%	2.09	Pass	131	244	86%	8.25	Fail	171	228	33%	4.04	Pass
5	Bamber Bridge	236	368	56%	7.60	Fail	157	262	67%	7.25	Fail	121	165	36%	3.68	Pass
6	Lostock Hall	111	160	44%	4.21	Pass	51	67	31%	2.08	Pass	31	41	32%	1.67	Pass
7	Penwortham	242	230	-5%	0.78	Pass	180	173	-4%	0.53	Pass	88	77	-13%	1.21	Pass
8	Ashton-on-Ribble	276	261	-5%	0.92	Pass	174	213	22%	2.80	Pass	110	117	6%	0.66	Pass
9	Leyland	199	414	108%	12.28	Fail	198	236	19%	2.58	Pass	134	169	26%	2.84	Pass
10	Buckshaw Village	54	72	33%	2.27	Pass	15	58	287%	7.12	Fail	26	40	54%	2.44	Pass
11	Clayton Brook	167	116	-31%	4.29	Pass	52	89	71%	4.41	Pass	75	59	-21%	1.95	Pass
12	Whittle Woods	65	83	28%	2.09	Pass	26	60	131%	5.0	Pass	19	34	79%	2.91	Pass
13	Clayton-le-Woods	17	41	141%	4.46	Pass	9	28	211%	4.42	Pass	6	14	133%	2.53	Pass
14	Chorley	565	913	62%	12.80	Fail	579	609	5%	1.23	Pass	405	544	34%	6.38	Fail
15	Walmer Bridge/Longton/Hutton	143	97	-32%	4.20	Pass	58	82	41%	2.87	Pass	45	41	-9%	0.61	Pass
16	Samlesbury/Myerscough	40	62	55%	3.08	Pass	7	45	543%	7.45	Fail	12	39	225%	5.0	Pass
17	Grimsargh	78	79	1%	0.11	Pass	38	97	155%	7.18	Fail	69	97	41%	3.07	Pass
18	Longridge	93	79	-15%	1.51	Pass	85	52	-39%	3.99	Pass	55	35	-36%	2.98	Pass
19	Kirkham	113	130	15%	1.54	Pass	62	130	110%	6.94	Fail	49	82	67%	4.08	Pass
20	Newton-with-Scales/Clifton	20	29	45%	1.82	Pass	7	22	214%	3.94	Pass	5	10	100%	1.83	Pass
21	Warton	125	68	-46%	5.80	Fail	41	51	24%	1.47	Pass	46	32	-30%	2.24	Pass
Total		**5910**	**6598**	**12%**	**8.70**		**4375**	**5055**	**15.54%**	**9.90**		**4104**	**4357**	**6%**	**3.89**	

Figure 8.2 PT Sector Map and Sector Description



Sector_ID	Sector Name
1	Preston City Center
2	Cottam
3	Fulwood
4	Longsands
4	Moor Nook
5	Bamber Bridge
6	Lostock Hall
7	Penwortham
8	Ashton-on-Ribble
9	Leyland
10	Buckshaw Village
11	Clayton Brook
12	Whittle Woods
13	Clayton-le-Woods
14	Chorley/Eccleston
15	Walmer Bridge/Longton/Hutton
16	Samlesbury/Myerscough
17	Red Scar Business Park/Grimsargh/Whittingham
18	Longridge
19	Kirkham
20	Newton-with-Scales/Clifton
21	Warton

Figure 8.3 Preston City Centre Calibration Locations – Counts (C) vs Modelled (M), Passenger per hour, AM Peak

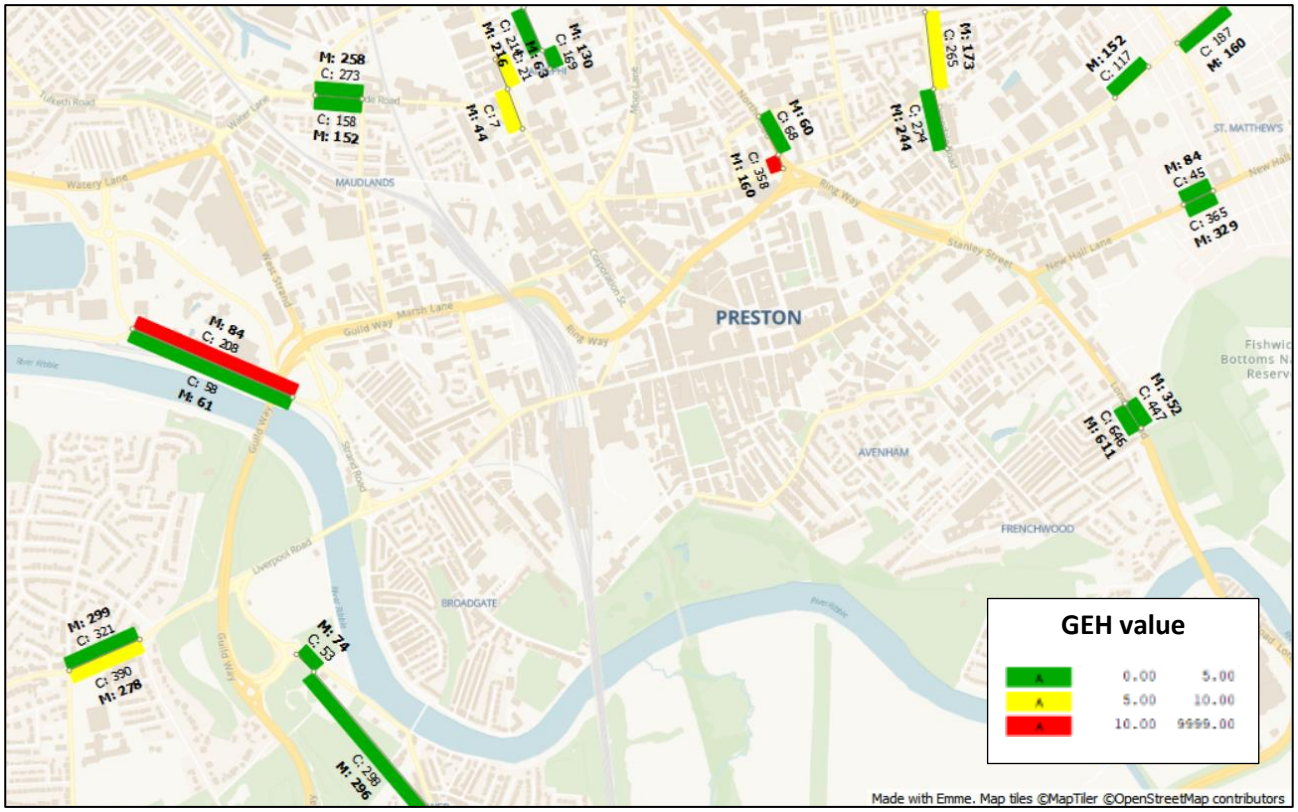


Figure 8.4 Preston City Centre Calibration Locations – Counts (C) vs Modelled (M), Passenger per hour, Interpeak

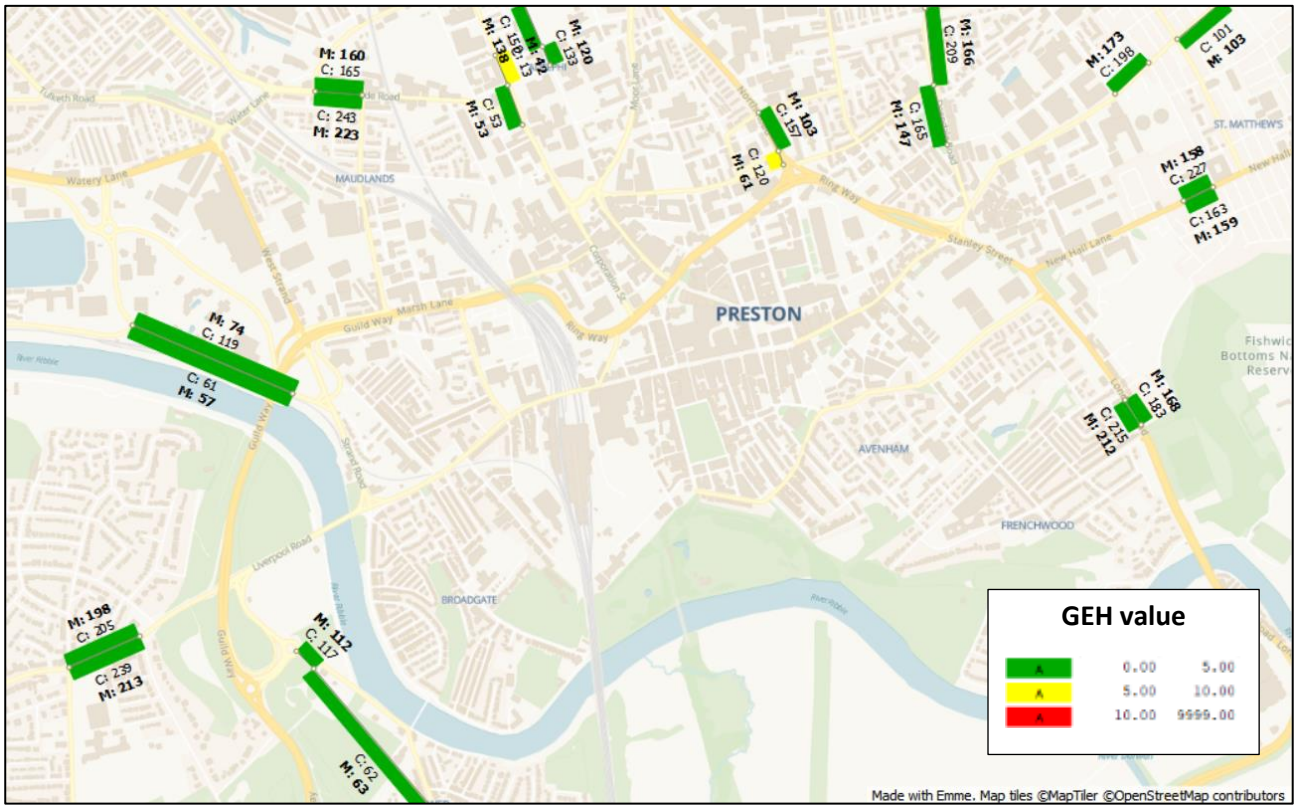
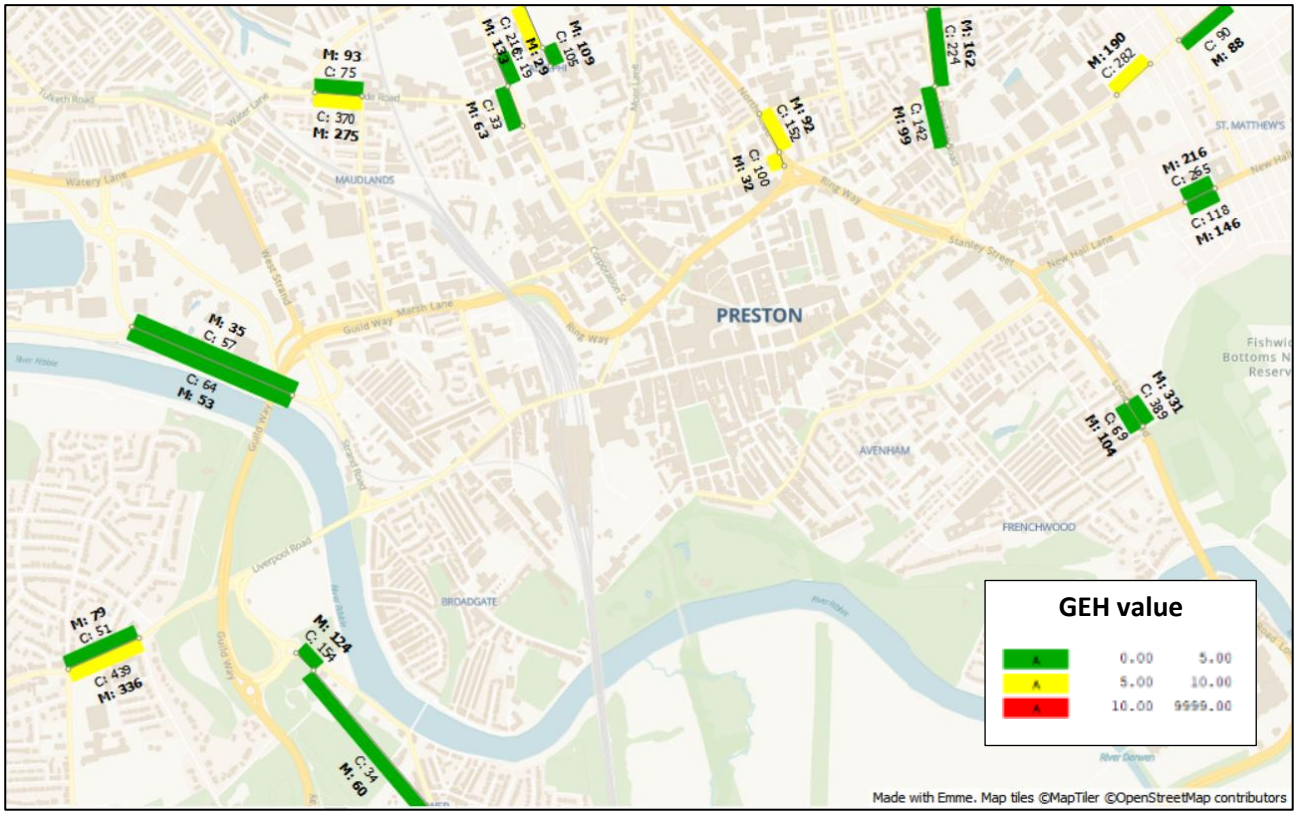


Figure 8.5 Preston City Centre Calibration Locations – Counts (C) vs Modelled (M), Passenger per hour, PM Peak



9. Rail Assignment Calibration and Validation

Following the construction of the public transport network and services and the accompanying rail demand matrices, a calibration and validation exercise was undertaken to assess the robustness of the resulting model. The validation process has been carried out in-line with current guidelines as set-out in the TAG M3.2. This states that validation should involve checks of:

- Validation of the trip matrix;
- Network and service validation; and,
- Assignment validation.

The validation of the public transport network was an on-going iterative process during the model construction. A number of assignments were undertaken to achieve a validated model. The results of the final assignment are outlined in the following sections.

9.1 Validation of Rail Matrix

Table 9.1 shows the number of rail trips assigned to the network. This indicates that all trips in the matrices have been assigned as the difference between total demand and assigned demand is the intrazonal demand within the matrices.

Table 9.1 Assigned Trip Statistics

Time period	Total demand	Assigned demand	Not assigned demand	Aux transit only demand	Total boardings	Avg lines per passenger	Passenger hours	Mean impedance
AM	2,303	2,259	0	68	2,920	1.29	4,073	108
IP	1,875	1,843	0	45	2,402	1.30	3,392	110
PM	1,934	1,897	0	60	2,390	1.26	3,335	105

9.2 Rail Assignment Validation

TAG Unit M3.2 specifies the validation criteria for public transport models and covers modelled flows on screenlines and also on individual links. No historic public transport count data was available for the project at the temporal resolution required for calibration, i.e. only annual statistics were available from the MOIRA and ORR. Additionally, a full public transport passenger survey was out of scope of the commission due to the current COVID-19 restrictions.

The public transport calibration guidelines in WebTAG Unit 3.11.2 state that "Across modelling screenlines, modelled flows should, in total, be within 15% of the observed values. On individual links in the network, modelled flows should be within 25% of the counts, except where the observed flows are particularly low (less than 150)".

The rail trips were validated based on the TAG guidance noted above, with observed combined entry and exit data sourced from MOIRA. Apart from a few small stations, the daily boarding and alighting counts validate at all stations, with differences less than 25%, except where the observed flows are particularly low (less than 150 passengers per hour).

Overall, the results show that the model provides a reasonable representation of boarding and alighting, and all large flows are modelled very well. For all stations a GEH of less than 5 is achieved. We note that GEH is not a recommended metric in TAG for public transport validation, but it has been provided here as additional information.

Table 9.2 Rail Assignment Validation– Daily Entry and Exit

Station		Observed	Modelled	[%]	GEH	Difference	GEH
ADL	Adlington (Lancs) Rail Station	354	419	18	3.3	Pass	Pass
AFV	Ansdell & Fairhaven Rail Station	129	54	-58	7.8	Pass	Fail
BBN	Blackburn Rail Station	3,544	3,095	-13	7.8	Pass	Fail
BMB	Bamber Bridge Rail Station	200	238	19	2.6	Pass	Pass
BPB	Blackpool Pleasure Beach Rail Station	334	220	-34	6.8	Fail	Fail
BPN	Blackpool North Rail Station	4,351	4,024	-8	5.0	Pass	Fail
BPS	Blackpool South Rail Station	302	256	-15	2.7	Pass	Pass
BSV	Buckshaw Parkway Rail Station	1,156	1,033	-11	3.7	Pass	Pass
CRL	Chorley Rail Station	1,660	1,501	-10	4.0	Pass	Pass
CSO	Croston Rail Station	112	148	32	3.1	Pass	Pass
CYT	Cherry Tree Rail Station	99	84	-15	1.5	Pass	Pass
DWN	Darwen Rail Station	823	836	2	0.5	Pass	Pass
EBA	Euxton Balshaw Lane Rail Station	195	203	4	0.6	Pass	Pass
ENT	Entwistle Rail Station	33	37	12	0.6	Pass	Pass
KKM	Kirkham & Wesham Rail Station	873	872	0	0.0	Pass	Pass
LAY	Layton (Lancs) Rail Station	209	91	-56	9.6	Fail	Fail
LEY	Leyland Rail Station	930	984	6	1.8	Pass	Pass
LOH	Lostock Hall Rail Station	116	119	3	0.3	Pass	Pass
LTM	Lytham Rail Station	205	248	21	2.8	Pass	Pass
MLH	Mill Hill (Lancs) Rail Station	207	209	1	0.1	Pass	Pass
MOS	Moss Side Rail Station	17	14	-20	0.9	Pass	Pass
PFY	Poulton-le-Fylde Rail Station	1,239	1,060	-14	5.3	Pass	Fail
PLS	Pleasington Rail Station	21	33	56	2.3	Pass	Pass
PRE	Preston Rail Station	14,318	14,601	2	2.4	Pass	Pass
SAS	St Annes-on-the-Sea Rail Station	334	279	-16	3.1	Pass	Pass
SLW	Salwick Rail Station	7	1	-85	2.9	Pass	Pass
SQU	Squires Gate Rail Station	64	60	-7	0.6	Pass	Pass

9.3 Rail Model Calibration

The sensitivity of a logit choice model is controlled by a scale parameter (the greater the scale parameter, the more sensitive the model is to differences in generalised cost). In the absence of any locally available information on the mode choice, scale factors for main mode choice were based on TAG Unit M2 recommended median values, which were confirmed using the realism testing. These are summarised in Table 9.3.

Table 9.3 Scale Factors for Main Mode Choice (Car vs. PT)

Trip Purpose	Minimum	Median	Maximum
Home-based work	0.50	0.68	0.83
Home-based employers business	0.26	0.45	0.65
Home-based other	0.27	0.53	1
Non-home-based employers business	0.73	0.73	0.73
Non-home-based other	0.62	0.81	1

The calibration process also involved setting mode constants (adjustments to generalised costs for one or more alternatives) in order to replicate observed choices in the base case scenario. In the base year, the model was calibrated to meet the following targets:

- proportions of rail access mode estimated from the survey conducted at Buckshaw station (33% walk, 46% park-and-ride, 18% drop off, 1% cyc bus); and
- base year demand from analysis of MND and ORR data for internal stations.

9.4 Park and Ride Results

In the absence of any new surveys within the study area, passenger surveys undertaken at Buckshaw Parkway were used to benchmark Park and Ride trips. The surveys were undertaken on three days in June 2016; Saturday 11th June, Monday 13th June and Tuesday 14th June.

The survey included passenger entry and exit counts at the single station entrance, cark park entry counts, and interviews with both boarding and alighting passengers.

The survey was undertaken by Acumen Fieldwork, using hand-held capture devices for the interviews, and manual counters for the passenger entry/exit and car park counts.

Passengers were asked what mode of transport they used to access the station. For boarding passengers, this represented the mode used to arrive at the station. For alighting passengers, this represented the mode used upon leaving the station to arrive at their final destination.

Table 9.4 compares the number of daily trips or each home-based purpose in the model and the total observed users from survey in the Buckshaw PnR. Although the percentage difference between the observed and model park and ride flows are high, the absolute differences is small and hence considered satisfactory.

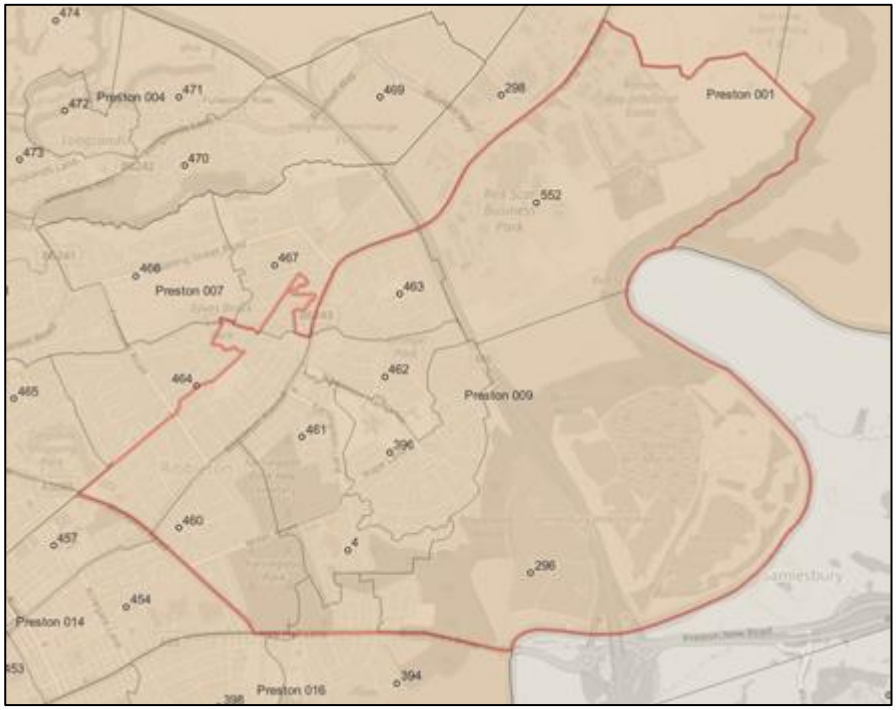
Table 9.4 Park and Ride Modelled Vs Observed

Modelled	Observed	Absolute Difference	% Difference
229	202	27	11.8%

10. Highway Assignment

As part of the bus service network updates, it was noted that the CLTM SATURN highway model did not include all bus services. These missing bus services were updated in the highway model in order to have consistent bus services in SATURN and EMME. There are no significant changes in the highway assignment results as a result of including these bus services. This check also confirmed that with the introduction of Public Transport model, the highway model calibration achieved previously has not changed significantly and still passes the TAG recommended criteria.

In addition to the above, a correction for 2 of the model zones (zones 552 and 296 located east of J31A, and to the west of J31 respectively) around the Red Scar Industrial Area was done to ensure that the traffic demand is allocated correctly to each of these zones due to an issue how the geographic coordinates are mapped.



The model update has not materially impacted the validation of the highway assignment model and still passes the TAG required criteria. Updated matrix integrity checks, calibration, validation and journey time results is included in the subsequent sections.

10.1 Matrix estimation

Following the prior matrix assignment and refining of the modelled network, the trip matrices underwent a process of 'matrix estimation' whereby trip matrices are adjusted such that the resulting assigned flows matches are able to match count data better; in a controlled as possible process.

The following parameters were used for matrix estimation:

- XAMAX – 4.0
- Number of iterations – 9

It is important when running a matrix estimation process that the original 'prior' (to estimation) trip matrices are not distorted in such a way that the underlying trip patterns are altered.

To ensure that there was minimum distortion, short screenlines (Combined constraints) were applied. Counts used as constraints in matrix estimation were derived from count data, and applied at the Car, LGV and HGV level.

In addition to the short screenline approach, a frozen cell matrix was also setup to ensure that fully observed car trips were not altered in the process, and the car trips developed through trip synthesis were primarily impacted.

All HGV and LGV trip movements were left unfrozen due to the synthetic nature of demand.

To test whether this altering process has occurred, and resulted in minimum distortion to the trip matrices, the guidelines set out within TAG unit M3-1 were applied to the prior - and post-ME matrices, as detailed below:

Table 10.1: 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 zone 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%

The significance of matrix estimation for each measure listed in the above table is described in the following section.

10.1.1 Matrix Cell Value Changes

Table 10.2 below shows for each time period and vehicle type (cars and HGVs), the cell values of the prior matrix plotted against the values in the same cell of the post matrix. The graphs are provided in Appendix H.

The guidance states that the trend line must have a gradient between 0.98 and 1.02, an intercept close to zero, and an R^2 value exceeding 0.95. It also suggests that the criteria should be met by car and total vehicle. In this study, the criteria have been separately applied to cars and HGVs to ensure that prior matrices are not significantly distorted by ME. These conditions are met for car and HGV matrices and the fit exceeds guidance by a greater margin in all time periods, which is one of the model's strengths.

Table 10.2: Summary of Matrix Cell Value Changes

Measurement		Requirement	AM		IP		PM	
			Value	Result	Value	Value	Value	Value
Total Matrix - Car	Slope	Within 0.98 and 1.02	1.000	Pass	1.000	Pass	1.000	Pass
	Intercept	Near 0	0.004	Pass	0.002	Pass	0.000	Pass
	R-Sq	> 0.95	1.000	Pass	1.000	Pass	1.000	Pass
Trip Less than 500- Car	Slope	Within 0.98 and 1.02	0.992	Pass	0.998	Pass	0.995	Pass
	Intercept	Near 0	0.006	Pass	0.003	Pass	0.002	Pass
	R-Sq	> 0.95	0.980	Pass	0.992	Pass	0.980	Pass
Total Matrix - HGV	Slope	Within 0.98 and 1.02	1.000	Pass	1.000	Pass	1.000	Pass
	Intercept	Near 0	0.001	Pass	0.002	Pass	-0.004	Pass
	R-Sq	> 0.95	1.000	Pass	1.000	Pass	1.000	Pass
Trip Less than 500- HGV	Slope	Within 0.98 and 1.02	0.999	Pass	1.001	Pass	0.993	Pass
	Intercept	Near 0	0.001	Pass	0.002	Pass	-0.003	Pass
	R-Sq	> 0.95	0.999	Pass	0.999	Pass	0.996	Pass

10.1.2 Matrix Trip End Changes

The check on how much matrix trip ends have been affected by matrix estimation is a similar one to the check on individual cell values in that the prior and post trip ends must be plotted on a graph and a trend line added. The graphs showing these are provided in Appendix H.

A trend line, with equation and R^2 value has also been plotted. The results are provided for both the full matrix and also just for trips less than 500; the latter test ensures that cells with a large number of trips do not mask changes occurring to row and column totals with lower values.

The guidance on these trend lines is the following:

- Slope to be within 0.99 and 1.01
- Intercept near zero
- R Squared in excess of 0.98

As shown Table 10.3 and Table 10.4, in majority of cases the effect of ME on trip end values fall within the guidelines prescribed by TAG for all vehicle classes. And where it is observed not passing, the values fall slightly below the TAG criteria.

Only trip end intercepts (judged to have failed if less than -3 or greater than +3) have been considered to be not meeting the criteria.

Table 10.3: Matrix Row Total Changes - Trend Line Statistics

Measurement		Requirement	AM		IP		PM	
			Value	Pass/Fail	Value	Pass/Fail	Value	Pass/Fail
Row Total - Total Car	Slope	Within 0.99 and 1.01	1.00	Pass	1.00	Pass	1.00	Pass
	Intercept	Near 0	2.00	Pass	1.33	Pass	-0.37	Pass
	R-Sq	> 0.98	1.00	Pass	1.00	Pass	1.00	Pass
Row Total - Car Trips Less than 500	Slope	Within 0.99 and 1.01	0.99	Pass	1.01	Pass	0.99	Pass
	Intercept	Near 0	4.26	Fail	1.96	Pass	2.79	Pass
	R-Sq	> 0.98	0.97	Fail	0.98	Pass	0.97	Fail
Row Total - Total HGV	Slope	Within 0.99 and 1.01	1.00	Pass	1.00	Pass	1.00	Pass
	Intercept	Near 0	0.54	Pass	0.68	Pass	-1.30	Pass
	R-Sq	> 0.98	1.00	Pass	1.00	Pass	1.00	Pass
Row Total - HGV Trips Less than 500	Slope	Within 0.99 and 1.01	0.99	Pass	1.01	Pass	0.94	Fail
	Intercept	Near 0	0.58	Pass	0.17	Pass	0.33	Pass
	R-Sq	> 0.98	0.98	Pass	0.99	Pass	0.96	Fail

Table 10.4: Matrix Column Total Changes - Trend Line Statistics

Measurement		Requirement	AM		IP		PM	
			Value	Pass/Fail	Value	Pass/Fail	Value	Pass/Fail
Column Total - Total Car	Slope	Within 0.99 and 1.01	1.00	Pass	1.00	Pass	1.00	Pass
	Intercept	Near 0	2.28	Pass	1.51	Pass	-0.34	Pass
	R-Sq	> 0.98	1.00	Pass	1.00	Pass	1.00	Pass
Column Total - Car Trips Less than 500	Slope	Within 0.99 and 1.01	0.99	Pass	0.99	Pass	1.00	Pass
	Intercept	Near 0	4.92	Fail	4.65	Fail	1.82	Pass
	R-Sq	> 0.98	0.97	Fail	0.97	Fail	0.97	Fail
Column Total - Total HGV	Slope	Within 0.99 and 1.01	1.00	Pass	1.00	Pass	1.00	Pass
	Intercept	Near 0	0.59	Pass	0.91	Pass	-1.28	Pass
	R-Sq	> 0.98	1.00	Pass	1.00	Pass	1.00	Pass
Column Total - HGV Trips Less than 500	Slope	Within 0.99 and 1.01	1.01	Pass	1.01	Pass	0.99	Pass
	Intercept	Near 0	0.26	Pass	0.35	Pass	-0.26	Pass
	R-Sq	> 0.98	0.99	Pass	0.99	Pass	0.98	Pass

10.1.3 Trip length distributions

For trip length distributions, it is stipulated in TAG that both the mean and standard deviation of the post matrix trip lengths should not differ by more than 5% from those of the prior matrices.

Whilst the change in average and standard deviation tip lengths for non E-E trips is negligible and well within guidelines, a more detailed assessment has been undertaken to derive the means and standard deviations

broken down by internal and external movements as summarised in Table 10.5 and Table 10.6 for cars and HGVs respectively. All variations except for I-I for AM peak are in line with 5% tolerance required by the TAG.

Table 10.5: ME Trip Length Distribution Changes – Cars

Measurement			Requirement	AM		IP		PM	
				Value	Pass/Fail	Value	Pass/Fail	Value	Pass/Fail
Mean Trip Length	Internal - Internal	Prior	Within 5%	6.7	Fail	6.1	Pass	6.6	Fail
	Internal - Internal	Post		6.2		5.8		6.2	
	Internal - Internal	Diff		6.44%		4.99%		5.47%	
	Internal - External	Prior	Within 5%	29.7	Pass	32.1	Pass	28.8	Pass
	Internal - External	Post		29.0		31.6		28.1	
	Internal - External	Diff		2.33%		1.31%		2.34%	
	External - Internal	Prior	Within 5%	28.1	Pass	32.7	Pass	31.0	Pass
	External - Internal	Post		27.6		31.4		30.7	
	External - Internal	Diff		1.79%		3.82%		0.88%	
	External - External	Prior	Within 5%	18.8	Pass	19.0	Pass	20.6	Pass
	External - External	Post		18.8		19.1		20.6	
	External - External	Diff		-0.07%		-0.10%		-0.29%	
	Total	Prior	Within 5%	18.3	Pass	18.5	Pass	19.7	Pass
	Total	Post		18.1		18.3		19.6	
	Total	Diff		0.80%		0.92%		0.38%	
Trip Length Standard Deviation	Internal - Internal	Prior	Within 5%	8.9	Fail	8.1	Fail	8.7	Fail
	Internal - Internal	Post		8.2		7.5		8.1	
	Internal - Internal	Diff		7.97%		7.43%		6.77%	
	Internal - External	Prior	Within 5%	45.2	Pass	50.8	Pass	42.6	Pass
	Internal - External	Post		44.0		50.0		41.4	
	Internal - External	Diff		2.71%		1.51%		2.81%	
	External - Internal	Prior	Within 5%	40.3	Pass	51.3	Pass	47.9	Pass
	External - Internal	Post		40.0		49.1		47.1	
	External - Internal	Diff		0.85%		4.29%		1.77%	
	External - External	Prior	Within 5%	44.1	Pass	47.6	Pass	47.1	Pass
	External - External	Post		44.0		47.6		47.1	
	External - External	Diff		0.15%		0.03%		-0.10%	
	Total	Prior	Within 5%	41.5	Pass	45.0	Pass	44.0	Pass
	Total	Post		41.3		44.7		43.9	
	Total	Diff		0.53%		0.60%		0.21%	

Table 10.6: ME Trip Length Distribution Changes – HGV

Measurement			Requirement	AM		IP		PM	
				Value	Pass/Fail	Value	Pass/Fail	Value	Pass/Fail
Mean Trip Length	Internal - Internal	Prior	Within 5%	8.2	Fail	7.7	Fail	6.0	Fail
	Internal - Internal	Post		9.0		8.5		6.8	
	Internal - Internal	Diff		-10.42%		-11.30%		-14.12%	
	Internal - External	Prior	Within 5%	76.1	Pass	79.4	Fail	64.8	Pass
	Internal - External	Post		75.8		72.7		67.8	
	Internal - External	Diff		0.36%		8.49%		-4.53%	
	External - Internal	Prior	Within 5%	71.2	Pass	90.8	Fail	74.7	Pass
	External - Internal	Post		69.1		82.2		75.5	
	External - Internal	Diff		2.87%		9.49%		-1.04%	
	External - External	Prior	Within 5%	32.1	Pass	30.6	Pass	33.3	Pass
	External - External	Post		32.0		30.7		32.5	
	External - External	Diff		0.37%		-0.31%		2.36%	
	Total	Prior	Within 5%	32.3	Pass	30.8	Pass	33.5	Pass
	Total	Post		32.2		30.9		32.7	
	Total	Diff		0.29%		-0.28%		2.49%	
Trip Length Standard Deviation	Internal - Internal	Prior	Within 5%	9.9	Fail	9.3	Fail	8.5	Fail
	Internal - Internal	Post		10.7		10.2		9.4	
	Internal - Internal	Diff		-8.83%		-9.52%		-10.84%	
	Internal - External	Prior	Within 5%	104.8	Pass	113.7	Fail	97.3	Pass
	Internal - External	Post		103.3		103.5		100.2	
	Internal - External	Diff		1.47%		9.01%		-3.06%	
	External - Internal	Prior	Within 5%	102.0	Pass	126.7	Fail	105.2	Pass
	External - Internal	Post		99.2		116.0		107.5	
	External - Internal	Diff		2.74%		8.42%		-2.22%	
	External - External	Prior	Within 5%	77.4	Pass	75.7	Pass	80.7	Pass
	External - External	Post		77.1		75.9		78.9	
	External - External	Diff		0.39%		-0.28%		2.22%	
	Total	Prior	Within 5%	77.5	Pass	75.9	Pass	80.8	Pass
	Total	Post		77.2		76.1		79.0	
	Total	Diff		0.39%		-0.21%		2.23%	

Figure 10-1 to Figure 10-6 compare the trip length distributions in distance bands for prior and post matrices for all time periods for both cars and HGVs. As these figures show the matrix estimation process has generally increased the number of trips within all distance bands except in PM HGV, where a decrease in trips is observed for all distance bands.

Figure 10-1: AM Car Trip Length Distribution Comparison

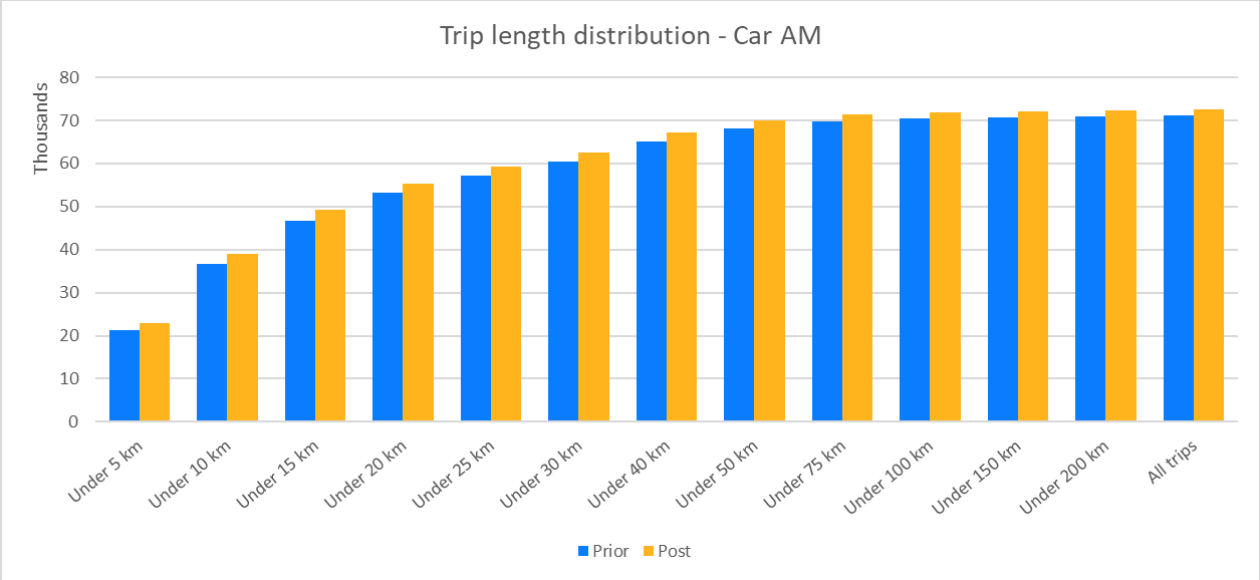


Figure 10-2: AM HGV Trip Length Distribution Comparison

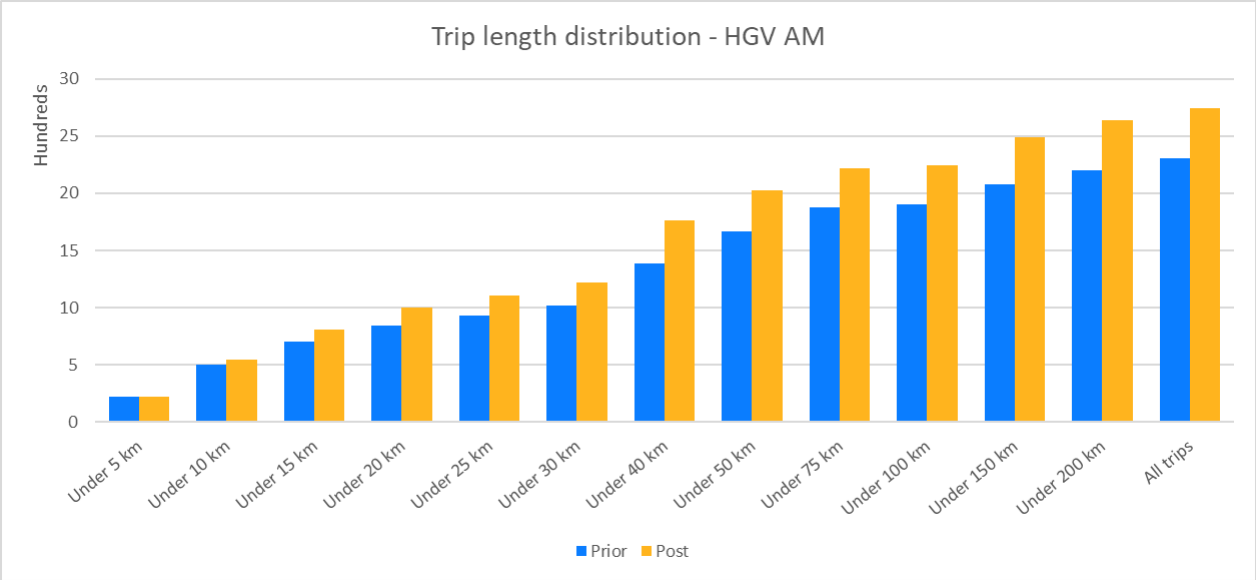


Figure 10-3: IP Car Trip Length Distribution Comparison

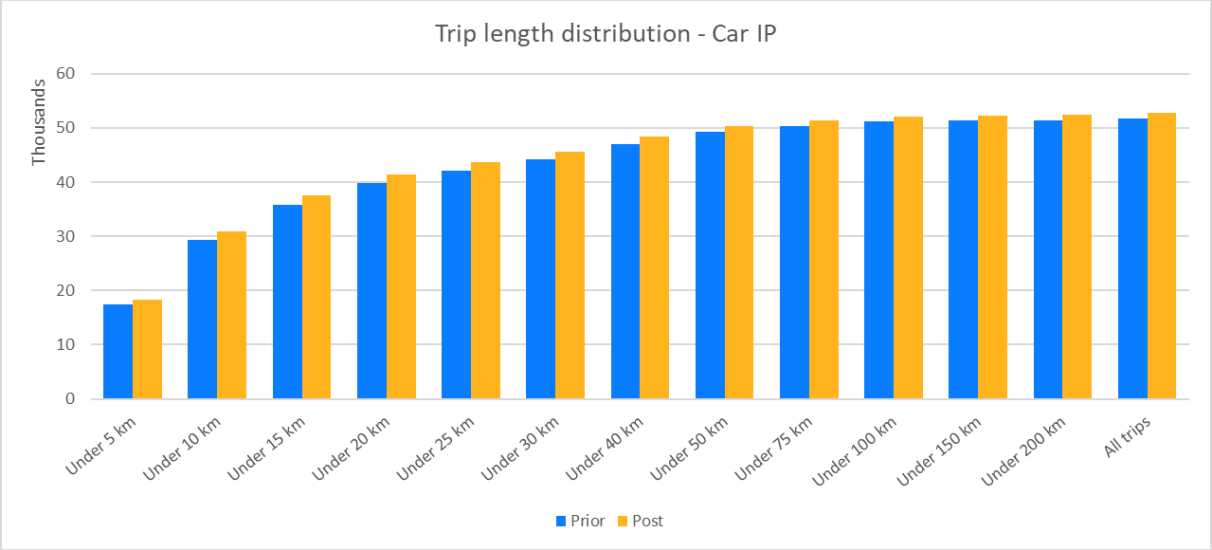


Figure 10-4: IP HGV Trip Length Distribution Comparison

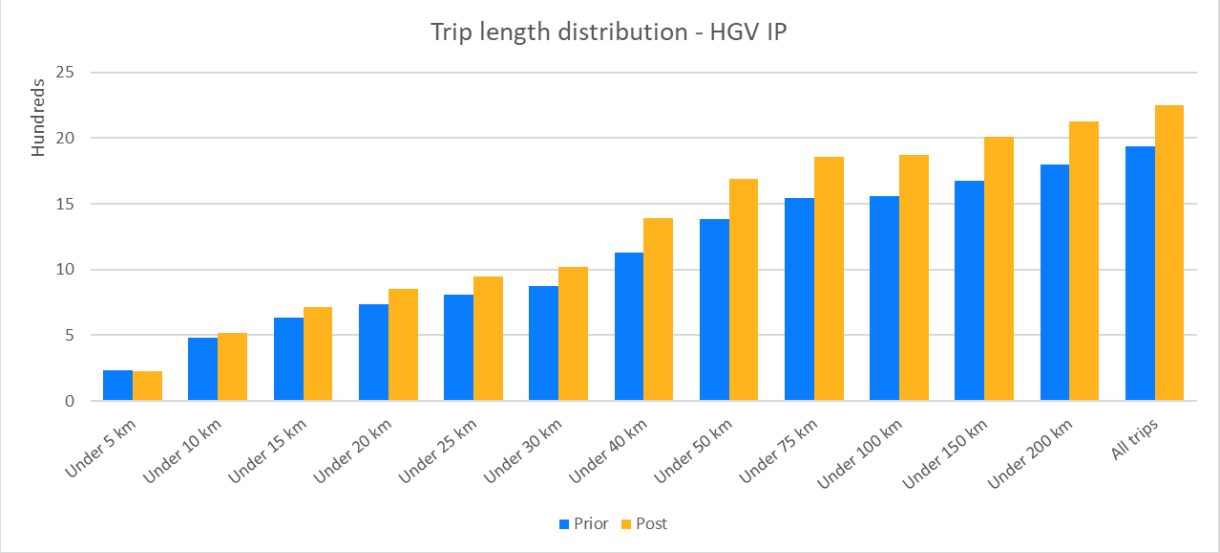


Figure 10-5: PM Car Trip Length Distribution Comparison

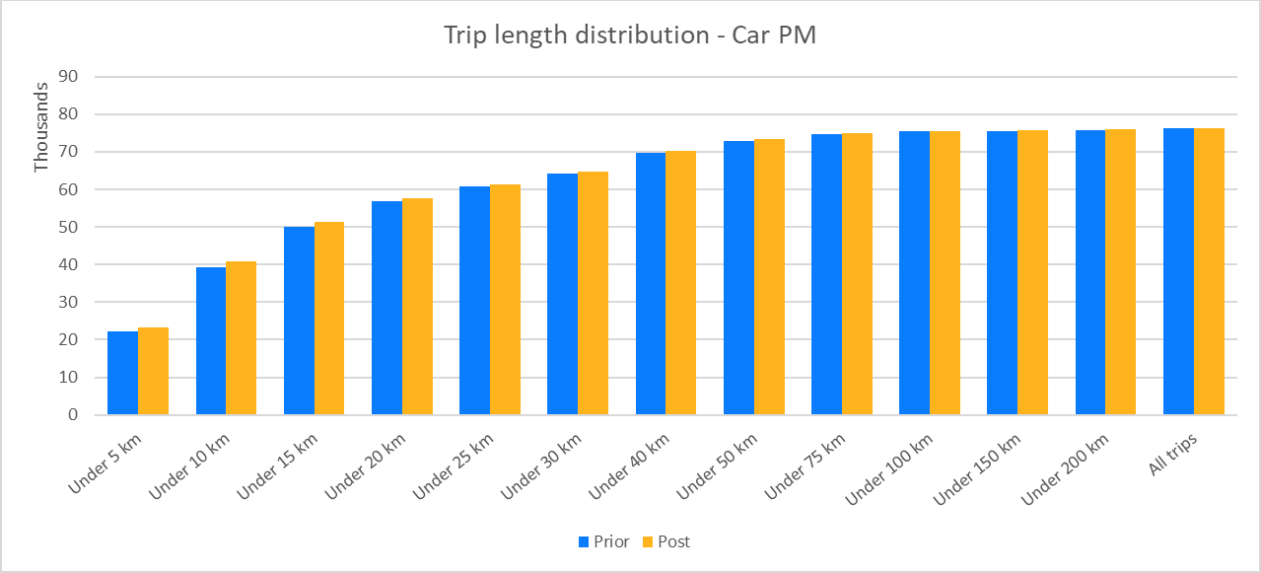
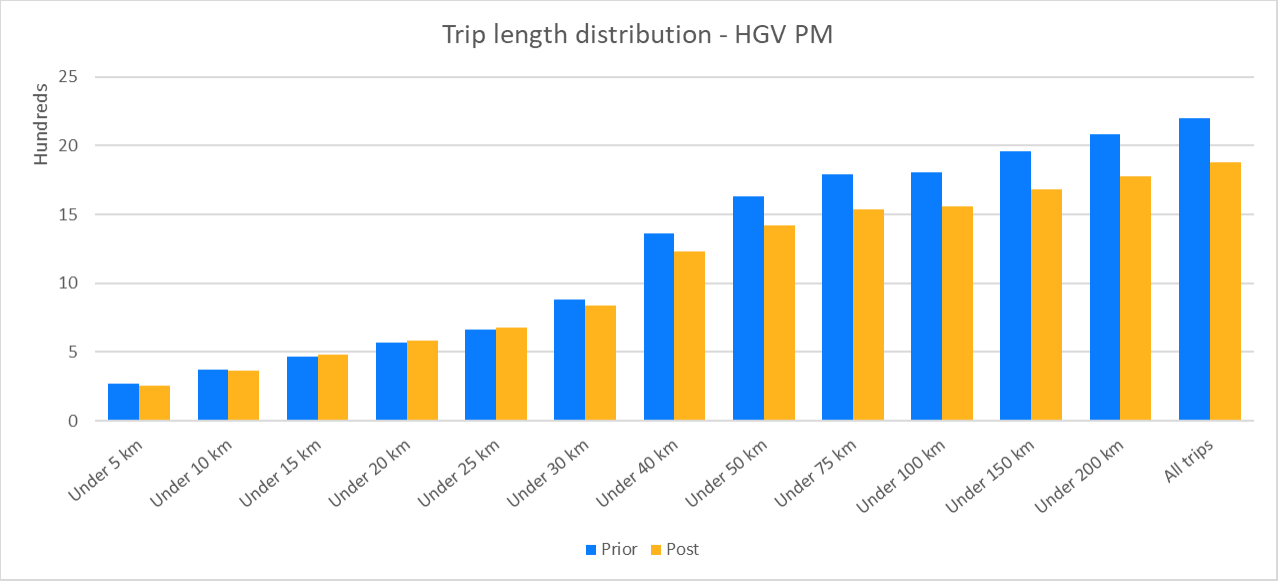


Figure 10-6: PM HGV Trip Length Distribution Comparison



10.1.4 Sector to Sector movements

Finally, the guidelines require a check on the matrix cells on a sector basis. The guidelines state that trips should not change by more than 5% prior and post Matrix Estimation.

It should be noted that a proportion of trip movements were frozen during ME to account for trips that were fully observed in the RSI matrix. As a result, some sector-to-sector movements change relatively little, compared to sector-to-sector movements with a low proportion of observed zone to zone movements.

Table 10-7, Table 10-11 and

Table 10-15 show the total trip differences between the prior and post Matrix Estimation for all time periods. The highlighted cells show sector trip movements that increase by more than 50. It is assumed that a change of less than 50 vehicles can be considered as minor given the size of the sectors. A high percentage change for the sector-to-sector movements of less than 50 is acceptable as the overall number of trips is low. Table 10-8, Table 10-12 and Table 10-16 show the percentage differences between the prior and post Matrix Estimation for sector movements for each time period. The table shows only the cell values that change by more than 50 vehicles and the percent difference is above 5% as a result of Matrix Estimation. These values are highlighted to help distinguish a pattern in all three time periods. An unmasked version of percentage difference is also included for reference purpose.

There are few sector-to-sector movements that change by more than 5%, and as expected most changes that have been factored are synthetic trip movements.

The tables also show that generally the sector-to-sector movements with the greatest differences between pre-matrix estimation and post matrix estimation contain few zone-to-zone movements that have been observed, and therefore are frozen during the matrix estimation process.

In order to further investigate the significance of these changes, the GEH values were calculated and presented in

Table 10-10, Table 10-14 and Table 10-18. There are very few sector pairs with GEH above 5 and although it is acknowledged that ME resulted in some noticeable changes at sector level the overall scale of variation from the prior is relatively minor and considered satisfactory.

The highest GEH in AM peak is observed for the following sector pairs:

- Sector 4-4: GEH 9 - Sector 4 is in north Preston area (far from the A582 scheme) and the high difference can be attributed to the fact that these are short trips that will not be captured in the RSI surveys and therefore are derived from synthetic matrix. Given the synthetic matrices use national average trip length distributions, ME process can have more significant impact on such OD pairs to match local distribution.
- Sector 9-4: GEH 9 - Sector 9 represents the inner north Preston (northeast) and lies adjacent to Sector 4 (North Preston area). The reason for the high differences is the same as above, given that the short trips are not captured in the RSI surveys, they are primarily synthetic. It should be also noted that sector 4 is a large sector consisting of 26 zones and hence the magnitude of the difference. Both sectors are far from the scheme.
- Sector 11-28: GEH 9 - Sector 11 represents the zones in the northeast outer screenline, the zones in this sector are partly outside the simulation area and consists of 22 large zones. Sector 28 represents the Preston City Centre. The difference is because the trips are not fully observed in the RSI surveys and partly uses synthetic matrices to infill those gaps.

The highest GEH in IP peak is observed for the following sector pairs:

- Sector 11-28: GEH 10 - Sector 11 represents the zones in the northeast outer screenline, the zones in this sector are partly outside the simulation area and consists of 22 zones. Sector 28 represents the Preston City Centre. The difference is because the trips are not fully observed in the RSI surveys and partly uses synthetic matrices to infill those gaps.
- Sector 24-33: GEH 8 – Sector 24 represents Leyland and sector 33 represents Tardy Gate. Sector 24 includes 22 zones and the overall increase in trips is only 85.

The highest GEH in PM peak is observed for following sector:

- Sector 7-5: GEH 7 – Sector 7 represents the zones in the western outer screenline, and Sector 5 represents Blackpool North. Both sectors lie outside the RSI screenline cordon and the trips are purely synthetic and therefore ME process has made changes to the OD trips.
- Sector 24-33: GEH 8 – Sector 24 represents Leyland and sector 33 represents Tardy Gate. Sector 24 includes 22 zones and the overall increase in trips is only 91.

Most of the sector pairs which show high differences after the ME process are either outside the RSI cordon area or are far from the scheme area. Sectors movements are likely to cross the immediate A582 study area is highlighted in blue to understand the ME changes for the scheme specific sector movements.

The changes brought by ME were necessary for improving the overall model performance and therefore is deemed to be acceptable considering the synthetic nature of some demand.

The sector-to-sector movement changes for HGVs are shown in Appendix I. The percentage difference tables only show trip movements that differ by 5% or more, and where the number of HGVs has increased by more than 50 vehicles. It should be noted that there are large percentage changes, but in terms of the total HGV trip numbers, the number of trip changes and GEH values are relatively small in most cases.

Based on the above results, the comparison of the prior and post ME matrices did not show significant distortions and therefore is considered acceptable.

Table 10-7: Sector to Sector Changes - Cars AM Trips

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
1	0	0	5	-5	3	47	-1	11	-7	-8	1	-38	2	-8	-14	3	0	-21	9	0	-6	-18	-13	-7	-2	10	-8	-12	-1	-3	1	15	-1	0
2	0	0	6	19	-2	-6	-70	17	4	0	6	8	7	3	-1	23	2	-2	23	4	4	-1	0	-2	1	2	18	-6	22	4	3	7	4	0
3	0	2	11	4	5	6	-10	9	-8	-1	-21	-27	-3	2	-5	41	0	-10	-1	-1	0	-3	-2	-2	-1	1	1	-1	32	18	-3	1	-2	0
4	-13	57	17	288	54	30	-15	59	-40	-3	-47	-92	-11	-8	-8	103	0	-16	2	0	-4	-33	-6	-11	4	7	-3	-84	-24	19	3	4	7	2
5	1	-1	6	1	0	0	-18	8	-12	-1	1	-4	-2	5	-4	22	0	-5	4	1	3	-1	-1	-1	1	-2	8	-2	-6	3	0	2	0	0
6	52	1	32	7	0	-2	-120	19	1	-1	-15	-31	1	1	-3	14	0	-6	9	1	1	-5	-1	-11	-1	0	8	-156	-30	-2	-1	2	-2	16
7	6	-1	5	13	-104	-112	-15	16	-5	0	-13	-31	-3	1	-3	9	0	-17	-8	-7	0	-12	0	-1	-1	0	8	-112	-10	-2	-1	-2	-6	2
8	4	38	15	16	35	-4	3	-3	1	-2	0	1	0	-3	-1	-6	0	-5	-4	0	0	0	0	-1	0	0	1	-14	-9	10	0	0	0	3
9	-4	1	4	193	-5	-4	-7	-6	-2	0	-67	-22	-3	-1	-3	-1	12	-4	19	-3	1	1	-1	-6	0	0	4	52	61	-1	5	21	2	1
10	-14	2	0	0	-1	-8	-1	-1	-5	4	0	16	8	4	-1	-8	0	-1	3	0	8	29	32	-24	2	5	-2	-6	-2	-5	9	14	9	0
11	-4	3	-2	52	2	-2	-4	2	23	-1	-14	-9	2	-2	-3	12	0	-6	8	0	-2	-2	-2	-2	-2	3	12	99	50	1	1	8	0	0
12	69	31	10	43	16	-25	-17	-3	-48	-29	36	26	30	-6	-25	-14	-1	-53	15	0	-40	6	-59	-44	23	75	60	-1	-94	-16	156	103	20	12
13	-14	13	2	10	3	-17	-11	-1	-9	-12	6	38	0	1	0	-8	0	0	0	-1	-8	-78	72	-59	-12	1	-4	-12	-38	-6	21	38	2	2
14	-17	2	0	-25	-14	-18	-12	-3	-5	6	-7	-29	3	1	0	-6	0	0	1	-1	51	30	31	-27	-2	-7	-5	-5	12	20	0	13	2	0
15	-10	0	0	2	-1	-5	-4	-3	-2	0	-1	-17	0	0	0	-1	0	0	0	0	4	-1	4	-10	-3	-3	-1	-5	-2	1	5	8	1	2
16	-3	52	10	76	3	-8	4	-12	-48	7	-17	-3	-2	-7	-1	13	0	-1	-4	0	2	-16	-1	-2	0	-1	29	-54	-51	13	-1	2	1	2
17	-4	0	0	1	0	0	0	0	-1	0	0	-1	0	0	0	0	0	0	0	0	0	0	1	-1	-1	0	4	0	0	0	3	0	0	0
18	-12	-1	0	3	0	-13	-4	-2	-1	0	-1	-28	0	0	0	-2	0	0	0	0	1	-3	8	-16	-5	-6	0	-10	-2	0	12	12	2	2
19	11	9	9	26	6	-18	-11	0	-18	-8	44	12	0	1	0	-7	0	0	0	0	-5	32	18	-2	9	29	-4	-20	-55	-5	19	19	1	12
20	0	1	0	1	0	0	0	2	-1	0	0	0	0	-2	0	0	0	0	0	0	-3	0	-1	-1	0	0	10	0	0	-2	6	0	0	0
21	-10	-2	-5	-20	-12	-16	-18	0	-5	-4	-4	-1	-4	-18	-4	-10	-1	-6	0	0	1	-10	-12	17	10	1	-3	-9	-16	-39	7	7	29	-2
22	-8	1	0	-2	0	-23	-3	-5	-7	-27	-1	158	9	14	-10	-9	0	-24	34	1	-19	-8	8	-18	26	47	-4	-11	-30	-33	3	2	-5	0
23	-8	-1	0	-4	-2	-8	-1	-2	-3	39	-3	18	63	23	6	-23	1	18	36	-1	-8	10	24	-11	40	19	4	-18	8	1	31	29	8	0
24	-7	0	-1	-3	-1	-9	-3	-7	-5	-12	-6	-30	-20	6	-19	-3	2	-44	43	0	-17	37	13	32	97	-13	-9	-11	-17	-36	22	20	81	0
25	13	4	1	-1	6	-12	-11	-1	-6	-10	-3	37	-15	-1	-13	-6	0	-28	5	1	-21	30	-4	6	6	34	1	-15	-15	-21	29	52	1	1
26	16	7	7	21	3	-11	-1	-3	-9	1	23	73	-3	2	-1	-3	0	-3	14	1	-4	44	14	25	38	3	3	-9	-8	1	62	22	8	3
27	-3	0	-2	-4	-7	-18	-6	-2	1	-1	-21	1	-12	-6	-4	-10	-1	-7	2	-1	-1	-11	-4	6	6	1	2	0	-29	-13	2	2	-3	-1
28	0	-18	-13	36	-11	-5	-4	-7	8	1	-32	-1	0	-2	0	65	0	0	0	0	3	0	4	1	3	4	30	16	51	25	19	19	10	-12
29	-3	11	-5	-15	10	18	19	1	12	0	-55	-38	-12	-8	-6	-4	0	-2	-16	1	0	-1	4	-10	0	8	29	-28	21	13	6	5	-1	-2
30	-4	-6	1	23	-13	-42	-19	4	10	-6	2	-11	-19	-8	-14	-10	-1	-3	-11	-1	12	-29	-15	-43	38	0	41	16	128	156	10	9	21	2
31	-2	2	0	5	-1	-15	-17	-4	-5	-2	-18	39	-3	-14	-4	-9	0	-6	-7	0	-12	-12	-23	-14	-2	9	-4	-28	-48	-4	51	30	-1	2
32	-9	0	0	0	0	-7	-7	-4	1	4	-6	-38	19	0	6	-12	0	7	29	0	-8	13	-4	-8	8	4	28	-14	-31	0	84	10	-2	0
33	-5	0	0	-1	0	-11	-6	-2	1	-2	-4	-16	-9	-6	-7	-9	0	-7	-6	0	4	-7	-27	53	12	5	10	-8	44	70	15	15	1	1
34	0	0	1	-4	1	-12	-4	2	-7	-1	-1	-14	-3	-2	-5	7	0	-9	-7	0	0	-2	-1	-1	-1	0	1	-4	5	0	-3	1	-1	0

Table 10-8: Sector to Sector % Changes - Cars AM Trips (Unmasked)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
1	0%	0%	0%	0%	0%	21%	0%	0%	0%	0%	0%	-8%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
2	0%	0%	0%	0%	0%	0%	-19%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
3	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	80%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	39%	0%	0%	0%	0%	0%
4	0%	65%	0%	31%	84%	0%	0%	66%	-7%	0%	-18%	-31%	0%	0%	0%	22%	0%	0%	0%	0%	0%	-52%	0%	0%	0%	0%	0%	-38%	0%	0%	0%	0%	0%	0%
5	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
6	48%	0%	56%	0%	0%	0%	-20%	0%	0%	0%	0%	-30%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-57%	0%	0%	0%	0%	0%	0%
7	0%	0%	0%	0%	-19%	-18%	0%	0%	0%	0%	0%	-48%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-38%	0%	0%	0%	0%	0%	0%
8	0%	58%	0%	0%	38%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
9	0%	0%	0%	56%	0%	0%	0%	0%	0%	0%	-41%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	15%	14%	0%	0%	0%	0%	0%
10	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	22%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
11	0%	0%	0%	109%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	122%	40%	0%	0%	0%	0%	0%
12	19%	46%	0%	30%	0%	0%	0%	0%	-36%	0%	13%	0%	0%	0%	0%	0%	0%	-6%	0%	0%	-33%	0%	-33%	-24%	0%	42%	28%	0%	-22%	0%	70%	37%	0%	0%
13	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-12%	34%	-31%	0%	0%	0%	0%	-32%	0%	0%	43%	0%	0%
14	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	31%	35%	19%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
15	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
16	0%	98%	0%	14%	0%	0%	0%	0%	-22%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-32%	-8%	0%	0%	0%	0%	0%
17	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
18	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
19	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	40%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	13%	0%	0%	0%	0%	0%	0%	-29%	0%	0%	0%	0%	0%
20	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
21	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-13%	0%	0%	0%	0%
22	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	33%	0%	0%	0%	0%	0%	0%	19%	0%	0%	0%	0%	0%	0%	27%	0%	0%	-40%	-48%	0%	0%	0%	0%
23	0%	0%	0%	0%	0%	0%	0%	0%	0%	27%	0%	0%	31%	0%	0%	0%	0%	0%	48%	0%	0%	0%	0%	0%	22%	0%	0%	0%	0%	0%	41%	0%	0%	0%
24	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-65%	51%	0%	0%	26%	0%	0%	42%	0%	0%	0%	0%	-25%	0%	0%	91%	0%
25	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	13%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	18%	0%	0%	0%	0%	0%	46%	0%	0%
26	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	19%	0%	0%	0%	0%	0%	0%	0%	0%	0%	12%	0%	0%	24%	0%	0%	0%	0%	0%	57%	0%	0%	0%
27	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
28	0%	0%	0%	21%	0%	0%	0%	0%	0%	0%	-53%	0%	0%	0%	0%	41%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	15%	0%	0%	0%	0%	0%
29	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-26%	-20%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
30	0%	0%	0%	0%	0%	-26%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-34%	32%	0%	25%	0%	30%	29%	0%	0%	0%	0%
31	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	15%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-38%	0%	25%	14%	0%	0%
32	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-10%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-30%	0%	47%	0%	0%	0%
33	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	43%	0%	0%	0%	0%	25%	34%	0%	0%	0%	0%
34	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Table 10-9: Sector to Sector % Changes - Cars AM Trips (Masked)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-19%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	-	65%	-	31%	84%	-	-	66%	-	-	-	-31%	-	-	-	22%	-	-	-	-	-	-	-	-	-	-	-	-38%	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	48%	-	-	-	-	-	-20%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-57%	-	-	-	-	-	-
7	-	-	-	-	-19%	-18%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-38%	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	-	-	-	56%	-	-	-	-	-	-	-41%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15%	14%	-	-	-	-	-
10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	-	-	-	109%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	122%	-	-	-	-	-	-
12	19%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-6%	-	-	-	-	-33%	-	-	42%	28%	-	-22%	-	70%	37%	-	-
13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-12%	34%	-31%	-	-	-	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	31%	-	-	-	-	-	-	-	-	-	-	-	-	-
15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	-	98%	-	14%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-32%	-8%	-	-	-	-	-
17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-29%	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-	-	-	-	-	33%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-	-	-	-	-	-	31%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	42%	-	-	-	-	-	-	-	91%	-
25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	46%	-	-	-
26	-	-	-	-	-	-	-	-	-	-	-	19%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	57%	-	-	-	-
27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	41%	-	-	-	-	-	-	-	-	-	-	-	-	15%	-	-	-	-	-
29	-	-	-	-	-	-	-	-	-	-	-26%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30%	29%	-	-	-	-
31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25%	-	-	-
32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	47%	-	-	-
33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	43%	-	-	-	-	-	34%	-	-	-	-
34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 10-10: Sector to Sector GEH Values- Cars AM Trips

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
1	0	0	0	0	0	3	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0
4	0	5	0	9	6	0	0	5	2	0	3	6	0	0	0	4	0	0	0	0	0	5	0	0	0	0	0	6	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	4	0	4	0	0	0	5	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0
7	0	0	0	0	5	5	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0
8	0	4	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	9	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	4	0	0	0	0	0
12	3	3	0	3	0	0	0	0	5	0	2	0	0	0	0	0	0	2	0	0	4	0	5	3	0	5	4	0	5	0	9	6	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5	5	0	0	0	0	4	0	0	4	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	3	2	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	6	0	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	2	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	4	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	2	0	0	0	0	0	0	3	0	0	4	5	0	0	0	0
23	0	0	0	0	0	0	0	0	0	3	0	0	4	0	0	0	0	0	4	0	0	0	0	0	3	0	0	0	0	0	3	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	4	0	0	3	0	0	6	0	0	0	0	3	0	0	7	0
25	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	4	0	0
26	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	2	0	0	3	0	0	0	0	0	5	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	0	3	0	0	0	0	0	0	5	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0
29	0	0	0	0	0	0	0	0	0	0	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	3	0	3	0	6	6	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	3	2	0
32	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	6	0	0	0
33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	3	5	0	0	0	0
34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 10-11: Sector to Sector Changes - Cars IP Trips

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
1	0	0	1	-3	0	15	-2	0	-10	-12	0	-11	19	-30	-17	-4	1	-24	15	0	-10	-20	-22	-15	-4	26	-9	-11	-15	-6	3	13	-7	0
2	0	0	2	15	-1	0	-7	8	-2	-1	2	-3	2	-5	-5	10	1	-8	18	3	-3	-2	-4	-5	-1	2	-5	-14	1	-5	-1	3	-1	0
3	1	1	8	34	2	7	4	3	-3	-1	-13	-13	-1	0	-3	0	0	-6	5	0	-1	-2	-2	-3	-3	2	-7	-8	-10	-1	0	-1	5	0
4	-3	45	8	90	16	23	-3	32	42	-3	-42	-50	-7	-1	-5	2	-1	-9	11	1	-10	-14	-8	-13	-7	10	-24	-34	-4	8	0	4	-1	1
5	1	0	3	8	0	0	-2	4	-7	-3	3	-7	-5	-7	-7	9	0	-10	6	2	-2	-2	-4	-6	-1	0	-9	-14	-11	-6	0	0	-2	0
6	40	4	24	5	0	-1	-24	5	0	-5	2	-27	-9	-5	-8	12	-1	-11	3	2	-3	-10	-5	-12	-3	5	-9	-17	15	-8	-2	-1	-2	29
7	7	25	5	-1	-99	-56	17	13	-3	-2	-2	-13	-6	-1	-4	4	-1	-4	-11	0	-1	-2	-1	-3	-2	0	-7	-13	12	-3	-2	-4	-2	3
8	3	27	3	0	-4	6	36	-1	-9	0	-6	-9	-2	-1	-1	-12	0	-1	-3	0	-1	-2	-1	-3	-1	-1	-2	-7	7	1	0	-1	-2	0
9	-7	23	6	-29	-2	6	-7	-11	7	-1	-23	-20	-3	-4	0	-62	6	-2	2	6	0	-13	-6	-9	-2	13	-16	44	50	-6	-3	1	-3	1
10	-9	0	0	-5	-4	-3	-1	-1	-2	4	-1	-11	-14	4	0	0	0	0	-6	0	6	-4	45	-6	6	2	-4	-4	-1	0	0	8	-2	1
11	2	6	-3	0	1	0	-2	1	15	0	8	-1	8	-1	1	-1	1	1	22	0	-1	0	-2	-2	0	9	-1	93	15	3	2	3	-1	0
12	13	6	0	-36	-10	-42	-15	-6	-3	-18	-10	37	19	-11	9	-6	0	16	5	0	-7	2	-27	-41	-15	90	-14	2	6	-8	47	48	-10	5
13	21	11	2	-9	-7	-18	-6	-2	-2	-16	5	5	0	1	0	-3	0	0	0	1	-1	-92	75	-13	25	0	-21	-6	-3	-5	-1	26	-3	3
14	-19	5	0	0	-6	0	4	0	-3	0	-2	-13	0	0	0	4	0	0	1	-1	12	6	2	-8	-1	-1	-4	-3	5	7	-6	9	0	0
15	-8	0	1	-7	-5	-9	-6	-1	-1	0	3	-11	0	0	0	-2	0	0	0	0	2	-5	9	-5	4	1	-4	-2	-2	-1	0	8	-1	4
16	-2	12	6	49	-2	0	5	-10	-45	-1	-9	-15	-2	1	-1	-3	0	-1	15	3	0	-2	-2	-9	4	2	-21	-46	-36	17	-3	4	1	3
17	-1	1	0	-1	0	-4	-1	-1	0	0	0	0	0	0	0	0	0	0	0	0	-1	0	1	1	0	0	-1	0	0	0	0	1	0	1
18	-11	-1	1	-13	-4	-13	-6	-1	-1	0	2	-20	0	0	0	-1	0	0	0	0	1	-10	20	-11	6	1	-3	-3	-1	-1	-1	14	-2	6
19	16	20	13	3	1	-3	-16	-6	2	-7	29	2	0	1	0	-4	0	0	0	0	-5	20	14	26	8	18	-27	-10	2	-7	0	17	-3	23
20	0	2	0	0	0	0	0	0	1	0	0	0	1	-1	0	-1	0	0	0	0	-2	0	-2	-1	0	0	-4	-1	0	0	2	0	0	0
21	-1	1	0	-9	-3	-1	2	0	0	6	2	5	-2	1	0	2	0	-1	-1	0	0	-3	6	13	3	4	3	-4	0	8	11	9	9	0
22	-8	0	0	-12	-2	-7	-4	-4	-4	-19	0	30	-115	15	-9	-2	0	-18	7	0	-3	37	14	-31	10	-43	-16	-12	-7	-22	-8	8	-8	1
23	-19	-4	-1	-9	-6	-2	1	0	-5	36	-7	-28	56	20	8	0	1	14	25	-1	11	10	24	-4	8	-4	-13	-5	-5	5	6	7	-1	0
24	-17	-5	-1	-15	-10	-6	-2	-1	-8	-8	-7	-35	-15	-2	-11	-2	0	-21	20	-1	28	24	31	15	28	-6	-6	-6	-10	-9	6	12	85	0
25	-3	0	0	-7	-2	-1	-3	0	-4	-2	0	28	7	-7	-6	3	0	-11	9	0	7	43	8	39	8	35	8	5	11	32	25	56	16	0
26	9	2	2	-5	-3	-4	-8	-2	1	2	5	46	-27	-1	-1	0	0	-2	2	0	1	-1	24	10	31	-1	-2	13	5	-1	49	30	2	1
27	-14	4	-1	27	-5	0	1	2	16	0	3	32	-6	-2	2	14	0	0	0	-1	11	-6	-13	-2	5	3	-3	15	33	16	9	18	0	-1
28	-5	-33	-5	-46	-28	-9	-12	7	44	0	-3	16	-4	-6	0	-25	0	0	-4	0	-5	-4	-11	4	3	5	-17	-1	14	-13	16	28	-1	-4
29	-10	2	-9	-48	-19	-4	-3	-5	40	-3	-32	-9	-8	-3	-1	-36	3	-1	9	0	0	-10	-6	-8	-1	3	-33	-15	74	45	0	12	18	-3
30	-1	3	-1	-2	-4	-1	1	1	-8	1	5	8	-3	21	0	17	0	-1	3	0	28	-17	-13	-15	12	7	-4	-9	35	85	8	10	8	0
31	-2	3	0	-9	-2	-2	-3	0	-4	2	-6	50	0	-12	3	-4	1	1	5	1	6	-10	4	-2	7	33	-7	2	2	25	52	35	0	1
32	-4	1	0	-10	-2	-4	-5	0	-3	4	-1	29	11	2	5	0	1	9	7	0	7	-6	-4	-7	33	25	2	4	0	14	32	15	0	0
33	-3	-1	1	-4	-2	1	-3	2	1	0	-1	1	0	5	0	4	0	0	-1	0	12	-2	-9	65	12	7	7	2	17	27	4	7	1	0
34	0	0	0	15	0	4	0	5	8	0	0	-1	0	-1	-1	-2	0	-2	12	0	0	-1	-1	-1	0	1	-3	-6	-7	-1	0	1	0	0

Table 10-12: Sector to Sector % Changes – Car IP Trips (Unmasked)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
1	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-24%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
2	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
3	0%	0%	0%	25%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
4	0%	67%	0%	15%	0%	0%	0%	21%	13%	0%	-20%	-39%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-30%	0%	0%	0%	0%	0%	0%
5	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
6	50%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
7	0%	0%	0%	0%	-31%	-14%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
8	0%	0%	0%	0%	0%	0%	51%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
9	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-25%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	29%	17%	0%	0%	0%	0%	0%
10	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	36%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
11	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	235%	0%	0%	0%	0%	0%	0%
12	0%	0%	0%	-35%	0%	-44%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-34%	0%	65%	0%	0%	0%	0%	66%	41%	0%	0%
13	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-16%	47%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
14	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
15	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
16	0%	0%	0%	13%	0%	0%	0%	0%	-32%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-33%	-8%	0%	0%	0%	0%	0%
17	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
18	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
19	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
20	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
21	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
22	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	8%	-20%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-18%	0%	-12%	0%	0%	0%	0%	0%	0%	0%	0%
23	0%	0%	0%	0%	0%	0%	0%	0%	36%	0%	0%	41%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
24	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-35%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	14%	0%	0%	0%	0%	0%	0%	0%	0%	0%	113%	0%
25	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	40%	0%	21%	0%	0%	29%	0%	0%	0%	56%	0%	86%	0%	0%
26	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	32%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	20%	0%	0%	0%	0%	0%	0%	68%	35%	0%	0%
27	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	32%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	16%	0%	0%	0%	0%	0%
28	0%	-29%	0%	-18%	0%	0%	0%	0%	30%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
29	0%	0%	0%	-12%	0%	0%	0%	0%	16%	0%	-23%	0%	0%	0%	0%	-9%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-13%	0%	11%	25%	0%	0%	0%	0%
30	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	25%	34%	0%	0%	0%	0%
31	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	71%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	69%	0%	0%	0%	0%	33%	40%	0%	0%
32	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	45%	0%	0%	0%	0%	34%	0%	0%	0%	0%
33	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	83%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
34	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Table 10-13: Sector to Sector % Changes – Car IP Trips (Masked)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	-	-	-	15%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	-	-	-	-	-31%	-14%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-25%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	235%	-	-	-	-	-	-
12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	65%	-	-	-	-	-	-	-	-
13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-16%	47%	-	-	-	-	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-	-	-	-	-	-	-20%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-	-	-	-	-	-	41%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	113%	-	-
25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	86%	-	-	-
26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11%	-	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	34%	-	-	-	-
31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33%	-	-	-
32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	83%	-	-	-	-	-	-	-	-	-	-
34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 10-14: Sector to Sector GEH Values- Cars IP Trips

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
1	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	5	0	4	0	0	0	2	2	0	3	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	6	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	0	0
12	0	0	0	4	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	7	0	0	0	5	4	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	5	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	2	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	2	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	2	5	0	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	3	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	8	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	3	0	3	0	0	0	4	0	6	0	0
26	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	5	3	0	0
27	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
28	0	3	0	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29	0	0	0	3	0	0	0	0	2	0	3	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0	3	3	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	4	3	0	0
32	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	3	0	0	0
33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 10-15: Sector to Sector Changes - Cars PM Trips

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
1	0	0	2	9	1	36	8	4	9	-17	-3	-1	12	-13	-7	9	-2	-11	17	0	-17	-5	-26	-7	28	9	-18	-17	-46	-21	5	17	2	0
2	0	0	3	7	-1	-5	-2	-7	4	0	-7	6	13	-3	1	6	2	1	18	5	-2	1	-2	-4	5	3	-1	-2	8	-4	5	11	1	0
3	4	2	10	-29	0	-1	-1	10	-6	-1	-18	-13	-1	-3	-2	-38	0	-4	4	0	-3	-1	-4	-1	3	2	-14	-19	-35	-1	-1	0	-1	0
4	-8	17	8	67	-2	-14	-3	13	76	-8	-43	-69	-2	-43	-4	-93	0	-8	17	0	-25	-12	-19	-10	6	11	0	-24	-49	-34	11	20	-5	0
5	3	2	8	11	0	0	39	4	-1	-1	3	6	9	-6	1	3	1	0	14	4	-2	0	-3	-4	18	2	-5	-9	4	-7	1	4	1	1
6	45	-8	35	-55	0	-3	-88	-7	-5	-7	-9	-66	-18	-6	-5	1	-1	-9	-19	3	-3	-20	-9	-17	3	-1	-6	-14	48	-24	-5	-2	-2	4
7	-7	-63	4	-50	-132	-109	0	46	1	-2	-6	-34	-14	2	-6	9	-1	-5	-13	-2	1	-4	-3	-5	-1	-2	-6	21	23	-2	-3	-3	0	-3
8	6	41	16	102	24	-19	18	-2	-13	-1	4	-8	2	-2	0	-12	0	-1	-1	8	-1	-2	-1	-4	0	1	-2	-3	6	2	-1	-1	0	5
9	-2	11	-1	-33	-18	-3	-2	-17	3	-2	-30	-25	-1	-9	-2	-123	4	-2	46	1	-2	-2	-10	-17	0	2	-25	16	55	-29	-9	13	-1	3
10	-9	-1	0	-4	-4	-5	-3	-1	-2	5	-1	-12	5	11	0	0	0	-1	2	0	2	8	63	-21	2	4	-3	0	1	-5	1	4	-2	1
11	19	13	0	44	5	11	2	7	35	1	22	23	21	-3	2	4	0	4	26	0	4	4	-4	-1	5	8	-9	47	-1	6	13	7	1	0
12	59	42	14	24	1	-13	-23	1	-3	-89	9	-110	46	-25	-21	-24	0	-37	10	0	11	-100	-77	-47	86	72	-62	-8	-45	22	82	46	6	15
13	10	8	3	-7	-10	-11	-6	-3	-3	-28	10	2	0	3	0	-8	0	0	0	-1	-4	-78	108	-50	28	25	-37	7	-14	-22	17	13	-1	6
14	-11	-6	4	-6	3	0	7	-3	-1	7	-8	-13	2	3	0	-2	0	0	0	-2	8	23	25	5	5	-1	3	5	1	3	4	5	2	-3
15	-9	-3	2	-7	-7	-9	-2	-1	0	0	6	-28	0	0	0	-3	0	0	0	0	2	-3	10	-18	-2	0	-3	-1	-1	0	4	4	-1	5
16	-6	5	11	17	-9	-21	-13	-24	-16	-1	-20	-16	-4	-3	0	-3	0	0	38	0	-3	-1	-6	-8	3	0	-10	-21	12	6	5	19	-3	0
17	-1	2	1	-2	-1	-1	-1	0	-2	0	1	-1	0	0	0	-3	0	0	0	0	-1	0	1	0	1	0	0	0	13	-2	1	0	0	1
18	-13	-5	2	-12	-8	-11	-15	-3	-1	0	11	-57	0	0	0	-3	0	0	0	0	1	-7	29	-42	-5	1	-5	0	-2	-5	2	8	-1	11
19	17	24	19	4	-1	-5	-16	-6	-9	-21	38	-3	0	1	0	-6	0	0	0	0	-7	22	29	23	24	41	-34	-4	-11	-12	6	22	-3	28
20	0	5	0	1	1	2	-2	0	2	-1	0	0	4	-1	0	-2	0	0	0	0	0	-1	-2	0	1	1	-4	0	3	1	10	0	0	0
21	-15	-4	-1	-7	5	-5	-2	-2	-1	-1	-7	24	-7	10	-1	-1	-1	-5	1	2	2	-1	-3	-26	-8	10	-9	4	4	-49	-7	0	-9	-1
22	-9	-1	0	-12	-2	-8	-9	-1	-4	-85	1	68	23	26	-16	-13	0	-30	58	1	-10	33	16	-22	34	-31	-49	-12	-11	-41	-26	-4	-15	1
23	-16	-2	-1	-5	-6	-1	1	0	-2	29	-5	-51	48	35	1	-2	1	5	29	0	0	10	16	-22	11	8	-2	12	-5	-19	7	8	-5	-1
24	-14	-4	-3	-15	-5	-20	-4	-2	-7	-23	-7	-44	-61	-9	-18	1	3	-32	29	1	24	32	-2	20	49	3	3	4	-5	-38	42	21	91	0
25	-5	-1	1	-3	-4	-6	0	0	-3	-18	1	-10	-19	-2	-14	10	-1	-24	-1	0	1	80	10	110	13	24	-17	1	4	14	16	45	-12	1
26	13	4	4	7	-1	3	-2	1	0	-2	11	77	-15	10	-1	-4	0	-1	9	2	6	43	48	-2	49	0	5	22	11	0	20	10	1	2
27	-15	16	1	-13	12	0	6	-1	-9	-2	-9	30	-6	7	-2	23	1	0	-7	0	2	-1	-4	-5	23	5	-6	50	11	9	16	45	2	-3
28	-12	0	6	-37	-28	-17	3	7	103	-5	16	35	-8	-17	-3	-42	1	-1	-6	-1	-6	-5	-18	-34	11	0	-45	-7	85	-18	39	36	-4	-6
29	-18	-14	-2	-161	-40	-38	-29	-67	53	-5	-42	-101	-16	-1	-4	-64	1	-3	3	-2	-2	-3	-9	-3	18	0	-34	-12	58	134	6	15	5	-3
30	-10	2	0	-18	37	5	5	-1	-7	9	-4	17	1	44	-1	15	1	-9	-3	2	30	-12	20	-44	22	7	12	59	22	62	-7	-2	-1	-3
31	-6	-8	-1	-34	-12	-7	-1	1	-8	-5	-14	53	-7	-11	1	-32	-1	0	-4	1	-1	-7	10	-4	19	26	-10	9	3	9	80	57	1	-1
32	-12	-3	-1	-27	-4	-9	-6	-3	-8	0	-16	101	32	-1	2	-16	-1	5	35	0	-3	-4	-16	-20	30	3	-28	-5	-2	8	17	8	-2	0
33	4	-1	2	1	-2	17	-4	3	-1	4	5	16	5	5	1	2	0	2	1	0	2	1	5	125	40	6	-2	17	7	42	-2	5	1	2
34	0	0	1	-3	0	3	1	-1	-16	-1	-1	-1	0	-2	-1	-4	0	-2	5	0	-1	0	-1	-1	1	1	-8	-12	-18	-9	-1	3	0	0

Table 10-16: Sector to Sector % Changes - Cars PM Trips (Unmasked)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
1	0%	0%	0%	0%	0%	35%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-41%	0%	0%	0%	0%	0%
2	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
3	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-25%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-39%	0%	0%	0%	0%	0%
4	0%	0%	0%	7%	0%	0%	0%	0%	19%	0%	-20%	-23%	0%	-47%	0%	-11%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-9%	-16%	0%	0%	0%	0%
5	0%	0%	0%	0%	0%	0%	12%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
6	25%	0%	42%	-25%	0%	0%	-18%	0%	0%	0%	0%	-38%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	37%	0%	0%	0%	0%	0%
7	0%	-17%	0%	-45%	-32%	-19%	0%	52%	0%	0%	0%	-52%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
8	0%	66%	0%	49%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
9	0%	0%	0%	-9%	0%	0%	0%	0%	0%	-17%	0%	0%	0%	0%	0%	-34%	0%	0%	32%	0%	0%	0%	0%	0%	0%	0%	0%	0%	15%	0%	0%	0%	0%	0%
10	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	31%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
11	0%	0%	0%	50%	0%	0%	0%	0%	52%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	128%	0%	0%	0%	0%	0%	0%
12	19%	37%	0%	0%	0%	0%	0%	0%	-25%	0%	0%	0%	0%	0%	0%	0%	-7%	0%	0%	0%	-12%	-27%	-36%	33%	26%	-28%	0%	-19%	0%	44%	17%	0%	0%	0%
13	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-11%	36%	-27%	0%	0%	-28%	0%	0%	0%	0%	0%	0%	0%	0%
14	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
15	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
16	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	61%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
17	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
18	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-10%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-52%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
19	0%	0%	0%	0%	0%	0%	0%	0%	0%	51%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	37%	-37%	0%	0%	0%	0%	0%	0%	0%
20	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
21	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-20%	0%	0%	0%	0%
22	0%	0%	0%	0%	0%	0%	0%	0%	0%	-24%	0%	13%	0%	0%	0%	0%	0%	-36%	23%	0%	0%	0%	0%	0%	16%	-7%	-47%	0%	0%	-50%	0%	0%	0%	0%
23	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-38%	22%	23%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
24	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-37%	-33%	0%	0%	0%	0%	-60%	0%	0%	0%	21%	0%	0%	31%	0%	0%	0%	0%	-24%	53%	0%	97%	0%
25	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	39%	0%	36%	0%	0%	0%	0%	0%	0%	49%	0%	0%	0%
26	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	20%	0%	0%	0%	0%	0%	0%	0%	0%	0%	11%	27%	0%	29%	0%	0%	0%	0%	0%	0%	0%	0%	0%
27	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	41%	0%	0%	0%	54%	0%	0%
28	0%	0%	0%	-13%	0%	0%	0%	0%	60%	0%	0%	18%	0%	0%	0%	-12%	0%	0%	0%	0%	0%	0%	0%	-36%	0%	0%	-29%	0%	9%	0%	45%	62%	0%	0%
29	0%	0%	0%	-23%	-33%	-18%	0%	-36%	11%	0%	-22%	-33%	0%	0%	0%	-7%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-8%	0%	5%	29%	0%	0%	0%	0%
30	0%	0%	0%	0%	86%	0%	0%	0%	0%	0%	0%	0%	0%	32%	0%	0%	0%	0%	0%	0%	0%	0%	0%	-32%	0%	0%	0%	54%	0%	18%	0%	0%	0%	0%
31	0%	0%	0%	-33%	0%	0%	0%	0%	0%	0%	0%	22%	0%	0%	0%	-52%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	28%	39%	0%	0%
32	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	18%	20%	0%	0%	0%	0%	0%	34%	0%	0%	0%	0%	0%	34%	0%	0%	0%	0%	0%	0%	0%	0%	0%
33	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	102%	84%	0%	0%	0%	0%	27%	0%	0%	0%	0%
34	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Table 10-17: Sector to Sector % Changes - Cars PM Trips (Masked)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	-	-	-	7%	-	-	-	-	19%	-	-	-23%	-	-	-	-11%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	-	-	-	-25%	-	-	-18%	-	-	-	-	-38%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	-	-17%	-	-45%	-32%	-19%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	-	-	-	49%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-34%	-	-	-	-	-	-	-	-	-	-	-	-	15%	-	-	-	-	-
10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	31%	-	-	-	-	-	-	-	-	-	-	-
11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	19%	-	-	-	-	-	-	-	-	-25%	-	-	-	-	-	-	-	-	-	-	-	-12%	-27%	-	33%	26%	-28%	-	-	-	44%	-	-	-
13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-11%	36%	-27%	-	-	-	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	-	-	-	-	-	-	-	-	-	-	-	-10%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22	-	-	-	-	-	-	-	-	-	-24%	-	13%	-	-	-	-	-	-	23%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23	-	-	-	-	-	-	-	-	-	-	-	-38%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	-	-	-	-	-	-	-	-	-	-	-	-	-33%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	97%	-
25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	39%	-	36%	-	-	-	-	-	-	-	-	-	-
26	-	-	-	-	-	-	-	-	-	-	-	20%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	-	-	-	-	-	-	-	-	60%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9%	-	-	-	-	-
29	-	-	-	-23%	-	-	-	-36%	11%	-	-	-33%	-	-	-	-7%	-	-	-	-	-	-	-	-	-	-	-	-	5%	29%	-	-	-	-
30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	54%	-	18%	-	-	-	-
31	-	-	-	-	-	-	-	-	-	-	-	22%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	28%	39%	-	-
32	-	-	-	-	-	-	-	-	-	-	-	18%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	102%	-	-	-	-	-	-	-	-	-	-
34	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 10-18: Sector to Sector GEH Values- Cars PM Trips

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
1	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0
4	0	0	0	2	0	0	0	0	4	0	3	4	0	5	0	3	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0
5	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	3	0	3	4	0	0	4	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0
7	0	3	0	5	7	5	0	4	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	5	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	2	0	0	0	0	0	0	2	0	0	0	0	7	0	0	4	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	4	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0
12	3	4	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	2	0	0	0	4	5	5	5	4	4	0	3	0	5	3	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	6	4	0	0	3	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
22	0	0	0	0	0	0	0	0	0	5	0	3	0	0	0	0	0	4	3	0	0	0	0	0	2	2	5	0	0	5	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	5	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	4	5	0	0	0	0	5	0	0	0	2	0	0	4	0	0	0	0	3	4	0	8	0
25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	6	0	0	0	0	0	0	0	4	0	0
26	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	2	3	0	4	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	4	0	0
28	0	0	0	2	0	0	0	0	7	0	0	2	0	0	0	2	0	0	0	0	0	0	0	4	0	0	4	0	3	0	4	4	0	0
29	0	0	0	7	4	3	0	5	2	0	3	6	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0	2	6	0	0	0	0
30	0	0	0	0	5	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	4	0	0	0	5	0	3	0	0	0	0
31	0	0	0	4	0	0	0	0	0	0	0	3	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	0	0
32	0	0	0	0	0	0	0	0	0	0	0	4	2	0	0	0	0	0	3	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	5	0	0	0	0	3	0	0	0	0
34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

10.2 Calibration Results

The locations of counts used for calibration (i.e. those counts used as part of the creation of the trip matrices and/or the matrix estimation) are shown in Figure 10-7.

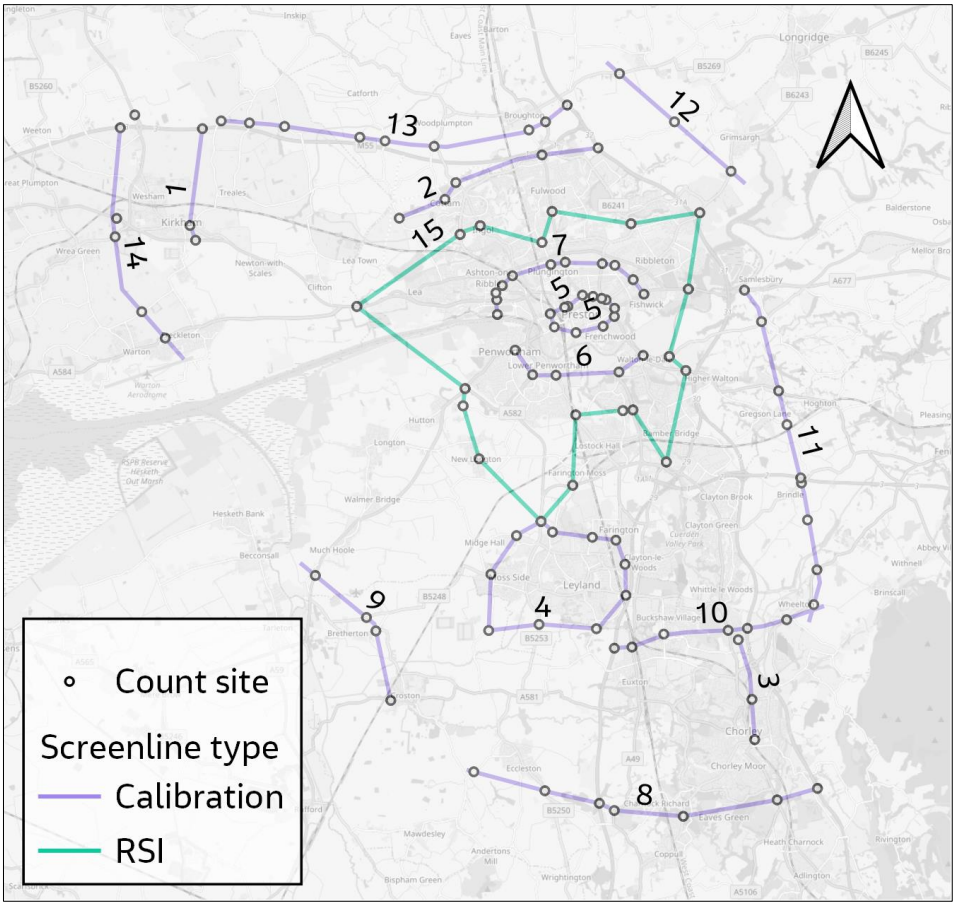


Figure 10-7: Location of Calibration Counts

The performance of the model in terms of comparisons with count data are measured in two ways. The first of these is the GEH statistic, as defined below:

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

Where: M is the modelled flow on a link, and O is the observed.

The second is made by reference to the following table, extracted from TAG Unit M 3-1:

Table 10.19: Link Flow Validation Criterion

Size of observed flow	Criteria for valid modelled flow
< 700 vehicles/hour	Modelled flow within 100 vehicles/hour of observed flow
700-2,700 vehicles/hour	Modelled flow within 15% of observed flow
> 2,700 vehicles/hour	Modelled flow within 400 vehicles/hour of observed

TAG advises that in ordinary circumstances the practitioner should aim to reach a state where 85% of modelled links have a GEH of less than 5 or satisfy the criterion in link flow.

There were 310 calibration counts used in the base year model. The comparison of modelled flows against these counts is summarised in Table 10.20, Table 10.21 and Table 10.22, for all time periods.

Table 10.20: - Calibration Count Summary – AM Peak Hour

TAG Guideline Values	All Vehicles				Cars			
	Total Count	Compliant	Result	Not compliant	Total Count	Compliant	Result	Not compliant
Individual flows within 100 vph for <700 vph	193	91%	Pass	17	220	92%	Pass	18
Individual flows within 15% for 700-2,700 vph	96	93%	Pass	7	84	93%	Pass	6
Individual flows within 400 vph for >2,700 vph	21	100%	Pass	0	6	100%	Pass	0
Total of above								
GEH: Individual flows GEH <5	310	92%	Pass	26	310	91%	Pass	29
Links meeting either TAG criteria	**310**	**93%**	Pass	**22**	**310**	**93%**	Pass	**23**

Table 10.21: Calibration Count Summary – IP Average Peak Hour

TAG Guideline Values	All Vehicles				Cars			
	Total Count	Compliant	Result	Not compliant	Total Count	Compliant	Result	Not compliant
Individual flows within 100 vph for <700 vph	237	98%	Pass	5	262	98%	Pass	5
Individual flows within 15% for 700-2,700 vph	62	97%	Pass	2	44	98%	Pass	1
Individual flows within 400 vph for >2,700 vph	11	100%	Pass	0	4	100%	Pass	0
Total of above								
GEH: Individual flows GEH <5	310	96%	Pass	12	310	96%	Pass	12
Links meeting either TAG criteria	**310**	**98%**	Pass	**6**	**310**	**98%**	Pass	**6**

Table 10.22: Calibration Count Summary – PM Peak Hour

TAG Guideline Values	All Vehicles				Cars			
	Total Count	Compliant	Result	Not compliant	Total Count	Compliant	Result	Not compliant
Individual flows within 100 vph for <700 vph	197	90%	Pass	19	210	92%	Pass	16
Individual flows within 15% for 700-2,700 vph	90	92%	Pass	7	85	92%	Pass	7
Individual flows within 400 vph for >2,700 vph	23	100%	Pass	0	15	100%	Pass	0
Total of above								
GEH: Individual flows GEH <5	310	92%	Pass	24	310	93%	Pass	23
Links meeting either TAG criteria	**310**	**93%**	Pass	**22**	**310**	**94%**	Pass	**20**

In line with guidance, the statistics are shown for all vehicles combined and for cars separately.

The table demonstrates that 85% of sites meet link flow criteria and GEH criteria for both car and total vehicles for all time periods.

The results are encouraging as it gives confidence that modelled flows are representative of real-life traffic flows.

A full breakdown of the comparison at the individual count level is included in Appendix I.

10.3 Calibration Screenlines

As indicated above, many of the counts are arranged along screenlines. TAG has a separate criterion for total screenline flows, which is that total modelled flows on all links crossing a screenline should be within 5% of the observed totals. Since percentage difference is not always the best measure, particularly for low flows, a relaxed criterion based on GEH criterion has also been used for assessing screenline performance. It is assumed that a GEH of less than 4 is considered as a pass.

The performance of the models along the calibration screenlines are summarised in the tables below.

Table 10.23: AM Calibration Screenlines – All Vehicles

Screenline Number	Inbound/ Outbound	Observed Flow	Modelled Flow	Actual Difference	% Difference	Pass/Fail	GEH	Pass/Fail
SL_1	Inbound	3944	3925	19	0%	Pass	0.3	Pass
SL_2	Inbound	1499	1668	-169	11%	Fail	4.3	Fail
SL_3	Inbound	1240	1269	-29	2%	Pass	0.8	Pass
SL_4	Inbound	5302	5271	31	1%	Pass	0.4	Pass
SL_5	Inbound	5493	5241	252	5%	Pass	3.4	Pass
SL_6	Inbound	5759	5518	241	4%	Pass	3.2	Pass
SL_7	Inbound	5055	4985	70	1%	Pass	1.0	Pass
SL_8	Inbound	9487	9649	-162	2%	Pass	1.7	Pass
SL_9	Inbound	1642	1646	-4	0%	Pass	0.1	Pass
SL_10	Inbound	9826	9671	155	2%	Pass	1.6	Pass
SL_11	Inbound	6425	6630	-205	3%	Pass	2.5	Pass
SL_12	Inbound	1225	1219	6	1%	Pass	0.2	Pass
SL_13	Inbound	935	818	117	13%	Fail	4.0	Pass
SL_14	Inbound	4820	4811	9	0%	Pass	0.1	Pass
SL_15	Inbound	14627	14484	143	1%	Pass	1.2	Pass
SL_1	Outbound	3965	3933	32	1%	Pass	0.5	Pass
SL_2	Outbound	1786	1718	68	4%	Pass	1.6	Pass
SL_3	Outbound	1178	1337	-159	13%	Fail	4.5	Fail
SL_4	Outbound	5616	5761	-145	3%	Pass	1.9	Pass
SL_5	Outbound	3879	3812	67	2%	Pass	1.1	Pass
SL_6	Outbound	2773	2835	-62	2%	Pass	1.2	Pass
SL_7	Outbound	3609	3575	34	1%	Pass	0.6	Pass
SL_8	Outbound	9016	9159	-143	2%	Pass	1.5	Pass
SL_9	Outbound	1237	1278	-41	3%	Pass	1.2	Pass
SL_10	Outbound	9475	9049	426	5%	Pass	4.4	Fail
SL_11	Outbound	6309	6293	16	0%	Pass	0.2	Pass
SL_12	Outbound	1176	1240	-64	5%	Pass	1.8	Pass
SL_13	Outbound	800	692	108	14%	Fail	4.0	Pass
SL_14	Outbound	5102	5028	74	1%	Pass	1.0	Pass
SL_15	Outbound	11668	11600	68	1%	Pass	0.6	Pass
Total Passing						**87%**		**90%**

Table 10.24: IP Calibration Screenlines – All Vehicles

Screenline Number	Inbound/ Outbound	Observed Flow	Modelled Flow	Actual Difference	% Difference	Pass/Fail	GEH	Pass/Fail
SL_1	Inbound	2855	2842	13	0%	Pass	0.2	Pass
SL_2	Inbound	1347	1288	59	4%	Pass	1.6	Pass
SL_3	Inbound	869	845	24	3%	Pass	0.8	Pass
SL_4	Inbound	3979	3852	127	3%	Pass	2.0	Pass
SL_5	Inbound	4017	3998	19	0%	Pass	0.3	Pass
SL_6	Inbound	3328	3312	16	0%	Pass	0.3	Pass
SL_7	Inbound	3487	3364	123	4%	Pass	2.1	Pass
SL_8	Inbound	7519	7490	29	0%	Pass	0.3	Pass
SL_9	Inbound	968	990	-22	2%	Pass	0.7	Pass
SL_10	Inbound	7606	7319	287	4%	Pass	3.3	Pass
SL_11	Inbound	4103	4017	86	2%	Pass	1.4	Pass
SL_12	Inbound	810	773	37	5%	Pass	1.3	Pass
SL_13	Inbound	366	438	-72	20%	Fail	3.6	Pass
SL_14	Inbound	3434	3379	55	2%	Pass	0.9	Pass
SL_15	Inbound	10029	10147	-118	1%	Pass	1.2	Pass
SL_1	Outbound	2903	2869	34	1%	Pass	0.6	Pass
SL_2	Outbound	1239	1127	112	9%	Fail	3.3	Pass
SL_3	Outbound	975	1102	-127	13%	Fail	3.9	Pass
SL_4	Outbound	4088	4049	39	1%	Pass	0.6	Pass
SL_5	Outbound	4423	4486	-63	1%	Pass	0.9	Pass
SL_6	Outbound	3634	3593	42	1%	Pass	0.7	Pass
SL_7	Outbound	3566	3396	170	5%	Pass	2.9	Pass
SL_8	Outbound	7919	7900	19	0%	Pass	0.2	Pass
SL_9	Outbound	1060	1065	-5	1%	Pass	0.2	Pass
SL_10	Outbound	8076	7978	98	1%	Pass	1.1	Pass
SL_11	Outbound	4076	3857	219	5%	Pass	3.5	Pass
SL_12	Outbound	915	906	9	1%	Pass	0.3	Pass
SL_13	Outbound	446	392	54	12%	Fail	2.6	Pass
SL_14	Outbound	3473	3387	86	2%	Pass	1.5	Pass
SL_15	Outbound	10280	10311	-31	0%	Pass	0.3	Pass
Total Passing						**87%**		**100%**

Table 10.25: PM Calibration Screenlines – All Vehicles

Screenline Number	Inbound/ Outbound	Observed Flow	Modelled Flow	Actual Difference	% Difference	Pass/Fail	GEH	Pass/Fail
SL_1	Inbound	3888	3810	78	2%	Pass	1.3	Pass
SL_2	Inbound	1758	1669	89	5%	Pass	2.2	Pass
SL_3	Inbound	1157	1102	55	5%	Pass	1.6	Pass
SL_4	Inbound	5680	5560	120	2%	Pass	1.6	Pass
SL_5	Inbound	4237	4140	97	2%	Pass	1.5	Pass
SL_6	Inbound	3731	3694	37	1%	Pass	0.6	Pass
SL_7	Inbound	3834	3798	36	1%	Pass	0.6	Pass
SL_8	Inbound	9672	9914	-242	2%	Pass	2.4	Pass
SL_9	Inbound	1161	1171	-10	1%	Pass	0.3	Pass
SL_10	Inbound	9588	9201	387	4%	Pass	4.0	Pass
SL_11	Inbound	6639	6538	101	2%	Pass	1.2	Pass
SL_12	Inbound	939	984	-45	5%	Pass	1.5	Pass
SL_13	Inbound	583	698	-115	20%	Fail	4.6	Fail
SL_14	Inbound	4783	4751	32	1%	Pass	0.5	Pass
SL_15	Inbound	13476	12790	686	5%	Pass	6.0	Fail
SL_1	Outbound	4168	4054	114	3%	Pass	1.8	Pass
SL_2	Outbound	1784	1646	138	8%	Fail	3.3	Pass
SL_3	Outbound	1395	1465	-70	5%	Pass	1.9	Pass
SL_4	Outbound	5304	5271	33	1%	Pass	0.4	Pass
SL_5	Outbound	5763	5763	0	0%	Pass	0.0	Pass
SL_6	Outbound	5507	5240	267	5%	Pass	3.6	Pass
SL_7	Outbound	4945	4697	248	5%	Pass	3.0	Pass
SL_8	Outbound	10466	10610	-144	1%	Pass	1.4	Pass
SL_9	Outbound	1604	1607	-3	0%	Pass	0.1	Pass
SL_10	Outbound	11032	10834	198	2%	Pass	1.9	Pass
SL_11	Outbound	6422	6344	78	1%	Pass	1.0	Pass
SL_12	Outbound	1290	1321	-31	2%	Pass	0.9	Pass
SL_13	Outbound	732	736	-4	1%	Pass	0.1	Pass
SL_14	Outbound	5076	4847	229	5%	Pass	3.2	Pass
SL_15	Outbound	13985	13946	39	0%	Pass	0.3	Pass
Total Passing						**93%**		**93%**

A total of 24 calibration screenlines and 2 observed screenlines were used. The tables above show that the vast majority of calibration screenlines meet the 5% difference criterion in all peaks.

The list of screenlines failing to meet the criteria are summarised below:

AM:

- Screenline 2 is 11% or 169 vehicles too high in inbound direction but has GEH 4.3 criterion
- Screenline 13 is more than 113 vehicles too low in both inbound and outbound direction
- Screenline 3 is 13% or 158 vehicles too high in outbound direction

IP:

- Screenline 2 is 9% or 112 vehicles too low in outbound direction but passes GEH 4 criterion
- Screenline 13 is failing in inbound and outbound directions but passes GEH 4 criterion
- Screenline 3 is 13% or 128 vehicles too high in outbound direction but passes GEH 4 criterion

PM:

- Screenline 2 is 8% or 138 vehicles too low in outbound direction but passes GEH 4 criterion
- Screenline 13 is 20% or 115 vehicles too high in inbound direction

It should be noted that all failing screenlines are far away from the A582 impact area and most of them pass the GEH 4 criterion or stop slightly short of passing it. However, it was prudent to investigate the reasons for these failures and the analysis is provided below.

The poor model performance at screenline 2 especially in AM and PM is primarily due to traffic congestion along Garstang Road in the north Preston area. During peak hours this corridor is recording abnormally low observed flows at the majority of traffic survey locations on that road and not only at screenline 2.

Low traffic flows for the Garstang Road count location ATC-76 (included in screenline 2) were due to severe delays, which limited the amount of traffic able to pass through the count site. This is primarily because of the traffic spill back from the M55 Junction 1 and from the signalised junction on Garstang Road with Lightfoot Lane.
Figure 10-8 shows the dip in count traffic flow for AM peak in southbound direction.

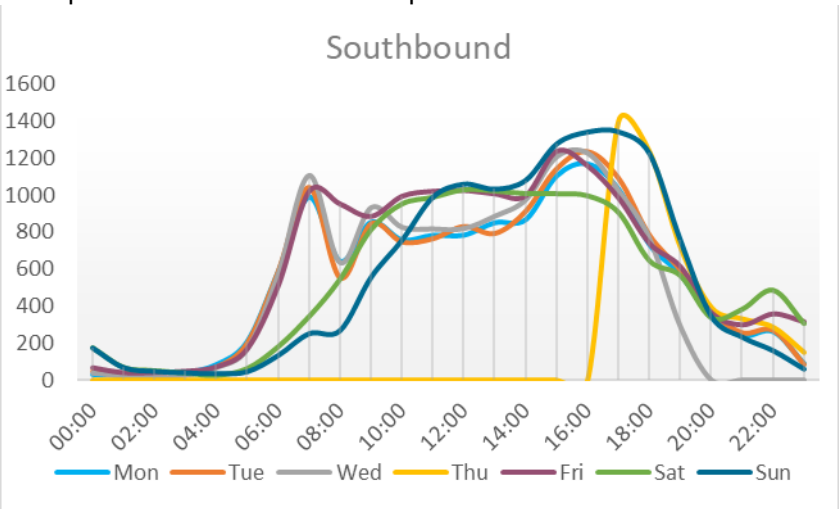


Figure 10-8: ATC 76 Traffic Profile SB

The speed profiles were also investigated and sudden reduction in speed was observed especially for AM peak hour. Figure 10-9 and Figure 10-10 shows the percentage of vehicles for ATC-76 in NB and SB direction for each of the below mentioned category. The posted speed limit for Garstang Road is 30mph.

PSL	Posted Speed Limit
ACPO	Association of Chief Police Officers (Used to display the speed limit the police will generally enforce, 110% of PSL +2mph)
DFT	Department for Transport (Used to display a speed statistic used by the government looking at vehicles travelling over 15mph above the PSL)

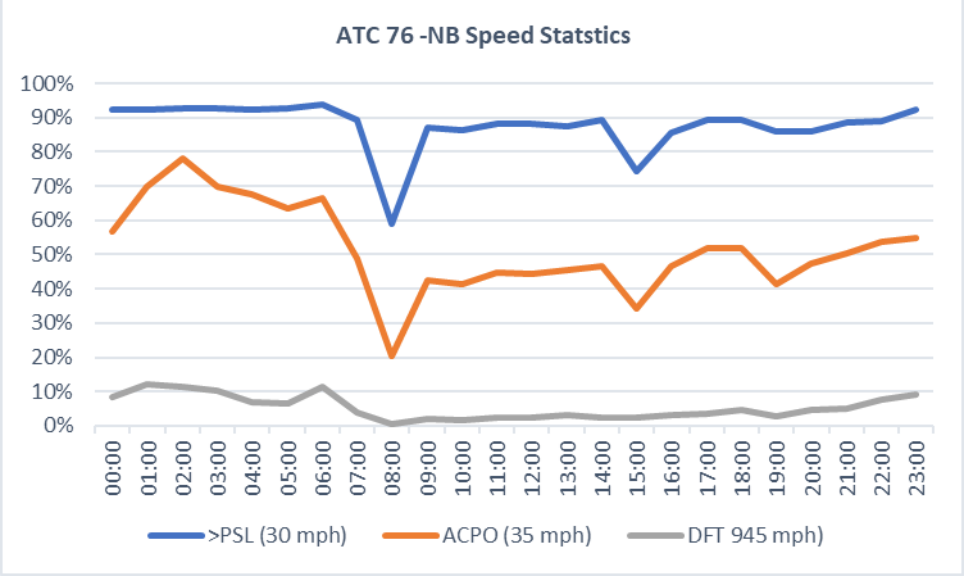


Figure 10-9: ATC 76 - Speed Stastics -NB

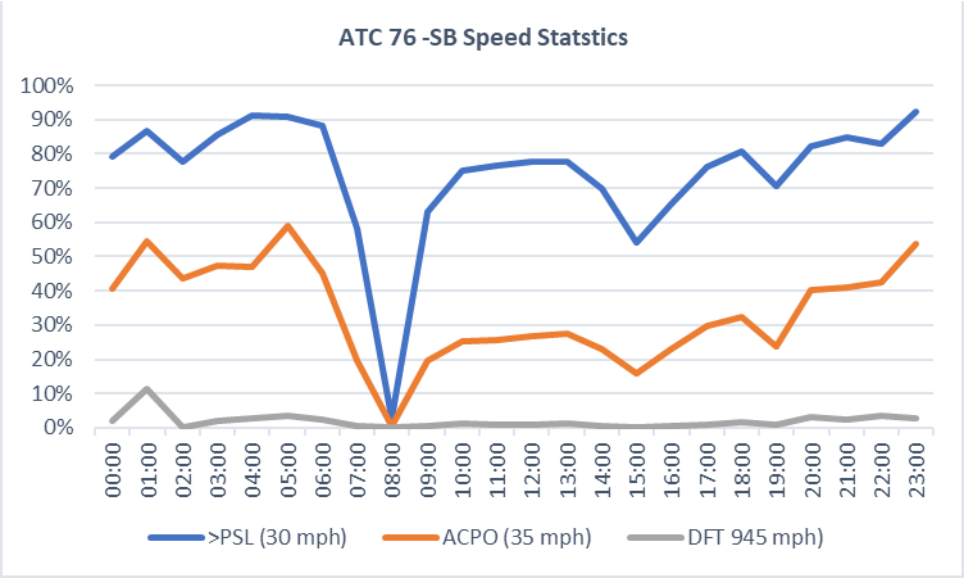


Figure 10-10: ATC 76 - Speed Statistics -SB

While this confirms that in peak hour the traffic recorded in the congested section is low even when the demand is high, strategic models developed in SATURN are unable to replicate such delays, and such delays can be reproduced only in microsimulation models. The delays at junctions and links were reviewed to confirm if the network coding were correct.

Considering the facts mentioned above, the decision was made to maintain the integrity of the matrices rather than further adjust them to bring the links in line with the guidance. Reducing the traffic demand to match traffic counts would result in overall less delay for the corridor, which would affect the travel time validation. This is primarily because of SATURN's inability to model very congested situations like this.

Screenline 13 mainly consists of low trafficked rural roads and while all individual counts are passing the criteria the screenline fails because of the cumulative differences at each individual link.

Screenline 3 was investigated for the failure and all links except one link along Moss Lane (eastbound) is passing. The traffic flow difference for this link in AM peak is around 170 and 140 in IP. Although the traffic counts did not show any major anomalies, observed traffic flow seems to be quite low considering that it gives direct connection to A674. It should be noted that although the flows at this screenlines do not pass the

percentage criterion, they are generally close to passing particularly with respect to GEH values, and therefore are still considered to be acceptable.

Calibration screenlines results for each vehicle type are provided in **Error! Reference source not found.**.

10.4 Count Validation

Count validation relies on making similar comparisons to the ones made for the count calibration, but against independent counts, i.e. those not used in the model building process up to this point, in either the matrix building or the matrix estimation.

The locations of these counts are show in Figure 10-11.

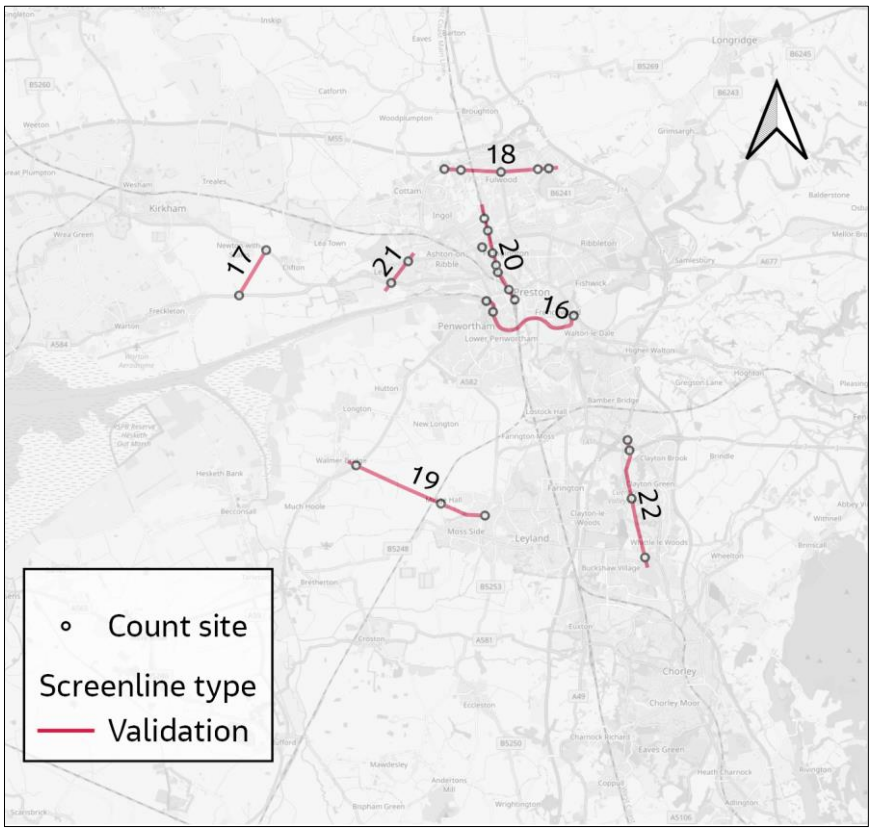


Figure 10-11: Locations of Validation Counts Location and Respective Screenlines

Table 10.26 to Table 10.22 below provide a summary of the detailed results. Full validation results are contained in Appendix I.

Table 10.26: Validation Count Summary – AM Peak Hour

TAG Guideline Values	All Vehicles				Cars			
	Total Count	Compliant	Result	Not compliant	Total Count	Compliant	Result	Not compliant
Individual flows within 100 vph for <700 vph	25	100%	Pass	0	31	94%	Pass	2
Individual flows within 15% for 700-2,700 vph	20	85%	Pass	3	15	87%	Pass	2
Individual flows within 400 vph for >2,700 vph	3	100%	Pass	0	2	100%	Pass	0
Total of above								
GEH: Individual flows GEH <5	48	96%	Pass	2	48	96%	Pass	2
Links meeting either TAG criteria	**48**	**96%**	Pass	**2**	**48**	**96%**	Pass	**2**

Table 10.27: Validation Count Summary – IP Average Peak Hour

TAG Guideline Values	All Vehicles				Cars			
	Total Count	Compliant	Result	Not compliant	Total Count	Compliant	Result	Not compliant
Individual flows within 100 vph for <700 vph	36	97%	Pass	1	40	98%	Pass	1
Individual flows within 15% for 700-2,700 vph	10	100%	Pass	0	6	100%	Pass	0
Individual flows within 400 vph for >2,700 vph	2	100%	Pass	0	2	100%	Pass	0
Total of above								
GEH: Individual flows GEH <5	48	98%	Pass	1	48	100%	Pass	0
Links meeting either TAG criteria	**48**	**98%**	Pass	**1**	**48**	**100%**	Pass	**0**

Table 10.28: Validation Count Summary – PM Peak Hour

TAG Guideline Values	All Vehicles				Cars			
	Total Count	Compliant	Result	Not compliant	Total Count	Compliant	Result	Not compliant
Individual flows within 100 vph for <700 vph	26	96%	Pass	1	30	97%	Pass	1
Individual flows within 15% for 700-2,700 vph	19	95%	Pass	1	16	94%	Pass	1
Individual flows within 400 vph for >2,700 vph	3	100%	Pass	0	2	100%	Pass	0
Total of above								
GEH: Individual flows GEH <5	48	96%	Pass	2	48	96%	Pass	2
Links meeting either TAG criteria	**48**	**96%**	Pass	**2**	**48**	**96%**	Pass	**2**

The above results show that the traffic model fully meet 85% criteria for all link flows for all time periods. It should be also noted that count sites close to the proposed A582 scheme also validate well.

10.5 Validation Screenlines

Similar to the calibration counts, the validation counts are also arranged along screenlines. The performance of the models along the validation screenlines are provided in the tables below.

Table 10.29 AM Validation Screenlines – All Vehicles

Screenline Number	Inbound/ Outbound	Observed Flow	Modelled Flow	Actual Difference	% Difference	Pass/Fail	GEH	Pass/Fail
SL_16	Inbound	4647	4585	62	1%	Pass	0.9	Pass
SL_17	Inbound	1599	1593	6	0%	Pass	0.1	Pass
SL_18	Inbound	7564	7482	82	1%	Pass	0.9	Pass
SL_19	Inbound	2021	2010	11	1%	Pass	0.3	Pass
SL_20	Inbound	3088	3001	87	3%	Pass	1.6	Pass
SL_21	Inbound	1957	2010	-53	3%	Pass	1.2	Pass
SL_22	Inbound	4502	4365	137	3%	Pass	2.1	Pass
SL_16	Outbound	2819	2821	-2	0%	Pass	0.0	Pass
SL_17	Outbound	1571	1555	16	1%	Pass	0.4	Pass
SL_18	Outbound	7616	7615	1	0%	Pass	0.0	Pass
SL_19	Outbound	1327	1326	1	0%	Pass	0.0	Pass
SL_20	Outbound	2451	2523	-72	3%	Pass	1.4	Pass
SL_21	Outbound	1510	1481	29	2%	Pass	0.7	Pass
SL_22	Outbound	3952	3715	236	6%	Fail	3.8	Pass
Total Passing						**93%**		**100%**

Table 10.30 IP Validation Screenlines – All Vehicles

Screenline Number	Inbound/ Outbound	Observed Flow	Modelled Flow	Actual Difference	% Difference	Pass/Fail	GEH	Pass/Fail
SL_16	Inbound	3116	3120	-4	0%	Pass	0.1	Pass
SL_17	Inbound	998	990	8	1%	Pass	0.3	Pass
SL_18	Inbound	6749	6703	46	1%	Pass	0.6	Pass
SL_19	Inbound	1119	1115	4	0%	Pass	0.1	Pass
SL_20	Inbound	1923	1883	40	2%	Pass	0.9	Pass
SL_21	Inbound	1350	1279	71	5%	Pass	2.0	Pass
SL_22	Inbound	3089	3064	25	1%	Pass	0.5	Pass
SL_16	Outbound	2668	2727	-59	2%	Pass	1.1	Pass
SL_17	Outbound	962	957	5	1%	Pass	0.2	Pass
SL_18	Outbound	6555	6427	128	2%	Pass	1.6	Pass
SL_19	Outbound	1264	1262	2	0%	Pass	0.1	Pass
SL_20	Outbound	2436	2360	76	3%	Pass	1.6	Pass
SL_21	Outbound	1159	1158	1	0%	Pass	0.0	Pass
SL_22	Outbound	2891	2896	-5	0%	Pass	0.1	Pass
Total Passing						**100%**		**100%**

Table 10.31 PM Validation Screenlines – All Vehicles

Screenline Number	Inbound/ Outbound	Observed Flow	Modelled Flow	Actual Difference	% Difference	Pass/Fail	GEH	Pass/Fail
SL_16	Inbound	3573	3613	-40	1%	Pass	0.7	Pass
SL_17	Inbound	1417	1417	0	0%	Pass	0.0	Pass
SL_18	Inbound	8256	8171	85	1%	Pass	0.9	Pass
SL_19	Inbound	1369	1369	0	0%	Pass	0.0	Pass
SL_20	Inbound	2271	2232	39	2%	Pass	0.8	Pass
SL_21	Inbound	1501	1501	0	0%	Pass	0.0	Pass
SL_22	Inbound	4519	4470	49	1%	Pass	0.7	Pass
SL_16	Outbound	3864	3850	14	0%	Pass	0.2	Pass
SL_17	Outbound	1543	1538	5	0%	Pass	0.1	Pass
SL_18	Outbound	7953	8006	-53	1%	Pass	0.6	Pass
SL_19	Outbound	2030	2029	1	0%	Pass	0.0	Pass
SL_20	Outbound	3061	3110	-49	2%	Pass	0.9	Pass
SL_21	Outbound	1807	1814	-7	0%	Pass	0.2	Pass
SL_22	Outbound	4193	3710	483	12%	Fail	7.7	Fail
Total Passing						**93%**		**93%**

The performance of the model along the validation screenlines shows that for all time periods screenlines totals pass the flow difference and GEH criteria. It should also be noted that individual screenlines which do not satisfy the thresholds are all fairly close to meeting the standards.

10.6 Turning Flow Analysis

It is acknowledged that the A582 SRWD and the future developments unlocked by the scheme are likely to have an impact on the SRN. More specifically based on the communication with Highways England as one of the stakeholders for the scheme they are particularly concerned about the scheme impacts on the M65 J1 and M6 J29. To ensure the model is sufficiently robust to support the analysis of scheme impacts on those

junctions it was agreed that as part of model calibration the junction turning flows will be benchmarked against the best available observed.

Link level traffic counts were available from the traffic surveys undertaken for the project (2019) and turning movement counts were provided by LCC for year 2016. It should be noted that turning counts were only available for one day. More details on the turning count data are available in TDCR.

Figure 10-12 through Figure 10-21 show the comparison of turning movement counts for AM and PM peaks. Due to some inconsistencies between 2016 turning counts and 2019 link counts it was not possible to achieve a close match for all movements. It should be noted that the model specification did not include calibration to turning movements. However, it can be seen from the figures that in the majority of cases modelled turning flow distribution is comparable to the observed proportions. As per DfT's request for wider context, traffic flow diagrams for A6 -A582 Roundabout, M6-A6 Terminus Roundabout and Broad Oak Roundabout have been included in the report. Given no turning movement counts were available for these junctions, only model traffic flows are shown in the flow diagrams.

Figure 10-12: AM - Turning counts comparison A6/M6 Roundabout

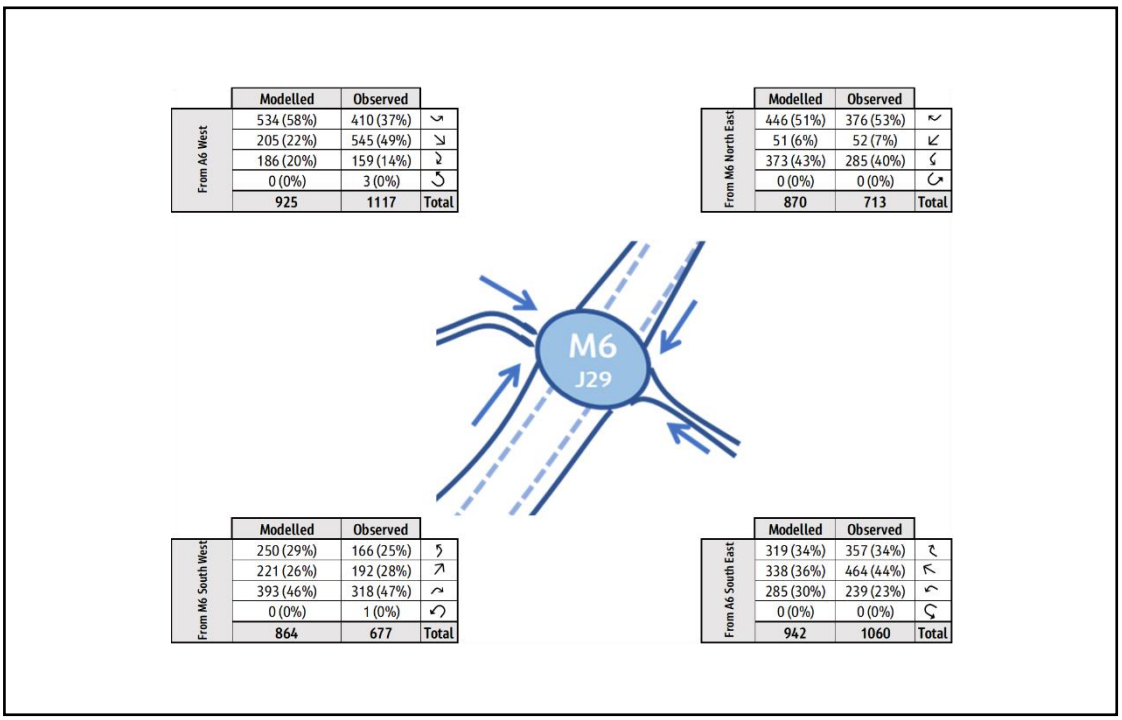


Figure 10-13: AM - Turning counts comparison M6/M65 Roundabout

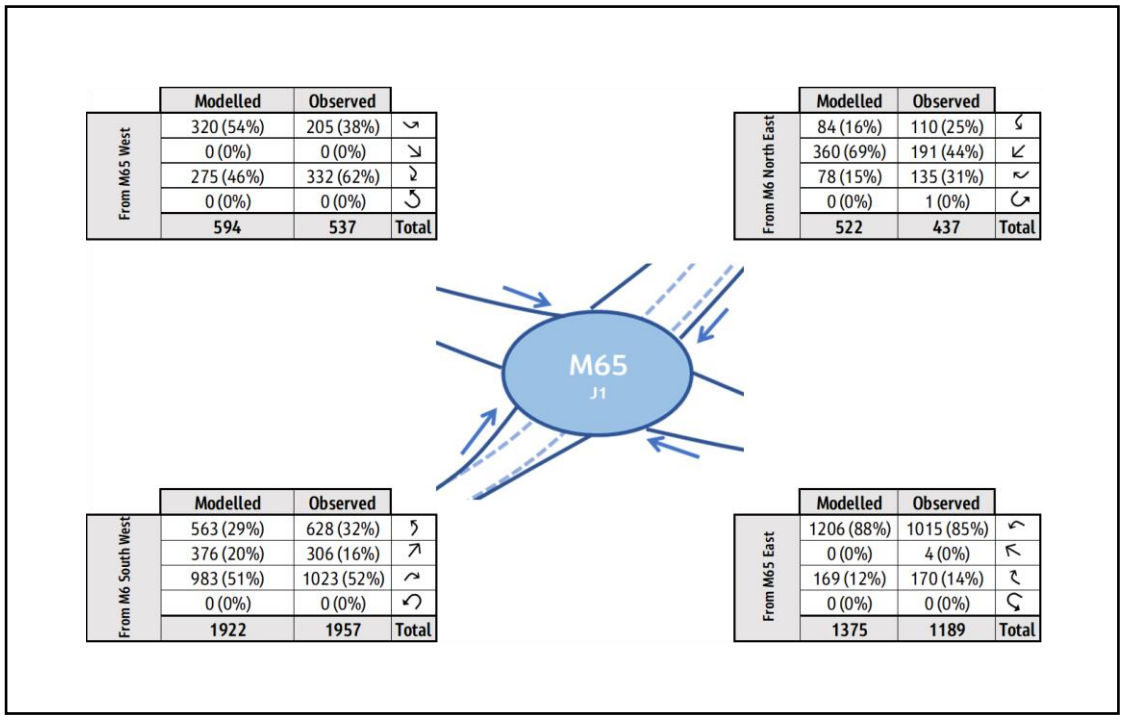


Figure 10-14: AM - Turning counts for Lostock Lane - London Way Roundabout

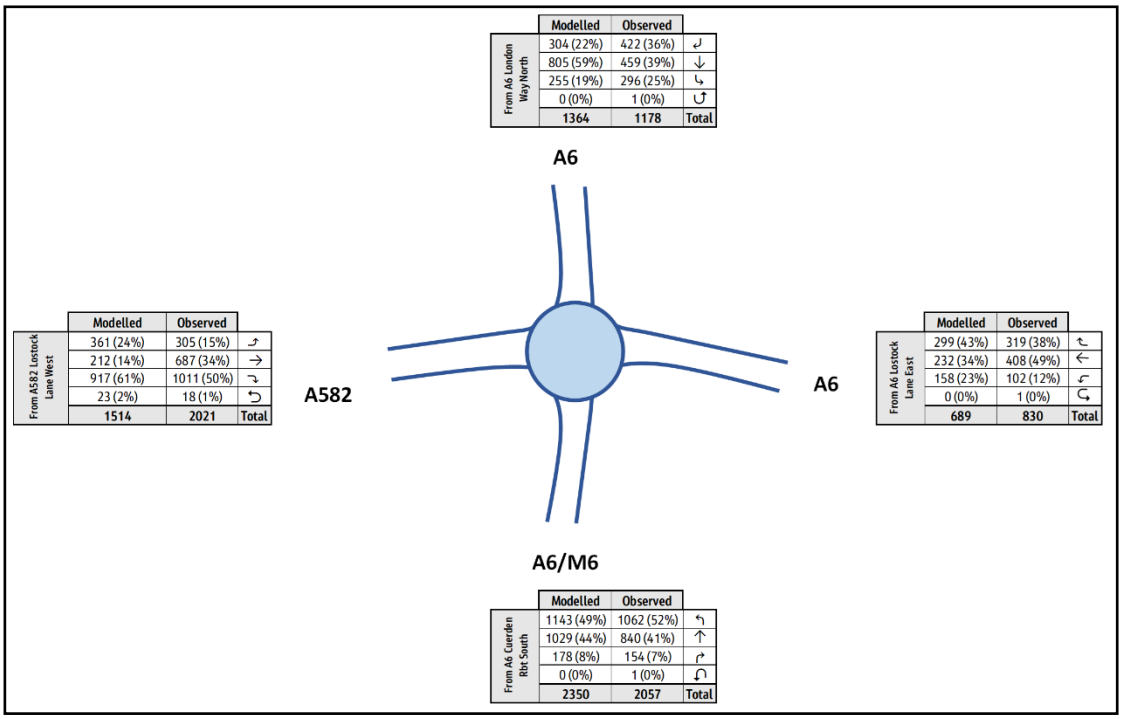


Figure 10-15: AM - Turning counts for Cuerden Roundabout

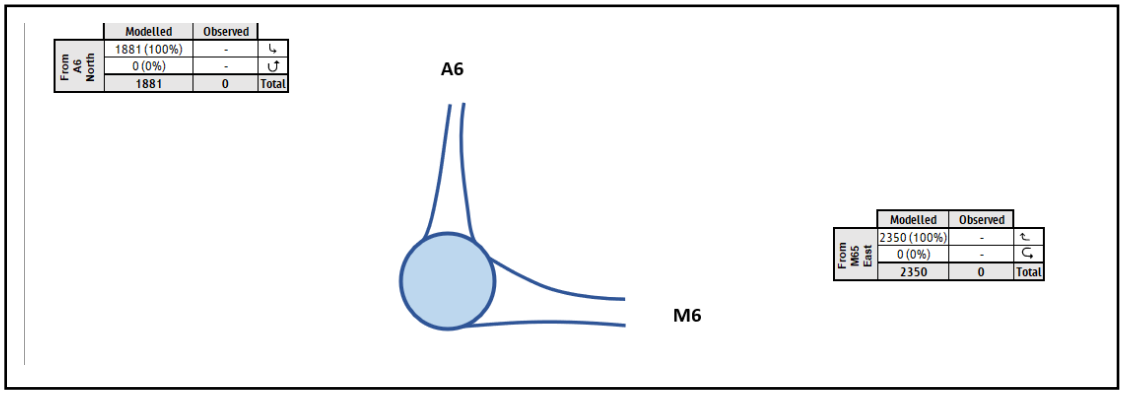


Figure 10-16: AM - Turning counts for Broad Oak Roundabout

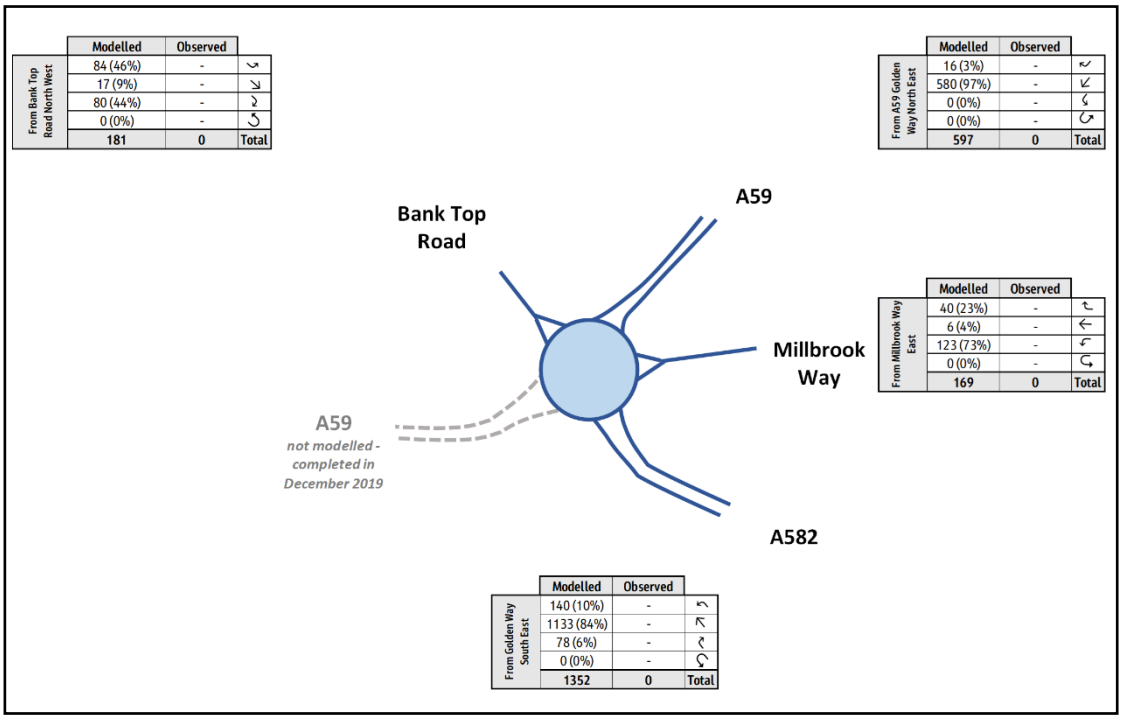


Figure 10-17: PM - Turning counts comparison A6/M6 Roundabout

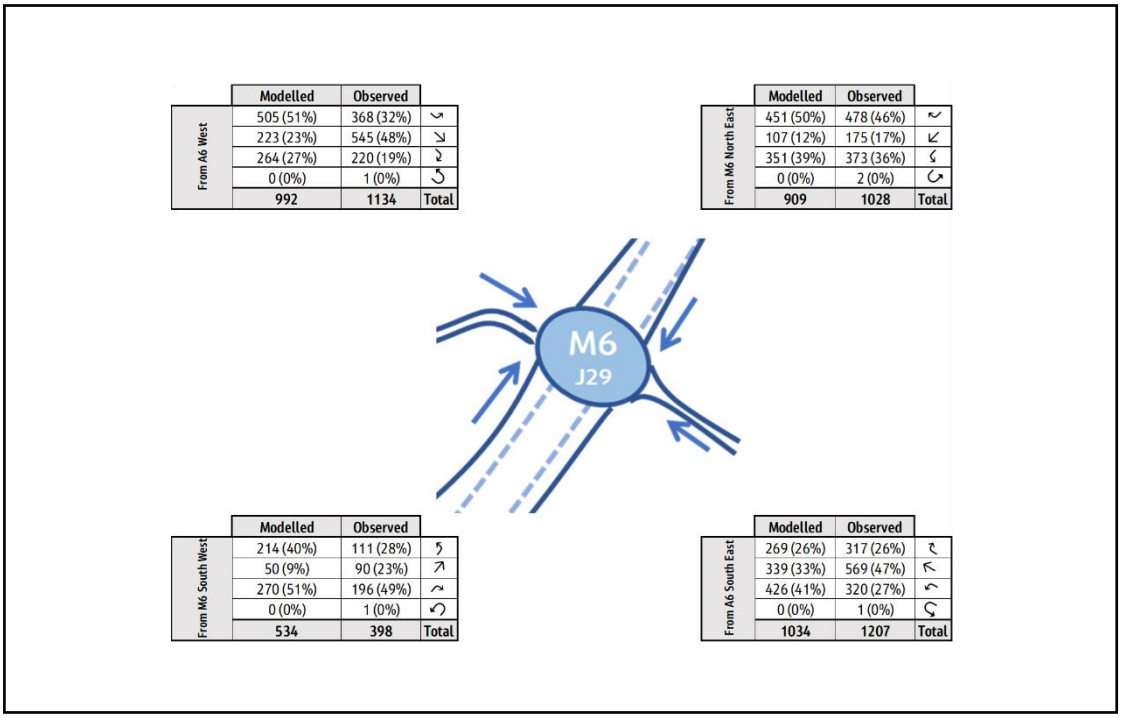


Figure 10-18: PM - Turning counts comparison M6/M65 Roundabout

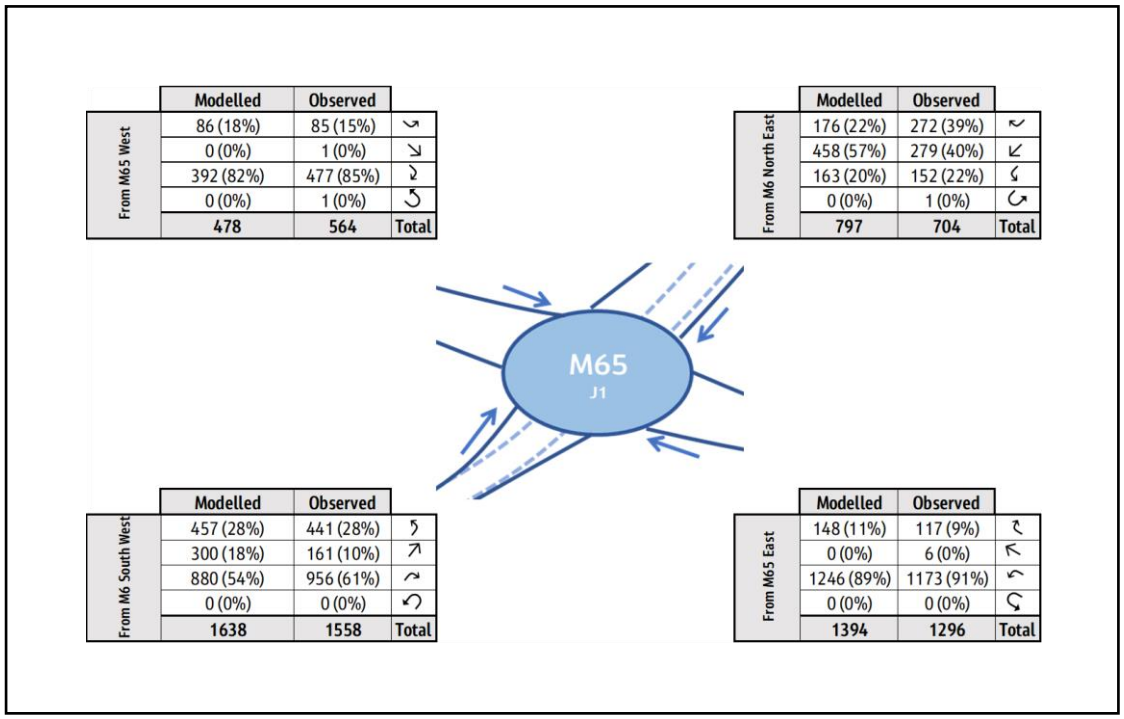


Figure 10-19: PM - Turning counts for Lostock Lane - London Way Roundabout

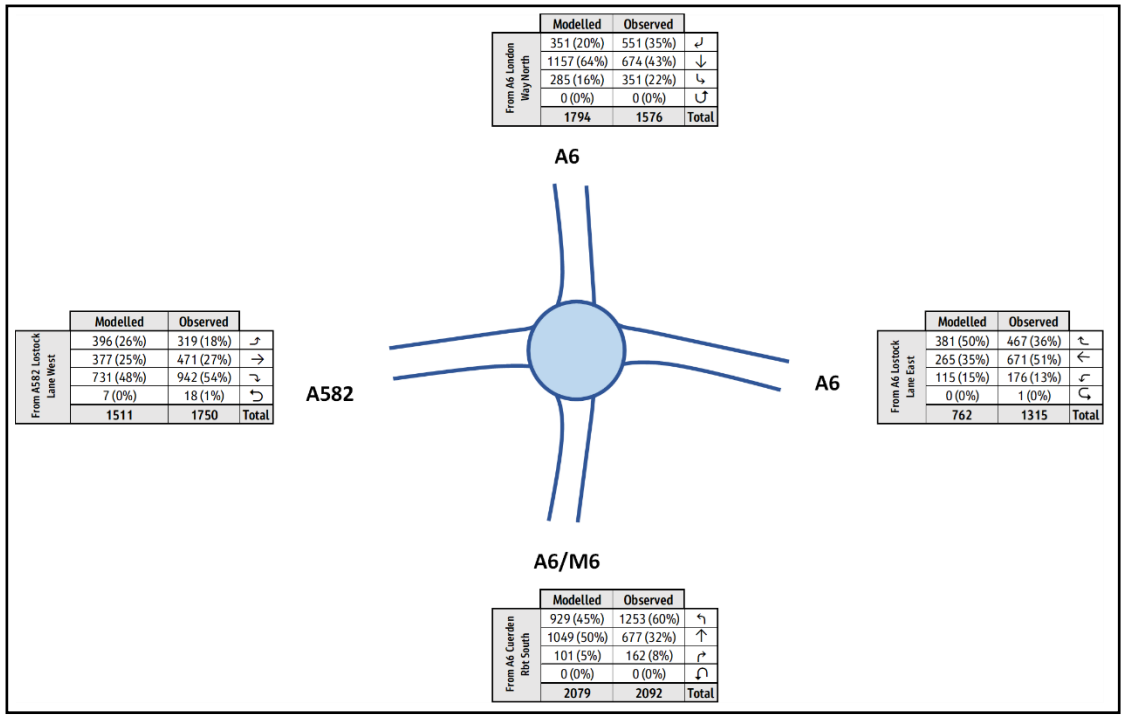


Figure 10-20: PM - Turning counts for Cuerden Roundabout

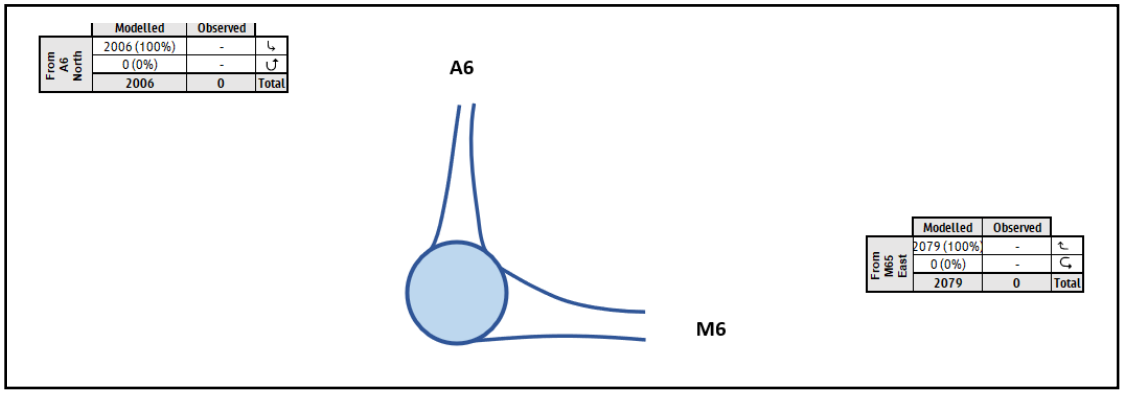
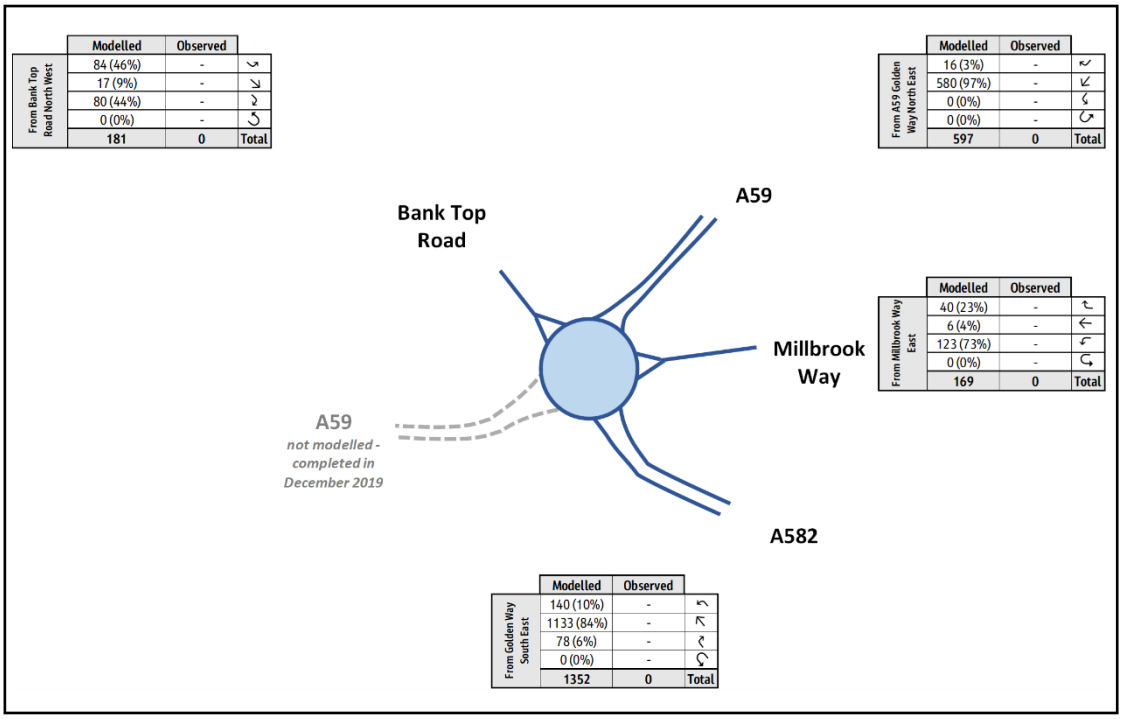


Figure 10-21: AM - Turning counts for Broad Oak Roundabout



10.7 Journey Time Validation

Journey times within the model were checked by comparison of the modelled journey times against the observed times along the routes identified as shown in Figure 10-22. The updated runs have not made significant changes to the journey times results.

To ensure rigour in the modelled delays and journey times, the modelled times have been compared to the observed times not just for the total time along the routes, but also along the sections within each route. To that end, distance versus time graphs for the modelled and observed times are provided in Appendix I of the Base Year 2019 Re-Calibration Report.

TrafficMaster data was used to calculate observed journey times. The weighted average of the vehicle types captured by TrafficMaster were used to provide the average journey time for each of the identified journey time routes. These averaged journey times were then compared with the averaged PCU journey times within the SATURN models.

TAG requires that for the total route length, the modelled journey time from start to finish is within 15% (or 1 minute) of the observed time, and this must be the case for 85% of all the routes. However, that simple comparison ignores the fact that modelled and observed journey times could deviate significantly from each other along specific sections of a route, and the overall time still be within the specified acceptance criteria.

Figure 10-22 shows the journey time routes and Table 10.32 to Table 10.34 summarises the performance of the model in terms of the TAG criteria for each modelled time period.

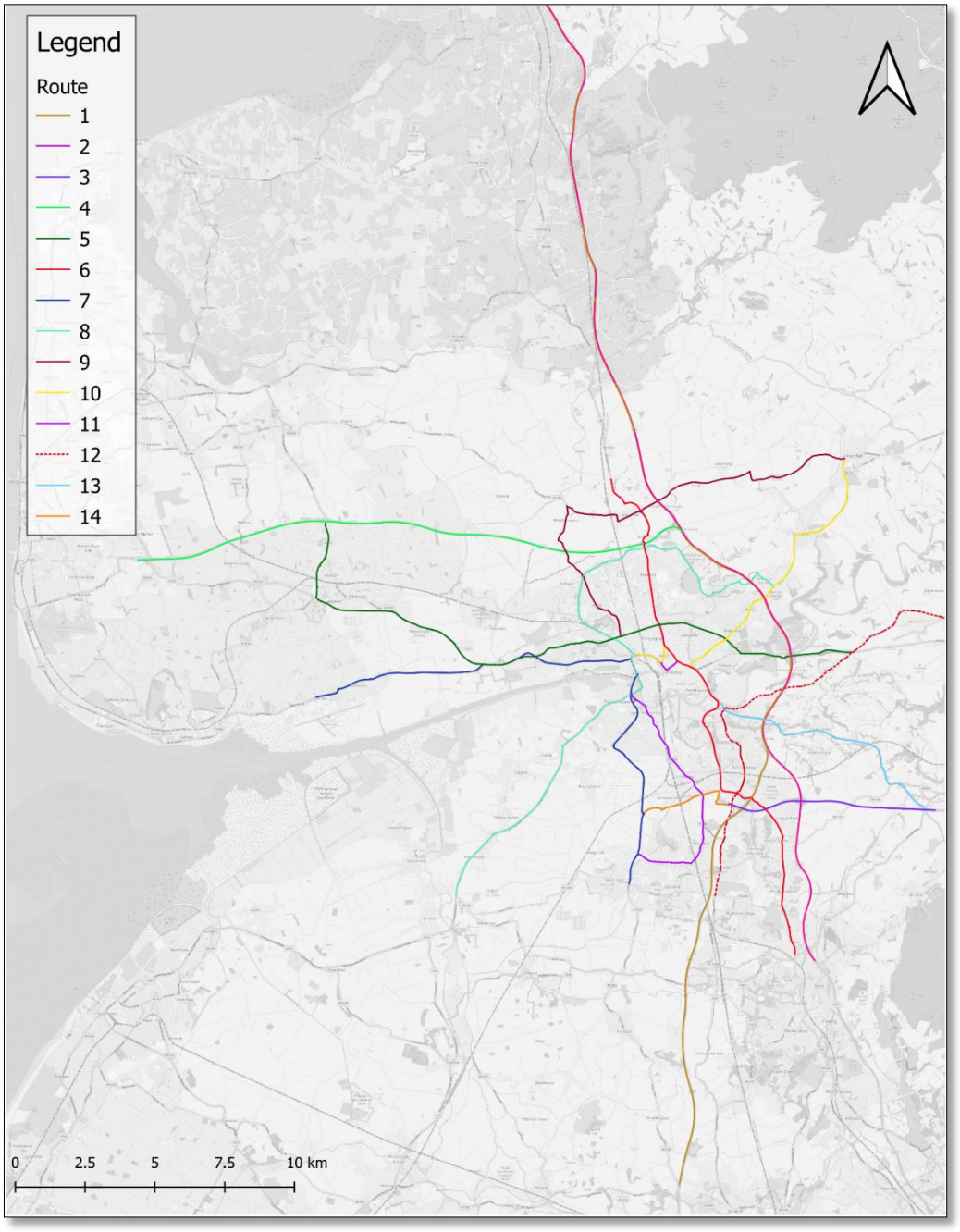


Figure 10-22: Journey Time Validation Routes

Table 10.32: Comparison of Modelled Journey Time against the Observed, AM Peak

Route	Dir	Total Observed (s)	Total Modelled (s)	Diff (s)	Rel. Diff	Result
1	1A	2591	2225	366	14%	Pass
	1B	2702	2318	384	14%	Pass
2	2A	2669	2122	547	21%	Fail
	2B	2781	2332	449	16%	Fail
3	3A	1544	1676	132	9%	Pass
	3B	1717	1718	1	0%	Pass
4	4A	2602	2307	295	11%	Pass
	4B	2677	2341	336	13%	Pass
5	5A	1613	1385	228	14%	Pass
	5B	1526	1342	184	12%	Pass
6	6A	1810	1732	78	4%	Pass
	6B	1864	2006	142	8%	Pass
7	7A	2042	1968	74	4%	Pass
	7B	1934	1938	4	0%	Pass
8	8A	1579	1511	68	4%	Pass
	8B	1570	1516	54	3%	Pass
9	9A	661	613	48	7%	Pass
	9B	837	635	202	24%	Fail
10	10A	357	380	23	7%	Pass
	10B	417	397	20	5%	Pass
M1	M1A	1705	1729	24	1%	Pass
	M1B	1558	1675	117	8%	Pass
M2	M2A	293	289	4	1%	Pass
	M2B	352	340	12	3%	Pass
M3	M3A	364	285	79	22%	Fail
	M3B	301	309	8	3%	Pass
M4	M4A	679	656	23	3%	Pass
	M4B	652	661	9	1%	Pass

Table 10.33: Comparison of Modelled Journey Time against the Observed, IP

Route	Dir	Total Observed (s)	Total Modelled (s)	Diff (s)	Rel. Diff	Result
1	1A	2194	2066	128	6%	Pass
	1B	2232	2174	58	3%	Pass
2	2A	2207	2046	161	7%	Pass
	2B	2178	2213	35	2%	Pass
3	3A	1574	1680	106	7%	Pass
	3B	1489	1549	60	4%	Pass
4	4A	2041	2109	68	3%	Pass
	4B	2226	2245	19	1%	Pass
5	5A	1481	1360	121	8%	Pass
	5B	1468	1307	161	11%	Pass
6	6A	1657	1697	40	2%	Pass
	6B	1705	1948	243	14%	Pass
7	7A	1862	1839	23	1%	Pass
	7B	1902	2011	109	6%	Pass
8	8A	1421	1472	51	4%	Pass
	8B	1446	1450	4	0%	Pass
9	9A	654	602	52	8%	Pass
	9B	675	588	87	13%	Pass
10	10A	323	342	19	6%	Pass
	10B	346	372	26	7%	Pass
M1	M1A	1555	1626	71	5%	Pass
	M1B	1585	1671	86	5%	Pass
M2	M2A	296	283	13	4%	Pass
	M2B	298	313	15	5%	Pass
M3	M3A	268	258	10	4%	Pass
	M3B	262	262	0	0%	Pass
M4	M4A	641	639	2	0%	Pass
	M4B	661	649	12	2%	Pass

Table 10.34: Comparison of Modelled Journey Time against the Observed, PM Peak

Route	Dir	Total Observed (s)	Total Modelled (s)	Diff (s)	Rel. Diff	Result
1	1A	2531	2177	354	14%	Pass
	1B	2664	2266	398	15%	Pass
2	2A	2658	2172	486	18%	Fail
	2B	2514	2402	112	4%	Pass
3	3A	2007	1794	213	11%	Pass
	3B	1671	1723	52	3%	Pass
4	4A	2293	2315	22	1%	Pass
	4B	3184	2390	794	25%	Fail
5	5A	1527	1372	155	10%	Pass
	5B	1536	1343	193	13%	Pass
6	6A	1964	1820	144	7%	Pass
	6B	2235	2006	229	10%	Pass
7	7A	2397	2008	389	16%	Fail
	7B	2482	2213	269	11%	Pass
8	8A	1508	1460	48	3%	Pass
	8B	1703	1466	237	14%	Pass
9	9A	664	650	14	2%	Pass
	9B	642	608	34	5%	Pass
10	10A	542	482	60	11%	Pass
	10B	407	456	49	12%	Pass
M1	M1A	1520	1660	140	9%	Pass
	M1B	1634	1778	144	9%	Pass
M2	M2A	292	300	8	3%	Pass
	M2B	297	333	36	12%	Pass
M3	M3A	298	297	1	0%	Pass
	M3B	288	294	6	2%	Pass
M4	M4A	637	656	19	3%	Pass
	M4B	664	659	5	1%	Pass

The above results show that the traffic model validates well against journey times, exceeding the TAG criteria, with more than 85% of journey time routes within the required criteria.

It can be noted that 86% of journey time routes pass in the AM time period, 100% of journey times pass in the IP time period, and 89% of journey time routes pass in the PM time period.

The failing Route 2A in AM peak generally fits well with the observed time and only the section along the Garstang Road fails to match the observed. This is because of multiple signalised junctions along this corridor which have major delays during morning and evening peak. Network checks were undertaken to ensure the delays were realistic, however it is the inability of the Saturn software to accurately replicate delays caused by traffic spillback that affected the results of journey time validation for this route.

M3A also fails in AM peak, however the section that fails is in the buffer area network and the section along M6 and M65 matches the observed times.

In PM peak, for the failing route 4B, most of the sections along this route pass the TAG criteria individually except the section along Eastway Road in southbound direction.

To further ensure that the journey times are not totally off from the observed, comparison of modelled journey time was done with observed using the median times rather than mean. This was done to remove any major outliers and it was noted that all failing routes passed with this method. However, for consistency, average observed times were used for the reporting purpose.

It should be noted that routes passing through the scheme area are well within the limits.

It is also notable that the differences in times are not consistently positive or negative, suggesting there is no underlying bias of high or low journey times in the model.

10.8 Model Test - Post Opening John Horrocks Way

The new bypass is one of the major road schemes built as part of the Preston, South Ribble, and Lancashire City Deal. The aim of the new bypass is to remove traffic through the centre of Penwortham by providing a new route from the A59 Liverpool Road at Howick to the A582 at Broad Oak Roundabout. Following the opening of John Horrocks Way bypass, the slip road onto Guild Way was closed. Access to the flyover is possible via the roundabouts at the junctions of Leyland Road and Golden Way. This was done as part of the wider measures to encourage people to use John Horrocks Way, rather than travelling unnecessarily through Penwortham. The construction work for John Horrocks Way in Penwortham was completed in December 2019.

As part of the base year calibration in 2019, a series of traffic counts were undertaken in Preston and surrounding areas. During the data collection, it was noted that there were some temporary management measures such as reduced speed and narrow lanes along the Liverpool Road due to the ongoing construction of John Horrocks Way. Given that the traffic counts collected around that area will be affected because of this arrangement, it was decided that the model network should be updated to reflect this change to have a realistic match with the traffic counts.

Following DfT's comments regarding these network changes, a model test was undertaken to provide assurance that these traffic calming measures has not caused any significant impact on the traffic conditions in the study corridor and that the model can capture the impact of the scheme and therefore is fit for appraisal purpose.

Traffic count post opening the John Horrocks Way was obtained from LCC. The traffic flows for the neutral period were extracted for the pre-Covid 2020 period, prior to the national lockdown period. Base year model was updated with steps described below to create a post opening scenario:

- Reverse all the network changes associated with the temporary traffic plans due to the construction works along Liverpool Rd included in the base model
- Close the slip road onto Guild Way
- Code the completed John Horrocks Way and related traffic network updates in the base year model
- Run the SATURN models with the updated network
- Compare the model traffic flows with observed counts post opening of John Horrocks way (pre-Covid 2020)

The performance of the model in terms of comparisons with count data is measured in two ways. The first of these is the link flow validation criteria set by TAG as defined in Section 3.2.1 and secondly using the GEH statistic.

The comparison shows that traffic flows from model and counts match well and pass the TAG criteria except in IP in the westbound direction, where model predicts higher traffic. The results are summarised in Table 10.35 and Table 10.36.

Table 10.35 Traffic Flow Comparison – John Horrocks Way – EB

Eastbound	AM	IP	PM
Obs	795	467	492
Mod	708	556	550
Diff	87	- 89	- 58
Diff%	-11.0%	19.1%	11.7%
GEH	3.2	3.9	2.5
Pass/Fail	Pass	Pass	Pass

Table 10.36 Traffic Flow Comparison – John Horrocks Way – WB

Westbound	AM	IP	PM
Obs	528	382	822
Mod	485	667	897
Diff	43	- 285	- 75
Diff%	-8.1%	74.7%	9.1%
GEH	1.9	12.4	2.5
Pass/Fail	Pass	Fail	Pass

Traffic flow differences between the pre and post opening of John Horrocks way for AM, IP and PM peak is shown in

Figure 10-23 thru

Figure 10-25. Green bars represent increases in traffic in the post opening John Horrocks Way scenario while red bars represent decreases. Following key observations can be made:

- There is a reduction in traffic flow along Liverpool Road between John Horrocks Way and Penwortham Triangle.
- There is an increase in traffic flow accessing Preston City Centre via John Horrocks Way and A582.
- A reduction in traffic flow along Lindle Lane, which runs parallel to John Horrocks Way, was observed.
- No significant re-routing or traffic changes were noted in the wider network.

The traffic flow patterns are in line with the anticipated effects of post opening of John Horrocks Way, with the route being more attractive than the Liverpool Road to access Preston city centre. There are no significant re-routings in the wider network, indicating that there is no model noise and that the effects of the opening of John Horrocks Way are localized.

Figure 10-23 Traffic Flow Difference (Post -Pre opening of John Horrocks Way) - AM Peak

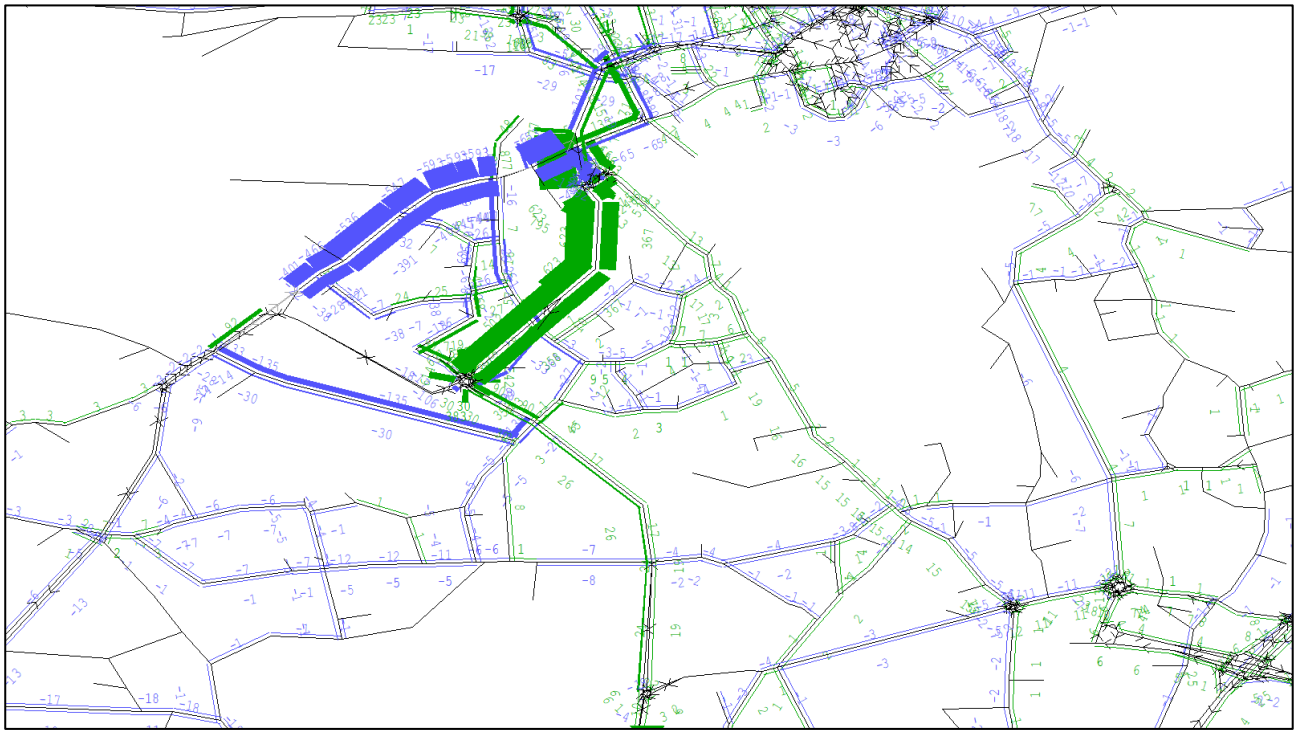


Figure 10-24 Traffic Flow Difference (Post -Pre opening of John Horrocks Way) - IP Peak

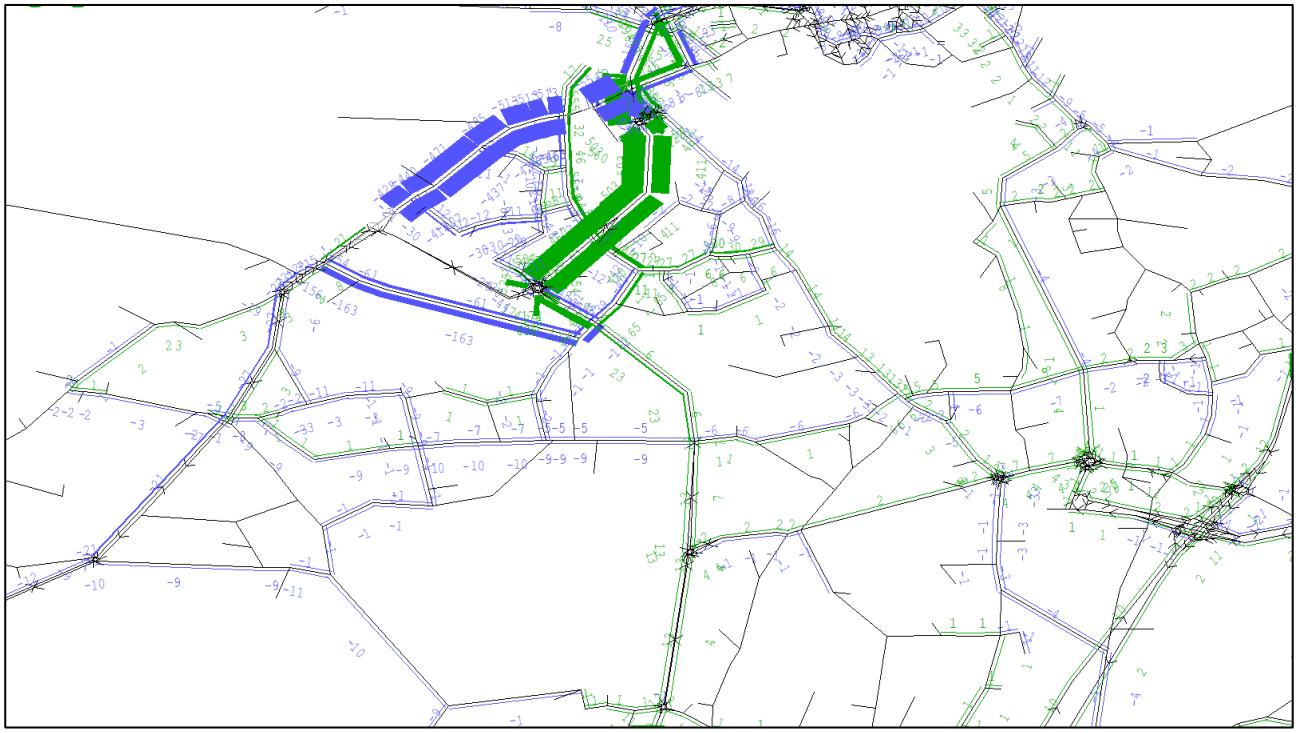
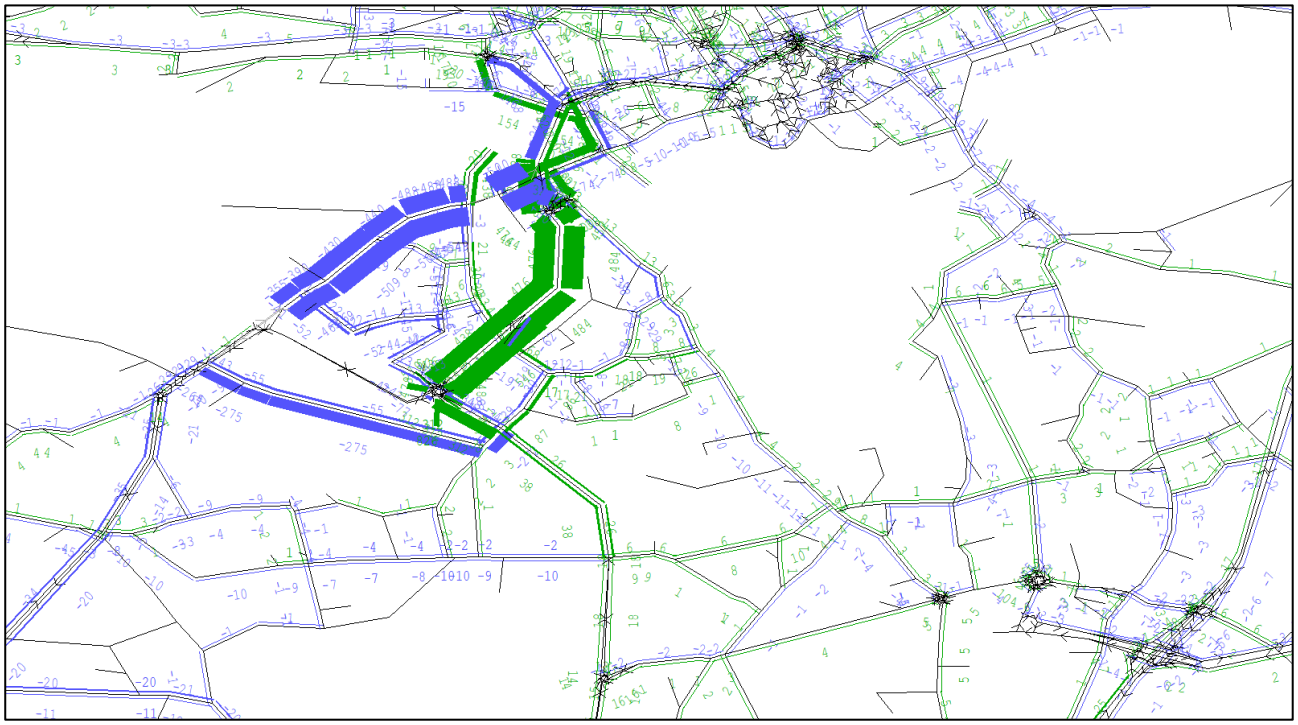


Figure 10-25 Traffic Flow Difference (Post -Pre opening of John Horrocks Way) - PM Peak



10.9 Calibrated and Validation Results – Conclusion

The model calibration and validation process were undertaken successfully and shows the model provides a satisfactory representation of the existing traffic conditions within the modelled area across all three peaks.

The calibration, and validation checks have shown that generally outputs from the model accord well with expectations and fall within expected limits. They show that the model network structure and overall coverage is appropriate. It shows that predicted link speeds and delays accord well with the observed data.

The model has been calibrated and validated using the measures and criteria recommended in TAG M3.1.

In all peaks at least 26 out of 30 (87%) of calibration screenline and 13 out of 14 (93%) validation screenline are within 5% of the observed totals. And 27 out of 30 (90%) of calibration screenline and 13 out of 14 (93%) validation screenline have a GEH value under 4.

Meeting TAG criteria on screenline flow is more difficult due to the low number of sites in some of the screenlines and the relatively low total observed flows across the screenlines. The GEH comparison is included to show that the fit across screenlines while not TAG compliant is still relatively close.

The link flow calibration and validation process for all time periods are at sufficient standard to provide confidence the model is replicating existing traffic conditions. In all peaks link calibration meets TAG requirements.

Similar to calibration results, validation screenlines and link counts passes the TAG criterion for all model peaks.

Overall, the analysis shows that the model exceeds the TAG acceptability guidelines for Strategic Road Network performance, screenline performance, calibration traffic flows, and journey time validation requirements in each time period, which gives more confidence in the model's abilities to represent actual traffic conditions.

When considering the area in vicinity of the proposed A582 scheme, the results exceed the requirement of 85% on the passing links. The majority of sites that do not validate to individual GEH/DMRB criteria are unlikely to be affected as a result of the scheme being implemented.

The model has also been shown to be stable by exceeding acceptable levels of convergence.

On this basis, the highway assignment model, as discussed in the chapters above, is considered to be a robust platform upon which to develop the variable demand model component of CLHTM. The development of the VDM is discussed in the next chapter.

11. Variable Demand

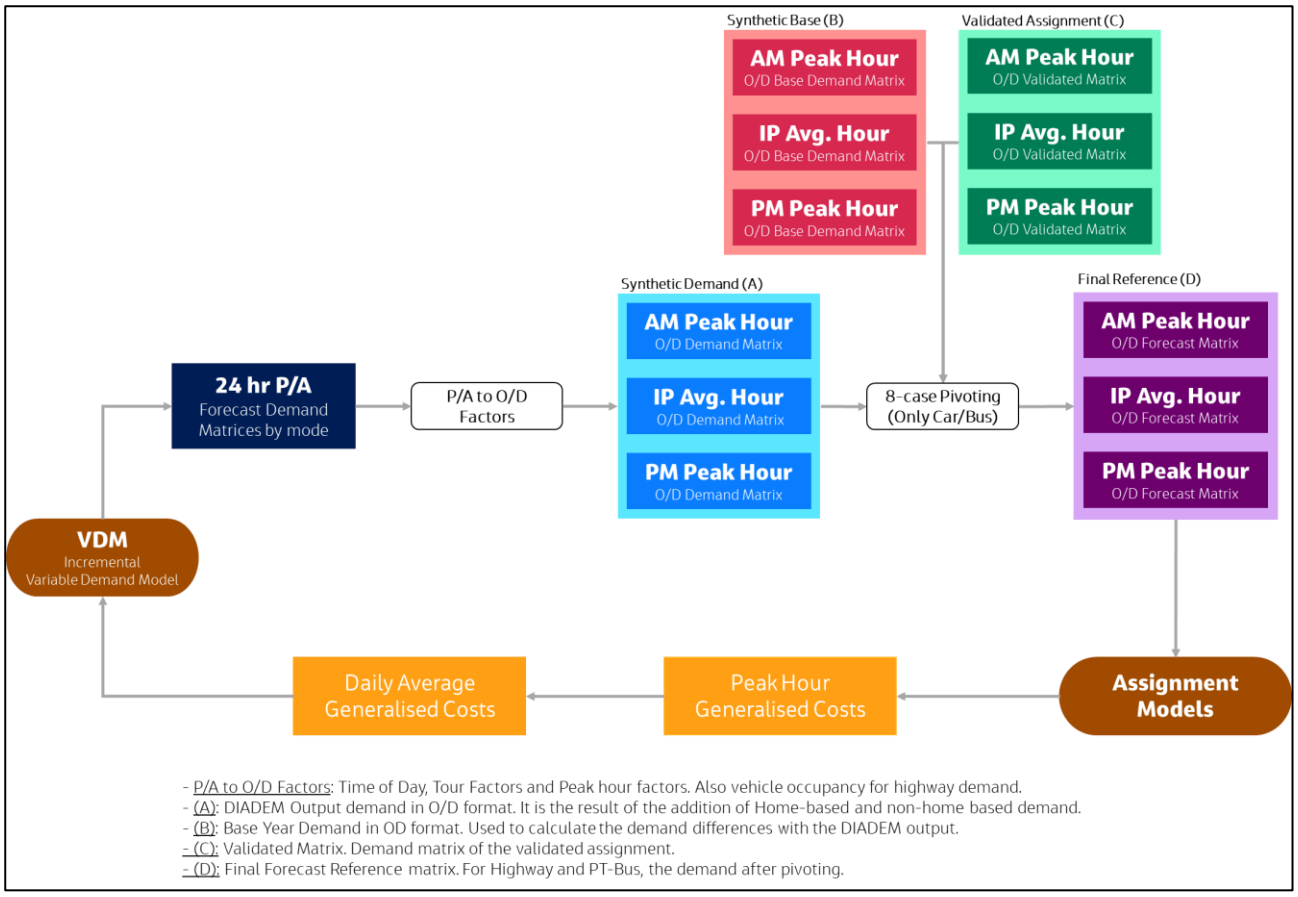
11.1 Introduction

The upgraded CLTM has been built following TAG Unit M2.1 guidance and a multi-modal variable demand model has been developed to estimate the changes in demand due to the variations in transport conditions. This section provides a description of structure, scope, and calibration of the variable demand model (VDM).

11.2 Variable Demand Model Overview

The demand model operates at a 24-hour Production/Attraction level utilising an incremental logit model that responds to changes in daily generalised costs. Such costs are obtained from highway and public transport assignment models and then converted to the daily weighted average costs taking account of the time period and direction of journey prior to the demand modelling. As shown in Figure 11.1, new assignment OD matrices are calculated using the 24-hour demand that was obtained in the previous step, and new costs are extracted. This process is repeated iteratively until convergence is reached i.e. when the difference in demand and cost between successive iterations are sufficiently small.

Figure 11.1 Relationship between Demand Model and Assignment Models

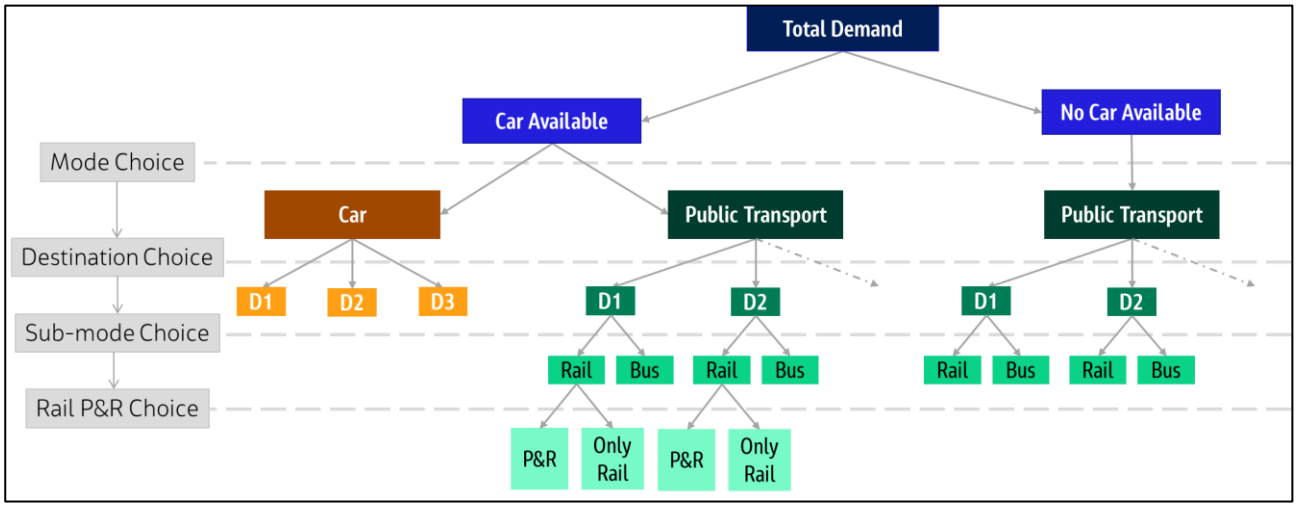


The demand model has been implemented in EMME following Appendix D of TAG Unit M2.1. Subsequently, the demand model has been calibrated in accordance with the methodology laid out in TAG Unit M2.1. This process involved adjusting the model parameters, in accordance with the values outlined in TAG Unit M2 until plausible results were produced from the realism testing.

The upgraded CLTM is built to recreate the travel behaviour in terms of mode choice and trip distribution in the study area. The trip distribution response considers the attractiveness of alternative destinations whereas the mode choice response considers demand switching between car and public transport. Since mode choice

depends on whether a traveller has a car available for the journey, the model also distinguishes between households that have a car available and those that do not. Under the public transport choice model there is also a sub-mode choice between rail and bus. Additionally, for the car-available rail trips, there is a sub-mode choice for the rail Park-and-Ride and rail only. A schematic of the structure of the mode choice model and the hierarchy of responses is presented in Figure 11.2.

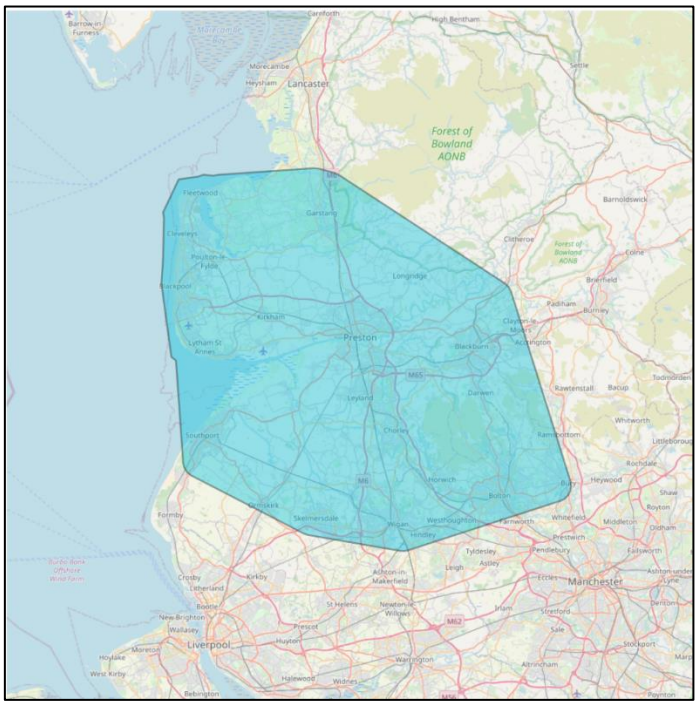
Figure 11.2 Mode Choice Structure



11.3 Cost Responsive Model Area

The area covered by the model and the zoning system are described in Sections 2.1 and 2.3. For the demand model, any trip starting or ending within the modelled area, as shown in Figure 11.3, is within the scope of the VDM and hence is fully responsive to cost changes. Any other trip both starting and ending outside of the shaded area, i.e., between two external zones, is fixed within the variable demand model.

Figure 11.3 Cost Responsive Area



11.4 Demand Segmentation

The following journey purpose segmentation is used in the CLTM demand model:

- Home-Based Work (HBW) – trips from home to work (and return) – a typical commuting journey.
- Home-Based Employer's Business (HBEB) – trips from home to a destination where the traveller is in employers' time as soon as leaving home (and return).
- Home-Based Other (HBO) – trips from home to a non-work-related location including shopping and education (and return).
- Non-Home-Based Employer's Business (NHBEB) – trips during employers' time, such as travelling from a place of work to a business meeting, visiting customers etc.
- Non-Home-Based Other (NHBO) – trips between two non-home locations e.g., from work to shops.

These journey purposes are used across car, public transport car available, and public transport no car available modes. Public transport is further segmented into Bus and Rail (including rail P&R). In line with TAG guidance, Home-Based Work purpose trips are doubly constrained within the variable demand model, while the other purpose trips are singly (Production) constrained.

A summary of the correspondence between the journey purposes and assignment user classes for all modes is presented in Table 11.1.

Table 11.1 Assignment User Classes by Mode and Demand Segments Correspondence

<table>
<tr><th>Demand Model Purpose</th><th colspan="4">Assignment User Class</th></tr>
<tr><td></td><td>Car</td><td colspan="2">Bus</td><td colspan="2">Rail</td></tr>
<tr><td>Home-Based Work</td><td>Car commute Car Available</td><td rowspan="5">Bus Only Car Available</td><td rowspan="5">Bus Only No Car Available</td><td rowspan="4">Must Use Rail Car Available</td><td rowspan="5">Must Use Rail No Car Available</td></tr>
<tr><td>Home-Based Employers Business</td><td rowspan="2">Car Employer business Car Available</td></tr>
<tr><td>Non-Home-Based Employers Business</td></tr>
<tr><td>Home-Based Other</td><td rowspan="2">Car Other Car Available</td></tr>
<tr><td>Non-Home-Based Other</td><td></td></tr>
</table>

Also, Light, and Heavy Good vehicles are included as two separate user classes in the highway assignment model. However, they are treated as fixed demand i.e., they are not included in the demand model calculations.

11.5 Generalised Costs

All the elements that were considered for the calculation of the generalised costs used in the assignments of each mode are described in Section 2.6. Other components of the generalised costs which are considered in the demand model are described below.

11.5.1 Public Transport Fare

For the Public Transport assignment, and following guidance from TAG Unit M3.2, Public Transport fares were not included as part of the assignment as they are not thought to sufficiently affect route choice in the CLTM.

Matrices of fares were included in the Variable Demand Model and added to the generalised cost as they will be an important influence on mode choice for some trips. The following sections outline the process for deriving the rail and bus fares.

11.5.2 Rail Fares

Rail fares were estimated from MOIRA for year 2019 and calculated by:

- Aggregate MOIRA into a unique station-station matrix with sum of annual demand and revenue (i.e. group ticket types and Summer/Winter)
- Join (1) with National Rail Travel Survey (NRTS) sample network distances
- Calculate the average revenue per passenger kilometre from (2). Use distance bands as price/km will decrease for longer distance trips.
- Join Mobile Network Data (MND) station catchment zones with PT model distances from zone-station.
- Compare distance bands from (4) against NRTS access/egress observed data.
- From (5) adjust catchments (e.g. remove very long-distance access legs).
- Finalise assignment of zones to stations - check for zones without station and vice versa.
- Assign station-station average MOIRA fare to the zone-zone matrix. Where average fare is missing, use the average price/km travelled (3) * station-station network distance.
- Where a zone can use more than one station, weight fares is based on a probability of station choice

11.5.3 Bus Fares

Bus fares for each OD pair and trip purpose are derived using the Stagecoach ticket options valid for August 2019. Using GIS, all OD movements are assigned to a corresponding ticketing zone. Assuming that every purpose completes one return journey per day, single-trip fares are calculated as follows:

- Business trip purpose = Day Ticket divided by 2
- Commute trip purpose = Weekly Ticket divided by 10
- Other trip purpose = Day Ticket divided by 2

A simple fare calculation provides only the 'Adult single' fare does not take into account the mixture of different passengers using the bus service such as concessionary fare users who travel at reduced fares. To address this, percentage of split of ticket types using bus services in the study area throughout the day was estimated and using the percentage splits, a reduction factor was applied to the fare. According to the ticketing information provider by Stagecoach, 27.8% of the trips correspond to concessionary users under the English National Concessionary Scheme. To reflect the mixture of tickets used by all users, the base fare matrices have been adjusted using a factor of 0.722.

Fares for external-to-external zonal OD pairs are set at £9999 as they are excluded from the mode choice model.

11.5.4 Parking Charges

Parking charges in Preston City Centre are sourced from published data from relevant websites. In addition to the dedicated station parking, Fishergate shopping centre car park, located next to the station is also considered as a potential parking location for rail passengers as there is good chance that people would use this facility instead of the station car park due to lower parking charges.

Station parking costs for Preston Railway Station is as summarised in Table 11.2 below.

The daily weekday parking fee was converted into highway generalised cost using the Value of Time (VoT) corresponding to each of the demand segment. The parking cost was halved to spread the cost for outbound and return trip.

Table 11.2 Parking Charges

Car Park	Capacity	Opening hours	Parking Fee
Preston Railway Station car park	1,025	Monday to Sunday (available at all times)	Daily: £12.00 Saturday: £6.00 Sunday: £6.00 Monthly: £166.00

Car Park	Capacity	Opening hours	Parking Fee
			Three Monthly: £374.00 Annual: £1,200.00
Fishergate shopping centre	720	Sunday - 08:00 -18:00 Monday to Saturday - 08:00 - 19:00	Up to 1 hour £1.50 Up to 2 hours £2.00 Up to 3 hours £2.50 Up to 4 hours £3.50 Up to 5 hours £4.50 Up to 8 hours £7.50 Over 8 hours £8.50

11.6 Bus and Highway Assignments Integration

Bus link speeds are adjusted in every iteration in order to estimate the likely impact of changes in car traffic on the bus travel times. First, highway assignments are run and travel times for all simulation links are extracted. Subsequently, the bus network is updated with times from highway assignments. Bus times from CIF files are added to each of transit lines segment. The time between bus stops is divided proportionally between each transit line segment (link) between stops (split time macro). If the segment speed is greater than 90 km/h then the segment time is changed to match the highway assignments times. These times determine the base year bus travel times.

For forecast year and realism testing scenarios the following steps are taken:

- Base year and forecast year times from highway assignments are compared and the percentage difference is calculated for each link
- The base year segment times are then factored by the percentage change from the highway assignments to create the forecast year segment times.
- If the calculated forecast year bus speed is greater than 90 km/h then the speed is limited to 89 km/h.

11.7 Variable Demand Model Calibration

11.7.1 Demand Model Distribution Parameters

The demand model parameters control the sensitivity of the model's mode, destination, and sub-mode choice responses. These parameters are sensitivity parameters (λ) and the scaling parameters (θ). Scaling factors represent the ratio of sensitivity parameters from successive levels of the demand model choice structure (e.g. the sensitivity of main mode choice relative to that of destination choice).

The strength of the sensitivity parameters should be in line with the model hierarchy, i.e. these need to be stronger at lower levels of the model hierarchy than at the higher level. To be consistent with TAG recommended hierarchy of destination choice following main mode choice, the main mode choice scaling parameters should be less than or equal to one. TAG Unit M2.1 Section 5.6 provides a number of illustrative parameter values defined individually by mode and by purpose.

For the sensitivity parameters, the TAG median values by trip purpose and mode were adopted as a starting point for the calibration of the VDM. This is the standard approach recommended for those cases where no locally calibrated data is available. The initial sensitivity parameters of the variable demand model are shown in Table 11.4.

Table 11.3 Sensitivity Parameters (Before Realism Testing)

Trip Purpose	Bottom Level Sensitivity Parameters			Destination Choice Scaling Parameters θ	Mode Choice Scaling Parameters θ
	Highway	Bus	Rail		
HB Commute	0.065	0.033	0.033	1	0.68
HB Employer Business	0.067	0.036	0.036	1	0.45
HB Other	0.090	0.036	0.036	1	0.53
NHB Employer Business	0.077	0.042	0.042	1	0.73
NHB Other	0.081	0.033	0.033	1	0.81

These sensitivity parameter values have then been subject to realism testing and refinement as defined by TAG Unit M2.

11.7.2 Cost Damping

There is strong empirical evidence that the sensitivity of demand responses to changes in generalised cost reduces with increasing trip length. The mechanisms by which this may be achieved are generally referred to as 'cost damping'. TAG prescribes the application of cost damping in those instances where a model fails to yield elasticities within TAG specified ranges. In view of early analyses of the outturn elasticities from the model set up with TAG median parameter values, a decision was taken to employ generalised cost damping as a function of distance.

TAG states that if cost damping is employed, it should apply to all person demand responses. The same cost damping function should be applied to both car and public transport costs. While the starting position should be that the same cost damping parameter values are used for both modes, it may be necessary to vary the cost damping parameters between the modes in order to achieve satisfactory realism test results. It may also be necessary to vary cost damping parameters by trip purpose. However, these variations by mode and purpose should be avoided unless it is essential to achieve acceptable model performance.

The damped cost applied in the demand model follows the formula:

$$G' = \left(\frac{d}{k}\right)^{-\alpha} \cdot \left(t + \frac{c}{\mathrm{VOT}}\right)$$

Where:

- G' is the damped generalised cost
- t and c are the trip time and monetary cost, respectively
- VoT is the value of time
- d is the trip length; and
- α and k are parameters that need to be calibrated

α must be positive and less than 1 and should be determined by experimentation in the course of adjusting the model so that it meets the requirements of realism tests. k must also be positive and in the same units as d.

To prevent short-distance trips, particularly intra-zonal trips, becoming unduly sensitive to cost changes, a cut-off is applied. Parameter d' represents the distance below which generalised costs would not be reduced. As per TAG unit M2.1 guidance, some commonly used parameter values are presented below:

- α = 0.5
- k = 30 km
- d' = 30 km.

These initial values were used for realism testing and then subject to further refinement.

11.7.3 Parameter Estimation

11.7.3.1 Realism Testing Overview

To ensure that the variable demand model behaves 'realistically', a series of tests have to be undertaken by changing the various components of travel costs and checking the overall demand response. The suitability of the model's responses is evaluated through its demand elasticities. Acceptable demand elasticities are achieved by varying the distribution and cost damping parameters described before.

Demand elasticities are calculated by changing a cost or time component and calculating the proportionate change in travel. The elasticity is calculated using the following formula:

$$\varepsilon = \frac{In(T_1) - ln(T_0)}{In(C_1) - ln(C_0)}$$

where the superscripts 0 and 1 indicate values of demand, T, and cost, C, before and after the change in cost, respectively. The demand can be expressed in terms of vehicle kilometres (for car demand) or person trips (for public transport modes). The model tests have been applied to the base model to demonstrate appropriate responsiveness to changes in highway fuel cost, highway journey times, public transport fares (rail and bus), and bus fares in isolation.

11.7.3.2 Car Fuel Elasticity

The car fuel cost elasticity measures the percentage change in car vehicle kilometres with respect to the percentage change in fuel cost. TAG states that the calculations should be carried out for a 10% or a 20% fuel cost increase. A 20% increase was used in this study.

The matrix-based approach compares the change in car vehicle kilometres using the car trip matrices and skimmed distance matrices relating to the before and after fuel cost change model runs. The movements included in this calculation relate only to the movements to which the full range of demand responses apply (internal productions) in the demand model. The calculations have been carried out at a time period and 24-hour production-attraction basis.

The network-based approach measures changes in car vehicle kilometres accumulated over the model network (links) from the before and after fuel cost change model runs. The network used for this calculation extends to cover the area over which the highway assignment model has been validated but excludes external to external movements.

11.7.3.3 Car Journey Time Elasticity

The car journey time elasticity measures the change in car trips with respect to a change in journey time. Car journey time elasticities were calculated using the fuel cost elasticities and cost damping, using the equation below:

$$\varepsilon^{time} = \varepsilon^{fuel} \frac{p^{time}}{p^{fuel}}$$

Where :

- p^{time} is cost of travel as a proportion of generalised cost; and
- p^{fuel} is the cost of fuel as a proportion of total generalised cost.

Furthermore, if the total vehicle kilometres (K) and total vehicle hours (T) are known then the following relationship can be derived:

$$\frac{p^{time}}{p^{fuel}} = \frac{aT}{bK}$$

where a is the cost per hour; and b is the cost per km.

11.7.3.4 Public Transport Fares Elasticities

The public transport fare elasticity measures the percentage change in public transport trips by all public transport modes with respect to the percentage change in public transport fares. A fare increase of 20% was used for these two tests, applied to all public transport modes equally, and only to bus. Public transport fare elasticities are calculated on a matrix basis, by time period and trip purpose. The movements included in this calculation relate only to the movements to which the full range of demand responses apply in the demand model (internal productions).

11.7.3.5 Target Elasticities

Table 11.4 summarises the recommended elasticity ranges that should be achieved by the realism tests that have been carried out for the upgraded CLTM.

Table 11.4 Recommended Elasticities

Test	High	Low
Fuel cost (km)	-0.35	-0.25
Car Journey Time (trips)	No stronger than -0.2	
PT main mode fare (trips)	-0.9	-0.2
Bus fare (trips)	-0.9	-0.7

11.8 Calibration Results

11.8.1 Car Fuel Elasticity

Calibration of the car destination model parameters was conducted in line with guidance from TAG Unit M2 using the recommended median values. A sequence of model runs was conducted, as described below, in order to achieve calibration.

Run 1 used the median parameter. The results indicate that in all time periods for employer's business and other purposes the response is very sensitive and too strong; while commute elasticity is not as sensitive. Run 2 increased the distribution parameters by 25% above median. The elasticities strengthened, and increased commute sensitivity. Run 3 decreases the distribution parameters by 25% below median. The elasticities weakened but remained too sensitive for business and other purpose.

As a next step Run 1,2 3 were repeated (runs 4, 5, 6) with distance-based cost damping introduced based on the commonly used values quoted in WebTAG Unit M2, namely k and d' set to 30km and alpha to 0.5. This again reduced and weakened the sensitivity for all time periods. However, the responses for Other remained too sensitive, and too weak for commute. In Run 7, the distribution parameter was reduced by 25% for business and other and increased by 25% commute from median values, whilst retaining the same cost damping parameters as before.

These sequences of runs gave reductions from the initial over-sensitive responses for business and other and under sensitivity for commute. In the next steps, described below, the cost damping was strengthened for other to bring overall model sensitivity between -0.3 and -0.35, based on WebTAG Unit M2 paragraph 3.3.5 which recognises the following;

"It may also be necessary to vary cost damping parameters by trip purpose. However, these variations by mode and purpose should be avoided unless it is essential to achieve acceptable model performance".

In the Run 7 cost damping was removed for commute, to bring that purpose up to an acceptable sensitivity. In Run 8, 9 and 10 adjustments were made to the cost damping parameters for the other purpose to further reduce its sensitivity. First, in Run 8 the k and d' were reduced to 20km based upon the shorter mean trip length for 'other' and business purpose trips. Finally, in Runs 9 and 10 the alpha was increased from 0.5 to 0.6 to further strengthen the cost damping response. The distributions parameters of all runs are presented in Table 11.5. Complete results of the sequence of runs are provided in Appendix G.

Table 11.5 Car Fuel Cost Test - Distribution Parameters

Run ID	Distribution Parameter Trip (Lambda)					Cost Damping		
	HBW	HBEB	NHB EB	HB Other	NHB Other	HBW	EB	Other
1	-0.065	-0.067	-0.081	-0.090	-0.077	-	-	-
2	-0.049	-0.050	-0.061	-0.068	-0.058	-	-	-
3	-0.081	-0.084	-0.101	-0.113	-0.096	-	-	-
4	-0.065	-0.067	-0.081	-0.090	-0.077	d'=k=30000; α = 0.5		
5	-0.049	-0.050	-0.061	-0.068	-0.058	d'=k=30000; α = 0.5		
6	-0.081	-0.084	-0.101	-0.113	-0.096	d'=k=30000; α = 0.5		
7	-0.081	-0.050	-0.061	-0.068	-0.058	-	d'=k=30000; α = 0.5	
8	-0.081	-0.050	-0.061	-0.068	-0.058	-	d'=k=20000; α = 0.5	
9	-0.081	-0.050	-0.061	-0.068	-0.058	-	d'=k=20000; α = 0.55	
10	-0.081	-0.050	-0.061	-0.068	-0.058	-	d'=k=20000; α = 0.5	

Table 11.7 presents the outturn fuel cost elasticities obtained with median choice and final parameters. The average 24-hour demand elasticity of -0.325 lies within the TAG recommended range, and the AM and PM peak period elasticities are weaker than the inter-peak elasticities.

The characteristics of the study area were compared against the national characteristics as shown in Table 11.6 in order to determine which side of -0.3 the annual average fuel cost elasticity should lie. Given that half of the conditions are met, and the car mode share is not significantly higher than the national average, it is reasonable to conclude that elasticity should lie between -0.30 and -0.35, as the income is lower than the national average.

Table 11.6 Comparisons at National level

Conditions for elasticity weaker than -0.30	Result
Trip Length shorter than average	North West (NTS 2018/19) = 7.6 miles England (NTS 2018/19) = 8.3 miles **Yes** - Shorter than NTS for majority of trips (across all purposes)
Care mode share higher than average	North West (NTS 2018/19) = 63.8% England (NTS 2018/19) = 63.1% **Yes** – Marginally higher than national
EB proportion higher than average	North West (TEMPRO 7.2) = 7% GB (TEMPRO 7.2) = 8% **No** - Lower than national
Higher income levels	North West (ONS 2013) = £15,791 England (ONS 2013) = £18,020 **No** - Lower than national

Furthermore, the relative pattern of elasticities across different journey purposes is in line with expectations and deemed plausible with discretionary trips (Other) exhibiting the strongest elasticities.

Table 11.7 Car Fuel Cost Elasticities - Results

Period	Purpose	Median Parameters	Final Parameters
AM	Commute	-0.171	-0.217
	Employer Business	-0.773	-0.163
	Other	-1.009	-0.378

Period	Purpose	Median Parameters	Final Parameters
	Average	-0.504	-0.255
IP	Commute	-0.186	-0.237
	Employer Business	-0.791	-0.169
	Other	-1.268	-0.452
	Average	-0.961	-0.352
PM	Commute	-0.173	-0.223
	Employer Business	-0.764	-0.168
	Other	-1.242	-0.450
	Average	-0.699	-0.310
12 HR	Commute	-0.175	-0.224
	Employer Business	-0.780	-0.167
	Other	-1.218	-0.439
	Total	-0.760	-0.314
24 HR	Commute	-0.177	-0.226
	Employer Business	-0.784	-0.168
	Other	-1.236	-0.444
	Total	-0.820	-0.325

The corresponding network elasticities are presented in Table 11.8. Results are in line with matrix-based elasticities presented before. No External-to-External movements were included in the calculation.

Table 11.8 Car Fuel Cost - Network Based Elasticities

Trip Purpose	AM	IP	PM
Commute	-0.238	-0.239	-0.268
Employer Business	-0.218	-0.094	-0.171
Other	-0.291	-0.298	-0.363

11.8.2 Car Journey Time Elasticity

Car journey time elasticities derived from the fuel cost elasticities, as described in Section 11.7.3.3, are summarised in Table 11.9. The demand elasticities with respect to journey time are not overly strong and are weaker than -2.0 across all journey purposes and time periods.

Table 11.9 Car Journey Time Elasticity Results

Trip Purpose	AM	IP	PM
Commute	-0.659	-0.709	-0.668
Employer Business	-0.163	-0.342	-0.335
Other	-0.378	-1.039	-1.032

11.8.3 Public Transport Fares Elasticities

11.8.3.1 Overall Increase

As described before, the public transport fares elasticity test included an increase of the fare component of generalised cost by 20%. The model was run to convergence and the results for internal productions are shown in Table 11.10. The results show that the elasticity is close to TAG recommended value of -0.2.

Table 11.10 Public Transport Fare Test Elasticity Results

Period	Mode	Median Parameters	Final Parameters
AM	Rail	-0.639	-0.604
	Bus	-0.143	-0.200
	All	**-0.174**	**-0.225**
IP	Rail	-0.709	-0.651
	Bus	-0.158	-0.233
	All	**-0.174**	**-0.246**
PM	Rail	-0.616	-0.580
	Bus	-0.157	-0.233
	All	**-0.191**	**-0.258**
12 hr	Rail	-0.651	-0.609
	Bus	-0.154	-0.224
	All	**-0.178**	**-0.243**
24 hr	Rail	-0.664	-0.618
	Bus	-0.155	-0.227
	All	**-0.177**	**-0.244**

The demand model converged after one iteration. Convergence metrics are presented in Table 11.15.

11.8.3.2 Bus Fare Increase

The public transport sub-mode (bus) fares elasticity test was undertaken by increasing the bus fare matrices by 20%. The model was run iteratively to convergence. As shown in Table 11.11, bus response is below the target range (-0.7 to -0.9) for all periods and 24-hours.

This weak response was deemed as acceptable given two key characteristics of the local demand. Bus share in Lancashire is lower than in the region and the rest of the country, the number of passengers per head of population are 32.5 for Lancashire, 50.0 in the North-West, and 72.4 in England. Although concessionary users are not segmented explicitly, including them can reduce the response as it is recognised in TAG unit M2.1 par 6.4.24: "Including concessionary passengers would tend to reduce the elasticities given above to around -0.4 with a lower elasticity in the off-peak". Considering that the proportion of the concessionary journeys in Lancashire is higher (29%) than the national average (22%), according to DfT's Local transport statistics (Tables BSU0109 and BUS0113), a weaker response to bus fare increases can be expected. Although the TAG criteria is not met due to the inclusion of concessionary passengers, the values are close to -0.4 and hence considered acceptable

Table 11.11 Bus Fare Test Elasticity Result

Period	Mode	Median Parameters	Final Parameters
AM	Rail	0.180	0.22
	Bus	-0.207	-0.27
	All	**-0.181**	**-0.23**
IP	Rail	0.223	0.28
	Bus	-0.256	-0.33
	All	**-0.240**	**-0.31**
PM	Rail	0.189	0.22
	Bus	-0.257	-0.34
	All	**-0.221**	**-0.29**
24 hr	Bus	**-0.226**	**-0.30**

11.9 Final Sensitivity Parameters

Table 11.12 summarises the final choice parameters of the variable demand model.

Table 11.12 Final Choice Parameters

Trip Purpose	Bottom Level Sensitivity Parameters			Destination Choice Scaling Parameters θ	Mode Choice Scaling Parameters θ
	Highway	Bus	Rail		
HB Commute	0.08125	0.04125	0.033	1	0.68
HB Employer Business	0.05025	0.045	0.036	1	0.45
HB Other	0.0675	0.06	0.036	1	0.53
NHB Employer Business	0.06075	0.0525	0.042	1	0.73
NHB Other	0.05775	0.043	0.033	1	0.81

No further sensitivity testing on the distribution parameters was undertaken as they were not imported from other studies and no local data was used for calibration of the demand model.

11.10 Convergence

In assessing the outputs of the model runs, the main parameter of importance is the 'relative gap', which is the measure of convergence between demand and supply. Current TAG guidance recommends a relative gap of at least 0.2%. The base year realism testing models converged to less than 0.2%, with all runs reaching convergence within 3 iterations, which suggests the demand - supply convergence of the variable demand traffic model is acceptable. It has therefore been shown that the traffic model is stable and has converged to an acceptable standard. Convergence metrics for the Car Fuel Cost, the Bus Fare Test and the overall PT Fare test are presented in Table 11.13 through Table 11.15.

Table 11.13. Car Fuel Cost – Convergence metrics

OD Pairs	Convergence (Relative Gap %)			
	Rail	Bus	Car	All
All	0.031	0.072	0.064	0.062
Internal to Internal	0.032	0.074	0.076	0.074

Table 11.14. Bus Fare Test – Convergence Metrics

OD Pairs	Convergence (Relative Gap %)			
	Rail	Bus	Car	All
All	0.014	0.036	0.032	0.031
Internal to Internal	0.017	0.037	0.045	0.043

Table 11.15. Public Transport Fare Test – Convergence Metrics

OD Pairs	Convergence (Relative Gap %)			
	Rail	Bus	Car	All
All	0.014	0.036	0.032	0.031
Internal to Internal	0.017	0.037	0.045	0.043

11.11 Conclusion

The variable demand model for the upgraded CLTM model has been calibrated in accordance with the methodology and recommendations set out in TAG unit M2.

Realism tests have readily converged in line with TAG Unit M2 and all assignments comply with the corresponding criteria.

The results presented in the preceding sections demonstrate that:

- The demand model structure and response hierarchy have been set up correctly and comply with TAG Unit M2 requirements;
- The calculations and the methodology used for fuel cost elasticities are compliant to TAG Unit M2 guidance;
- The outturn elasticity results fall within the WebTAG Unit M2 expectations and requirements; and
- The distribution parameters that are adopted in the model are WebTAG Unit M2 compliant and within recommendations.
- The highway and public transport models have been validated against observed data collected in 2019 representing an average weekday (Mon-Fri) in a neutral month. Realism test elasticities have been shown to lie within the TAG criteria. It is therefore it is expected annual average elasticity will also lie within the expected range.

Overall, the demand model responses to change are realistic and within the requirements of TAG Unit M2. Thus, these calculated parameters will be considered suitable for variable demand modelling for future year forecasting.

12. Summary of Model Development, Standards Achieved and Fitness for Purpose

12.1 Summary of Model Development

The CLTM has been enhanced to include a bus and rail assignment model and a variable demand model in EMME, following guidance laid out in TAG Units M1, M2 and M3. The highway assignment model was updated to ensure consistency with the bus assignment model, and the validation of the model was reviewed.

Synthetic bus demand matrices were generated from NTEM 2019 trip ends distributed to NTS trip length distribution. Synthetic rail demand matrices were generated from MOIRA station-station data and Mobile Network Device (MND) derived journey observations provided by CitiLogik.

Modelled bus link flows, sectored boardings and journey times compare favourably to observed data. Where the boardings do not meet the criteria, this has been explained. The rail model calibrates well to observed station entry and exit data. There is no significant change to the calibration, validation or convergence of the highway assignment model previously reported in the CLHTM 2019 Recalibration Report.

The VDM has been updated to P/A format and calibrated to pass realism testing prescribed in TAG.

12.2 Summary of Standards Achieved

The standards to which the model aimed to conform are set out in Chapter 3. Table 12.1 summarises how the model performs against those standards.

Table 12.1 Model Performance Standards

Model Aspect	Criterion	Acceptability Guidelines	Actual Model Performance
Bus Network	Journey Times within 15% (or one minute if higher)	> 85% of Routes	▪ AM Peak – 88% ▪ Inter-peak – 85% ▪ PM Peak – 85%
Bus Prior Matrix Calibration	Link Flows within 25% of the counts, except where observed hourly flows are particularly low (less than 150 passengers per hour).	> 85% of Links	▪ AM Peak – 61% ▪ Interpeak – 71% ▪ PM Peak – 75% Links GEH > 5: ▪ AM Peak – 46% ▪ Interpeak – 71% ▪ PM Peak – 57%
	City Centre Cordon within 15% of the counts.		Interpeak and PM Peak Inbound to Preston are within 15% of observed, with AM Peak (-21%) failing to meet the criteria. No period Outbound is within 15% of observed with AM Peak (-29%), Interpeak (-17%) and PM Peak (-41%) failing to meet the criteria.

Model Aspect	Criterion	Acceptability Guidelines	Actual Model Performance
	Sector Boardings within 25% of the counts, except where observed hourly flows are particularly low (less than 150 passengers per hour).	> 85% of Sectors	▪ AM Peak – 77% ▪ Interpeak – 92% ▪ PM Peak – 92% Sector GEH > 5: ▪ AM Peak – 65% ▪ Interpeak – 58% ▪ PM Peak – 77%
Bus Matrix Estimation	Matrix Zonal Cell Values	Slope within 0.98 and 1.02 Intercept near zero R2 in excess of 0.95	Slope between 0.88 and 0.96, Intercepts near zero, and R^2 between 0.91 and 0.93.
	Matrix Zone Trip Ends	Slope within 0.99 and 1.01 Intercept near zero R2 in excess of 0.98	Slope between 0.92 and 0.99, Intercepts near zero, and R^2 between 0.97 and 0.99.
	Trip Length Distribution	Means within 5% Standard deviations within 5%	Means within 8%. Standard deviation within 10%
	Sector-to-Sector Difference GEH < 5	All or nearly all sectors	99% of all sector-to-sector movements have a GEH of less than 5 in all time periods.
Bus Final Matrix Calibration	Link Flows within 25% of the counts, except where observed hourly flows are particularly low (less than 150 passengers per hour).	> 85% of Links	▪ AM Peak – 79% ▪ Interpeak – 93% ▪ PM Peak – 82% Links GEH > 5: ▪ AM Peak – 71% ▪ Interpeak – 93% ▪ PM Peak – 75%
	City Centre Cordon within 15% of the counts.	All or nearly all cordons	AM Peak, Interpeak and PM Peak Inbound to Preston are all within 15% of observed. AM Peak and Interpeak Outbound are within 15% of observed with PM Peak (-25%) failing to meet the criteria.
	Sector Boardings within 25% of the counts, except where observed hourly flows are particularly low (less than 150 passengers per hour).	> 85% of Sectors	Individua Sector: ▪ AM Peak – 76% ▪ Interpeak – 76% ▪ PM Peak – 95%

Model Aspect	Criterion	Acceptability Guidelines	Actual Model Performance
Rail	Station entry / exits 25% of the counts, except where observed hourly flows are particularly low (less than 150 passengers per hour).	> 85% of Stations	Stations > 150 Observations - 93% All Links GEH > 5 – 89%
Highway Validation	Screenline Flows within 5% of observed	All or nearly all screenlines	For all time periods, screenline totals pass the flow difference and GEH criteria.
	Journey Times within 15% (or one minute if higher)	> 85% of Routes	Criteria met for 86% of journey time routes in the AM, 100% in the IP and 89% in the PM time period.
VDM Realism Testing	Fuel Cost Elasticity	-0.35 to -0.25	All peak average elasticities between -0.35 and -0.25
	Car Journey Time Elasticity	No stronger than -0.2	All elasticities weaker than -0.2.
	PT Main Mode Fare Elasticity	-0.9 to -0.2	All peak and mode elasticities between -0.9 and -0.2
	Bus Fare Elasticity	-0.9 to -0.7	Bus response below target range.

Table 12.1 demonstrates that the majority of the model standards are met.

Some of the criteria related to matrix estimation performance are not met, however, there are understood reasons why that is the case, as detailed in each of the previous sections.

12.3 Assessment of Fitness for Purpose

The model performs well against the model standards previously set out and this should serve to give confidence and provide reassurance that the model is representative of 2019 conditions for all modelled modes.

The synthetic prior matrices were adjusted using the calibration techniques set out in Chapter 8 (for bus) and Chapter 9 (for rail). The matrices were adjusted to better match observed data whilst maintaining matrix integrity, both in terms of matrix totals and trip length distribution. Modelled journey times on the bus network, including congested highway times, performs well, meeting the journey time validation criteria.

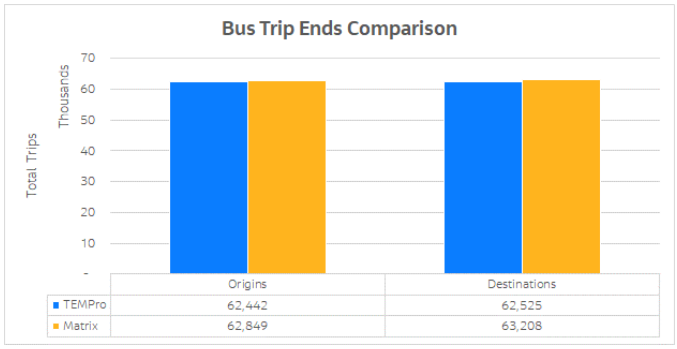
No significant changes were applied to the previously calibrated and validated highway model.

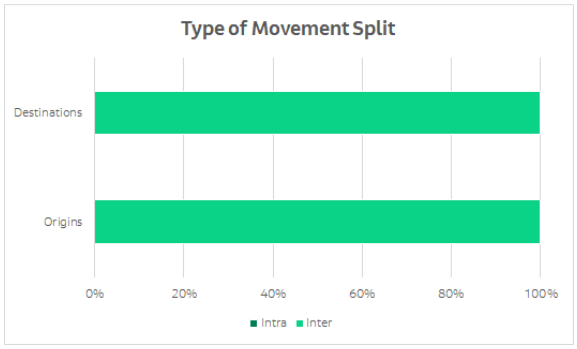
Given that the model has been demonstrated to have been constructed in a manner consistent with guidance, has been developed in conjunction with local LCC checks and DfT advice, and is representative of traffic conditions, it is expected that a high degree of confidence may be placed in the model for the purposes of scheme assessment, appraisal, economic and environmental appraisal, as described in the opening sections of this report.

Appendix G. Appendix A – Matrix Development Checks

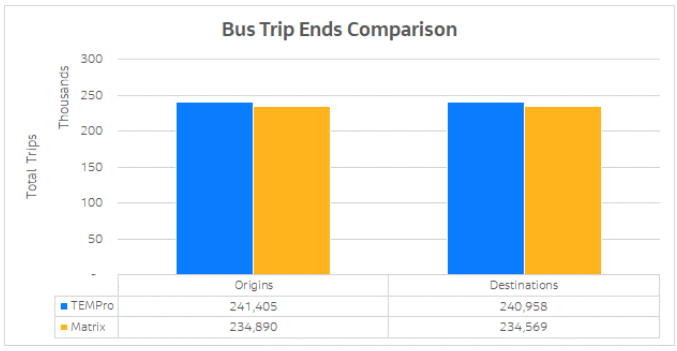
Trip Ends Comparison at Different Levels and Movement Type

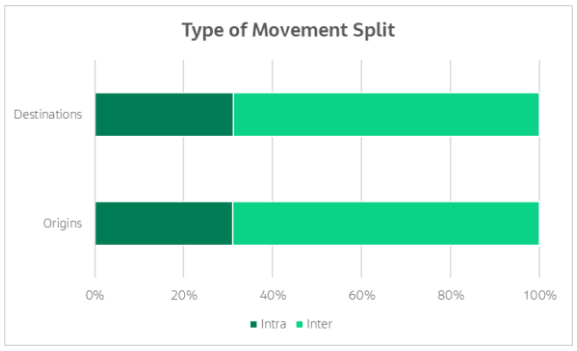
AoDM Comparison



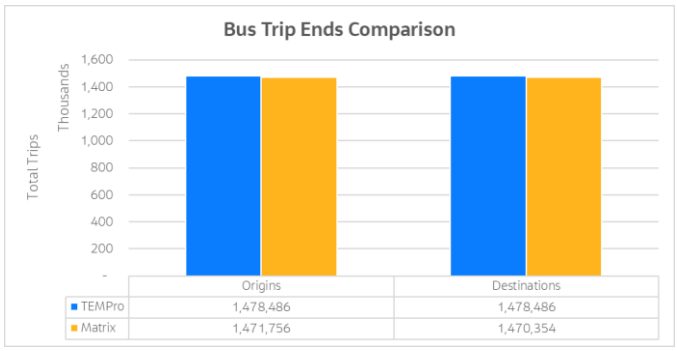


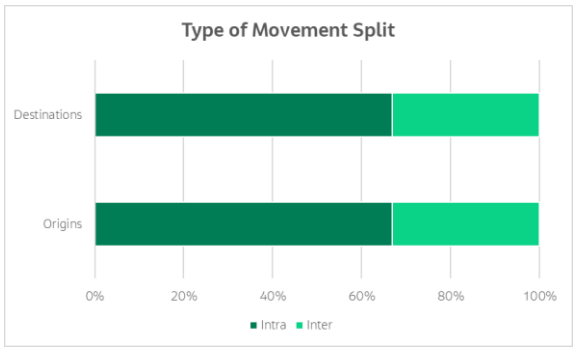
County Comparison (Lancashire)



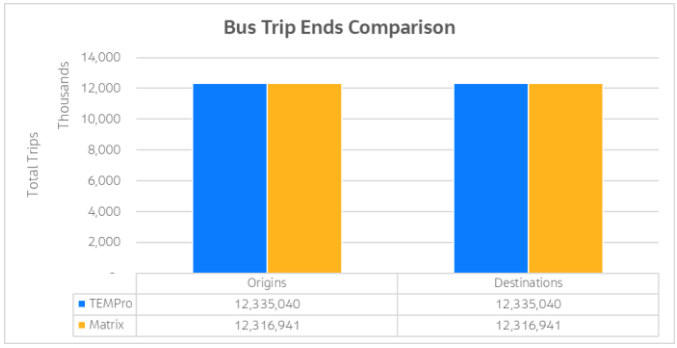


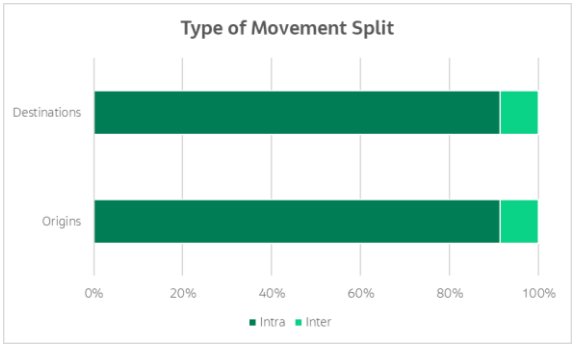
Region Comparison (NW)





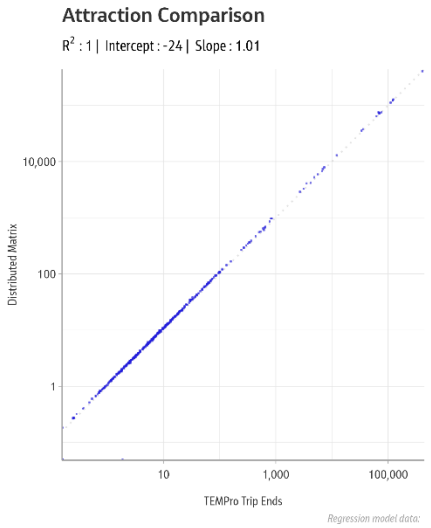
National Comparison (GB)

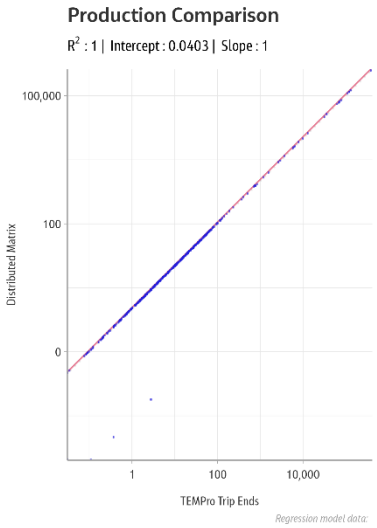




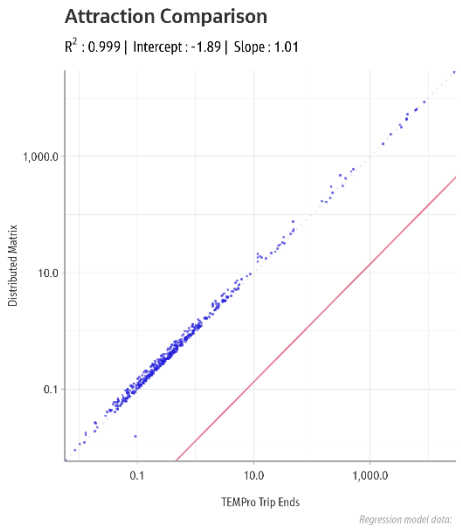
Trip Ends Check by Trip Purpose after Trip Distribution

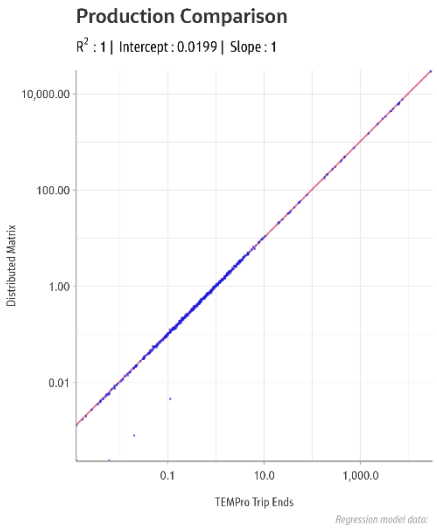
HB Work





HB EB





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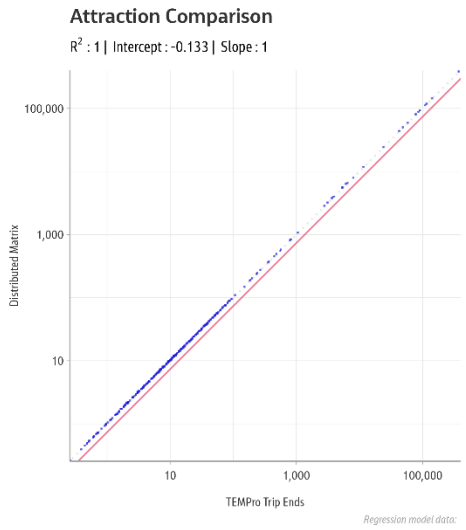
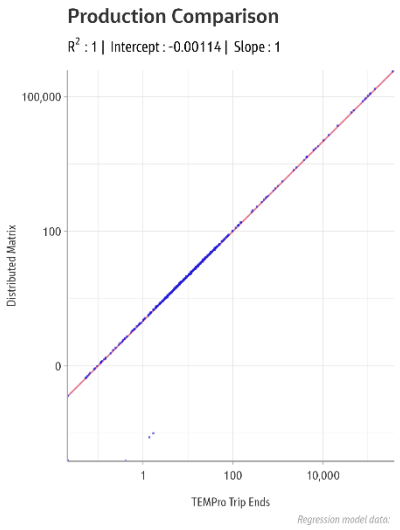
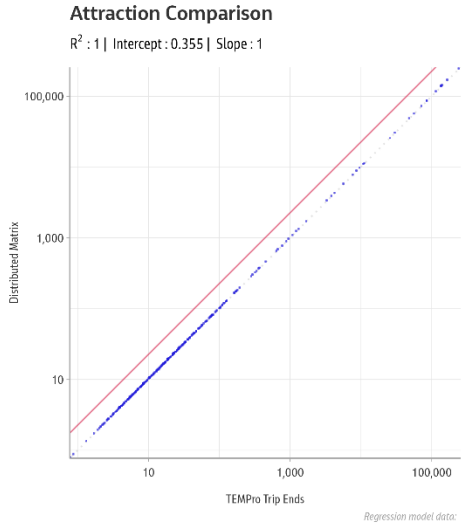
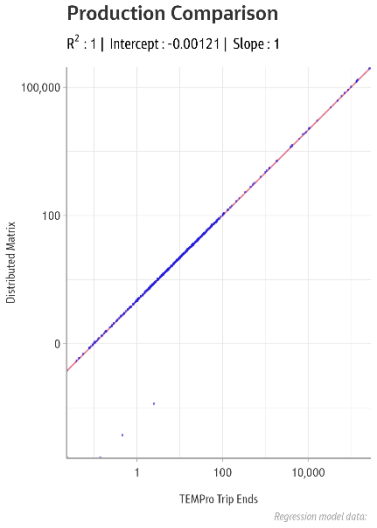


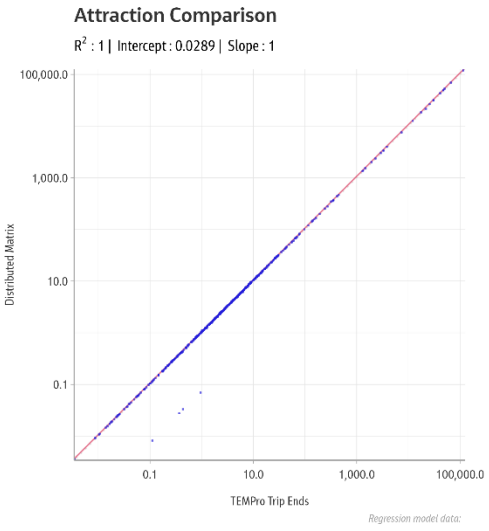


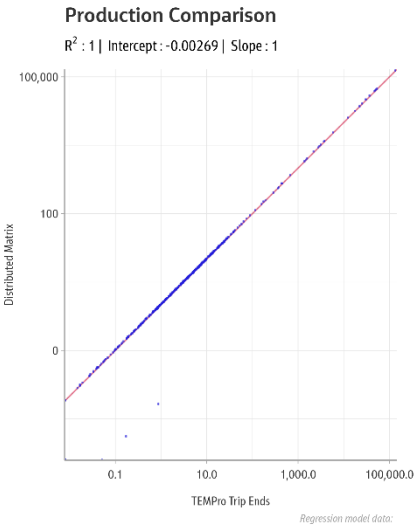
HB Shopping



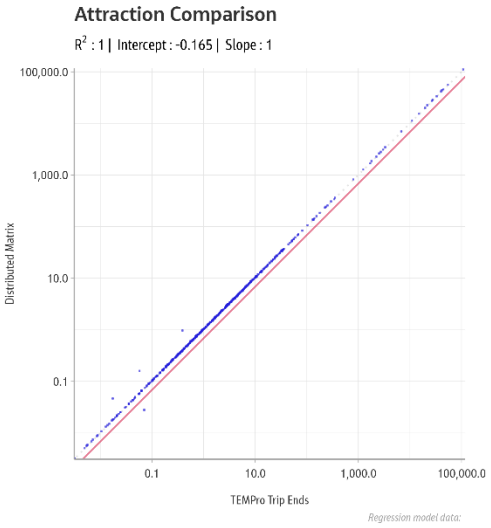


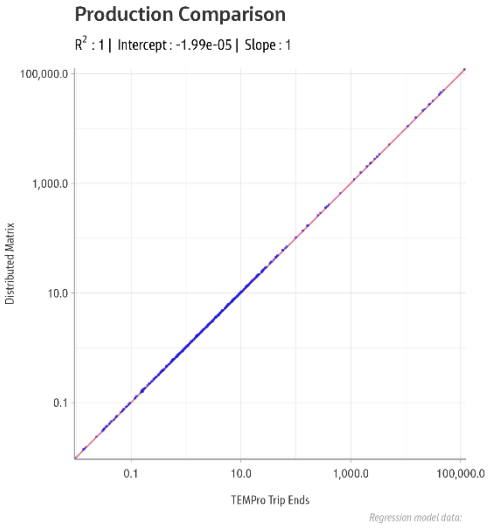
HB Personal Business





HB Recreation





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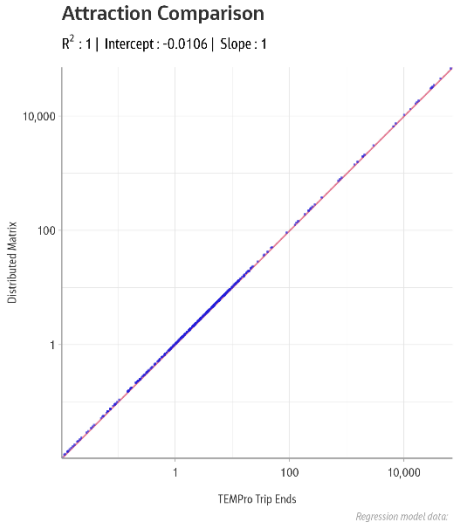
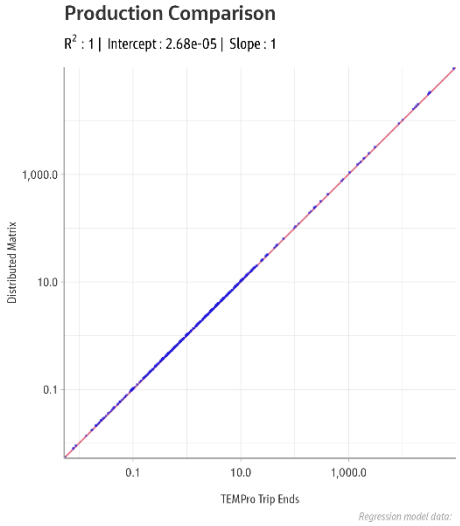
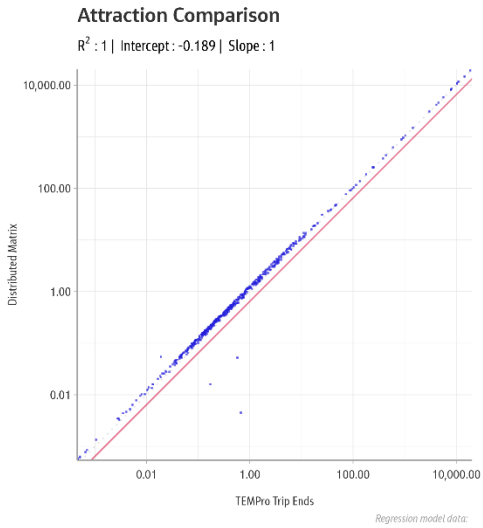
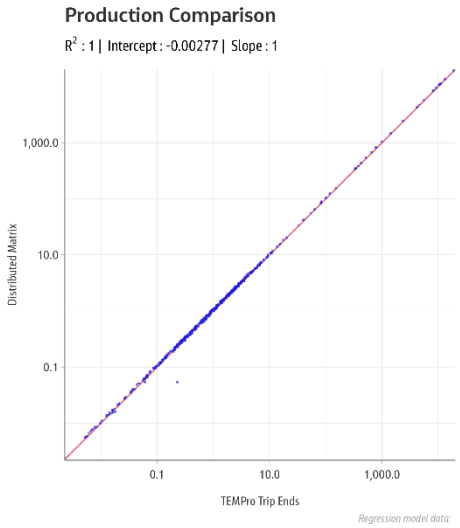


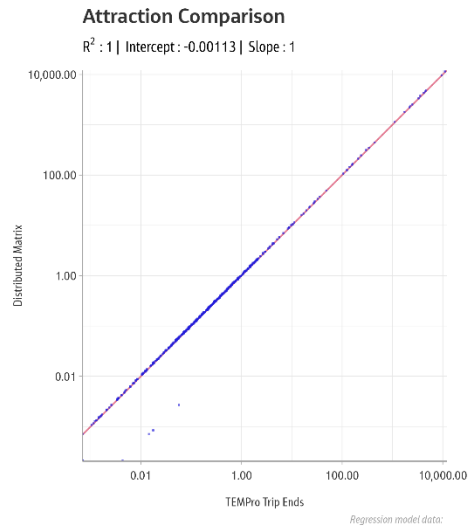


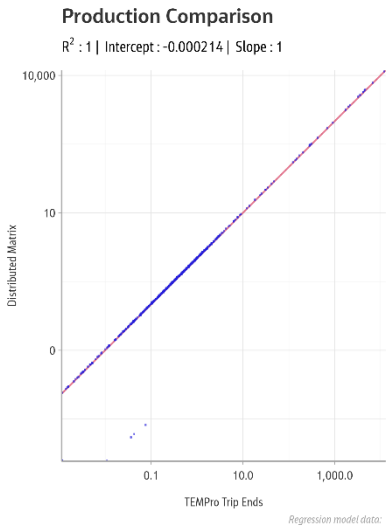
HB Holiday-Trip



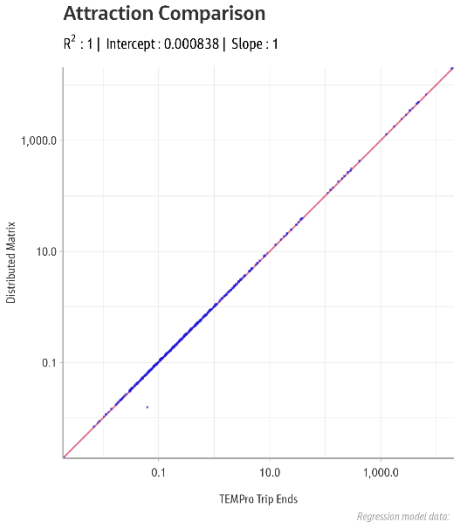


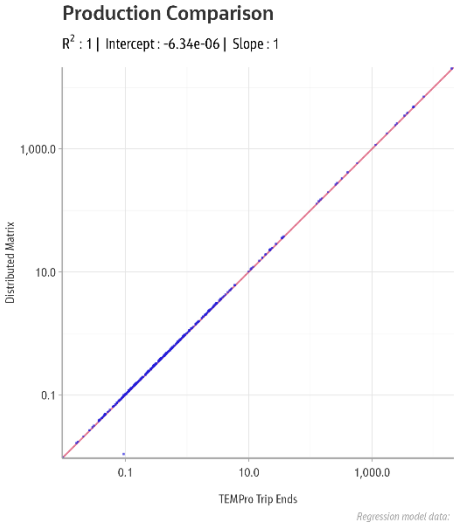
NHB Work





NHB EB





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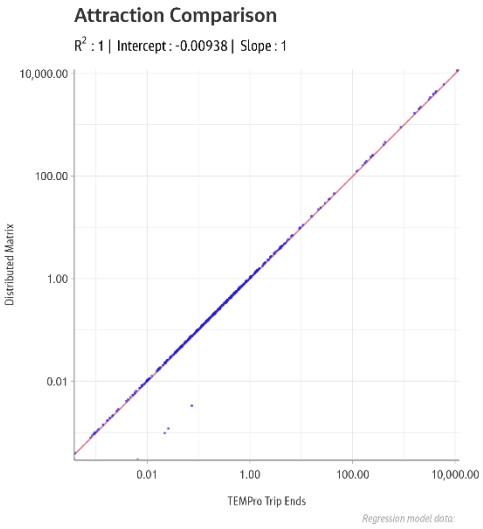

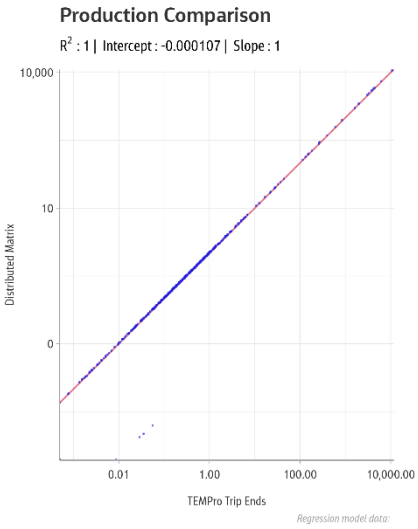

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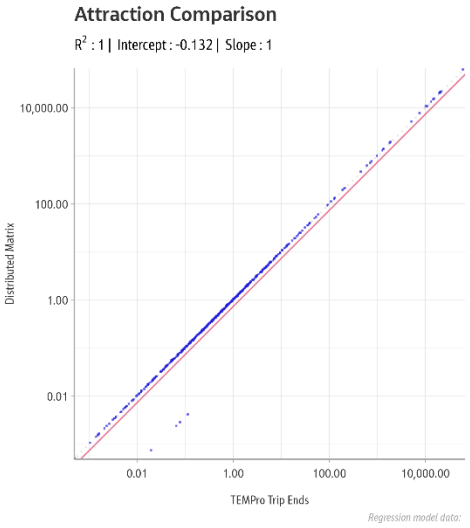
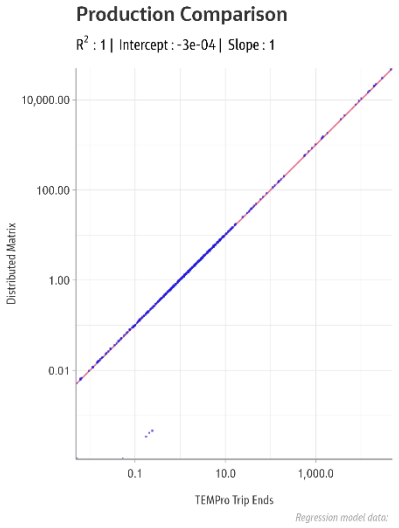
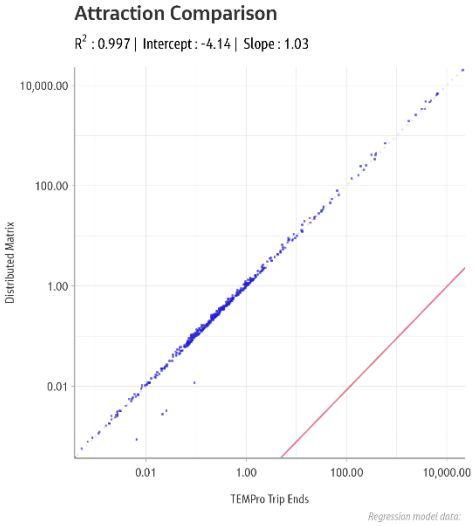
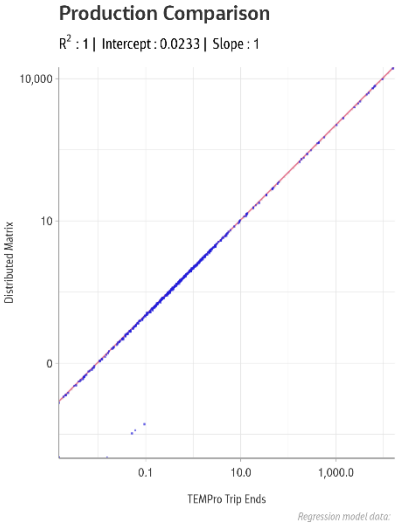




NHB Personal Business





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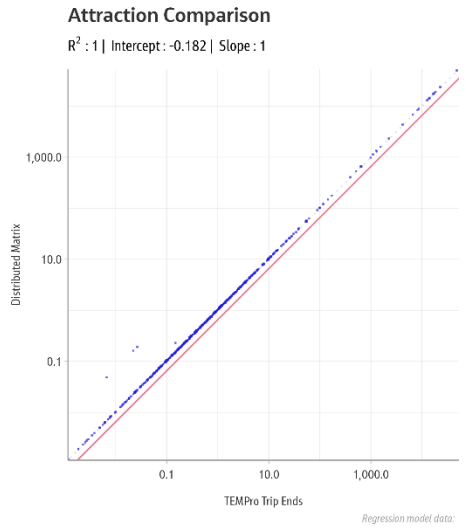
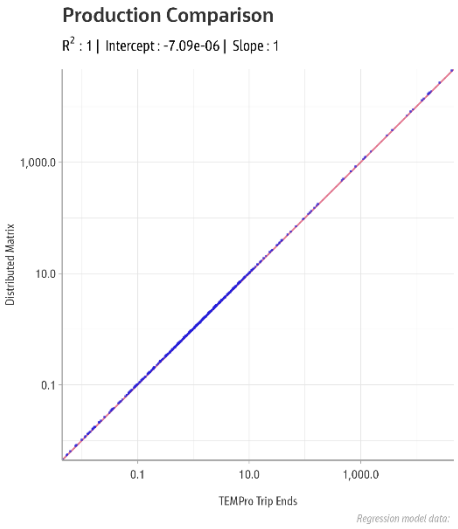
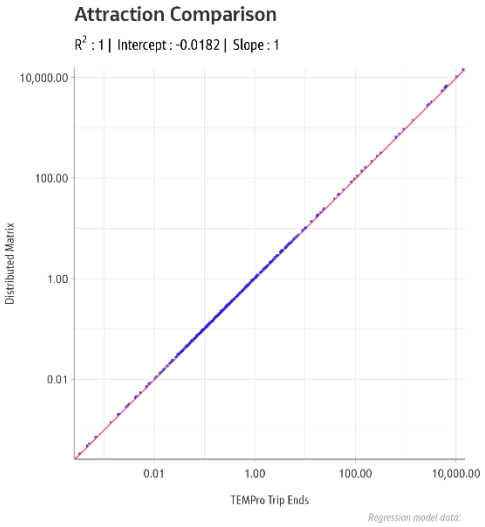
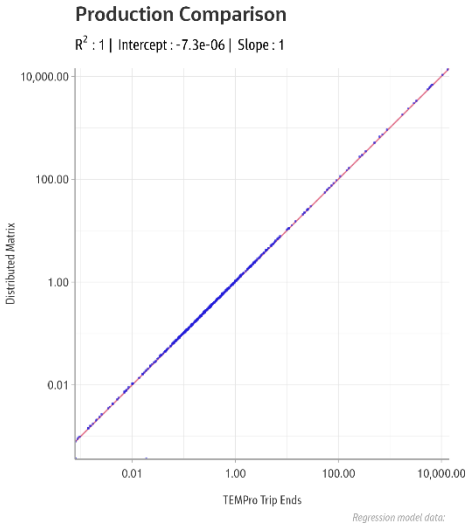




NHB Holiday


Attraction Comparison
R² : 1 | Intercept : -0.0182 | Slope : 1
10,000.00
100.00
1.00
0.01
Distributed Matrix
0.01
1.00
100.00
10,000.00
TEMPro Trip Ends
Regression model data:


Production Comparison
R² : 1 | Intercept : -7.3e-06 | Slope : 1
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100.00
1.00
0.01
Distributed Matrix
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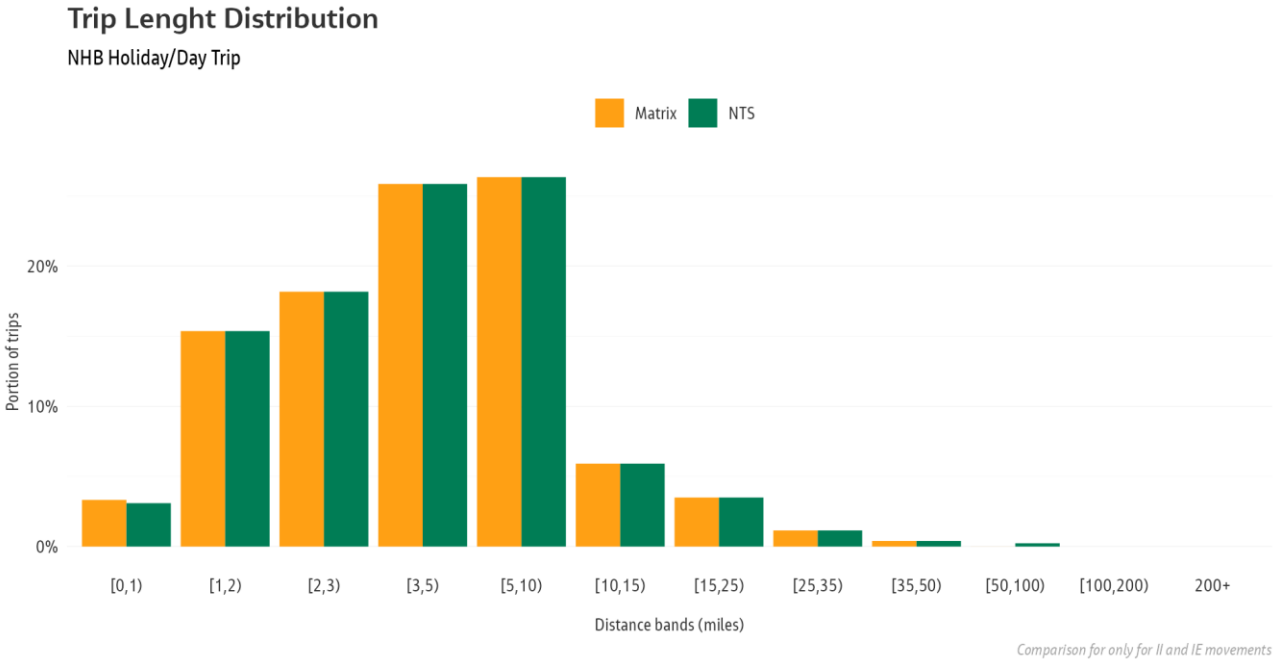
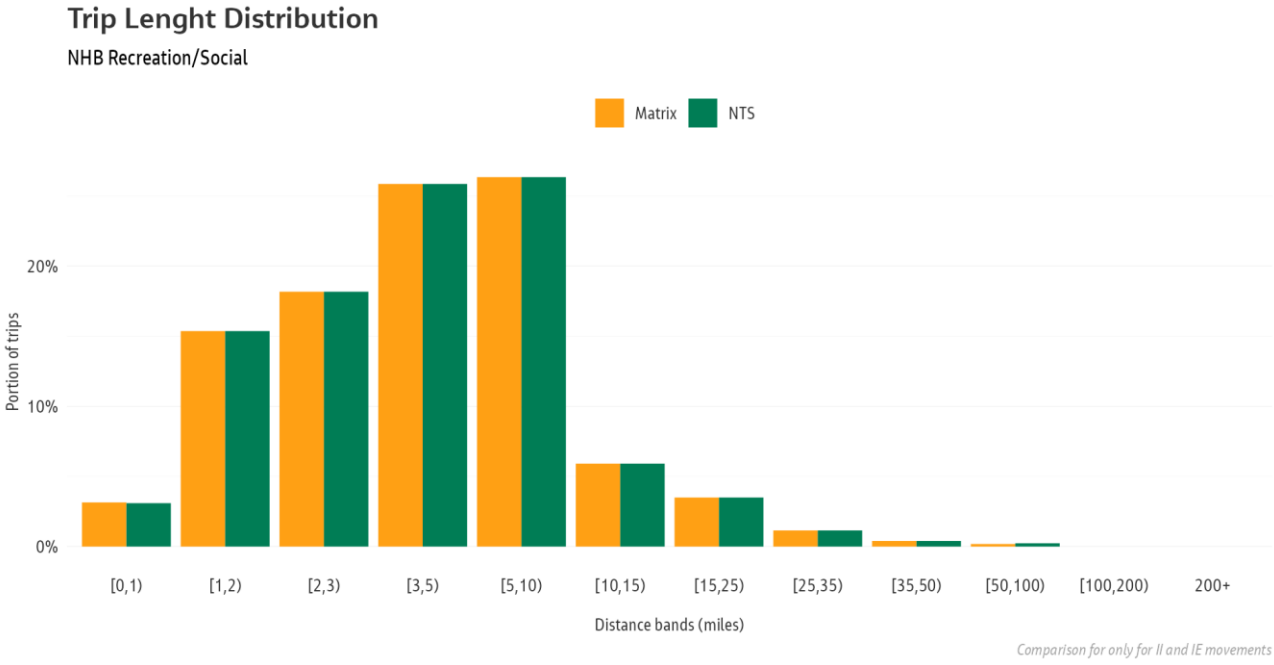
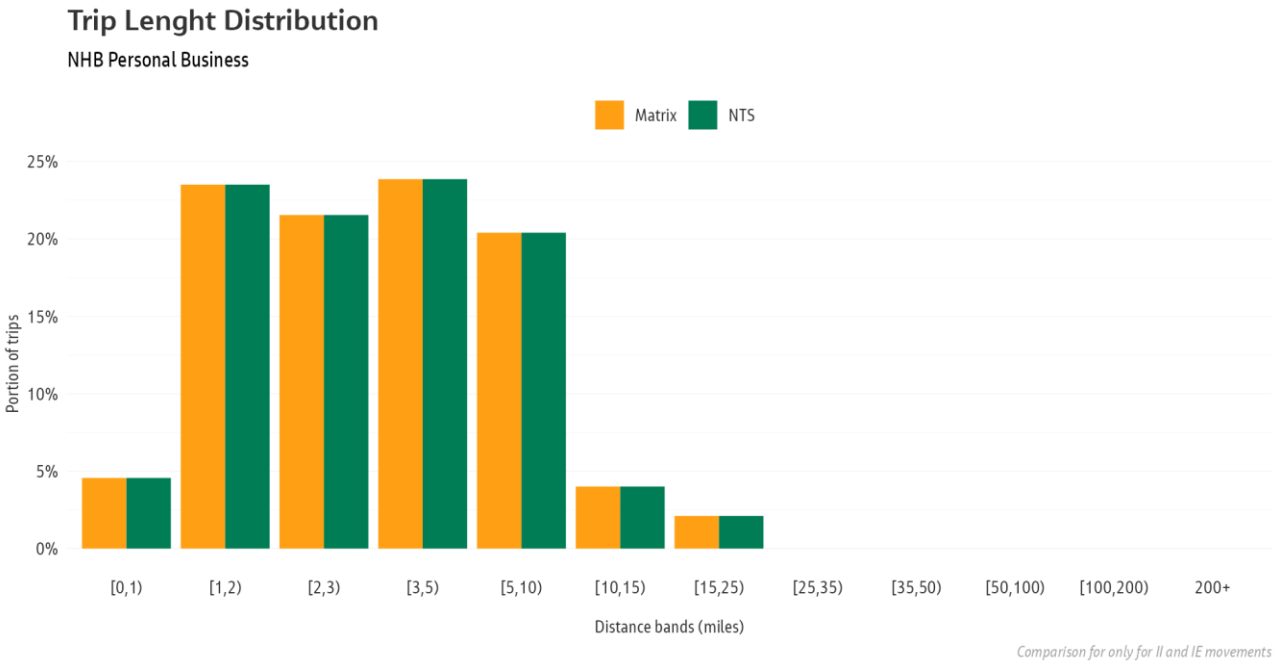
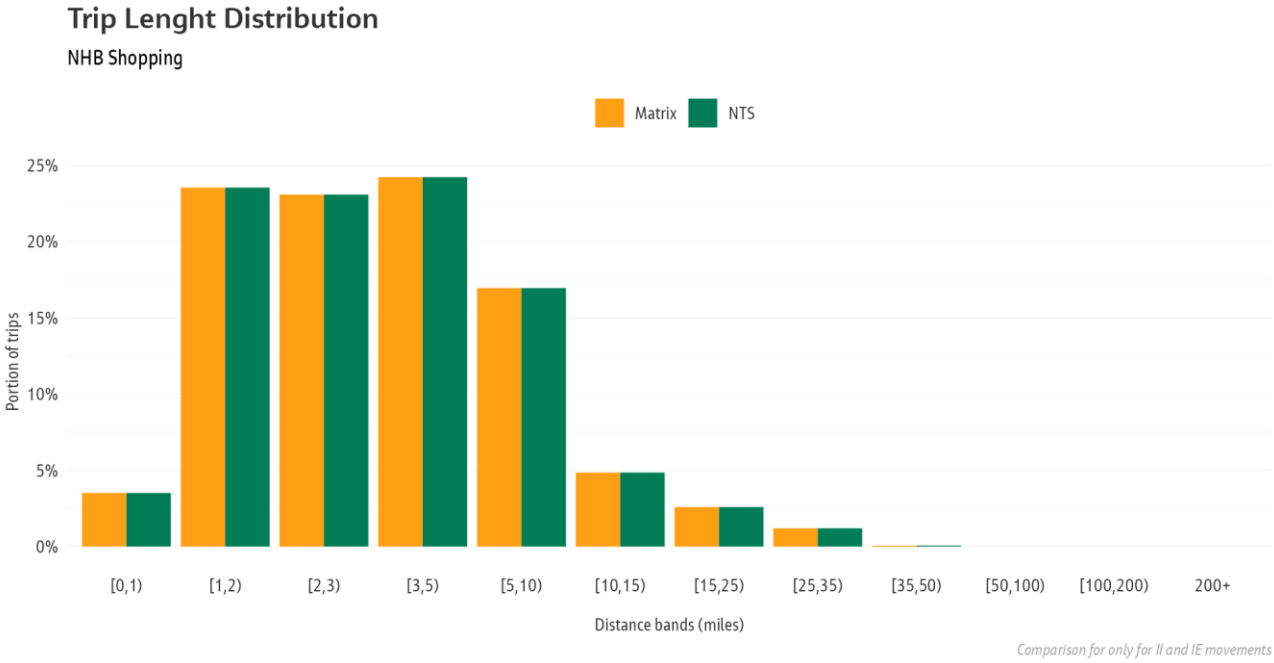
1.00
100.00
10,000.00
TEMPro Trip Ends
Regression model data:

Trip Length Distribution Check after Trip Distribution






Trip Lenght Distribution
NHB Personal Business
Matrix
NTS
25%
20%
15%
10%
5%
0%
Portion of trips
[0,1)
[1,2)
[2,3)
[3,5)
[5,10)
[10,15)
[15,25)
[25,35)
[35,50)
[50,100)
[100,200)
200+
Distance bands (miles)
Comparison for only for II and IE movements


Trip Lenght Distribution
NHB Shopping
Matrix
NTS
25%
20%
15%
10%
5%
0%
Portion of trips
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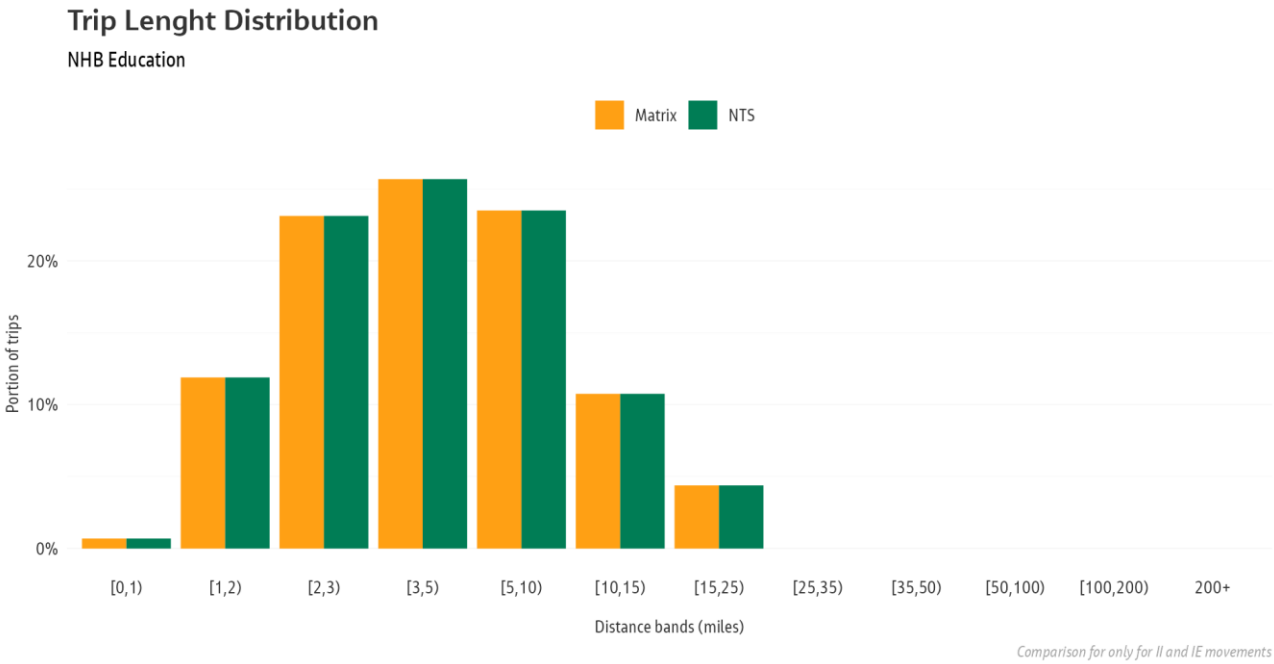
[1,2)
[2,3)
[3,5)
[5,10)
[10,15)
[15,25)
[25,35)
[35,50)
[50,100)
[100,200)
200+
Distance bands (miles)
Comparison for only for II and IE movements


Trip Lenght Distribution
NHB Education
Matrix
NTS
20%
10%
0%
Portion of trips
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[1,2)
[2,3)
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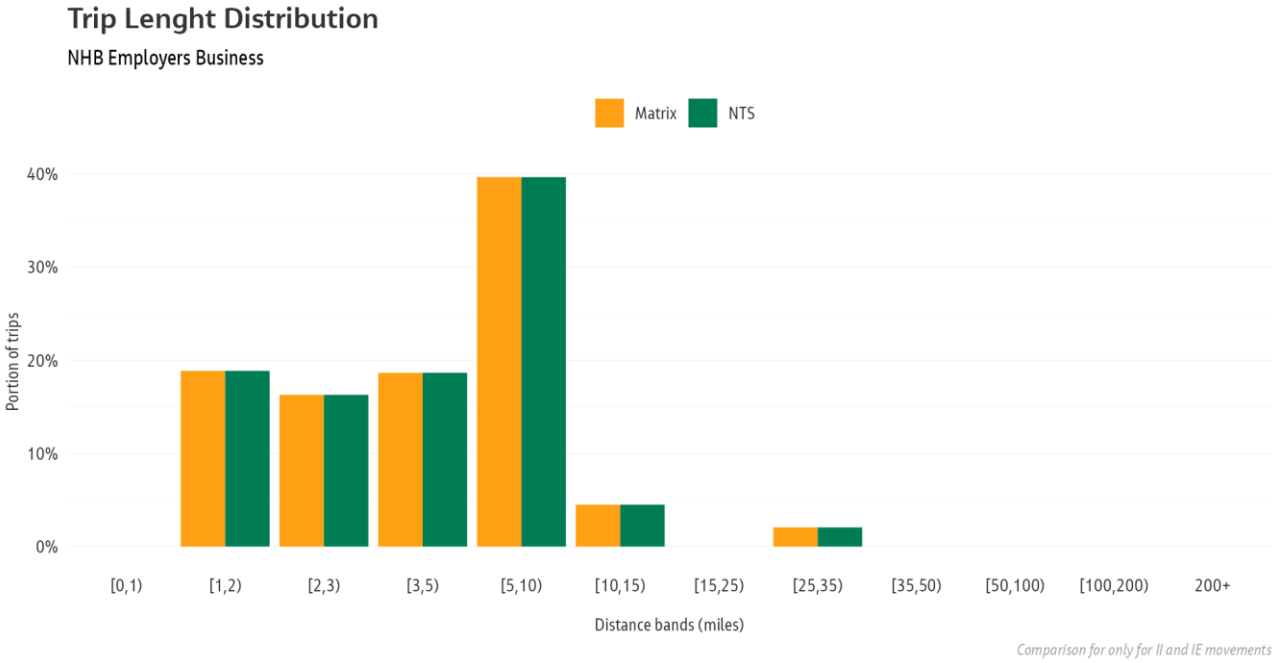
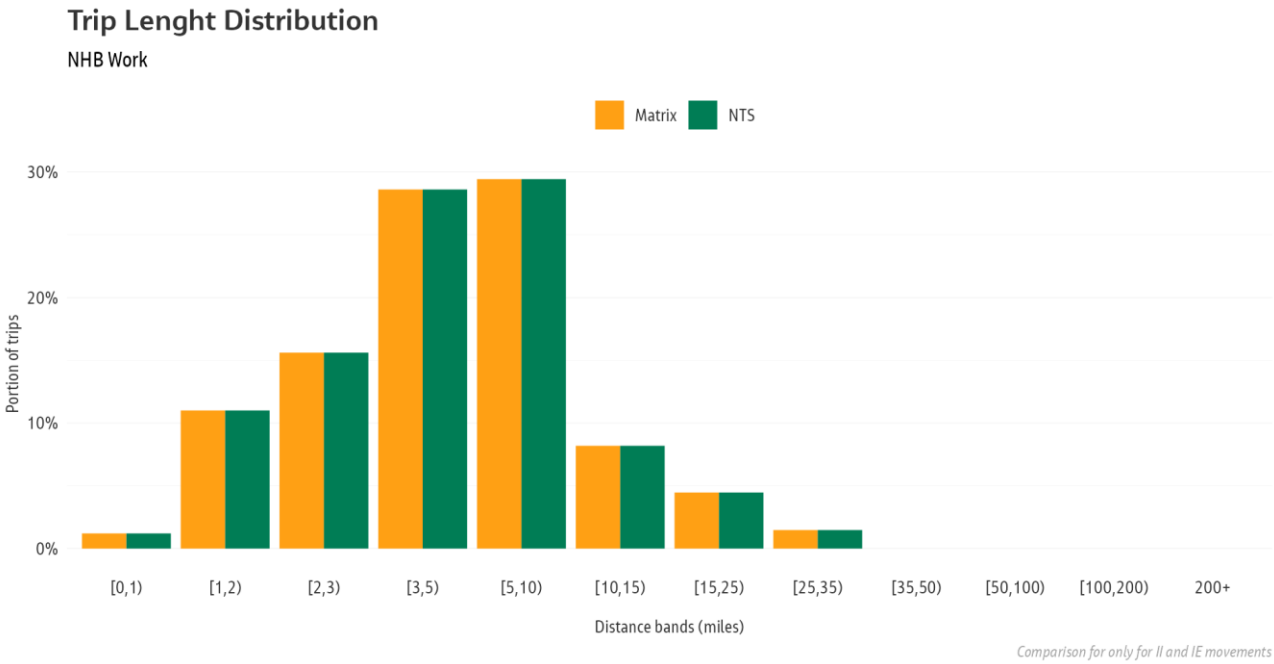
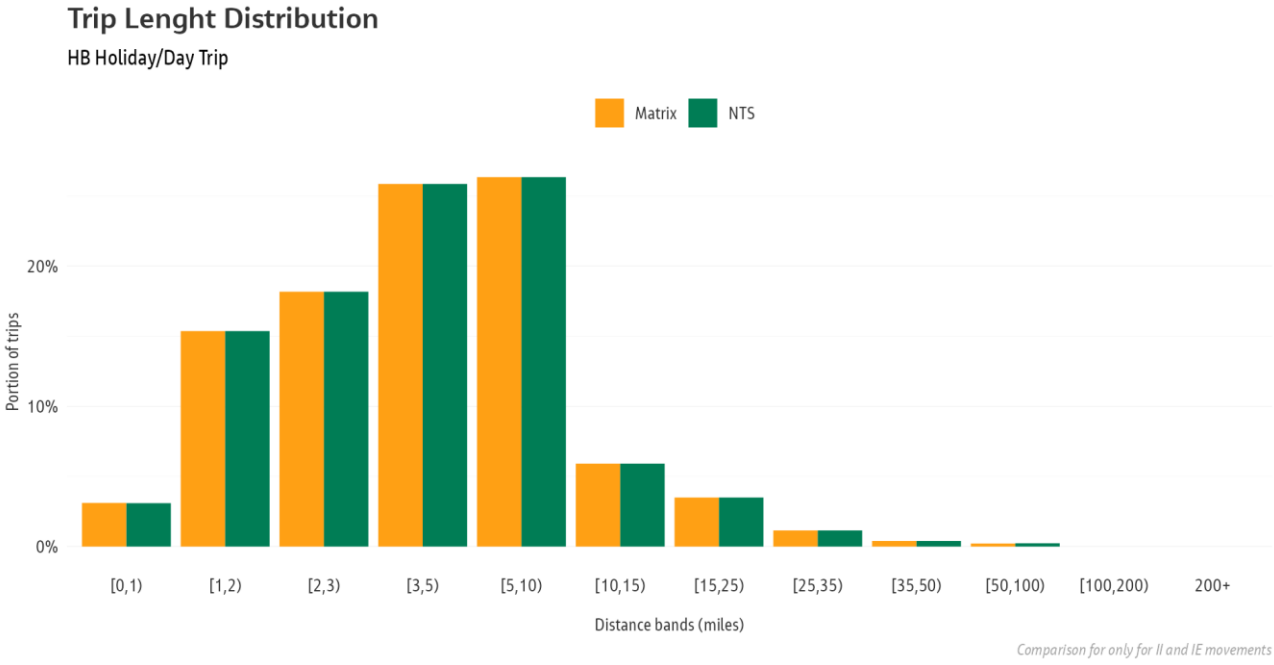
[5,10)
[10,15)
[15,25)
[25,35)
[35,50)
[50,100)
[100,200)
200+
Distance bands (miles)
Comparison for only for II and IE movements


Trip Lenght Distribution
NHB Employers Business
Matrix
NTS
40%
30%
20%
10%
0%
Portion of trips
[0,1)
[1,2)
[2,3)
[3,5)
[5,10)
[10,15)
[15,25)
[25,35)
[35,50)
[50,100)
[100,200)
200+
Distance bands (miles)
Comparison for only for II and IE movements


Trip Lenght Distribution
NHB Work
Matrix
NTS
30%
20%
10%
0%
Portion of trips
[0,1)
[1,2)
[2,3)
[3,5)
[5,10)
[10,15)
[15,25)
[25,35)
[35,50)
[50,100)
[100,200)
200+
Distance bands (miles)
Comparison for only for II and IE movements


Trip Lenght Distribution
HB Holiday/Day Trip
Matrix
NTS
20%
10%
0%
Portion of trips
[0,1)
[1,2)
[2,3)
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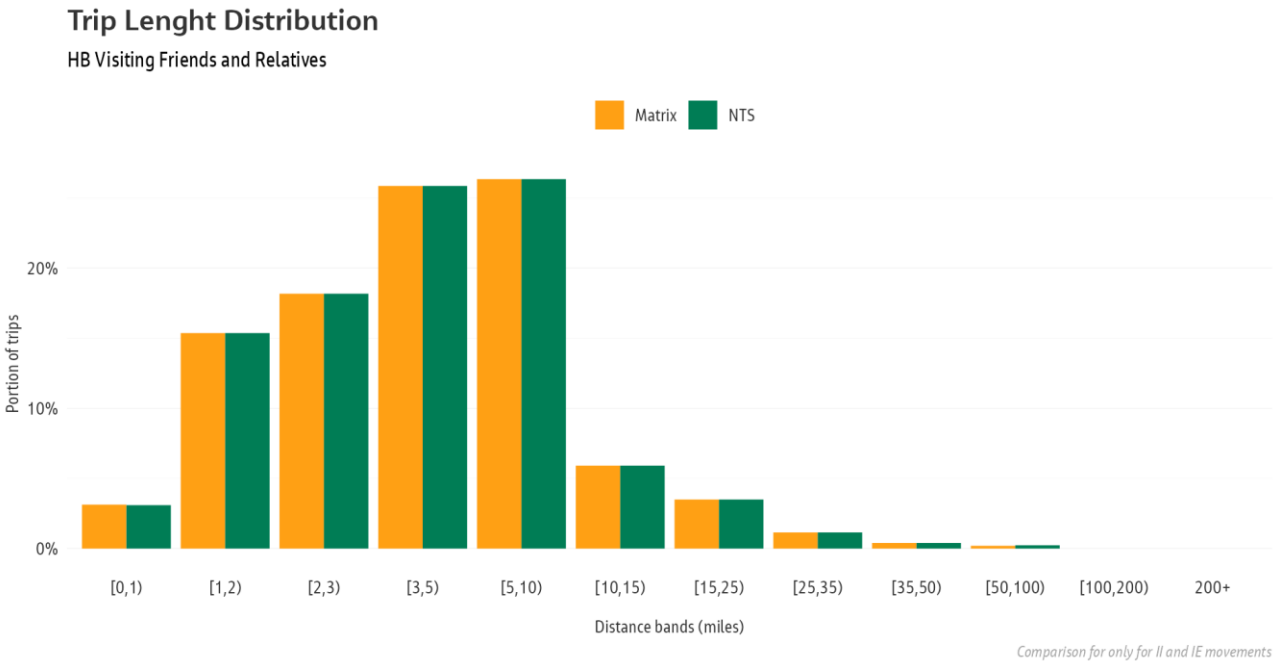
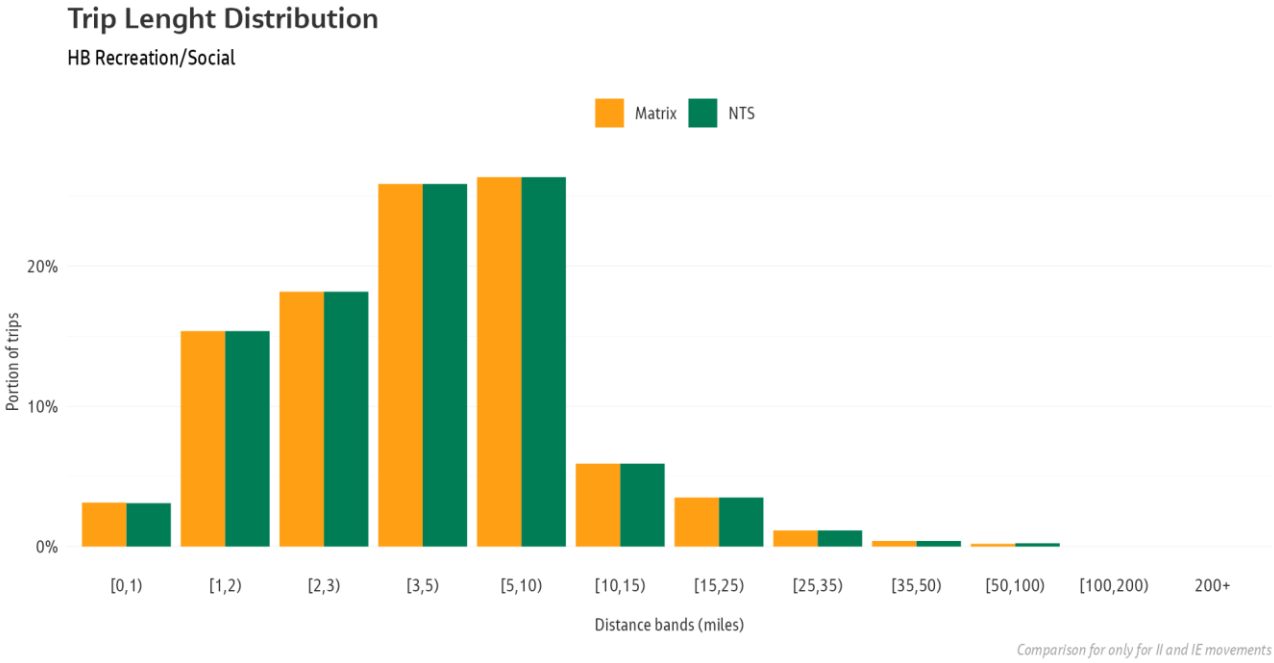
[5,10)
[10,15)
[15,25)
[25,35)
[35,50)
[50,100)
[100,200)
200+
Distance bands (miles)
Comparison for only for II and IE movements


Trip Lenght Distribution
HB Visiting Friends and Relatives
Matrix
NTS
20%
10%
0%
Portion of trips
[0,1)
[1,2)
[2,3)
[3,5)
[5,10)
[10,15)
[15,25)
[25,35)
[35,50)
[50,100)
[100,200)
200+
Distance bands (miles)
Comparison for only for II and IE movements


Trip Lenght Distribution
HB Recreation/Social
Matrix
NTS
20%
10%
0%
Portion of trips
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[1,2)
[2,3)
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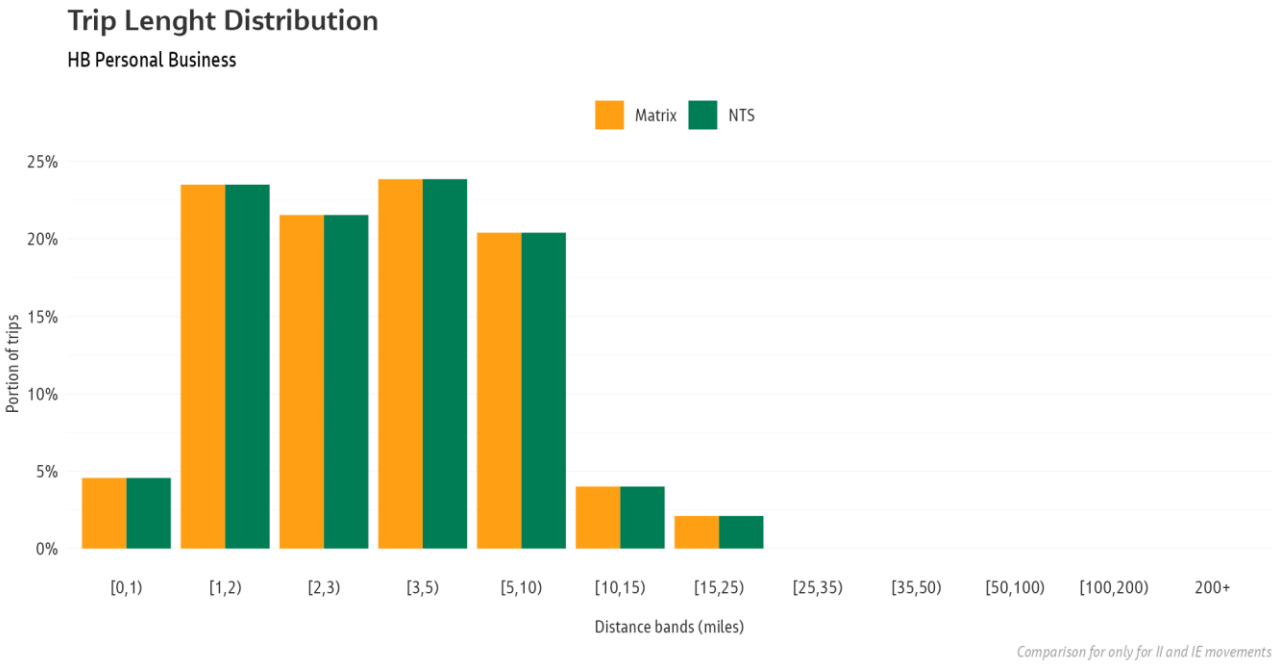
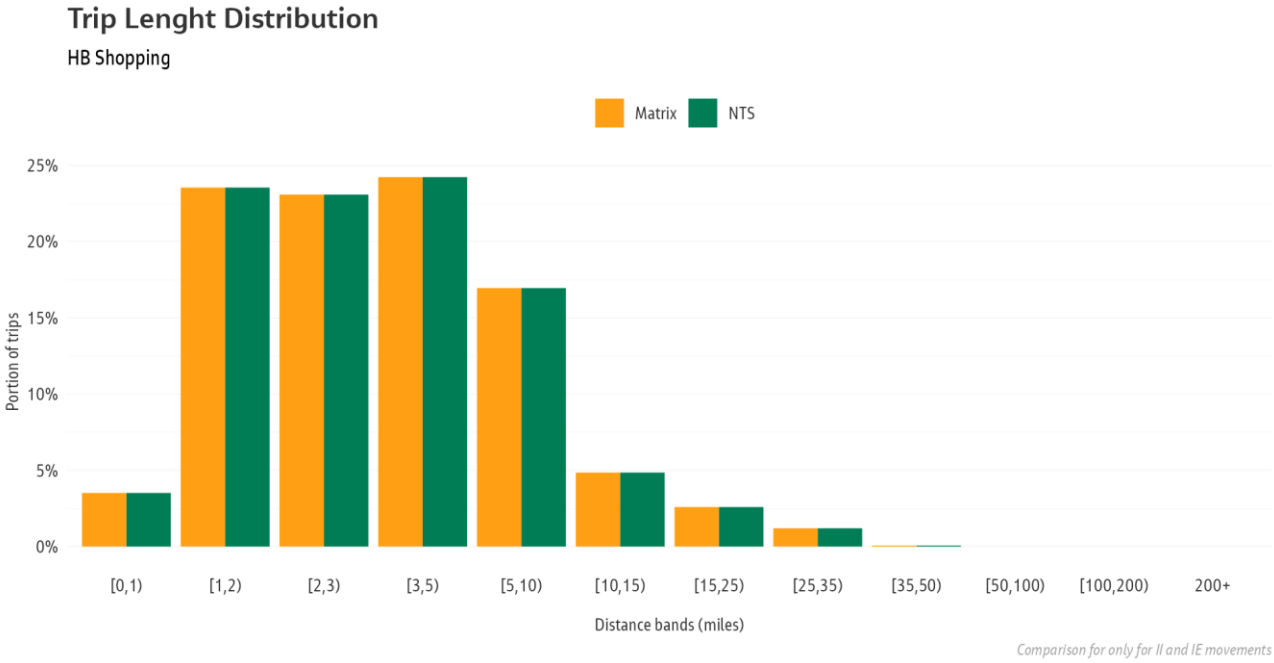
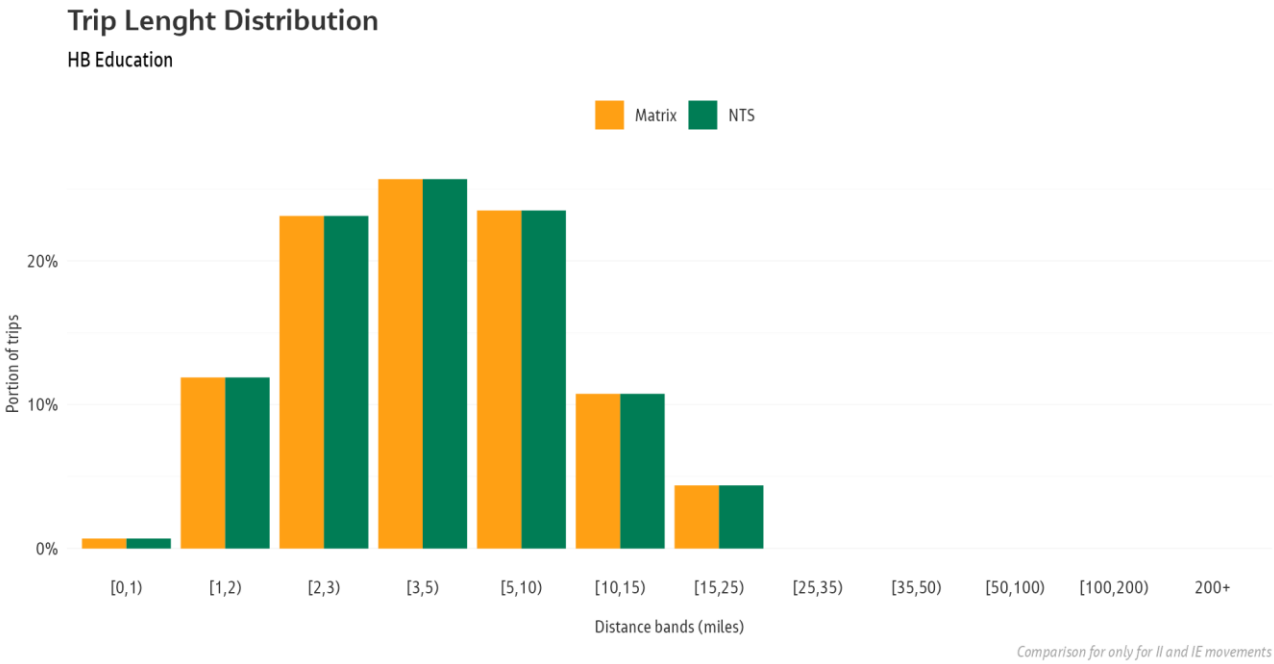
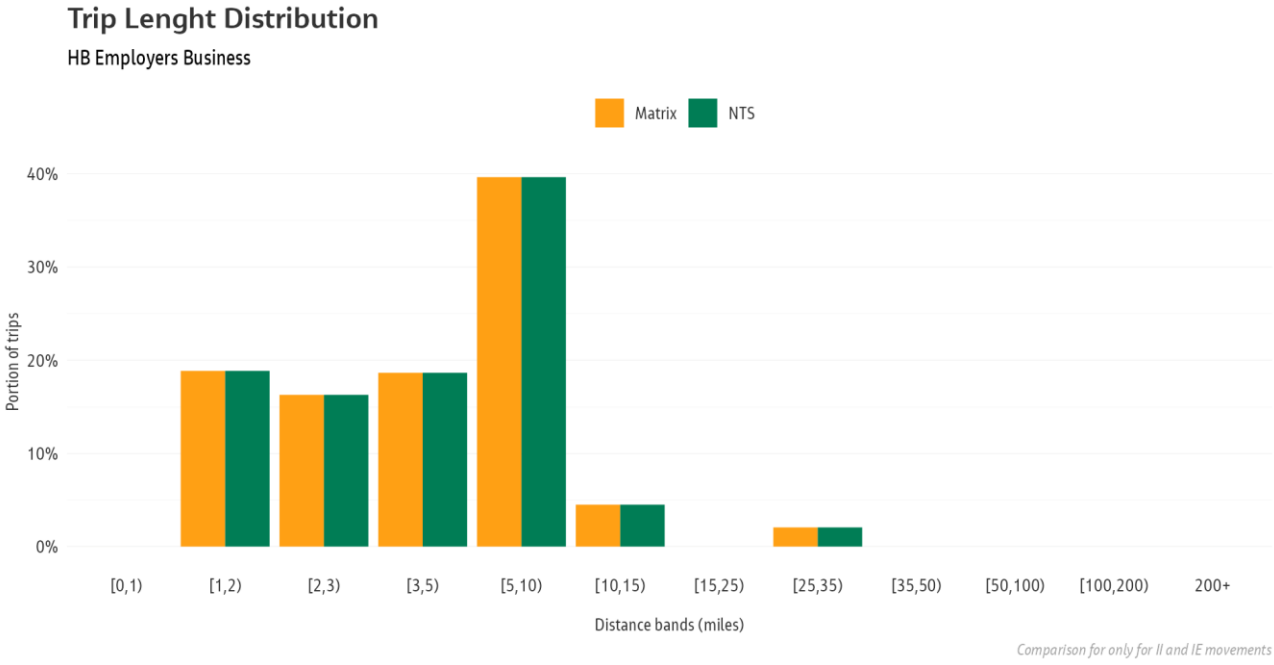
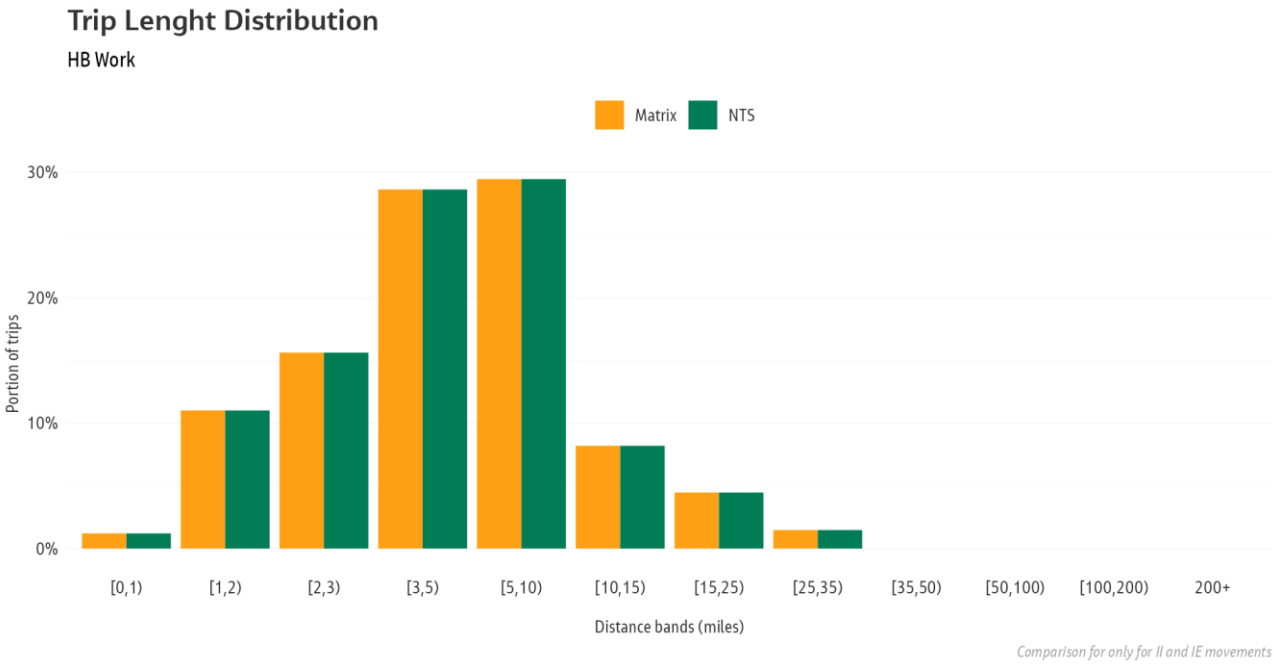
[5,10)
[10,15)
[15,25)
[25,35)
[35,50)
[50,100)
[100,200)
200+
Distance bands (miles)
Comparison for only for II and IE movements


Trip Lenght Distribution
HB Personal Business
Matrix
NTS
25%
20%
15%
10%
5%
0%
Portion of trips
[0,1)
[1,2)
[2,3)
[3,5)
[5,10)
[10,15)
[15,25)
[25,35)
[35,50)
[50,100)
[100,200)
200+
Distance bands (miles)
Comparison for only for II and IE movements


Trip Lenght Distribution
HB Shopping
Matrix
NTS
25%
20%
15%
10%
5%
0%
Portion of trips
[0,1)
[1,2)
[2,3)
[3,5)
[5,10)
[10,15)
[15,25)
[25,35)
[35,50)
[50,100)
[100,200)
200+
Distance bands (miles)
Comparison for only for II and IE movements


Trip Lenght Distribution
HB Education
Matrix
NTS
20%
10%
0%
Portion of trips
[0,1)
[1,2)
[2,3)
[3,5)
[5,10)
[10,15)
[15,25)
[25,35)
[35,50)
[50,100)
[100,200)
200+
Distance bands (miles)
Comparison for only for II and IE movements


Trip Lenght Distribution
HB Employers Business
Matrix
NTS
40%
30%
20%
10%
0%
Portion of trips
[0,1)
[1,2)
[2,3)
[3,5)
[5,10)
[10,15)
[15,25)
[25,35)
[35,50)
[50,100)
[100,200)
200+
Distance bands (miles)
Comparison for only for II and IE movements


Trip Lenght Distribution
HB Work
Matrix
NTS
30%
20%
10%
0%
Portion of trips
[0,1)
[1,2)
[2,3)
[3,5)
[5,10)
[10,15)
[15,25)
[25,35)
[35,50)
[50,100)
[100,200)
200+
Distance bands (miles)
Comparison for only for II and IE movements

Appendix B – Citi Logic Validation Report

Appendix C – Bus Journey Time Validation

Timetables vs Modelled journey time

AM Peak									
Route No	Operator	Bus Line Description	Headway [min]	Length [km]	Observed JT [min]	Modelled JT [min]	Diff [min]	Diff [%]	Pass/Fail
362	Arriva North West	opp Old Lane - by Chapel Street (Chorley)	16	11.87	41	37.5	3.5	-8.5%	Pass
362	Arriva North West	by Chapel Street (Chorley) - opp Old Lane	16	12.24	40	40.0	0.0	0.0%	Pass
842	Avacab	o/s High School (Ribble Valley) - opp Grammar School (South Ribble)	180	22.58	68	65.6	2.4	-3.5%	Pass
99	Avacab	by Rothwell Crescent (Preston) - o/s High School (Ribble Valley)	180	20.4	50	53.8	-3.8	7.6%	Pass
852	Burnley Bus Company	opp Queensgate Depot (Burnley) - by College (Wyre)	180	44.73	95	79.8	15.2	-16.0%	Fail
76	Blackpool Transport	by Rossall Road (Wyre) - opp Lowther Terrace (Fylde)	180	34.4	65	54.9	10.1	-15.5%	Fail
76	Blackpool Transport	Market Street, Stop MA4 (Blackpool) - opp Lowther Terrace (Fylde)	180	41.4	80	67.9	12.1	-15.1%	Fail
76	Blackpool Transport	opp Lowther Terrace (Fylde) - Market Street, Stop MA4 (Blackpool)	180	41.31	80	79.9	0.1	-0.2%	Pass
77A	Blackpool Transport	Bus Station, Stand 25 (Preston) - by College (Wyre)	180	32.68	57	57.2	-0.2	0.4%	Pass
77	Blackpool Transport	Market Street, Stop MA4 (Blackpool) - Arrival Stand, Stand 0 (Preston)	90	38.44	80	74.8	5.2	-6.5%	Pass
77	Blackpool Transport	Bus Station, Stand 25 (Preston) - Market Street, Stop MA4 (Blackpool)	180	38.18	85	75.0	10.0	-11.7%	Pass
77	Blackpool Transport	Bus Station, Stand 25 (Preston) - Market Street, Stop MA4 (Blackpool)	180	53.05	100	89.7	10.3	-10.3%	Pass
78	Blackpool Transport	Ashton Gardens, Stand 8 (Fylde) - by AFC Fylde (Kirkham)	60	38.1	55	74.1	-19.1	34.7%	Fail
78	Blackpool Transport	by AFC Fylde (Kirkham) - Ashton Gardens, Stand 8 (Fylde)	60	38.1	55	70.2	-15.2	27.6%	Fail
723	Holmeswood Coaches	Opposite Bridge Wills Lane (Southport) - by Bishop Rawsthorne Turning Circle (Chorley)	180	11.85	45	45.6	-0.6	1.2%	Pass
152	Blackburn Bus Company	opp Queensgate Depot (Burnley) - Arrival Stand, Stand 0 (Preston)	30	34.03	95	76.5	18.5	-19.5%	Fail

152	Blackburn Bus Company	Bus Station, Stand 25 (Preston) - opp Queensgate Depot (Burnley)	36	34.5	96	58.8	37.2	-38.8%	Fail
24	Blackburn Bus Company	by Chapel Street (Chorley) - Bus Station, Stand 6 (Blackburn)	60	20.89	54	35.3	18.7	-34.7%	Fail
24	Blackburn Bus Company	Bus Station, Stand 6 (Blackburn) - by Chapel Street (Chorley)	60	20.79	52	47.9	4.1	-7.9%	Pass
623	Longridge Coaches	o/s Traders Arms (Ribble Valley) - Market Place, Stand A (Ribble Valley)	180	28.3	46	38.4	7.6	-16.6%	Fail
966	Olympia	opp The Bromilow Arms - o/s St John Rigby R C College	180	32.43	62	56.8	5.2	-8.3%	Pass
112	Preston Bus	by Clydesdale Place (Leyland) - Arrival Stand, Stand 0 (Preston)	60	28.61	81	80.0	1.0	-1.2%	Pass
112	Preston Bus	Bus Station, Stand 25 (Preston) - opp Robin Hey (Leyland)	60	27.93	78	78.6	-0.6	0.8%	Pass
114	Preston Bus	Bus Station, Stand 25 (Preston) - by St Peters Street (Chorley)	60	38.06	102	105.7	-3.7	3.7%	Pass
114	Preston Bus	by St Peters Street (Chorley) - Arrival Stand, Stand 0 (Preston)	60	38.1	102	103.1	-1.1	1.1%	Pass
12	Preston Bus	by Shirley Lane (South Ribble) - by St Georges Centre (Preston)	36	10.69	26	26.0	0.0	0.0%	Pass
12	Preston Bus	by Shirley Lane (South Ribble) - Cardinal Newman College, N1 (Preston)	180	11.73	36	36.0	0.0	0.0%	Pass
12	Preston Bus	by St Georges Centre (Preston) - by Shirley Lane (South Ribble)	45	10.49	21	21.0	0.0	0.0%	Pass
14	Preston Bus	adj Lily Grove (Preston) - Bus Station, Stand 25 (Preston)	180	2.71	12	12.0	0.0	0.0%	Pass
14	Preston Bus	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	30	6.15	25	25.0	0.0	0.0%	Pass
15	Preston Bus	Bus Station, Stand 25 (Preston) - Arrival Stand, Stand 0 (Preston)	60	9.16	35	35.0	0.0	0.0%	Pass
16	Preston Bus	by Tudor Avenue (Preston) - Bus Station, Stand 25 (Preston)	90	3.67	11	11.5	-0.5	4.7%	Pass
16	Preston Bus	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	11	7.69	26	26.5	-0.5	2.0%	Pass
19A	Preston Bus	opp Fairfield Road (Preston) - Royal Preston Hospital Grounds, Stop 2 (Preston)	90	2.41	7	7.0	0.0	0.0%	Pass

19A	Preston Bus	Royal Preston Hospital Grounds, Stop 2 (Preston) - Royal Preston Hospital Grounds, Stop 2 (Preston)	16	3.85	14	14.0	0.0	0.0%	Pass
19	Preston Bus	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	9	11.23	41	40.7	0.3	-0.8%	Pass
23	Preston Bus	by Leisure Centre (Preston) - Arrival Stand, Stand 0 (Preston)	180	4.28	22	22.0	0.0	0.0%	Pass
23	Preston Bus	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	8	16.11	54	53.2	0.8	-1.5%	Pass
25	Preston Bus	Bus Station, Stand 6 (Blackburn) - Market Place, Stand A (Ribble Valley)	90	24.91	58	34.8	23.2	-40.0%	Fail
25	Preston Bus	o/s Traders Arms (Ribble Valley) - Bus Station, Stand 6 (Blackburn)	90	5.72	20	21.5	-1.5	7.6%	Pass
25	Preston Bus	Market Place, Stand A (Ribble Valley) - Bus Station, Stand 6 (Blackburn)	180	24.91	60	44.2	15.8	-26.3%	Fail
31	Preston Bus	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	15	15.59	53	53.1	-0.1	0.2%	Pass
337	Preston Bus	Adjacent Green Lane (Sefton) - by Chapel Street (Chorley)	180	37.31	80	85.1	-5.1	6.4%	Pass
337	Preston Bus	by Dog and Partridge (Chorley) - by Chapel Street (Chorley)	180	5.42	14	13.2	0.8	-5.8%	Pass
337	Preston Bus	by Chapel Street (Chorley) - Adjacent Green Lane (Sefton)	180	37.39	80	78.6	1.4	-1.8%	Pass
347	Preston Bus	by Liverpool Road (West Lancashire) - by Chapel Street (Chorley)	180	29.85	51	56.8	-5.8	11.4%	Pass
347	Preston Bus	by Bishop Rawsthorne Turning Circle (Chorley) - by Chapel Street (Chorley)	180	18.13	35	36.6	-1.6	4.6%	Pass
347	Preston Bus	by Chapel Street (Chorley) - by Bishop Rawsthorne Turning Circle (Chorley)	180	16.35	31	31.5	-0.5	1.6%	Pass
347	Preston Bus	by Chapel Street (Chorley) - Adjacent Wennington Road (Southport)	180	47.23	78	83.0	-5.0	6.3%	Pass
35	Preston Bus	Bus Station, Stand 6 (Blackburn) - opp Post Office (Ribble Valley)	90	25	34	50.4	-16.4	48.3%	Fail
35	Preston Bus	by Threefields (Preston) - Bus Station, Stand 25 (Preston)	180	6.41	24	24.3	-0.3	1.0%	Pass
35	Preston Bus	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	10	12.02	40	39.9	0.1	-0.4%	Pass

35	Preston Bus	opp Post Office (Ribble Valley) - Bus Station, Stand 6 (Blackburn)	180	23.84	45	65.4	-20.4	45.2%	Fail
35	Preston Bus	opp Post Office (Ribble Valley) - Bus Station, Stand 6 (Blackburn)	90	23.84	30	52.4	-22.4	74.5%	Fail
400	Preston Bus	by Queens Terrace (Wyre) - by College (Wyre)	180	37.57	77	77.3	-0.3	0.4%	Pass
401	Preston Bus	by College (Wyre) - by College (Wyre)	60	3.97	13	13.3	-0.3	2.4%	Pass
433	Preston Bus	Railway Station, Stand A (Preston) - by College (Wyre)	180	13.21	40	40.5	-0.5	1.2%	Pass
437	Preston Bus	Bus Station, Stand 25 (Preston) - by College (Wyre)	180	12.92	27	28.6	-1.6	6.1%	Pass
44	Preston Bus	by Ancient Oak (Preston) - Bus Station, Stand 25 (Preston)	180	10.77	25	25.3	-0.3	1.0%	Pass
44	Preston Bus	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	45	16.54	51	50.8	0.2	-0.4%	Pass
44	Preston Bus	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	180	18.51	53	53.1	-0.1	0.1%	Pass
44	Preston Bus	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	180	20.48	55	55.6	-0.6	1.1%	Pass
576	Preston Bus	by Walker Street (Preston) - by Corpus Christi High School (Preston)	180	4.93	15	15.0	0.0	0.0%	Pass
584	Preston Bus	o/s Black Bull Garstang Rd (Preston) - opp Spout Farm (Ribble Valley)	180	11.8	30	30.1	-0.1	0.3%	Pass
5	Preston Bus	Bus Station, Stand 25 (Preston) - o/s Fulwood Asda (Preston)	180	7.31	16	16.8	-0.8	5.2%	Pass
663	Preston Bus	adj Lily Grove (Preston) - by Leisure Centre (Preston)	180	8.05	40	40.0	0.0	0.0%	Pass
664	Preston Bus	by Centenary Mill (Preston) - by Leisure Centre (Preston)	180	9.19	32	32.0	0.0	0.0%	Pass
680	Preston Bus	by Chapel Road (West Lancashire) - by Cop Lane School Stop Only (South Ribble)	180	18.28	51	52.1	-1.1	2.2%	Pass
6	Preston Bus	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	10	12.43	36	36.4	-0.4	1.2%	Pass
75	Preston Bus	Bus Station, Stand 25 (Preston) - by Queens Terrace (Wyre)	90	40.83	98	97.6	0.4	-0.4%	Pass
75	Preston Bus	by Queens Terrace (Wyre) - Arrival Stand, Stand 0 (Preston)	60	42.93	101	96.1	4.9	-4.9%	Pass
853	Preston Bus	Ashton Gardens, Stand 8 (Fylde) - by College (Wyre)	180	36.28	65	72.0	-7.0	10.7%	Pass

88	Preston Bus	by Mythop Place (Preston) - opp St Clare's Church (Preston)	60	9.58	30	29.7	0.3	-1.1%	Pass
88	Preston Bus	opp St Clare's Church (Preston) - by Mythop Place (Preston)	60	8.95	25	25.5	-0.5	1.8%	Pass
89	Preston Bus	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	10	12.92	45	44.8	0.2	-0.4%	Pass
8	Preston Bus	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	10	9.86	34	34.0	0.0	0.0%	Pass
959	Preston Bus	by Waverley Gardens (Preston) - by Corpus Christi High School (Preston)	180	8.82	30	31.0	-1.0	3.2%	Pass
960	Preston Bus	by Waverley Gardens (Preston) - by Corpus Christi High School (Preston)	180	6.7	30	31.0	-1.0	3.2%	Pass
961	Preston Bus	adj Bay Road (Preston) - by Corpus Christi High School (Preston)	180	6.45	25	25.0	0.0	0.0%	Pass
962	Preston Bus	by Tudor Avenue (Preston) - by Corpus Christi High School (Preston)	180	6.92	30	30.0	0.0	0.0%	Pass
963	Preston Bus	by Motorway Bridge (Preston) - by Corpus Christi High School (Preston)	180	8.78	35	35.0	0.0	0.0%	Pass
995	Preston Bus	Market Place, Stand A (Ribble Valley) - by College (Wyre)	180	57.19	68	77.5	-9.5	14.0%	Pass
118	Tyrers Coaches	by Chapel Street (Chorley) - by Chapel Street (Chorley)	60	9.48	33	33.4	-0.4	1.1%	Pass
119	Tyrers Coaches	by Park Gates (Chorley) - by Runshaw College (South Ribble)	180	10.29	35	35.7	-0.7	2.1%	Pass
470	Tyrers Coaches	by Abattoir (Chorley) - opp Lancashire College (Chorley)	180	12.53	23	24.2	-1.2	5.1%	Pass
804	Tyrers Coaches	opp The Hub (Leyland) - opp Lancashire College (Chorley)	180	5.98	22	22.0	0.0	0.0%	Pass
BSM	Tyrers Coaches	by Heaton Close (South Ribble) - opp Brownedge St Marys (South Ribble)	180	8.32	15	16.0	-1.0	6.5%	Pass
40A	Stagecoach Cumbria and North Lancashire	by Palatine Avenue (Lancaster) - by Preston College Grounds (Preston)	180	40.29	70	72.3	-2.3	3.3%	Pass
40	Stagecoach Cumbria and North Lancashire	Bus Station, Stand 25 (Preston) - by Palatine Avenue (Lancaster)	90	45	79	84.4	-5.4	6.8%	Pass
40	Stagecoach Cumbria and North Lancashire	by Palatine Avenue (Lancaster) - Bus Station, Stand 25 (Preston)	180	42.4	85	87.3	-2.3	2.7%	Pass
40	Stagecoach Cumbria and North Lancashire	by Palatine Avenue (Lancaster) - Bus Station, Stand 25 (Preston)	90	42.4	80	82.3	-2.3	2.9%	Pass

41	Stagecoach Cumbria and North Lancashire	Bus Station, Stand 25 (Preston) - by Palatine Avenue (Lancaster)	180	43.06	85	88.0	-3.0	3.6%	Pass
41	Stagecoach Cumbria and North Lancashire	Bus Station, Stand 25 (Preston) - by Palatine Avenue (Lancaster)	90	43.06	104	107.1	-3.1	3.0%	Pass
41	Stagecoach Cumbria and North Lancashire	by Palatine Avenue (Lancaster) - Bus Station, Stand 25 (Preston)	90	42.66	110	111.9	-1.9	1.7%	Pass
41	Stagecoach Cumbria and North Lancashire	by Palatine Avenue (Lancaster) - Bus Station, Stand 25 (Preston)	180	42.66	85	87.3	-2.3	2.7%	Pass
940	Stagecoach Cumbria and North Lancashire	Bus Station, Stand 25 (Preston) - by Palatine Avenue (Lancaster)	180	45	69	72.7	-3.7	5.4%	Pass
940	Stagecoach Cumbria and North Lancashire	opp St Clare's Church (Preston) - by Palatine Avenue (Lancaster)	180	41.38	59	62.7	-3.7	6.3%	Pass
941	Stagecoach Cumbria and North Lancashire	Bus Station, Stand 25 (Preston) - by Palatine Avenue (Lancaster)	180	43.59	66	67.4	-1.4	2.1%	Pass
942	Stagecoach Cumbria and North Lancashire	adj Village Centre (Preston) - by Palatine Avenue (Lancaster)	180	38.21	56	59.7	-3.7	6.7%	Pass
113	Stagecoach in Lancashire	opp Old Lane - Bus Station, Stand 25 (Preston)	60	50.46	121	118.8	2.2	-1.8%	Pass
113	Stagecoach in Lancashire	Bus Station, Stand 25 (Preston) - opp Old Lane	180	42.91	120	124.6	-4.6	3.9%	Pass
113	Stagecoach in Lancashire	Bus Station, Stand 25 (Preston) - opp Old Lane	90	50.06	119	122.2	-3.2	2.7%	Pass
109	Stagecoach Merseyside and South Lancashire	by Chapel Street (Chorley) - Bus Station, Stand 25 (Preston)	30	22.75	68	67.7	0.3	-0.4%	Pass
109	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - by Chapel Street (Chorley)	30	22.8	66	65.9	0.1	-0.2%	Pass
111	Stagecoach Merseyside and South Lancashire	o/s St Annes School (South Ribble) - Bus Station, Stand 25 (Preston)	12	15.92	56	57.1	-1.1	2.0%	Pass
111	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - o/s St Annes School (South Ribble)	13	12.4	39	38.8	0.2	-0.6%	Pass
113	Stagecoach Merseyside and South Lancashire	opp Old Lane - Bus Station, Stand 25 (Preston)	60	50.46	121	119.9	1.1	-0.9%	Pass
113	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - opp Old Lane	180	42.91	120	124.6	-4.6	3.9%	Pass
113	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - opp Old Lane	90	50.06	119	122.2	-3.2	2.7%	Pass
119	Stagecoach Merseyside and South Lancashire	by Chapel Street (Chorley) - by Chapel Street (Chorley)	60	8.68	25	24.7	0.3	-1.3%	Pass
125	Stagecoach Merseyside and South Lancashire	by Leeson Avenue (Chorley) - by College (Wyre)	180	38.42	110	110.8	-0.8	0.7%	Pass

125	Stagecoach Merseyside and South Lancashire	by Chapel Street (Chorley) - Bus Station, Stand 25 (Preston)	180	18.62	54	54.9	-0.9	1.7%	Pass
125	Stagecoach Merseyside and South Lancashire	opp The Victoria - Bus Station, Stand 25 (Preston)	180	26.78	83	84.4	-1.4	1.7%	Pass
125	Stagecoach Merseyside and South Lancashire	nr Ivy Road - Bus Station, Stand 25 (Preston)	11	36.44	101	102.6	-1.6	1.6%	Pass
125	Stagecoach Merseyside and South Lancashire	o/s Library (Chorley) - Bus Station, Stand 25 (Preston)	180	26.37	78	80.1	-2.1	2.7%	Pass
125	Stagecoach Merseyside and South Lancashire	nr Ivy Road - by Chapel Street (Chorley)	180	17.82	54	52.0	2.0	-3.8%	Pass
125	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - by Chapel Street (Chorley)	180	18.8	49	48.7	0.3	-0.5%	Pass
125	Stagecoach Merseyside and South Lancashire	by Chapel Street (Chorley) - nr Ivy Road	45	22.3	44	44.9	-0.9	1.9%	Pass
125	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - nr Ivy Road	11	41.09	96	95.0	1.0	-1.0%	Pass
1A	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	11	8.91	30	30.0	0.0	-0.1%	Pass
1	Stagecoach Merseyside and South Lancashire	opp Post Office (Ribble Valley) - Bus Station, Stand 25 (Preston)	11	14.4	31	34.1	-3.1	9.9%	Pass
1	Stagecoach Merseyside and South Lancashire	Lava Ignite, Stand G (Preston) - by Park and Ride (South Ribble)	10	3.14	7	7.0	0.0	0.0%	Pass
1	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - opp Post Office (Ribble Valley)	10	14.1	34	36.7	-2.7	8.0%	Pass
1	Stagecoach Merseyside and South Lancashire	by Park and Ride (South Ribble) - Lava Ignite, Stand G (Preston)	10	2.95	7	7.0	0.0	0.0%	Pass
280	Stagecoach Merseyside and South Lancashire	Market Place, Stand A (Ribble Valley) - Arrival Stand, Stand 0 (Preston)	180	30.71	65	49.5	15.5	-23.8%	Fail
280	Stagecoach Merseyside and South Lancashire	adj Sulphur Well Houses (Craven) - Arrival Stand, Stand 0 (Preston)	180	145.15	111	175.1	-64.1	57.7%	Fail
280	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - adj Sulphur Well Houses (Craven)	180	145.51	104	163.7	-59.7	57.5%	Fail
280	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - Market Place, Stand A (Ribble Valley)	180	31.07	61	38.2	22.8	-37.4%	Fail
2A	Stagecoach Merseyside and South Lancashire	Adjacent Green Lane (Sefton) - Bus Station, Stand 25 (Preston)	45	28.75	77	78.5	-1.5	1.9%	Pass
2A	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - Adjacent Green Lane (Sefton)	60	27.22	71	71.3	-0.3	0.4%	Pass
2	Stagecoach Merseyside and South Lancashire	opp Walmer Bridge Inn (South Ribble) - Bus Station, Stand 25 (Preston)	180	10.55	27	28.6	-1.6	6.1%	Pass

2	Stagecoach Merseyside and South Lancashire	Adjacent Wennington Road (Southport) - Bus Station, Stand 25 (Preston)	45	30.53	80	81.3	-1.3	1.7%	Pass
2	Stagecoach Merseyside and South Lancashire	by Chapel Road (West Lancashire) - Bus Station, Stand 25 (Preston)	180	16.65	60	47.6	12.4	-20.6%	Fail
2	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - Adjacent Wennington Road (Southport)	60	29.78	73	73.2	-0.2	0.3%	Pass
2	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - by Chapel Road (West Lancashire)	180	15.9	46	45.5	0.5	-1.0%	Pass
3	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	10	11.44	49	49.0	0.0	0.0%	Pass
4C	Stagecoach Merseyside and South Lancashire	Royal Preston Hospital Grounds, Stop 2 (Preston) - Bus Station, Stand 25 (Preston)	90	4.88	17	17.0	0.0	0.0%	Pass
4C	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - by Preston College Grounds (Preston)	180	5.7	15	15.0	0.0	0.0%	Pass
4C	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - Royal Preston Hospital Grounds, Stop 2 (Preston)	90	7.14	18	18.0	0.0	0.0%	Pass
4	Stagecoach Merseyside and South Lancashire	by WychnorTurning Circle (Preston) - Bus Station, Stand 25 (Preston)	180	8.23	29	29.5	-0.5	1.7%	Pass
4	Stagecoach Merseyside and South Lancashire	by Kirklands Estate (Ribble Valley) - Bus Station, Stand 25 (Preston)	180	39.13	86	84.4	1.6	-1.8%	Pass
4	Stagecoach Merseyside and South Lancashire	opp Post Office (Ribble Valley) - Bus Station, Stand 25 (Preston)	90	25.32	63	61.4	1.6	-2.5%	Pass
4	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - opp Post Office (Ribble Valley)	180	26.55	55	55.7	-0.7	1.4%	Pass
4	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - opp Post Office (Ribble Valley)	180	19.32	43	43.1	-0.1	0.2%	Pass
4	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - opp Post Office (Ribble Valley)	180	26.97	55	55.7	-0.7	1.4%	Pass
59C	Stagecoach Merseyside and South Lancashire	opp War Memorial (Hyndburn) - by Preston College Grounds (Preston)	180	44.38	96	146.2	-50.2	52.3%	Fail
59	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 6 (Blackburn) - Bus Station, Stand 25 (Preston)	30	18.43	37	38.4	-1.4	3.8%	Pass
59	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 6 (Blackburn) - Cardinal Newman College, N1 (Preston)	180	19.45	55	56.9	-1.9	3.5%	Pass

59	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - Bus Station, Stand 6 (Blackburn)	30	17.97	37	34.1	2.9	-7.7%	Pass
61C	Stagecoach Merseyside and South Lancashire	o/s Grapes Hotel (Fylde) - Bus Station, Stand 25 (Preston)	180	22.78	58	57.6	0.4	-0.7%	Pass
61	Stagecoach Merseyside and South Lancashire	Bispham Roundabout, Stop 2 (Blackpool) - Bus Station, Stand 25 (Preston)	45	29.98	77	74.3	2.7	-3.4%	Pass
61	Stagecoach Merseyside and South Lancashire	opp Railway Station (Fylde) - Cardinal Newman College, N1 (Preston)	180	15.71	37	36.6	0.4	-1.0%	Pass
61	Stagecoach Merseyside and South Lancashire	Bispham Roundabout, Stop 2 (Blackpool) - Cardinal Newman College, N1 (Preston)	180	31	78	76.0	2.0	-2.6%	Pass
61	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - Bispham Roundabout, Stop 2 (Blackpool)	36	29.85	74	64.6	9.4	-12.6%	Pass
68C	Stagecoach Merseyside and South Lancashire	Market Street, Stop MA4 (Blackpool) - Bus Station, Stand 25 (Preston)	180	42.57	98	89.4	8.6	-8.8%	Pass
68	Stagecoach Merseyside and South Lancashire	Market Street, Stop MA4 (Blackpool) - Bus Station, Stand 25 (Preston)	20	38.27	90	78.3	11.7	-13.0%	Pass
68	Stagecoach Merseyside and South Lancashire	Market Street, Stop MA4 (Blackpool) - Cardinal Newman College, N1 (Preston)	180	39.29	93	83.9	9.1	-9.8%	Pass
68	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - Market Street, Stop MA4 (Blackpool)	15	37.9	89	85.1	3.9	-4.4%	Pass
721	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - opp Carleton Drive (Preston)	180	10.89	39	39.0	0.0	0.0%	Pass
9	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	22	9.58	35	36.8	-1.8	5.2%	Pass
9	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	180	12.39	49	50.5	-1.5	3.0%	Pass
S1	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - opp Post Office (Ribble Valley)	180	11.89	43	42.0	1.0	-2.2%	Pass
X2	Stagecoach Merseyside and South Lancashire	Opposite Croxteth Road (Bootle) - Arrival Stand, Stand 0 (Preston)	36	60.36	136	140.8	-4.8	3.5%	Pass
X2	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - Opposite Croxteth Road (Bootle)	30	59.83	136	137.5	-1.5	1.1%	Pass
V1	Vision Bus	opp The Victoria - adj Albany School (Chorley)	180	9.18	32	31.3	0.7	-2.2%	Pass
V2	Vision Bus	opp The Hub (Leyland) - adj Albany School (Chorley)	180	10.35	37	37.0	0.0	0.0%	Pass

Inter-peak									
Route No	**Operator**	**Bus Line Description**	**Headway [min]**	**Length [km]**	**Observed JT [min]**	**Modelled JT [min]**	**Diff [min]**	**Diff [%]**	**Pass/Fail**
362	Arriva North West	opp Old Lane - by Chapel Street (Chorley)	16	11.87	41	39.2	1.8	-4.5%	Pass
362	Arriva North West	by Chapel Street (Chorley) - opp Old Lane	16	12.24	40	40.0	0.0	0.0%	Pass
842	Avacab	opp Grammar School (South Ribble) - opp Spout Farm (Ribble Valley)	360	22.18	56	52.7	3.3	-5.9%	Pass
99	Avacab	o/s High School (Ribble Valley) - by Clock Garage (Preston)	360	21.31	44	48.2	-4.2	9.5%	Pass
76	Blackpool Transport	Market Street, Stop MA4 (Blackpool) - opp Lowther Terrace (Fylde)	180	41.4	80	72.9	7.1	-8.8%	Pass
76	Blackpool Transport	opp Lowther Terrace (Fylde) - by Rossall Road (Wyre)	360	34.3	60	64.9	-4.9	8.1%	Pass
76	Blackpool Transport	opp Lowther Terrace (Fylde) - Market Street, Stop MA4 (Blackpool)	180	41.31	80	85.9	-5.9	7.3%	Pass
77A	Blackpool Transport	by College (Wyre) - Arrival Stand, Stand 0 (Preston)	120	31.68	52	52.2	-0.2	0.3%	Pass
77A	Blackpool Transport	Bus Station, Stand 25 (Preston) - by College (Wyre)	180	32.68	57	59.5	-2.5	4.4%	Pass
77A	Blackpool Transport	Bus Station, Stand 25 (Preston) - by Marsh Farm (Wyre)	360	25.24	45	47.5	-2.5	5.6%	Pass
77	Blackpool Transport	Market Street, Stop MA4 (Blackpool) - Arrival Stand, Stand 0 (Preston)	120	38.44	77	79.2	-2.2	2.8%	Pass
77	Blackpool Transport	Bus Station, Stand 25 (Preston) - Market Street, Stop MA4 (Blackpool)	120	38.18	80	86.0	-6.0	7.5%	Pass
78	Blackpool Transport	Ashton Gardens, Stand 8 (Fylde) - by AFC Fylde (Kirkham)	60	38.1	55	72.0	-17.0	30.8%	Fail
78	Blackpool Transport	by AFC Fylde (Kirkham) - Ashton Gardens, Stand 8 (Fylde)	60	38.1	55	70.2	-15.2	27.6%	Fail
723	Holmeswood Coaches	by Bishop Rawsthorne Turning Circle (Chorley) - Opposite Bridge Wills Lane (Southport)	360	11.85	40	40.0	0.0	0.0%	Pass
984	Holmeswood Coaches	o/s Anchor Inn (South Ribble) - by Old Oak (South Ribble)	360	22.82	45	46.8	-1.8	4.0%	Pass
152	Blackburn Bus Company	opp Queensgate Depot (Burnley) - Arrival Stand, Stand 0 (Preston)	30	34.03	92	76.4	15.6	-16.9%	Fail
152	Blackburn Bus Company	Bus Station, Stand 25 (Preston) - opp Queensgate Depot (Burnley)	30	34.5	96	59.0	37.0	-38.5%	Fail
24	Blackburn Bus Company	by Chapel Street (Chorley) - Bus Station, Stand 6 (Blackburn)	60	20.89	50	35.3	14.7	-29.4%	Fail
24	Blackburn Bus Company	Bus Station, Stand 6 (Blackburn) - by Chapel Street (Chorley)	60	20.79	50	47.8	2.2	-4.4%	Pass
623	Longridge Coaches	Market Place, Stand A (Ribble Valley) - o/s Traders Arms (Ribble Valley)	360	28.3	48	40.7	7.3	-15.2%	Fail
112	Preston Bus	by Clydesdale Place (Leyland) - Arrival Stand, Stand 0 (Preston)	60	28.61	78	80.2	-2.2	2.8%	Pass
112	Preston Bus	Bus Station, Stand 25 (Preston) - opp Robin Hey (Leyland)	60	27.93	76	78.6	-2.6	3.4%	Pass
114	Preston Bus	Bus Station, Stand 25 (Preston) - by St Peters Street (Chorley)	60	38.06	97	105.2	-8.2	8.5%	Pass

114	Preston Bus	by St Peters Street (Chorley) - Arrival Stand, Stand 0 (Preston)	60	38.1	100	103.1	-3.1	3.1%	Pass
12	Preston Bus	by Shirley Lane (South Ribble) - by St Georges Centre (Preston)	30	10.69	26	26.0	0.0	0.0%	Pass
12	Preston Bus	by St Georges Centre (Preston) - by Shirley Lane (South Ribble)	30	10.49	21	21.0	0.0	0.0%	Pass
14	Preston Bus	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	30	6.15	26	25.0	1.0	-3.8%	Pass
15	Preston Bus	Bus Station, Stand 25 (Preston) - Arrival Stand, Stand 0 (Preston)	60	9.16	32	35.0	-3.0	9.4%	Pass
16	Preston Bus	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	10	7.69	27	26.6	0.4	-1.5%	Pass
19	Preston Bus	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	9	11.23	39	40.7	-1.7	4.3%	Pass
23	Preston Bus	by Leisure Centre (Preston) - Arrival Stand, Stand 0 (Preston)	360	4.28	15	22.0	-7.0	46.7%	Fail
23	Preston Bus	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	8	16.11	53	54.1	-1.1	2.0%	Pass
25	Preston Bus	Bus Station, Stand 6 (Blackburn) - Market Place, Stand A (Ribble Valley)	120	24.91	58	34.4	23.6	-40.7%	Fail
25	Preston Bus	Bus Station, Stand 6 (Blackburn) - o/s Traders Arms (Ribble Valley)	120	5.72	20	18.5	1.5	-7.6%	Pass
25	Preston Bus	o/s Traders Arms (Ribble Valley) - Bus Station, Stand 6 (Blackburn)	120	5.72	19	21.4	-2.4	12.6%	Pass
25	Preston Bus	Market Place, Stand A (Ribble Valley) - Bus Station, Stand 6 (Blackburn)	180	24.91	60	37.6	22.4	-37.4%	Fail
31	Preston Bus	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	15	15.59	53	53.1	-0.1	0.2%	Pass
337	Preston Bus	Adjacent Green Lane (Sefton) - by Chapel Street (Chorley)	180	37.31	80	85.0	-5.0	6.3%	Pass
337	Preston Bus	by Chapel Street (Chorley) - Adjacent Green Lane (Sefton)	180	37.39	80	78.6	1.4	-1.8%	Pass
347	Preston Bus	Adjacent Wennington Road (Southport) - by Chapel Street (Chorley)	120	47.57	77	83.1	-6.1	7.9%	Pass
347	Preston Bus	by Chapel Street (Chorley) - Adjacent Wennington Road (Southport)	90	47.23	78	82.9	-4.9	6.3%	Pass
35	Preston Bus	Bus Station, Stand 6 (Blackburn) - opp Post Office (Ribble Valley)	72	25	34	35.9	-1.9	5.5%	Pass
35	Preston Bus	Bus Station, Stand 6 (Blackburn) - opp Post Office (Ribble Valley)	360	25	44	45.9	-1.9	4.3%	Pass
35	Preston Bus	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	10	12.02	40	39.8	0.2	-0.4%	Pass
35	Preston Bus	opp Post Office (Ribble Valley) - Bus Station, Stand 6 (Blackburn)	72	23.84	30	39.2	-9.2	30.6%	Fail
401	Preston Bus	by College (Wyre) - by College (Wyre)	45	3.97	13	13.3	-0.3	2.4%	Pass
437	Preston Bus	by College (Wyre) - Bus Station, Stand 25 (Preston)	360	13.06	25	27.5	-2.5	10.0%	Pass
437	Preston Bus	Bus Station, Stand 25 (Preston) - by College (Wyre)	360	13.2	25	25.1	-0.1	0.6%	Pass
44	Preston Bus	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	180	16.54	55	50.8	4.2	-7.7%	Pass
44	Preston Bus	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	40	20.48	55	55.6	-0.6	1.0%	Pass
44	Preston Bus	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	360	18.51	54	54.0	0.0	0.1%	Pass
576	Preston Bus	by Corpus Christi High School (Preston) - by Walker Street (Preston)	360	4.7	15	15.0	0.0	0.0%	Pass

584	Preston Bus	o/s High School (Ribble Valley) - opp Brookside Road (Preston)	360	12	30	30.9	-0.9	3.0%	Pass
663	Preston Bus	by Leisure Centre (Preston) - adj Lily Grove (Preston)	360	8.8	28	29.1	-1.1	3.9%	Pass
664	Preston Bus	by Leisure Centre (Preston) - opp Centenary Mill (Preston)	360	9.66	35	36.1	-1.1	3.1%	Pass
680	Preston Bus	by Cop Lane School Stop Only (South Ribble) - by Chapel Road (West Lancashire)	360	17.75	51	50.5	0.5	-0.9%	Pass
6	Preston Bus	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	11	12.43	37	35.6	1.4	-3.9%	Pass
75	Preston Bus	Bus Station, Stand 25 (Preston) - by Queens Terrace (Wyre)	60	40.83	94	96.3	-2.3	2.5%	Pass
75	Preston Bus	by Queens Terrace (Wyre) - Arrival Stand, Stand 0 (Preston)	60	42.93	99	101.3	-2.3	2.3%	Pass
88	Preston Bus	by Mythop Place (Preston) - opp St Clare's Church (Preston)	60	9.58	26	29.7	-3.7	14.1%	Pass
88	Preston Bus	opp St Clare's Church (Preston) - by Mythop Place (Preston)	60	8.95	26	25.4	0.6	-2.1%	Pass
89	Preston Bus	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	10	12.92	46	45.7	0.3	-0.7%	Pass
8	Preston Bus	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	10	9.86	35	34.0	1.0	-2.9%	Pass
959	Preston Bus	by Corpus Christi High School (Preston) - by Waverley Gardens (Preston)	360	8.82	27	27.0	0.0	0.0%	Pass
960	Preston Bus	by Corpus Christi High School (Preston) - by Waverley Gardens (Preston)	360	6.7	25	25.0	0.0	0.0%	Pass
961	Preston Bus	by Corpus Christi High School (Preston) - by Grizedale Crescent (Preston)	360	5.86	23	23.0	0.0	0.0%	Pass
962	Preston Bus	by Corpus Christi High School (Preston) - by Tudor Avenue (Preston)	360	6.91	30	29.7	0.3	-0.9%	Pass
963	Preston Bus	by Corpus Christi High School (Preston) - by Motorway Bridge (Preston)	360	8.68	32	32.0	0.0	0.0%	Pass
118	Tyrers Coaches	by Chapel Street (Chorley) - by Chapel Street (Chorley)	60	9.48	30	33.4	-3.4	11.2%	Pass
119	Tyrers Coaches	by Park Gates (Chorley) - opp Greenside (Chorley)	360	8.66	20	20.0	0.0	0.0%	Pass
470	Tyrers Coaches	opp Lancashire College (Chorley) - by Abattoir (Chorley)	360	11.78	23	22.8	0.2	-0.8%	Pass
804	Tyrers Coaches	opp Lancashire College (Chorley) - opp The Hub (Leyland)	360	6	19	19.0	0.0	0.0%	Pass
804	Tyrers Coaches	opp Lancashire College (Chorley) - opp The Hub (Leyland)	360	5.51	15	15.0	0.0	0.0%	Pass
BSM	Tyrers Coaches	opp Brownedge St Marys (South Ribble) - opp Hennel Lane (South Ribble)	360	7.43	15	15.9	-0.9	6.2%	Pass
40	Stagecoach Cumbria and North Lancashire	Bus Station, Stand 25 (Preston) - by Palatine Avenue (Lancaster)	60	45	75	82.7	-7.7	10.2%	Pass
40	Stagecoach Cumbria and North Lancashire	by Palatine Avenue (Lancaster) - Bus Station, Stand 25 (Preston)	60	42.4	81	84.4	-3.4	4.2%	Pass
41	Stagecoach Cumbria and North Lancashire	Bus Station, Stand 25 (Preston) - by Palatine Avenue (Lancaster)	360	43.06	96	85.0	11.0	-11.4%	Pass
41	Stagecoach Cumbria and North Lancashire	Bus Station, Stand 25 (Preston) - by Palatine Avenue (Lancaster)	90	43.06	104	103.1	0.9	-0.8%	Pass
41	Stagecoach Cumbria and North Lancashire	Bus Station, Stand 25 (Preston) - by Palatine Avenue (Lancaster)	360	43.06	113	111.8	1.2	-1.0%	Pass

41	Stagecoach Cumbria and North Lancashire	by Palatine Avenue (Lancaster) - Bus Station, Stand 25 (Preston)	60	42.66	110	91.3	18.7	-17.0%	Fail
940	Stagecoach Cumbria and North Lancashire	by Palatine Avenue (Lancaster) - opp St Clare's Church (Preston)	360	40.06	57	67.4	-10.4	18.3%	Fail
940	Stagecoach Cumbria and North Lancashire	by Palatine Avenue (Lancaster) - Bus Station, Stand 25 (Preston)	360	42.94	65	75.4	-10.4	16.0%	Fail
941	Stagecoach Cumbria and North Lancashire	by Palatine Avenue (Lancaster) - opp Garrison Road (Preston)	360	42.97	57	69.7	-12.7	22.2%	Fail
113	Stagecoach in Lancashire	opp Old Lane - Bus Station, Stand 25 (Preston)	72	50.46	118	116.4	1.6	-1.4%	Pass
113	Stagecoach in Lancashire	Bus Station, Stand 25 (Preston) - opp Old Lane	72	50.06	120	122.1	-2.1	1.8%	Pass
109	Stagecoach Merseyside and South Lancashire	by Chapel Street (Chorley) - Bus Station, Stand 25 (Preston)	30	22.75	58	67.7	-9.7	16.7%	Fail
109	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - by Chapel Street (Chorley)	30	22.8	64	65.9	-1.9	3.0%	Pass
111	Stagecoach Merseyside and South Lancashire	o/s St Annes School (South Ribble) - Bus Station, Stand 25 (Preston)	12	15.92	50	56.8	-6.8	13.5%	Pass
111	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - o/s St Annes School (South Ribble)	12	12.4	39	38.8	0.2	-0.6%	Pass
113	Stagecoach Merseyside and South Lancashire	opp Old Lane - Bus Station, Stand 25 (Preston)	72	50.46	118	119.4	-1.4	1.2%	Pass
113	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - opp Old Lane	72	50.06	120	122.1	-2.1	1.8%	Pass
119	Stagecoach Merseyside and South Lancashire	by Chapel Street (Chorley) - by Chapel Street (Chorley)	60	8.68	22	24.7	-2.7	12.2%	Pass
125	Stagecoach Merseyside and South Lancashire	nr Ivy Road - Bus Station, Stand 25 (Preston)	10	36.44	97	102.3	-5.3	5.4%	Pass
125	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - nr Ivy Road	10	41.09	95	95.4	-0.4	0.4%	Pass
1A	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	10	8.91	30	30.0	0.0	-0.1%	Pass
1	Stagecoach Merseyside and South Lancashire	opp Post Office (Ribble Valley) - Bus Station, Stand 25 (Preston)	10	14.4	30	34.5	-4.5	15.1%	Fail
1	Stagecoach Merseyside and South Lancashire	Lava Ignite, Stand G (Preston) - by Park and Ride (South Ribble)	10	3.14	7	7.0	0.0	0.0%	Pass
1	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - opp Post Office (Ribble Valley)	10	14.1	30	36.1	-6.1	20.4%	Fail
1	Stagecoach Merseyside and South Lancashire	by Park and Ride (South Ribble) - Lava Ignite, Stand G (Preston)	10	2.95	7	7.0	0.0	0.0%	Pass
280	Stagecoach Merseyside and South Lancashire	adj Sulphur Well Houses (Craven) - Arrival Stand, Stand 0 (Preston)	120	145.15	111	147.9	-36.9	33.3%	Fail

280	Stagecoach Merseyside and South Lancashire	Market Place, Stand A (Ribble Valley) - Arrival Stand, Stand 0 (Preston)	120	28.71	56	41.2	14.8	-26.4%	Fail
280	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - adj Sulphur Well Houses (Craven)	120	145.51	104	135.1	-31.1	29.9%	Fail
280	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - Market Place, Stand A (Ribble Valley)	120	31.07	49	41.9	7.1	-14.6%	Pass
2A	Stagecoach Merseyside and South Lancashire	Adjacent Green Lane (Sefton) - Bus Station, Stand 25 (Preston)	60	28.75	76	78.5	-2.5	3.2%	Pass
2A	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - Adjacent Green Lane (Sefton)	60	27.22	70	71.3	-1.3	1.9%	Pass
2	Stagecoach Merseyside and South Lancashire	by Chapel Road (West Lancashire) - Bus Station, Stand 25 (Preston)	360	16.65	44	45.6	-1.6	3.7%	Pass
2	Stagecoach Merseyside and South Lancashire	Adjacent Wennington Road (Southport) - Bus Station, Stand 25 (Preston)	60	30.53	79	81.3	-2.3	2.9%	Pass
2	Stagecoach Merseyside and South Lancashire	by Chapel Road (West Lancashire) - Bus Station, Stand 25 (Preston)	60	16.65	46	47.6	-1.6	3.5%	Pass
2	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - Adjacent Wennington Road (Southport)	51	29.78	78	73.2	4.8	-6.1%	Pass
2	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - by Chapel Road (West Lancashire)	72	15.9	46	45.5	0.5	-1.0%	Pass
3	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	10	11.44	46	49.0	-3.0	6.5%	Pass
4C	Stagecoach Merseyside and South Lancashire	Royal Preston Hospital Grounds, Stop 2 (Preston) - Bus Station, Stand 25 (Preston)	51	4.88	18	17.0	1.0	-5.6%	Pass
4C	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - Royal Preston Hospital Grounds, Stop 2 (Preston)	180	7.14	18	19.1	-1.1	6.1%	Pass
4C	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - Royal Preston Hospital Grounds, Stop 2 (Preston)	72	6.72	18	19.1	-1.1	6.1%	Pass
4	Stagecoach Merseyside and South Lancashire	opp Post Office (Ribble Valley) - Bus Station, Stand 25 (Preston)	60	25.32	59	62.9	-3.9	6.7%	Pass
4	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - opp Post Office (Ribble Valley)	72	26.97	57	56.8	0.2	-0.4%	Pass
4	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - by Kirklands Estate (Ribble Valley)	360	38.93	81	82.8	-1.8	2.2%	Pass
59	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 6 (Blackburn) - Bus Station, Stand 25 (Preston)	30	18.43	33	37.9	-4.9	14.7%	Pass
59	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - Bus Station, Stand 6 (Blackburn)	28	17.97	37	34.2	2.8	-7.7%	Pass
61	Stagecoach Merseyside and South Lancashire	Bispham Roundabout, Stop 2 (Blackpool) - Bus Station, Stand 25 (Preston)	30	29.98	71	73.8	-2.8	4.0%	Pass
61	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - Bispham Roundabout, Stop 2 (Blackpool)	30	29.85	73	72.1	0.9	-1.2%	Pass

68	Stagecoach Merseyside and South Lancashire	Market Street, Stop MA4 (Blackpool) - Bus Station, Stand 25 (Preston)	15	38.27	90	77.3	12.7	-14.2%	Pass
68	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - Market Street, Stop MA4 (Blackpool)	15	37.9	90	85.0	5.0	-5.5%	Pass
721	Stagecoach Merseyside and South Lancashire	opp Carleton Drive (Preston) - Bus Station, Stand 25 (Preston)	360	11.18	35	36.9	-1.9	5.5%	Pass
8A	Stagecoach Merseyside and South Lancashire	by Blackrod Bypass - by Chapel Street (Chorley)	180	13.93	32	34.5	-2.5	7.8%	Pass
8A	Stagecoach Merseyside and South Lancashire	by Chapel Street (Chorley) - by Blackrod Bypass	180	9.91	29	29.0	0.0	0.0%	Pass
8A	Stagecoach Merseyside and South Lancashire	by Chapel Street (Chorley) - by Blackrod Bypass	360	9.91	30	30.0	0.0	0.0%	Pass
9	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	20	9.58	35	36.5	-1.5	4.2%	Pass
S1	Stagecoach Merseyside and South Lancashire	opp Spout Farm (Ribble Valley) - Bus Station, Stand 25 (Preston)	360	10.53	29	25.6	3.4	-11.7%	Pass
X2	Stagecoach Merseyside and South Lancashire	Opposite Croxteth Road (Bootle) - Arrival Stand, Stand 0 (Preston)	30	60.36	132	140.8	-8.8	6.7%	Pass
X2	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - Opposite Croxteth Road (Bootle)	33	59.83	141	137.5	3.5	-2.5%	Pass
V1	Vision Bus	adj Albany School (Chorley) - opp The Victoria	360	9.18	24	22.2	1.8	-7.4%	Pass
V2	Vision Bus	adj Albany School (Chorley) - opp The Hub (Leyland)	360	10.91	45	45.0	0.0	0.0%	Pass
649	Coach Hire Executive Travel Ltd	by Meadow Lane (Fylde) - opp Market Square (Fylde)	360	11.34	30	31.0	-1.0	3.4%	Pass

PM Peak

Route No	Operator	Bus Line Description	Headway [min]	Length [km]	Observed JT [min]	Modelled JT [min]	Diff [min]	Diff [%]	Pass/Fail
362	Arriva North West	opp Old Lane - by Chapel Street (Chorley)	16	11.87	39	39.30	-0.30	0.8%	Pass
362	Arriva North West	by Chapel Street (Chorley) - opp Old Lane	15	12.24	39	40.00	-1.00	2.6%	Pass
852	Burnley Bus Company	by College (Wyre) - opp Queensgate Depot (Burnley)	180	43.76	85	63.28	21.72	-25.5%	Fail
76	Blackpool Transport	by Rossall Road (Wyre) - opp Lowther Terrace (Fylde)	180	34.4	58	55.05	2.95	-5.1%	Pass
76	Blackpool Transport	opp Lowther Terrace (Fylde) - by Rossall Road (Wyre)	180	34.3	59	65.49	-6.49	11.0%	Pass
76	Blackpool Transport	opp Market Square (Fylde) - by Rossall Road (Wyre)	180	21.39	32	33.38	-1.38	4.3%	Pass
77	Blackpool Transport	Market Street, Stop MA4 (Blackpool) - Arrival Stand, Stand 0 (Preston)	90	38.44	77	73.77	3.23	-4.2%	Pass

PM Peak									
Route No	Operator	Bus Line Description	Headway [min]	Length [km]	Observed JT [min]	Modelled JT [min]	Diff [min]	Diff [%]	Pass/Fail
77	Blackpool Transport	by Rossall Road (Wyre) - Arrival Stand, Stand 0 (Preston)	180	46.31	75	74.65	0.35	-0.5%	Pass
77	Blackpool Transport	Bus Station, Stand 25 (Preston) - Market Street, Stop MA4 (Blackpool)	90	38.18	83	85.98	-2.98	3.6%	Pass
77	Blackpool Transport	Bus Station, Stand 25 (Preston) - by Rossall Road (Wyre)	180	31.17	59	61.98	-2.98	5.1%	Pass
78	Blackpool Transport	Ashton Gardens, Stand 8 (Fylde) - by AFC Fylde (Kirkham)	90	38.1	55	72.13	-17.13	31.1%	Fail
78	Blackpool Transport	by AFC Fylde (Kirkham) - Ashton Gardens, Stand 8 (Fylde)	180	38.1	55	70.21	-15.21	27.6%	Fail
78	Blackpool Transport	by AFC Fylde (Kirkham) - opp Lowther Terrace (Fylde)	180	13.7	31	26.60	4.40	-14.2%	Pass
152	Blackburn Bus Company	opp Queensgate Depot (Burnley) - Arrival Stand, Stand 0 (Preston)	36	34.03	88	76.61	11.39	-12.9%	Pass
152	Blackburn Bus Company	Bus Station, Stand 25 (Preston) - opp Queensgate Depot (Burnley)	36	34.5	94	58.82	35.18	-37.4%	Fail
24	Blackburn Bus Company	by Chapel Street (Chorley) - Bus Station, Stand 6 (Blackburn)	60	20.89	52	35.28	16.72	-32.1%	Fail
24	Blackburn Bus Company	Bus Station, Stand 6 (Blackburn) - by Chapel Street (Chorley)	60	20.79	51	47.98	3.02	-5.9%	Pass
966	Olympia	o/s St John Rigby R C College - opp The Bromilow Arms	180	32.13	62	64.00	-2.00	3.2%	Pass
112	Preston Bus	by Clydesdale Place (Leyland) - Arrival Stand, Stand 0 (Preston)	90	28.61	79	79.94	-0.94	1.2%	Pass
112	Preston Bus	Bus Station, Stand 25 (Preston) - opp Robin Hey (Leyland)	90	27.93	78	76.67	1.33	-1.7%	Pass
114	Preston Bus	Bus Station, Stand 25 (Preston) - by St Peters Street (Chorley)	90	38.06	103	106.22	-3.22	3.1%	Pass
114	Preston Bus	Bus Station, Stand 25 (Preston) - adj Gough Lane (South Ribble)	180	25.92	68	71.24	-3.24	4.8%	Pass
114	Preston Bus	by St Peters Street (Chorley) - Arrival Stand, Stand 0 (Preston)	90	38.1	101	103.11	-2.11	2.1%	Pass
119	Preston Bus	opp St Clare's Church (Preston) - Arrival Stand, Stand 0 (Preston)	90	4.53	25	25.00	0.00	0.0%	Pass
119	Preston Bus	by Preston College Grounds (Preston) - Arrival Stand, Stand 0 (Preston)	180	3.96	20	20.00	0.00	0.0%	Pass
12	Preston Bus	by Shirley Lane (South Ribble) - by St Georges Centre (Preston)	36	10.69	26	26.00	0.00	0.0%	Pass
12	Preston Bus	by St Georges Centre (Preston) - by Shirley Lane (South Ribble)	36	10.49	21	21.00	0.00	0.0%	Pass
14	Preston Bus	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	30	6.15	26	25.00	1.00	-3.8%	Pass
15	Preston Bus	Bus Station, Stand 25 (Preston) - Arrival Stand, Stand 0 (Preston)	60	9.16	35	35.00	0.00	0.0%	Pass
16	Preston Bus	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	13	7.69	28	26.52	1.48	-5.3%	Pass
19	Preston Bus	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	12	11.23	42	40.68	1.32	-3.1%	Pass
23	Preston Bus	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	11	16.11	55	53.37	1.63	-3.0%	Pass

PM Peak									
Route No	Operator	Bus Line Description	Headway [min]	Length [km]	Observed JT [min]	Modelled JT [min]	Diff [min]	Diff [%]	Pass/Fail
23	Preston Bus	Bus Station, Stand 25 (Preston) - o/s Fulwood Asda (Preston)	180	8.45	24	24.00	0.00	0.0%	Pass
25	Preston Bus	Bus Station, Stand 6 (Blackburn) - Market Place, Stand A (Ribble Valley)	180	24.91	58	34.78	23.22	-40.0%	Fail
25	Preston Bus	Bus Station, Stand 6 (Blackburn) - by Whitehalgh Lane (Ribble Valley)	180	15.53	37	28.21	8.79	-23.8%	Fail
25	Preston Bus	Market Place, Stand A (Ribble Valley) - Bus Station, Stand 6 (Blackburn)	90	24.91	60	32.71	27.29	-45.5%	Fail
31	Preston Bus	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	18	15.59	53	53.08	-0.08	0.2%	Pass
337	Preston Bus	Adjacent Green Lane (Sefton) - by Chapel Street (Chorley)	90	37.31	76	83.61	-7.61	10.0%	Pass
337	Preston Bus	by Chapel Street (Chorley) - Adjacent Green Lane (Sefton)	180	37.39	80	78.61	1.39	-1.7%	Pass
347	Preston Bus	Adjacent Wennington Road (Southport) - by Chapel Street (Chorley)	90	47.57	77	81.65	-4.65	6.0%	Pass
347	Preston Bus	by Chapel Street (Chorley) - by Liverpool Road (West Lancashire)	90	29.5	46	46.35	-0.35	0.8%	Pass
35	Preston Bus	Bus Station, Stand 6 (Blackburn) - opp Post Office (Ribble Valley)	90	25	34	59.39	-25.39	74.7%	Fail
35	Preston Bus	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	13	12.02	43	40.18	2.82	-6.6%	Pass
35	Preston Bus	Bus Station, Stand 25 (Preston) - by The Guild Merchant (Preston)	90	6.24	19	19.28	-0.28	1.5%	Pass
35	Preston Bus	opp Post Office (Ribble Valley) - Bus Station, Stand 6 (Blackburn)	90	23.84	30	56.80	-26.80	89.3%	Fail
400	Preston Bus	by College (Wyre) - by Queens Terrace (Wyre)	180	37.57	77	76.75	0.25	-0.3%	Pass
401	Preston Bus	by College (Wyre) - by College (Wyre)	60	3.97	12	13.32	-1.32	11.0%	Pass
433	Preston Bus	by College (Wyre) - Railway Station, Stand A (Preston)	180	12.43	40	40.49	-0.49	1.2%	Pass
437	Preston Bus	by College (Wyre) - Bus Station, Stand 25 (Preston)	180	12.16	30	31.99	-1.99	6.6%	Pass
44	Preston Bus	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	26	16.54	48	51.08	-3.08	6.4%	Pass
5	Preston Bus	by Caxton Road (Preston) - Bus Station, Stand 25 (Preston)	90	6.85	25	25.00	0.00	0.0%	Pass
663	Preston Bus	by Leisure Centre (Preston) - Arrival Stand, Stand 0 (Preston)	180	11.28	40	40.00	0.00	0.0%	Pass
6	Preston Bus	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	14	12.43	39	35.57	3.43	-8.8%	Pass
75	Preston Bus	Bus Station, Stand 25 (Preston) - by Queens Terrace (Wyre)	60	40.83	98	93.47	4.53	-4.6%	Pass
75	Preston Bus	by Queens Terrace (Wyre) - Arrival Stand, Stand 0 (Preston)	90	42.93	102	89.44	12.56	-12.3%	Pass
853	Preston Bus	by College (Wyre) - Ashton Gardens, Stand 8 (Fylde)	180	36.29	65	55.87	9.13	-14.0%	Pass

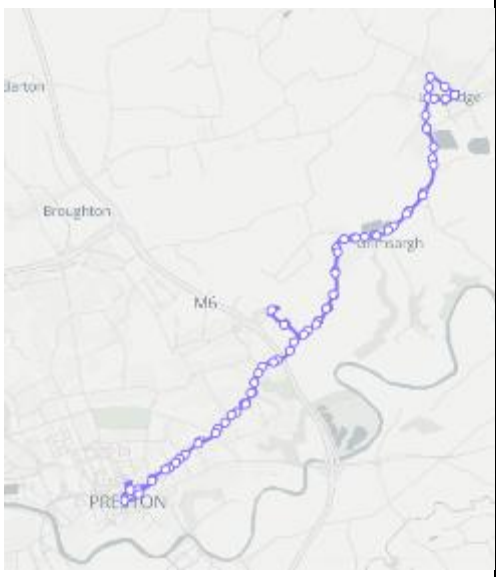
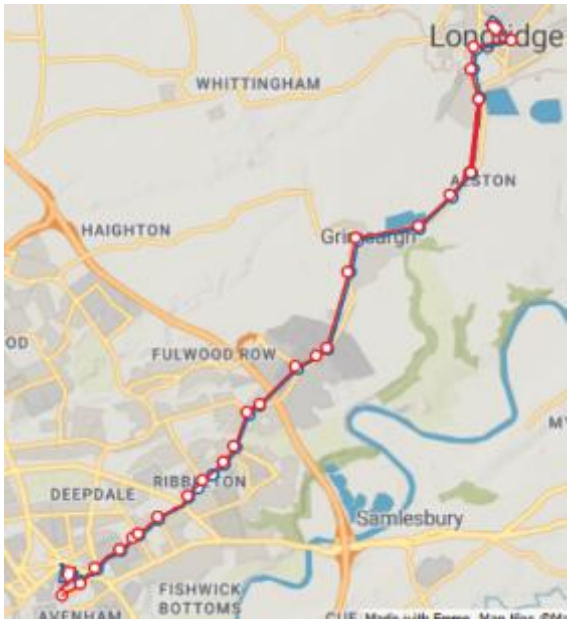
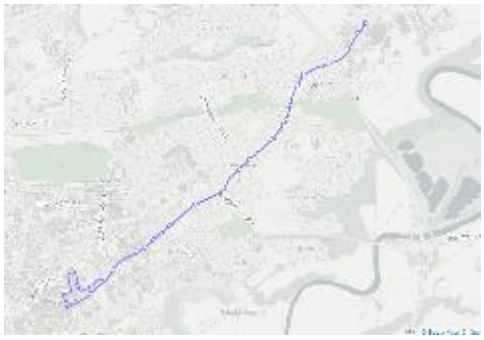
PM Peak									
Route No	Operator	Bus Line Description	Headway [min]	Length [km]	Observed JT [min]	Modelled JT [min]	Diff [min]	Diff [%]	Pass/Fail
88	Preston Bus	by Mythop Place (Preston) - opp St Clare's Church (Preston)	90	9.58	29	29.43	-0.43	1.5%	Pass
88	Preston Bus	opp St Clare's Church (Preston) - by Mythop Place (Preston)	90	8.95	29	25.45	3.55	-12.2%	Pass
89	Preston Bus	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	20	12.92	50	45.67	4.33	-8.7%	Pass
89	Preston Bus	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	26	12.92	39	38.65	0.35	-0.9%	Pass
8	Preston Bus	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	13	9.86	37	34.00	3.00	-8.1%	Pass
959	Preston Bus	by Corpus Christi High School (Preston) - by Waverley Gardens (Preston)	180	8.82	27	27.00	0.00	0.0%	Pass
995	Preston Bus	by College (Wyre) - Market Place, Stand A (Ribble Valley)	180	56.43	68	64.10	3.90	-5.7%	Pass
118	Tyrers Coaches	by Chapel Street (Chorley) - by Chapel Street (Chorley)	90	9.48	31	33.37	-2.37	7.6%	Pass
119	Tyrers Coaches	by Runshaw College (South Ribble) - opp Millfield Road (Chorley)	180	9.93	35	35.73	-0.73	2.1%	Pass
40A	Stagecoach Cumbria and North Lancashire	by Preston College Grounds (Preston) - by Palatine Avenue (Lancaster)	180	42.15	97	101.20	-4.20	4.3%	Pass
40	Stagecoach Cumbria and North Lancashire	Bus Station, Stand 25 (Preston) - by Palatine Avenue (Lancaster)	180	45	59	83.48	-24.48	41.5%	Fail
40	Stagecoach Cumbria and North Lancashire	Bus Station, Stand 25 (Preston) - by Palatine Avenue (Lancaster)	60	45	97	102.38	-5.38	5.5%	Pass
40	Stagecoach Cumbria and North Lancashire	by Palatine Avenue (Lancaster) - Bus Station, Stand 25 (Preston)	180	42.4	79	86.74	-7.74	9.8%	Pass
40	Stagecoach Cumbria and North Lancashire	by Palatine Avenue (Lancaster) - Bus Station, Stand 25 (Preston)	180	42.4	85	82.74	2.26	-2.7%	Pass
40	Stagecoach Cumbria and North Lancashire	by Palatine Avenue (Lancaster) - Bus Station, Stand 25 (Preston)	180	42.4	90	94.24	-4.24	4.7%	Pass
41	Stagecoach Cumbria and North Lancashire	Bus Station, Stand 25 (Preston) - by Palatine Avenue (Lancaster)	90	43.06	96	87.06	8.94	-9.3%	Pass
41	Stagecoach Cumbria and North Lancashire	by Palatine Avenue (Lancaster) - Bus Station, Stand 25 (Preston)	180	42.66	109	111.74	-2.74	2.5%	Pass
113	Stagecoach in Lancashire	opp Old Lane - Bus Station, Stand 25 (Preston)	60	50.46	116	118.80	-2.80	2.4%	Pass
113	Stagecoach in Lancashire	Bus Station, Stand 25 (Preston) - opp Old Lane	180	50.06	123	122.39	0.61	-0.5%	Pass
113	Stagecoach in Lancashire	Bus Station, Stand 25 (Preston) - at Standish Village	180	46.67	102	105.96	-3.96	3.9%	Pass
113	Stagecoach in Lancashire	Bus Station, Stand 25 (Preston) - opp Farmers Arms (Chorley)	180	37.7	79	84.69	-5.69	7.2%	Pass
109	Stagecoach Merseyside and South Lancashire	by Chapel Street (Chorley) - Bus Station, Stand 25 (Preston)	36	22.75	61	67.70	-6.70	11.0%	Pass
109	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - by Chapel Street (Chorley)	30	22.8	65	65.90	-0.90	1.4%	Pass
111	Stagecoach Merseyside and South Lancashire	o/s St Annes School (South Ribble) - Bus Station, Stand 25 (Preston)	15	15.92	49	57.27	-8.27	16.9%	Fail

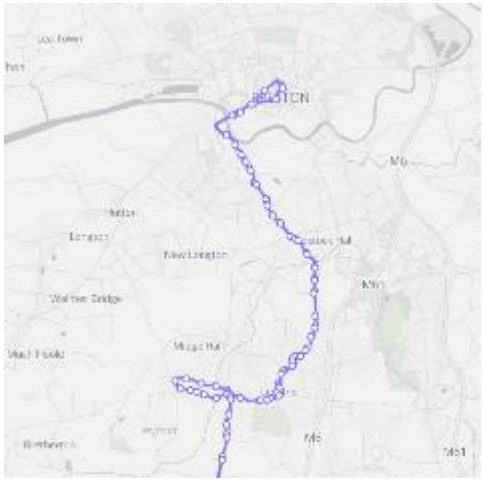
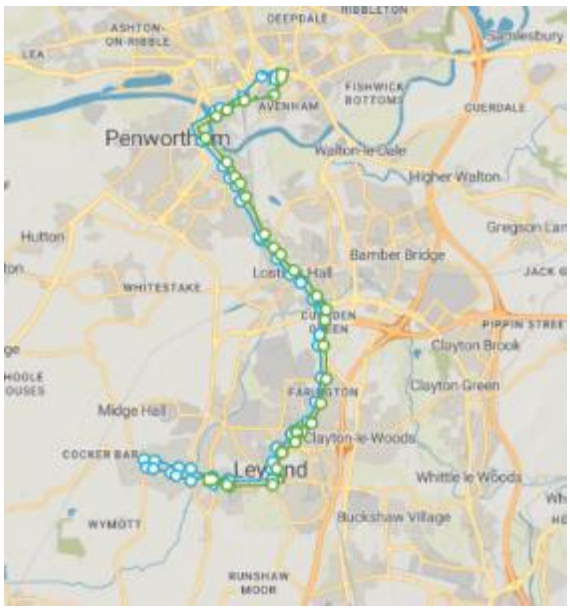
PM Peak									
Route No	Operator	Bus Line Description	Headway [min]	Length [km]	Observed JT [min]	Modelled JT [min]	Diff [min]	Diff [%]	Pass/Fail
111	Stagecoach Merseyside and South Lancashire	o/s St Annes School (South Ribble) - o/s St Annes School (South Ribble)	90	3.33	7	7.00	0.00	0.0%	Pass
111	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - o/s St Annes School (South Ribble)	15	12.4	44	38.77	5.23	-11.9%	Pass
113	Stagecoach Merseyside and South Lancashire	opp Old Lane - Bus Station, Stand 25 (Preston)	60	50.46	116	119.85	-3.85	3.3%	Pass
113	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - opp Old Lane	180	50.06	123	122.39	0.61	-0.5%	Pass
113	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - at Standish Village	180	46.67	102	105.96	-3.96	3.9%	Pass
113	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - opp Farmers Arms (Chorley)	180	37.7	79	84.69	-5.69	7.2%	Pass
119	Stagecoach Merseyside and South Lancashire	by Chapel Street (Chorley) - by Chapel Street (Chorley)	60	8.68	24	24.79	-0.79	3.3%	Pass
125	Stagecoach Merseyside and South Lancashire	nr Ivy Road - Bus Station, Stand 25 (Preston)	26	36.44	103	102.44	0.56	-0.5%	Pass
125	Stagecoach Merseyside and South Lancashire	nr Ivy Road - by Chapel Street (Chorley)	22	17.82	47	54.00	-7.00	14.9%	Pass
125	Stagecoach Merseyside and South Lancashire	nr Ivy Road - Bus Station, Stand 25 (Preston)	60	35.69	79	80.60	-1.60	2.0%	Pass
125	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - by Chapel Street (Chorley)	30	18.8	52	49.18	2.82	-5.4%	Pass
125	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - nr Ivy Road	20	41.09	97	95.48	1.52	-1.6%	Pass
125	Stagecoach Merseyside and South Lancashire	by Preston College Grounds (Preston) - by Leeson Avenue (Chorley)	180	28.1	78	78.91	-0.91	1.2%	Pass
125	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - nr Ivy Road	180	40.66	81	83.45	-2.45	3.0%	Pass
125	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - by Chapel Street (Chorley)	180	18.36	40	41.57	-1.57	3.9%	Pass
1A	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	16	8.91	30	29.98	0.02	-0.1%	Pass
1	Stagecoach Merseyside and South Lancashire	opp Post Office (Ribble Valley) - Bus Station, Stand 25 (Preston)	11	14.4	31	33.99	-2.99	9.7%	Pass
1	Stagecoach Merseyside and South Lancashire	Lava Ignite, Stand G (Preston) - by Park and Ride (South Ribble)	11	3.14	7	7.00	0.00	0.0%	Pass
1	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - opp Post Office (Ribble Valley)	12	14.1	34	36.24	-2.24	6.6%	Pass
1	Stagecoach Merseyside and South Lancashire	by Park and Ride (South Ribble) - Lava Ignite, Stand G (Preston)	11	2.95	7	7.00	0.00	0.0%	Pass
280	Stagecoach Merseyside and South Lancashire	by White Bull (Ribble Valley) - Arrival Stand, Stand 0 (Preston)	180	72.43	84	112.63	-28.63	34.1%	Fail
280	Stagecoach Merseyside and South Lancashire	adj Sulphur Well Houses (Craven) - Arrival Stand, Stand 0 (Preston)	180	145.15	103	200.13	-97.13	94.3%	Fail
280	Stagecoach Merseyside and South Lancashire	Market Place, Stand A (Ribble Valley) - Arrival Stand, Stand 0 (Preston)	180	28.71	53	52.18	0.82	-1.5%	Pass
280	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - Market Place, Stand A (Ribble Valley)	90	31.07	51	42.01	8.99	-17.6%	Fail
280	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - by White Bull (Ribble Valley)	180	72.79	87	104.44	-17.44	20.1%	Fail

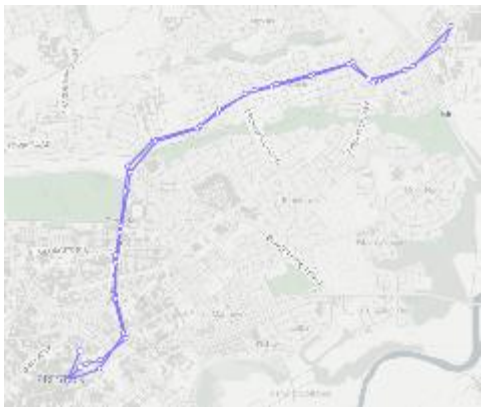
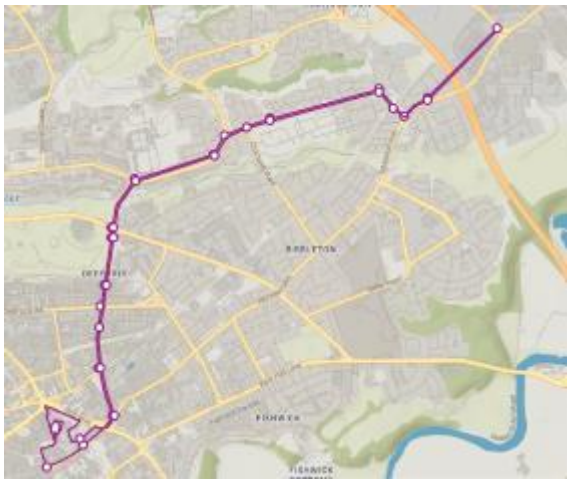
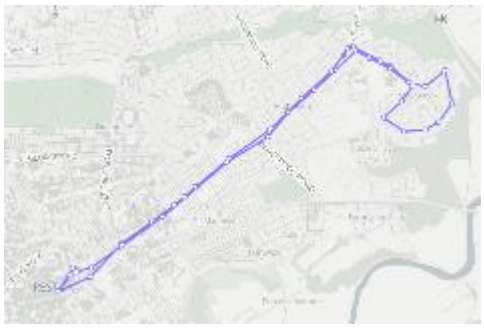
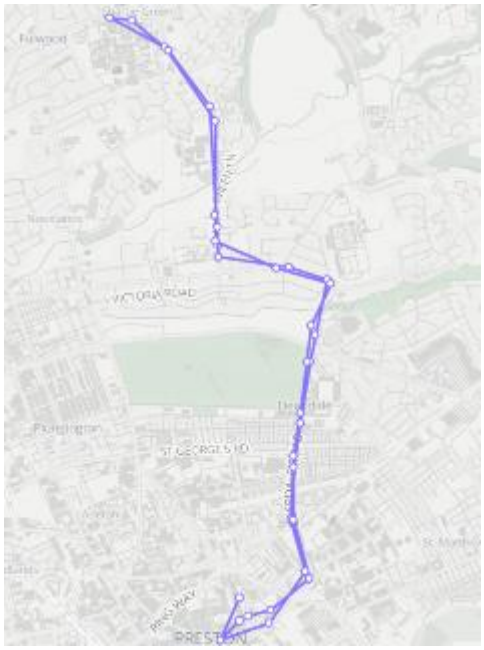
PM Peak									
Route No	Operator	Bus Line Description	Headway [min]	Length [km]	Observed JT [min]	Modelled JT [min]	Diff [min]	Diff [%]	Pass/Fail
2A	Stagecoach Merseyside and South Lancashire	Adjacent Green Lane (Sefton) - Bus Station, Stand 25 (Preston)	60	28.75	74	79.33	-5.33	7.2%	Pass
2A	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - Adjacent Green Lane (Sefton)	90	27.22	74	71.47	2.53	-3.4%	Pass
2	Stagecoach Merseyside and South Lancashire	Adjacent Wennington Road (Southport) - Bus Station, Stand 25 (Preston)	45	30.53	75	81.33	-6.33	8.4%	Pass
2	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - Adjacent Wennington Road (Southport)	45	29.78	77	73.40	3.60	-4.7%	Pass
2	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - by Chapel Road (West Lancashire)	90	15.9	50	49.09	0.91	-1.8%	Pass
3	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	11	11.44	48	48.98	-0.98	2.0%	Pass
4C	Stagecoach Merseyside and South Lancashire	by Preston College Grounds (Preston) - Bus Station, Stand 25 (Preston)	90	4.06	15	15.00	0.00	0.0%	Pass
4C	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - by Preston College Grounds (Preston)	180	5.7	15	15.00	0.00	0.0%	Pass
4	Stagecoach Merseyside and South Lancashire	by Kirklands Estate (Ribble Valley) - Bus Station, Stand 25 (Preston)	180	38.93	76	75.99	0.01	0.0%	Pass
4	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - by Kirklands Estate (Ribble Valley)	180	38.93	78	81.66	-3.66	4.7%	Pass
59	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 6 (Blackburn) - Bus Station, Stand 25 (Preston)	26	18.43	32	38.44	-6.44	20.1%	Fail
59	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - Bus Station, Stand 6 (Blackburn)	30	17.97	38	29.10	8.90	-23.4%	Fail
59	Stagecoach Merseyside and South Lancashire	by Preston College Grounds (Preston) - opp War Memorial (Hyndburn)	180	43.19	100	130.45	-30.45	30.4%	Fail
61	Stagecoach Merseyside and South Lancashire	Bispham Roundabout, Stop 2 (Blackpool) - Bus Station, Stand 25 (Preston)	36	29.98	67	74.15	-7.15	10.7%	Pass
61	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - Bispham Roundabout, Stop 2 (Blackpool)	36	29.85	72	72.07	-0.07	0.1%	Pass
61	Stagecoach Merseyside and South Lancashire	by Preston College Grounds (Preston) - o/s Grapes Hotel (Fylde)	180	18.71	47	46.24	0.76	-1.6%	Pass
68	Stagecoach Merseyside and South Lancashire	Market Street, Stop MA4 (Blackpool) - Bus Station, Stand 25 (Preston)	16	38.27	85	77.38	7.62	-9.0%	Pass
68	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - Market Street, Stop MA4 (Blackpool)	22	37.9	86	85.06	0.94	-1.1%	Pass
68	Stagecoach Merseyside and South Lancashire	by Preston College Grounds (Preston) - Market Street, Stop MA4 (Blackpool)	180	38.61	94	89.64	4.36	-4.6%	Pass
9	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - Bus Station, Stand 25 (Preston)	22	9.58	34	36.81	-2.81	8.3%	Pass
X2	Stagecoach Merseyside and South Lancashire	Opposite Croxteth Road (Bootle) - Arrival Stand, Stand 0 (Preston)	36	60.36	130	140.82	-10.82	8.3%	Pass
X2	Stagecoach Merseyside and South Lancashire	Bus Station, Stand 25 (Preston) - Opposite Croxteth Road (Bootle)	36	59.83	132	137.68	-5.68	4.3%	Pass

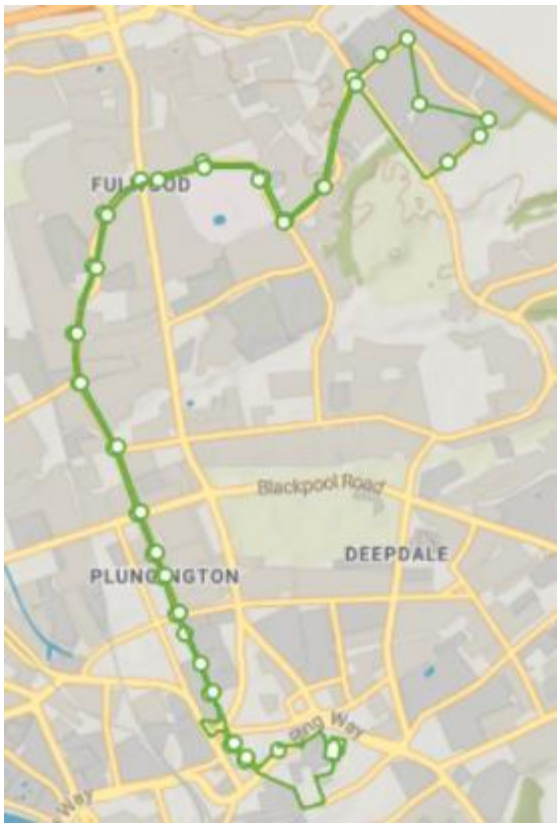
Appendix D – Bus Route Validation

This appendix summarises the bus routes considered in the Central Lancashire Public Transport Model validation. Routes for comparison were taken from bustimes.org website which uses Traveline National Dataset (TNDS).

Route, operator	From bustimes.org website	CLTM Model
1 **Stagecoach**		
1A **Stagecoach**		

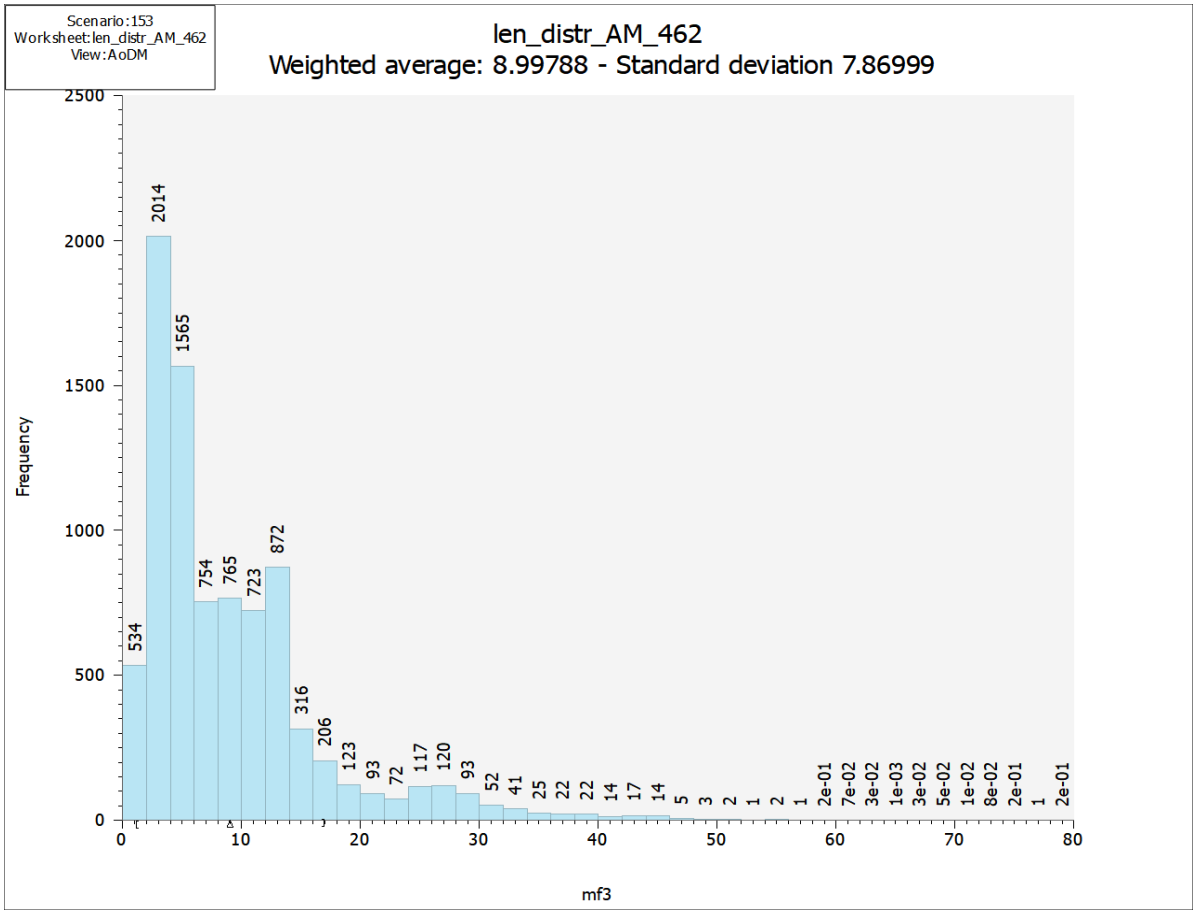
Route, operator	From bustimes.org website	CLTM Model
3 **Stagecoach**		
111 **Stagecoach**		

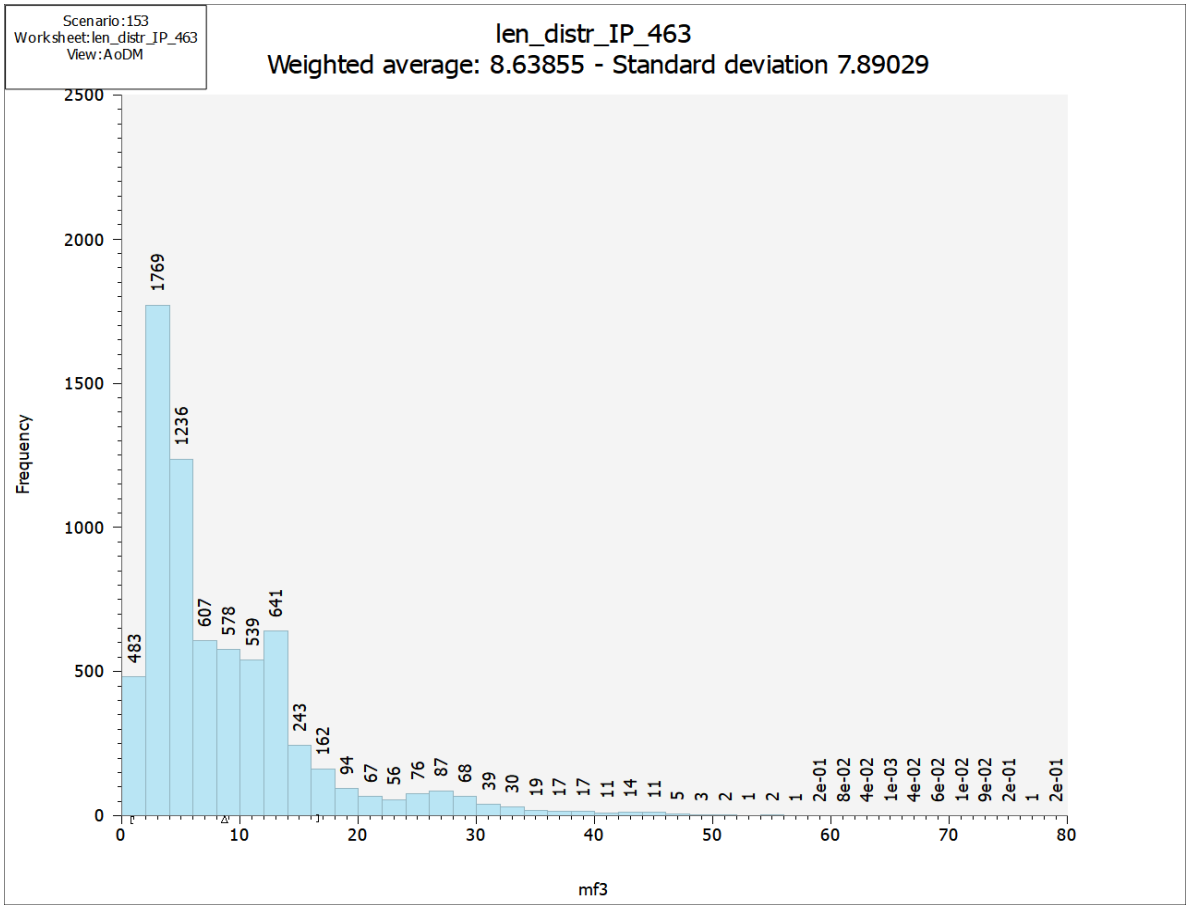
Route, operator	From bustimes.org website	CLTM Model
6 **Preston Bus**		
8 **Preston Bus**		
19 **Preston Bus**		

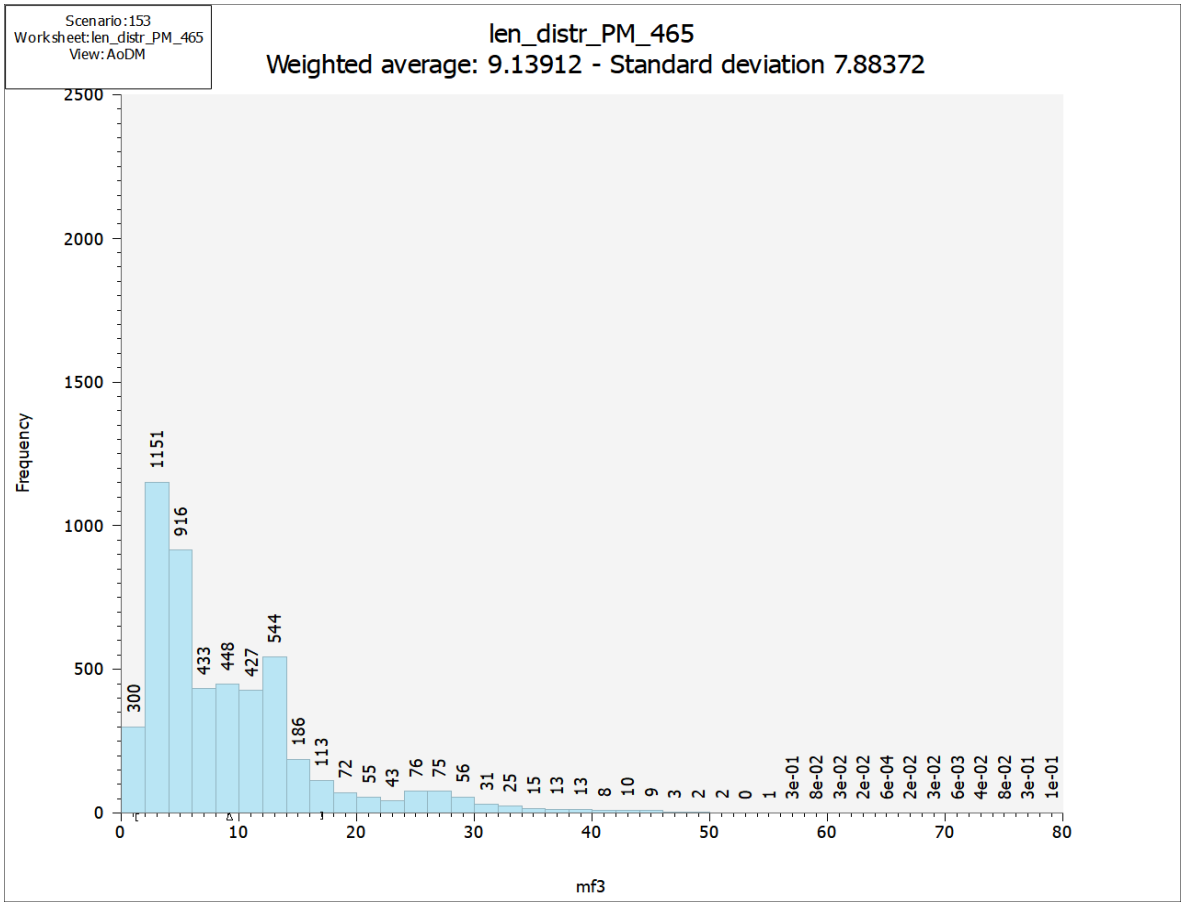
Route, operator	From bustimes.org website	CLTM Model
23 **Preston Bus**		
35 **Preston Bus**		

Appendix H. Appendix E – Matrix Estimation Changes

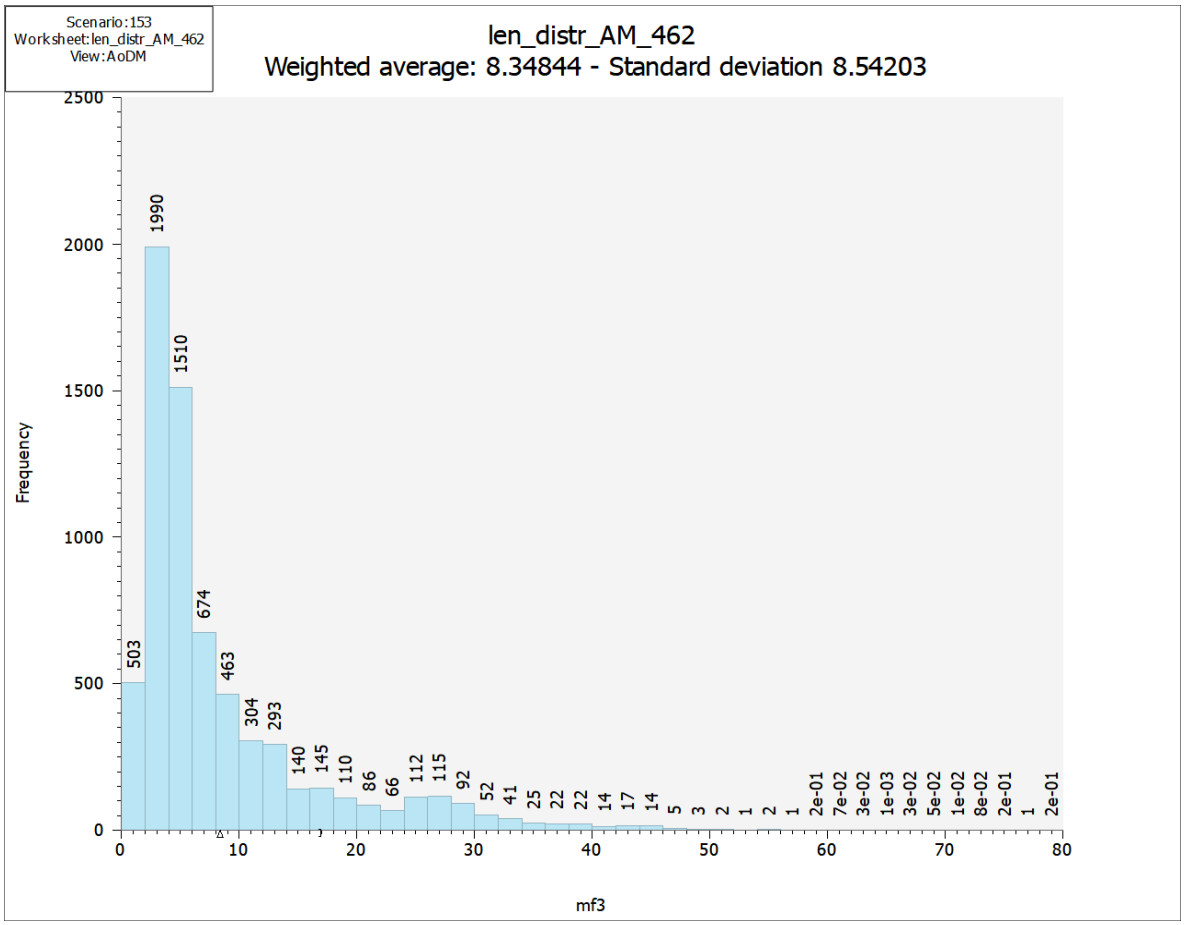
Prior Matrix Trip Length Distributions

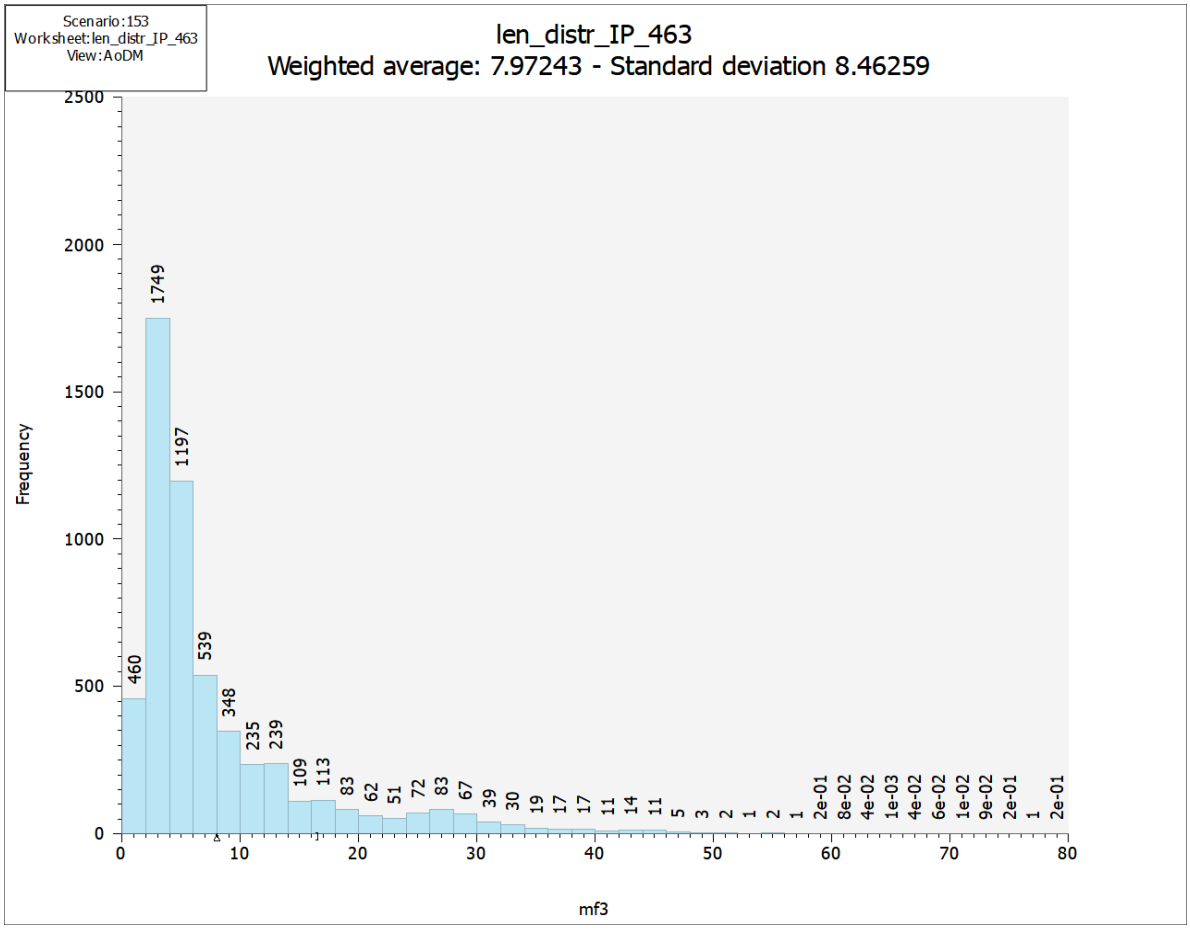



Scenario:153
Worksheet:len_distr_IP_463
View:AoDM
len_distr_IP_463
Weighted average: 8.63855 - Standard deviation 7.89029
Frequency
mf3
0
500
1000
1500
2000
2500
0
10
20
30
40
50
60
70
80
483
1769
1236
607
578
539
641
243
162
94
67
56
76
87
68
39
30
19
17
17
11
14
11
5
3
2
1
2
1
2e-01
8e-02
4e-02
1e-03
4e-02
6e-02
1e-02
9e-02
2e-01
1
2e-01


Scenario:153
Worksheet:len_distr_PM_465
View:AoDM
len_distr_PM_465
Weighted average: 9.13912 - Standard deviation 7.88372
Frequency
mf3
0
500
1000
1500
2000
2500
0
10
20
30
40
50
60
70
80
300
1151
916
433
448
427
544
186
113
72
55
43
76
75
56
31
25
15
13
13
8
10
9
3
2
2
0
1
3e-01
8e-02
3e-02
2e-02
6e-04
2e-02
3e-02
6e-03
4e-02
8e-02
3e-01
1e-01

Prior Matrix Trip Length Distributions – excluding Blackburn and Wigan trips




Scenario:153
Worksheet:len_distr_IP_463
View:AoDM
len_distr_IP_463
Weighted average: 7.97243 - Standard deviation 8.46259
Frequency
mf3
2500
2000
1500
1000
500
0
0
10
20
30
40
50
60
70
80
460
1749
1197
539
348
235
239
109
113
83
62
51
72
83
67
39
30
19
17
17
11
14
11
5
3
2
1
2
1
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1e-03
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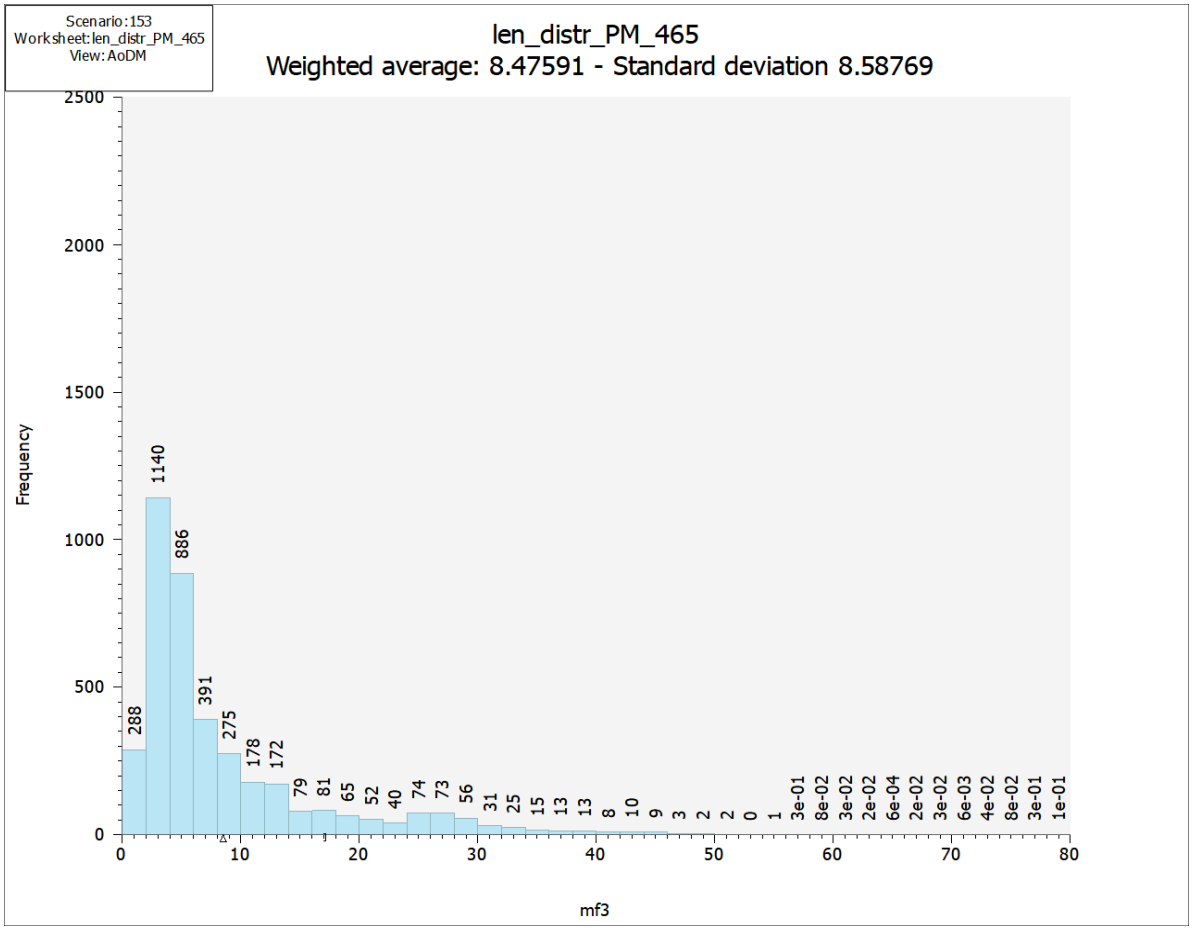
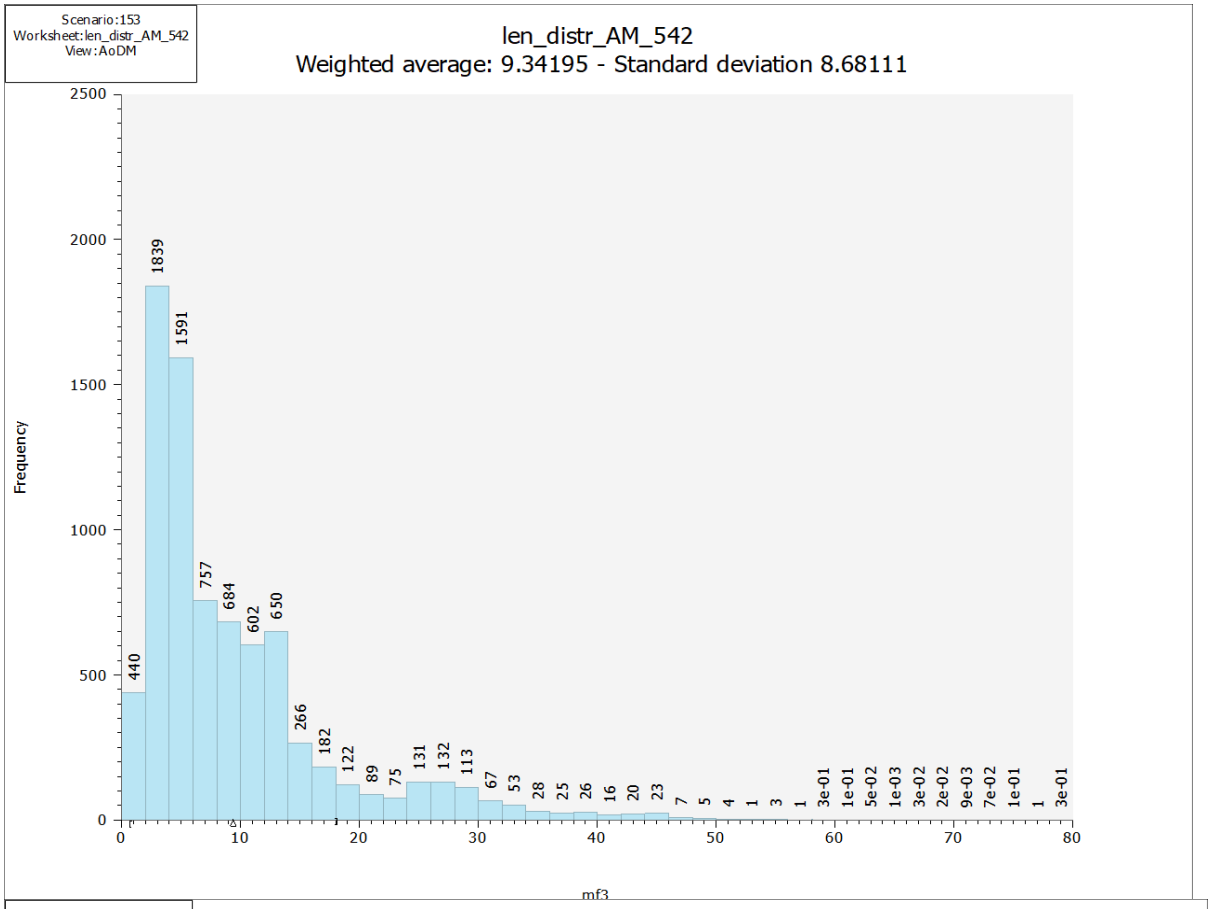
6e-02
1e-02
9e-02
2e-01
1
2e-01



Post Matrix Trip Length Distributions


Scenario:153
Worksheet:len_distr_AM_542
View:AoDM
len_distr_AM_542
Weighted average: 9.34195 - Standard deviation 8.68111
Frequency
mf3
440
1839
1591
757
684
602
650
266
182
122
89
75
131
132
113
67
53
28
25
26
16
20
23
7
5
4
1
3
1
3e-01
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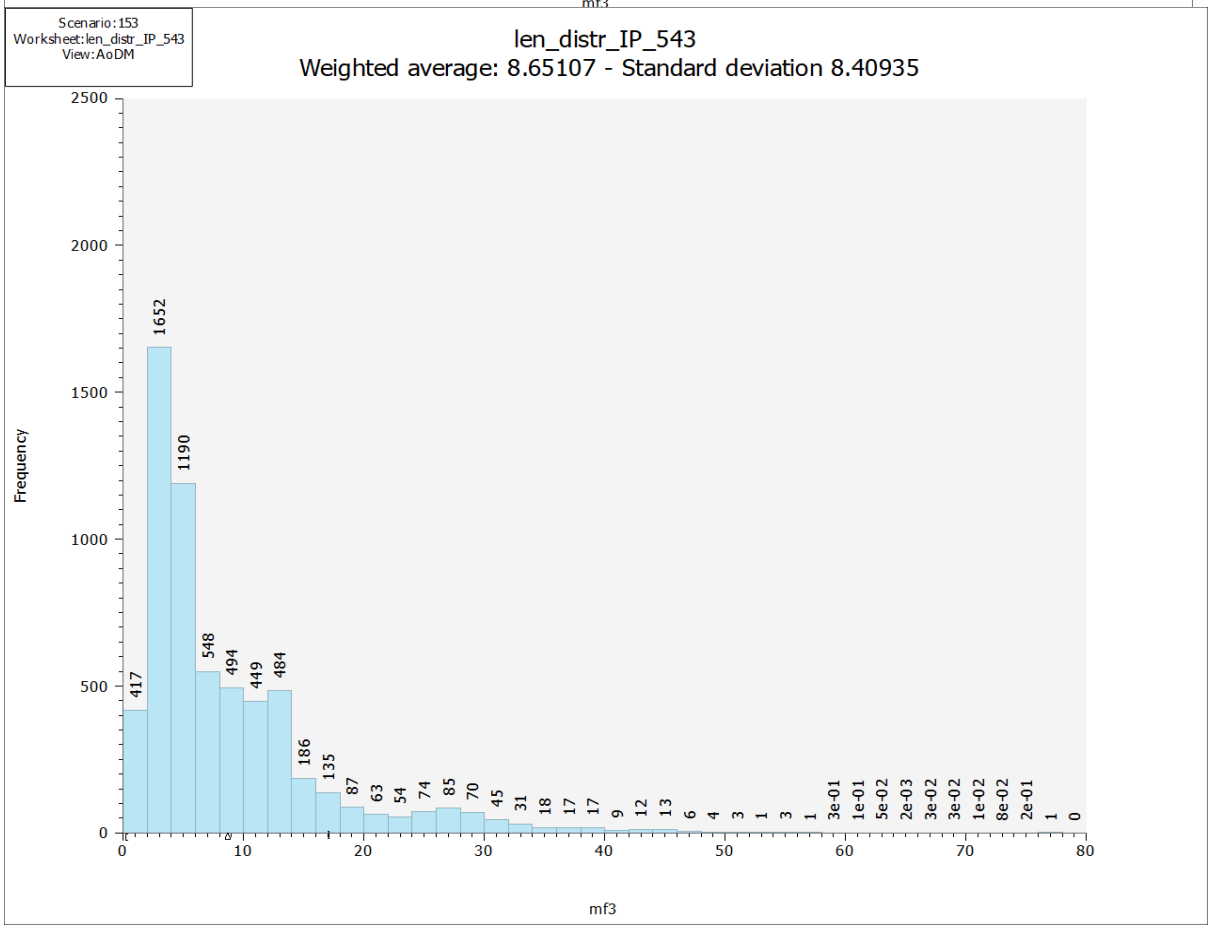
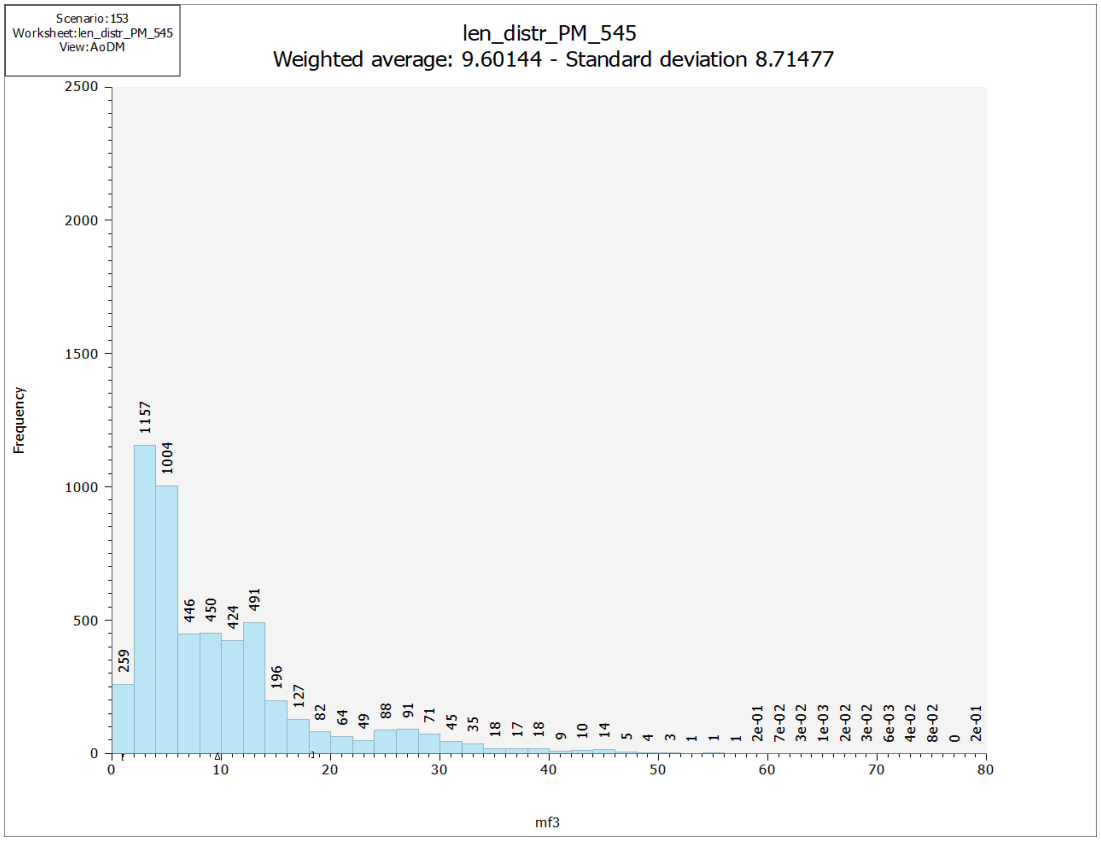
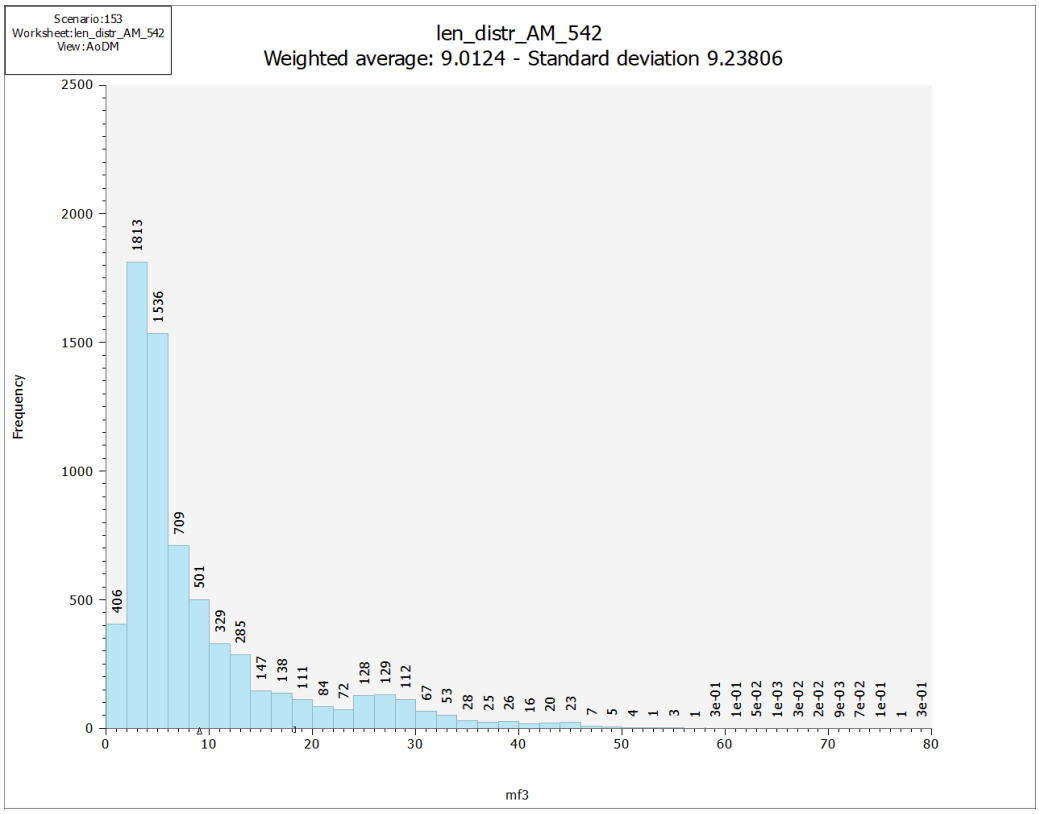
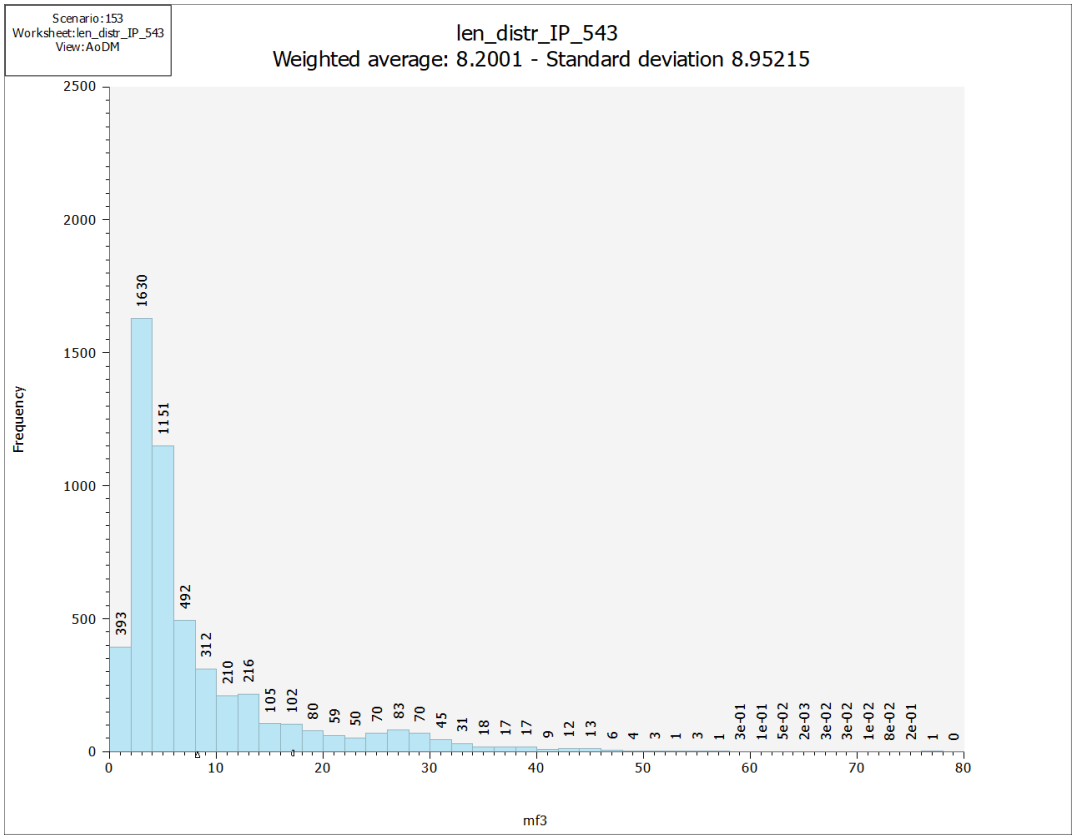
9e-03
7e-02
1e-01
1
3e-01

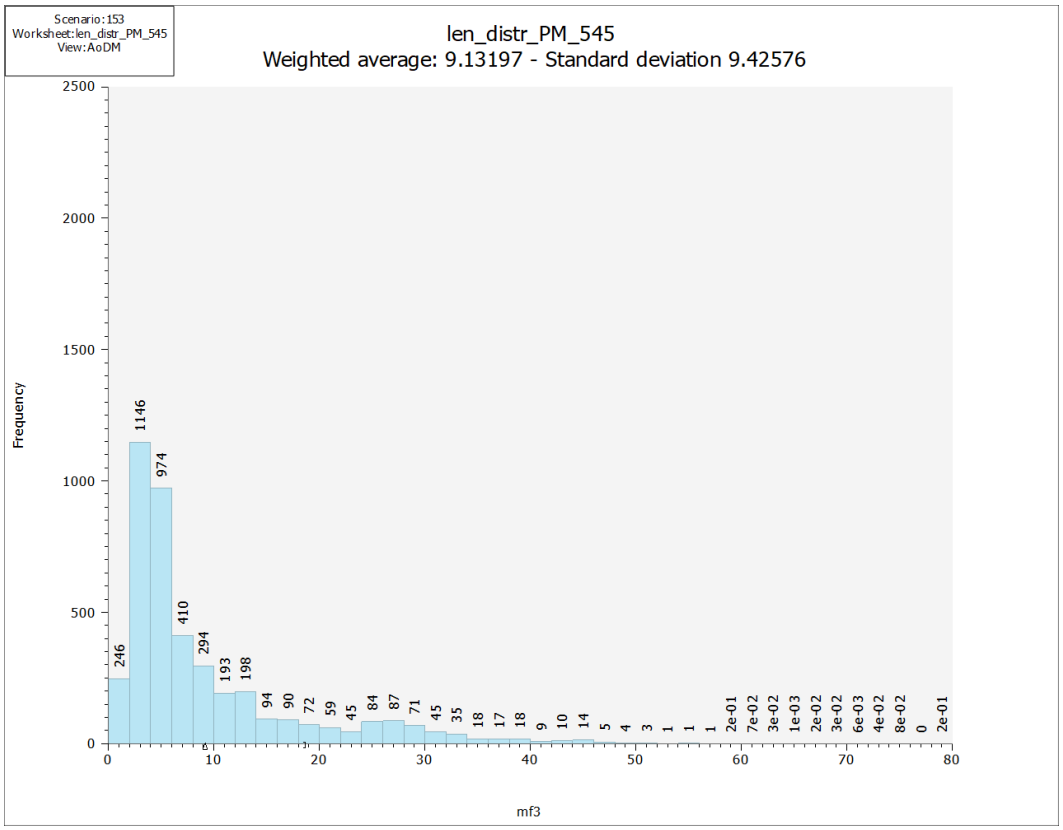

Scenario:153
Worksheet:len_distr_IP_543
View:AoDM
len_distr_IP_543
Weighted average: 8.65107 - Standard deviation 8.40935
Frequency
mf3
417
1652
1190
548
494
449
484
186
135
87
63
54
74
85
70
45
31
18
17
17
9
12
13
6
4
3
1
3
1
3e-01
1e-01
5e-02
2e-03
3e-02
3e-02
1e-02
8e-02
2e-01
1
0



Post Matrix Trip Length Distributions – excluding Blackburn and Wigan trips

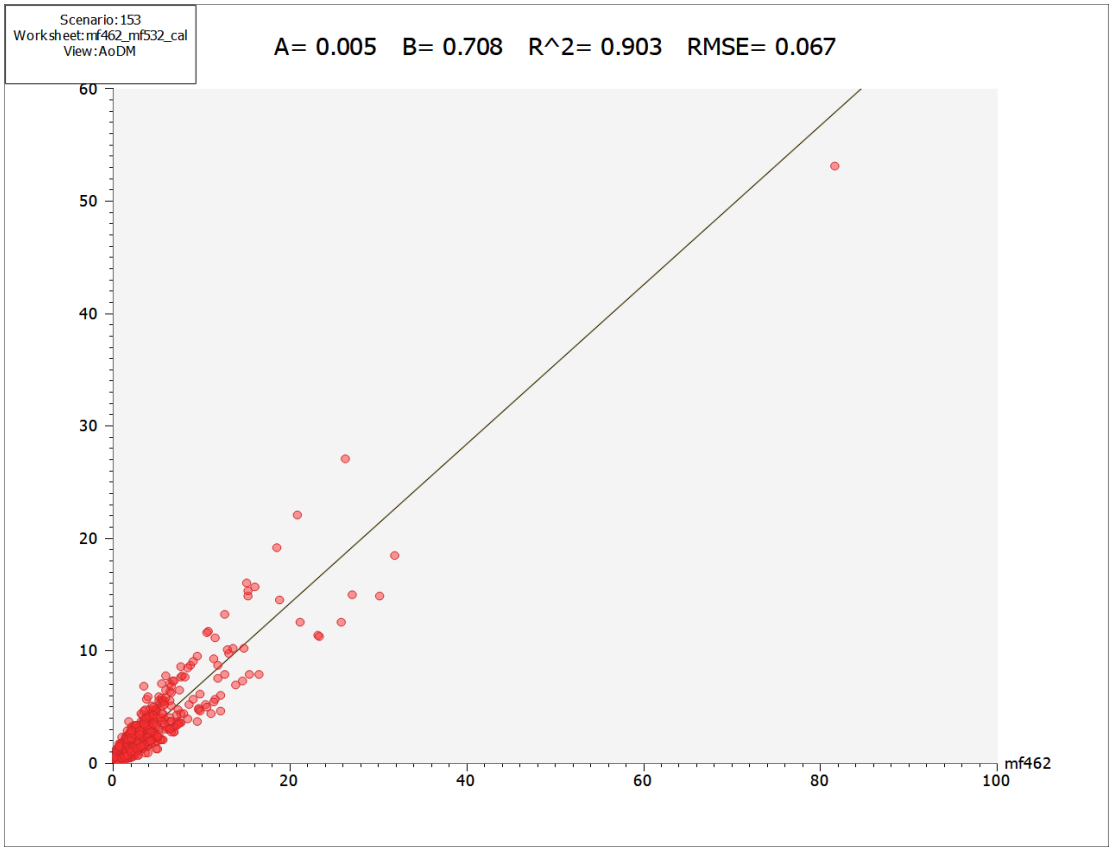



Scenario:153
Worksheet:len_distr_IP_543
View:AoDM
len_distr_IP_543
Weighted average: 8.2001 - Standard deviation 8.95215
Frequency
mf3
393
1630
1151
492
312
210
216
105
102
80
59
50
70
83
70
45
31
18
17
17
9
12
13
6
4
3
1
3
1
3e-01
1e-01
5e-02
2e-03
3e-02
3e-02
1e-02
8e-02
2e-01
1
0

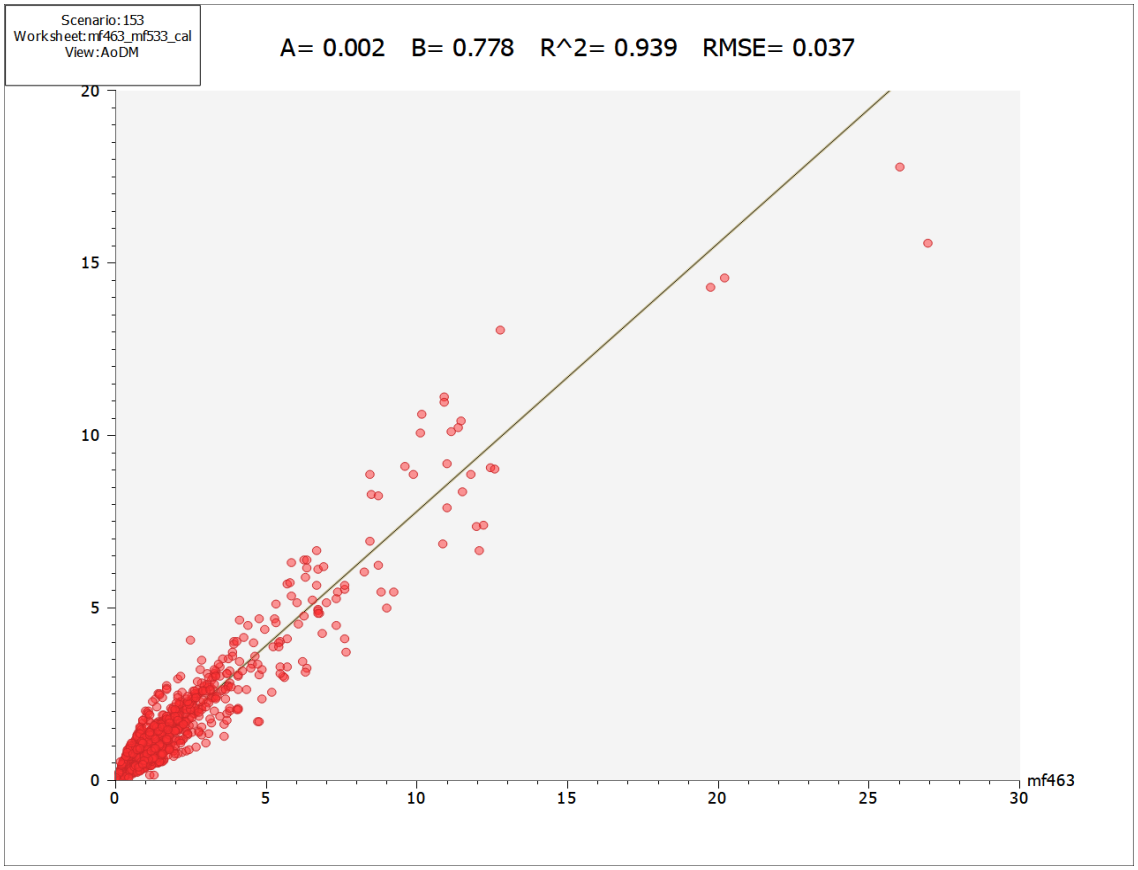

Scenario:153
Worksheet:len_distr_PM_545
View:AoDM
len_distr_PM_545
Weighted average: 9.13197 - Standard deviation 9.42576
Frequency
mf3
246
1146
974
410
294
193
198
94
90
72
59
45
84
87
71
45
35
18
17
18
9
10
14
5
4
3
1
1
1
2e-01
7e-02
3e-02
1e-03
2e-02
3e-02
6e-03
4e-02
8e-02
0
2e-01

Matrix Zonal Cell Values – Prior vs. Post

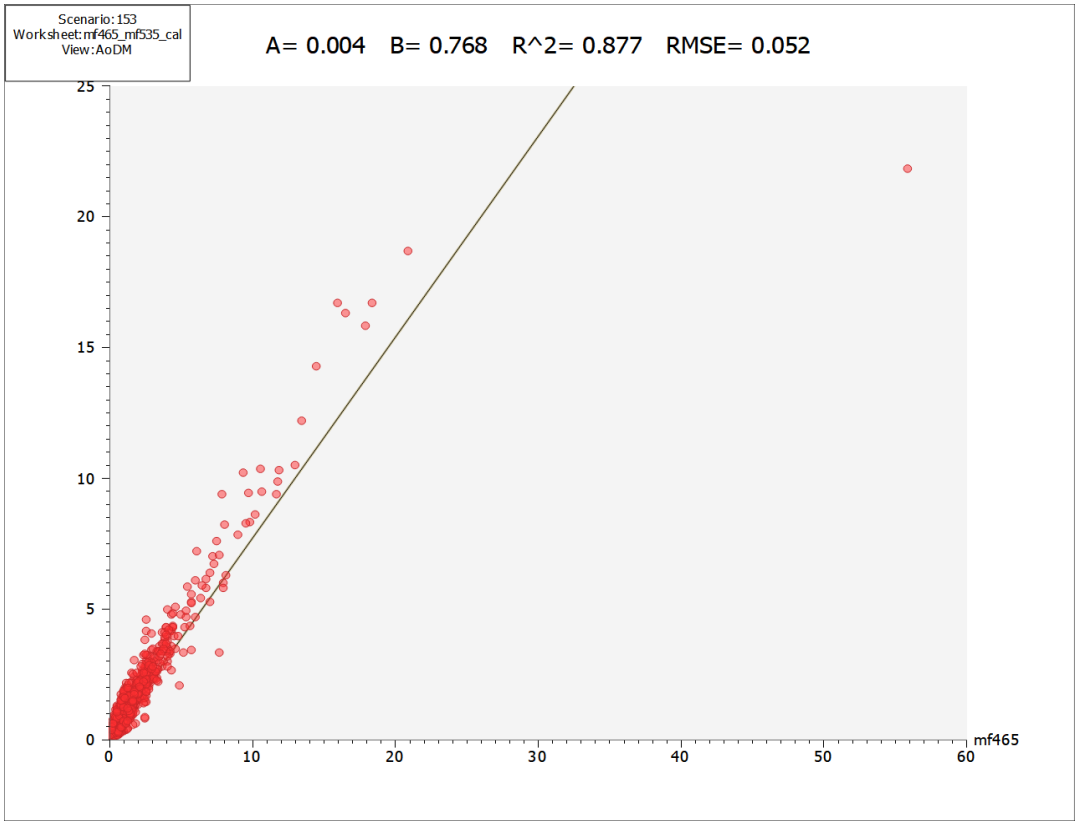
AM Peak



Inter-peak

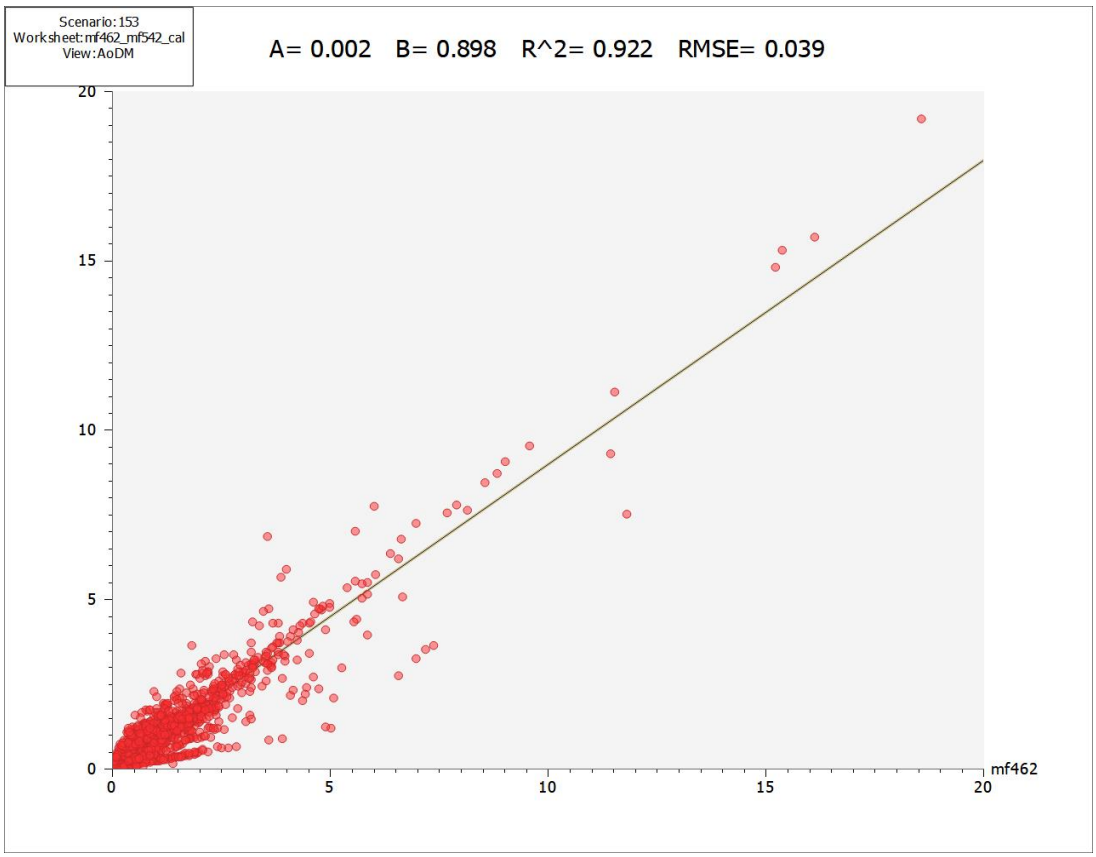

Scenario: 153
Worksheet: mf463_mf533_cal
View: AoDM
A= 0.002 B= 0.778 R^2= 0.939 RMSE= 0.037
20
15
10
5
0
0
5
10
15
20
25
30
mf463

PM Peak

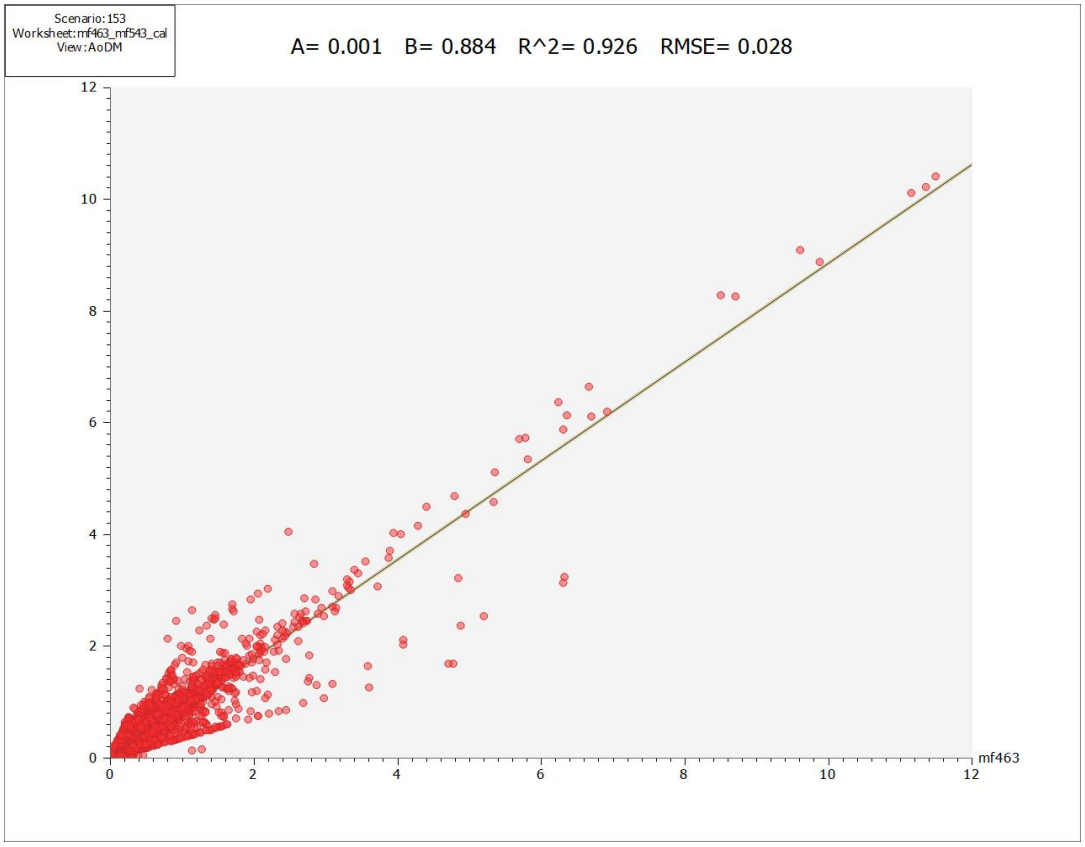


Matrix Zonal Cell Values – Prior vs. Post – Excluding Blackburn and Wigan Trips

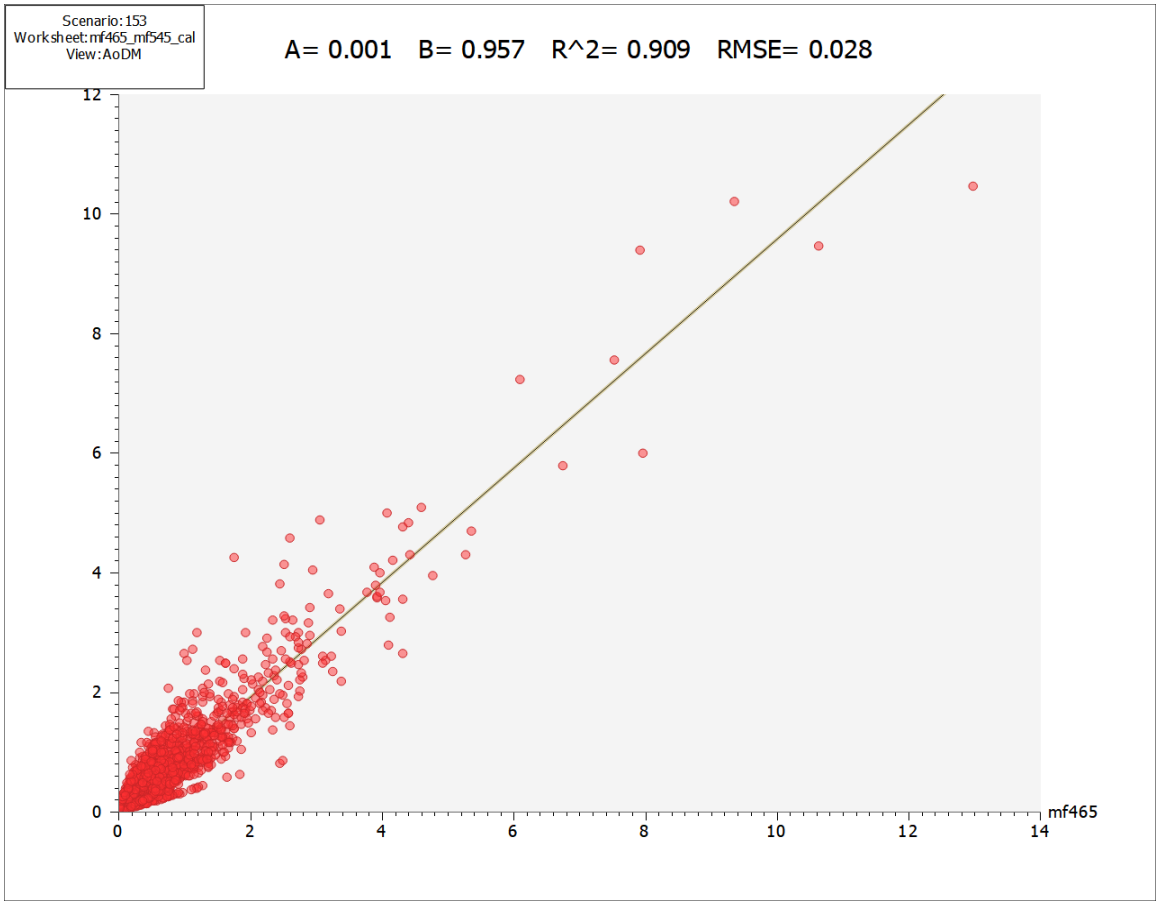
AM Peak



Inter-peak

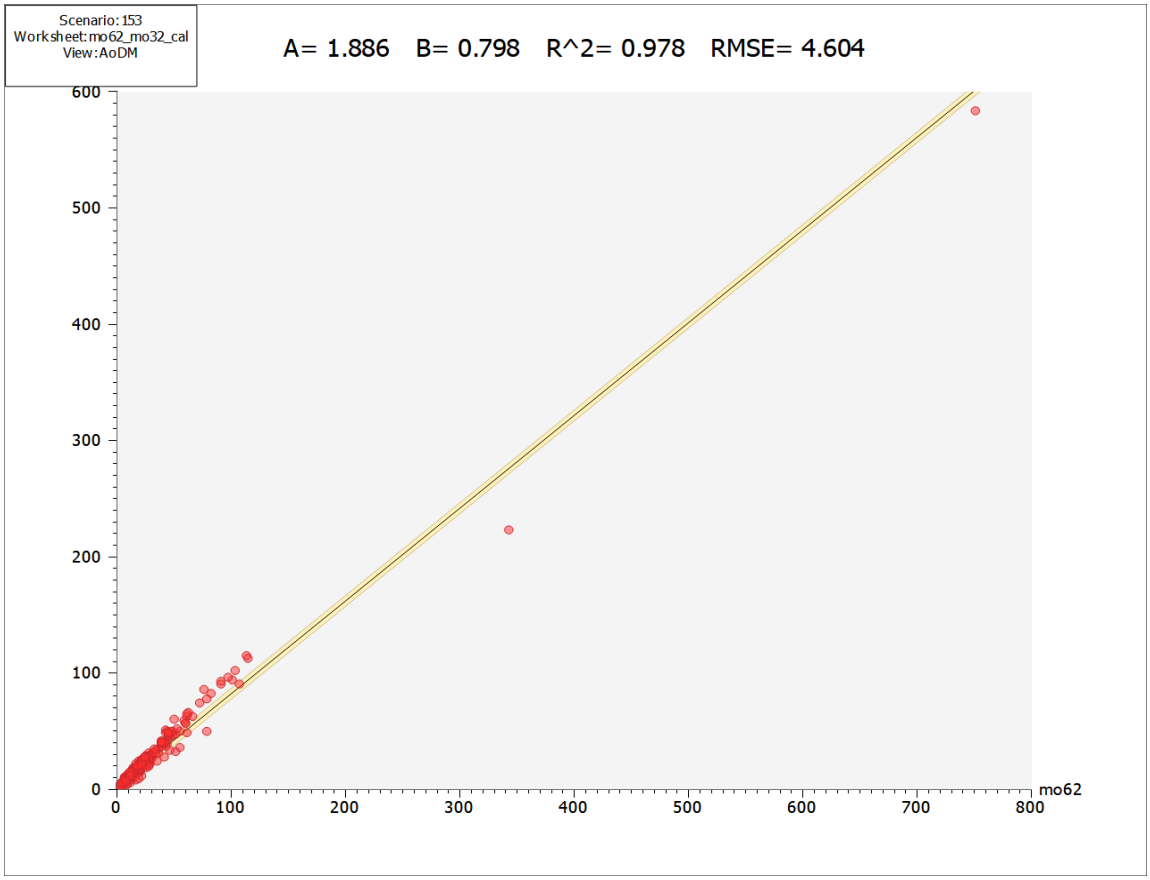


PM Peak

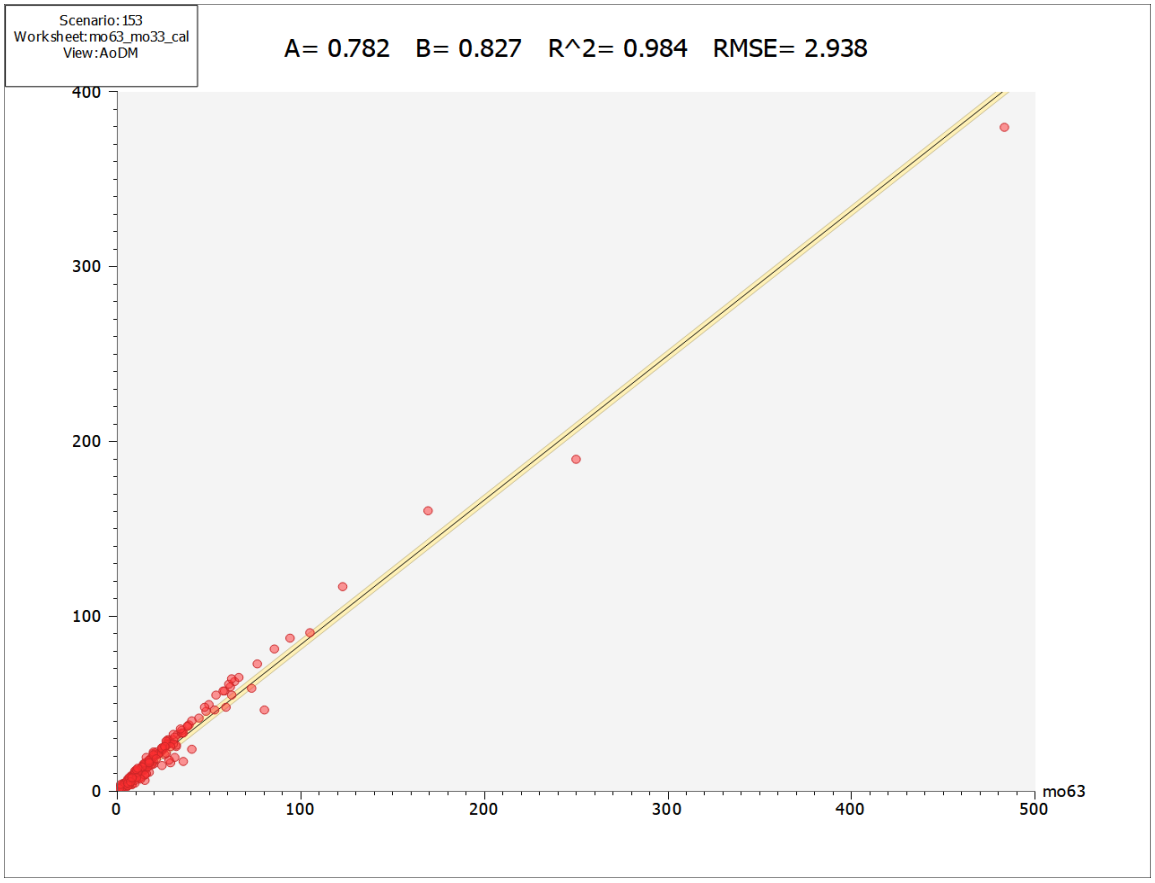

Scenario: 153
Worksheet: mf465_mf545_cal
View: AoDM
A= 0.001 B= 0.957 R^2= 0.909 RMSE= 0.028
12
10
8
6
4
2
0
0
2
4
6
8
10
12
14
mf465

Matrix Origins – Prior vs. Post

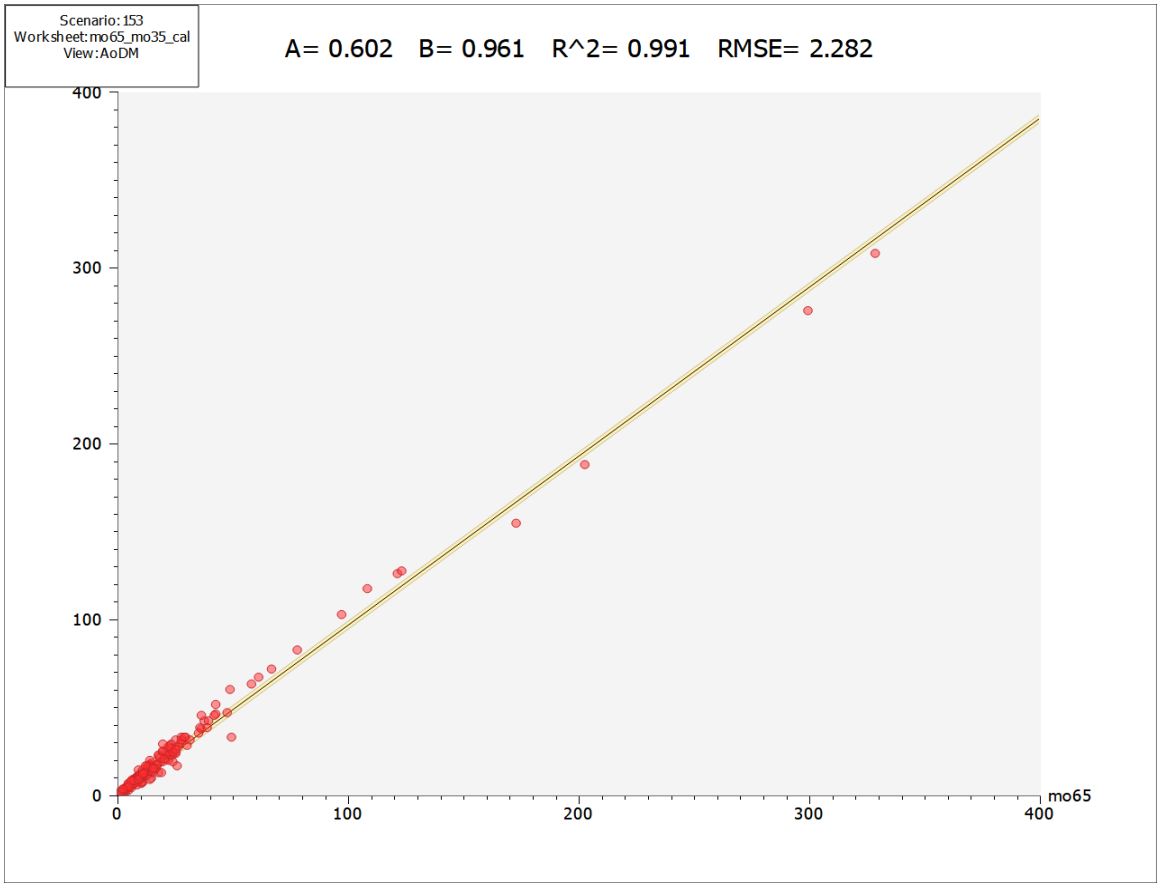
AM Peak



Inter-peak

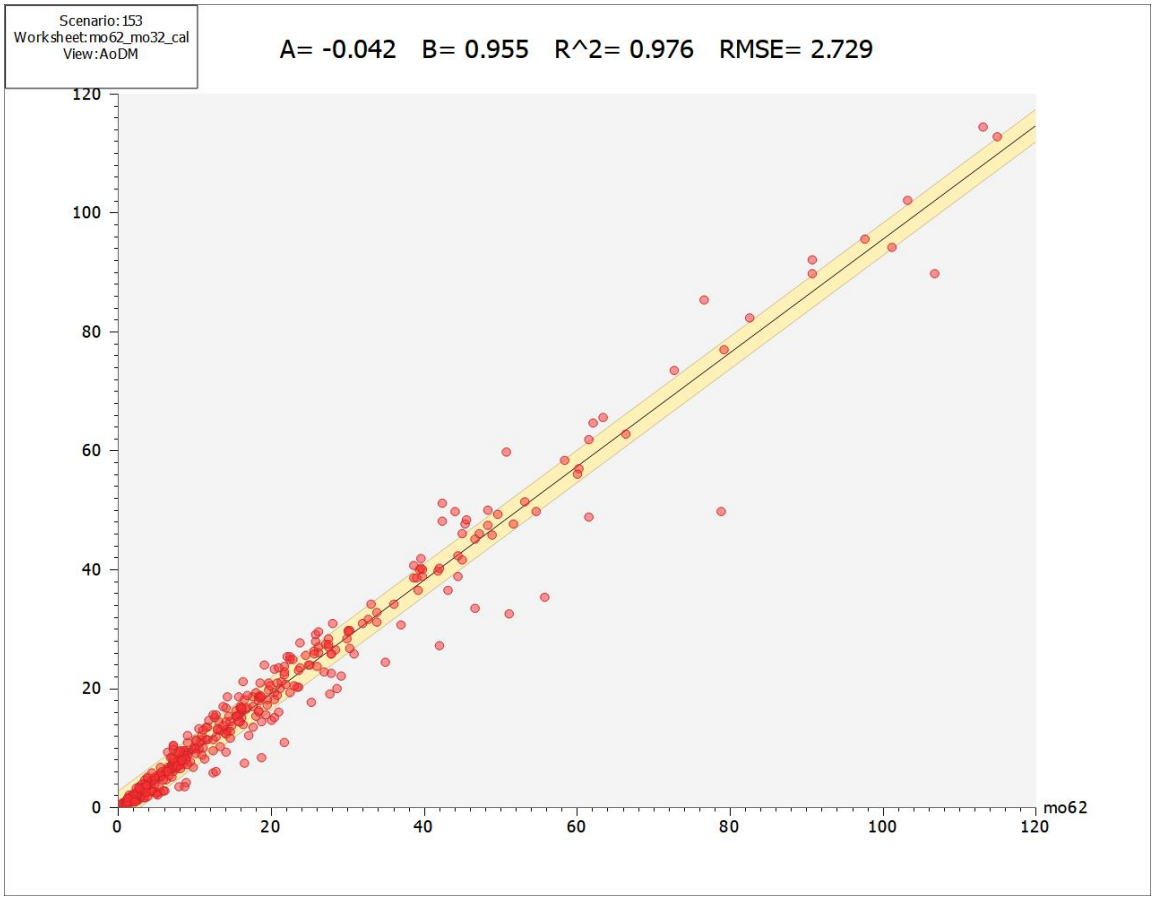

Scenario: 153
Worksheet: mo63_mo33_cal
View: AoDM
A= 0.782 B= 0.827 R^2= 0.984 RMSE= 2.938
400
300
200
100
0
0
100
200
300
400
500
mo63

PM Peak

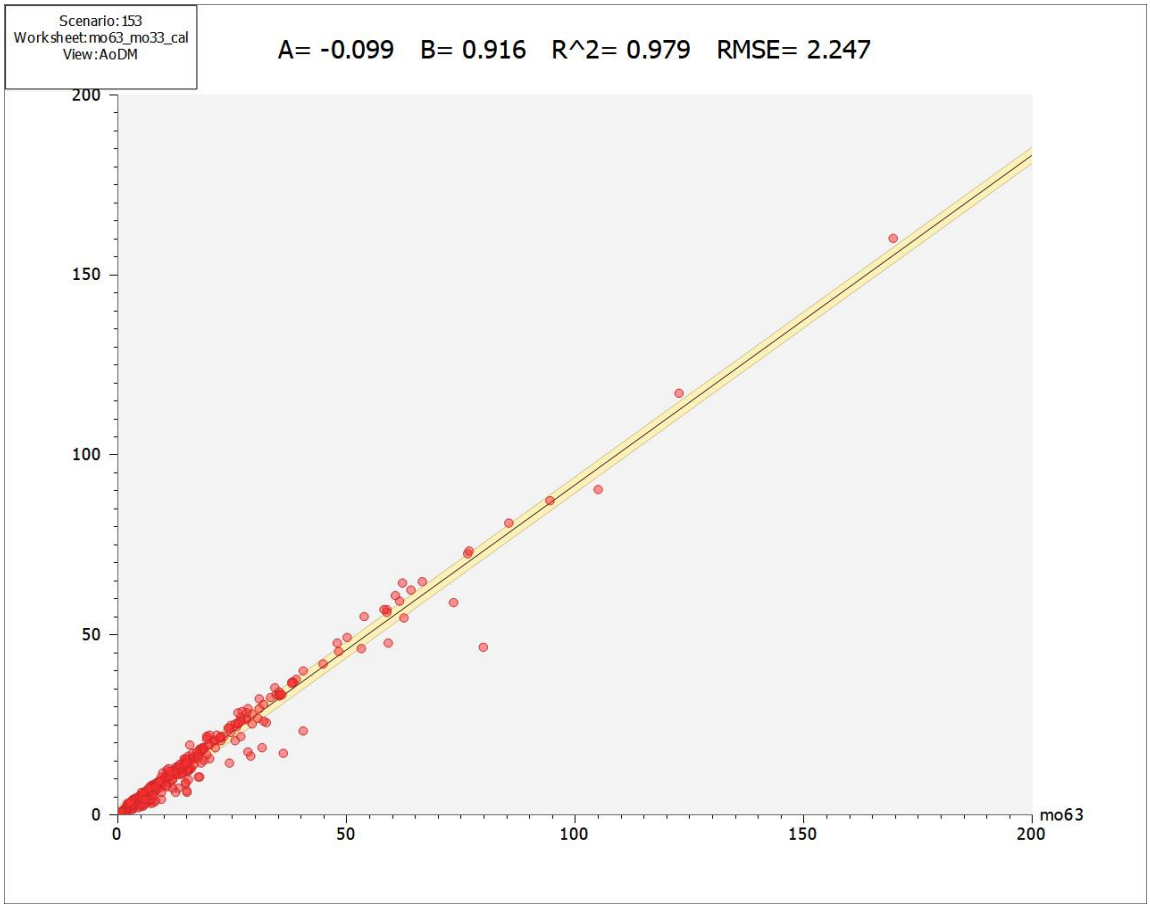


Matrix Origins – Prior vs. Post – Excluding Blackburn and Wigan Trips

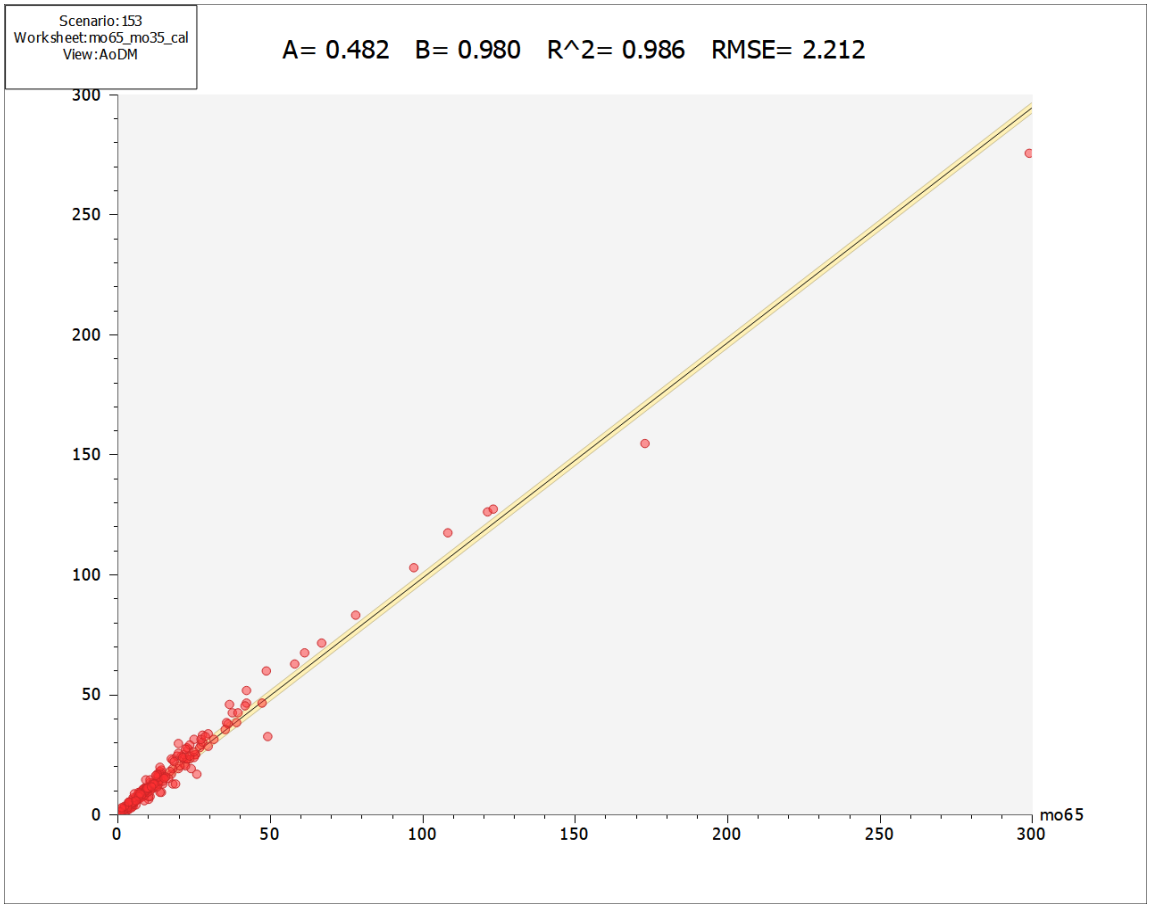
AM Peak


Scenario: 153
Worksheet: mo62_mo32_cal
View: AoDM
A= -0.042 B= 0.955 R^2= 0.976 RMSE= 2.729
120
100
80
60
40
20
0
0
20
40
60
80
100
120
mo62

Inter-peak

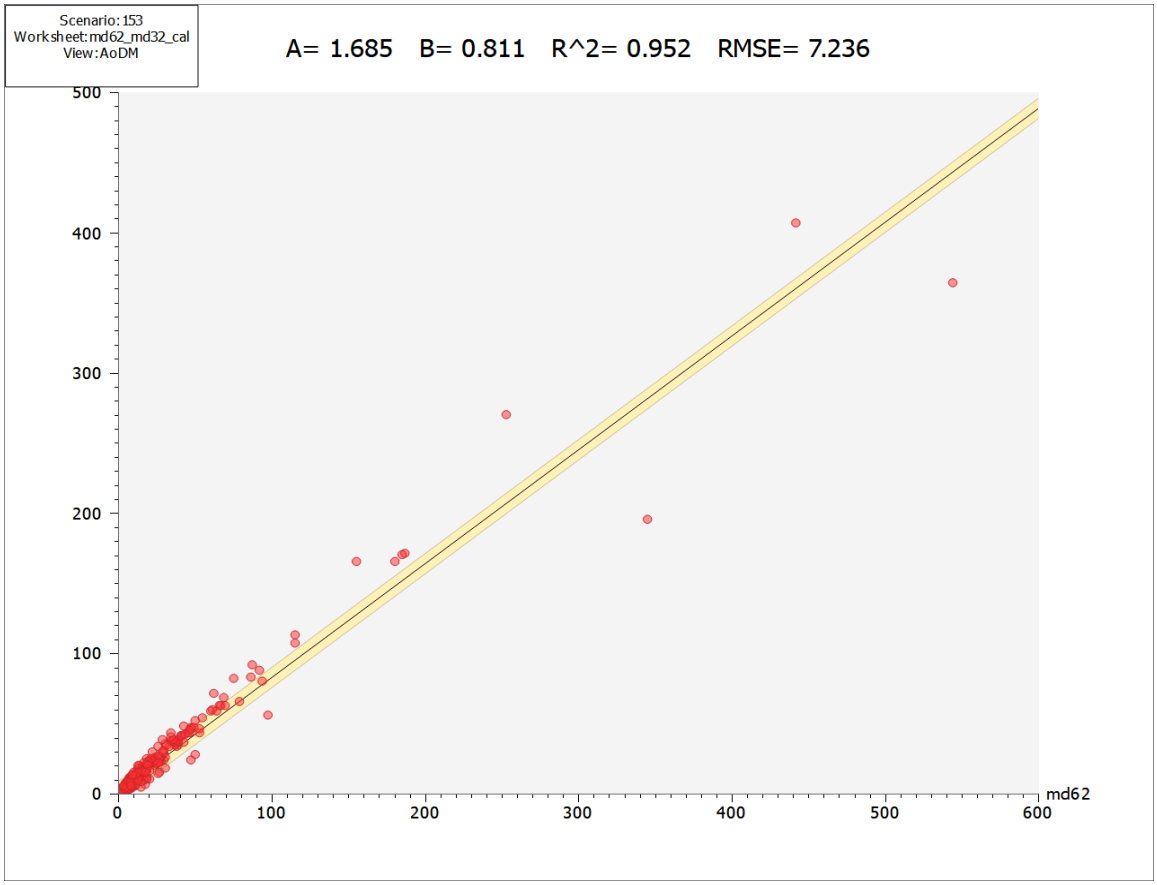

Scenario: 153
Worksheet: mo63_mo33_cal
View: AoDM
A= -0.099 B= 0.916 R^2= 0.979 RMSE= 2.247
200
150
100
50
0
0
50
100
150
200
mo63

PM Peak

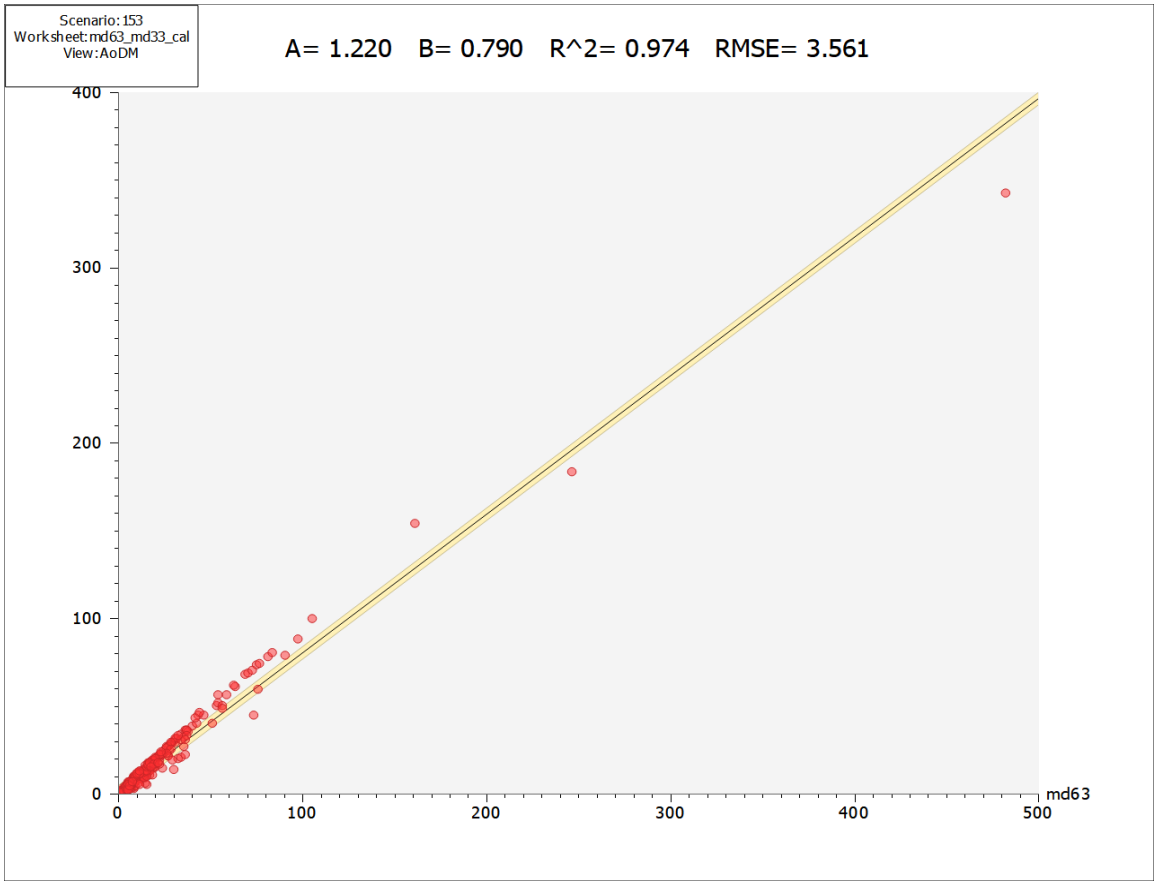

Scenario: 153
Worksheet: mo65_mo35_cal
View: AoDM
A= 0.482 B= 0.980 R^2= 0.986 RMSE= 2.212
300
250
200
150
100
50
0
0
50
100
150
200
250
300
mo65

Matrix Destinations – Prior vs. Post

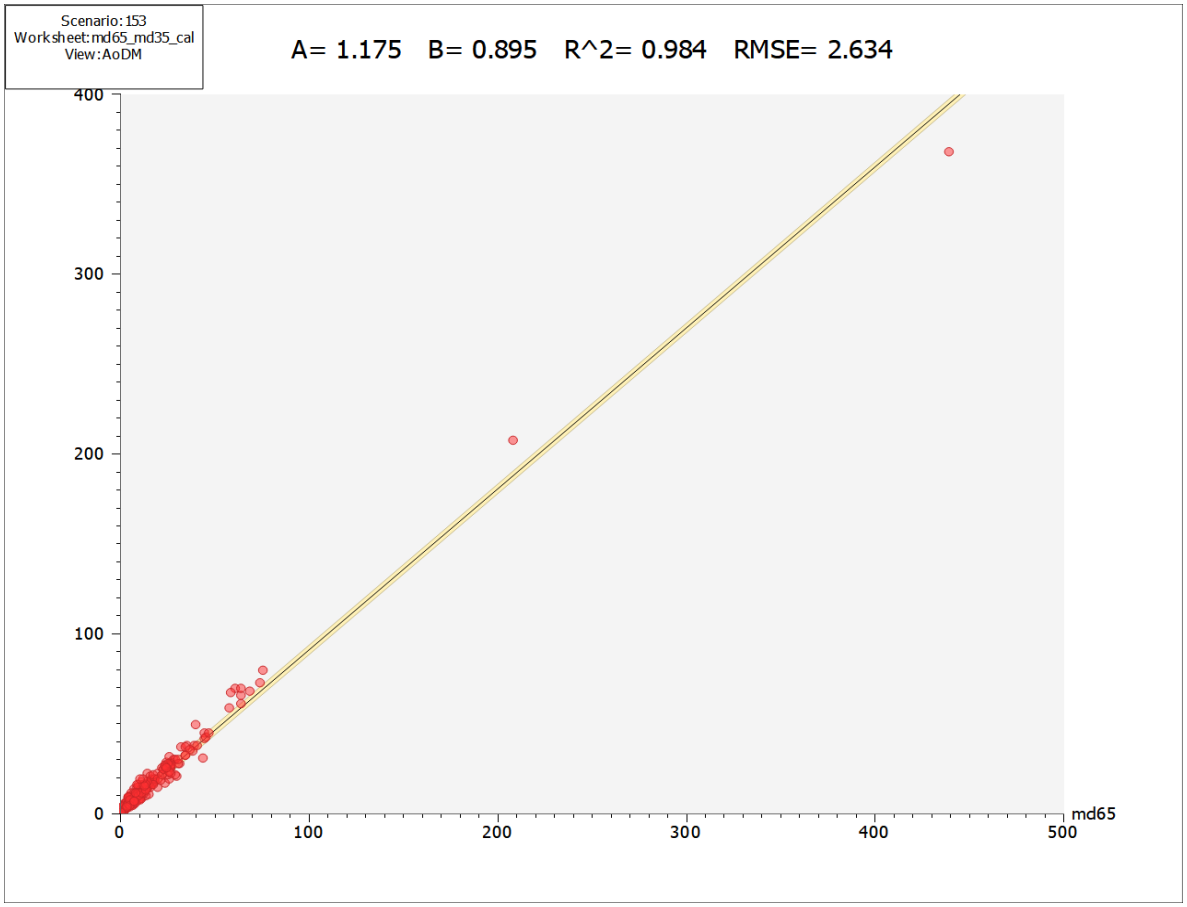
AM Peak



Inter-peak

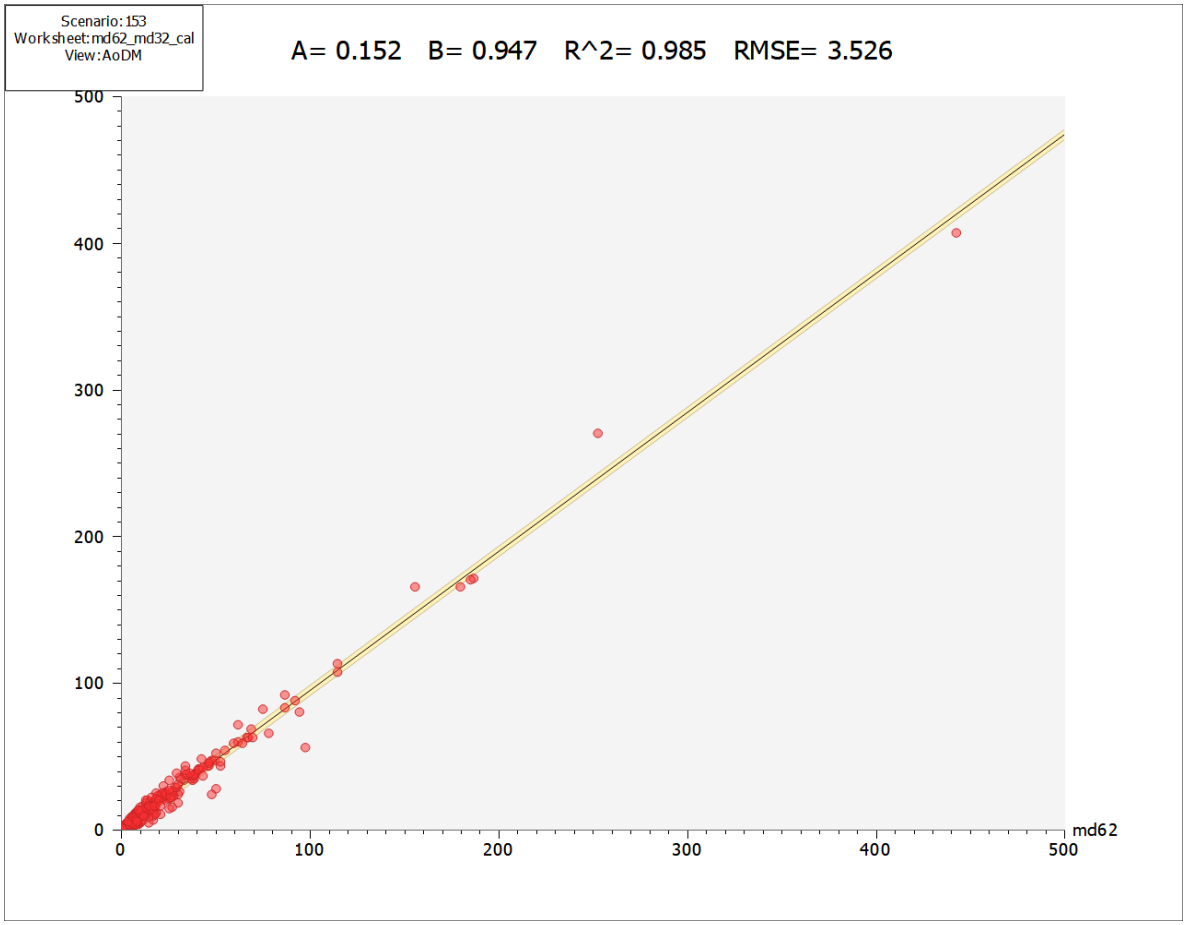

Scenario: 153
Worksheet: md63_md33_cal
View: AoDM
A= 1.220 B= 0.790 R^2= 0.974 RMSE= 3.561
400
300
200
100
0
0
100
200
300
400
500
md63

PM Peak

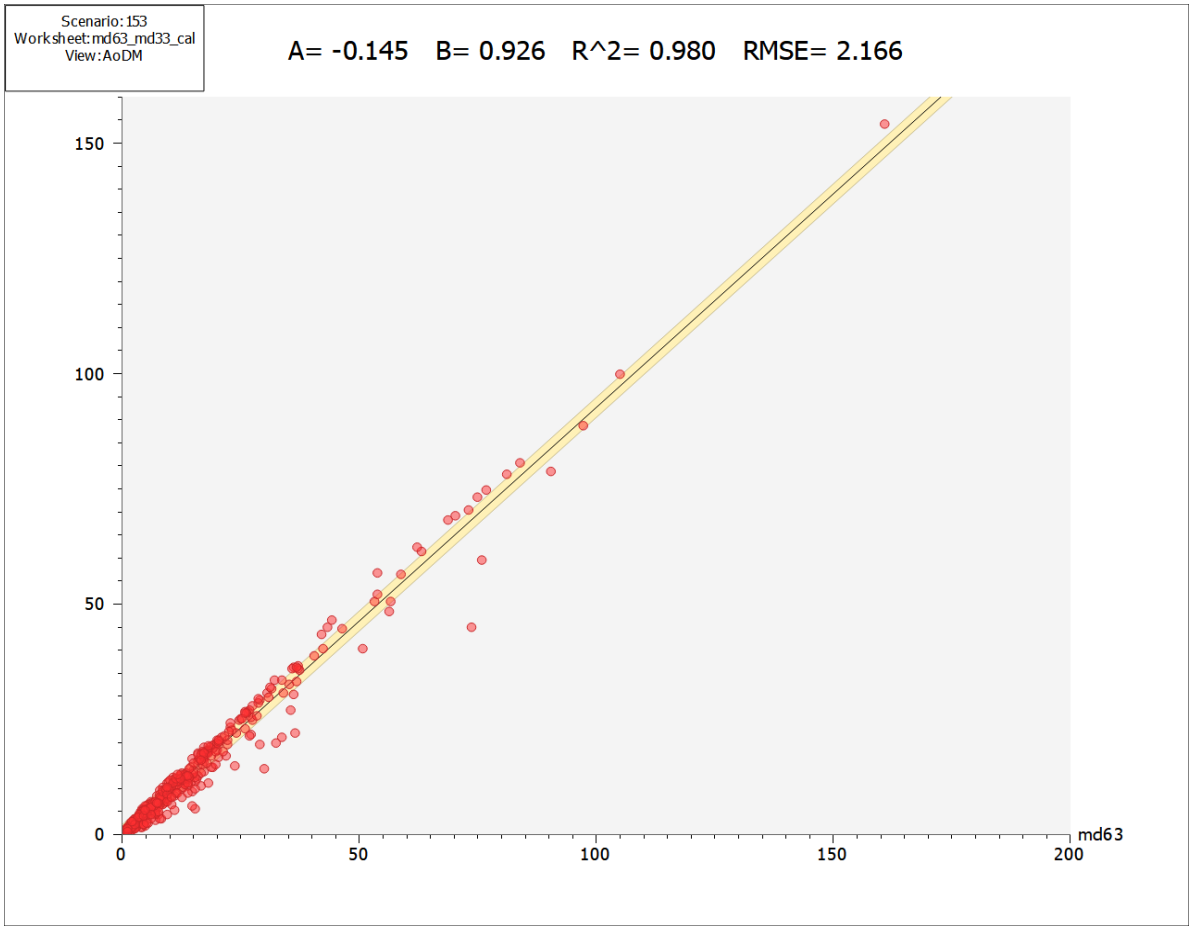


Matrix Destinations – Prior vs. Post – Excluding Blackburn and Wigan Trips

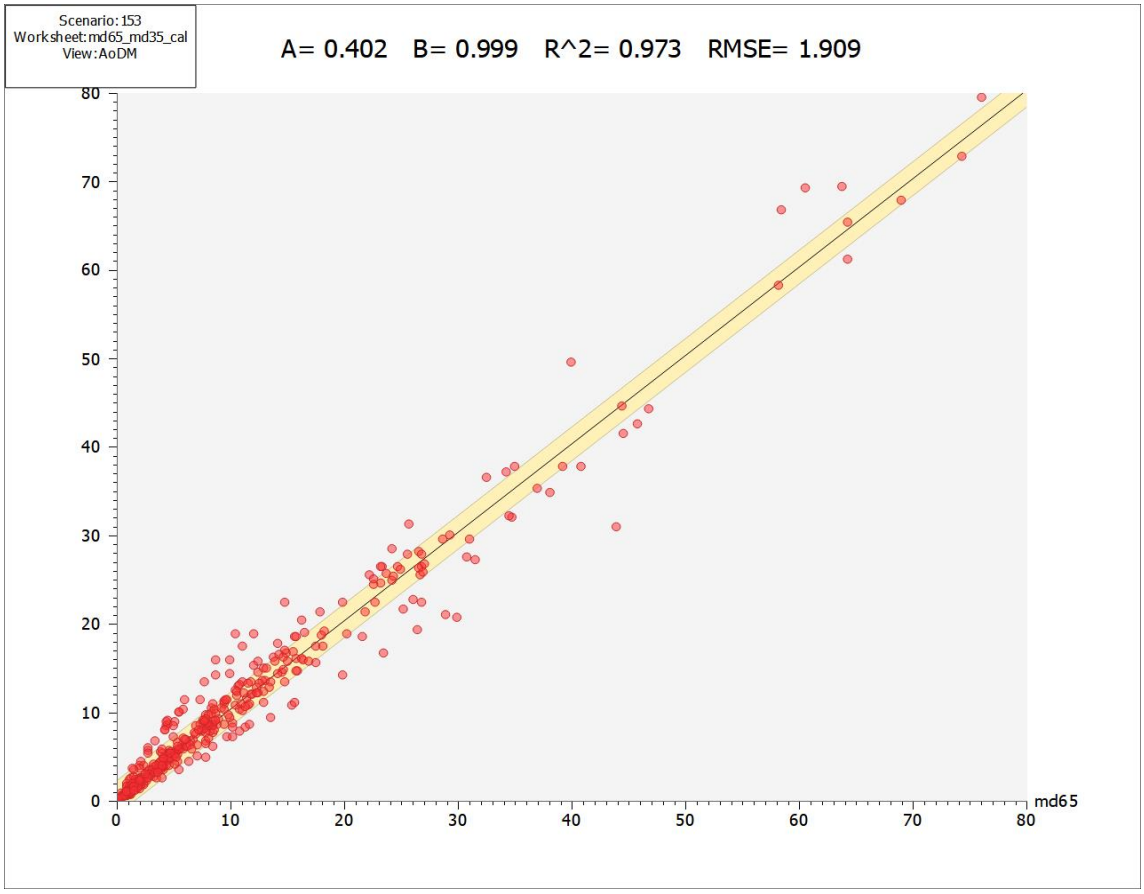
AM Peak


Scenario: 153
Worksheet: md62_md32_cal
View: AoDM
A= 0.152 B= 0.947 R^2= 0.985 RMSE= 3.526
500
400
300
200
100
0
0
100
200
300
400
500
md62

Inter-peak


Scenario: 153
Worksheet: md63_md33_cal
View: AoDM
A= -0.145 B= 0.926 R^2= 0.980 RMSE= 2.166
150
100
50
0
0
50
100
150
200
md63

PM Peak


Scenario: 153
Worksheet: md65_md35_cal
View: AoDM
A= 0.402 B= 0.999 R^2= 0.973 RMSE= 1.909
0
10
20
30
40
50
60
70
80
md65

Appendix I. Appendix F – Sector to Sector Movements

GEH Values – AM Peak

AM	gb1	gb2	gb3	gb4	gb5	gb6	gb7	gb8	gb9	gb10	gb11	gb12	gb13	gb14	gb15	gb16	gb17	gb18	gb19	gb20	gb21	gb22	gb23	gb24	gb25	gb26	gb27	gb28	gb29	gb30	gb31	gb32	gb33	gb34	Sum
gb1	0.00	0.04	1.29	0.37	0.05	0.04	0.06	0.01	0.14	0.16	0.28	0.26	0.19	0.04	0.00	0.03	0.00	0.00	0.00	0.08	0.54	0.56	0.19	0.24	0.31	0.49	0.24	0.35	0.05	0.21	0.23	0.38	0.22	0.00	0.46
gb2	0.03	0.14	1.89	0.30	0.04	0.22	0.17	0.07	0.19	0.18	0.81	0.44	0.26	0.20	0.18	0.32	0.00	0.00	0.04	0.16	0.29	0.66	0.21	0.46	0.55	0.55	0.08	1.18	0.46	0.04	0.39	0.67	0.16	0.03	0.20
gb3	1.01	0.76	2.92	1.61	0.79	0.28	0.29	0.31	0.72	0.16	1.04	1.69	0.24	0.27	0.40	0.80	0.00	0.07	0.03	0.07	0.15	0.15	0.03	0.06	0.08	0.13	0.58	0.78	1.23	0.21	0.08	0.09	0.03	1.31	4.23
gb4	0.37	1.05	2.10	0.59	1.73	1.08	0.37	0.20	0.59	0.76	1.27	1.36	1.15	1.26	0.69	0.03	0.00	0.24	0.23	0.17	1.03	0.80	0.39	0.24	0.58	0.92	0.21	0.72	0.53	0.93	1.07	1.19	0.62	0.07	0.32
gb5	0.11	0.06	1.24	1.23	0.32	0.05	0.24	0.14	0.74	0.10	0.96	0.49	0.22	0.04	0.09	0.44	0.00	0.01	0.03	0.18	0.19	0.61	0.03	0.10	0.38	0.48	0.39	0.67	0.19	0.26	0.23	0.52	0.03	0.05	0.08
gb6	0.38	0.03	0.56	0.47	0.16	0.11	0.26	0.11	0.71	0.18	0.55	0.82	0.33	0.26	0.21	0.37	0.00	0.02	0.10	0.18	0.01	0.56	0.07	0.10	0.32	0.41	0.68	0.33	0.06	0.28	0.18	0.45	0.03	0.04	0.19
gb7	0.53	0.11	0.73	0.45	0.74	0.26	0.03	0.26	0.18	0.45	0.61	1.16	0.86	0.81	0.20	0.44	0.00	0.01	0.19	0.12	0.29	0.43	0.12	0.23	0.33	0.39	0.30	0.40	0.06	0.18	0.24	0.43	0.12	0.00	0.26
gb8	0.13	0.06	0.61	0.19	0.27	0.12	0.10	0.15	0.30	0.23	0.27	0.89	0.42	0.33	0.24	0.15	0.00	0.09	0.05	0.06	0.26	0.21	0.08	0.02	0.13	0.21	0.36	0.62	0.47	0.19	0.06	0.21	0.01	0.01	0.66
gb9	0.21	0.32	1.03	1.40	0.92	0.55	0.24	0.14	1.03	0.63	3.46	0.35	1.05	0.95	0.69	0.10	0.00	0.21	0.07	0.36	1.37	0.71	0.32	0.14	0.61	1.12	0.42	1.08	0.47	1.93	1.33	1.38	0.87	0.09	1.59
gb10	0.76	0.18	0.15	1.26	0.00	0.04	0.04	0.02	0.07	1.32	1.03	0.89	3.76	1.83	0.27	0.15	0.00	0.14	0.33	0.26	0.23	0.58	1.55	0.57	0.19	0.20	0.51	0.21	0.25	0.24	0.13	0.17	0.01	0.50	3.47
gb11	0.25	0.10	1.79	0.07	0.14	0.01	0.08	0.02	0.40	0.58	0.02	0.22	1.27	1.16	0.70	0.42	0.00	0.08	0.18	0.04	0.89	0.78	0.40	0.61	0.60	0.90	0.24	0.43	0.71	0.79	0.58	0.81	0.54	0.01	1.14
gb12	0.09	0.09	1.41	1.63	0.16	0.76	0.75	0.82	1.52	0.15	1.41	0.99	0.00	0.09	0.33	1.49	0.00	0.01	0.17	0.55	0.90	0.58	0.14	0.68	0.29	0.12	4.16	7.31	4.27	1.42	2.14	1.73	0.11	0.16	7.82
gb13	0.65	0.23	0.23	1.77	0.19	0.03	0.36	0.04	0.07	3.26	2.49	0.95	1.28	0.46	0.43	0.57	0.00	0.00	0.20	0.71	0.43	6.65	3.03	1.29	0.82	1.28	1.05	0.55	0.87	0.43	1.10	0.36	0.30	0.40	6.45
gb14	0.16	0.00	0.12	1.13	0.02	0.28	0.16	0.16	0.62	1.34	1.34	0.93	0.44	1.31	0.26	0.17	0.00	0.16	0.03	0.31	0.53	0.70	1.03	0.08	0.57	0.72	1.30	0.68	0.24	0.59	0.20	0.65	0.13	0.12	1.10
gb15	0.00	0.18	0.46	0.24	0.09	0.40	0.64	0.11	0.27	0.05	0.98	0.30	0.26	0.11	0.00	0.04	0.00	0.00	0.00	0.13	0.13	0.82	0.15	0.39	0.45	0.79	0.53	0.76	0.04	0.02	0.13	0.44	0.12	0.00	0.29
gb16	0.30	0.07	1.63	0.38	0.82	0.60	0.68	0.48	0.68	0.67	1.33	2.78	1.09	1.14	0.68	0.34	0.00	0.24	0.02	0.34	1.06	0.64	0.36	0.43	0.35	0.79	0.56	0.03	0.61	1.78	0.84	1.18	0.07	0.00	0.70
gb17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09
gb18	0.00	0.03	0.12	0.29	0.02	0.06	0.10	0.09	0.11	0.06	0.17	0.02	0.05	0.08	0.00	0.21	0.00	0.00	0.00	0.04	0.12	0.10	0.29	0.14	0.01	0.01	0.11	0.17	0.38	0.11	0.07	0.07	0.01	0.00	0.09
gb19	0.00	0.31	0.91	0.42	0.16	0.73	1.18	0.40	0.29	0.18	1.03	0.36	0.25	0.06	0.00	0.30	0.00	0.00	0.00	0.30	0.97	0.43	0.27	0.42	0.03	0.02	0.63	0.89	0.45	0.17	0.48	0.46	0.12	0.00	0.22
gb20	0.06	0.07	0.01	0.18	0.10	0.08	0.05	0.00	0.00	0.03	0.18	0.27	0.13	0.03	0.01	0.05	0.23	0.10	0.03	0.13	0.04	0.10	0.23	0.75	0.23	0.17	0.14	0.08	0.08	0.05	0.17	0.16	0.16	0.06	0.42
gb21	0.75	0.14	0.02	1.25	0.25	0.12	0.01	0.02	0.07	0.11	0.74	1.03	0.32	0.69	0.04	0.05	0.00	0.05	0.03	0.19	0.25	0.20	0.30	0.46	0.08	0.16	0.62	0.07	0.01	0.42	0.13	0.29	0.06	0.67	0.35
gb22	2.08	0.38	0.61	2.46	0.11	0.23	0.27	0.11	0.59	0.80	1.73	2.50	6.09	0.41	0.60	0.74	0.00	0.05	1.00	0.51	0.15	0.56	0.93	0.69	0.35	0.17	0.24	0.77	1.26	0.35	0.39	0.07	0.02	1.33	4.02
gb23	0.76	0.10	0.24	1.57	0.16	0.01	0.11	0.02	0.14	1.89	1.11	1.22	2.84	1.46	0.71	0.29	0.00	0.65	0.35	0.75	0.47	0.68	4.05	3.73	0.49	0.21	0.54	0.51	0.50	0.36	0.30	0.37	0.36	0.70	4.64
gb24	0.91	0.43	0.16	2.75	0.53	0.31	0.05	0.10	0.39	1.05	2.07	2.23	1.12	0.96	0.14	0.69	0.00	0.61	0.18	1.76	1.23	1.03	4.16	10.49	3.31	1.51	1.37	0.60	0.96	0.61	1.22	1.64	1.13	0.83	7.65
gb25	0.67	0.18	0.22	2.05	0.28	0.29	0.04	0.06	0.34	0.11	1.47	0.69	0.32	0.02	0.35	0.47	0.00	0.12	0.40	0.77	0.34	0.15	0.77	2.85	0.27	0.48	0.50	0.58	0.75	0.21	0.64	0.29	0.45	0.59	1.13
gb26	0.10	0.03	0.61	2.78	0.04	0.21	0.23	0.14	1.04	0.06	1.85	1.07	1.15	0.57	0.54	1.03	0.00	0.07	0.46	0.73	0.13	0.28	0.31	0.97	0.11	0.92	0.20	1.11	1.77	0.38	0.70	0.30	0.18	0.54	0.29
gb27	1.02	0.06	0.05	0.68	0.56	0.50	0.42	0.28	0.32	0.39	2.07	1.87	0.56	0.33	0.48	0.42	0.00	0.25	0.03	0.52	1.05	0.37	0.11	0.46	0.28	0.62	1.20	1.95	1.59	1.82	0.84	0.89	0.07	0.90	0.73
gb28	1.56	0.12	0.38	0.28	0.51	0.52	0.57	0.43	0.37	0.67	1.74	3.71	0.85	1.16	0.77	0.01	0.00	0.31	0.07	0.47	1.47	0.67	0.35	0.68	0.41	0.98	1.31	0.23	1.01	2.91	1.50	1.37	0.07	1.38	0.52
gb29	0.44	0.05	2.10	0.97	0.86	0.74	0.82	0.53	1.92	1.04	3.09	4.08	1.67	1.82	1.16	0.83	0.00	0.48	0.17	0.55	2.18	1.08	0.57	0.61	0.91	1.63	1.59	1.10	1.58	4.21	2.38	2.17	0.40	0.11	0.90
gb30	1.62	0.13	0.27	1.38	0.59	0.37	0.13	0.12	0.04	0.03	1.60	2.33	0.34	0.93	0.05	0.07	0.00	0.11	0.12	0.69	0.22	0.11	0.33	0.64	0.23	0.11	1.26	0.04	0.51	0.62	0.04	0.08	0.04	1.24	0.20
gb31	0.20	0.10	0.21	2.01	0.40	0.33	0.12	0.07	1.01	0.11	1.29	4.16	0.09	0.58	0.43	1.22	0.00	0.13	0.19	0.55	0.38	0.17	0.22	0.67	0.07	0.63	0.18	2.20	2.71	1.01	0.79	0.43	0.30	0.28	1.57
gb32	0.17	0.09	0.39	2.96	0.24	0.20	0.04	0.11	1.02	0.15	1.44	4.37	0.07	0.57	0.44	1.01	0.00	0.04	0.10	0.44	0.34	0.01	0.14	0.50	0.01	0.25	0.22	1.48	1.87	0.11	0.67	0.41	0.27	0.02	0.22
gb33	0.79	0.14	0.16	2.20	0.37	0.30	0.13	0.08	0.84	0.11	1.14	2.09	0.03	0.09	0.16	1.05	0.00	0.06	0.19	0.53	0.05	0.10	0.27	0.83	0.18	0.40	0.32	2.92	2.62	1.74	0.66	0.58	0.09	0.60	2.93
gb34	0.00	0.00	2.13	0.24	0.00	0.02	0.00	0.01	0.18	0.10	0.10	0.16	0.10	0.03	0.00	0.04	0.00	0.00	0.00	0.04	0.34	0.31	0.13	0.15	0.17	0.29	0.17	0.20	0.19	0.11	0.14	0.23	0.12	0.00	1.27
Sum	1.85	0.63	5.13	1.30	1.56	1.18	0.38	0.99	1.83	3.21	6.49	8.42	6.48	0.33	1.63	0.51	0.23	0.47	1.23	2.72	1.90	4.54	5.50	9.39	1.33	0.38	4.29	1.70	0.47	4.10	0.09	0.36	0.49	1.18	8.38

GEH Values – Inter-peak

IP	gb1	gb2	gb3	gb4	gb5	gb6	gb7	gb8	gb9	gb10	gb11	gb12	gb13	gb14	gb15	gb16	gb17	gb18	gb19	gb20	gb21	gb22	gb23	gb24	gb25	gb26	gb27	gb28	gb29	gb30	gb31	gb32	gb33	gb34	Sum
gb1	0.00	0.02	1.08	0.48	0.11	0.41	0.86	0.12	0.41	0.07	0.16	0.13	0.09	0.08	0.00	0.05	0.00	0.00	0.00	0.00	0.68	0.19	0.30	0.49	0.28	0.28	0.72	1.09	0.57	0.97	0.55	0.34	0.43	0.00	1.30
gb2	0.03	0.12	1.23	0.85	0.03	0.08	0.13	0.04	0.21	0.01	0.35	0.14	0.01	0.10	0.21	0.22	0.00	0.00	0.09	0.09	0.14	0.05	0.01	0.02	0.01	0.02	0.04	0.40	0.26	0.05	0.09	0.01	0.01	0.00	0.63
gb3	1.10	1.57	3.26	2.09	1.32	0.38	0.31	0.48	0.48	0.04	1.43	1.17	0.25	0.19	0.40	1.27	0.00	0.06	0.13	0.03	0.08	0.17	0.05	0.06	0.03	0.10	0.04	0.06	1.12	0.15	0.05	0.07	0.08	1.95	4.87
gb4	0.26	1.80	1.94	1.29	2.95	1.55	0.49	0.19	2.03	0.04	0.13	3.00	1.33	0.40	0.38	0.48	0.00	0.22	0.34	0.07	0.55	0.90	0.38	0.01	0.00	0.72	1.23	1.75	1.11	1.00	0.72	0.38	0.45	0.25	1.55
gb5	0.11	0.09	1.01	2.31	0.08	0.01	0.11	0.19	0.81	0.11	0.34	0.19	0.02	0.05	0.12	0.78	0.00	0.00	0.05	0.12	0.04	0.27	0.25	0.53	0.27	0.18	0.39	0.25	0.49	0.42	0.24	0.31	0.23	0.04	1.45
gb6	0.13	0.06	0.20	0.62	0.19	0.45	0.05	0.03	0.05	0.02	0.52	0.23	0.10	0.23	0.32	0.14	0.00	0.01	0.25	0.08	0.18	0.18	0.05	0.16	0.11	0.12	0.07	0.20	0.18	0.04	0.02	0.14	0.03	0.03	0.44
gb7	0.15	0.03	0.37	0.21	0.67	0.26	0.04	0.08	0.18	0.13	0.59	0.33	0.03	0.52	0.41	0.43	0.00	0.02	0.39	0.05	0.30	0.09	0.02	0.00	0.01	0.03	0.12	0.28	0.01	0.21	0.06	0.03	0.03	0.02	0.34
gb8	0.02	0.09	0.43	0.14	0.39	0.11	0.19	0.15	0.02	0.09	0.19	0.49	0.14	0.19	0.25	0.26	0.00	0.10	0.06	0.02	0.18	0.12	0.01	0.02	0.04	0.10	0.03	0.09	0.23	0.19	0.13	0.12	0.01	0.02	0.60
gb9	0.13	0.51	0.56	1.79	0.84	0.13	0.07	0.03	2.19	0.05	0.33	2.40	1.03	0.15	0.31	0.26	0.00	0.14	0.39	0.15	0.50	0.76	0.28	0.44	0.30	0.81	0.28	1.21	0.18	0.59	0.98	0.85	0.59	0.16	1.90
gb10	0.23	0.03	0.04	0.57	0.01	0.13	0.24	0.08	0.06	1.26	0.55	0.13	1.70	1.50	0.19	0.16	0.00	0.14	0.01	0.08	0.12	1.55	1.80	0.60	0.03	0.13	0.10	0.09	0.19	0.08	0.02	0.07	0.01	0.13	2.88
gb11	0.04	0.04	1.29	0.36	0.20	0.25	0.41	0.25	0.26	0.27	0.31	0.46	0.07	0.87	0.71	0.76	0.00	0.09	0.18	0.00	0.66	0.13	0.13	0.34	0.23	0.04	0.69	1.21	1.11	1.01	0.61	0.17	0.41	0.05	1.15
gb12	0.01	0.12	1.17	1.14	0.16	0.14	0.24	0.40	1.50	0.26	0.30	0.05	0.12	0.19	0.25	1.57	0.00	0.03	0.16	0.26	0.42	0.09	0.80	2.08	0.40	0.09	2.08	3.49	3.36	1.29	0.50	0.55	0.22	0.03	4.58
gb13	0.26	0.17	0.12	1.09	0.16	0.32	0.62	0.29	0.03	1.93	1.14	0.05	1.09	0.44	0.20	0.50	0.00	0.03	0.04	0.21	0.22	3.38	2.29	0.43	0.42	0.58	0.16	0.02	0.44	0.08	0.31	0.39	0.12	0.13	3.39
gb14	0.06	0.10	0.09	1.04	0.00	0.20	0.41	0.10	0.11	1.52	1.03	0.27	0.39	1.20	0.13	0.24	0.00	0.10	0.10	0.12	0.56	0.13	1.10	0.38	0.09	0.08	0.66	0.01	0.26	0.72	0.02	0.08	0.02	0.05	0.98
gb15	0.00	0.19	0.44	0.59	0.10	0.45	0.72	0.26	0.18	0.20	0.80	0.05	0.04	0.13	0.00	0.37	0.00	0.00	0.00	0.04	0.03	0.01	0.34	0.14	0.14	0.19	0.07	0.23	0.56	0.13	0.19	0.16	0.11	0.00	1.11
gb16	0.05	0.41	1.13	0.44	1.04	0.47	0.64	0.30	0.17	0.22	0.82	1.74	0.51	0.58	0.48	0.30	0.00	0.24	0.26	0.08	0.59	0.43	0.04	0.02	0.03	0.42	0.72	0.92	0.19	1.20	0.55	0.44	0.14	0.00	0.17
gb17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15
gb18	0.00	0.03	0.11	0.27	0.02	0.07	0.12	0.09	0.09	0.15	0.17	0.01	0.02	0.12	0.00	0.19	0.00	0.00	0.00	0.01	0.08	0.07	0.50	0.28	0.05	0.06	0.11	0.22	0.36	0.07	0.11	0.09	0.02	0.00	0.23
gb19	0.00	0.23	0.51	0.59	0.13	0.57	0.92	0.41	0.16	0.03	0.71	0.13	0.08	0.01	0.00	0.49	0.00	0.00	0.00	0.08	0.44	0.19	0.03	0.32	0.41	0.54	0.11	0.13	0.71	0.30	0.37	0.28	0.21	0.00	1.28
gb20	0.00	0.11	0.03	0.19	0.13	0.09	0.06	0.04	0.21	0.09	0.02	0.26	0.25	0.10	0.03	0.17	0.22	0.04	0.11	0.20	0.08	0.20	0.34	0.93	0.38	0.29	0.36	0.45	0.37	0.38	0.26	0.22	0.28	0.02	1.33
gb21	0.52	0.19	0.11	0.98	0.26	0.15	0.03	0.05	0.34	0.11	0.66	0.56	0.01	0.60	0.02	0.23	0.00	0.09	0.02	0.07	0.28	0.07	0.34	0.58	0.07	0.01	0.09	0.27	0.36	0.36	0.01	0.04	0.00	0.39	0.17
gb22	0.50	0.12	0.03	0.39	0.12	0.27	0.16	0.08	0.15	1.50	0.54	0.47	3.21	0.18	0.22	0.12	0.00	0.05	0.22	0.18	0.05	3.54	1.97	0.72	0.15	0.24	0.22	0.17	0.04	0.11	0.05	0.08	0.07	0.34	4.78
gb23	0.37	0.10	0.11	0.11	0.25	0.00	0.04	0.03	0.24	1.75	0.26	0.68	2.09	1.19	0.29	0.14	0.00	0.43	0.13	0.32	0.31	1.89	3.99	3.30	0.57	0.19	0.56	0.56	0.48	0.51	0.17	0.14	0.23	0.29	5.63
gb24	0.72	0.06	0.10	0.48	0.51	0.09	0.02	0.20	0.83	0.54	0.19	1.65	0.15	0.52	0.06	0.89	0.00	0.19	0.37	0.85	0.48	0.58	3.50	8.25	2.00	0.39	1.59	2.32	2.27	1.05	0.15	0.30	0.38	0.56	8.49
gb25	0.54	0.00	0.04	0.27	0.02	0.15	0.17	0.00	0.14	0.05	0.44	0.30	0.50	0.00	0.36	0.14	0.00	0.02	0.40	0.34	0.07	0.13	0.58	2.18	0.06	0.13	0.66	0.57	0.48	0.31	0.18	0.13	0.02	0.35	1.37
gb26	0.14	0.07	0.05	0.87	0.08	0.20	0.19	0.08	0.05	0.10	0.69	0.43	0.54	0.19	0.54	0.23	0.00	0.00	0.49	0.26	0.01	0.31	0.27	0.74	0.08	0.27	0.10	0.05	0.13	0.02	0.05	0.18	0.11	0.06	0.13
gb27	0.55	0.13	0.25	0.68	0.26	0.05	0.09	0.07	0.23	0.06	1.09	1.97	0.66	0.20	0.18	0.24	0.00	0.16	0.30	0.19	0.28	0.45	0.33	0.49	0.16	0.36	0.62	1.45	0.68	0.36	0.80	0.62	0.14	0.42	1.33
gb28	1.03	0.04	0.26	1.13	0.05	0.38	0.32	0.23	0.95	0.01	1.61	3.85	1.55	0.52	0.36	1.10	0.00	0.25	1.08	0.13	0.81	1.07	0.32	0.20	0.27	1.10	0.89	0.27	0.81	1.06	2.10	1.51	0.05	0.85	0.18
gb29	0.08	0.06	1.03	0.02	0.30	0.46	0.29	0.09	0.20	0.29	1.46	3.56	0.90	0.97	0.91	0.79	0.00	0.46	0.35	0.14	1.13	0.87	0.20	0.09	0.23	1.01	0.16	0.89	0.68	1.82	2.15	1.49	0.07	0.11	0.09
gb30	0.86	0.12	0.26	0.89	0.49	0.15	0.01	0.03	0.57	0.10	1.13	1.18	0.13	0.75	0.11	0.28	0.00	0.09	0.08	0.22	0.33	0.16	0.39	0.55	0.03	0.01	0.29	0.27	0.53	0.63	0.09	0.10	0.21	0.63	0.06
gb31	0.28	0.02	0.18	0.78	0.01	0.26	0.25	0.12	0.09	0.06	0.91	1.56	0.16	0.38	0.38	0.25	0.00	0.13	0.29	0.19	0.22	0.13	0.17	0.40	0.05	0.05	0.54	0.26	0.34	0.29	0.04	0.03	0.09	0.22	0.61
gb32	0.06	0.02	0.16	0.97	0.01	0.23	0.22	0.11	0.03	0.12	0.79	1.59	0.33	0.40	0.43	0.35	0.00	0.07	0.21	0.18	0.20	0.00	0.16	0.52	0.01	0.26	0.34	0.12	0.14	0.12	0.14	0.01	0.18	0.04	0.54
gb33	0.54	0.03	0.18	0.32	0.05	0.16	0.18	0.01	0.24	0.09	0.60	0.98	0.23	0.14	0.19	0.29	0.00	0.01	0.27	0.22	0.12	0.01	0.16	0.36	0.01	0.13	0.82	0.91	0.89	0.59	0.27	0.09	0.05	0.37	0.95
gb34	0.00	0.02	1.71	0.28	0.06	0.30	0.68	0.13	0.42	0.09	0.53	0.17	0.07	0.08	0.00	0.06	0.00	0.00	0.00	0.01	0.61	0.23	0.33	0.50	0.27	0.31	0.64	1.06	0.45	0.80	0.47	0.32	0.34	0.00	0.57
Sum	0.71	1.38	4.31	0.83	1.97	0.53	0.06	0.19	1.48	3.12	2.16	6.23	4.11	0.47	1.41	0.09	0.22	0.10	0.15	1.01	0.71	5.14	5.78	7.47	1.37	0.51	1.05	0.04	0.06	1.09	1.57	1.32	0.21	0.55	8.74

GEH Values – PM Peak

PM	gb1	gb2	gb3	gb4	gb5	gb6	gb7	gb8	gb9	gb10	gb11	gb12	gb13	gb14	gb15	gb16	gb17	gb18	gb19	gb20	gb21	gb22	gb23	gb24	gb25	gb26	gb27	gb28	gb29	gb30	gb31	gb32	gb33	gb34	Sum
gb1	0.00	0.08	0.36	0.70	0.12	0.70	1.46	0.01	0.46	0.36	0.32	0.17	0.21	0.24	0.00	0.33	0.00	0.00	0.00	0.04	0.97	0.79	0.76	0.68	0.46	0.66	0.48	0.73	0.08	1.06	0.58	0.54	0.58	0.00	1.99
gb2	0.04	0.10	0.02	0.39	0.10	0.08	0.25	0.09	0.12	0.10	0.34	0.06	0.04	0.11	0.22	0.11	0.00	0.02	0.11	0.03	0.24	0.09	0.11	0.02	0.03	0.09	0.02	0.20	0.18	0.07	0.05	0.09	0.05	0.01	0.01
gb3	0.13	0.26	0.40	0.53	0.62	0.42	0.30	0.24	0.41	0.36	0.19	0.18	0.16	0.68	0.75	0.33	0.00	0.17	0.41	0.04	0.70	0.42	0.47	0.51	0.40	0.52	0.44	0.73	0.26	0.71	0.57	0.50	0.38	0.34	0.17
gb4	0.42	0.74	0.33	1.84	1.37	0.54	0.24	0.04	2.56	0.89	0.16	1.72	1.10	1.42	0.71	0.90	0.00	0.34	1.09	0.01	1.73	0.45	0.61	0.45	0.48	0.58	1.43	1.11	0.46	1.11	1.32	0.96	0.87	0.24	0.46
gb5	0.08	0.02	0.24	1.15	0.09	0.36	0.72	0.21	0.52	0.03	0.36	0.15	0.02	0.09	0.12	0.66	0.00	0.01	0.06	0.06	0.16	0.15	0.11	0.56	0.24	0.12	0.47	0.25	0.70	0.43	0.21	0.07	0.26	0.03	1.38
gb6	0.21	0.15	0.02	0.22	0.55	1.27	0.61	0.09	0.13	0.01	0.55	0.53	0.31	0.14	0.28	0.57	0.00	0.04	0.30	0.04	0.34	0.11	0.04	0.36	0.14	0.00	0.47	0.25	0.70	0.36	0.16	0.01	0.16	0.09	1.78
gb7	0.28	0.02	0.02	0.04	0.94	1.13	0.31	0.06	0.09	0.16	0.53	0.37	0.16	0.37	0.31	0.44	0.00	0.07	0.47	0.02	0.32	0.08	0.12	0.04	0.02	0.11	0.28	0.10	0.47	0.09	0.02	0.12	0.05	0.02	1.24
gb8	0.02	0.03	0.23	0.33	0.45	0.22	0.32	0.18	0.03	0.18	0.36	0.22	0.16	0.15	0.24	0.51	0.00	0.14	0.10	0.02	0.30	0.01	0.07	0.13	0.02	0.04	0.23	0.29	0.44	0.01	0.03	0.04	0.07	0.01	0.89
gb9	0.37	0.12	0.07	1.71	0.38	0.81	0.59	0.06	2.55	0.25	0.31	1.90	0.75	0.54	0.40	0.40	0.00	0.27	0.86	0.09	1.22	0.08	0.16	0.56	0.21	0.01	0.49	1.71	0.08	1.59	0.25	0.18	0.06	0.25	0.82
gb10	0.18	0.13	0.15	0.19	0.18	0.22	0.29	0.01	0.04	0.22	0.44	0.28	0.12	0.20	0.01	0.07	0.00	0.09	0.08	0.04	0.05	1.07	0.18	0.23	0.09	0.15	0.21	0.20	0.19	0.17	0.01	0.10	0.00	0.09	0.61
gb11	0.02	0.91	0.07	1.08	1.64	1.53	1.15	0.71	1.00	1.11	0.09	2.38	1.17	1.97	1.26	1.85	0.00	0.20	0.42	0.16	1.54	1.29	1.03	1.54	1.21	1.47	1.98	2.29	3.08	2.47	1.49	1.31	1.40	0.02	6.73
gb12	0.15	0.26	0.71	1.18	0.03	0.62	1.56	0.25	0.87	0.24	0.63	1.60	0.42	0.22	0.04	0.04	0.00	0.03	0.40	0.08	1.47	0.80	0.71	0.04	0.01	0.18	1.04	1.19	1.11	0.29	0.79	0.90	0.24	0.08	1.30
gb13	0.17	0.17	0.31	0.43	0.26	0.36	0.67	0.14	0.20	0.04	0.90	0.18	0.42	0.12	0.22	0.10	0.00	0.09	0.02	0.11	0.26	0.34	0.56	0.01	0.44	0.51	0.28	0.44	0.25	0.03	0.17	0.24	0.17	0.09	0.83
gb14	0.05	0.12	0.26	0.38	0.03	0.28	0.58	0.06	0.31	0.07	0.84	0.20	0.22	0.22	0.08	0.26	0.00	0.00	0.06	0.07	0.31	0.13	0.21	0.30	0.03	0.10	0.87	0.61	0.58	0.86	0.13	0.07	0.18	0.03	0.89
gb15	0.00	0.10	0.31	0.22	0.06	0.26	0.43	0.07	0.03	0.04	0.51	0.01	0.10	0.02	0.00	0.03	0.00	0.00	0.00	0.03	0.02	0.23	0.01	0.09	0.12	0.22	0.14	0.16	0.01	0.16	0.05	0.12	0.01	0.00	0.29
gb16	0.04	0.21	0.23	0.70	0.70	0.26	0.37	0.25	0.51	0.65	1.32	0.21	0.00	0.91	0.57	0.69	0.00	0.35	0.08	0.06	1.40	0.28	0.49	0.53	0.07	0.39	0.06	0.14	0.31	1.37	0.47	0.48	0.06	0.05	0.19
gb17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
gb18	0.00	0.02	0.10	0.11	0.01	0.04	0.09	0.03	0.00	0.07	0.11	0.00	0.01	0.03	0.00	0.05	0.00	0.00	0.00	0.01	0.03	0.07	0.05	0.14	0.01	0.05	0.00	0.06	0.10	0.04	0.00	0.04	0.01	0.00	0.06
gb19	0.00	0.10	0.31	0.04	0.07	0.30	0.49	0.16	0.07	0.62	0.38	0.19	0.48	0.18	0.00	0.04	0.00	0.00	0.00	0.02	0.30	1.61	0.93	0.65	0.52	0.63	0.03	0.26	0.06	0.16	0.34	0.22	0.28	0.00	2.26
gb20	0.07	0.13	0.04	0.22	0.15	0.14	0.10	0.06	0.32	0.22	0.03	0.50	0.61	0.27	0.10	0.30	0.37	0.17	0.27	0.18	0.16	0.44	0.63	1.44	0.64	0.62	0.48	0.48	0.51	0.58	0.48	0.39	0.43	0.03	2.26
gb21	0.29	0.36	0.40	0.34	0.05	0.16	0.10	0.03	0.08	0.33	0.55	0.05	0.20	1.24	0.36	0.23	0.00	0.07	0.01	0.05	0.20	0.01	0.09	0.40	0.13	0.01	0.49	0.38	0.55	0.51	0.09	0.03	0.06	0.21	1.13
gb22	0.52	0.46	0.23	0.33	0.70	0.61	0.37	0.10	0.05	1.57	0.64	1.02	0.06	0.44	0.46	0.12	0.00	0.27	0.06	0.09	0.15	3.40	1.80	0.23	0.54	0.69	0.11	0.15	0.11	0.04	0.21	0.29	0.18	0.25	3.11
gb23	0.35	0.25	0.22	0.29	0.32	0.33	0.25	0.02	0.02	0.17	0.46	0.09	0.04	0.77	0.08	0.03	0.00	0.08	0.01	0.18	0.14	1.10	0.23	0.85	0.01	0.08	0.30	0.18	0.25	0.19	0.04	0.02	0.03	0.20	0.07
gb24	0.41	0.36	0.44	0.59	0.67	0.62	0.55	0.04	0.13	0.54	0.86	0.44	1.27	0.72	0.17	0.01	0.00	0.10	0.51	0.58	0.41	0.63	1.90	6.32	1.89	0.82	0.61	0.54	0.55	0.40	0.45	0.45	0.45	0.24	5.64
gb25	0.36	0.42	0.33	0.52	0.62	0.65	0.48	0.08	0.26	0.10	0.62	0.00	0.03	0.34	0.44	0.20	0.00	0.01	0.10	0.19	0.03	0.41	0.04	1.41	0.05	0.06	0.07	0.03	0.03	0.37	0.08	0.05	0.07	0.20	0.07
gb26	0.08	0.32	0.23	0.34	0.38	0.51	0.26	0.03	0.27	0.14	0.55	0.20	0.07	0.53	0.70	0.07	0.00	0.04	0.09	0.15	0.00	0.42	0.20	0.30	0.05	0.31	0.30	0.48	0.50	0.11	0.21	0.01	0.06	0.04	0.14
gb27	0.05	0.31	0.42	0.93	0.58	0.56	0.14	0.28	0.11	0.16	1.14	2.92	1.30	0.23	0.03	0.58	0.00	0.22	0.75	0.20	0.60	0.38	0.44	1.93	0.90	0.37	1.13	1.33	1.59	0.85	0.54	0.21	0.92	0.02	2.66
gb28	0.15	1.36	1.08	2.51	2.27	2.66	2.29	0.38	1.34	0.47	2.18	5.50	1.98	1.00	0.41	0.75	0.00	0.32	1.50	0.20	2.39	0.40	0.27	1.97	0.48	0.26	1.64	0.34	0.07	3.91	0.19	0.19	0.73	0.24	0.75
gb29	0.26	0.80	0.29	0.68	1.14	1.99	1.96	0.19	0.72	0.92	1.62	1.93	0.41	1.65	1.06	1.46	0.00	0.59	0.41	0.12	2.54	0.30	0.75	0.91	0.01	0.43	0.67	0.29	0.61	4.69	0.72	0.52	0.09	0.28	3.35
gb30	0.42	0.52	0.75	1.26	0.08	0.03	0.22	0.01	0.65	0.19	1.41	0.32	0.25	0.82	0.09	0.05	0.00	0.15	0.00	0.16	0.14	0.11	0.29	1.16	0.48	0.22	0.92	0.84	1.07	0.69	0.14	0.08	0.22	0.32	1.27
gb31	0.15	0.50	0.37	0.82	0.93	0.95	0.74	0.08	0.02	0.08	1.24	1.93	0.84	0.79	0.55	0.12	0.00	0.23	0.38	0.08	0.64	0.12	0.06	0.29	0.07	0.22	0.64	1.06	1.48	0.29	0.29	0.22	0.01	0.11	1.37
gb32	0.07	0.57	0.38	0.68	0.96	1.05	0.69	0.14	0.04	0.36	0.94	1.83	0.08	0.92	0.66	0.16	0.00	0.08	0.37	0.09	0.53	0.37	0.02	0.74	0.16	0.16	0.45	0.72	0.91	0.18	0.19	0.08	0.01	0.04	0.70
gb33	0.29	0.33	0.41	0.86	0.49	0.54	0.48	0.10	0.30	0.17	0.80	0.51	0.30	0.39	0.27	0.24	0.00	0.01	0.14	0.12	0.34	0.02	0.08	0.33	0.08	0.06	0.13	0.33	0.23	0.26	0.12	0.14	0.04	0.17	0.45
gb34	0.00	0.04	0.09	0.18	0.08	0.42	0.82	0.13	0.68	0.31	0.61	0.28	0.20	0.18	0.00	0.10	0.00	0.00	0.00	0.05	0.83	0.73	0.69	0.79	0.49	0.67	0.65	0.94	0.56	0.98	0.60	0.55	0.52	0.00	2.13
Sum	0.09	0.98	0.56	0.93	0.57	1.55	1.68	0.28	0.52	1.50	2.99	5.87	1.08	2.02	1.82	0.19	0.37	0.64	1.37	0.65	4.00	2.97	0.99	4.93	0.70	0.49	1.08	0.18	0.57	5.62	0.43	0.17	0.30	0.20	0.72

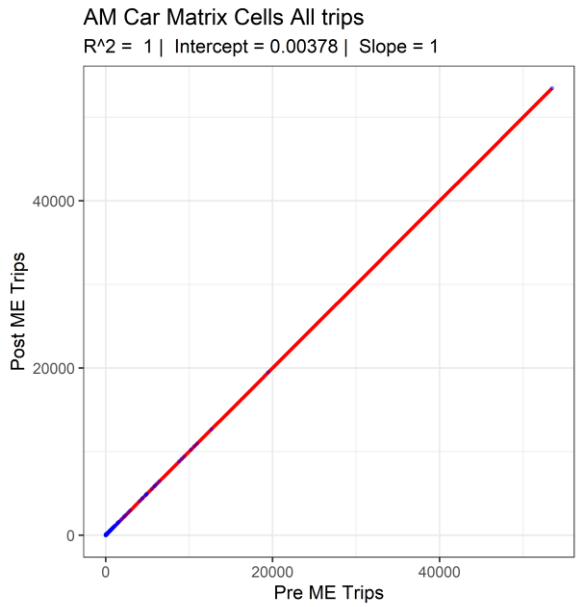
Appendix J. Appendix G – Realism Testing Results

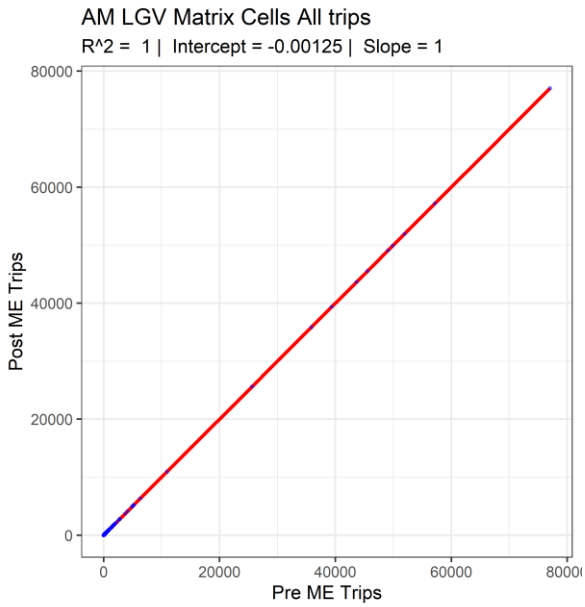
Time Period	Trip Purpose Group	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6	Run 7	Run 8	Run 9	Run 10	Final	Final with final Bus and Rail parameters
AM	Commute	-0.17	-0.20	-0.13	-0.15	-0.18	-0.14	-0.21	-0.22	-0.21	-0.21	-0.22	-0.21
	Employer Business	-0.77	-0.93	-0.59	-0.34	-0.42	-0.20	-0.20	-0.21	-0.18	-0.16	-0.16	-0.16
	Other	-1.01	-1.18	-0.82	-0.66	-0.80	-0.43	-0.43	-0.44	-0.40	-0.38	-0.38	-0.38
	Average	-0.50	-0.59	-0.40	-0.32	-0.39	-0.23	-0.28	-0.28	-0.26	-0.25	-0.25	-0.25
IP	Commute	-0.18	-0.22	-0.14	-0.16	-0.19	-0.15	-0.23	-0.24	-0.24	-0.24	-0.23	-0.24
	Employer Business	-0.79	-0.96	-0.62	-0.35	-0.43	-0.21	-0.21	-0.22	-0.19	-0.17	-0.17	-0.17
	Other	-1.24	-1.44	-1.01	-0.79	-0.95	-0.51	-0.51	-0.52	-0.48	-0.44	-0.44	-0.44
	Average	-0.95	-1.11	-0.77	-0.58	-0.70	-0.38	-0.40	-0.40	-0.37	-0.35	-0.35	-0.35
PM	Commute	-0.17	-0.21	-0.14	-0.15	-0.18	-0.14	-0.22	-0.23	-0.22	-0.23	-0.22	-0.23
	Employer Business	-0.76	-0.92	-0.59	-0.33	-0.41	-0.20	-0.20	-0.21	-0.18	-0.16	-0.16	-0.16
	Other	-1.24	-1.43	-1.01	-0.79	-0.96	-0.52	-0.52	-0.52	-0.48	-0.45	-0.45	-0.45
	Average	-0.70	-0.81	-0.56	-0.44	-0.54	-0.31	-0.34	-0.35	-0.33	-0.31	-0.31	-0.31
12 HR	Commute	-0.17	-0.21	-0.14	-0.15	-0.18	-0.14	-0.22	-0.23	-0.22	-0.22	-0.22	-0.22
	Employer Business	-0.78	-0.94	-0.60	-0.34	-0.42	-0.21	-0.21	-0.21	-0.19	-0.17	-0.17	-0.17
	Other	-1.20	-1.39	-0.98	-0.77	-0.93	-0.50	-0.50	-0.50	-0.47	-0.43	-0.43	-0.43
	Total	-0.75	-0.88	-0.61	-0.47	-0.57	-0.32	-0.35	-0.36	-0.33	-0.31	-0.31	-0.31
24 HR	Commute	-0.18	-0.21	-0.14	-0.15	-0.18	-0.14	-0.22	-0.23	-0.23	-0.23	-0.23	-0.23
	Employer Business	-0.78	-0.95	-0.61	-0.34	-0.42	-0.21	-0.21	-0.21	-0.19	-0.17	-0.17	-0.17
	Other	-1.21	-1.41	-0.99	-0.77	-0.94	-0.51	-0.50	-0.51	-0.47	-0.44	-0.44	-0.44
	Total	-0.81	-0.95	-0.66	-0.50	-0.61	-0.34	-0.36	-0.37	-0.34	-0.32	-0.32	-0.32

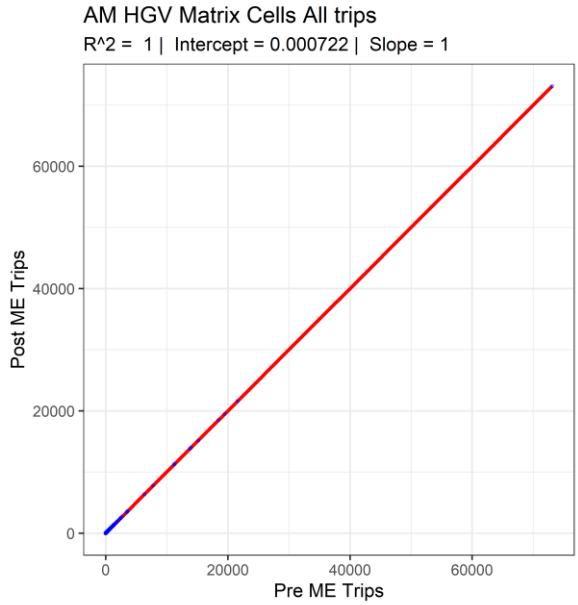
Appendix H – Matrix integrity Checks

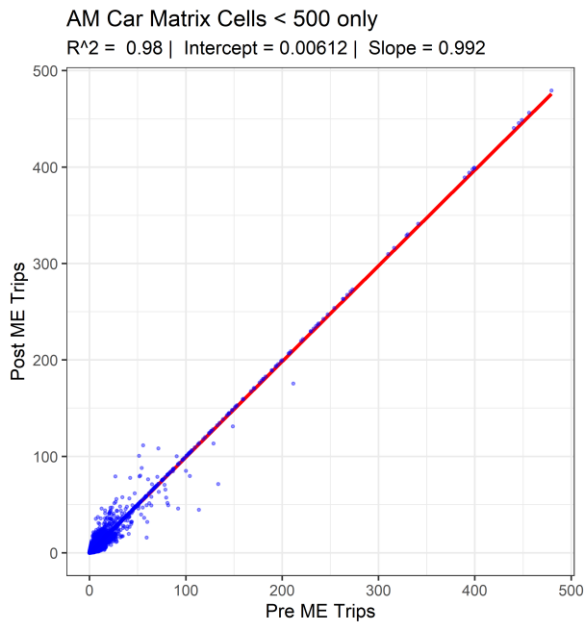
Scatter Plots

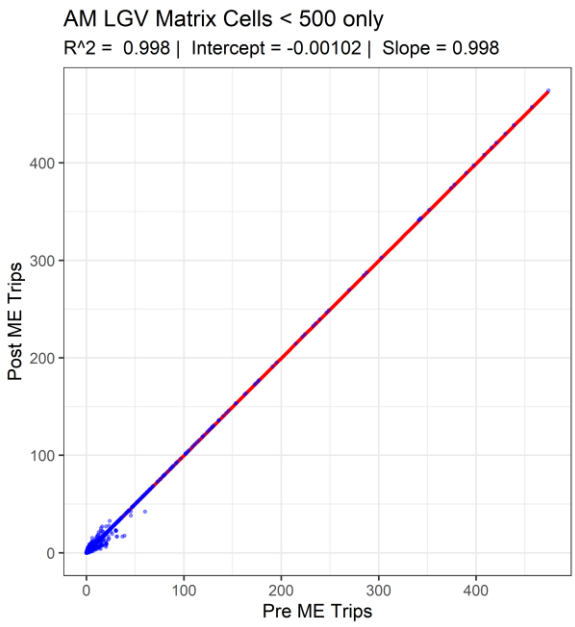
1. Matrix Cells

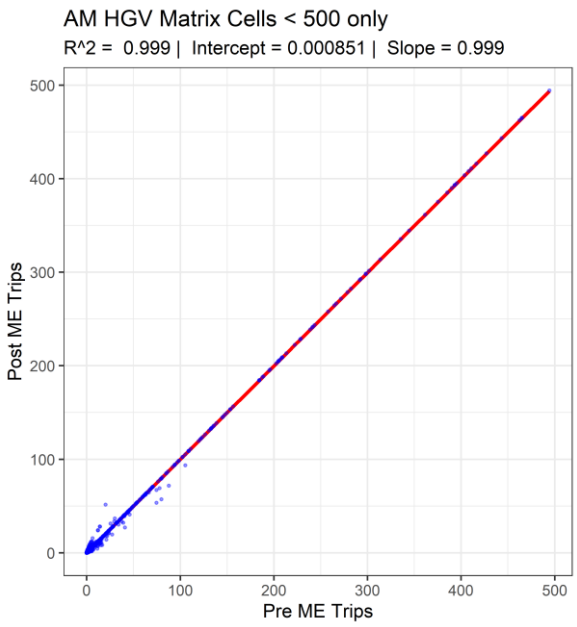


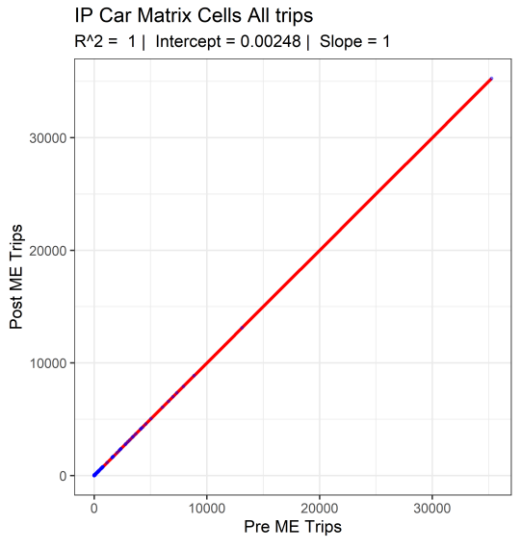


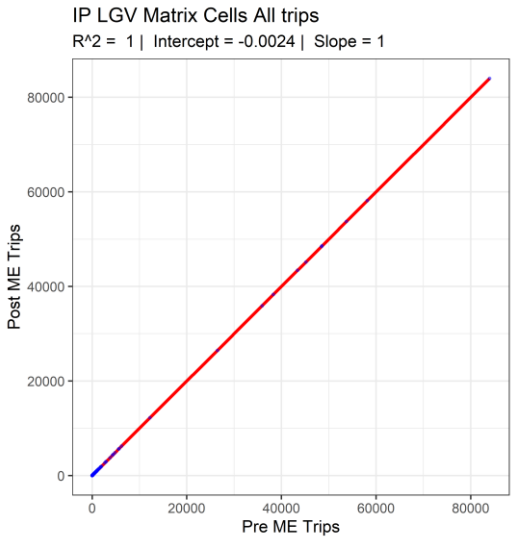


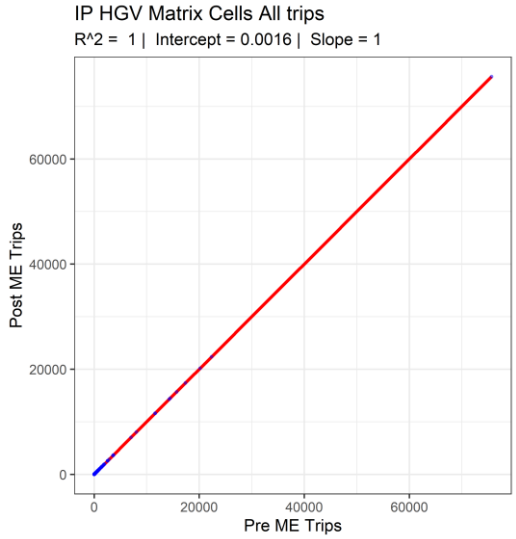

AM Car Matrix Cells < 500 only
R^2 = 0.98 | Intercept = 0.00612 | Slope = 0.992
Post ME Trips
Pre ME Trips
0
100
200
300
400
500

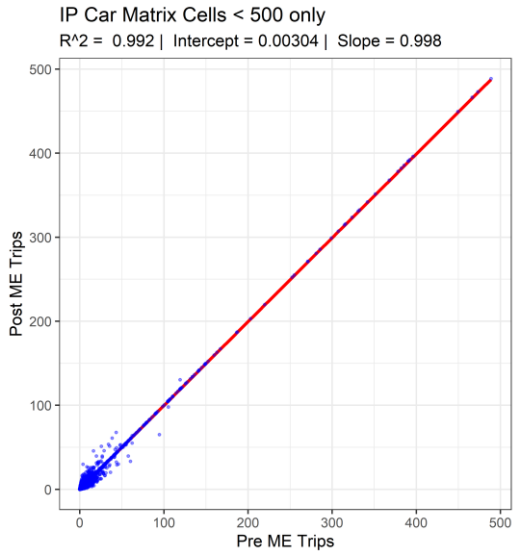

AM LGV Matrix Cells < 500 only
R^2 = 0.998 | Intercept = -0.00102 | Slope = 0.998
Post ME Trips
Pre ME Trips
0
100
200
300
400

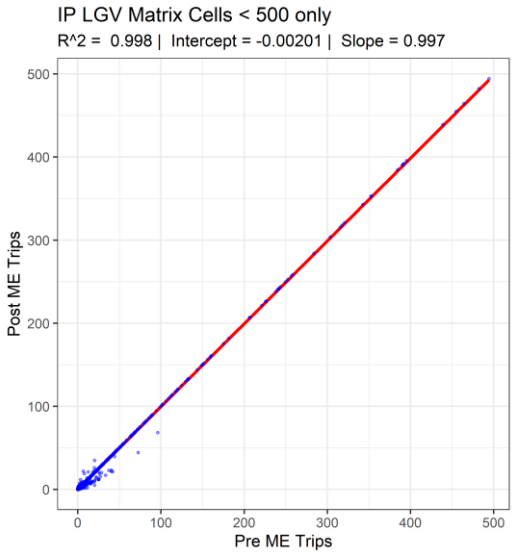

AM HGV Matrix Cells < 500 only
R^2 = 0.999 | Intercept = 0.000851 | Slope = 0.999
Post ME Trips
Pre ME Trips
0
100
200
300
400
500

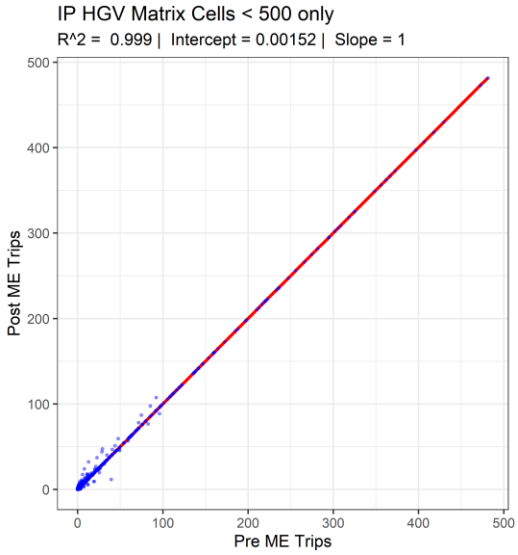

IP Car Matrix Cells All trips
R^2 = 1 | Intercept = 0.00248 | Slope = 1
Post ME Trips
Pre ME Trips
0
10000
20000
30000

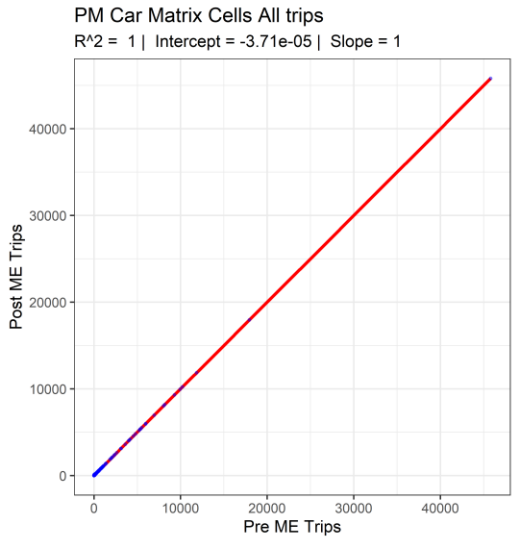

IP LGV Matrix Cells All trips
R^2 = 1 | Intercept = -0.0024 | Slope = 1
Post ME Trips
Pre ME Trips
0
20000
40000
60000
80000

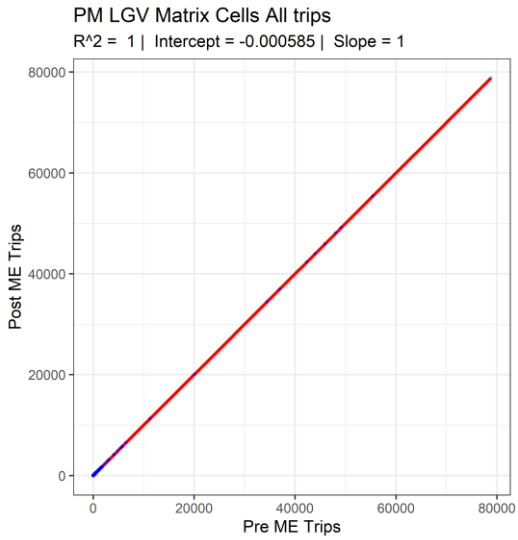

IP HGV Matrix Cells All trips
R^2 = 1 | Intercept = 0.0016 | Slope = 1
Post ME Trips
Pre ME Trips
0
20000
40000
60000

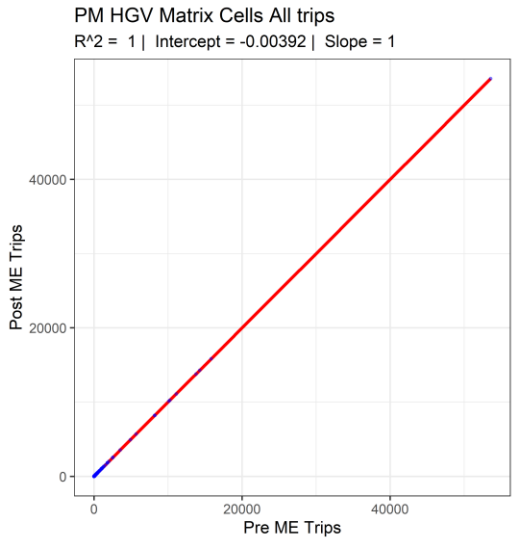

IP Car Matrix Cells < 500 only
R^2 = 0.992 | Intercept = 0.00304 | Slope = 0.998
Post ME Trips
Pre ME Trips
0
100
200
300
400
500

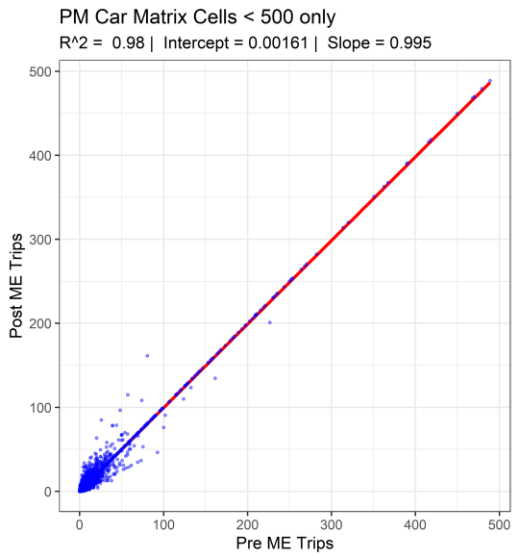

IP LGV Matrix Cells < 500 only
R^2 = 0.998 | Intercept = -0.00201 | Slope = 0.997
Post ME Trips
Pre ME Trips
0
100
200
300
400
500

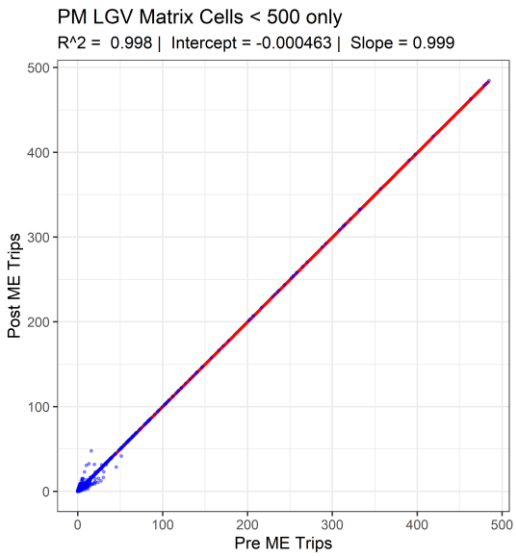

IP HGV Matrix Cells < 500 only
R^2 = 0.999 | Intercept = 0.00152 | Slope = 1
Post ME Trips
Pre ME Trips
0
100
200
300
400
500

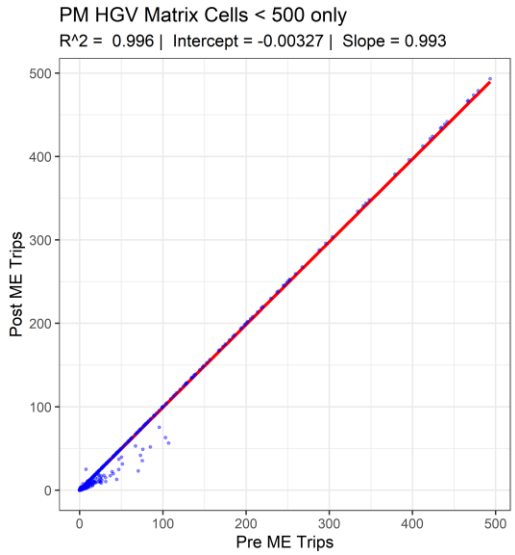

PM Car Matrix Cells All trips
R^2 = 1 | Intercept = -3.71e-05 | Slope = 1
Post ME Trips
Pre ME Trips
0
10000
20000
30000
40000


PM LGV Matrix Cells All trips
R^2 = 1 | Intercept = -0.000585 | Slope = 1
Post ME Trips
Pre ME Trips
0
20000
40000
60000
80000

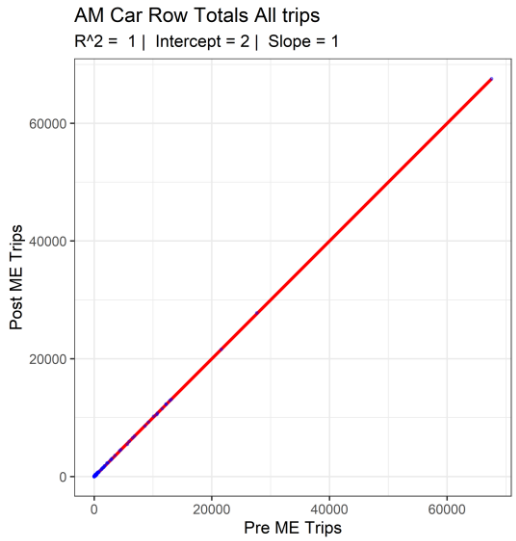

PM HGV Matrix Cells All trips
R^2 = 1 | Intercept = -0.00392 | Slope = 1
Post ME Trips
Pre ME Trips
0
20000
40000

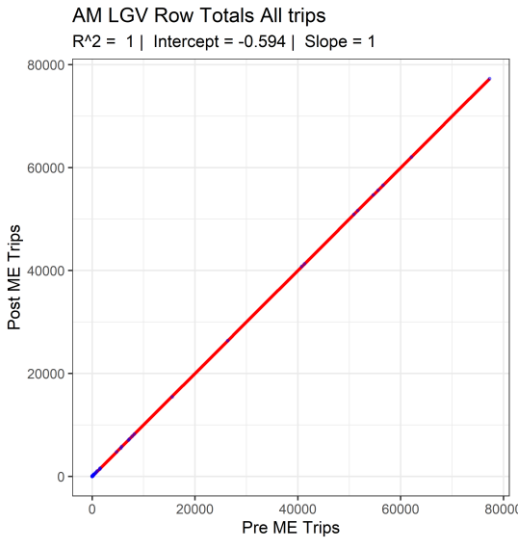

PM Car Matrix Cells < 500 only
R^2 = 0.98 | Intercept = 0.00161 | Slope = 0.995
Post ME Trips
Pre ME Trips
0
100
200
300
400
500

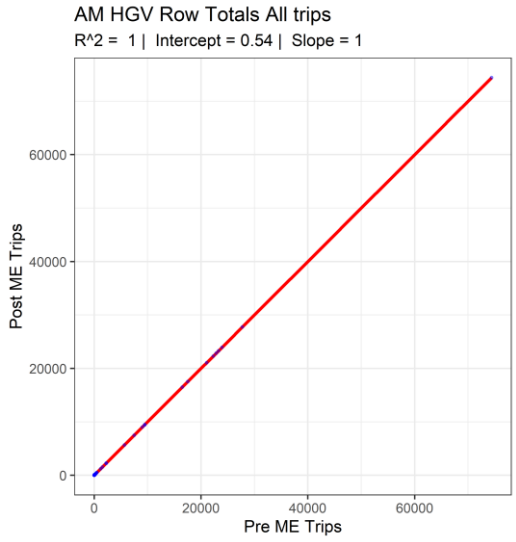

PM LGV Matrix Cells < 500 only
R^2 = 0.998 | Intercept = -0.000463 | Slope = 0.999
Post ME Trips
Pre ME Trips
0
100
200
300
400
500

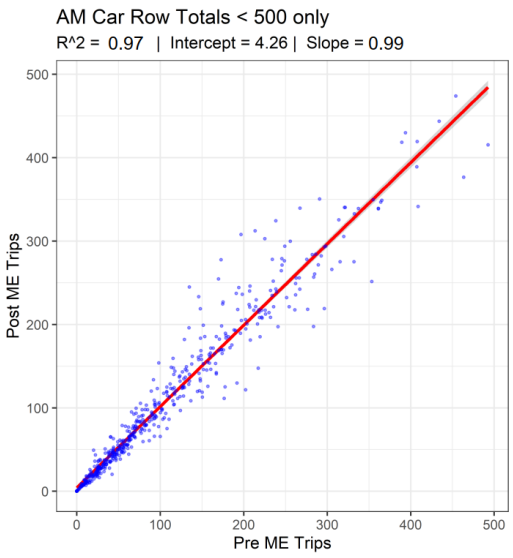

PM HGV Matrix Cells < 500 only
R^2 = 0.996 | Intercept = -0.00327 | Slope = 0.993
Post ME Trips
Pre ME Trips
0
100
200
300
400
500

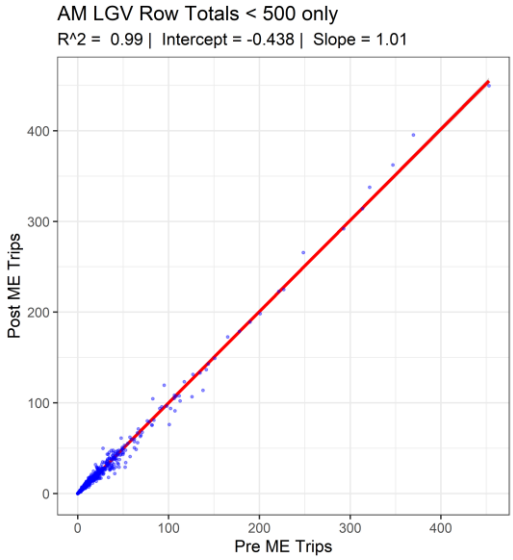
2. Row Totals

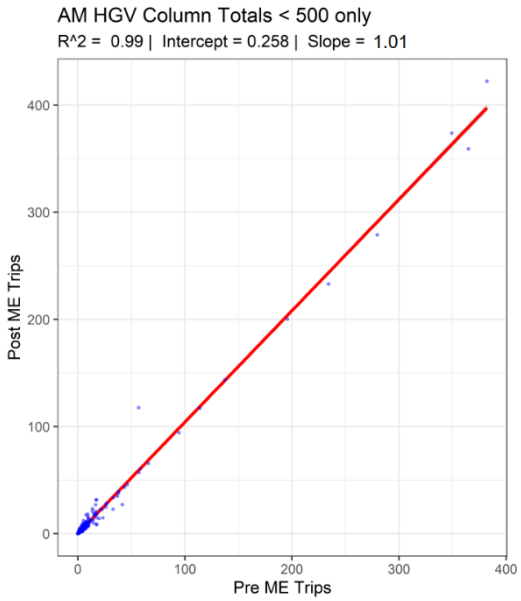

AM Car Row Totals All trips
R^2 = 1 | Intercept = 2 | Slope = 1
Post ME Trips
Pre ME Trips
0
20000
40000
60000

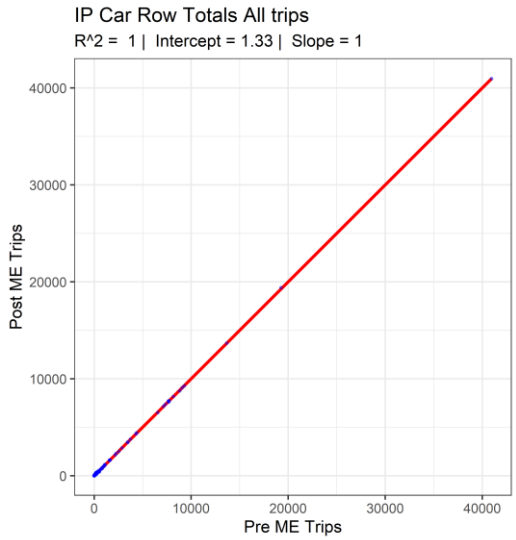

AM LGV Row Totals All trips
R^2 = 1 | Intercept = -0.594 | Slope = 1
Post ME Trips
Pre ME Trips
0
20000
40000
60000
80000

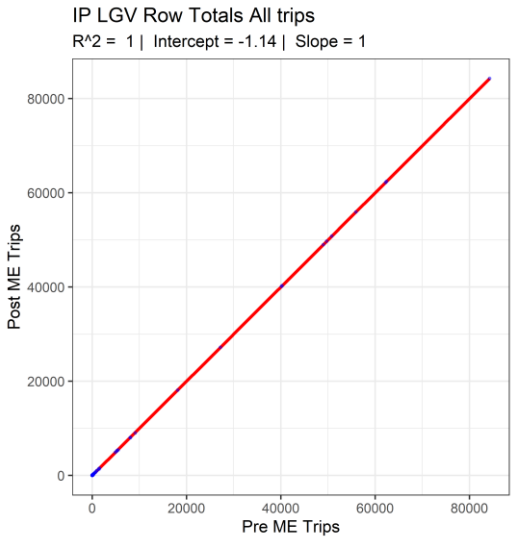

AM HGV Row Totals All trips
R^2 = 1 | Intercept = 0.54 | Slope = 1
Post ME Trips
Pre ME Trips
0
20000
40000
60000

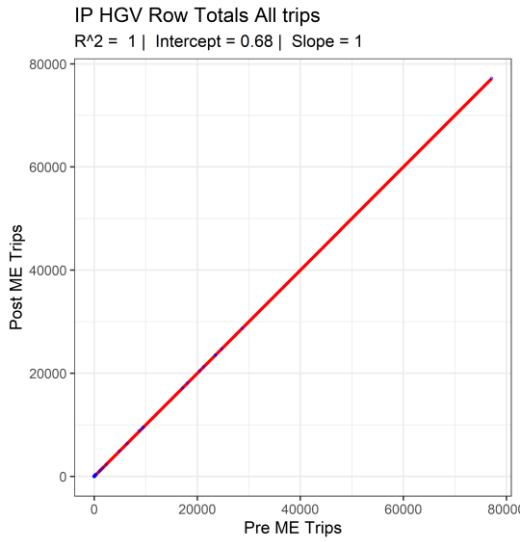

AM Car Row Totals < 500 only
R^2 = 0.97 | Intercept = 4.26 | Slope = 0.99
Post ME Trips
Pre ME Trips
0
100
200
300
400
500

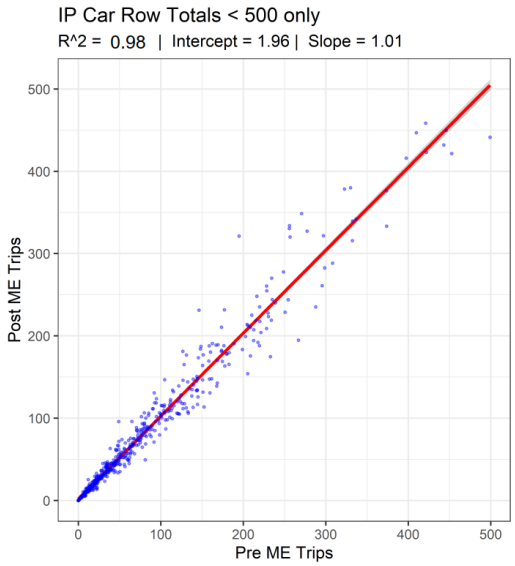

AM LGV Row Totals < 500 only
R^2 = 0.99 | Intercept = -0.438 | Slope = 1.01
Post ME Trips
Pre ME Trips
0
100
200
300
400

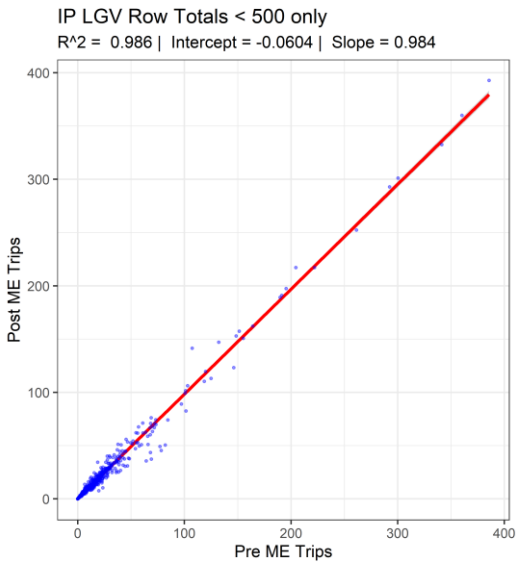

AM HGV Column Totals < 500 only
R^2 = 0.99 | Intercept = 0.258 | Slope = 1.01
Post ME Trips
Pre ME Trips
0
100
200
300
400

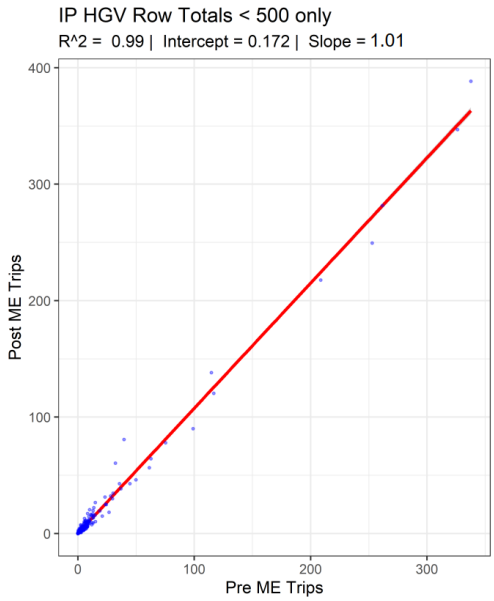

IP Car Row Totals All trips
R^2 = 1 | Intercept = 1.33 | Slope = 1
Post ME Trips
Pre ME Trips
0
10000
20000
30000
40000

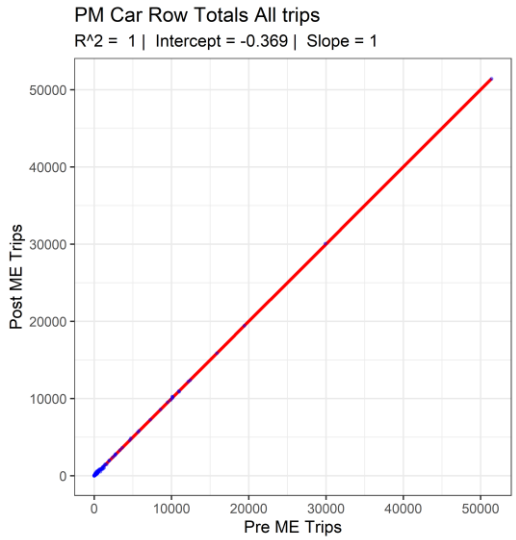

IP LGV Row Totals All trips
R^2 = 1 | Intercept = -1.14 | Slope = 1
Post ME Trips
Pre ME Trips
0
20000
40000
60000
80000

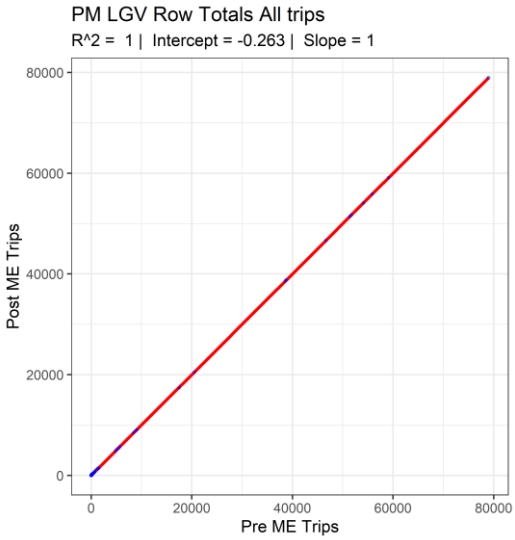

IP HGV Row Totals All trips
R^2 = 1 | Intercept = 0.68 | Slope = 1
Post ME Trips
Pre ME Trips
0
20000
40000
60000
80000

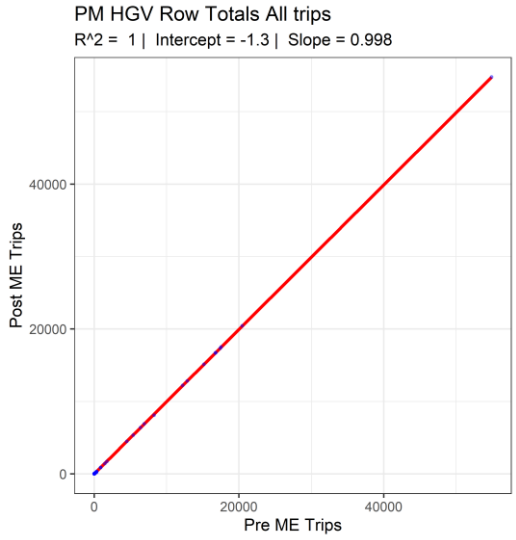

IP Car Row Totals < 500 only
R^2 = 0.98 | Intercept = 1.96 | Slope = 1.01
Post ME Trips
Pre ME Trips
0
100
200
300
400
500

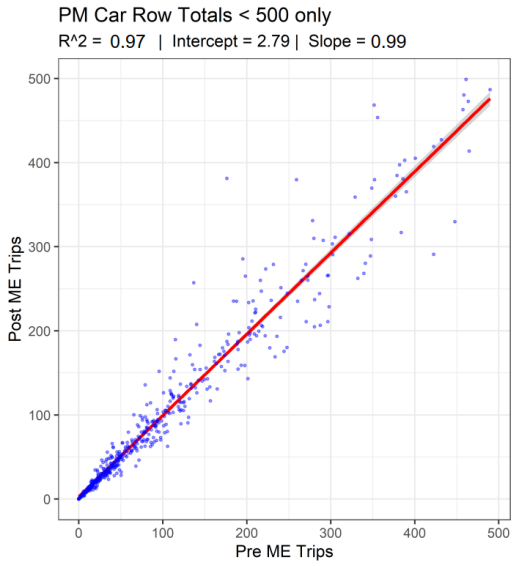

IP LGV Row Totals < 500 only
R^2 = 0.986 | Intercept = -0.0604 | Slope = 0.984
Post ME Trips
Pre ME Trips
0
100
200
300
400

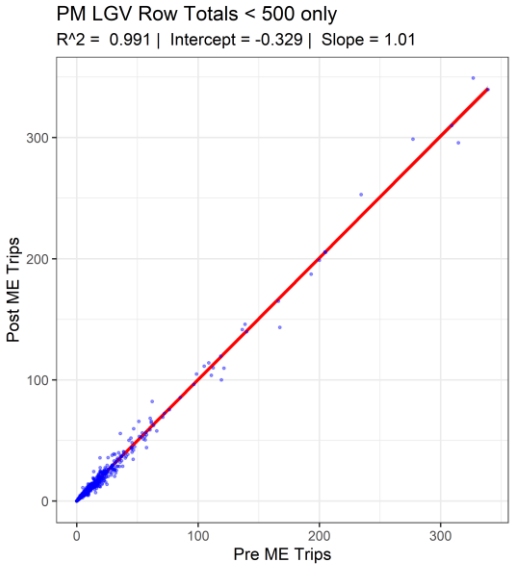

IP HGV Row Totals < 500 only
R^2 = 0.99 | Intercept = 0.172 | Slope = 1.01
Post ME Trips
Pre ME Trips
0
100
200
300
400

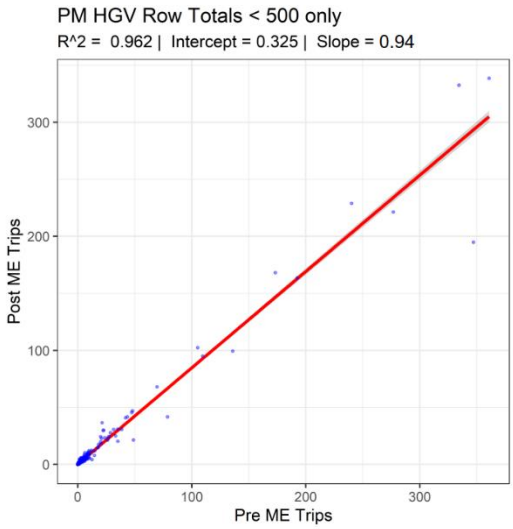

PM Car Row Totals All trips
R^2 = 1 | Intercept = -0.369 | Slope = 1
Post ME Trips
Pre ME Trips
0
10000
20000
30000
40000
50000


PM LGV Row Totals All trips
R^2 = 1 | Intercept = -0.263 | Slope = 1
Post ME Trips
Pre ME Trips
0
20000
40000
60000
80000

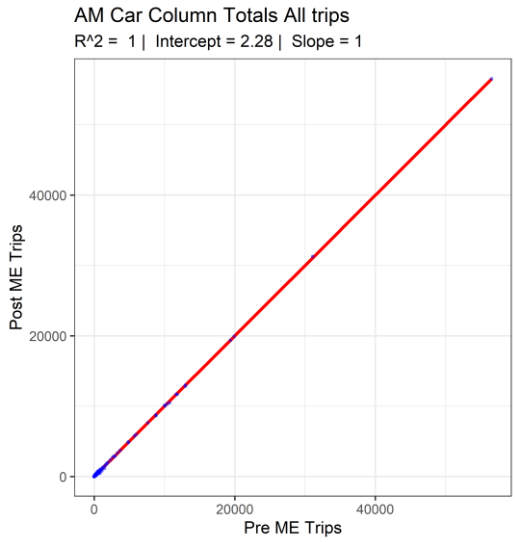

PM HGV Row Totals All trips
R^2 = 1 | Intercept = -1.3 | Slope = 0.998
Post ME Trips
Pre ME Trips
0
20000
40000

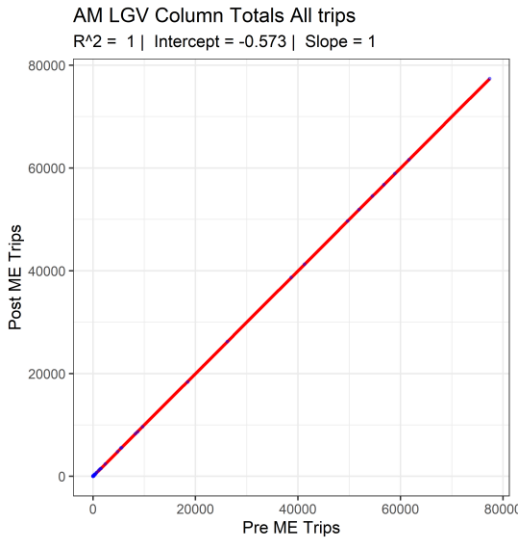

PM Car Row Totals < 500 only
R^2 = 0.97 | Intercept = 2.79 | Slope = 0.99
Post ME Trips
Pre ME Trips
0
100
200
300
400
500

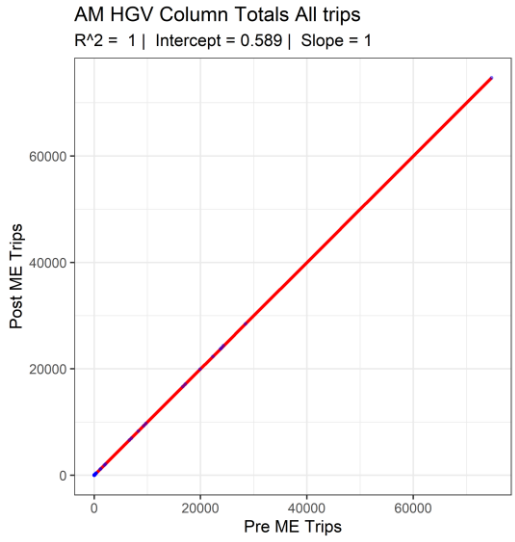

PM LGV Row Totals < 500 only
R^2 = 0.991 | Intercept = -0.329 | Slope = 1.01
Post ME Trips
Pre ME Trips
0
100
200
300

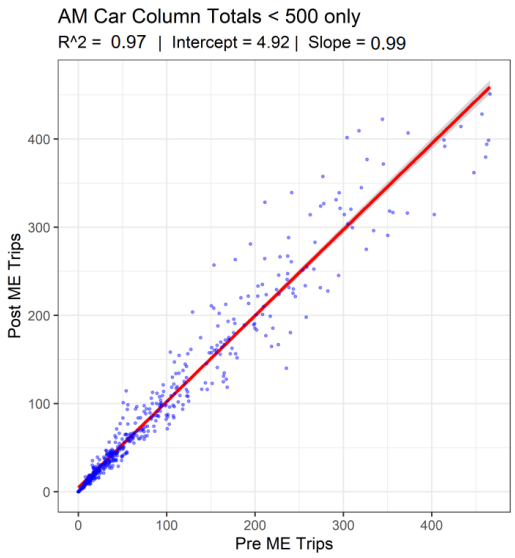

PM HGV Row Totals < 500 only
R^2 = 0.962 | Intercept = 0.325 | Slope = 0.94
Post ME Trips
Pre ME Trips
0
100
200
300

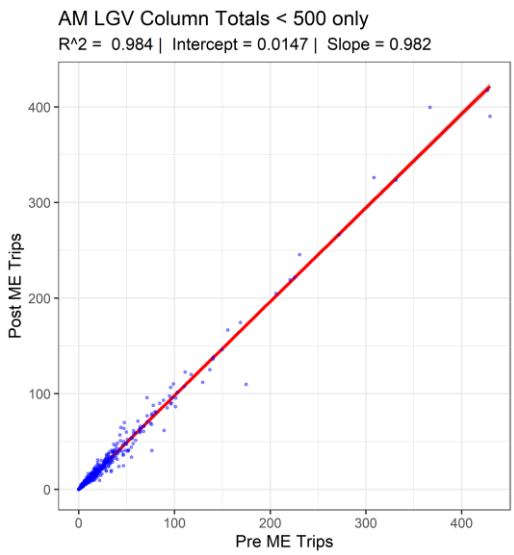
3. Column Totals

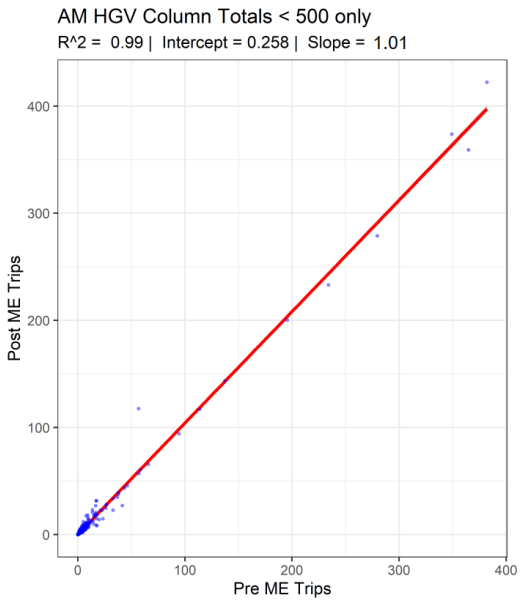


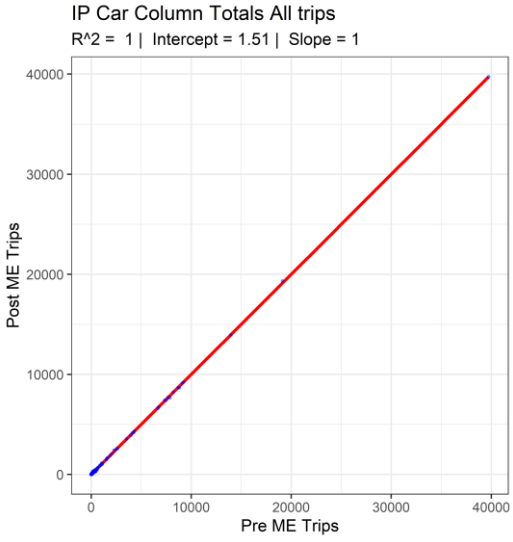


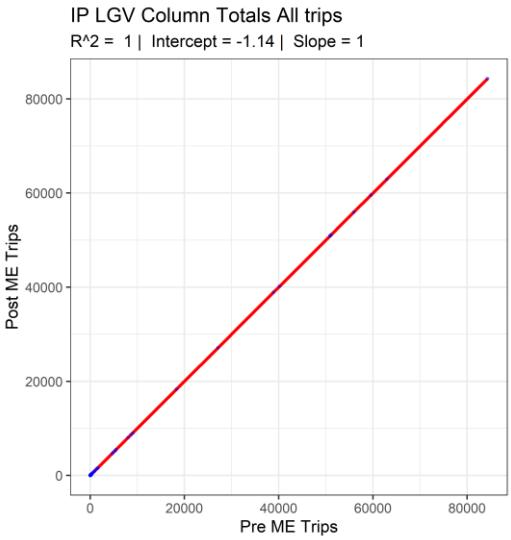


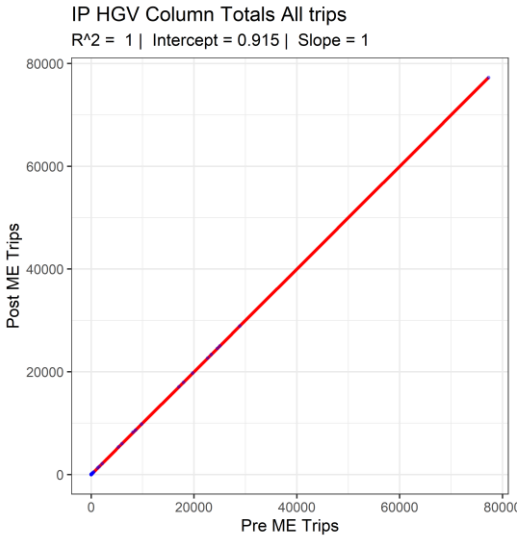

AM Car Column Totals < 500 only
R^2 = 0.97 | Intercept = 4.92 | Slope = 0.99
Post ME Trips
Pre ME Trips
0
100
200
300
400

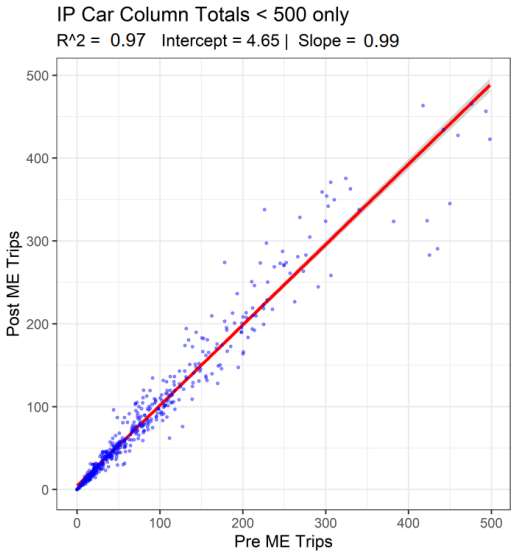

AM LGV Column Totals < 500 only
R^2 = 0.984 | Intercept = 0.0147 | Slope = 0.982
Post ME Trips
Pre ME Trips
0
100
200
300
400

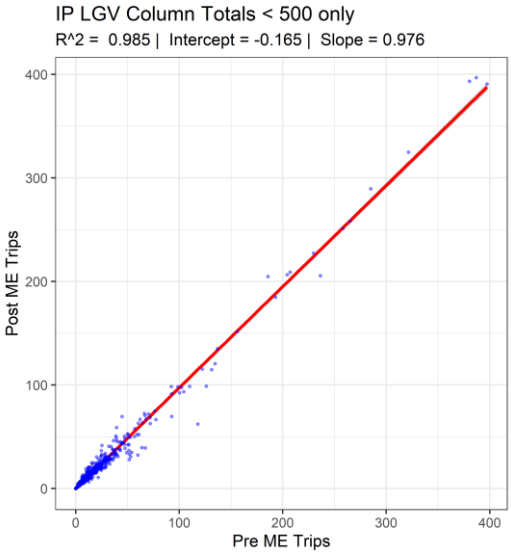

AM HGV Column Totals < 500 only
R^2 = 0.99 | Intercept = 0.258 | Slope = 1.01
Post ME Trips
Pre ME Trips
0
100
200
300
400

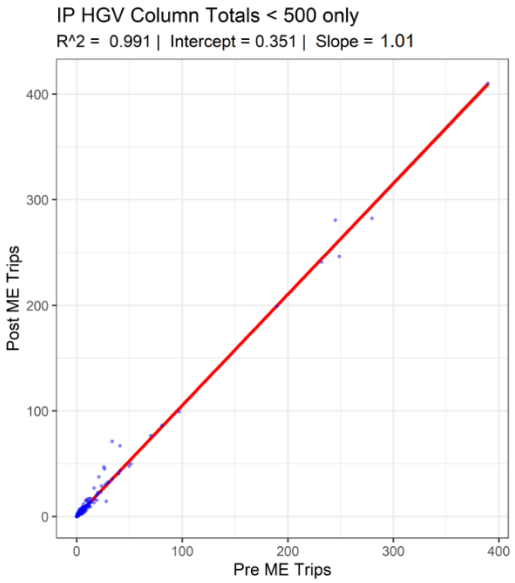

IP Car Column Totals All trips
R^2 = 1 | Intercept = 1.51 | Slope = 1
Post ME Trips
Pre ME Trips
0
10000
20000
30000
40000

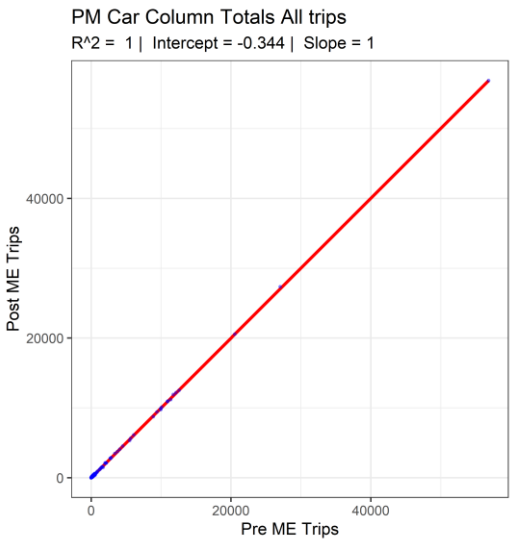

IP LGV Column Totals All trips
R^2 = 1 | Intercept = -1.14 | Slope = 1
Post ME Trips
Pre ME Trips
0
20000
40000
60000
80000

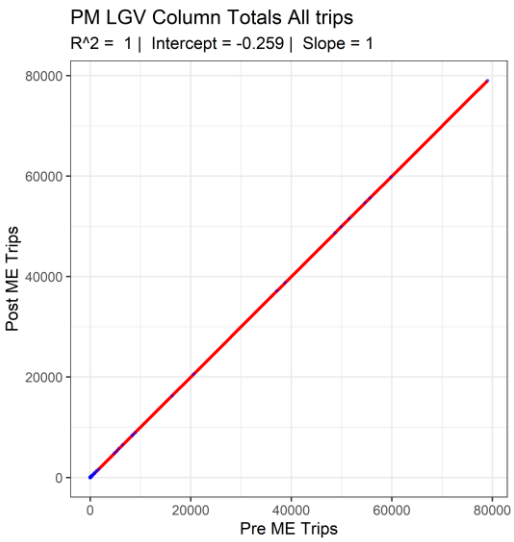

IP HGV Column Totals All trips
R^2 = 1 | Intercept = 0.915 | Slope = 1
Post ME Trips
Pre ME Trips
0
20000
40000
60000
80000

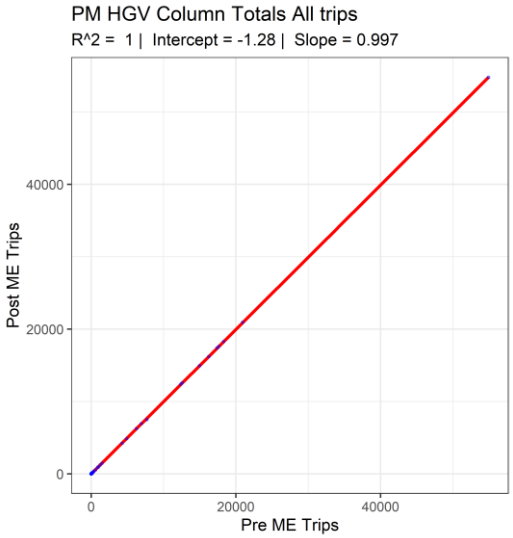

IP Car Column Totals < 500 only
R^2 = 0.97 Intercept = 4.65 | Slope = 0.99
Post ME Trips
Pre ME Trips
0
100
200
300
400
500

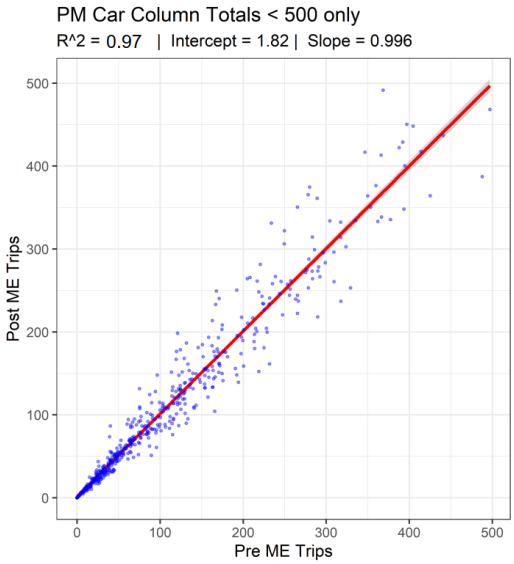

IP LGV Column Totals < 500 only
R^2 = 0.985 | Intercept = -0.165 | Slope = 0.976
Post ME Trips
Pre ME Trips
0
100
200
300
400

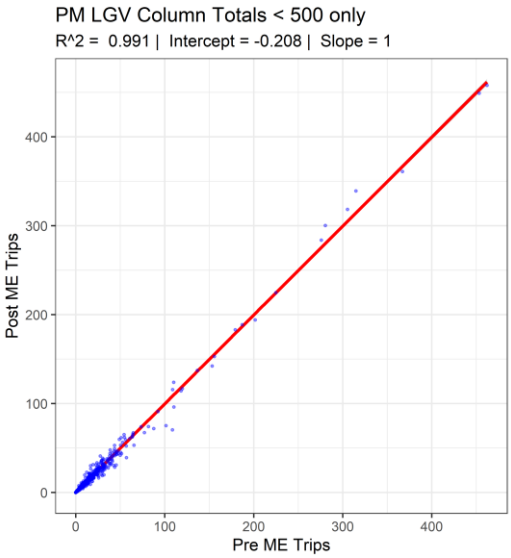

IP HGV Column Totals < 500 only
R^2 = 0.991 | Intercept = 0.351 | Slope = 1.01
Post ME Trips
Pre ME Trips
0
100
200
300
400

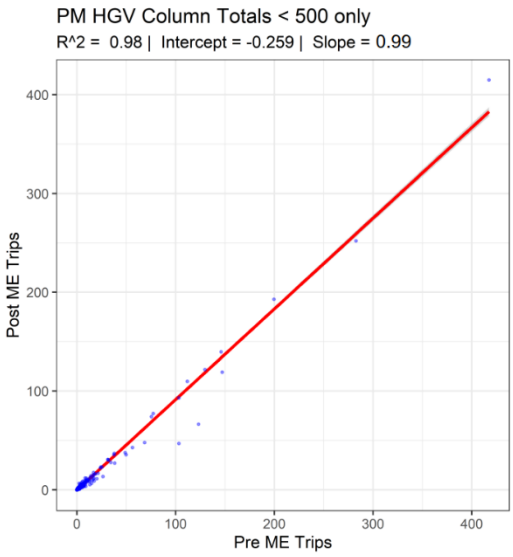

PM Car Column Totals All trips
R^2 = 1 | Intercept = -0.344 | Slope = 1
Post ME Trips
Pre ME Trips
0
20000
40000


PM LGV Column Totals All trips
R^2 = 1 | Intercept = -0.259 | Slope = 1
Post ME Trips
Pre ME Trips
0
20000
40000
60000
80000


PM HGV Column Totals All trips
R^2 = 1 | Intercept = -1.28 | Slope = 0.997
Post ME Trips
Pre ME Trips
0
20000
40000


PM Car Column Totals < 500 only
R^2 = 0.97 | Intercept = 1.82 | Slope = 0.996
Post ME Trips
Pre ME Trips
0
100
200
300
400
500


PM LGV Column Totals < 500 only
R^2 = 0.991 | Intercept = -0.208 | Slope = 1
Post ME Trips
Pre ME Trips
0
100
200
300
400


PM HGV Column Totals < 500 only
R^2 = 0.98 | Intercept = -0.259 | Slope = 0.99
Post ME Trips
Pre ME Trips
0
100
200
300
400

HGV Sector-to-Sector changes

AM Sector to Sector Changes - HGV Trips

OS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
1	-	-	0	3	0	0	1	1	0	1	3	10	3	1	0	0	1	1	27	-	0	0	0	1	3	0	9	1	0	0	0	1	0	-
2	-	-	0	0	0	0	0	0	0	0	0	2	1	0	3	0	2	5	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	4	0	0	0	1	0	0	0	0	0	0	8	1	0	3	0	2	2	2	0	0	0	0	0	1	0	0	0	9	0	0	0	0	0
5	0	0	0	0	-	-	0	0	0	0	0	10	3	0	2	0	6	6	14	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
6	1	0	0	0	-	-	1	1	0	0	1	1	0	0	0	0	1	1	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	2	1	0	0	3	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	1	0	0	1	1	0	0	0	0	0
8	5	0	0	0	0	0	1	0	0	0	0	1	0	0	1	0	1	0	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0
10	0	1	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	3	0	1	1	2	2	1	1	0	1	1	1	4	0	0
11	47	0	0	0	0	2	0	1	0	0	0	3	1	0	2	0	1	1	4	0	0	0	0	0	2	0	8	3	1	0	0	0	0	0
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AM Sector to Sector % difference- HGV Trips

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AM Sector to Sector GEH - HGV Trips

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17	-8	9	1	1	7	-0	-0	-0	-1	-0	4	1	-	0	-	-1	-	-	-	-	-1	-0	1	-1	-1	1	-1	-2	-3	-0	1	3	0	0
18	-18	14	1	1	13	-0	-1	-3	-1	0	6	7	-	0	-	-2	-	-	-	-	-6	-1	1	-7	-4	2	-1	-3	-5	-2	2	7	0	1
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IP Sector to Sector % difference- HGV Trips

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PM Sector to Sector Changes - HGV Trips

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12	11	9	0	1	1	0	0	0	0	4	16	1	2	3	35	0	6	23	1	0	3	1	2	7	4	12	0	0	0	0	2	23	1	0
13	8	5	0	1	1	0	0	0	0	0	7	1	-	0	-	0	-	-	-	27	0	1	0	0	0	2	0	0	0	1	0	1	0	0
14	3	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
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17	43	10	0	1	4	0	0	0	1	0	10	4	-	0	-	0	-	-	-	-	0	1	2	1	1	2	0	0	0	0	0	2	0	0
18	90	20	0	2	7	1	0	0	1	0	18	21	-	1	-	0	-	-	-	-	0	1	1	2	1	0	0	0	0	0	1	4	1	0
19	56	22	0	5	8	1	0	0	1	1	25	14	-	0	-	0	-	-	-	-	0	8	9	1	3	17	2	1	2	0	4	15	0	0
20	-	-	0	0	0	0	0	0	-	6	-	0	40	4	0	0	-	-	-	-	4	0	1	3	17	1	0	0	0	0	3	9	2	-
21	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	0	0	1	15	1	1	0	1	0	0	0	0	0	1	0	0	0	0	0
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0	0	0	0	0	1	1	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0	0	0	3	1	0	1	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	-	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	4	0	0	1	0	0	0	0	1	0	0	2	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0
28	1	0	0	1	0	0	0	0	2	0	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
29	0	0	0	0	0	0	1	0	2	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	1	2	0	3	0	0	0	0	7	0	0	0	0	0	2	0
31	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	2	2	1	0	1	1	3	1	0	0	0	0	0	0	0	0	0
33	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	-	0
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PM Sector to Sector % difference- HGV Trips

OS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
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Appendix I – Calibration and Validation Results

Cars - AM Peak Hour Calibration Screenlines

Screenline Number	Direction	Screenline Code	Use	Observed Flow	Modelled Flow	Number of links	% of Links Compliant	Actual Difference	GEH	% Difference	% Difference Compliant
1	In	1_I	Calibration	3236	3238	3	100%	-2	0	0%	Pass
2	In	2_I	Calibration	1372	1505	4	50%	-133	4	10%	Fail
3	In	3_I	Calibration	1013	1042	3	100%	-29	1	3%	Pass
4	In	4_I	Calibration	4415	4367	10	100%	48	1	1%	Pass
5	In	5_I	Calibration	4863	4640	8	88%	223	3	5%	Pass
6	In	6_I	Calibration	4989	4857	5	100%	132	2	3%	Pass
7	In	7_I	Calibration	4555	4512	10	90%	43	1	1%	Pass
8	In	8_I	Calibration	7183	7185	6	100%	-2	0	0%	Pass
9	In	9_I	Calibration	1393	1393	4	100%	0	0	0%	Pass
10	In	10_I	Calibration	7478	7301	6	83%	177	2.06	2%	Pass
11	In	11_I	Calibration	5148	5285	9	89%	-137	2	3%	Pass
12	In	12_I	Calibration	1068	1068	3	100%	0	0	0%	Pass
13	In	13_I	Calibration	836	716	7	86%	120	4.3	14%	Fail
14	In	14_I	Calibration	4111	4025	6	100%	86	1	2%	Pass
15	In	15_I	Model Development	12850	12781	19	89%	69	1	1%	Pass
1	Out	1_O	Calibration	3123	3104	3	100%	19	0	1%	Pass
2	Out	2_O	Calibration	1581	1534	4	75%	47	1.2	3%	Pass
3	Out	3_O	Calibration	956	1092	3	67%	-136	4.26	14%	Fail
4	Out	4_O	Calibration	4587	4725	10	90%	-138	2	3%	Pass
5	Out	5_O	Calibration	3274	3224	9	100%	50	1	2%	Pass
6	Out	6_O	Calibration	2326	2344	5	100%	-18	0	1%	Pass
7	Out	7_O	Calibration	3169	3114	10	100%	55	1	2%	Pass
8	Out	8_O	Calibration	6791	6788	6	100%	3	0	0%	Pass
9	Out	9_O	Calibration	1043	1075	4	100%	-32	1	3%	Pass
10	Out	10_O	Calibration	7144	6816	6	83%	328	3.92	5%	Pass
11	Out	11_O	Calibration	4923	4907	9	100%	16	0	0%	Pass
12	Out	12_O	Calibration	1058	1121	3	100%	-63	2	6%	Fail
13	Out	13_O	Calibration	706	595	7	100%	111	4.35	16%	Fail
14	Out	14_O	Calibration	4234	4121	6	100%	113	2	3%	Pass
15	Out	15_O	Model Development	9984	9921	19	100%	63	1	1%	Pass

LGV - AM Peak Hour Calibration Screenlines

Screenline Number	Direction	Screenline Code	Use	Observed Flow	Modelled Flow	Number of links	% of Links Compliant	Actual Difference	GEH	% Difference	% Difference Compliant
1	In	1_I	Calibration	575	539	3	100%	36	2	6%	Fail
2	In	2_I	Calibration	121	148	4	100%	-27	2	23%	Fail
3	In	3_I	Calibration	192	192	3	100%	0	0	0%	Pass
4	In	4_I	Calibration	768	775	10	100%	-7	0	1%	Pass
5	In	5_I	Calibration	535	526	8	100%	9	0	2%	Pass
6	In	6_I	Calibration	659	564	5	100%	95	4	14%	Fail
7	In	7_I	Calibration	458	424	10	100%	34	2	7%	Fail
8	In	8_I	Calibration	1557	1678	6	100%	-121	3	8%	Fail
9	In	9_I	Calibration	213	213	4	100%	0	0	0%	Pass
10	In	10_I	Calibration	1587	1589	6	100%	-2	0.05	0%	Pass
11	In	11_I	Calibration	976	1029	9	100%	-53	2	5%	Pass
12	In	12_I	Calibration	142	138	3	100%	4	0	3%	Pass
13	In	13_I	Calibration	89	82	7	100%	7	0.8	8%	Fail
14	In	14_I	Calibration	552	633	6	100%	-81	3	15%	Fail
15	In	15_I	Model Development	1563	1512	19	100%	51	1	3%	Pass
1	Out	1_O	Calibration	657	614	3	100%	43	2	7%	Fail
2	Out	2_O	Calibration	187	155	4	100%	32	2.5	17%	Fail
3	Out	3_O	Calibration	199	215	3	100%	-16	1.08	8%	Fail
4	Out	4_O	Calibration	904	900	10	100%	4	0	0%	Pass
5	Out	5_O	Calibration	553	531	9	100%	22	1	4%	Pass
6	Out	6_O	Calibration	379	457	5	100%	-78	4	21%	Fail
7	Out	7_O	Calibration	395	407	10	100%	-12	1	3%	Pass
8	Out	8_O	Calibration	1490	1631	6	83%	-141	4	9%	Fail
9	Out	9_O	Calibration	175	186	4	100%	-11	1	6%	Fail
10	Out	10_O	Calibration	1577	1521	6	100%	56	1.42	4%	Pass
11	Out	11_O	Calibration	1044	1057	9	100%	-13	0	1%	Pass
12	Out	12_O	Calibration	108	108	3	100%	0	0	0%	Pass
13	Out	13_O	Calibration	83	90	7	100%	-7	0.75	8%	Fail
14	Out	14_O	Calibration	657	671	6	100%	-14	1	2%	Pass
15	Out	15_O	Model Development	1485	1494	19	100%	-9	0	1%	Pass

HGV - AM Peak Hour Calibration Screenlines

Screenline Number	Direction	Screenline Code	Use	Observed Flow	Modelled Flow	Number of links	% of Links Compliant	Actual Difference	GEH	% Difference	% Difference Compliant
1	In	1_I	Calibration	134	148	3	100%	-14	1	10%	Fail
2	In	2_I	Calibration	6	15	4	100%	-9	3	147%	Fail
3	In	3_I	Calibration	35	35	3	100%	0	0	0%	Pass
4	In	4_I	Calibration	119	130	10	100%	-11	1	9%	Fail
5	In	5_I	Calibration	95	75	8	100%	20	2	21%	Fail
6	In	6_I	Calibration	111	98	5	100%	13	1	12%	Fail
7	In	7_I	Calibration	42	50	10	100%	-8	1	18%	Fail
8	In	8_I	Calibration	749	786	6	100%	-37	1	5%	Pass
9	In	9_I	Calibration	36	40	4	100%	-4	1	11%	Fail
10	In	10_I	Calibration	764	781	6	100%	-17	0.61	2%	Pass
11	In	11_I	Calibration	303	316	9	100%	-13	1	4%	Pass
12	In	12_I	Calibration	15	13	3	100%	2	1	15%	Fail
13	In	13_I	Calibration	10	20	7	100%	-10	2.5	98%	Fail
14	In	14_I	Calibration	160	152	6	100%	8	1	5%	Pass
15	In	15_I	Model Development	214	191	19	100%	23	2	11%	Fail
1	Out	1_O	Calibration	186	215	3	100%	-29	2	15%	Fail
2	Out	2_O	Calibration	18	29	4	100%	-11	2.3	62%	Fail
3	Out	3_O	Calibration	23	30	3	100%	-7	1.40	31%	Fail
4	Out	4_O	Calibration	125	136	10	100%	-11	1	9%	Fail
5	Out	5_O	Calibration	52	57	9	100%	-5	1	9%	Fail
6	Out	6_O	Calibration	68	35	5	100%	33	5	49%	Fail
7	Out	7_O	Calibration	45	54	10	100%	-9	1	20%	Fail
8	Out	8_O	Calibration	737	740	6	100%	-3	0	0%	Pass
9	Out	9_O	Calibration	19	17	4	100%	2	0	9%	Fail
10	Out	10_O	Calibration	756	711	6	100%	45	1.65	6%	Fail
11	Out	11_O	Calibration	342	329	9	100%	13	1	4%	Pass
12	Out	12_O	Calibration	10	11	3	100%	-1	0	8%	Fail
13	Out	13_O	Calibration	11	7	7	100%	4	1.40	38%	Fail
14	Out	14_O	Calibration	211	236	6	100%	-25	2	12%	Fail
15	Out	15_O	Model Development	197	185	19	100%	12	1	6%	Fail

Car - IP Peak Hour Calibration Screenlines

Screenline Number	Direction	Screenline Code	Use	Observed Flow	Modelled Flow	Number of links	% of Links Compliant	Actual Difference	GEH	% Difference	% Difference Compliant
1	In	1_I	Calibration	2209	2184	3	100%	25	1	1%	Pass
2	In	2_I	Calibration	1173	1108	4	100%	65	2	6%	Fail
3	In	3_I	Calibration	696	674	3	100%	22	1	3%	Pass
4	In	4_I	Calibration	3208	3074	10	90%	134	2	4%	Pass
5	In	5_I	Calibration	3306	3294	8	100%	12	0	0%	Pass
6	In	6_I	Calibration	2793	2771	5	100%	22	0	1%	Pass
7	In	7_I	Calibration	2986	2879	10	100%	107	2	4%	Pass
8	In	8_I	Calibration	5469	5464	6	100%	5	0	0%	Pass
9	In	9_I	Calibration	784	797	4	100%	-13	0	2%	Pass
10	In	10_I	Calibration	5593	5368	6	83%	225	3.04	4%	Pass
11	In	11_I	Calibration	3076	3023	9	100%	53	1	2%	Pass
12	In	12_I	Calibration	689	652	3	100%	37	1	5%	Pass
13	In	13_I	Calibration	314	368	7	100%	-54	2.9	17%	Fail
14	In	14_I	Calibration	2732	2685	6	100%	47	1	2%	Pass
15	In	15_I	Model Development	8374	8406	19	95%	-32	0	0%	Pass
1	Out	1_O	Calibration	2279	2278	3	100%	1	0	0%	Pass
2	Out	2_O	Calibration	1080	970	4	100%	110	3.4	10%	Fail
3	Out	3_O	Calibration	767	863	3	67%	-96	3.36	12%	Fail
4	Out	4_O	Calibration	3261	3206	10	100%	55	1	2%	Pass
5	Out	5_O	Calibration	3714	3767	9	100%	-53	1	1%	Pass
6	Out	6_O	Calibration	3060	3036	5	100%	24	0	1%	Pass
7	Out	7_O	Calibration	3093	2919	10	100%	174	3	6%	Fail
8	Out	8_O	Calibration	5677	5662	6	100%	15	0	0%	Pass
9	Out	9_O	Calibration	876	883	4	100%	-7	0	1%	Pass
10	Out	10_O	Calibration	5837	5810	6	100%	27	0.35	0%	Pass
11	Out	11_O	Calibration	3046	3012	9	100%	34	1	1%	Pass
12	Out	12_O	Calibration	794	784	3	100%	10	0	1%	Pass
13	Out	13_O	Calibration	385	331	7	100%	54	2.85	14%	Fail
14	Out	14_O	Calibration	2870	2728	6	100%	142	3	5%	Pass
15	Out	15_O	Model Development	8695	8714	19	100%	-19	0	0%	Pass

LGV - IP Peak Hour Calibration Screenlines

Screenline Number	Direction	Screenline Code	Use	Observed Flow	Modelled Flow	Number of links	% of Links Compliant	Actual Difference	GEH	% Difference	% Difference Compliant
1	In	1_I	Calibration	486	485	3	100%	1	0	0%	Pass
2	In	2_I	Calibration	157	163	4	100%	-6	0	4%	Pass
3	In	3_I	Calibration	148	152	3	100%	-4	0	3%	Pass
4	In	4_I	Calibration	659	655	10	100%	4	0	1%	Pass
5	In	5_I	Calibration	623	637	8	100%	-14	1	2%	Pass
6	In	6_I	Calibration	456	486	5	100%	-30	1	6%	Fail
7	In	7_I	Calibration	454	439	10	100%	15	1	3%	Pass
8	In	8_I	Calibration	1313	1315	6	100%	-2	0	0%	Pass
9	In	9_I	Calibration	159	168	4	100%	-9	1	6%	Fail
10	In	10_I	Calibration	1277	1253	6	100%	24	0.68	2%	Pass
11	In	11_I	Calibration	738	731	9	100%	7	0	1%	Pass
12	In	12_I	Calibration	109	109	3	100%	0	0	0%	Pass
13	In	13_I	Calibration	44	55	7	100%	-11	1.6	26%	Fail
14	In	14_I	Calibration	540	519	6	100%	21	1	4%	Pass
15	In	15_I	Model Development	1472	1540	19	100%	-68	2	5%	Pass
1	Out	1_O	Calibration	481	447	3	100%	34	2	7%	Fail
2	Out	2_O	Calibration	142	139	4	100%	3	0.2	2%	Pass
3	Out	3_O	Calibration	173	201	3	100%	-28	2.08	16%	Fail
4	Out	4_O	Calibration	700	707	10	100%	-7	0	1%	Pass
5	Out	5_O	Calibration	620	639	9	100%	-19	1	3%	Pass
6	Out	6_O	Calibration	483	500	5	100%	-17	1	4%	Pass
7	Out	7_O	Calibration	421	424	10	100%	-3	0	1%	Pass
8	Out	8_O	Calibration	1450	1456	6	100%	-6	0	0%	Pass
9	Out	9_O	Calibration	160	161	4	100%	-1	0	1%	Pass
10	Out	10_O	Calibration	1448	1411	6	100%	37	0.97	3%	Pass
11	Out	11_O	Calibration	755	641	9	89%	114	4	15%	Fail
12	Out	12_O	Calibration	109	109	3	100%	0	0	0%	Pass
13	Out	13_O	Calibration	52	57	7	100%	-5	0.65	9%	Fail
14	Out	14_O	Calibration	467	510	6	100%	-43	2	9%	Fail
15	Out	15_O	Model Development	1385	1388	19	100%	-3	0	0%	Pass

HGV - IP Peak Hour Calibration Screenlines

Screenline Number	Direction	Screenline Code	Use	Observed Flow	Modelled Flow	Number of links	% of Links Compliant	Actual Difference	GEH	% Difference	% Difference Compliant
1	In	1_I	Calibration	160	172	3	100%	-12	1	8%	Fail
2	In	2_I	Calibration	17	17	4	100%	0	0	2%	Pass
3	In	3_I	Calibration	25	19	3	100%	6	1	23%	Fail
4	In	4_I	Calibration	112	123	10	100%	-11	1	10%	Fail
5	In	5_I	Calibration	88	67	8	100%	21	2	24%	Fail
6	In	6_I	Calibration	79	55	5	100%	24	3	31%	Fail
7	In	7_I	Calibration	47	46	10	100%	1	0	2%	Pass
8	In	8_I	Calibration	739	711	6	100%	28	1	4%	Pass
9	In	9_I	Calibration	25	25	4	100%	0	0	1%	Pass
10	In	10_I	Calibration	736	698	6	100%	38	1.41	5%	Pass
11	In	11_I	Calibration	290	263	9	100%	27	2	9%	Fail
12	In	12_I	Calibration	12	12	3	100%	0	0	0%	Pass
13	In	13_I	Calibration	8	15	7	100%	-7	2.0	86%	Fail
14	In	14_I	Calibration	161	175	6	100%	-14	1	9%	Fail
15	In	15_I	Model Development	183	201	19	100%	-18	1	10%	Fail
1	Out	1_O	Calibration	144	143	3	100%	1	0	0%	Pass
2	Out	2_O	Calibration	17	17	4	100%	0	0.0	1%	Pass
3	Out	3_O	Calibration	35	37	3	100%	-2	0.40	7%	Fail
4	Out	4_O	Calibration	127	136	10	100%	-9	1	7%	Fail
5	Out	5_O	Calibration	89	80	9	100%	9	1	11%	Fail
6	Out	6_O	Calibration	91	56	5	100%	35	4	38%	Fail
7	Out	7_O	Calibration	52	53	10	100%	-1	0	3%	Pass
8	Out	8_O	Calibration	793	781	6	100%	12	0	2%	Pass
9	Out	9_O	Calibration	24	21	4	100%	3	1	12%	Fail
10	Out	10_O	Calibration	791	757	6	100%	34	1.22	4%	Pass
11	Out	11_O	Calibration	276	204	9	100%	72	5	26%	Fail
12	Out	12_O	Calibration	12	13	3	100%	-1	0	9%	Fail
13	Out	13_O	Calibration	9	4	7	100%	5	1.93	55%	Fail
14	Out	14_O	Calibration	136	149	6	100%	-13	1	10%	Fail
15	Out	15_O	Model Development	200	209	19	100%	-9	1	4%	Pass

Car - PM Peak Hour Calibration Screenlines

Screenline Number	Direction	Screenline Code	Use	Observed Flow	Modelled Flow	Number of links	% of Links Compliant	Actual Difference	GEH	% Difference	% Difference Compliant
1	In	1_I	Calibration	3299	3298	3	100%	1	0	0%	Pass
2	In	2_I	Calibration	1590	1484	4	75%	106	3	7%	Fail
3	In	3_I	Calibration	1018	963	3	100%	55	2	5%	Pass
4	In	4_I	Calibration	4999	4859	10	90%	140	2	3%	Pass
5	In	5_I	Calibration	3735	3692	8	100%	43	1	1%	Pass
6	In	6_I	Calibration	3369	3321	5	100%	48	1	1%	Pass
7	In	7_I	Calibration	3472	3426	10	100%	46	1	1%	Pass
8	In	8_I	Calibration	8020	8028	6	100%	-8	0	0%	Pass
9	In	9_I	Calibration	1049	1056	4	100%	-7	0	1%	Pass
10	In	10_I	Calibration	7805	7474	6	83%	331	3.79	4%	Pass
11	In	11_I	Calibration	5569	5480	9	100%	89	1	2%	Pass
12	In	12_I	Calibration	833	881	3	67%	-48	2	6%	Fail
13	In	13_I	Calibration	519	620	7	86%	-101	4.2	20%	Fail
14	In	14_I	Calibration	4227	4182	6	100%	45	1	1%	Pass
15	In	15_I	Model Development	12068	11431	19	89%	637	6	5%	Pass
1	Out	1_O	Calibration	3631	3613	3	100%	18	0	0%	Pass
2	Out	2_O	Calibration	1612	1487	4	75%	125	3.2	8%	Fail
3	Out	3_O	Calibration	1232	1300	3	100%	-68	1.90	5%	Pass
4	Out	4_O	Calibration	4675	4618	10	100%	57	1	1%	Pass
5	Out	5_O	Calibration	5236	5247	9	100%	-11	0	0%	Pass
6	Out	6_O	Calibration	4999	4815	5	100%	184	3	4%	Pass
7	Out	7_O	Calibration	4537	4262	10	90%	275	4	6%	Fail
8	Out	8_O	Calibration	8727	8721	6	100%	6	0	0%	Pass
9	Out	9_O	Calibration	1433	1438	4	100%	-5	0	0%	Pass
10	Out	10_O	Calibration	9223	9050	6	83%	173	1.81	2%	Pass
11	Out	11_O	Calibration	5617	5519	9	100%	98	1	2%	Pass
12	Out	12_O	Calibration	1170	1198	3	100%	-28	1	2%	Pass
13	Out	13_O	Calibration	649	656	7	100%	-7	0.29	1%	Pass
14	Out	14_O	Calibration	4595	4370	6	100%	225	3	5%	Pass
15	Out	15_O	Model Development	12764	12662	19	84%	102	1	1%	Pass

LGV - PM Peak Hour Calibration Screenlines

Screenline Number	Direction	Screenline Code	Use	Observed Flow	Modelled Flow	Number of links	% of Links Compliant	Actual Difference	GEH	% Difference	% Difference Compliant
1	In	1_I	Calibration	514	411	3	100%	103	5	20%	Fail
2	In	2_I	Calibration	151	161	4	100%	-10	1	7%	Fail
3	In	3_I	Calibration	124	124	3	100%	0	0	0%	Pass
4	In	4_I	Calibration	619	626	10	100%	-7	0	1%	Pass
5	In	5_I	Calibration	458	412	8	100%	46	2	10%	Fail
6	In	6_I	Calibration	321	348	5	100%	-27	1	8%	Fail
7	In	7_I	Calibration	342	346	10	100%	-4	0	1%	Pass
8	In	8_I	Calibration	1198	1413	6	83%	-215	6	18%	Fail
9	In	9_I	Calibration	103	103	4	100%	0	0	0%	Pass
10	In	10_I	Calibration	1327	1270	6	100%	57	1.57	4%	Pass
11	In	11_I	Calibration	902	884	9	100%	18	1	2%	Pass
12	In	12_I	Calibration	102	101	3	100%	1	0	1%	Pass
13	In	13_I	Calibration	58	66	7	100%	-8	1.0	14%	Fail
14	In	14_I	Calibration	405	466	6	100%	-61	3	15%	Fail
15	In	15_I	Model Development	1314	1286	19	100%	28	1	2%	Pass
1	Out	1_O	Calibration	470	369	3	100%	101	5	22%	Fail
2	Out	2_O	Calibration	135	119	4	100%	16	1.5	12%	Fail
3	Out	3_O	Calibration	149	152	3	100%	-3	0.21	2%	Pass
4	Out	4_O	Calibration	574	588	10	100%	-14	1	3%	Pass
5	Out	5_O	Calibration	480	465	9	100%	15	1	3%	Pass
6	Out	6_O	Calibration	472	392	5	100%	80	4	17%	Fail
7	Out	7_O	Calibration	370	353	10	100%	17	1	5%	Pass
8	Out	8_O	Calibration	1242	1384	6	83%	-142	4	11%	Fail
9	Out	9_O	Calibration	158	158	4	100%	0	0	0%	Pass
10	Out	10_O	Calibration	1311	1298	6	100%	13	0.37	1%	Pass
11	Out	11_O	Calibration	661	665	9	100%	-4	0	1%	Pass
12	Out	12_O	Calibration	113	113	3	100%	0	0	0%	Pass
13	Out	13_O	Calibration	75	75	7	100%	0	0.03	0%	Pass
14	Out	14_O	Calibration	375	405	6	100%	-30	2	8%	Fail
15	Out	15_O	Model Development	1133	1179	19	100%	-46	1	4%	Pass

HGV - PM Peak Hour Calibration Screenlines

Screenline Number	Direction	Screenline Code	Use	Observed Flow	Modelled Flow	Number of links	% of Links Compliant	Actual Difference	GEH	% Difference	% Difference Compliant
1	In	1_I	Calibration	76	101	3	100%	-25	3	33%	Fail
2	In	2_I	Calibration	17	23	4	100%	-6	1	34%	Fail
3	In	3_I	Calibration	15	15	3	100%	0	0	0%	Pass
4	In	4_I	Calibration	62	75	10	100%	-13	2	21%	Fail
5	In	5_I	Calibration	44	37	8	100%	7	1	16%	Fail
6	In	6_I	Calibration	41	26	5	100%	16	3	38%	Fail
7	In	7_I	Calibration	20	26	10	100%	-6	1	28%	Fail
8	In	8_I	Calibration	456	472	6	100%	-16	1	4%	Pass
9	In	9_I	Calibration	9	12	4	100%	-3	1	31%	Fail
10	In	10_I	Calibration	458	457	6	100%	1	0.05	0%	Pass
11	In	11_I	Calibration	169	175	9	100%	-6	0	3%	Pass
12	In	12_I	Calibration	4	2	3	100%	2	1	39%	Fail
13	In	13_I	Calibration	6	12	7	100%	-6	2.0	98%	Fail
14	In	14_I	Calibration	152	103	6	100%	49	4	32%	Fail
15	In	15_I	Model Development	94	73	19	100%	21	2	22%	Fail
1	Out	1_O	Calibration	68	73	3	100%	-5	1	7%	Fail
2	Out	2_O	Calibration	37	40	4	100%	-3	0.5	9%	Fail
3	Out	3_O	Calibration	14	14	3	100%	0	0.00	0%	Pass
4	Out	4_O	Calibration	55	65	10	100%	-10	1	18%	Fail
5	Out	5_O	Calibration	47	51	9	100%	-4	1	9%	Fail
6	Out	6_O	Calibration	36	33	5	100%	3	1	8%	Fail
7	Out	7_O	Calibration	38	49	10	100%	-11	2	30%	Fail
8	Out	8_O	Calibration	498	505	6	100%	-7	0	1%	Pass
9	Out	9_O	Calibration	13	11	4	100%	2	1	15%	Fail
10	Out	10_O	Calibration	500	486	6	100%	14	0.62	3%	Pass
11	Out	11_O	Calibration	145	161	9	100%	-16	1	11%	Fail
12	Out	12_O	Calibration	7	10	3	100%	-3	1	41%	Fail
13	Out	13_O	Calibration	8	4	7	100%	4	1.47	46%	Fail
14	Out	14_O	Calibration	108	72	6	100%	36	4	34%	Fail
15	Out	15_O	Model Development	88	106	19	100%	-18	2	20%	Fail

Cars - AM Peak Hour Validation Screenlines

Screenline Number	Direction	Screenline Code	Use	Observed Flow	Modelled Flow	Number of links	% of Links Compliant	Actual Difference	GEH	% Difference	% Difference Compliant
16	In	16_I	Validation	4209	4085	3	100%	123	1.9	3%	Pass
17	In	17_I	Validation	1426	1426	2	100%	0	0.0	0%	Pass
18	In	18_I	Validation	6249	6111	5	100%	138	1.8	2%	Pass
19	In	19_I	Validation	1750	1743	3	100%	7	0.2	0%	Pass
20	In	20_I	Validation	2720	2624	5	100%	96	1.9	4%	Pass
21	In	21_I	Validation	1745	1798	2	100%	-53	1.3	3%	Pass
22	In	22_I	Validation	3374	3374	4	100%	0	0.0	0%	Pass
16	Out	16_O	Validation	2389	2402	3	100%	-13	0.3	1%	Pass
17	Out	17_O	Validation	1376	1363	2	100%	13	0.4	1%	Pass
18	Out	18_O	Validation	5809	5734	5	80%	75	1.0	1%	Pass
19	Out	19_O	Validation	1093	1092	3	100%	1	0.0	0%	Pass
20	Out	20_O	Validation	2123	2208	5	100%	-85	1.8	4%	Pass
21	Out	21_O	Validation	1324	1295	2	100%	29	0.8	2%	Pass
22	Out	22_O	Validation	2988	2896	4	75%	92	1.7	3%	Pass

LGV - AM Peak Hour Validation Screenlines

Screenline Number	Direction	Screenline Code	Use	Observed Flow	Modelled Flow	Number of links	% of Links Compliant	Actual Difference	GEH	% Difference	% Difference Compliant
16	In	16_I	Validation	363	418	3	100%	-55	2.8	15%	Fail
17	In	17_I	Validation	157	153	2	100%	4	0.4	3%	Pass
18	In	18_I	Validation	924	902	5	100%	22	0.7	2%	Pass
19	In	19_I	Validation	224	221	3	100%	3	0.2	2%	Pass
20	In	20_I	Validation	332	341	5	100%	-9	0.5	3%	Pass
21	In	21_I	Validation	192	192	2	100%	0	0.0	0%	Pass
22	In	22_I	Validation	904	740	4	75%	164	5.7	18%	Fail
16	Out	16_O	Validation	401	380	3	100%	21	1.0	5%	Pass
17	Out	17_O	Validation	172	172	2	100%	0	0.0	0%	Pass
18	Out	18_O	Validation	1274	1249	5	100%	25	0.7	2%	Pass
19	Out	19_O	Validation	212	212	3	100%	0	0.0	0%	Pass
20	Out	20_O	Validation	301	289	5	100%	12	0.7	4%	Pass
21	Out	21_O	Validation	165	165	2	100%	0	0.0	0%	Pass
22	Out	22_O	Validation	690	599	4	100%	91	3.6	13%	Fail

HGV - AM Peak Hour Validation Screenlines

Screenline Number	Direction	Screenline Code	Use	Observed Flow	Modelled Flow	Number of links	% of Links Compliant	Actual Difference	GEH	% Difference	% Difference Compliant
16	In	16_I	Validation	75	81	3	100%	-6	0.7	9%	Fail
17	In	17_I	Validation	16	15	2	100%	1	0.4	9%	Fail
18	In	18_I	Validation	392	469	5	100%	-77	3.7	20%	Fail
19	In	19_I	Validation	47	46	3	100%	1	0.2	2%	Pass
20	In	20_I	Validation	36	36	5	100%	0	0.0	0%	Pass
21	In	21_I	Validation	20	20	2	100%	0	0.0	0%	Pass
22	In	22_I	Validation	226	250	4	100%	-24	1.6	11%	Fail
16	Out	16_O	Validation	29	38	3	100%	-9	1.6	31%	Fail
17	Out	17_O	Validation	23	20	2	100%	3	0.6	12%	Fail
18	Out	18_O	Validation	534	632	5	100%	-98	4.1	18%	Fail
19	Out	19_O	Validation	22	22	3	100%	0	0.1	1%	Pass
20	Out	20_O	Validation	27	25	5	100%	2	0.3	6%	Fail
21	Out	21_O	Validation	21	21	2	100%	0	0.0	0%	Pass
22	Out	22_O	Validation	277	221	4	100%	55	3.5	20%	Fail

Car - IP Peak Hour Validation Screenlines

Screenline Number	Direction	Screenline Code	Use	Observed Flow	Modelled Flow	Number of links	% of Links Compliant	Actual Difference	GEH	% Difference	% Difference Compliant
16	In	16_I	Validation	2560	2584	3	100%	-24	0.5	1%	Pass
17	In	17_I	Validation	839	839	2	100%	0	0.0	0%	Pass
18	In	18_I	Validation	5285	5104	5	100%	181	2.5	3%	Pass
19	In	19_I	Validation	910	911	3	100%	-1	0.0	0%	Pass
20	In	20_I	Validation	1621	1605	5	100%	16	0.4	1%	Pass
21	In	21_I	Validation	1123	1092	2	100%	31	0.9	3%	Pass
22	In	22_I	Validation	2215	2216	4	100%	-1	0.0	0%	Pass
16	Out	16_O	Validation	2288	2293	3	100%	-5	0.1	0%	Pass
17	Out	17_O	Validation	845	845	2	100%	0	0.0	0%	Pass
18	Out	18_O	Validation	5202	5021	5	100%	181	2.5	3%	Pass
19	Out	19_O	Validation	1036	1037	3	100%	-1	0.0	0%	Pass
20	Out	20_O	Validation	2043	1982	5	100%	61	1.4	3%	Pass
21	Out	21_O	Validation	1017	1016	2	100%	1	0.0	0%	Pass
22	Out	22_O	Validation	2029	2135	4	100%	-106	2.3	5%	Pass

LGV - IP Peak Hour Validation Screenlines

Screenline Number	Direction	Screenline Code	Use	Observed Flow	Modelled Flow	Number of links	% of Links Compliant	Actual Difference	GEH	% Difference	% Difference Compliant
16	In	16_I	Validation	500	480	3	100%	20	0.9	4%	Pass
17	In	17_I	Validation	141	136	2	100%	5	0.4	4%	Pass
18	In	18_I	Validation	1007	1035	5	100%	-28	0.9	3%	Pass
19	In	19_I	Validation	182	182	3	100%	0	0.0	0%	Pass
20	In	20_I	Validation	273	250	5	100%	23	1.4	8%	Fail
21	In	21_I	Validation	202	165	2	100%	37	2.7	18%	Fail
22	In	22_I	Validation	625	621	4	100%	4	0.1	1%	Pass
16	Out	16_O	Validation	344	388	3	100%	-44	2.3	13%	Fail
17	Out	17_O	Validation	101	98	2	100%	3	0.3	3%	Pass
18	Out	18_O	Validation	916	902	5	100%	14	0.5	2%	Pass
19	Out	19_O	Validation	196	196	3	100%	0	0.0	0%	Pass
20	Out	20_O	Validation	357	350	5	100%	7	0.4	2%	Pass
21	Out	21_O	Validation	122	122	2	100%	0	0.0	0%	Pass
22	Out	22_O	Validation	649	539	4	75%	110	4.5	17%	Fail

HGV - IP Peak Hour Validation Screenlines

Screenline Number	Direction	Screenline Code	Use	Observed Flow	Modelled Flow	Number of links	% of Links Compliant	Actual Difference	GEH	% Difference	% Difference Compliant
16	In	16_I	Validation	56	56	3	100%	0	0.0	0%	Pass
17	In	17_I	Validation	18	15	2	100%	3	0.8	18%	Fail
18	In	18_I	Validation	458	564	5	100%	-106	4.7	23%	Fail
19	In	19_I	Validation	27	23	3	100%	4	0.9	17%	Fail
20	In	20_I	Validation	29	27	5	100%	2	0.3	6%	Fail
21	In	21_I	Validation	25	22	2	100%	3	0.7	13%	Fail
22	In	22_I	Validation	250	227	4	100%	23	1.5	9%	Fail
16	Out	16_O	Validation	36	46	3	100%	-10	1.6	28%	Fail
17	Out	17_O	Validation	16	14	2	100%	2	0.4	11%	Fail
18	Out	18_O	Validation	437	505	5	100%	-68	3.1	15%	Fail
19	Out	19_O	Validation	32	29	3	100%	3	0.5	9%	Fail
20	Out	20_O	Validation	36	28	5	100%	8	1.4	22%	Fail
21	Out	21_O	Validation	20	20	2	100%	0	0.0	0%	Pass
22	Out	22_O	Validation	213	222	4	100%	-9	0.6	4%	Pass

Car - PM Peak Hour Validation Screenlines

Screenline Number	Direction	Screenline Code	Use	Observed Flow	Modelled Flow	Number of links	% of Links Compliant	Actual Difference	GEH	% Difference	% Difference Compliant
16	In	16_I	Validation	3241	3237	3	100%	4	0.1	0%	Pass
17	In	17_I	Validation	1313	1313	2	100%	0	0.0	0%	Pass
18	In	18_I	Validation	6820	6781	5	100%	39	0.5	1%	Pass
19	In	19_I	Validation	1232	1230	3	100%	2	0.1	0%	Pass
20	In	20_I	Validation	2067	2029	5	100%	38	0.8	2%	Pass
21	In	21_I	Validation	1390	1390	2	100%	0	0.0	0%	Pass
22	In	22_I	Validation	3697	3758	4	100%	-61	1.0	2%	Pass
16	Out	16_O	Validation	3539	3537	3	100%	3	0.0	0%	Pass
17	Out	17_O	Validation	1423	1418	2	100%	5	0.1	0%	Pass
18	Out	18_O	Validation	6839	6826	5	100%	13	0.2	0%	Pass
19	Out	19_O	Validation	1819	1819	3	100%	0	0.0	0%	Pass
20	Out	20_O	Validation	2778	2822	5	100%	-44	0.8	2%	Pass
21	Out	21_O	Validation	1678	1675	2	100%	3	0.1	0%	Pass
22	Out	22_O	Validation	3597	3089	4	50%	508	8.8	14%	Fail

LGV - PM Peak Hour Validation Screenlines

Screenline Number	Direction	Screenline Code	Use	Observed Flow	Modelled Flow	Number of links	% of Links Compliant	Actual Difference	GEH	% Difference	% Difference Compliant
16	In	16_I	Validation	308	353	3	100%	-45	2.5	14%	Fail
17	In	17_I	Validation	101	101	2	100%	0	0.0	0%	Pass
18	In	18_I	Validation	1053	993	5	100%	60	1.9	6%	Fail
19	In	19_I	Validation	125	126	3	100%	-1	0.1	1%	Pass
20	In	20_I	Validation	198	193	5	100%	5	0.4	3%	Pass
21	In	21_I	Validation	107	107	2	100%	0	0.0	0%	Pass
22	In	22_I	Validation	689	582	4	100%	107	4.2	16%	Fail
16	Out	16_O	Validation	315	297	3	100%	18	1.0	6%	Fail
17	Out	17_O	Validation	112	112	2	100%	0	0.0	0%	Pass
18	Out	18_O	Validation	816	849	5	100%	-33	1.1	4%	Pass
19	Out	19_O	Validation	196	195	3	100%	1	0.0	0%	Pass
20	Out	20_O	Validation	272	273	5	100%	-1	0.1	0%	Pass
21	Out	21_O	Validation	121	131	2	100%	-10	0.9	8%	Fail
22	Out	22_O	Validation	505	497	4	100%	8	0.3	2%	Pass

HGV - PM Peak Hour Validation Screenlines

Screenline Number	Direction	Screenline Code	Use	Observed Flow	Modelled Flow	Number of links	% of Links Compliant	Actual Difference	GEH	% Difference	% Difference Compliant
16	In	16_I	Validation	24	23	3	100%	1	0.1	2%	Pass
17	In	17_I	Validation	3	3	2	100%	0	0.0	0%	Pass
18	In	18_I	Validation	383	397	5	100%	-14	0.7	4%	Pass
19	In	19_I	Validation	12	13	3	100%	-1	0.3	10%	Fail
20	In	20_I	Validation	6	10	5	100%	-4	1.4	67%	Fail
21	In	21_I	Validation	4	4	2	100%	0	0.0	0%	Pass
22	In	22_I	Validation	133	130	4	100%	3	0.2	2%	Pass
16	Out	16_O	Validation	10	17	3	100%	-7	1.8	67%	Fail
17	Out	17_O	Validation	8	8	2	100%	0	0.1	4%	Pass
18	Out	18_O	Validation	299	331	5	100%	-32	1.8	11%	Fail
19	Out	19_O	Validation	15	14	3	100%	1	0.3	7%	Fail
20	Out	20_O	Validation	11	14	5	100%	-3	0.9	29%	Fail
21	Out	21_O	Validation	8	8	2	100%	0	0.0	0%	Pass
22	Out	22_O	Validation	91	124	4	100%	-33	3.1	36%	Fail

AM All Vehicles

Screenline ID	Type	Site ID	Site Direction	Screenline Direction	Road Name	Model LinkID	Observed Flows	Modelled Flows	Flow Difference	Flow Difference	WebTAG Criteria 1	GEH	GEH Criteria	Passes at least 1 criterion
1	Calibration	61	E	In	Kirkham By-Pass	10014_1590	628	629	-1	0%	Pass	0	Pass	Pass
1	Calibration	62	E	In	Preston Street	1579_1584	358	358	0	0%	Pass	0	Pass	Pass
1	Calibration	F	E	In	M55	7001_5099	2958	2938	20	1%	Pass	0	Pass	Pass
1	Calibration	61	W	Out	Kirkham By-Pass	1590_10014	717	677	40	6%	Pass	1	Pass	Pass
1	Calibration	62	W	Out	Preston Street	1584_1579	420	419	1	0%	Pass	0	Pass	Pass
1	Calibration	F	W	Out	M55	5102_5107	2828	2836	-8	0%	Pass	0	Pass	Pass
2	Calibration	75	S	In	Tabley Lane	8503_3060	339	335	4	1%	Pass	0	Pass	Pass
2	Calibration	76	S	In	Garstang Road	4146_4201	732	1108	-376	-51%	Fail	12	Fail	Fail
2	Calibration	77	S	In	Sandy Lane	10209_1015	210	1	209	100%	Fail	20	Fail	Fail
2	Calibration	140	S	In	Sidgreaves Lane	1645_1016	218	225	-7	-3%	Pass	0	Pass	Pass
2	Calibration	75	N	Out	Tabley Lane	3060_8503	267	267	0	0%	Pass	0	Pass	Pass
2	Calibration	76	N	Out	Garstang Road	4201_4146	1052	1119	-67	-6%	Pass	2	Pass	Pass
2	Calibration	77	N	Out	Sandy Lane	1015_10209	146	3	143	98%	Fail	17	Fail	Fail
2	Calibration	140	N	Out	Sidgreaves Lane	1016_1645	321	329	-8	-2%	Pass	0	Pass	Pass
3	Calibration	25	W	In	Moss Lane	8060_4011	203	232	-29	-14%	Pass	2	Pass	Pass
3	Calibration	27	W	In	Harper's Lane	3197_4015	661	661	0	0%	Pass	0	Pass	Pass
3	Calibration	28	W	In	Lyons Lane	3161_4019	376	376	0	0%	Pass	0	Pass	Pass
3	Calibration	25	E	Out	Moss Lane	4011_8060	265	445	-180	-68%	Fail	10	Fail	Fail
3	Calibration	27	E	Out	Harper's Lane	4015_3197	419	396	23	5%	Pass	1	Pass	Pass
3	Calibration	28	E	Out	Lyons Lane	4019_3161	494	495	-1	0%	Pass	0	Pass	Pass
4	Calibration	45	E	In	Dunkirk Lane	3072_8084	373	362	11	3%	Pass	1	Pass	Pass
4	Calibration	46	N	In	Ulnes Walton Lane	8240_8242	225	197	28	12%	Pass	2	Pass	Pass
4	Calibration	47	N	In	Leyland Lane	3202_3027	475	476	-1	0%	Pass	0	Pass	Pass
4	Calibration	48	N	In	Runshaw Hall Lane	1056_1055	494	496	-2	0%	Pass	0	Pass	Pass
4	Calibration	49	W	In	Heald House Road	4032_3155	633	631	2	0%	Pass	0	Pass	Pass
4	Calibration	50	W	In	Leyland Way	5068_3206	1007	1013	-6	-1%	Pass	0	Pass	Pass
4	Calibration	51	S	In	Stanifield Lane	8257_3152	343	343	0	0%	Pass	0	Pass	Pass
4	Calibration	52	S	In	Wheelton Lane	1069_3054	193	207	-14	-7%	Pass	1	Pass	Pass
4	Calibration	53	S	In	Croston Road	8433_8090	267	243	24	9%	Pass	1	Pass	Pass
4	Calibration	55	E	In	Reiver Road	8246_1386	376	392	-16	-4%	Pass	1	Pass	Pass
4	Calibration	45	W	Out	Dunkirk Lane	8084_3072	376	351	25	7%	Pass	1	Pass	Pass
4	Calibration	46	S	Out	Ulnes Walton Lane	8242_8240	193	205	-12	-6%	Pass	1	Pass	Pass
4	Calibration	47	S	Out	Leyland Lane	3027_3202	581	573	8	1%	Pass	0	Pass	Pass
4	Calibration	48	S	Out	Runshaw Hall Lane	1055_1056	264	269	-5	-2%	Pass	0	Pass	Pass
4	Calibration	49	E	Out	Heald House Road	3155_4032	777	773	4	1%	Pass	0	Pass	Pass
4	Calibration	50	E	Out	Leyland Way	3206_5068	908	1097	-189	-21%	Fail	6	Fail	Fail
4	Calibration	51	N	Out	Stanifield Lane	3152_8257	550	528	22	4%	Pass	1	Pass	Pass
4	Calibration	52	N	Out	Wheelton Lane	3054_1069	411	378	33	8%	Pass	2	Pass	Pass
4	Calibration	53	N	Out	Croston Road	8090_8433	290	288	2	1%	Pass	0	Pass	Pass
4	Calibration	55	W	Out	Reiver Road	1386_8246	229	228	1	1%	Pass	0	Pass	Pass
5	Calibration	93	S	In	Ribbleton Lane	3156_4142	395	368	27	7%	Pass	1	Pass	Pass
5	Calibration	94	S	In	Deepdale Road	4480_4142	351	381	-30	-9%	Pass	2	Pass	Pass
5	Calibration	95	S	In	Meadow Street	8305_1114	87	89	-2	-3%	Pass	0	Pass	Pass
5	Calibration	96	S	In	North Road	4357_4263	748	779	-31	-4%	Pass	1	Pass	Pass
5	Calibration	100	E	In	Marsh Lane	4371_4247	1546	1481	65	4%	Pass	2	Pass	Pass
5	Calibration	103	N	In	Manchester Road	10205_1019	372	120	252	68%	Fail	16	Fail	Fail
5	Calibration	104	W	In	London Road	4376_4207	1262	1287	-25	-2%	Pass	1	Pass	Pass
5	Calibration	105	W	In	New Hall Lane	4515_1764	732	736	-4	0%	Pass	0	Pass	Pass
5	Calibration	93	N	Out	Ribbleton Lane	4142_3156	352	348	4	1%	Pass	0	Pass	Pass
5	Calibration	94	N	Out	Deepdale Road	4142_4480	478	436	42	9%	Pass	2	Pass	Pass
5	Calibration	95	N	Out	Meadow Street	1114_8305	94	95	-1	-1%	Pass	0	Pass	Pass
5	Calibration	96	N	Out	North Road	4263_4357	524	521	3	1%	Pass	0	Pass	Pass
5	Calibration	100	W	Out	Marsh Lane	4247_4310	396	378	18	4%	Pass	1	Pass	Pass
5	Calibration	101	S	Out	Fishergate Hill	1190_1191	571	570	1	0%	Pass	0	Pass	Pass
5	Calibration	103	S	Out	Manchester Road	10205_1268	72	72	0	0%	Pass	0	Pass	Pass
5	Calibration	104	E	Out	London Road	4207_4376	863	863	0	0%	Pass	0	Pass	Pass
5	Calibration	105	E	Out	New Hall Lane	1764_4515	529	529	0	0%	Pass	0	Pass	Pass
6	Calibration	109	N	In	Victoria Road	4156_4048	861	849	12	1%	Pass	0	Pass	Pass
6	Calibration	110	N	In	London Way	4070_10101	1099	1100	-1	0%	Pass	0	Pass	Pass
6	Calibration	111	N	In	Leyland Road	3083_8406	981	925	56	6%	Pass	2	Pass	Pass
6	Calibration	112	N	In	Golden Way	8434_10099	1662	1492	170	10%	Pass	4	Pass	Pass
6	Calibration	113	E	In	Liverpool Road	4208_4532	1156	1153	3	0%	Pass	0	Pass	Pass
6	Calibration	109	S	Out	Victoria Road	4048_4156	410	451	-41	-10%	Pass	2	Pass	Pass
6	Calibration	110	S	Out	London Way	10101_4070	578	590	-12	-2%	Pass	0	Pass	Pass
6	Calibration	111	S	Out	Leyland Road	8406_3083	407	411	-4	-1%	Pass	0	Pass	Pass
6	Calibration	112	S	Out	Golden Way	10099_8434	756	751	5	1%	Pass	0	Pass	Pass
6	Calibration	113	W	Out	Liverpool Road	4532_4208	622	633	-11	-2%	Pass	0	Pass	Pass
7	Calibration	81	E	In	Watery Lane	4468_8290	1116	1105	11	1%	Pass	0	Pass	Pass
7	Calibration	82	S	In	Tulketh Road	4513_4492	191	189	2	1%	Pass	0	Pass	Pass
7	Calibration	83	E	In	Tom Benson Way	3087_10076	670	665	5	1%	Pass	0	Pass	Pass
7	Calibration	85	S	In	Garstang Road	10069_4268	882	886	-4	0%	Pass	0	Pass	Pass
7	Calibration	86	S	In	Sir Tom Finney Way	8155_4283	723	652	71	10%	Pass	3	Pass	Pass
7	Calibration	87	S	In	Plungington Road	4184_1076	403	553	-150	-37%	Fail	7	Fail	Fail
7	Calibration	88	E	In	Egerton Road	4192_1342	125	91	34	27%	Pass	3	Pass	Pass
7	Calibration	89	E	In	Navigation Way	1426_1110	141	90	51	36%	Pass	5	Pass	Pass
7	Calibration	90	S	In	St Gregory Road	3062_1262	160	158	2	1%	Pass	0	Pass	Pass
7	Calibration	92	S	In	New Hall Lane	8624_4369	644	596	48	7%	Pass	2	Pass	Pass
7	Calibration	81	W	Out	Watery Lane	8290_4468	886	898	-12	-1%	Pass	0	Pass	Pass
7	Calibration	82	N	Out	Tulketh Road	4492_4513	145	143	2	1%	Pass	0	Pass	Pass
7	Calibration	83	W	Out	Tom Benson Way	10076_3087	350	350	0	0%	Pass	0	Pass	Pass
7	Calibration	85	N	Out	Garstang Road	4268_10069	662	660	2	0%	Pass	0	Pass	Pass
7	Calibration	86	N	Out	Sir Tom Finney Way	4283_8155	557	555	2	0%	Pass	0	Pass	Pass
7	Calibration	87	N	Out	Plungington Road	1076_4184	210	304	-94	-45%	Pass	6	Fail	Pass
7	Calibration	88	W	Out	Egerton Road	1342_4192	84	76	8	9%	Pass	1	Pass	Pass
7	Calibration	89	W	Out	Navigation Way	1110_1426	103	105	-2	-2%	Pass	0	Pass	Pass
7	Calibration	90	N	Out	St Gregory Road	1262_3062	124	71	53	43%	Pass	5	Pass	Pass
7	Calibration	92	N	Out	New Hall Lane	4369_8624	488	412	76	16%	Pass	4	Pass	Pass

Screenline ID	Type	Site ID	Site Direction	Screenline Direction	Road Name	Model LinkID	Observed Flows	Modelled Flows	Flow Difference	Flow Difference	WebTAG Criteria 1	GEH	GEH Criteria	Passes at least 1 criterion
8	Calibration	19	N	In	Tincklers Lane	1387_3170	178	185	-7	-4%	Pass	1	Pass	Pass
8	Calibration	21	N	In	Wood Lane	8100_8099	351	351	0	0%	Pass	0	Pass	Pass
8	Calibration	22	N	In	Preston Road	4452_4176	328	328	0	0%	Pass	0	Pass	Pass
8	Calibration	23	N	In	New Road	8214_8226	713	713	0	0%	Pass	0	Pass	Pass
8	Calibration	24	N	In	Bolton Road	8520_4164	897	897	0	0%	Pass	0	Pass	Pass
8	Calibration	S4	N	In	M61	5141_5001	3030	3145	-115	-4%	Pass	2	Pass	Pass
8	Calibration	19	S	Out	Tincklers Lane	3170_1387	211	212	-1	0%	Pass	0	Pass	Pass
8	Calibration	21	S	Out	Wood Lane	8099_8100	393	394	-1	0%	Pass	0	Pass	Pass
8	Calibration	22	S	Out	Preston Road	4176_4452	294	291	3	1%	Pass	0	Pass	Pass
8	Calibration	23	S	Out	New Road	8226_8214	419	424	-5	-1%	Pass	0	Pass	Pass
8	Calibration	24	S	Out	Bolton Road	4164_8520	919	919	0	0%	Pass	0	Pass	Pass
8	Calibration	S4	S	Out	M61	7024_5141	3256	3395	-139	-4%	Pass	2	Pass	Pass
9	Calibration	15	N	In	Liverpool Road	4160_8080	922	922	0	0%	Pass	0	Pass	Pass
9	Calibration	16	E	In	North Road	8426_8082	249	249	0	0%	Pass	0	Pass	Pass
9	Calibration	17	E	In	South Road	8188_8092	268	268	0	0%	Pass	0	Pass	Pass
9	Calibration	18	N	In	Westhead Road	8430_8095	203	207	-4	-2%	Pass	0	Pass	Pass
9	Calibration	15	S	Out	Liverpool Road	8080_4160	697	698	-1	0%	Pass	0	Pass	Pass
9	Calibration	16	W	Out	North Road	8082_8426	159	191	-32	-20%	Pass	2	Pass	Pass
9	Calibration	17	W	Out	South Road	8092_8188	230	225	5	2%	Pass	0	Pass	Pass
9	Calibration	18	S	Out	Westhead Road	8095_8430	151	164	-13	-9%	Pass	1	Pass	Pass
10	Calibration	29	N	In	Wigan Road	4178_4540	435	435	0	0%	Pass	0	Pass	Pass
10	Calibration	30	N	In	Preston Road	4404_8559	769	769	0	0%	Pass	0	Pass	Pass
10	Calibration	31	E	In	A674	8548_4504	824	823	1	0%	Pass	0	Pass	Pass
10	Calibration	149	N	In	Central Avenue	1045_1368	460	280	180	39%	Fail	9	Fail	Fail
10	Calibration	C	N	In	M61	7018_5015	3348	3335	13	0%	Pass	0	Pass	Pass
10	Calibration	D	N	In	M6	5113_10086	3990	4029	-39	-1%	Pass	1	Pass	Pass
10	Calibration	29	S	Out	Wigan Road	4540_4178	433	425	8	2%	Pass	0	Pass	Pass
10	Calibration	30	S	Out	Preston Road	8559_4404	704	703	1	0%	Pass	0	Pass	Pass
10	Calibration	31	W	Out	A674	4504_8548	714	715	-1	0%	Pass	0	Pass	Pass
10	Calibration	149	S	Out	Central Avenue	1368_1045	806	476	330	41%	Fail	13	Fail	Fail
10	Calibration	C	S	Out	M61	7017_5004	3294	3204	90	3%	Pass	2	Pass	Pass
10	Calibration	D	S	Out	M6	7019_5115	3524	3525	-1	0%	Pass	0	Pass	Pass
11	Calibration	32	W	In	Briers Brow	1483_4505	169	169	0	0%	Pass	0	Pass	Pass
11	Calibration	33	S	In	Blackburn Road	8542_8057	528	530	-2	0%	Pass	0	Pass	Pass
11	Calibration	34	S	In	Marsh Lane	1029_8540	4	4	0	0%	Pass	0	Pass	Pass
11	Calibration	35	S	In	Stony Bank	1073_8541	122	122	0	0%	Pass	0	Pass	Pass
11	Calibration	36	W	In	Gregson Lane	1072_8565	40	44	-4	-11%	Pass	1	Pass	Pass
11	Calibration	37	W	In	Hoghton Lane	1786_4528	400	401	-1	0%	Pass	0	Pass	Pass
11	Calibration	38	S	In	Cuerdale Lane	3032_8159	400	318	82	21%	Pass	4	Pass	Pass
11	Calibration	39	W	In	Preston New Road	4279_9962	1349	1674	-325	-24%	Fail	8	Fail	Fail
11	Calibration	H	W	In	M65	7010_5025	3413	3368	45	1%	Pass	1	Pass	Pass
11	Calibration	32	E	Out	Briers Brow	4505_1483	147	158	-11	-7%	Pass	1	Pass	Pass
11	Calibration	33	N	Out	Blackburn Road	8057_8542	692	691	1	0%	Pass	0	Pass	Pass
11	Calibration	34	N	Out	Marsh Lane	8540_1029	4	3	1	32%	Pass	1	Pass	Pass
11	Calibration	35	N	Out	Stony Bank	8541_1073	235	232	3	1%	Pass	0	Pass	Pass
11	Calibration	36	E	Out	Gregson Lane	8565_1072	39	66	-27	-69%	Pass	4	Pass	Pass
11	Calibration	37	E	Out	Hoghton Lane	4528_1786	358	360	-2	-1%	Pass	0	Pass	Pass
11	Calibration	38	N	Out	Cuerdale Lane	8159_3032	345	343	2	1%	Pass	0	Pass	Pass
11	Calibration	39	E	Out	Preston New Road	8444_4278	1554	1556	-2	0%	Pass	0	Pass	Pass
11	Calibration	H	E	Out	M65	7009_5071	2935	2885	50	2%	Pass	1	Pass	Pass
12	Calibration	78	W	In	Whittingham Lane	8582_8020	356	348	8	2%	Pass	0	Pass	Pass
12	Calibration	79	W	In	Haighton Green Lane	8019_8459	119	120	-1	-1%	Pass	0	Pass	Pass
12	Calibration	80	S	In	Longridge Road	8580_8457	750	751	-1	0%	Pass	0	Pass	Pass
12	Calibration	78	E	Out	Whittingham Lane	8020_8582	320	408	-88	-27%	Pass	5	Pass	Pass
12	Calibration	79	E	Out	Haighton Green Lane	8459_8019	211	187	24	11%	Pass	2	Pass	Pass
12	Calibration	80	N	Out	Longridge Road	8457_8580	645	645	0	0%	Pass	0	Pass	Pass
13	Calibration	68	S	In	Garstang Road	4269_4202	298	195	103	35%	Fail	7	Fail	Fail
13	Calibration	69	S	In	Woodplumpton Road	8497_3059	398	382	16	4%	Pass	1	Pass	Pass
13	Calibration	70	S	In	Rosemary Lane	1632_1641	145	140	5	3%	Pass	0	Pass	Pass
13	Calibration	71	S	In	Blackleach Lane	1632_8374	8	0	8	100%	Pass	4	Pass	Pass
13	Calibration	72	S	In	Salwick Road	8495_1603	21	19	2	12%	Pass	1	Pass	Pass
13	Calibration	73	S	In	Church Road	10200_8668	48	42	6	12%	Pass	1	Pass	Pass
13	Calibration	74	S	In	Moorside	8493_8500	17	39	-22	-131%	Pass	4	Pass	Pass
13	Calibration	68	N	Out	Garstang Road	4202_4269	183	149	34	19%	Pass	3	Pass	Pass
13	Calibration	69	N	Out	Woodplumpton Road	3059_8497	379	337	42	11%	Pass	2	Pass	Pass
13	Calibration	70	N	Out	Rosemary Lane	1641_1632	136	125	11	8%	Pass	1	Pass	Pass
13	Calibration	71	N	Out	Blackleach Lane	8374_1632	11	0	11	100%	Pass	5	Pass	Pass
13	Calibration	72	N	Out	Salwick Road	1603_8495	43	18	25	57%	Pass	4	Pass	Pass
13	Calibration	73	N	Out	Church Road	8668_10200	34	33	1	2%	Pass	0	Pass	Pass
13	Calibration	74	N	Out	Moorside	8500_8493	14	29	-15	-106%	Pass	3	Pass	Pass
14	Calibration	56	E	In	A584	4122_10016	633	591	42	7%	Pass	2	Pass	Pass
14	Calibration	57	N	In	Hillock Lane	1563_8393	81	89	-8	-10%	Pass	1	Pass	Pass
14	Calibration	58	N	In	Ribby Road	8605_8606	472	471	1	0%	Pass	0	Pass	Pass
14	Calibration	59	E	In	Blackpool Road	8208_4119	560	560	0	0%	Pass	0	Pass	Pass
14	Calibration	A	S	In	Fleetwood Road	1479_10089	1256	1258	-2	0%	Pass	0	Pass	Pass
14	Calibration	S18	E	In	M55	1313_5103	1818	1841	-23	-1%	Pass	1	Pass	Pass
14	Calibration	56	W	Out	A584	10016_4122	830	815	15	2%	Pass	1	Pass	Pass
14	Calibration	57	S	Out	Hillock Lane	8393_1563	69	133	-64	-93%	Pass	6	Fail	Pass
14	Calibration	58	S	Out	Ribby Road	8606_8605	469	479	-10	-2%	Pass	0	Pass	Pass
14	Calibration	59	W	Out	Blackpool Road	4119_8208	649	649	0	0%	Pass	0	Pass	Pass
14	Calibration	A	N	Out	Fleetwood Road	10089_1479	871	874	-3	0%	Pass	0	Pass	Pass
14	Calibration	S18	W	Out	M55	5110_7023	2214	2078	137	6%	Pass	3	Pass	Pass

Screenline ID	Type	Site ID	Site Direction	Screenline Direction	Road Name	Model LinkID	Observed Flows	Modelled Flows	Flow Difference	Flow Difference	WebTAG Criteria 1	GEH	GEH Criteria	Passes at least 1 criterion
15	Model Develo	1	E	In	Liverpool Road	10010_6195	738	739	-1	0%	Pass	0	Pass	Pass
15	Model Develo	5	N	In	Leyland Road	4251_1737	934	937	-3	0%	Pass	0	Pass	Pass
15	Model Develo	6	N	In	Todd Lane North	8269_1463	221	188	33	15%	Pass	2	Pass	Pass
15	Model Develo	7	N	In	London Way	10102_4070	1071	1084	-13	-1%	Pass	0	Pass	Pass
15	Model Develo	9	W	In	Higher Walton Road	8157_8570	716	673	43	6%	Pass	2	Pass	Pass
15	Model Develo	54	N	In	Flensburg Way	5333_5332	1037	1071	-34	-3%	Pass	1	Pass	Pass
15	Model Develo	122	S	In	Cuerdale Lane	8571_3177	323	318	5	1%	Pass	0	Pass	Pass
15	Model Develo	123	W	In	Brockholes Brow	9965_4353	847	855	-8	-1%	Pass	0	Pass	Pass
15	Model Develo	124	S	In	Longridge Road	3018_8453	672	540	132	20%	Fail	5	Pass	Pass
15	Model Develo	125	E	In	Eastway	3011_3009	850	854	-4	0%	Pass	0	Pass	Pass
15	Model Develo	126	S	In	Garstang Road	4520_4274	1102	1043	59	5%	Pass	2	Pass	Pass
15	Model Develo	127	S	In	Black Bull Lane	1402_1007	581	548	33	6%	Pass	1	Pass	Pass
15	Model Develo	128	S	In	Tag Lane	4194_3086	637	634	3	0%	Pass	0	Pass	Pass
15	Model Develo	129	S	In	Tom Benson Way	4195_3087	664	657	7	1%	Pass	0	Pass	Pass
15	Model Develo	130	E	In	Blackpool Road	8389_4115	1564	1564	0	0%	Pass	0	Pass	Pass
15	Model Develo	131	S	In	Lindle Lane	4477_8408	447	588	-141	-32%	Fail	6	Fail	Fail
15	Model Develo	132	E	In	Wham Lane	1255_1147	511	510	1	0%	Pass	0	Pass	Pass
15	Model Develo	133	W	In	Farington Road	9987_5231	1137	1108	29	3%	Pass	1	Pass	Pass
15	Model Develo	134	N	In	Station Road	10105_3186	575	570	5	1%	Pass	0	Pass	Pass
15	Model Develo	1	W	Out	Liverpool Road	6117_4477	629	629	0	0%	Pass	0	Pass	Pass
15	Model Develo	5	S	Out	Leyland Road	1737_4251	511	518	-7	-1%	Pass	0	Pass	Pass
15	Model Develo	6	S	Out	Todd Lane North	1463_8269	194	101	93	48%	Pass	8	Fail	Pass
15	Model Develo	7	S	Out	London Way	4070_10102	893	876	17	2%	Pass	1	Pass	Pass
15	Model Develo	9	E	Out	Higher Walton Road	8570_8157	274	274	0	0%	Pass	0	Pass	Pass
15	Model Develo	54	S	Out	Flensburg Way	8250_3021	916	911	5	1%	Pass	0	Pass	Pass
15	Model Develo	122	N	Out	Cuerdale Lane	3177_8571	346	346	0	0%	Pass	0	Pass	Pass
15	Model Develo	123	E	Out	Brockholes Brow	4353_9965	776	781	-5	-1%	Pass	0	Pass	Pass
15	Model Develo	124	N	Out	Longridge Road	8453_3018	736	748	-12	-2%	Pass	0	Pass	Pass
15	Model Develo	125	W	Out	Eastway	3009_3011	783	750	33	4%	Pass	1	Pass	Pass
15	Model Develo	126	N	Out	Garstang Road	4274_4520	532	533	-1	0%	Pass	0	Pass	Pass
15	Model Develo	127	N	Out	Black Bull Lane	1007_1402	567	588	-21	-4%	Pass	1	Pass	Pass
15	Model Develo	128	N	Out	Tag Lane	3086_4194	464	465	-1	0%	Pass	0	Pass	Pass
15	Model Develo	129	N	Out	Tom Benson Way	3087_4195	457	455	2	0%	Pass	0	Pass	Pass
15	Model Develo	130	W	Out	Blackpool Road	4115_8389	1419	1419	0	0%	Pass	0	Pass	Pass
15	Model Develo	131	N	Out	Lindle Lane	8408_4477	261	298	-37	-14%	Pass	2	Pass	Pass
15	Model Develo	132	W	Out	Wham Lane	1147_1255	453	448	5	1%	Pass	0	Pass	Pass
15	Model Develo	133	E	Out	Farington Road	5231_9987	916	918	-2	0%	Pass	0	Pass	Pass
15	Model Develo	134	S	Out	Station Road	3186_10105	541	542	-1	0%	Pass	0	Pass	Pass
16	Validation	106	N	In	A59	4084_4088	2568	2613	-45	-2%	Pass	1	Pass	Pass
16	Validation	107	W	In	Liverpool Road	4544_4086	652	568	84	13%	Pass	3	Pass	Pass
16	Validation	108	N	In	London Road	10024_4464	1426	1403	23	2%	Pass	1	Pass	Pass
16	Validation	106	S	Out	A59	4088_4084	1135	1122	13	1%	Pass	0	Pass	Pass
16	Validation	107	E	Out	Liverpool Road	4086_4544	712	741	-29	-4%	Pass	1	Pass	Pass
16	Validation	108	S	Out	London Road	4464_10024	972	958	14	1%	Pass	0	Pass	Pass
17	Validation	63	E	In	Blackpool Road	10013_8384	894	889	5	1%	Pass	0	Pass	Pass
17	Validation	64	E	In	Preston New Road	9994_8040	705	705	0	0%	Pass	0	Pass	Pass
17	Validation	63	W	Out	Blackpool Road	8384_10013	677	661	16	2%	Pass	1	Pass	Pass
17	Validation	64	W	Out	Preston New Road	8040_9994	894	894	0	0%	Pass	0	Pass	Pass
18	Validation	135	S	In	Eastway	4198_3088	756	758	-2	0%	Pass	0	Pass	Pass
18	Validation	137	S	In	Tom Benson Way	3085_3003	573	565	8	1%	Pass	0	Pass	Pass
18	Validation	150	S	In	Wychnor	8342_1276	85	82	3	4%	Pass	0	Pass	Pass
18	Validation	151	S	In	Sherwood Way	8168_8349	691	609	82	12%	Pass	3	Pass	Pass
18	Validation	S13	S	In	M6	7013_5085	4424	4427	-3	0%	Pass	0	Pass	Pass
18	Validation	135	N	Out	Eastway	3088_4198	736	736	0	0%	Pass	0	Pass	Pass
18	Validation	137	N	Out	Tom Benson Way	3003_3085	822	637	185	23%	Fail	7	Fail	Fail
18	Validation	150	N	Out	Wychnor	1276_8342	131	128	3	3%	Pass	0	Pass	Pass
18	Validation	151	N	Out	Sherwood Way	8349_8168	508	511	-3	-1%	Pass	0	Pass	Pass
18	Validation	S13	N	Out	M6	5083_2401	4993	5000	-7	0%	Pass	0	Pass	Pass
19	Validation	42	N	In	Longton By-Pass	4338_4340	1046	1046	0	0%	Pass	0	Pass	Pass
19	Validation	43	N	In	Longmeanygate	8081_1047	278	283	-5	-2%	Pass	0	Pass	Pass
19	Validation	44	N	In	Schleswig Way	10008_3024	697	681	16	2%	Pass	1	Pass	Pass
19	Validation	42	S	Out	Longton By-Pass	4339_4336	607	608	-1	0%	Pass	0	Pass	Pass
19	Validation	43	S	Out	Longmeanygate	1047_8081	156	156	0	0%	Pass	0	Pass	Pass
19	Validation	44	S	Out	Schleswig Way	3024_10008	564	562	2	0%	Pass	0	Pass	Pass
20	Validation	84	E	In	Eldon Street	1082_1086	160	154	6	4%	Pass	0	Pass	Pass
20	Validation	99	E	In	Fylde Road	4249_4248	504	527	-23	-4%	Pass	1	Pass	Pass
20	Validation	121	E	In	Marsh Lane	4247_1059	700	584	116	17%	Fail	4.6	Pass	Pass
20	Validation	141	E	In	Blackpool Road	4267_10068	884	880	4	0%	Pass	0	Pass	Pass
20	Validation	155	E	In	Aqueduct Street	1100_1078	485	490	-5	-1%	Pass	0	Pass	Pass
20	Validation	84	W	Out	Eldon Street	1086_1082	113	112	1	1%	Pass	0	Pass	Pass
20	Validation	99	W	Out	Fylde Road	4248_4249	326	356	-30	-9%	Pass	2	Pass	Pass
20	Validation	120	W	Out	Fishergate	1014_1097	692	715	-23	-3%	Pass	1	Pass	Pass
20	Validation	141	W	Out	Blackpool Road	10068_4267	622	624	-2	0%	Pass	0	Pass	Pass
20	Validation	155	W	Out	Aqueduct Street	1078_1100	442	435	7	2%	Pass	0	Pass	Pass
21	Validation	65	E	In	Riversway	4112_10072	1192	1242	-50	-4%	Pass	1	Pass	Pass
21	Validation	66	E	In	Blackpool Road	8615_4281	765	768	-3	0%	Pass	0	Pass	Pass
21	Validation	65	W	Out	Riversway	10072_4112	961	935	26	2.7%	Pass	1	Pass	Pass
21	Validation	66	W	Out	Blackpool Road	4281_8615	549	546	3	1%	Pass	0	Pass	Pass
22	Validation	40	W	In	Sheep Hill Brow	8258_3090	305	305	0	0%	Pass	0	Pass	Pass
22	Validation	41	W	In	Dawson Lane	8253_1043	307	307	0	0%	Pass	0	Pass	Pass
22	Validation	148	W	In	Church Road	4002_4001	1054	943	111	11%	Pass	4	Pass	Pass
22	Validation	B	W	In	M65	5031_5032	2836	2809	27	1%	Pass	1	Pass	Pass
22	Validation	40	E	Out	Sheep Hill Brow	3090_8258	441	441	0	0%	Pass	0	Pass	Pass
22	Validation	41	E	Out	Dawson Lane	1043_8253	271	271	0	0%	Pass	0	Pass	Pass
22	Validation	148	E	Out	Church Road	4001_4002	1140	943	197	17%	Fail	6	Fail	Fail
22	Validation	B	E	Out	M65	5037_10085	2100	2061	39	2%	Pass	1	Pass	Pass
23	Independent (	E	S	In	M6	7011_5096	2531	2469	62	2%	Pass	1	Pass	Pass
23	Independent (	E	N	Out	M6	5088_5188	2652	2644	8	0%	Pass	0	Pass	Pass

Screenline ID	Type	Site ID	Site Direction	Screenline Direction	Road Name	Model LinkID	Observed Flows	Modelled Flows	Flow Difference	Flow Difference	WebTAG Criteria 1	GEH	GEH Criteria	Passes at least 1 criterion
Independent Count	Independent (	2	S		Pope Lane	4078_1258	379	387	-8	-2%	Pass	0	Pass	Pass
Independent Count	Independent (	2	N		Pope Lane	1258_4078	746	740	6	1%	Pass	0	Pass	Pass
Independent Count	Independent (	3	E		Chain House Lane	8260_5240	441	398	43	10%	Pass	2	Pass	Pass
Independent Count	Independent (	3	W		Chain House Lane	5240_8260	472	473	-1	0%	Pass	0	Pass	Pass
Independent Count	Independent (	4	S		Penwortham Way	50002_6126	1010	1007	3	0%	Pass	0	Pass	Pass
Independent Count	Independent (	4	N		Penwortham Way	6126_50002	1235	1227	8	1%	Pass	0	Pass	Pass
Independent Count	Independent (	8	N		Chorley Road	3106_3179	527	501	26	5%	Pass	1	Pass	Pass
Independent Count	Independent (	8	S		Chorley Road	3179_3106	571	565	6	1%	Pass	0	Pass	Pass
Independent Count	Independent (	10	E		Cuerdale Lane	3177_8571	328	346	-18	-5%	Pass	1	Pass	Pass
Independent Count	Independent (	10	W		Cuerdale Lane	8571_3177	398	318	80	20%	Pass	4	Pass	Pass
Independent Count	Independent (	11	N		Stanifield Lane	1545_5561	484	485	-1	0%	Pass	0	Pass	Pass
Independent Count	Independent (	11	S		Stanifield Lane	5561_1545	617	618	-0.6	0%	Pass	0	Pass	Pass
Independent Count	Independent (	13	N		Craven Drive	4476_1204	43	9	34	80%	Pass	7	Fail	Pass
Independent Count	Independent (	13	S		Craven Drive	1204_4476	190	24	166	87%	Fail	16	Fail	Fail
Independent Count	Independent (	14	N		Wigan Road	4476_4035	466	451	15	3%	Pass	1	Pass	Pass
Independent Count	Independent (	14	S		Wigan Road	4035_4476	449	447	2	0%	Pass	0	Pass	Pass
Independent Count	Independent (	114	N		Port Way	1110_10053	496	557	-61	-12%	Pass	3	Pass	Pass
Independent Count	Independent (	114	S		Port Way	10053_1110	828	585	243	29%	Fail	9	Fail	Fail
Independent Count	Independent (	115	N		Channel Way	10061_1134	1099	697	402	37%	Fail	13	Fail	Fail
Independent Count	Independent (	116	N		West Strand	4363_10065	635	683	-48	-8%	Pass	2	Pass	Pass
Independent Count	Independent (	116	S		West Strand	4363_4362	853	844	9	1%	Pass	0	Pass	Pass
Independent Count	Independent (	117	E		Ring Way	4481_4260	1323	1004	319	24%	Fail	9	Fail	Fail
Independent Count	Independent (	117	W		Ring Way	4382_4383	975	978	-3	0%	Pass	0	Pass	Pass
Independent Count	Independent (	118	E		Ring Way	4389_4262	668	766	-98	-15%	Pass	4	Pass	Pass
Independent Count	Independent (	118	W		Ring Way	4321_4418	432	436	-4	-1%	Pass	0	Pass	Pass
Independent Count	Independent (	119	E		Ring Way	4299_4136	668	641	27	4%	Pass	1	Pass	Pass
Independent Count	Independent (	119	W		Ring Way	10107_4299	432	436	-4	-1%	Pass	0	Pass	Pass
Independent Count	Independent (	138	E		Lightfoot Lane	1713_1364	356	230	126	35%	Fail	7	Fail	Fail
Independent Count	Independent (	138	W		Lightfoot Lane	1364_1713	397	190	207	52%	Fail	12	Fail	Fail
Independent Count	Independent (	139	E		Longsands Lane	10026_8454	572	633	-61	-11%	Pass	2	Pass	Pass
Independent Count	Independent (	139	W		Longsands Lane	8454_10026	1080	1029	51	5%	Pass	2	Pass	Pass
Independent Count	Independent (	142	E		Blackpool Road	10070_8007	790	792	-2	0%	Pass	0	Pass	Pass
Independent Count	Independent (	142	W		Blackpool Road	8007_10070	701	702	-1	0%	Pass	0	Pass	Pass
Independent Count	Independent (	143	E		Blackpool Road	4352_4147	605	529	76	13%	Pass	3	Pass	Pass
Independent Count	Independent (	143	W		Blackpool Road	4147_4352	422	481	-59	-14%	Pass	3	Pass	Pass
Independent Count	Independent (	144	S		Blackpool Road	4284_4102	602	596	6	1%	Pass	0	Pass	Pass
Independent Count	Independent (	144	N		Blackpool Road	4102_4284	571	558	13	2%	Pass	1	Pass	Pass
Independent Count	Independent (	145	N		Penwortham Way	5330_50001	1182	1230	-48	-4%	Pass	1	Pass	Pass
Independent Count	Independent (	145	S		Penwortham Way	50005_5306	980	1059	-79	-8%	Pass	2	Pass	Pass
Independent Count	Independent (	146	E		Flensburg Way	8091_50000	929	920	9	1%	Pass	0	Pass	Pass
Independent Count	Independent (	146	W		Flensburg Way	50000_8091	851	934	-83	-10%	Pass	3	Pass	Pass
Independent Count	Independent (	147	W		Lostock Lane	4074_4240	1425	1628	-203	-14%	Pass	5	Pass	Pass
Independent Count	Independent (	147	E		Lostock Lane	4240_4074	1451	1454	-3	0%	Pass	0	Pass	Pass
Independent Count	Independent (	152	N		Church Street	1167_1128	285	347	-62	-22%	Pass	3	Pass	Pass
Independent Count	Independent (	153	N		Queen Street	1225_1350	291	245	46	16%	Pass	3	Pass	Pass
Independent Count	Independent (	153	S		Queen Street	1350_1225	702	633	69	10%	Pass	3	Pass	Pass
Independent Count	Independent (	154	S		Carlisle Street	1279_1162	400	400	0	0%	Pass	0	Pass	Pass
Independent Count	Independent (	156	W		Brownedge Road	4069_3066	401	404	-3	-1%	Pass	0	Pass	Pass
Independent Count	Independent (	156	E		Brownedge Road	3066_4069	460	467	-7	-2%	Pass	0	Pass	Pass
Independent Count	Independent (	157	N		Croston Road	1058_1049	279	228	51	18%	Pass	3	Pass	Pass
Independent Count	Independent (	157	S		Croston Road	1049_1058	241	242	-1	-1%	Pass	0	Pass	Pass
Independent Count	Independent (	158	W		Bank Bridge	8425_8427	902	902	0	0%	Pass	0	Pass	Pass
Independent Count	Independent (	158	E		Bank Bridge	8427_8425	1226	1226	0	0%	Pass	0	Pass	Pass
Independent Count	Independent (	159	E		Southport Road	4043_4244	662	654	8	1%	Pass	0	Pass	Pass
Independent Count	Independent (	159	W		Southport Road	4244_4043	459	460	-1	0%	Pass	0	Pass	Pass
Independent Count	Independent (	160	W		Myerscough Smithy Road	8118_8117	946	931	15	2%	Pass	0	Pass	Pass
Independent Count	Independent (	160	E		Myerscough Smithy Road	8117_8118	685	633	52	8%	Pass	2	Pass	Pass
Independent Count	Independent (	161	E		Preston New Road	1834_8119	720	721	-1	0%	Pass	0	Pass	Pass
Independent Count	Independent (	161	W		Preston New Road	8119_1834	977	925	52	5%	Pass	2	Pass	Pass
Independent Count	Independent (	162	E		Longsight Road	1803_8128	674	676	-2	0%	Pass	0	Pass	Pass
Independent Count	Independent (	162	W		Longsight Road	8128_1803	877	877	0	0%	Pass	0	Pass	Pass
Independent Count	Independent (	163	N		Pope Lane	8010_1075	240	246	-6	-3%	Pass	0	Pass	Pass
Independent Count	Independent (	163	S		Pope Lane	1075_8010	323	320	3	1%	Pass	0	Pass	Pass
Independent Count	Independent (	164	N		Cop Lane	1020_8276	457	291	166	36%	Fail	9	Fail	Fail
Independent Count	Independent (	164	S		Cop Lane	8276_1020	495	387	108	22%	Fail	5	Pass	Pass
Independent Count	Independent (	165	N		Bow Lane	1432_1129	278	344	-66	-24%	Pass	4	Pass	Pass
Independent Count	Independent (	165	S		Bow Lane	1129_1432	475	305	170	36%	Fail	9	Fail	Fail
Independent Count	Independent (	166	N		Corporation Street	1014_4304	105	57	48	45%	Pass	5	Pass	Pass
Independent Count	Independent (	166	S		Corporation Street	4304_1014	419	507	-88	-21%	Pass	4	Pass	Pass
Independent Count	Independent (	167	N		James Towers Way	5404_5217	1080	1101	-21	-2%	Pass	1	Pass	Pass
Independent Count	Independent (	167	S		James Towers Way	5218_5404	899	910	-11	-1%	Pass	0	Pass	Pass
Independent Count	Independent (	168	S		D'urton Lane	1011_3008	236	159	77	33%	Pass	5	Pass	Pass
Independent Count	Independent (	168	N		D'urton Lane	3008_1011	123	292	-169	-137%	Fail	12	Fail	Fail
Independent Count	Independent (	169	E		Eastway	981_3165	815	817	-2	0%	Pass	0	Pass	Pass
Independent Count	Independent (	169	W		Eastway	3165_981	412	386	26	6%	Pass	1	Pass	Pass
Independent Count	Independent (	170	W		Hoyles Lane	1015_8167	225	231	-6	-2%	Pass	0	Pass	Pass
Independent Count	Independent (	170	E		Hoyles Lane	8167_1015	165	139	26	16%	Pass	2	Pass	Pass
Independent Count	Independent (	G	S		M6	5085_7014	5582	5650	-68	-1%	Pass	1	Pass	Pass
Independent Count	Independent (	G	N		M6	2405_5083	6682	6682	0	0%	Pass	0	Pass	Pass
Independent Count	Independent (	S1	N		M6	5087_5088	2141	2181	-40	-2%	Pass	1	Pass	Pass
Independent Count	Independent (	S1	S		M6	5096_5090	1772	1756	16	1%	Pass	0	Pass	Pass
Independent Count	Independent (	S10	N		M6	5075_9964	1194	1131	63	5%	Pass	2	Pass	Pass
Independent Count	Independent (	S11	N		M6	5077_5076	1027	1103	-76	-7%	Pass	2	Pass	Pass
Independent Count	Independent (	S12	S		M6	5078_10082	978	946	32	3%	Pass	1	Pass	Pass
Independent Count	Independent (	S14	W		M55	5087_2407	2852	2819	33	1%	Pass	1	Pass	Pass
Independent Count	Independent (	S15	E		M6	5089_5090	2663	2670	-7	0%	Pass	0	Pass	Pass
Independent Count	Independent (	S16	W		M55	5096_5092	759	713	46	6%	Pass	2	Pass	Pass
Independent Count	Independent (	S17	E		M6	5089_10011	317	463	-146	-46%	Fail	7	Fail	Fail
Independent Count	Independent (	S2	S		M6	5064_5165	717	690	27	4%	Pass	1	Pass	Pass
Independent Count	Independent (	S3	S		M6	7007_10116	3755	3754	1	0%	Pass	0	Pass	Pass
Independent Count	Independent (	S3	N		M6	7008_5039	4499	4501	-2	0%	Pass	0	Pass	Pass
Independent Count	Independent (	S5	S		A6	4064_4063	1655	1657	-2	0%	Pass	0	Pass	Pass
Independent Count	Independent (	S5	N		A6	4063_4064	2218	2192	26	1%	Pass	1	Pass	Pass
Independent Count	Independent (	S6	N		M6	5040_7006	3721	3786	-65	-2%	Pass	1	Pass	Pass
Independent Count	Independent (	S6	S		M6	5074_10084	2976	2976	0	0%	Pass	0	Pass	Pass
Independent Count	Independent (	S7	N		M61	7016_5073	3042	2925	117	4%	Pass	2	Pass	Pass
Independent Count	Independent (	S7	S		M61	10104_10103	2723	2726	-3	0%	Pass	0	Pass	Pass
Independent Count	Independent (	S8	S		M6	7005_10083	5699	5701	-2	0%	Pass	0	Pass	Pass
Independent Count	Independent (	S8	N		M6	7015_2406	6763	6711	52	1%	Pass	1	Pass	Pass
Independent Count	Independent (	60	S	In	Fleetwood Road	1570_8498	924	924	0	0%	Pass	0	Pass	Pass
Independent Count	Independent (	60	N	Out	Fleetwood Road	8498_1570	875	878	-3	0%	Pass	0	Pass	Pass

IP All Vehicles

Screenline ID	Type	Site ID	Site Direction	Screenline Direction	Road Name	Model LinkID	Observed Flows	Modelled Flows	Flow Difference	Flow Difference	WebTAG Criteria 1	GEH	GEH Criteria	Passes at least 1 criterion
1	Calibration	61	E	In	Kirkham By-Pass	10014_1590	425	421	4	1%	Pass	0	Pass	Pass
1	Calibration	62	E	In	Preston Street	1579_1584	280	254	26	9%	Pass	2	Pass	Pass
1	Calibration	F	E	In	M55	7001_5099	2150	2166	-16	-1%	Pass	0	Pass	Pass
1	Calibration	61	W	Out	Kirkham By-Pass	1590_10014	517	514	3	1%	Pass	0	Pass	Pass
1	Calibration	62	W	Out	Preston Street	1584_1579	276	275	1	0%	Pass	0	Pass	Pass
1	Calibration	F	W	Out	M55	5102_5107	2110	2080	30	1%	Pass	1	Pass	Pass
2	Calibration	75	S	In	Tabley Lane	8503_3060	117	117	0	0%	Pass	0	Pass	Pass
2	Calibration	76	S	In	Garstang Road	4146_4201	948	987	-39	-4%	Pass	1	Pass	Pass
2	Calibration	77	S	In	Sandy Lane	10209_1015	100	0	100	100%	Pass	14	Fail	Pass
2	Calibration	140	S	In	Sidgreaves Lane	1645_1016	182	184	-2	-1%	Pass	0	Pass	Pass
2	Calibration	75	N	Out	Tabley Lane	3060_8503	126	126	0	0%	Pass	0	Pass	Pass
2	Calibration	76	N	Out	Garstang Road	4201_4146	871	854	17	2%	Pass	1	Pass	Pass
2	Calibration	77	N	Out	Sandy Lane	1015_10209	98	0	98	100%	Pass	14	Fail	Pass
2	Calibration	140	N	Out	Sidgreaves Lane	1016_1645	144	146	-2	-2%	Pass	0	Pass	Pass
3	Calibration	25	W	In	Moss Lane	8060_4011	129	133	-4	-3%	Pass	0	Pass	Pass
3	Calibration	27	W	In	Harper's Lane	3197_4015	440	412	28	6%	Pass	1	Pass	Pass
3	Calibration	28	W	In	Lyons Lane	3161_4019	300	300	0	0%	Pass	0	Pass	Pass
3	Calibration	25	E	Out	Moss Lane	4011_8060	124	270	-146	-118%	Fail	10	Fail	Fail
3	Calibration	27	E	Out	Harper's Lane	4015_3197	419	401	18	4%	Pass	1	Pass	Pass
3	Calibration	28	E	Out	Lyons Lane	4019_3161	432	431	1	0%	Pass	0	Pass	Pass
4	Calibration	45	E	In	Dunkirk Lane	3072_8084	270	255	15	6%	Pass	1	Pass	Pass
4	Calibration	46	N	In	Ulnes Walton Lane	8240_8242	119	119	0	0%	Pass	0	Pass	Pass
4	Calibration	47	N	In	Leyland Lane	3202_3027	281	279	2	1%	Pass	0	Pass	Pass
4	Calibration	48	N	In	Runshaw Hall Lane	1056_1055	203	204	-1	-1%	Pass	0	Pass	Pass
4	Calibration	49	W	In	Heald House Road	4032_3155	566	566	0	0%	Pass	0	Pass	Pass
4	Calibration	50	W	In	Leyland Way	5068_3206	727	734	-7	-1%	Pass	0	Pass	Pass
4	Calibration	51	S	In	Stanifield Lane	8257_3152	376	376	0	0%	Pass	0	Pass	Pass
4	Calibration	52	S	In	Wheelton Lane	1069_3054	260	156	104	40%	Fail	7	Fail	Fail
4	Calibration	53	S	In	Croston Road	8433_8090	225	199	26	11%	Pass	2	Pass	Pass
4	Calibration	55	E	In	Reiver Road	8246_1386	215	226	-11	-5%	Pass	1	Pass	Pass
4	Calibration	45	W	Out	Dunkirk Lane	8084_3072	285	285	0	0%	Pass	0	Pass	Pass
4	Calibration	46	S	Out	Ulnes Walton Lane	8242_8240	157	156	1	1%	Pass	0	Pass	Pass
4	Calibration	47	S	Out	Leyland Lane	3027_3202	403	397	6	2%	Pass	0	Pass	Pass
4	Calibration	48	S	Out	Runshaw Hall Lane	1055_1056	193	193	0	0%	Pass	0	Pass	Pass
4	Calibration	49	E	Out	Heald House Road	3155_4032	584	583	1	0%	Pass	0	Pass	Pass
4	Calibration	50	E	Out	Leyland Way	3206_5068	718	731	-13	-2%	Pass	0	Pass	Pass
4	Calibration	51	N	Out	Stanifield Lane	3152_8257	396	383	13	3%	Pass	1	Pass	Pass
4	Calibration	52	N	Out	Wheelton Lane	3054_1069	177	178	-1	0%	Pass	0	Pass	Pass
4	Calibration	53	N	Out	Croston Road	8090_8433	192	196	-4	-2%	Pass	0	Pass	Pass
4	Calibration	55	W	Out	Reiver Road	1386_8246	239	197	42	17%	Pass	3	Pass	Pass
5	Calibration	93	S	In	Ribbleton Lane	3156_4142	368	352	16	4%	Pass	1	Pass	Pass
5	Calibration	94	S	In	Deepdale Road	4480_4142	359	364	-5	-1%	Pass	0	Pass	Pass
5	Calibration	95	S	In	Meadow Street	8305_1114	85	92	-7	-8%	Pass	1	Pass	Pass
5	Calibration	96	S	In	North Road	4357_4263	712	742	-30	-4%	Pass	1	Pass	Pass
5	Calibration	100	E	In	Marsh Lane	4371_4247	927	901	26	3%	Pass	1	Pass	Pass
5	Calibration	103	N	In	Manchester Road	10205_1019	120	106	14	12%	Pass	1	Pass	Pass
5	Calibration	104	W	In	London Road	4376_4207	918	913	5	1%	Pass	0	Pass	Pass
5	Calibration	105	W	In	New Hall Lane	4515_1764	528	528	0	0%	Pass	0	Pass	Pass
5	Calibration	93	N	Out	Ribbleton Lane	4142_3156	420	417	3	1%	Pass	0	Pass	Pass
5	Calibration	94	N	Out	Deepdale Road	4142_4480	477	477	0	0%	Pass	0	Pass	Pass
5	Calibration	95	N	Out	Meadow Street	1114_8305	134	134	0	0%	Pass	0	Pass	Pass
5	Calibration	96	N	Out	North Road	4263_4357	545	548	-3	-1%	Pass	0	Pass	Pass
5	Calibration	100	W	Out	Marsh Lane	4247_4310	572	562	10	2%	Pass	0	Pass	Pass
5	Calibration	101	S	Out	Fishergate Hill	1190_1191	521	524	-3	-1%	Pass	0	Pass	Pass
5	Calibration	103	S	Out	Manchester Road	10205_1268	83	83	0	0%	Pass	0	Pass	Pass
5	Calibration	104	E	Out	London Road	4207_4376	1049	1117	-68	-7%	Pass	2	Pass	Pass
5	Calibration	105	E	Out	New Hall Lane	1764_4515	622	625	-3	0%	Pass	0	Pass	Pass
6	Calibration	109	N	In	Victoria Road	4156_4048	554	557	-3	-1%	Pass	0	Pass	Pass
6	Calibration	110	N	In	London Way	4070_10101	875	875	0	0%	Pass	0	Pass	Pass
6	Calibration	111	N	In	Leyland Road	3083_8406	512	515	-3	-1%	Pass	0	Pass	Pass
6	Calibration	112	N	In	Golden Way	8434_10099	646	643	3	0%	Pass	0	Pass	Pass
6	Calibration	113	E	In	Liverpool Road	4208_4532	741	722	19	3%	Pass	1	Pass	Pass
6	Calibration	109	S	Out	Victoria Road	4048_4156	621	619	2	0%	Pass	0	Pass	Pass
6	Calibration	110	S	Out	London Way	10101_4070	940	941	-1	0%	Pass	0	Pass	Pass
6	Calibration	111	S	Out	Leyland Road	8406_3083	538	542	-4	-1%	Pass	0	Pass	Pass
6	Calibration	112	S	Out	Golden Way	10099_8434	844	831	13	1%	Pass	0	Pass	Pass
6	Calibration	113	W	Out	Liverpool Road	4532_4208	691	659	32	5%	Pass	1	Pass	Pass
7	Calibration	81	E	In	Watery Lane	4468_8290	623	624	-1	0%	Pass	0	Pass	Pass
7	Calibration	82	S	In	Tulketh Road	4513_4492	140	140	0	0%	Pass	0	Pass	Pass
7	Calibration	83	E	In	Tom Benson Way	3087_10076	334	334	0	0%	Pass	0	Pass	Pass
7	Calibration	85	S	In	Garstang Road	10069_4268	652	661	-9	-1%	Pass	0	Pass	Pass
7	Calibration	86	S	In	Sir Tom Finney Way	8155_4283	619	626	-7	-1%	Pass	0	Pass	Pass
7	Calibration	87	S	In	Plungington Road	4184_1076	281	310	-29	-10%	Pass	2	Pass	Pass
7	Calibration	88	E	In	Egerton Road	4192_1342	89	53	36	41%	Pass	4	Pass	Pass
7	Calibration	89	E	In	Navigation Way	1426_1110	104	98	6	6%	Pass	1	Pass	Pass
7	Calibration	90	S	In	St Gregory Road	3062_1262	98	91	7	8%	Pass	1	Pass	Pass
7	Calibration	92	S	In	New Hall Lane	8624_4369	547	428	119	22%	Fail	5	Pass	Pass
7	Calibration	81	W	Out	Watery Lane	8290_4468	670	696	-26	-4%	Pass	1	Pass	Pass
7	Calibration	82	N	Out	Tulketh Road	4492_4513	139	141	-2	-1%	Pass	0	Pass	Pass
7	Calibration	83	W	Out	Tom Benson Way	10076_3087	404	407	-3	-1%	Pass	0	Pass	Pass
7	Calibration	85	N	Out	Garstang Road	4268_10069	698	701	-3	0%	Pass	0	Pass	Pass
7	Calibration	86	N	Out	Sir Tom Finney Way	4283_8155	552	485	67	12%	Pass	3	Pass	Pass
7	Calibration	87	N	Out	Plungington Road	1076_4184	273	282	-9	-3%	Pass	1	Pass	Pass
7	Calibration	88	W	Out	Egerton Road	1342_4192	83	20	63	76%	Pass	9	Fail	Pass
7	Calibration	89	W	Out	Navigation Way	1110_1426	83	83	0	0%	Pass	0	Pass	Pass
7	Calibration	90	N	Out	St Gregory Road	1262_3062	142	142	0	0%	Pass	0	Pass	Pass
7	Calibration	92	N	Out	New Hall Lane	4369_8624	522	440	82	16%	Pass	4	Pass	Pass

Screenline ID	Type	Site ID	Site Direction	Screenline Direction	Road Name	Model LinkID	Observed Flows	Modelled Flows	Flow Difference	Flow Difference	WebTAG Criteria 1	GEH	GEH Criteria	Passes at least 1 criterion
8	Calibration	19	N	In	Tincklers Lane	1387_3170	144	146	-2	-1%	Pass	0	Pass	Pass
8	Calibration	21	N	In	Wood Lane	8100_8099	302	298	4	1%	Pass	0	Pass	Pass
8	Calibration	22	N	In	Preston Road	4452_4176	243	237	6	2%	Pass	0	Pass	Pass
8	Calibration	23	N	In	New Road	8214_8226	455	455	0	0%	Pass	0	Pass	Pass
8	Calibration	24	N	In	Bolton Road	8520_4164	715	715	0	0%	Pass	0	Pass	Pass
8	Calibration	S4	N	In	M61	5141_5001	2537	2516	21	1%	Pass	0	Pass	Pass
8	Calibration	19	S	Out	Tincklers Lane	3170_1387	138	147	-9	-7%	Pass	1	Pass	Pass
8	Calibration	21	S	Out	Wood Lane	8099_8100	302	299	3	1%	Pass	0	Pass	Pass
8	Calibration	22	S	Out	Preston Road	4176_4452	250	231	19	8%	Pass	1	Pass	Pass
8	Calibration	23	S	Out	New Road	8226_8214	423	416	7	2%	Pass	0	Pass	Pass
8	Calibration	24	S	Out	Bolton Road	4164_8520	706	706	0	0%	Pass	0	Pass	Pass
8	Calibration	S4	S	Out	M61	7024_5141	2684	2684	0	0%	Pass	0	Pass	Pass
9	Calibration	15	N	In	Liverpool Road	4160_8080	563	563	0	0%	Pass	0	Pass	Pass
9	Calibration	16	E	In	North Road	8426_8082	121	144	-23	-19%	Pass	2	Pass	Pass
9	Calibration	17	E	In	South Road	8188_8092	165	164	1	0%	Pass	0	Pass	Pass
9	Calibration	18	N	In	Westhead Road	8430_8095	119	119	0	0%	Pass	0	Pass	Pass
9	Calibration	15	S	Out	Liverpool Road	8080_4160	631	630	1	0%	Pass	0	Pass	Pass
9	Calibration	16	W	Out	North Road	8082_8426	132	143	-11	-8%	Pass	1	Pass	Pass
9	Calibration	17	W	Out	South Road	8092_8188	172	167	5	3%	Pass	0	Pass	Pass
9	Calibration	18	S	Out	Westhead Road	8095_8430	125	125	0	0%	Pass	0	Pass	Pass
10	Calibration	29	N	In	Wigan Road	4178_4540	349	344	5	2%	Pass	0	Pass	Pass
10	Calibration	30	N	In	Preston Road	4404_8559	555	560	-5	-1%	Pass	0	Pass	Pass
10	Calibration	31	E	In	A674	8548_4504	444	444	0	0%	Pass	0	Pass	Pass
10	Calibration	149	N	In	Central Avenue	1045_1368	507	259	248	49%	Fail	13	Fail	Fail
10	Calibration	C	N	In	M61	7018_5015	2628	2590	38	1%	Pass	1	Pass	Pass
10	Calibration	D	N	In	M6	5113_10086	3123	3122	1	0%	Pass	0	Pass	Pass
10	Calibration	29	S	Out	Wigan Road	4540_4178	356	349	7	2%	Pass	0	Pass	Pass
10	Calibration	30	S	Out	Preston Road	8559_4404	562	553	9	2%	Pass	0	Pass	Pass
10	Calibration	31	W	Out	A674	4504_8548	444	444	0	0%	Pass	0	Pass	Pass
10	Calibration	149	S	Out	Central Avenue	1368_1045	503	480	23	5%	Pass	1	Pass	Pass
10	Calibration	C	S	Out	M61	7017_5004	2795	2737	58	2%	Pass	1	Pass	Pass
10	Calibration	D	S	Out	M6	7019_5115	3416	3415	1	0%	Pass	0	Pass	Pass
11	Calibration	32	W	In	Briers Brow	1483_4505	110	109	1	1%	Pass	0	Pass	Pass
11	Calibration	33	S	In	Blackburn Road	8542_8057	319	321	-2	-1%	Pass	0	Pass	Pass
11	Calibration	34	S	In	Marsh Lane	1029_8540	5	3	2	34%	Pass	1	Pass	Pass
11	Calibration	35	S	In	Stony Bank	1073_8541	89	83	6	7%	Pass	1	Pass	Pass
11	Calibration	36	W	In	Gregson Lane	1072_8565	31	37	-6	-20%	Pass	1	Pass	Pass
11	Calibration	37	W	In	Hoghton Lane	1786_4528	211	207	4	2%	Pass	0	Pass	Pass
11	Calibration	38	S	In	Cuerdale Lane	3032_8159	210	182	28	13%	Pass	2	Pass	Pass
11	Calibration	39	W	In	Preston New Road	4279_9962	915	921	-6	-1%	Pass	0	Pass	Pass
11	Calibration	H	W	In	M65	7010_5025	2213	2153	60	3%	Pass	1	Pass	Pass
11	Calibration	32	E	Out	Briers Brow	4505_1483	105	105	0	0%	Pass	0	Pass	Pass
11	Calibration	33	N	Out	Blackburn Road	8057_8542	300	300	0	0%	Pass	0	Pass	Pass
11	Calibration	34	N	Out	Marsh Lane	8540_1029	5	0	5	98%	Pass	3	Pass	Pass
11	Calibration	35	N	Out	Stony Bank	8541_1073	95	59	36	38%	Pass	4	Pass	Pass
11	Calibration	36	E	Out	Gregson Lane	8565_1072	28	29	-1	-2%	Pass	0	Pass	Pass
11	Calibration	37	E	Out	Hoghton Lane	4528_1786	215	215	0	0%	Pass	0	Pass	Pass
11	Calibration	38	N	Out	Cuerdale Lane	8159_3032	182	180	2	1%	Pass	0	Pass	Pass
11	Calibration	39	E	Out	Preston New Road	8444_4278	922	931	-9	-1%	Pass	0	Pass	Pass
11	Calibration	H	E	Out	M65	7009_5071	2224	2038	186	8%	Pass	4	Pass	Pass
12	Calibration	78	W	In	Whittingham Lane	8582_8020	265	265	0	0%	Pass	0	Pass	Pass
12	Calibration	79	W	In	Haighton Green Lane	8019_8459	113	76	37	33%	Pass	4	Pass	Pass
12	Calibration	80	S	In	Longridge Road	8580_8457	432	432	0	0%	Pass	0	Pass	Pass
12	Calibration	78	E	Out	Whittingham Lane	8020_8582	278	313	-35	-13%	Pass	2	Pass	Pass
12	Calibration	79	E	Out	Haighton Green Lane	8459_8019	74	74	0	-1%	Pass	0	Pass	Pass
12	Calibration	80	N	Out	Longridge Road	8457_8580	563	518	45	8%	Pass	2	Pass	Pass
13	Calibration	68	S	In	Garstang Road	4269_4202	79	156	-77	-97%	Pass	7	Fail	Pass
13	Calibration	69	S	In	Woodplumpton Road	8497_3059	139	139	0	0%	Pass	0	Pass	Pass
13	Calibration	70	S	In	Rosemary Lane	1632_1641	74	73	1	1%	Pass	0	Pass	Pass
13	Calibration	71	S	In	Blackleach Lane	1632_8374	8	0	8	100%	Pass	4	Pass	Pass
13	Calibration	72	S	In	Salwick Road	8495_1603	25	12	13	51%	Pass	3	Pass	Pass
13	Calibration	73	S	In	Church Road	10200_8668	25	26	-1	-3%	Pass	0	Pass	Pass
13	Calibration	74	S	In	Moorside	8493_8500	16	32	-16	-98%	Pass	3	Pass	Pass
13	Calibration	68	N	Out	Garstang Road	4202_4269	149	110	39	26%	Pass	3	Pass	Pass
13	Calibration	69	N	Out	Woodplumpton Road	3059_8497	153	154	-1	0%	Pass	0	Pass	Pass
13	Calibration	70	N	Out	Rosemary Lane	1641_1632	77	49	28	36%	Pass	4	Pass	Pass
13	Calibration	71	N	Out	Blackleach Lane	8374_1632	10	0	10	100%	Pass	4	Pass	Pass
13	Calibration	72	N	Out	Salwick Road	1603_8495	17	13	4	22%	Pass	1	Pass	Pass
13	Calibration	73	N	Out	Church Road	8668_10200	22	23	-1	-4%	Pass	0	Pass	Pass
13	Calibration	74	N	Out	Moorside	8500_8493	18	43	-25	-139%	Pass	5	Pass	Pass
14	Calibration	56	E	In	A584	4122_10016	458	409	49	11%	Pass	2	Pass	Pass
14	Calibration	57	N	In	Hillock Lane	1563_8393	50	53	-3	-7%	Pass	0	Pass	Pass
14	Calibration	58	N	In	Ribby Road	8605_8606	307	317	-10	-3%	Pass	1	Pass	Pass
14	Calibration	59	E	In	Blackpool Road	8208_4119	367	367	0	0%	Pass	0	Pass	Pass
14	Calibration	A	S	In	Fleetwood Road	1479_10089	865	847	18	2%	Pass	1	Pass	Pass
14	Calibration	S18	E	In	M55	1313_5103	1387	1386	1	0%	Pass	0	Pass	Pass
14	Calibration	56	W	Out	A584	10016_4122	353	347	6	2%	Pass	0	Pass	Pass
14	Calibration	57	S	Out	Hillock Lane	8393_1563	50	73	-23	-46%	Pass	3	Pass	Pass
14	Calibration	58	S	Out	Ribby Road	8606_8605	351	352	-1	0%	Pass	0	Pass	Pass
14	Calibration	59	W	Out	Blackpool Road	4119_8208	413	413	0	0%	Pass	0	Pass	Pass
14	Calibration	A	N	Out	Fleetwood Road	10089_1479	912	891	21	2%	Pass	1	Pass	Pass
14	Calibration	S18	W	Out	M55	5110_7023	1394	1311	83	6%	Pass	2	Pass	Pass

Screenline ID	Type	Site ID	Site Direction	Screenline Direction	Road Name	Model LinkID	Observed Flows	Modelled Flows	Flow Difference	Flow Difference	WebTAG Criteria 1	GEH	GEH Criteria	Passes at least 1 criterion
15	Model Develo	1	E	In	Liverpool Road	10010_6195	641	641	0	0%	Pass	0	Pass	Pass
15	Model Develo	5	N	In	Leyland Road	4251_1737	595	599	-4	-1%	Pass	0	Pass	Pass
15	Model Develo	6	N	In	Todd Lane North	8269_1463	109	108	1	1%	Pass	0	Pass	Pass
15	Model Develo	7	N	In	London Way	10102_4070	898	999	-101	-11%	Pass	3	Pass	Pass
15	Model Develo	9	W	In	Higher Walton Road	8157_8570	257	256	1	0%	Pass	0	Pass	Pass
15	Model Develo	54	N	In	Flensburg Way	5333_5332	744	749	-5	-1%	Pass	0	Pass	Pass
15	Model Develo	122	S	In	Cuerdale Lane	8571_3177	159	169	-10	-6%	Pass	1	Pass	Pass
15	Model Develo	123	W	In	Brockholes Brow	9965_4353	761	767	-6	-1%	Pass	0	Pass	Pass
15	Model Develo	124	S	In	Longridge Road	3018_8453	521	387	134	26%	Fail	6	Fail	Fail
15	Model Develo	125	E	In	Eastway	3011_3009	674	674	0	0%	Pass	0	Pass	Pass
15	Model Develo	126	S	In	Garstang Road	4520_4274	619	620	-1	0%	Pass	0	Pass	Pass
15	Model Develo	127	S	In	Black Bull Lane	1402_1007	422	367	55	13%	Pass	3	Pass	Pass
15	Model Develo	128	S	In	Tag Lane	4194_3086	403	399	4	1%	Pass	0	Pass	Pass
15	Model Develo	129	S	In	Tom Benson Way	4195_3087	390	411	-21	-5%	Pass	1	Pass	Pass
15	Model Develo	130	E	In	Blackpool Road	8389_4115	929	991	-62	-7%	Pass	2	Pass	Pass
15	Model Develo	131	S	In	Lindle Lane	4477_8408	156	220	-64	-41%	Pass	5	Pass	Pass
15	Model Develo	132	E	In	Wham Lane	1255_1147	317	323	-6	-2%	Pass	0	Pass	Pass
15	Model Develo	133	W	In	Farington Road	9987_5231	883	885	-2	0%	Pass	0	Pass	Pass
15	Model Develo	134	N	In	Station Road	10105_3186	551	583	-32	-6%	Pass	1	Pass	Pass
15	Model Develo	1	W	Out	Liverpool Road	6117_4477	629	629	0	0%	Pass	0	Pass	Pass
15	Model Develo	5	S	Out	Leyland Road	1737_4251	533	539	-6	-1%	Pass	0	Pass	Pass
15	Model Develo	6	S	Out	Todd Lane North	1463_8269	141	89	52	37%	Pass	5	Pass	Pass
15	Model Develo	7	S	Out	London Way	4070_10102	999	1100	-101	-10%	Pass	3	Pass	Pass
15	Model Develo	9	E	Out	Higher Walton Road	8570_8157	311	303	8	2%	Pass	0	Pass	Pass
15	Model Develo	54	S	Out	Flensburg Way	8250_3021	737	738	-1	0%	Pass	0	Pass	Pass
15	Model Develo	122	N	Out	Cuerdale Lane	3177_8571	197	197	0	0%	Pass	0	Pass	Pass
15	Model Develo	123	E	Out	Brockholes Brow	4353_9965	761	765	-4	-1%	Pass	0	Pass	Pass
15	Model Develo	124	N	Out	Longridge Road	8453_3018	493	493	0	0%	Pass	0	Pass	Pass
15	Model Develo	125	W	Out	Eastway	3009_3011	647	647	0	0%	Pass	0	Pass	Pass
15	Model Develo	126	N	Out	Garstang Road	4274_4520	607	606	1	0%	Pass	0	Pass	Pass
15	Model Develo	127	N	Out	Black Bull Lane	1007_1402	492	424	68	14%	Pass	3	Pass	Pass
15	Model Develo	128	N	Out	Tag Lane	3086_4194	439	439	0	0%	Pass	0	Pass	Pass
15	Model Develo	129	N	Out	Tom Benson Way	3087_4195	460	457	3	1%	Pass	0	Pass	Pass
15	Model Develo	130	W	Out	Blackpool Road	4115_8389	914	916	-2	0%	Pass	0	Pass	Pass
15	Model Develo	131	N	Out	Lindle Lane	8408_4477	184	229	-45	-24%	Pass	3	Pass	Pass
15	Model Develo	132	W	Out	Wham Lane	1147_1255	367	371	-4	-1%	Pass	0	Pass	Pass
15	Model Develo	133	E	Out	Farington Road	5231_9987	852	852	0	0%	Pass	0	Pass	Pass
15	Model Develo	134	S	Out	Station Road	3186_10105	517	517	0	0%	Pass	0	Pass	Pass
16	Validation	106	N	In	A59	4084_4088	1518	1518	0	0%	Pass	0	Pass	Pass
16	Validation	107	W	In	Liverpool Road	4544_4086	667	668	-1	0%	Pass	0	Pass	Pass
16	Validation	108	N	In	London Road	10024_4464	931	934	-3	0%	Pass	0	Pass	Pass
16	Validation	106	S	Out	A59	4088_4084	1210	1254	-44	-4%	Pass	1	Pass	Pass
16	Validation	107	E	Out	Liverpool Road	4086_4544	226	238	-12	-5%	Pass	1	Pass	Pass
16	Validation	108	S	Out	London Road	4464_10024	1232	1235	-3	0%	Pass	0	Pass	Pass
17	Validation	63	E	In	Blackpool Road	10013_8384	515	507	8	2%	Pass	0	Pass	Pass
17	Validation	64	E	In	Preston New Road	9994_8040	483	483	0	0%	Pass	0	Pass	Pass
17	Validation	63	W	Out	Blackpool Road	8384_10013	542	537	5	1%	Pass	0	Pass	Pass
17	Validation	64	W	Out	Preston New Road	8040_9994	420	420	0	0%	Pass	0	Pass	Pass
18	Validation	135	S	In	Eastway	4198_3088	690	600	90	13%	Pass	4	Pass	Pass
18	Validation	137	S	In	Tom Benson Way	3085_3003	543	538	5	1%	Pass	0	Pass	Pass
18	Validation	150	S	In	Wychnor	8342_1276	59	57	2	4%	Pass	0	Pass	Pass
18	Validation	151	S	In	Sherwood Way	8168_8349	324	324	0	0%	Pass	0	Pass	Pass
18	Validation	S13	S	In	M6	7013_5085	4294	4347	-53	-1%	Pass	1	Pass	Pass
18	Validation	135	N	Out	Eastway	3088_4198	647	647	0	0%	Pass	0	Pass	Pass
18	Validation	137	N	Out	Tom Benson Way	3003_3085	619	485	134	22%	Fail	6	Fail	Fail
18	Validation	150	N	Out	Wychnor	1276_8342	59	56	3	5%	Pass	0	Pass	Pass
18	Validation	151	N	Out	Sherwood Way	8349_8168	380	380	0	0%	Pass	0	Pass	Pass
18	Validation	S13	N	Out	M6	5083_2401	4043	4052	-9	0%	Pass	0	Pass	Pass
19	Validation	42	N	In	Longton By-Pass	4338_4340	550	550	0	0%	Pass	0	Pass	Pass
19	Validation	43	N	In	Longmeanygate	8081_1047	123	123	0	0%	Pass	0	Pass	Pass
19	Validation	44	N	In	Schleswig Way	10008_3024	446	442	4	1%	Pass	0	Pass	Pass
19	Validation	42	S	Out	Longton By-Pass	4339_4336	628	628	0	0%	Pass	0	Pass	Pass
19	Validation	43	S	Out	Longmeanygate	1047_8081	138	138	0	0%	Pass	0	Pass	Pass
19	Validation	44	S	Out	Schleswig Way	3024_10008	498	496	2	0%	Pass	0	Pass	Pass
20	Validation	84	E	In	Eldon Street	1082_1086	106	92	14	13%	Pass	1	Pass	Pass
20	Validation	99	E	In	Fylde Road	4249_4248	321	322	-1	0%	Pass	0	Pass	Pass
20	Validation	121	E	In	Marsh Lane	4247_1059	374	328	46	12%	Pass	2.5	Pass	Pass
20	Validation	141	E	In	Blackpool Road	4267_10068	583	570	13	2%	Pass	1	Pass	Pass
20	Validation	155	E	In	Aqueduct Street	1100_1078	409	402	7	2%	Pass	0	Pass	Pass
20	Validation	84	W	Out	Eldon Street	1086_1082	107	106	1	1%	Pass	0	Pass	Pass
20	Validation	99	W	Out	Fylde Road	4248_4249	459	397	62	14%	Pass	3	Pass	Pass
20	Validation	120	W	Out	Fishergate	1014_1097	614	566	48	8%	Pass	2	Pass	Pass
20	Validation	141	W	Out	Blackpool Road	10068_4267	566	566	0	0%	Pass	0	Pass	Pass
20	Validation	155	W	Out	Aqueduct Street	1078_1100	498	497	1	0%	Pass	0	Pass	Pass
21	Validation	65	E	In	Riversway	4112_10072	843	770	73	9%	Pass	3	Pass	Pass
21	Validation	66	E	In	Blackpool Road	8615_4281	507	508	-1	0%	Pass	0	Pass	Pass
21	Validation	65	W	Out	Riversway	10072_4112	702	702	0	0.0%	Pass	0	Pass	Pass
21	Validation	66	W	Out	Blackpool Road	4281_8615	457	456	1	0%	Pass	0	Pass	Pass
22	Validation	40	W	In	Sheep Hill Brow	8258_3090	274	267	7	3%	Pass	0	Pass	Pass
22	Validation	41	W	In	Dawson Lane	8253_1043	167	167	0	0%	Pass	0	Pass	Pass
22	Validation	148	W	In	Church Road	4002_4001	859	840	19	2%	Pass	1	Pass	Pass
22	Validation	B	W	In	M65	5031_5032	1789	1790	-1	0%	Pass	0	Pass	Pass
22	Validation	40	E	Out	Sheep Hill Brow	3090_8258	289	248	41	14%	Pass	3	Pass	Pass
22	Validation	41	E	Out	Dawson Lane	1043_8253	179	171	8	4%	Pass	1	Pass	Pass
22	Validation	148	E	Out	Church Road	4001_4002	828	827	1	0%	Pass	0	Pass	Pass
22	Validation	B	E	Out	M65	5037_10085	1595	1649	-54	-3%	Pass	1	Pass	Pass
23	Independent (	E	S	In	M6	7011_5096	2593	2579	14	1%	Pass	0	Pass	Pass
23	Independent (	E	N	Out	M6	5088_5188	2356	2349	7	0%	Pass	0	Pass	Pass

Screenline ID	Type	Site ID	Site Direction	Screenline Direction	Road Name	Model LinkID	Observed Flows	Modelled Flows	Flow Difference	Flow Difference	WebTAG Criteria 1	GEH	GEH Criteria	Passes at least 1 criterion
Independent Count	Independent (	2	S		Pope Lane	4078_1258	355	299	56	16%	Pass	3	Pass	Pass
Independent Count	Independent (	2	N		Pope Lane	1258_4078	290	290	0	0%	Pass	0	Pass	Pass
Independent Count	Independent (	3	E		Chain House Lane	8260_5240	338	356	-18	-5%	Pass	1	Pass	Pass
Independent Count	Independent (	3	W		Chain House Lane	5240_8260	385	389	-4	-1%	Pass	0	Pass	Pass
Independent Count	Independent (	4	S		Penwortham Way	50002_6126	774	758	16	2%	Pass	1	Pass	Pass
Independent Count	Independent (	4	N		Penwortham Way	6126_50002	671	672	-1	0%	Pass	0	Pass	Pass
Independent Count	Independent (	8	N		Chorley Road	3106_3179	420	389	31	7%	Pass	2	Pass	Pass
Independent Count	Independent (	8	S		Chorley Road	3179_3106	404	399	5	1%	Pass	0	Pass	Pass
Independent Count	Independent (	10	E		Cuerdale Lane	3177_8571	177	197	-20	-11%	Pass	1	Pass	Pass
Independent Count	Independent (	10	W		Cuerdale Lane	8571_3177	206	169	37	18%	Pass	3	Pass	Pass
Independent Count	Independent (	11	N		Stanifield Lane	1545_5561	501	504	-3	-1%	Pass	0	Pass	Pass
Independent Count	Independent (	11	S		Stanifield Lane	5561_1545	486	493	-7.0	-1%	Pass	0	Pass	Pass
Independent Count	Independent (	13	N		Craven Drive	4476_1204	72	6	66	92%	Pass	11	Fail	Pass
Independent Count	Independent (	13	S		Craven Drive	1204_4476	51	16	35	68%	Pass	6	Fail	Pass
Independent Count	Independent (	14	N		Wigan Road	4476_4035	356	335	21	6%	Pass	1	Pass	Pass
Independent Count	Independent (	14	S		Wigan Road	4035_4476	400	384	16	4%	Pass	1	Pass	Pass
Independent Count	Independent (	114	N		Port Way	1110_10053	474	407	67	14%	Pass	3	Pass	Pass
Independent Count	Independent (	114	S		Port Way	10053_1110	551	554	-3	-1%	Pass	0	Pass	Pass
Independent Count	Independent (	115	N		Channel Way	10061_1134	577	490	87	15%	Pass	4	Pass	Pass
Independent Count	Independent (	116	N		West Strand	4363_10065	564	579	-15	-3%	Pass	1	Pass	Pass
Independent Count	Independent (	116	S		West Strand	4363_4362	776	597	179	23%	Fail	7	Fail	Fail
Independent Count	Independent (	117	E		Ring Way	4481_4260	1200	958	242	20%	Fail	7	Fail	Fail
Independent Count	Independent (	117	W		Ring Way	4382_4383	803	804	-1	0%	Pass	0	Pass	Pass
Independent Count	Independent (	118	E		Ring Way	4389_4262	595	606	-11	-2%	Pass	0	Pass	Pass
Independent Count	Independent (	118	W		Ring Way	4321_4418	512	513	-1	0%	Pass	0	Pass	Pass
Independent Count	Independent (	119	E		Ring Way	4299_4136	595	593	2	0%	Pass	0	Pass	Pass
Independent Count	Independent (	119	W		Ring Way	10107_4299	512	513	-1	0%	Pass	0	Pass	Pass
Independent Count	Independent (	138	E		Lightfoot Lane	1713_1364	150	134	16	10%	Pass	1	Pass	Pass
Independent Count	Independent (	138	W		Lightfoot Lane	1364_1713	254	186	68	27%	Pass	5	Pass	Pass
Independent Count	Independent (	139	E		Longsands Lane	10026_8454	569	588	-19	-3%	Pass	1	Pass	Pass
Independent Count	Independent (	139	W		Longsands Lane	8454_10026	504	504	0	0%	Pass	0	Pass	Pass
Independent Count	Independent (	142	E		Blackpool Road	10070_8007	621	639	-18	-3%	Pass	1	Pass	Pass
Independent Count	Independent (	142	W		Blackpool Road	8007_10070	680	679	1	0%	Pass	0	Pass	Pass
Independent Count	Independent (	143	E		Blackpool Road	4352_4147	603	530	73	12%	Pass	3	Pass	Pass
Independent Count	Independent (	143	W		Blackpool Road	4147_4352	523	524	-1	0%	Pass	0	Pass	Pass
Independent Count	Independent (	144	S		Blackpool Road	4284_4102	605	598	7	1%	Pass	0	Pass	Pass
Independent Count	Independent (	144	N		Blackpool Road	4102_4284	596	580	16	3%	Pass	1	Pass	Pass
Independent Count	Independent (	145	N		Penwortham Way	5330_50001	834	828	6	1%	Pass	0	Pass	Pass
Independent Count	Independent (	145	S		Penwortham Way	50005_5306	839	858	-19	-2%	Pass	1	Pass	Pass
Independent Count	Independent (	146	E		Flensburg Way	8091_50000	797	796	1	0%	Pass	0	Pass	Pass
Independent Count	Independent (	146	W		Flensburg Way	50000_8091	763	765	-2	0%	Pass	0	Pass	Pass
Independent Count	Independent (	147	W		Lostock Lane	4074_4240	1308	1336	-28	-2%	Pass	1	Pass	Pass
Independent Count	Independent (	147	E		Lostock Lane	4240_4074	1319	1319	0	0%	Pass	0	Pass	Pass
Independent Count	Independent (	152	N		Church Street	1167_1128	507	506	1	0%	Pass	0	Pass	Pass
Independent Count	Independent (	153	N		Queen Street	1225_1350	573	527	46	8%	Pass	2	Pass	Pass
Independent Count	Independent (	153	S		Queen Street	1350_1225	379	371	8	2%	Pass	0	Pass	Pass
Independent Count	Independent (	154	S		Carlisle Street	1279_1162	400	400	0	0%	Pass	0	Pass	Pass
Independent Count	Independent (	156	W		Brownedge Road	4069_3066	387	390	-3	-1%	Pass	0	Pass	Pass
Independent Count	Independent (	156	E		Brownedge Road	3066_4069	323	324	-1	0%	Pass	0	Pass	Pass
Independent Count	Independent (	157	N		Croston Road	1058_1049	181	158	23	13%	Pass	2	Pass	Pass
Independent Count	Independent (	157	S		Croston Road	1049_1058	139	139	0	0%	Pass	0	Pass	Pass
Independent Count	Independent (	158	W		Bank Bridge	8425_8427	803	803	0	0%	Pass	0	Pass	Pass
Independent Count	Independent (	158	E		Bank Bridge	8427_8425	721	721	0	0%	Pass	0	Pass	Pass
Independent Count	Independent (	159	E		Southport Road	4043_4244	383	377	6	2%	Pass	0	Pass	Pass
Independent Count	Independent (	159	W		Southport Road	4244_4043	416	403	13	3%	Pass	1	Pass	Pass
Independent Count	Independent (	160	W		Myerscough Smithy Road	8118_8117	517	507	10	2%	Pass	0	Pass	Pass
Independent Count	Independent (	160	E		Myerscough Smithy Road	8117_8118	557	516	41	7%	Pass	2	Pass	Pass
Independent Count	Independent (	161	E		Preston New Road	1834_8119	446	450	-4	-1%	Pass	0	Pass	Pass
Independent Count	Independent (	161	W		Preston New Road	8119_1834	483	464	19	4%	Pass	1	Pass	Pass
Independent Count	Independent (	162	E		Longsight Road	1803_8128	524	524	0	0%	Pass	0	Pass	Pass
Independent Count	Independent (	162	W		Longsight Road	8128_1803	496	499	-3	-1%	Pass	0	Pass	Pass
Independent Count	Independent (	163	N		Pope Lane	8010_1075	199	199	0	0%	Pass	0	Pass	Pass
Independent Count	Independent (	163	S		Pope Lane	1075_8010	239	238	1	0%	Pass	0	Pass	Pass
Independent Count	Independent (	164	N		Cop Lane	1020_8276	341	338	3	1%	Pass	0	Pass	Pass
Independent Count	Independent (	164	S		Cop Lane	8276_1020	325	312	13	4%	Pass	1	Pass	Pass
Independent Count	Independent (	165	N		Bow Lane	1432_1129	354	354	0	0%	Pass	0	Pass	Pass
Independent Count	Independent (	165	S		Bow Lane	1129_1432	197	196	1	0%	Pass	0	Pass	Pass
Independent Count	Independent (	166	N		Corporation Street	1014_4304	70	63	7	11%	Pass	1	Pass	Pass
Independent Count	Independent (	166	S		Corporation Street	4304_1014	401	401	0	0%	Pass	0	Pass	Pass
Independent Count	Independent (	167	N		James Towers Way	5404_5217	906	892	14	2%	Pass	0	Pass	Pass
Independent Count	Independent (	167	S		James Towers Way	5218_5404	999	1004	-5	-1%	Pass	0	Pass	Pass
Independent Count	Independent (	168	S		D'urton Lane	1011_3008	87	87	0	0%	Pass	0	Pass	Pass
Independent Count	Independent (	168	N		D'urton Lane	3008_1011	131	170	-39	-29%	Pass	3	Pass	Pass
Independent Count	Independent (	169	E		Eastway	981_3165	504	519	-15	-3%	Pass	1	Pass	Pass
Independent Count	Independent (	169	W		Eastway	3165_981	555	545	10	2%	Pass	0	Pass	Pass
Independent Count	Independent (	170	W		Hoyles Lane	1015_8167	106	107	-1	-1%	Pass	0	Pass	Pass
Independent Count	Independent (	170	E		Hoyles Lane	8167_1015	138	106	32	23%	Pass	3	Pass	Pass
Independent Count	Independent (	G	S		M6	5085_7014	5200	5261	-61	-1%	Pass	1	Pass	Pass
Independent Count	Independent (	G	N		M6	2405_5083	4766	4788	-22	0%	Pass	0	Pass	Pass
Independent Count	Independent (	S1	N		M6	5087_5088	1915	1953	-38	-2%	Pass	1	Pass	Pass
Independent Count	Independent (	S1	S		M6	5096_5090	2144	2179	-35	-2%	Pass	1	Pass	Pass
Independent Count	Independent (	S10	N		M6	5075_9964	800	758	42	5%	Pass	2	Pass	Pass
Independent Count	Independent (	S11	N		M6	5077_5076	633	571	62	10%	Pass	3	Pass	Pass
Independent Count	Independent (	S12	S		M6	5078_10082	600	573	27	5%	Pass	1	Pass	Pass
Independent Count	Independent (	S14	W		M55	5087_2407	2128	2099	29	1%	Pass	1	Pass	Pass
Independent Count	Independent (	S15	E		M6	5089_5090	2200	2168	32	1%	Pass	1	Pass	Pass
Independent Count	Independent (	S16	W		M55	5096_5092	449	400	49	11%	Pass	2	Pass	Pass
Independent Count	Independent (	S17	E		M6	5089_10011	362	396	-34	-9%	Pass	2	Pass	Pass
Independent Count	Independent (	S2	S		M6	5064_5165	507	508	-1	0%	Pass	0	Pass	Pass
Independent Count	Independent (	S3	S		M6	7007_10116	3630	3610	20	1%	Pass	0	Pass	Pass
Independent Count	Independent (	S3	N		M6	7008_5039	3271	3273	-2	0%	Pass	0	Pass	Pass
Independent Count	Independent (	S5	S		A6	4064_4063	1318	1296	22	2%	Pass	1	Pass	Pass
Independent Count	Independent (	S5	N		A6	4063_4064	1329	1324	5	0%	Pass	0	Pass	Pass
Independent Count	Independent (	S6	N		M6	5040_7006	2704	2690	14	1%	Pass	0	Pass	Pass
Independent Count	Independent (	S6	S		M6	5074_10084	2932	2944	-12	0%	Pass	0	Pass	Pass
Independent Count	Independent (	S7	N		M61	7016_5073	2231	2284	-53	-2%	Pass	1	Pass	Pass
Independent Count	Independent (	S7	S		M61	10104_10103	2530	2494	36	1%	Pass	1	Pass	Pass
Independent Count	Independent (	S8	S		M6	7005_10083	5462	5438	24	0%	Pass	0	Pass	Pass
Independent Count	Independent (	S8	N		M6	7015_2406	4935	4974	-39	-1%	Pass	1	Pass	Pass
Independent Count	Independent (	60	S	In	Fleetwood Road	1570_8498	594	595	-1	0%	Pass	0	Pass	Pass
Independent Count	Independent (	60	N	Out	Fleetwood Road	8498_1570	651	651	0	0%	Pass	0	Pass	Pass

PM All Vehicles

Screenline ID	Type	Site ID	Site Direction	Screenline Direction	Road Name	Model LinkID	Observed Flows	Modelled Flows	Flow Difference	Flow Difference	WebTAG Criteria 1	GEH	GEH Criteria	Passes at least 1 criterion
1	Calibration	61	E	In	Kirkham By-Pass	10014_1590	560	561	-1	0%	Pass	0	Pass	Pass
1	Calibration	62	E	In	Preston Street	1579_1584	451	449	2	0%	Pass	0	Pass	Pass
1	Calibration	F	E	In	M55	7001_5099	2877	2800	77	3%	Pass	1	Pass	Pass
1	Calibration	61	W	Out	Kirkham By-Pass	1590_10014	726	705	21	3%	Pass	1	Pass	Pass
1	Calibration	62	W	Out	Preston Street	1584_1579	361	363	-2	0%	Pass	0	Pass	Pass
1	Calibration	F	W	Out	M55	5102_5107	3081	2987	94	3%	Pass	2	Pass	Pass
2	Calibration	75	S	In	Tabley Lane	8503_3060	199	199	0	0%	Pass	0	Pass	Pass
2	Calibration	76	S	In	Garstang Road	4146_4201	1103	1187	-84	-8%	Pass	2	Pass	Pass
2	Calibration	77	S	In	Sandy Lane	10209_1015	177	0	177	100%	Fail	19	Fail	Fail
2	Calibration	140	S	In	Sidgreaves Lane	1645_1016	279	282	-3	-1%	Pass	0	Pass	Pass
2	Calibration	75	N	Out	Tabley Lane	3060_8503	239	238	1	0%	Pass	0	Pass	Pass
2	Calibration	76	N	Out	Garstang Road	4201_4146	1137	1171	-34	-3%	Pass	1	Pass	Pass
2	Calibration	77	N	Out	Sandy Lane	1015_10209	195	0	195	100%	Fail	20	Fail	Fail
2	Calibration	140	N	Out	Sidgreaves Lane	1016_1645	213	236	-23	-11%	Pass	2	Pass	Pass
3	Calibration	25	W	In	Moss Lane	8060_4011	268	268	0	0%	Pass	0	Pass	Pass
3	Calibration	27	W	In	Harper's Lane	3197_4015	555	500	55	10%	Pass	2	Pass	Pass
3	Calibration	28	W	In	Lyons Lane	3161_4019	334	334	0	0%	Pass	0	Pass	Pass
3	Calibration	25	E	Out	Moss Lane	4011_8060	287	357	-70	-24%	Pass	4	Pass	Pass
3	Calibration	27	E	Out	Harper's Lane	4015_3197	613	613	0	0%	Pass	0	Pass	Pass
3	Calibration	28	E	Out	Lyons Lane	4019_3161	495	495	0	0%	Pass	0	Pass	Pass
4	Calibration	45	E	In	Dunkirk Lane	3072_8084	346	325	21	6%	Pass	1	Pass	Pass
4	Calibration	46	N	In	Ulnes Walton Lane	8240_8242	169	171	-2	-1%	Pass	0	Pass	Pass
4	Calibration	47	N	In	Leyland Lane	3202_3027	366	366	0	0%	Pass	0	Pass	Pass
4	Calibration	48	N	In	Runshaw Hall Lane	1056_1055	260	261	-1	0%	Pass	0	Pass	Pass
4	Calibration	49	W	In	Heald House Road	4032_3155	881	872	9	1%	Pass	0	Pass	Pass
4	Calibration	50	W	In	Leyland Way	5068_3206	1075	1098	-23	-2%	Pass	1	Pass	Pass
4	Calibration	51	S	In	Stanifield Lane	8257_3152	530	531	-1	0%	Pass	0	Pass	Pass
4	Calibration	52	S	In	Wheelton Lane	1069_3054	446	322	124	28%	Fail	6	Fail	Fail
4	Calibration	53	S	In	Croston Road	8433_8090	320	318	2	1%	Pass	0	Pass	Pass
4	Calibration	55	E	In	Reiver Road	8246_1386	206	218	-12	-6%	Pass	1	Pass	Pass
4	Calibration	45	W	Out	Dunkirk Lane	8084_3072	439	439	0	0%	Pass	0	Pass	Pass
4	Calibration	46	S	Out	Ulnes Walton Lane	8242_8240	206	208	-2	-1%	Pass	0	Pass	Pass
4	Calibration	47	S	Out	Leyland Lane	3027_3202	567	565	2	0%	Pass	0	Pass	Pass
4	Calibration	48	S	Out	Runshaw Hall Lane	1055_1056	252	275	-23	-9%	Pass	1	Pass	Pass
4	Calibration	49	E	Out	Heald House Road	3155_4032	774	775	-1	0%	Pass	0	Pass	Pass
4	Calibration	50	E	Out	Leyland Way	3206_5068	837	844	-7	-1%	Pass	0	Pass	Pass
4	Calibration	51	N	Out	Stanifield Lane	3152_8257	441	436	5	1%	Pass	0	Pass	Pass
4	Calibration	52	N	Out	Wheelton Lane	3054_1069	163	179	-16	-10%	Pass	1	Pass	Pass
4	Calibration	53	N	Out	Croston Road	8090_8433	269	268	1	0%	Pass	0	Pass	Pass
4	Calibration	55	W	Out	Reiver Road	1386_8246	418	341	77	18%	Pass	4	Pass	Pass
5	Calibration	93	S	In	Ribbleton Lane	3156_4142	371	346	25	7%	Pass	1	Pass	Pass
5	Calibration	94	S	In	Deepdale Road	4480_4142	313	397	-84	-27%	Pass	4	Pass	Pass
5	Calibration	95	S	In	Meadow Street	8305_1114	75	84	-9	-12%	Pass	1	Pass	Pass
5	Calibration	96	S	In	North Road	4357_4263	736	812	-76	-10%	Pass	3	Pass	Pass
5	Calibration	100	E	In	Marsh Lane	4371_4247	1043	898	145	14%	Pass	5	Pass	Pass
5	Calibration	103	N	In	Manchester Road	10205_1019	147	212	-65	-44%	Pass	5	Pass	Pass
5	Calibration	104	W	In	London Road	4376_4207	1002	841	161	16%	Fail	5	Pass	Pass
5	Calibration	105	W	In	New Hall Lane	4515_1764	550	551	-1	0%	Pass	0	Pass	Pass
5	Calibration	93	N	Out	Ribbleton Lane	4142_3156	446	422	24	5%	Pass	1	Pass	Pass
5	Calibration	94	N	Out	Deepdale Road	4142_4480	501	512	-11	-2%	Pass	0	Pass	Pass
5	Calibration	95	N	Out	Meadow Street	1114_8305	167	166	1	1%	Pass	0	Pass	Pass
5	Calibration	96	N	Out	North Road	4263_4357	588	605	-17	-3%	Pass	1	Pass	Pass
5	Calibration	100	W	Out	Marsh Lane	4247_4310	1036	921	115	11%	Pass	4	Pass	Pass
5	Calibration	101	S	Out	Fishergate Hill	1190_1191	777	775	2	0%	Pass	0	Pass	Pass
5	Calibration	103	S	Out	Manchester Road	10205_1268	139	129	10	8%	Pass	1	Pass	Pass
5	Calibration	104	E	Out	London Road	4207_4376	1353	1477	-124	-9%	Pass	3	Pass	Pass
5	Calibration	105	E	Out	New Hall Lane	1764_4515	756	756	0	0%	Pass	0	Pass	Pass
6	Calibration	109	N	In	Victoria Road	4156_4048	622	628	-6	-1%	Pass	0	Pass	Pass
6	Calibration	110	N	In	London Way	4070_10101	933	929	4	0%	Pass	0	Pass	Pass
6	Calibration	111	N	In	Leyland Road	3083_8406	579	579	0	0%	Pass	0	Pass	Pass
6	Calibration	112	N	In	Golden Way	8434_10099	810	808	2	0%	Pass	0	Pass	Pass
6	Calibration	113	E	In	Liverpool Road	4208_4532	787	752	35	5%	Pass	1	Pass	Pass
6	Calibration	109	S	Out	Victoria Road	4048_4156	960	960	0	0%	Pass	0	Pass	Pass
6	Calibration	110	S	Out	London Way	10101_4070	1240	1302	-62	-5%	Pass	2	Pass	Pass
6	Calibration	111	S	Out	Leyland Road	8406_3083	779	749	30	4%	Pass	1	Pass	Pass
6	Calibration	112	S	Out	Golden Way	10099_8434	1524	1407	117	8%	Pass	3	Pass	Pass
6	Calibration	113	W	Out	Liverpool Road	4532_4208	1004	821	183	18%	Fail	6	Fail	Fail
7	Calibration	81	E	In	Watery Lane	4468_8290	674	685	-11	-2%	Pass	0	Pass	Pass
7	Calibration	82	S	In	Tulketh Road	4513_4492	149	149	0	0%	Pass	0	Pass	Pass
7	Calibration	83	E	In	Tom Benson Way	3087_10076	339	340	-1	0%	Pass	0	Pass	Pass
7	Calibration	85	S	In	Garstang Road	10069_4268	667	671	-4	-1%	Pass	0	Pass	Pass
7	Calibration	86	S	In	Sir Tom Finney Way	8155_4283	662	668	-6	-1%	Pass	0	Pass	Pass
7	Calibration	87	S	In	Plungington Road	4184_1076	314	317	-3	-1%	Pass	0	Pass	Pass
7	Calibration	88	E	In	Egerton Road	4192_1342	182	183	-1	0%	Pass	0	Pass	Pass
7	Calibration	89	E	In	Navigation Way	1426_1110	180	171	9	5%	Pass	1	Pass	Pass
7	Calibration	90	S	In	St Gregory Road	3062_1262	111	107	4	3%	Pass	0	Pass	Pass
7	Calibration	92	S	In	New Hall Lane	8624_4369	556	509	47	8%	Pass	2	Pass	Pass
7	Calibration	81	W	Out	Watery Lane	8290_4468	1031	980	51	5%	Pass	2	Pass	Pass
7	Calibration	82	N	Out	Tulketh Road	4492_4513	208	197	11	5%	Pass	1	Pass	Pass
7	Calibration	83	W	Out	Tom Benson Way	10076_3087	749	747	2	0%	Pass	0	Pass	Pass
7	Calibration	85	N	Out	Garstang Road	4268_10069	780	787	-7	-1%	Pass	0	Pass	Pass
7	Calibration	86	N	Out	Sir Tom Finney Way	4283_8155	686	521	165	24%	Fail	7	Fail	Fail
7	Calibration	87	N	Out	Plungington Road	1076_4184	387	414	-27	-7%	Pass	1	Pass	Pass
7	Calibration	88	W	Out	Egerton Road	1342_4192	121	120	1	1%	Pass	0	Pass	Pass
7	Calibration	89	W	Out	Navigation Way	1110_1426	180	105	75	42%	Pass	6	Fail	Pass
7	Calibration	90	N	Out	St Gregory Road	1262_3062	197	197	0	0%	Pass	0	Pass	Pass
7	Calibration	92	N	Out	New Hall Lane	4369_8624	606	598	8	1%	Pass	0	Pass	Pass

Screenline ID	Type	Site ID	Site Direction	Screenline Direction	Road Name	Model LinkID	Observed Flows	Modelled Flows	Flow Difference	Flow Difference	WebTAG Criteria 1	GEH	GEH Criteria	Passes at least 1 criterion
8	Calibration	19	N	In	Tincklers Lane	1387_3170	185	185	0	0%	Pass	0	Pass	Pass
8	Calibration	21	N	In	Wood Lane	8100_8099	463	463	0	0%	Pass	0	Pass	Pass
8	Calibration	22	N	In	Preston Road	4452_4176	320	320	0	0%	Pass	0	Pass	Pass
8	Calibration	23	N	In	New Road	8214_8226	543	540	3	1%	Pass	0	Pass	Pass
8	Calibration	24	N	In	Bolton Road	8520_4164	976	981	-5	0%	Pass	0	Pass	Pass
8	Calibration	S4	N	In	M61	5141_5001	3461	3689	-228	-7%	Pass	4	Pass	Pass
8	Calibration	19	S	Out	Tincklers Lane	3170_1387	195	200	-5	-2%	Pass	0	Pass	Pass
8	Calibration	21	S	Out	Wood Lane	8099_8100	370	370	0	0%	Pass	0	Pass	Pass
8	Calibration	22	S	Out	Preston Road	4176_4452	359	359	0	0%	Pass	0	Pass	Pass
8	Calibration	23	S	Out	New Road	8226_8214	596	597	-1	0%	Pass	0	Pass	Pass
8	Calibration	24	S	Out	Bolton Road	4164_8520	983	978	5	0%	Pass	0	Pass	Pass
8	Calibration	S4	S	Out	M61	7024_5141	3576	3723	-147	-4%	Pass	2	Pass	Pass
9	Calibration	15	N	In	Liverpool Road	4160_8080	659	658	1	0%	Pass	0	Pass	Pass
9	Calibration	16	E	In	North Road	8426_8082	149	159	-10	-6%	Pass	1	Pass	Pass
9	Calibration	17	E	In	South Road	8188_8092	203	201	2	1%	Pass	0	Pass	Pass
9	Calibration	18	N	In	Westhead Road	8430_8095	150	153	-3	-2%	Pass	0	Pass	Pass
9	Calibration	15	S	Out	Liverpool Road	8080_4160	881	880	1	0%	Pass	0	Pass	Pass
9	Calibration	16	W	Out	North Road	8082_8426	277	282	-5	-2%	Pass	0	Pass	Pass
9	Calibration	17	W	Out	South Road	8092_8188	255	254	1	0%	Pass	0	Pass	Pass
9	Calibration	18	S	Out	Westhead Road	8095_8430	191	191	0	0%	Pass	0	Pass	Pass
10	Calibration	29	N	In	Wigan Road	4178_4540	389	387	2	1%	Pass	0	Pass	Pass
10	Calibration	30	N	In	Preston Road	4404_8559	672	674	-2	0%	Pass	0	Pass	Pass
10	Calibration	31	E	In	A674	8548_4504	754	752	2	0%	Pass	0	Pass	Pass
10	Calibration	149	N	In	Central Avenue	1045_1368	678	338	340	50%	Fail	15	Fail	Fail
10	Calibration	C	N	In	M61	7018_5015	3371	3314	57	2%	Pass	1	Pass	Pass
10	Calibration	D	N	In	M6	5113_10086	3724	3736	-12	0%	Pass	0	Pass	Pass
10	Calibration	29	S	Out	Wigan Road	4540_4178	492	512	-20	-4%	Pass	1	Pass	Pass
10	Calibration	30	S	Out	Preston Road	8559_4404	759	755	4	1%	Pass	0	Pass	Pass
10	Calibration	31	W	Out	A674	4504_8548	744	742	2	0%	Pass	0	Pass	Pass
10	Calibration	149	S	Out	Central Avenue	1368_1045	767	579	188	25%	Fail	7	Fail	Fail
10	Calibration	C	S	Out	M61	7017_5004	3883	3863	20	1%	Pass	0	Pass	Pass
10	Calibration	D	S	Out	M6	7019_5115	4387	4383	4	0%	Pass	0	Pass	Pass
11	Calibration	32	W	In	Briers Brow	1483_4505	153	154	-1	-1%	Pass	0	Pass	Pass
11	Calibration	33	S	In	Blackburn Road	8542_8057	608	608	0	0%	Pass	0	Pass	Pass
11	Calibration	34	S	In	Marsh Lane	1029_8540	6	5	1	10%	Pass	0	Pass	Pass
11	Calibration	35	S	In	Stony Bank	1073_8541	168	168	0	0%	Pass	0	Pass	Pass
11	Calibration	36	W	In	Gregson Lane	1072_8565	52	68	-16	-30%	Pass	2	Pass	Pass
11	Calibration	37	W	In	Hoghton Lane	1786_4528	367	372	-5	-1%	Pass	0	Pass	Pass
11	Calibration	38	S	In	Cuerdale Lane	3032_8159	462	365	97	21%	Pass	5	Pass	Pass
11	Calibration	39	W	In	Preston New Road	4279_9962	1528	1608	-80	-5%	Pass	2	Pass	Pass
11	Calibration	H	W	In	M65	7010_5025	3295	3190	105	3%	Pass	2	Pass	Pass
11	Calibration	32	E	Out	Briers Brow	4505_1483	166	167	-1	0%	Pass	0	Pass	Pass
11	Calibration	33	N	Out	Blackburn Road	8057_8542	510	510	0	0%	Pass	0	Pass	Pass
11	Calibration	34	N	Out	Marsh Lane	8540_1029	9	1	8	87%	Pass	3	Pass	Pass
11	Calibration	35	N	Out	Stony Bank	8541_1073	164	164	0	0%	Pass	0	Pass	Pass
11	Calibration	36	E	Out	Gregson Lane	8565_1072	44	63	-19	-43%	Pass	3	Pass	Pass
11	Calibration	37	E	Out	Hoghton Lane	4528_1786	352	363	-11	-3%	Pass	1	Pass	Pass
11	Calibration	38	N	Out	Cuerdale Lane	8159_3032	297	296	1	0%	Pass	0	Pass	Pass
11	Calibration	39	E	Out	Preston New Road	8444_4278	1445	1456	-11	-1%	Pass	0	Pass	Pass
11	Calibration	H	E	Out	M65	7009_5071	3435	3326	109	3%	Pass	2	Pass	Pass
12	Calibration	78	W	In	Whittingham Lane	8582_8020	375	373	2	0%	Pass	0	Pass	Pass
12	Calibration	79	W	In	Haighton Green Lane	8019_8459	213	150	63	30%	Pass	5	Pass	Pass
12	Calibration	80	S	In	Longridge Road	8580_8457	351	460	-109	-31%	Fail	5	Pass	Pass
12	Calibration	78	E	Out	Whittingham Lane	8020_8582	402	430	-28	-7%	Pass	1	Pass	Pass
12	Calibration	79	E	Out	Haighton Green Lane	8459_8019	112	112	0	0%	Pass	0	Pass	Pass
12	Calibration	80	N	Out	Longridge Road	8457_8580	776	779	-3	0%	Pass	0	Pass	Pass
13	Calibration	68	S	In	Garstang Road	4269_4202	88	249	-161	-183%	Fail	12	Fail	Fail
13	Calibration	69	S	In	Woodplumpton Road	8497_3059	264	241	23	9%	Pass	1	Pass	Pass
13	Calibration	70	S	In	Rosemary Lane	1632_1641	130	131	-1	0%	Pass	0	Pass	Pass
13	Calibration	71	S	In	Blackleach Lane	1632_8374	7	0	7	100%	Pass	4	Pass	Pass
13	Calibration	72	S	In	Salwick Road	8495_1603	44	20	24	55%	Pass	4	Pass	Pass
13	Calibration	73	S	In	Church Road	10200_8668	29	28	1	3%	Pass	0	Pass	Pass
13	Calibration	74	S	In	Moorside	8493_8500	21	30	-9	-41%	Pass	2	Pass	Pass
13	Calibration	68	N	Out	Garstang Road	4202_4269	184	181	3	2%	Pass	0	Pass	Pass
13	Calibration	69	N	Out	Woodplumpton Road	3059_8497	318	296	22	7%	Pass	1	Pass	Pass
13	Calibration	70	N	Out	Rosemary Lane	1641_1632	121	121	0	0%	Pass	0	Pass	Pass
13	Calibration	71	N	Out	Blackleach Lane	8374_1632	8	0	8	100%	Pass	4	Pass	Pass
13	Calibration	72	N	Out	Salwick Road	1603_8495	20	20	0	0%	Pass	0	Pass	Pass
13	Calibration	73	N	Out	Church Road	8668_10200	39	38	1	2%	Pass	0	Pass	Pass
13	Calibration	74	N	Out	Moorside	8500_8493	42	81	-39	-92%	Pass	5	Pass	Pass
14	Calibration	56	E	In	A584	4122_10016	816	708	108	13%	Pass	4	Pass	Pass
14	Calibration	57	N	In	Hillock Lane	1563_8393	69	94	-25	-36%	Pass	3	Pass	Pass
14	Calibration	58	N	In	Ribby Road	8605_8606	445	451	-6	-1%	Pass	0	Pass	Pass
14	Calibration	59	E	In	Blackpool Road	8208_4119	571	571	0	0%	Pass	0	Pass	Pass
14	Calibration	A	S	In	Fleetwood Road	1479_10089	922	923	-1	0%	Pass	0	Pass	Pass
14	Calibration	S18	E	In	M55	1313_5103	1960	2005	-45	-2%	Pass	1	Pass	Pass
14	Calibration	56	W	Out	A584	10016_4122	534	532	2	0%	Pass	0	Pass	Pass
14	Calibration	57	S	Out	Hillock Lane	8393_1563	74	82	-8	-11%	Pass	1	Pass	Pass
14	Calibration	58	S	Out	Ribby Road	8606_8605	531	531	0	0%	Pass	0	Pass	Pass
14	Calibration	59	W	Out	Blackpool Road	4119_8208	655	655	0	0%	Pass	0	Pass	Pass
14	Calibration	A	N	Out	Fleetwood Road	10089_1479	1248	1251	-3	0%	Pass	0	Pass	Pass
14	Calibration	S18	W	Out	M55	5110_7023	2034	1796	238	12%	Pass	5	Pass	Pass

Screenline ID	Type	Site ID	Site Direction	Screenline Direction	Road Name	Model LinkID	Observed Flows	Modelled Flows	Flow Difference	Flow Difference	WebTAG Criteria 1	GEH	GEH Criteria	Passes at least 1 criterion
15	Model Develo	1	E	In	Liverpool Road	10010_6195	698	696	2	0%	Pass	0	Pass	Pass
15	Model Develo	5	N	In	Leyland Road	4251_1737	801	802	-1	0%	Pass	0	Pass	Pass
15	Model Develo	6	N	In	Todd Lane North	8269_1463	151	152	-1	-1%	Pass	0	Pass	Pass
15	Model Develo	7	N	In	London Way	10102_4070	1234	1225	9	1%	Pass	0	Pass	Pass
15	Model Develo	9	W	In	Higher Walton Road	8157_8570	283	288	-5	-2%	Pass	0	Pass	Pass
15	Model Develo	54	N	In	Flensburg Way	5333_5332	938	941	-3	0%	Pass	0	Pass	Pass
15	Model Develo	122	S	In	Cuerdale Lane	8571_3177	361	359	2	0%	Pass	0	Pass	Pass
15	Model Develo	123	W	In	Brockholes Brow	9965_4353	934	930	4	0%	Pass	0	Pass	Pass
15	Model Develo	124	S	In	Longridge Road	3018_8453	676	392	284	42%	Fail	12	Fail	Fail
15	Model Develo	125	E	In	Eastway	3011_3009	897	897	0	0%	Pass	0	Pass	Pass
15	Model Develo	126	S	In	Garstang Road	4520_4274	1202	663	539	45%	Fail	18	Fail	Fail
15	Model Develo	127	S	In	Black Bull Lane	1402_1007	463	510	-47	-10%	Pass	2	Pass	Pass
15	Model Develo	128	S	In	Tag Lane	4194_3086	476	514	-38	-8%	Pass	2	Pass	Pass
15	Model Develo	129	S	In	Tom Benson Way	4195_3087	470	557	-87	-19%	Pass	4	Pass	Pass
15	Model Develo	130	E	In	Blackpool Road	8389_4115	1305	1311	-6	0%	Pass	0	Pass	Pass
15	Model Develo	131	S	In	Lindle Lane	4477_8408	257	309	-52	-20%	Pass	3	Pass	Pass
15	Model Develo	132	E	In	Wham Lane	1255_1147	406	404	2	1%	Pass	0	Pass	Pass
15	Model Develo	133	W	In	Farington Road	9987_5231	1263	1170	93	7%	Pass	3	Pass	Pass
15	Model Develo	134	N	In	Station Road	10105_3186	661	671	-10	-2%	Pass	0	Pass	Pass
15	Model Develo	1	W	Out	Liverpool Road	6117_4477	779	772	7	1%	Pass	0	Pass	Pass
15	Model Develo	5	S	Out	Leyland Road	1737_4251	685	696	-11	-2%	Pass	0	Pass	Pass
15	Model Develo	6	S	Out	Todd Lane North	1463_8269	272	125	147	54%	Fail	10	Fail	Fail
15	Model Develo	7	S	Out	London Way	4070_10102	1539	1509	30	2%	Pass	1	Pass	Pass
15	Model Develo	9	E	Out	Higher Walton Road	8570_8157	545	544	1	0%	Pass	0	Pass	Pass
15	Model Develo	54	S	Out	Flensburg Way	8250_3021	1081	1077	4	0%	Pass	0	Pass	Pass
15	Model Develo	122	N	Out	Cuerdale Lane	3177_8571	312	313	-1	0%	Pass	0	Pass	Pass
15	Model Develo	123	E	Out	Brockholes Brow	4353_9965	996	992	4	0%	Pass	0	Pass	Pass
15	Model Develo	124	N	Out	Longridge Road	8453_3018	478	719	-241	-50%	Fail	10	Fail	Fail
15	Model Develo	125	W	Out	Eastway	3009_3011	789	791	-2	0%	Pass	0	Pass	Pass
15	Model Develo	126	N	Out	Garstang Road	4274_4520	666	602	64	10%	Pass	3	Pass	Pass
15	Model Develo	127	N	Out	Black Bull Lane	1007_1402	668	473	195	29%	Fail	8	Fail	Fail
15	Model Develo	128	N	Out	Tag Lane	3086_4194	669	670	-1	0%	Pass	0	Pass	Pass
15	Model Develo	129	N	Out	Tom Benson Way	3087_4195	743	742	1	0%	Pass	0	Pass	Pass
15	Model Develo	130	W	Out	Blackpool Road	4115_8389	1361	1391	-30	-2%	Pass	1	Pass	Pass
15	Model Develo	131	N	Out	Lindle Lane	8408_4477	320	453	-133	-41%	Fail	7	Fail	Fail
15	Model Develo	132	W	Out	Wham Lane	1147_1255	551	552	-1	0%	Pass	0	Pass	Pass
15	Model Develo	133	E	Out	Farington Road	5231_9987	944	941	3	0%	Pass	0	Pass	Pass
15	Model Develo	134	S	Out	Station Road	3186_10105	587	587	0	0%	Pass	0	Pass	Pass
16	Validation	106	N	In	A59	4084_4088	1631	1667	-36	-2%	Pass	1	Pass	Pass
16	Validation	107	W	In	Liverpool Road	4544_4086	952	954	-2	0%	Pass	0	Pass	Pass
16	Validation	108	N	In	London Road	10024_4464	990	992	-2	0%	Pass	0	Pass	Pass
16	Validation	106	S	Out	A59	4088_4084	1908	1904	4	0%	Pass	0	Pass	Pass
16	Validation	107	E	Out	Liverpool Road	4086_4544	279	277	2	1%	Pass	0	Pass	Pass
16	Validation	108	S	Out	London Road	4464_10024	1677	1669	8	0%	Pass	0	Pass	Pass
17	Validation	63	E	In	Blackpool Road	10013_8384	618	618	0	0%	Pass	0	Pass	Pass
17	Validation	64	E	In	Preston New Road	9994_8040	799	799	0	0%	Pass	0	Pass	Pass
17	Validation	63	W	Out	Blackpool Road	8384_10013	813	810	3	0%	Pass	0	Pass	Pass
17	Validation	64	W	Out	Preston New Road	8040_9994	730	728	2	0%	Pass	0	Pass	Pass
18	Validation	135	S	In	Eastway	4198_3088	899	819	80	9%	Pass	3	Pass	Pass
18	Validation	137	S	In	Tom Benson Way	3085_3003	717	717	0	0%	Pass	0	Pass	Pass
18	Validation	150	S	In	Wychnor	8342_1276	93	93	0	0%	Pass	0	Pass	Pass
18	Validation	151	S	In	Sherwood Way	8168_8349	447	450	-3	-1%	Pass	0	Pass	Pass
18	Validation	S13	S	In	M6	7013_5085	5150	5145	5	0%	Pass	0	Pass	Pass
18	Validation	135	N	Out	Eastway	3088_4198	705	727	-22	-3%	Pass	1	Pass	Pass
18	Validation	137	N	Out	Tom Benson Way	3003_3085	783	774	9	1%	Pass	0	Pass	Pass
18	Validation	150	N	Out	Wychnor	1276_8342	88	82	6	6%	Pass	1	Pass	Pass
18	Validation	151	N	Out	Sherwood Way	8349_8168	469	470	-1	0%	Pass	0	Pass	Pass
18	Validation	S13	N	Out	M6	5083_2401	5055	5056	-1	0%	Pass	0	Pass	Pass
19	Validation	42	N	In	Longton By-Pass	4338_4340	681	681	0	0%	Pass	0	Pass	Pass
19	Validation	43	N	In	Longmeanygate	8081_1047	170	171	-1	0%	Pass	0	Pass	Pass
19	Validation	44	N	In	Schleswig Way	10008_3024	518	517	1	0%	Pass	0	Pass	Pass
19	Validation	42	S	Out	Longton By-Pass	4339_4336	924	924	0	0%	Pass	0	Pass	Pass
19	Validation	43	S	Out	Longmeanygate	1047_8081	311	311	0	0%	Pass	0	Pass	Pass
19	Validation	44	S	Out	Schleswig Way	3024_10008	795	794	1	0%	Pass	0	Pass	Pass
20	Validation	84	E	In	Eldon Street	1082_1086	139	137	2	1%	Pass	0	Pass	Pass
20	Validation	99	E	In	Fylde Road	4249_4248	361	409	-48	-13%	Pass	2	Pass	Pass
20	Validation	121	E	In	Marsh Lane	4247_1059	447	365	82	18%	Pass	4.1	Pass	Pass
20	Validation	141	E	In	Blackpool Road	4267_10068	699	700	-1	0%	Pass	0	Pass	Pass
20	Validation	155	E	In	Aqueduct Street	1100_1078	437	427	10	2%	Pass	0	Pass	Pass
20	Validation	84	W	Out	Eldon Street	1086_1082	211	200	11	5%	Pass	1	Pass	Pass
20	Validation	99	W	Out	Fylde Road	4248_4249	547	499	48	9%	Pass	2	Pass	Pass
20	Validation	120	W	Out	Fishergate	1014_1097	678	689	-11	-2%	Pass	0	Pass	Pass
20	Validation	141	W	Out	Blackpool Road	10068_4267	677	697	-20	-3%	Pass	1	Pass	Pass
20	Validation	155	W	Out	Aqueduct Street	1078_1100	596	597	-1	0%	Pass	0	Pass	Pass
21	Validation	65	E	In	Riversway	4112_10072	828	828	0	0%	Pass	0	Pass	Pass
21	Validation	66	E	In	Blackpool Road	8615_4281	673	674	-1	0%	Pass	0	Pass	Pass
21	Validation	65	W	Out	Riversway	10072_4112	1147	1152	-5	-0.4%	Pass	0	Pass	Pass
21	Validation	66	W	Out	Blackpool Road	4281_8615	660	663	-3	0%	Pass	0	Pass	Pass
22	Validation	40	W	In	Sheep Hill Brow	8258_3090	397	397	0	0%	Pass	0	Pass	Pass
22	Validation	41	W	In	Dawson Lane	8253_1043	295	294	1	0%	Pass	0	Pass	Pass
22	Validation	148	W	In	Church Road	4002_4001	1047	1030	17	2%	Pass	1	Pass	Pass
22	Validation	B	W	In	M65	5031_5032	2780	2748	32	1%	Pass	1	Pass	Pass
22	Validation	40	E	Out	Sheep Hill Brow	3090_8258	367	257	111	30%	Fail	6	Fail	Fail
22	Validation	41	E	Out	Dawson Lane	1043_8253	285	282	3	1%	Pass	0	Pass	Pass
22	Validation	148	E	Out	Church Road	4001_4002	1006	817	189	19%	Fail	6	Fail	Fail
22	Validation	B	E	Out	M65	5037_10085	2535	2354	181	7%	Pass	4	Pass	Pass
23	Independent (	E	S	In	M6	7011_5096	2893	2878	15	1%	Pass	0	Pass	Pass
23	Independent (	E	N	Out	M6	5088_5188	2471	2462	9	0%	Pass	0	Pass	Pass

Screenline ID	Type	Site ID	Site Direction	Screenline Direction	Road Name	Model LinkID	Observed Flows	Modelled Flows	Flow Difference	Flow Difference	WebTAG Criteria 1	GEH	GEH Criteria	Passes at least 1 criterion
Independent Count	Independent (	2	S		Pope Lane	4078_1258	597	572	25	4%	Pass	1	Pass	Pass
Independent Count	Independent (	2	N		Pope Lane	1258_4078	387	387	0	0%	Pass	0	Pass	Pass
Independent Count	Independent (	3	E		Chain House Lane	8260_5240	389	391	-2	0%	Pass	0	Pass	Pass
Independent Count	Independent (	3	W		Chain House Lane	5240_8260	518	519	-1	0%	Pass	0	Pass	Pass
Independent Count	Independent (	4	S		Penwortham Way	50002_6126	1161	1028	133	11%	Pass	4	Pass	Pass
Independent Count	Independent (	4	N		Penwortham Way	6126_50002	1034	1034	1	0%	Pass	0	Pass	Pass
Independent Count	Independent (	8	N		Chorley Road	3106_3179	597	596	1	0%	Pass	0	Pass	Pass
Independent Count	Independent (	8	S		Chorley Road	3179_3106	574	577	-3	0%	Pass	0	Pass	Pass
Independent Count	Independent (	10	E		Cuerdale Lane	3177_8571	292	313	-21	-7%	Pass	1	Pass	Pass
Independent Count	Independent (	10	W		Cuerdale Lane	8571_3177	448	359	89	20%	Pass	4	Pass	Pass
Independent Count	Independent (	11	N		Stanifield Lane	1545_5561	520	560	-40	-8%	Pass	2	Pass	Pass
Independent Count	Independent (	11	S		Stanifield Lane	5561_1545	527	501	26.1	5%	Pass	1	Pass	Pass
Independent Count	Independent (	13	N		Craven Drive	4476_1204	136	8	128	94%	Fail	15	Fail	Fail
Independent Count	Independent (	13	S		Craven Drive	1204_4476	57	60	-3	-6%	Pass	0	Pass	Pass
Independent Count	Independent (	14	N		Wigan Road	4476_4035	445	444	1	0%	Pass	0	Pass	Pass
Independent Count	Independent (	14	S		Wigan Road	4035_4476	655	623	32	5%	Pass	1	Pass	Pass
Independent Count	Independent (	114	N		Port Way	1110_10053	595	577	18	3%	Pass	1	Pass	Pass
Independent Count	Independent (	114	S		Port Way	10053_1110	526	622	-96	-18%	Pass	4	Pass	Pass
Independent Count	Independent (	115	N		Channel Way	10061_1134	669	595	74	11%	Pass	3	Pass	Pass
Independent Count	Independent (	116	N		West Strand	4363_10065	602	749	-147	-24%	Fail	6	Fail	Fail
Independent Count	Independent (	116	S		West Strand	4363_4362	761	737	24	3%	Pass	1	Pass	Pass
Independent Count	Independent (	117	E		Ring Way	4481_4260	1287	1030	257	20%	Fail	8	Fail	Fail
Independent Count	Independent (	117	W		Ring Way	4382_4383	669	672	-3	-1%	Pass	0	Pass	Pass
Independent Count	Independent (	118	E		Ring Way	4389_4262	630	733	-103	-16%	Fail	4	Pass	Pass
Independent Count	Independent (	118	W		Ring Way	4321_4418	564	772	-208	-37%	Fail	8	Fail	Fail
Independent Count	Independent (	119	E		Ring Way	4299_4136	628	624	4	1%	Pass	0	Pass	Pass
Independent Count	Independent (	119	W		Ring Way	10107_4299	564	772	-208	-37%	Fail	8	Fail	Fail
Independent Count	Independent (	138	E		Lightfoot Lane	1713_1364	198	256	-58	-29%	Pass	4	Pass	Pass
Independent Count	Independent (	138	W		Lightfoot Lane	1364_1713	535	177	358	67%	Fail	19	Fail	Fail
Independent Count	Independent (	139	E		Longsands Lane	10026_8454	880	880	0	0%	Pass	0	Pass	Pass
Independent Count	Independent (	139	W		Longsands Lane	8454_10026	742	744	-2	0%	Pass	0	Pass	Pass
Independent Count	Independent (	142	E		Blackpool Road	10070_8007	689	699	-10	-1%	Pass	0	Pass	Pass
Independent Count	Independent (	142	W		Blackpool Road	8007_10070	815	803	12	2%	Pass	0	Pass	Pass
Independent Count	Independent (	143	E		Blackpool Road	4352_4147	640	624	16	3%	Pass	1	Pass	Pass
Independent Count	Independent (	143	W		Blackpool Road	4147_4352	492	545	-53	-11%	Pass	2	Pass	Pass
Independent Count	Independent (	144	S		Blackpool Road	4284_4102	713	699	14	2%	Pass	1	Pass	Pass
Independent Count	Independent (	144	N		Blackpool Road	4102_4284	691	630	61	9%	Pass	2	Pass	Pass
Independent Count	Independent (	145	N		Penwortham Way	5330_50001	1197	1189	8	1%	Pass	0	Pass	Pass
Independent Count	Independent (	145	S		Penwortham Way	50005_5306	1092	1136	-44	-4%	Pass	1	Pass	Pass
Independent Count	Independent (	146	E		Flensburg Way	8091_50000	919	916	3	0%	Pass	0	Pass	Pass
Independent Count	Independent (	146	W		Flensburg Way	50000_8091	1102	1088	14	1%	Pass	0	Pass	Pass
Independent Count	Independent (	147	W		Lostock Lane	4074_4240	1280	1466	-186	-15%	Pass	5	Pass	Pass
Independent Count	Independent (	147	E		Lostock Lane	4240_4074	1480	1475	5	0%	Pass	0	Pass	Pass
Independent Count	Independent (	152	N		Church Street	1167_1128	630	670	-40	-6%	Pass	2	Pass	Pass
Independent Count	Independent (	153	N		Queen Street	1225_1350	957	669	288	30%	Fail	10	Fail	Fail
Independent Count	Independent (	153	S		Queen Street	1350_1225	297	303	-6	-2%	Pass	0	Pass	Pass
Independent Count	Independent (	154	S		Carlisle Street	1279_1162	543	561	-18	-3%	Pass	1	Pass	Pass
Independent Count	Independent (	156	W		Brownedge Road	4069_3066	606	613	-7	-1%	Pass	0	Pass	Pass
Independent Count	Independent (	156	E		Brownedge Road	3066_4069	417	420	-3	-1%	Pass	0	Pass	Pass
Independent Count	Independent (	157	N		Croston Road	1058_1049	334	335	-1	0%	Pass	0	Pass	Pass
Independent Count	Independent (	157	S		Croston Road	1049_1058	192	205	-13	-7%	Pass	1	Pass	Pass
Independent Count	Independent (	158	W		Bank Bridge	8425_8427	1277	1277	0	0%	Pass	0	Pass	Pass
Independent Count	Independent (	158	E		Bank Bridge	8427_8425	883	881	2	0%	Pass	0	Pass	Pass
Independent Count	Independent (	159	E		Southport Road	4043_4244	419	419	0	0%	Pass	0	Pass	Pass
Independent Count	Independent (	159	W		Southport Road	4244_4043	644	644	0	0%	Pass	0	Pass	Pass
Independent Count	Independent (	160	W		Myerscough Smithy Road	8118_8117	593	591	2	0%	Pass	0	Pass	Pass
Independent Count	Independent (	160	E		Myerscough Smithy Road	8117_8118	868	703	165	19%	Fail	6	Fail	Fail
Independent Count	Independent (	161	E		Preston New Road	1834_8119	816	777	39	5%	Pass	1	Pass	Pass
Independent Count	Independent (	161	W		Preston New Road	8119_1834	910	894	16	2%	Pass	1	Pass	Pass
Independent Count	Independent (	162	E		Longsight Road	1803_8128	841	840	1	0%	Pass	0	Pass	Pass
Independent Count	Independent (	162	W		Longsight Road	8128_1803	561	582	-21	-4%	Pass	1	Pass	Pass
Independent Count	Independent (	163	N		Pope Lane	8010_1075	245	245	0	0%	Pass	0	Pass	Pass
Independent Count	Independent (	163	S		Pope Lane	1075_8010	319	320	0	0%	Pass	0	Pass	Pass
Independent Count	Independent (	164	N		Cop Lane	1020_8276	514	512	2	0%	Pass	0	Pass	Pass
Independent Count	Independent (	164	S		Cop Lane	8276_1020	369	372	-3	-1%	Pass	0	Pass	Pass
Independent Count	Independent (	165	N		Bow Lane	1432_1129	464	463	1	0%	Pass	0	Pass	Pass
Independent Count	Independent (	165	S		Bow Lane	1129_1432	346	348	-2	-1%	Pass	0	Pass	Pass
Independent Count	Independent (	166	N		Corporation Street	1014_4304	90	90	0	0%	Pass	0	Pass	Pass
Independent Count	Independent (	166	S		Corporation Street	4304_1014	429	430	-1	0%	Pass	0	Pass	Pass
Independent Count	Independent (	167	N		James Towers Way	5404_5217	1142	1114	28	2%	Pass	1	Pass	Pass
Independent Count	Independent (	167	S		James Towers Way	5218_5404	1068	1070	-2	0%	Pass	0	Pass	Pass
Independent Count	Independent (	168	S		D'urton Lane	1011_3008	154	154	0	0%	Pass	0	Pass	Pass
Independent Count	Independent (	168	N		D'urton Lane	3008_1011	286	301	-15	-5%	Pass	1	Pass	Pass
Independent Count	Independent (	169	E		Eastway	981_3165	519	628	-109	-21%	Fail	5	Pass	Pass
Independent Count	Independent (	169	W		Eastway	3165_981	632	633	-1	0%	Pass	0	Pass	Pass
Independent Count	Independent (	170	W		Hoyles Lane	1015_8167	169	174	-5	-3%	Pass	0	Pass	Pass
Independent Count	Independent (	170	E		Hoyles Lane	8167_1015	237	147	90	38%	Pass	6	Fail	Pass
Independent Count	Independent (	G	S		M6	5085_7014	6770	6779	-9	0%	Pass	0	Pass	Pass
Independent Count	Independent (	G	N		M6	2405_5083	6063	6108	-45	-1%	Pass	1	Pass	Pass
Independent Count	Independent (	S1	N		M6	5087_5088	1816	1847	-31	-2%	Pass	1	Pass	Pass
Independent Count	Independent (	S1	S		M6	5096_5090	2280	2277	3	0%	Pass	0	Pass	Pass
Independent Count	Independent (	S10	N		M6	5075_9964	1106	1064	42	4%	Pass	1	Pass	Pass
Independent Count	Independent (	S11	N		M6	5077_5076	1093	1122	-29	-3%	Pass	1	Pass	Pass
Independent Count	Independent (	S12	S		M6	5078_10082	954	907	47	5%	Pass	2	Pass	Pass
Independent Count	Independent (	S14	W		M55	5087_2407	3239	3209	30	1%	Pass	1	Pass	Pass
Independent Count	Independent (	S15	E		M6	5089_5090	2862	2867	-5	0%	Pass	0	Pass	Pass
Independent Count	Independent (	S16	W		M55	5096_5092	613	601	12	2%	Pass	0	Pass	Pass
Independent Count	Independent (	S17	E		M6	5089_10011	640	615	25	4%	Pass	1	Pass	Pass
Independent Count	Independent (	S2	S		M6	5064_5165	1000	939	61	6%	Pass	2	Pass	Pass
Independent Count	Independent (	S3	S		M6	7007_10116	4898	4838	60	1%	Pass	1	Pass	Pass
Independent Count	Independent (	S3	N		M6	7008_5039	3901	3907	-6	0%	Pass	0	Pass	Pass
Independent Count	Independent (	S5	S		A6	4064_4063	1922	1929	-7	0%	Pass	0	Pass	Pass
Independent Count	Independent (	S5	N		A6	4063_4064	2026	2017	9	0%	Pass	0	Pass	Pass
Independent Count	Independent (	S6	N		M6	5040_7006	3168	3166	2	0%	Pass	0	Pass	Pass
Independent Count	Independent (	S6	S		M6	5074_10084	3930	3669	261	7%	Pass	4	Pass	Pass
Independent Count	Independent (	S7	N		M61	7016_5073	2870	2883	-13	0%	Pass	0	Pass	Pass
Independent Count	Independent (	S7	S		M61	10104_10103	3301	3327	-26	-1%	Pass	0	Pass	Pass
Independent Count	Independent (	S8	S		M6	7005_10083	7231	6996	235	3%	Pass	3	Pass	Pass
Independent Count	Independent (	S8	N		M6	7015_2406	6038	6050	-12	0%	Pass	0	Pass	Pass
Independent Count	Independent (	60	S	In	Fleetwood Road	1570_8498	881	881	0	0%	Pass	0	Pass	Pass
Independent Count	Independent (	60	N	Out	Fleetwood Road	8498_1570	740	812	-72	-10%	Pass	3	Pass	Pass