Wokingham Local and M4 Modelling Assessment

WSTM4-HE Update

Local Model Validation Report

On behalf of **Wokingham Borough Council**

WOKINGHAM BOROUGH COUNCIL

Project Ref: 332110634/006 | Rev: A | Date: December 2022

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Document Control Sheet

Project Name: Wokingham Local and M4 Modelling Assessment

Project Ref: 332110634

Report Title: WSTM4-HE Update LMVR

Doc Ref: 006

Date: December 2022

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For and on behalf of Stantec UK Limited				

Revision	Date	Description	Prepared	Reviewed	Approved

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1 Introduction

1.1 Introduction

1.1.1 Stantec has been commissioned by Wokingham Borough Council (WBC) and Homes England (HE) to support the preparation of the Local Plan Update (LPU). In addition to a number of smaller residential sites around the Borough, the assessment includes a major development option known as Hall Farm / Loddon Valley (Hall Farm, Hatch Farm and Four Valleys Development) and South Wokingham extension. This study is informed by a comprehensive modelling exercise, which is being undertaken using up to date information. This will support the study in identifying the impacts of the proposed development to inform a mitigation strategy.

1.1.2 The transport impacts of the development are informed by a three – tier modelling approach comprising:

i. Wokingham Strategic Transport Model 4 (WSTM4) in VISUM
ii. A VISSIM microsimulation model, which comprises a section of the M4 between J11 and J10, the A329M between Coppid Beech and Winnersh and Lower Early Way, which run parallel to the M4
iii. Individual Local Junction Models (LJMs)

1.1.3 The models will interact in a way that outputs from the VISUM model will be required to inform the VISSIM and LJMs. The junction models will be used to inform the development of the VISUM and VISSIM models, in providing traffic signal data where applicable.

1.1.4 The overall approach to the assessment has been described within the “Wokingham Local and M4 Modelling Assessment – Homes England Study. Assessment Methodology”, November 2021.

1.1.5 The purpose of this document is to provide an overview of the strategic modelling base year update to represent November 2021 flows, utilising the existing Wokingham Strategic Transport Model (WSTM4), which is created within the PTV VISUM modelling package. The VISUM model will be used to test the development scenarios at the wide area level, with outputs from these tests then used within the localised VISSIM model and the junction models.

1.2 WSTM4 Background

1.2.1 The existing WSTM4 model was developed by WSP on behalf of WBC using PTV’s VISUM 17.01-04. VISUM is a software program for traffic and transport analyses and forecasts. The use of a single software platform has combined the highway, Public Transport (PT) and Variable Demand Models (VDM) in one suite and allowed GIS - based data management.

1.2.2 The base year of the WSTM4 is 2015. The model was validated to TAG standards, which was reported in the *‘Wokingham Strategic Transport Model 4 (WSTM4) Local Model Validation Report, WSP, May 2018’*. A copy of the report can be downloaded from the WBC’s website via https://www.wokingham.gov.uk/_resources/assets/attachment/full/0/276581.pdf.

1.2.3 The detailed model area and fully modelled area of the WSTM4 are shown in Figure 1-1.

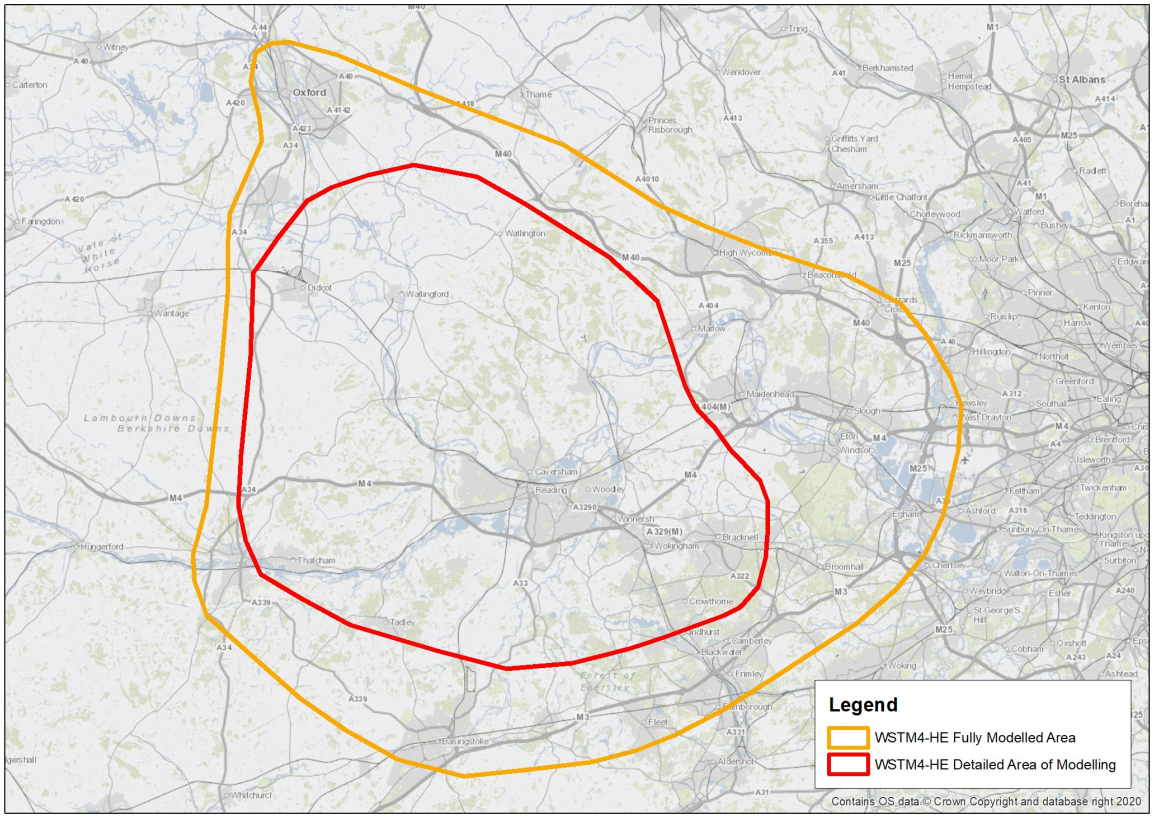


Figure 1-1: WSTM4-HE Modelled Area

1.2.4 WSTM4 consists of the following sub-models:

- Average Weekday (Monday to Thursday) AM peak hour (08:00 - 09:00)
- Average Weekday (Monday to Thursday) Inter peak hour (average 10:00 – 16:00)
- Average Weekday (Monday to Thursday) PM peak hour (17:00 - 18:00).

1.2.5 In order to support the assessment of the proposed development the WSTM4 model has undergone a local update and a local revalidation exercise as detailed within the *"Wokingham Local and M4 Modelling Assessment – Homes England Study. Assessment Methodology", November 2021*. This approach ensures that all three model types, i.e. strategic, microsimulation and local junction models share the same base year and are based on the same dataset, thus making forecasting more transparent and straight-forward.

1.2.6 For the purposes of this work, given use of the VISSIM model for more detailed testing, the need to assess a worst case scenario from the highway congestion point of view and uncertainty around public transport usage post COVID-19, only the highway model has been utilised and therefore updated.

1.2.7 The AM and PM peak hours are the busiest time periods and therefore have been selected for the assessment.

1.2.8 The WSTM4 2021 model update and refinement take into account:

- Any network changes that have taken place since 2015
- New development built since 2015
- November 2021 roadworks (including the M4 Smart Motorway traffic management)
- Changes in generalised cost parameters to reflect the latest data from DfT TAG Databook November 2021.

2 Approach Overview

2.1.1 In order to support the assessment of the proposed development, the WSTM4 has undergone a local update and a local revalidation exercise. The new base year of the model is set to 2021; however, this is not a full model update and the WSTM4 has been refined for the sole purpose of testing the proposed development and any associated mitigation and to feed into the VISSIM model.

2.1.2 The model update has followed the appropriate guidance provided in Department for Transport's (DfT) TAG Unit M3.1 'Highway Assignment Modelling', May 2020.

2.1.3 The model update has concentrated on roads where the Hall Farm development is likely to have significant impacts and the extent of this area is shown on Figure 2-1. The area has been determined through looking at the initial Local Plan update work completed earlier in 2021 and the trip distribution from Hall Farm development and where it is deemed to have the biggest impacts.

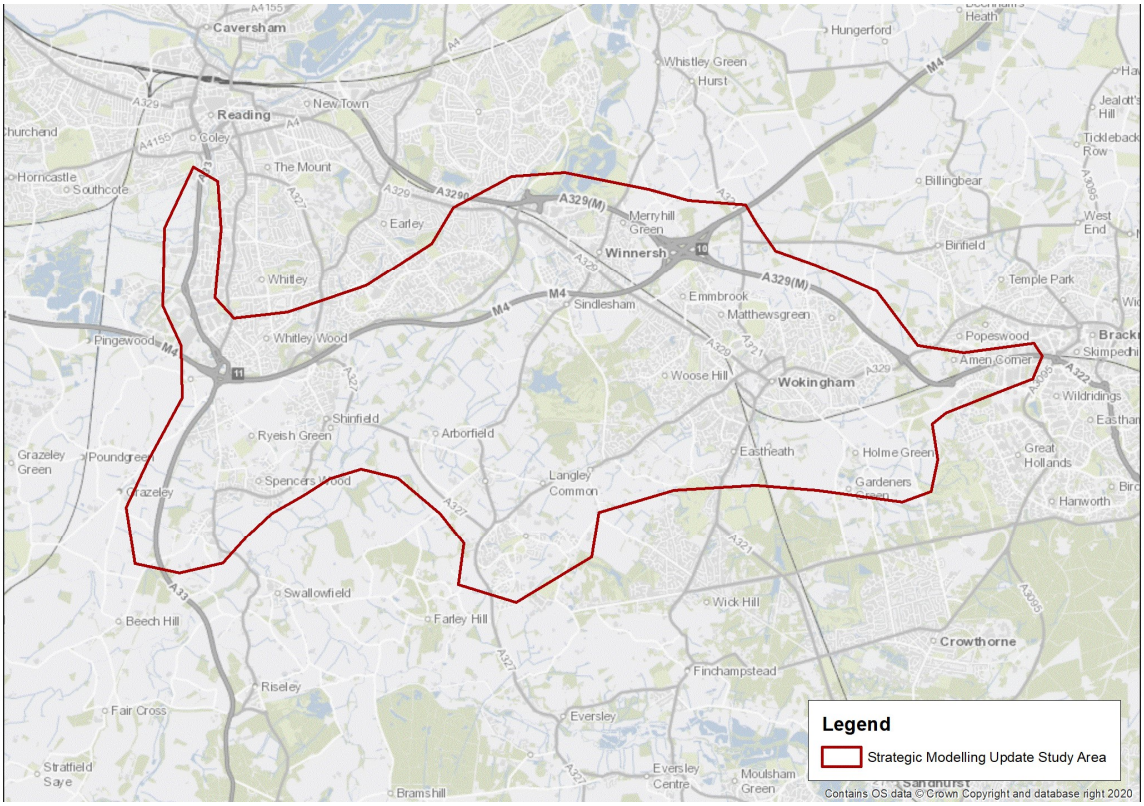


Figure 2-1: WSTM4-HE Update Model Update Study Area

2.1.4 It is acknowledged that the impact of the development proposals may spread wider than the area identified in the figure above. And therefore, the impact in the wider area may need to be the subject of future investigations. The Strategic Road Network (SRN) and the local roads feeding into the SRN are the main areas of interest of this study, as such this LMVR focusses on the validation and calibration of the area outlined above and is proportionate to the aim and purpose of this study.

2.1.5 The original WSTM4 model was developed using PTV's VISUM 17.01-04. To take advantage of the latest features of the software, the model has now been updated to use the latest version of VISUM, version 22.

3 Data Collection

3.1 Overview

3.1.1 This section summarises the data that has been used in the update of the WSTM4 and includes both existing data and new data that has recently been collected. The types of existing and new collected data comprise:

- Automatic Traffic Counts (ATC)
- Manual Classified Turning Counts (MCTC)
- Journey Time data
- Traffic Signal Data

3.1.2 Complete information about observed data that has been used in refining and updating the WSTM4 is provided within the "Wokingham Local and M4 Modelling Assessment Data Collection Report", May 2022, which should be read in conjunction with this section. The sections that follow outline the key data that has been used in updating the strategic model.

3.1.3 The data has been collected during a period between October and November 2021 and therefore the updated base year model reflects the average travel conditions of this period.

3.2 Existing Data Collection Sources

3.2.1 In line with DfT's TAG guidance, existing data has been used wherever possible in order to keep data costs to a minimum while not compromising the integrity of the model. The following existing data has been used:

- Traffic count data collected by Wokingham Borough Council was obtained through their traffic count database (Drakewell).
- The National Highways Open Data source WebTRIS, which includes ATC data on links and junctions on the Strategic Road Network (SRN).

3.2.2 The WBC permanent count locations are shown in Figure 3-1, whilst existing WebTRIS permanent count sites are shown in Figure 3-2. The ATC data was cleaned and processed to derive the average weekday flow by taking the mean of Tuesday to Thursday counts.

3.2.3 Traffic counts were extracted for November 2021 to be consistent with the new data collection programme.

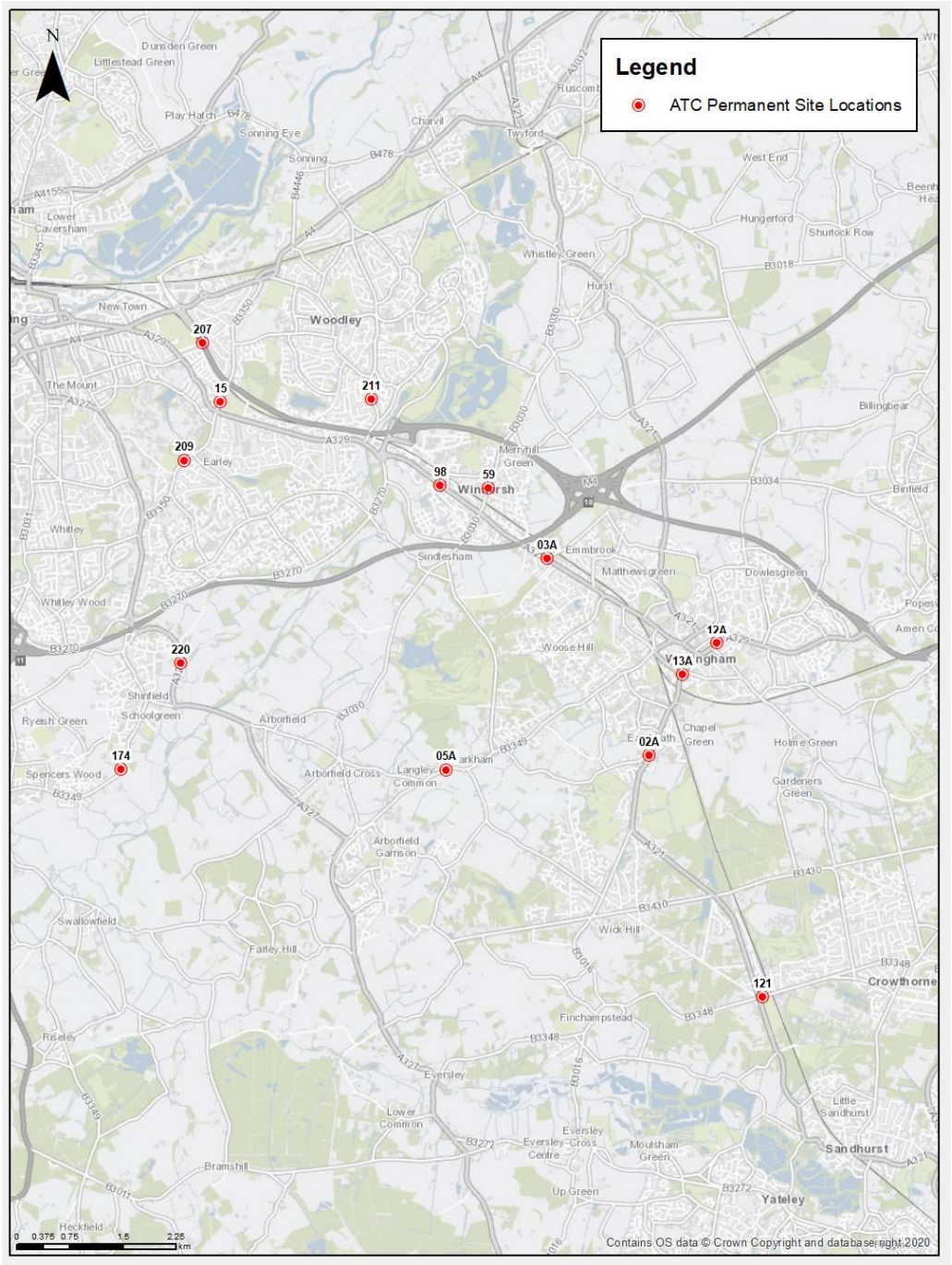


Figure 3-1: Permanent ATC Locations – Used in Link Flow Validation

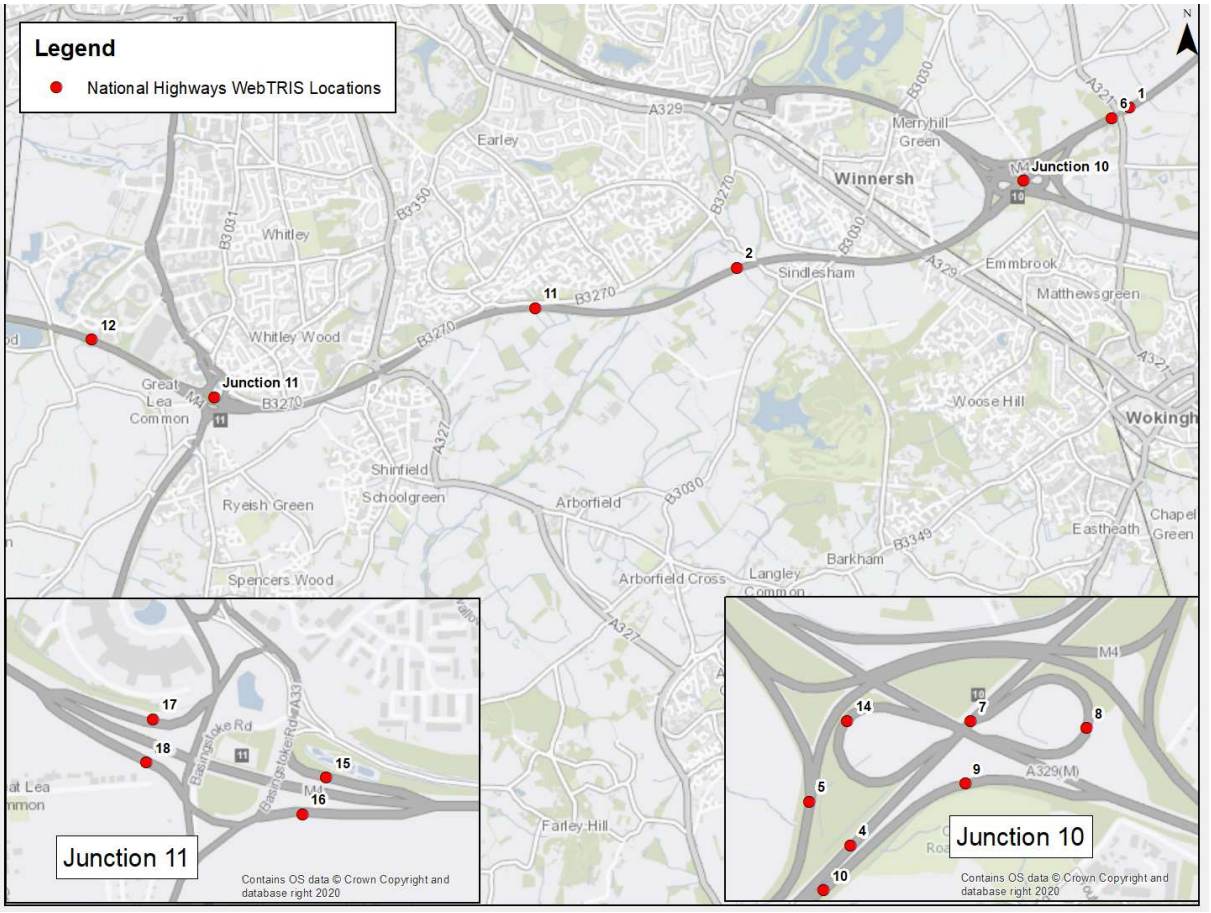


Figure 3-2: WebTRIS ATC Locations – Used in Link Flow Validation

3.3 New Data Collection

3.3.1 In addition to the existing available count sites, new ATC and MCTC data was collected for the purpose of providing complete coverage of model calibration and validation. Gap analysis was undertaken once existing data had been collated to inform requirements for new data collection. The selection of new data collection locations therefore aimed to provide a complete data set for screenline validation and also for turning movement calibration at key junctions across the Wokingham and Reading Borough. Data was collected in 2021 for a period between 16th November – 25th November 2021.

3.3.2 The locations of the newly collected ATC are shown in Figure 3-3.

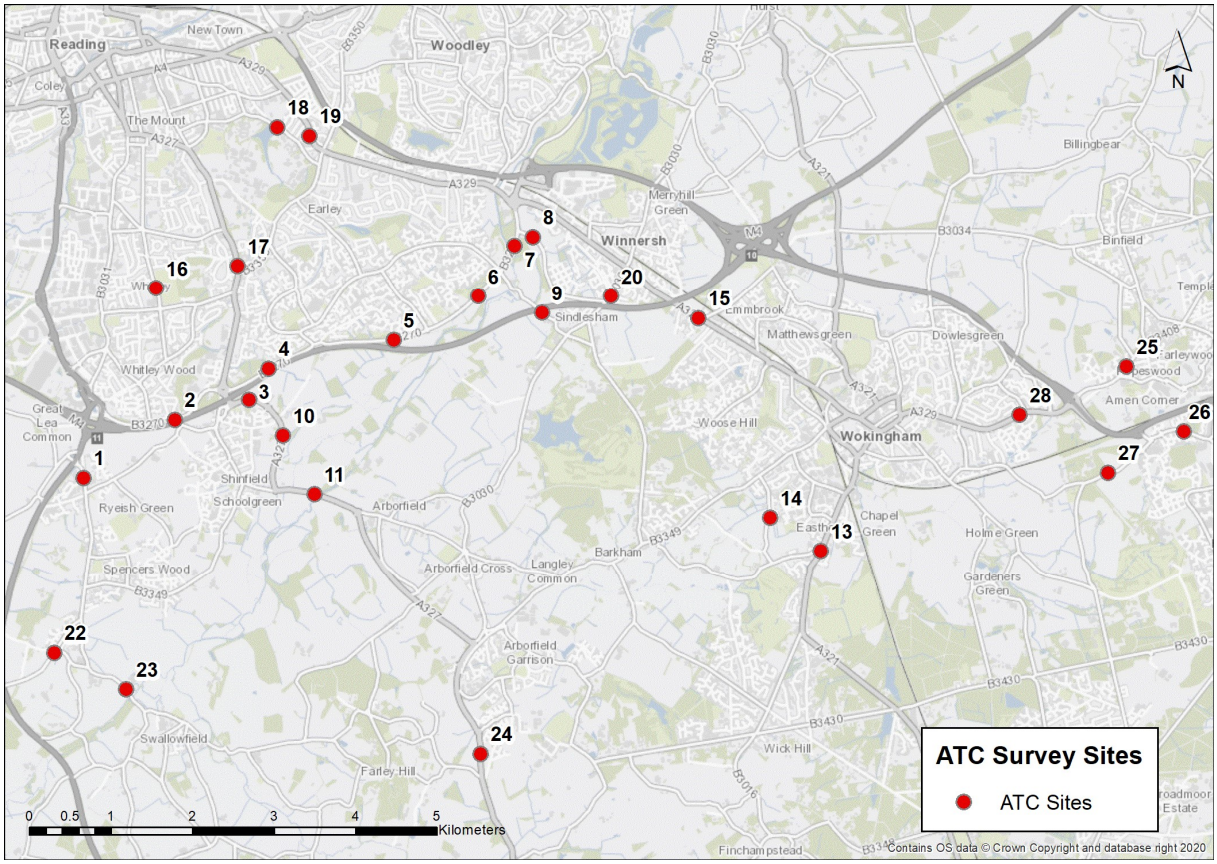


Figure 3-3: ATC Survey Location

3.3.3 Manual Classified Turning Counts were conducted as part of the data collection process for the individual junction assessment models. As such the observed turning flows from this will be used in tandem to validate the turning flows of the WSTM4-HE at the junctions shown within Figure 3-4.

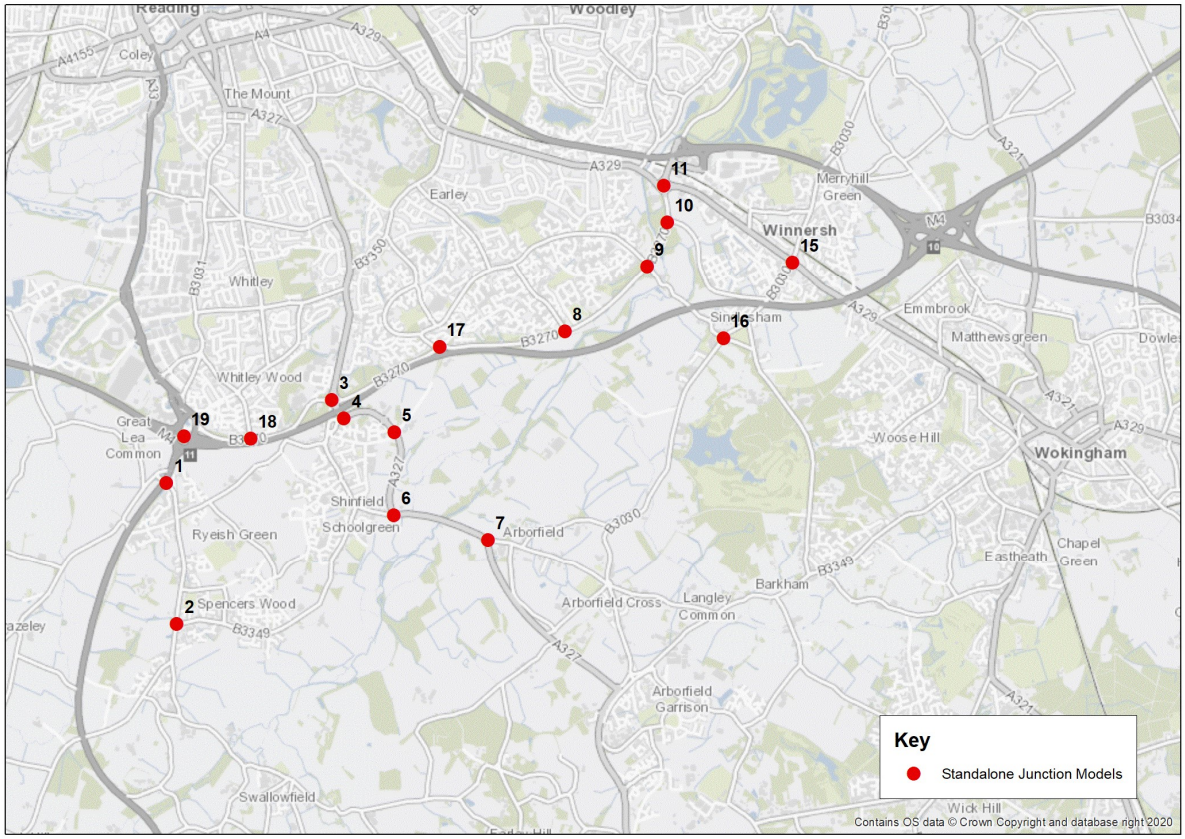


Figure 3-4: MCC Survey Location

3.3.4 In addition, traffic signal data was collected at key junctions within the study area, with green times and phasing sequences coded into the model accordingly.

3.4 Journey Time Data Collection

3.4.1 Journey time data for model update was sourced from INRIX covering 22nd November to 3rd December 2021. Journey time routes are shown in Figure 3-5 with the M4 route stretching between Junction 9 and Junction 12.

3.4.2 The journey time data was sourced for weekdays only in 1/5/15/60-minute intervals across each of the days. The data is provided from aggregated connected car data, which is used to provide real-time speeds on roads. The 8-9am and 5-6pm journey times were extracted from the data with outliers checked against the median and removed where judged to be skewing the average significantly.

3.4.3 Furthermore, link distance checks have been conducted on the INRIX data to verify this matched VISUM link distances on the select journey time routes.

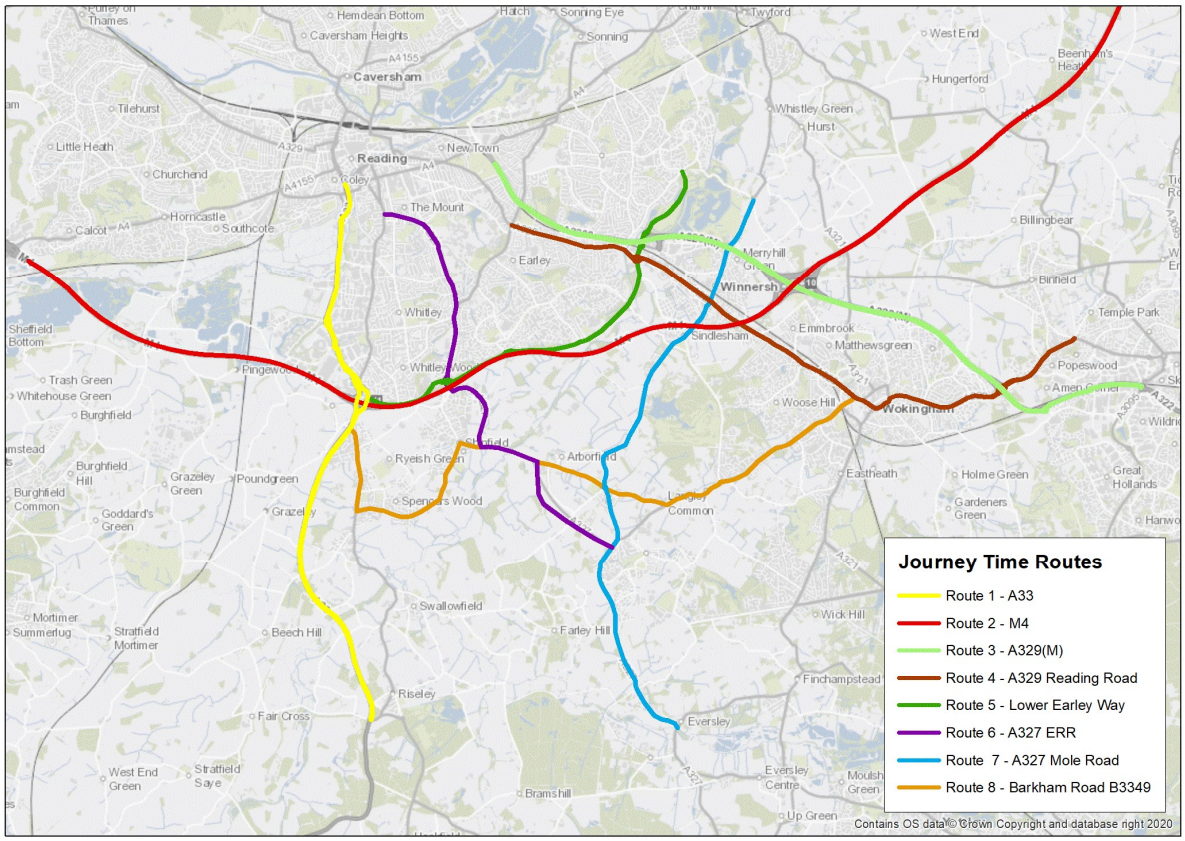


Figure 3-5:Journey Time Validation Routes

4 Network Development

4.1 Network Extent & Structure

4.1.1 The model update has used the 2015 WSTM4 network as the basis. The WSTM4 network structure was designed in accordance with TAG Unit M3.1. The network is coded at two levels with more detail provided within what is known as the detailed modelled area and less detail in the fully modelled area.

4.1.2 The model refinement has concentrated on roads where the Hall Farm development is likely to have significant impacts and the extent of this area is shown in Figure 4-1. The area has been determined through looking at the initial Local Plan update work completed earlier in 2021 and the trip distribution from Hall Farm development and where it is deemed to have the biggest impacts.

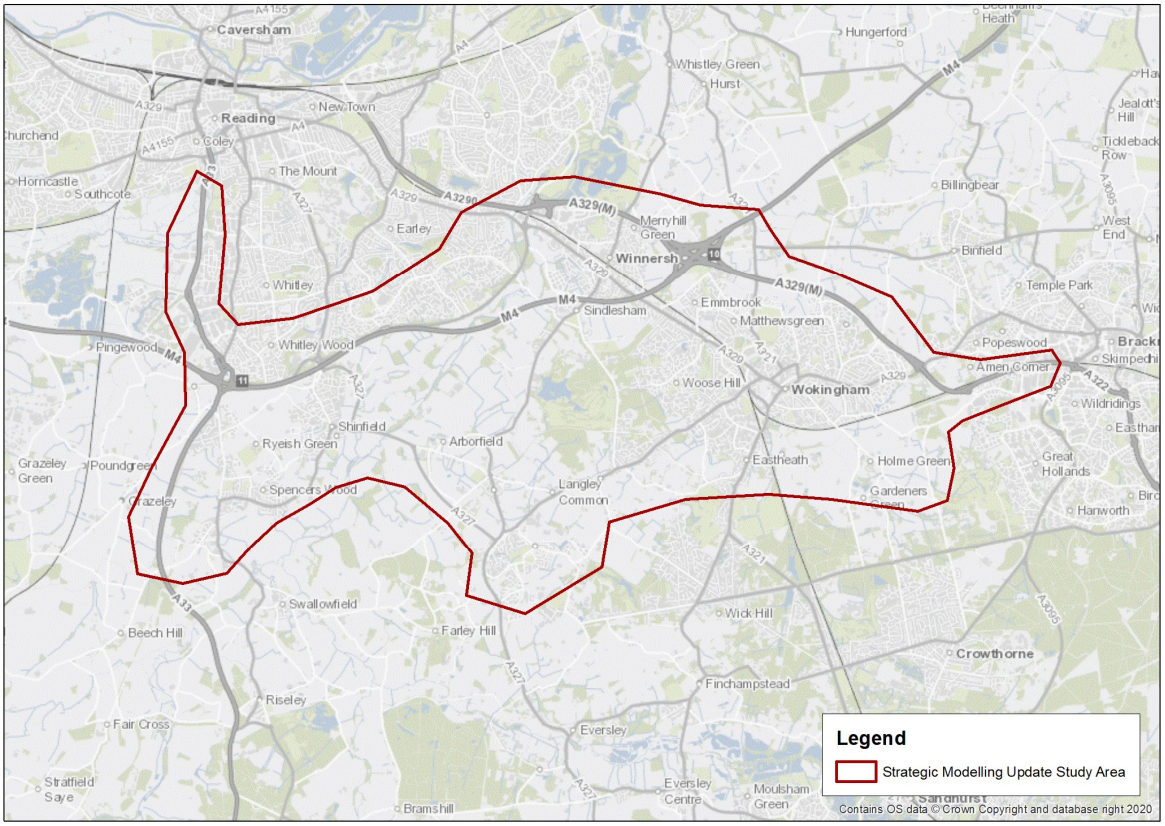


Figure 4-1 Local Model Area of Interest

4.2 Junction coding

4.2.1 Junction coding has been reviewed and where necessary updated at the key junctions of interest and where observed turning flow movements were collected as shown in Figure 3-1. This has aimed to improve coding of the junctions to better replicate network capacity.

4.2.2 All junctions within the WSTM4 area of detailed modelling are fully simulated in terms of capacity constraints. All major junctions in this area use the Node Impedance Calculation (ICA) to calculate the Method of Impedance at nodes. This is the PTV recommended method to be adopted on strategic models. ICA was used for calculating junction capacities and delays based on junction geometry and layout input into the model and did not require the saturation flows to be input explicitly.

4.2.3 Roundabout geometrical parameters have been refined using the new junction editor function available in VISUM 22. This enabled improved calculations of capacity constraints at junctions, as such better aligning with roundabout junction capacity in the detailed junction assessment.

4.3 Highway Infrastructure Update

4.3.1 Key infrastructure updates required to be made to the WSTM4-HE updated Base Year to represent changes in the highway network that have taken place between 2015 and 2021 are listed below:

a. Observer Way – Arborfield Relief Road
b. Shinfield Relief Road, including upgrades to Black Boy roundabout
c. Winnersh Relief Road
d. Eastern Section of the North Wokingham Distributor Road
e. M4 Smart Motorways – Junctions 10-11

4.4 Coding of Roadworks

4.4.1 At the time of the surveys there were a number of roadworks happening within the local study area that impacted upon the observed data collection and therefore have been coded within the base year model:

a. M4 junction 3 to 10 Smart Motorways –minor lane closures and reduced speed limits in place
b. Wharfdale Road/ A329, Winnersh Triangle – temporary speed limits and lane closures
c. Waterloo Road, closure of the road due to construction of the South Wokingham Distributor Road
d. Toutley Road, closure due to construction of North Wokingham Distributor Road

4.5 Zoning System

4.5.1 The zone plan in the WSTM4 was devised to give a fine level of detail in the urban areas of Wokingham, Bracknell Forest, Reading and South Oxfordshire. The zones are coarser outside of the Area of Detailed Modelling and ultimately covering the whole of the UK (excluding Northern Ireland). Compatibility between WSTM4 and TEMPRO v. 6.21 zone boundaries was ensured.

4.5.2 Whilst the zone structure of the WSTM4 was broadly suitable for the modelling of impacts in proximity to Hall Farm, a review identified a need for refining and splitting one existing zone (zone 182) containing the Tesco Reading Distribution centre and industrial land use along Imperial Way that was impacting routing around the M4 Junction 11 approach.

4.6 Zone Centroid Connectors

4.6.1 Centroid connectors enable the zones to be linked to the highway network. These are coded as far as possible using specific entry / exit junctions from local access roads onto the main road network from self-contained areas.

4.6.2 A review of existing centroid connector coding from the WSTM4 was undertaken, revisions were made refining locations where the traffic from the zones was likely to join the main road network, in particular adjustments were made to zones in proximity to new highway infrastructure not in place within the previous base year model.

5 Matrix Development

5.1 Introduction

5.1.1 In order to support the assessment of the proposed development, the WSTM4 model has undergone a local update and a local revalidation exercise. A new model has been created that has been validated to newly collected November 2021 data. However as this is not a full update and is developed for the sole purpose of testing the proposed Local Plan Update proposed development and any associated mitigation and to feed into the VISSIM model, the 2015 WSTM4 prior matrices have been used as basis for refining to updated 2021 observed traffic flows through Matrix Estimation.

5.1.2 The trip distribution from the 2015 model has been maintained and the pre-Matrix Estimation WSTM4 matrices have been used as the prior matrices for the WSTM4-HE update. These matrices were based on Mobile Network Data (MND) collected in 2015 and other data sources.

5.1.3 Information about Prior Matrix development can be found within the WSTM4 LMVR (May 2018).

6 Model Calibration and Validation Objectives and Standards

6.1 Introduction

6.1.1 Calibration of the network and matrices was undertaken to demonstrate that the model outputs provide a reasonable representation of observed traffic flows and behaviours in the updated model. The calibration process involved the refinement of the network detail to check that link speeds and junction behaviour/operation are well represented.

6.1.2 TAG unit M3.1 outlines several checks that should be undertaken in the calibration and validation stages of model development. The TAG unit recommends that the model performance is assessed against a series of criteria including:

- flows across screenlines
- flows on individual links
- journey times
- convergence, and
- impact of matrix estimation

6.2 Screenline Validation Criteria

6.2.1 TAG Unit M3.1 (May 2020) specifies the following validation criteria for screenlines:

- Differences between modelled flows and observed counts on all or nearly all screenlines should be within 5% of the observed counts.

6.3 Link and Turn Validation Criteria

6.3.1 Table 6-1 provides a summary of the TAG link and turning flow validation criteria and acceptability guidelines.

Table 6-1 DfT TAG Flow Validation Criteria Guidelines

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

6.3.2 The criteria and guidelines apply to models created both for general purposes and those created to address or assess specific interventions. In respect of the latter, it is expected that greater attention should be paid to validation quality in the vicinity of the interventions.

6.4 Journey Time Validation Criteria

6.4.1 For journey time validation, the validation criteria, which is detailed in Table 6-2, is the percentage difference between modelled and observed journey times.

Table 6-2 Journey Time Validation Criterion and Acceptability Guideline

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

6.5 Model Convergence

6.5.1 TAG guidance notes that before the results of any traffic assignment are used to influence decisions, the stability or degree of convergence of the assignment must be confirmed at the appropriate level (para 3.3 of TAG M3.1).

6.5.2 Table 6-3 summarises the most appropriate convergence measures of proximity and stability given in TAG Unit M3.1 Table 4 for model convergence.

Table 6-3: Convergence Criteria

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

6.6 Significance of Matrix Estimation

6.6.1 To ensure that matrix estimation was a controlled process, due care and attention was given to the requirements set out in TAG to monitor the impacts of matrix estimation. In accordance with the TAG guidance, it is recommended that the changes brought about by matrix estimation should not be significant. The criteria by which the significance of the changes brought about by matrix estimation may be judged are given in Table 6-4.

Table 6-4: Matrix Estimation Criteria

Parameter	Significance Criteria
Matrix Zonal cell values	Slope within 0.98 and 1.02 Intercept near zero R2 in excess of 0.95
Matrix zonal trip ends	Slope within 0.99 and 1.01 Intercept near zero R2 in excess of 0.98
Trip length distributions	Means within 5% Standard deviations within 5%
Sector to sector level matrices	Differences within 5%

7 Model Calibration Results

7.1 Introduction

7.1.1 This section reports on the flow calibration. The calibration of the network and matrices was undertaken to achieve a refined representation of observed traffic flows and behaviours in the updated WSTM4 2021 Base Year.

7.2 Screenline Calibration Approach

7.2.1 The WSTM4-HE Model Update uses the screenlines defined in the original WSTM4 base year model with the addition of refined new screenlines located in closer proximity to the study area. The locations of the screenlines and cordons are shown in Figure 7-1.

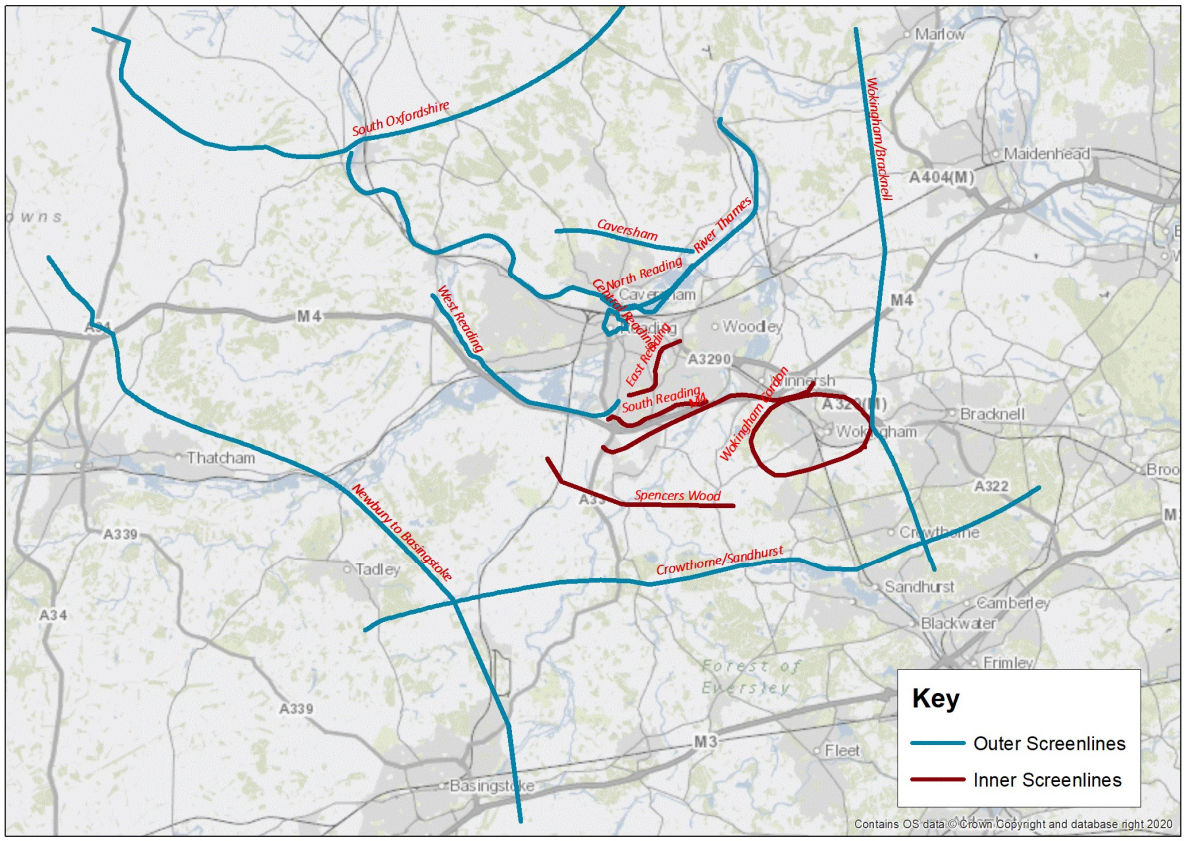


Figure 7-1 Screenlines

7.2.2 The screenlines have been classed as “Inner” or “Outer”. The screenlines marked as “Inner” are those that are in close proximity to the study area and which have been formed using the data collected in November 2021. The screenlines marked as “Outer” are located further away from the study area and are the screenlines that were used in the 2015 WSTM4 model development.

7.2.3 The Outer screenlines re-use 2015 data processed for the original WSTM4 base year model development, which has been factored to represent 2021 traffic flows.

7.2.4 A comparison has been completed using 2015 and November 2021 observed traffic data, which concluded that traffic on average reduced by 4.3% from 2015 to November 2021 (The analysis has been reported in the “Wokingham Local and M4 Modelling Assessment.

Reference Case – Matrix Development Methodology", May 2022). As such this value was used to factor down the 2021 Outer screenline observed data flows.

7.2.5 The screenline counts were used as constraints in the matrix estimation process, for this the matrix estimation "T-Flow Fuzzy" procedure in VISUM was used on all calibration screenlines. The matrix estimation process adjusts the "prior" matrix to better reflect observed traffic volumes at key locations on the network.

7.3 Screenline Calibration Results

7.3.1 DfT TAG guidance recommends that the total on most of the screenlines should be within 5% difference from observed data. The performance of the calibrated matrix on the key screenlines is presented in the tables below. The results demonstrate that nearly all the post matrix estimation calibration screenlines meet the acceptability criteria and provide a good representation of traffic movements.

Table 7-1: WSTM4_HE Screenline Results, AM Peak

Screenline			All Vehicles			
ID	Name	Type	Observed	Modelled	Difference	GEH
1	Wokingham Cordon- Inbound	Inner	4,300	4,321	0.5%	0.3
2	Wokingham Cordon-Outbound	Inner	4,704	4,753	1.0%	0.7
3	East Reading- Southbound	Inner	3,552	3,244	-8.7%	5.3
4	East Reading- Northbound	Inner	4,434	4,335	-2.2%	1.5
5	M4- Southbound	Inner	7,358	7,046	-4.2%	3.7
6	M4- Northbound	Inner	8,216	7,975	-2.9%	2.7
7	Arborfield - Northbound	Inner	1,635	1,602	-2.1%	0.8
8	Arborfield - Southbound	Inner	1,366	1,386	1.4%	0.5
9	West Reading- Southbound	Outer	2,888	2,810	-2.7%	1.5
10	West Reading- Northbound	Outer	2,229	2,190	-1.7%	0.8
11	Bracknell- Eastbound	Outer	11,820	11,762	-0.5%	0.5
12	Bracknell -Westbound	Outer	10,082	9,793	-2.9%	2.9
13	River Thames- Southbound	Outer	3,833	3,845	0.3%	0.2
14	River Thames- Northbound	Outer	3,213	3,220	0.2%	0.1
15	North Reading- Southbound	Outer	2,428	2,453	1.0%	0.5
16	North Reading- Northbound	Outer	2,032	2,046	0.7%	0.3
17	Central Reading- Inbound	Outer	2,006	1,669	-16.8%	7.9
18	Central Reading- Outbound	Outer	1,187	1,141	-3.9%	1.3
19	Caversham- Southbound	Outer	1,205	1,180	-2.0%	0.7
20	Caversham- Northbound	Outer	1,630	1,620	-0.6%	0.2
21	Crowthorne/Sandhurst - Southbound	Outer	7,134	7,182	0.7%	0.6
22	Crowthorne/Sandhurst- Northbound	Outer	8,268	8,243	-0.3%	0.3
23	South Oxfordshire- Southbound	Outer	4,063	4,162	2.4%	1.5
24	South Oxfordshire- Northbound	Outer	4,265	4,106	-3.7%	2.5
25	Newbury to Basingstoke- Eastbound	Outer	12,766	12,847	0.6%	0.7
26	Newbury to Basingstoke- Westbound	Outer	12,898	12,662	-1.8%	2.1

Table 7-2: WSTM4_HE Screenline Results, PM Peak

Screenline			All Vehicles			
ID	Name	Type	Observed	Modelled	Difference	GEH
1	Wokingham Cordon- Inbound	Inner	3,798	3,848	1.3%	0.8
2	Wokingham Cordon-Outbound	Inner	4,343	4,401	1.3%	0.9
3	East Reading- Southbound	Inner	4,348	4,215	-3.1%	2.0
4	East Reading- Northbound	Inner	3,090	2,981	-3.5%	2.0
5	M4- Southbound	Inner	7,938	7,680	-3.2%	2.9
6	M4- Northbound	Inner	7,136	7,025	-1.6%	1.3
7	Arborfield NB	Inner	1,561	1,597	2.3%	0.9
8	Arborfield SB	Inner	1,438	1,493	3.8%	1.4
9	West Reading- Southbound	Outer	2,405	2,406	0.0%	0.0
10	West Reading- Northbound	Outer	3,238	3,213	-0.8%	0.4
11	Bracknell- Eastbound	Outer	10,953	10,771	-1.7%	1.7
12	Bracknell -Westbound	Outer	12,429	12,003	-3.4%	3.9
13	River Thames- Southbound	Outer	3,699	3,714	0.4%	0.3
14	River Thames- Northbound	Outer	3,863	3,959	2.5%	1.5
15	North Reading- Southbound	Outer	2,255	2,181	-3.3%	1.6
16	North Reading- Northbound	Outer	2,788	2,757	-1.1%	0.6
17	Central Reading- Inbound	Outer	1,660	1,616	-2.7%	1.1
18	Central Reading- Outbound	Outer	2,262	2,275	0.6%	0.3
19	Caversham- Southbound	Outer	1,504	1,496	-0.5%	0.2
20	Caversham- Northbound	Outer	1,340	1,305	-2.6%	1.0
21	Crowthorne/Sandhurst - Southbound	Outer	8,829	8,691	-1.6%	1.5
22	Crowthorne/Sandhurst- Northbound	Outer	7,853	7,835	-0.2%	0.2
23	South Oxfordshire- Southbound	Outer	4,601	4,531	-1.5%	1.0
24	South Oxfordshire- Northbound	Outer	4,228	4,163	-1.5%	1.0
25	Newbury to Basingstoke- Eastbound	Outer	13,976	13,800	-1.3%	1.5
26	Newbury to Basingstoke- Westbound	Outer	15,035	14,994	-0.3%	0.3

7.3.2 Appendix A further details the results of the screenline validation by vehicle class.

7.4 Impact of Matrix Estimation

7.4.1 This section describes the resulting impact of the matrix estimation process to the prior matrices. The analysis is intended to check there are no significant changes to the prior matrices. As stated within TAG M3.1, it is important that the fidelity of the underlying trip matrices is not compromised in order to meet the validation standards.

7.4.2 As stated in paragraph 7.2.5, for matrix estimation T-Flow Fuzzy in VISUM was used on all calibration screenlines.

7.4.3 Trip length distribution pre and post matrix estimation has been checked. This is to check that the matrix estimation process does not materially alter the trip making patterns in the prior matrices. Matrix estimation can have the tendency to increase short distance trips at the expense of long-distance trips, which needs to be kept to a minimum.

7.4.4 The results of the trip length distribution checks are shown in Figure 7-2 and Figure 7-3 for each of the AM and PM peaks respectively. The results indicate minor changes to the trip length distribution as a result of the matrix estimation.

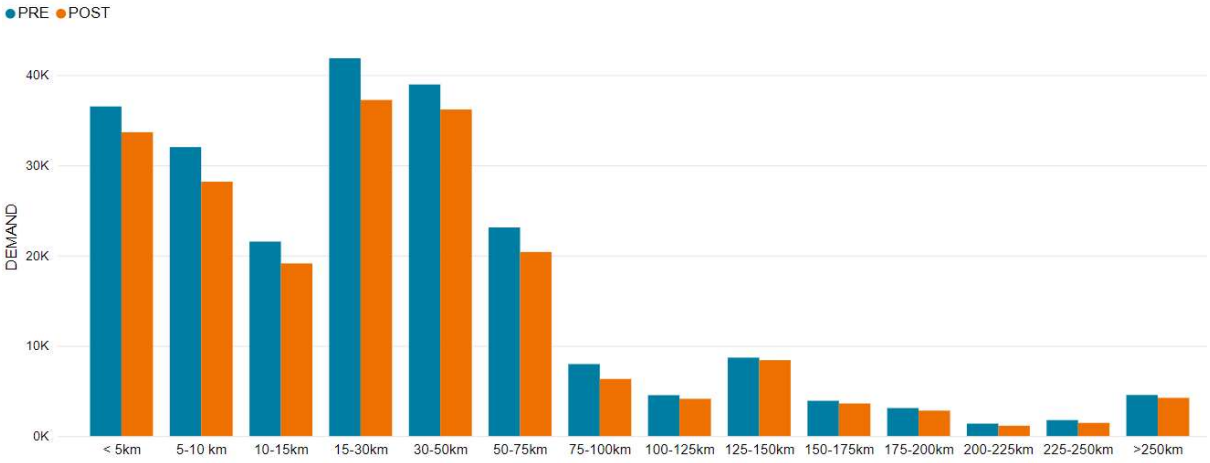


Figure 7-2: AM Trip Length Distribution Pre and Post Matrix Estimation

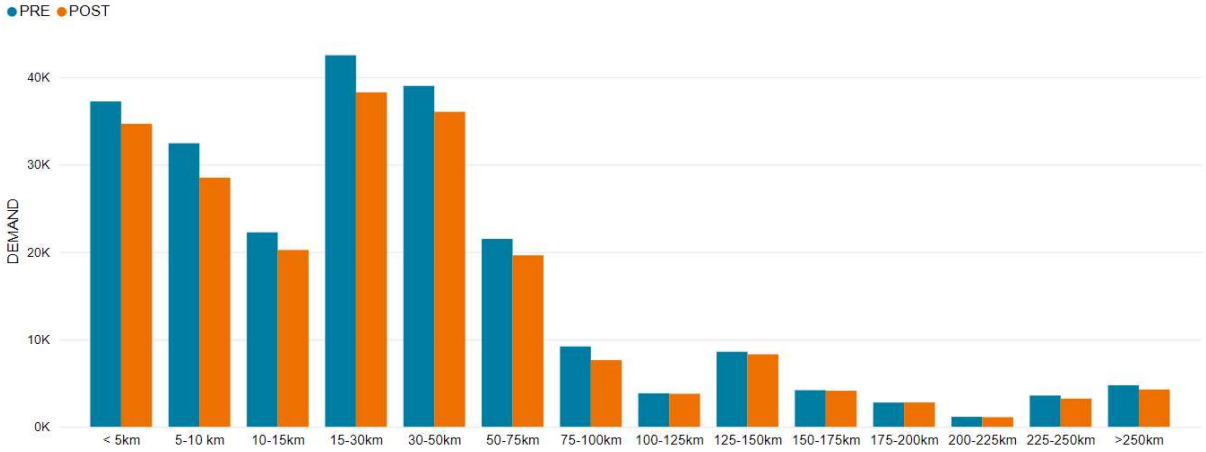


Figure 7-3 : PM Trip Length Distribution Pre and Post Matrix Estimation

7.4.5 In accordance with TAG guidance further analysis on mean and standard deviation percentage change, shown within the tables below, indicate a satisfactory level of change to trip lengths from the Pre to Post Matrix Estimation travel demand matrices.

Table 7-3: Trip Length Variance

Time Period	Matrix	Average Trip Length (km)			Standard Deviation		
		Car	LGV	HGV	Car	LGV	HGV
AM Peak	Prior	39.5	59.7	105.3	0.01	0.00	0.02
	ME	40.0	56.0	102.6	0.01	0.00	0.02
	% Difference	1%	6%	3%	0%	0%	0%
PM Peak	Prior	41.9	53.8	107.3	0.01	0.00	0.02
	ME	42.7	52.0	102.3	0.01	0.00	0.02
	% Difference	2%	3%	5%	0%	0%	0%

7.4.6 Matrix estimation changes on the matrix zonal cell values has been analysed in order to assess the significance of prior matrix changes in accordance with TAG M3.1. The changes are measured with the use of linear regression as set out in Unit M3.1 with the criteria of acceptable change set out in section 6.6.

7.4.7 The following table shows the significance of changes on the matrix zonal cell values brought about by matrix estimation. R2 is in excess of 0.98 and the intercept is close to zero in both the AM and PM peaks as recommended by TAG. Though the PM slope values fall slightly short of the recommended TAG values, the results examined across the whole set of regression parameters indicate an overall level of acceptable change.

Table 7-4: Cell Value Regression Analysis

Parameter	TAG Criteria	AM Peak	PM Peak
Slope	Slope within 0.98 and 1.02	0.98	0.93
Intercept	Intercept near zero	-0.03	-0.02
R2	R2 in excess of 0.95	1.00	0.99

7.4.8 Figure 7-4 and Figure 7-5 demonstrate a strong positive relationship of matrix zonal cell values between the prior and post matrices for the AM and PM peak respectively.

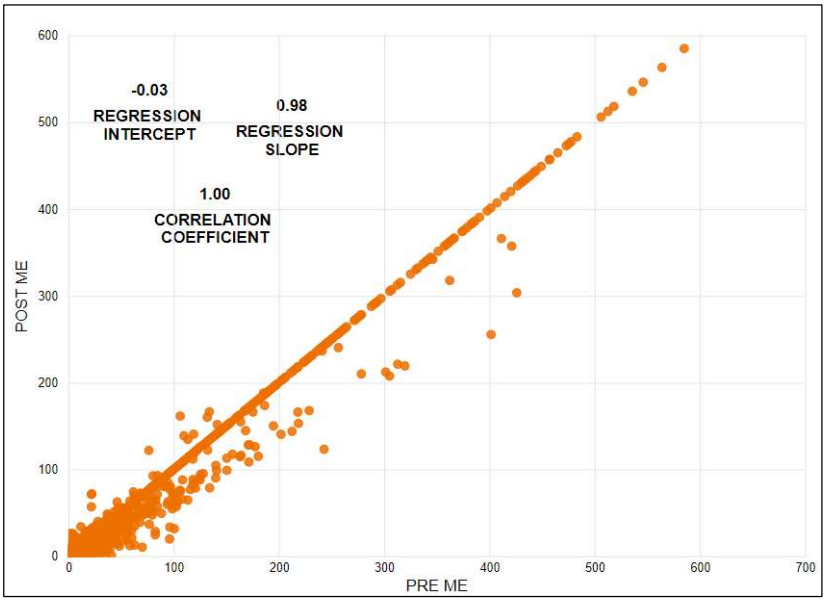


Figure 7-4: AM Peak ME Cell Value Regression Analysis

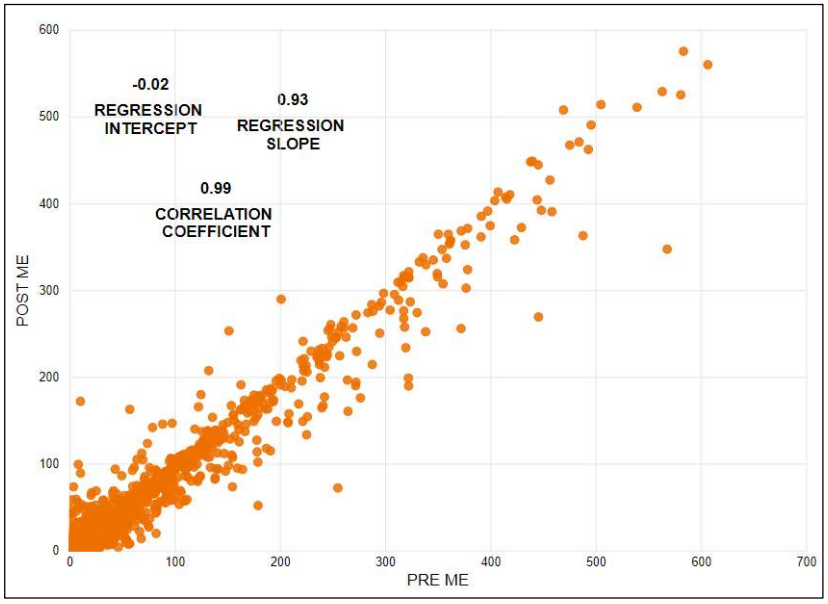


Figure 7-5: PM Peak ME Cell Value Regression Analysis

7.4.9 Zonal trip end regression analysis shows a weaker correlation between the Pre and Post matrix estimation matrices in comparison with the analysis of the matrix zonal cell values. The results of the Zonal trip end regression analysis are presented in Table 7-5 and fall slightly short of the recommended TAG values. This may be due to a general drop in demand between 2015 and 2021, which ME process aimed to address.

Table 7-5: Trip End Regression Analysis

Parameter	TAG Criteria	AM Peak	PM Peak
Slope	Slope within 0.99 and 1.01	-0.93	0.89
Intercept	Intercept near zero	-6.14	-2.61
R2	R2 in excess of 0.98	0.89	0.99

7.4.10 In order to evaluate spatially the variance of travel demand between the prior and post matrices, a sectoring system has been devised. To give geographical context to movements across the study area, the sector system has been constructed roughly based on Local Authority boundaries where zoning permits, with wider periphery zones falling outside of the study area being classified as “Rest of the UK”. Figure 7-6 shows the sectoring system used to analyse the pre-post matrix changes.

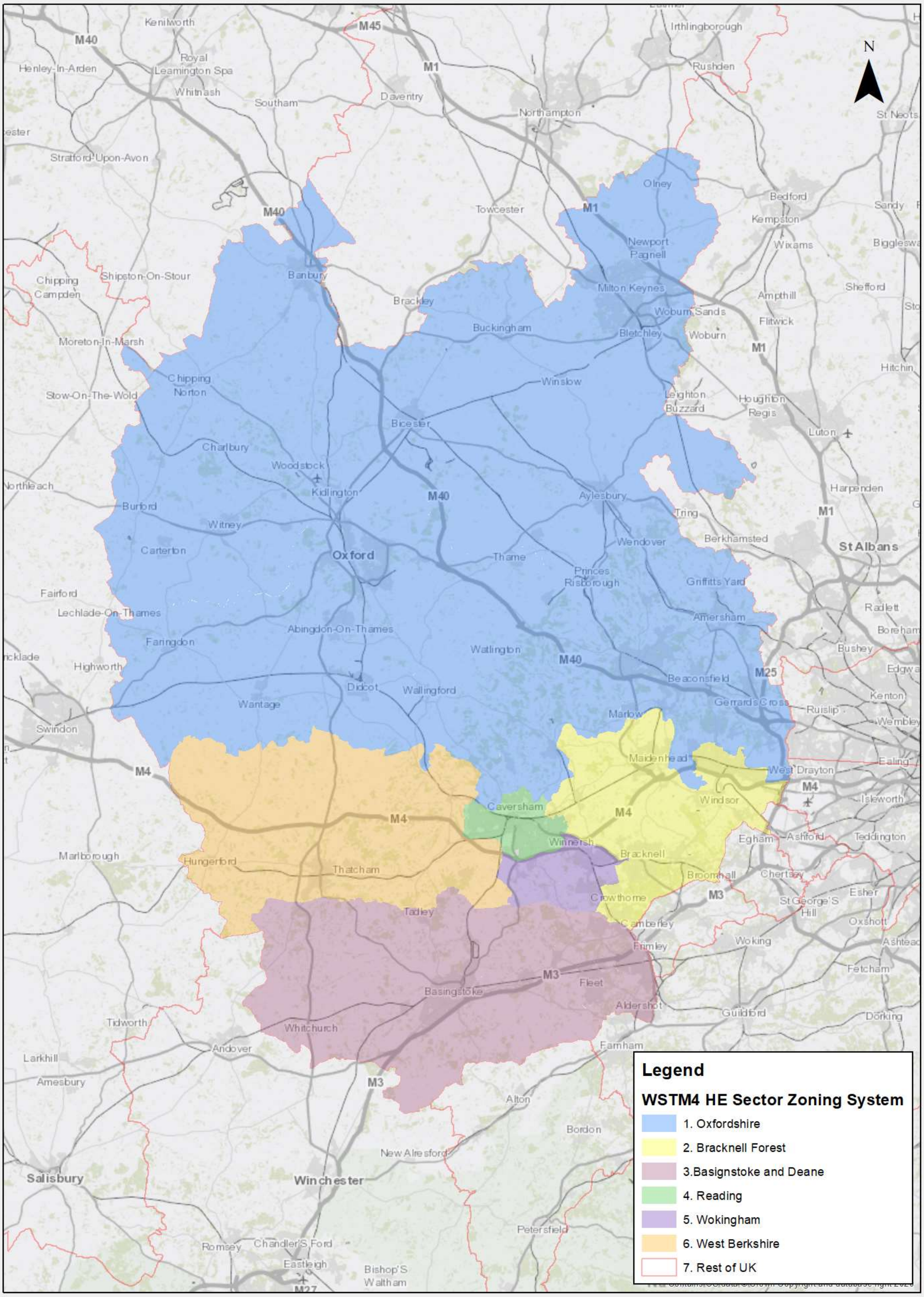


Figure 7-6: Sectoring

7.4.11 The following tables present the sector to sector changes of pre to post matrix estimation trip totals. It should be noted that the sector level changes in many cases do fall outside of DfT TAG guidance criteria of 5%. This can be due to a quality of the prior matrix, which has not been updated since the 2015 WSTM4 Base Year model development (it should be noted that less number of checks between the prior and the post matrices were undertaken at the time of the model development as required by the latest TAG then and a sector to sector comparison was not among those), changes in travel demand over the 5 year interval since the prior matrices were created and changes in travel demand resulting from COVID.

Table 7-6: AM Sector Pre-Post ME Changes

PRE ME

Sector	1	2	3	4	5	6	7	TOTAL
1	40,069	3,659	722	2,241	404	1,862	10,138	**59,094**
2	3,639	17,489	1,631	2,867	2,741	644	8,015	**37,028**
3	754	1,702	10,797	1,007	1,401	1,799	8,090	**25,549**
4	2,252	2,508	833	23,128	2,610	2,468	1,920	**35,719**
5	583	3,250	1,329	3,538	7,167	442	1,231	**17,541**
6	1,585	354	1,535	2,135	326	5,160	2,827	**13,923**
7	9,227	9,011	7,805	2,114	961	2,226	24,987	**56,331**
TOTAL	**58,110**	**37,973**	**24,652**	**37,030**	**15,611**	**14,601**	**57,209**	**245,185**

POST ME

Sector	1	2	3	4	5	6	7	TOTAL
1	39,531	3,465	612	1,737	369	1,463	9,778	**56,956**
2	3,367	16,729	1,510	2,347	2,440	483	7,848	**34,725**
3	674	1,566	9,644	841	1,260	1,486	7,383	**22,856**
4	1,887	2,190	556	20,013	2,138	1,830	1,755	**30,369**
5	473	2,737	1,171	3,073	6,472	394	956	**15,276**
6	1,414	279	1,266	1,843	340	5,289	2,641	**13,073**
7	9,063	8,731	6,906	1,577	850	1,929	23,977	**53,032**
TOTAL	**56,410**	**35,698**	**21,666**	**31,431**	**13,869**	**12,873**	**54,338**	**226,286**

Difference

Sector	1	2	3	4	5	6	7	TOTAL
1	-538	-194	-110	-503	-34	-399	-360	**-2,138**
2	-272	-760	-121	-520	-301	-161	-167	**-2,304**
3	-80	-135	-1,153	-166	-141	-313	-707	**-2,694**
4	-365	-318	-277	-3,115	-472	-638	-165	**-5,350**
5	-110	-513	-158	-466	-695	-48	-275	**-2,265**
6	-171	-75	-269	-292	14	128	-186	**-850**
7	-164	-280	-899	-537	-112	-297	-1,010	**-3,299**
TOTAL	**-1,700**	**-2,274**	**-2,986**	**-5,599**	**-1,741**	**-1,728**	**-2,871**	**-18,899**

% Difference

1	1	2	3	4	5	6	7	TOTAL
2	-1%	-5%	-15%	-22%	-9%	-21%	-4%	**-4%**
3	-7%	-4%	-7%	-18%	-11%	-25%	-2%	**-6%**
4	-11%	-8%	-11%	-16%	-10%	-17%	-9%	**-11%**
5	-16%	-13%	-33%	-13%	-18%	-26%	-9%	**-15%**
6	-19%	-16%	-12%	-13%	-10%	-11%	-22%	**-13%**
7	-11%	-21%	-18%	-14%	4%	2%	-7%	**-6%**
TOTAL	**-2%**	**-3%**	**-12%**	**-25%**	**-12%**	**-13%**	**-4%**	**-6%**

Table 7-7: PM Sector Pre-Post ME Changes

PRE ME

Sector	1	2	3	4	5	6	7	TOTAL
1	39,910	4,024	905	2,309	450	1,652	8,461	**57,712**
2	3,791	16,173	2,004	2,523	2,660	357	7,820	**35,327**
3	534	1,487	11,254	1,139	1,351	1,926	7,428	**25,119**
4	2,035	2,293	1,196	24,952	2,565	1,916	1,966	**36,925**
5	372	3,187	1,069	2,882	5,977	245	1,057	**14,789**
6	1,582	270	1,828	2,468	235	4,890	3,466	**14,740**
7	10,577	9,462	8,669	1,971	1,172	2,385	23,500	**57,736**
TOTAL	**58,800**	**36,897**	**26,925**	**38,244**	**14,412**	**13,371**	**53,698**	**242,347**

POST ME

Sector	1	2	3	4	5	6	7	TOTAL
1	39,438	3,898	759	1,819	436	1,470	8,416	**56,236**
2	3,758	15,794	1,803	2,286	2,336	340	7,561	**33,879**
3	475	1,497	10,249	911	1,332	1,850	6,530	**22,844**
4	1,721	2,271	1,105	22,109	2,413	1,758	2,171	**33,548**
5	379	2,849	979	2,438	5,059	261	987	**12,951**
6	1,422	281	1,419	2,203	284	5,105	3,353	**14,065**
7	10,412	9,132	8,032	1,738	1,034	2,520	22,466	**55,334**
TOTAL	**57,604**	**35,723**	**24,346**	**33,504**	**12,894**	**13,303**	**51,484**	**228,858**

Difference

Sector	1	2	3	4	5	6	7	TOTAL
1	-472	-126	-147	-490	-14	-182	-45	**-1,476**
2	-32	-379	-200	-237	-324	-16	-258	**-1,447**
3	-59	10	-1,005	-228	-20	-76	-898	**-2,275**
4	-315	-23	-91	-2,843	-152	-158	206	**-3,377**
5	7	-337	-89	-445	-919	16	-71	**-1,838**
6	-160	11	-409	-266	49	215	-113	**-674**
7	-165	-329	-636	-233	-139	134	-1,034	**-2,402**
TOTAL	**-1,196**	**-1,174**	**-2,579**	**-4,741**	**-1,518**	**-68**	**-2,213**	**-13,488**

% Difference

1	1	2	3	4	5	6	7	TOTAL
2	-1%	-3%	-16%	-21%	-3%	-11%	-1%	**-3%**
3	-1%	-2%	-10%	-9%	-12%	-5%	-3%	**-4%**
4	-11%	1%	-9%	-20%	-1%	-4%	-12%	**-9%**
5	-15%	-1%	-8%	-11%	-6%	-8%	10%	**-9%**
6	2%	-11%	-8%	-15%	-15%	7%	-7%	**-12%**
7	-10%	4%	-22%	-11%	21%	4%	-3%	**-5%**
TOTAL	**-2%**	**-3%**	**-7%**	**-12%**	**-12%**	**6%**	**-4%**	**-4%**

8 Model Validation Results

8.1 Introduction

8.1.1 This chapter presents the results of the validation process adopted for the WSTM4-HE model. The process checks how the highway assignment model performs against link flow and turning flow validation criteria. The section also presents journey time validation statistics.

8.2 Individual Link Flow Validation

8.2.1 Link flow validation statistics of the WSTM4-HE are shown within the following tables for all vehicles and cars. TAG advises that both:

- Absolute and percentage differences between modelled flows and counts, and
- GEH statistic

should be considered.

8.2.2 TAG acknowledges that these two measures are broadly consistent and link flows that meet either criterion should be regarded as satisfactory.

8.2.3 Table 8-1 presents the final AM Peak link validation performance and shows that either TAG link flow criteria or GEH criteria are met for car and total vehicles.

Table 8-1: AM Peak Individual Link Flow Validation Statistics

Criteria and Measure		Acceptability Guideline	All Vehicles			Car		
Observed	Modelled	Pass Criteria	Total Counts	Meet Criteria	%	Total Counts	Meet Criteria	%
Flow Criteria								
< 700 pph	±100 vph	> 85 %	33	29	**88%**	38	35	**92%**
700 - 2,700 vph	±15%	> 85 %	26	25	**96%**	24	22	**92%**
> 2,700 vph	±400 vph	> 85 %	6	6	**100%**	3	3	**100%**
GEH Criteria								
GEH Statistic for individual links < 5		> 85 %	65	62	**95%**	65	59	**91%**
Flow or GEH Criteria								
Above Flow Criteria or GEH Criteria are met		> 85 %	65	59	**91%**	65	60	**92%**

8.2.4 Table 8-2 shows the individual link flow validation performance for the PM Peak. This shows that the criteria have been met for flow or GEH criteria. For individual link flow validation on more minor roads with flow less than 700 vehicles, link flow validation falls slightly below the TAG recommended 85% threshold, however on the majority of these road types they do pass the GEH criteria.

Table 8-2: PM Peak Individual Link Flow Validation Statistics

Criteria and Measure		Acceptability Guideline	All Vehicles			Car		
Observed	Modelled	Pass Criteria	Total Counts	Meet Criteria	%	Total Counts	Meet Criteria	%
Flow Criteria								
< 700 pph	±100 vph	> 85 %	36	30	83%	41	35	85%
700 - 2,700 vph	±15%	> 85 %	22	19	86%	18	16	89%
> 2,700 vph	±400 vph	> 85 %	7	6	86%	6	5	83%
GEH Criteria								
GEH Statistic for individual links < 5		> 85 %	65	56	86%	65	54	83%
Flow or GEH Criteria								
Above Flow Criteria or GEH Criteria are met		> 85 %	65	57	88%	65	57	88%

8.2.5 Appendix B presents individual link flow results for cars and all vehicle classes.

8.3 Journey Time Validation

8.3.1 Journey time validation performance has been summarised across all routes shown within Figure 3-5. The model journey times were compared against the median of observed journey times and results of this comparison are presented in Table 8-3 and Table 8-4 for the AM and PM peaks.

8.3.2 The results show a high level of journey time validation, with 15 out of 16 routes passing the 85% threshold for the AM and PM Peak respectively, indicating a good reflection of observed travel times within the model.

8.3.3 Appendix C presents journey time graphs, which segments the results into different sections of the journey time routes.

Table 8-3: AM Peak Journey Time Validation

AM JOURNEY TIME VALIDATION						
ID	Name	Observed Time	Modelled Time	Difference	Difference %	Pass?
1	A33NB	13:28	13:44	00:16	0%	✓
2	A33SB	13:02	14:51	01:48	14%	✓
3	M4EB	17:45	19:11	01:26	8%	✓
4	M4WB	17:56	17:57	00:01	0%	✓
5	A329MSB	10:57	09:15	-01:43	-16%	×
6	A329MNB	09:51	09:15	-00:36	-6%	✓
7	A329_READING_RD_NB	22:23	22:26	00:03	0%	✓
8	A329_READING_RD_SB	24:26	24:59	00:33	2%	✓
9	LOWER_EARLEY_EB	12:19	13:10	00:51	7%	✓
10	LOWER_EARLEY_WB	12:43	13:44	01:01	8%	✓
11	A327_ERR_NB	19:02	17:56	-01:06	-6%	✓
12	A327_ERR_SB	17:03	14:40	-02:23	-14%	✓
13	A327_MOLE_RD_NB	15:48	15:22	-00:26	-3%	✓
14	A327_MOLE_RD_SB	16:07	14:59	-01:08	-7%	✓
15	BARKHAM_RD_B3349_EB	20:15	18:54	-01:21	-7%	✓
16	BARKHAM_RD_B3349_WB	18:38	19:56	01:18	7%	✓
					%Pass	**94%**

Table 8-4: PM Peak Journey Time Validation

PM JOURNEY TIME VALIDATION						
ID	Name	Observed Time	Modelled Time	Difference	Difference %	Pass?
1	A33NB	12:27	15:24	02:57	24%	×
2	A33SB	15:40	15:57	00:17	2%	✓
3	M4EB	17:59	19:04	01:05	6%	✓
4	M4WB	17:41	18:35	00:54	5%	✓
5	A329MSB	10:28	09:35	-00:53	-8%	✓
6	A329MNB	10:45	09:19	-01:26	-13%	✓
7	A329_READING_RD_NB	20:06	22:40	02:34	13%	✓
8	A329_READING_RD_SB	22:12	24:10	01:58	9%	✓
9	LOWER_EARLEY_EB	13:04	11:20	-01:44	-13%	✓
10	LOWER_EARLEY_WB	12:39	12:50	00:11	1%	✓
11	A327_ERR_NB	17:38	15:36	-02:02	-12%	✓
12	A327_ERR_SB	16:22	15:40	-00:42	-4%	✓
13	A327_MOLE_RD_NB	15:46	15:08	-00:38	-4%	✓
14	A327_MOLE_RD_SB	16:10	14:39	-01:31	-9%	✓
15	BARKHAM_RD_B3349_EB	19:29	18:11	-01:18	-7%	✓
16	BARKHAM_RD_B3349_WB	18:50	19:21	00:31	3%	✓
					%Pass	**94%**

8.4 Turning Flow Validation

8.4.1 Turning counts have been assessed at junctions where standalone junction models have been created and will be assessed in detail in relation to the impact of the Local Plan Update proposed development either using the VISSIM model or local junction models.

8.4.2 The observed and modelled turning movement validation statistics for these sites are summarised in Table 8-5 and Appendix D details junction statistics for each junction.

8.4.3 Turning movements are validated to a reasonable standard close to 85%, in particular for the flow % pass criteria. Specific focus in the validation and calibration of the junction was given for the major movements. Differences between observed and modelled flows will be accounted for in forecasting using standalone junction models and the VISSIM model.

Table 8-5: Summary of Turning Flow Validation

Site No.	Junction Name	AM Peak			PM Peak		
		GEH % Pass	Flow % Pass	Pass?	GEH % Pass	Flow % Pass	Pass?
1	Basingstoke Road / Three Mile Cross	88%	94%	✓	94%	94%	✓
2	Basingstoke Road / Church Lane	67%	78%	×	56%	67%	×
3	Black Boy Roundabout	69%	81%	×	75%	94%	✓
4	Black Boy /Eastern Relief Road (Southern Jct)	56%	67%	×	56%	67%	×
5	Eastern Science Park Access	75%	94%	✓	81%	88%	✓
6	Shinfield Relief Road / Arborfield Road	56%	78%	×	78%	100%	✓
7	Arborfield Relief Road/ A327	67%	78%	×	78%	89%	✓
8	Lower Earley Way / Meldreth Way	89%	100%	✓	89%	100%	✓
9	Lower Earley Way/ Mill Lane	100%	100%	✓	100%	100%	✓
10	Winnersh Relief Road / Hatch Farm	78%	78%	×	89%	100%	✓
11	Showcase Roundabout	81%	81%	×	88%	100%	✓
15	Winnersh Crossroads	75%	94%	✓	56%	94%	✓
16	Mill Lane / New Road Roundabout	69%	88%	✓	88%	94%	✓
17a	Lower Earley Way / Beeston Way	89%	89%	✓	78%	78%	×
17b	Lower Earley Way / Beeston Way	78%	100%	✓	78%	100%	✓
18	B3270 / Whitley Wood Road	56%	56%	×	67%	67%	×
19	J11	88%	92%	✓	80%	80%	×

8.5 Convergence

8.5.1 Each user class is assigned over a number of iterations until a level of stability or 'convergence' is achieved. The convergence results of the assignment are shown in Table 8-6 for the AM Peak and PM Peak respectively. This demonstrate that the vehicle classes converge and meet TAG convergence criteria, which was summarised in Table 6-3.

Table 8-6: Model Convergence Results

	AM Peak			PM Peak		
Mode	**Iteration**	**Delta**	**%Flow**	**Iteration**	**Delta**	**%Flow**
ICA	15	0.0005	0.994	11	0.001	0.989
	16	0.0003	0.993	12	0.001	0.993
	17	0.0003	0.996	13	0.001	0.991
	18	0.0007	0.995	14	0.001	0.992
	19	0.0010	0.995	15	0.000	0.997
	20	0.0002	0.994	16	0.001	0.993
Measure of convergence						
Delta (GAP)	✓			✓		
Percentage of links (non-ICA) or turns (ICA) with flow change < set threshold	✓			✓		

9 Summary

9.1.1 This report has described an update of the WSTM4 base year highway assignment model to represent November 2021 flows. This model will be used as the basis for forecasting and assessing the strategic impacts of the Local Plan Update proposed development, with forecast cordon models informing the more detailed local junction models and the microsimulation VISSIM model, which will inform the impacts of the Local Plan Update proposed development on the local and strategic network.

9.1.2 The model maintains key highway assignment features of the existing 2015 WSTM4 Base Year model but includes a set of network enhancements to reflect the infrastructure delivered in the borough between 2015 and 2021.

9.1.3 The WSTM4 2015 Prior matrices were used as a basis for Matrix Calibration and were assigned to the refined WSTM4-HE 2021 Base year Update Model. A process of matrix estimation was undertaken to reflect travel behaviours observed in November 2021.

9.1.4 Overall, the network and matrix calibration processes produced a model, which reflects observed travel conditions well. The final model performance largely meets Department for Transport's Transport Analysis Guidance criteria for the calibration and validation of transport models. High standard of model validation was achieved particularly in the focal area of the Hall Farm scheme and the surrounding study area. Furthermore, the good standard of the model validation achieved across the wider Wokingham area from the existing WSTM4 model was retained.

9.1.5 It can be concluded that 2021 WSTM4 model represents a suitable basis for testing development scenarios to inform 2038 Local Plan process. Shortcomings in the strategic model validation will be addressed in forecasting by using local junction models and the VISSIM model.

Appendix A Screenline Validation Link Flows

Table A-1 AM Peak Screenline Link Flow Results

Screenline	Car				LGV				HGV			
Name	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH
Wokingham Cordon-Inbound	3,741	3,778	1.0%	0.6	432	424	-1.8%	0.4	127	118	-6.4%	0.7
Wokingham Cordon-Outbound	4,109	4,175	1.6%	1.0	461	468	1.5%	0.3	134	110	-17.8%	2.2
East Reading-Southbound	3,071	2,858	-6.9%	3.9	363	311	-14.3%	2.8	118	75	-36.6%	4.4
East Reading-Northbound	3,864	3,848	-0.4%	0.2	424	402	-5.1%	1.1	147	85	-42.2%	5.8
M4- Southbound	6,063	5,995	-1.1%	0.9	997	850	-14.8%	4.9	298	201	-32.5%	6.1
M4- Northbound	6,897	6,938	0.6%	0.5	1,023	847	-17.2%	5.7	296	189	-36.0%	6.8
Arborfield NB	1,338	1,335	-0.2%	0.1	234	218	-6.9%	1.1	63	49	-22.8%	1.9
Arborfield SB	1,158	1,194	3.1%	1.0	159	163	2.8%	0.4	49	28	-42.1%	3.3
West Reading-Southbound	2,474	2,455	-0.8%	0.4	360	300	-16.8%	3.3	107	55	-48.3%	5.7
West Reading-Northbound	1,922	1,919	-0.2%	0.1	291	218	-25.1%	4.6	75	54	-28.0%	2.6
Bracknell- Eastbound	9,720	9,960	2.5%	2.4	1,565	1,326	-15.3%	6.3	611	477	-22.0%	5.8
Bracknell -Westbound	8,238	8,165	-0.9%	0.8	1,509	1,273	-15.6%	6.3	451	354	-21.6%	4.8
River Thames-Southbound	3,343	3,355	0.3%	0.2	371	368	-0.9%	0.2	118	123	3.8%	0.4
River Thames-Northbound	2,828	2,830	0.1%	0.1	276	287	4.1%	0.7	109	102	-6.3%	0.7
North Reading-Southbound	2,148	2,173	1.2%	0.5	207	208	0.4%	0.1	73	73	-0.5%	0.0
North Reading-Northbound	1,828	1,832	0.2%	0.1	135	137	1.4%	0.2	68	77	12.4%	1.0

Screenline	Car				LGV				HGV			
Name	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH
Central Reading-Inbound	1,811	1,516	-16.3%	7.2	159	128	-19.7%	2.6	36	26	-28.3%	1.8
Central Reading-Outbound	1,021	1,003	-1.8%	0.6	141	131	-6.8%	0.8	25	7	-70.5%	4.4
Caversham-Southbound	1,040	1,030	-1.0%	0.3	121	119	-1.7%	0.2	44	32	-27.8%	2.0
Caversham- Northbound	1,400	1,399	-0.1%	0.0	170	170	-0.3%	0.0	60	51	-14.4%	1.2
Crowthorne/Sandhurst - Southbound	6,123	6,130	0.1%	0.1	758	789	4.1%	1.1	252	263	4.3%	0.7
Crowthorne/Sandhurst-Northbound	7,029	7,015	-0.2%	0.2	949	976	2.9%	0.9	291	252	-13.2%	2.3
South Oxfordshire-Southbound	3,467	3,534	1.9%	1.1	439	445	1.2%	0.3	157	183	17.0%	2.0
South Oxfordshire-Northbound	3,618	3,458	-4.4%	2.7	494	493	-0.3%	0.1	153	154	1.0%	0.1
Newbury to Basingstoke- Eastbound	10,757	10,879	1.1%	1.2	1,473	1,467	-0.4%	0.1	536	501	-6.5%	1.5
Newbury to Basingstoke-Westbound	10,925	10,798	-1.2%	1.2	1,452	1,406	-3.2%	1.2	521	459	-12.0%	2.8

Table A-2 PM Peak Screenline Link Flow Results

Screenline	Car				LGV				HGV			
Name	Observed	Modelled	Diff	GEH	Observed	Modelled	Diff	GEH	Observed	Modelled	Diff	GEH
Wokingham Cordon-Inbound	3,334	3,406	2.2%	1.2	377	361	-4.3%	0.8	87	81	-7.3%	0.7
Wokingham Cordon-Outbound	3,859	3,936	2.0%	1.2	395	389	-1.6%	0.3	88	76	-13.5%	1.3
East Reading-Southbound	3,775	3,698	-2.0%	1.3	456	440	-3.6%	0.8	117	77	-34.1%	4.0
East Reading-Northbound	2,650	2,588	-2.3%	1.2	353	321	-9.0%	1.7	87	72	-17.5%	1.7
M4- Southbound	6,888	6,708	-2.6%	2.2	843	804	-4.6%	1.3	207	168	-18.9%	2.9
M4- Northbound	6,231	6,160	-1.1%	0.9	721	713	-1.1%	0.3	184	152	-17.6%	2.5
Aborfield NB	1,352	1,403	3.8%	1.4	175	164	-6.0%	0.8	35	30	-13.1%	0.8
Aborfield SB	1,260	1,309	3.9%	1.4	146	165	13.2%	1.5	33	19	-41.9%	2.7
West Reading-Southbound	2,128	2,126	-0.1%	0.1	222	218	-1.6%	0.2	72	62	-14.1%	1.2
West Reading-Northbound	2,857	2,820	-1.3%	0.7	360	310	-14.0%	2.8	91	83	-8.4%	0.8
Bracknell- Eastbound	9,509	9,375	-1.4%	1.4	1,121	1,037	-7.5%	2.5	434	359	-17.3%	3.8
Bracknell -Westbound	10,710	10,369	-3.2%	3.3	1,458	1,307	-10.4%	4.1	397	327	-17.7%	3.7
River Thames-Southbound	3,306	3,336	0.9%	0.5	313	304	-2.8%	0.5	80	74	-7.5%	0.7
River Thames-Northbound	3,488	3,587	2.8%	1.7	260	267	2.7%	0.4	116	105	-9.1%	1.0
North Reading-Southbound	2,045	1,980	-3.2%	1.4	163	160	-1.8%	0.2	47	41	-13.5%	1.0
North Reading-Northbound	2,535	2,518	-0.7%	0.3	159	160	0.4%	0.1	94	79	-16.1%	1.6
Central Reading-Inbound	1,537	1,517	-1.3%	0.5	121	91	-25.0%	2.9	2	8	267.3%	2.6
Central Reading-Outbound	2,136	2,159	1.1%	0.5	120	112	-6.4%	0.7	7	4	-38.8%	1.1

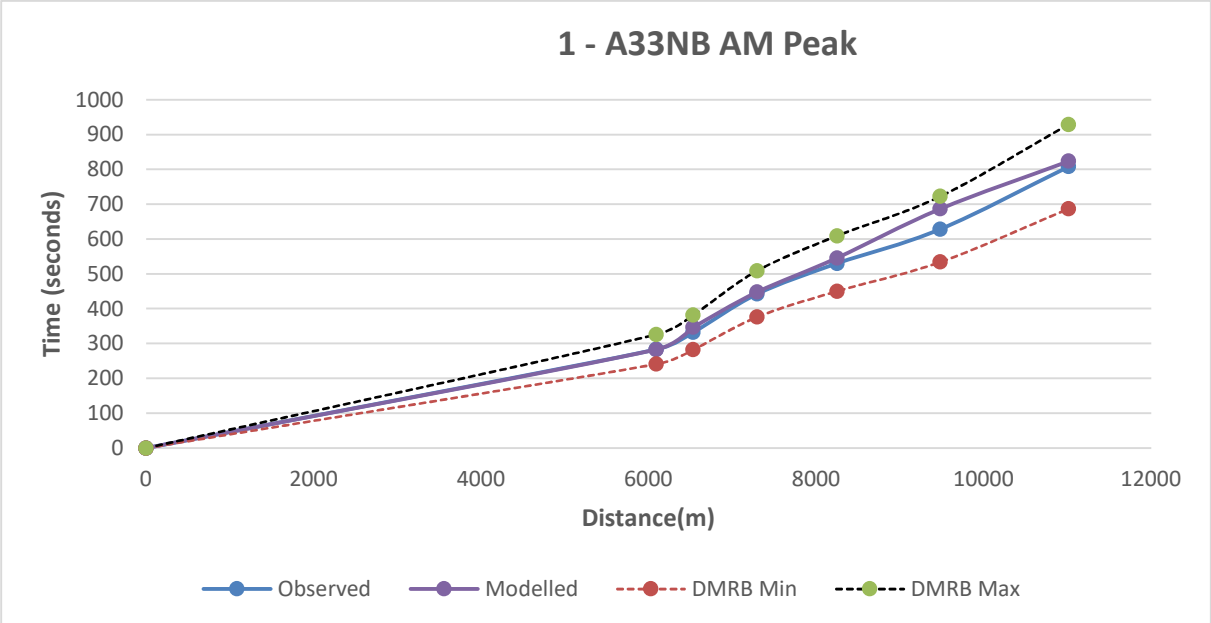
Screenline	Car				LGV				HGV			
Name	Observed	Modelled	Diff	GEH	Observed	Modelled	Diff	GEH	Observed	Modelled	Diff	GEH
Caversham-Southbound	1,332	1,330	-0.2%	0.1	137	136	-0.9%	0.1	35	30	-14.0%	0.9
Caversham-Northbound	1,187	1,156	-2.6%	0.9	123	124	1.0%	0.1	30	25	-17.2%	1.0
Crowthorne/Sandhurst - Southbound	7,741	7,611	-1.7%	1.5	864	876	1.4%	0.4	224	204	-8.9%	1.4
Crowthorne/Sandhurst-Northbound	6,828	6,823	-0.1%	0.1	819	840	2.5%	0.7	206	172	-16.5%	2.5
South Oxfordshire-Southbound	4,084	4,006	-1.9%	1.2	407	399	-1.9%	0.4	110	126	14.5%	1.5
South Oxfordshire-Northbound	3,674	3,618	-1.5%	0.9	454	441	-2.8%	0.6	100	104	3.6%	0.4
Newbury to Basingstoke-Eastbound	12,220	12,118	-0.8%	0.9	1,374	1,333	-3.0%	1.1	381	349	-8.4%	1.7
Newbury to Basingstoke-Westbound	13,135	13,134	0.0%	0.0	1,488	1,481	-0.5%	0.2	412	379	-8.0%	1.6

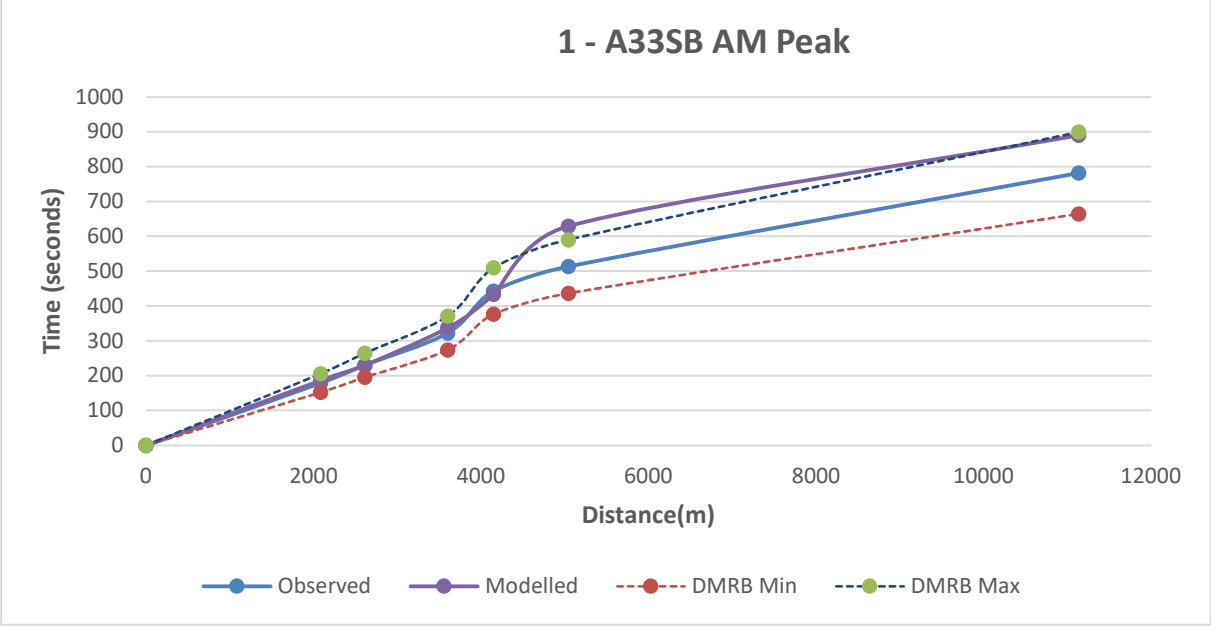
Appendix B Individual Link Flow Validation

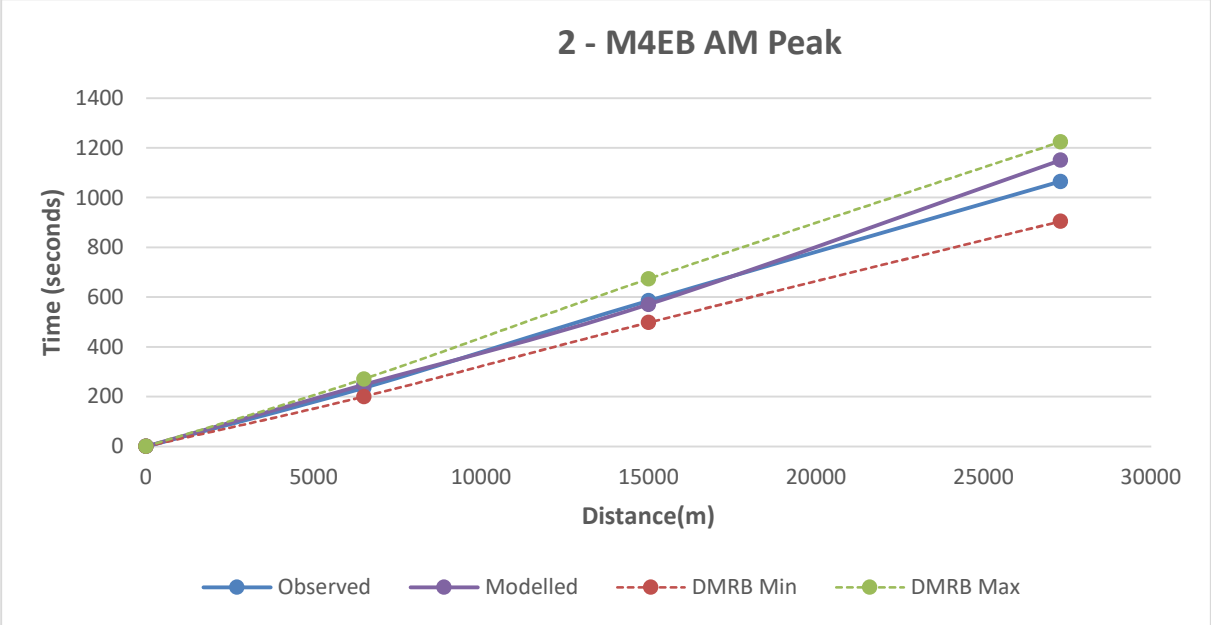
						AM Peak																				
													CAR							LGV			HGV		
ID	Site Location	Dir	Ref	A-Node	B-Node	Observed	Modelled	Flow Diff	GEH	GEH Pass?	Flow Pass?	Link Pass?	Observed	Modelled	Flow Diff	GEH	GEH Pass?	Flow Pass?	Link Pass?	Observed	Modelled	GEH	Observed	Modelled	GEH
M4 2559B	Junction 9-10	Eastbound	1188_1186	1188	1186	3135	3267	133	2.3	Pass	Pass	Pass	2575	2719	144	2.8	Pass	Pass	Pass	282	283	0.1	278	265	0.8
M4 2602B	Junction 10-11	Eastbound	1064_1050	1064	1050	4098	3877	-221	3.5	Pass	Pass	Pass	3438	3291	-146	2.5	Pass	Pass	Pass	371	340	1.7	289	246	2.6
M4 2656M	Junction 11 M4 EB On Slip	Eastbound	1068_1064	1068	1064	1279	1235	-44	1.2	Pass	Pass	Pass	1063	1000	-63	2.0	Pass	Pass	Pass	143	164	1.7	73	71	0.3
M4 2575B	Junction 10 EB Off Slip to A329	Eastbound	1050_1711	1050	1711	2318	2186	-132	2.8	Pass	Pass	Pass	1947	1827	-120	2.8	Pass	Pass	Pass	160	166	0.5	212	193	1.3
M4 2576L	Junction 10 M4 Off Slip to A329M (NB&SB)	Eastbound	1050_1047	1050	1047	1660	1691	31	0.8	Pass	Pass	Pass	1430	1465	34	0.9	Pass	Pass	Pass	174	173	0.1	56	54	0.4
M4 2559A	Junction 9-10	Westbound	1185_1176	1185	1176	3010	2927	-83	1.5	Pass	Pass	Pass	2396	2320	-76	1.6	Pass	Pass	Pass	434	419	0.7	180	189	0.7
M4 2570A	Junction 10 EB Mainline after A329M Off slip	Westbound	1176_2041	1176	2041	1975	1972	-2	0.1	Pass	Pass	Pass	1637	1599	-38	0.9	Pass	Pass	Pass	187	243	3.8	151	131	1.7
M4 2570K	Junction 10 On Slip (From A329M SB)	Westbound	1709_2041	1709	2041	298	290	-8	0.5	Pass	Pass	Pass	254	285	32	1.9	Pass	Pass	Pass	37	5	7.0	8	0	3.9
M4 2573K	Junction 10 On Slip (From A329M NB)	Westbound	1048_1049	1048	1049	1308	1189	-120	3.4	Pass	Pass	Pass	1117	1029	-88	2.7	Pass	Pass	Pass	121	122	0.1	71	37	4.5
M4 2575A	Junction 10 Mainline (between A329M On-Slips)	Westbound	2041_1049	2041	1049	2260	2262	2	0.1	Pass	Pass	Pass	1880	1884	4	0.1	Pass	Pass	Pass	246	247	0.1	133	131	0.2
M4 2602A	Junction 10-11	Westbound	1049_1063	1049	1063	3410	3451	41	0.7	Pass	Pass	Pass	2888	2913	25	0.5	Pass	Pass	Pass	353	369	0.9	169	168	0.1
M4 2672B	Junction 11-12	Eastbound	2060_1263	2060	1263	3975	3917	-58	0.9	Pass	Pass	Pass	3322	3310	-13	0.2	Pass	Pass	Pass	310	395	4.6	344	212	7.9
M4 2688A	Junction 11-12	Westbound	2059_1261	2059	1261	3043	3217	174	3.1	Pass	Pass	Pass	2511	2739	228	4.5	Pass	Pass	Pass	381	368	0.7	150	109	3.6
M4 2573M	Junction 10 A329M NB to M4 EB On Slip	Eastbound	1708_1711	1708	1711	661	541	-120	4.9	Pass	Fail	Pass	547	481	-66	2.9	Pass	Pass	Pass	69	59	1.2	44	0	9.4
J11_EB_Off	Junction 11 M4 EB Off Slip	0	9351_1065	9351	1065	1352	1436	84	2.3	Pass	Pass	Pass	940	1136	196	6.1	Fail	Fail	Fail	250	212	2.5	162	88	6.6
J11_WB_On	Junction 11 M4 WB On Slip	0	8338_2059	8338	2059	1279	1202	-76	2.2	Pass	Pass	Pass	1021	962	-59	1.9	Pass	Pass	Pass	232	211	1.4	26	29	0.6
J11_WB_Off	Junction 11 M4 WB Off Slip	0	9352_8339	9352	8339	1475	1275	-200	5.4	Fail	Pass	Pass	1059	1018	-41	1.3	Pass	Pass	Pass	275	219	3.5	140	37	11.0
207 EB	Culver Lane, Earley	Eastbound	1973_4689	1973	4689	238	336	98	5.8	Fail	Pass	Pass	209	315	105	6.5	Fail	Fail	Fail	22	21	0.3	6	0	3.3
207 WB	Culver Lane, Earley	Westbound	4689_1973	4689	1973	421	466	45	2.1	Pass	Pass	Pass	370	426	56	2.8	Pass	Pass	Pass	40	38	0.3	10	2	3.6
15 NB	B3350 Church Lane, Earley	Northbound	1159_8926	1159	8926	545	560	15	0.7	Pass	Pass	Pass	478	499	21	1.0	Pass	Pass	Pass	52	56	0.6	15	5	3.2
15 SB	B3350 Church Lane, Earley	Southbound	8926_1159	8926	1159	239	337	98	5.8	Fail	Pass	Pass	209	303	93	5.8	Fail	Pass	Pass	23	30	1.5	7	4	1.2
209 NE	B3350 Wilderness Road, Earley	Northeast	4552_1164	4552	1164	510	543	33	1.4	Pass	Pass	Pass	448	487	40	1.8	Pass	Pass	Pass	48	43	0.7	14	12	0.5
209 SW	B3350 Wilderness Road, Earley	Southwest	1164_4552	1164	4552	506	572	66	2.8	Pass	Pass	Pass	444	501	57	2.6	Pass	Pass	Pass	48	49	0.2	14	22	1.8
211 NB	Loddon Bridge Road, Earley	Northbound	1156_1649	1156	1649	575	511	-64	2.7	Pass	Pass	Pass	507	456	-50	2.3	Pass	Pass	Pass	54	52	0.2	14	2	4.1
211 SB	Loddon Bridge Road, Earley	Southbound	1649_1156	1649	1156	434	354	-80	4.0	Pass	Pass	Pass	382	310	-72	3.9	Pass	Pass	Pass	41	38	0.5	11	6	1.8
98 NW	A329 Reading Road, Winnersh	Northwest	1145_4488	1145	4488	736	723	-13	0.5	Pass	Pass	Pass	620	619	-1	0.0	Pass	Pass	Pass	88	80	0.9	27	24	0.6
98 SE	A329 Reading Road, Winnersh	Southeast	4488_1145	4488	1145	598	599	0	0.0	Pass	Pass	Pass	504	508	3	0.2	Pass	Pass	Pass	72	72	0.0	22	19	0.8
59 NB	B3030 Robin Hood Lane, Winnersh	Northbound	8345_4481	8345	4481	383	373	-10	0.5	Pass	Pass	Pass	336	328	-8	0.4	Pass	Pass	Pass	36	37	0.2	11	8	1.0
59 SB	B3030 Robin Hood Lane, Winnersh	Southbound	4481_8345	4481	8345	318	326	8	0.4	Pass	Pass	Pass	279	284	5	0.3	Pass	Pass	Pass	30	36	1.1	9	6	1.2
174 NB	B3349 Hyde End Road, Spencers Wood	Northbound	1397_2092	1397	2092	403	391	-11	0.6	Pass	Pass	Pass	353	376	22	1.2	Pass	Pass	Pass	38	15	4.6	11	1	4.1
174 SB	B3349 Hyde End Road, Spencers Wood	Southbound	2092_1397	2092	1397	380	329	-51	2.7	Pass	Pass	Pass	333	291	-42	2.4	Pass	Pass	Pass	36	34	0.3	11	3	2.9
121 EB	A329 Kings Rd	Eastbound	1124_4237	1124	4237	509	476	-33	1.5	Pass	Pass	Pass	429	413	-16	0.8	Pass	Pass	Pass	61	54	0.9	19	8	2.9
3A NB	A329 Reading Road/Old Forest Rd	Northbound	4026_1141	4026	1141	817	723	-93	3.4	Pass	Pass	Pass	688	654	-34	1.3	Pass	Pass	Pass	98	55	4.9	30	14	3.5
3A SB	A329 Reading Road/Old Forest Rd	Southbound	1141_4026	1141	4026	666	676	10	0.4	Pass	Pass	Pass	562	600	39	1.6	Pass	Pass	Pass	80	61	2.3	25	15	2.2
13A SW	A321 Denmark Street	Southwest	9058_1090	9058	1090	668	741	72	2.7	Pass	Pass	Pass	563	635	71	2.9	Pass	Pass	Pass	80	83	0.3	25	23	0.4
12A SW	A329 Peach Street	Southwest	1015_1017	1015	1017	1519	1434	-85	2.2	Pass	Pass	Pass	1281	1231	-49	1.4	Pass	Pass	Pass	182	164	1.4	56	39	2.5
2A NB	A321 Evendons Lane	Northbound	4171_1107	4171	1107	241	228	-13	0.9	Pass	Pass	Pass	203	204	0	0.0	Pass	Pass	Pass	29	24	1.0	9	1	3.8
2A SB	A321 Evendons Lane	Southbound	1107_4171	1107	4171	195	193	-2	0.1	Pass	Pass	Pass	165	164	-1	0.1	Pass	Pass	Pass	23	25	0.2	7	5	0.8
220 NB	A327 Eastern Relief Road, Shinfield	Northbound	9035_9353	9035	9353	569	611	42	1.7	Pass	Pass	Pass	480	519	39	1.8	Pass	Pass	Pass	68	70	0.2	21	22	0.2
220 SB	A327 Eastern Relief Road, Shinfield	Southbound	9353_9035	9353	9035	408	438	30	1.5	Pass	Pass	Pass	344	372	28	1.5	Pass	Pass	Pass	49	53	0.5	15	14	0.3
121 EB	A329 Kings Rd	Eastbound	1124_4237	1124	4237	509	476	-33	1.5	Pass	Pass	Pass	429	413	-16	0.8	Pass	Pass	Pass	61	54	0.9	19	8	2.9
Site 1 NB	Basingstoke Road from Mitford Close	Northbound	1360_8220	1360	8220	838	847	9	0.3	Pass	Pass	Pass	702	738	36	1.4	Pass	Pass	Pass	108	101	0.7	28	8	4.7
Site 1 SB	Basingstoke Road from Tabby Drive	Southbound	8220_1360	8220	1360	575	529	-45	1.9	Pass	Pass	Pass	547	500	-47	2.0	Pass	Pass	Pass	16	29	2.7	12	0	4.8
Site 2 EB	B3270 from Whitley wood lane	Eastbound	1353_1349	1353	1349	1016	1069	53	1.6	Pass	Pass	Pass	899	906	7	0.2	Pass	Pass	Pass	94	151	5.2	23	11	2.9
Site 2 WB	B3270 from Old Shinfield Road	Westbound	1349_1353	1349	1353	1429	1562	133	3.4	Pass	Pass	Pass	1254	1384	130	3.6	Pass	Pass	Pass	133	152	1.6	42	26	2.8
Site 3 EB	A327 Eastern Relief Road, Shinfield	Eastbound	9337_9353	9337	9353	429	485	55	2.6	Pass	Pass	Pass	355	406	51	2.6	Pass	Pass	Pass	53	65	1.5	22	14	1.9
Site 3 WB	A327 Eastern Relief Road, Shinfield	Westbound	9353_9337	9353	9337	591	663	72	2.9	Pass	Pass	Pass	493	566	73	3.2	Pass	Pass	Pass	68	75	0.8	30	22	1.5
Site 4 NE	B3270 Lower Earley Way West	Northeast	1342_1169	1342	1169	1159	1015	-144	4.4	Pass	Pass	Pass	1050	885	-165	5.3	Fail	Fail	Fail	81	123	4.2	29	6	5.3
Site 4 SW	B3270 Lower Earley Way West	Southwest	1169_1342	1169	1342	1193	1258	65	1.9	Pass	Pass	Pass	1029	1126	96	2.9	Pass	Pass	Pass	138	124	1.2	26	8	4.4
Site 5 EB	B3270 Lower Earley Way from Cutbush Lane	Eastbound	1170_1153	1170	1153	653	707	54	2.1	Pass	Pass	Pass	562	596	34	1.4	Pass	Pass	Pass	75	102	2.8	17	10	1.9
Site 5 WB	B3270 Lower Earley Way from Meldreth Way	Westbound	1153_1170	1153	1170	858	782	-76	2.6	Pass	Pass	Pass	746	677	-68	2.6	Pass	Pass	Pass	89	92	0.3	23	13	2.4
Site 6 NE	B3270 Lower Earley Way from Barn Croft Dr.	Northeast	4526_1150	4526	1150	858	914	55	1.9	Pass	Pass	Pass	740	790	50	1.8	Pass	Pass	Pass	91	114	2.2	27	10	3.9
Site 6 SW	B3270 Lower Earley Way from Mill Lane	Southwest	1150_4526	1150	4526	813	839	26	0.9	Pass	Pass	Pass	702	731	29	1.1	Pass	Pass	Pass	86	96	1.0	25	12	3.0
Site 7 NB	B3270 Lower Earley Way North	Northbound	1150_9330	1150	9330	1127	1204	77	2.3	Pass	Pass	Pass	957	1072	116	3.6	Pass	Pass	Pass	145	122	2.0	25	10	3.8
Site 7 SB	B3270 Lower Earley Way from Hatch Farm Way	Southbound	9330_1150	9330	1150	1052	970	-82	2.6	Pass	Pass	Pass	965	852	-112	3.7	Pass	Pass	Pass	57	100	4.9	30	18	2.5
Site 8 NW	Hatch Farm Way	Northwest	9362_9330	9362	9330	712	735	24	0.9	Pass	Pass	Pass	667	635	-33	1.3	Pass	Pass	Pass	31	77	6.3	14	24	2.3
Site 8 SE	Hatch Farm Way	Southeast	9330_9362	9330	9362	596	459	-137	6.0	Fail	Fail	Fail	521	360	-161	7.7	Fail	Fail	Fail	61	78	1.9	13	21	1.9
Site 11 EB	A327 Arborfield Road from A327 Observer way	Eastbound	9035_9036	9035	9036	580	609	28	1.2	Pass	Pass	Pass	500	533	33	1.5	Pass	Pass	Pass	62	61	0.0	19	14	1.2
Site 11 WB	A327 Aborfield Road from Observer Way	Westbound	9036_9035	9036	9035	683	664	-18	0.7	Pass	Pass	Pass	523	524	1	0.1	Pass	Pass	Pass	124	117	0.6	36	23	2.3
Site 25 NB	B3408 London Road	Northbound	5056_4854	5056	4854	823	799	-24	0.8	Pass	Pass	Pass	760	723	-37	1.4	Pass	Pass	Pass	39	45	0.9	24	31	1.3
Site 25 SB	B3408 London Road	Southbound	4854_5056	4854	5056	715	685	-30	1.1	Pass	Pass	Pass	671	647	-24	0.9	Pass	Pass	Pass	25	27	0.4	19	11	2.0
Site 28 EB	A329 London Road	Eastbound	1025_9375	1025	9375	703	593	-110	4.3	Pass	Fail	Pass	528	530	2	0.1	Pass	Pass	Pass	147	49	9.8	28	14	3.1
Site 28 WB	A329 London Road	Westbound	9375_1025	9375	1025	602	407	-196	8.7	Fail	Fail	Fail	486	336	-151	7.4	Fail	Fail	Fail	93	64	3.2	23	7	4.2
5A EB	Barkham Road	Eastbound	1301_1300	1301	1300	464	457	-7	0.3	Pass	Pass	Pass	407	403	-4	0.2	Pass	Pass	Pass	44	42	0.2	13	12	0.3
5A WB	Barkham Road	Westbound	1300_1301	1300	1301	480	367	-113	5.5	Fail	Fail	Fail	421	345	-76	3.9	Pass	Pass	Pass	45	17	5.0	13	5	2.8

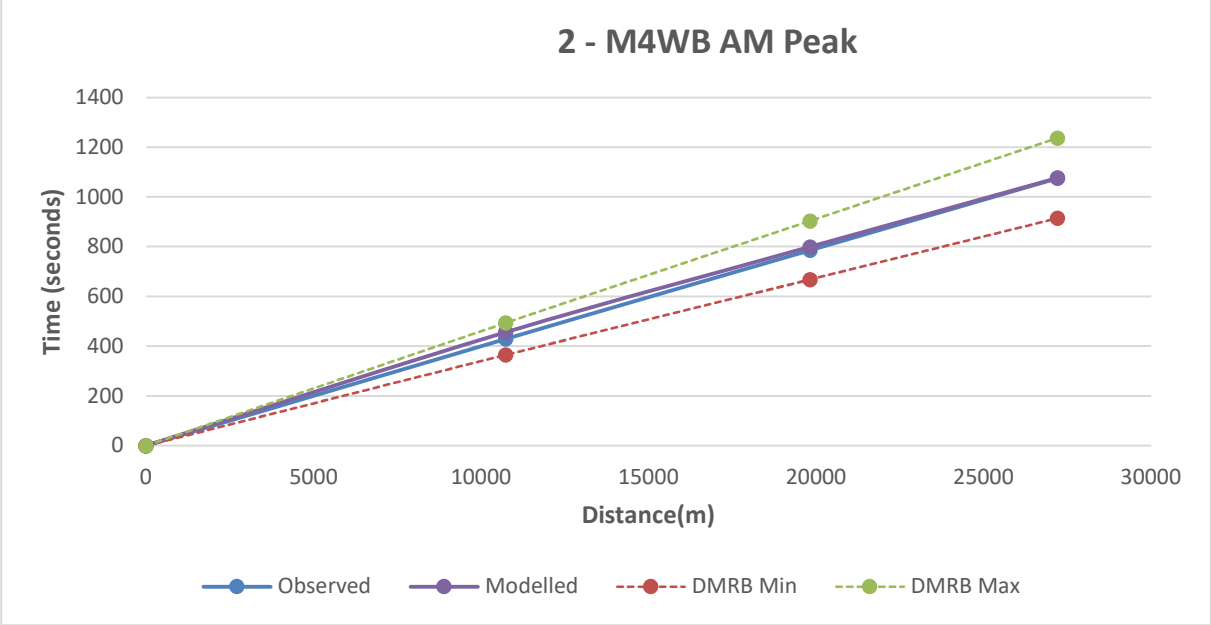
		PM Peak																		
		CAR													LGV			HGV		
ID	Site Location	Observed	Modelled	Flow Diff	GEH	GEH Pass?	Flow Pass?	Link Pass?	Observed	Modelled	GEH	GEH Pass?	Flow Pass?	Link Pass?	Observed	Modelled	GEH	Observed	Modelled	GEH
M4 2559B	Junction 9-10	3604	3494	-110	1.8	Pass	Pass	Pass	3244	3146	1.7	Pass	Pass	Pass	169	167	0.1	192	181	0.8
M4 2602B	Junction 10-11	3890	3736	-154	2.5	Pass	Pass	Pass	3424	3380	0.7	Pass	Pass	Pass	242	165	5.4	225	191	2.3
M4 2656M	Junction 11 M4 EB On Slip	1342	1177	-165	4.7	Pass	Pass	Pass	1238	1060	5.3	Fail	Pass	Pass	43	77	4.4	62	40	3.0
M4 2575B	Junction 10 EB Off Slip to A329	2279	2247	-32	0.7	Pass	Pass	Pass	2042	2029	0.3	Pass	Pass	Pass	81	89	0.9	156	129	2.2
M4 2576L	Junction 10 M4 Off Slip to A329M (NB&SB)	1562	1489	-73	1.9	Pass	Pass	Pass	1449	1351	2.6	Pass	Pass	Pass	61	76	1.8	53	62	1.2
M4 2559A	Junction 9-10	3613	3427	-186	3.1	Pass	Pass	Pass	3091	2903	3.4	Pass	Pass	Pass	376	374	0.1	146	150	0.3
M4 2570A	Junction 10 EB Mainline after A329M Off slip	2377	2119	-258	5.4	Fail	Pass	Pass	2079	1816	5.9	Fail	Pass	Pass	163	180	1.3	135	123	1.1
M4 2570K	Junction 10 On Slip (From A329M SB)	345	419	74	3.8	Pass	Pass	Pass	322	407	4.5	Pass	Pass	Pass	20	12	1.9	3	0	2.6
M4 2573K	Junction 10 On Slip (From A329M NB)	1287	1155	-132	3.8	Pass	Pass	Pass	1136	1017	3.6	Pass	Pass	Pass	98	103	0.5	53	35	2.8
M4 2575A	Junction 10 Mainline (between A329M On-Slips)	2703	2536	-167	3.3	Pass	Pass	Pass	2376	2222	3.2	Pass	Pass	Pass	203	191	0.9	124	123	0.1
M4 2602A	Junction 10-11	3769	3691	-78	1.3	Pass	Pass	Pass	3331	3239	1.6	Pass	Pass	Pass	285	294	0.5	154	158	0.3
M4 2672B	Junction 11-12	3826	3729	-97	1.6	Pass	Pass	Pass	3374	3314	1.0	Pass	Pass	Pass	193	231	2.6	259	184	5.1
M4 2688A	Junction 11-12	3377	3789	412	6.9	Fail	Fail	Fail	2931	3355	7.6	Fail	Fail	Fail	306	314	0.4	139	120	1.7
M4 2573M	Junction 10 A329M NB to M4 EB On Slip	515	471	-44	2.0	Pass	Pass	Pass	453	439	0.7	Pass	Pass	Pass	35	32	0.6	26	0	7.2
J11_EB_Off	Junction 11 M4 EB Off Slip	1352	1210	-142	4.0	Pass	Pass	Pass	1063	1002	1.9	Pass	Pass	Pass	167	155	1.0	122	53	7.3
J11_WB_On	Junction 11 M4 WB On Slip	1279	1307	29	0.8	Pass	Pass	Pass	1077	1118	1.2	Pass	Pass	Pass	191	175	1.2	10	14	1.0
J11_WB_Off	Junction 11 M4 WB Off Slip	1475	1170	-305	8.4	Fail	Fail	Fail	1169	994	5.3	Fail	Pass	Pass	207	144	4.7	99	32	8.2
207 EB	Culver Lane, Earley	347	342	-5	0.3	Pass	Pass	Pass	310	316	0.3	Pass	Pass	Pass	30	26	0.7	7	0	3.7
207 WB	Culver Lane, Earley	259	338	79	4.6	Pass	Pass	Pass	232	322	5.4	Fail	Pass	Pass	22	15	1.7	5	1	2.3
15 NB	B3350 Church Lane, Earley	638	672	34	1.3	Pass	Pass	Pass	575	616	1.7	Pass	Pass	Pass	52	52	0.0	12	4	2.8
15 SB	B3350 Church Lane, Earley	286	362	76	4.2	Pass	Pass	Pass	258	334	4.4	Pass	Pass	Pass	23	25	0.3	5	3	1.1
209 NE	B3350 Wilderness Road, Earley	687	754	67	2.5	Pass	Pass	Pass	618	677	2.3	Pass	Pass	Pass	56	58	0.3	13	19	1.6
209 SW	B3350 Wilderness Road, Earley	475	522	47	2.1	Pass	Pass	Pass	427	465	1.8	Pass	Pass	Pass	39	44	0.8	9	13	1.3
211 NB	Loddon Bridge Road, Earley	558	507	-51	2.2	Pass	Pass	Pass	499	456	2.0	Pass	Pass	Pass	48	48	0.0	11	3	3.0
211 SB	Loddon Bridge Road, Earley	455	414	-41	1.9	Pass	Pass	Pass	406	371	1.8	Pass	Pass	Pass	39	40	0.1	9	3	2.4
98 NW	A329 Reading Road, Winnersh	575	558	-17	0.7	Pass	Pass	Pass	500	489	0.5	Pass	Pass	Pass	60	55	0.7	15	14	0.2
98 SE	A329 Reading Road, Winnersh	698	669	-29	1.1	Pass	Pass	Pass	607	580	1.1	Pass	Pass	Pass	73	71	0.3	18	18	0.0
59 NB	B3030 Robin Hood Lane, Winnersh	298	310	12	0.7	Pass	Pass	Pass	268	282	0.8	Pass	Pass	Pass	24	25	0.2	6	3	1.2
59 SB	B3030 Robin Hood Lane, Winnersh	371	374	3	0.1	Pass	Pass	Pass	334	332	0.1	Pass	Pass	Pass	30	36	1.0	7	6	0.3
174 NB	B3349 Hyde End Road, Spencers Wood	404	358	-46	2.4	Pass	Pass	Pass	364	333	1.7	Pass	Pass	Pass	33	24	1.7	7	1	3.2
174 SB	B3349 Hyde End Road, Spencers Wood	367	360	-7	0.3	Pass	Pass	Pass	330	322	0.4	Pass	Pass	Pass	30	37	1.2	7	1	2.9
121 EB	A329 Kings Rd	470	461	-9	0.4	Pass	Pass	Pass	409	410	0.1	Pass	Pass	Pass	49	49	0.1	12	2	3.8
3A NB	A329 Reading Road/Old Forest Rd	613	601	-12	0.5	Pass	Pass	Pass	533	548	0.7	Pass	Pass	Pass	64	47	2.3	16	6	2.9
3A SB	A329 Reading Road/Old Forest Rd	598	759	162	6.2	Fail	Fail	Fail	519	695	7.1	Fail	Fail	Fail	63	48	2.0	15	16	0.2
13A SW	A321 Denmark Street	397	546	149	6.9	Fail	Fail	Fail	345	476	6.5	Fail	Fail	Fail	42	53	1.6	10	17	1.9
12A SW	A329 Peach Street	1187	1206	19	0.6	Pass	Pass	Pass	1032	1062	0.9	Pass	Pass	Pass	125	119	0.5	30	25	1.0
2A NB	A321 Evendons Lane	95	112	17	1.7	Pass	Pass	Pass	82	96	1.4	Pass	Pass	Pass	10	13	0.9	2	3	0.4
2A SB	A321 Evendons Lane	259	259	0	0.0	Pass	Pass	Pass	225	223	0.1	Pass	Pass	Pass	27	31	0.7	7	5	0.7
220 NB	A327 Eastern Relief Road, Shinfield	437	449	12	0.6	Pass	Pass	Pass	380	393	0.7	Pass	Pass	Pass	46	45	0.1	11	11	0.1
220 SB	A327 Eastern Relief Road, Shinfield	487	467	-20	0.9	Pass	Pass	Pass	423	414	0.4	Pass	Pass	Pass	51	42	1.3	12	11	0.4
121 EB	A329 Kings Rd	470	461	-9	0.4	Pass	Pass	Pass	409	410	0.1	Pass	Pass	Pass	49	49	0.1	12	2	3.8
Site 1 NB	Basingstoke Road from Mitford Close	652	534	-118	4.9	Pass	Fail	Pass	555	465	4.0	Pass	Pass	Pass	78	67	1.3	19	2	5.3
Site 1 SB	Basingstoke Road from Tabby Drive	698	612	-86	3.4	Pass	Pass	Pass	659	573	3.4	Pass	Pass	Pass	32	37	0.9	7	2	2.5
Site 2 EB	B3270 from Whitley wood lane	1162	1087	-75	2.2	Pass	Pass	Pass	1045	964	2.6	Pass	Pass	Pass	98	111	1.3	20	12	1.9
Site 2 WB	B3270 from Old Shinfield Road	1138	1124	-14	0.4	Pass	Pass	Pass	1017	1026	0.3	Pass	Pass	Pass	99	87	1.2	22	11	2.8
Site 3 EB	A327 Eastern Relief Road, Shinfield	475	526	51	2.3	Pass	Pass	Pass	418	472	2.6	Pass	Pass	Pass	42	43	0.1	14	11	1.0
Site 3 WB	A327 Eastern Relief Road, Shinfield	494	483	-11	0.5	Pass	Pass	Pass	431	429	0.1	Pass	Pass	Pass	49	43	0.9	14	11	0.8
Site 4 NE	B3270 Lower Earley Way West	1233	1149	-84	2.4	Pass	Pass	Pass	1150	1030	3.6	Pass	Pass	Pass	63	111	5.2	21	8	3.4
Site 4 SW	B3270 Lower Earley Way West	1028	963	-65	2.0	Pass	Pass	Pass	910	872	1.3	Pass	Pass	Pass	102	90	1.2	16	1	5.2
Site 5 EB	B3270 Lower Earley Way from Cutbush Lane	743	706	-37	1.4	Pass	Pass	Pass	662	638	0.9	Pass	Pass	Pass	72	63	1.1	9	5	1.5
Site 5 WB	B3270 Lower Earley Way from Meldreth Way	765	705	-60	2.2	Pass	Pass	Pass	682	632	1.9	Pass	Pass	Pass	70	67	0.4	13	6	2.3
Site 6 NE	B3270 Lower Earley Way from Barn Croft Dr.	782	798	16	0.6	Pass	Pass	Pass	687	726	1.5	Pass	Pass	Pass	84	68	1.8	12	4	2.7
Site 6 SW	B3270 Lower Earley Way from Mill Lane	874	925	51	1.7	Pass	Pass	Pass	773	831	2.1	Pass	Pass	Pass	85	87	0.2	16	7	2.7
Site 7 NB	B3270 Lower Earley Way North	986	961	-25	0.8	Pass	Pass	Pass	867	867	0.0	Pass	Pass	Pass	102	89	1.4	16	5	3.4
Site 7 SB	B3270 Lower Earley Way from Hatch Farm Way	1130	1102	-28	0.8	Pass	Pass	Pass	1058	992	2.1	Pass	Pass	Pass	49	97	5.6	23	13	2.4
Site 8 NW	Hatch Farm Way	564	479	-85	3.7	Pass	Pass	Pass	526	404	5.7	Fail	Fail	Fail	29	59	4.6	10	16	1.8
Site 8 SE	Hatch Farm Way	640	573	-67	2.7	Pass	Pass	Pass	584	528	2.4	Pass	Pass	Pass	47	38	1.4	9	7	0.5
Site 11 EB	A327 Arborfield Road from A327 Observer way	561	685	124	5.0	Pass	Fail	Pass	508	623	4.9	Pass	Fail	Pass	41	51	1.5	12	11	0.3
Site 11 WB	A327 Aborfield Road from Observer Way	626	628	2	0.1	Pass	Pass	Pass	514	540	1.1	Pass	Pass	Pass	89	76	1.5	22	12	2.5
Site 25 NB	B3408 London Road	876	696	-180	6.4	Fail	Fail	Fail	815	631	6.8	Fail	Fail	Fail	38	40	0.3	23	25	0.4
Site 25 SB	B3408 London Road	673	782	109	4.0	Pass	Fail	Pass	629	707	3.0	Pass	Pass	Pass	31	50	3.0	14	25	2.6
Site 28 EB	A329 London Road	722	439	-283	11.7	Fail	Fail	Fail	583	382	9.2	Fail	Fail	Fail	116	50	7.2	23	7	4.1
Site 28 WB	A329 London Road	747	667	-80	3.0	Pass	Pass	Pass	613	595	0.7	Pass	Pass	Pass	120	57	6.7	14	15	0.2
5A EB	Barkham Road	418	469	51	2.4	Pass	Pass	Pass	376	436	3.0	Pass	Pass	Pass	34	26	1.5	8	7	0.3
5A WB	Barkham Road	443	282	-161	8.5	Fail	Fail	Fail	399	250	8.3	Fail	Fail	Fail	36	29	1.2	8	3	2.2

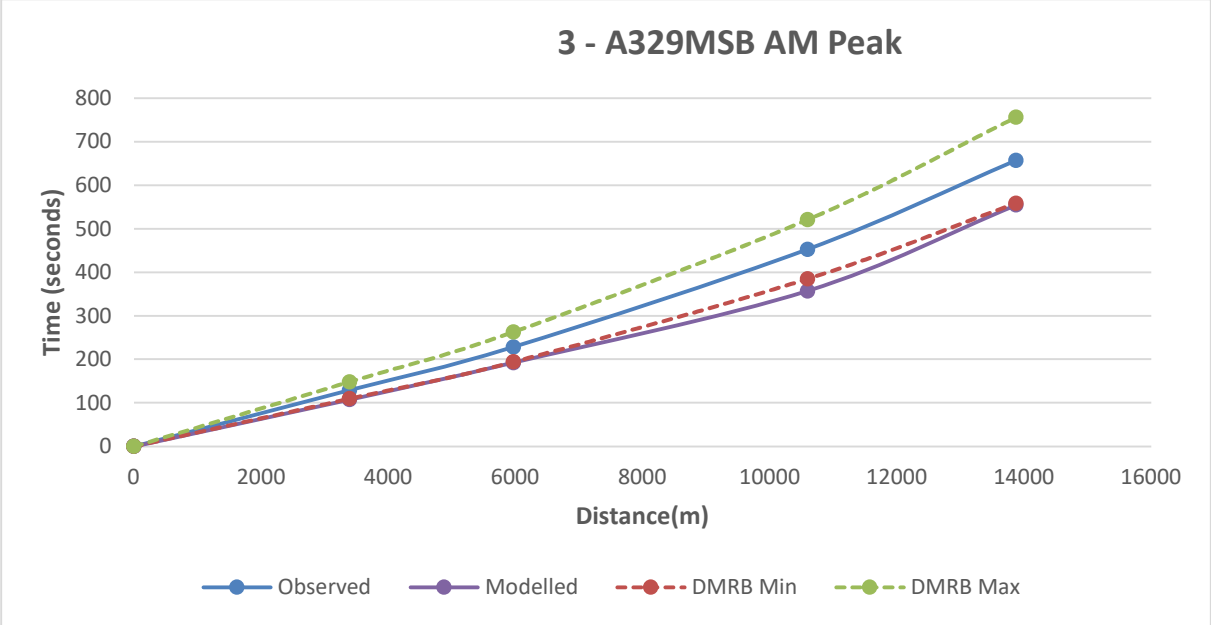
Appendix C Journey Time Validation Graphs

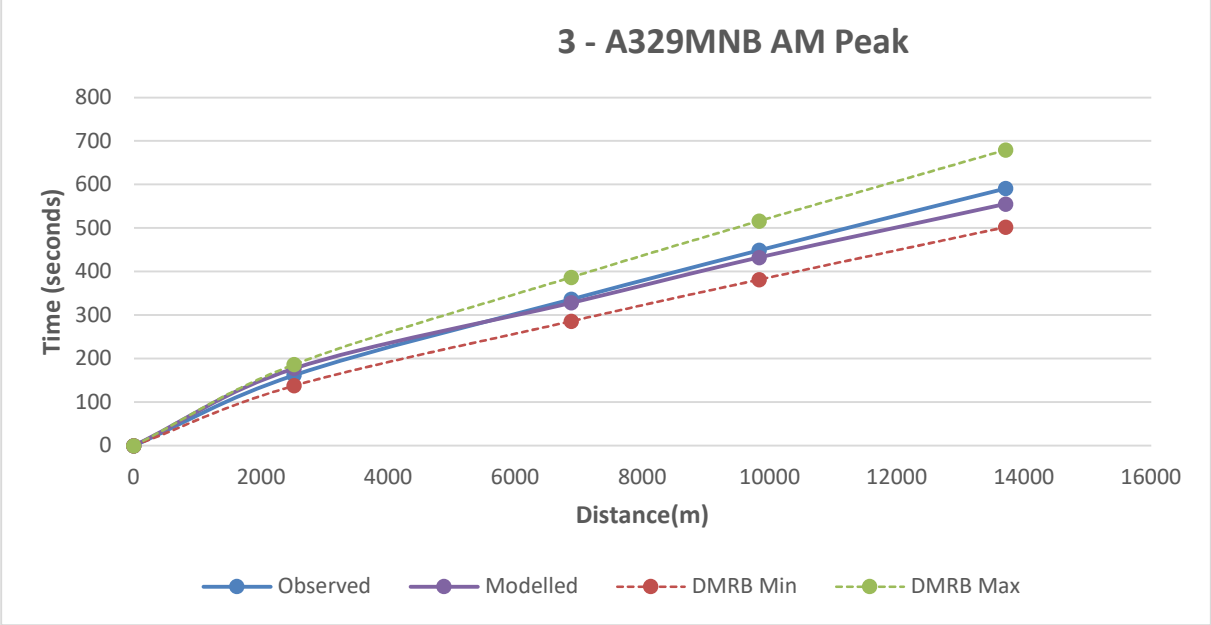


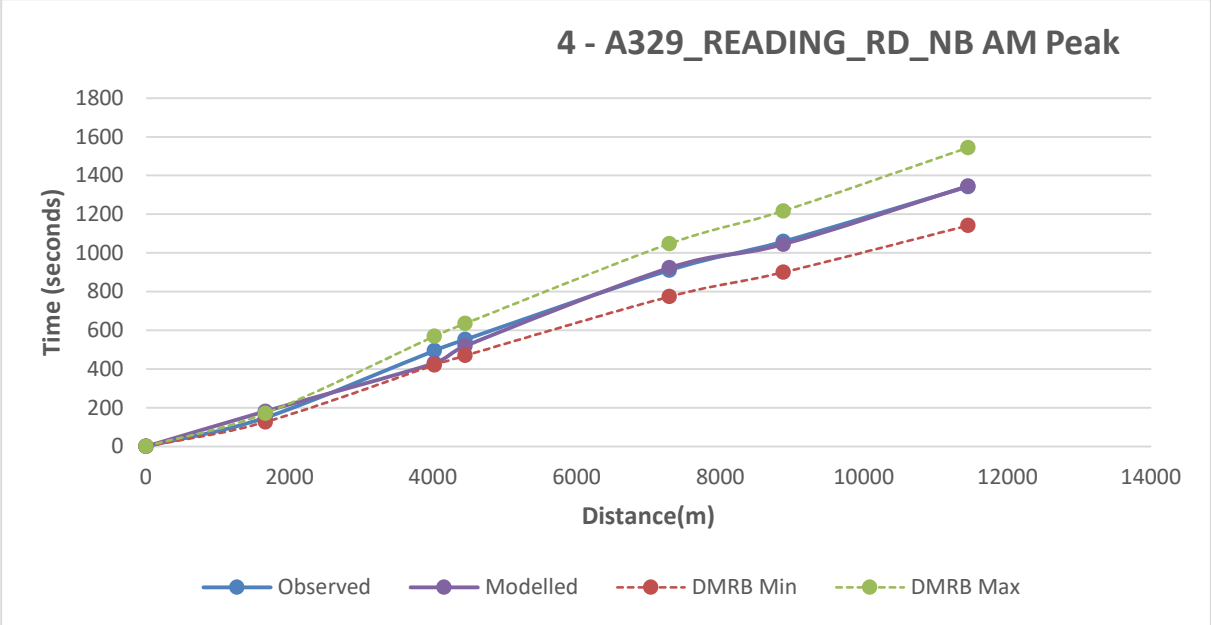


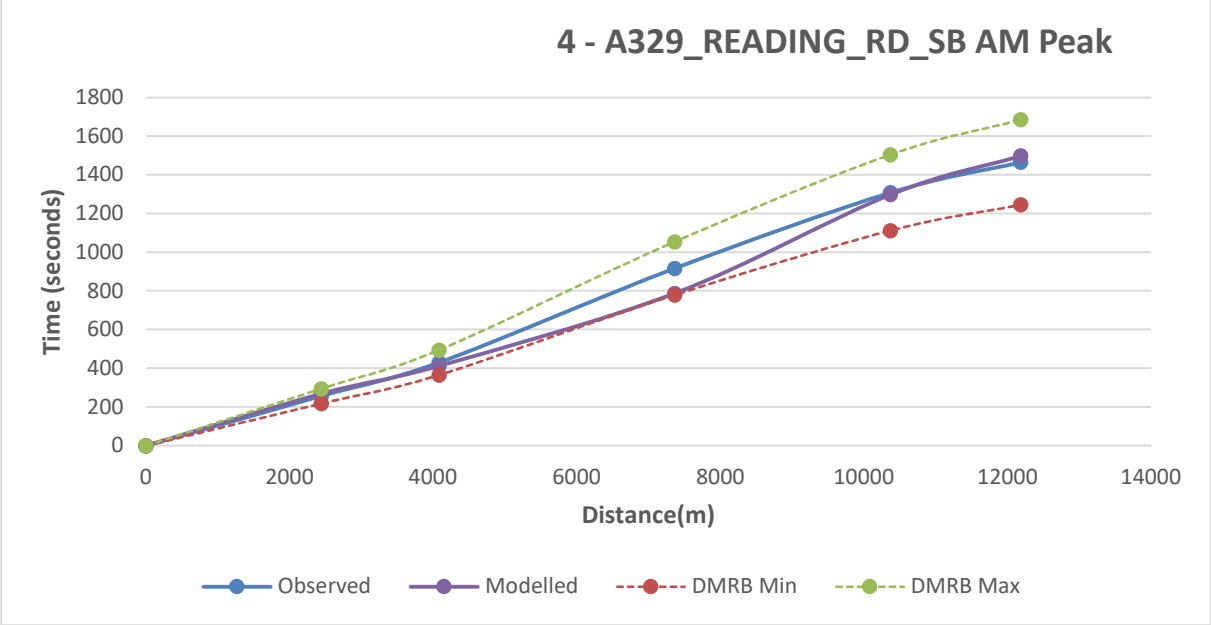

2 - M4EB AM Peak
Time (seconds)
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
30000
Distance(m)
Observed
Modelled
DMRB Min
DMRB Max

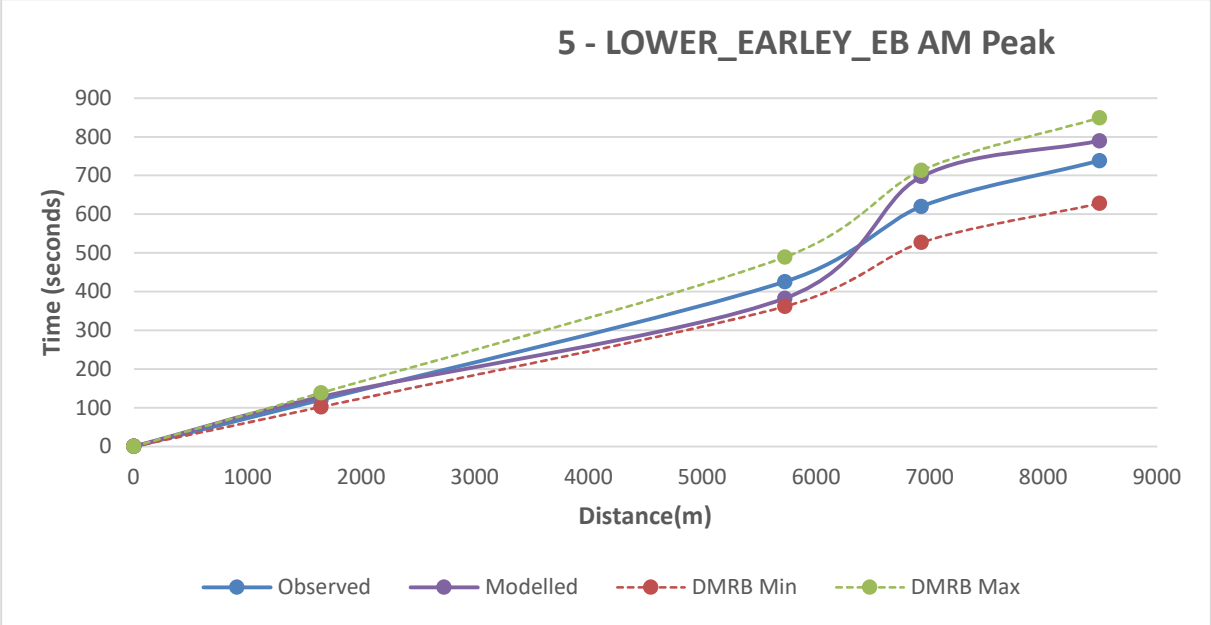

2 - M4WB AM Peak
Time (seconds)
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
30000
Distance(m)
Observed
Modelled
DMRB Min
DMRB Max

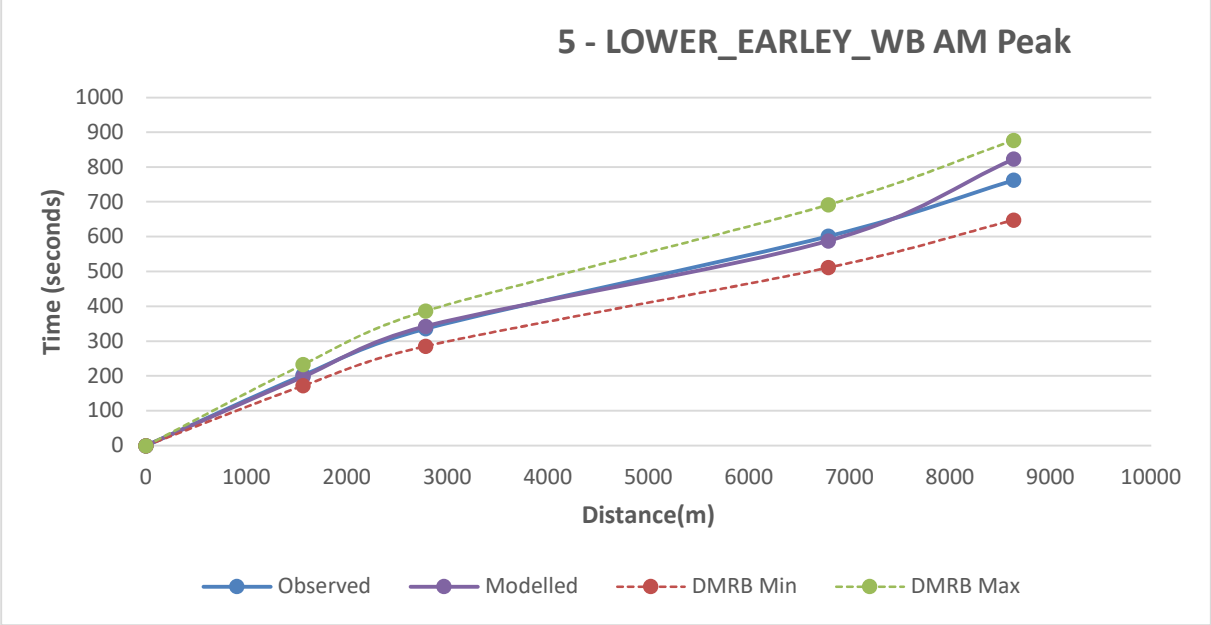

3 - A329MSB AM Peak
Time (seconds)
800
700
600
500
400
300
200
100
0
0
2000
4000
6000
8000
10000
12000
14000
16000
Distance(m)
Observed
Modelled
DMRB Min
DMRB Max

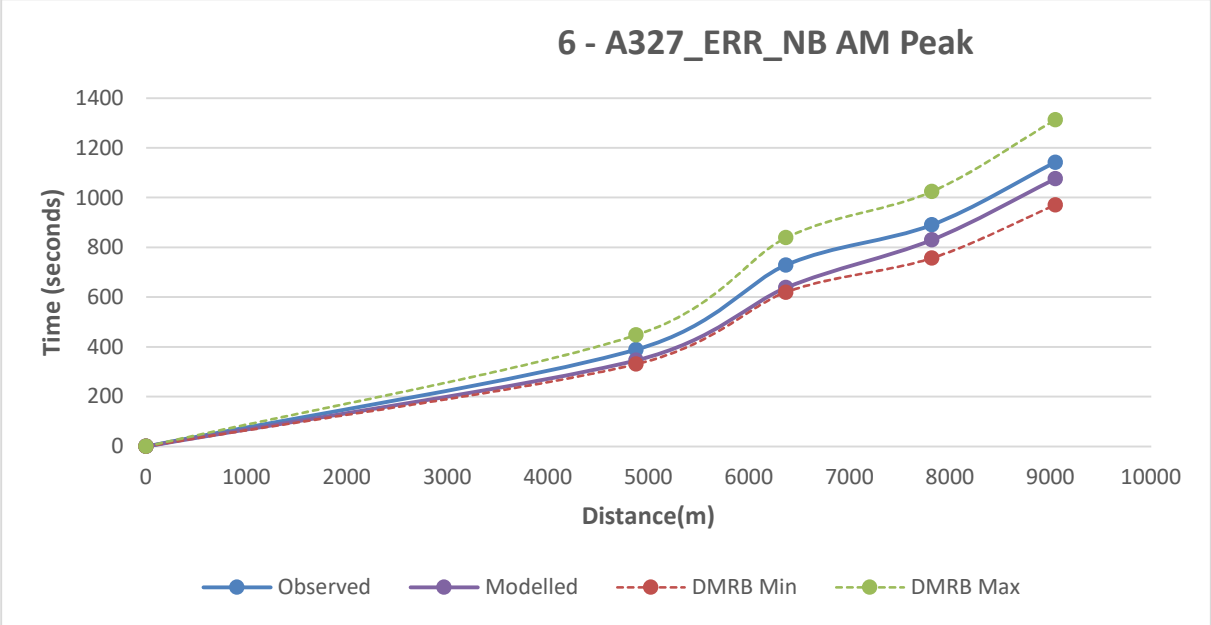

3 - A329MNB AM Peak
Time (seconds)
800
700
600
500
400
300
200
100
0
0
2000
4000
6000
8000
10000
12000
14000
16000
Distance(m)
Observed
Modelled
DMRB Min
DMRB Max

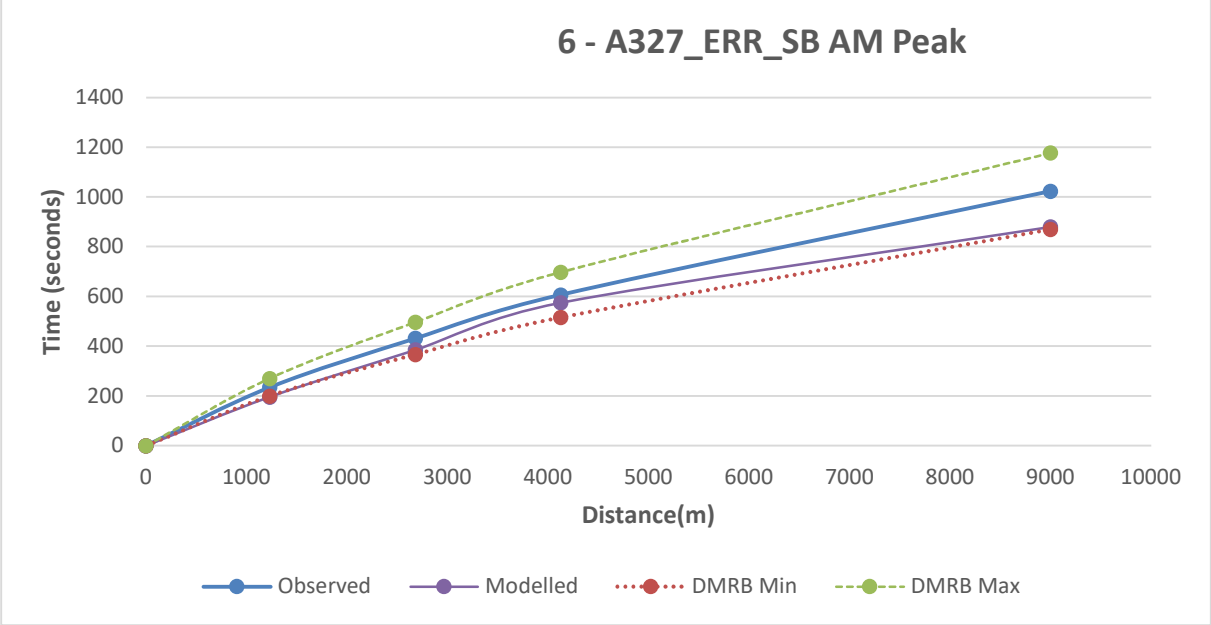

4 - A329_READING_RD_NB AM Peak
Time (seconds)
1800
1600
1400
1200
1000
800
600
400
200
0
0
2000
4000
6000
8000
10000
12000
14000
Distance(m)
Observed
Modelled
DMRB Min
DMRB Max

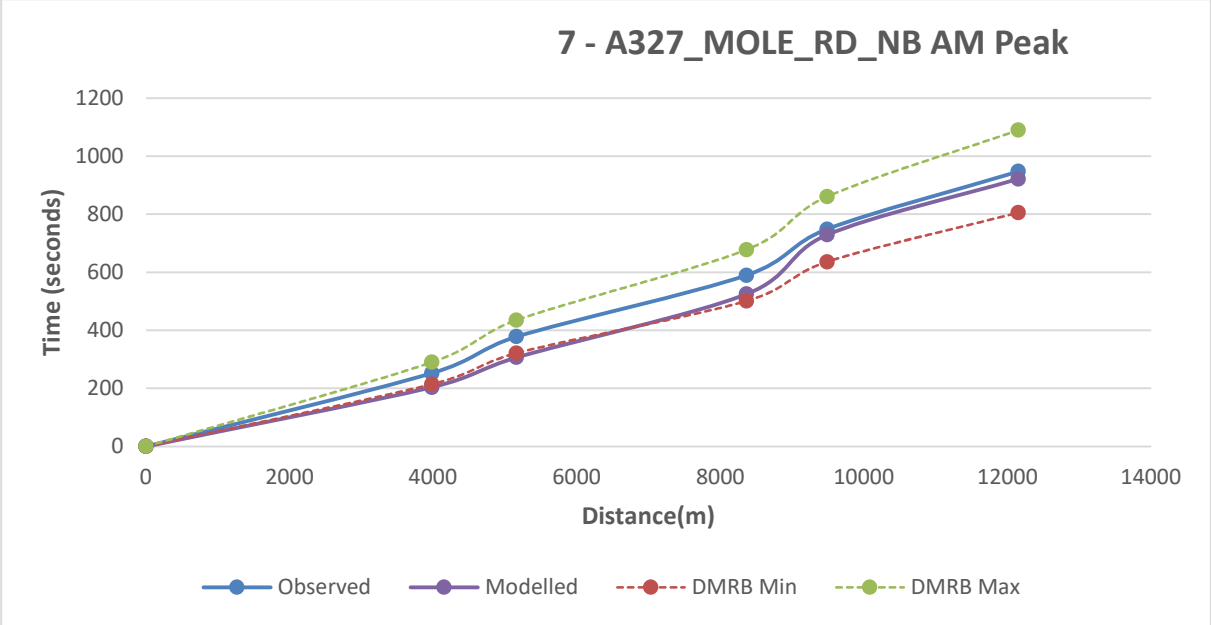

4 - A329_READING_RD_SB AM Peak
Time (seconds)
1800
1600
1400
1200
1000
800
600
400
200
0
0
2000
4000
6000
8000
10000
12000
14000
Distance(m)
Observed
Modelled
DMRB Min
DMRB Max

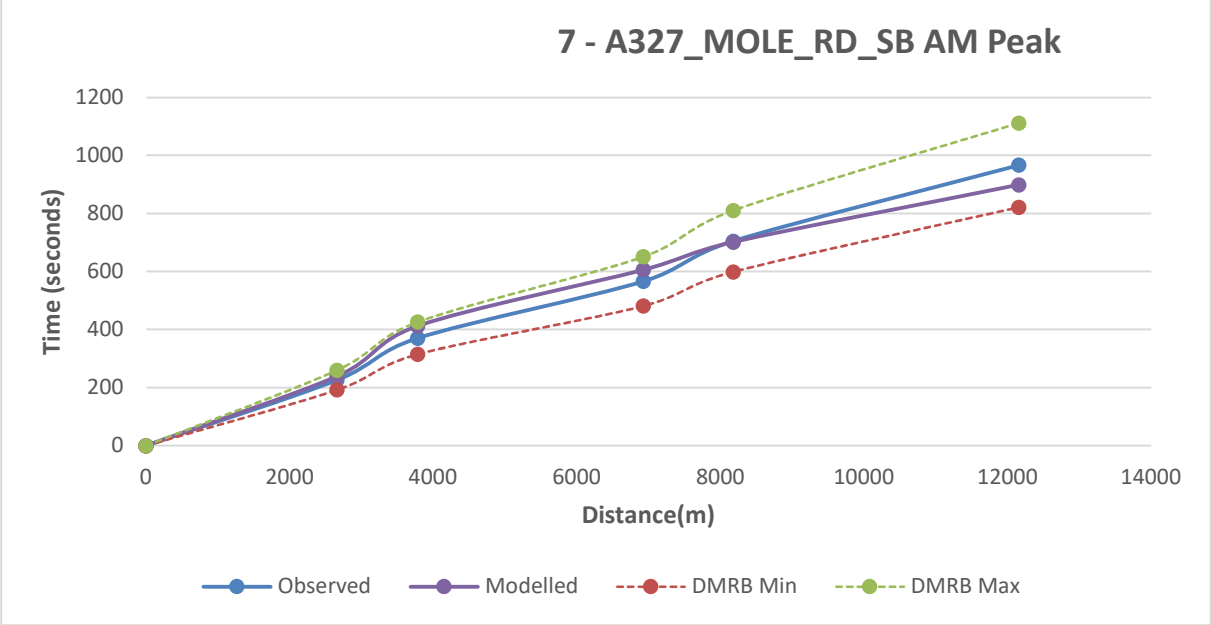

5 - LOWER_EARLEY_EB AM Peak
Time (seconds)
900
800
700
600
500
400
300
200
100
0
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
Distance(m)
Observed
Modelled
DMRB Min
DMRB Max

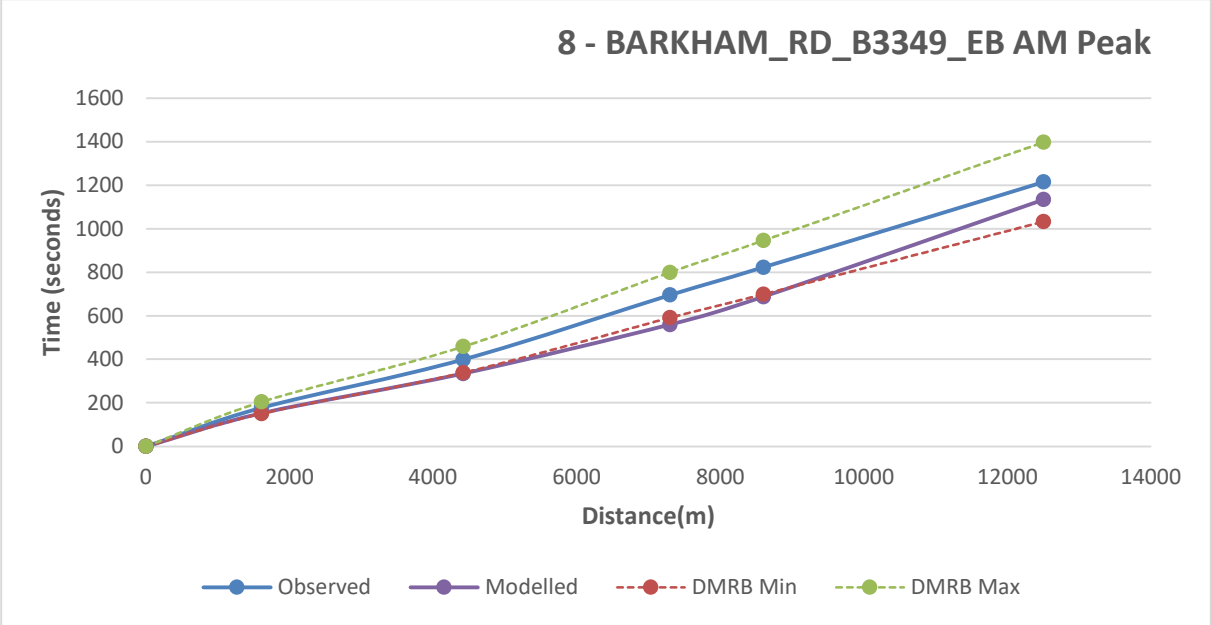

5 - LOWER_EARLEY_WB AM Peak
Time (seconds)
1000
900
800
700
600
500
400
300
200
100
0
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
Distance(m)
Observed
Modelled
DMRB Min
DMRB Max

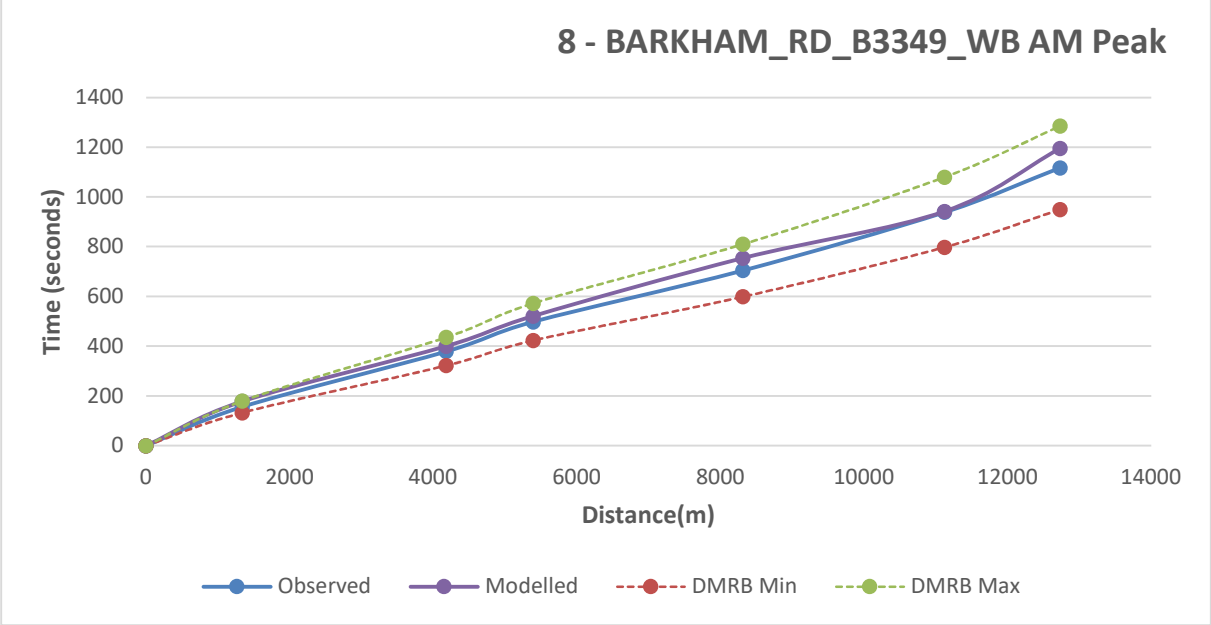

6 - A327_ERR_NB AM Peak
Time (seconds)
0
200
400
600
800
1000
1200
1400
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
Distance(m)
Observed
Modelled
DMRB Min
DMRB Max

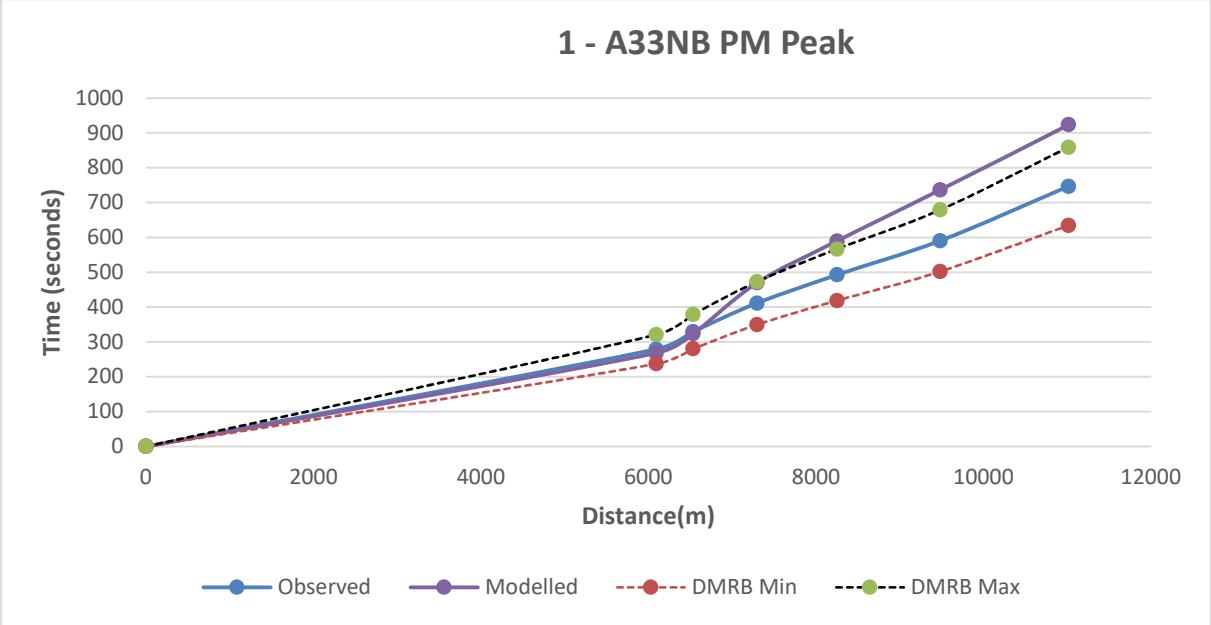

6 - A327_ERR_SB AM Peak
Time (seconds)
0
200
400
600
800
1000
1200
1400
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
Distance(m)
Observed
Modelled
DMRB Min
DMRB Max

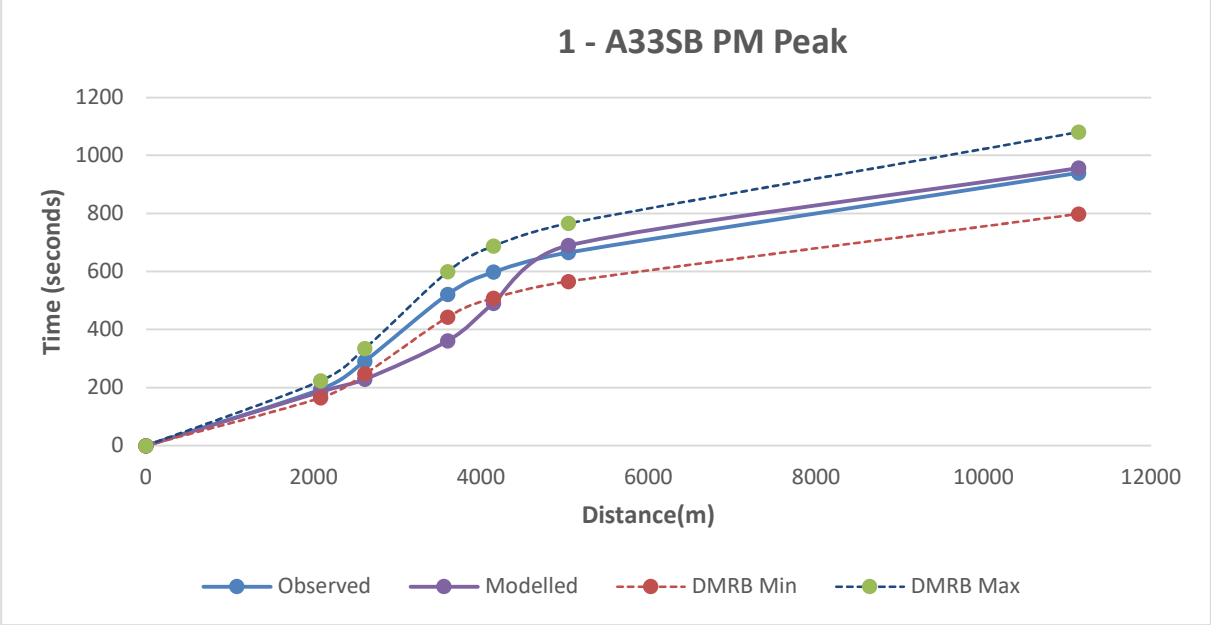

7 - A327_MOLE_RD_NB AM Peak
Time (seconds)
0
200
400
600
800
1000
1200
0
2000
4000
6000
8000
10000
12000
14000
Distance(m)
Observed
Modelled
DMRB Min
DMRB Max

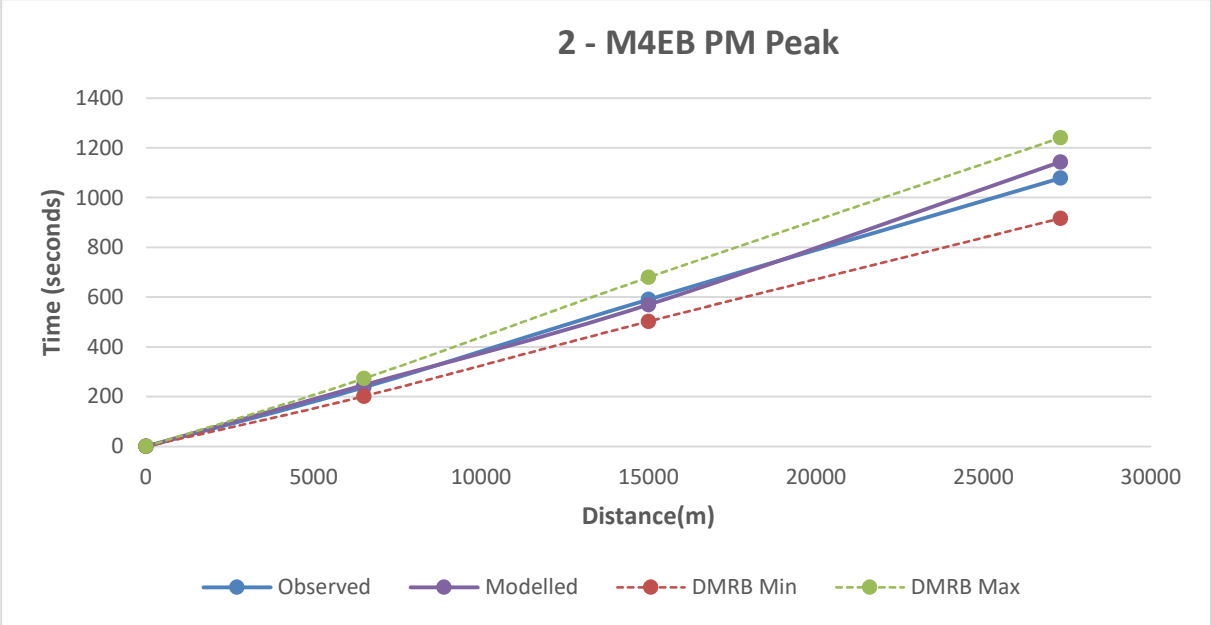

7 - A327_MOLE_RD_SB AM Peak
Time (seconds)
0
200
400
600
800
1000
1200
0
2000
4000
6000
8000
10000
12000
14000
Distance(m)
Observed
Modelled
DMRB Min
DMRB Max

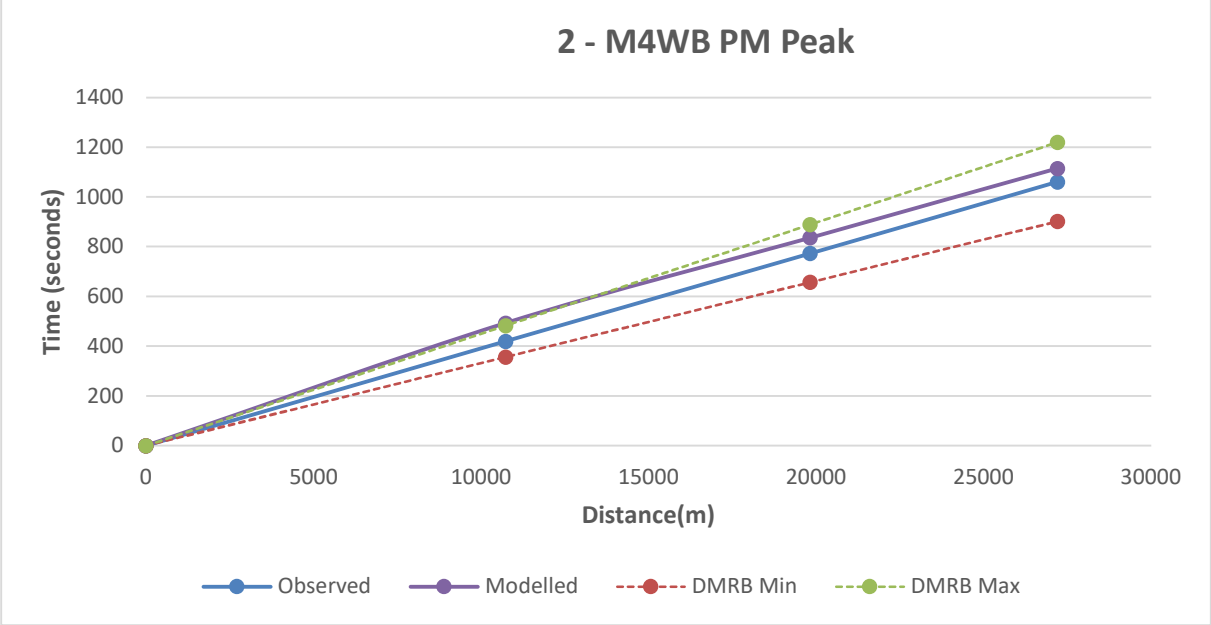

8 - BARKHAM_RD_B3349_EB AM Peak
Time (seconds)
1600
1400
1200
1000
800
600
400
200
0
0
2000
4000
6000
8000
10000
12000
14000
Distance(m)
Observed
Modelled
DMRB Min
DMRB Max

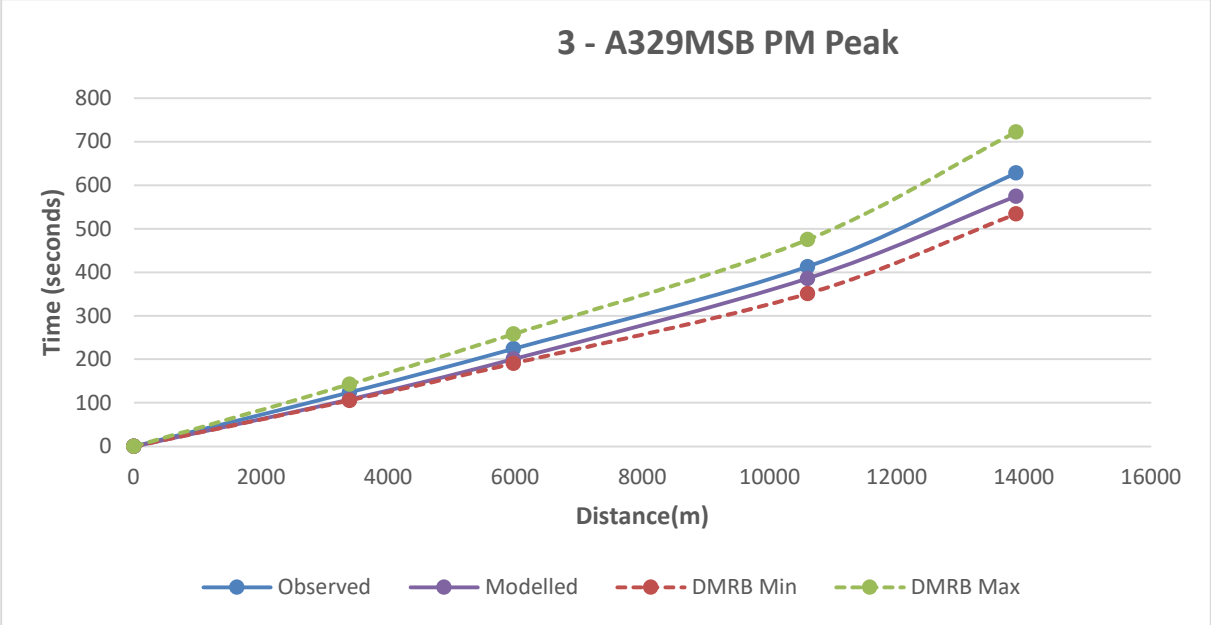

8 - BARKHAM_RD_B3349_WB AM Peak
Time (seconds)
1400
1200
1000
800
600
400
200
0
0
2000
4000
6000
8000
10000
12000
14000
Distance(m)
Observed
Modelled
DMRB Min
DMRB Max

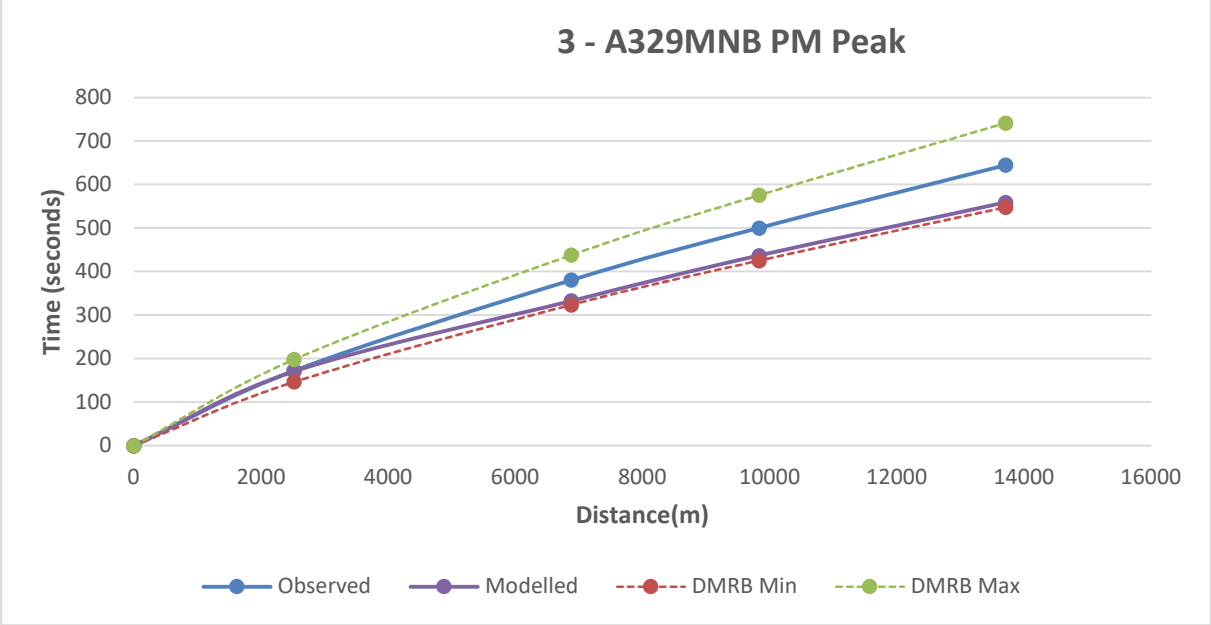

1 - A33NB PM Peak
Time (seconds)
1000
900
800
700
600
500
400
300
200
100
0
0
2000
4000
6000
8000
10000
12000
Distance(m)
Observed
Modelled
DMRB Min
DMRB Max

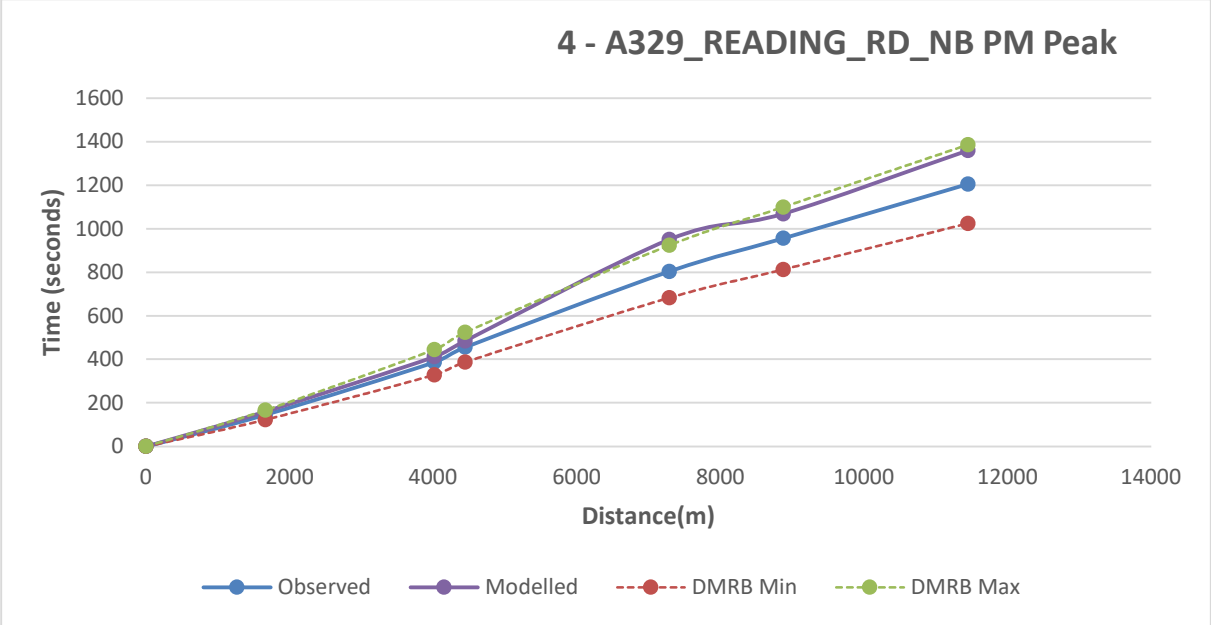

1 - A33SB PM Peak
Time (seconds)
1200
1000
800
600
400
200
0
0
2000
4000
6000
8000
10000
12000
Distance(m)
Observed
Modelled
DMRB Min
DMRB Max

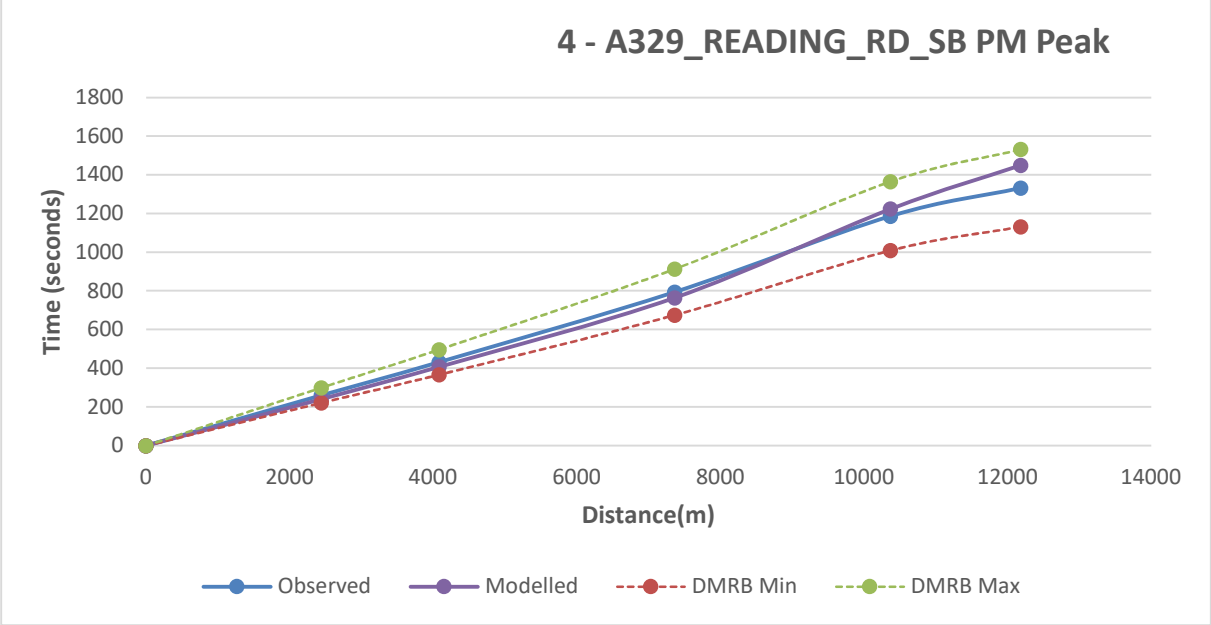

2 - M4EB PM Peak
Time (seconds)
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
30000
Distance(m)
Observed
Modelled
DMRB Min
DMRB Max

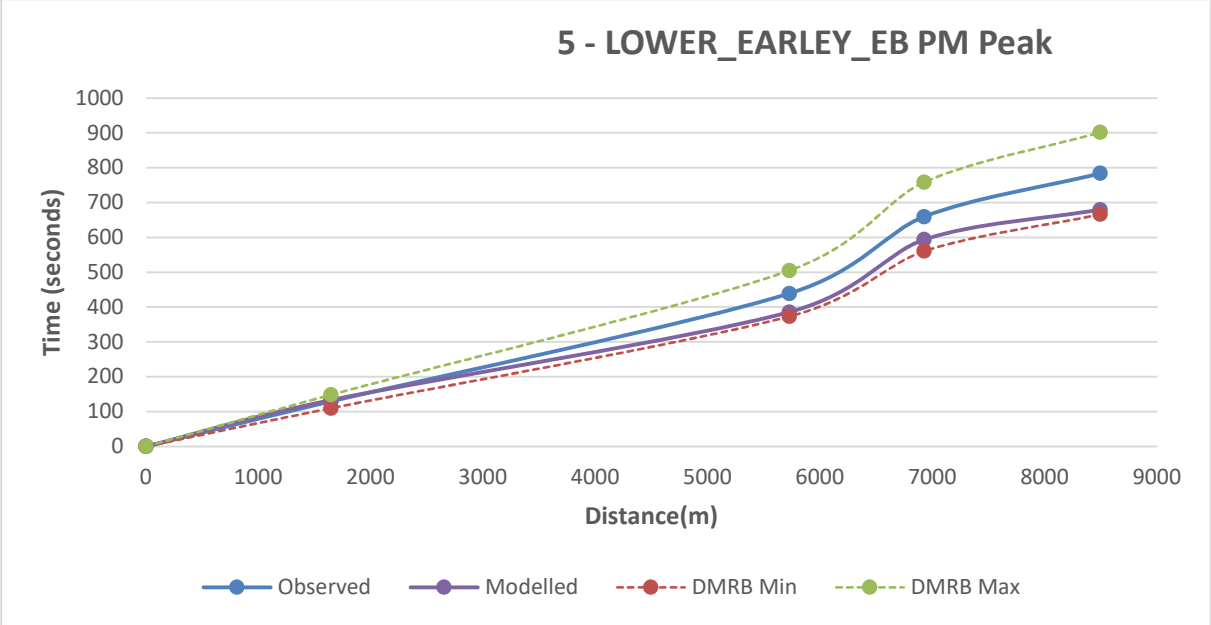

2 - M4WB PM Peak
Time (seconds)
1400
1200
1000
800
600
400
200
0
0
5000
10000
15000
20000
25000
30000
Distance(m)
Observed
Modelled
DMRB Min
DMRB Max

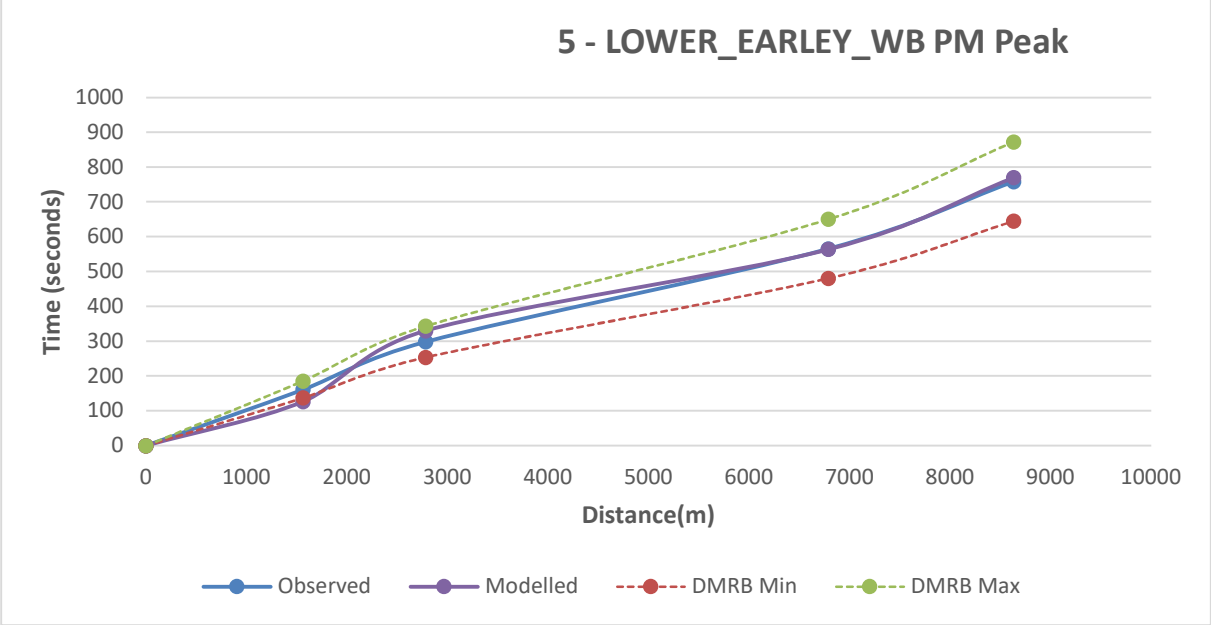

3 - A329MSB PM Peak
Time (seconds)
800
700
600
500
400
300
200
100
0
0
2000
4000
6000
8000
10000
12000
14000
16000
Distance(m)
Observed
Modelled
DMRB Min
DMRB Max

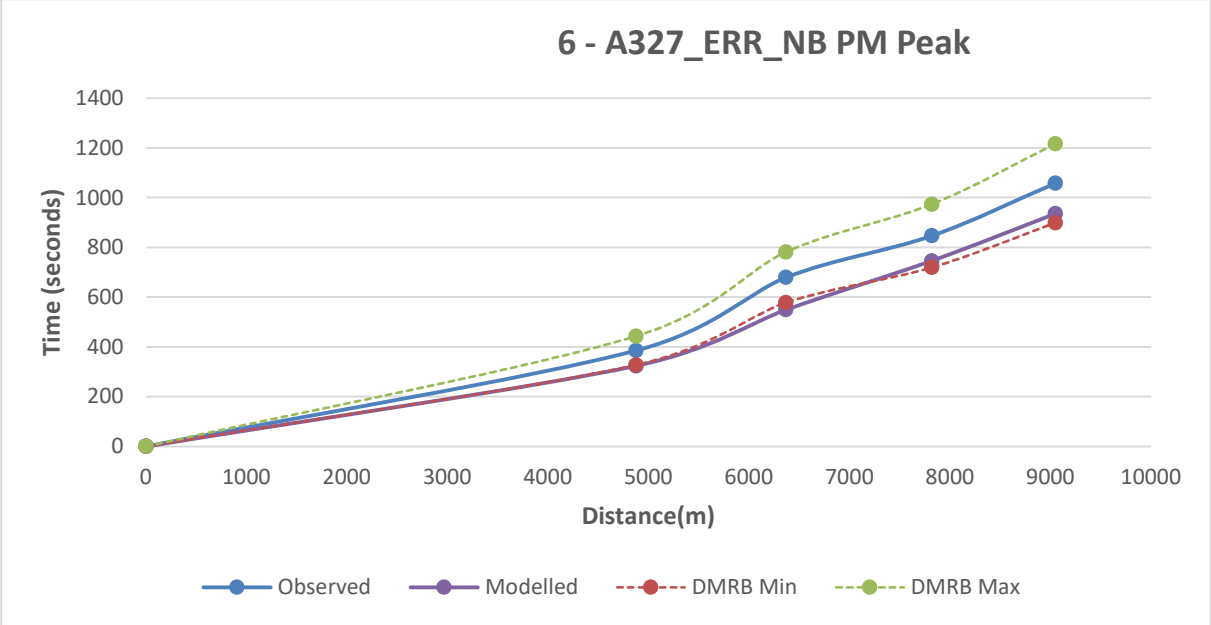

3 - A329MNB PM Peak
Time (seconds)
800
700
600
500
400
300
200
100
0
0
2000
4000
6000
8000
10000
12000
14000
16000
Distance(m)
Observed
Modelled
DMRB Min
DMRB Max

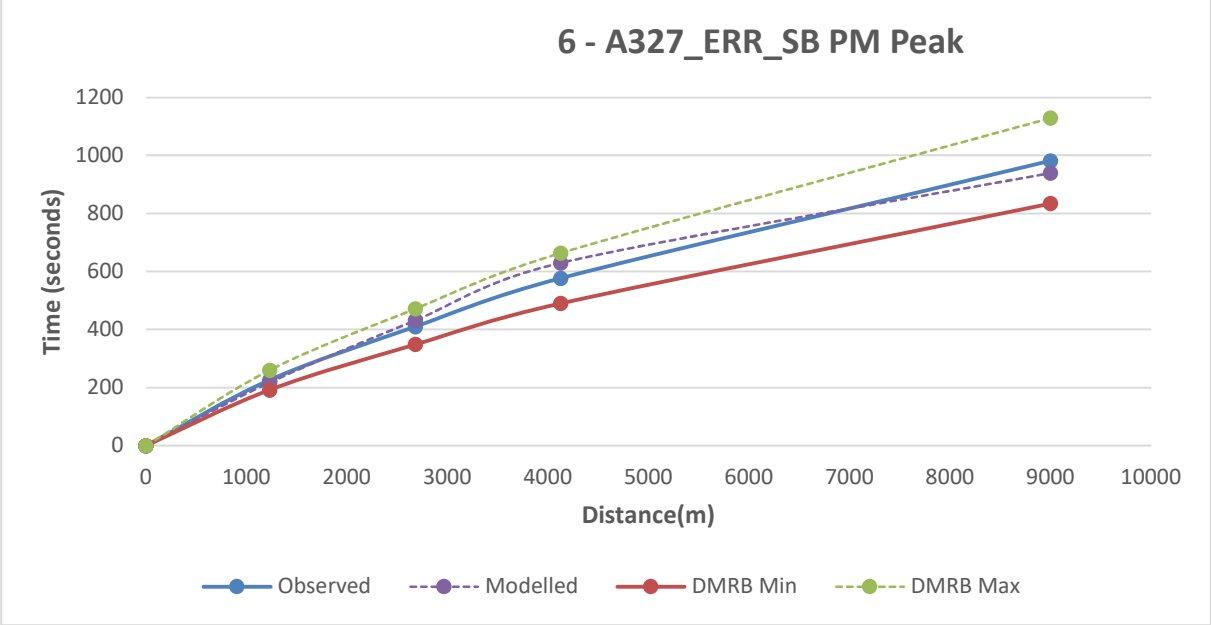

4 - A329_READING_RD_NB PM Peak
Time (seconds)
1600
1400
1200
1000
800
600
400
200
0
0
2000
4000
6000
8000
10000
12000
14000
Distance(m)
Observed
Modelled
DMRB Min
DMRB Max

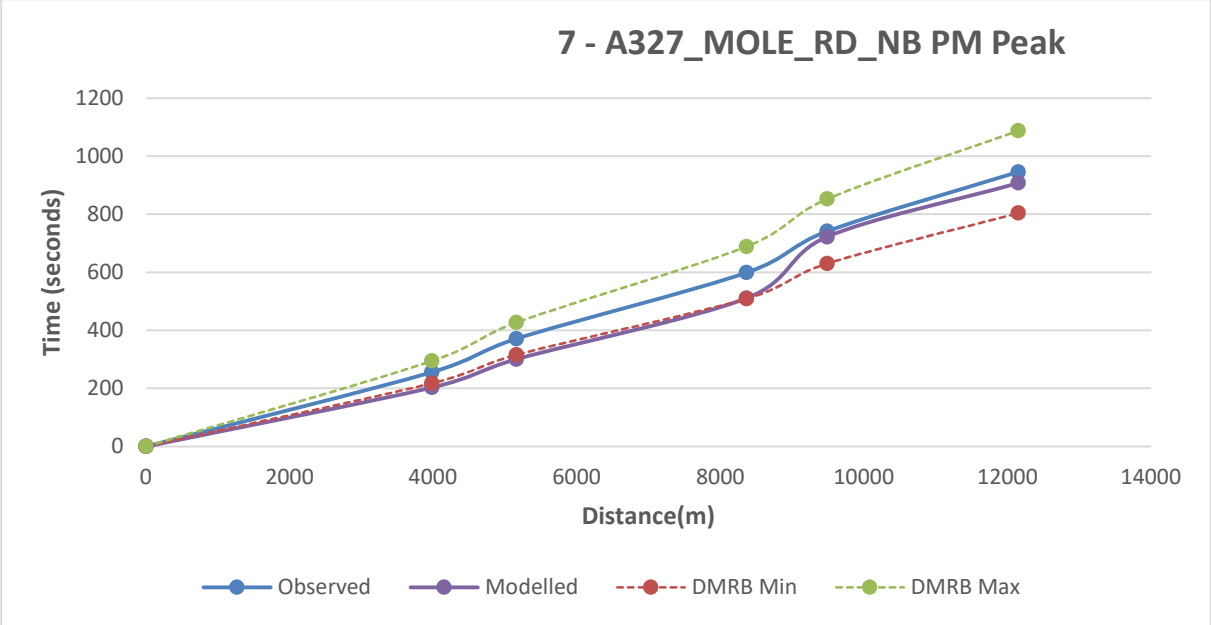

4 - A329_READING_RD_SB PM Peak
Time (seconds)
1800
1600
1400
1200
1000
800
600
400
200
0
0
2000
4000
6000
8000
10000
12000
14000
Distance(m)
Observed
Modelled
DMRB Min
DMRB Max

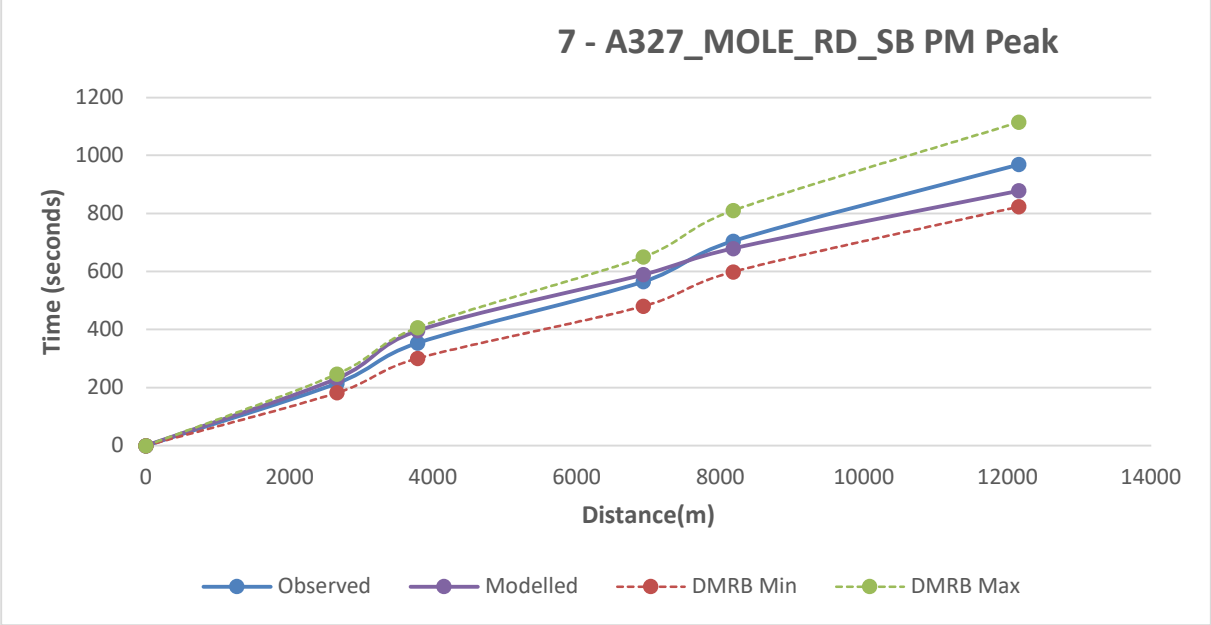

5 - LOWER_EARLEY_EB PM Peak
Time (seconds)
1000
900
800
700
600
500
400
300
200
100
0
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
Distance(m)
Observed
Modelled
DMRB Min
DMRB Max

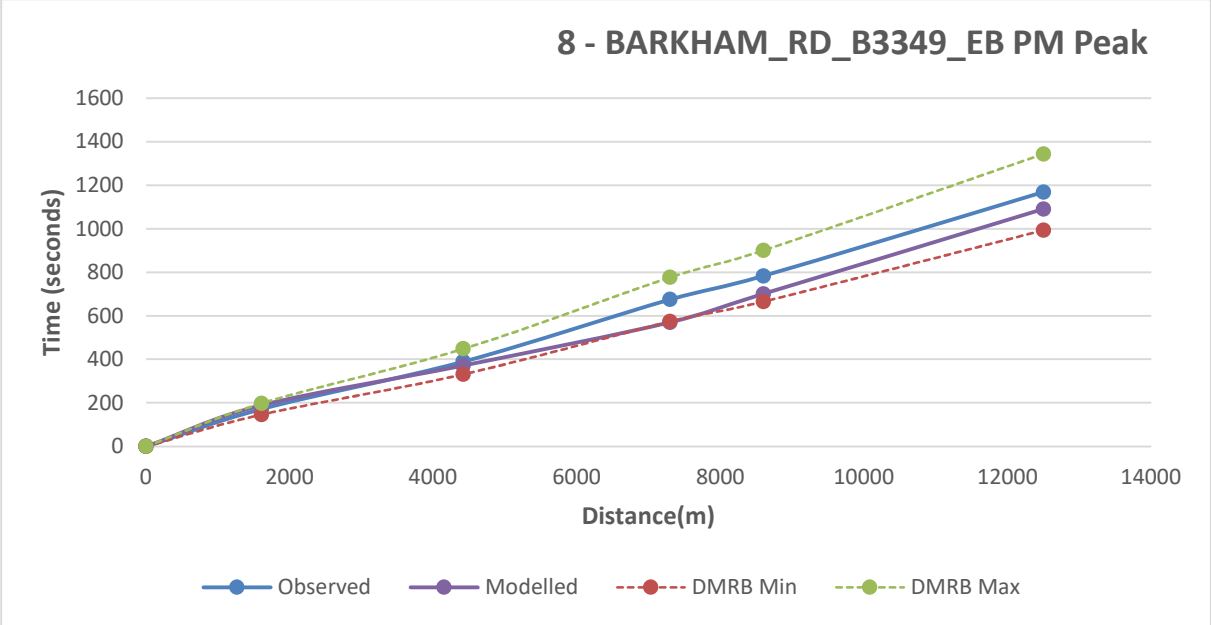

5 - LOWER_EARLEY_WB PM Peak
Time (seconds)
1000
900
800
700
600
500
400
300
200
100
0
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
Distance(m)
Observed
Modelled
DMRB Min
DMRB Max

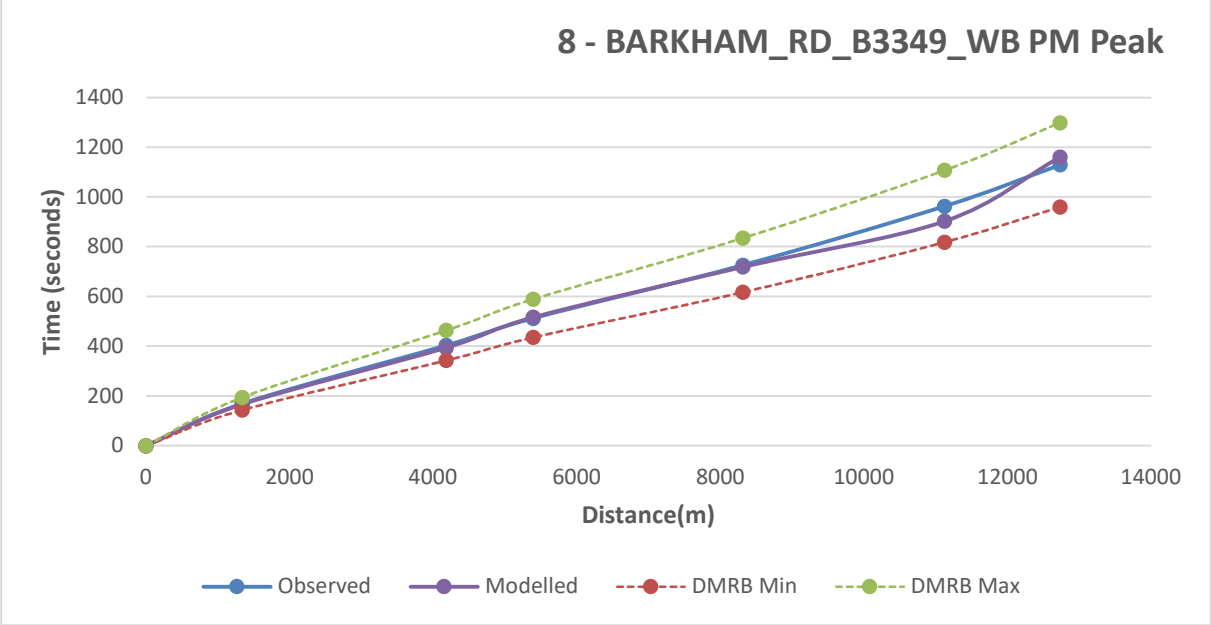

6 - A327_ERR_NB PM Peak
Time (seconds)
1400
1200
1000
800
600
400
200
0
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
Distance(m)
Observed
Modelled
DMRB Min
DMRB Max


6 - A327_ERR_SB PM Peak
Time (seconds)
1200
1000
800
600
400
200
0
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
Distance(m)
Observed
Modelled
DMRB Min
DMRB Max


7 - A327_MOLE_RD_NB PM Peak
Time (seconds)
0
200
400
600
800
1000
1200
0
2000
4000
6000
8000
10000
12000
14000
Distance(m)
Observed
Modelled
DMRB Min
DMRB Max

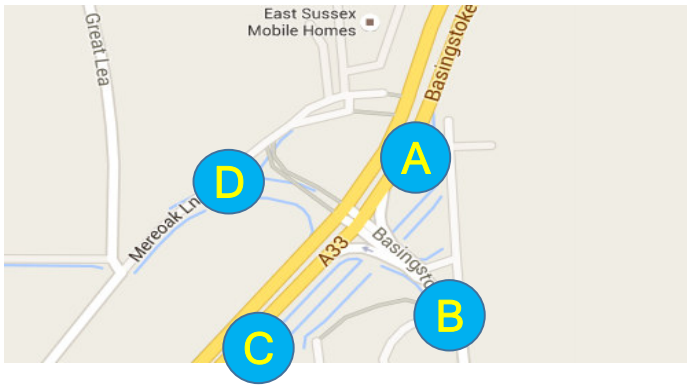

7 - A327_MOLE_RD_SB PM Peak
Time (seconds)
0
200
400
600
800
1000
1200
0
2000
4000
6000
8000
10000
12000
14000
Distance(m)
Observed
Modelled
DMRB Min
DMRB Max


8 - BARKHAM_RD_B3349_EB PM Peak
Time (seconds)
1600
1400
1200
1000
800
600
400
200
0
0
2000
4000
6000
8000
10000
12000
14000
Distance(m)
Observed
Modelled
DMRB Min
DMRB Max


8 - BARKHAM_RD_B3349_WB PM Peak
Time (seconds)
1400
1200
1000
800
600
400
200
0
0
2000
4000
6000
8000
10000
12000
14000
Distance(m)
Observed
Modelled
DMRB Min
DMRB Max

Appendix D Turning Flow Validation

Site 1- Basingstoke Road / Three Mile Cross



AM Observed					
	A	B	C	D	Sum
A	0	341	1561	0	1902
B	657	0	230	3	890
C	1690	172	0	0	1862
D	0	2	0	0	2
Sum	2347	515	1791	3	4656

PM Observed					
	A	B	C	D	Sum
A	0	493	1819	0	2312
B	481	0	216	2	699
C	1491	198	0	0	1689
D	0	0	0	0	0
Sum	1972	691	2035	2	4700

AM Modelled					
	A	B	C	D	Sum
A	0	429	1261	0	1690
B	637	0	212	0	849
C	1752	104	0	0	1856
D	0	0	0	0	0
Sum	2389	533	1473	0	4395

PM Modelled					
	A	B	C	D	Sum
A	0	401	1741	0	2142
B	471	0	85	0	556
C	1367	214	0	0	1581
D	0	0	0	0	0
Sum	1838	615	1826	0	4279

GEH Criteria				
	A	B	C	D
A	0	4	8	0
B	1	0	1	2
C	1	6	0	0
D	0	2	0	0

GEH Criteria				
	A	B	C	D
A	0	4	2	0
B	0	0	11	2
C	3	1	0	0
D	0	0	0	0

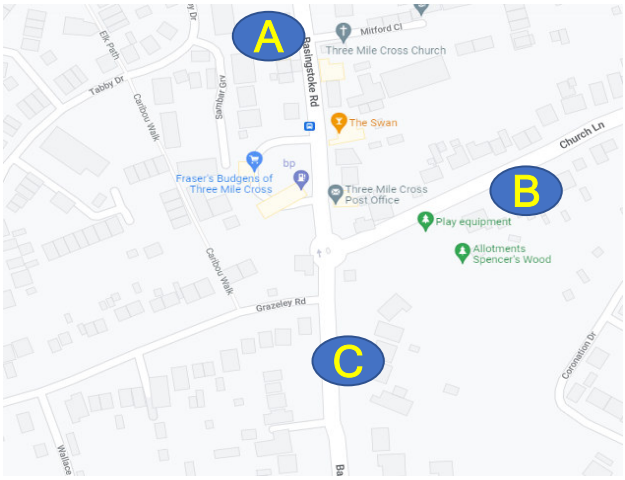
Relative Flow Criteria				
	A	B	C	D
A	Pass	Pass	Fail	Pass
B	Pass	Pass	Pass	Pass
C	Pass	Pass	Pass	Pass
D	Pass	Pass	Pass	Pass

Relative Flow Criteria				
	A	B	C	D
A	Pass	Pass	Pass	Pass
B	Pass	Pass	Fail	Pass
C	Pass	Pass	Pass	Pass
D	Pass	Pass	Pass	Pass

AM Summary	
Total Turns	16
GEH < 5.0	88%
DfT Flow Criteria	94%

PM Summary	
Total Turns	16
GEH < 5.0	94%
DfT Flow Criteria	94%

Site 2 - Basingstoke Road / Church Lane



AM Observed				
	A	B	C	Sum
A	0	202	304	506
B	314	1	93	408
C	496	153	0	649
Sum	810	356	397	1563

PM Observed				
	A	B	C	Sum
A	1	325	338	664
B	224	0	86	310
C	488	84	1	573
Sum	713	409	425	1547

AM Modelled				
	A	B	C	Sum
A	0	156	374	529
B	461	0	183	644
C	386	207	0	593
Sum	847	363	557	1767

PM Modelled				
	A	B	C	Sum
A	0	173	444	617
B	173	0	152	325
C	374	92	0	466
Sum	547	264	596	1408

GEH Criteria				
	A	B	C	D
A	0	3	4	
B	7	1	8	
C	5	4	0	
D				

GEH Criteria				
	A	B	C	D
A	1	10	5	
B	4	0	6	
C	5	1	1	
D				

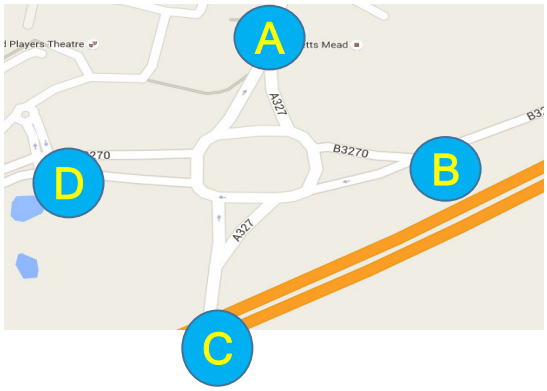
Relative Flow Criteria				
	A	B	C	D
A	Pass	Pass	Pass	
B	Fail	Pass	Pass	
C	Fail	Pass	Pass	
D				

Relative Flow Criteria				
	A	B	C	D
A	Pass	Fail	Fail	
B	Pass	Pass	Pass	
C	Fail	Pass	Pass	

AM Summary	
Total Turns	9
GEH < 5.0	67%
DfT Flow Criteria	78%

PM Summary	
Total Turns	9
GEH < 5.0	56%
DfT Flow Criteria	67%

Site 3 - Black Boy Roundabout



AM Observed					
	A	B	C	D	Sum
A	0	174	304	156	634
B	152	0	318	760	1230
C	265	540	0	573	1379
D	147	515	340	0	1001
Sum	564	1229	963	1489	4244

PM Observed					
	A	B	C	D	Sum
A	0	153	329	144	627
B	92	0	434	560	1086
C	230	401	0	406	1037
D	113	733	362	0	1208
Sum	435	1287	1125	1111	3958

AM Modelled					
	A	B	C	D	Sum
A	0	135	208	268	611
B	70	0	377	804	1251
C	414	460	0	580	1454
D	100	394	336	0	830
Sum	584	989	921	1652	4146

PM Modelled					
	A	B	C	D	Sum
A	0	126	295	226	647
B	48	0	356	552	956
C	325	366	0	294	985
D	72	696	437	0	1205
Sum	445	1188	1088	1072	3793

GEH Criteria				
	A	B	C	D
A	0	3	6	8
B	8	0	3	2
C	8	4	0	0
D	4	6	0	0

GEH Criteria				
	A	B	C	D
A	0	2	2	6
B	5	0	4	0
C	6	2	0	6
D	4	1	4	0

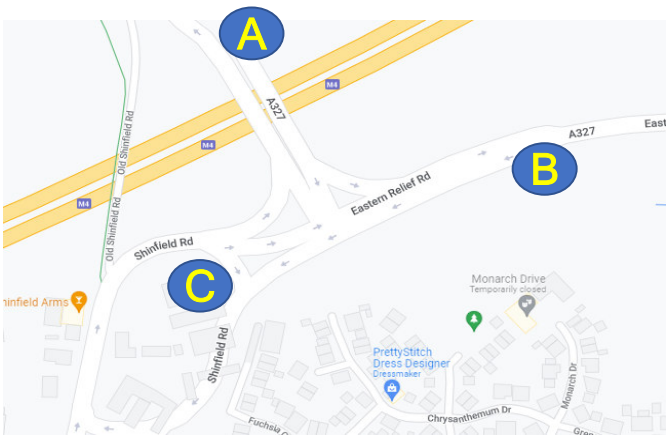
Relative Flow Criteria				
	A	B	C	D
A	Pass	Pass	Pass	Fail
B	Pass	Pass	Pass	Pass
C	Fail	Pass	Pass	Pass
D	Pass	Fail	Pass	Pass

Relative Flow Criteria				
	A	B	C	D
A	Pass	Pass	Pass	Pass
B	Pass	Pass	Pass	Pass
C	Pass	Pass	Pass	Fail
D	Pass	Pass	Pass	Pass

AM Summary	
Total Turns	16
GEH < 5.0	69%
DfT Flow Criteria	81%

PM Summary	
Total Turns	16
GEH < 5.0	75%
DfT Flow Criteria	94%

Site 4 - Black Boy Southern Junction



AM Observed				
	A	B	C	Sum
A	0	330	633	963
B	515	0	25	540
C	863	8	0	872
Sum	1379	338	658	2374

PM Observed				
	A	B	C	Sum
A	0	392	733	1125
B	432	0	15	447
C	605	8	0	613
Sum	1037	400	748	2185

AM Modelled				
	A	B	C	Sum
A	0	482	494	976
B	663	0	0	663
C	777	2	0	780
Sum	1440	485	494	2419

PM Modelled				
	A	B	C	Sum
A	0	559	570	1129
B	521	0	0	521
C	462	0	0	462
Sum	984	559	570	2112

GEH Criteria				
	A	B	C	D
A	0	8	6	
B	6	0	7	
C	3	3	0	
D				

GEH Criteria				
	A	B	C	D
A	0	8	6	
B	4	0	5	
C	6	4	0	
D				

Relative Flow Criteria				
	A	B	C	D
A	Pass	Fail	Fail	
B	Fail	Pass	Pass	
C	Pass	Pass	Pass	
D				

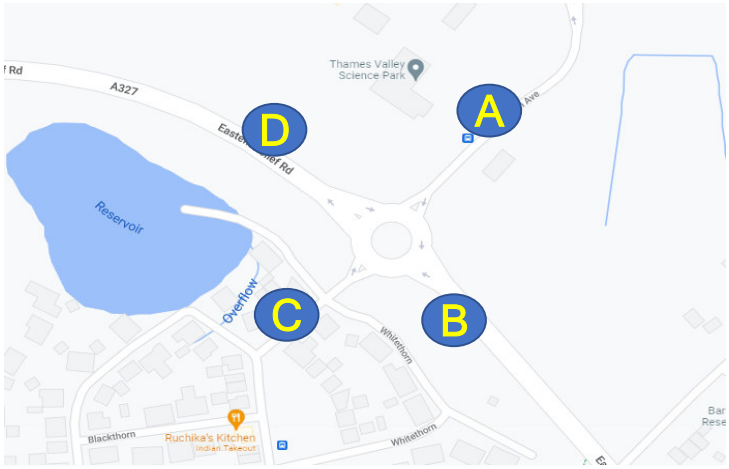
Relative Flow Criteria				
	A	B	C	D
A	Pass	Fail	Fail	
B	Pass	Pass	Pass	
C	Fail	Pass	Pass	

AM Summary	
Total Turns	9
GEH < 5.0	56%
DfT Flow Criteria	67%

PM Summary	
Total Turns	9
GEH < 5.0	56%
DfT Flow Criteria	67%

Site 5 - Eastern Science Park Access

3_9337
3_9337



AM Observed

	A	B	C	D	Sum
A	0	1	2	14	17
B	9	1	17	470	497
C	1	21	0	56	78
D	53	247	41	2	343
Sum	63	270	60	542	935

PM Observed

	A	B	C	D	Sum
A	0	7	3	57	67
B	4	2	8	356	370
C	0	6	1	36	43
D	11	360	39	1	411
Sum	15	375	51	450	891

AM Modelled

	A	B	C	D	Sum
A	0	6	0	0	6
B	76	0	3	532	611
C	0	7	0	112	119
D	30	426	29	0	485
Sum	105	438	32	644	1220

PM Modelled

	A	B	C	D	Sum
A	0	0	0	0	0
B	0	0	7	461	468
C	0	7	0	60	67
D	0	482	77	0	559
Sum	0	489	84	521	1094

GEH Criteria

	A	B	C	D
A	0	3	2	5
B	10	1	4	3
C	1	4	0	6
D	4	10	2	2

GEH Criteria

	A	B	C	D
A	0	4	2	11
B	3	2	0	5
C	0	0	1	3
D	5	6	5	1

Relative Flow Criteria

	A	B	C	D
A	Pass	Pass	Pass	Pass
B	Pass	Pass	Pass	Pass
C	Pass	Pass	Pass	Pass
D	Pass	Fail	Pass	Pass

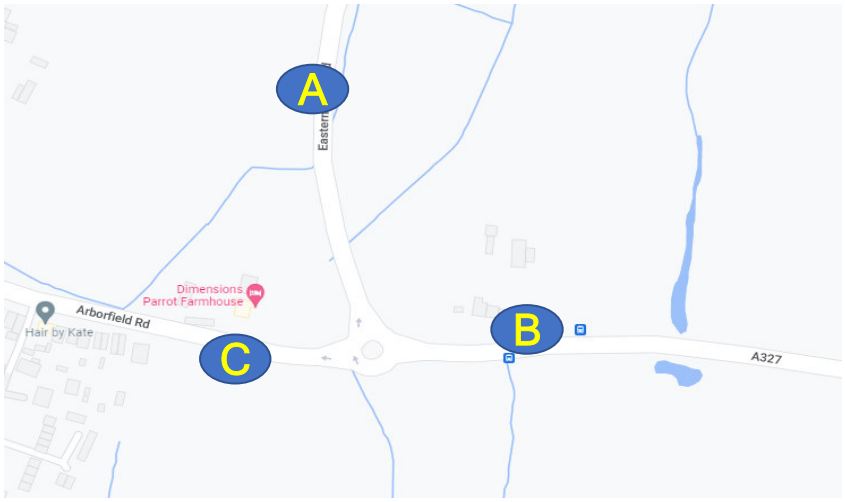
Relative Flow Criteria

	A	B	C	D
A	Pass	Pass	Pass	Pass
B	Pass	Pass	Pass	Fail
C	Pass	Pass	Pass	Pass
D	Pass	Fail	Pass	Pass

AM Summary	
Total Turns	16
GEH < 5.0	75%
DfT Flow Criteria	94%

PM Summary	
Total Turns	16
GEH < 5.0	81%
DfT Flow Criteria	88%

Site 6 Shinfield Relief Road / Arborfield Road



AM Observed				
	A	B	C	Sum
A	0	246	23	269
B	378	0	196	574
C	61	254	4	319
Sum	439	500	223	1162

PM Observed				
	A	B	C	Sum
A	2	354	21	377
B	327	0	272	599
C	41	191	1	233
Sum	370	545	294	1209

AM Modelled				
	A	B	C	Sum
A	0	332	107	438
B	330	0	335	664
C	281	277	0	558
Sum	578	602	484	0

PM Modelled				
	A	B	C	Sum
A	0	439	50	489
B	425	0	194	619
C	43	248	0	291
Sum	578	602	484	460

GEH Criteria				
	A	B	C	D
A	0	5	10	
B	3	0	9	
C	17	1	3	
D				

GEH Criteria				
	A	B	C	D
A	2	4	5	
B	5	0	5	
C	0	4	1	
D				

Relative Flow Criteria				
	A	B	C	D
A	Pass	Pass	Pass	
B	Pass	Pass	Fail	
C	Fail	Pass	Pass	
D				

Relative Flow Criteria				
	A	B	C	D
A	Pass	Pass	Pass	
B	Pass	Pass	Pass	
C	Pass	Pass	Pass	
D				

AM Summary	
Total Turns	9
GEH < 5.0	56%
DfT Flow Criteria	78%

PM Summary	
Total Turns	9
GEH < 5.0	78%
DfT Flow Criteria	100%

AM Observed				
	A	B	C	Sum
A	0	424	379	803
B	348	0	7	355
C	515	13	0	528
Sum	863	437	386	1686

PM Observed				
	A	B	C	Sum
A	0	308	420	
B	347	0	20	
C	439	8	2	
Sum				

AM Modelled				
	A	B	C	Sum
A	0	322	287	609
B	319	0	8	327
C	345	4	0	350
Sum	578	602	484	0

PM Modelled				
	A	B	C	Sum
A	0	338	350	687
B	384	0	0	384
C	235	1	0	236
Sum	578	602	484	460

GEH Criteria				
	A	B	C	D
A	0	5	5	
B	2	0	0	
C	8	3	0	
D				

GEH Criteria				
	A	B	C	D
A	0	2	4	
B	2	0	6	
C	11	3	2	
D				

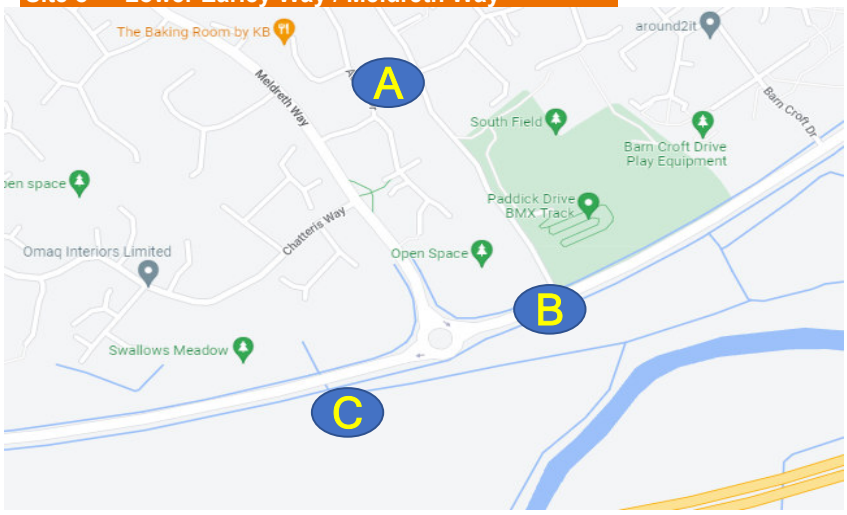
Relative Flow Criteria				
	A	B	C	D
A	Pass	Fail	Pass	
B	Pass	Pass	Pass	
C	Fail	Pass	Pass	
D				

Relative Flow Criteria				
	A	B	C	D
A	Pass	Pass	Pass	
B	Pass	Pass	Pass	
C	Fail	Pass	Pass	
D				

AM Summary	
Total Turns	9
GEH < 5.0	67%
DfT Flow Criteria	78%

PM Summary	
Total Turns	9
GEH < 5.0	78%
DfT Flow Criteria	89%

Site 8 - Lower Earley Way / Meldreth Way



AM Observed				
	A	B	C	Sum
A	2	129	45	176
B	69	1	872	942
C	24	722	0	746
	95	852	917	1864

PM Observed				
	A	B	C	Sum
A	2	77	22	101
B	140	1	754	895
C	44	759	1	804
Sum	186	837	777	1800

AM Modelled				
	A	B	C	Sum
A	0	164	29	193
B	95	0	753	848
C	1	706	0	707
Sum	91	850	795	191

PM Modelled				
	A	B	C	Sum
A	0	125	3	128
B	201	0	706	906
C	19	684	0	703
Sum	214	864	716	191

GEH Criteria				
	A	B	C	D
A	2	3	3	
B	3	1	4	
C	6	1	0	
D				

GEH Criteria				
	A	B	C	D
A	2	5	5	
B	5	1	2	
C	4	3	1	
D				

Relative Flow Criteria				
	A	B	C	D
A	Pass	Pass	Pass	
B	Pass	Pass	Pass	
C	Pass	Pass	Pass	
D				

Relative Flow Criteria				
	A	B	C	D
A	Pass	Pass	Pass	
B	Pass	Pass	Pass	
C	Pass	Pass	Pass	
D				

AM Summary	
Total Turns	9
GEH < 5.0	89%
DfT Flow Criteria	100%

PM Summary	
Total Turns	9
GEH < 5.0	89%
DfT Flow Criteria	100%

0_2047
0_2047
0_2047

Site 9 - Lower Earley Way/ Mill Lane

AM Observed

	A	B	C	D	Sum
A	3	136	679	277	1095
B	188	1	159	161	509
C	641	188	1	71	901
D	364	139	85	0	588
Sum	1196	464	924	509	3093

PM Observed

	A	B	C	D	Sum
A	3	143	677	327	1150
B	128	0	177	123	428
C	595	113	2	79	789
D	303	129	68	0	500
	1029	385	924	529	2867

AM Modelled

	A	B	C	D	Sum
A	0	106	602	262	970
B	183	0	153	152	488
C	659	183	0	71	914
D	362	156	84	0	602
Sum	1204	445	839	486	2974

PM Modelled

	A	B	C	D	Sum
A	0	125	677	294	1095
B	104	0	177	126	407
C	585	118	0	94	797
D	268	134	73	0	476
Sum	957	377	927	513	2775

GEH Criteria

	A	B	C	D
A	2	3	3	1
B	0	1	0	1
C	1	0	1	0
D	0	1	0	0

GEH Criteria

	A	B	C	D
A	2	2	0	2
B	2	0	0	0
C	0	1	2	2
D	2	0	1	0

Relative Flow Criteria

	A	B	C	D
A	Pass	Pass	Pass	Pass
B	Pass	Pass	Pass	Pass
C	Pass	Pass	Pass	Pass
D	Pass	Pass	Pass	Pass

Relative Flow Criteria

	A	B	C	D
A	Pass	Pass	Pass	Pass
B	Pass	Pass	Pass	Pass
C	Pass	Pass	Pass	Pass
D	Pass	Pass	Pass	Pass

AM Summary	
Total Turns	16
GEH < 5.0	100%
DfT Flow Criteria	100%

PM Summary	
Total Turns	16
GEH < 5.0	100%
DfT Flow Criteria	100%

Site 10 Winnersh Relief Road / Hatch Farm

AM Observed				
	A	B	C	Sum
A	0	284	810	1094
B	388	0	282	670
C	893	307	0	1200
	1281	591	1092	2964

PM Observed				
	A	B	C	Sum
A	0	319	909	1228
B	302	0	238	540
C	699	336	0	1035
Sum	1001	655	1147	2803

AM Modelled				
	A	B	C	Sum
A	0	173	670	843
B	435	0	300	735
C	918	286	0	1204
Sum	1353	459	970	2782

PM Modelled				
	A	B	C	Sum
A	0	232	897	1129
B	283	0	198	481
C	622	336	0	957
Sum	905	567	1095	2567

GEH Criteria				
	A	B	C	D
A	0	7	5	
B	2	0	1	
C	1	1	0	
D				

GEH Criteria				
	A	B	C	D
A	0	5	0	
B	1	0	3	
C	3	0	0	
D				

Relative Flow Criteria				
	A	B	C	D
A	Pass	Fail	Fail	
B	Pass	Pass	Pass	
C	Pass	Pass	Pass	
D				

Relative Flow Criteria				
	A	B	C	D
A	Pass	Pass	Pass	
B	Pass	Pass	Pass	
C	Pass	Pass	Pass	
D				

AM Summary	
Total Turns	9
GEH < 5.0	78%
DfT Flow Criteria	78%

PM Summary	
Total Turns	9
GEH < 5.0	89%
DfT Flow Criteria	100%

Site 11 - Showcase Roundabout

AM Observed

	A	B	C	D	Sum
A	1	286	583	151	1021
B	234	1	265	373	873
C	655	166	1	470	1292
D	223	309	265	5	802
Sum	1113	762	1114	999	3988

PM Observed

	A	B	C	D	Sum
A	1	337	803	189	1330
B	168	2	218	397	785
C	441	130	1	440	1012
D	212	368	210	11	801
Sum	822	837	1232	1037	3928

AM Modelled

	A	B	C	D	Sum
A	0	169	497	99	765
B	231	0	158	354	743
C	713	172	0	508	1393
D	287	449	190	0	926
Sum	1231	790	845	961	3827

PM Modelled

	A	B	C	D	Sum
A	0	392	725	223	1340
B	176	0	254	360	790
C	416	155	0	364	935
D	141	393	142	0	676
Sum	733	940	1121	947	3741

GEH Criteria

	A	B	C	D
A	1	8	4	5
B	0	1	7	1
C	2	0	1	2
D	4	7	5	3

GEH Criteria

	A	B	C	D
A	1	3	3	2
B	1	2	2	2
C	1	2	1	4
D	5	1	5	5

Relative Flow Criteria

	A	B	C	D
A	Pass	Fail	Pass	Pass
B	Pass	Pass	Fail	Pass
C	Pass	Pass	Pass	Pass
D	Pass	Fail	Pass	Pass

Relative Flow Criteria

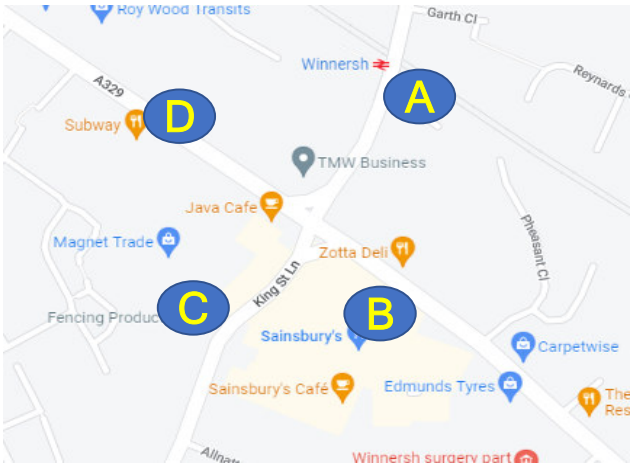
	A	B	C	D
A	Pass	Pass	Pass	Pass
B	Pass	Pass	Pass	Pass
C	Pass	Pass	Pass	Pass
D	Pass	Pass	Pass	Pass

AM Summary	
Total Turns	16
GEH < 5.0	81%
DfT Flow Criteria	81%

PM Summary	
Total Turns	16
GEH < 5.0	88%
DfT Flow Criteria	100%

8_8346
8_8346
8_8346

Site 15 Winnersh Crossroads



AM Observed

	A	B	C	D	Sum
A	0	149	161	169	479
B	139	0	37	326	502
C	263	38	0	59	360
D	107	289	48	0	444
Sum	509	476	246	554	1785

PM Observed

	A	B	C	D	Sum
A	0	142	145	129	416
B	139	0	38	307	484
C	201	12	0	45	258
D	57	416	42	0	515
Sum	397	570	225	481	1673

AM Modelled

	A	B	C	D	Sum
A	0	100	163	63	326
B	102	0	0	296	398
C	219	3	0	85	307
D	52	272	82	0	406
Sum	373	375	245	443	1436

PM Modelled

	A	B	C	D	Sum
A	0	125	187	65	377
B	16	0	0	268	284
C	291	2	0	107	400
D	1	384	109	0	494
Sum	308	511	296	440	1554

GEH Criteria

	A	B	C	D
A	0	4	0	10
B	3	0	9	2
C	3	8	0	3
D	6	1	4	0

GEH Criteria

	A	B	C	D
A	0	1	3	6
B	14	0	9	2
C	6	4	0	7
D	10	2	8	0

Relative Flow Criteria

	A	B	C	D
A	Pass	Pass	Pass	Fail
B	Pass	Pass	Pass	Pass
C	Pass	Pass	Pass	Pass
D	Pass	Pass	Pass	Pass

Relative Flow Criteria

	A	B	C	D
A	Pass	Pass	Pass	Pass
B	Fail	Pass	Pass	Pass
C	Pass	Pass	Pass	Pass
D	Pass	Pass	Pass	Pass

AM Summary	
Total Turns	16
GEH < 5.0	75%
DfT Flow Criteria	94%

PM Summary	
Total Turns	16
GEH < 5.0	56%
DfT Flow Criteria	94%

Site 16 Mill Lane / New Road Rbout

5_7065
5_7065
5_7065

AM Observed

	A	B	C	D	Sum
A	1	31	244	58	334
B	49	0	62	213	324
C	276	67	0	239	582
D	31	254	188	1	474
Sum	357	352	494	511	1714

PM Observed

	A	B	C	D	Sum
A	2	4	293	60	359
B	10	0	50	153	213
C	291	33	2	199	525
D	47	134	207	1	389
Sum	350	171	552	413	1486

AM Modelled

	A	B	C	D	Sum
A	0	0	446	38	484
B	0	0	60	138	198
C	406	33	0	312	751
D	27	196	223	0	445
Sum	433	229	728	488	1878

PM Modelled

	A	B	C	D	Sum
A	0	0	339	19	358
B	0	0	48	166	214
C	546	16	0	222	784
D	20	127	230	0	377
Sum	566	143	617	407	1734

GEH Criteria

	A	B	C	D
A	1	8	11	3
B	10	0	0	6
C	7	5	0	4
D	1	4	2	1

GEH Criteria

	A	B	C	D
A	2	3	3	7
B	4	0	0	1
C	12	3	2	2
D	5	1	2	1

Relative Flow Criteria

	A	B	C	D
A	Pass	Pass	Fail	Pass
B	Pass	Pass	Pass	Pass
C	Fail	Pass	Pass	Pass
D	Pass	Pass	Pass	Pass

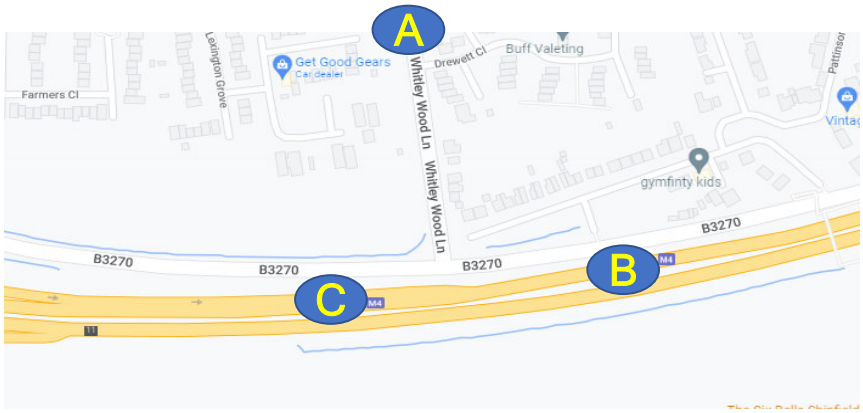
Relative Flow Criteria

	A	B	C	D
A	Pass	Pass	Pass	Pass
B	Pass	Pass	Pass	Pass
C	Fail	Pass	Pass	Pass
D	Pass	Pass	Pass	Pass

AM Summary	
Total Turns	16
GEH < 5.0	69%
DfT Flow Criteria	88%

PM Summary	
Total Turns	16
GEH < 5.0	88%
DfT Flow Criteria	94%

Site 18 B3270 / Whitley Wood Road



AM Observed				
	A	B	C	Sum
A	0	248	82	330
B	353	0	1007	1360
C	135	754	0	889
	488	1002	1089	2579

PM Observed				
	A	B	C	Sum
A	0	287	55	342
B	252	0	820	1072
C	115	893	0	1008
Sum	367	1180	875	2422

AM Modelled				
	A	B	C	Sum
A	0	139	183	321
B	452	0	1109	1562
C	26	930	0	956
Sum	479	1069	1292	2839

PM Modelled				
	A	B	C	Sum
A	0	160	168	328
B	279	0	828	1108
C	258	926	0	1184
Sum	538	1086	997	2620

GEH Criteria				
	A	B	C	D
A	0	8	9	
B	5	0	3	
C	12	6	0	
D				

GEH Criteria				
	A	B	C	D
A	0	8	11	
B	2	0	0	
C	10	1	0	
D				

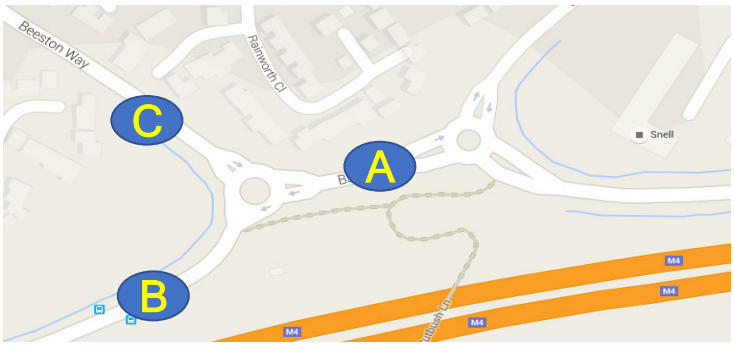
Relative Flow Criteria				
	A	B	C	D
A	Pass	Fail	Fail	
B	Pass	Pass	Pass	
C	Fail	Fail	Pass	
D				

Relative Flow Criteria				
	A	B	C	D
A	Pass	Fail	Fail	
B	Pass	Pass	Pass	
C	Fail	Pass	Pass	
D				

AM Summary	
Total Turns	9
GEH < 5.0	56%
DfT Flow Criteria	56%

PM Summary	
Total Turns	9
GEH < 5.0	67%
DfT Flow Criteria	67%

Site 17a Winnersh Relief Road / Hatch Farm



AM Observed				
	A	B	C	Sum
A	1	771	223	995
B	669	0	598	1267
C	150	442	1	593
	820	1213	822	2855

PM Observed				
	A	B	C	Sum
A	1	629	239	869
B	716	1	543	1260
C	157	451	0	608
Sum	874	1081	782	2737

AM Modelled				
	A	B	C	Sum
A	0	742	169	911
B	635	0	380	1015
C	208	515	0	724
Sum	843	1258	549	2649

PM Modelled				
	A	B	C	Sum
A	0	537	288	825
B	580	0	566	1145
C	276	430	0	705
Sum	855	967	854	2676

GEH Criteria				
	A	B	C	D
A	1	1	4	
B	1	0	10	
C	4	3	1	
D				

GEH Criteria				
	A	B	C	D
A	1	4	3	
B	5	1	1	
C	8	1	0	
D				

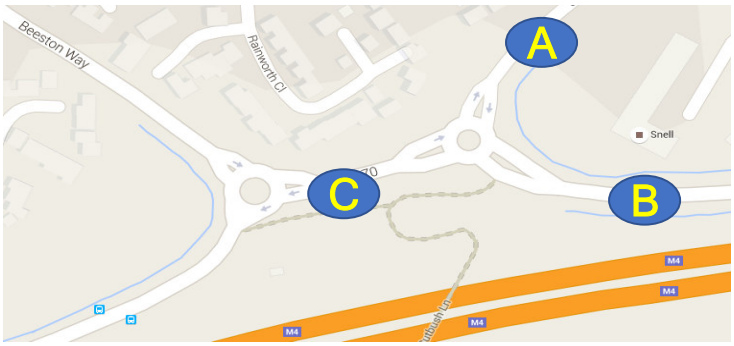
Relative Flow Criteria				
	A	B	C	D
A	Pass	Pass	Pass	
B	Pass	Pass	Fail	
C	Pass	Pass	Pass	
D				

Relative Flow Criteria				
	A	B	C	D
A	Pass	Pass	Pass	
B	Fail	Pass	Pass	
C	Fail	Pass	Pass	
D				

AM Summary	
Total Turns	9
GEH < 5.0	89%
DfT Flow Criteria	89%

PM Summary	
Total Turns	9
GEH < 5.0	78%
DfT Flow Criteria	78%

Site 17b Winnersh Relief Road / Hatch Farm



AM Observed				
	A	B	C	Sum
A	0	26	106	132
B	23	1	888	912
C	106	708	1	815
	129	735	995	1859

PM Observed				
	A	B	C	Sum
A	0	37	111	148
B	22	2	747	771
C	118	759	2	879
Sum	140	798	860	1798

AM Modelled				
	A	B	C	Sum
A	0	0	129	129
B	0	0	782	782
C	136	707	0	843
Sum	136	707	911	1754

PM Modelled				
	A	B	C	Sum
A	0	0	117	117
B	0	0	709	709
C	152	703	0	855
Sum	152	703	825	1681

GEH Criteria				
	A	B	C	D
A	0	7	2	
B	7	1	4	
C	3	0	1	
D				

GEH Criteria				
	A	B	C	D
A	0	9	1	
B	7	2	1	
C	3	2	2	
D				

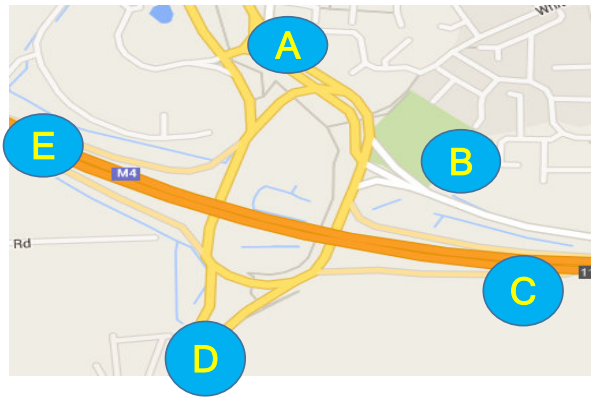
Relative Flow Criteria				
	A	B	C	D
A	Pass	Pass	Pass	
B	Pass	Pass	Pass	
C	Pass	Pass	Pass	
D				

Relative Flow Criteria				
	A	B	C	D
A	Pass	Pass	Pass	
B	Pass	Pass	Pass	
C	Pass	Pass	Pass	
D				

AM Summary	
Total Turns	9
GEH < 5.0	78%
DfT Flow Criteria	100%

PM Summary	
Total Turns	9
GEH < 5.0	78%
DfT Flow Criteria	100%

Site 19 - M4 J11



AM Observed						
	A	B	C	D	E	Sum
A	0	215	317	625	489	1645
B	457	0	174	270	321	1222
C	784	59	0	585	0	1428
D	1085	259	707	0	469	2521
E	614	337	0	364	0	1315
Sum	2940	870	1198	1843	1279	8131

PM Observed						
	A	B	C	D	E	Sum
A	0	315	488	1106	673	2582
B	281	0	134	250	338	1003
C	694	60	0	552	0	1306
D	786	192	637	0	347	1962
E	383	434	0	375	0	1192
Sum	2145	870	1198	1843	1279	7335

AM Modelled						
	A	B	C	D	E	Sum
A		297	426	571	404	1698
B	477	0	179	255	370	1281
C	785	54	0	579	0	1418
D	1161	239	543	0	446	2389
E	592	391	0	286	0	1269
Sum	3015	870	1198	1843	1279	8205

PM Modelled						
	A	B	C	D	E	Sum
A	0	427	550	1021	497	2495
B	155	0	161	223	464	1003
C	628	67	0	527	0	1222
D	771	234	496	0	336	1837
E	344	486	0	360	0	1190
Sum	1898	870	1198	1843	1279	7088

GEH Criteria					
	A	B	C	D	E
A	0	5	6	2	4
B	1	0	0	1	3
C	0	1	0	0	0
D	2	1	7	0	1
E	1	3	0	4	0

GEH Criteria					
	A	B	C	D	E
A	0	6	3	3	7
B	9	0	2	2	6
C	3	1	0	1	0
D	1	3	6	0	1
E	2	2	0	1	0

Relative Flow Criteria					
	A	B	C	D	E
A	Pass	Pass	Fail	Pass	Pass
B	Pass	Pass	Pass	Pass	Pass
C	Pass	Pass	Pass	Pass	Pass
D	Pass	Pass	Fail	Pass	Pass
E	Pass	Pass	Pass	Pass	Pass

Relative Flow Criteria					
	A	B	C	D	E
A	Pass	Fail	Pass	Pass	Fail
B	Fail	Pass	Pass	Pass	Fail
C	Pass	Pass	Pass	Pass	Pass
D	Pass	Pass	Fail	Pass	Pass
E	Pass	Pass	Pass	Pass	Pass

AM Summary	
Total Turns	25
GEH < 5.0	88%
DfT Flow Criteria	92%

PM Summary	
Total Turns	25
GEH < 5.0	80%
DfT Flow Criteria	80%