A303 Amesbury to Berwick Down

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Transport Model Package, Appendix B to the Combined Modelling and Appraisal Report (Application Document 7.5)

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Foreword

The A303 Amesbury to Berwick Down scheme ("the Scheme") forms part of a programme of improvements for upgrading the A303/A358 corridor, improving this vital connection between the South West and London and the South East and including the upgrade of remaining single carriageway sections on the route to dual carriageway. This investment is stated as a priority project in the National Infrastructure Plan and Government's commitment is confirmed in the Road Investment Strategy (2015-2020). Subject to achieving an approved Development Consent Order (DCO), preliminary works are planned to start in 2020 with the main construction works following in 2021, and the Scheme is due to open to traffic in 2026.

Objectives for the Scheme have been formulated both to address identified problems and to take advantage of the opportunities that new infrastructure would provide. The objectives are defined by the Department for Transport (DfT):

a. **Transport:** To create a high quality reliable route between the South East and the South West that meets the future needs of traffic;
b. **Economic Growth:** To enable growth in jobs and housing by providing a free flowing and reliable connection between the South East and the South West.
c. **Cultural Heritage:** To help conserve and enhance the World Heritage Site and to make it easier to reach and explore; and
d. **Environment and Community:** To improve biodiversity and provide a positive legacy for nearby communities.

The objectives would be achieved by providing a high quality, two-lane dual carriageway on the A303 trunk road between Amesbury and Berwick Down in Wiltshire. The Scheme would resolve traffic problems and, at the same time, protect and enhance the Stonehenge, Avebury and Associated Sites World Heritage Site ("WHS"). The Scheme would be approximately 8 miles (13km) long and comprise the following key components:

a. a northern bypass of Winterbourne Stoke with a viaduct over the River Till valley;
b. a new junction between the A303 and A360 to the west of and outside the WHS, replacing the existing Longbarrow roundabout;
c. a tunnel approximately 2 miles (3.3km) in length past Stonehenge; and
d. a new junction between the A303 and A345 at the existing Countess roundabout.

The Transport Model Package explains how the transport model was developed and demonstrates its performance in the base year through comparisons against observed data. The Transport Model Package is one element of the Combined Modelling and Appraisal (ComMA) Report (Application Document 7.5), which documents the transport modelling and economic assessment process for transport schemes.

Executive summary

The A303 Amesbury to Berwick Down scheme involves the dualling of the first single-carriageway section of A303 encountered after the M3, including the construction of a tunnel approximately 2 miles (3.3km) long as the road passes Stonehenge, the construction of a northern bypass of Winterbourne Stoke and the construction of a flyover at Countess roundabout. The Scheme is one of three A303 / A358 corridor schemes that have been prioritised within the first Road Investment Strategy (RIS) period. Delivery of the RIS is the responsibility of Highways England.

A transport model of the A303 and local roads in the vicinity of the Scheme has been developed, refining the previous stage model through the update of local demand following a comprehensive data collection exercise, refined network detail and improved local area calibration and validation to WebTAG criteria and acceptability guidelines for link and turning flows and travel times. Traffic forecasts are required to determine the impacts of the Scheme on the A303, surrounding local road network and on the parallel SRN to inform the scheme design, buildability, environmental impacts and traffic-related economics.

Pre-existing transport models exist in the form of Highways England's South West Regional Traffic Model (SWRTM) and the model developed to assess scheme options at Stage 2 (the Options phase) of Highways England's Project Control Framework (PCF) for Major Projects. Information from these models has been augmented, particularly with the introduction of local demand data, local traffic counts and network refinements pertinent to the single scheme being taken forward at Stage 3 (the Development phase). Given the specific issues on the A303 caused by holiday traffic, a 'busy day' time period model has also been developed to cover the busy summer Friday, Saturday and Sunday times during July and August. The refined model is known as the 'A303 Stonehenge SWRTM (DCO)' model. The refined model will provide the evidence base for Highways England's (the applicant) Development Consent Order (DCO) application and subsequently provide evidence to questions raised by the Examining Authority during the DCO process. Separate microsimulation models have also been developed to assess the operational performance of the Scheme.

The model has been developed, calibrated and validated in accordance with guidance: this includes appropriate elements of the Department for Transport's (DfT) Web-based Transport Analysis Guidance (WebTAG) as well as guidelines produced during the development of the Highways England Regional Traffic Models (RTMs).

The transport model base year has been updated from 2015 to 2017, matching the new data collection undertaken in August and October 2017. As a single scheme is to be appraised, the Area of Detailed Modelling (AoDM) – the area over which impacts of the Scheme are certain – has been refined, with data collection undertaken throughout the area. A full review and refinement of network detail and coding has been undertaken throughout this area.

New data collection was undertaken in August and October 2017. This involved a programme comprising:

a. Automatic Number Plate Recognition (ANPR) surveys (both internal to and at the edges of the refined AoDM) to provide insights on local and strategic traffic movements;

b. Visitor interviews at Stonehenge visitor centre to provide insight as to the ultimate origins and destinations of visitors to the key monument on the World Heritage Site (WHS);

c. Automatic Traffic Count (ATC) surveys for a two-week period to provide high quality volumetric data at key locations on the local road network; and

d. Manual Classified Turning Counts (MCTC) to provide volumetric data for turns at key junctions on the A303 and surrounding local network in the vicinity of the Scheme.

Additionally, existing data sources have been collated and used in the refinement of the model. These include:

a. Existing traffic count and journey time data from the development of SWRTM;

b. Trafficmaster GPS data for 2016/2017, supplied by DfT, for key routes within and through the AoDM;

c. Traffic count data for the Strategic Road Network (SRN), from Highways England's Web-based Traffic Information System (WebTRIS); and

d. Freight movement data from the DfT's Continuing Survey of Roads Goods Traffic for Great Britain (CSRGT GB).

The highway networks in the model have been refined. Additional links on the local road network have been added to better represent local traffic movements and movements to and from the A303. The zoning system has been fully disaggregated to ensure better representation of trip-loading in the AoDM, refining trip routeing within the model. All network refinements have used coding standards as per SWRTM, to ensure consistency in modelling. A full review and update of link distances and speeds has been undertaken. Bus routes have also been added within the AoDM to ensure appropriate capacity reductions from these fixed routes. To better reflect the non-equilibrium of traffic flows observed in the summer, the assignment methodology has been adjusted to make use of additional queueing and preloading facilities available in the software.

Local demand estimates have been refined making use of the new data collected. In addition to the disaggregation of the matrices to the refined zoning system and the update of the matrices from a 2015 to 2017 base year (making use of existing DfT statistics and datasets), the following updates have been made:

a. HGV representation has been refined for trips through the study area making use of the DfT's CSRGT GB dataset, improving the representation of freight trips in SWRTM;

b. ANPR data have been used to refine the representation of car, LGV and HGV trips both through and within the AoDM; and

c. Stonehenge Visitor Centre interview data have been used to refine trip estimates to and from the visitor centre.

For the 'busy day' time period, mobile phone data from Highways England's Trip Information System (TIS) have been used to adjust the existing neutral month average interpeak hour matrices to an initial 'busy day' matrix, subsequently refined using the above datasets.

Both the neutral month and 'busy day' time period demand matrices were subsequently refined using trip matrix estimation. Prior to this being undertaken, checks were undertaken on the network structure, coding and out-turn route choice to ensure that they represented an appropriate starting point and that adjustments to the trip matrices would not be made to account for errors in the networks.

The validation of the out-turn trip matrices, following estimation, was demonstrated using the WebTAG screenline acceptability guidelines for the local AoDM. Comparing screenline performance against SWRTM for the wider fully modelled area for the neutral month time periods shows similar results, suggesting local demand refinements have made no material change to the Fully Modelled Area (FMA).

Assignment calibration and validation for the neutral month time periods shows no material change in the Fully Modelled Area for either link flow validation or journey times compared to SWRTM. Against observed data in the AoDM, the model meets or exceeds WebTAG acceptability guidelines for individual link flow calibration, independent link and turning count validation and journey time route and segment validation.

The existing variable demand model (VDM) and processes from SWRTM have been adjusted to work with the refined 'A303 Stonehenge SWRTM (DCO)' model. The VDM has not been recalibrated, due to calibration previously having been undertaken across all five of Highways England's RTMs. Realism testing of the refined model on the VDM gives results aligned with those achieved in SWRTM and aligned with WebTAG guidance.

Two microsimulation models – one of the A303, and one of the local road network between the A360 and A345, covering Larkhill and Durrington – have been developed from the ANPR and traffic count data collected in August and October 2017. These have been developed for operational assessment of junctions on the scheme route and to assess the impact on junctions on the local road network that will be relieved by the Scheme, particularly in the summer. The models have been validated to guidance given in WebTAG Unit M3.1.

The strategic and operational models provide a sound base from which to forecast the impacts of traffic growth and the Scheme and from which secondary analysis, such as skims for economic appraisal may be undertaken. The models will support the DCO application and subsequent analyses required.

1 Introduction

1.1 Statement of the scheme objectives

1.1.1 Objectives for the Scheme have been formulated both to address identified problems and to take advantage of the opportunities the new infrastructure would provide. The objectives are defined in the Department for Transport's (DfT's) Client Scheme Requirements (CSRs) which respond directly to the need for change:

a. **Transport**: To create a high quality route between the South East and the South West that meets the future needs of traffic;

b. **Economic Growth**: To enable growth in jobs and housing by providing a free flowing and reliable connection between the South East and the South West;

c. **Cultural Heritage**: To help conserve and enhance the World Heritage Site (WHS) and make it easier to reach and explore; and

d. **Environment and Community**: To improve biodiversity and provide a positive legacy for nearby communities.

1.2 Description of the Scheme

Overview of the Scheme

1.2.1 The Scheme would be approximately 8 miles (13km) long and comprise the following key components:

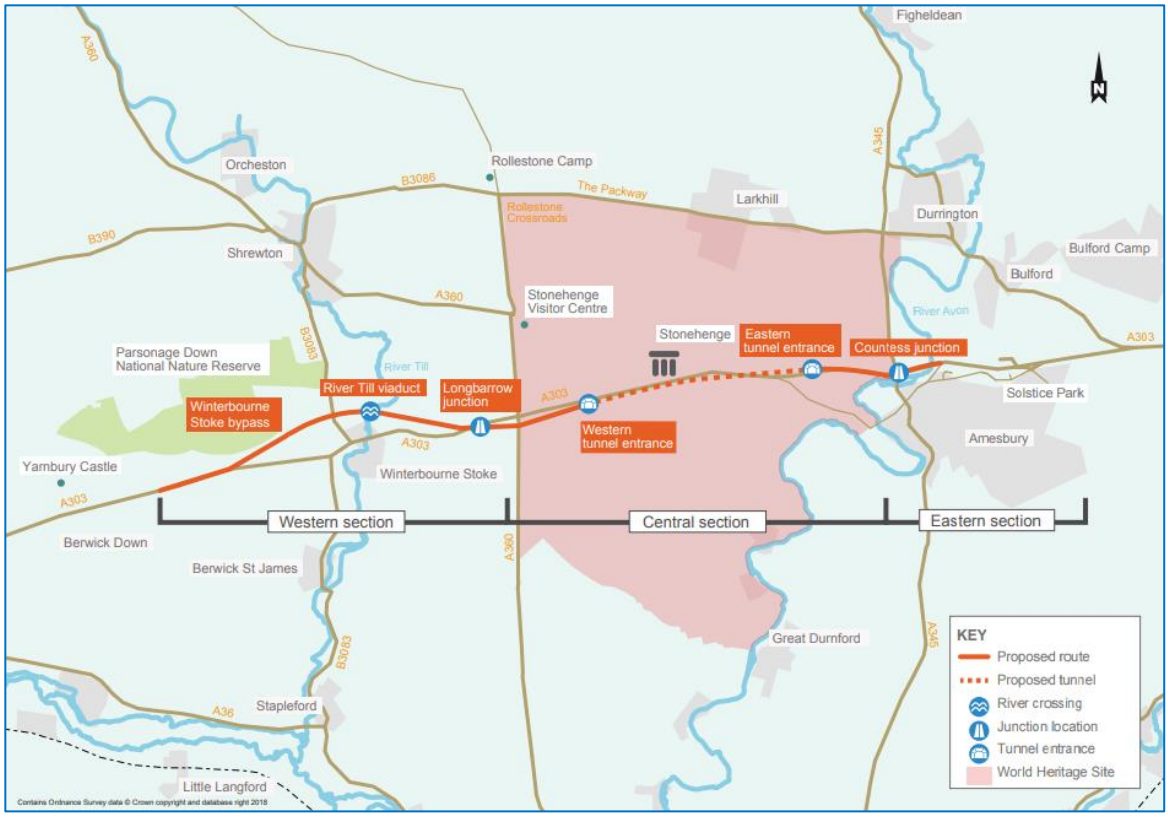
a. a northern bypass of Winterbourne Stoke with a viaduct over the River Till valley;

b. a new junction between the A303 and A360 to the west of and outside the WHS, replacing the existing Longbarrow roundabout;

c. a twin-bore tunnel approximately 2 miles (3.3km) long, past Stonehenge; and

d. a new junction between the A303 and A345 at the existing Countess roundabout.

1.2.2 The Scheme is described briefly in three route sections as shown in Figure 1-1.



Source: Figure 5.1 Scheme sections, A303 Amesbury to Berwick Down Public Consultation Booklet (February 2018)

Figure 1-1: Overview of the Scheme

a. Western section – Winterbourne Stoke bypass to Longbarrow junction

b. Central section – within the World Heritage Site

c. Eastern section – Countess junction to just beyond the Solstice Park junction

Western section

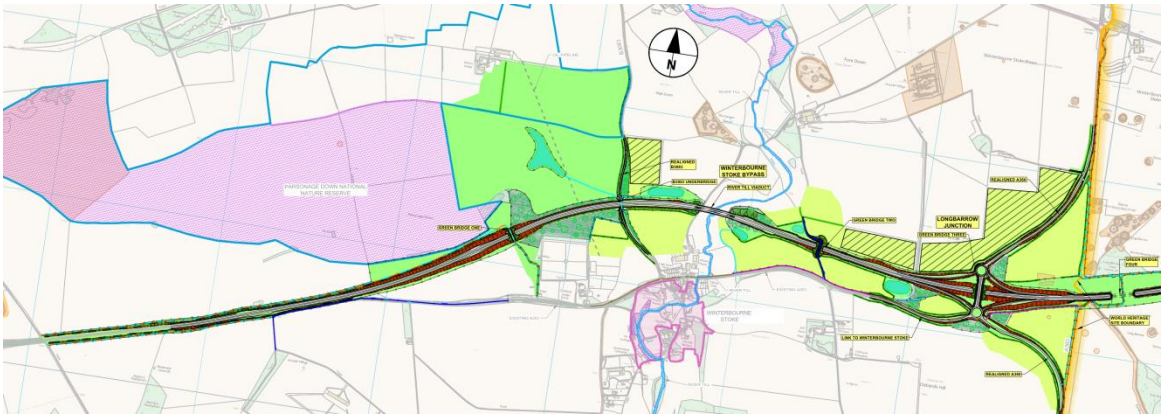


Figure 1-2: Western section

1.2.3 The Scheme would commence on the existing A303 approximately at Yarnbury Castle and would closely follow the existing A303 alignment, south of Parsonage Down NNR. It would then continue in a north easterly direction providing a bypass to the north of the village of Winterbourne Stoke.

1.2.4 A ‘green bridge’ would be constructed over the new A303 north-west of Scotland Lodge Farm near the south-east corner of Parsonage Down. This bridge would provide ecological and landscape connectivity across the Scheme and would form part of a non-motorised user (NMU) route and agricultural access route which would run from adjacent to a layby on the existing A303 to Parsonage Down and Yarnbury Castle. An area east of Parsonage Down would be used to create chalk grassland habitat using excavated chalk material arising from construction.

1.2.5 Local access from Winterbourne Stoke, northwards towards Shrewton, would be provided by the B3083. This access would be maintained by the provision of a single span bridge to carry the new A303 over the B3083. The proposed new bridge would be located approximately 50m to the west of the existing B3083. This location would necessitate the realignment of some 400m of the B3083 but would enable the B3083 to be kept open to traffic throughout the construction period other than for discrete periods to allow short duration specific activities to be undertaken (e.g. construction of tie-ins etc.). The clear span of the bridge would accommodate both the re-aligned B3083 and a segregated verge on the east side to allow cattle movements and equestrian use across the new alignment. The minimum headroom would be 5.35m.

1.2.6 The Scheme would continue in an easterly direction, crossing the River Till valley on a new twin deck viaduct. The River Till viaduct would carry the proposed A303 over the River Till SAC and SSSI and its floodplain. The viaduct would be designed to minimise impacts on the river below while balancing other environmental considerations, such as landscape and visual impacts. It would be a twin deck structure, with each deck approximately 14m wide and 210m long, and with a gap of approximately 7m between the decks. The road level on the bridge would be approximately 10m above the River Till where it crosses the river channel. The location of the piers would not be within the SAC or SSSI and would allow the existing bridleway (WST04) from Winterbourne Stoke to remain at its current location. An environmental screen, approximately 1.5m in height, would be installed on the southern parapet to help screen vehicle movements from locations to the south.

1.2.7 A second green bridge at the Winterbourne Stoke Public Right of Way (PRoW) WST06B would maintain the existing PRoW over the new A303 alignment and as with other green bridges would provide for ecological and landscape connectivity across the Scheme.

1.2.8 Continuing to the east, the Scheme would cross the line of the existing A303 approximately 700m west of the existing A360 Longbarrow roundabout. A new grade separated junction with the A360 is proposed to the west of the WHS boundary. This junction, known as the Longbarrow junction, would accommodate free-flowing traffic movements between the A360 and the A303. The junction would consist of two roundabouts connected by a short length of dual carriageway, carried over the A303 on a new green bridge with earth bunds on each side, to help mitigate visual impact and to provide ecological connectivity. The structure would be a single span bridge, with headroom of at least 5.35m. The roundabouts would be set below existing ground level.

1.2.9 Traffic lights would be required at the Longbarrow junction. The traffic lights could be used during both day and night. A link to the de-trunked A303 to the west, accessing Winterbourne Stoke, would also be provided from the new Longbarrow junction.

Central section

Figure 1-3: Central section

1.2.10 As the Scheme crosses the line of the existing A360, it would enter into the WHS where it then follows closely the line of the existing A303.

1.2.11 The proposed alignment over the first c.1.0km of this section would generally be in a cutting varying in depth between approximately 7m and 10m. Approximately 2.5m to the top of the cutting would have a 1 in 2 grassed slope. The bottom of the cutting would comprise vertical retaining walls.

1.2.12 However, shortly after entering the WHS there would be a further green bridge (also known as a 'land bridge') that would be approximately 150m in length and would start approximately 150m from the western boundary of the WHS. In addition to an NMU route, this bridge would also provide visual and landscape connectivity between barrow groups to the north and south of the Scheme. The existing A303 through the WHS would be converted to a restricted byway.

1.2.13 The western tunnel portal would be located within the WHS, north west of Normanton Gorse, approximately 1.0km east of the existing Longbarrow roundabout and immediately to the south of the existing A303. The tunnel would commence with a fully grassed approximately 200m long over cut and cover tunnel before it becomes a bored tunnel. Tunnel service buildings would be located outside the tunnel portal.

1.2.14 The Scheme would then continue in tunnel in an easterly direction following an alignment that is broadly similar to the existing A303 but at a depth of up to approximately 50m.

1.2.15 The tunnel would be a twin-bore structure, approximately 1.9 miles (approximately 3 km) in length, and each tunnel bore would have an internal diameter of approximately 11.5m.

1.2.16 The two bores would be connected underground by a series of cross passages at regular intervals to allow for the safe evacuation of road users in the event of an incident in one of the bores.

1.2.17 The tunnel would contain a number of mechanical and electrical, operational and safety systems. The items of plant required to power and control these systems would predominantly be housed at the tunnel service buildings located outside of the tunnel.

1.2.18 The tunnel would emerge at the eastern tunnel portal through a short section of cut and cover tunnel approximately 85m in length extending eastwards from the bored tunnel section. The eastern tunnel portal would be located to the east of the King Barrow Ridge and The Avenue and just to the north of the existing A303. The portal approach would be in deep cutting formed with 1 in 2 grassed slopes.

1.2.19 The Scheme would then closely follow the line of the existing A303 to Countess roundabout.

Eastern section

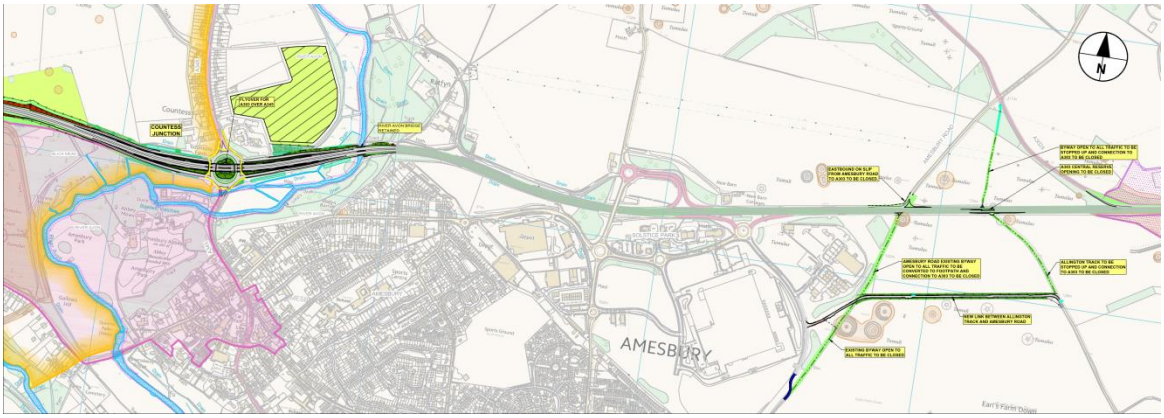


Figure 1-4: Eastern section

1.2.20 A new flyover above the existing roundabout would separate traffic going east-west along the A303 from traffic going north-south along the A345 Countess Road, with slip roads accommodating traffic movements between the two roads. The new flyover would include two single span bridges that would accommodate the existing roundabout traffic lanes. The minimum headroom of the bridges would be 5.35m.

1.2.21 Retaining walls would be required at this junction to support the A303 between the slip-roads. Noise barriers, approximately 1.8m high, would be installed along both sides of the flyover to help screen vehicles and to help attenuate vehicle noise at nearby houses.

1.2.22 There are two existing subways between the proposed eastern tunnel portal and Countess junction, which would be removed. Two new pedestrian crossings would be created around the existing Countess roundabout to provide north-south connectivity along Countess Road under the A303.

1.2.23 The Scheme would tie in with the existing A303 close to the existing River Avon Bridge, to the west of Solstice Park junction.

1.2.24 To the east of the Solstice Park junction there would be a number of changes to existing rights of way and to points of access to and from the A303.

1.3 Model purpose

Description of the model need

1.3.1 A transport model of the A303 and local roads in the vicinity of the Scheme is required for traffic forecasting and economic appraisal purposes.

1.3.2 Traffic forecasts are required to determine the impacts of the Scheme on the A303, surrounding local road network and on the parallel SRN. Forecast traffic volumes (both in absolute volumes and changes due to the Scheme) are required to inform:

a. whether the Scheme addresses the identified transport problem;

b. scheme design standard requirements (e.g. against Design Manual for Roads and Bridges (DMRB) criteria for number of lanes, junction types, road standard);

c. the Environmental Statement (ES) through the impacts of changes brought about by the Scheme on Air Quality, Noise pollution, health impacts and biodiversity assessment amongst others;

d. on the impacts of proposed construction and traffic management plans;

e. providing an assessment of transport user impacts of the Scheme, accident and construction impacts to the economy; and

f. procurement – providing traffic inputs as part of the assessment of the procurement route and associated financing strategy of the Scheme.

1.3.3 The traffic model must also be capable of assessing the cumulative impacts of other interventions on the A303 / A358 corridor, given Highways England's proposals to transform the route into a high quality dual carriageway between London and the South West. Whilst the model need not (and does not) assess the impacts of the other schemes in detail (separate local models will be developed for those schemes), the model needs to be able to assess the impact of those on the A303 Amesbury to Berwick Down scheme.

1.3.4 The key requirement of the model will be that it adequately represents base year traffic patterns and volumes (both strategic and local) in the vicinity of the A303 Amesbury to Berwick Down scheme and provides appropriate capability for forecasting, the outputs of which will feed into the many workstreams noted above.

Model heritage

1.3.5 The PCF Stage 2 traffic model was initially developed from an early release version of the South West Regional Traffic Model (SWRTM), known as Design Freeze 2.0 (DF2.0). An updated version – Design Freeze 2.1 – was subsequently used for forecasting purposes.

1.3.6 At PCF Stage 2, the SWRTM DF2.0 zoning in the vicinity of the Scheme was disaggregated using information from the PCF Stage 1 model – this was the South West Area Multi-Modal Study (SWARMMS) model. This disaggregated zoning system, whilst more detailed than SWRTM DF2.0 zones, did not follow the guidance set out in the DfT's Web-based Transport Analysis Guidance (WebTAG) unit M3.1, as it did not follow current Census 2011 Output Area (OA) boundaries or aggregations thereof.

1.3.7 Since the release of SWRTM DF2.0, work has been undertaken to improve the model by Highways England and its model maintenance consultant team. This has resulted in network improvements and better calibration and validation. The most recent version of the model is known as Design Freeze 3.0, or SWRTM DF3.0.

1.3.8 For the purposes of the PCF Stage 3 work it is this more recent version of SWRTM, DF3.0, which has been taken forward for local refinement. This report outlines the refinements to modelled areas, networks and local and strategic demand that have been made to produce a model that can provide evidence for the DCO application of the Scheme.

Schemes to be tested

1.3.9 The principal aim of the model is to appraise the traffic and economic impacts of the A303 Amesbury to Berwick Down scheme. The scheme proposal is to upgrade the A303 past Stonehenge, between Amesbury and Berwick Down, to a dual two-lane carriageway. The Scheme is approximately 8 miles (13km) long, incorporating a tunnel of around 2 miles (3.3km) in length to reduce its impact on the Stonehenge stone circle and the wider WHS.

1.3.10 The Scheme is shown in Figure 1-1.

1.4 Report structure and purpose

Project Control Framework Product

1.4.1 Highways England's Transport Planning Group (TPG) revised its list of expected PCF products in 2017. A formal Model Validation Report (MVR) is no longer specified, instead the 'Transport Model Package' must be prepared with TPG guidance. The majority of reporting will be encapsulated in an 'end of stage' Combined Modelling and Appraisal (ComMA) report.

1.4.2 The guidance states that the 'Transport Model Package' must provide sufficient evidence to the TPG Business Partner to:

a. demonstrate that the model accurately reproduces an existing situation, by comparison to independently observed data; and

b. summarise the accuracy of the base from which the forecasts will be prepared.

1.4.3 This document is the 'Transport Model Package', an Appendix to the ComMA.

Introduction to the Transport Model Package

1.4.4 The Transport Model Package sets out information detail and evidence pertaining to the development of the base year models.

1.4.5 The primary focus of the document is to describe the refinements made to the strategic model, SWRTM, as part of the Project Control Framework (PCF) Stage 3 work – also known as the 'Development Phase'. It is this refined model, the 'A303 Stonehenge SWRTM (DCO)' model, which will be the basis of traffic forecasts that will underpin evidence at the Development Consent Order (DCO) application.

1.4.6 Further to this, chapter 13 of this report focuses on the development and validation of the A303 mainline and local road operational models. The purpose of those models is to assess the operational performance of junctions along the length of the Scheme.

Report Structure

1.4.7 The structure of this Transport Model Package follows the guidance given in Appendix F of WebTAG Unit M3.1 'Highway Assignment Models'. A crosscheck has been undertaken to ensure that Highways England's requirements as set out in Interim Advice Note (IAN) 106/08 are also captured; Table 1-1 presents the structure from IAN 106/08 and provides cross-references to the relevant section of this report. The content required by the relevant sections (predominantly Chapters 6, 7, 8 and 9) of ComMA is therefore captured in this document.

Table 1-1: Interim Advice Note 106/08 contents guide for LMVR

Content	Report Section	Comment
Study overview		
Statement of scheme objectives	§1.1, §1.3	
Explanation of the purpose of the model and the schemes likely to be assessed using the model	§1.3, §2.1	
Model Description / Specification		
Description of the wider modelling system	§2.2	
Explanation of how the highway model relates to other components of any wider model	§2.2, §2.3	
Description of any land use transport interaction models used	N/A	There is no land-use interaction model as part of this suite of models.
Description of type of highway model	§2.3	
Justification of type of highway model	§2.3	
Description and plan of geographical model coverage, including identification of areas of differing model type	§4.3, Appendix A	Appendix A sets out testing undertaken to define the Area of Influence
Justification of geographical model coverage	Appendix A	
Specification and justification of demand segmentation within the traffic model	§4.6 §4.7	Time Periods User and Vehicle Classes
Statement of any software package and version used	§2.5	Includes key analysis software packages
Summary of Data Collection		
Outline description of data sources and units	§5	Data Summary chapter
References to any relevant survey reports	§1.5, §5.1	
Definition of calibration data	§5.3	
Definition of validation data	§5.4 §5.5	Counts for validation Journey Time validation data
Comparison of comparable data from different sources, where relevant	N/A	
Model Development – Network		
Description of network structure	§4.3, §6.4, §13	
Description of coding processes used	§6.2, §6.5, §13	
Evidence for assessment of speed limits / road types	§6.4, §8.2, §13	
Location, value and justification of fixed speeds and/or Speed-Flow Curves used on links	§4.9, §6.4	
Description of calculation and assumptions behind junction saturation capacities	§6.2, §6.4, §6.5, §13	

Content	Report Section	Comment
Description of network inventory undertaken	§6.4, §13	
Description of junction operation data collected	§6.4, §13	
Description of modelling assumptions	§4, §6	
Description of modelling of PT services and bus priority measures	§6.6	
Description of treatment of Freight Transport	§6.7	
Description of network assumptions relating to representation of tolls, etc.	§6.8, §6.9	
Model Development – Matrices		
Description of zone structure	§4.4	
Description of data sources	§7.2	
Description of any matrix infilling	N/A	Documented in SWRTM MVR
Description of matrix building process	§7.3	
Description of the matrix estimation process	§7.4, §10.1	
Matrix estimation monitoring	§3.6, §10.1	
Model Development – Assignment process		
Description of approach used	§4.7	Includes assignment methodology for summer
Description of time slices used	§4.6	
Definition of the assignment cost calculation reference to generalised cost and the VoT and VOC	§4.9	
Assignment convergence criteria	§3.3	
Summary of assignment parameters used by the software	N/A	Refer to SWRTM MVR
Calibration		
Evidence of checks on network structure	§8	
Evidence of check that link speeds on the network are realistic	§8.2	
Evidence of checks to ensure delay calculations at junctions	§8.3	
Scope of use of matrix estimation	§7.4, §10.2	
Validation – Network		
Analysis of paths	§9.3, Appendix C	
Justification and description of speed flow curves used in 'post capacity' formulation	N/A	Refer to SWRTM MVR
Description of junction coding approach	§6.2, §6.4	
Description of coding of other network characteristics	§6.4, §6.5, §6.6, §6.7, §9.1	

Content	Report Section	Comment
Examination and justification of paths used on preliminary assignments	§9.3	
Evidence of ad-hoc network validation	§8, §9	
Validation – Matrix		
Zone plan	§4.4	
Distinction between those movements observed and synthesised	N/A	Demand matrix refinement only included synthetic elements inherited from SWRTM
Comparison of modelled zonal demand for key movements against independent data (if available)		
Comparison of modelled sector-to-sector demand with any independent screenline counts		
Plans of zone, sectors and screenlines	§4.4, §5.3	
Validation – Assignment		
List of, and justification for, deviations from any default parameters used in assignment software	N/A	No deviations beyond those in SWRTM
Statement / explanation of independence of validation data	§11.3	
Tabular comparison of modelled flows with observed site and screenline counts	§11.2, §11.3	
Map-based comparison of modelled flows with observed site and screenline counts		
Tabular comparison of modelled and observed journey times	§11.4	
Diagrammatic comparison of modelled and observed journey times		
Statement of convergence stability	§11.1	
Statement of convergence proximity	§11.1	
Discussion of model validation in the context of a wider modelling system	§11.2, §11.3, §12	
Realism testing to establish robustness of base model in relation to its use as the 'reference pivot' for subsequent variable demand modelling	§12.2	
Conclusion		
Conclusion on the robustness of the model to be used for forecasting	§14.3	
Discussion of where the model is less robust with statement on how this impacts on the models performance	§14.2	
Discussion of where the model representation of traffic and travel could be further improved in the future	§14.4	

1.4.8 Following this introductory chapter, the remainder of this Transport Model Package is structured as follows:

a. Chapter 2 - Proposed uses of the model and key design considerations;

b. Chapter 3 - Model standards;

c. Chapter 4 - Key features of the model;

d. Chapter 5 - Data summary;

e. Chapter 6 - Network development;

f. Chapter 7 - Trip matrix development;

g. Chapter 8 - Network calibration and validation;

h. Chapter 9 - Route choice calibration and validation;

i. Chapter 10 - Trip matrix calibration and validation;

j. Chapter 11 - Assignment calibration and validation;

k. Chapter 12 - Variable demand modelling;

l. Chapter 13 - Operational model development; and

m. Chapter 14 - Summary of model development.

1.4.9 A list of abbreviations can be found at the end of this document. This consolidates key acronyms noted and previously expanded in the main text of this report.

1.4.10 This report concludes with a number of appendices, as follows:

a. Appendix A – setting out detail on the Area of Influence Test;

b. Appendix B – a Technical Note prepared by the A303 Sparkford to Ilchester scheme, setting out the methodology for the derivation of an initial summer demand matrix;

c. Appendix C – Route choice validation plots, including minimum cost path and Select Link Analyses;

d. Appendix D – Operational modelling turning count validation summaries; and

e. Appendix E – Operational modelling link count validation summaries.

1.5 Complementary reports

1.5.1 Whilst this report can be read in isolation, it is recommended that this report be read in conjunction with the Combined Modelling and Appraisal Report (Application Document 7.5) and its Appendices. This will provide the full scope of the traffic modelling and economic appraisal work undertaken.

1.5.2 This Transport Model Package is one of a number of Appendices of the Combined Modelling and Appraisal Report (Application Document 7.5) as follows:

a. Transport Data Package, Appendix A to the Combined Modelling and Appraisal Report;

b. Transport Model Package, Appendix B to the Combined Modelling and Appraisal Report;

c. Transport Forecasting Package, Appendix C to the Combined Modelling and Appraisal Report; and

d. Economic Appraisal Package, Appendix D to the Combined Modelling and Appraisal Report.

1.5.3 Further to the above, the development of Highways England's South West Regional Traffic Model (SWRTM) is well documented and has been set out in a number of complementary reports. This Transport Model Package does not seek to reproduce the content of the development of the standard version of SWRTM and is instead focussed on the A303 Amesbury to Berwick Down scheme model. Commentary on the development of the standard version of SWRTM can be found in:

a. South West Regional Traffic Model: Traffic Data Collection Report version 3.0; and

b. South West Regional Traffic Model: Model Validation Report (document reference REP/MVR/001).

2 Proposed uses of the model and key design considerations

2.1 Proposed uses of the model

2.1.1 As noted in chapter 1, the primary use of the 'A303 Stonehenge SWRTM (DCO)' model will be to assess the traffic impacts of the A303 Amesbury to Berwick Down scheme and to provide inputs into economic and environmental appraisals, as well as informing the buildability (construction, traffic management) of the Scheme and operation and design of its junctions.

2.1.2 In addition to appraising the core scheme scenario, the model will also need to be able to assess the impacts of a number of alternative scenarios around the core assumptions. These will include high and low demand growth tests, in accordance with guidance in WebTAG Unit M4, and may include alternative growth or infrastructure scenarios. The model may also need to be able to undertake bespoke sensitivity tests at the request of stakeholders to provide additional supporting information – either as part of the DCO examination or for separate supporting activities. It is likely that the model will also be used in the future as part of a monitoring and evaluation strategy for the Scheme.

2.1.3 For many of the construction and design focussed activities for which traffic data will be required, traffic data from the model may be used as an input into more specialised operational models. A separate microsimulation model is being designed for this purpose, with further information provided in chapter 13. The strategic model has been refined with this in mind, with network updates undertaken to ensure compatibility for providing inputs into the microsimulation model (for example, in the case of cordoning of networks and demand).

2.2 South West Regional Traffic Model (SWRTM) structure

2.2.1 SWRTM is the highway assignment component of the wider Regional Traffic Model suite. Highways England developed the model suite to provide an evidence base for the future development of schemes on its SRN as part of the RIS.

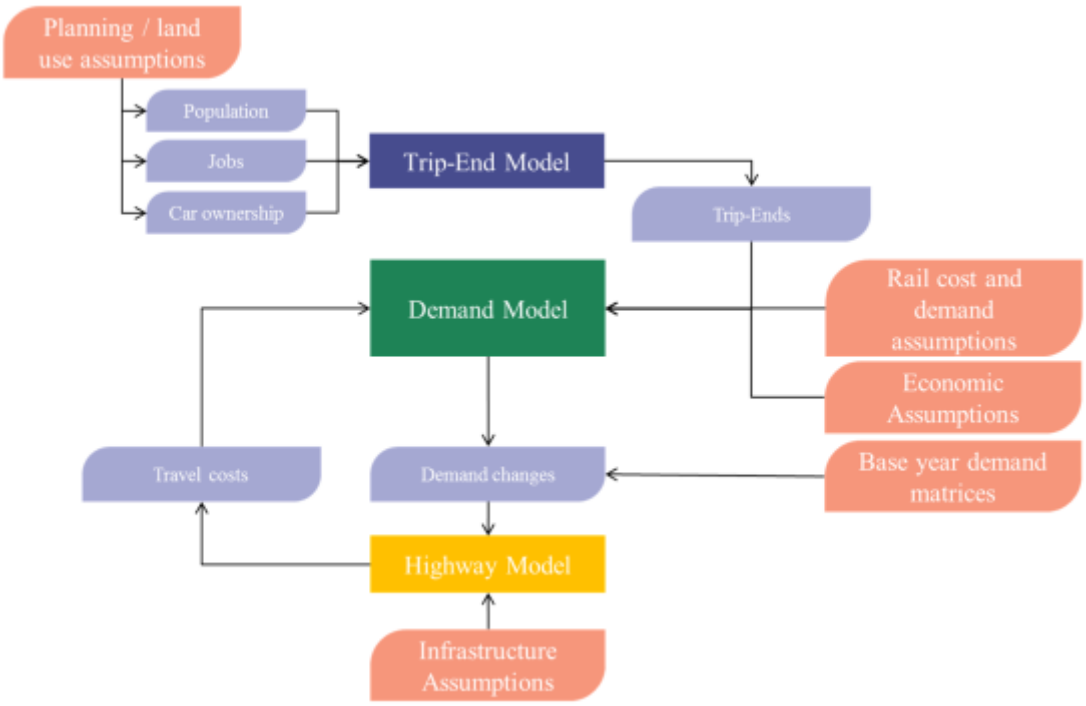
2.2.2 The suite of models is therefore aligned with the approach given in WebTAG, comprising:

a. a trip-end model, used for estimating the number of trips generated / attracted by a specific zone where chapter 7 outlines the estimate of trip-ends in the development of the refined base year demand matrices;

b. a variable demand model (VDM), used for estimating how travellers will respond to changes in their travel costs, including modal considerations, further detail on which is given in chapter 12; and

c. a highway assignment model, used for estimating travel costs and identifying the routes travellers may take through a congested road network, the development and performance of which is the focus of the majority of the chapters in this report.

2.2.3 Figure 2-1 provides an overview of the approach in flowchart form, as taken from the SWRTM MVR.



Source: Figure 4. South West Regional Traffic Model: Model Validation Report.

Figure 2-1: Regional Traffic Model (RTM) suite design

2.3 Highway assignment model type

2.3.1 The 'A303 Stonehenge SWRTM (DCO)' model is a Steady State Assignment model. That is, the model represents average conditions over the model period – an average hour in the case of all four time periods modelled (see section 4.5). The model assumes a fixed volume of trips and a uniform demand profile throughout each of the modelled time periods.

2.3.2 Demand is assigned to the network using multi-user class user-equilibrium assignment algorithms built into the software. The routes that the various user-classes take through the highway network are determined by the generalised costs ascribed to them. Further information on the assignment methodology and generalised costs can be found in sections 4.7 and 4.8 respectively.

2.3.3 The model has been developed in the SATURN[1] software. SATURN is a UK industry standard software suite that comprises a number of different specialist modules. SATURN is particularly suited to the modelling of congested networks both in the strategic and inter-urban context. The software simulates junction delay in detail and represents the effect of flow metering (especially important on the section of the A303 in question) and blocking back (interaction of queues). Both flow metering and blocking back are observed on the A303 and surrounding urban road networks in the vicinity of Stonehenge.

2.4 Key local area model design considerations

Linkage with standard SWRTM

2.4.1 The 'A303 Stonehenge SWRTM (DCO)' model is a model for the sole purpose of appraisal of the A303 Amesbury to Berwick Down scheme. As such, it is different from its parent model – SWRTM DF3.0 – which was designed to assess the regional impacts of packages of significant (RIS) schemes as opposed to an individual scheme.

2.4.2 The starting point for refinement of the strategic modelling suite for the A303 Amesbury to Berwick Down scheme is therefore comprised of two key separate inputs:

a. the South West Regional Traffic Model (Design Freeze 3.0); and

b. the A303 Stonehenge PCF Stage 2 options model.

2.4.3 The PCF Stage 2 model includes some refinements in the vicinity of the Scheme, albeit less detailed in the direct vicinity of the Scheme than the refinements undertaken for the PCF Stage 3 model and over a wider area, owing to the need to assess a number of different scheme options during the previous phase of works.

2.4.4 The starting point for refinement of the model for PCF Stage 3 is therefore the SWRTM DF3.0 model, with appropriate updates from the PCF Stage 2 models incorporated. Each of these changes has been reviewed in accordance with the coding manual and refined network and zoning requirements of the PCF Stage 3 single scheme assessment.

2.4.5 For the wider modelling suite, the functionality of the variable demand model (VDM) and the Highways England Integrated DIADEM Interface (HEIDI) has been retained as per standard SWRTM (albeit with adjustments to account for the refined zoning system). The operational modelling tools are new and are not derived from any previous SWRTM-related inputs.

Summer modelling

2.4.6 The A303 between Amesbury and Berwick Down suffers severe congestion during the summer period as it is one of the main tourist routes into the South West. The construction of the Scheme is likely, therefore, to yield significant benefits during this time.

[1] Simulation and Assignment of Traffic to Urban Road Networks (SATURN). Dirck van Vliet, ITS Leeds and Atkins.

2.4.7 A summer traffic model is therefore required to provide both an input to the assessment of the transport user benefits in the economic appraisal of the Scheme, and to provide the necessary evidence to inform the design process and the operation of the Scheme during forecast years.

2.4.8 The summer strategic traffic model represents a period with 'normal' summer peak traffic volumes and delays and not the absolute 'occasional' summer peak, such as the August Bank Holiday.

Relationship with variable demand model and public transport modelling

2.4.9 A variable demand model (VDM) forms part of the suite of A303 Amesbury to Berwick Down assessment tools. The demand model calculates changes in travel accessibility and applies macro time period choice, mode choice and destination choice models to reflect the changes in travel behaviour.

2.4.10 There is no formal public transport assignment model as part of the model suite. However, the VDM does contain public transport demand in the form of rail passenger trip matrices. Other than to disaggregate these data to the refined zoning system around Stonehenge, no additional work has been undertaken on these rail matrices as part of the 'A303 Stonehenge SWRTM (DCO)' model refinement. Further data on the development of the rail matrices can be found in the South West Regional Traffic Model: Model Validation Report (document reference REP/MVR/001).

2.5 Software platform

2.5.1 A number of different software packages have been used in the development and refinement of the 'A303 Stonehenge SWRTM (DCO)' model. Aside from standard Microsoft Office packages used for data and model analysis, key specialist software used is given below:

a. ArcGIS versions 10.3 and 10.4

    i. Used for Geographical Information Systems (GIS) analysis supporting development of model inputs and display of model outputs.

b. SATURN version 11.3.12W

    i. An industry standard highway assignment modelling package, used in the development of the RTMs and in many other UK-based highway models. This is the software used for the 'A303 Stonehenge SWRTM (DCO)' model.

c. DIADEM[2] version 6.3.3

    i. An adapted version of the DfT's standard DIADEM v5.0 variable demand modelling software, with adaptations specifically for Highways England's RTMs.

d. HEIDI version 5.3

    i. The Highways England Integrated DIADEM Interface (HEIDI) supports the operation of DIADEM with the RTMs and provides a set of SQL databases back-ends to store model demand and results.

e. VISSIM[3] version 8.00-13

    i. VISSIM is a microscopic, time-step and behaviour-based simulation model used to model urban traffic volumes and interactions. In the context of the A303 Amesbury to Berwick Down scheme, it has been developed to model the operational performance of the Scheme and its junctions.

[2] Dynamic integrated assignment and demand modelling (DIADEM). Department for Transport.
[3] Verkehr In Städten SIMulieren (VISSIM). PTV AG.

3 Model standards

3.1 Key guidance

3.1.1 Development of the 'A303 Stonehenge SWRTM (DCO)' model has built on top of the standard Highways England RTM guidance to which the SWRTM DF3.0 model was developed.

3.1.2 The further refinement of the model has followed guidance set out in the DfT's WebTAG. Most notably, this includes:

a. WebTAG Unit A1.3: User and Provider Impacts (March 2017);

b. WebTAG Unit M1.2: Data Sources and Surveys (January 2014);

c. WebTAG Unit M2: Variable Demand Modelling (March 2017);

d. WebTAG Unit M3.1: Highway Assignment Modelling (January 2014); and

e. WebTAG Databook (Interim May 2018 Databook provided by DfT).

3.2 Validation criteria and acceptability guidelines

3.2.1 The differences between modelled and observed data need to be quantified against some criteria with subsequent assessment made to determine the acceptability of the model performance against these. WebTAG Unit M3.1 §3.2 provides a detailed set of criteria and acceptability guidelines against which model performance should be assessed.

3.2.2 Principally, there are three complementary sets of measures, criteria and acceptability guidelines used to verify the model performance:

a. comparison of total assigned flows and counts crossing cordons/screenlines;

b. comparison of total assigned flows and counts on individual links and of turning movements at junctions; and

c. comparison of modelled and observed journey times on defined routes.

Trip matrix validation

3.2.3 The trip matrix quality can be judged by comparing total observed and modelled flows across defined screenlines and cordons. The measure that should be used is the percentage difference in these totals.

3.2.4 WebTAG Unit M3.1 §3.2 notes that the validation criterion should be a difference of ±5% or less. The RTMs – noting the large zone sizes and sparseness of the networks in some locations, defined a criterion of ±10%, aligned with the data quality. As the 'A303 Stonehenge SWRTM (DCO)' model is a scheme model, it has followed the more stringent criterion from WebTAG for new screenlines in the Area of Detailed Modelling (AoDM), retaining the RTM guidance over the wider area where the impacts of the Scheme are, by definition, judged not to be significant.

3.2.5 Table 3-1 sets out the criterion and acceptability guidelines used to judge the quality of the trip matrices.

Table 3-1: Screenline flow validation criterion and acceptability guidelines

Criteria	Acceptability guideline
Area of Detailed Modelling Differences between modelled flows and counts should be less than 5% of the counts	All or nearly all screenlines
Rest of SWRTM Differences between modelled flows and counts should be less than 10% of the counts	All or nearly all screenlines

3.2.6 With regard to screenline validation, and noting the guidance in WebTAG:

a. screenlines should normally be made up of more than five links;

b. the comparisons for screenlines containing high flow routes such as motorways should be presented both including and excluding such routes;

c. the comparisons should be presented separately for (a) other screenlines used as constraints in matrix estimation; and (b) screenlines used for independent validation;

d. the comparisons should be presented by vehicle type (preferably cars, light goods vehicles and other goods vehicles); and

e. the comparisons should be presented separately for each modelled period or hour.

3.2.7 RTM guidance also notes that:

a. for screenlines of fewer than five links, the acceptability guideline may be relaxed pro rata between 5% for five links and 15% for one link.

Link flow validation

3.2.8 The validation criteria and acceptability guidelines are set out in Table 2 of WebTAG Unit M3.1.

3.2.9 It should be noted however, that the Technical Consistency Groups (TCGs) involved in the development of the RTMs made provision for different criteria to be used for link flow validation on 'non-core' links (i.e. away from the SRN). The rationale behind this being that the size of model zones would materially increase model error and greater variation between modelled link flows and counts should therefore be expected. Additional information is set out in the RTM Technical Guidance notes.

3.2.10 As per the screenline criterion, as the 'A303 Stonehenge SWRTM (DCO)' model is a scheme model, it has followed the more stringent criteria from WebTAG for link flow validation in the AoDM, regardless of the type of road. Outside of the AoDM, link flow validation reverts to the 'core' and 'non-core' definitions used in the development of SWRTM DF3.0.

3.2.11 Table 3-2 presents the link flow criteria and acceptability guidelines for all links within the AoDM and for all 'Core' links throughout the rest of the model. Table 3-3 presents the criteria and acceptability guidelines for the 'non-core' links in the rest of the model.

Table 3-2: Link flow validation and acceptability criteria for all links in AoDM

Criteria	Acceptability guidelines
Individual flows within 100 veh/h of counts for flows less than 700 veh/h	> 85% of links
Individual flows within 15% of counts for flows from 700 to 2,700 veh/h	
Individual flows within 400 veh/h of counts for flows more than 2,700 veh/h	
GEH <5 for individual link flows	> 85% of links

Table 3-3: Link flow validation and acceptability criteria for non-core links outside of AoDM

Measure	Criteria	Acceptability guidelines
1	Individual flows within 300 veh/h of counts for flows less than 2,000 veh/h	> 85% of links
	Individual flows within 15% of counts for flows from 2,000 to 2,700 veh/h	
	Individual flows within 400 veh/h of counts for flows more than 2,700 veh/h	
2	GEH <5 for individual link flows	> 85% of links

3.2.12 It is noted that the link flow comparisons should:

a. be presented separately for each modelled period;

b. be presented for cars and for all vehicles but not for goods vehicles unless sufficiently accurate link counts have been obtained; and

c. use both measures in the model validation report, recognising that link flows that meet either criterion should be viewed as satisfactory.

Turning count validation

3.2.13 Turning counts were collected for a number of key junctions throughout the AoDM, for locations that either will be altered as part of the Scheme or may be impacted in some way.

3.2.14 The RTMs did not attempt to validate any junctions to observed turning counts as part of their development. Therefore, for the turning count validation undertaken as part of the development of the 'A303 Stonehenge SWRTM (DCO)' model, criteria and acceptability guidelines are adopted solely as per WebTAG Unit M3.1 guidance.

3.2.15 The criteria and acceptability guidelines used are the same as those for link flows and presented in Table 3-2 above. WebTAG further notes however, that the acceptability guideline should be applied to link flows but may be difficult to achieve for turning movements.

Journey time validation

3.2.16 The validation criteria and acceptability guidelines used for journey time validation are presented in Table 3-4, as per guidance in WebTAG Unit M3.1. For the validation analysis, the journey time comparisons will be presented separately for each modelled time period.

Table 3-4: Journey Time validation criteria and acceptability guidelines

Criteria	Acceptability guideline
Modelled times along routes should be within 15% of surveyed times (or 1 minute, if higher)	> 85% of routes
Modelled times along route segments should be within 15% of surveyed times (or 1 minute, if higher)	> 85% of segments

3.3 Convergence criteria and standards

3.3.1 WebTAG Unit M3.1 §3 provides guidance on criteria and minimum Base Model acceptable values to which a highway assignment model should demonstrate assignment convergence. These are reproduced in Table 3-5 below.

Table 3-5: Summary of convergence measures and base acceptable values

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%
Percentage of links with cost change (P2) <1%	Four consecutive iterations greater than 98%

Source: Table 4, WebTAG Unit M3.1

3.3.2 Recent experience has shown that %GAP values of less than 0.05% are routinely necessary if results from the model are to provide a robust basis for economic appraisal. The RTMs were designed with economic appraisal in mind and, in the case of SWRTM, the %GAP criterion was set much lower in the development of the original model, to a value of 0.025%.

3.3.3 For assessment of the A303 Amesbury to Berwick Down scheme, this tighter %GAP criterion of 0.025% has been retained in the 'A303 Stonehenge SWRTM (DCO)' model. The flow change criterion has also been retained as per guidance, with the model needing to demonstrate link flow changes of less than 1% across 98% of modelled links or greater for four successive iterations.

3.3.4 The target measure of convergence should be the same for 'without-scheme' and 'with-scheme' assignments. This may require a different number of iterations for different network configurations and different matrices. Convergence is generally harder to achieve in congested conditions. Hence, more iterations may be required in the without-scheme network and in later forecast years.

3.3.5 Though this report is concerned with Base Year validation, it is important that the same assignment procedures and standards be used for the forecasting. The ultimate purpose of the model is to assess the benefits and impacts of the A303 Amesbury to Berwick Down scheme. When comparing the impact of a scheme in terms of traffic flows, journey times and economics, it is necessary to demonstrate that the differences between the 'without-scheme' and 'with-scheme' assignments are the result of real changes and not the result of modelling noise. This dictates the requirements for convergence and stability.

3.4 Matrix estimation measures and significance criteria

3.4.1 WebTAG Unit M3.1 §8.3 additionally suggests a set of measures and significance criteria against which the impacts of matrix estimation should be monitored. Four separate measures are identified against which the impacts of matrix estimation should be judged.

3.4.2 The impacts brought about by matrix estimation should not be so significant as to distort the underlying observed demand patterns at the expense of achieving validation standards and the guidance notes that, in some cases, it may be appropriate to accept lower validation standards so as not to exceed the significance criteria.

3.4.3 WebTAG notes that exceedances of the criteria should be examined and assessed for their importance for the accuracy of the matrices in the Fully Modelled Area.

3.4.4 The measures and criteria set forth in the guidance are given in Table 3-6.

Table 3-6: Significance of matrix estimation changes

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

3.5 Variable demand model realism testing and convergence criteria

3.5.1 The variable demand model (VDM) will adopt the same convergence criteria as those used across all of the RTMs. That is:

a. a demand / supply gap (%GAP) for the model system of 0.1%; and

b. a sub-area gap for the RoF of 0.2%.

3.5.2 Realism testing will be undertaken to ensure that the VDM responds to changes in car fuel cost, PT (rail) fare cost and car journey times appropriately. The model will be judged against the recommended elasticity ranges set out in WebTAG Unit M2, and by comparison to the values achieved in the standard version of SWRTM.

Table 3-7: Recommended Elasticity ranges

Test	High Elasticity Range	Low Elasticity Range
Average fuel cost (kilometres)	-0.35	-0.25
PT main mode fare (trips)	-0.9	-0.2
Car journey time (trips)	No stronger than -2.0	

Source: Table 6.2, WebTAG Unit M2 'Variable Demand Modelling'. DfT. March 2017.

4 Key features of the model

4.1 Introduction

4.1.1 This chapter of the report sets out the key features of the model. This provides an overview of the model with further detail on the processes used to refine the model set out in subsequent chapters.

4.2 Base year

General

4.2.1 The base year of the model is summer / autumn 2017. This represents a change from the 'standard' version of SWRTM (and the other RTMs), which represent an average Monday-Friday weekday in March 2015.

4.2.2 The rationale for the change in base year is necessary as a result of roadworks on The Packway, Larkhill being operational throughout the data collection window. This is explained in more detail in chapter 5. These roadworks were significant enough that they had the potential to influence and alter local trip movement patterns, which it would not have been possible to reflect in the rebasing of traffic counts to a 2015 year through application of annualisation and seasonality adjustment factors.

Neutral month model

4.2.3 The neutral month model represents the average Monday-Thursday weekday in October 2017. This is in accordance with the definition of a neutral month as per WebTAG Unit M1.2 §3.3.6, and is consistent with the period where the vast amount of new demand and traffic count data were collected.

Summer model

4.2.4 The summer month model represents an average Friday-Sunday from 15th July to 28th August 2017. This is consistent with the period for which new demand and traffic count data were collected.

4.3 Modelled Areas

4.3.1 WebTAG M3.1 §2.2.5 states that the modelled area should comprise the 'Fully Modelled Area' (including the Area of Detailed Modelling (AoDM) and the Rest of the Fully Modelled Area (RoFMA)) and the 'External Area'. This has been reflected in the construction and refinement of the networks and zoning system for the 'A303 Stonehenge SWRTM (DCO)' model.

4.3.2 The model comprises skeletal network detail and larger, more aggregate zones for the whole of Great Britain in the External Area, with progressively greater network detail and smaller, more disaggregate zones in the proximity of the Scheme. The External Area for the 'A303 Stonehenge SWRTM (DCO)' model is consistent with (and unchanged from) SWRTM DF3.0.

4.3.3 The Fully Modelled Area is comprised entirely of simulation coding, further details of the refinement for which are given in chapter 6.

4.3.4 The definitions of the sub-areas within the Fully Modelled Area have been refined, in-line with the development of a single-scheme focussed model. The following sections set out the definition of the Fully Modelled Area in SWRTM and subsequent refinement of the AoDM for the 'A303 Stonehenge SWRTM (DCO)' model.

South West Regional Traffic Model

4.3.5 SWRTM DF3.0 is designed to allow for the appraisal of schemes across the South West region. As a result, what would ordinarily be the AoDM for a scheme model is much larger in SWRTM. This has been termed as the Region of Focus (RoF).

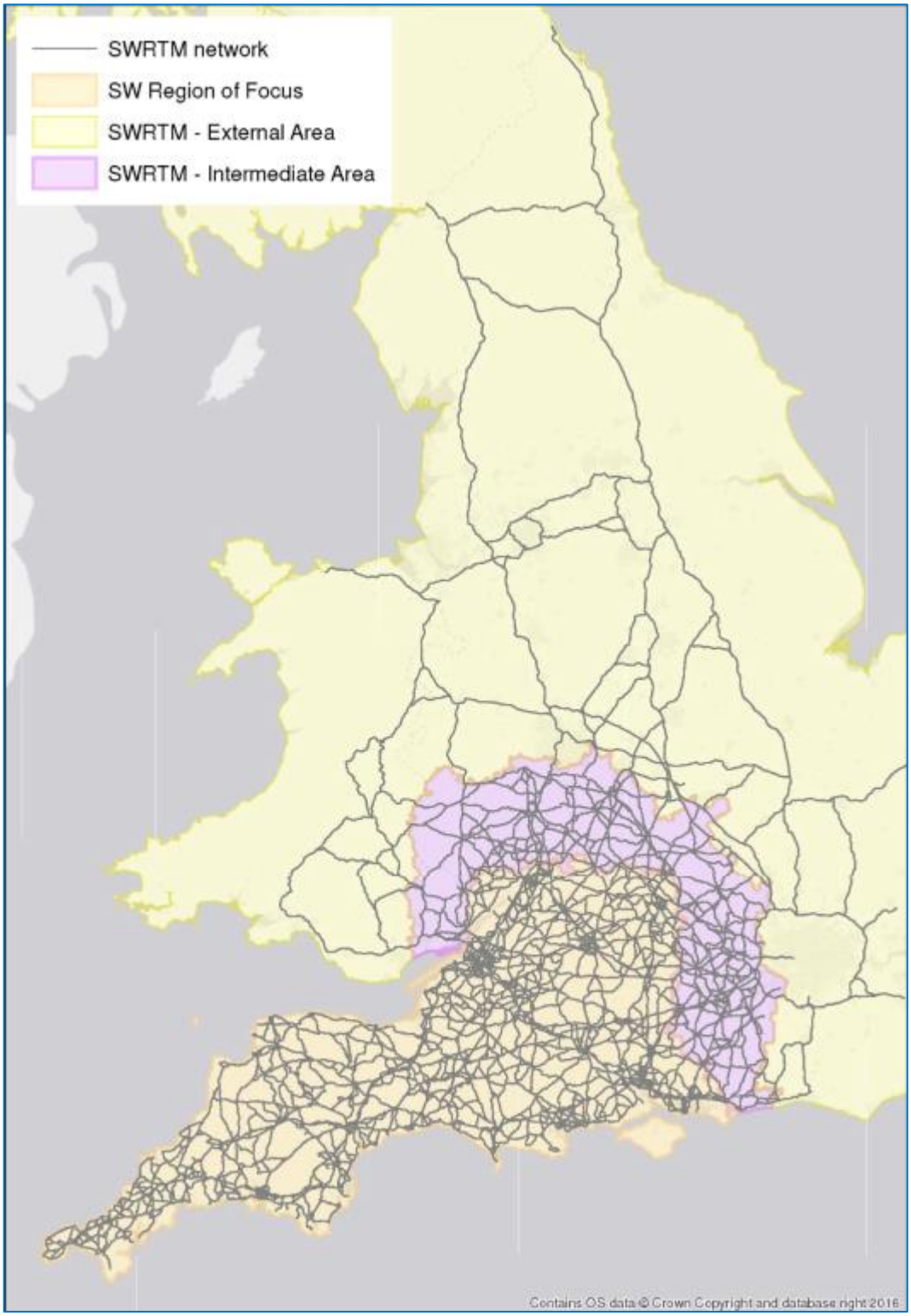
4.3.6 The RoF in SWRTM represents the fully modelled area and includes full demand relative to the modelled road network. It is fully simulated (including junction modelling).

4.3.7 Within the RoF, the modelled road network includes all motorways, A roads, B roads and any C roads that provide an important role in enabling strategic traffic movements within the model. Within the RoF, urban areas such as Bristol, Portsmouth, Southampton, Exeter and Plymouth are not modelled in detail and are instead coded with fixed speeds.

4.3.8 Outside of the RoF, the External Area is an important element of the model in allowing full trip costs to be modelled, i.e. those that start or finish in the RoF. It provides the routeing for trips into the RoF. The External Area is modelled as fixed speed network and does not include travel time responses to increased flow. The External Area covers the wider UK SRN.

4.3.9 Figure 4-1 provides an overview of the full SWRTM modelled areas. Further detail on the design and derivation of these areas is given in the SWRTM MVR.

4.3.10 The SWRTM RoF forms the Fully Modelled Area of the 'A303 Stonehenge SWRTM (DCO)' model. However, as noted below, a detailed scheme-specific AoDM has been derived for the purposes of the A303 Amesbury to Berwick Down scheme appraisal.



Source: Figure 6, South West Regional Traffic Model: Model Validation Report.

Figure 4-1: SWRTM Modelled Areas and Network Coverage

‘A303 Stonehenge SWRTM (DCO)’ model – Area of Detailed Modelling

4.3.11 WebTAG Unit M3.1 §2.2.1 and §2.2.5 state that “the geographic coverage of highway assignment models generally need to allow for the strategic re-routeing impacts of interventions” and that the Fully Modelled Area should be that over which the effects of the proposed intervention have influence. This is the case with the RoF for SWRTM, which include the key parallel or alternative strategic corridors to the A303 – principally the M4 / M5 and the M3 / M27 / A31 and A35 – in detailed simulation coding.

4.3.12 The same sections of WebTAG note that the Area of Detailed Modelling should encompass all areas over which it is certain that the proposed intervention will have significant impacts. In order to determine how wide this area should be, analysis was undertaken using the PCF Stage 2 model. The analysis included assessments of where changes in traffic volumes as a result of the Scheme were significant, along with comparison of derived Annual Average Daily Traffic (AADT) and Annual Average Weekday Traffic (AAWT) flows in accordance with initial criteria for noise and air quality sensitivities as set out in the Design Manual for Roads and Bridges (DMRB). The full methodology and analyses undertaken is given in Appendix A.

4.3.13 Figure 4-2 sets out the extents of the refined AoDM (highlighted in red), compared to the wider AoDM in the PCF Stage 2 model (highlighted blue) that was required for the assessment of multiple proposed scheme options. Figure 4-3 shows the AoDM (highlighted red) in the context of the Fully Modelled Area (blue) and External Area (green).

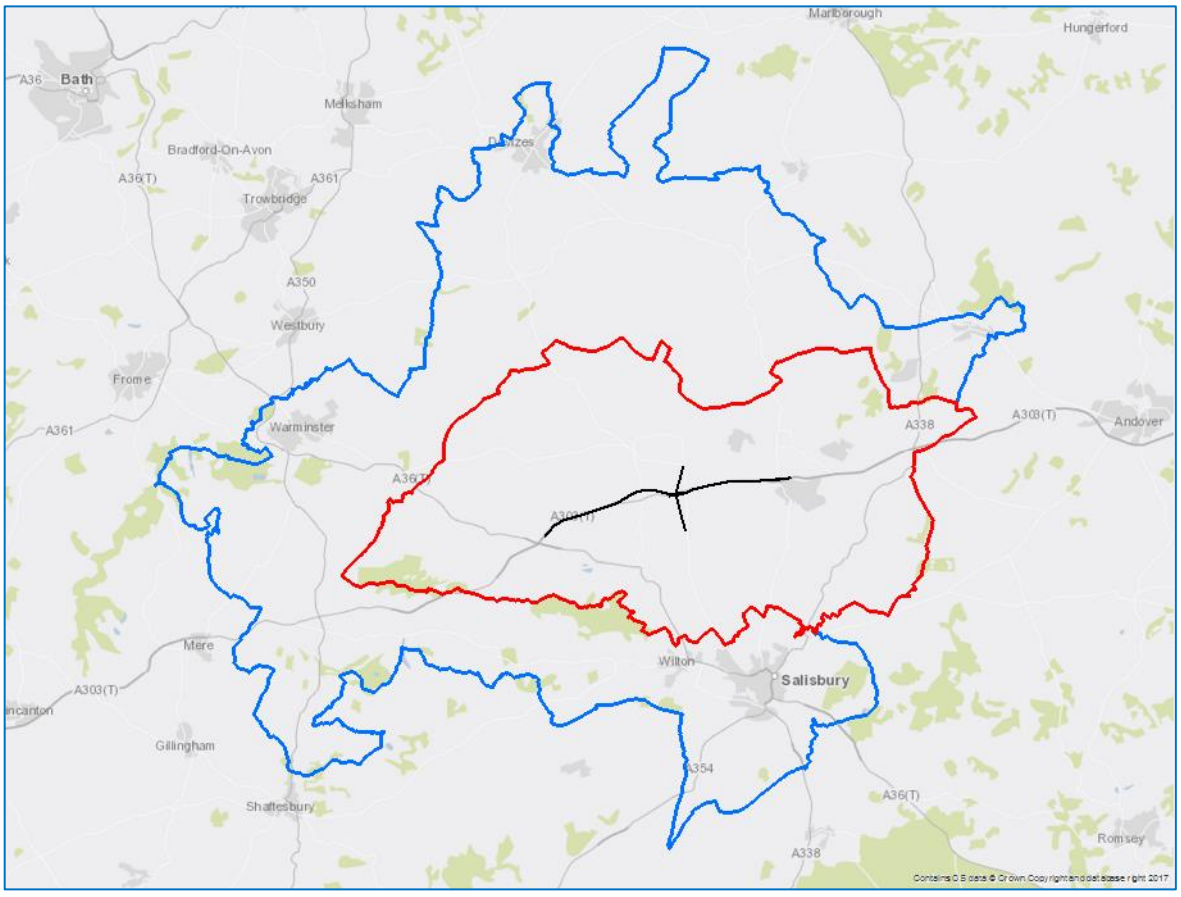


Figure 4-2: Refined Area of Detailed Modelling (red) for PCF Stage 3

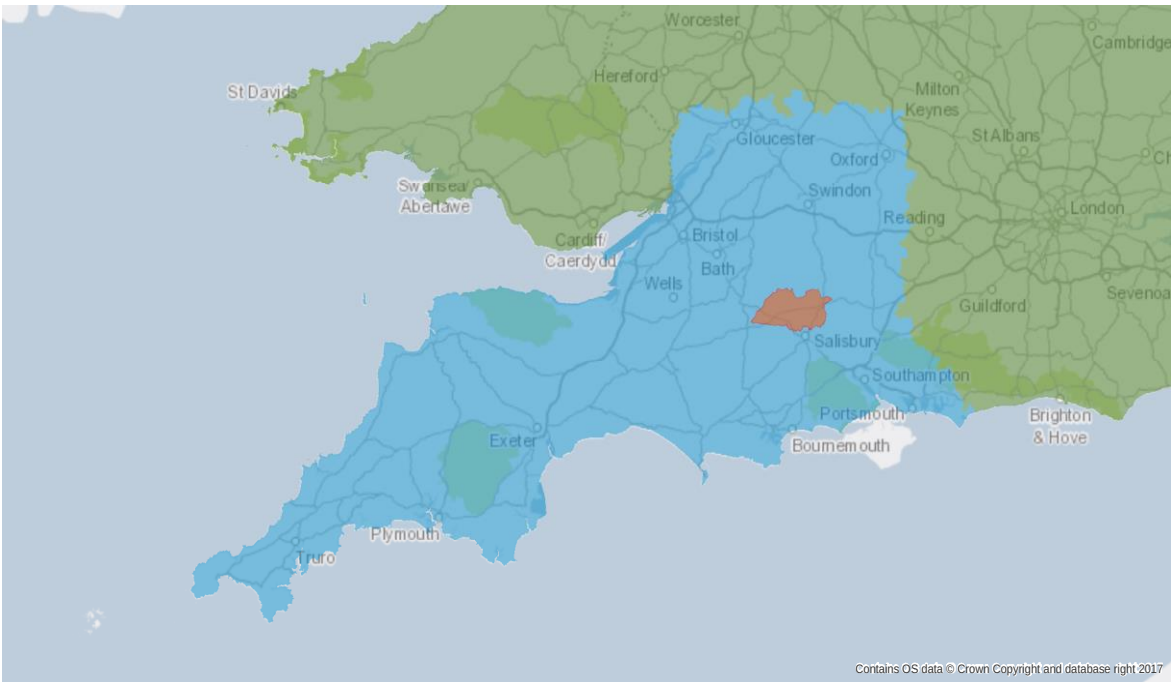


Figure 4-3: Modelled areas in 'A303 Stonehenge SWRTM (DCO)' model

4.3.14 As the figures show, the refined AoDM extends north on the Salisbury Plain, north of Larkhill and Bulford, and south to the northern extents of Wilton and Salisbury. The eastern extent of the AoDM extends to the east of the A338, whilst the area extends towards Warminster in the west, incorporating the A36.

4.3.15 Any alterations to the Scheme in advance of the DCO, either as a result of value engineering, operational review or review following public consultation are likely to be small and not significantly affect the alignment of the Scheme and thus the AoDM.

4.4 Zoning System

4.4.1 The zone system used in the 'A303 Stonehenge SWRTM (DCO)' model is a refinement of that in SWRTM DF3.0. The model zoning has been reviewed against the considerations set out in WebTAG Unit M3.1 §2.3.11. The guidance states that "a*n important feature of the zoning system for the Area of Detailed Modelling in a highway assignment model is that the resultant numbers of trips to and from individual zones should be approximately the same for most zones and that the numbers of trips to and from each zone should be some relatively small number, such as 200 or 300 per hour, to avoid unrealistically high loads appearing at some points in the network*".

4.4.2 The PCF Stage 3 model included some zones with trip-ends in excess of 500 Passenger Car Units (PCUs) in the AoDM, hence there was a need to disaggregate the zone system further in order to reflect current guidance. Additionally, the refined zones in the AoDM in the PCF Stage 2 model were not aligned with Census 2011 geographies as is noted as good practice in the guidance. Hence, refinement of the zoning system in the AoDM has made use of the SWRTM DF3.0 model as a starting point.

4.4.3 WebTAG Unit M3.1 §2.3.9 also notes that, “If zones are significantly larger than implied by the detail of the network, it will often be impossible to locate zone connectors realistically. This may lead to distorted traffic flows on nearby links and turning movements at nearby junctions, which may themselves distort traffic patterns elsewhere in the network. In urban area models in particular, zones should be small enough to avoid this type of problem”. Thus, zone loading and the surrounding network has formed an important part of the considerations of zonal disaggregation.

Zonal disaggregation in the AoDM

4.4.4 The zoning system in and around the AoDM has been fully reviewed against the guidance provided in WebTAG Unit M3.1. The primary focus in disaggregating the zoning system was to ensure that zones were small enough so as to target the 200 to 300 vehicles per hour by zone in the AoDM and to ensure appropriate and realistic loading onto the highway network (noting additional detail to be added).

4.4.5 The initial review therefore plotted the trip-ends by zone for each of the time periods, with a focus on the AoDM, for SWRTM DF3.0 and for the PCF Stage 2 model, which had a more detailed zoning system in the AoDM. Trip end plots for the average PM hour are shown in Figure 4-4 and Figure 4-5 respectively.

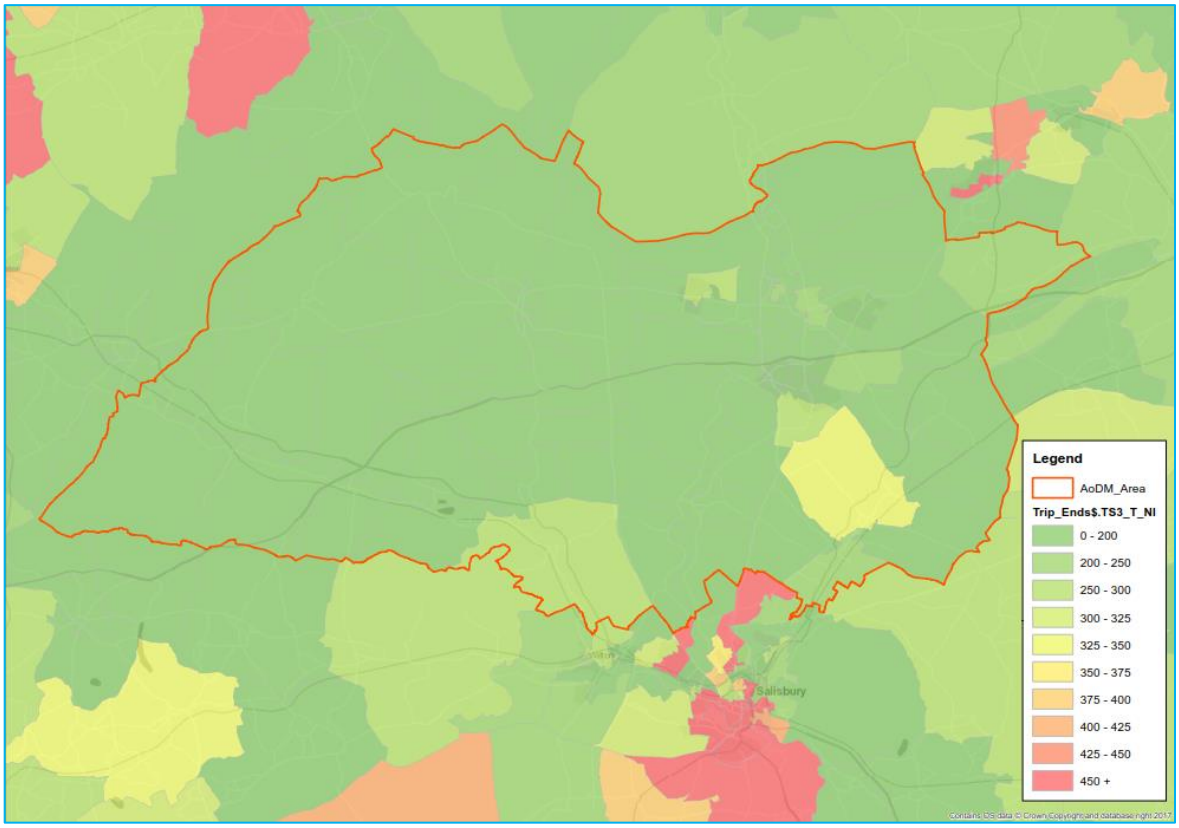


Figure 4-4: SWRTM DF3.0 trip-ends by zone (average PM hour)

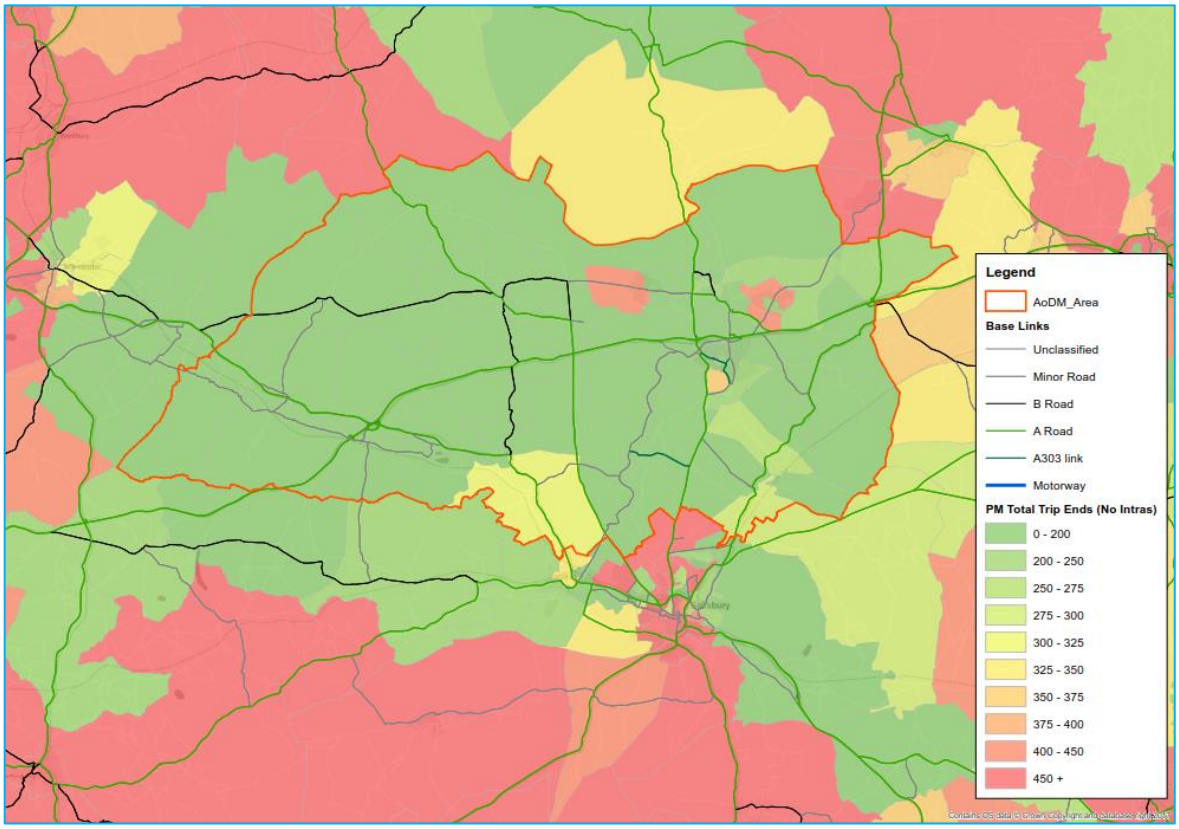


Figure 4-5: PCF Stage 2 model trip-ends by zone (average PM hour)

4.4.6 As the figures show, the trip-ends from SWRTM DF3.0 within the AoDM show only one slight exceedance of the 300 trip end criteria. However, there are a number of exceedances just outside of the AoDM, including at Tidworth and in Salisbury.

4.4.7 The PCF Stage 2 model shows more exceedances than the SWRTM DF3.0 model, despite having a more disaggregate zone system. However, demand has been adjusted locally in these models to enhance the non-strategic trip representation. Exceedances in the AoDM are noted in south Amesbury, and particularly in Larkhill and Bulford. Just outside the AoDM, exceedances are larger – Salisbury and Tidworth are noted as in SWRTM DF3.0, but so too are some larger rural zones.

4.4.8 This analysis provided a focus for zonal disaggregation. As the PCF Stage 2 model zones were not aligned with Census 2011 boundaries, disaggregation made use of SWRTM DF3.0 zoning as the starting point.

4.4.9 A set of rules was defined which informed how the zones would be disaggregated. This took into account the land-use and natural / highway boundaries of the zone when disaggregating as noted in WebTAG Unit M3.1 §2.3.2. These existing zones were then split using 2011 Census Output Areas as the primary building blocks for the updated zones. Zone disaggregation was undertaken at a lower level than Output Area in the AoDM where it was necessary to ensure that zones did not straddle the A303. The disaggregation rules were:

a. the zone boundary must not straddle Output Area boundaries;

b. where appropriate, natural barriers (rivers, railways, motorways or other major roads) should be used – in particular, zones should not straddle the A303;

c. differences in land use (urban and rural) should inform the zonal division;

d. where reasonably practicable, the division should allow the definition of clearly identifiable and unambiguous points of access onto the modelled road network;

e. it was necessary to subdivide zones with similar land uses, focusing on distinct urban/rural components of the zone in order to be able to reduce further the number of trips to and from the zone however, where less distinction exists, the zones were instead split using the most appropriate Output Area boundaries; and

f. it was important to avoid sudden changes in average zone size at the boundary between the area type classifications ('Area of Detailed Modelling' 'Fully Modelled Area' 'External Area').

4.4.10 The outcome of the above review was a zone system comprising 2,078 zones, compared to the 1,901 zones in SWRTM DF3.0. The additional 177 zones provide additional detail in and around the AoDM, to better represent local trip movements and loading onto the network.

4.4.11 Figure 4-6 provides a comparison of the SWRTM zones and the disaggregated 'A303 Stonehenge SWRTM (DCO)' model zones in the vicinity of the AoDM. SWRTM zoning is shown in black, whilst the disaggregated zoning of the 'A303 Stonehenge SWRTM (DCO)' model is given in red. The AoDM boundary is shown in blue.

4.4.12 As the figure demonstrates, there has been a large amount of disaggregation in the AoDM and in the surrounding areas to address the exceedances previously noted. Disaggregation at Tidworth, Salisbury and Wilton is notable. Additionally, many of the larger rural zones have been disaggregated following the review of trip-ends from the PCF Stage 2 model, with disaggregation as far north as Westbury and Devizes, as far east as Andover, to rural areas south of Salisbury, and as far west as Mere.

4.4.13 Significant disaggregation has also taken place in the centre of the AoDM, with disaggregation undertaken to better represent land-uses (known and future) in Larkhill, Durrington, Amesbury, Solstice Park and near to Boscombe Down. This is shown in Figure 4-7, which also shows the further disaggregation of the zoning system to ensure that zones do not span the A303.

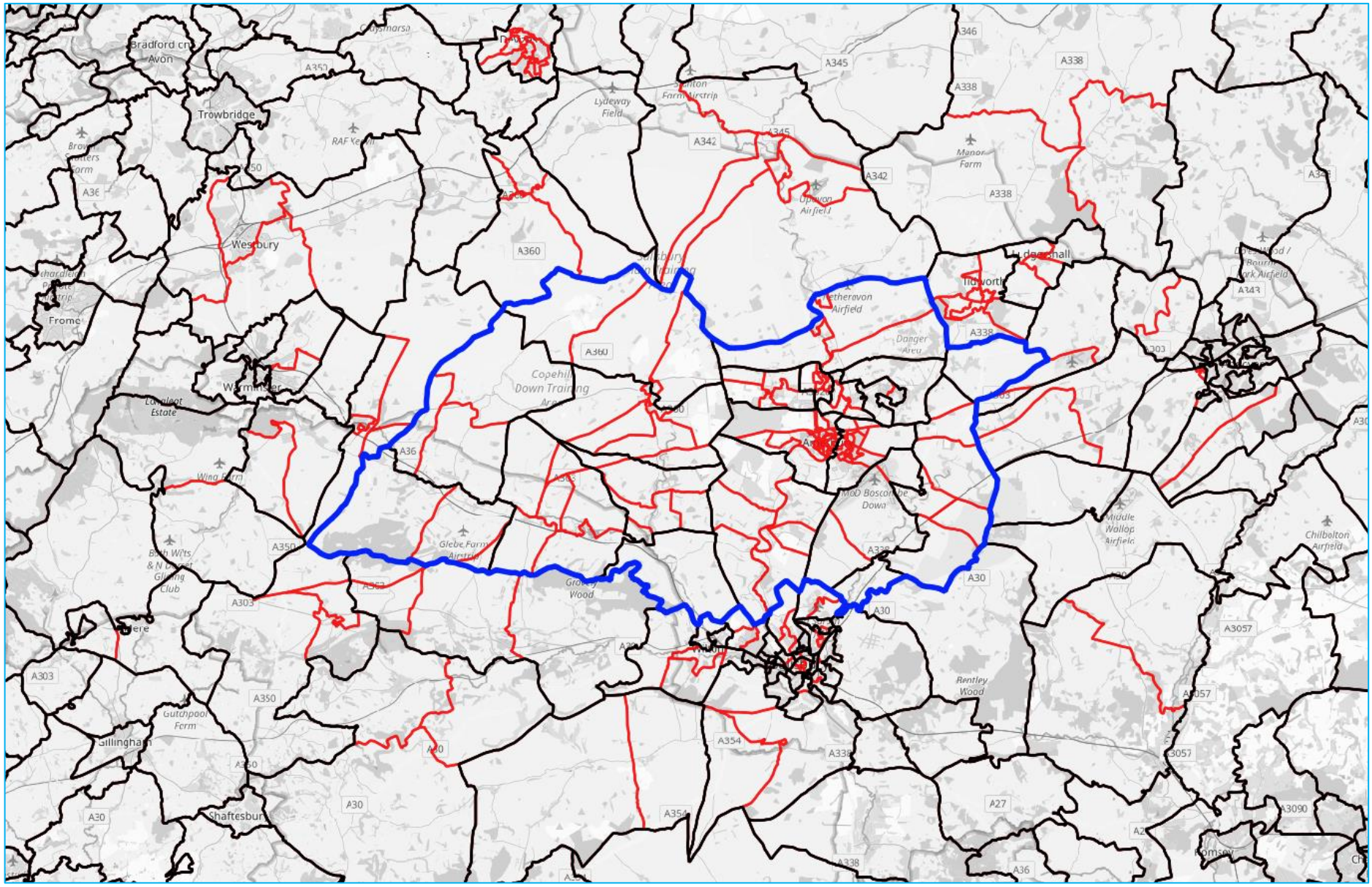


Figure 4-6: Overview of disaggregated zoning system (red) for 'A303 Stonehenge SWRTM (DCO)' model

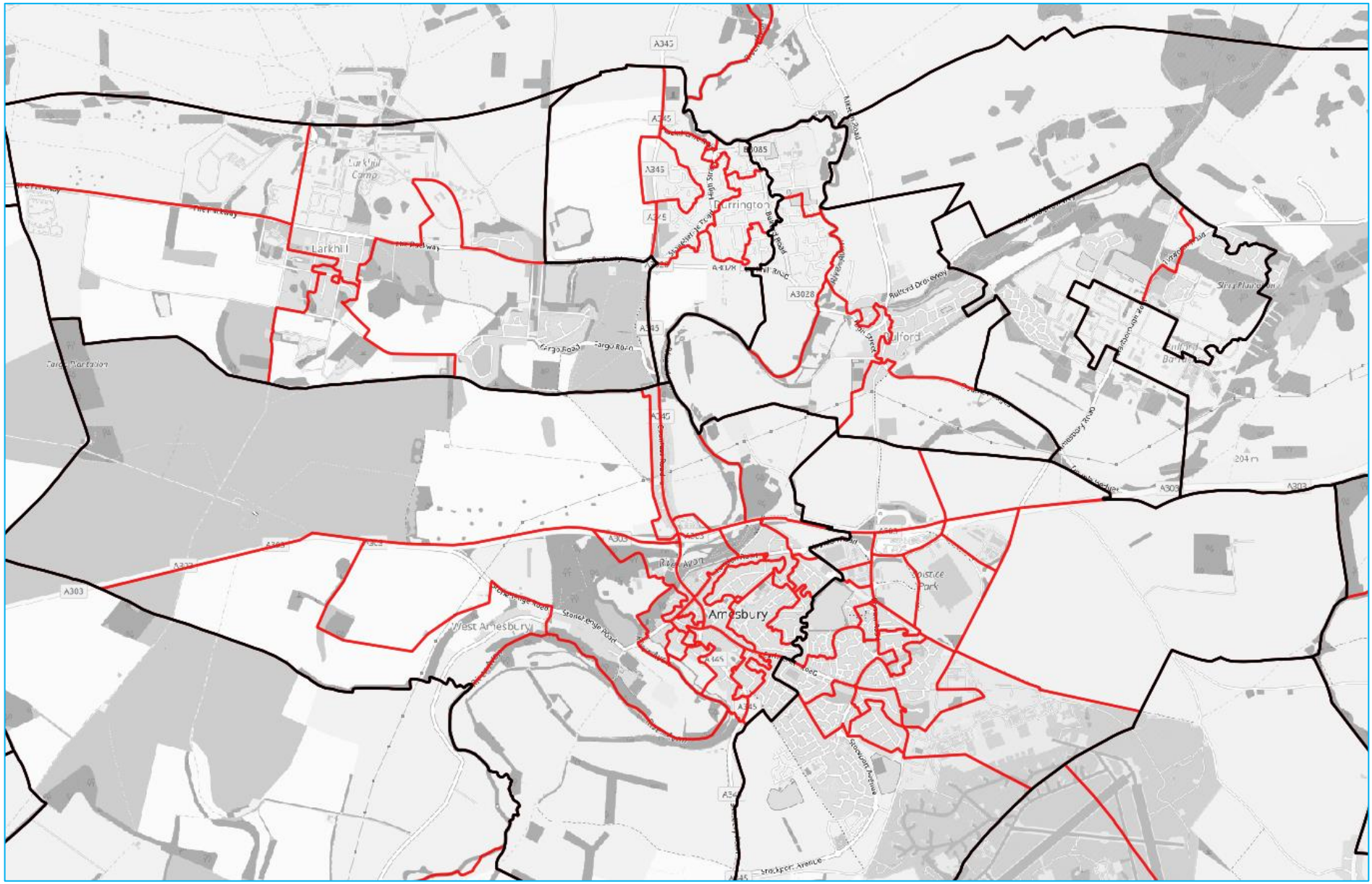


Figure 4-7: Detailed overview of zonal disaggregation around Amesbury, Larkhill and Durrington

4.5 Time periods

Neutral model time periods

4.5.1 The neutral month time periods are consistent with the standard SWRTM DF3.0 model from which the 'A303 Stonehenge SWRTM (DCO)' model has been derived.

4.5.2 The assignment models cover a single average hour across three time periods, the modelled time periods being:

a. AM average hour (07:00 to 10:00);

b. interpeak average hour (10:00 to 16:00); and

c. PM average hour (16:00 to 19:00).

Summer model time periods

4.5.3 The time period to be modelled for the summer period model was determined through analysis of the available traffic flow and journey time data for the Friday, Saturday and Sunday summer periods (between 15th July and 28th August). Analysis of this data identified that the period from 10am to 7pm generally had markedly longer journey times and higher traffic flows than off peak conditions; periods outside of these times experience flows and journey times with limited delays and closer to free flow conditions.

4.5.4 The summer assignment model therefore covers a single average hour across the following time period:

a. summer average hour (10:00 to 19:00).

4.6 User classes

4.6.1 Five user-classes are represented in the 'A303 Stonehenge SWRTM (DCO)' highway assignment model. These user-classes are consistent between the neutral month and summer time period models and are as follows:

b. car business;

c. car commute;

d. car other;

e. light goods vehicles (LGVs); and

f. heavy goods vehicles (HGVs), comprising both ordinary goods vehicles type 1 (OGV1) and ordinary goods vehicles type 2 (OGV2).

4.6.2 LGV demand is assumed to be a mix of freight and personal business trips based on the average proportions outlined in the WebTAG Databook.

4.6.3 It should be noted that the public transport demand included in the variable demand model covers three separate user-classes, all covering rail mode. These are:

a. rail commute;

b. rail other; and

c. rail business.

4.7 Assignment methodology

General

4.7.1 The assignment methodology used in the model is a multi-user-class equilibrium assignment. Wardrop's first principle of traffic equilibrium is that all trips will seek to minimise their cost of travel between their origin and destination. A number of different routes will normally be used between zone pairs. This results from differences in the actual location of origin and destination within the zone, differences in the relative values of time and distance between users, and changes in route costs due to congestion.

4.7.2 The assignment process adopted takes account of the impact of flows on route costs by running a series of iterations. In the first iteration, trips will be assigned to the best route in uncongested conditions. Costs will be recalculated under these flow conditions and the demand assigned again for the next iteration. The iteration process will be complete when all trips are minimising their costs under prevailing traffic conditions. In general, the iterative process used in assignment algorithms will not converge completely. Hence, there will be an error in the assignment resulting from a failure to ensure that all trips minimise their cost of travel.

4.7.3 This assignment method is commonly used across steady-state assignment models. The convergence of the assignment is measured in terms of both proximity and stability:

a. proximity to equilibrium is measured by the percentage GAP (%GAP) and is considered the most valuable measure of overall convergence. The %GAP is the difference between the current total vehicle costs on the assigned routes and the total vehicle costs if all drivers were to use minimum cost routes with the costs FIXED. This measure is then normalised by dividing by the total vehicle costs and expressing it as a %; and

b. stability means that flows and costs are stable between successive iterations and is important for the reporting of flows and delays. This is usually measured by the percentages of links with small flow or cost changes which provide pragmatic views of the stability of the assignment.

4.7.4 The criteria used to determine if the assignments are converged are given in Table 3-5.

Neutral month time period models

4.7.5 As the modelled time periods all cover a single average hour over a three (AM and PM) or six hour interpeak period, there is no requirement to model a pre-peak hour through a proxy assignment. Therefore no passing of queues (a 'PASSQ' assignment) is undertaken.

4.7.6 All bus routes have been modelled directly as fixed routes within the highway network. There is also no requirement to specifically assign or represent other vehicle types on fixed routes prior to general traffic being assigned. Therefore, no use is made of a 'pre-load' facility or assignment in the neutral month time period models.

Summer time period models

PASSQ

4.7.7 The standard SATURN assignment represents only a single hour and does not therefore reflect the build-up of queues over a longer period. Initial testing demonstrated that a cordoned model with a constrained capacity past the stones (as described in section 6.5) was not capable of representing the observed summer delay unless the assumed capacity on the A303 past Stonehenge was reduced to a level that constrained the downstream flow unacceptably.

4.7.8 The PASSQ assignment method has therefore been used for the summer model. This models queued flows building up over a longer period, better representing the extended summer time period (an average hour between 10:00 and 19:00). The demand is representative of an average hourly flow across the period, thus the demand for the PASSQ assignment is 100% of the demand of the main hour assignment.

Preload

4.7.9 Analysis from ANPR journey time data on the A303 and the alternative routes on the Packway and A36 / A360 has shown that the journey times are not in equilibrium. The journey times on the A303 are higher when compared to the equivalent route via the A360 or the Packway. There is evidence therefore that traffic is choosing to stay on the A303, instead of diverting to other routes, even if those routes would result in a lower overall cost. SATURN assigns traffic using the Wardrop equilibrium algorithm, which assumes traffic has perfect knowledge of the network. The evidence suggests that this is not the case in the summer month and therefore there is a need to adapt the standard assignment method to represent the observed routeing behaviour in the summer time period.

4.7.10 This has been represented using a pre-load assignment with a proportion of traffic assigned first using uncongested times, implicitly representing a routeing decision that does not reflect perfect knowledge of the potential to reduce journey time by diverting onto the local road network; the observed behaviour.

4.7.11 In order to represent this, an initial assignment of car other trips (assuming that business and commute would be more familiar with and willing to make local network routeing decisions) was analysed to identify the trips routeing along the A303 past Stonehenge.

4.7.12 This matrix included a wide range of journeys. Where travellers are making short distance trips, it would be reasonable to assume that many are made by local residents who would be familiar with the local road network and associated journey times and more likely to choose alternative routes to avoid delay. Therefore a factor depending on the distance of the trip has been applied to the identified trips to retain a larger proportion of longer distance trips where the driver can be expected to be less familiar with the local network conditions. Details of these banding factors appear in the following table.

Table 4-1: Preload select link reduction factors

Trip Distance (km)	Reduction factor
Lower than 50	0.1
Between 50 and 75	0.5
Between 75 and 100	0.8
Greater than 100	1.0

4.7.13 These distance-weighted trips are applied to split the identified part of the home-based other demand between a sixth user-class (used for the preload) and with the residual trips retained in the original user class 3 (car other), so that the total matrix values stay the same.

4.8 Generalised costs

4.8.1 Route choice in the assignment model is based on the generalised cost, whereby:

$$\text{Generalised Cost} = \text{Time} + \frac{(\text{Vehicle Operating Cost per km} \times \text{Distance})}{Value\ of\ Time} + \frac{road\ user\ charges}{Value\ of\ Time}$$

4.8.2 Within the highway assignment model, the value of time (VoT) is expressed as the Pence Per Minute (PPM), whilst the vehicle operating cost (VOC) is expressed as the Pence Per Kilometre (PPK).

4.8.3 PPM and PPK values have been provided by Highways England TPG using its internal spreadsheet. This is aligned with the standard formulation given in WebTAG Unit A1.3 and the values and parameters using information provided by the DfT as an early release of the May 2018 WebTAG Databook.

Value of time (Pence Per Minute)

4.8.4 The Highways England TPG spreadsheet provides PPM values for 2017 by vehicle type and journey purpose.

4.8.5 PPM values for the three car user-classes in the 'A303 Stonehenge SWRTM (DCO)' model are used directly from this spreadsheet, as the WebTAG Databook provides parameters and values for car business, car commute and car other trips separately.

4.8.6 LGVs (user class 4 in the assignment model) are a composite of LGVs on work purpose and those which are not. The fleet split for these has been taken from the WebTAG Databook, which indicates that 88% of LGVs are work related purposes, and 12% are non-work. This proportion, along with LGV occupancy values, does not change by time period.

4.8.7 HGVs (user class 5 in the assignment model) comprise OGV1 and OGV2. 100% of HGVs are assumed to be work related and have an occupancy of 1.0, in accordance with the WebTAG Databook.

4.8.8 WebTAG Unit M3.1 §2.8.8 notes that, for HGVs, it is possible to apply an owner / operator factor of 2.0 to the driver values of time in order to take account of the influence of the owner on routeing. WebTAG notes that, should this factor be applied, a sensitivity test should be undertaken to demonstrate its impact. An assessment of the impact was made on the PCF Stage 2 model prior to beginning the calibration of the 'A303 Stonehenge SWRTM (DCO)' model – the impacts were deemed to be modest in the AoDM and thus the factor has not been applied.

Vehicle operating cost (Pence Per Kilometre)

4.8.9 Vehicle operating costs comprise both fuel and non-fuel related elements. For LGVs, both elements assumed the default 88:12 split of work / non-work purposes noted above. For HGVs, separate fuel and non-fuel costs are given for OGV1 and OGV2.

4.8.10 As the assignment model only models a single HGV user-class it has therefore been necessary to weight the vehicle operating costs. Whilst SWRTM DF3.0 assumed a standard 60:40 split for OGV1 and OGV2, the data collection exercise for the A303 Amesbury to Berwick Down project included a large number of manual classified counts, which provide a local estimate of the split of OGV1 and OGV2 through the AoDM. These data were analysed, with an overall split of OGV1 and OGV2 calculated. These splits are set out in Table 4-2 below and have been used in the weighting of the PPK values for use in the assignment model. It should be noted that the proportion of OGV2 is much greater than that assumed in SWRTM DF3.0, likely the result of the role of the A303 as the principal and identified HGV route between London and the South West and the large number of distribution centres in the vicinity of Solstice Park.

Table 4-2: OGV1 and OGV2 splits derived from MCC data

Survey period	HGV sub-class	Proportion across all 2017 MCC surveys
Neutral (October 2017)	OGV1	35.6%
	OGV2	64.4%
	Total	100%

Final PPM and PPK values used

4.8.11 The final PPM and PPK values used in the assignment model are given in Table 4-3.

Table 4-3: PPM and PPK values (2010 prices, 2017 values)

Vehicle Type	Purpose	PPM				PPK			
		AM	IP	PM	Summer	AM	IP	PM	Summer
Car	Business	30.61	31.36	31.05	30.86	12.34	12.34	12.34	12.34
	Commute	20.53	20.86	20.60	20.53	5.87	5.87	5.87	5.87
	Other	14.16	15.08	14.83	14.65	5.87	5.87	5.87	5.87
LGV	Average	21.63	21.63	21.63	21.55	13.51	13.51	13.51	13.51
HGV	Average	21.96	21.96	21.96	21.87	48.07	48.07	48.07	48.06

4.9 Capacity restraint mechanisms

4.9.1 Capacity restraint mechanisms are an important function of the network coding. They ensure that the effects of congestion, both in the base year and in forecast models, are incorporated and appropriately reflected on links and at junctions. This ensures appropriate route-choice through the network.

4.9.2 The use of capacity restraint mechanisms in the model has followed the same guidelines as used in the RTMs, with consistency ensured with the SWRTM DF3.0 model from which the 'A303 Stonehenge SWRTM (DCO)' model has been developed. Outside of the AoDM and its immediate environs, no changes have been made to the representation of capacity restraints.

Junction modelling

4.9.3 As described in WebTAG Unit M3.1 §2.2.5 the model comprises the Fully Modelled Area (incorporating the Area of Detailed Modelling and the Rest of the Fully Modelled Area) and the External Area. The external network has been coded using buffer link coding, assuming fixed link speeds, with no detailed node coding. Within the Fully Modelled Area the network has been modelled with a greater level of detail, including detailed junction modelling with blocking back; signal timings; lane coding and saturation flows by turn. Standard saturation flows have been used at all new and reviewed junctions, consistent with the Highways England RTM coding manual. Turn radii (tight, average, wide) have been selected by observing junction dimensions in freely available aerial and 'Street view' photography. Further detail on junction coding and refinements made in the AoDM is given in chapter 6, including specific adjustments required in the summer time period to reflect the impact of 'rubbernecking' reducing capacity past Stonehenge.

Speed flow relationships

4.9.4 Speed flow curves have been applied to the majority of simulation links. The exceptions – as per the RTM coding guidance – are the centre of large urban areas and the buffer network, which have fixed speeds derived from Trafficmaster data.

4.9.5 WebTAG Unit M3.1 §2.9.8 states that “in urban areas within the Fully Modelled Area, the use of fixed cruise speeds is advised in conjunction with junction modelling, rather than using link-based speed/flow relationships”. This is due to the fact that delays within these areas are more likely to be caused by interactions at closely spaced at-grade junctions rather than the volume of traffic on links. Fixed speeds are coded within the external buffer to represent routeing to the Region of Focus, following RTM guidance and practice.

4.9.6 All speed flow curves used in any refinement activity have been inherited from the RTM coding manual. Some benchmarking of these has been undertaken to determine whether or not those standard rural single carriageway and Dual 2 All Purpose (D2AP) curves are applicable for the complex issues observed on the A303 past Stonehenge. Further detail on the use of speed flow curves and refinements made in the AoDM is given in chapter 6.

4.9.7 Figure 4-8 highlights the links within and adjacent to the AoDM that have speed flow curves coded (red). Links without speed flow curves are highlighted blue.

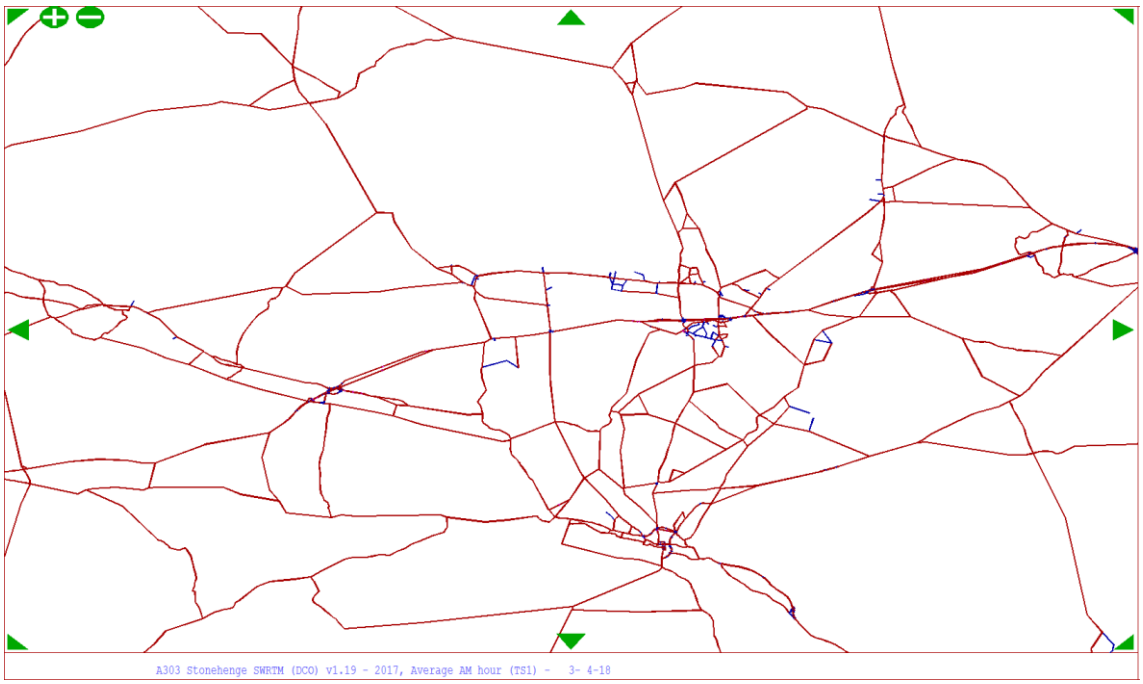


Figure 4-8: Links with speed flow curves applied, Area of Detailed Modelling

5 Data summary

5.1 Introduction

5.1.1 This chapter summarises the data used in the refinement of the 'A303 Stonehenge SWRTM (DCO)' model and the Operational models.

5.1.2 This chapter does not analyse the data collected for the project in detail. The separate Transport Data Package (itself a PCF product) encapsulates all of the data gathered to support the transport analysis used to underpin the model development. This information is summarised in the Transport Data Package, Appendix A of the Combined Modelling and Appraisal Report (Application Document 7.5).

5.2 Summary of origin destination data

5.2.1 A number of different sources of origin destination (O-D) data have been collected to improve the representation of demand within the study area. These build on the demand development work undertaken as part of the standard SWRTM DF3.0 model, which made extensive use of mobile phone origin destination (MPOD) data to derive trip demand matrices.

5.2.2 A summary of the origin destination data used in the development of the SWRTM DF3.0 matrices is given in chapter 7. Further details are given in the SWRTM MVR and associated Traffic Data Collection Report. The remainder of this section focuses on new origin destination data collection undertaken for the refinement of the 'A303 Stonehenge SWRTM (DCO)' model.

Automatic number plate recognition surveys

5.2.3 Automatic number plate recognition (ANPR) surveys were carried out for three days during the summer period (Friday 18 August 2017 to Sunday 20 August 2017) and three days during the autumn period (Tuesday 3 October 2017 to Thursday 5 October 2017). ANPR cameras were positioned at the locations shown in Figure 5-1 and listed in Table 5-1. At each camera site, 'control counts' were undertaken using ATCs, with the exception of the survey locations on the A303, where video cameras were used in the interest of safety.

5.2.4 The purpose of the ANPR surveys is to refine O-D estimates in the prior trip matrices through the AoDM, enhancing both local and strategic traffic representation in the strategic model; and secondly to provide camera-to-camera travel times against which the Operational Model can be validated.

5.2.5 On review of the ANPR data, it was noted that on Thursday 5 October 2017 there was an accident on the A303 at Chicklade (approximately 23 km west of Stonehenge). The accident, which happened in the early afternoon, resulted in the A303 being closed eastbound between the A350 and the A36, albeit being subsequently reopened by mid-afternoon. As a result of this incident, none of the ANPR analyses from this day have been used to inform either the strategic or operational traffic models.

5.2.6 Further details on a review of the ANPR data and their suitability for use are given in the Transport Data Package, Appendix A of the Combined Modelling and Appraisal Report (Application Document 7.5). Details on the use of ANPR data in the refinement of the strategic model trip matrices are given in chapter 7, whilst use of the data for Operational Model purposes is given in chapter 13.

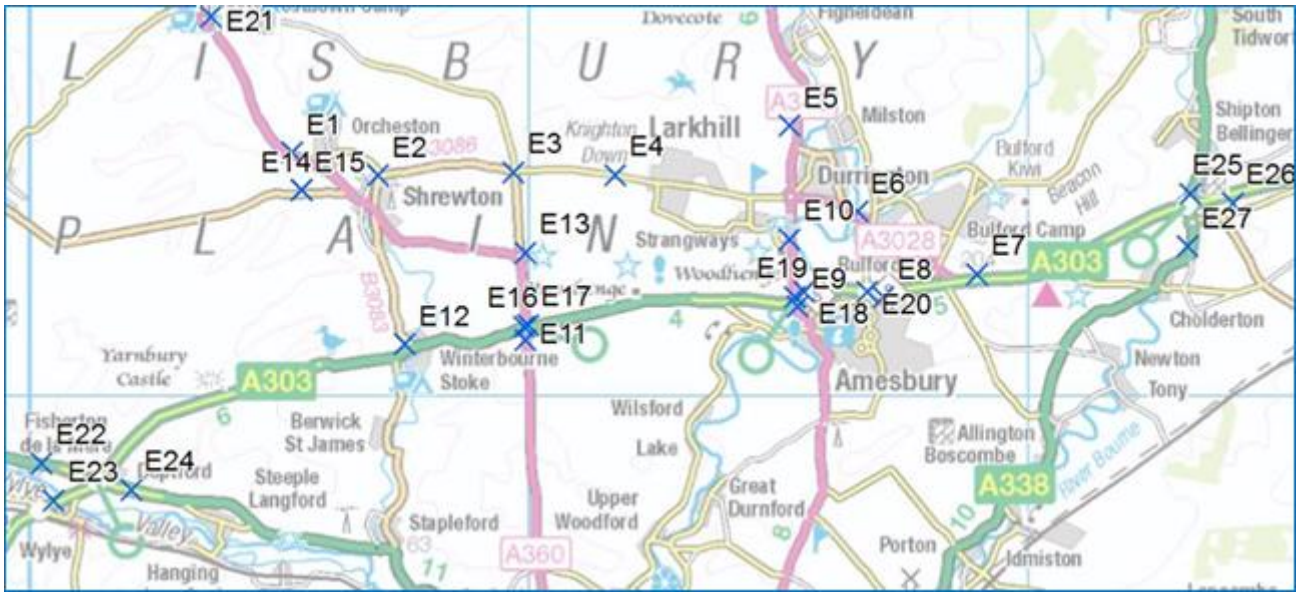


Figure 5-1: Location of ANPR sites

Table 5-1: Description of ANPR camera locations

Site ref	Junction description	Site ref	Junction description
E1	A360: West of Eltson Lane turning	E15	Chitterne Rd: West of A360
E2	High St: South of London Rd	E16	Longbarrow Rdbt E/B exit
E3	B3086: South of the Packway	E17	Longbarrow Rdbt W/B exit
E4	The Packway w of Brackenbury Rd	E18	Countess Rdbt W/B exit
E5	Netheravon Rd: North of Hackthorne Rd	E19	Countess Rdbt E/B exit
E6	A3028: West of Church Lane	E20	A303 at Solstice Park Overbridge
E7	A303: East of Double Hedges	E21	A360: West of Elston Lane turning
E8	Solstice Park Ave: East of Meridian Way	E22	A36, west of A303 junction
E9	A345: South of River Avon	E23	A303, south of A36 junction
E10	A345: South of Fargo Rd	E24	A36, east of A303 junction
E11	A360: South of A303	E25	A338, north of A303 junction (existing ATC site)
E12	A303: West of B3083	E26	A303, east of A338 junction (existing ATC site)
E13	Stonehenge Visitors Rd	E27	A338, south of A303 junction (existing ATC site)

E14	Chitterne Rd: West of A360		

Stonehenge Visitor Centre interviews

5.2.7 Visitors to the Stonehenge Visitor Centre were interviewed during both the summer and autumn survey period. Survey dates were as follows:

a. Saturday 26, Sunday 27 and Monday 28 August 2017 (summer); and

b. Tuesday 3, Wednesday 4 and Thursday 5 October 2017 (neutral).

5.2.8 Surveyors were positioned on the main entrance path to interview visitors as they walked from the main car park to the visitor centre. Visitors that arrived by coach at the designated coach car park were not interviewed.

5.2.9 The primary purpose of the interviews was to ascertain the origin and destination of visitors to the centre in order to refine the local demand in the strategic model. The survey sought to obtain full origin and onward destination data to a postcode level of accuracy and also asked questions on occupancy, mode and journey purpose. Further details on the responses, average vehicle occupancies and mode composition are given in the Transport Data Package, Appendix A of the Combined Modelling and Appraisal Report (Application Document 7.5).

5.2.10 During the summer surveys, information on onward destination was not correctly collected by the survey team. Therefore, a separate method to infer onward destinations in the summer has been derived. This is discussed in the development of the trip matrices from the data in chapter 7.

5.2.11 Associated traffic counts were undertaken at the entry / exit of the Visitor Centre car park onto the A360, which have been used to expand the interview records.

Highways England Trip Information System (TIS) data

5.2.12 The representation of a summer time period requires an estimate of demand in the summer covering the entire modelled area represented by SWRTM. SWRTM (as per all of the RTMs) has only been developed to represent demand for three average hour periods in a neutral month.

5.2.13 It was decided at the outset of the development of the model that it was neither practical within the timeframes of the scheme programme nor desirable to produce summer demand matrices from mobile phone data following the same process as was undertaken for the development of the neutral month SWRTM DF3.0 matrices. However, mobile phone data have been used to derive an initial proxy summer matrix from the neutral month demand, which has subsequently been enhanced using local data collected and outlined herein.

5.2.14 The Trip Information System (TIS) consists of origin/destination matrices for motorised road or rail trips and has been produced for Highways England by Telefónica (owner of the O_2 network) using data extracted from its UK mobile phone network. It should be noted that the TIS data are a refinement of the Provisional Data used in the development of the neutral month model RTMs.

5.2.15 The person trip matrices extracted from the TIS are the average number of trips for the specified dates, times and trip types.

5.2.16 TIS data were obtained for the following neutral month interpeak and summer time periods, noting the requirement to cover a minimum of 20 days:

a. 10:00 to 16:00 for weekdays between 26th February and 24th March 2016 (inclusive) – 20 days; and

b. 10:00 to 19:00 for Fridays, Saturdays and Sundays between Friday 15th July and Sunday 28th August 2016 (inclusive) – 21 days.

5.2.17 The TIS data have been extracted for the zone system shown in Figure 5-2. Within the South West region and the areas immediately adjacent, these zones are formed by historic counties. Outside of the South West the zones are formed by Government Office Regions (GOR).

5.2.18 The TIS data have been used to calculate adjustment factors that have been applied to the SWRTM prior 2015 weekday interpeak matrices in order to represent the summer weekend demand. Further detail on this process is given in chapter 7. This process was undertaken collaboratively with the project team delivering the A303 Sparkford to Ilchester scheme to ensure a consistent approach.

Figure 5-2: Zonal system at which TIS data have been used

DfT Continuing Survey of Roads Goods Traffic Great Britain (CSRGT GB)

5.2.19 CSRGT data have been obtained from the DfT's Road Statistics team in order to enhance the representation of HGV trips on the A303 corridor and through the AoDM.

5.2.20 The existing representation of HGVs in SWRTM makes use of the DfT's Base Year Freight Matrices (BYFM), which are from 2006. The CSRGT data have therefore been obtained to enhance the trip representation in the 'A303 Stonehenge SWRTM (DCO)' model.

5.2.21 CSRGT data are not a complete record of HGV movements across the UK. Instead, the data represent a snapshot of a random sample of UK-based HGV operators over a two-week period. This random sample is based on vehicle type, vehicle weight and area of the UK in which the vehicle is registered.

5.2.22 CSRGT data have been provided for domestic road freight activity in 2015 and 2016. Due to restrictions and limitations on the use of the data, the data are aggregated to a greater level further away from the AoDM and have only been provided for movements that would pass through the region.

5.2.23 Further information on how the CSRGT data have been used to refine the representation of HGVs in the prior trip matrices is given in chapter 7.

5.3 Traffic counts for model calibration

South West Regional Traffic Model data

5.3.1 As noted in chapter 4 of the SWRTM MVR, there are 52 calibration screenlines and cordons within the Fully Modelled Area. The vast majority of these are located outside of the AoDM of the 'A303 Stonehenge SWRTM (DCO)' model.

5.3.2 These screenlines were formed using a combination of data from Local Authorities, Highways England, DfT and specific data collected for the SWRTM development. Each site used at least two weeks ATC data to provide an estimate of the volume of vehicles per time period. Classified data were available at some sites but, where it was not available, average proportions were applied by the SWRTM development team as detailed in the TDCR.

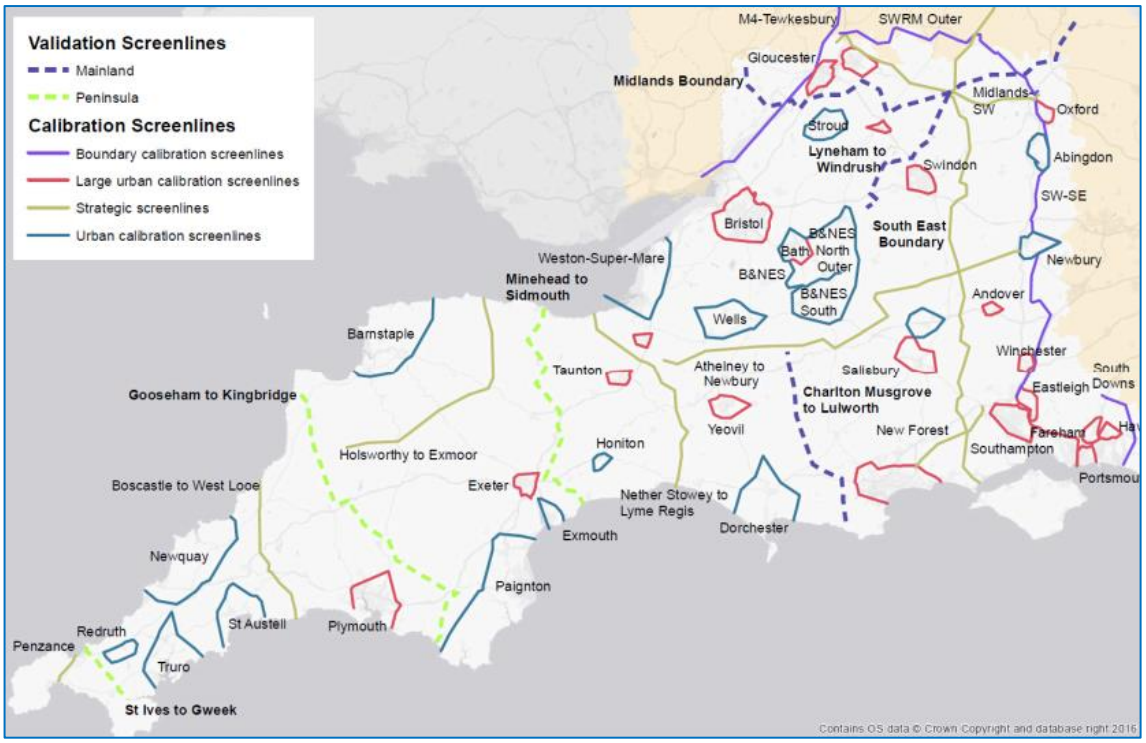
5.3.3 These screenlines were defined to ensure that they are crossed by major traffic routeing into and out of distinct urban population and employment centres. Further detail on the development of these calibration screenlines is given in the SWRTM MVR.

5.3.4 Figure 5-3 provides the spatial locations of the screenlines and cordons inherited from SWRTM for both calibration and validation. The location of the calibration counts (both those on screenlines and those which are 'ad-hoc') is given in Figure 5-4.

5.3.5 All of the calibration count sites from SWRTM were retained in the calibration of the 'A303 Stonehenge SWRTM (DCO)' model, unless they were located at the same location for which new data were collected. In that case, the new data were used in preference. The primary purpose of the SWRTM calibration count data was to ensure the RoFMA in the 'A303 Stonehenge SWRTM (DCO)' model was appropriately calibrated and to provide a base against which the refined model could be compared, to show limited detriment to the calibration of the model compared to SWRTM DF3.0.

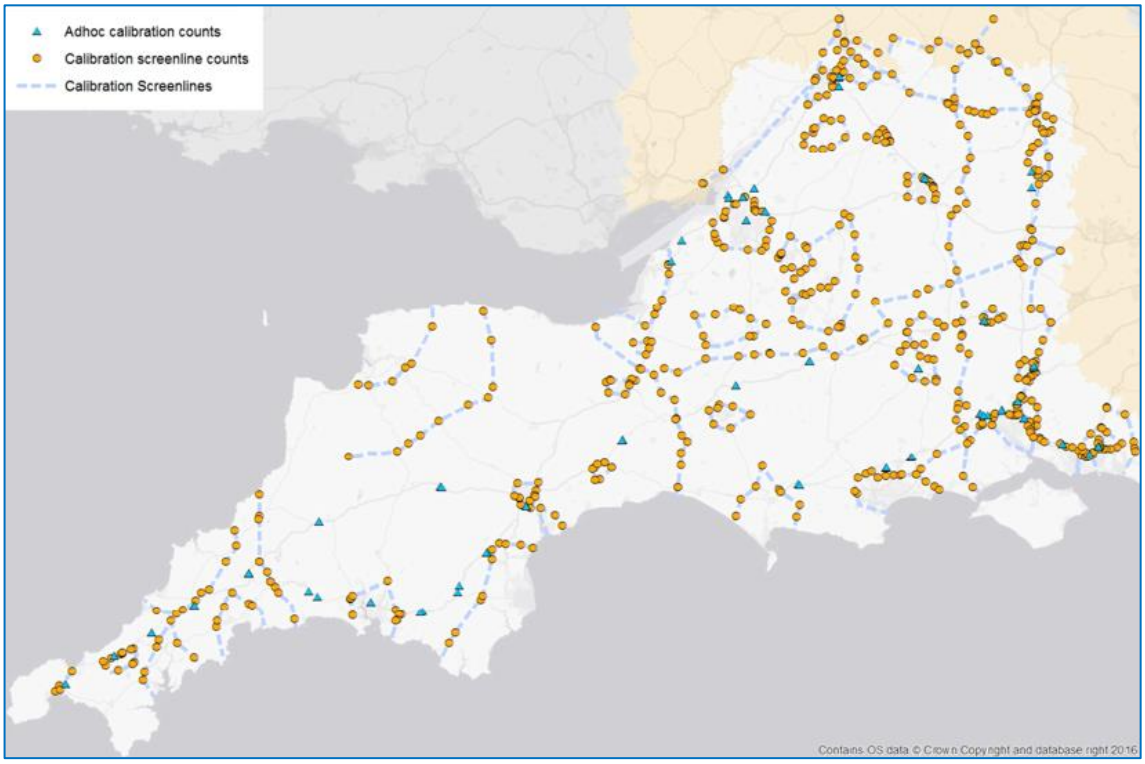
5.3.6 Whilst it is acknowledged that the retained traffic counts from SWRTM are controlled to a 2015 base year, the analysis on traffic growth between 2015 and 2017 (set out in chapter 7) shows that, other than for LGVs, the evidence points to no material change in traffic demand between 2015 and 2017. On that basis, the 2015 count data (where not replaced) are retained unadjusted.

5.3.7 It should be noted that all of the calibration data from SWRTM cover the neutral month time periods only.



Source: Figure 9, South West Regional Traffic Model: Model Validation Report

Figure 5-3: Calibration and Validation screenlines in SWRTM



Source: Figure 10, South West Regional Traffic Model: Model Validation Report

Figure 5-4: Calibration count site locations in SWRTM

Highways England WebTRIS data

5.3.8 Highways England maintains a permanent data collection process across its SRN, utilising Automatic Traffic Counters (ATCs) to obtain up-to-date volumetric information across the network. These data are publicly available online (http://webtris.highwaysengland.co.uk/).

5.3.9 In total 197 sites have been identified in WebTRIS as being pertinent to the model development and data have been downloaded and extracted. The locations of these sites are given in Figure 5-5. Of these sites, 16 are located within the AoDM with the remainder throughout the Fully Modelled Area.

5.3.10 Data have been extracted for 2017, for periods concurrent to the summer and neutral month time periods. These data have been checked for outliers or other potential issues and then processed for use in the model development.

5.3.11 Owing to the nature of the SWRTM parent model and the requirement for a summer model for the assessment of the A303 Amesbury to Berwick Down scheme, the data have been used differently in the neutral month time periods and the summer model time period.

5.3.12 In the neutral month time periods, where the locations identified duplicate either screenline, cordon or ad-hoc counts used in SWRTM, then the more up-to-date WebTRIS data have been used in preference. However, in the case where a site does not duplicate an existing location within SWRTM, then the data have been used for ad-hoc validation purposes.

5.3.13 In the summer model time period, as there are no pre-existing data available from SWRTM, all of the WebTRIS counts have been used for model calibration throughout the Fully Modelled Area. In the particular case of the Area of Detailed Modelling, however, only the counts that are part of the screenlines are included in calibration. Remaining counts have been used in validation. Owing to the locations of these, it has not been possible to organise these locations into screenlines for use in the summer model calibration and so counts have been used on an individual (ad-hoc) basis.

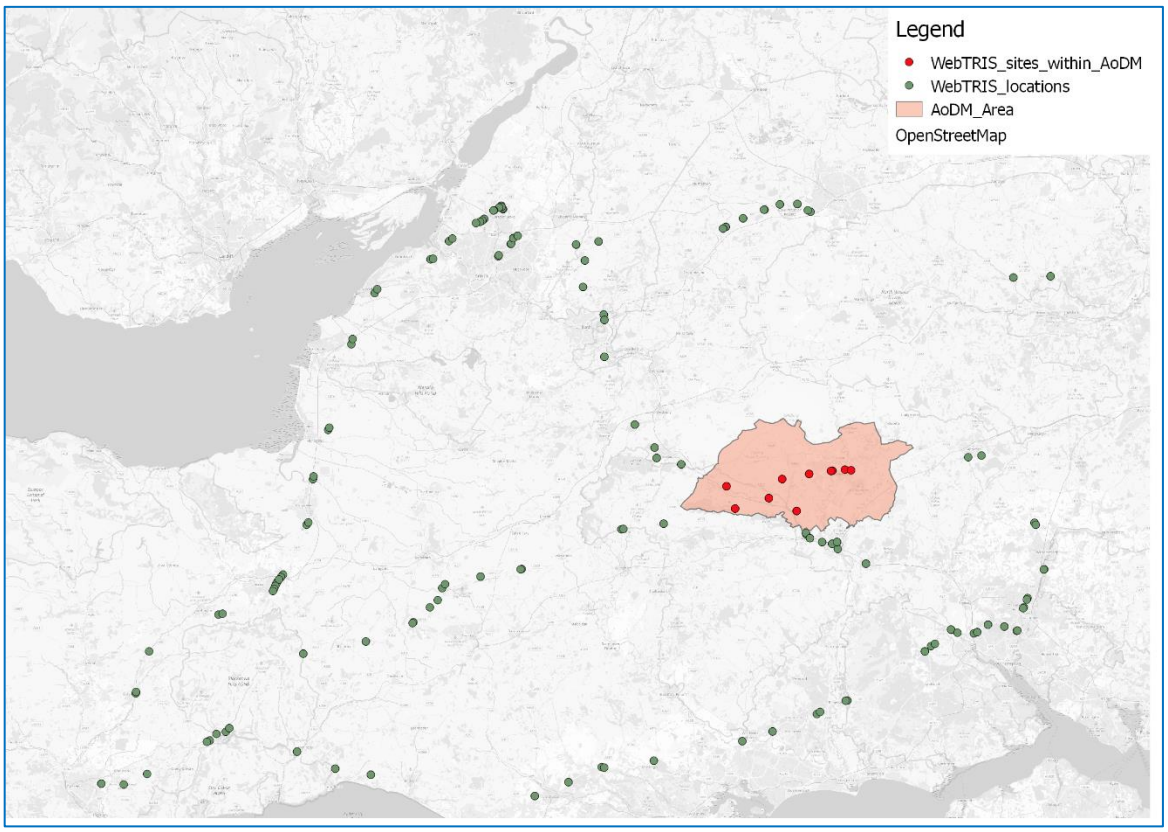


Figure 5-5: Locations of WebTRIS data extracted for use in model calibration

New local area data collection

5.3.14 As the Transport Data Package, Appendix A of the Combined Modelling and Appraisal Report (Application Document 7.5), notes, a large programme of traffic counts was undertaken in both the neutral month model time periods and the summer to provide new data to be used for development of the Operational Model and for calibration of the strategic model.

5.3.15 The principal new sources of data for model calibration are the Automatic Traffic Counts (ATCs) and Manual Classified Turning Counts (MCTCs).

5.3.16 ATCs were collected across a two-week period commencing 17 August 2017 (Summer time period) and 22 September 2017 (neutral month model time periods). ATCs were located coincident with the ANPR camera sites to provide control counts against which to verify capture rates.

5.3.17 The MCTCs have primarily been used for turning count validation purposes in the strategic model, discussed in section 5.4, below. However, some of the turning volumes have been converted to link counts and used in model calibration where a need for the count has been identified.

5.3.18 For the purpose of model calibration, traffic counts have been arranged into five separate screenlines covering the key movements in the AoDM. These screenlines and their definition are consistent in the neutral month and summer time period models. These form:

a. the 'North of A303' screenlines (capturing traffic approaching / leaving the A303 to its north side);

b. the 'South of A303' screenline (capturing traffic approaching / leaving the A303 to its south side);

c. the 'East of AoDM' screenline (capturing traffic on the A303 and parallel routes at the east of the AoDM);

d. the 'West of AoDM' screenline (capturing traffic on the A303 and parallel routes at the west of the AoDM); and

e. the 'West of Amesbury to West of Durrington' screenline (a short screenline running parallel to the A345 Countess Road, capturing east-west traffic at the mid-point of the AoDM).

5.3.19 Figure 5-6 shows the locations of the screenlines spatially. Table 5-2 outlines the number of counts by screenline and the composition in terms of type of count.

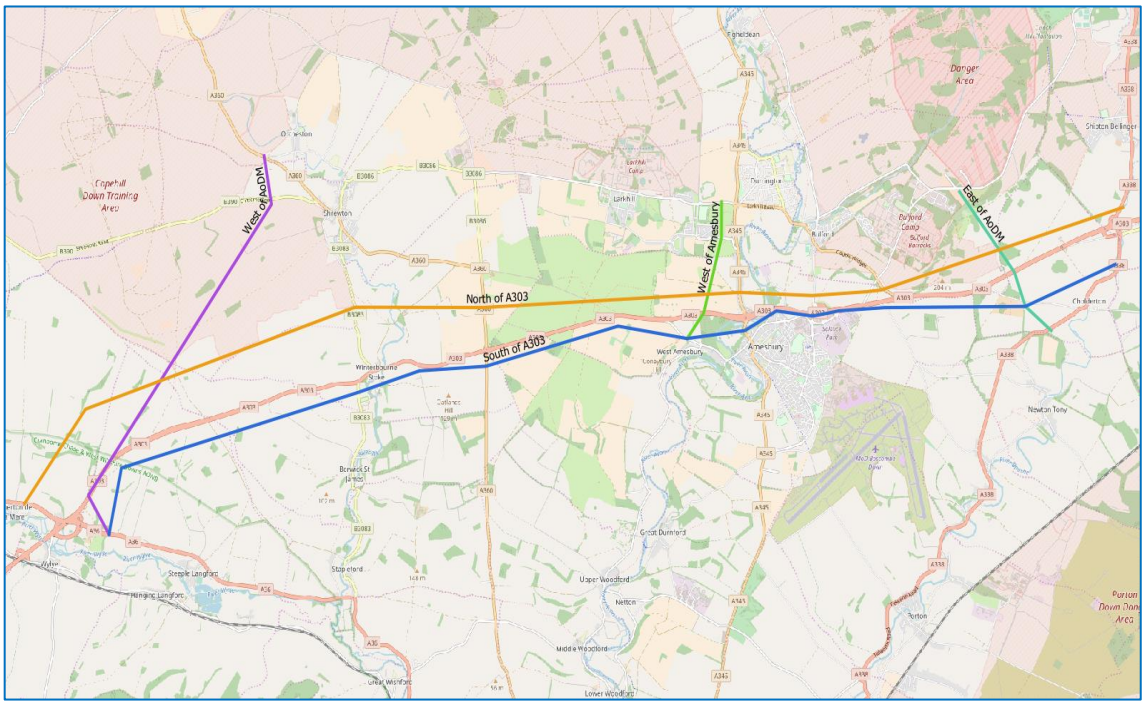


Figure 5-6: AoDM calibration screenlines formed of new data

5.3.20 It should be noted that the 'West of Amesbury to West of Durrington' screenline was only used in the neutral month model calibration. In the summer time period, the definition of this screenline was altered so this was located to the east of the A345, instead crossing the A3028 between Durrington and Bulford, the A303 between Countess roundabout and Solstice Park and London Road south of the A303.

Table 5-2: AoDM screenline composition

Screenline	Direction	Total no. counts	No. ATCs	No. MCCs
North of A303*	NB	7	6	1
	SB	8	6	2
South of A303**	NB	11	5	6
	SB	10	5	5
East of AoDM	EB	4	0	4
	WB	4	0	4
West of AoDM	EB	4	4	0
	WB	4	4	0
West of Amesbury to West of Durrington (Neutral)***	EB	3	1	2
	WB	4	1	3
East of A345 (Summer)	EB	3	2	1
	WB	3	2	1

* North of A303 has one more count southbound as A3028 approach to A303 is southbound only

** South of A303 has one more count northbound as Stonehenge Road approach to A303 is northbound only

*** West of Amesbury to West of Durrington has one more count westbound, as Stonehenge Road is west / northbound only

5.3.21 It should be noted that WebTAG Unit M3.1 states that a screenline should typically be comprised of five links or more. The East and West of AoDM screenlines and the West of Amesbury to West of Durrington screenline all comprise four counts or fewer. This is purely the result of the geography and network topology in the area, particularly noting that the Salisbury Plain to the north is a large open expanse. It was not sensible to extend the screenlines further just to meet the five counts per screenline recommendation noted in WebTAG. However, it should be recognised that the fewer counts on the screenline could make the WebTAG criteria more stringent than appropriate.

5.3.22 In addition to the above screenlines, a further 18 new ATCs (9 sites, two directions) have been included in the AoDM calibration process for the neutral month time periods as 'ad-hoc' sites – i.e. they are unaligned to screenlines. The main purpose of these is to ensure appropriate representation of traffic volumes on key links. Table 5-3 sets out the ATC site numbers and descriptions, whilst they are shown spatially in Figure 5-7.

Table 5-3: ATCs used as ad-hoc calibration locations

ATC ID	Location / Description	Road Name	2-way?
9	Stonehenge Visitor Centre entry / exit	-	Yes
12	The Packway, east of Bingham Road	The Packway	Yes
15	A3028, West of Amesbury Road	A3028	Yes
16	Amesbury Road, north of A3028	Amesbury Road	Yes
17	A303, West of Amesbury Road	A303	Yes
22	A303, East of A338	A303	Yes
25	A303, East of B3083	A303	Yes
26	A3028, West of Church Lane	A3028	Yes
37	A303, South of A36	A303	Yes

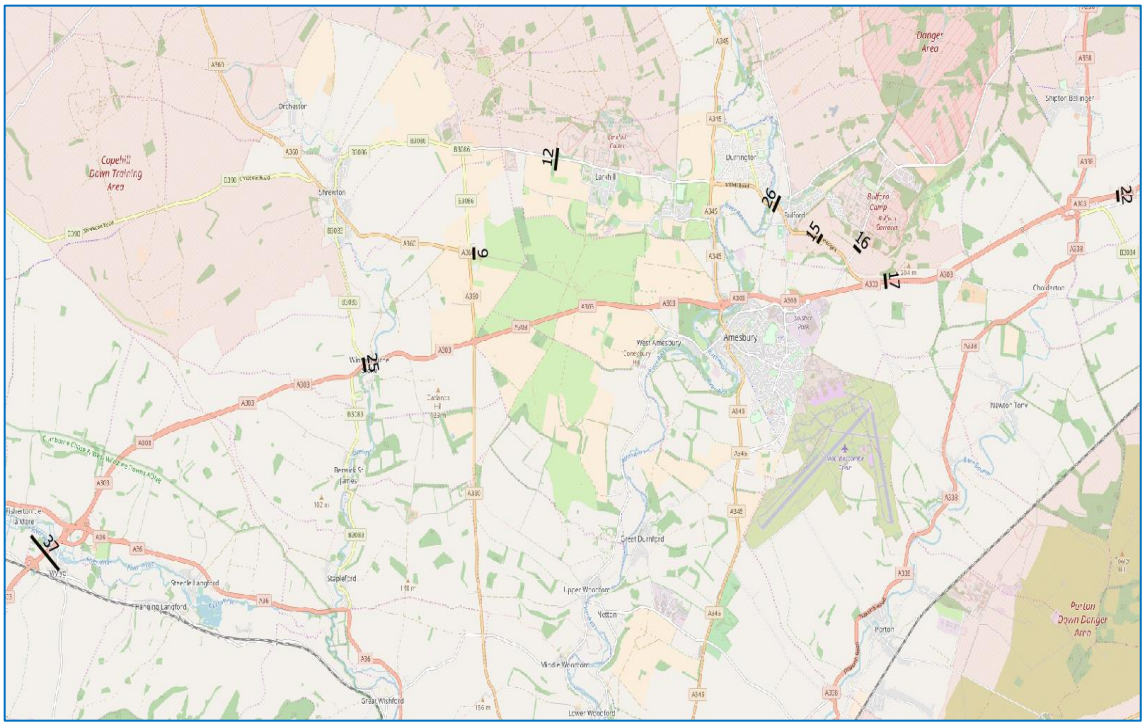


Figure 5-7: Location of ATC sites used as ad-hoc calibration

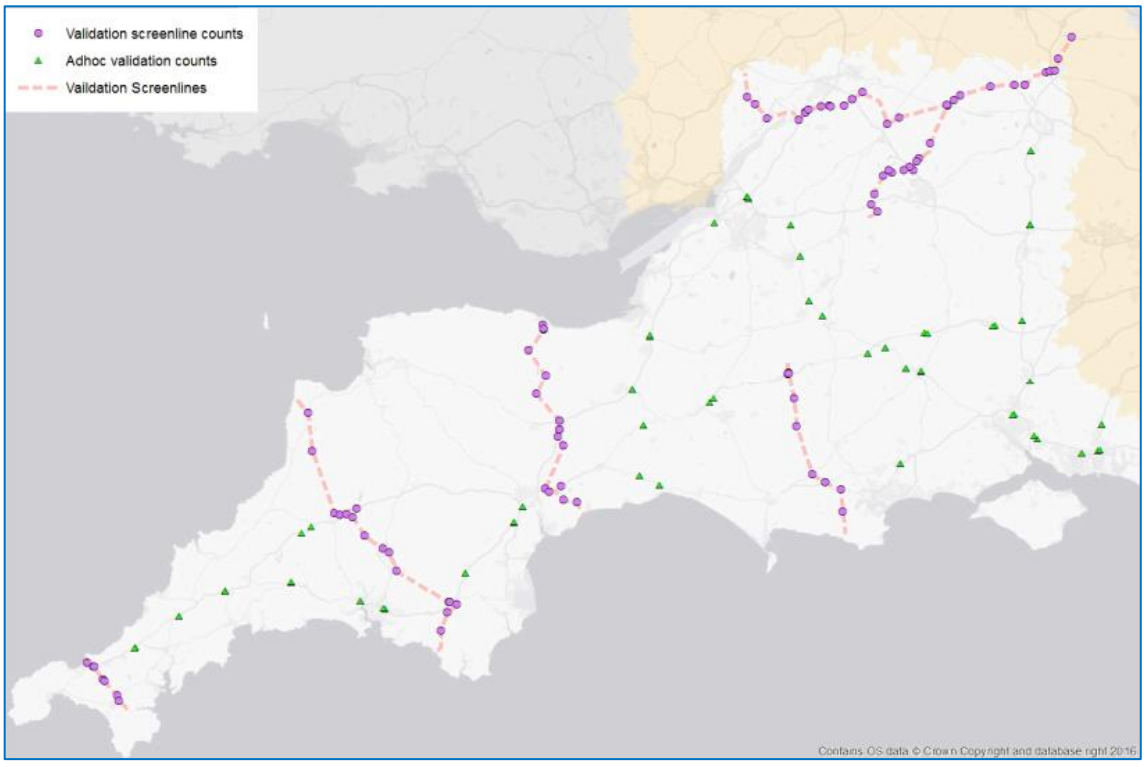
5.4 Traffic counts for model validation

South West Regional Traffic Model data

5.4.1 As with the calibration data, a set of validation screenlines and ad-hoc counts were retained from SWRTM. The primary purpose of these was again to ensure that new local area and other additional data added to the model (either as part of the network or demand refinements, or for use in calibration) did not result in detrimental performance of the RoFMA compared to SWRTM.

5.4.2 In total, SWRTM has seven validation screenlines, used to provide a strategic view of interurban travel between major urban centres. In addition to the validation screenlines, a number of 'ad-hoc' validation count sites were included to ensure the performance of the SRN was reasonable. These data were largely composed of Highways England WebTRIS data downloaded specifically for March 2015. As previously discussed, no adjustment of these counts to a 2017 year has been undertaken, based on the evidence of traffic growth set out in chapter 7. Specific count sites used for validation within SWRTM are shown in Figure 5-8, with the spatial location of the screenlines and cordons previously given in Figure 5-3.

5.4.3 It should be noted that all of the validation count data from SWRTM cover the neutral month time periods only.



Source: Figure 11, South West Regional Traffic Model: Model Validation Report

Figure 5-8: Validation count site locations in SWRTM

New local area data

5.4.4 Manual Classified Turning Counts (MCTCs) were commissioned at 51 different locations within the AoDM. These turning counts serve a dual purpose within the strategic model, as noted below. They have been separately used in the Operational Model for the construction of the disaggregate trip matrices for both the A303 mainline and local road models:

a. turning counts have been converted to link counts where ATC data were unavailable in order to ensure watertight screenlines for calibration in the AoDM (as above); and

b. used for wholly independent turning count validation at key junctions on both the strategic and local road network likely to be affected by the Scheme in the AoDM.

5.4.5 In total, 35 turning count locations have been selected for the purposes of wholly independent validation. These comprise 14 junctions on the A303 and 21 junctions on the local road network.

5.4.6 These data were collected across both the neutral month time periods and the summer model time period. These sites have therefore been used as independent turning count validation for all three neutral month model time periods and for the summer model time period.

5.4.7 Table 5-4 sets out a list of the locations that have been used for independent turning count validation. These are shown spatially in Figure 5-9.

Table 5-4: Location of MCTCs used for independent turning count validation

Location / Description	Strategic or Local junction
A303(E) / Allington Track / A303(W)	A303
A303(ENE) / Amesbury Road / A303(WSW)	A303
A303(ENE) / Berwick Road / A303(WSW)	A303
A360(N) / A303(ENE) / A360(S) / A303(W)	A303
Amesbury Bypass(E) / Amesbury Bypass(E) / Amesbury Bypass(W)	A303
A303(ESE) / A303(S) / High Street	A303
B3083 / High Street(ENE) / High Street(S) / A303	A303
B3083 / High Street(ENE) / High Street(S) / A304	A303
B3083 / High Street(ENE) / High Street(S) / A305	A303
B3083 / High Street(ENE) / High Street(S) / A306	A303
B3083 / High Street(ENE) / High Street(S) / A307	A303
B3083 / High Street(ENE) / High Street(S) / A308	A303
High Street(N) / High Street(E) / High Street(S) / High Street(W)	A303
Unnamed Road / Amesbury Bypass(ENE) / Amesbury Bypass(WSW)	A303
A338 / / Amesbury Road	Local
A338(N) / B3084 / A338 / Parkhouse Mews(W) /	Local

Location / Description	Strategic or Local junction
Parkhouse Mews	
B3086 / A344 / A360(S) / A360(WNW)	Local
Biddulph Road / The Packway(ESE) / The Packway(WNW)	Local
Bulford Droveway(N) / Bulford Road / Bulford Droveway(WSW)	Local
Bulford Road / Bulford Hill / Unnamed Road / Larkhill Road(WNW)	Local
Countess Road(NNW) / Countess Road(S) / Fargo Road	Local
Netheravon Road / Larkhill Road(E) / Countess Road(S) / The Packway	Local
Ross Road(NNE) / The Packway(ESE) / Bingham Road(S) / The Packway(WNW)	Local
Salisbury Road(NNE) / Double Hedges / Salisbury Road(SSW) / High Street	Local
The Packway(E) / Wood Road / The Packway(W)	Local
Watson Road / The Packway(ESE) / Willoughby Road / The Packway(WNW)	Local
Porton Road(NNE) / Solstice Park Avenue / Porton Road(S) / London Road	Local
A3028 High St (SE)/ /Orchard End (SW) / /A3028 High St (NE)	Local
Amesbury Road(NE) / Double Hedges(SSE) / Amesbury Road(SW) / Double	Local
Countess Road(NNW) / Unnamed Road / Countess Road(SSE)	Local
Salisbury Road(NNE) / Salisbury Road(S) / Salisbury Road(WNW)	Local
Stonehenge Road/ Larkhill Road(E)/ Unnamed Road/ Larkhill Road(W)	Local
The Packway(NNW) / The Packway(NNW) / The Packway(ESE) / B3086 / The Packway(W)	Local
The Packway(NNW)(NNW) / The Packway(NNW)(NNW) / The Packway(ESE) / B3086 / The Packway(W)	Local
Tidworth Road(ENE) / Gaza Road / Baghdad Road / Tidworth Road(WSW) / Sheepbridge Road	Local

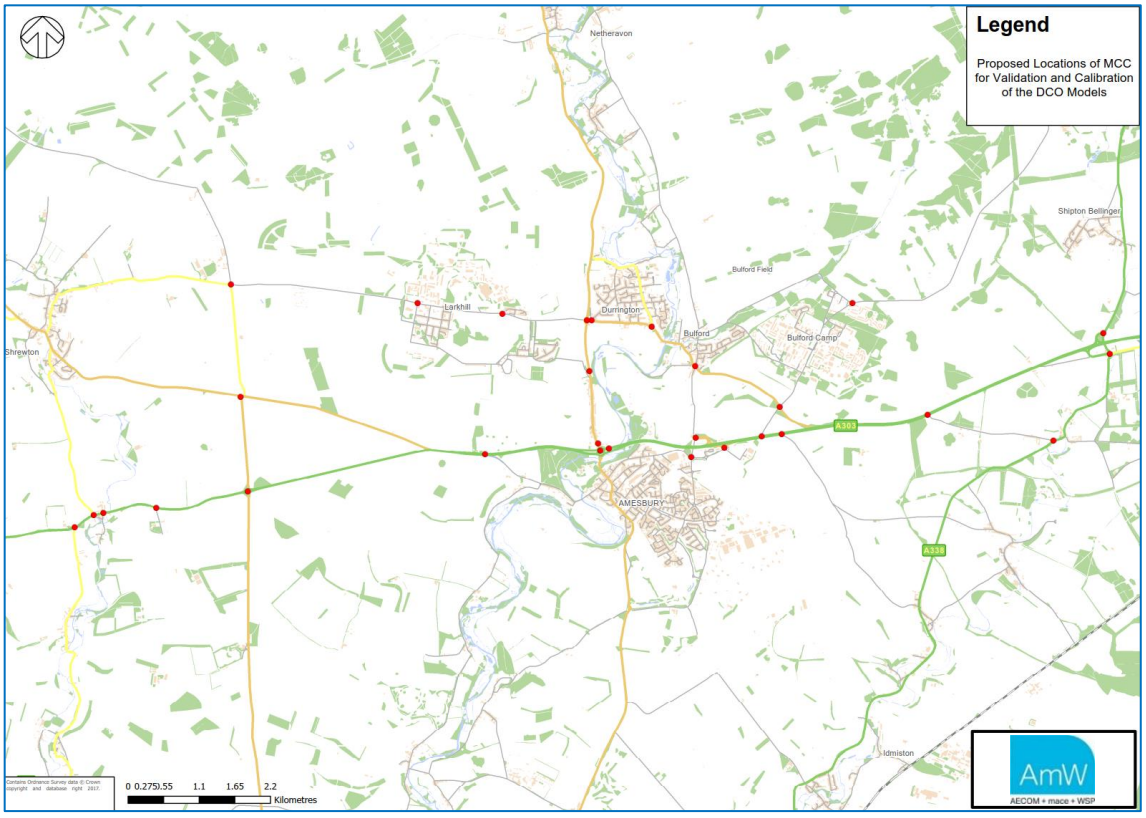


Figure 5-9: Spatial locations of independent turning count validation

Additional supplementary data from Wiltshire County Council

5.4.8 Wiltshire County Council maintains an ongoing survey and monitoring programme across its locally managed road network. These are monitored through the laying of ATC tubes at the same locations, a number of times each year.

5.4.9 Since 2011, most sites have been surveyed for one or two consecutive weeks per year. These surveys have followed a “same weeks each year” schedule, but not necessarily in neutral months.

5.4.10 Following a review of the sites available, data were requested from 15 separate locations for use in the validation of the traffic model. The primary purpose of these sites was to identify locations in the RoFMA, around the edge of the AoDM, where new local count data were not collected but where an understanding of model performance would be necessary to inform air quality and noise appraisal of the Scheme. These data were held completely independent from any matrix build, adjustment or estimation processes and retained for independent validation purposes. These data are therefore used for ad-hoc independent validation purposes.

5.4.11 Table 5-5 lists the site locations and years for which data were provided. Figure 5-10 shows these locations spatially.

5.4.12 It should be noted that the vast majority of the Wiltshire counts are non-neutral, as per the periods defined in WebTAG Unit M1.2. All of these data have been used for the purposes of neutral month model time period validation. None of the data have been used in the validation of the summer time period.

Table 5-5: Wiltshire County Council data description, dates and weeks data

Site ID	Description	Start date of survey	No. weeks data
a601	A30, East of Barford St. Martin	06 January 2016	2
a1101	B3083, South of Berwick St James	07 January 2015	2
b201	A338, North of Winterbourne Gunner	18 January 2017	1
b301	A345, South of Highpost	20 January 2016	1
b401	A360, South of Druid's Lodge	18 January 2017	1
B803	A30, North-East of Salisbury	23 September 2015	1
C102	A342, East of Upavon	03 May 2017	1
C202	A338, Tidworth Military Cemetery	06 May 2015	2
C320	A338, North of Collingbourne Kingston	04 May 2016	1
F503	B3098, West of Lavington	19 July 2017	1
F603	A360, Gore Cross	19 July 2017	1
F703	B3098, West of Erlstoke	19 July 2017	1
I501	A362, Corsley Heath	25 February 2015	1
M501	B3089, Fonthill Bishop	08 March 2017	2
M701	B390, West of Shrewton	08 March 2017	1

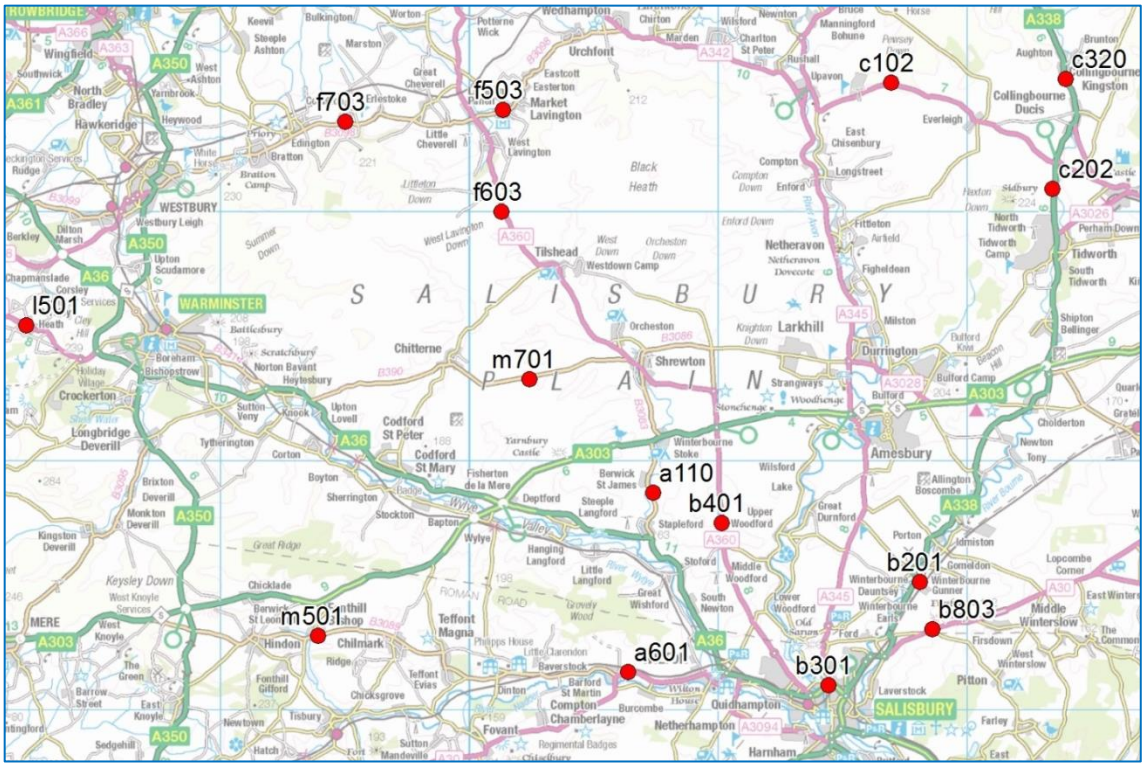


Figure 5-10: Locations of ATC data provided by Wiltshire County Council

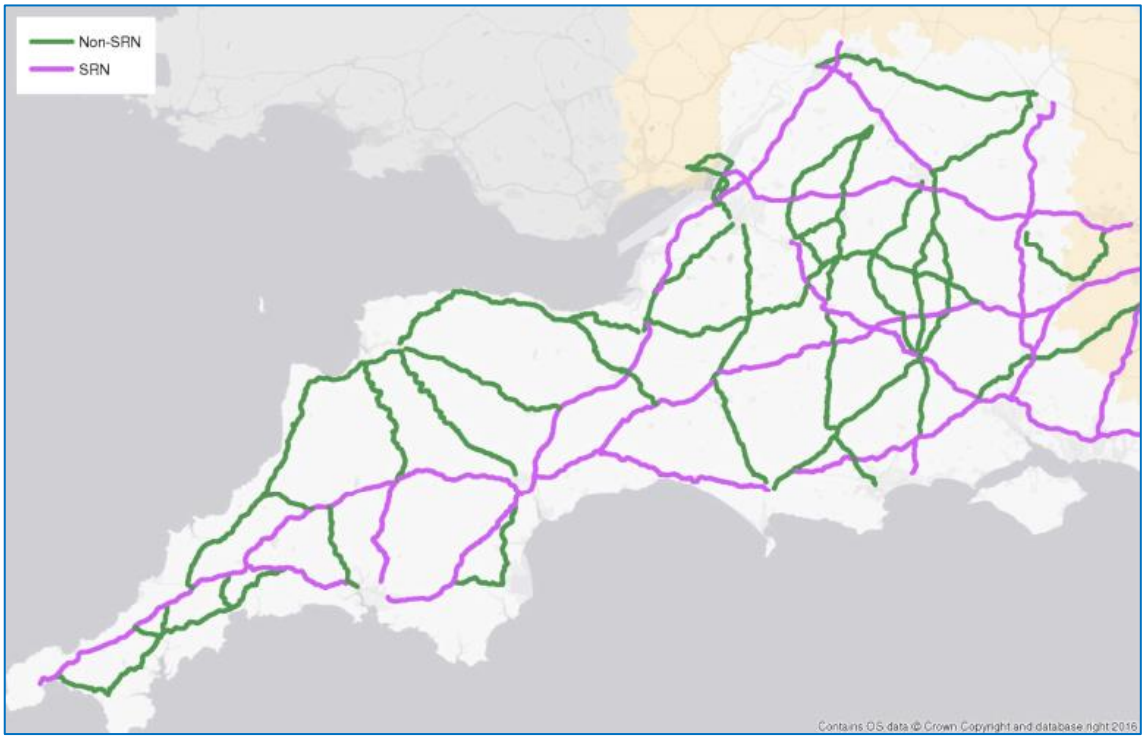
5.5 Journey time data for model validation

South West Regional Traffic Model data

5.5.1 Observed travel times from Trafficmaster data were used to validate modelled times in the SWRTM DF3.0 model.

5.5.2 DfT provided Trafficmaster data for the period September 2014 to August 2015. However, only the data from May and June 2015 were used, noting their being outside of the school holiday period and recognising the change in HGV speed limits that took effect from 6th April 2015.

5.5.3 Figure 5-11 shows the routes used for journey time validation in SWRTM DF3.0.



Source: Figure 12, South West Regional Traffic Model: Model Validation Report

Figure 5-11: Journey Time validation routes in SWRTM, by type

5.5.4 In total, there are 104 journey time routes used for validation purposes in SWRTM, comprising 44 routes on the SRN and 60 routes on the remainder of the road network. These are further sub-divided into 512 segments.

5.5.5 Each of these journey time routes were retained for comparative purposes, with the exception of where new data for 2017 was sourced from DfT. These routes where new data are available are set out below.

New local area data (Trafficmaster)

5.5.6 Updated Trafficmaster data have been requested and received from DfT for the purpose of validating the modelled travel times through the AoDM and on the parallel / alternative SRN routes (M4 / M5, and M3 / M27 / A31 / A35 (the 'Coast Route') to the A303.

5.5.7 New Trafficmaster data were collected for validation as a result of the change in model Base Year to 2017, which meant that the SWRTM observed data from 2014 and 2015 were outdated. The most recent data available from DfT at the time of request covered the period of July 2016 to June 2017. The data were provided by each ITN link comprising the requested routes where data exists, at 15 minute intervals on each day, categorised by vehicle type. The locations of the routes where updated data have been used are shown in Figure 5-12.

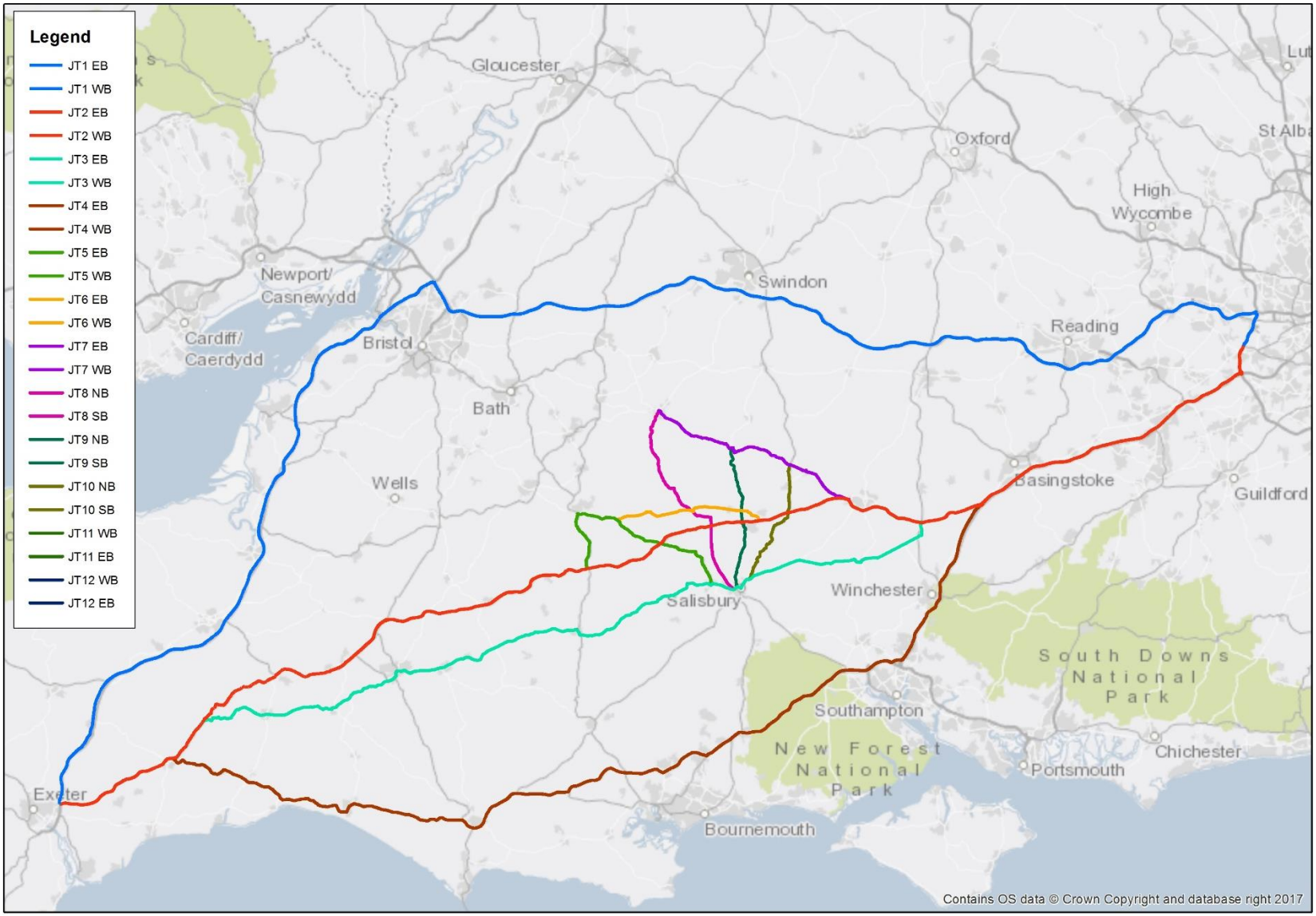


Figure 5-12: Spatial coverage of 2016-2017 Trafficmaster data

5.5.8 The data have been processed to calculate the median travel times for each of these routes. The use of the median travel time, as opposed to the mean, for model validation is consistent with the observed data used for the validation of the standard SWRTM DF3.0 model and also with the definition of average hour time periods, as opposed to peak hours.

5.5.9 Table 5-6 provides a summary of the new Trafficmaster observed data by route, including route length and the observed median travel times. It should be noted that routes exceeding 40 minutes in total travel time have been split into segments, in accordance with the guidance provided in WebTAG Unit M3.1 §4.4. Owing to the strategic nature of the model, routes are generally in excess of the 15km length noted in the same section of the guidance.

Table 5-6: Summary of updated Trafficmaster data, by route

Route	Section	Description	Distance (km)	Direction	Median travel time (hh:mm:ss)				Direction	Median travel time (hh:mm:ss)			
					Neutral			Summer		Neutral			Summer
					AM	IP	PM			AM	IP	PM	
1	Total	via M4/M5	287	WB	02:27:56	02:25:14	02:37:25	02:37:26	EB	02:31:46	02:24:48	02:26:46	02:32:27
	1	M25 J13 to M4 J13	70		00:40:01	00:37:23	00:48:00	00:41:13		00:41:34	00:37:18	00:40:15	00:38:13
	2	M4 J13 to M4 J18	78		00:37:23	00:38:05	00:38:30	00:39:14		00:38:18	00:37:22	00:37:20	00:38:29
	3	M4 J18 to M5 J22	65		00:34:47	00:34:01	00:35:30	00:39:55		00:36:04	00:34:12	00:34:22	00:38:11
	4	M5 J22 to M5 J29	74		00:35:45	00:35:45	00:35:25	00:37:04		00:35:50	00:35:56	00:34:49	00:37:34
2	Total	via A303	238	WB	02:24:23	02:25:04	02:26:42	02:52:00	EB	02:27:40	02:24:53	02:22:48	02:35:52
	1	M25 J13 to M3 J6	46		00:31:25	00:29:50	00:33:16	00:34:59		00:31:04	00:29:16	00:29:24	00:29:39
	2	M3 J6 to A303/A36 Wylye	71		00:38:48	00:39:22	00:38:45	00:57:29		00:39:51	00:38:35	00:38:01	00:46:49
	3	A303/A36 Wylye to A303 South Petherton	64		00:37:17	00:38:11	00:37:33	00:40:17		00:39:05	00:38:56	00:38:19	00:40:14
	4	A303 South Petherton to M5 J29	56		00:36:34	00:37:23	00:36:49	00:39:15		00:37:40	00:38:06	00:37:04	00:39:10
3	Total	via A30	243	WB	03:19:41	03:20:44	03:18:32	03:23:47	EB	03:15:44	03:14:07	03:10:48	03:14:04
	1	M25 J13 to M3/M25	4		00:04:02	00:02:31	00:05:23	00:06:57		00:02:53	00:02:46	00:02:52	00:02:56
	2	M3/M25 to A360/A303	64		00:38:41	00:38:41	00:39:13	00:39:31		00:40:22	00:38:02	00:38:01	00:38:16
	3	A360/A303 to A30/A36 Wilton	42		00:37:16	00:36:47	00:36:55	00:38:20		00:36:21	00:35:49	00:35:33	00:35:57
	4	A30/A36 Wilton to A30 Stour Hill	38		00:34:39	00:35:22	00:34:56	00:34:42		00:35:36	00:35:46	00:34:18	00:34:42
	5	A30 Stour Hill to A30 East Chinnock	31		00:35:11	00:36:49	00:32:49	00:32:24		00:31:49	00:32:30	00:32:01	00:32:12
	6	A30 East Chinnock to A30/A303	33		00:31:27	00:31:55	00:30:56	00:32:59		00:30:38	00:30:59	00:30:17	00:31:22

Route	Section	Description	Distance (km)	Direction	Median travel time (hh:mm:ss)				Direction	Median travel time (hh:mm:ss)			
					Neutral			Summer		Neutral			Summer
					AM	IP	PM			AM	IP	PM	
	7	A30/A303 to M5 J29	31		00:18:25	00:18:39	00:18:20	00:18:54		00:18:05	00:18:15	00:17:46	00:18:39
4	Total	via M3/A35	256	WB	02:52:18	02:52:40	02:58:06	03:17:50	EB	02:56:57	02:49:41	02:46:37	02:58:07
	1	M25 J13 to M3 J3	17		00:13:29	00:11:54	00:15:04	00:16:38		00:12:26	00:11:25	00:11:29	00:11:47
	2	M3 J3 to M3 J11	61		00:33:26	00:33:44	00:34:33	00:35:15		00:35:11	00:33:12	00:33:04	00:33:28
	3	M3 J11 to A31/A348 Ferndown	50		00:28:36	00:28:33	00:32:26	00:37:18		00:32:54	00:27:51	00:27:40	00:29:41
	4	A31/A348 Ferndown to A35/A354	37		00:29:17	00:28:47	00:28:36	00:34:25		00:28:38	00:28:14	00:27:53	00:30:30
	5	A35/A354 to A35 Bothenhampton	34		00:26:17	00:26:47	00:26:10	00:30:28		00:26:15	00:26:27	00:25:42	00:27:42
	6	A35 Bothenhampton to A30/A35	35		00:29:20	00:30:59	00:29:35	00:31:56		00:29:39	00:30:44	00:29:20	00:33:08
	7	A30/A35 to M5 J29	22		00:11:53	00:11:56	00:11:42	00:11:50		00:11:54	00:11:48	00:11:29	00:11:51
5	Total	A36/A350	40	WB	00:31:46	00:32:13	00:31:16	00:32:33	EB	00:33:23	00:32:34	00:31:23	00:32:50
6	Total	The Packway	26	WB	00:25:07	00:23:46	00:23:27	00:24:42	EB	00:24:17	00:23:27	00:23:39	00:23:48
7	Total	A342	40	WB	00:34:16	00:34:19	00:34:43	00:34:48	EB	00:35:14	00:34:11	00:34:04	00:34:03
8	Total	A360	39	NB	00:36:36	00:36:14	00:35:54	00:35:48	SB	00:36:34	00:35:51	00:35:48	00:36:56
9	Total	A345	26	NB	00:25:29	00:24:51	00:25:15	00:25:53	SB	00:26:05	00:25:11	00:25:04	00:26:42
10	Total	A338	23	NB	00:22:48	00:22:40	00:22:54	00:24:01	SB	00:22:49	00:22:32	00:22:42	00:24:03
11	Total	via A303	109	WB	01:02:58	01:04:04	01:02:55	01:23:23	EB	01:04:34	01:03:47	01:02:54	01:13:19
	1	A34 to A36 Wylye	49		00:28:12	00:28:35	00:28:03	00:46:36		00:29:05	00:28:17	00:27:54	00:36:31
	2	A36 Wylye to A303 Martock	60		00:34:46	00:35:29	00:34:52	00:36:47		00:35:29	00:35:30	00:35:00	00:36:48
12	Total	via A30	108	WB	01:42:31	01:44:30	01:40:00	01:40:49	EB	01:38:43	01:39:18	01:36:33	01:38:06
	1	A303/A34 to Salisbury	39		00:32:37	00:31:54	00:31:32	00:33:10		00:31:16	00:31:13	00:30:58	00:31:23
	2	Salisbury to B3092	39		00:36:29	00:37:28	00:37:29	00:37:07		00:37:34	00:37:15	00:35:43	00:36:20

Route	Section	Description	Distance (km)	Direction	Median travel time (hh:mm:ss)				Direction	Median travel time (hh:mm:ss)			
					Neutral			Summer		Neutral			Summer
					AM	IP	PM			AM	IP	PM	
		East Stour											
	3	B3092 East Stour to Yeovil	30		00:33:25	00:35:08	00:30:59	00:30:32		00:29:53	00:30:50	00:29:52	00:30:23

New local area data (Moving Car Observer)

5.5.10 A shortcoming of the new Trafficmaster data provided by DfT is that it did not contain information for the B3083, between the A36 and Shrewton. This is a key (in terms of road classification) north-south route in the AoDM, which crosses the A303 in Winterbourne Stoke. Traffic on this route is likely to be affected by the provision of a bypass of Winterbourne Stoke as part of the Scheme.

5.5.11 Data were not included in Trafficmaster due to the low sample of trips with GPS receivers using this route. Therefore, an alternative method of data collection was required.

5.5.12 A series of Moving Car Observer (MCO) surveys were undertaken to provide data for this route. These involved driving a car along the length of the route between the A36 and Shrewton and recording travel times at key points along the route. The MCO surveys were undertaken on 23 January 2018 and covered the AM, IP and PM periods. No MCO was undertaken for the summer time period.

5.5.13 Four journey time runs were undertaken for each time period. The average of these runs has been compared to commercially available travel time data (Google Maps) and provides similar journey times to the observed in all time periods.

5.5.14 Table 5-7 summarises the average travel times from the MCO survey by time period for the route.

Table 5-7: B3083 Moving Car Observer summary

Route	Section	Description	Distance (km)	Direction	Travel time (hh:mm:ss)		
					AM	IP	PM
13	Total	B3083, Shrewton to A36	15	SB	00:14:35	00:14:28	00:15:14
13	Total	B3083, A36 to Shrewton	15	NB	00:14:17	00:14:31	00:15:00

6 Network development

6.1 Introduction

6.1.1 This chapter sets out the updates made to the highway networks in the development of the 'A303 Stonehenge SWRTM (DCO)' model.

6.1.2 In addition to the additional summer time period, the zonal disaggregation throughout the AoDM and updates to generalised costs, a full review of network coding and detail has been undertaken to ensure that the model is sufficiently detailed in the AoDM for the representation of both local and strategic traffic movements.

6.2 Network coding standards

6.2.1 As noted in WebTAG Unit M3.1 §5.3 and §5.4, the use of standardised coding practices is important to ensure consistency of network representation throughout the model and to minimise the potential for excessive adjustments later in the model development process.

6.2.2 As part of the development of the RTMs, the RTM network TCG produced a standardised network coding manual for use across all of the models. SWRTM was coded using this network coding manual. The coding manual sets out agreed coding standards in terms of saturation flows, junction type usage, default junction properties (e.g. circulatory capacities, time to circle and gap acceptance) for a 'standard' junction on the network, and speed-flow curves. Ranges around these defaults are also provided for use in calibration if required.

6.2.3 To ensure consistency with the rest of the coding in the Fully Modelled Area of SWRTM, all refinement work undertaken in the development of the 'A303 Stonehenge SWRTM (DCO)' model has maintained consistency with the standards set out in the RTM coding manual, and with the methods and values set out in Chapter 5 and Appendix A of the SWRTM MVR. These standard values are not reproduced here. All coding initially assumed use of the default, central values where ranges for parameters were provided. Parameters and coding values were only altered within the defined ranges if an issue was identified in network or assignment calibration after network coding review had confirmed that no other required changes were identified.

6.3 Site visit

6.3.1 Prior to undertaking a significant amount of work on the strategic network refinement, a site visit was undertaken to appreciate the performance of the network and to inventory elements of the network that it would not be possible to do in a desktop environment.

6.3.2 A site visit was undertaken on Wednesday 26 July 2017. Whilst noting that this coincided with the summer time period to be modelled, it was still thought beneficial to observe the network and record details that would also apply to the three neutral month time periods. The site visit took place in the interpeak.

6.3.3 In addition to an annotated map marked-up on site (primarily noting speed limit changes and network restrictions), key observations from the site visit noted were:

a. 'rubbernecking' was observed on the stretch of carriageway by Stonehenge as drivers viewed the stones with vehicles observed going extremely slowly past the stones with large headway to the vehicle in front;

b. eastbound congestion was observed on the mainline A303 where two lanes merge to one, to the west of Winterbourne Stoke;

c. eastbound queues along the A303 through Winterbourne Stoke, Longbarrow Roundabout and Stonehenge, whilst traffic returned to free-flow conditions once past Stonehenge;

d. traffic was moving very slowly in the eastbound direction on the A303 from the junction with Stonehenge Road all the way past Stonehenge and once past Stonehenge, vehicle speeds increased before slowing down into Longbarrow junction;

e. The Packway was closed to all vehicles in both directions;

f. Fargo Road appeared to be used as an alternative route to The Packway, with apparently little regard for the 'Military personnel only' signage; and

g. temporary speed restrictions were in place on Bulford Droveway, although these did not appear to be observed by traffic using the route.

6.3.4 Separate site visits were undertaken by the Operational modelling team, which had different requirements from on-site observations. The key findings from those site visits are outlined in chapter 13.

6.4 Local area network refinement

6.4.1 Noting the refinement in the local area already undertaken in PCF Stage 2, the focus of the network refinement for the 'A303 Stonehenge SWRTM (DCO)' model at PCF Stage 3 is to refine detail further, with respect to the appraisal of a single scheme option. The refinement undertaken is set out below.

Additional network detail

6.4.2 The first task undertaken when reviewing the network was to ensure that all of the key local routes were represented. Having been designed to test the impacts of interventions on the SRN, the network topography in SWRTM was appropriate for feeding trips to the A303 for the most-part, but additional detail was required to ensure that routeing within the AoDM – particularly between the refined and more disaggregated zones – was appropriate.

6.4.3 This additional network was identified through:

a. a review of the refined zoning system against OS mapping;

b. reviews of routeing through the AoDM suggested by Google Maps; and

c. review of routes used by bus routes (see below) through the AoDM.

6.4.4 Additional network detail was also added in many cases where a road was already represented in the model. The main reason for adding detail – through the splitting of links by addition of extra nodes – was to better represent speed limits and changes on the local road network. Additional detail was mostly required in the case of speed changes on rural roads at the entry and exit from villages along their routes.

6.4.5 Figure 6-1 presents a comparison of the highway network in and around the AoDM. Links highlighted in black are those which are present in SWRTM DF3.0, whilst those in red are either additional links in the 'A303 Stonehenge SWRTM (DCO)' model, or links which have been split to better represent changing characteristics (e.g. speed limits) along their routes.

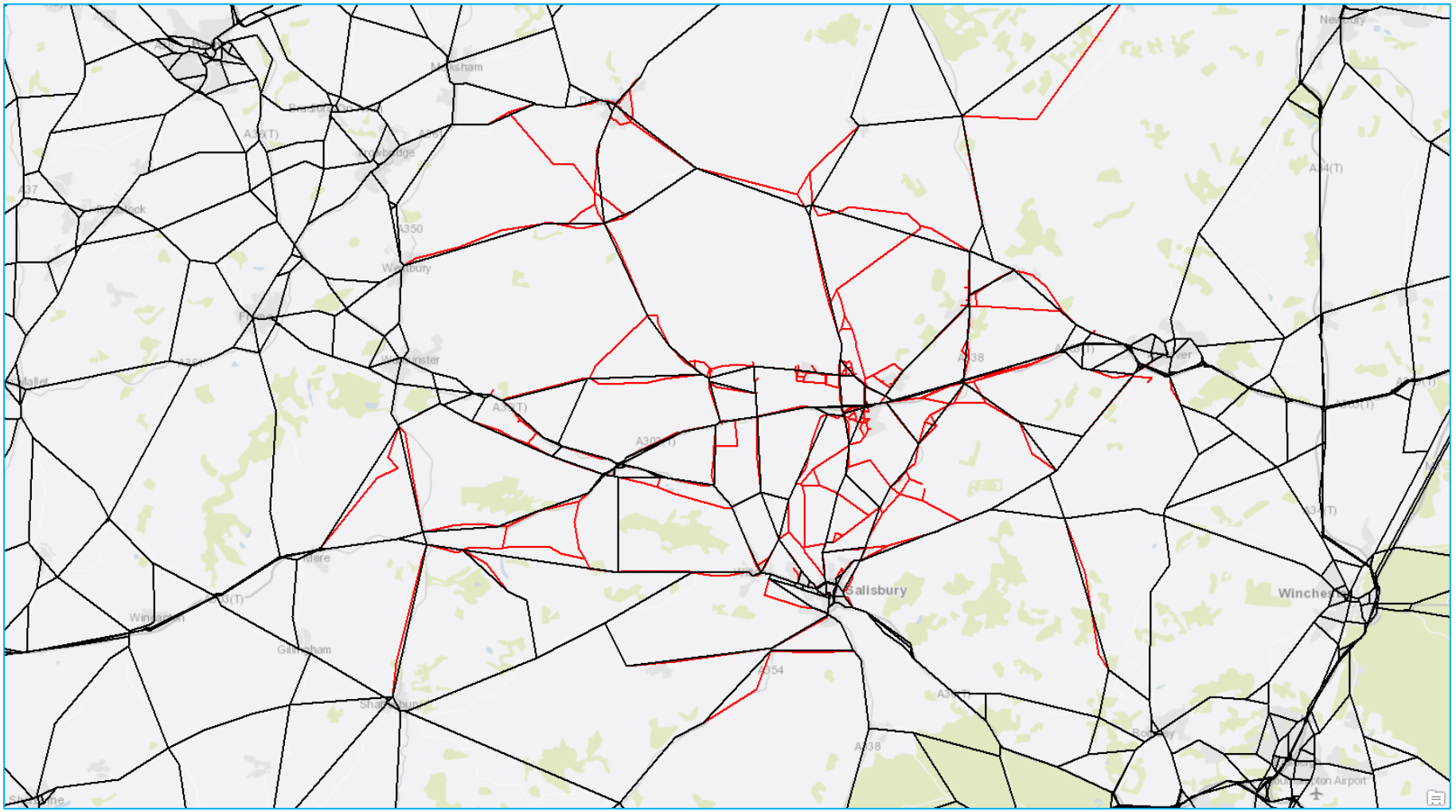


Figure 6-1: Comparison of network detail in AoDM

Centroid connectors

6.4.6 In addition to the network coding refinements noted above, all centroid connectors in the AoDM have been reviewed and, if necessary, re-coded to ensure more appropriate loading onto the highway network. This has been undertaken regardless of whether or not the zone representation between SWRTM DF3.0 and 'A303 Stonehenge SWRTM (DCO)' model has been altered or not.

6.4.7 Where appropriate, the link spanning zone connectors used throughout the AoDM in SWRTM have been reconsidered and – if relevant network and zonal detail allows – zones have been loaded via single point connector spigots. This is particularly the case along the Packway, Larkhill and for some of the refined zones around Amesbury. This change in loading is to consider the guidance in WebTAG Unit M3.1 §2.4.12 that "*centroid connectors should, wherever possible, represent actual means of access to and egress from the modelled network*". The use of multiple centroid connectors from zones has also been avoided to reduce potential convergence issues.

Link distances

6.4.8 Link lengths have been reviewed throughout the AoDM. A number of different consistency checks have been undertaken:

a. for those links forming part of a journey time validation route, link distances have been checked against the link lengths given in the OS ITN layer. Whilst there may not be an exact one-to-one match between modelled links and ITN links, aggregating either dataset provides common reference points across which the combined distances can be checked. A check was built into the local route Journey Time validation spreadsheet to allow this to be repeated as the network development progressed; and

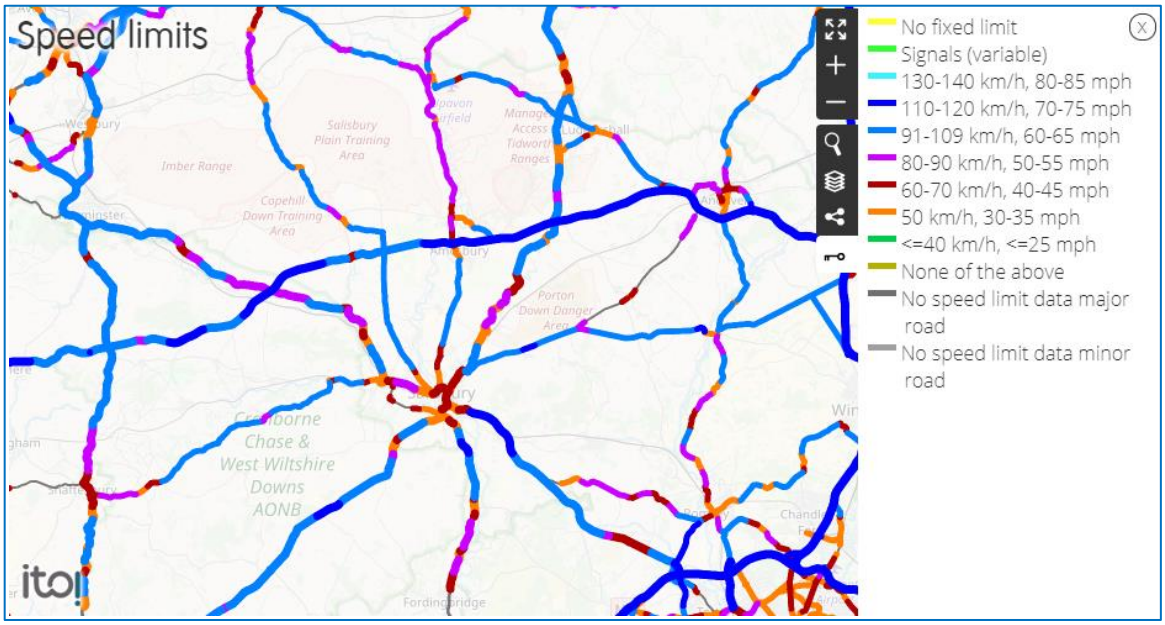
b. for links in the AoDM not located on journey time validation routes, checks were undertaken against the SATURN warnings generated for differences in link-length compared to the crow-fly distance. Those showing differences triggering the warnings were compared against distances in GIS software and Google Maps. Distances and/or coordinates were updated as necessary. Distances on key strategic routes were subject to a thorough review as part of a separate exercise.

Network speeds

6.4.9 Free-flow and cruise speeds coded in the simulation network were fully reviewed in the AoDM. The main check undertaken was to compare coded speeds against available speed limit data, noting that variances may be appropriate in some cases – particularly in the case of rural links that may be unrestricted but which in reality it may not be possible or safe to travel at 97 km/h (60 mph).

6.4.10 Checks against speed limit data were undertaken using information available in OpenStreetMap, where many links have speed data assigned to them. An example of the type of thematic output used for comparison purposes is given in Figure 6-2.

6.4.11 Noting the publicly editable and open source nature of OpenStreetMap, verification of speed limits was undertaken, with cross-references made against Google StreetView photography where available and from observations made on site.



Source: Speed Limits Map. Ito World. http://product.itoworld.com/map/124 [Last accessed: 03/04/2018]

Figure 6-2: Example of OpenStreetMap derived thematic speed limits map

Other

6.4.12 Specific non-fatal errors, serious warnings and warnings identified by SATURN in the AoDM were reviewed and rectified where appropriate. These warnings were continually monitored throughout the network calibration phase.

6.4.13 Node coordinates have been updated better to reflect the actual locations of junctions. Whilst this has no impact on assignment within the traffic model, the better location of nodes helps with secondary analysis processes – such as in the provision of data to environmental workstreams.

6.5 Non-standard coding

6.5.1 As noted above, the vast majority of network coding was undertaken in accordance with the RTM coding guidance, using default values as the starting point, refining within the upper and lower limits specified in network and assignment calibration if required. However, there were some instances where non-standard coding was undertaken.

Neutral month model time periods

6.5.2 Reduced saturation flows have been coded on the unnamed road through the villages of Bapton and Stockton, Wiltshire, reflecting the narrow carriageway widths. This route runs parallel to the A36 between Wylye in the south and Sutton Veny in the north.

6.5.3 The PCF Stage 2 model identified some traffic transfer to this unclassified road, despite the narrow carriageway noted above and frequent narrowing to a single lane requiring one-way traffic and courtesy give-ways. To provide some representation of road standard and quality, cruise speeds have been reduced and saturation flows have been reduced from the RTM coding manual to 1,000 PCU/hour at two locations.

Summer model time period

6.5.4 Data collected for the operational modelling, including video footage, clearly shows a change in driver behaviour on the section of the A303 near Stonehenge for the single day analysed. These behaviours are more pronounced in the summer than in the neutral month, which is likely due to the increased proportion of leisure trips in the summer, where traffic slows down to allow passengers a view of the stones.

6.5.5 This 'rubbernecking' is less apparent in the neutral months, where trips will include a higher proportion of 'commute' trips, and other trips by local residents who do not change driving behaviour to view the stones. This adapted behaviour in the summer suggests that a different approach is appropriate to reflect the specific conditions observed in the summer.

6.5.6 The observed delays between the A36 and Winterbourne Stoke in the eastbound direction cannot be easily explained by changes in driver behaviour; other than on the approach to Stonehenge there appear to be no exceptional characteristics of the route which could justify local modifications in the network. In particular, it is noted that the observed delay on this section is in the eastbound direction only.

6.5.7 A key purpose of the summer model is to test that the Scheme solves the summer queueing problem. Given the extent of the Scheme (from Amesbury to Berwick Down), and that similar significant delays are observed in both directions, the approach taken has been to consider how best to represent the overall average delay, comparing the total time between the A36 junction and the A338 junction.

6.5.8 Analysis of traffic data demonstrated that the westbound flow approaching Longbarrow and eastbound flow approaching Countess roundabout was below 1,000 vehicles through the summer period. It was concluded that the 'rubbernecking' behaviour resulted in a reduced capacity of the A303 past Stonehenge in the summer period. The approach taken, therefore, was to explicitly represent the reduced capacity of the A303 by using a calibrated saturation flow of 950 for straight-ahead movements past Stonehenge.

6.6 Fixed route data

6.6.1 A full review of bus routes within the AoDM was undertaken during the network refinement stage. Due to the strategic focus of the SWRTM bus routes are not included; however, in the context of a scheme model, with a focus on local movements, buses reduce capacity available to other vehicles on links and at junctions.

6.6.2 Bus route data were extracted from Basemap's Route Lines product. This contains a visual representation and service frequency for twelve weekly time periods. These data are derived from the DfT's Traveline National Dataset (TNDS) for bus services and National Coach Services Database (NCSD) for coaches.

6.6.3 All routes either wholly within or passing through the AoDM were selected. In total, 82 separate routes were identified. These routes are shown spatially in Figure 6-3.

6.6.4 These data were extracted from the GIS layer provided and the average frequencies by weekday time periods were calculated. As the SATURN software only allows for the input of frequencies to a whole integer, these frequencies had to be rounded to be included in the model. Table 6-1 provides a list of bus services extracted and coded into the model, along with the average frequencies by time period. Table 6-2 sets out the average number of PSV services by time period on the A303 mainline, split by section.

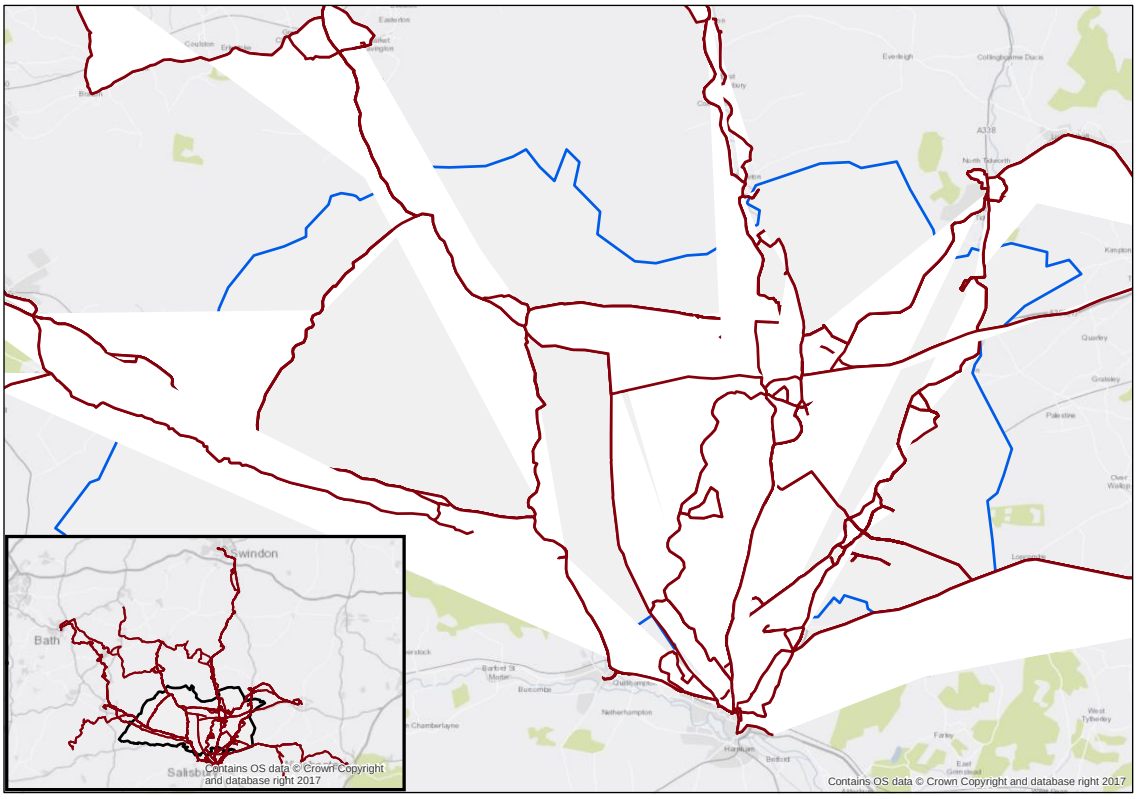


Figure 6-3: Spatial location of bus routes passing through AoDM

Table 6-1: Bus routes, operators, description, average weekday frequency

Service Number	Operator Name	Description	Frequency		
			AM*	IP*	PM*
2	Salisbury Reds	Stoford to Salisbury	0	0	0
2	Salisbury Reds	Devizes to Salisbury via Shrewton	2	1	1
2	Salisbury Reds	Great Cheverell to Salisbury via Shrewton	0	0	0
2	Salisbury Reds	Salisbury to Devizes via Market Lavington	0	0	0
2	Salisbury Reds	Salisbury to Devizes via Great Cheverell	2	1	1
2	Salisbury Reds	Shrewton to Salisbury	0	0	0
201	Wheelers Travel	Salisbury to Amesbury	1	0	0
201	Tourist Coaches	Figheldean to Salisbury via Amesbury	0	0	1
201	Tourist Coaches	Salisbury to Figheldean via Amesbury	0	0	0
265	First	Salisbury to Westbury via Warminster	1	0	0
265	First	Salisbury to Bath via Warminster	2	2	2
265	First	Salisbury to Trowbridge via Warminster	1	0	0
265	First	Westbury to Salisbury via Warminster	1	0	0
265	First	Bath to Codford St Mary via Warminster	2	1	0
265	First	Bath to Salisbury via Warminster	1	0	1
287	Tourist Coaches	Stockbridge to Salisbury via Porton	0	0	0
287	Tourist Coaches	Salisbury to Stockbridge via Porton	1	0	0
54	Beeline Coaches	Chitterne to Warminster via Codford St Mary	0	0	0
54	Beeline Coaches	Warminster to Chitterne via Codford St Mary	0	0	0
55	Beeline Coaches	Warminster to Devises via Chitterne	0	0	0
55	Beeline Coaches	Devizes to Warminster via Chitterne	0	0	0
56	Beeline Coaches	Warminster to Salisbury via Sherrington and Hanging Langford	0	0	0
56	Beeline Coaches	Salisbury to Warminster via Stapleford, Wylye and Sherrington	0	0	0
605	Tourist Coaches	Netheravon to Andover via Bulford and South Tidworth	0	0	1
605	Tourist Coaches	Andover to Netheravon via South Tidworth and Bulford	1	0	0
608	Tourist Coaches	Andover to Larkhill via Longbarrow and Shrewton	1	0	0

Service Number	Operator Name	Description	Frequency		
			AM*	IP*	PM*
608	Tourist Coaches	Larkhill to Andover via Shrewton and Longbarrow	0	0	1
615	Wheelers Travel	Durrington to Amesbury via Larkhill	0	0	0
615	more Bus	Amesbury to Durrington via Larkhill	1	1	0
66	Salisbury Reds	Salisbury to Tidworth via Cholderton	1	0	2
66	Salisbury Reds	Shipton Bellinget to Salisbury via Cholderton	1	1	0
66	Salisbury Reds	Persham Down to Salisbury via Newton Tony	2	0	1
66	Salisbury Reds	Allington to Salisbury via Gomeldon	0	0	1
66	Salisbury Reds	Idmiston to Salisbury via Gomeldon and Laverstock	0	0	0
66	Salisbury Reds	Idmiston to Salisbury via Gomeldon	1	0	0
666	Salisbury Reds	Laverstock to Allington	1	0	0
666	Salisbury Reds	Allington to S of Salisbury via Laverstock	0	0	0
668	Salisbury Reds	Salisbury to Shipton Bellinger via Cholderton	0	0	0
67	Wheelers Travel	Persham Down to Salisbury via Winterbourne Earls and back again via Old Sarum	0	0	0
67	Wheelers Travel	Tidworth to Salisbury via Old Sarum	0	0	1
67	Wheelers Travel	Shipton Bellinger to Persham Down via North Tidworth	1	0	0
674	Salisbury Reds	Laverstock to Amesbury via Porton	0	0	1
674	Salisbury Reds	Amesbury to Laverstock via Porton	1	0	0
678	Salisbury Reds	Salisbury to Laverstock via Old Sarum	1	0	0
678	Salisbury Reds	Laverstock to Salisbury via Old Sarum	0	1	0
8	Salisbury Reds	Salisbury to Andover via Amesbury and Tidworth	1	1	1
8	Salisbury Reds	Andover to Salisbury via Tidworth, Durrington, Larkhill and Amesbury	1	3	1
8	Stagecoach in Hampshire	Salisbury to Andover via Amesbury and Tidworth	2	0	3
8	Stagecoach in Hampshire	Amesbury to Andover via Tidworth and Bulford	1	1	0
8	Stagecoach in Hampshire	Salisbury to Bulford via Amesbury	1	0	1
83	Frome Minibuses	Salisbury to Stourton via Codford St Mary and Sutton Veny	1	0	0
83	Frome Minibuses	Stourton to Salisbury via Codford St Mary and Sutton Veny	0	0	0

Service Number	Operator Name	Description	Frequency		
			AM*	IP*	PM*
HPA	Community Transport South Wiltshire	Amesbury local circular route	1	2	0
HPB	Community Transport South Wiltshire	Amesbury local circular route	0	1	2
STB	Salisbury Reds	Salisbury to Stonehenge via A360	0	0	0
STB	Salisbury Reds	Salisbury to Stonehenge via Old Sarum Castle	0	0	1
X5	Salisbury Reds	Pewsey to Salisbury via Larkhill, Durrington and Amesbury	2	0	0
X5	Salisbury Reds	Swindon to Amesbury via Larkhill and Durrington	0	2	0
X5	Salisbury Reds	Marlborough to Salisbury via Durrington, Bulford and Amesbury	2	1	2
X5	Salisbury Reds	Salisbury to Swindon via Larkhill, Durrington, Bulford and Amesbury	2	1	2
X5	Salisbury Reds	Larkhill to Salisbury via Durrington and Amesbury	1	0	1
X88	Real Coach Hire	Chitterne to Bath via Great Cheverell	0	0	0
X88	Real Coach Hire	Bath to Chitterne via Great Cheverell	0	2	0
X4	Salisbury Reds	Salisbury to Larkhill via Durrington and Amesbury	2	2	2
X4	Salisbury Reds	Larkhill to Salisbury via Amesbury and Durrington	2	2	2
Active8	Salisbury Reds	Andover to Salisbury via Tidworth, Bulford and Amesbury	4	4	4
Active8	Salisbury Reds	Salisbury to Andover via Amesbury, Bulford and Tidworth	4	4	4
651	Salisbury Reds	Durrington College to Bulford Camp	1	0	0
651	Salisbury Reds	Bulford Camp to Durrington College	1	0	0

* Note: Frequencies rounded to nearest whole number for input into SATURN

Table 6-2: Average number of scheduled PSVs on A303, by time period

Section	Direction	Neutral time periods			Summer
		AM	IP	PM	10:00-19:00
Longbarrow to Countess	EB	0	0	1	0
	WB	1	0	0	0
Countess to Solstice Park	EB	0	0	0	0
	WB	0	0	0	0
Solstice Park to A3028	EB	2	2	3	2
	WB	2	0	0	0
A3028 to A338	EB	1	0	1	0
	WB	1	0	1	0

6.7 Passenger Car Unit factors

6.7.1 Passenger Car Unit (PCU) factors allow for the conversion of different vehicle types to a standardised unit for representation in the demand trip matrices and assignment to the highway network. A single PCU represents a typical car length, in this case assumed to be 5.75 metres.

6.7.2 The PCU factors used in the 'A303 Stonehenge SWRTM (DCO)' model are unchanged from those used in the standard SWRTM DF3.0 and the other Highways England RTMs. These are aligned with guidance given in WebTAG Unit M3.1 §D.7.2. PCU factors are therefore:

a. car – 1.0;

b. LGV – 1.0; and

c. HGV – 2.5.

6.7.3 As noted above, the refined model has seen the addition of buses as fixed routes in the AoDM. These fixed route buses have been given a PCU factor of 3.0. This ensures that buses take up appropriate capacity on the network, which is therefore not available to other user-classes assigned in the model.

6.8 Bans and restrictions

6.8.1 A full review of bans and restrictions to vehicular movement in the AoDM has been undertaken. Neither SWRTM DF3.0 nor the PCF Stage 2 model included any bans for HGVs in the AoDM or prohibitions or penalties for other vehicles.

6.8.2 A full review of known restrictions in the network was undertaken. Data were identified from a number of different sources, including:

a. site visit observations, as undertaken in July 2017;

b. known road closures during the traffic data survey period;

c. a review of Google StreetView imagery for modelled roads in the AoDM ; and

d. a review of existing freight restrictions, as noted on the Freight Journey Planner website (http://www.freightjourneyplanner.co.uk/), throughout the AoDM.

6.8.3 Table 6-3 summarises the restrictions that were coded into the highway networks. Further detail on the specifics of these restrictions, particularly those that restrict HGV route choice, are given in chapter 9.

Table 6-3: Summary of coded Bans and Restrictions

Location	Affected Vehicle Classes	Type of restriction
The Packway, Larkhill, between Tombs Road and the A345	Car, LGV, HGV and Buses	Full closure, due to roadworks
Tombs Road, Larkhill, between The Packway and Fargo Road	Car, LGV, HGV and Buses	Full closure, due to roadworks
High Street, Shrewton	HGV	Restriction (2T mgw limit)
London Road, between Shrewton and the B3086	HGV	Restriction (2T mgw limit)
Tanners Lane, Shrewton	HGV	Time Penalty
B3083, between the A36 and A303	HGV	Time Penalty

6.8.4 It should be noted that the closure of The Packway, Larkhill, due to roadworks only takes place in the validated base year model. This closure is removed (as was the case in October 2017) in the 'base minus' model, which is used as the basis for all forecasting and will not be present in any of the forecast year models.

6.9 Tolls

6.9.1 Whilst there are no tolled routes in the AoDM or its direct environs, SWRTM does include a number of tolled bridges:

a. M4 and M48 River Severn Crossings;

b. Clifton Suspension Bridge, Bristol;

c. Itchen Bridge, Southampton;

d. Swinford Bridge, Oxford; and

e. Tamar Bridge, Plymouth.

6.9.2 In SWRTM DF3.0, toll prices were collected for 2015, aligning with the modelled base year. These were subsequently adjusted to exclude the Value Added Tax (VAT) element for car business, LGV and HGV trips. These prices were then adjusted to a 2010 price base using the GDP deflator values from the WebTAG Databook to be consistent with the price base for the generalised costs.

6.9.3 As a result of the change in base year to 2017, the tolls have been recalculated as 2017 values in 2010 price base using the methodology adopted in SWRTM. Table 6-4 sets out a comparison of the 2015 and 2017 toll values for each of the modelled time periods.

6.9.4 In general, it is noted that tolls are generally slightly cheaper in 2017 adjusted values. This is because in most cases the actual toll price has not changed, but the adjustment back to a 2010 price base using the GDP deflator values results in a slightly larger reduction. The exception to this is the River Severn crossings, where the charge for cars increased slightly in 2017 over previous years.

Table 6-4: Comparison of adjusted 2015 and 2017 toll prices

Toll	2015 tolls (pence)*					2017 tolls (pence)*				
	Car EB	Car Commute	Car Other	LGV	HGV	Car EB	Car Commute	Car Other	LGV	HGV
AM average hour										
M48 Severn Crossing (WB)	497	597	597	1002	1500	498	598	598	996	1487
M4 Severn Crossing (WB)	497	597	597	1002	1500	498	598	598	996	1487
Clifton EB	77	92	92	77	77	74	89	89	74	74
Clifton WB	77	92	92	77	77	74	89	89	74	74
Itchen EB	46	55	55	92	1913	45	54	54	89	1858
Itchen WB	46	55	55	92	1913	45	54	54	89	1858
Swinford EB	4	5	5	4	31	4	4	4	4	30
Swinford WB	4	5	5	4	31	4	4	4	4	30
Tamar EB	69	83	83	170	376	67	80	80	165	366
Tamar WB	69	83	83	170	376	67	80	80	165	366
IP average hour										
M48 Severn Crossing (WB)	497	597	597	1002	1500	498	598	598	996	1487
M4 Severn Crossing (WB)	497	597	597	1002	1500	498	598	598	996	1487
Clifton EB	77	92	92	77	77	74	89	89	74	74
Clifton WB	77	92	92	77	77	74	89	89	74	74
Itchen EB	38	46	46	92	1913	37	45	45	89	1858
Itchen WB	38	46	46	92	1913	37	45	45	89	1858
Swinford EB	4	5	5	4	31	4	4	4	4	30
Swinford WB	4	5	5	4	31	4	4	4	4	30
Tamar EB	69	83	83	170	376	67	80	80	165	366
Tamar WB	69	83	83	170	376	67	80	80	165	366
PM average hour										
M48 Severn Crossing (WB)	497	597	597	1002	1500	498	598	598	996	1487
M4 Severn Crossing (WB)	497	597	597	1002	1500	498	598	598	996	1487
Clifton EB	77	92	92	77	77	74	89	89	74	74
Clifton WB	77	92	92	77	77	74	89	89	74	74
Itchen EB	46	55	55	92	1913	45	54	54	89	1858
Itchen WB	46	55	55	92	1913	45	54	54	89	1858
Swinford EB	4	5	5	4	31	4	4	4	4	30
Swinford WB	4	5	5	4	31	4	4	4	4	30
Tamar EB	69	83	83	170	376	67	80	80	165	366
Tamar WB	69	83	83	170	376	67	80	80	165	366

* values include removal of VAT for Car Business, LGV and HGV, and adjustment to 2010 price base

7 Trip matrix development

7.1 Introduction

7.1.1 This chapter of the report summarises the data sources used in the development of the trip matrices for the model, along with the processes used to verify and clean said data, processing of the data and use in refining the SWRTM DF3.0 prior matrices.

7.1.2 This chapter culminates in justifying matrix estimation to refine the trip matrices, albeit that process is set out separately in chapter 10.

7.2 Travel demand data

7.2.1 This section summarises the data that have been used in the refinement of the trip matrices. The methods employed to refine the matrices are set out in detail in section 7.3.

Summary of SWRTM demand matrices

7.2.2 The SWRTM DF3.0 trip matrices were primarily derived from mobile phone origin destination (MPOD) data supplied by Telefónica, as opposed to being developed from more traditional sources (e.g. roadside interview surveys (RSIs)).

7.2.3 The matrix RTM Technical Consistency Group (TCG) produced an approach to matrix development using MPOD data that was followed by each of the RTMs. The guidance given in that Technical Note formed the basis for the methodology to derive prior trip matrices for SWRTM, which form the starting point for the development of the refined local area matrices for the 'A303 Stonehenge SWRTM (DCO)' model.

7.2.4 The key data sources used in the development of the SWRTM DF3.0 prior matrices include:

a. MPOD data collected in March 2015 by the operator Telefónica (subsequently processed to remove LGV, HGV and rail trips from the dataset);

b. Trafficmaster origin destination (O-D) data at Lower level Super Output Area (LSOA) resolution, for the periods September 2013 to August 2014 and from March 2015 to August 2015. These data were used for the derivation of LGV matrices;

c. the DfT's Base Year Freight Matrices (BYFM), which provide an estimate of daily demand in 2006 at a Local Authority District (LAD) level, with some key special generators separately represented (e.g. ports, airports and key distribution centres);

d. MOIRA and NRTS data used to estimate rail demand, both for removal from the MPOD data and to provide Base Year rail demand inputs to the VDM;

e. Civil Aviation Authority (CAA) 2014 passenger data and the DfT's National Air Passenger Allocation Model (NAPALM) data to derive airport related demand (not wholly represented in MPOD data, due to higher volumes of 'roaming' phones);

f. National Travel Survey (NTS) data, heavily used for the verification of trip rates, trip purposes and trip lengths included in the MPOD data, and as an input to the synthetic matrix build process;

g. 2011 Census Journey to Work (JtW) data to provide estimates of origin-destination commuter trips in England;

h. National Trip End Model (NTEM) version 6.2 (NTEM v6.2) data to provide trip-end estimates for comparison with the MPOD data and as an input into the matrix synthesis processes; and

i. Business Register and Employment Survey (BRES) data from 2014 used in the derivation of trip end estimates in the matrix synthesis processes.

7.2.5 The processes to derive the prior matrices from these datasets are set out in the SWRTM MVR (document reference REP/MVR/001) and are not repeated herein.

Base year uplift

7.2.6 The principle data source of trip growth available is the DfT's National Trip End Model (NTEM) dataset, of which version 7.2 is the current version. NTEM provides forecasts of population, households, workforce, and jobs at Middle-layer Super Output Area (MSOA) resolution (and aggregates to authority, county and region) over a period from 2011 to 2051. The current version of NTEM is multi-modal, providing data on trips on foot, by bicycle, motor vehicle (both as a driver and as passenger) by rail and by bus.

7.2.7 Data from NTEM7.2 have therefore been extracted for the South West region for car driver mode for the morning period (07:00 – 09:59), interpeak period (10:00 – 15:59), evening period (16:00 – 18:59) and off-peak period (19:00 – 06:59). The data have been extracted using the Trip End Model Presentation programme (TEMPro).

7.2.8 Light goods vehicle (LGV) and heavy goods vehicle (HGV) data cannot be obtained from NTEM. Instead, the Road Traffic Forecasts 2015 (RTF15), derived from the DfT's National Transport Model (NTM) have been interrogated. These provide traffic forecasts by road type, area type and vehicle type in the form of vehicle miles travelled. Data are presented in five-yearly intervals from 2010 to 2040. Scenario 1 of the RTF15 data has been analysed to obtain LGV and HGV growth in the South West region.

7.2.9 Additionally, the DfT's Transport Statistics 2017 have been interrogated. Specifically, table 'TSGB0705' which provides traffic growth in terms of billions of vehicle miles travelled per year, by vehicle type. These data are not currently available for 2017 and so growth is only available between 2015 and 2016.

HGV update (strategic movements)

7.2.10 The SWRTM DF3.0 HGV matrices were derived from DfT's Base Year Freight Matrices (BYFM), subsequently uplifted from 2006 to 2015 as detailed within the RTM Matrix Development Technical Guidance.

7.2.11 To improve the representation of HGV demand at a strategic movement level in the 'A303 Stonehenge SWRTM (DCO)' model, the DfT's Continuing Survey of Road Goods Transport Great Britain (CSRGT GB) data were obtained and used.

7.2.12 CSRGT GB data are collected via surveys given to HGV operators asking them to provide details of all domestic trips undertaken by specific vehicles during a one-week period. The survey has a sample size of around 230 vehicles per week with data grossed up to the population of GB-registered HGVs using licensing records from the Driver and Vehicle Licensing Agency (DVLA).

7.2.13 The data used to inform the 'A303 Stonehenge SWRTM (DCO)' model HGV demand was a subset of the whole CSRGT GB dataset. Data provided included journeys which were surveyed in 2015 and 2016 and where the origin or destination was within one of the following NUTS3[4] regions: UKJ37, UKJ36, UKK22, UKK23 or UKK43. These are highlighted spatially in Figure 7-1.

[4] NUTS - The Nomenclature of Territorial Units for Statistics (NUTS) is a geocode standard by Eurostat for referencing the subdivisions of the United Kingdom of Great Britain and Northern Ireland for statistical purposes. As a country, there are nine top-level NUTS regions in England.

Figure 7-1: NUTS3 regions in the South West of England

7.2.14 A sector system was defined using NUTS boundaries. These sectors were at the NUTS3 level in the South West (UKK) and South East (UKJ); the NUTS2 level in the East (UKH) and London (UKI); and the NUTS1 level elsewhere. The sector system is shown in Figure 7-2.

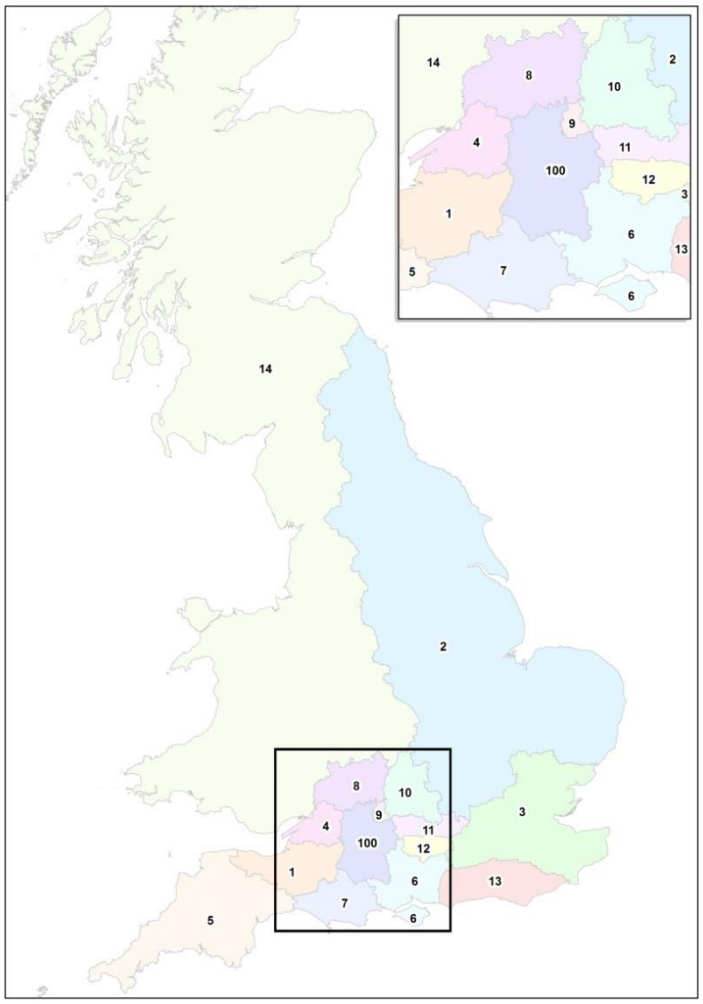


Figure 7-2: Derived CSRGT GB sector system

7.2.15 The grossed CSRGT GB data were converted to average hour numbers of trips per time period. This was undertaken based on the proportion of trips in the existing SWRTM DF3.0 HGV matrix. These trips were then aggregated to the previously defined sector system, giving average hour sector-to-sector trip matrices. Comparing these matrices against the SWRTM HGV demand, aggregated to the same sector system, highlighted where modifications were required to improve the representation of HGV trips in the 'A303 Stonehenge SWRTM (DCO)' model. This is described in detail in section 7.3.

Trip Information System (TIS) data

7.2.16 TIS data consists of origin/destination matrices for motorised road or rail trips and has been produced for Highways England by Telefónica (owner of the O_2 network) using data extracted from its UK mobile phone network. The person trip matrices extracted from the TIS are the average number of trips for the specified dates, times and trip types.

7.2.17 TIS data were obtained for the following neutral month interpeak and summer time periods:

a. 10:00 to 16:00 for weekdays between 26th February and 24th March 2016 (inclusive) – 20 days; and

b. 10:00 to 19:00 for Fridays, Saturdays and Sundays between Friday 15th July and Sunday 28th August 2016 (inclusive) – 21 days.

7.2.18 The TIS data have been extracted for the zone system shown in Figure 5-2. Within the South West region and the areas immediately adjacent, these zones are formed by historic counties. Outside of the South West, the zones are formed by regions.

7.2.19 The TIS data have been used to calculate adjustment factors that have been applied to the SWRTM prior 2015 weekday interpeak matrices in order to represent the summer weekend demand. This process is documented in Appendix B.

Local area update: ANPR

7.2.20 As noted in chapter 5, ANPR data were collected at 27 separate sites in both August and October to be used to update the representation of trips through the AoDM. The locations of these have previously been set out in Figure 5-1.

7.2.21 Before use in the matrix build process, the count data were checked to identify any periods in which records were missing or incorrect.

7.2.22 The raw number plate records were checked for unlikely or repeated camera pairs and significantly higher or lower flows between camera pairs than would be expected. Where issues were found with camera allocation, for example where camera IDs at a site were allocated in the wrong direction, these were corrected before any further processing of the data was undertaken.

7.2.23 Due to an accident on the A303 potentially affecting traffic flows and routeing within the study area on Thursday 5 October 2017, the records collected on this day were excluded from any further analysis.

7.2.24 The processed ANPR number plate records were then sampled to extract data to build camera-to-camera trip matrices by time period. Data were sampled between three hours before the start and three hours after the end of the modelled time period being analysed. This ensured that the full route of trips occurring near the start or end of the model period was within the sampled data and therefore the trip could be included or excluded as appropriate. Data were sampled separately by survey day to enable separate time period matrices to be built and converted to average hour once complete.

7.2.25 ANPR cameras do not have a 100% capture rate. There are known issues in, firstly, reading a number plate where not all vehicles passing the site are captured and, secondly, reading the correct characters on captured number plates. In order to improve the record matching when chaining number plates together various character transformations were applied as detailed in Table 7-1.

Table 7-1: ANPR character transformations

Initial Character	Transformed Character
0	O
1	I
2	Z
5	S
7	T
8	B
D	O
K	R
F	E

7.2.26 Building camera-to-camera trip matrices from the ANPR number plate records firstly required all records to be matched. After applying character transformations to the data each unique number plate was associated with all cameras it was captured at passing through paired with the time it was captured in chronological order. This gave the starting point for the trip chains for each vehicle in the survey period.

7.2.27 The unique trip chains likely include records where vehicles have made multiple trips within the study period.

7.2.28 As a first step in searching for and defining the multiple trip chains, ANPR cameras inbound and outbound to the study area cordon were defined.

7.2.29 Any trip chains which included an inbound cordon camera were split, with the first trip chain ending with the camera before the inbound camera and the additional trip chain starting from the inbound camera. Similarly, if a trip chain contained an outbound camera then the chain was split with the outbound camera forming the end of the first chain and the additional chain continuing from the next camera in the record.

7.2.30 Defining further multiple trip chains required an analysis of their travel times. The median travel time between all observed camera pairs was calculated by hour from the initially split chain records.

7.2.31 The actual travel time between a camera pair was compared to its median time. Where the actual travel time was above 1.5 times the median travel time it was assumed that the vehicle had made a stop in its trip. Therefore, the trip chain was split at the camera pair with the above average travel time creating two new trip chains.

7.2.32 Taking the final number plate dataset, with trip chains split by inbound and outbound cameras and travel times, a camera-to-camera trip matrix was built using the first and last cameras in the chain as the trip origin and destination. Vehicle classifications, obtained through matching number plate records to the DVLA licencing database, were used to build separate matrices for cars, LGVs, Public Service Vehicles (PSVs), OGV1 and OGV2. Some number plates could not be matched with a vehicle on the DVLA database and these trips were placed into an 'unclassed' trip matrix.

7.2.33 The individual day matrices were then averaged to produce period trip matrices representing average traffic movements across the three days of the separate summer and neutral month surveys. Finally, the time period matrices were converted to average hour by dividing by the number of hours in each period.

7.2.34 Total trip origins and destinations were compared to ATC data at the cordon camera sites where trip volumes and traffic flows were comparable. The comparison of the results is shown in Table 7-2 and Table 7-3.

Table 7-2: Comparison of Neutral ANPR Cordon Trip Ends and Traffic Volumes (AM, interpeak and PM)

Location	AM							
	Modelled		Observed		% Diff		GEH	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
A360 West of Shrewton	920	563	1,066	719	-14%	-22%	3.3	4.4
B390 Chitterne Road West of Shrewton	548	159	650	173	-16%	-8%	2.9	0.8
A36 West of Deptford	1,704	1,139	1,744	1,165	-2%	-2%	0.7	0.5
A303 South of Deptford	1,918	1,381	2,134	1,510	-10%	-9%	3.4	2.4
A360 South of Longbarrow Roundabout	1,040	1,269	1,163	1,418	-11%	-11%	2.6	2.9
Countess Road South of Countess Roundabout	1,212	1,347	1,439	1,427	-16%	-6%	4.4	1.5
A345 North West of Durrington	1,112	861	1,168	798	-5%	8%	1.2	1.5
A303 North of Cholderton	2,392	3,721	2,422	3,799	-1%	-2%	0.4	0.9
A338 North of Cholderton	643	652	751	691	-14%	-6%	2.9	1.1
A338 South of Shipton Bellington	1,469	1,249	1,632	1,417	-10%	-12%	2.9	3.3
Stonehenge Visitor Centre	31	123	23	121	35%	2%	1.1	0.1

Location	IP							
	Modelled		Observed		% Diff		GEH	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
A360 West of Shrewton	981	973	1,086	1,155	-10%	-16%	2.3	3.9
B390 Chitterne Road West of Shrewton	448	456	486	513	-8%	-11%	1.3	1.8
A36 West of Deptford	2,147	2,300	2,212	2,350	-3%	-2%	1.0	0.7
A303 South of Deptford	3,354	3,745	3,930	4,351	-15%	-14%	6.7	6.7
A360 South of Longbarrow Roundabout	1,374	1,422	1,599	1,695	-14%	-16%	4.1	4.9
Countess Road South of Countess Roundabout	2,223	1,947	2,662	2,104	-16%	-7%	6.3	2.5
A345 North West of Durrington	1,287	1,371	1,285	1,404	0%	-2%	0.0	0.6
A303 North of Cholderton	4,784	4,943	4,885	5,018	-2%	-1%	1.0	0.7
A338 North of Cholderton	860	972	1,103	976	-22%	0%	5.5	0.1
A338 South of Shipton Bellington	1,995	1,772	2,316	2,059	-14%	-14%	4.9	4.6
Stonehenge Visitor Centre	475	580	535	672	-11%	-14%	1.9	2.6

Location	PM							
	Modelled		Observed		% Diff		GEH	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
A360 West of Shrewton	609	777	611	924	0%	-16%	0.1	3.6
B390 Chitterne Road West of Shrewton	257	473	272	532	-5%	-11%	0.6	1.9
A36 West of Deptford	1,245	1,612	1,269	1,651	-2%	-2%	0.5	0.7
A303 South of Deptford	1,265	2,150	1,313	2,305	-4%	-7%	1.0	2.3
A360 South of Longbarrow Roundabout	1,076	903	1,120	964	-4%	-6%	0.9	1.4
Countess Road South of Countess Roundabout	1,592	1,254	1,703	1,327	-7%	-6%	1.9	1.4
A345 North West of Durrington	920	1,052	829	1,074	11%	-2%	2.2	0.5
A303 North of Cholderton	3,646	2,718	3,669	2,775	-1%	-2%	0.3	0.8
A338 North of Cholderton	676	723	747	698	-10%	4%	1.9	0.7
A338 South of Shipton Bellington	1,356	1,335	1,398	1,429	-3%	-7%	0.8	1.8
Stonehenge Visitor Centre	191	70	211	79	-9%	-12%	1.0	0.8

Table 7-3: Comparison of Summer ANPR Cordon Trip Ends and Traffic Volumes

Location	10am – 7pm							
	Modelled		Observed		% Diff		GEH	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
A360 West of Shrewton	1,542	1,661	1,667	1,842	-8%	-10%	2.2	3.1
B390 Chitterne Road West of Shrewton	1,871	1,419	1,986	1,553	-6%	-9%	1.9	2.5
A36 West of Deptford	3,238	3,154	3,546	2,936	-9%	7%	3.7	2.8
A303 South of Deptford	8,442	7,951	8,195	9,215	3%	-14%	1.9	9.7
A360 South of Longbarrow Roundabout	2,352	2,387	3,409	2,705	-31%	-12%	13.9	4.5
Countess Road South of Countess Roundabout	2,787	2,416	3,848	3,446	-28%	-30%	13.0	13.4
A345 North West of Durrington	2,151	2,495	2,314	2,527	-7%	-1%	2.4	0.5
A303 North of Cholderton	10,547	10,849	11,650	11,367	-9%	-5%	7.4	3.5
A338 North of Cholderton	1,704	1,868	1,851	2,032	-8%	-8%	2.5	2.6
A338 South of Shipton Bellington	3,312	3,041	3,621	3,352	-9%	-9%	3.7	3.9
Stonehenge Visitor Centre	1,430	1,484	1,700	1,741	-16%	-15%	4.8	4.5

7.2.35 The comparisons demonstrate that the ANPR trip matrices represent traffic flows into and out of the study area and provide a basis for refining the representation of trips in the AoDM. The detail on the methodology used to incorporate the ANPR demand into the full model matrices is detailed in section 7.3.

Local area update: Stonehenge Visitor Centre Interviews

7.2.36 As noted in chapter 5, interviews of visitors at the Stonehenge Visitor Centre were undertaken to obtain full origin-destination records of those visiting the centre in the neutral and summer time periods. These Visitor Centre Interviews (VCIs) were undertaken in August and October.

7.2.37 These VCI data have been processed in the same way as roadside interview (RSI) data, as they provide a similar type of information about trip making. WebTAG Unit M1.2 guidance relating to RSI surveys has therefore been followed where appropriate.

7.2.38 These interview data were collected alongside two sets of count data collection undertaken at the entrance / exit to the visitor centre car park:

a. a 12 hour manual classified link count (MCC) on the same days as the surveys; and

b. a two-week automatic traffic count (ATC).

7.2.39 Prior to use in matrix building, the VCI records obtained were cleaned by plotting the origin and destination locations of each record in GIS software. Records where the origin or destination has been stated as being outside of the UK have been removed from the dataset.

7.2.40 The detail on the methodology used to incorporate the VCI data into the full model matrices is detailed in section 7.3.

7.3 Matrix build

7.3.1 This section of the report sets out the method used to produce the new local area demand matrices for the ‘A303 Stonehenge SWRTM (DCO)’ model. This section of the report is broken into various sub-sections dealing with the key steps in the matrix uplift and refinement.

Overview of process

7.3.2 The SWRTM DF3.0 prior matrices were taken as the starting point for further refinement. This avoids incorporating the effects of any matrix estimation that would have been undertaken by the SWRTM development team.

7.3.3 The general process to derive the refined prior matrices for the 2017 base year involved five broad stages:

a. stage 1 – disaggregation of the SWRTM DF3.0 prior matrices to refined zoning system;

b. stage 2 – base year uplift to 2017;

c. stage 3 – factoring of HGVs by CSRGT GB data;

d. stage 4 – refinement of local demand using ANPR data; and

e. stage 5 – inclusion of Stonehenge Visitor Centre trips.

7.3.4 It should be noted that, for the development of the summer time period matrices, a further stage is introduced at the beginning, whereby the TIS data are used to factor the neutral month average interpeak hour matrix to estimate summer demand.

7.3.5 A flowchart outlining the process is given in Figure 7-3.

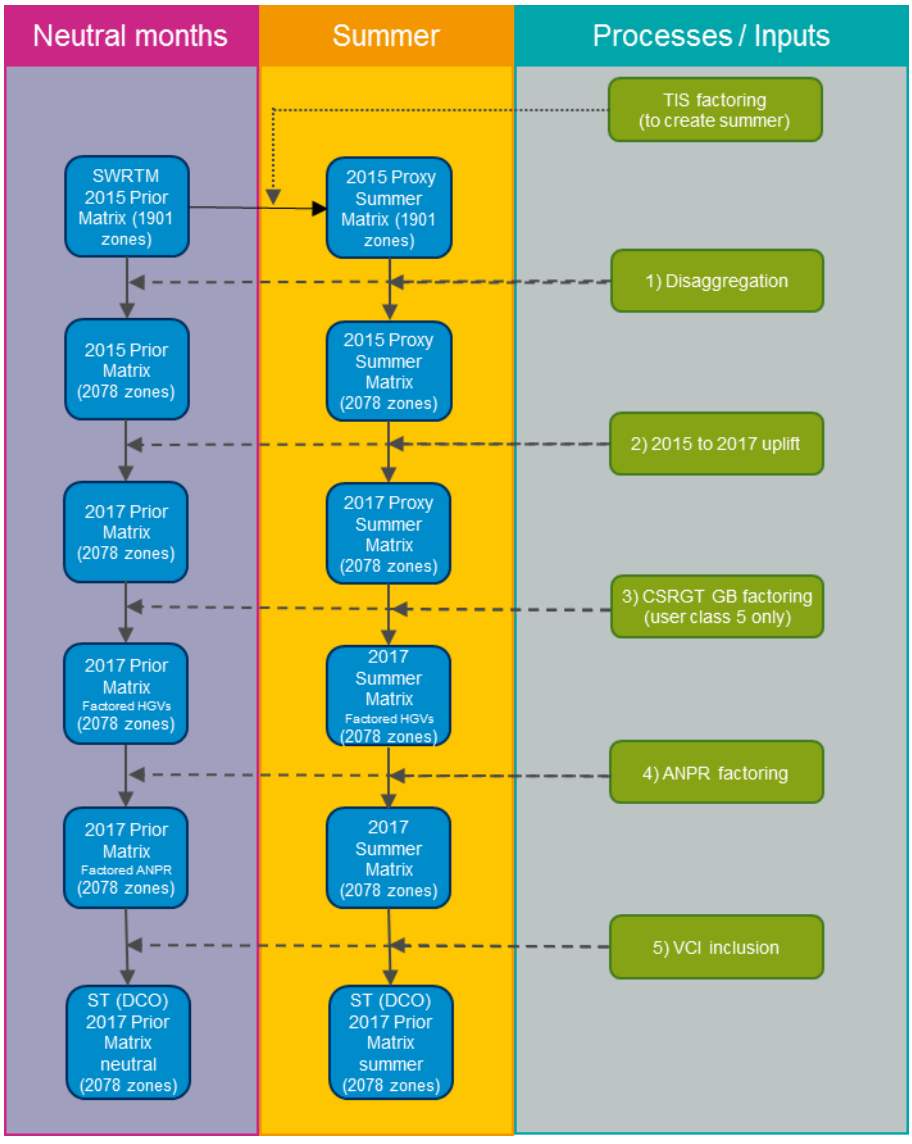


Figure 7-3: Flowchart of matrix build processes

TIS factoring, to create summer proxy model

7.3.6 A Technical Note outlining the TIS data and the processing of this for use to factor the neutral interpeak matrices to create a starting summer matrix is included in Appendix B. Further to this starting point, the local demand has been enhanced through the same processes as for the neutral month time periods, as set out below.

Disaggregation of SWRTM DF3.0 prior matrices

7.3.7 SWRTM DF3.0 base year prior matrices were disaggregated to bring them in line with the refined 'A303 Stonehenge SWRTM (DCO)' model zoning system. SWRTM, alongside the other RTMs, has zone boundaries aligned with middle super output areas (MSOAs). As noted previously, the refined zoning system has been 'snapped' to Output Area (OA) boundaries, which can be aggregated to MSOAs.

7.3.8 2011 Census population and employment data were extracted at an OA level. These data were used to disaggregate the SWRTM DF3.0 prior matrix demand from 1,901 zones to 2,078 zones. Where the refined zoning system was split smaller than OAs, manual checks of the resulting factor allocation were undertaken to ensure that this matched observed land-use.

Base year uplift to 2017

7.3.9 The standard SWRTM DF3.0 prior demand matrices represent a base year of 2015. As previously noted, the 'A303 Stonehenge SWRTM (DCO)' model has a 2017 base year. There was therefore a need to update the starting disaggregated SWRTM DF3.0 prior matrices to a 2017 demand level prior to any further matrix refinement or calibration being undertaken. As noted in WebTAG Unit M3.1 §8.3.3, matrix estimation should not be used to factor matrices from one year to another.

7.3.10 NTEM v7.2 car growth was extracted using the TEMPro software for all MSOAs in the South West region. These data were aggregated to authority, county and regional level and origin/destination growth between 2015 and 2017 for Car Driver mode is shown in Table 7-4 to Table 7-6 below.

7.3.11 As the tables demonstrate, in almost all cases, the growth between 2015 and 2017 is less than 1% (much less than 1% in many cases) and is only greater than 1% in the districts of Torridge, Devon and Gloucester, Gloucestershire. In some cases, there is a small reduction (again, less than -1%).

7.3.12 At a county level, growth is less than 1% in all cases, with the county of Dorset showing a small reduction at an overall level. Across the entire of the South West region, growth is less than a third of a percent in the morning, evening and off-peak periods, and just under two thirds of a percent in the interpeak.

Table 7-4: NTEM 7.2 Car Driver growth (Origin / Destination), by Local Authority in the South West region

Authority	AM Period			Interpeak Period			PM Period			Off-Peak Period		
	Origin	Destination	Average	Origin	Destination	Average	Origin	Destination	Average	Origin	Destination	Average
Bristol, City of	1.0033	1.0020	1.0027	1.0038	1.0040	1.0039	1.0015	1.0024	1.0020	1.0003	1.0003	1.0003
Cornwall	1.0031	1.0041	1.0036	1.0071	1.0069	1.0070	1.0042	1.0035	1.0039	1.0027	1.0024	1.0026
Isles of Scilly	0.9939	1.0058	0.9999	1.0073	1.0051	1.0062	1.0045	0.9949	0.9997	0.9975	0.9950	0.9963
East Devon	1.0051	1.0054	1.0053	1.0103	1.0101	1.0102	1.0060	1.0057	1.0059	1.0046	1.0047	1.0047
Exeter	1.0118	1.0012	1.0065	1.0071	1.0085	1.0078	1.0028	1.0103	1.0066	1.0050	1.0068	1.0059
Mid Devon	1.0005	1.0066	1.0036	1.0091	1.0085	1.0088	1.0060	1.0018	1.0039	1.0024	1.0017	1.0021
North Devon	1.0083	1.0066	1.0075	1.0112	1.0112	1.0112	1.0073	1.0081	1.0077	1.0062	1.0065	1.0064
Plymouth	0.9995	0.9976	0.9986	1.0008	1.0013	1.0011	0.9974	0.9990	0.9982	0.9965	0.9968	0.9967
South Hams	1.0010	1.0028	1.0019	1.0079	1.0075	1.0077	1.0034	1.0021	1.0028	1.0015	1.0011	1.0013
Teignbridge	0.9983	1.0024	1.0004	1.0062	1.0059	1.0061	1.0022	0.9998	1.0010	0.9998	0.9991	0.9995
Torbay	0.9991	1.0041	1.0016	1.0061	1.0059	1.0060	1.0030	0.9998	1.0014	0.9997	0.9984	0.9991
Torridge	1.0166	1.0102	1.0134	1.0173	1.0174	1.0174	1.0126	1.0163	1.0145	1.0128	1.0152	1.0140
West Devon	1.0012	1.0043	1.0028	1.0060	1.0057	1.0059	1.0040	1.0018	1.0029	1.0019	1.0014	1.0017
Bournemouth	1.0050	0.9992	1.0021	1.0046	1.0051	1.0049	1.0002	1.0037	1.0020	0.9995	1.0005	1.0000
Christchurch	1.0062	0.9976	1.0019	1.0059	1.0064	1.0062	0.9998	1.0055	1.0027	1.0009	1.0026	1.0018
East Dorset	0.9917	0.9976	0.9947	1.0011	1.0008	1.0010	0.9970	0.9933	0.9952	0.9936	0.9925	0.9931
North Dorset	0.9961	1.0000	0.9981	1.0043	1.0041	1.0042	1.0001	0.9973	0.9987	0.9970	0.9967	0.9969
Poole	0.9988	0.9962	0.9975	1.0027	1.0030	1.0029	0.9969	0.9990	0.9980	0.9959	0.9963	0.9961
Purbeck	0.9909	0.9968	0.9939	1.0010	1.0006	1.0008	0.9972	0.9935	0.9954	0.9951	0.9932	0.9942
West Dorset	0.9976	1.0034	1.0005	1.0069	1.0066	1.0068	1.0035	0.9995	1.0015	1.0005	0.9989	0.9997
Weymouth and Portland	1.0003	1.0006	1.0005	1.0069	1.0064	1.0067	1.0012	1.0006	1.0009	0.9982	0.9988	0.9985
Cheltenham	1.0079	1.0044	1.0062	1.0044	1.0050	1.0047	1.0043	1.0066	1.0055	1.0041	1.0047	1.0044
Cotswold	0.9988	1.0059	1.0024	1.0048	1.0041	1.0045	1.0050	1.0005	1.0028	1.0027	1.0008	1.0018
Forest of Dean	0.9996	1.0060	1.0028	1.0042	1.0035	1.0039	1.0046	1.0003	1.0025	1.0016	1.0005	1.0011
Gloucester	1.0132	1.0074	1.0103	1.0076	1.0082	1.0079	1.0075	1.0113	1.0094	1.0079	1.0093	1.0086
South Gloucestershire	1.0023	1.0012	1.0018	1.0046	1.0046	1.0046	1.0014	1.0020	1.0017	1.0001	1.0004	1.0003
Stroud	1.0012	1.0058	1.0035	1.0047	1.0043	1.0045	1.0046	1.0018	1.0032	1.0024	1.0015	1.0020
Tewkesbury	1.0093	1.0046	1.0070	1.0074	1.0076	1.0075	1.0054	1.0085	1.0070	1.0055	1.0068	1.0062
Bath and North East Somerset	1.0018	1.0047	1.0033	1.0060	1.0058	1.0059	1.0043	1.0020	1.0032	1.0018	1.0010	1.0014
Mendip	1.0029	1.0038	1.0034	1.0089	1.0089	1.0089	1.0049	1.0045	1.0047	1.0043	1.0040	1.0042
North Somerset	1.0047	1.0052	1.0050	1.0082	1.0078	1.0080	1.0053	1.0045	1.0049	1.0031	1.0034	1.0033
Sedgemoor	1.0005	1.0025	1.0015	1.0063	1.0063	1.0063	1.0028	1.0015	1.0022	1.0011	1.0005	1.0008
South Somerset	1.0039	1.0027	1.0033	1.0096	1.0096	1.0096	1.0039	1.0047	1.0043	1.0030	1.0036	1.0033
Taunton Deane	1.0077	1.0046	1.0062	1.0102	1.0104	1.0103	1.0056	1.0077	1.0067	1.0054	1.0063	1.0059
West Somerset	0.9977	1.0051	1.0014	1.0074	1.0066	1.0070	1.0048	0.9998	1.0023	1.0020	0.9998	1.0009
Swindon	1.0064	1.0006	1.0035	1.0077	1.0083	1.0080	1.0023	1.0065	1.0044	1.0035	1.0048	1.0042
Wiltshire	1.0017	1.0016	1.0017	1.0068	1.0067	1.0068	1.0024	1.0026	1.0025	1.0016	1.0017	1.0017

Table 7-5: NTEM 7.2 Car Driver growth (Origin / Destination), by County / Unitary Authority in the South West region

County	AM Period			Interpeak Period			PM Period			Off-Peak Period		
	Origin	Destination	Average	Origin	Destination	Average	Origin	Destination	Average	Origin	Destination	Average
Bristol	1.0033	1.0020	1.0027	1.0038	1.0040	1.0039	1.0015	1.0024	1.0020	1.0003	1.0003	1.0003
Cornwall	1.0031	1.0041	1.0036	1.0071	1.0069	1.0070	1.0042	1.0035	1.0039	1.0027	1.0024	1.0026
Devon	1.0033	1.0028	1.0031	1.0070	1.0071	1.0071	1.0032	1.0035	1.0034	1.0019	1.0020	1.0020
Dorset	0.9990	0.9989	0.9990	1.0042	1.0042	1.0042	0.9995	0.9995	0.9995	0.9977	0.9976	0.9977
Gloucestershire	1.0044	1.0043	1.0044	1.0053	1.0053	1.0053	1.0041	1.0042	1.0042	1.0029	1.0030	1.0030
Somerset	1.0034	1.0041	1.0038	1.0081	1.0080	1.0081	1.0045	1.0039	1.0042	1.0030	1.0029	1.0030
Wiltshire	1.0017	1.0016	1.0017	1.0068	1.0067	1.0068	1.0024	1.0026	1.0025	1.0016	1.0017	1.0017

Table 7-6: NTEM 7.2 Car Driver growth (Origin / Destination), the South West region

Region	AM Period			Interpeak Period			PM Period			Off-Peak Period		
	Origin	Destination	Average	Origin	Destination	Average	Origin	Destination	Average	Origin	Destination	Average
SW	1.0027	1.0027	1.0027	1.0063	1.0063	1.0063	1.0029	1.0029	1.0029	1.0016	1.0016	1.0016

7.3.13 Scenario 1 of the NTM RTF15 forecasts were subsequently analysed. Data for the South West region were linearly interpolated for LGVs and HGVs to provide numbers for 2017 and the growth between 2015 and 2017 subsequently calculated.

7.3.14 The results of this interpolation suggest the following growth between 2015 and 2017 within the South West region:

Table 7-7: NTM RTF15 Scenario 1, freight growth (2015-2017)

Vehicle type	Growth (2015-2017)
LGV	5.61%
Total HGVs, of which…	1.47%
… Rigid HGVs	1.30%
… Articulated HGVs	1.47%

Source: National Transport Model, Road Traffic Forecasts 2015 Scenario 1 – interpolated

7.3.15 The DfT's Transport Statistics Great Britain (TSGB)[5] provides summary growth across Great Britain by vehicle type, in the form of vehicle miles travelled. The data are only provided up to 2016.

7.3.16 Table 'TSGB0705' provides the growth in road traffic by vehicle type from 2015. The statistics show the following growth:

Table 7-8: Transport Statistics Great Britain (2015-2016)

Vehicle type	Growth (2015-2016)
Car / Taxi	1.98%
LGV	4.69%
HGV	-0.60%

Source: Table TSGB0705, TSGB2017

7.3.17 On the basis of the growth noted by NTEM, NTM RTF15 and TSGB, the following factors were applied to the disaggregated SWRTM DF3.0 prior matrices to uplift the base year to 2017:

[5] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/662174/tsgb-2017-print-ready-version.pdf [Last accessed: 01/12/2017]

a. for car trips, based on the negligible change suggested by NTEM, no adjustment was applied (local demand within the AoDM was subsequently refined using the ANPR and Visitor Centre Interview surveys undertaken in 2017);

b. for HGV trips, whilst the NTM RTF15 forecasts show a growth of just under 1.5%, the data from TSGB shows a small decline. On that basis, no adjustment factor was applied (HGV trips within the AoDM were subsequently updated using the ANPR surveys, whilst longer distance movements were updated using the DfT's CSRGT data); and

c. for LGV trips, both the NTM RTF15 forecasts and TSGB data show around a five percent increase in trips. The LGV matrices were therefore adjusted using data from the NTM RTF15 forecasts, with regional level growth factors calculated and applied to the prior matrices. For the South West region, the growth applied was therefore 5.6%, as given in Table 7-7.

CSRGT GB factoring (for HGVs)

7.3.18 The disaggregated SWRTM DF3.0 HGV demand matrices were aggregated to the same sectors as used in the processing of the CSRGT GB data; this is given in Figure 7-2.

7.3.19 The sector-to-sector trip matrix was compared against the CSRGT GB trip data to calculate factors to adjust the SWRTM DF3.0 HGV demand to match the CSRGT GB data. These factors are shown in Table 7-9 to Table 7-11.

7.3.20 Factors were only calculated for movements where demand existed in the grossed CSRGT GB records. Similarly, factors were only applied where the trip was identified as travelling through, to or from the AoDM and thus had a high probability of using or crossing the A303 in some way.

7.3.21 The sector factors were applied to the disaggregated SWRTM demand matrix at a zonal level.

Table 7-9: CSRGT GB factors, AM average hour

NUTS O/D	UKC	UKD	UKE	UKF	UKG	UKH1	UKH2	UKH3	UKI3_UKI4	UKI5	UKI6	UKI7	UKJ11	UKJ12	UKJ13	UKJ14	KJ21_UKJ2	UKJ25	UKJ26	UKJ27	UKJ28	UKJ31	<J32_UKJ:	UKJ35	UKJ36	UKJ37	}_UKJ44_(	UKK11	UKK12	UKK13	UKK14	UKK15	UKK21	UKK22	UKK23	UKK30	UKK41	UKK42	UKK43	UKL	UKM
UKC	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKD	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.52	1.00	0.35	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKE	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.66	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.73	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKG	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.15	1.00	0.83	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKH1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.64	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKH2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.25	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKH3	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.23	1.00	1.00	1.37	1.00	1.00	1.00	0.78	1.00	1.00
UKI3_UKI4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.14	1.00	1.00	0.50	1.00	1.00	1.00	1.00	1.00	1.00
UKI5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.03	1.00	1.00	6.24	1.00	1.00	1.00	2.51	1.00	1.00
UKI6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.22	1.00	1.00	0.57	1.00	1.00	1.00	1.00	1.00	1.00
UKI7	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.42	1.00	1.00	0.68	1.00	1.00	1.00	0.61	1.00	1.00
UKJ11	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.48	1.00	0.43	0.85	1.00	1.00	1.00	1.00	1.00	1.00
UKJ12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.23	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKJ13	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKJ14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.43	1.00	0.40	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKJ21_UKJ22	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.48	1.00	1.00	1.26	1.00	1.00	1.00	1.00	1.00	1.00
UKJ25	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.15	1.00	1.00	0.62	1.00	1.00	1.00	0.65	1.00	1.00
UKJ26	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.46	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKJ27	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.11	1.00	1.00	1.55	1.00	1.00	1.00	1.00	1.00	1.00
UKJ28	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.87	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKJ31	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.58	1.00	1.00	0.38	1.00	1.00	1.00	1.00	1.00	1.00
UKJ32_UKJ34	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.73	1.00	1.00	3.23	1.00	1.00	1.00	1.00	1.00	1.00
UKJ35	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.64	1.00	1.00	1.76	1.00	1.00	1.00	1.00	1.00	1.00
UKJ36	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.69	0.55	0.85	1.49	0.81	1.00	1.00	2.50	1.00	1.00	1.00	1.00	1.00	1.00
UKJ37	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.28	1.00	1.00	3.33	1.11	4.03	1.00	2.47	1.00	1.00
43_UKJ44_UK	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.78	1.00	1.00	1.89	1.00	1.00	1.00	0.59	1.00	1.00
UKK11	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.57	1.00	1.00	1.31	1.00	1.00	1.00	1.00	1.00	1.00
UKK12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.58	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.18	1.00	0.27	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKK13	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.48	1.00	0.14	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKK14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.47	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.31	1.00	0.11	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKK15	0.38	0.60	1.11	0.90	0.90	1.26	0.31	0.23	0.31	0.41	0.38	0.18	0.32	1.30	1.25	0.45	0.52	0.02	1.30	0.39	0.40	0.42	0.53	0.48	1.29	0.26	0.61	0.56	0.21	0.56	0.47	0.73	0.79	0.38	1.40	0.31	1.09	1.00	0.72	0.77	3.45
UKK21	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.86	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKK22	1.00	0.30	1.00	1.00	1.27	1.00	1.00	1.00	1.00	1.00	1.00	0.79	1.00	1.00	1.00	0.38	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.50	0.36	0.45	0.13	0.64	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.41	0.42
UKK23	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.26	0.44	3.68	1.00	0.79	0.75	1.00	1.00	1.00	0.37	0.39	0.50	1.14	0.83	0.19	1.51	0.85	1.25	2.58	1.90	1.00	1.00	1.00	1.00	1.18	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKK30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.56	1.00	1.00	1.00	1.00	1.00	0.25	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKK41	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKK42	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	6.93	1.00	1.00	1.00	1.00	1.00	0.72	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKK43	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.36	1.00	1.03	1.00	0.46	1.00	1.00	1.00	1.00	1.00	0.70	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.53	0.37	1.00	1.00	1.00	1.00	0.62	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKL	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.86	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKM	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.55	1.00	0.56	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Table 7-10: CSRGT GB factors, IP average hour

NUTS O/D	UKC	UKD	UKE	UKF	UKG	UKH1	UKH2	UKH3	UKI3_UKI4	UKI5	UKI6	UKI7	UKJ11	UKJ12	UKJ13	UKJ14	KJ21_UKJ2	UKJ25	UKJ26	UKJ27	UKJ28	UKJ31	<J32_UKJ:	UKJ35	UKJ36	UKJ37	}_UKJ44_(	UKK11	UKK12	UKK13	UKK14	UKK15	UKK21	UKK22	UKK23	UKK30	UKK41	UKK42	UKK43	UKL	UKM
UKC	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKD	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.52	1.00	0.35	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKE	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.66	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.73	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKG	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.15	1.00	0.83	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKH1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.64	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKH2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.25	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKH3	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.23	1.00	1.00	1.37	1.00	1.00	1.00	0.78	1.00	1.00
UKI3_UKI4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.14	1.00	1.00	0.50	1.00	1.00	1.00	1.00	1.00	1.00
UKI5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.03	1.00	1.00	6.24	1.00	1.00	1.00	2.51	1.00	1.00
UKI6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.22	1.00	1.00	0.57	1.00	1.00	1.00	1.00	1.00	1.00
UKI7	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.42	1.00	1.00	0.68	1.00	1.00	1.00	0.61	1.00	1.00
UKJ11	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.48	1.00	0.43	0.85	1.00	1.00	1.00	1.00	1.00	1.00
UKJ12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.23	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKJ13	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKJ14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.43	1.00	0.40	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKJ21_UKJ22	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.48	1.00	1.00	1.26	1.00	1.00	1.00	1.00	1.00	1.00
UKJ25	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.15	1.00	1.00	0.62	1.00	1.00	1.00	0.65	1.00	1.00
UKJ26	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.

Table 7-11: CSRGT GB factors, PM average hour

NUTS O/D	UKC	UKD	UKE	UKF	UKG	UKH1	UKH2	UKH3	UKI3_UKI4	UKI5	UKI6	UKI7	UKJ11	UKJ12	UKJ13	UKJ14	KJ21_UKJ2	UKJ25	UKJ26	UKJ27	UKJ28	UKJ31	<J32_UKJ:	UKJ35	UKJ36	UKJ37	3_UKJ44_L	UKK11	UKK12	UKK13	UKK14	UKK15	UKK21	UKK22	UKK23	UKK30	UKK41	UKK42	UKK43	UKL	UKM
UKC	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.24	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKD	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.52	1.00	0.35	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKE	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.66	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.73	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKG	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.15	1.00	0.83	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKH1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.64	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKH2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.25	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKH3	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.29	1.00	1.00	1.97	1.00	1.00	1.00	0.78	1.00	1.00
UKI3_UKI4	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.14	1.00	1.00	0.50	1.00	1.00	1.00	1.00	1.00	1.00
UKI5	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.09	1.00	1.00	6.24	1.00	1.00	1.00	2.51	1.00	1.00
UKI6	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.22	1.00	1.00	0.57	1.00	1.00	1.00	1.00	1.00	1.00
UKI7	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.42	1.00	1.00	0.68	1.00	1.00	1.00	0.61	1.00	1.00
UKJ11	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.48	1.00	0.43	0.85	1.00	1.00	1.00	1.00	1.00	1.00
UKJ12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.23	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKJ13	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.10	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKJ14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.43	1.00	0.40	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKJ21_UKJ22	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.48	1.00	1.00	1.26	1.00	1.00	1.00	1.00	1.00	1.00
UKJ25	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.15	1.00	1.00	0.62	1.00	1.00	1.00	0.65	1.00	1.00
UKJ26	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.46	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKJ27	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.11	1.00	1.00	1.55	1.00	1.00	1.00	1.00	1.00	1.00
UKJ28	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.87	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKJ31	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.58	1.00	1.00	0.93	1.00	1.00	1.00	1.00	1.00	1.00
UKJ32_UKJ34	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.73	1.00	1.00	3.23	1.00	1.00	1.00	1.00	1.00	1.00
UKJ35	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.64	1.00	1.00	1.77	1.00	1.00	1.00	1.00	1.00	1.00
UKJ36	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.69	0.55	0.85	1.50	0.81	1.00	1.00	2.50	1.00	1.00	1.00	1.00	1.00	1.00
UKJ37	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.28	1.00	1.00	3.33	1.12	4.05	1.00	2.48	1.00	1.00
43_UKJ44_UK	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.78	1.00	1.00	1.89	1.00	1.00	1.00	0.59	1.00	1.00
UKK11	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.02	1.00	1.00	1.00	1.00	1.00	1.00	0.57	1.00	1.31	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKK12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.58	1.00	1.00	1.00	1.00	1.00	1.00	0.18	1.00	0.27	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKK13	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.50	1.00	1.00	1.00	1.00	1.00	1.00	0.48	1.00	0.14	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKK14	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.47	1.00	1.00	1.00	1.00	1.00	1.00	0.31	1.00	0.11	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKK15	0.38	0.60	1.11	0.90	0.90	1.26	0.31	0.29	0.31	0.41	0.38	0.18	0.32	1.30	1.25	0.45	0.52	0.02	1.30	0.39	0.40	0.42	0.53	0.48	1.29	0.26	0.61	0.56	0.21	0.56	0.47	0.73	0.79	0.38	1.40	0.31	1.09	1.00	0.72	0.77	3.45
UKK21	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.86	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKK22	1.00	0.30	1.00	1.00	1.27	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.79	1.00	1.00	0.38	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.50	0.36	0.45	0.13	0.64	1.00	1.00	1.00	1.00	1.00	1.00	0.41	0.42	1.00
UKK23	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.26	0.44	3.68	1.00	0.79	0.75	1.00	1.00	1.00	0.37	0.39	0.50	1.14	0.83	0.19	1.51	0.85	1.25	2.53	1.90	1.00	1.00	1.00	1.00	1.18	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKK30	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.57	1.00	1.00	1.00	1.00	1.00	0.25	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKK41	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.72	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKK42	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	6.92	1.00	1.00	1.00	1.00	1.00	0.62	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKK43	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.36	1.00	1.03	1.00	0.46	1.00	1.00	1.00	1.00	1.00	0.70	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.53	0.37	1.00	1.00	1.00	1.00	0.86	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKL	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.55	1.00	0.56	1.00	1.00	1.00	1.00	1.00	1.00	1.00
UKM	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.40	1.00	0.25	1.00	1.00	1.00	1.00	1.00	1.00	1.00

ANPR factoring (local demand)

7.3.22 The resulting matrices from the previous stages were used as a base from which to calculate factors to control the matrices to the observed ANPR data. The same process was employed for each of the three neutral month model time periods and the summer model time period.

7.3.23 Due to route choice within the model assignment, not all trips will travel on a route passing through an ANPR camera site even where trip origin and destination may be the same. In order to modify only those movements where demand would have been captured passing an ANPR camera such partially observed demand first needed to be excluded.

7.3.24 Within the SATURN network, links were identified which had an ANPR camera located on them during the survey. A screenline select link analysis (SLA) was then undertaken on the assignment to extract both 'actual' and 'demand' flow trip matrices representing journeys that travelled along at least one link covered by an ANPR camera.

7.3.25 The 'actual' flow trip matrix offers a direct comparison to the ANPR observations. It only includes trips which actually passed through a camera site, not including any trips which would pass through a site due to routeing but which also may not due to congestion. This matrix was used to calculate the factors to match the model demand to the ANPR demand.

7.3.26 The factors calculated from the actual flow demand were subsequently applied to the SLA demand flow matrix. This is a measure of the total demand that would have passed at least one ANPR camera on its journey, providing there was no congestion in the network. The factors were applied to this demand to ensure that the assigned volumes would match the observed volumes passing the ANPR cameras.

7.3.27 To calculate the factors the ANPR and SLA trip matrices needed to be aggregated to the same sector system. This sector system is shown in Figure 7-4.

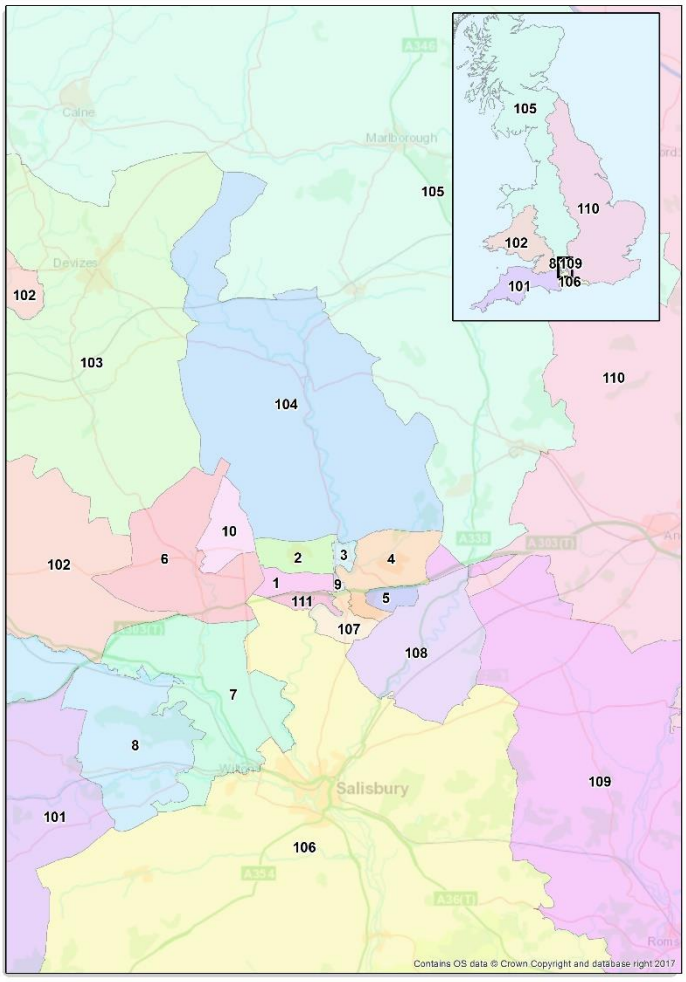


Figure 7-4: ANPR sector system

7.3.28 The individual ANPR cameras were assigned an origin sector and a destination sector. These sectors represented the zones that trips could start from and end at if they passed through a camera without being captured at another camera site elsewhere.

7.3.29 Taking the first and last camera sites for each trip chain, the records were converted into sector-to-sector movements using the camera-to-sector correspondence described above. This produced sector-to-sector matrices with observed ANPR demand.

7.3.30 The SLA demand matrices were then aggregated to the same sector system using the zone to sector correspondence.

7.3.31 Comparing the sector-to-sector ANPR and actual flow trip matrices enabled factors to be calculated, by time period and user class, so that the actual flow matrix would match the ANPR matrix. These factors were then applied to the SLA demand flow trip matrix at a full model zone level.

7.3.32 Once the factored SLA demand was derived this needed to be incorporated within the full model demand matrix. As previously noted the route choice within the assignment processes means that not all trips between two zones may pass through the ANPR survey area. Therefore simply replacing the current demand with the factored SLA demand could result in underestimating the number of trips being made.

7.3.33 To account for this, the original SLA demand matrix was subtracted from the full trip matrix leaving only those trips which did not pass through any ANPR camera sites. The factored SLA demand matrix was then added onto this creating a new full demand matrix with local trip representation improved using the ANPR data.

Stonehenge Visitor Centre demand

7.3.34 Following review and cleaning of the data, the remaining VCI records were allocated to a journey purpose and vehicle type, to allow for correspondence with the five user-classes represented in the 'A303 Stonehenge SWRTM (DCO)' model.

7.3.35 The VCI records contained sufficient information to assign each record a user class in the model. LGVs and HGVs are allocated to their respective user classes (UC4 and UC5), while cars are split into user classes dependent on their origin and destination purposes, as shown in Table 7-12. Motorcycle and 'other' vehicle classes were removed at this stage.

7.3.36 The journey purpose types, and how these correspond to modelled user classes, is as follows:

a. car employer's business, homebased (user class 1);

b. car employer's business, non-homebased (user class 1);

c. car commute (user class 2);

d. car other, homebased (user class 3); and

e. car other, non-homebased (user class 3).

Table 7-12: Journey Purpose correspondence

	Home	Holiday Home	Work	Employers Business	Education	Shopping	Personal Business	Visit Friends	Recreation /Leisure	Tourism	Other
Home	CO-HB	CO-HB	CC	CB-HB	CO-HB	CO-HB	CO-HB	CO-HB	CO-HB	CO-HB	CO-HB
Holiday Home	CO-HB	CO-HB	CC	CB-HB	CO-HB	CO-HB	CO-HB	CO-HB	CO-HB	CO-HB	CO-HB
Work	CC	CC	CB-NHB	CB-NHB	CC	CC	CC	CC	CC	CC	CC
Employers Business	CB-HB	CB-HB	CB-NHB	CB-NHB	CB-NHB	CB-NHB	CB-NHB	CB-NHB	CB-NHB	CB-NHB	CB-NHB
Education	CO-HB	CO-HB	CC	CB-NHB	CO-NHB	CO-NHB	CO-NHB	CO-NHB	CO-NHB	CO-NHB	CO-NHB
Shopping	CO-HB	CO-HB	CC	CB-NHB	CO-NHB	CO-NHB	CO-NHB	CO-NHB	CO-NHB	CO-NHB	CO-NHB
Personal Business	CO-HB	CO-HB	CC	CB-NHB	CO-NHB	CO-NHB	CO-NHB	CO-NHB	CO-NHB	CO-NHB	CO-NHB
Visit Friends	CO-HB	CO-HB	CC	CB-NHB	CO-NHB	CO-NHB	CO-NHB	CO-NHB	CO-NHB	CO-NHB	CO-NHB
Recreation/Leisure	CO-HB	CO-HB	CC	CB-NHB	CO-NHB	CO-NHB	CO-NHB	CO-NHB	CO-NHB	CO-NHB	CO-NHB
Tourism	CO-HB	CO-HB	CC	CB-NHB	CO-NHB	CO-NHB	CO-NHB	CO-NHB	CO-NHB	CO-NHB	CO-NHB
Other	CO-HB	CO-HB	CC	CB-NHB	CO-NHB	CO-NHB	CO-NHB	CO-NHB	CO-NHB	CO-NHB	CO-NHB

7.3.37 It was subsequently necessary to match reverse trips to time periods, as this information was not reliably collected by the interviews. ANPR data were used to analyse trips entering and leaving the site through the matching of number plates. From this, it was possible to derive an average time spent at Stonehenge by vehicle type, which in turn was used to create distributions for determining the number of reverse trips (per hour) based on the arrival time (by hour).

7.3.38 The VCI records themselves provide information on the origin-destination distribution of trips and the car user class splits ('car employer's business', 'car commute' and 'car other'). The MCC surveys were used to provide the proportion splits for the different vehicle classes ('Car', 'LGV' and 'HGV').

7.3.39 To retain the individual trip length distributions and user class splits from the separate hours, VCI records were scaled at an hourly level to the MCC hourly totals.

7.3.40 The ATC data were subsequently used to scale up the MCC hourly totals to the ATC average peak period hourly values. In most cases with RSI data, the MCC surveys taken on the day of the RSI surveys are likely to underestimate the total traffic flow, as trips reroute to avoid the congestion that the surveys cause. Thus, ATC data are used to align the number of trips to that of a 'neutral' day's flow. It is unlikely that the Visitor Centre Interviews would have had any impact on the number of trips to/from the centre, but this process was still undertaken to ensure that the interviews were constrained to the more accurate 2-week ATC data.

7.3.41 The neutral month ATC data used for the VCI scaling process were subject to the following procedure, in line with WebTAG Unit M1.2 §3.3.6 where appropriate, and following best practice:

a. Monday to Thursday average flow calculated to represent a 'neutral' period;

b. exclusion of days in the weeks before and after bank holidays;

c. no exclusion of the day of VCI surveys due to no effect on traffic volumes (this is different to conventional RSI methodology that excludes the day of survey); and

d. checking of traffic volumes by day to ensure that any anomalies due to non-typical traffic flow may be identified and any outliers removed, e.g. due to accidents in the study area.

7.3.42 For the summer records, data have been scaled to ATC data collected over the modelled period, i.e. 1000-1900 on Fridays-Sundays across the seven weekends in July and August defined for the summer modelling.

7.3.43 For the neutral model, total trip volumes have been scaled to the ATC neutral day period totals (AM 07:00 – 10:00, IP 10:00 – 16:00 and PM 16:00 – 19:00). Average hour totals have then been calculated by dividing through by the number of hours in the period (three, six and three, respectively).

7.3.44 For the summer modelling, trip volumes have been scaled to the average total for the 1000-1900 period total, and then divided by seven to give the average hour summer volumes.

7.3.45 Due to an error with the interviews in the summer, VCI records collected on the summer survey days did not contain information related to the onward destination of visitors to Stonehenge. It was therefore necessary to derive a process to generate outbound trips from Stonehenge.

7.3.46 Comparisons were made between the neutral month and summer month inbound trip distributions: both the arrival time profile and the trip length distribution. These were judged to be similar enough that it would be suitable to use the neutral month outbound trip distributions – at least to the entry and exit locations from the AoDM – and to scale these to the summer MCC and ATC totals. Checks were undertaken on the neutral month data to judge if there was a correspondence between the inbound and outbound trips. No strong relationship was found between the inbound and outbound profiles to allow a summer outbound distribution to be calculated from the inbound records. Thus, the neutral month data was the only source of information available providing destinations for outbound trips from the site.

7.3.47 Figure 7-5 and Figure 7-6 show the comparisons of these distributions. Whilst not identical, analysis shows that the trip length distributions between the neutral and summer month inbound trips have a similar pattern, with peaks at 0-5km, 10-15km, 40-45km and 120-125km. The graph shapes between these peaks are also similar.

7.3.48 Figure 7-7 shows that the arrival times at the visitor centre of the inbound trips are also comparable.

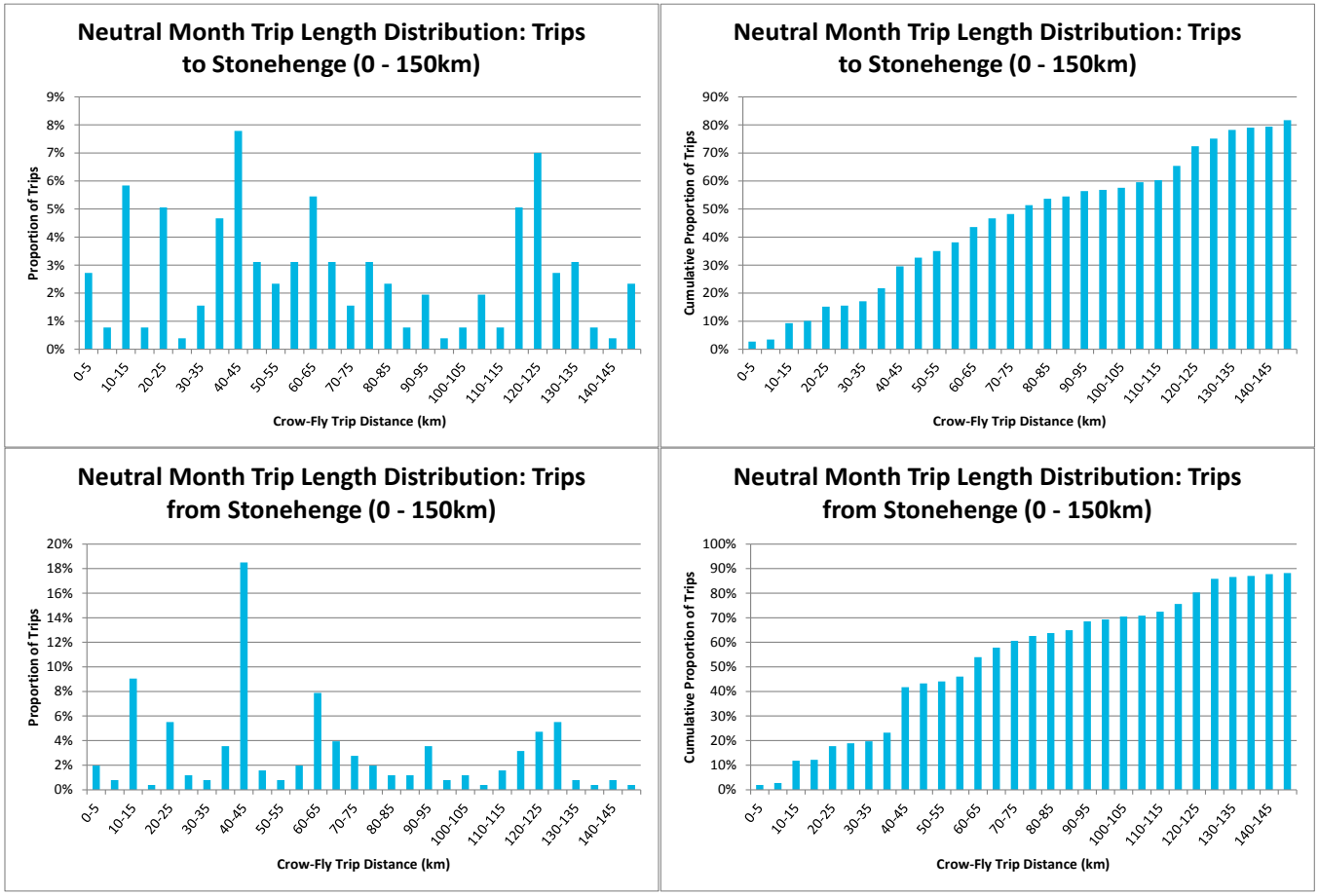


Figure 7-5: Comparison between neutral month inbound and outbound trip lengths

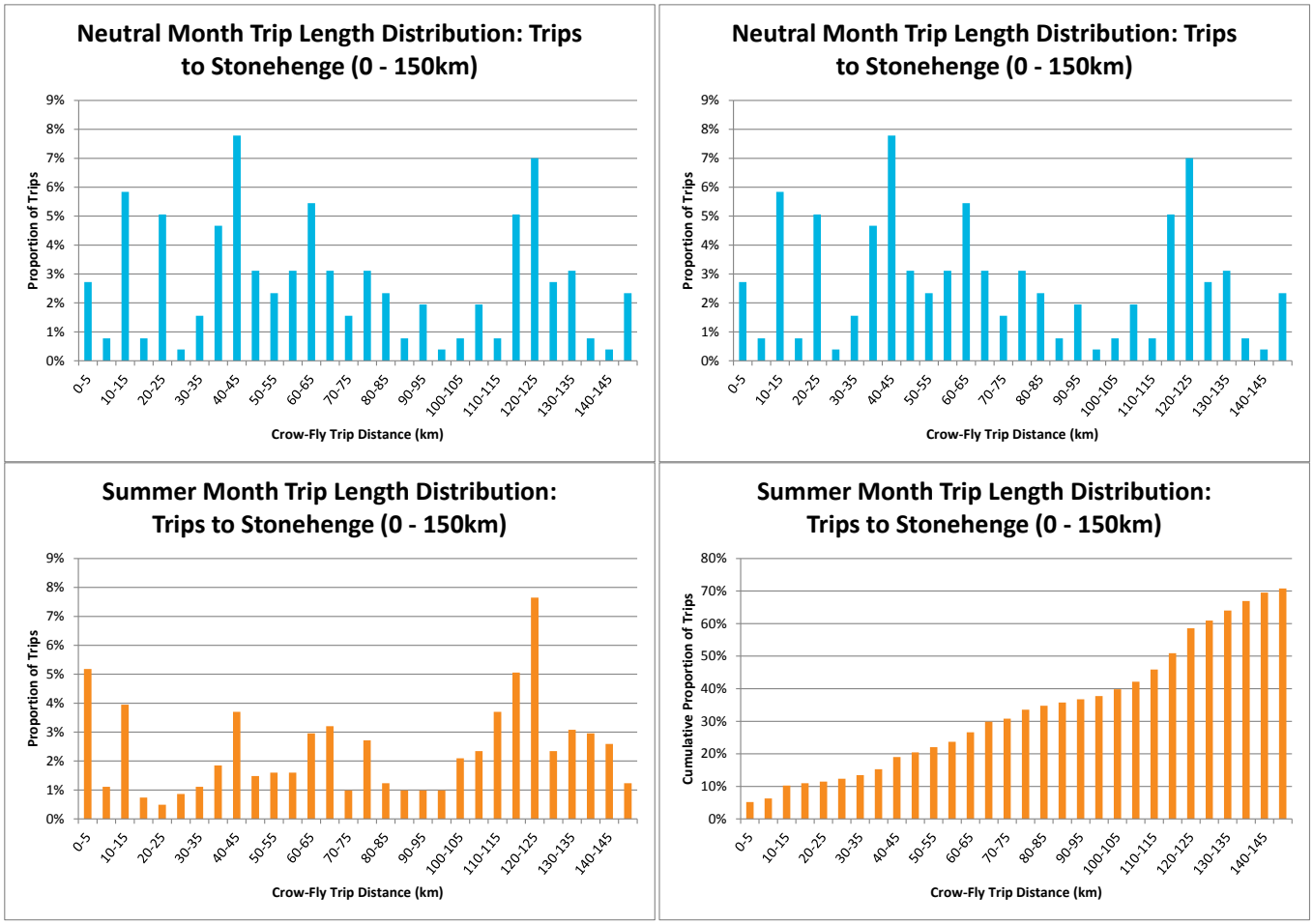


Figure 7-6: Comparison between neutral and summer month inbound trip distributions

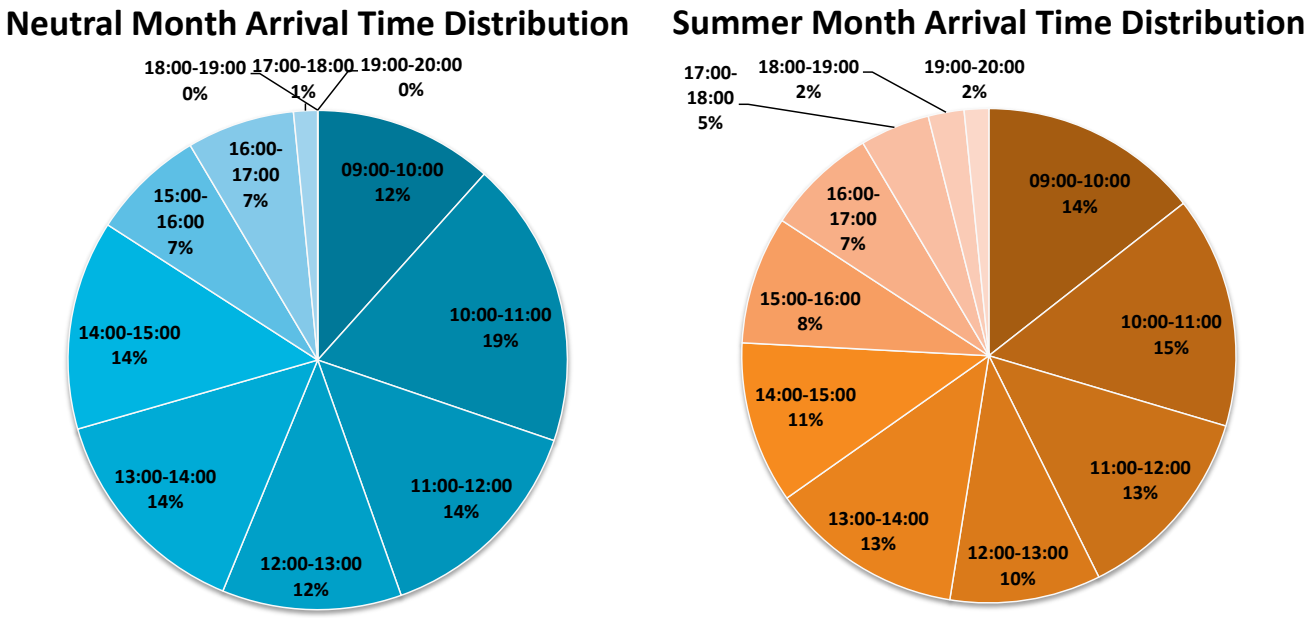


Figure 7-7: Comparison between neutral and summer month arrival time

7.3.49 The Stonehenge Visitor Centre car park is designed to allow cars and LGVs to arrive and leave on the same road, the eastern arm of the Airman's Cross roundabout. HGVs, PSVs and Coaches also enter the site from this road.

7.3.50 Parking facilities for cars and LGVs are located to the south of this access road, whilst parking for HGVs (in particular aimed at buses and coaches) is to the north. Figure 7-8 demonstrates this layout.

Figure 7-8: Entrance, exits and parking at Stonehenge Visitor Centre

7.3.51 When HGVs leave the site they do not go back along the same road, but exit onto the A360 north of Airman's Corner roundabout.

7.3.52 When the MCC and ATC surveys were undertaken for the visitor centre, the count site was located on the main access road from Airman's Corner. As a result, the counts did not include the HGVs leaving the site. To correct for this issue, the following adjustments were made:

a. the MCC was corrected by using other MCC data from the roundabout to the north at the B3086/Packway junction, which allowed HGV exit flows to be deduced; and

b. the ATC total across all vehicles for outbound trips was set to match the inbound total. Due to the opening times of the visitor centre it is appropriate to assume that inbound and outbound counts should be equal. The ATC was then split between the time periods using proportions derived from the MCC.

7.3.53 Following this processing, the resultant trips derived from the VCI data were allocated to zones based on their origin / destination postcode and added to the matrices resulting from the ANPR adjustment. The existing SWRTM matrices, when disaggregated, did not contain trips to or from the Stonehenge visitor centre zone, due to the Output Area that it lays within containing negligible housing and employment. The visitor centre trips could therefore be added on without any double counting.

7.4 Matrix estimation

7.4.1 Matrix estimation is a process by which trip estimates in a prior matrix may be refined through the use of observed count data and appropriately considered restraints.

7.4.2 As noted in WebTAG Unit M3.1 §8.3, it is important that matrix estimation is only used to refine trip estimates in a way that is sufficiently small so as not to have a significant change on the underlying observed data. It should not be used to factor trip matrices.

7.4.3 SWRTM DF3.0, along with the other RTMs, set a precedent for the use of matrix estimation for the refinement of the MPOD derived trip matrices by this method. As the starting point of the refined trip matrices for the 'A303 Stonehenge SWRTM (DCO)' model is these same prior matrices, with only primarily local area updates with more detailed data, matrix estimation is a requirement for this model.

7.4.4 Matrix estimation has been judged against the criteria previously specified in section 3.4 of this report, with the significance of any changes monitored and reported. A full review of network coding in the AoDM was undertaken prior to any matrix estimation being undertaken.

7.4.5 Chapter 10 of this report provides further detail on the process of matrix estimation adopted, checks undertaken and the results with regards to the various measures and significance criteria previously noted.

8 Network calibration and validation

8.1 Introduction

8.1.1 It is vital to ensure that the highway network is suitable for use prior to assignment of matrices. This is necessary to ensure that any matrix adjustment or estimation is valid and is not the result of compensating for errors or deficiencies in the highway networks.

8.1.2 Whilst a full round of network calibration, validation and review was undertaken as part of the development of SWRTM, the significant refinement of the 'A303 Stonehenge SWRTM (DCO)' model in the AoDM necessitated that detailed calibration checks were undertaken. This is to check that data had been input correctly and to identify any potential issues because of either zoning system or network refinement.

8.2 Network calibration

8.2.1 The ultimate aim of the network calibration process is to ensure a better fit between modelled flows and journey times prior to matrix estimation, ensuring that any adjustments made by the estimation process are appropriate and account for true deficiencies in the prior trip matrices and not compensating for network errors. WebTAG Unit M3.1 §5 and 6 set out a series of recommended checks that will help to ensure that the network is successfully calibrated and validated prior to matrix estimation.

SATURN errors and warnings

8.2.2 The first checks of network coding were undertaken during the network refinement process and ensured that the networks were built properly without producing fatal or semi-fatal errors.

8.2.3 Following the initial network build, specific non-fatal errors, serious warnings and warnings identified by SATURN in the AoDM were reviewed and corrected where issues were identified. These warnings were continually monitored throughout the network development and during later assignment calibration phases when further updates were made to the networks.

Network standardisation checks

8.2.4 As noted in chapter 6, standardised coding values were used to ensure consistency in coding methods across the full model. However, it is still possible for errors to be made in what is a manual coding process. Therefore, a log of all changes made to the networks was kept and independently reviewed on a periodic basis.

8.2.5 To ensure coding was applied consistently, checks on link properties were undertaken to ensure that – within the AoDM – link distances, free-flow speeds and capacity indices (speed-flow curves) were coded consistently by direction. Any inconstancies were identified and, following review, the correct values coded for both directions of the link.

8.2.6 Use was made of '$INCLUDE' files within SATURN to ensure that network refinements were consistent by time period, with the same file applied to each of the modelled time periods. The exception to this is signalised nodes (where timings, staging and phasing can vary by time of day), and bus routes (where frequencies vary by time of day). These were retained in separate $INCLUDE files and checks were undertaken to ensure that only data relating to those specific data or node types was contained in the file.

Link distance checks

8.2.7 As noted in chapter 6, link lengths were fully reviewed as part of the network coding and calibration process.

8.2.8 As previously noted, links appearing on a local journey time route had their distances checked at an aggregated level (so as to match with ITN links) against the Trafficmaster / OS ITN data to ensure that there were no significant differences apparent. A process was built into the journey time validation spreadsheet to ensure that this could be checked for each development version of the model. Across each of the 12 journey time routes that have used updated Trafficmaster data for journey time validation, most routes have a total distance difference of less than 1%, with the largest variation being less than 2%.

8.2.9 A full review of link distance differences against warnings generated by SATURN for variances from the crow-fly was also undertaken.

Free-flow speed checks

8.2.10 Again, as noted in chapter 6, coded free-flow speeds were checked against speed-limit data available from OpenStreetMap and, acknowledging the limitations in using open source data, cross-referenced against Google StreetView photography were there were discrepancies.

8.2.11 Free-flow speeds from the model were also plotted thematically in GIS software to ensure that any obvious errors in the coding of speeds could be identified. These were reviewed visually by the network coder and reviewer. These plots were subsequently compared against the OpenStreetMap data as per the example given in Figure 6-2. Figure 8-1 shows an example of a plot produced using free-flow speeds as coded in the model.

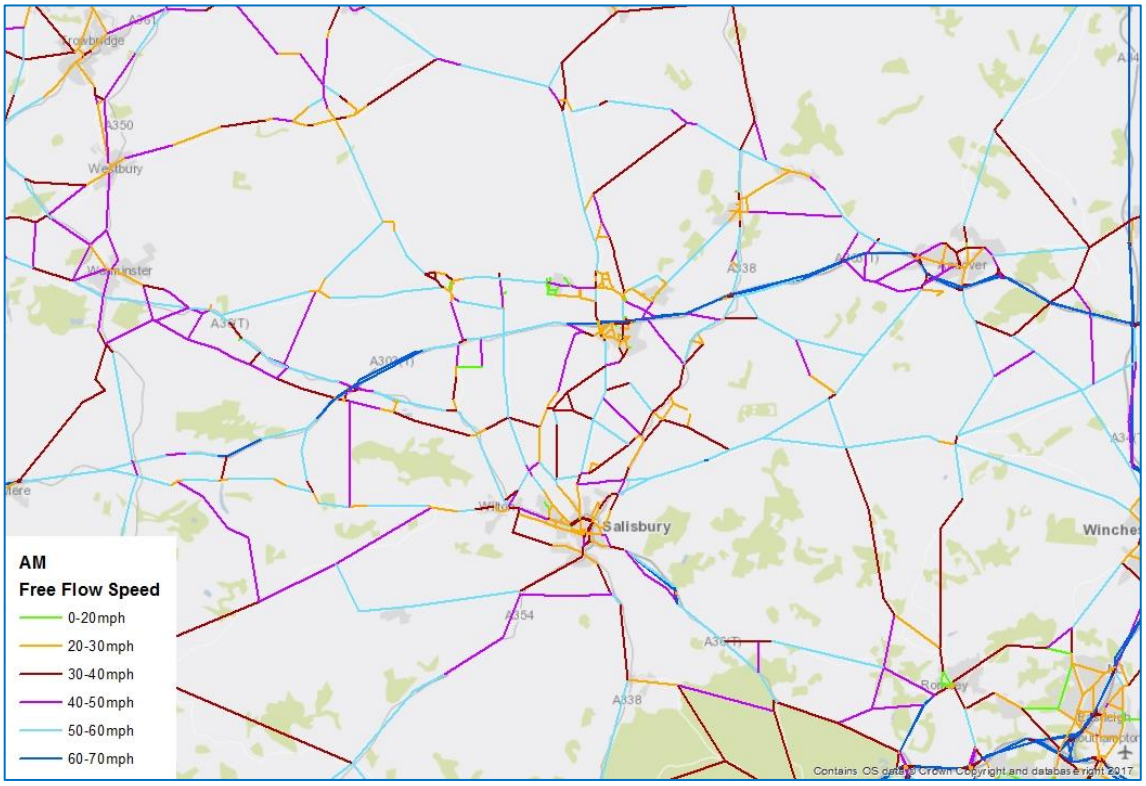


Figure 8-1: Coded free flow speeds, Area of Detailed Modelling

8.3 Network validation

8.3.1 WebTAG Unit M3.1 §6.3 notes that it is not generally possible to undertake network validation in isolation as output traffic flows and travel times also reflect issues in the trip matrices as well as the highway networks.

8.3.2 The same section of WebTAG notes that a comparison of observed travel times against modelled travel times from an initial prior matrix may be useful to help validate the network early on.

8.3.3 At this initial stage, the local AoDM journey time route data available were mean travel times, and not medians to be used in the final model validation. However, these were felt to be representative enough to allow initial network validation checks to be undertaken.

8.3.4 The initial comparisons identified differences of between -14% and +11% in modelled travel times. Noting that median times were likely to be faster than mean observed times, this provided an area to focus further network review and calibration, by targeting the routes that were slower than the observed times. However, the differences were within the 25% difference cited in WebTAG for warranting further investigation and within the final assignment validation criteria of ±15%.

9 Route choice calibration and validation

9.1 Introduction

9.1.1 WebTAG Unit M3.1 §7.1.3 notes that modelled route choice will depend on:

a. appropriateness of zones;

b. accuracy of network coding and appropriateness of simplifications;

c. accuracy with which link journey times and junction delays are modelled; and

d. accuracy of the trip matrices.

9.1.2 The out-turn routeing from the model should be examined and its plausibility checked in order to ensure robust results from the highway model. This is a somewhat iterative process, with calibration of routeing being intrinsically linked to the update of the highway networks, model structure and parameters and final route choice validation being undertaken following matrix updates.

9.1.3 This section of the report provides detail on the calibration of routeing in the model and subsequent validation checks.

9.2 Route choice calibration

HGV route choice calibration

9.2.1 The A303 is a designated 'High Load Route' – HiR25d – between the A338 and A36 junctions[6], and particular attention has been paid to how the model routes HGVs.

9.2.2 The balance of the generalised costs for HGVs is more heavily weighted towards distance, which can lead to local routes being favoured over motorway and trunk road routes. WebTAG Unit M3.1 §7.2.4 suggests that adjustments may be considered such as the use of HGV specific maximum link speeds and the inclusion of HGV specific penalties.

9.2.3 In the 'A303 Stonehenge SWRTM (DCO)' model, HGV speeds have been capped at a maximum of 91 km/h by the use of the CLICKS and CLIMAX parameters in SATURN. This is unchanged from SWRTM DF3.0.

9.2.4 As noted in section 4.8, the impact of applying the owner / operator factor of 2.0 to HGV VoTs was explored at the start of the model refinement process. This application has not been taken forward, as changes within the AoDM were – at most – modest and would have been a further change away from SWRTM DF3.0.

9.2.5 As noted in section 6.8, a full review of HGV restrictions in the AoDM was undertaken, resulting in the coding of a number of bans and restrictions:

[6] Heavy and High Routes. Highways England. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/360533/High_and_Heavy_Load_Grids_Map_for_Abnormal_Loads.pdf [Last accessed: 04/04/2018]

a. A 2 tonne maximum gross weight (mgw) limit was identified on High Street, Shrewton and on London Road between Shrewton and the B3086 junction. This is a low weight limit and as a result, these routes were banned in the model to HGVs;

b. Tanners Lane in Shrewton is a minor-road and has only been added to the model to provide access to the refined zone definitions in Shrewton. Whilst not having an official HGV restriction in place, the road runs parallel to the High Street (which has been banned) and could have been used by HGVs as an alternative route, despite being inappropriate in reality. A large time penalty of 999 seconds was therefore applied to the links comprising Tanners Lane to ensure that HGVs did not use it as an alternative route through Shrewton; and

c. The B3083 between the A36 and the A303 (i.e. through Berwick St James and Stapleford) has a 7 tonne mgw limit in place. Whilst this would be sufficient to ban all OGV2 type vehicles, the 'A303 Stonehenge SWRTM (DCO)' model has only a single HGV user-class and does not distinguish between OGV1 and OGV2. It has not therefore been possible to ban this route to HGVs entirely. As a result, modest time penalties have been applied to links on this route to prevent its use by a large number of HGVs, effectively ensuring it is only used by those trips wanting to access the villages along the route.

9.2.6 A check on the final assignments has been undertaken to identify the percentage of HGVs on roads in the AoDM. This analysis is presented in Figure 9-1 to Figure 9-3 for the AM, IP and PM average hour neutral month models. These show a consistent picture across all time periods, and show that HGV percentages are greatest along the length of the A303 (with the exception of some short feeder roads where total vehicle flows are low) and on other key A-roads (A36, A345, A338), with lower percentages on lower classification routes.

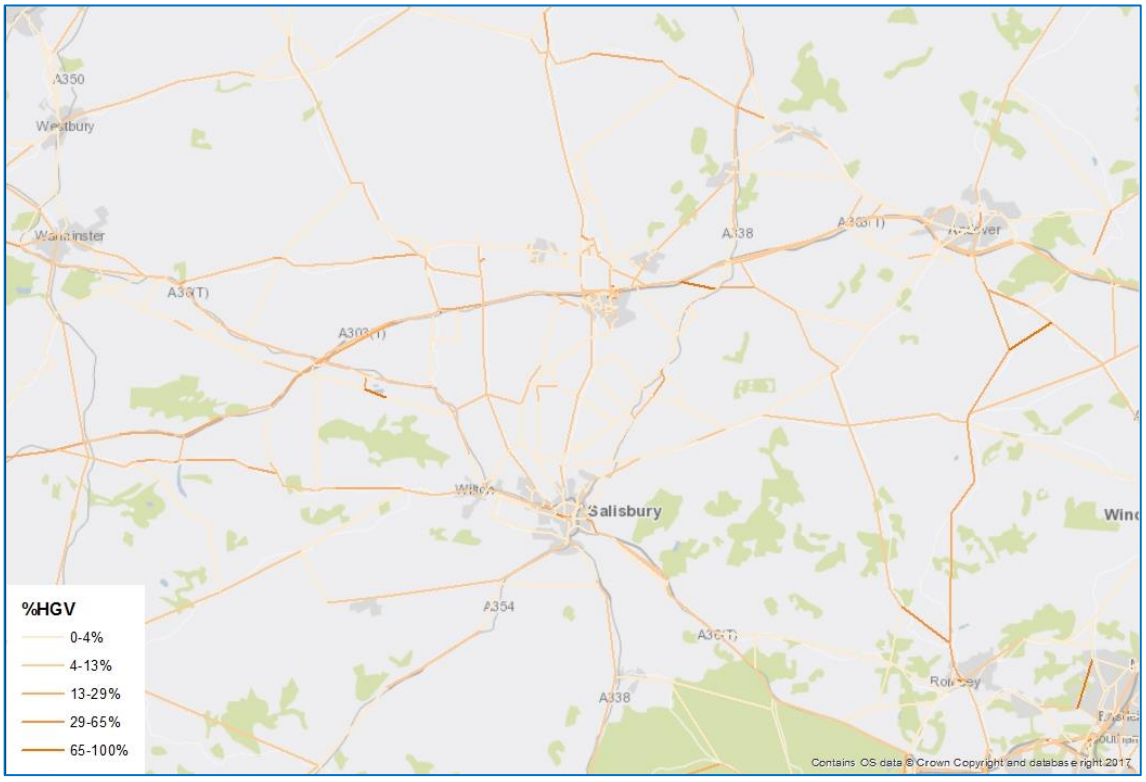


Figure 9-1: HGV proportions by link, average AM hour

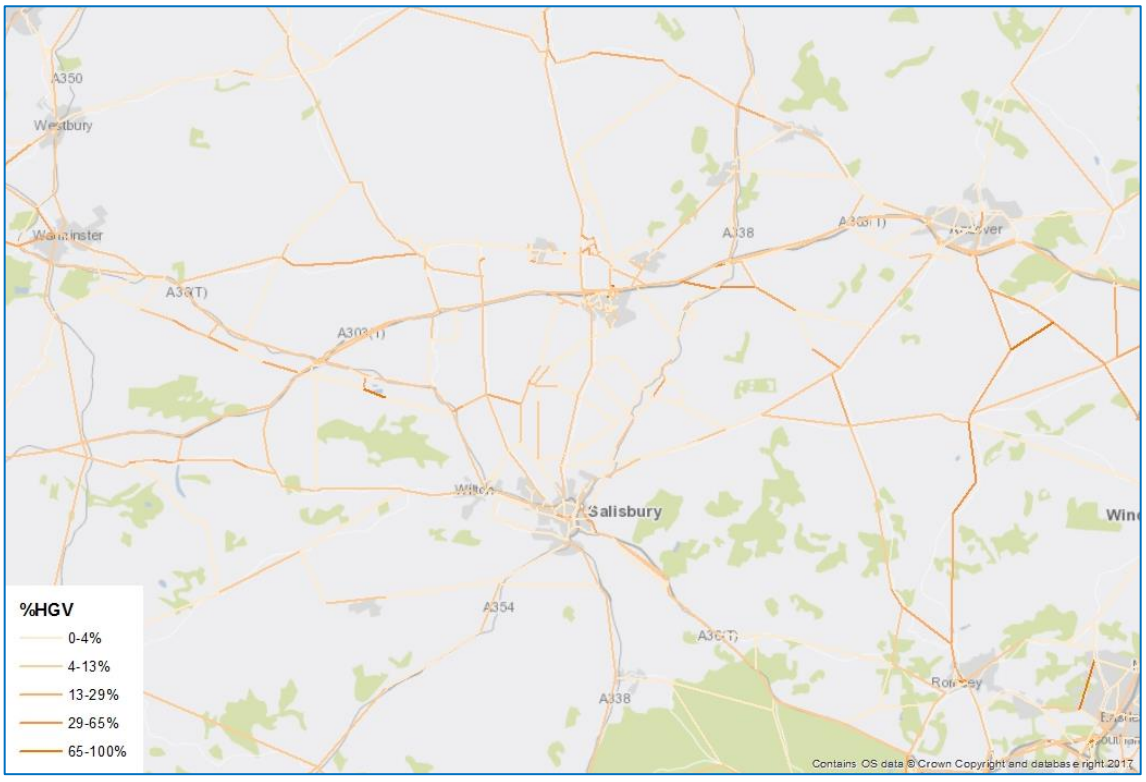


Figure 9-2: HGV proportions by link, average IP hour

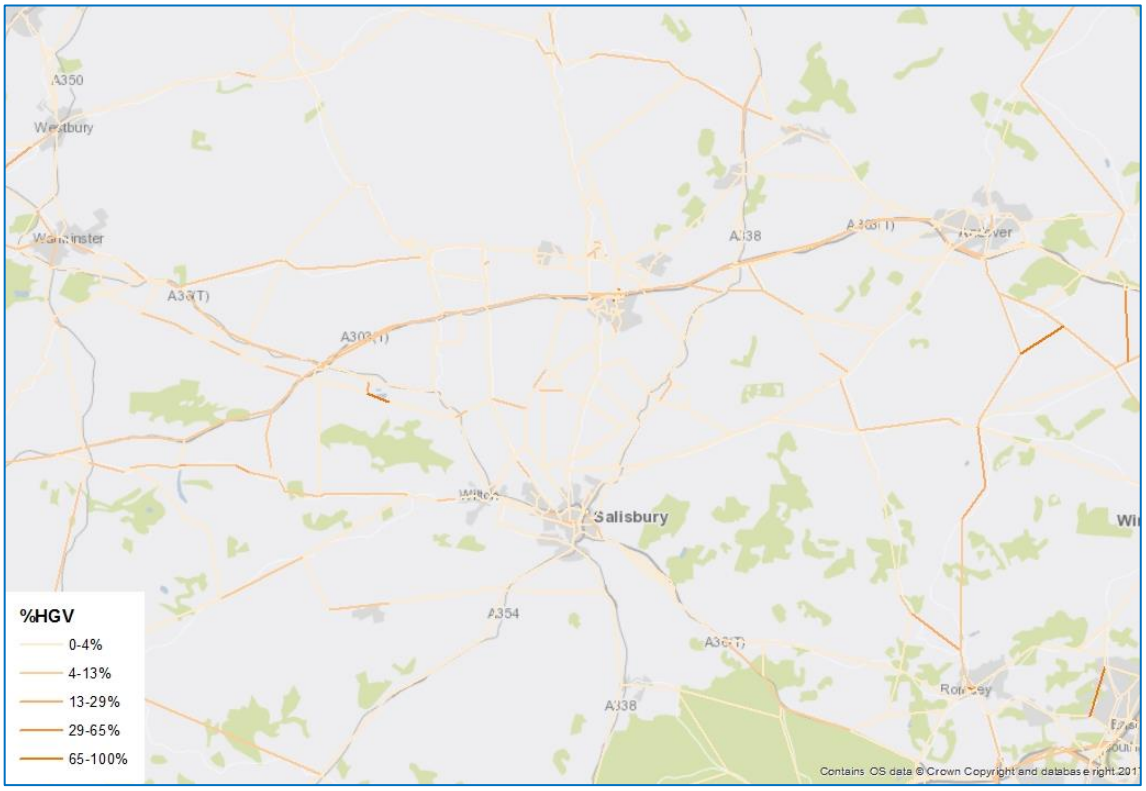


Figure 9-3: HGV proportions by link, average PM hour

9.3 Route choice validation

Minimum cost origin-destination paths

9.3.1 Route choice validation has been undertaken following the guidance in WebTAG Unit M3.1 §7.3.1. WebTAG Unit M3.1 §7.3.2 states that the number of pairs of zones which should be examined and minimum cost paths produced for is dependent on the size of the model. The following rule of thumb should be used:

$$Number\ of\ OD\ pairs = (number\ of\ zones)^{0.25} \times the\ number\ of\ user\ classes$$

9.3.2 Based on the above formula, 34 O-D routes either within or through the AoDM have been selected. Figures for each of the three neutral month modelled time periods have been produced and are provided in Appendix C.

9.3.3 The origins and destinations for the minimum cost path analysis are set out in Table 9-1. In each case, minimum cost paths for each direction have been checked.

9.3.4 The minimum cost O-D paths extracted show consistent patterns across each of the modelled time periods and show logical routeing. Whilst there are no route data against which the minimum cost paths can be verified, the minimum cost routes through the network appear to be logical based on knowledge of the local road network.

Table 9-1: List of zone pairs for path analysis and movement type

Zone 1	Location	Zone 2	Location	Movement type
20421	Clyst Honiton / East Exeter	80385	London (South West)	Strategic (A303)
20690	Bath (South)	80273	Romsey / Southampton	Strategic (crossing A303)
20878	Warminster	20960	Salisbury (South East)	Inter-urban (crossing A303)
20907	Great Wishford / South Newton	22557	Porton	Local (in AoDM)
20962	Bulford	22614	Heytesbury	Local (in AoDM)
21035	Southampton	80234	Chiseldon (Swindon South East)	Strategic (crossing A303)
22441	Durrington (North)	22540	Old Sarum	Local (in AoDM)
22446	Tilshead	22498	Boscombe Down	Local (in AoDM)
22447	Orcheston	20923	Salisbury (North West)	Local
22463	Winterbourne Stoke	22642	Sherrington / Boyton / Corton	Local (in AoDM)
22473	Druid's Head Farm (East of Upper Woodford)	22568	Parsonage Down National Nature Reserve	Local (in AoDM)
22532	Wilton	22604	Tidworth	Local (in AoDM)
22574	Mere	80291	Andover (East)	Inter-urban (A303)
22596	Wilsford / Normanton	22526	Perham Down	Local (in AoDM)
22618	Deptford	80545	Thruxton	Local (A303)
22624	Stonehenge Visitor Centre	22544	Salisbury City Centre	Local
80036	Marlborough	20976	Fordingbridge	Inter-urban (crossing A303)

Select Link Analyses

9.3.5 Select Link Analyses have been undertaken to validate out-turn route-choice from the assignment throughout the network. Select Link Analyses have been undertaken for the following key locations within the AoDM, for both directions:

a. A303 mainline:

   i. past Stonehenge (between A345 Countess Roundabout and A360 Longbarrow junctions);

   ii. east of the A36 junction; and

   iii. west of the A338 junction.

b. local road network:

   i. The Packway, Larkhill;

   ii. A345 north of Countess Roundabout;

   iii. A360, between Shrewton and the B360;

   iv. A360, south of Longbarrow junction; and

   v. B3083, near Berwick St James.

9.3.6 The Select Link Analyses are presented in Appendix C. The out-turn routes from the assignment show logical routeing through the AoDM at each of the locations.

10 Trip matrix calibration and validation

10.1 Validation of the prior matrices

10.1.1 As WebTAG Unit M3.1 §8.2 notes, it is essential that the need for matrix adjustment by matrix estimation is clearly established prior to any such processes being undertaken.

10.1.2 As noted in section 7.4, the parent model SWRTM DF3.0, along with the other RTMs, established the need for the use of matrix estimation for the refinement of the MPOD derived trip matrices. This is documented in the SWRTM MVR.

10.1.3 As the starting point of the refined trip matrices for the 'A303 Stonehenge SWRTM (DCO)' model is these same prior matrices, albeit with local demand refinements in the AoDM, the assumption was that matrix estimation would be a requirement for this model. This is necessary to ensure consistency with SWRTM DF3.0 in the RoFMA.

10.1.4 However, the refinement of the prior matrices in the AoDM has altered local demand from that in SWRTM DF3.0. Therefore, prior to undertaking any estimation, the prior trip matrices were validated against the five newly derived local screenlines earmarked for calibration purposes and previously summarised in chapter 5.

10.1.5 The prior matrices were therefore assigned to the highway network and comparisons at a total level, by vehicle type, across these five screenlines were undertaken for each modelled time period. The criterion and acceptability guidelines for matrix validation previously stated in chapter 3 have been used for this purpose.

10.1.6 Table 10-1, Table 10-2, Table 10-3 and Table 10-4 set out the comparison of total observed traffic volumes against total modelled, from the prior matrix assignment, for the five screenlines for the average AM, IP and PM hours and summer average hour respectively.

10.1.7 As the tables show, whilst performance against the RTM criterion of ±10% is above 50% (and at 80% and 90% in the interpeak) for Total Vehicle and Total Car flows across the screenlines, matrix estimation may be appropriate in making moderate scale adjustments to the demand.

10.1.8 However the overall fit of the model against observed data in the AoDM, despite refinements made to the prior matrix and appropriate network coding checks and network validation, suggested that matrix estimation was required in the AoDM to attain reasonable performance against the WebTAG criteria and acceptability guidelines.

Table 10-1: Prior matrix validation (AoDM screenlines), average AM hour

			Average AM Hour											
Screenline	Direction	No. Sites	Total			Car			LGV			HGV		
			Obs	Mod	%Diff	Obs	Mod	%Diff	Obs	Mod	%Diff	Obs	Mod	%Diff
East of Scheme	EB	4	2,051	1,706	-16.8%	1,539	1,361	-11.6%	283	268	-5.3%	229	77	-66.5%
East of Scheme	WB	4	1,483	1,107	-25.4%	1,136	859	-24.4%	207	182	-11.8%	140	66	-53.2%
North of A303	NB	7	2,237	2,061	-7.9%	1,739	1,558	-10.4%	343	395	15.1%	155	108	-30.1%
North of A303	SB	8	2,773	3,059	10.3%	2,157	2,452	13.7%	426	474	11.2%	190	132	-30.6%
South of A303	NB	11	2,336	2,291	-2.0%	1,849	1,757	-4.9%	331	398	20.1%	157	136	-13.5%
South of A303	SB	10	2,574	2,676	4.0%	2,081	2,085	0.2%	349	444	27.2%	144	147	2.0%
West of Amesbury to West of Durrington	EB	3	1,526	1,391	-8.9%	1,206	1,120	-7.1%	217	212	-2.3%	103	58	-43.7%
West of Amesbury to West of Durrington	WB	4	1,257	963	-23.4%	950	714	-24.8%	195	184	-5.7%	111	64	-42.2%
West of AoDM	EB	4	1,709	1,789	4.7%	1,310	1,347	2.8%	256	336	31.3%	143	107	-25.6%
West of AoDM	WB	4	1,295	1,175	-9.3%	921	859	-6.8%	226	222	-1.5%	148	94	-36.4%
TOTAL (Within ±5%)					**30%**			**30%**			**20%**			**10%**
TOTAL (Within ±10%)					**60%**			**50%**			**40%**			**10%**

Table 10-2: Prior matrix validation (AoDM screenlines), average IP hour

			Average Interpeak Hour											
Screenline	Direction	No. Sites	Total			Car			LGV			HGV		
			Obs	Mod	%Diff	Obs	Mod	%Diff	Obs	Mod	%Diff	Obs	Mod	%Diff
East of Scheme	EB	4	1,388	1,235	-11.0%	1,021	951	-6.9%	190	197	3.7%	177	87	-50.8%
East of Scheme	WB	4	1,497	1,141	-23.8%	1,152	902	-21.6%	216	173	-19.9%	130	65	-49.6%
North of A303	NB	7	1,981	1,815	-8.4%	1,503	1,384	-7.9%	298	323	8.6%	180	108	-40.0%
North of A303	SB	8	1,913	1,959	2.4%	1,451	1,505	3.7%	287	333	16.1%	176	121	-31.1%
South of A303	NB	11	1,933	1,999	3.4%	1,505	1,520	1.0%	271	344	27.1%	158	135	-14.6%
South of A303	SB	10	1,871	1,897	1.4%	1,464	1,458	-0.4%	260	306	17.7%	148	134	-9.5%
West of Amesbury to West of Durrington	EB	3	1,119	1,022	-8.7%	835	786	-5.9%	162	171	5.4%	122	65	-46.7%
West of Amesbury to West of Durrington	WB	4	1,134	1,133	-0.1%	859	888	3.4%	164	175	7.2%	112	70	-37.6%
West of AoDM	EB	4	1,267	1,321	4.3%	945	1,014	7.4%	176	206	17.0%	146	101	-31.0%
West of AoDM	WB	4	1,355	1,400	3.3%	991	1,064	7.4%	204	228	11.7%	160	107	-33.3%
TOTAL (Within ±5%)					**60%**			**40%**			**10%**			**0%**
TOTAL (Within ±10%)					**80%**			**90%**			**40%**			**10%**

Table 10-3: Prior matrix validation (AoDM screenlines), average PM hour

			Average PM Hour											
Screenline	Direction	No. Sites	Total			Car			LGV			HGV		
			Obs	Mod	%Diff	Obs	Mod	%Diff	Obs	Mod	%Diff	Obs	Mod	%Diff
East of Scheme	EB	4	1,565	1,345	-14.0%	1,297	1,122	-13.4%	177	172	-3.3%	91	51	-43.8%
East of Scheme	WB	4	2,053	1,604	-21.9%	1,739	1,358	-21.9%	236	207	-12.4%	78	40	-48.9%
North of A303	NB	7	3,104	2,773	-10.7%	2,640	2,372	-10.1%	350	328	-6.4%	114	74	-35.6%
North of A303	SB	8	2,641	2,430	-8.0%	2,231	1,998	-10.5%	300	352	17.3%	110	80	-26.7%
South of A303	NB	11	2,822	2,902	2.8%	2,442	2,460	0.7%	289	354	22.8%	92	88	-4.3%
South of A303	SB	10	2,548	2,416	-5.2%	2,183	2,021	-7.4%	279	315	12.7%	86	80	-7.1%
West of Amesbury to West of Durrington	EB	3	1,261	995	-21.1%	1,051	816	-22.4%	145	133	-8.5%	65	46	-29.0%
West of Amesbury to West of Durrington	WB	4	1,448	1,506	4.0%	1,224	1,272	3.9%	165	188	13.8%	59	46	-22.2%
West of AoDM	EB	4	1,285	1,227	-4.5%	1,051	1,001	-4.7%	153	167	9.1%	81	59	-27.5%
West of AoDM	WB	4	1,771	1,780	0.5%	1,436	1,449	0.9%	234	261	11.5%	101	69	-31.1%
TOTAL (Within ±5%)					**40%**			**40%**			**10%**			**10%**
TOTAL (Within ±10%)					**60%**			**50%**			**40%**			**20%**

Table 10-4: Prior matrix Validation (AoDM screenlines), average summer hour

			Average Summer Hour											
Screenline	Direction	No. Sites	Total			Car			LGV			HGV		
			Obs	Mod	%Diff	Obs	Mod	%Diff	Obs	Mod	%Diff	Obs	Mod	%Diff
East of Scheme	EB	4	1,773	1,527	-13.87%	1,617	1,340	-17.12%	114	133	15.95%	42	55	30.28%
East of Scheme	WB	4	1,706	1,461	-14.35%	1,562	1,275	-18.37%	100	138	37.27%	43	48	11.06%
North of A303	NB	7	2,288	2,132	-6.81%	2,136	1,851	-13.33%	120	202	67.51%	31	79	152.77%
North of A303	SB	8	2,270	2,196	-3.26%	2,112	1,902	-9.95%	123	210	71.47%	35	84	137.50%
South of A303	NB	11	2,136	2,014	-5.72%	1,987	1,736	-12.61%	110	205	85.68%	39	73	86.84%
South of A303	SB	10	2,511	2,212	-11.90%	2,296	1,906	-17.00%	140	229	63.26%	74	78	4.20%
East of A345	EB	3	1,885	1,408	-25.30%	1,742	1,237	-28.94%	107	116	8.45%	36	54	50.50%
East of A345	WB	3	1837	1414	-23.02%	1700	1250	-26.44%	103	105	1.99%	34	59	71.40%
West of B3083	EB	4	1760	1699	-3.43%	1607	1495	-6.94%	111	155	39.97%	42	49	16.18%
West of B3083	WB	4	1764	1660	-5.89%	1609	1452	-9.77%	113	159	40.30%	42	50	17.94%
TOTAL (Within 5%)					**20%**			**0%**			**10%**			**10%**
TOTAL (Within 10%)					**50%**			**30%**			**20%**			**10%**

10.2 Matrix estimation

Overview of the process

10.2.1 Matrix estimation has been undertaken for all of the modelled time periods, that is the neutral month AM, IP and PM average hour models and for the summer average hour model.

10.2.2 Matrix estimation has been undertaken for cars, LGVs and HGVs separately. All calibration screenline counts and ad-hoc calibration counts defined in SWRTM have been used for this process for the neutral month time periods, along with the addition of the five local AoDM calibration screenlines and ad-hoc counts previously set out in section 5.3.

10.2.3 As discussed in WebTAG Unit M3.1 §8.3.5 count sites should generally be grouped and applied at a short screenline level, in order to reduce the chance that large changes between single O-D pairs are made to account for differences between modelled and observed flows that may not be related to deficiencies in the trip matrices. Again, for the neutral month time periods, the mini-screenline groupings previously defined in SWRTM DF3.0 have been retained for all SWRTM calibration cordons and screenlines. Counts on the five new AoDM screenlines have also been grouped into mini-screenlines for the neutral month time periods.

10.2.4 As previously noted, matrix estimation was only undertaken following a thorough review of the highway networks as set out in chapters 6, 8 and 9.

Neutral month time periods

10.2.5 The process of matrix estimation used in the development of SWRTM DF3.0 has been retained for the 'A303 Stonehenge SWRTM (DCO)' model. Matrix estimation has been undertaken for six separate loops of the SATPIJA / SATME2 process.

10.2.6 Within SATME2, a parameter controlling the maximum balancing factor – XAMAX – exists to limit excessive changes to the prior matrices. As per SWRTM, this value was varied by user-class, with a value of 2.0 used for the car estimation, with the default value of 5.0 retained for the LGV and HGV estimation. This reflects the relative confidence in the count data for different vehicle types.

Blending

10.2.7 In addition, as per SWRTM DF3.0, a blending process was undertaken to reduce the impact of matrix estimation on more robust movements in the prior matrices.

10.2.8 Two parallel versions of matrix estimation were undertaken, as follows:

a. unconstrained: whereby only trips to or from ports and airport zones in the model were frozen for all user classes; and

b. constrained: whereby all car trips longer than 20km were also frozen, reflecting the greater confidence in the longer-distance movements derived from MPOD data.

10.2.9 Work was undertaken in the development of SWRTM to determine an appropriate ratio from which to 'blend' the results of the unconstrained and constrained estimation runs. This work has not been repeated as part of the 'A303 Stonehenge SWRTM (DCO)' model development and the 60% constrained / 40% unconstrained process that was selected as providing the best balance between optimising model validation and minimising matrix distortion was retained.

Summer time periods

10.2.1 In a similar manner, the summer model matrix estimation was carried out blending two different versions of the process, as follows:

a. simple: this version of the matrix estimation was carried out to aim for better flows in the link counts and screenlines, without preload or PASSQ; and

b. matrix estimation with preload and PASSQ: whereby the preload and PASSQ defined between §4.7.7 and §4.7.13 were added to the model in order to get better representation of the delay and congestion that has been observed in the AoDM.

10.2.2 The blending process was carried out with 50% of each matrix. It should be noted that in order to keep the preload matrix intact, it was subtracted from user class 3 in the simple matrix before blending, so it would not be counted 1.5 times in the blended matrix.

10.3 Impacts of matrix estimation

10.3.1 As noted in chapter 3, WebTAG Unit M3.1 notes that the changes brought about by matrix estimation should be carefully monitored to ensure that changes are not significant. Four separate significance measures and criteria are set out in WebTAG, as previously stated in Table 3-6.

10.3.2 The following tables set out the changes as a result of matrix estimation. As the tables demonstrate trip length changes are within guidance across the whole model, albeit noting slightly reduced performance when the AoDM is considered in isolation, with greater change noted in HGV trip lengths in the neutral AM and IP, and with larger changes in trip lengths across all user-classes in the summer time period.

Table 10-5: Trip length changes as a result of matrix estimation

Mean		AM				IP				PM				Summer			
		Prior	Post	Change	%Change	Prior	Post	Change	%Change	Prior	Post	Change	%Change	Prior	Post	Change	%Change
Full Model	All	66.19	65.69	-0.50	-0.75%	66.88	66.22	-0.66	-0.99%	66.31	66.16	-0.15	-0.22%	79.51	79.96	0.45	0.56%
	UC1	78.23	79.51	1.28	1.64%	76.01	76.65	0.63	0.84%	76.28	77.85	1.56	2.05%	86.3	89.05	2.75	3.18%
	UC2	46.20	46.86	0.66	1.43%	51.19	51.28	0.09	0.18%	48.38	48.88	0.51	1.04%	51.69	51.98	0.3	0.57%
	UC3	35.95	36.66	0.71	1.99%	35.93	36.13	0.20	0.55%	36.81	37.35	0.54	1.47%	42.4	43.44	1.03	2.44%
	UC4	54.60	53.67	-0.93	-1.70%	55.25	54.32	-0.93	-1.69%	53.98	53.23	-0.75	-1.39%	55.65	55.14	-0.51	-0.92%
	UC5	115.99	111.77	-4.22	-3.64%	116.00	112.69	-3.31	-2.85%	116.07	113.48	-2.60	-2.24%	111.82	110.65	-1.17	-1.05%
AoDM	All	34.94	33.61	-1.33	-3.81%	38.02	35.61	-2.41	-6.33%	38.67	35.34	-3.34	-8.63%	45.47	45.59	0.12	0.26%
	UC1	51.00	47.51	-3.49	-6.84%	46.92	43.09	-3.83	-8.17%	51.48	49.26	-2.22	-4.30%	62.79	65.76	2.97	4.73%
	UC2	23.00	22.48	-0.52	-2.28%	22.36	20.66	-1.70	-7.59%	24.70	24.28	-0.42	-1.69%	23.25	23.28	0.03	0.11%
	UC3	18.55	18.60	0.04	0.23%	26.63	25.95	-0.68	-2.56%	20.37	20.32	-0.05	-0.24%	37.56	39.4	1.85	4.92%
	UC4	32.09	29.74	-2.35	-7.33%	32.35	32.61	0.26	0.81%	31.98	29.01	-2.97	-9.29%	31.88	27.89	-4	-12.54%
	UC5	50.07	49.73	-0.34	-0.69%	61.82	55.75	-6.08	-9.83%	64.85	53.82	-11.03	-17.00%	59.5	52.9	-6.59	-11.08%

SD		AM				IP				PM				Summer			
		Prior	Post	Change	%Change	Prior	Post	Change	%Change	Prior	Post	Change	%Change	Prior	Post	Change	%Change
Full Model	All	450.91	451.24	0.33	0.07%	515.49	513.59	-1.90	-0.37%	447.28	447.10	-0.17	-0.04%	235.98	234.75	-1.23	-0.52%
	UC1	611.51	608.71	-2.80	-0.46%	709.98	706.71	-3.27	-0.46%	701.84	695.84	-6.00	-0.86%	415.95	407.8	-8.15	-1.96%
	UC2	339.12	339.85	0.73	0.21%	567.30	565.90	-1.40	-0.25%	346.18	346.04	-0.14	-0.04%	153.51	152.94	-0.57	-0.37%
	UC3	423.57	425.22	1.64	0.39%	376.32	375.71	-0.61	-0.16%	360.41	360.81	0.40	0.11%	168	166.09	-1.92	-1.14%
	UC4	628.04	624.47	-3.56	-0.57%	681.04	677.14	-3.91	-0.57%	712.43	707.46	-4.97	-0.70%	129.82	131.15	1.33	1.02%
	UC5	555.00	542.87	-12.13	-2.19%	564.81	554.37	-10.43	-1.85%	698.19	685.57	-12.62	-1.81%	642.9	649.58	6.68	1.04%
AoDM	All	1825.93	1791.13	-34.80	-1.91%	2039.98	1997.77	-42.21	-2.07%	1787.27	1759.72	-27.55	-1.54%	785.58	762.39	-23.19	-2.95%
	UC1	2851.68	2820.45	-31.22	-1.09%	3130.47	3064.50	-65.97	-2.11%	3044.52	2963.71	-80.81	-2.65%	1635.81	1472.65	-163.16	-9.97%
	UC2	1607.56	1577.09	-30.47	-1.90%	2987.88	2875.07	-112.81	-3.78%	1588.32	1531.00	-57.32	-3.61%	835.91	781.79	-54.12	-6.47%
	UC3	1412.09	1385.66	-26.44	-1.87%	1296.53	1282.12	-14.41	-1.11%	1288.43	1255.79	-32.63	-2.53%	636.6	592.99	-43.61	-6.85%
	UC4	2159.52	2181.33	21.81	1.01%	2428.30	2409.41	-18.89	-0.78%	2443.02	2507.94	64.93	2.66%	583.1	759.09	175.99	30.18%
	UC5	2633.19	2337.76	-295.43	-11.22%	2490.99	2236.85	-254.14	-10.20%	3004.71	2861.22	-143.49	-4.78%	1060.53	1267.34	206.81	19.50%

Table 10-6: Cell value and trip end changes as a result of matrix estimation

		AM		IP		PM		Summer	
Measurement		AoDM	Full Model	AoDM	Full Model	AoDM	Full Model	AoDM	Full Model
Cells	Slope	0.988	1.000	0.994	1.000	0.994	1.000	1.127	1.000
	Intercept	0.000	-0.001	0.000	0.000	0.000	-0.001	0.000	0.000
	R-Sq	0.990	1.000	0.993	1.000	0.991	1.000	0.954	1.000
Rows	Slope	0.987	1.000	0.968	1.000	0.976	1.000	1.117	1.000
	Intercept	0.097	1.502	0.150	-0.964	-0.409	1.062	-0.045	0.476
	R-Sq	0.968	1.000	0.968	1.000	0.965	1.000	0.986	1.000
Columns	Slope	0.960	1.000	0.985	1.000	0.979	1.000	1.041	1.000
	Intercept	1.327	1.526	-0.283	-0.945	0.855	1.100	0.030	2.710
	R-Sq	0.973	1.000	0.974	1.000	0.968	1.000	0.989	1.000

10.4 Validation of the post estimation trip matrices

10.4.1 Following matrix estimation, the performance of the trip matrices has again been measured against the criterion and acceptability guidance set out in WebTAG Unit M3.1 and given in Table 3-1.

Neutral month time periods

10.4.2 Table 10-7 presents a comparison of the screenline performance of the SWRTM screenlines and cordons across the Fully Modelled Area, whilst Table 10-8 to Table 10-10 presents the performance for the five local AoDM screenlines previously noted.

SWRTM screenlines

10.4.3 As noted earlier, all screenlines used for calibration or validation within SWRTM have been retained for this purpose in the 'A303 Stonehenge SWRTM (DCO)' model. The only change in their definitions has been if newly extracted WebTRIS data for 2017 have duplicated a site on one of these screenlines, in which case the 2017 data have been used in preference to pre-existing 2015 data.

10.4.4 Table 10-7 shows that the impact of the local refinement for the A303 Amesbury to Berwick Down scheme has had no detriment on the wider matrix. The out-turn matrix validation, in percentage of screenlines meeting the WebTAG and RTM criterion for total observed versus modelled flows, is very similar between the two models. In fact, there is a slight performance increase (an additional 1% to 2% of screenlines meeting the acceptability criteria) across all calibration and validation screenlines.

10.4.5 Performance is similar across all types of screenline, and at a total level for calibration and validation screenlines. This demonstrates that the local AoDM demand and network refinement, and introduction of additional traffic counts for calibration, has not materially changed the overall performance of the model in the region of focus outside the AoDM.

AoDM screenlines

10.4.6 For the five AoDM screenlines, the AM and PM average hour models show that 90% of screenlines have total vehicle and car flows within 5% of the observed values whilst, for the interpeak, this drops slightly lower, with 80% of total vehicle flows meeting the criteria and 70% of car flows meeting the criteria.

10.4.7 In the AM average hour, the only screenline failing to meet the 5% criterion is the West of AoDM screenline in the eastbound direction, with total vehicle flows exceeding the observed by 5.8%, just outside of the criterion. This same screenline is the cause of the car failure, where modelled car flows exceed the observed by 7.7%. It should be noted that, in both these cases, the absolute difference is 99 and 101 vehicles / cars respectively. The screenline itself comprises just four links which, combined with a low absolute difference and relatively low total flow, shows the slight exceedances are very close to meeting a demanding target.

10.4.8 In the PM average hour, the only screenline failing to meet the 5% criterion is the 'West of Amesbury to West of Durrington' screenline in the eastbound direction, with total vehicle flows 6% lower than observed and car flows 6.3% lower than observed, so just outside of the criterion. This screenline comprises only three links, two of which are low flow routes: The Packway (closed to all but construction traffic in the base year) and Fargo Road. The screenline is heavily dominated by the flow on the A303 to the east of Countess roundabout. The actual shortfall of just 76 vehicles and 66 cars across the screenline is very small and, were the screenline to be judged on the basis of individual link flows, well within the tolerance of the 15% difference that would be applied to the individual A303 link.

10.4.9 In the IP average hour, the two screenlines failing to meet the criterion are the West of AoDM screenline (as per the AM) and the East of AoDM screenline for both total vehicles and cars. In both cases, the screenlines are comprised of four links and the absolute flows are within 110 vehicles (and in three of the four cases, fewer than 100 vehicles/cars) difference from the observed. The relatively low flows result in proportionately larger percentage differences. A third screenline fails to meet the criterion for cars, with the North of A303 screenline southbound having 6.4% too many cars on it – fewer than 100 cars difference from the observed.

10.4.10 Across each of the neutral month time period models, the LGV and HGV screenline totals are generally in excess of 70% compliance across all screenlines, with just PM HGVs falling to 60%. Given the low observed flows, this is a good result, as many of those screenlines where modelled flows do not meet the 5% difference from observed values have very low absolute differences – many of the HGVs that have failed to meet the 5% criterion, have absolute differences of 10 vehicles or fewer.

Statement on matrix validation

10.4.11 Overall, the performance of the matrices for the neutral month time periods against the observed data for the local AoDM screenlines is acceptable. Those cases where the criterion has been exceeded are slight, with no percentage differences for total vehicles or cars being more than 9% (and, in most cases, lower than 7%). These are the equivalent of absolute differences of fewer than 100 vehicles in most cases. The local flows crossing these screenlines are therefore considered to be representative of observed values.

10.4.12 The use of matrix estimation incorporating new data in the AoDM, and the refinement of networks and demand in the AoDM, has not resulted in a detriment to the performance of the rest of the matrix, judged against the existing SWRTM screenlines and cordons. Both SWRTM DF3.0 and the 'A303 Stonehenge SWRTM (DCO)' model show very similar performance for screenlines, with some small beneficial changes noted as a result of the 'A303 Stonehenge SWRTM (DCO)' model refinements.

10.4.13 Table 10-11 presents the performance for the summer average hour model respective to the five local AoDM.

10.4.14 In the summer average hour, all of the screenlines meet the criteria for the total vehicle flow. The car flows fail in the north screenline in the southbound direction with 5.32%. With regard to the LGV and HGV flows none of the screenlines pass. The lower modelled flows suggests that the simulation allows more re-routeing due to the congestion on the A303, making these vehicles choose another route.

Table 10-7: Post estimation matrix validation (SWRTM screenlines) – comparison SWRTM vs 'A303 Stonehenge SWRTM (DCO)' model

Screenline Type	Difference in screenline totals ±5%						Difference in screenline totals ±10%					
	SWRTM DF3.0			'A303 Stonehenge SWRTM (DCO)' model			SWRTM DF3.0			'A303 Stonehenge SWRTM (DCO)' model		
	AM	IP	PM	AM	IP	PM	AM	IP	PM	AM	IP	PM
Strategic	56%	88%	88%	56%	81%	81%	88%	94%	88%	81%	94%	88%
Urban Calibration	67%	81%	86%	72%	81%	86%	92%	100%	92%	94%	100%	92%
Large Urban Calibration	71%	86%	79%	71%	88%	81%	88%	100%	95%	90%	100%	93%
Boundary	75%	100%	75%	75%	100%	75%	100%	100%	100%	100%	100%	100%
Calibration – Total	68%	85%	82%	71%	85%	83%	90%	99%	93%	92%	99%	93%
Peninsula	33%	33%	33%	33%	33%	50%	67%	67%	67%	67%	67%	67%
Mainland	50%	33%	33%	33%	50%	33%	100%	100%	67%	100%	83%	67%
Validation - Total	42%	33%	33%	36%	50%	50%	83%	83%	67%	86%	79%	71%
Total	***65%***	***80%***	***77%***	***67%***	***81%***	***79%***	***89%***	***97%***	***90%***	***91%***	***97%***	***90%***

Source: SWRTM DF3.0 figures from 'RTM_Dashboard_V4.15_RUN08988_B.xlsm'.

Table 10-8: Post estimation matrix validation (AoDM screenlines), average AM hour

Screenline	Direction	No. Sites	Average AM Hour											
			Total			Car			LGV			HGV		
			Obs	Mod	%Diff	Obs	Mod	%Diff	Obs	Mod	%Diff	Obs	Mod	%Diff
East of Scheme	EB	4	2,051	2,008	-2.1%	1,539	1,587	3.1%	283	292	3.1%	229	130	-43.2%
East of Scheme	WB	4	1,483	1,463	-1.4%	1,136	1,105	-2.7%	207	233	12.9%	140	124	-11.4%
North of A303	NB	7	2,237	2,218	-0.8%	1,739	1,725	-0.8%	343	343	0.0%	155	151	-2.9%
North of A303	SB	8	2,773	2,864	3.2%	2,157	2,248	4.2%	426	426	-0.2%	190	190	-0.1%
South of A303	NB	11	2,336	2,409	3.1%	1,849	1,920	3.9%	331	330	-0.4%	157	159	1.4%
South of A303	SB	10	2,574	2,622	1.9%	2,081	2,117	1.7%	349	349	-0.1%	144	156	8.4%
West of Amesbury to West of Durrington	EB	3	1,526	1,506	-1.3%	1,206	1,188	-1.5%	217	211	-3.0%	103	108	4.3%
West of Amesbury to West of Durrington	WB	4	1,257	1,226	-2.5%	950	916	-3.6%	195	194	-0.7%	111	116	4.5%
West of AoDM	EB	4	1,709	1,808	5.8%	1,310	1,411	7.7%	256	252	-1.5%	143	145	1.2%
West of AoDM	WB	4	1,295	1,274	-1.6%	921	917	-0.4%	226	213	-5.5%	148	143	-3.2%
TOTAL					**90%**			**90%**			**80%**			**70%**

Table 10-9: Post estimation matrix validation (AoDM screenlines), average IP hour

Screenline	Direction	No. Sites	Average Interpeak Hour											
			Total			Car			LGV			HGV		
			Obs	Mod	%Diff	Obs	Mod	%Diff	Obs	Mod	%Diff	Obs	Mod	%Diff
East of Scheme	EB	4	1,388	1,399	0.8%	1,021	1,038	1.7%	190	220	15.5%	177	141	-20.4%
East of Scheme	WB	4	1,497	1,388	-7.3%	1,152	1,052	-8.7%	216	206	-4.8%	130	131	1.3%
North of A303	NB	7	1,981	1,967	-0.7%	1,503	1,498	-0.3%	298	299	0.4%	180	170	-5.4%
North of A303	SB	8	1,913	2,006	4.8%	1,451	1,543	6.4%	287	287	0.1%	176	175	-0.3%
South of A303	NB	11	1,933	1,974	2.1%	1,505	1,539	2.3%	271	271	0.3%	158	164	3.9%
South of A303	SB	10	1,871	1,937	3.5%	1,464	1,527	4.3%	260	260	-0.1%	148	150	1.8%
West of Amesbury to West of Durrington	EB	3	1,119	1,119	0.0%	835	835	0.0%	162	164	1.2%	122	120	-1.3%
West of Amesbury to West of Durrington	WB	4	1,134	1,164	2.6%	859	878	2.2%	164	167	2.2%	112	119	6.4%
West of AoDM	EB	4	1,267	1,341	5.9%	945	1,021	8.1%	176	177	0.7%	146	143	-2.3%
West of AoDM	WB	4	1,355	1,391	2.6%	991	1,039	4.9%	204	195	-4.6%	160	157	-2.3%
TOTAL					**80%**			**70%**			**90%**			**70%**

Table 10-10: Post estimation matrix validation (AoDM screenlines), average PM hour

Screenline	Direction	No. Sites	Average PM Hour											
			Total			Car			LGV			HGV		
			Obs	Mod	%Diff	Obs	Mod	%Diff	Obs	Mod	%Diff	Obs	Mod	%Diff
East of Scheme	EB	4	1,565	1,600	2.3%	1,297	1,344	3.6%	177	176	-1.0%	91	81	-10.4%
East of Scheme	WB	4	2,053	1,971	-4.0%	1,739	1,677	-3.5%	236	216	-8.4%	78	78	-0.2%
North of A303	NB	7	3,104	2,993	-3.6%	2,640	2,537	-3.9%	350	351	0.3%	114	105	-8.5%
North of A303	SB	8	2,641	2,683	1.6%	2,231	2,277	2.0%	300	299	-0.1%	110	106	-3.0%
South of A303	NB	11	2,822	2,874	1.8%	2,442	2,495	2.2%	289	287	-0.7%	92	92	0.5%
South of A303	SB	10	2,548	2,631	3.3%	2,183	2,266	3.8%	279	278	-0.4%	86	87	1.6%
West of Amesbury to West of Durrington	EB	3	1,261	1,185	-6.0%	1,051	985	-6.3%	145	134	-7.5%	65	66	1.7%
West of Amesbury to West of Durrington	WB	4	1,448	1,473	1.7%	1,224	1,232	0.7%	165	172	4.2%	59	69	16.6%
West of AoDM	EB	4	1,285	1,314	2.2%	1,051	1,086	3.3%	153	148	-3.5%	81	81	-0.9%
West of AoDM	WB	4	1,771	1,752	-1.1%	1,436	1,458	1.5%	234	203	-13.2%	101	91	-10.0%
TOTAL					**90%**			**90%**			**70%**			**60%**

Table 10-11: Post estimation matrix validation (AoDM screenlines), average summer hour

Screenline	Direction	No. Sites	Average Summer Hour											
			Total			Car			LGV			HGV		
			Obs	Mod	%Diff	Obs	Mod	%Diff	Obs	Mod	%Diff	Obs	Mod	%Diff
East of Scheme	EB	4	1,773	1,764	-0.52%	1,617	1,673	3.49%	114	58	-49.18%	42	33	-22.10%
East of Scheme	WB	4	1,706	1,651	-3.21%	1,562	1,571	0.57%	100	50	-50.26%	43	30	-30.58%
North of A303	NB	7	2,288	2,268	-0.88%	2,136	2,180	2.06%	120	53	-56.08%	31	35	11.31%
North of A303	SB	8	2,270	2,339	3.02%	2,112	2,225	5.32%	123	69	-43.31%	35	45	26.47%
South of A303	NB	11	2,136	2,085	-2.37%	1,987	1,986	-0.03%	110	69	-37.20%	39	30	-22.58%
South of A303	SB	10	2,511	2,478	-1.31%	2,296	2,304	0.35%	140	106	-24.27%	74	68	-9.25%
East of A345	EB	3	1,885	1,801	-4.45%	1,742	1,733	-0.52%	107	36	-66.79%	36	33	-9.02%
East of A345	WB	3	1837	1799	-2.07%	1700	1714	0.83%	103	44	-57.54%	34	41	20.67%
West of B3083	EB	4	1760	1762	0.11%	1607	1660	3.28%	111	73	-33.77%	42	28	-31.90%
West of B3083	WB	4	1764	1791	1.51%	1609	1679	4.38%	113	80	-28.86%	42	31	-26.40%
TOTAL					**100%**			**90%**			**0%**			**0%**

11 Assignment calibration and validation

11.1 Convergence statistics

11.1.1 The 'A303 Stonehenge SWRTM (DCO)' time period models have been assigned using SATURN version 11.3.12W (multi-core). As previously noted, the neutral month time periods comprise a single average hour assignment, whilst the summer time period model comprises a preload, PASSQ and final average hour assignment.

11.1.2 Table 3-5 previously set out the convergence criteria for proximity and stability as recommended in WebTAG Unit M3.1. For the 'A303 Stonehenge SWRTM (DCO)' model, the following stopping criteria have been adopted. SATURN parameters are given in brackets:

a. proximity: A %GAP value of 0.025% (STPGAP), well within the 0.1% recommended by WebTAG Unit M3.1 §3.3. This must be achieved over four successive iterations (NISTOP); and

b. stability: 98% of links (RSTOP) demonstrating a change in assigned flows of less than 1% (PCNEAR) over four successive iterations (NISTOP).

11.1.3 The convergence criteria have been achieved in all modelled time periods: this is shown in Table 11-1 which provides convergence statistics for the last four iterations of each modelled period and demonstrates that all three models are suitably converged against both the proximity (%GAP) and stability (%Flows) criteria.

Table 11-1: Convergence results, 2017 base year

Time Period	Assignment Loop	%GAP	%Flows
AM average hour (Neutral)	34	0.0033	99.0
	35	0.0032	98.8
	36	0.0046	99.1
	37	0.0043	98.7
IP average hour (Neutral)	16	0.0025	98.6
	17	0.0024	98.7
	18	0.0021	99.0
	19	0.0014	99.3
PM average hour (Neutral)	35	0.0030	98.7
	36	0.0035	99.0
	37	0.0033	98.6
	38	0.0035	98.8
10:00 – 19:00 average hour (Summer)	12	0.0029	98.7
	13	0.0027	98.5
	14	0.0023	98.8
	15	0.0023	98.9

11.2 Assignment calibration

11.2.1 Assignment calibration is presented herein as the comparison of modelled link flows against observed data. The criteria for this have previously been presented in Table 3-2, which is the WebTAG criteria, and have been used for the assessment of link performance throughout the AoDM. For the comparison with SWRTM link flows, non-core links in the RoFMA have made use of the criteria given in Table 3-3 – the comparisons with SWRTM DF3.0 are undertaken on a like-for-like basis, using the core or non-core criteria as appropriate.

Comparison with SWRTM DF3.0

11.2.2 The modelled link flow comparisons for sites used in calibration are given in Table 11-2. This compares the results for calibration links between SWRTM DF3.0 and the 'A303 Stonehenge SWRTM (DCO)' model neutral month time periods. Model performance is compared against the GEH criterion (i.e. those sites with a GEH of less than 5.0), RTM flow criterion and those meeting either of the two measures.

Table 11-2: Comparison of link flow calibration: SWRTM vs 'A303 Stonehenge SWRTM (DCO)' model

Link classification	Time Period	GEH <5.0		Flow criterion		GEH or Flow criterion	
		SWRTM	A303	SWRTM	A303	SWRTM	A303
Calibration	AM	59.0%	61.4%	90.0%	90.6%	90.6%	91.1%
	IP	64.5%	65.7%	95.4%	94.8%	95.5%	94.9%
	PM	59.5%	62.1%	91.4%	91.3%	91.5%	91.5%

11.2.3 As the table demonstrates, the link calibration performance is very similar between the two models.

11.2.4 The 'A303 Stonehenge SWRTM (DCO)' model shows slight increases in the total number of calibration links meeting the GEH criterion with between a 1% and 2.5% increase in links meeting the criterion in all time periods.

11.2.5 The very similar results between the two models demonstrate that the 'A303 Stonehenge SWRTM (DCO)' model local area refinements have not materially changed the performance of the rest of the model across the Fully Modelled Area.

Area of Detailed Modelling performance

11.2.6 A summary of the performance of the links used for the neutral month calibration within the AoDM is given in Table 11-3. The table provides data for the three neutral time periods, with performance specified at an overall level, and against the different classification of counts: those on calibration screenlines, ad-hoc counts from the October survey period and ad-hoc counts from WebTRIS.

11.2.7 A summary of the performance of the links used for the summer time period calibration in the AoDM is given in Table 11-4. It should be noted that the summer model did not use any ad-hoc counts in the calibration process in the AoDM, therefore only screenline count performance is given.

Neutral month

11.2.8 As the tables demonstrate, the performance of link calibration counts within the AoDM for the neutral month is in excess of the WebTAG acceptability guidance in all time periods, with total vehicles meeting the flow criteria of 91% (AM), 94% (IP) and 88% (PM), and with car performance against the same criteria of 89% (AM), 99% (IP) and 89% (PM).

11.2.9 Across the screenline counts, the individual link performance of counts forming those screenlines is in excess of 86% in all cases for total vehicles and cars, with the majority in excess of 90%.

11.2.10 Against the ad-hoc counts, performance against the October 2017 surveys is better than against WebTRIS (albeit only eight ad-hoc counts from WebTRIS data are used, meaning that seven sites must meet the criteria to achieve the 85% acceptability guidance).

11.2.11 Individual link count performance is best in the interpeak and worst in the PM, although noting each time period exceeds the 85% acceptability guidance on screenlines and at an overall level.

11.2.12 The results demonstrate that the neutral month time period calibration is good within the AoDM, meeting and exceeding the acceptability guidelines previously specified.

Summer

11.2.13 Across the screenline counts, the pertaining individual link performance is 95% for the total flow and 93% taking into account only the car flows. Both cases are above the 85% acceptability guidance.

Table 11-3: Summary of link calibration performance in AoDM, by link type (neutral month time periods)

Location	Direction	No. Sites	Average AM Hour						Average Interpeak Hour						Average PM Hour					
			Total			Car			Total			Car			Total			Car		
			GEH	Flow	Either	GEH	Flow	Either	GEH	Flow	Either	GEH	Flow	Either	GEH	Flow	Either	GEH	Flow	Either
East of Scheme	EB	4	2	3	3	1	2	2	4	4	4	3	4	4	3	4	4	3	3	4
East of Scheme	WB	4	4	4	4	3	4	4	3	4	4	3	4	4	2	3	3	2	4	4
North of A303	NB	7	7	7	7	7	7	7	7	7	7	7	7	7	6	6	6	6	6	6
North of A303	SB	8	8	8	8	8	8	8	6	7	7	6	8	8	6	6	6	6	6	6
South of A303	NB	11	9	11	11	10	10	10	11	11	11	10	11	11	10	11	11	10	11	11
South of A303	SB	10	8	9	9	8	9	9	9	9	9	9	10	10	9	9	9	9	9	9
West of Amesbury to West of Durrington	EB	3	3	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3	3	3
West of Amesbury to West of Durrington	WB	4	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
West of AoDM	EB	4	1	1	1	1	1	1	3	3	3	2	4	4	3	3	3	2	3	3
West of AoDM	WB	4	3	4	4	3	3	3	4	4	4	3	4	4	4	4	4	3	4	4
Screenline Link Summary					**92%**			**86%**			**95%**			**100%**			**90%**			**92%**
Ad-hoc calibration links (TRACSIS)	Various	21	19	18	19	19	20	20	17	19	19	17	20	20	16	16	17	14	16	16
Ad-hoc calibration links (TRACSIS)					**90%**			**95%**			**90%**			**95%**			**81%**			**76%**
Ad-hoc calibration links (WebTRIS)	Various	8	6	6	6	6	6	6	6	6	6	6	5	6	5	5	5	5	5	5
Ad-hoc calibration links (WebTRIS)					**75%**			**75%**			**75%**			**75%**			**63%**			**63%**
TOTAL	Various	80	67	72	73	67	71	71	70	75	75	67	79	79	66	69	70	62	69	70
TOTAL (AoDM)					**91%**			**89%**			**94%**			**99%**			**88%**			**88%**

Table 11-4: Summary of link calibration performance in AoDM, by link type (summer time period)

Location	Direction	No. Sites	Average Summer Hour			Average Summer Hour		
			Total			Car		
			GEH	Flow	Either	GEH	Flow	Either
East of the Scheme	EB	4	3	4	4	3	4	4
East of the Scheme	WB	4	3	4	4	3	4	4
North of A303 Stonehenge	NB	7	6	7	7	6	7	7
North of A303 Stonehenge	SB	8	7	6	8	6	7	7
South of A303 Stonehenge	NB	11	9	11	11	9	11	11
South of A303 Stonehenge	SB	10	8	10	10	9	10	10
East of A345	EB	3	1	1	1	1	1	1
East of A345	WB	3	1	2	2	1	2	2
West of B3083	EB	4	3	4	4	3	4	4
West of B3083	WB	4	4	4	4	4	4	4
Screenline Link Summary					**95%**			**93%**
TOTAL (AoDM)					**95%**			**93%**

11.3 Assignment validation

Statement of data independence

11.3.1 All data used for validation of the assignment are independent. That is they have not been used in the matrix build process, nor have the data been used in any subsequent manual adjustment or refinement by matrix estimation of the prior matrices.

11.3.2 For the neutral month time periods, independent link data have been used throughout the Fully Modelled Area, inherited from SWRTM DF3.0. Separate independent link data have been collated from new traffic surveys and from the Local Highway Authority (Wiltshire County Council).

11.3.3 In addition, wholly independent turning count data were part of the data collection undertaken in August and October 2017 and previously outlined in chapter 5. These independent turning count data were used to validate both the neutral month and summer time period models.

Comparison with SWRTM DF3.0

11.3.4 The modelled link flow comparisons for sites used for independent validation are given in Table 11-5. As with the calibration presented above, this compares the results for validation links between SWRTM DF3.0 and the 'A303 Stonehenge SWRTM (DCO)' model neutral month time periods. Model performance is compared against the GEH criterion, RTM flow criterion and those meeting either of the two measures.

Table 11-5: Comparison of link flow validation: SWRTM vs 'A303 Stonehenge SWRTM (DCO)' model

Link classification	Time Period	GEH <5.0		Flow criterion		GEH or Flow criterion	
		SWRTM	A303	SWRTM	A303	SWRTM	A303
Validation	AM	60.2%	65.3%	85.7%	84.2%	86.6%	84.4%
	IP	65.8%	60.1%	87.9%	78.2%	89.2%	78.8%
	PM	57.6%	59.0%	81.0%	76.5%	81.4%	77.5%
Total (Cal + Val)	AM	59.2%	62.5%	89.3%	88.7%	89.9%	89.2%
	IP	64.7%	64.1%	94.1%	90.0%	94.4%	90.2%
	PM	59.2%	61.2%	89.6%	87.0%	89.7%	87.5%

11.3.5 The models show similar performance in terms of independent validation links in the AM average hour, with a small reduction in the interpeak and average PM hours.

11.3.6 Considering all link counts, both calibration and validation, the two models show very similar values, with the 'A303 Stonehenge SWRTM (DCO)' model exceeding the 85% acceptability guideline.

AoDM: Independent link validation

11.3.7 Independent link validation has been undertaken at 145 separate locations throughout the AoDM. These comprise counts on the local road network from the 2017 surveys, counts at the edges of the AoDM and within the AoDM as provided by Wiltshire County Council and a small number of WebTRIS counts on the SRN.

11.3.8 Table 11-6 presents the summary results of the link validation for the neutral month time periods. These show that, for all time periods, overall validation either meets or exceeds the acceptability guideline of 85% of sites meeting either GEH or Flow criterion measures as set out in WebTAG Unit M3.1.

11.3.9 The results show that performance is similar across all time periods for modelled flows compared against the Wiltshire monitoring sites on the edges of the AoDM, with all sites exceeding 90% compliance against either of the link flow validation measures.

11.3.10 For the October 2017 surveys within the AoDM, performance is also very good, with both total vehicles and cars in the AM and IP meeting either of the link flow validation criteria in more than 89% of cases. Only the PM total vehicle comparison does not meet the 85% acceptability guideline, with 82% of the October 2017 survey sites meeting the criteria – this is still considered a good result. The overall link validation of the neutral month time period models in the AoDM is strong and demonstrates that modelled link flows are representative of observed values.

Table 11-6: Independent link validation (neutral month time periods), AoDM

Location / Source	Direction	No. Sites	Average AM Hour						Average Interpeak Hour						Average PM Hour					
			Total			Car			Total			Car			Total			Car		
			GEH	Flow	Either	GEH	Flow	Either	GEH	Flow	Either	GEH	Flow	Either	GEH	Flow	Either	GEH	Flow	Either
Wiltshire monitoring sites	Various	29	25	26	27	23	28	28	28	29	29	28	29	29	24	27	27	22	27	27
Wiltshire monitoring sites (independent)					**93%**			**97%**			**100%**			**100%**			**93%**			**93%**
Ad-hoc validation links (TRACSIS)	Various	114	88	99	101	85	103	103	87	104	104	91	110	110	79	93	94	82	98	99
Ad-hoc validation links					**89%**			**90%**			**91%**			**96%**			**82%**			**87%**
Ad-hoc validation links (WebTRIS)	Various	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Ad-hoc validation links (WebTRIS)					**100%**			**100%**			**100%**			**100%**			**100%**			**100%**
TOTAL	Various	145	115	127	130	110	133	133	117	135	135	121	141	141	105	122	123	106	127	128
TOTAL (AoDM)					**90%**			**92%**			**93%**			**97%**			**85%**			**88%**

AoDM: Turning count validation

11.3.11 Independent turning count validation has been undertaken at 35 locations in the AoDM, with 14 locations being junctions on the A303 and the remainder being key junctions on the surrounding local road network. The locations of these turning counts are given in Table 5-4 and shown spatially in Figure 5-9.

11.3.12 Turning count validation has been undertaken for the three neutral month time periods and for the summer time period. A summary of the turning count performance is given in Table 11-7 for the neutral month time periods. This summary is the percentage of each of the possible turning movements across the 35 junctions that meet the specified criteria. Cells shaded green are those where the performance either meets or exceeds the acceptability guidance of 85% of movements or more meeting the criteria.

11.3.13 Flow criteria performance are not provided for LGV or HGV movements, as the low volume of trips making these movements means that the comparison is misleading, as almost all would show as being within 100 vehicles difference from the observed.

11.3.14 GEH criterion performance has been provided for all vehicle types as well as for total vehicles. It is noted that WebTAG Unit M3.1 §3.2.9 states that comparisons should be presented for cars and all vehicles but not for LGVs or OGVs unless sufficiently accurate counts have been obtained. The turning counts are the average across two days, but are still derived from MCTC surveys, so will have a lower confidence associated with them: the LGV and HGV data are therefore presented for information only.

11.3.15 Turning count performance has been categorised to provide disaggregation as follows:

a. total across all movements where observed data are available;

b. movements from either SRN or non-SRN links; and

c. turning counts at either A303 junctions or non-A303 junctions, regardless of whether or not the movement is from the SRN arm (A303) or from the minor non-SRN arms.

Neutral month time periods

11.3.16 Table 11-7 demonstrates that, in all time periods, turning movements used for independent validation meet either the GEH and flow criterion acceptability guidance for all vehicle types and for total vehicles.

11.3.17 In all cases, the performance of the SRN junctions exceeds that of the local junctions, showing that the turning movements along the A303 corridor between the A338 and the A36 are generally well represented.

Summer time period

11.3.18 Table 11-8 shows the performance of the summer month turning counts after the estimation process. The results generally show a good level of model performance, with 89% of total turning flows passing one or other validation criteria. Validation of turning movements at the A303 junctions is good, with 87% of total vehicle flows passing one or other criteria (or 86% for car only flows).

Table 11-7: Summary of neutral month time period turning count validation

Time Period	Vehicle Type	GEH <5					Flow criterion					Either				
		Total	SRN Link	Non-SRN Link	A303 Jct	Local Jct	Total	SRN	Non-SRN	A303 Jct	Local Jct	Total	SRN	Non-SRN	A303 Jct	Local Jct
AM	Car	88%	90%	88%	92%	87%	99%	100%	98%	100%	98%	99%	100%	93%	100%	92%
	LGV	100%	100%	100%	100%	99%										
	HGV	99%	100%	99%	100%	99%										
	TOTAL	87%	88%	87%	91%	86%	98%	100%	98%	100%	97%	98%	100%	92%	100%	91%
IP	Car	91%	96%	90%	97%	89%	100%	100%	100%	100%	99%	100%	100%	100%	100%	99%
	LGV	100%	99%	100%	99%	100%										
	HGV	99%	99%	100%	99%	99%										
	TOTAL	90%	96%	89%	97%	87%	99%	100%	99%	100%	98%	98%	100%	99%	100%	98%
PM	Car	87%	96%	84%	95%	82%	97%	100%	96%	100%	95%	97%	100%	96%	100%	95%
	LGV	100%	100%	100%	100%	99%										
	HGV	100%	100%	100%	100%	99%										
	TOTAL	83%	94%	80%	94%	78%	96%	99%	96%	99%	95%	97%	100%	96%	100%	95%

Note: Flow criterion results not provided for LGV or HGV due to low absolute number of trips making turning movements

Table 11-8: Summary of summer month time period turning count validation

Time Period	Vehicle Type	GEH <5			Flow criterion			Either		
		Total	A303 Jct	Local Jct	Total	A303 Jct	Local Jct	Total	A303 Jct	Local Jct
Summer	Car	89%	86%	90%	72%	76%	69%	89%	86%	90%
	LGV	99%	97%	100%						
	HGV	85%	76%	91%						
	TOTAL	72%	78%	68%	89%	86%	90%	89%	87%	90%

11.4 Journey time validation

11.4.1 Journey time validation has been undertaken against 13 separate routes in the AoDM, updated with recent 2017 observed travel time data from Trafficmaster, as noted in chapter 5.

11.4.2 Further to these 13 routes, there are a number of journey time routes throughout the Fully Modelled Area in SWRTM. These, as previously noted, are derived from 2015 Trafficmaster data. As with the calibration and validation comparisons, the journey time performance is first compared against SWRTM performance to determine the impact of the local updates on the wider model, and secondly with a more detailed route comparison in the AoDM.

Comparison with SWRTM

11.4.3 Journey times in the three neutral time periods have been compared with those from SWRTM, to assess the impact of the local area refinements on the performance of the wider model.

11.4.4 The percentage of routes meeting the validation criteria are given in Table 11-9. The criteria defined as 'Near' is a RTM measure, where travel times exceed the 15% difference stated in WebTAG, but are within 25% of observed times.

Table 11-9: Comparison of journey time validation performance

Time Period	Journey Time Element	SWRTM DF3.0			'A303 Stonehenge SWRTM (DCO)' Model		
		Pass	Near	Fail	Pass	Near	Fail
AM average hour	Full Routes	93%	7%	0%	94%	6%	0%
	Groups	81%	11%	8%	82%	11%	7%
IP average hour	Full Routes	97%	3%	0%	97%	3%	0%
	Groups	86%	10%	4%	87%	9%	4%
PM average hour	Full Routes	97%	2%	1%	97%	2%	1%
	Groups	82%	10%	8%	82%	9%	8%

Note: Figures may not sum to 100% in all cases due to rounding

11.4.5 As the comparison demonstrates, journey time validation between SWRTM DF3.0 and the 'A303 Stonehenge SWRTM (DCO)' model across the Fully Modelled Area is almost identical, with differences of – at most – 1% noted.

11.4.6 The similarity of these results suggests that the impact of the local area refinement has not materially changed the representation of travel times throughout the Fully Modelled Area.

Local and strategic route validation (2017 Trafficmaster data)

11.4.7 Journey time validation for the 2017 Trafficmaster data has been undertaken for all three neutral month time periods and for the summer time period. In both cases, journey time validation is against median observed travel times, as is the case with SWRTM, and reflecting the average hour nature of the models.

11.4.8 In the neutral month time periods, an additional route – Route 13 – representing the B3083 is shown in the comparisons. This route, as noted in chapter 5, was derived from MCO surveys due to a lack of Trafficmaster data for the route. This survey was not undertaken in the summer and so no validation can be presented.

11.4.9 The spatial coverage of the routes is given in Figure 5-12. Table 11-11 to Table 11-13 provide the detailed validation statistics for the three neutral month time periods, whilst Table 11-14 provides the same information for the summer time period. A summary of journey time validation across all routes is given in Table 11-10.

Table 11-10: Summary of route and segment validation

Journey Time Element	AM	IP	PM	Summer 10:00-19:00
No. Routes	24	24	24	23
No. Routes <15%	24	24	23	23
% Route validation	100%	100%	96%	100%
No. Segments	68	68	68	67
No. Segments <15%	67	67	61	65
% Segment validation	99%	99%	90%	97%

11.4.10 As the tables demonstrate, the journey time validation exceeds the WebTAG criteria of 15% in almost all cases, exceeding the 85% acceptability guideline suggested.

11.4.11 In the AM, IP and summer time periods all journey time routes have modelled times within 15% of observed. In the PM only one route – Route 1 (London to Exeter via the M4 / M5), eastbound – fails to meet the criteria and just exceeds the 15% criteria. This is due to the segment between the M25 Junction 13 and the M4 Junction 13 (Chieveley, A34) being too slow – the majority of which is outside of the RoF for SWRTM and is in the external buffer network. The segments within the simulation network tend to perform within the 15% criteria.

11.4.12 In all time periods, the only segments which fail to meet the criteria are those on the longer London to Exeter routes that are located in the buffer network. The exception to this is in the AM, where Route 1 (London to Exeter via the M4 / M5) segment 2 (M4 Junction 13, Chieveley to M4 Junction 18, Bath) is just outside the criteria, with modelled flows too slow by 15.6%.

11.4.13 Focussing on the A303, the neutral month time periods are all slightly too slow, with segments on Route 11 (A303 between A34 and Podimore roundabout) being slower than observed times by between 5% and 11%. In the summer, the same route has modelled times that are quicker than observed in the westbound direction by 4% and slower in the eastbound direction by 5%.

11.4.14 Overall, the model represents observed travel times in the AoDM and on key strategic corridors of importance to the A303 Amesbury to Berwick Down scheme well, and should provide a sound base from which to assess the travel time related impacts of the Scheme.

Table 11-11: Journey time route and segment summary, neutral month average AM hour

Route	Section	Description	Direction	Travel Time (hh:mm:ss)			Direction	Travel Time (hh:mm:ss)		
				Obs	Model	% Diff		Obs	Model	% Diff
1		via M4/M5		02:27:56	02:42:41	10%		02:31:46	02:47:45	11%
	1	M25 J13 to M4 J13		*00:40:01*	*00:41:51*	*5%*		*00:41:34*	*00:42:54*	*3%*
	2	M4 J13 to M4 J18	Westbound	*00:37:23*	*00:43:03*	*15%*	Eastbound	*00:38:18*	*00:43:31*	*14%*
	3	M4 J18 to M5 J22		*00:34:47*	*00:37:20*	*7%*		*00:36:04*	*00:41:10*	*14%*
	4	M5 J22 to M5 J29		*00:35:45*	*00:40:15*	*13%*		*00:35:50*	*00:40:09*	*12%*
2		via A303		02:24:23	02:35:56	8%		02:27:40	02:36:39	6%
	1	M25 J13 to M3 J6		*00:31:25*	*00:32:55*	*5%*		*00:31:04*	*00:31:08*	*0%*
	2	M3 J6 to A303/A36 Wylye	Westbound	*00:38:48*	*00:41:36*	*7%*	Eastbound	*00:39:51*	*00:43:48*	*10%*
	3	A303/A36 Wylye to A303 South Petherton		*00:37:17*	*00:41:01*	*10%*		*00:39:05*	*00:42:01*	*8%*
	4	A303 South Petherton to M5 J29		*00:36:34*	*00:40:21*	*10%*		*00:37:40*	*00:39:41*	*5%*
3		via A30		03:19:41	03:19:23	0%		03:15:44	03:18:54	2%
	1	M25 J13 to M3/M25		*00:04:02*	*00:04:17*	*6%*		*00:02:53*	*00:03:04*	*6%*
	2	M3/M25 to A360/A303		*00:38:41*	*00:41:08*	*6%*		*00:40:22*	*00:41:31*	*3%*
	3	A360/A303 to A30/A36 Wilton	Westbound	*00:37:16*	*00:38:15*	*3%*	Eastbound	*00:36:21*	*00:38:42*	*6%*
	4	A30/A36 Wilton to A30 Stour Hill		*00:34:39*	*00:34:07*	*-2%*		*00:35:36*	*00:34:54*	*-2%*
	5	A30 Stour Hill to A30 East Chinnock		*00:35:11*	*00:33:00*	*-6%*		*00:31:49*	*00:33:01*	*4%*
	6	A30 East Chinnock to A30/A303		*00:31:27*	*00:28:40*	*-9%*		*00:30:38*	*00:28:31*	*-7%*
	7	A30/A303 to M5 J29		*00:18:25*	*00:19:52*	*8%*		*00:18:05*	*00:19:07*	*6%*
4		via M3/A35		02:52:18	03:03:38	7%		02:56:57	03:05:15	5%
	1	M25 J13 to M3 J3		*00:13:29*	*00:14:27*	*7%*		*00:12:26*	*00:12:18*	*-1%*
	2	M3 J3 to M3 J11		*00:33:26*	*00:36:00*	*8%*		*00:35:11*	*00:36:58*	*5%*
	3	M3 J11 to A31/A348 Ferndown	Westbound	*00:28:36*	*00:31:55*	*12%*	Eastbound	*00:32:54*	*00:35:40*	*8%*
	4	A31/A348 Ferndown to A35/A354		*00:29:17*	*00:30:33*	*4%*		*00:28:38*	*00:30:47*	*8%*
	5	A35/A354 to A35 Bothenhampton		*00:26:17*	*00:25:31*	*-3%*		*00:26:15*	*00:25:51*	*-2%*
	6	A35 Bothenhampton to A30/A35		*00:29:20*	*00:31:47*	*8%*		*00:29:39*	*00:31:15*	*5%*
	7	A30/A35 to M5 J29		*00:11:53*	*00:13:23*	*13%*		*00:11:54*	*00:12:24*	*4%*
5		A36/A350	Westbound	00:31:46	00:31:53	0%	Eastbound	00:33:23	00:33:08	-1%
6		The Packway	Westbound	00:25:07	00:24:35	-2%	Eastbound	00:24:17	00:24:51	2%
7		A342	Westbound	00:34:16	00:34:27	1%	Eastbound	00:35:14	00:36:12	3%
8		A360	Northbound	00:36:36	00:36:56	1%	Southbound	00:36:34	00:37:44	3%

Route	Section	Description	Direction	Travel Time (hh:mm:ss)			Direction	Travel Time (hh:mm:ss)		
				Obs	Model	% Diff		Obs	Model	% Diff
9		A345	Northbound	00:25:29	00:26:52	5%	Southbound	00:26:05	00:27:44	6%
10		A338	Northbound	00:22:48	00:23:58	5%	Southbound	00:22:49	00:24:54	9%
11		via A303	Westbound	01:02:58	01:07:00	6%	Eastbound	01:04:34	01:09:27	8%
	1	A34 to A36 Wylye		*00:28:12*	*00:29:57*	*6%*		*00:29:05*	*00:31:46*	*9%*
	2	A36 Wylye to A303 Martock		*00:34:46*	*00:37:02*	*7%*		*00:35:29*	*00:37:41*	*6%*
12		via A30	Westbound	01:42:31	01:40:31	-2%	Eastbound	01:38:43	01:41:35	3%
	1	A303/A34 to Salisbury		*00:32:37*	*00:31:49*	*-2%*		*00:31:16*	*00:32:02*	*2%*
	2	Salisbury to B3092 East Stour		*00:36:29*	*00:38:00*	*4%*		*00:37:34*	*00:38:57*	*4%*
	3	B3092 East Stour to Yeovil		*00:33:25*	*00:30:41*	*-8%*		*00:29:53*	*00:30:35*	*2%*
13		B3083	Southbound	00:14:35	00:15:01	3%	Northbound	00:14:17	00:15:09	6%

Table 11-12: Journey time route and segment summary, neutral month average IP hour

Route	Section	Description	Direction	Travel Time (hh:mm:ss)			Direction	Travel Time (hh:mm:ss)		
				Obs	Model	% Diff		Obs	Model	% Diff
1		via M4/M5		02:25:14	02:41:28	11%		02:24:48	02:40:45	11%
	1	M25 J13 to M4 J13		*00:37:23*	*00:40:29*	*8%*		*00:37:18*	*00:40:23*	*8%*
	2	M4 J13 to M4 J18	Westbound	*00:38:05*	*00:43:11*	*13%*	Eastbound	*00:37:22*	*00:42:28*	*14%*
	3	M4 J18 to M5 J22		*00:34:01*	*00:37:30*	*10%*		*00:34:12*	*00:37:43*	*10%*
	4	M5 J22 to M5 J29		*00:35:45*	*00:40:05*	*12%*		*00:35:56*	*00:40:09*	*12%*
2		via A303		02:25:04	02:36:29	8%		02:24:53	02:33:42	6%
	1	M25 J13 to M3 J6		*00:29:50*	*00:31:58*	*7%*		*00:29:16*	*00:30:03*	*3%*
	2	M3 J6 to A303/A36 Wylye	Westbound	*00:39:22*	*00:42:04*	*7%*	Eastbound	*00:38:35*	*00:41:34*	*8%*
	3	A303/A36 Wylye to A303 South Petherton		*00:38:11*	*00:42:06*	*10%*		*00:38:56*	*00:41:44*	*7%*
	4	A303 South Petherton to M5 J29		*00:37:23*	*00:40:19*	*8%*		*00:38:06*	*00:40:20*	*6%*
3		via A30		03:20:44	03:17:16	-2%		03:14:07	03:14:45	0%
	1	M25 J13 to M3/M25		*00:02:31*	*00:03:28*	*38%*		*00:02:46*	*00:03:06*	*12%*
	2	M3/M25 to A360/A303		*00:38:41*	*00:40:57*	*6%*		*00:38:02*	*00:39:45*	*5%*
	3	A360/A303 to A30/A36 Wilton	Westbound	*00:36:47*	*00:38:04*	*3%*	Eastbound	*00:35:49*	*00:37:22*	*4%*
	4	A30/A36 Wilton to A30 Stour Hill		*00:35:22*	*00:34:04*	*-4%*		*00:35:46*	*00:34:17*	*-4%*
	5	A30 Stour Hill to A30 East Chinnock		*00:36:49*	*00:32:33*	*-12%*		*00:32:30*	*00:32:29*	*0%*
	6	A30 East Chinnock to A30/A303		*00:31:55*	*00:28:21*	*-11%*		*00:30:59*	*00:28:20*	*-9%*
	7	A30/A303 to M5 J29		*00:18:39*	*00:19:47*	*6%*		*00:18:15*	*00:19:23*	*6%*
4		via M3/A35		02:52:40	03:01:22	5%		02:49:41	02:55:43	4%
	1	M25 J13 to M3 J3		*00:11:54*	*00:13:32*	*14%*		*00:11:25*	*00:12:06*	*6%*
	2	M3 J3 to M3 J11		*00:33:44*	*00:35:43*	*6%*		*00:33:12*	*00:34:57*	*5%*
	3	M3 J11 to A31/A348 Ferndown	Westbound	*00:28:33*	*00:31:48*	*11%*	Eastbound	*00:27:51*	*00:30:08*	*8%*
	4	A31/A348 Ferndown to A35/A354		*00:28:47*	*00:29:43*	*3%*		*00:28:14*	*00:29:11*	*3%*
	5	A35/A354 to A35 Bothenhampton		*00:26:47*	*00:25:26*	*-5%*		*00:26:27*	*00:25:22*	*-4%*
	6	A35 Bothenhampton to A30/A35		*00:30:59*	*00:31:53*	*3%*		*00:30:44*	*00:31:30*	*2%*
	7	A30/A35 to M5 J29		*00:11:56*	*00:13:14*	*11%*		*00:11:48*	*00:12:26*	*5%*
5		A36/A350	Westbound	00:32:13	00:32:01	-1%	Eastbound	00:32:34	00:32:02	-2%
6		The Packway	Westbound	00:23:46	00:24:29	3%	Eastbound	00:23:27	00:24:19	4%
7		A342	Westbound	00:34:19	00:34:24	0%	Eastbound	00:34:11	00:34:45	2%
8		A360	Northbound	00:36:14	00:35:58	-1%	Southbound	00:35:51	00:36:18	1%

Route	Section	Description	Direction	Travel Time (hh:mm:ss)			Direction	Travel Time (hh:mm:ss)		
				Obs	Model	% Diff		Obs	Model	% Diff
9		A345	Northbound	00:24:51	00:26:20	6%	Southbound	00:25:11	00:27:04	7%
10		A338	Northbound	00:22:40	00:23:18	3%	Southbound	00:22:32	00:24:05	7%
11		via A303	Westbound	01:04:04	01:08:20	7%	Eastbound	01:03:47	01:07:36	6%
	1	A34 to A36 Wylye		*00:28:35*	*00:30:21*	*6%*		*00:28:17*	*00:30:09*	*7%*
	2	A36 Wylye to A303 Martock		*00:35:29*	*00:37:59*	*7%*		*00:35:30*	*00:37:26*	*5%*
12		via A30	Westbound	01:44:30	01:39:49	-4%	Eastbound	01:39:18	01:39:09	0%
	1	A303/A34 to Salisbury		*00:31:54*	*00:31:26*	*-1%*		*00:31:13*	*00:30:57*	*-1%*
	2	Salisbury to B3092 East Stour		*00:37:28*	*00:38:08*	*2%*		*00:37:15*	*00:38:07*	*2%*
	3	B3092 East Stour to Yeovil		*00:35:08*	*00:30:14*	*-14%*		*00:30:50*	*00:30:05*	*-2%*
13		B3083	Southbound	00:14:28	00:14:58	3%	Northbound	00:14:31	00:14:56	3%

Table 11-13: Journey time route and segment summary, neutral month average PM hour

Route	Section	Description	Direction	Travel Time (hh:mm:ss)			Direction	Travel Time (hh:mm:ss)		
				Obs	Model	% Diff		Obs	Model	% Diff
1		via M4/M5	Westbound	02:37:25	02:57:10	13%	Eastbound	02:26:46	02:49:15	15%
	1	M25 J13 to M4 J13		*00:48:00*	*00:54:50*	*14%*		*00:40:15*	*00:48:58*	*22%*
	2	M4 J13 to M4 J18		*00:38:30*	*00:43:32*	*13%*		*00:37:20*	*00:42:28*	*14%*
	3	M4 J18 to M5 J22		*00:35:30*	*00:38:26*	*8%*		*00:34:22*	*00:37:43*	*10%*
	4	M5 J22 to M5 J29		*00:35:25*	*00:40:09*	*13%*		*00:34:49*	*00:40:05*	*15%*
2		via A303	Westbound	02:26:42	02:42:44	11%	Eastbound	02:22:48	02:36:04	9%
	1	M25 J13 to M3 J6		*00:33:16*	*00:37:12*	*12%*		*00:29:24*	*00:33:56*	*15%*
	2	M3 J6 to A303/A36 Wylye		*00:38:45*	*00:43:13*	*12%*		*00:38:01*	*00:41:23*	*9%*
	3	A303/A36 Wylye to A303 South Petherton		*00:37:33*	*00:42:16*	*13%*		*00:38:19*	*00:40:54*	*7%*
	4	A303 South Petherton to M5 J29		*00:36:49*	*00:40:01*	*9%*		*00:37:04*	*00:39:48*	*7%*
3		via A30	Westbound	03:18:32	03:25:31	4%	Eastbound	03:10:48	03:23:07	6%
	1	M25 J13 to M3/M25		*00:05:23*	*00:08:07*	*51%*		*00:02:52*	*00:07:06*	*148%*
	2	M3/M25 to A360/A303		*00:39:13*	*00:42:05*	*7%*		*00:38:01*	*00:39:40*	*4%*
	3	A360/A303 to A30/A36 Wilton		*00:36:55*	*00:39:29*	*7%*		*00:35:33*	*00:37:41*	*6%*
	4	A30/A36 Wilton to A30 Stour Hill		*00:34:56*	*00:34:25*	*-1%*		*00:34:18*	*00:34:17*	*0%*
	5	A30 Stour Hill to A30 East Chinnock		*00:32:49*	*00:32:59*	*1%*		*00:32:01*	*00:36:28*	*14%*
	6	A30 East Chinnock to A30/A303		*00:30:56*	*00:28:35*	*-8%*		*00:30:17*	*00:28:37*	*-6%*
	7	A30/A303 to M5 J29		*00:18:20*	*00:19:48*	*8%*		*00:17:46*	*00:19:15*	*8%*
4		via M3/A35	Westbound	02:58:06	03:12:11	8%	Eastbound	02:46:37	02:59:37	8%
	1	M25 J13 to M3 J3		*00:15:04*	*00:18:16*	*21%*		*00:11:29*	*00:16:00*	*39%*
	2	M3 J3 to M3 J11		*00:34:33*	*00:37:24*	*8%*		*00:33:04*	*00:34:56*	*6%*
	3	M3 J11 to A31/A348 Ferndown		*00:32:26*	*00:36:39*	*13%*		*00:27:40*	*00:30:45*	*11%*
	4	A31/A348 Ferndown to A35/A354		*00:28:36*	*00:29:40*	*4%*		*00:27:53*	*00:29:04*	*4%*
	5	A35/A354 to A35 Bothenhampton		*00:26:10*	*00:25:39*	*-2%*		*00:25:42*	*00:25:05*	*-2%*
	6	A35 Bothenhampton to A30/A35		*00:29:35*	*00:31:10*	*5%*		*00:29:20*	*00:31:14*	*6%*
	7	A30/A35 to M5 J29		*00:11:42*	*00:13:19*	*14%*		*00:11:29*	*00:12:29*	*9%*
5		A36/A350	Westbound	00:31:16	00:32:23	4%	Eastbound	00:31:23	00:31:48	1%
6		The Packway	Westbound	00:23:27	00:25:01	7%	Eastbound	00:23:39	00:24:32	4%
7		A342	Westbound	00:34:43	00:35:05	1%	Eastbound	00:34:04	00:35:05	3%
8		A360	Northbound	00:35:54	00:36:54	3%	Southbound	00:35:48	00:37:18	4%

Route	Section	Description	Direction	Travel Time (hh:mm:ss)			Direction	Travel Time (hh:mm:ss)		
				Obs	Model	% Diff		Obs	Model	% Diff
9		A345	Northbound	00:25:15	00:27:41	10%	Southbound	00:25:04	00:27:48	11%
10		A338	Northbound	00:22:54	00:23:59	5%	Southbound	00:22:42	00:24:40	9%
11		via A303	Westbound	01:02:55	01:09:12	10%	Eastbound	01:02:54	01:06:40	6%
	1	A34 to A36 Wylye		*00:28:03*	*00:31:06*	*11%*		*00:27:54*	*00:29:59*	*7%*
	2	A36 Wylye to A303 Martock		*00:34:52*	*00:38:05*	*9%*		*00:35:00*	*00:36:41*	*5%*
12		via A30	Westbound	01:40:00	01:41:58	2%	Eastbound	01:36:33	01:43:20	7%
	1	A303/A34 to Salisbury		*00:31:32*	*00:32:00*	*1%*		*00:30:58*	*00:31:16*	*1%*
	2	Salisbury to B3092 East Stour		*00:37:29*	*00:39:19*	*5%*		*00:35:43*	*00:38:06*	*7%*
	3	B3092 East Stour to Yeovil		*00:30:59*	*00:30:37*	*-1%*		*00:29:52*	*00:33:57*	*14%*
13		B3083	Southbound	00:15:14	00:15:01	-1%	Northbound	00:15:00	00:14:51	-1%

Table 11-14: Journey time route and segment summary, summer average 10:00-19:00 hour

Route	Section	Description	Direction	Travel Time (hh:mm:ss)			Direction	Travel Time (hh:mm:ss)		
				Obs	Model	% Diff		Obs	Model	% Diff
1		via M4/M5	Westbound	02:37:26	02:45:12	5%	Eastbound	02:32:27	02:44:10	8%
	1	*M25 J13 to M4 J13*		*00:41:13*	*00:40:44*	*-1%*		*00:38:13*	*00:40:27*	*6%*
	2	*M4 J13 to M4 J18*		*00:39:14*	*00:44:12*	*13%*		*00:38:29*	*00:43:20*	*13%*
	3	*M4 J18 to M5 J22*		*00:39:55*	*00:38:44*	*-3%*		*00:38:11*	*00:38:49*	*2%*
	4	*M5 J22 to M5 J29*		*00:37:04*	*00:41:18*	*11%*		*00:37:34*	*00:41:31*	*11%*
2		via A303	Westbound	02:52:00	02:50:40	-1%	Eastbound	02:35:52	02:45:33	6%
	1	*M25 J13 to M3 J6*		*00:34:59*	*00:32:04*	*-8%*		*00:29:39*	*00:30:16*	*2%*
	2	*M3 J6 to A303/A36 Wylye*		*00:57:29*	*00:52:40*	*-8%*		*00:46:49*	*00:49:42*	*6%*
	3	*A303/A36 Wylye to A303 South Petherton*		*00:40:17*	*00:43:43*	*9%*		*00:40:14*	*00:43:13*	*7%*
	4	*A303 South Petherton to M5 J29*		*00:39:15*	*00:41:58*	*7%*		*00:39:10*	*00:42:06*	*7%*
3		via A30	Westbound	03:23:47	03:21:51	-1%	Eastbound	03:14:04	03:16:38	1%
	1	*M25 J13 to M3/M25*		*00:06:57*	*00:03:28*	*-50%*		*00:02:56*	*00:03:06*	*6%*
	2	*M3/M25 to A360/A303*		*00:39:31*	*00:41:13*	*4%*		*00:38:16*	*00:40:21*	*5%*
	3	*A360/A303 to A30/A36 Wilton*		*00:38:20*	*00:38:42*	*1%*		*00:35:57*	*00:37:51*	*5%*
	4	*A30/A36 Wilton to A30 Stour Hill*		*00:34:42*	*00:34:26*	*-1%*		*00:34:42*	*00:34:09*	*-2%*
	5	*A30 Stour Hill to A30 East Chinnock*		*00:32:24*	*00:35:17*	*9%*		*00:32:12*	*00:32:23*	*1%*
	6	*A30 East Chinnock to A30/A303*		*00:32:59*	*00:28:06*	*-15%*		*00:31:22*	*00:28:20*	*-10%*
	7	*A30/A303 to M5 J29*		*00:18:54*	*00:20:03*	*6%*		*00:18:39*	*00:19:43*	*6%*
4		via M3/A35	Westbound	03:17:50	03:08:44	-5%	Eastbound	02:58:07	03:04:31	4%
	1	*M25 J13 to M3 J3*		*00:16:38*	*00:13:32*	*-19%*		*00:11:47*	*00:12:06*	*3%*
	2	*M3 J3 to M3 J11*		*00:35:15*	*00:35:48*	*2%*		*00:33:28*	*00:35:19*	*6%*
	3	*M3 J11 to A31/A348 Ferndown*		*00:37:18*	*00:32:36*	*-13%*		*00:29:41*	*00:31:38*	*7%*
	4	*A31/A348 Ferndown to A35/A354*		*00:34:25*	*00:32:55*	*-4%*		*00:30:30*	*00:32:38*	*7%*
	5	*A35/A354 to A35 Bothenhampton*		*00:30:28*	*00:26:43*	*-12%*		*00:27:42*	*00:26:51*	*-3%*
	6	*A35 Bothenhampton to A30/A35*		*00:31:56*	*00:33:26*	*5%*		*00:33:08*	*00:33:03*	*0%*
	7	*A30/A35 to M5 J29*		*00:11:50*	*00:13:05*	*11%*		*00:11:51*	*00:12:31*	*6%*
5		A36/A350	Westbound	00:32:33	00:32:00	-2%	Eastbound	00:32:50	00:32:24	-1%
6		The Packway	Westbound	00:24:42	00:25:20	3%	Eastbound	00:23:48	00:25:26	7%
7		A342	Westbound	00:34:48	00:34:26	-1%	Eastbound	00:34:03	00:34:45	2%
8		A360	Northbound	00:35:48	00:35:45	0%	Southbound	00:36:56	00:35:50	-3%

Route	Section	Description	Direction	Travel Time (hh:mm:ss)			Direction	Travel Time (hh:mm:ss)		
				Obs	Model	% Diff		Obs	Model	% Diff
9		A345	Northbound	00:25:53	00:26:12	1%	Southbound	00:26:42	00:27:11	2%
10		A338	Northbound	00:24:01	00:23:12	-3%	Southbound	00:24:03	00:23:46	-1%
11		via A303	Westbound	01:23:23	01:20:09	-4%	Eastbound	01:13:19	01:16:44	5%
	1	*A34 to A36 Wylye*		*00:46:36*	*00:40:36*	*-13%*		*00:36:31*	*00:37:57*	*4%*
	2	*A36 Wylye to A303 Martock*		*00:36:47*	*00:39:31*	*7%*		*00:36:48*	*00:38:46*	*5%*
12		via A30	Westbound	01:40:49	01:43:40	3%	Eastbound	01:38:06	01:39:33	1%
	1	*A303/A34 to Salisbury*		*00:33:10*	*00:31:54*	*-4%*		*00:31:23*	*00:31:10*	*-1%*
	2	*Salisbury to B3092 East Stour*		*00:37:07*	*00:38:36*	*4%*		*00:36:20*	*00:38:19*	*5%*
	3	*B3092 East Stour to Yeovil*		*00:30:32*	*00:32:53*	*8%*		*00:30:23*	*00:29:49*	*-2%*

12 Variable demand modelling

12.1 Introduction

12.1.1 This chapter summarises the results of realism testing undertaken to ascertain the performance of the variable demand model (VDM) given the refined 2017 base year of the 'A303 Stonehenge SWRTM (DCO)' highway assignment model.

12.1.2 Calibration of the VDM was undertaken across all five of the RTMs and the resultant calibration parameter values justified at the total RTM level. The VDM has not therefore been re-calibrated as part of the 'A303 Stonehenge SWRTM (DCO)' model refinement; instead realism testing has been undertaken to determine if any material changes from the SWRTM calibrated model are noted.

12.2 Realism testing

12.2.1 As noted in WebTAG Unit M2 §6, it is important to ensure that the model converges, is realistic and that sufficient sensitivity tests have been undertaken in order to further validate the suitability and to understand the operation of the model before its application.

12.2.2 Realism testing is undertaken to ensure that the VDM behaves realistically, and that changes in components of travel costs and times provide results, in terms of demand response, that are aligned with general experience.

12.2.3 As noted above there was no scope to alter the calibration parameters used in the VDM, as these had been set across all of the RTMs. Therefore, the objective of the realism testing was to ascertain that overall performance of the VDM was not materially altered by the refinements made to the highway assignment model.

12.2.4 For this purpose, standard WebTAG Unit M2 realism tests have been undertaken:

a. car fuel cost elasticity;

b. public transport (main mode) fare elasticity; and

c. car journey time elasticity.

Car fuel cost elasticity

12.2.5 A test to ascertain the percentage change in car vehicle kilometres with respect to a 10% increase in fuel cost has been undertaken, in-line with the test set out in WebTAG Unit M2 and the tests undertaken in the development of the RTM VDMs.

12.2.6 Table 12-1 sets out the elasticities achieved by car purpose, and for total car trips. The values achieved in SWRTM are also given.

Table 12-1: Fuel cost elasticities

Purpose	WebTAG expectation	AM	IP	PM	12H	SWRTM Result
Car Business	-0.10	-0.21	-0.23	-0.21	-0.22	-0.22
Car Commute	-0.25	-0.16	-0.21	-0.18	-0.18	-0.19
Car Other	-0.40	-0.53	-0.53	-0.49	-0.52	-0.54
Total Car	**-0.25 to -0.35**	**-0.31**	**-0.42**	**-0.32**	**-0.36**	**-0.37**

12.2.7 As the table demonstrates, the overall car elasticity of -0.36 at the all-day level is just outside of the WebTAG ranges, indicating a strong elasticity. The sensitivity parameters of the RTMs were derived in part from the parameters statistically estimated to represent the distribution of highway trips. These were applied to all five RTMs and demonstrated, across England as a whole to be consistent with the WebTAG elasticity guidelines, which were also established from national data. There was however variation between the RTMs with a relatively high sensitivity for SWRTM (and low for the North of England) reflecting more local travel characteristics. The test here demonstrates that the local adjustments have not significantly affected the sensitivity of this local version of the SWRTM and the compliance with WebTAG at the national level summarised here is more fully explained in the SWRTM Model Validation Report.

12.2.8 By purpose, the car business and discretionary travel elasticities are stronger than the WebTAG Unit M2 expectations, whilst car commute is weaker. The values achieved are, however, in-line with those achieved in the development of SWRTM.

Public transport (rail) fare elasticity

12.2.9 Public transport (PT) in the VDM is represented solely by the rail mode. The test undertaken therefore is to assess the percentage change in rail trips with respect to a 10% increase in rail fares.

12.2.10 Table 12-2 sets out the elasticities achieved by time period, comparing to the values documented from the SWRTM development.

Table 12-2: PT (rail) fare elasticities

Purpose	WebTAG expectation	AM	IP	PM	All Day	SWRTM Result
Total PT (Rail)	**-0.20 to -0.90**	**-0.34**	**-0.52**	**-0.38**	**-0.42**	**-0.46**

12.2.11 It can be seen that the fare elasticity lies in the expected range set out in WebTAG Unit M2. The result attained at an all-day level is very close to that from the original SWRTM VDM calibration.

Car journey time elasticity

12.2.12 Car journey time elasticity (the change in car trips with respect to the change in journey time) has been calculated from the VOC elasticity, following the formula set out in WebTAG. Table 12-3 sets out the results of this calculation.

Table 12-3: Car journey time elasticities

Purpose	WebTAG expectation	AM	IP	PM	12H
Car Business	No stronger than -2.0	-0.44	-0.46	-0.44	-0.45
Car Commute		-0.62	-0.73	-0.68	-0.68
Car Other		-1.34	-1.33	-1.32	-1.33

12.2.13 The values achieved are within the recommended range noted in WebTAG Unit M2. A value for SWRTM is not documented in the SWRTM MVR.

Demand / supply GAP achieved

12.2.14 Table 12-4 sets out the demand / supply GAP values achieved during realism testing. The criteria for these are specified in section 3.5. The values achieved in realism testing of SWRTM are also given.

12.2.15 The GAP values achieved are within the criteria previously specified, with whole model GAP of 0.1% or less and sub-area GAPs of less than 0.2% achieved. The GAP values achieved in SWRTM are smaller, although the 'A303 Stonehenge SWRTM (DCO)' model converged to these criteria in fewer loops.

Table 12-4: Demand / Supply GAP values achieved

Test	SWRTM			'A303 Stonehenge SWRTM (DCO)' model		
	Whole model GAP	Sub-Area GAP	No. Loops	Whole model GAP	Sub-Area GAP	No. Loops
Fuel Cost Realism Test	0.05%	0.13%	7	0.10%	0.19%	5
Rail Fare Realism Test	0.05%	0.13%	7	0.08%	0.19%	3

Summary

12.2.16 Overall, the refinement of the 'A303 Stonehenge SWRTM (DCO)' model has been demonstrated to have made no material change to the satisfactory sensitivity of the VDM, with realism testing providing similar elasticities and convergence being within the desired criteria.

13 Operational model development

13.1 Introduction

13.1.1 The purpose of operational microsimulation and junction modelling is to assess in detail the operational impacts on the network of the Scheme during normal operation, during tunnel incidents/maintenance periods and during construction phases.

13.1.2 The operational models will provide detailed operational information to inform the design, verification and optimisation of the scheme design.

13.1.3 A number of models were developed for this purpose: neutral month AM peak, interpeak (IP) and PM peak and summer peak microsimulation models were developed to assess the scheme operation. This section of the report details the base models' build, calibration and validation using VISSIM.

13.1.4 VISSIM is a microscopic, behaviour based simulation model developed to model traffic and public transport operations. The program can analyse traffic and transport operations under constraints such as lane configuration, traffic composition, traffic signals, public transport stops etc., thus making it a useful tool for the appraisal of transport schemes. The outputs can be presented using the inbuilt visualisation tools.

13.1.5 This chapter of the Transport Model Package (TMP) details the process undertaken to construct the VISSIM 2017 base models for the neutral and summer periods. It discusses model specification, describes the calibration and validation processes and outputs, and explains the model performance.

Standards, guidance and reference documents

13.1.6 Chapter 3 introduced the standards and guidance applicable for the model development, in addition, the following reference documents were drawn on for the operational modelling:

a. VISSIM 8 User Manual; and

b. Guidelines for the Use of Microsimulation Software, Highways Agency (IAN 36/01).

13.2 Site visits

13.2.1 Two site visits were undertaken during July and August 2017 to inform the development of the summer 2017 base year A303 microsimulation model, and a further site visit was undertaken in October 2017 to inform the neutral month model.

13.2.2 The first site visit was undertaken on Friday 28 July 2017 and was to observe the operation of the highway network, traffic behaviour and inform the specification of traffic surveys required to develop the operational traffic models.

13.2.3 The second site visit was undertaken on Friday 18 August 2017, during the summer survey programme, to observe the operation of the highway network, confirm traffic behaviour and verify surveyor comments and information to allow the outturn traffic survey data to be interpreted correctly.

13.2.4 General comments and observations from the summer site visits are provided below:

a. eastbound congestion was observed on the mainline A303 where two lanes merge to one, to the west of Winterbourne Stoke;

b. eastbound queues along the A303 through Winterbourne Stoke, Longbarrow Roundabout and Stonehenge, whilst traffic returned to free-flow conditions once past Stonehenge;

c. the eastbound congestion through Longbarrow Roundabout leads to standstill vehicles on the roundabout and blocking of the A360 southbound entry, although southbound vehicles were observed weaving through this eastbound queue. The majority of vehicles use the nearside lane on exit for the A303 eastbound;

d. 'rubbernecking' was observed on the stretch of carriageway passing Stonehenge as drivers viewed the stones. Vehicles were observed going extremely slow past the stones with large headway to the vehicle in front. (see 13.6.32);

e. temporary one way traffic signals were observed in Durrington between Meads Road and Philip Road;

f. The Packway was closed to all vehicles in both directions;

g. Fargo Road appeared to be used as an alternative route to The Packway, with apparently little regard for the 'Military personnel only' signage. A large queue was observed on Fargo Road into the junction with Countess Road;

h. some significant gradients observed within the network;

i. heavy westbound traffic was observed on The Packway making it difficult to exit minor side roads, and in the afternoon queues were observed into the junction with the B3086; and

j. heavy westbound queueing on the A303 led to Google navigation directing vehicles via the M4 rather than A303.

13.2.5 The neutral month site visit was undertaken on 3 October 2017, during the neutral month survey programme. General comments and observations from the neutral month site visit are provided below:

a. the AM peak and interpeak (IP) periods were observed;

b. no obvious congestion was observed on the network, in either direction;

c. temporary one way traffic signals were in place in Durrington between Meads Road and Philip Road, blocking the access to and from Meads Road; and

d. Fargo Road appeared to be used as an alternative route as The Packway was closed.

13.3 Model specification

13.3.1 The summary of the specification of the base year VISSIM model is provided in Table 13-1 below. An explanation for these is included in the following sections.

Table 13-1 – A303 and Local VISSIM model specification

Base Year			2017
Summer	**Simulation Day**		Friday
	Simulation Period		12:00 to 18:00
	Warm Up and Cool Down Periods		A303 - 11:00 to 12:00 & 18:00 to 18:30
			Local - 11:30 to 12:00 & 18:00 to 18:30
Neutral	**Simulation Day**		Wednesday
	Simulation Period	**AM**	07:30 to 08:30
		IP	Average hour between 10:00 to 16:00
		PM	17:00 to 18:00
	Warm Up and Cool Down Periods	**AM**	06:00 to 07:30 & 08:30 to 09:00
		IP	1 hour warm-up & 30 minute cool down
		PM	15:30 to 17:00 & 18:00 to 18:30
Simulation Resolution			Set to 10
VISSIM Version			8.00-13

13.4 Time period selection

Summer model

13.4.1 Existing ANPR data collected during the PCF Stage 1 work was analysed to establish average journey times in each direction on the A303 on a Friday, Saturday and Sunday in August 2014. Table 13-2 below indicates eastbound and westbound journey times between Winterbourne Stoke and the A303 east of the A3028 and suggests that westbound journey times are highest on a Saturday and lowest on the following Sunday. Westbound peak journey times on a Friday are between 1 hour and 1 hour 15 minutes.

Table 13-2: 2014 ANPR: peak summer journey times along A303

Direction	Friday	Saturday	Sunday
Eastbound*	0h15 - 0h30	0h10 - 0h25	0h15 - 0h30
Westbound	1h00 - 1h15	1h15 - 1h30	0h35 - 0h50

** eastbound ANPR site located at Winterbourne Stoke did not capture full extent of delays in the eastbound direction i.e. between the A36 and Winterbourne Stoke.*

13.4.2 ATC data from the A303 south of the junction with the A36 and collected in August 2017 has also been analysed further to understand eastbound traffic volumes during a summer Friday to Sunday. Figure 13-1 below indicates similar traffic volumes, of between 1100 and 1200 vehicles per hour, on each of the corresponding days.

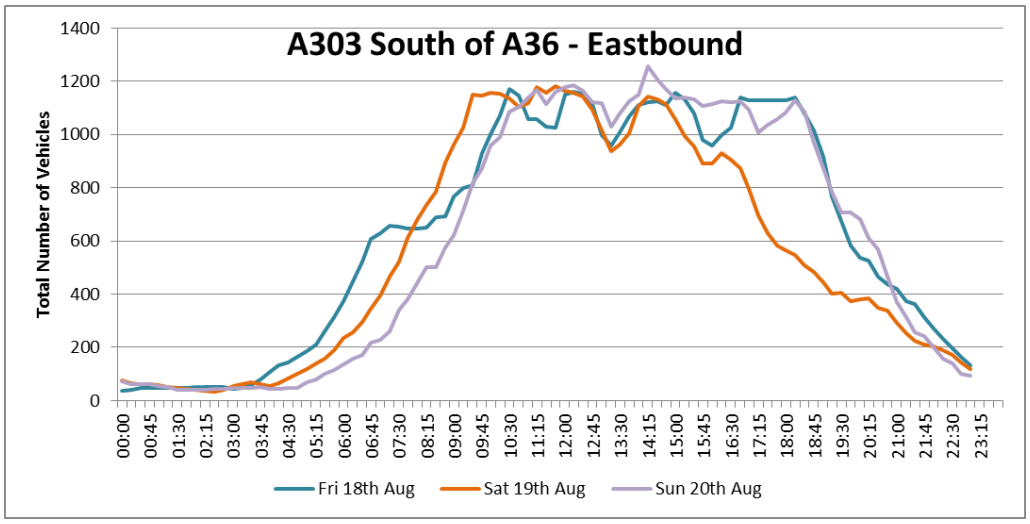


Figure 13-1: A303 eastbound traffic volumes, south of A36; 2017 data

13.4.3 Based on analysis of existing journey time data and traffic flows as shown above, a Friday was selected as the most suitable peak period that replicates the known issues along the A303. This provides a representation of higher local traffic flows on the A303 and therefore provides for a stronger test of the operational performance of junctions than other time periods (for which an assessment of other weekend days would add limited value). While the peak delays on Saturdays were longest in this data set, delays on Fridays were also observed to be high.

13.4.4 The model periods of the A303 and Local Road network models are:

a. the A303 mainline model runs from 11:00 to 18:30, this period includes an hour warm up and 30 minute cool down period. The core modelled period is six hours between 12:00-18:00; and

b. the Local Road model runs from 11:30 to 18:30, with a 30 minute warm up and 30 minute cool down period. The core modelled period is six hours between 12:00-18:00.

13.4.5 The warm up period is sufficient for vehicles fully to traverse the modelled network, and allow the software to populate the model network for the busy but not severely congested conditions observed at the start of the modelled period.

Neutral month model

13.4.6 Analysis was undertaken on the ATC and ANPR journey time data across the Tuesday 3, Wednesday 4 and Thursday 5 October 2017 survey dates to identify the neutral month peak hours for the AM, IP and PM models.

13.4.7 Figure 13-2 and Figure 13-3 below present the A303 hourly traffic volumes from ATC surveys at the western (Site C1 – A303 NE of the A36) and eastern (Site C17 - A303 West of Amesbury Road) extents of the study area.

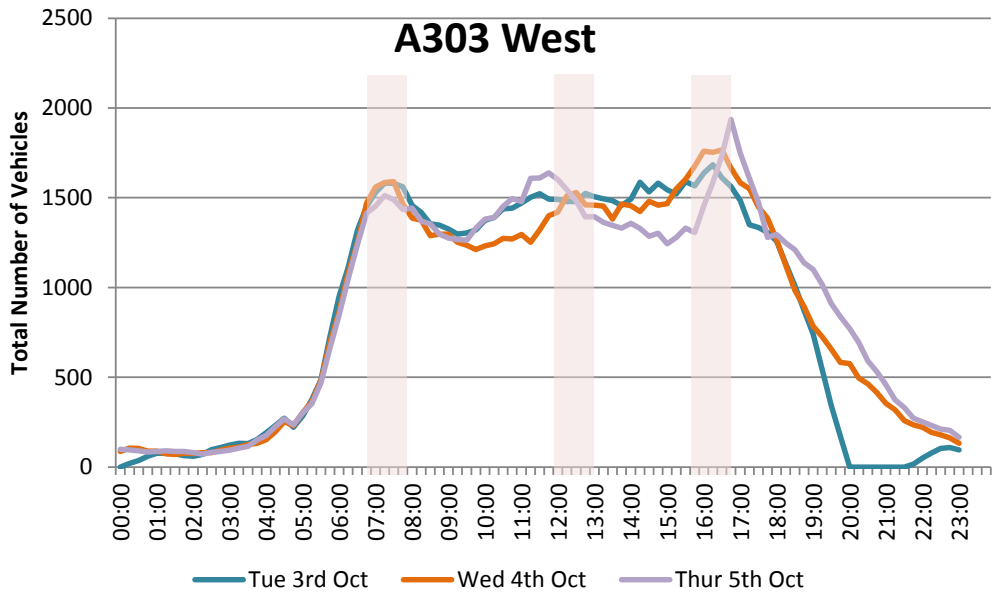


Figure 13-2: Hourly traffic flows (Site C1), western side of A303 Network

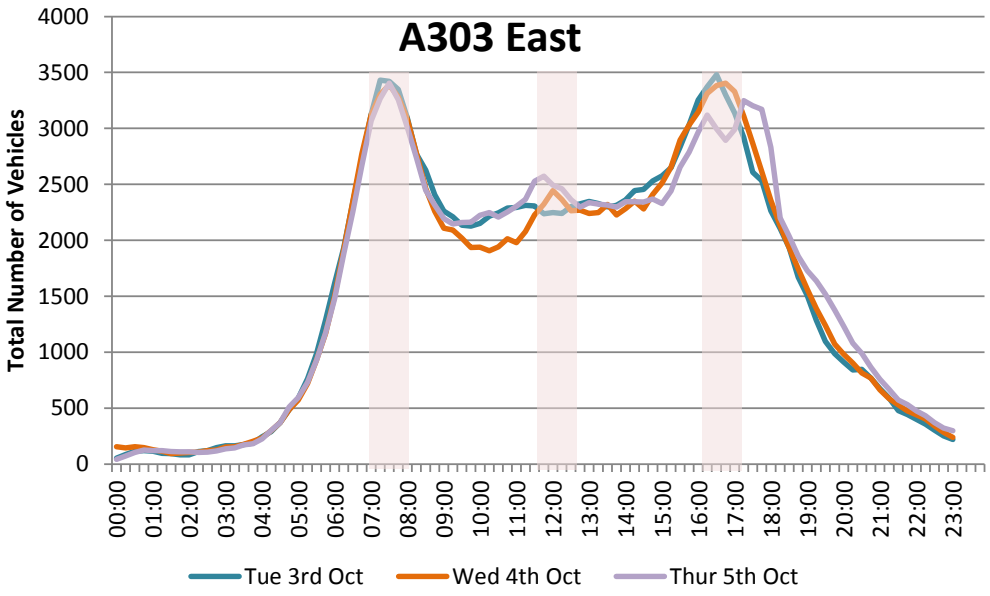


Figure 13-3: Hourly traffic flows C17, eastern side of A303 Network

13.4.8 The ATC data suggests little variation in traffic volumes and profiles between Tuesday 3 October and Wednesday 4 October, whilst Thursday data indicates greater variation in the PM period. Further investigation suggested the Thursday variation was caused by an incident on the A303 between A350 Chicklade and A36 near Wylye. Based on the above analysis, the Wednesday 4 October data was chosen to be modelled.

13.4.9 ANPR data from Wednesday 4 October was analysed to obtain travel times between A303 (Cholderton) and A303 South of A36 to help determine the AM, interpeak and PM time periods to represent in the VISSIM model. Figure 13-4 and Figure 13-5 show the eastbound (ANPR Site 41 to 50 via 31) and westbound (ANPR Site 48 to 39 via 32) mainline A303 journey times between ANPR sites to the west of the A338 and west of the A36 respectively.

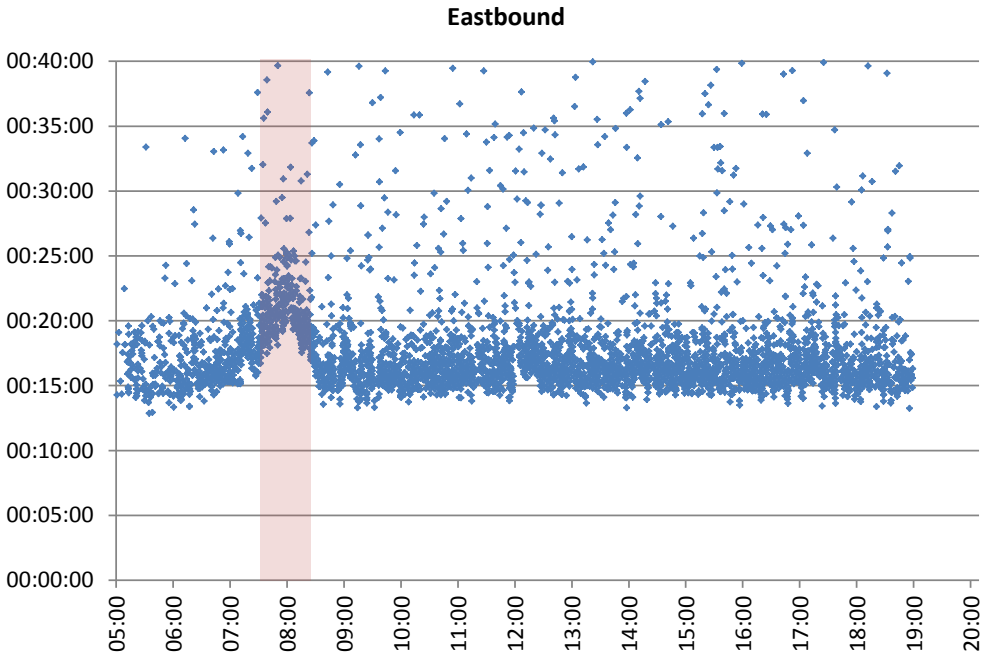


Figure 13-4: ANPR journey time eastbound A303 (0500-1900 04/10/2017)

13.4.10 In the eastbound direction, end-to-end A303 journey times peak at approximately 08:00, with no other clear delays throughout the day.

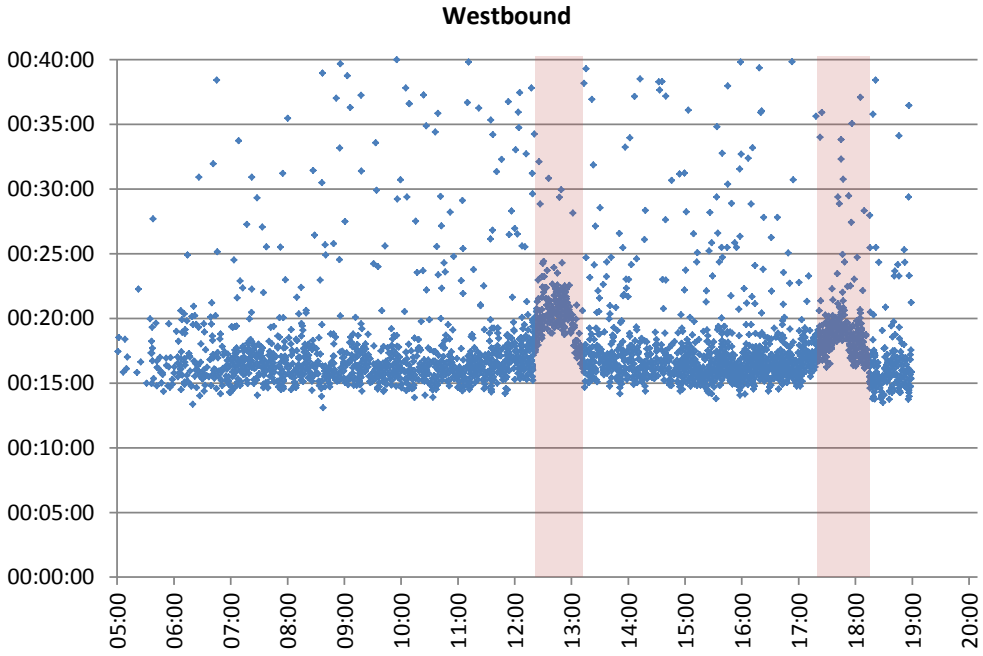


Figure 13-5: ANPR journey time westbound A303 (0500-1900 04/10/2017)

13.4.11 In the westbound direction journey times peak at approximately 12:45 and again at 17:45, with no other clear delays throughout the day.

13.4.12 For the interpeak period, the A303 strategic model represents an average hour between 10:00-16:00. To ensure the operational modelling is consistent, the same approach and modelled time period was selected.

13.4.13 Based on the above analysis, the AM, interpeak and PM peak periods were selected as in Table 13-3.

Table 13-3: Neutral month modelled periods

Time Period	Peak Hour (1 hr)	Modelled Period
AM	07:30 – 08:30	06:00* - 0900
IP	Average Hour; 10:00-16:00	11:15 - 13:45
PM	17:00 - 18:00	15:30 - 18:30

*No MCTC data 06:00-07:00

13.4.14 Vehicles modelled in the first hour of the warm up period will not be present in the model during the fully modelled period. The warm up period is sufficient for vehicles fully to traverse the modelled network, and allow the software to populate the model network for the start of the modelled period. The matrices for the warm up period 06:00 to 07:00 are based on the 07:00-08:00 hour flows, split equally across the hour.

13.5 Impacts of roadworks on The Packway

13.5.1 The 2017 data collection period (both summer and neutral month) coincided with planned temporary roadworks on The Packway through Larkhill. The temporary roadworks resulted in the complete closure of The Packway, East of Larkhill between Tombs Road and The Packway / Countess Road roundabout as indicated in Figure 13-6 below.

13.5.2 In the summer months The Packway is an alternative route or 'rat-run' used by vehicles to avoid delays on the A303, which would be unavailable during the survey periods and could potentially bias the traffic information collected as traffic is pushed back on to the A303 or on to alternative 'rat-runs'. During the survey periods the signed diversion route for this section of the Packway was via the A303.

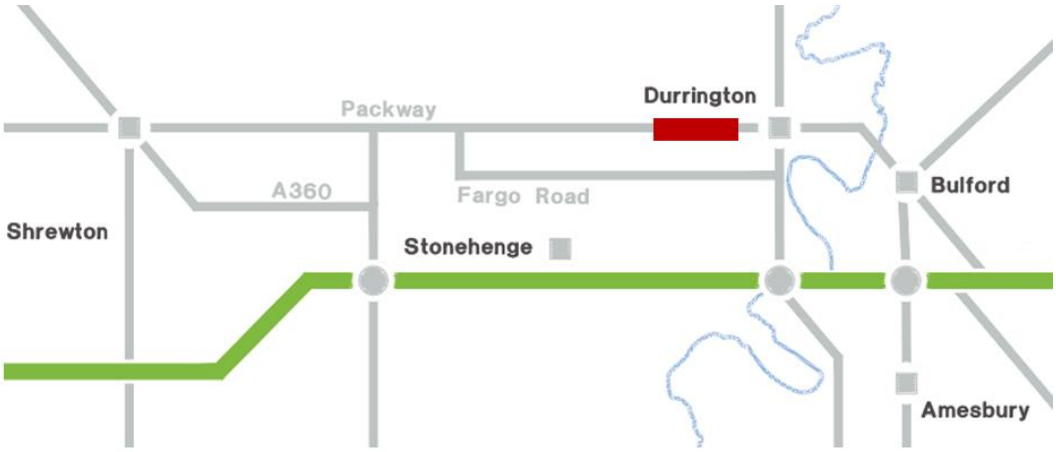


Figure 13-6: Location of roadworks on The Packway

13.5.3 The 2017 summer and neutral month VISSIM base models were validated against this temporary arrangement, using the survey data “as is” to calibrate and validate the models. This approach ensured fully validated base models were produced. This ‘Packway closed’ VISSIM model can be adjusted to reflect the normal base situation, with The Packway open in both directions.

13.5.4 Site observations undertaken throughout the summer survey period indicated that whilst The Packway was closed a significant number of vehicles were instead using Fargo Road between the A345 Countess Road and The Packway as an alternative route as indicated in Figure 13-7, instead of using the signed diversion via the A303.

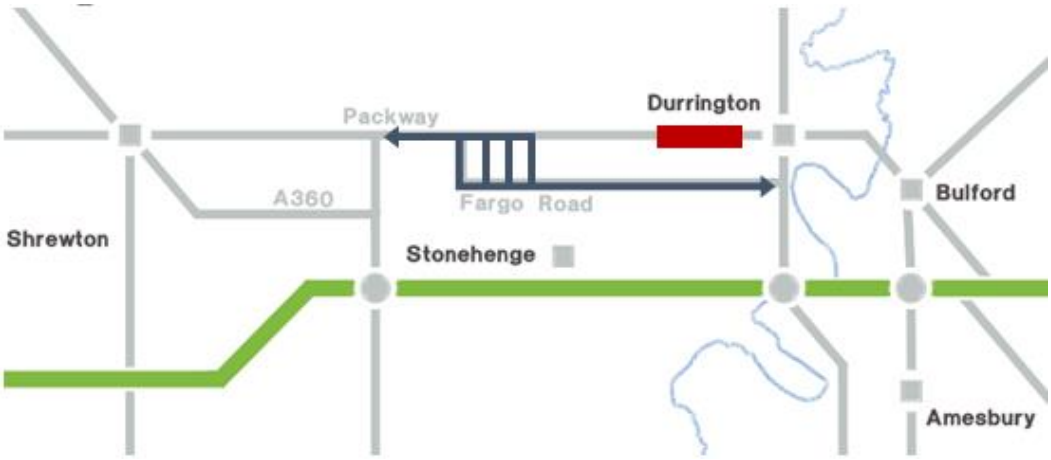


Figure 13-7: Alternative routes via Fargo Road

13.5.5 A comparison of the summer 2017 ‘Packway Closed’ ANPR data, against the ANPR survey carried out in 2014 whilst The Packway was open, was undertaken to ascertain if the roadworks had a significant impact on vehicle routeings.

13.5.6 Table 13-4 below provides a summary of the ANPR analysis between 2014 and 2017 and differences in routeing proportions on alternative routes for A303 through movements. Percentages represent the proportion of A303 end-end through traffic diverting on the routes indicated in Figure 13-8.

Figure 13-8: 'rat–running' via The Packway

Table 13-4: 2014 and 2017 'rat–running' via The Packway – A303 through trips

Direction	Route	2014		2017	
Eastbound	Packway	7%	7%	11%	11%
	B3086	5%	6%	4%	9%
	Shrewton	1%		5%	
	Countess Road	4%	7%	7%	8%
	Bulford	3%		1%	
	Average		**6%**		**9%**
Westbound	Packway	19%	19%	13%	13%
	B3086	12%	16%	11%	12%
	Shrewton	4%		1%	
	Countess Road	11%	20%	14%	18%
	Bulford	9%		4%	
	Average		**18%**		**14%**

13.5.7 Analysis of the 2017 'Packway Closed' and 2014 'Packway Open' summer ANPR surveys suggests that:

a. **eastbound** - ANPR data suggests more local diversion in 2017. With a 4 percentage point rise in through traffic on The Packway, 4 percentage point rise in Shrewton, and 3 percentage point rise on Countess Road compared with 2014. Through traffic drops 1 percentage point on the B3086 and 2 percentage points through Bulford; and

b. **westbound** - ANPR data suggests less local diversion in 2017. With a drop of 6 percentage points on The Packway, drop of 3 percentage points at Shrewton, and 5 percentage points drop at Bulford. However, through traffic increases by 3 percentage points on Countess Road.

13.5.8 There is clear evidence that local re-routeing on The Packway (via Fargo Road) still occurred in the summer 2017 survey period despite the roadworks, which is consistent with site observations at Fargo Road. The analysis undertaken is presented as traffic flows passing three distinct screenlines. There are differences in the change measured between the 2014 and 2017 surveys at each of these screenlines. Considering the variation in the results at each screenline the increase observed in diversion eastbound is statistically significant (at 95% confidence) whereas the reduction westbound is not. The data therefore indicate that the only measurable effect of the roadworks was to cause diversion from The Packway to Fargo Road.

13.5.9 Given the consistency between 2014 and 2017, the volumes (i.e. across all routes) of rat-running traffic in 2017 have not been adjusted to account for the presence of roadworks.

13.5.10 The neutral month MCTC surveys also show traffic using Fargo Road as an alternative route to The Packway during the road closure. However, analysis of the neutral month ANPR data shows no rat-running exists in the neutral month. This is consistent with the rationale behind rat-running as there are no significant delays along the A303 to avoid during the neutral month. The ANPR analysis for the neutral month is shown in Table 13-5.

Table 13-5: Neutral month ANPR through routes analysis – average hour

	Total end-to-end trips		End-to-end trips via The Packway		%	
	Eastbound	Westbound	Eastbound	Westbound	Eastbound	Westbound
AM	667	470	1	0	0.2%	0.0%
IP	406	346	0	0	0.0%	0.0%
PM	340	378	0	1	0.0%	0.3%

13.6 Modelled network

13.6.1 This section contains detail on the model construction, including network extents, link driving behaviours, speed distributions and local information such as bus routes and signals.

13.6.2 Drawing on the representation of routeing and travel patterns represented in the strategic traffic model, two microsimulation models were developed to assess operational performance:

a. a Local Road model north of the A303 including the B3086 and links through Larkhill, Durrington and Bulford; and

b. a Mainline A303 model including some local diversions through Amesbury.

13.6.3 Figure 13-9 shows the Local Road network in red and the A303 network in blue. A separate VISSIM model was built for each of the sections; the VISSIM network is shown in Figure 13-10.

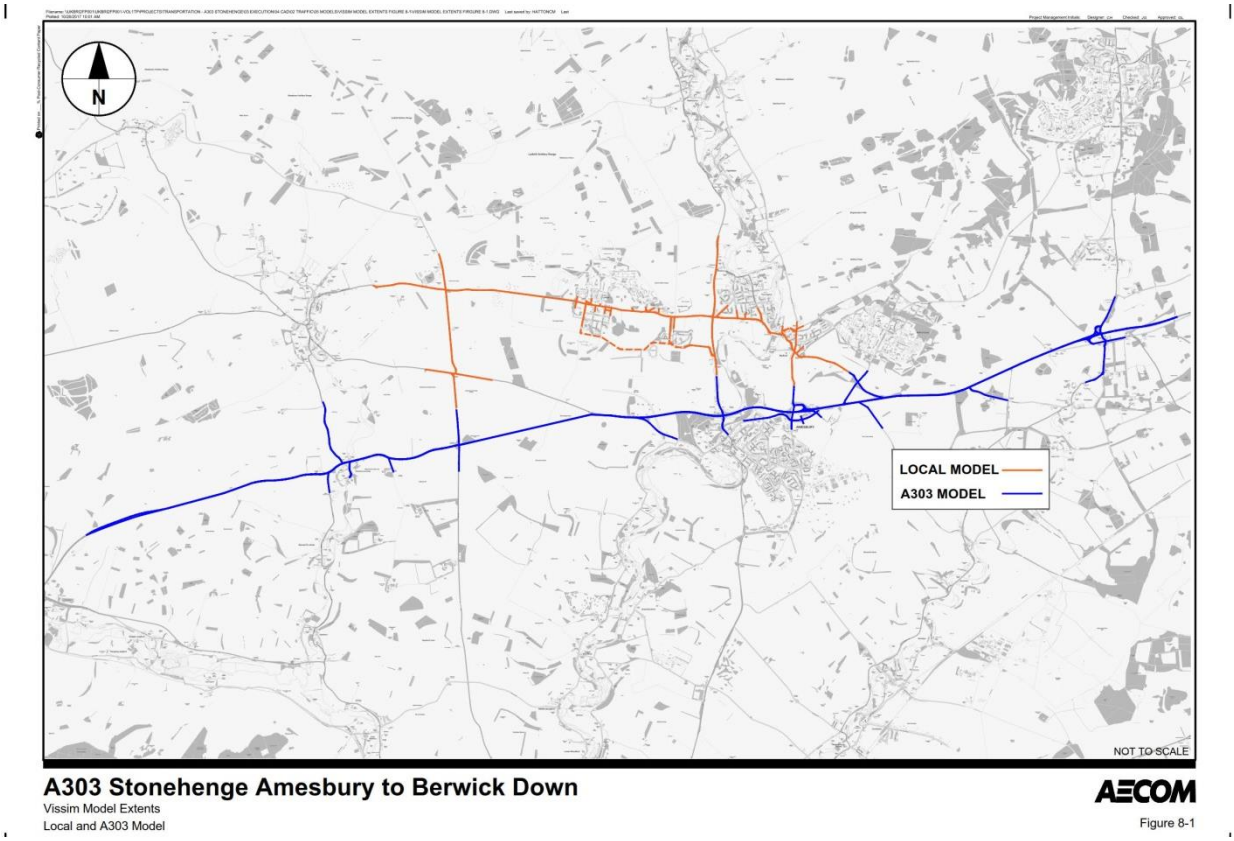


Figure 13-9: VISSIM network extents

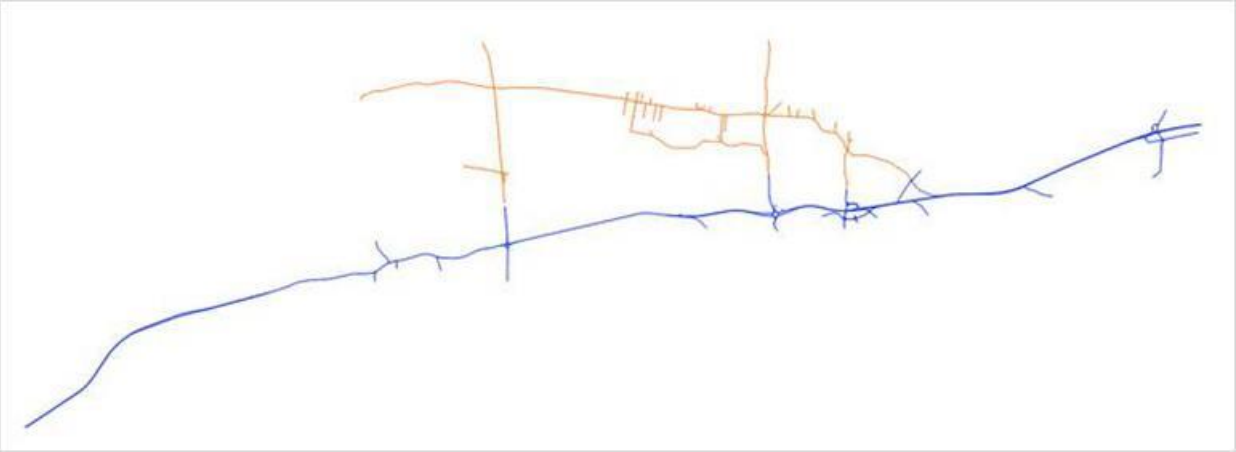


Figure 13-10: VISSIM modelled network

13.6.4 The mainline A303 network consists of six major junctions, with additional minor arms along the network:

a. B3083 at Winterbourne Stoke;

b. A360 at Longbarrow Roundabout;

c. A345 at Countess Roundabout;

d. Solstice Park slip roads and roundabouts;

e. A3028 slip road; and

f. A338 slip roads.

13.6.5 The Local Road network contains:

a. The Packway;

b. A360;

c. Fargo Road;

d. B3086;

e. A345;

f. A3028; and

g. local roads in Bulford, Larkhill and Durrington.

Highway network

13.6.6 The modelled highway network was coded in VISSIM using OS Mapping to define the length, width and number of lanes for each modelled link. Google Maps and site observations were used to assist in defining the highway, lane allocation and to check that link distances were accurate. The base year highway layout at key junctions is indicated in Figure 13-11.

13.6.7 Gradients were added to the links to ensure vehicle behaviour was representative on inclines and declines, with the data taken from Google Earth levels.

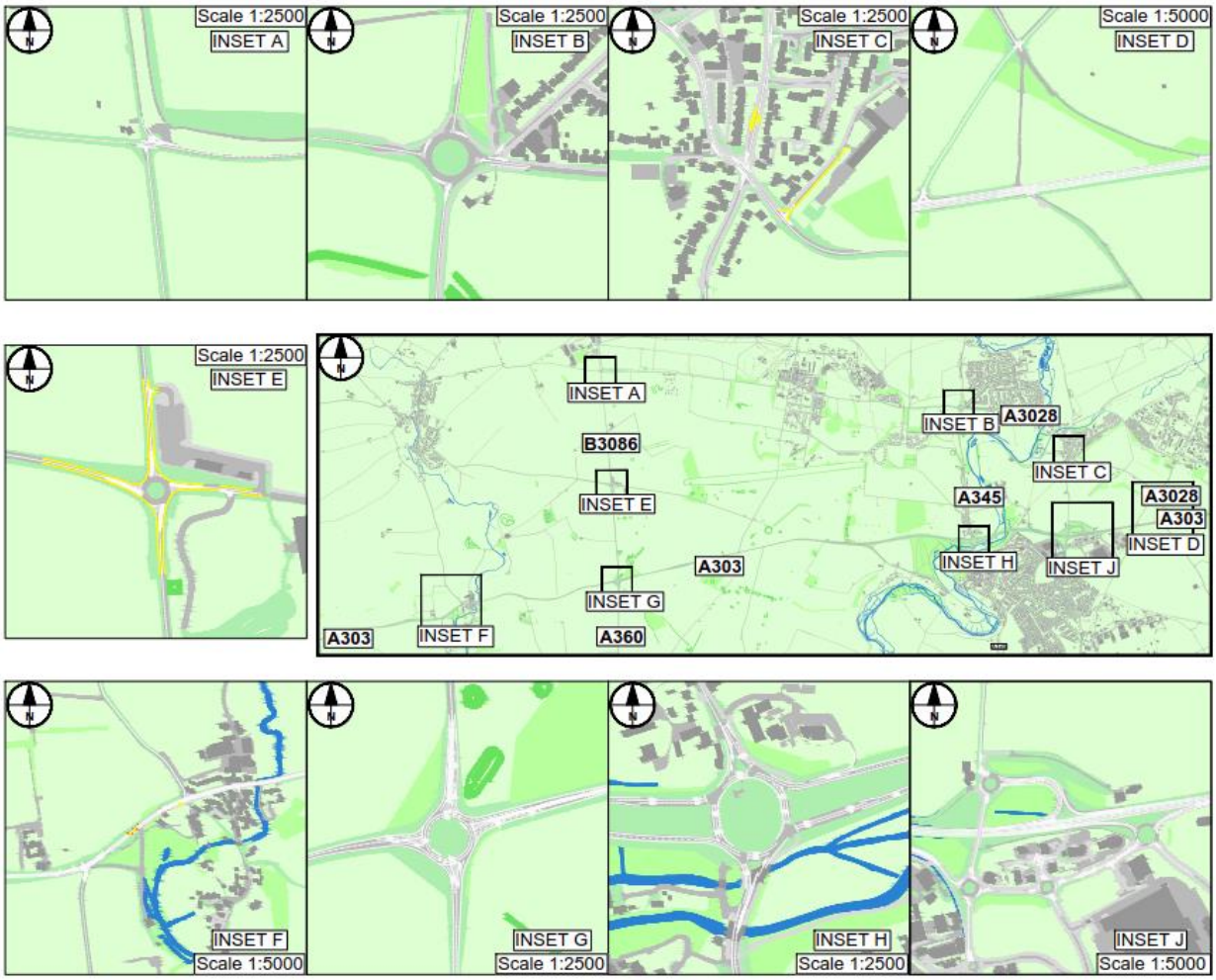


Figure 13-11: Highway network layout

Priority markers

13.6.8 OS mapping, site visit observations, photos, videos and Google Street View were used to place priority markers at all give-way points. Priority markers at junction stop lines were placed to reflect observed driving behaviour rather than the road markings directly. Separate priority rules were placed for headway/physical gap and time decision points to allow the operation of each stopline to represent observed conditions and the coding of 'yellow boxes' representing areas within junctions which are kept clear of stationary vehicles during congested operation.

13.6.9 Particular attention was paid to Longbarrow and Countess roundabouts, to match observed behaviours:

a. Countess roundabout survey footage showed vehicles observing yellow boxes and ensuring exits are not blocked; and

b. Longbarrow roundabout is a priority roundabout, with queueing traffic observed during the summer period on the eastbound circulatory, requiring detailed priority rules to ensure the traffic gives way appropriately and the observed conditions, where the A360 southbound entry 'weave' through the eastbound queue on the A303, are replicated.

Speed distributions / speed limits

13.6.10 The A303 and Local Road network VISSIM networks include roads with 30mph, 40mph, 50mph, 60mph and national speed limits. Speed distributions were entered in to the Local and A303 VISSIM models.

13.6.11 The Department for Transport has published vehicle speed compliance statistics from 2016. These data provide information about the speeds of different vehicle classes on Motorways (70mph), National speed limit single carriageways (60mph), 30mph and 20mph roads.

13.6.12 An average speed distribution was calculated for light vehicles from the distribution of cars and LGVs and for HGVs from the distribution of rigid and articulated vehicles. These have provided initial speed distributions throughout the network for 20mph, 30mph, 60mph and 70mph roads within the modelled network.

13.6.13 Transport for London have developed a standard set of VISSIM speed distributions based on the Department for Transport research published in 2006. These speed distributions were used as a starting point for modelled speeds on 40mph or 50mph roads for lights and on 40mph roads for heavies. The same 50mph distribution for heavies was applied on 50mph roads as on national speed limit carriageways from the DfT data.

13.6.14 Observations and statistics from initial model runs suggested that during uncongested periods the lower bound of the default distributions were slow. Platoons of modelled vehicles were observed on single lane sections of carriageway (A303 and The Packway) behind vehicles with speeds at the lower end of the speed distributions.

13.6.15 Amendments were made to the speed distributions so the VISSIM models better represent observations and journey times collected during uncongested periods. The following updates were made:

a. the lower limit of speed distributions for 70mph speed limit roads for light vehicles was increased from 40mph to 55mph, and for heavies from 40mph to 50mph;

b. the lower limit of speed distributions for 60mph speed limit roads for light vehicles was increased from 20mph to 30mph; and

c. the lower limit of speed distributions for 20mph speed limit roads for light vehicles was increased from 5mph to 8mph.

13.6.16 The range in miles per hour of the speed distributions in the A303 and Local VISSIM models are provided in Table 13-6 below:

Table 13-6: VISSIM speed distributions – range in mph

Vehicle Type	Road Speed:	20mph	30mph	40mph	50mph	60mph	70mph
Lights	Car, LGV	8 – 45	15 - 50	20 – 60	25 – 75	30 – 70	55 – 90
Heavies	MGV, OGV, Bus,	5 – 40	15 - 50	20 – 60	25 – 65	25 – 65	50 – 80

Reduced speed areas

13.6.17 Reduced speed areas representing sections of carriageway where a temporary speed restriction is required, such as tight radius corners or traffic calming were placed throughout the networks. Table 13-7 indicates the speed distributions used on reduced speed areas throughout the modelled network.

Table 13-7: VISSIM reduced speed areas – range in mph

Vehicle Type	RSA type:	Junction Turn	Roundabout / Road Bend	Specific Local Road Junction Turns
Lights	Car, LGV	15 – 20	15 – 20	10 – 15
Heavies	MGV, OGV, Bus,	5 – 10	10 – 15	5 – 10

Signal timings

13.6.18 Countess roundabout is the only signalised junction in the A303 VISSIM model study area. The signals at this junction were coded as fixed time throughout the full modelled period.

13.6.19 Staging and intergreen lengths were taken from the signal specification documentation, which corresponds to the Countess roundabout traffic signals.

13.6.20 Stage length timings for each model were calculated using a LinSig model based on an average hour flow profile from observed turn counts. Whilst CCTV footage of the junction is available, it is not possible to obtain observed signal timings as the signal heads and light indicator are not visible.

13.6.21 Signal times for the summer period are indicated in Figure 13-12 and Figure 13-13, with neutral month timings in Figure 13-14 to Figure 13-19.

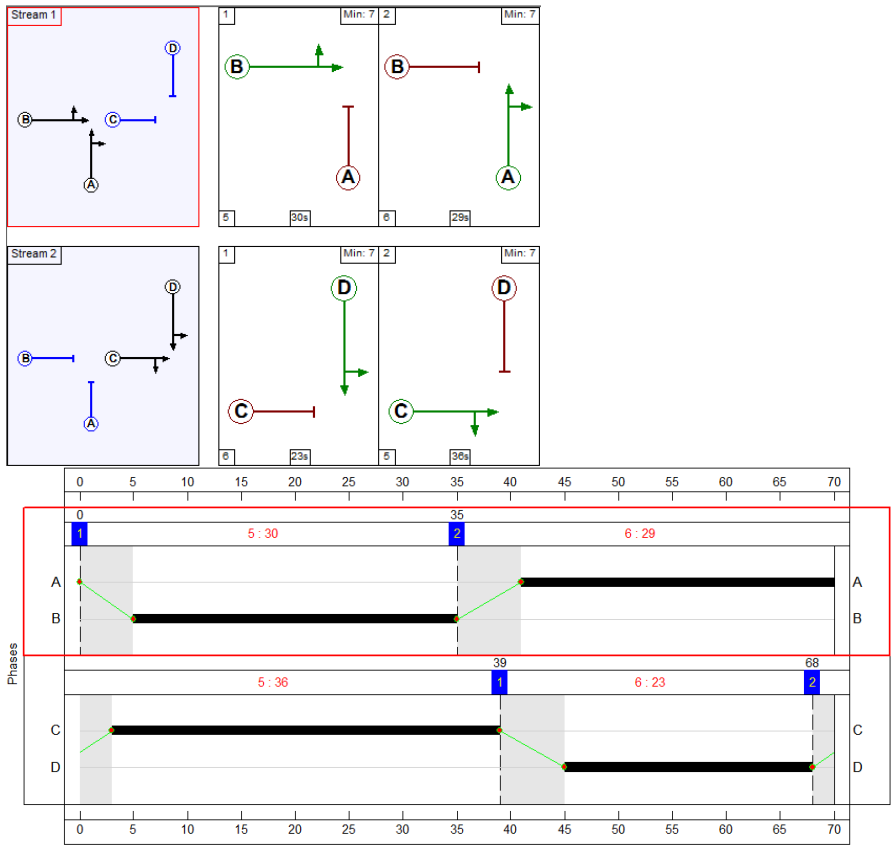


Figure 13-12: Countess roundabout summer signal timings – north side

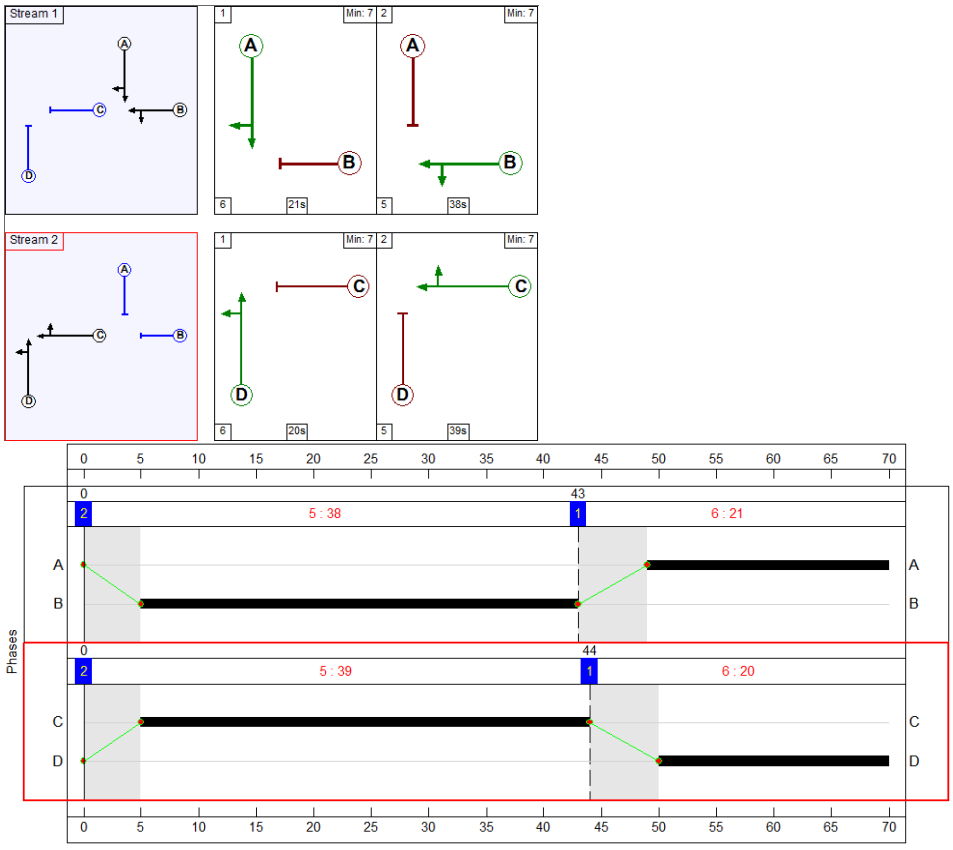


Figure 13-13: Countess roundabout summer signal timings – south side

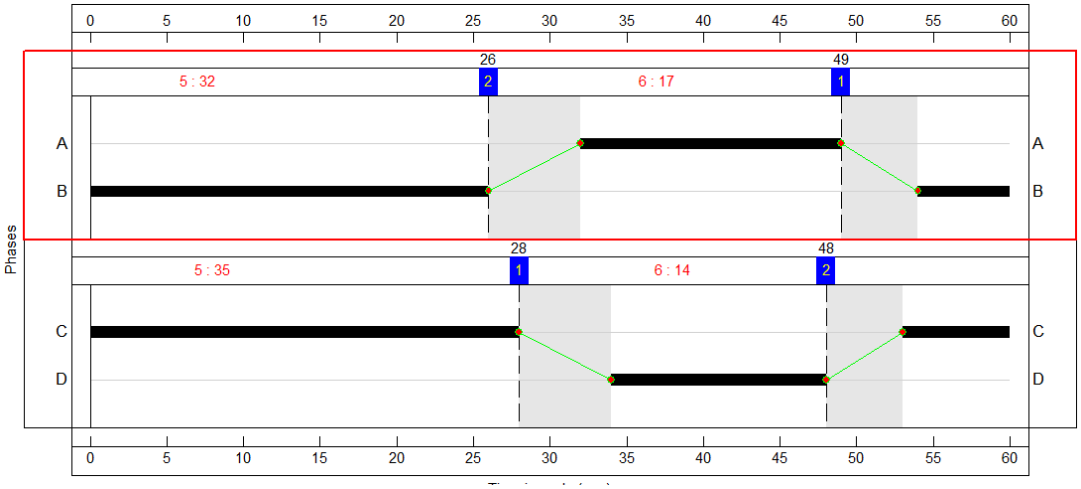


Figure 13-14: Countess roundabout neutral signal timings AM – north side

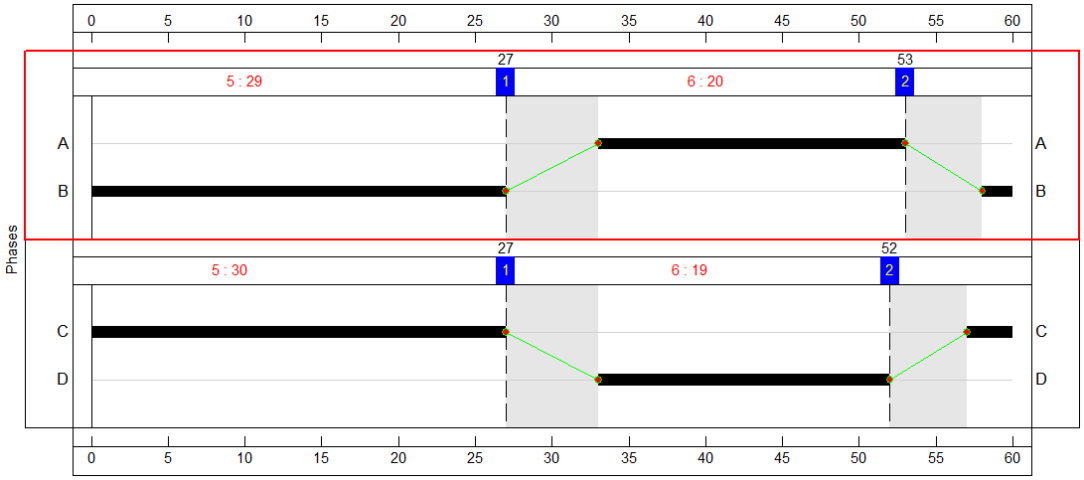


Figure 13-15: Countess roundabout neutral signal timings AM – south side

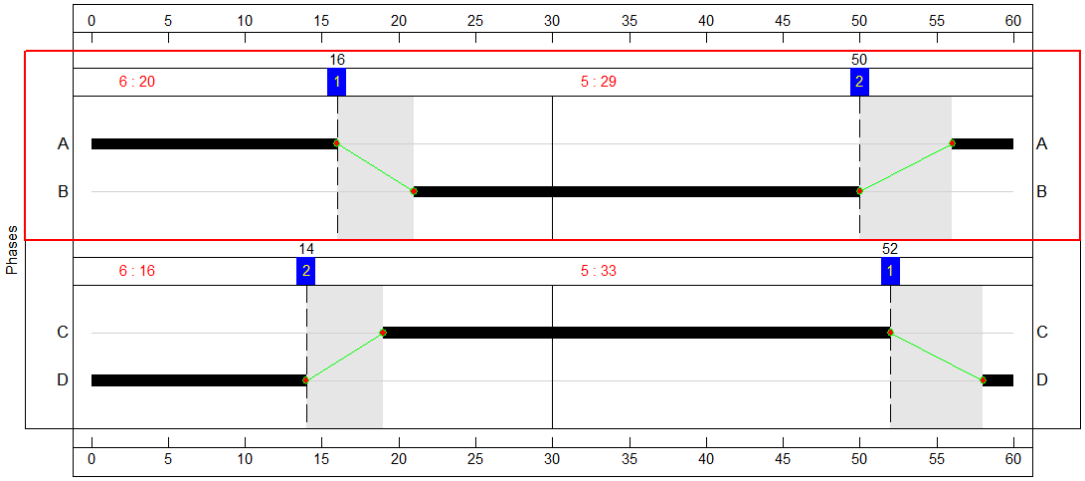


Figure 13-16: Countess roundabout neutral signal timings IP – north side

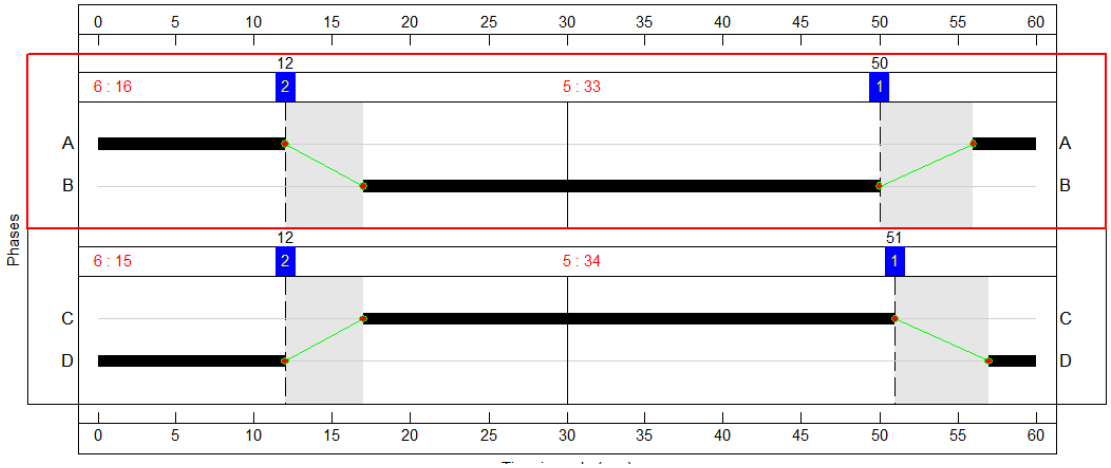


Figure 13-17: Countess roundabout neutral signal timings IP – south side

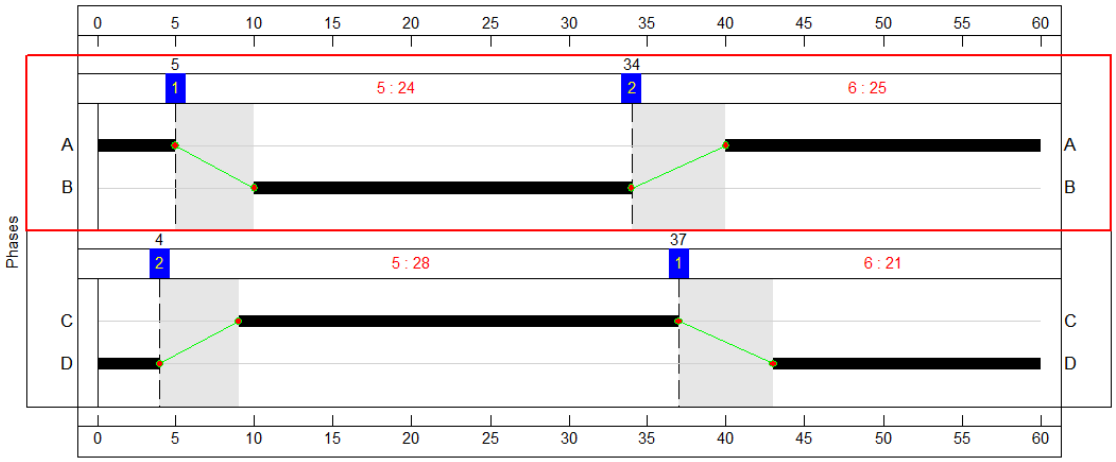


Figure 13-18: Countess roundabout neutral signal timings PM – north side

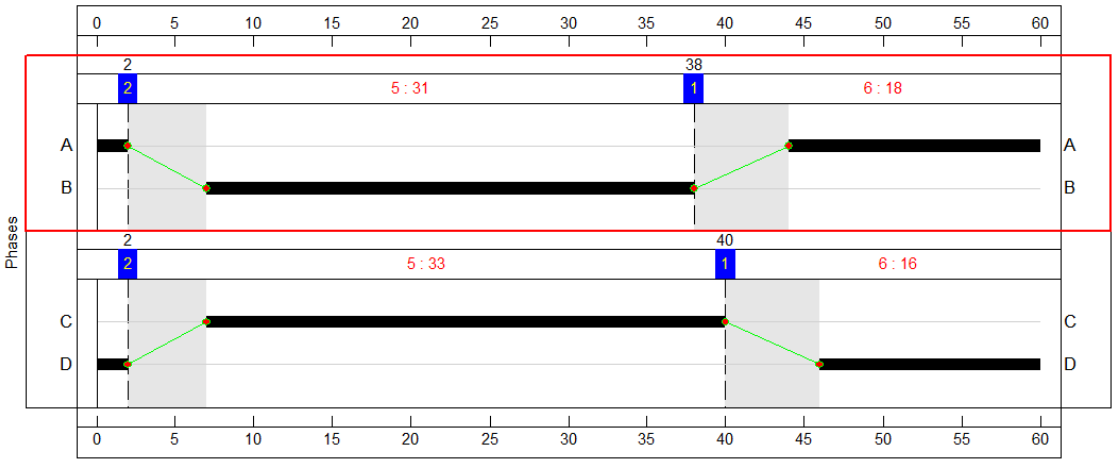


Figure 13-19: Countess roundabout neutral signal timings PM – south side

13.6.22 Temporary traffic signals were observed during the summer and neutral site visits on the A3028 Larkhill Road between Meads Road and Philip Road; average timings for these signals were extracted from video footage recorded at the junctions.

Bus routes

13.6.23 Bus route information and time tables were extracted on 26 July 2017 from salisburyreds.co.uk, http://www.thestonehengetour.info/timetable, and http://www.travelinesoutheast.org.uk . Stop locations were matched to those shown in Google Maps. The bus routes, and their operators, included in each model are listed below, with the routes shown spatially in Figure 13-20:

a. 2 (Mainline only) (S' Reds);

b. Activ8 (Salisbury Reds);

c. X4 (Salisbury Reds);

d. X5 (Salisbury Reds);

e. 651 (Local model only) (S' Reds);

f. 615 (Salisbury Reds);

g. Stonehenge Tour Bus (S' Reds); and

h. HPA/B (Mainline only) (Community Transport South Wiltshire).

Figure 13-20: Bus routes

Driving behaviours

13.6.24 The inbuilt driving behaviours in VISSIM are built around the principles of Wiedemann car following research which consists of a psycho-physical car following model for longitudinal vehicle movement and a rule-based algorithm for lateral vehicle movement. VISSIM 8 offers the user the opportunity to select one of two car following models which affect vehicle behaviour within VISSIM, namely Wiedemann 74 or Wiedemann 99. The VISSIM manual recommends that the following models are applied as below:

a. Wiedemann 74 (W74) Model mainly suitable for urban traffic and merging/weaving areas; and

b. Wiedemann 99 (W99) Model mainly suitable for inter-urban (motorway) traffic except merging/weaving areas.

13.6.25 The parameters used in the base A303 and Local model are based on Wiedemann 99 on the mainline carriageways as the parameters which underpin this car following model are suitable for modelling dual carriageway traffic. Wiedemann 74 behaviour parameters were allocated to links not on the mainline such as the Local Road network and at merges.

13.6.26 VISSIM has a default driving behaviour for freeway traffic (based on W99) with a 'left side rule', which was applied throughout the mainline A303 network. On the local road network a standard VISSIM 'Urban Motorized' driving behaviour was implemented. The term 'Urban' here is a VISSIM naming convention and relates to the state vehicles are in, their propensity to use the most appropriate lanes and pay more attention to vehicles around them, and is applicable to rural networks.

13.6.27 The default VISSIM behaviours did not accurately replicate observed behaviours on the merge sections of the A303, and as such a specific merge driving behaviour (B in Table 13-8) was developed and applied to slip roads, approaches to roundabouts and where there are two–to–one lane merges. This incorporated cooperative lane changing and the Wiedemann 74 car following behaviour.

13.6.28 Further to this, on the one lane sections immediately after the two-to-one merge sections of the A303 near Stonehenge, the observed behaviours and queues were not accurately represented in the VISSIM model. Specifically, this is on the exit from Longbarrow roundabout eastbound, and after the Stonehenge Road slip joins the A303 carriageway westbound. A specific driving behaviour (C) was developed to replicate this behaviour, increasing the headway and standstill distance from the default left-side rule driving behaviour.

13.6.29 In the summer model, observed queues extended back from the A303 two-to-one eastbound merge to the west of Winterbourne Stoke, which was not apparent in the model under the developed merge behaviours. Applying the behaviour developed for the single carriageway after the two-to-one merge near Stonehenge (C) did not generate a large enough queue. Therefore a new behaviour was developed (D), increasing the standstill distance and headway further, and increasing the following variation. This behaviour was not apparent in the neutral month periods, and as such was only applied to the summer model.

13.6.30 In the summer model, queues extended further than the VISSIM model showed under the standard driving behaviours on the A303 past Stonehenge – see following section on 'rubbernecking'. As such, a new behaviour was developed (E) to allow for larger headway and following variation but shorter standstill distances between vehicles to replicate the lengths of queues observed on site.

13.6.31 Key parameters of the driving behaviours in the A303 and Local model are indicated in Table 13-8 below.

Table 13-8: Driving behaviours

Ref	Behaviour	Parent Behaviour	Purpose	Changes						
				Standstill Distance (m)	Following Behaviour	Headway (sec)	Following Variation (m)	Look Back Distance (m)	Diffusion Time (sec)	Co-operative Lane Change
A	Left-side rule (motorized)	-	-	2.3	Wiedemann 99	0.9	4	150	60	no
B	Left-side rule (motorized) MERGE	Left-side rule (motorized)	Merge Sections	1.5	Wiedemann 74	-	-	5	120	yes
C	Left-side rule (motorized) GAP2	Left-side rule (motorized)	A303 EB & WB Two-to-one merge near Stonehenge	2.5	Wiedemann 99	2	4	150	60	no
D	Left-side rule (motorized) GAP	Left-side rule (motorized)	A303 EB Two-to-one merge	2.5	Wiedemann 99	3.7	8	150	60	no
E	Stonehenge Left-side rule (motorized)	Left-side rule (motorized)	Stonehenge Rubbernecking	1.5	Wiedemann 99	2	25	150	60	no

Stonehenge 'rubbernecking'

13.6.32 'Rubbernecking' is a term often used to describe a phenomenon where road users change their normal driving behaviour to observe an incident/event/point of interest or distraction. This often results in vehicles travelling slower, or leaving larger gaps, than they would otherwise which can lead to delays on the highway network.

13.6.33 'Rubbernecking' can often be observed during an incident on motorways or dual carriageways when an incident on one carriageway can lead to delays on the separate opposing carriageway as road users change their normal driving behaviour to observe the incident.

13.6.34 Site observations undertaken on the A303 during the summer period suggested that 'rubbernecking' was present on the stretch of carriageway passing Stonehenge as drivers slowed to view the stones (… and in one observed case take photos) contributing to the existing congestion in the corridor.

13.6.35 Figure 13-21 below presents speed information extracted from the Google Journey Time API database throughout the Friday 28 July 2017 survey day. The data presented indicates the average speed of eastbound vehicles indicated by a colour scale between Green/fast and Red/slow.

13.6.36 The key findings from this data are:

a. Section 8 represents the section of single lane carriageway on the eastbound approach to Stonehenge, and indicates slow moving traffic throughout the day consistent with the site observations;

b. Section 1 is the two-to-one merge before Winterbourne Stoke and indicates slow moving traffic from 10:30 onwards;

c. Section 6 on the approach to Longbarrow Roundabout and Section 7 exiting Longbarrow Roundabout also indicate slow moving traffic; and

d. between section 8 and 1 there are clear 'shockwaves' of queue stretching back through the network from Stonehenge (Section 9).

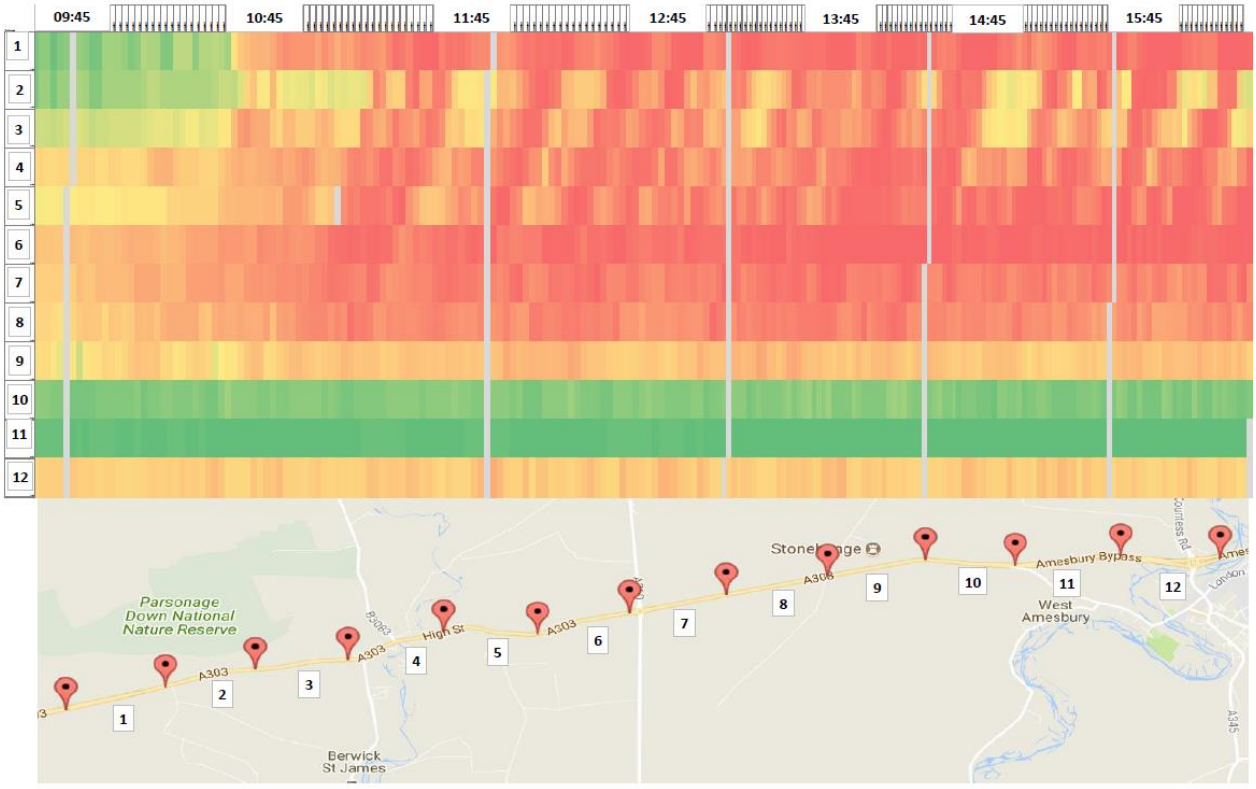


Figure 13-21: Google API - A303 eastbound average speed - Friday 28 July 2017

13.6.37 In order to recreate the effects of rubbernecking within the summer VISSIM model an additional driving behaviour was developed for the A303 eastbound and westbound past Stonehenge only, to replicate the behaviour observed in video footage and on the site visit, where vehicles are leaving larger gaps and travelling slowly (see 13.2.4).

13.6.38 The updated driving behaviour was combined with reduced speed areas which were used to control the speed and volume of traffic passing Stonehenge and to maintain the saturation flow of vehicles in each direction on the A303 past Stonehenge.

13.6.39 The saturation flow of the section of carriageway passing the stones can be calculated precisely in this instance due to the constant demand, held in eastbound and westbound queues inbound to this section and the relatively free flow conditions that exist after the stones.

13.6.40 The saturation flow was calculated using observed data, presented in Table 13-9 below which indicates the volume of vehicles passing Stonehenge and arriving at the downstream junction; Countess roundabout in the eastbound direction, and Longbarrow roundabout in the westbound direction.

Table 13-9: Summer traffic volumes past Stonehenge – inbound to downstream junction

Junction	Traffic Direction	12:00	13:00	14:00	15:00	16:00	17:00
Countess Rbt (West Arm)	Eastbound	1,001	900	935	1,026	1,038	974
Longbarrow Rbt (East Arm)	Westbound	839	865	886	922	968	950

13.6.41 Table 13-9 indicates that eastbound flows past the stones range from 900 to 1,038 vehicles per hour, whilst westbound flows increase from 839 vehicles at 12:00 to approximately 950 by 17:00.

13.6.42 This ‘rubbernecking’ behaviour was not clear from the data in the neutral month, and as such this specific behaviour past the stones has not been used. The volumes past the stones are in Table 13-10, showing higher traffic volumes through this section of road during the neutral month without the extensive queues.

Table 13-10: Neutral traffic volumes past Stonehenge – inbound to downstream

Junction	Traffic Direction	AM 07:30 – 08:30	IP Average Hour 10:00 – 16:00	PM 17:00 – 18:00
Countess Rbt (West Arm)	Eastbound	1,451	870	1,022
Longbarrow Rbt (East Arm)	Westbound	1,016	908	1,106

13.7 Data analysis and matrix development

13.7.1 This section details the survey data collected, method used to create the demand matrices, the modelled time periods and any route choice within the models.

Surveys

13.7.2 A suite of surveys, summarised in Chapter 5, was carried out over three days to inform the summer model development. The survey dates were Friday 18 August 2017 – Sunday 20 August 2017. The same surveys were undertaken over Tuesday 3 – Thursday 5 October 2017 to inform the neutral month model development. The surveys undertaken on these dates were:

a. Manually Classified Turn Counts (MCTC) surveys at all junctions to be modelled, Friday analysed only;

b. Automatic Number Plate Recognition (ANPR) surveys to produce origin destination (O-D) and journey time matrices;

c. Automatic Traffic Counts (ATC) surveys at specified locations; and

d. video footage for all counted junctions.

Matrix development

13.7.3 Traffic volumes were inserted in the model via origin destination (O-D) matrices, which defines the number of vehicles travelling from all model entry points to each exit point. Each entry/exit road is assigned a zone number.

13.7.4 The A303 and Local Road base year VISSIM matrices were developed directly from observed MCTC data rather than from ANPR data. Matrices developed using MCTCs will often have closer representation of turn counts as these are a direct input in to the matrix creation process. However, a matrix built with ANPR data would often have a closer representation of O-D routeing as these are defined in the prior matrix.

13.7.5 The matrix development methodology based on MCTCs is appropriate for this study as the amount of traffic weaving/lane choice is negligible in the Base Year due to a single lane mainline carriageway and junctions which are not closely spaced. Whilst the Scheme does introduce multiple lanes on the mainline the junctions remain in the same approximate location with sufficient distance between them to make the impact of traffic weaving/lane choice negligible.

13.7.6 MCTC surveys were analysed for Friday 18 August 2017 between 12:00-18:00 in the summer and 07:00-19:00 for Wednesday 4 October 2017.

13.7.7 Each of the key entry and exit points in the A303 and Local networks were defined a zone number from which traffic will enter (origin) and leave (destination) each network.

13.7.8 A spreadsheet was developed for the A303 and Local model study areas initially to create hourly matrices for each model. MCTC counts were processed in to a schematic, an example of which is indicated in Figure 13-22 below.

13.7.9 Hourly matrices were developed via a process, which used the turning proportions at each junction to distribute total light, medium and heavy traffic flows from each origin to all destination zones to create a prior matrix.

13.7.10 Hourly matrices were produced for the different vehicle compositions modelled:

a. Lights – Cars, Taxis and LGVs;

b. Mediums – Rigid Lorries; and

c. Heavies – Articulated Lorries.

13.7.11 An hourly O-D matrix was produced for each vehicle class separately for each of the modelled hours, defined by the time vehicles were observed entering the study area.

13.7.12 The prior matrix was then furnessed to total origin and destination traffic flow totals to refine the outturn matrix. On links where queueing is present, an upstream count was used as the origin total to ensure that the matrix represented the total traffic demand through the study areas rather than the actual observed flow, which would have underestimated demand, i.e. where the demand remains in traffic queues.

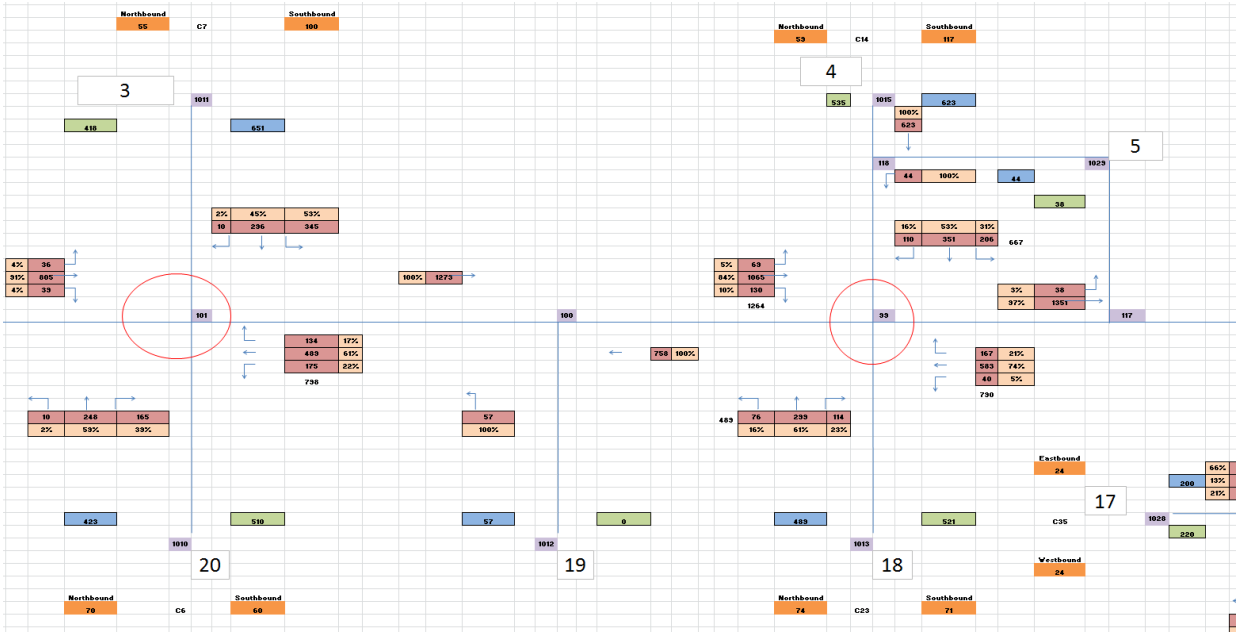


Figure 13-22: Example of A303 matrix creation schematic

Matrix totals for the A303 summer model and Local Road summer model are indicated in Table 13-11 and

13.7.13 Table 13-12Table 13-12 respectively.

Table 13-11: A303 summer matrix totals

Hour	Lights	Mediums	Heavies	Total	%Lights	%Mediums	%Heavies
12:00-13:00	7,721	474	575	8,770	88.0%	5.4%	6.6%
13:00-14:00	7,891	462	559	8,912	88.5%	5.2%	6.3%
14:00-15:00	8,402	453	548	9,403	89.4%	4.8%	5.8%
15:00-16:00	8,524	430	539	9,493	89.8%	4.5%	5.7%
16:00-17:00	8,935	416	480	9,831	90.9%	4.2%	4.9%
17:00-16:00	8,853	368	461	9,682	91.4%	3.8%	4.8%
Average Hr	**8,388**	**434**	**527**	**9,349**	**89.7%**	**4.7%**	**5.7%**

Table 13-12: Local model summer matrix totals

Hour	Lights	Mediums	Heavies	Total	%Lights	%Mediums	%Heavies
12:00-13:00	3,634	42	72	3,748	97.0%	1.1%	1.9%
13:00-14:00	3,579	41	57	3,677	97.3%	1.1%	1.6%
14:00-15:00	3,853	52	97	4,002	96.3%	1.3%	2.4%
15:00-16:00	4,101	32	93	4,226	97.0%	0.8%	2.2%
16:00-17:00	4,354	34	58	4,446	97.9%	0.8%	1.3%
17:00-16:00	4,174	13	56	4,243	98.4%	0.3%	1.3%
Average Hr	**3,949**	**36**	**72**	**4,057**	**97.3%**	**0.9%**	**1.8%**

13.7.14 Each hourly matrix is factored into 15 minute segments before assigning in the VISSIM model. A 15 minute global profile factor is derived based on total incoming traffic volumes across the hour.

13.7.15 In the summer model, the warm up period matrix uses the first hour matrix for each vehicle class, split into equal 15 minute periods and used throughout the warm up period. The cool down period uses the same method but with the final hour matrix.

13.7.16 In the summer model, the queues observed at 12:00 (in MCTC video footage) were not present with the warm-up matrix demand alone, and therefore an additional preload was added to the A303 mainline only to build up an adequate queue:

d. eastbound after Longbarrow roundabout, of 80 vehicles released from 11:00-12:00; and

e. westbound after Countess roundabout, of 500 vehicles released from 11:00-11:30.

13.7.17 The preload was calibrated to achieve the required queue build up past Stonehenge observed in video footage and during the site visit.

13.7.18 Matrix totals for the A303 neutral and Local Road neutral models are indicated in Table 13-13 and Table 13-14 respectively.

Table 13-13: A303 neutral matrix totals

Peak	Lights	Mediums	Heavies	Total	%Lights	%Mediums	%Heavies
AM	8,222	148	261	8,631	95.3%	1.7%	3.0%
IP	5,118	156	287	5,561	92.0%	2.8%	5.2%
PM	8,228	62	163	8,453	97.3%	0.7%	1.9%

Table 13-14: Local model neutral matrix totals

Peak	Lights	Mediums	Heavies	Total	%Lights	%Mediums	%Heavies
AM	5,469	57	70	5,596	97.7%	1.0%	1.3%
IP	2,640	39	56	2,735	96.5%	1.4%	2.0%
PM	4,254	12	37	4,303	98.9%	0.3%	0.9%

13.7.19 In the neutral month AM period, the 06:00-07:00 hour was created from the 07:00-08:00 data, scaled using the relative ATC count data. The AM models have a warm up period of 01:30 which starts at 06:00 and ends at 07:30. The IP models have a warm up period of 01:00 which starts at 11:15 and ends at 12:15. Similarly the PM models have a warm up period of 01:30 and start at 15:30 and end at 17:00. The cool down periods across all of the neutral models have a duration of 30 minutes.

13.7.20 Traffic volumes were entered into the base VISSIM model via origin destination (O-D) matrices in 15 minute periods.

Route choice

A303 model

13.7.21 There is no route choice represented within the A303 mainline VISSIM model, as its purpose is to understand the operational performance of the main route. The following simplifications (closures) have accordingly been made:

a. all internal U-turns at roundabouts and the option to leave the A303 at Solstice Park and immediately return to the A303 were closed;

b. the triangle with A3028 Double Hedges / Amesbury Road was restricted through banning right-turns from Amesbury Road to Double Hedges to prevent vehicles from leaving the A303 and immediately re-joining;

c. ensuring all vehicles entering the network from either Amesbury Road or Double Hedges access the A303 via Double Hedges slip road. Count data showed the use of Amesbury Road to access the A303 was very low; and

d. vehicle inputs with fixed routes were used to add flows that match the count data.

Local Road model – The Packway closed

13.7.22 Due to major building works on The Packway the eastern section of the road was closed between Tombs Road and Countess Road during the survey period.

13.7.23 Through traffic using Fargo Road as an alternative to The Packway has a number of possible routes through Larkhill to re-join The Packway. Analysis of count data showed the two main movements during the survey period was via Woods Road or via Willoughby Road.

13.7.24 The volumes of vehicles using each of these routes were identified during matrix development and apportioned to a separate vehicle class. In this way traffic in one class can be fixed to use either Woods Road or Willoughby Road. This approach removes route choice from the model and the need to run for convergence. The percentage splits used for each route are indicated in Table 13-15.

Table 13-15: Local model – Fargo Road route choice

		Woods Road	Willoughby Road
Summer	**Lights (Eastbound only)**	50%	50%
	Lights (Westbound only)	5%	95%
	Mediums	36%	64%
	Heavies	17%	83%
Neutral AM	**Lights (Eastbound only)**	100%	0%
	Lights (Westbound only)	96%	4%
	Mediums	96%	4%
	Heavies	96%	4%
Neutral IP	**Lights (Eastbound only)**	100%	0%
	Lights (Westbound only)	96%	4%
	Mediums	96%	4%
	Heavies	96%	4%
Neutral PM	**Lights (Eastbound only)**	100%	0%
	Lights (Westbound only)	97%	3%
	Mediums	97%	3%
	Heavies	97%	3%

13.7.25 All U-turns were banned in the Local Road model except at The Packway / A345 roundabout where vehicles entering the network on Countess Road from the south had a number of U-turn movements in the observed data, particularly in the summer period. The likely explanation is drivers using the local roads to rat-run, but arriving at the roundabout with The Packway to find The Packway closed. In the summer model, a proportion of vehicles entering the network on Countess Road were allowed to travel up to the roundabout with The Packway, U-turn back onto Countess Road before turning right into Fargo Road to complete their journey.

13.7.26 Traffic on Woods Road and Willoughby Road is made up of local traffic and through traffic using Fargo Road as an alternative to The Packway. Therefore the MCTCs include some internal trips from Larkhill. In order to calculate the matrix traffic volumes in the Local Road model it was assumed that:

a. the number of local trips with an origin and destination within Larkhill entering and exiting The Packway from Woods Road and Willoughby Road was calculated as an average of the origin and destination trips from adjacent zones accessing similar residential sites;

b. similarly, the number of local trips with an origin and destination within Larkhill entering and exiting Fargo Road was calculated as the difference between the count at the Fargo Road/Countess Road junction and the total flow exiting The Packway on Woods Road and Willoughby Road, once the local trips were removed; and

c. the remaining flow is the through traffic using Fargo Road as an alternate to The Packway.

ANPR journey times

13.7.27 ANPR data was analysed in a bespoke Microsoft Access database to interrogate 'matched' number plates passing through adjacent ANPR sites and to extract journey times for each of the summer and neutral month modelled hours, and for the Mainline A303 and Local Road highway networks.

13.7.28 A sequence of ANPR cameras were identified on the A303 mainline and the Local Road network that represent the VISSIM models extents in the eastbound and westbound directions.

13.7.29 The raw ANPR data was filtered by placing upper limits on the observed ANPR journey times between markers to remove anomalous data from the average. These boundaries were designed by plotting the ANPR data trend and imposing the limit only to include the data that closely followed the trend line. This is justified as the sections were short and often single lane with no explanation for anomalous data other than vehicles stopping en-route. Examples of this process are below.

13.7.30 Figure 13-23 shows the journey times on the section of the A303 between the east of Longbarrow roundabout and the east of Countess roundabout. The ANPR journey times range between 5 minutes and two and a half hours, with a clear trend line below 30 minutes. Therefore, 30 minutes was taken as the cut-off point to truncate the anomalous data.

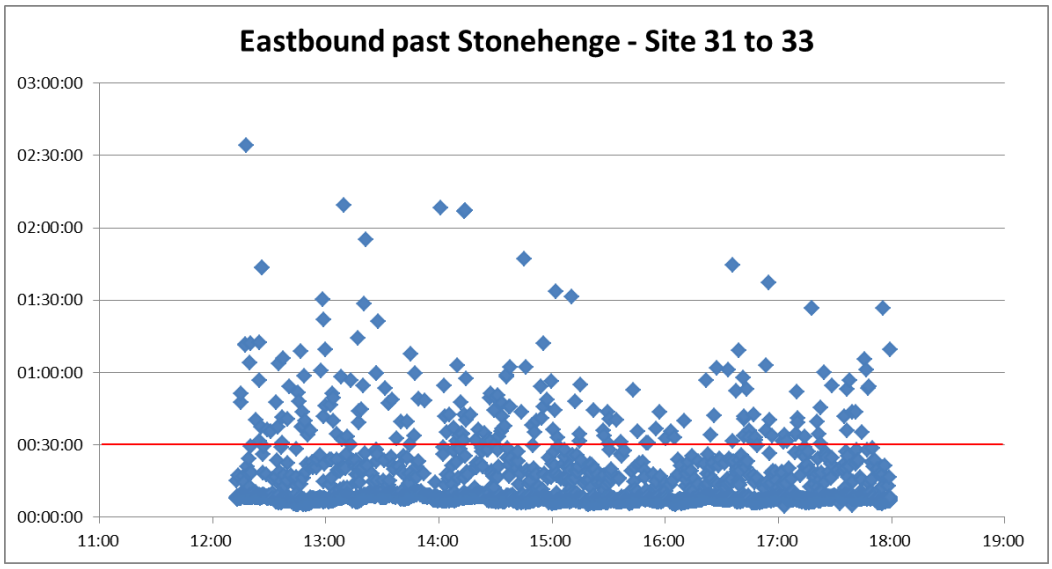


Figure 13-23: Summer ANPR journey time data – A303 mainline

13.7.31 Figure 13-24 shows the journey times between Countess Road south of the junction with Fargo Road, and The Packway east of the junction with the B3086. The ANPR journey times range between 5 minutes and three hours, with a clear trend line below 30 minutes. Therefore, this was taken as the cut-off point to remove anomalous data.

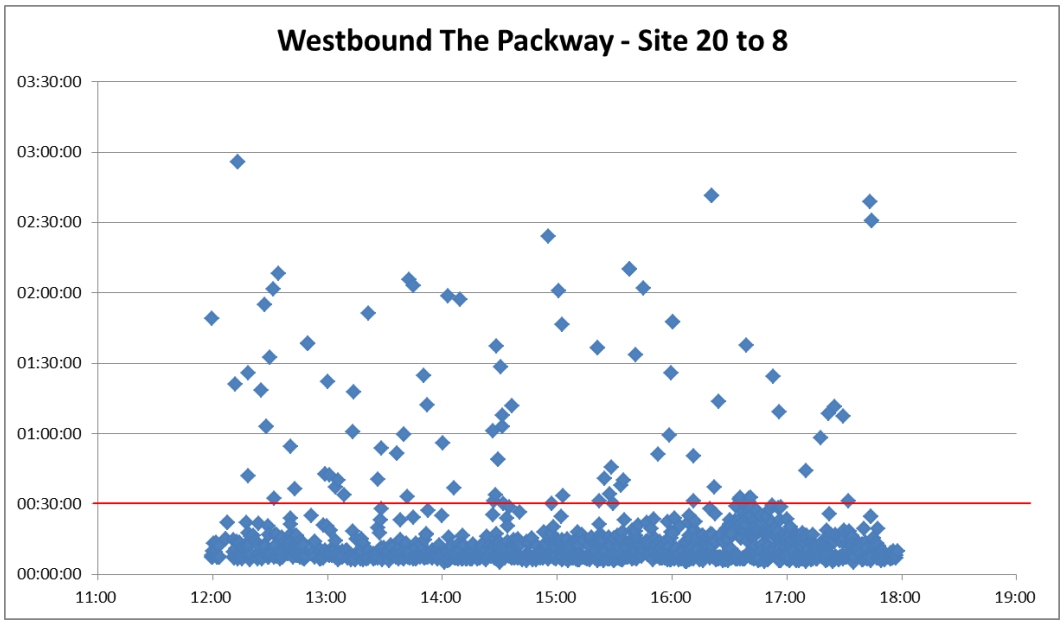


Figure 13-24: Summer ANPR journey time data – Local Road

13.7.32 The mean truncated observed ANPR journey time is used as a baseline with which the base year VISSIM model is validated against (see 13.8.14).

13.8 Calibration and validation

13.8.1 Micro-simulation modelling guidelines set out in IAN 36/01 describe the requirement to demonstrate that the parameters used in the micro-simulation model (whichever software is used) are specifically tested and selected to produce the expected vehicle behaviour. The previous sections set out the adjustments made to driving behaviours, speeds and default parameters required to replicate the specific behaviour observed in the Stonehenge study area.

13.8.2 Both the A303 mainline and the Local Road models were visually calibrated to video footage and to survey data. The data used in calibration was:

a. MCTC data;

b. ANPR through traffic proportions;

c. origin and destination totals (total flow into and out of the model); and

d. visual queue lengths and locations.

13.8.3 The models were run for ten seeds (1 to 10) and the results averaged for comparison to observed data in the validation process. The survey data used for validation of each of the models was:

a. independent ATC and link count data; and

b. ANPR journey time data.

Visual calibration

13.8.4 The models were reviewed to check that queuing and driving behaviour matched those observed in surveyed video footage and on the site visits. Specifically, the levels of queueing and queue behaviour past Stonehenge in the mainline A303 model was carefully tested and visually calibrated in the summer model.

Flow calibration

13.8.5 The criteria used to assess model performance are set out in section 3.2.

13.8.6 The modelled turn counts were compared to the observed MCTC data from Friday 18 August 2017 in the summer and 07:00-19:00 for Wednesday 4 October 2017 for the neutral month models.

Turn flow calibration – A303

13.8.7 The tables below show the proportion of GEH values that satisfy the criteria for all junctions in the Local Road and A303 Mainline models. Table 13-16 shows the level of turn count calibration achieved in the A303 Mainline summer model. This shows a level of calibration, with an average of 97% of all turning movements within a GEH of 5, and 92% with a GEH below 3 that exceeds WebTAG acceptability guidelines. Full details of the turn count calibration are included in Appendix D.

Table 13-16: Turn count GEH values for A303 summer mainline network

GEH	Hour 1	Hour 2	Hour 3	Hour 4	Hour 5	Hour 6	Average
GEH <3	139 95%	135 92%	130 89%	138 95%	136 93%	132 90%	135 92%
GEH <5	143 98%	143 98%	137 94%	143 98%	144 99%	140 96%	142 97%
GEH <7	145 99%	146 100%	145 99%	146 100%	146 100%	146 100%	146 100%
GEH <8	146 100%	146 100%	146 100%	146 100%	146 100%	146 100%	146 100%
Counts < 700vph **Flow within 100vph**	121 97%	125 96%	122 95%	123 99%	123 99%	125 94%	123 97%
Counts between 700 & 2,700vph **Flow within 15%**	25 100%	21 95%	24 92%	23 100%	23 100%	21 100%	23 98%
Counts > 2,700vph **Flow within 400 vph**	- -	- -	- -	- -	- -	- -	- -

13.8.8 Table 13-17 shows the level of turn count calibration achieved in the A303 Mainline neutral model. This shows a level of calibration, with 99% of all turning movements within a GEH of 5 in the AM, IP and PM time periods that exceeds WebTAG acceptability guidelines.

Table 13-17: Turn count GEH values for A303 neutral mainline network

GEH	AM	IP	PM
GEH <3	141 97%	140 96%	142 97%
GEH <5	145 99%	145 99%	145 99%
GEH <7	146 100%	146 100%	146 100%
GEH <8	146 100%	146 100%	146 100%
Counts < 700vph **Flow within 100vph**	125 99%	128 100%	123 98%
Counts between 700 & 2,700vph **Flow within 15%**	21 100%	18 100%	23 98%
Counts > 2,700vph **Flow within 400 vph**	- -	- -	- -

13.8.9 An additional layer of flow calibration was undertaken to ensure that the total number of vehicles entering and exiting the network, origins and destinations are consistent with their expected observed values. Vehicle flows on external links are direct input values and this check ensures that all assigned vehicle flows are being successfully loaded into the network during the peak modelled period. Similarly, a check of outbound link flows confirms that the assigned matrix and model operates as expected and that vehicles can complete their intended route.

13.8.10 Table 13-18 and Table 13-19 indicate the GEH and percentage difference of modelled and observed traffic flows across all entry and exit links in the summer mainline and local models. This indicates that all flows on entries and exits are within a GEH of 3 in each model throughout the modelled period, further demonstrating a degree of flow calibration that meets WebTAG acceptability guidelines.

Table 13-18: Entry and exit traffic link flow calibration A303 summer mainline network

Incoming	Hour 1	Hour 2	Hour 3	Hour 4	Hour 5	Hour 6	Average
GEH <3	25 100%	25 100%	25 100%	25 100%	25 100%	25 100%	25 100%
Within 10%	24 96%	21 84%	24 96%	21 84%	23 92%	23 92%	23 91%
Outgoing	**Hour 1**	**Hour 2**	**Hour 3**	**Hour 4**	**Hour 5**	**Hour 6**	**Average**
GEH <3	25 100%	25 100%	25 100%	25 100%	25 100%	25 100%	25 100%
Within 10%	18 72%	19 76%	19 76%	23 92%	21 84%	18 72%	20 79%

Table 13-19: Entry and exit traffic flow calibration A303 neutral mainline network

Incoming	AM	IP	PM
GEH <3	25 100%	25 100%	25 100%
Within 10%	17 68%	23 92%	24 96%
Outgoing	**AM**	**IP**	**PM**
GEH <3	25 100%	25 100%	25 100%
Within 10%	17 68%	23 92%	20 80%

Turn flow calibration – Local Road model

13.8.11 The Local Road summer model GEH calibration level is shown in Table 13-20. This shows a level of calibration with an average of 100% of all turning movements within a GEH of 5, and 96% below 3 that meets WebTAG acceptability guidelines.

Table 13-20: Turn count GEH values for Local Road summer network

GEH	Hour 1	Hour 2	Hour 3	Hour 4	Hour 5	Hour 6	Average
GEH <3	172 96%	168 94%	174 97%	174 97%	177 99%	173 97%	172 96%
GEH <5	179 100%	178 99%	179 100%	179 100%	179 100%	179 100%	179 100%
GEH <7	179 100%	179 100%	179 100%	179 100%	179 100%	179 100%	179 100%
GEH <9	179 100%	179 100%	179 100%	179 100%	179 100%	179 100%	179 100%
counts < 700vph **Flow within 100vph**	179 100%	179 100%	179 100%	179 100%	179 100%	179 100%	179 100%
counts between 700 and 2,700vph **Flow within 15%**	- -	- -	- -	- -	- -	- -	- -
counts > 2,700vph **Flow within 400 vph**	- -	- -	- -	- -	- -	- -	- -

13.8.12 Table 13-21 shows the level of turn count calibration achieved in the Local Road neutral model. This shows a level of calibration, with at least 99% of all turning movements within a GEH of 5 in the AM, IP and PM time periods that exceeds WebTAG acceptability guidelines.

Table 13-21: Turn count GEH values for Local Road neutral network

GEH	AM	IP	PM
GEH <3	167 97%	171 99%	171 99%
GEH <5	171 99%	173 100%	173 100%
GEH <7	173 100%	173 100%	173 100%
counts < 700vph **Flow within 100vph**	170 99%	173 100%	173 100%
counts between 700 and 2,700vph **Flow within 15%**	3 100%	- -	- -
counts > 2,700vph **Flow within 400 vph**	- -	- -	- -

13.8.13 Table 13-22 indicates the GEH and percentage difference of modelled and observed traffic flows across all entry and exit links. This indicates that flows are within a GEH of 3 in the Local model on at least 97% of origin and destination zones throughout the summer and neutral month modelled periods, demonstrating a degree of link flow calibration that exceeds WebTAG acceptability guidelines.

Table 13-22: Entry and exit traffic flow calibration Local Road summer network

Inbound	Hour 1	Hour 2	Hour 3	Hour 4	Hour 5	Hour 6	Average
GEH <3	29 97%	29 97%	30 100%	30 100%	29 97%	30 100%	30 98%
Within 10%	15 50%	17 57%	21 70%	21 70%	16 53%	26 87%	19 64%
Outgoing	**Hour 1**	**Hour 2**	**Hour 3**	**Hour 4**	**Hour 5**	**Hour 6**	**Average**
GEH <3	30 100%	30 100%	30 100%	30 100%	30 100%	29 90%	30 99%
Within 10%	19 63%	19 63%	24 80%	22 73%	21 70%	27 90%	22 73%

Table 13-23: Entry and exit traffic flow calibration Local Road neutral network

Incoming	AM	IP	PM
GEH <3	27 93%	29 97%	29 97%
Within 10%	15 52%	26 87%	22 73%
Outgoing	**AM**	**IP**	**PM**
GEH <3	27 93%	29 97%	29 97%
Within 10%	17 59%	24 80%	25 83%

Journey time validation

13.8.14 Journey time data were extracted from each VISSIM model between the markers shown in Figure 13-25. The Mainline A303 model markers are those shown in red while the Local Road markers are shown in green.

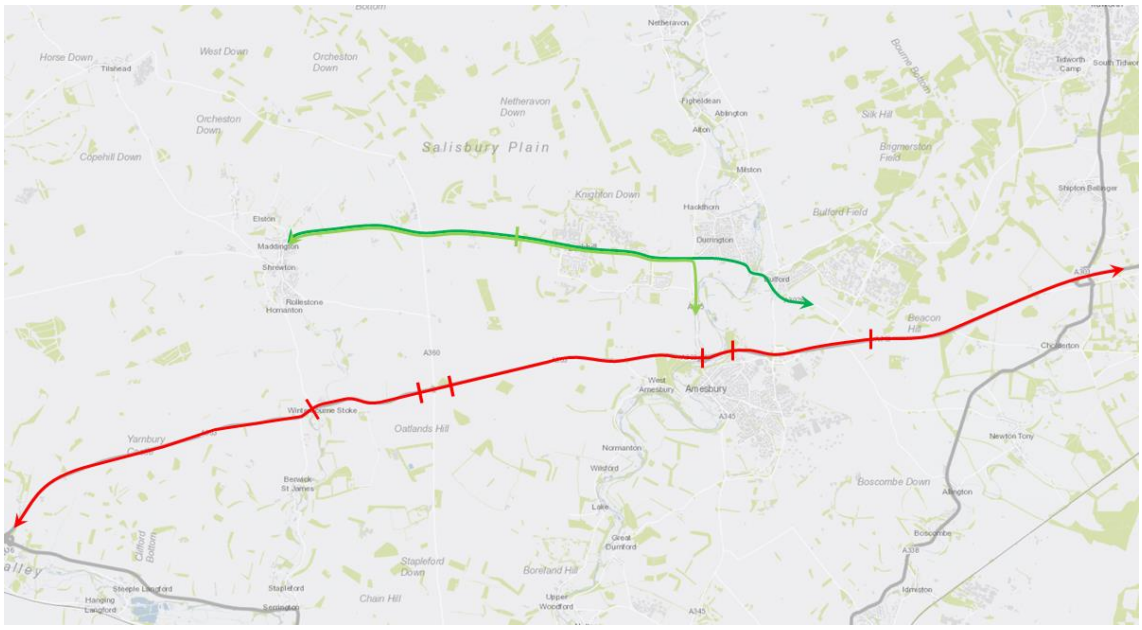


Figure 13-25: Journey time markers

13.8.15 Modelled and observed journey times were compared for each hour of the modelled periods against a tolerance of 1 minute, or 15%, whichever is highest, for journey time segments and the complete routes. Table 13-24 below indicates the comparison statistics at a segment level, and for the total route.

Table 13-24: Journey time summary statistics

Time period	Criteria	Individual JT segments		Complete JT routes	
		A303 Mainline	Local Road	A303 Mainline	Local Road
Neutral AM	Sites	12	3	2	2
	Within 15%, or 1 minute	10	3	2	2
	Percentage Pass	**83%**	**100%**	**100%**	**100%**
Neutral IP	Sites	12	6	2	4
	Within 15%, or 1 minute	11	6	2	4
	Percentage Pass	**92%**	**100%**	**100%**	**100%**
Neutral PM	Sites	12	6	2	4
	Within 15%, or 1 minute	12	4	2	3
	Percentage Pass	**100%**	**67%**	**100%**	**75%**
Summer	Sites	66	36	12	24
	Within 15%, or 1 minute	39	30	8	23
	Percentage Pass	**59%**	**83%**	**67%**	**96%**

13.8.16 Modelled journey times in the neutral month models pass an 85% criteria on all journey time routes except for one route in the Local Road network in the PM peak. At an individual segment level all neutral models pass on more than 85% of sites except the A303 Mainline model in the AM where 83% of segments pass, and the Local Road PM model where the two segments that fail are within only 8 and 6 seconds of passing.

13.8.17 In the summer Local Road model modelled journey times pass on 83% and 96% of individual segments and complete routes respectively. The summer A303 Mainline model passes on 59% of individual segments and 67% of complete routes.

13.8.18 While the summer A303 journey time is not represented to the WebTAG tolerances, the following analysis demonstrates that the substantial delay from traffic congestion in this period is represented within the Mainline models.

13.8.19 The summer cumulative eastbound and westbound journey time on the A303 mainline are shown in Figure 13-26 and Figure 13-27. The graphs show the modelled journey time against the average observed journey time and illustrate a 15% upper and lower range around the observed values (reflecting WebTAG guidance) across the six hour period. The uncongested travel time is about 18 minutes, with the model representing a delay of around 50 minutes within the 15% journey time tolerance for five of the six hours.

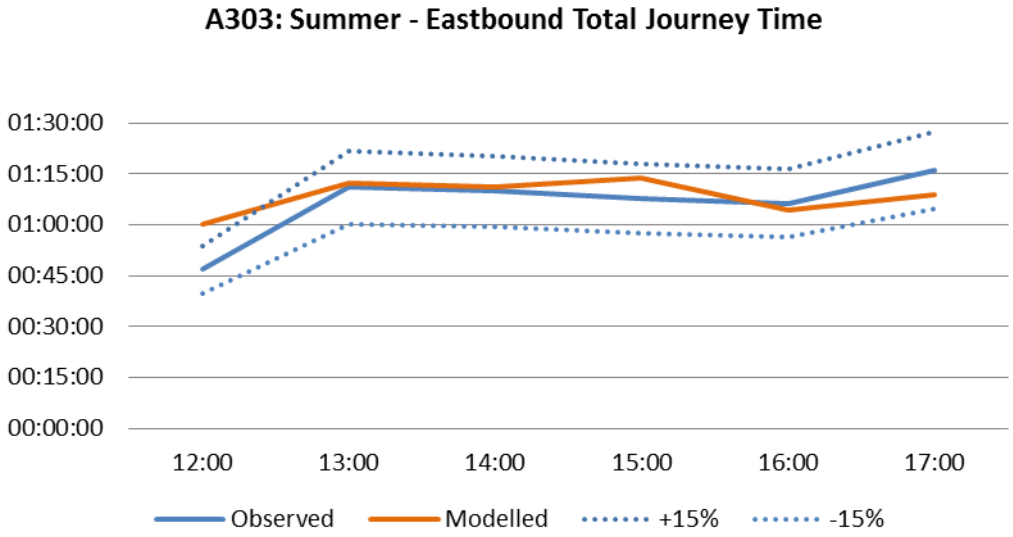


Figure 13-26: A303 summer eastbound total journey time (hh:mm)

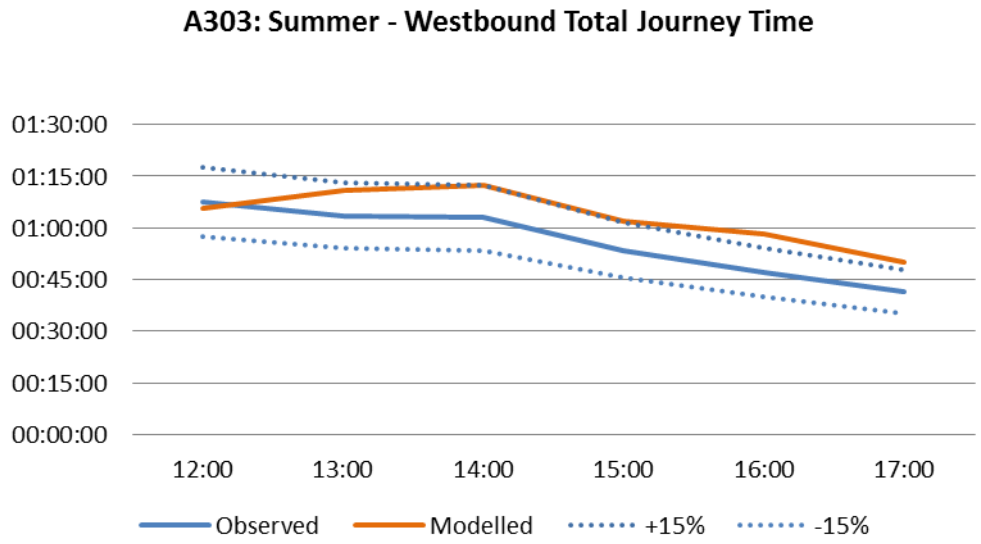


Figure 13-27: A303 summer westbound total journey time (hh:mm)

13.8.20 The eastbound average total journey times are within 15% of the average observed journey times during the summer period, with the exception of the first modelled hour. However, the observed queue levels within the hour from 12:00-13:00 are in accord with the survey video footage and the flow calibration matches well.

13.8.21 The westbound average total journey times are approximately 15% higher than the average observed summer journey times throughout the 13.00 – 18:00 modelled period. The journey time profile across the six hour period follows the observed profile, and the modelled queue patterns and extents match the observed queues well.

13.8.22 Figure 13-28 and Figure 13-29 present the eastbound and westbound journey time on the A303 mainline for each of the individual summer peak hours between 12:00 and 18:00.

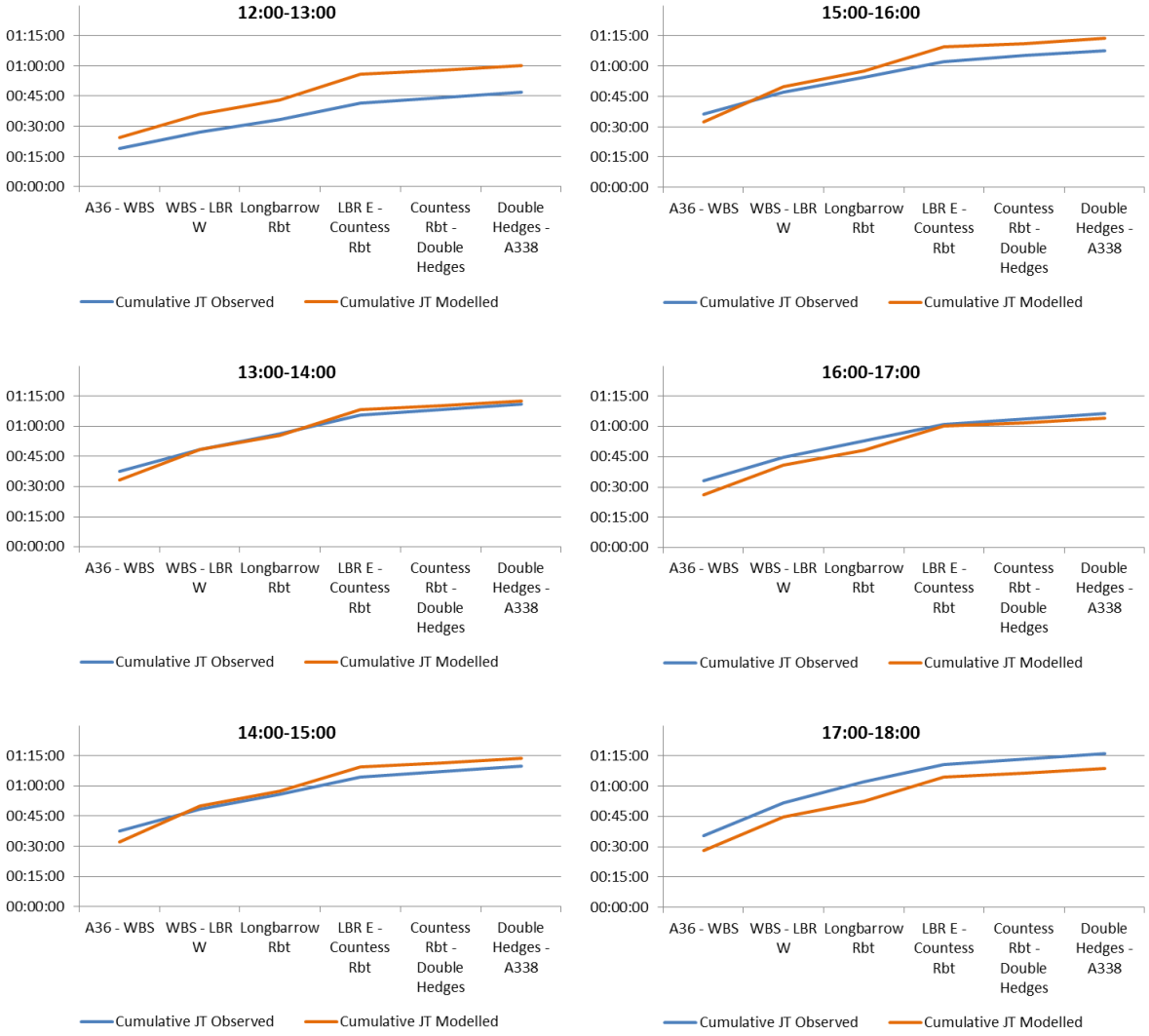


Figure 13-28: A303 summer eastbound total journey time – by hour (hh:mm)

13.8.23 These graphs show the eastbound cumulative journey time along the Mainline A303 per modelled hour. It shows the modelled journey times are slower than the observed in the first hour, 12:00 – 13:00, and closest to observed journey time between 13:00-17:00. Journey times are too fast at the start of the network, between the A303 / A36 and Winterbourne Stoke. The journey time profiles are consistent with observed travel times.

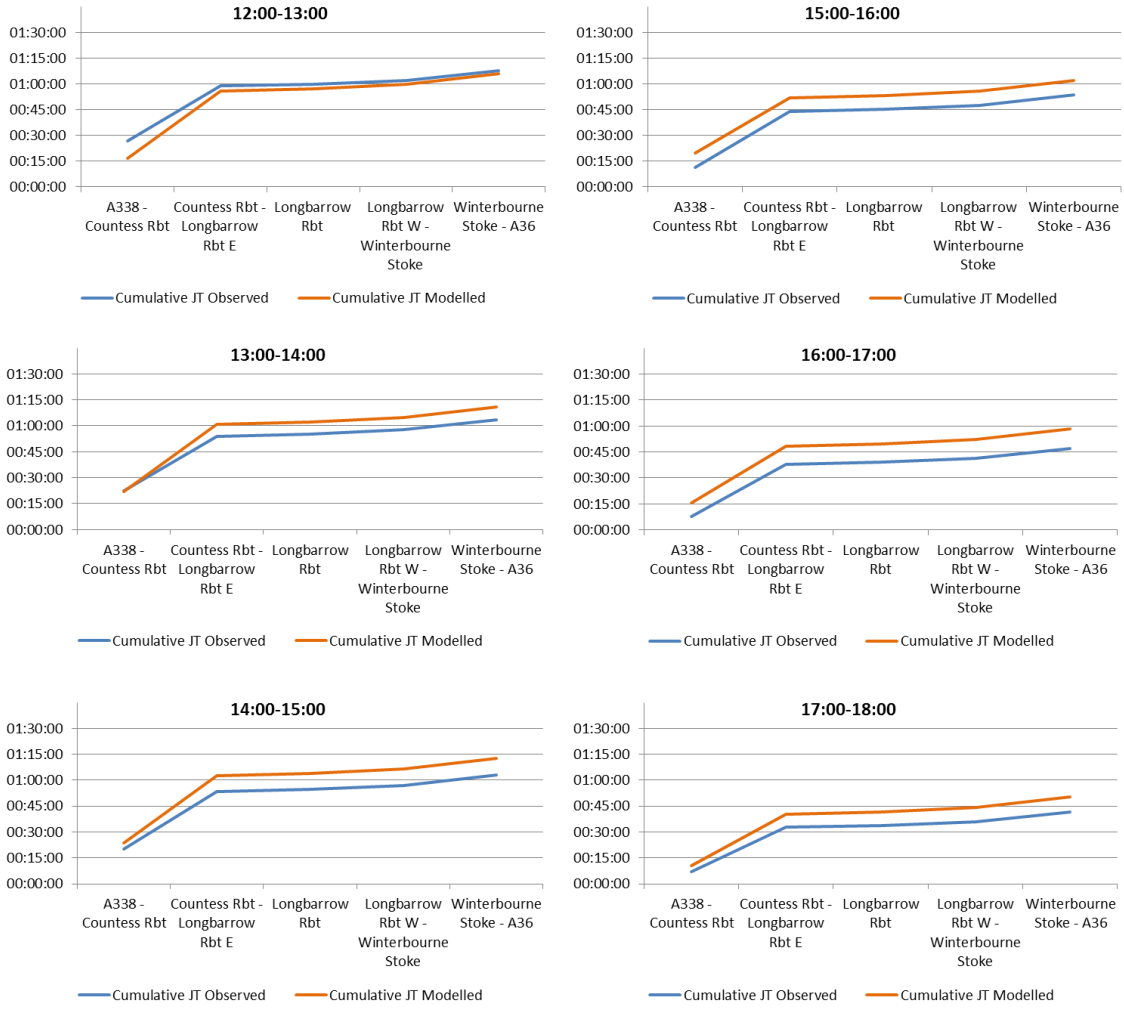


Figure 13-29: A303 summer westbound total journey time – by hour (hh:mm)

13.8.24 The westbound cumulative journey times by hour indicate that the profiles are consistent between the observed and modelled values in each hour, with consistently slower modelled journey times from 13:00 onwards.

13.8.25 The neutral month cumulative AM peak eastbound and westbound journey times on the A303 mainline, are shown in Figure 13-30 and Figure 13-31. The graphs show the modelled journey time against the average observed journey time and illustrate a 15% upper and lower range around the observed values across each peak hour period.

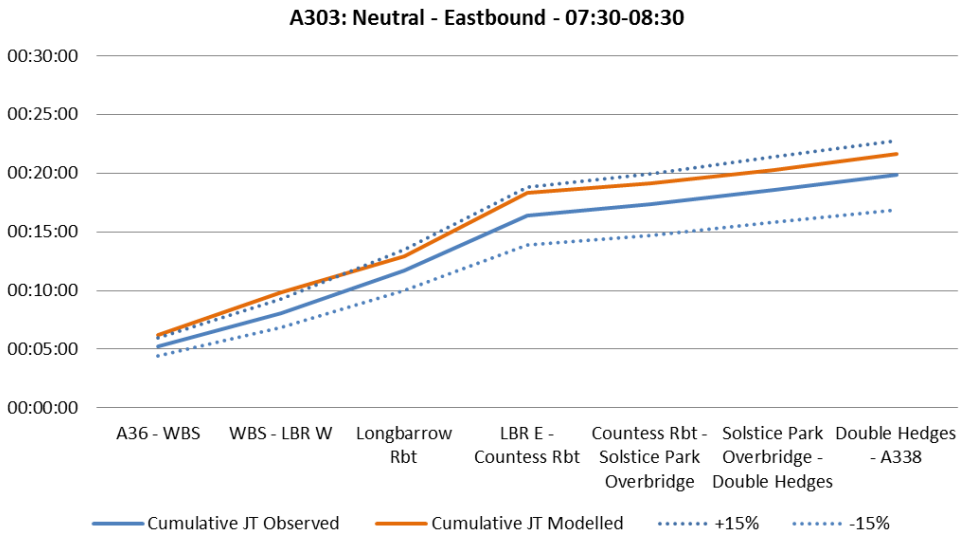


Figure 13-30: A303 neutral eastbound total journey time - AM (hh:mm)

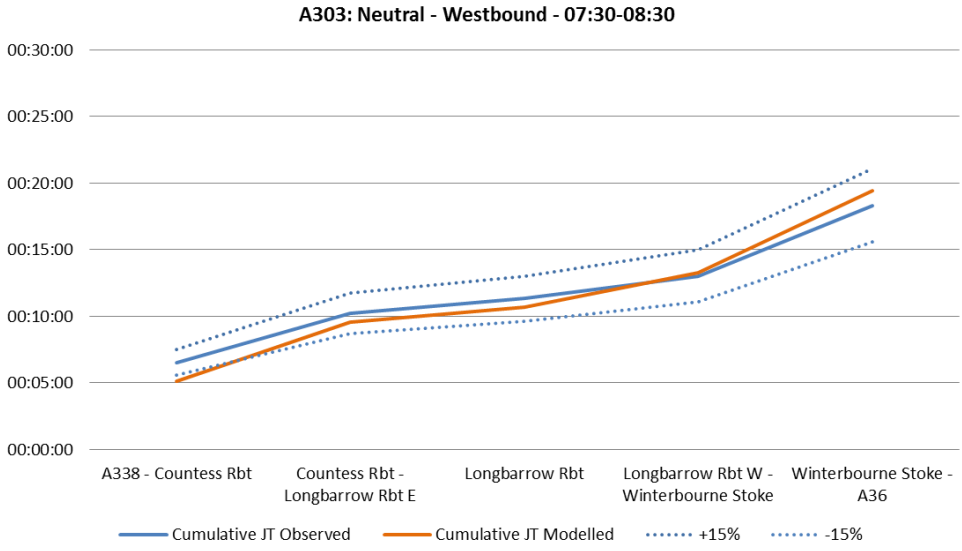


Figure 13-31: A303 neutral westbound total journey time - AM (hh:mm)

13.8.26 The AM peak hour eastbound modelled journey time follows a similar pattern to the observed, and the total journey time is within 15%. The westbound total modelled journey time is also within 15% of the observed.

13.8.27 The neutral month cumulative IP eastbound and westbound journey times on the A303 mainline, are shown in Figure 13-32 and Figure 13-33.

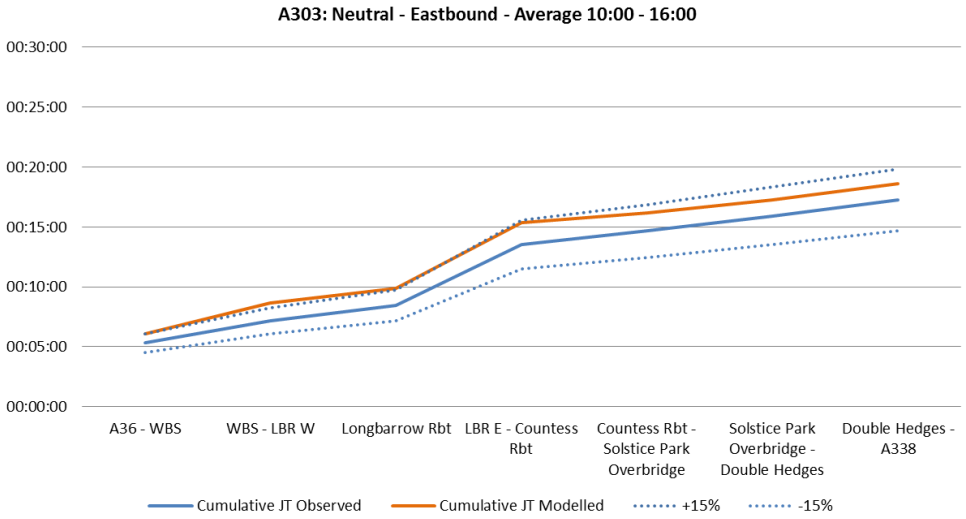


Figure 13-32: A303 neutral eastbound total journey time – average IP (hh:mm)

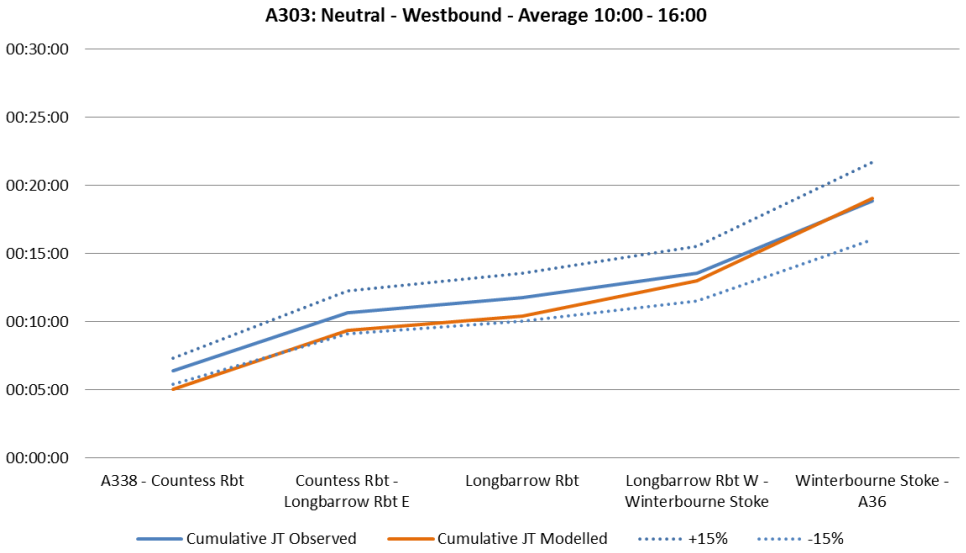


Figure 13-33: A303 neutral westbound total journey time – average IP (hh:mm)

13.8.28 The interpeak average hour total journey times along the A303 are within 15% of the observed in the eastbound and westbound directions. Modelled eastbound journey times are slower than observed and westbound are faster.

13.8.29 The neutral month cumulative PM eastbound and westbound journey times on the A303 mainline, are shown in Figure 13-34 and Figure 13-35.

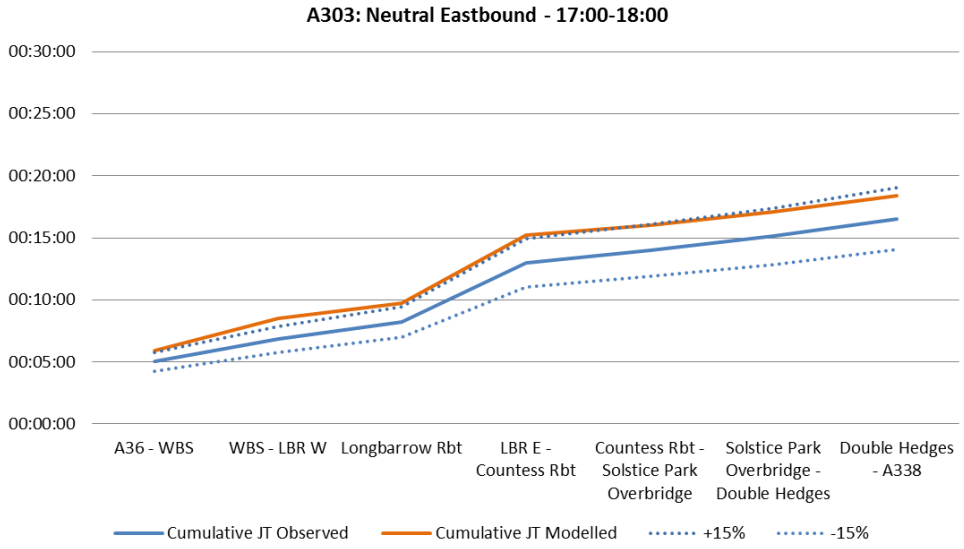


Figure 13-34: A303 neutral westbound total journey time – PM (hh:mm)

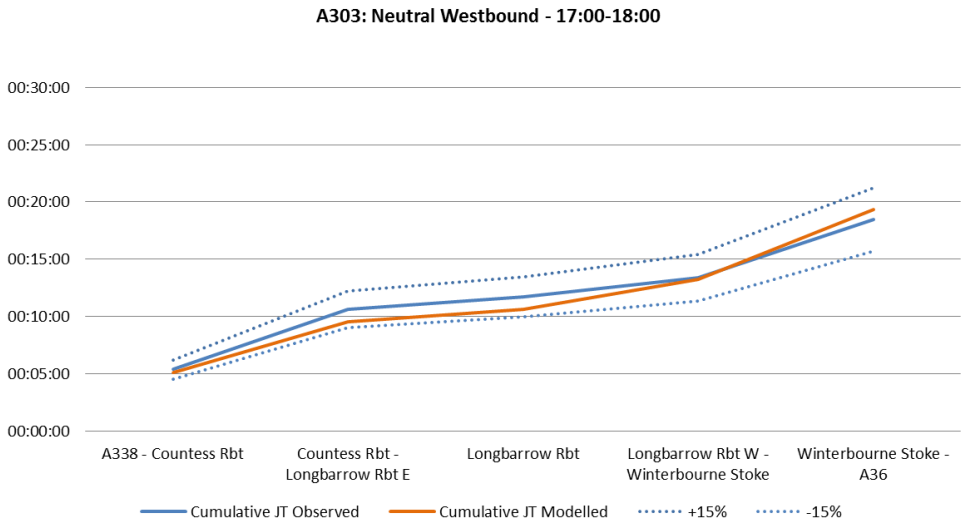


Figure 13-35: A303 neutral eastbound total journey time – PM (hh:mm)

13.8.30 The PM peak hour total modelled journey times are within 15% of the observed in both the eastbound and westbound directions. The eastbound journey times are slower than observed journey times between the A303 / A36 junction and Countess roundabout.

13.8.31 The cumulative eastbound and westbound journey time through the Local Road model between markers 201 and 206 are shown in Figure 13-36 and Figure 13-37 for the summer period. This route incorporates the re-routing of traffic along Fargo Road. The graphs show the modelled journey time against the average observed journey time and a 15% upper and lower limit of the observed values.

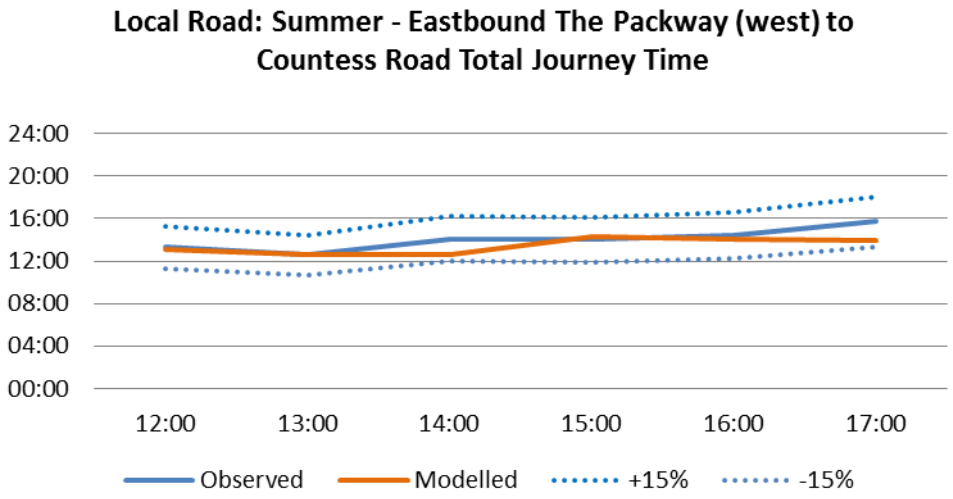


Figure 13-36: Local Roads summer total journey time - The Packway (west) to Countess Road (hh:mm)

13.8.32 The Packway to Countess Road average summer journey times fall within 15% of the average observed throughout the model period. The modelled profile fits the observed well throughout the 6 hour model period and as a result is a good validation result.

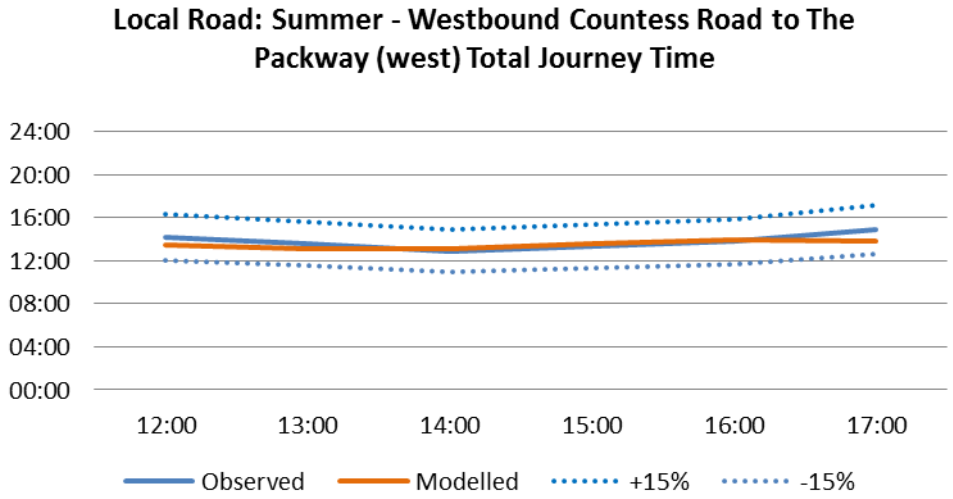


Figure 13-37: Local Roads summer total journey time - Countess Road to The Packway (west) (hh:mm)

13.8.33 The average journey times for the Countess Road to The Packway route are within the 15% upper and lower bounds of the average observed values in the summer period. The average hour journey times profile correlates well with the observed profile throughout the model period.

13.8.34 The cumulative westbound journey time through the Local Road model between markers 201 and 206 is shown in Figure 13-38. There were insufficient neutral AM eastbound observed journey times to establish a reliable observed journey time.

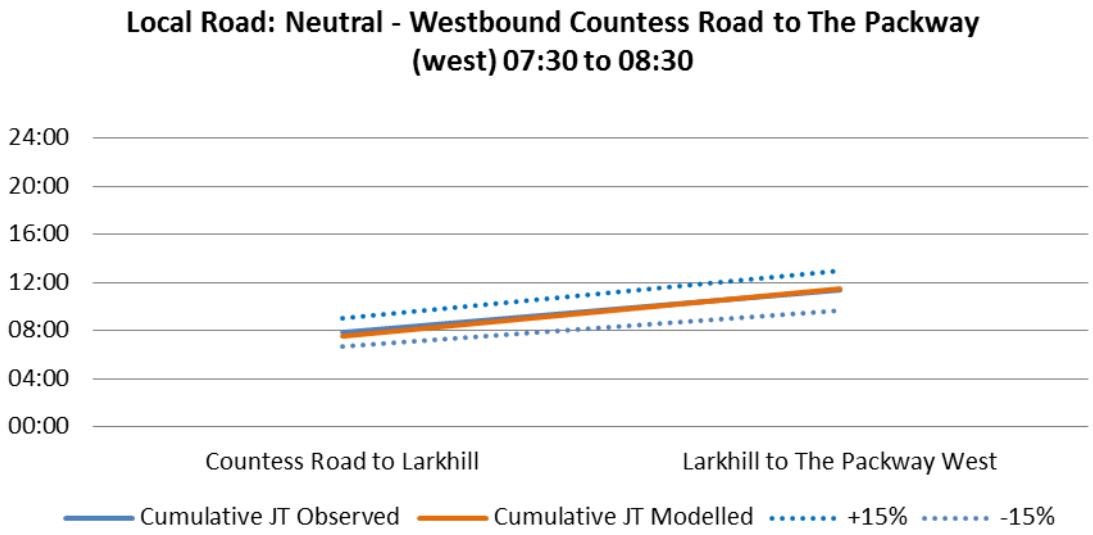


Figure 13-38: Local Roads neutral AM westbound total journey time (hh:mm)

13.8.35 The neutral AM westbound journey times from Countess Road to The Packway validate within 15% of the observed journey times.

13.8.36 The cumulative eastbound and westbound journey time through the Local Road model between markers 201 and 206 are shown in Figure 13-39 and Figure 13-40 for the neutral month average IP hour.

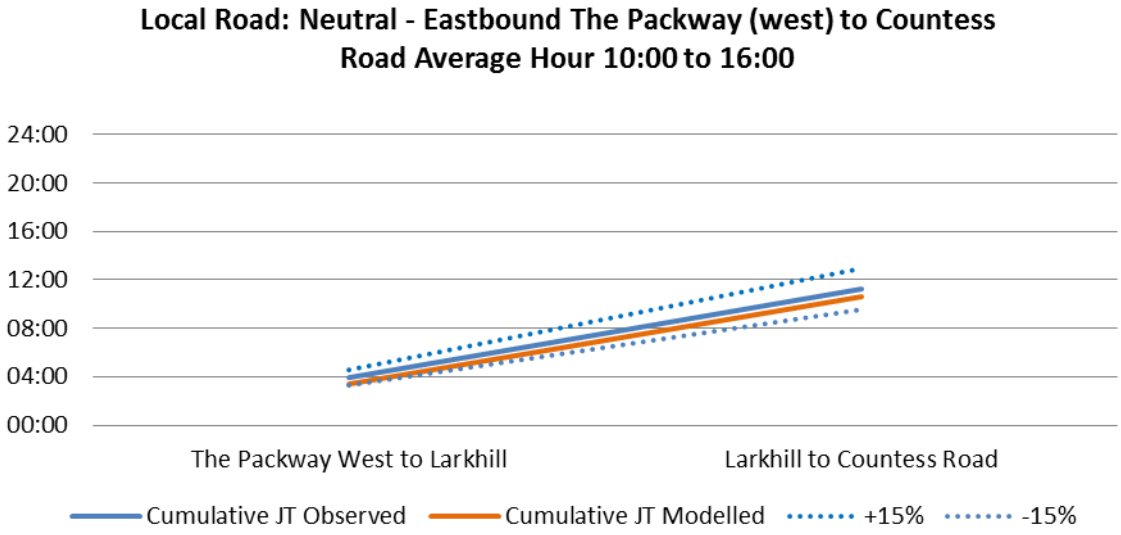


Figure 13-39: Local Roads neutral IP eastbound total journey time (hh:mm)

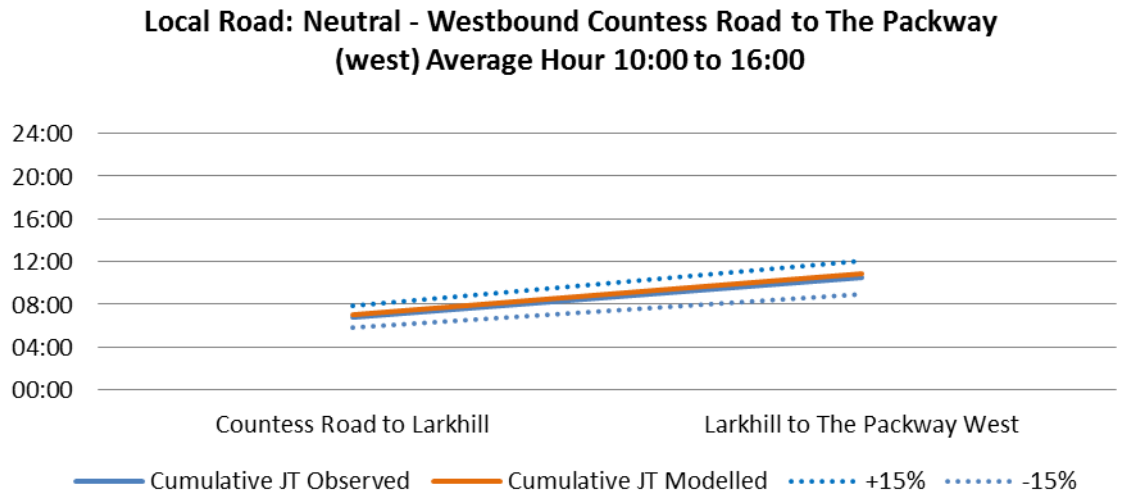


Figure 13-40: Local Roads neutral IP westbound total journey time (hh:mm)

13.8.37 The neutral inter-peak Local Road journey times, eastbound and westbound, validate against observed journey times within 15%.

13.8.38 The cumulative eastbound and westbound journey time through the Local Road model between markers 201 and 206 are shown in Figure 13-41 and Figure 13-42 for the PM peak hour.

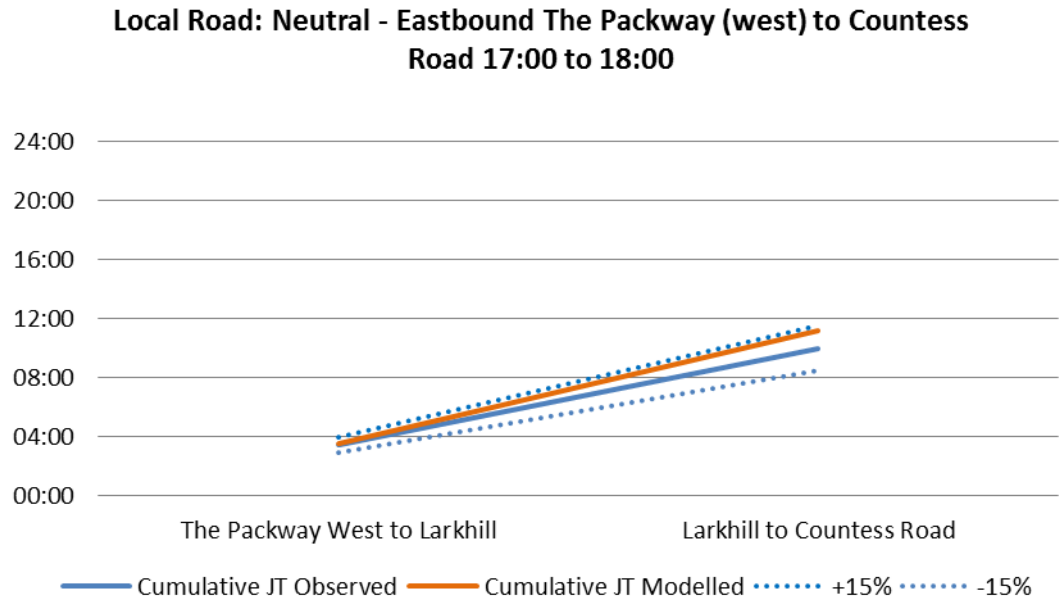


Figure 13-41: Local Roads neutral PM eastbound total journey time (hh:mm)

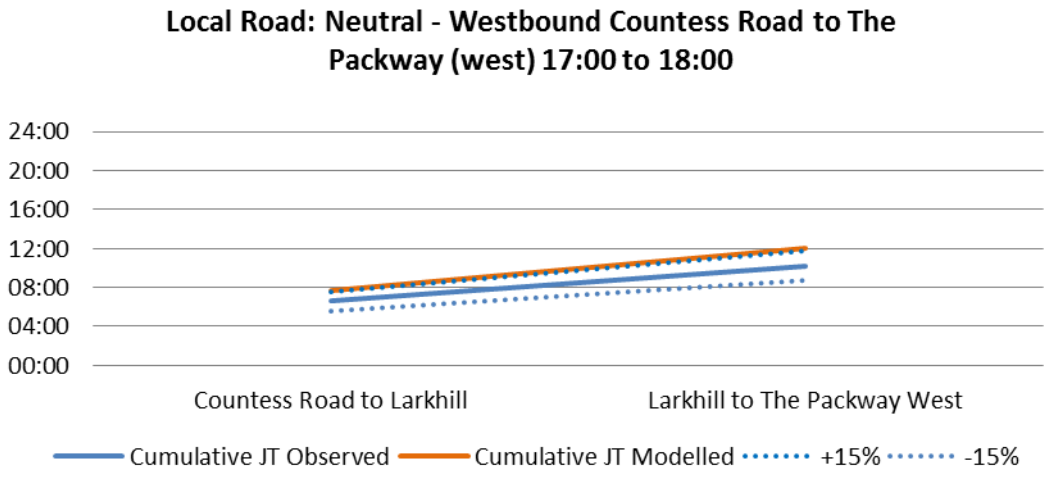


Figure 13-42: Local Roads neutral PM westbound total journey time (hh:mm)

13.8.39 The PM neutral month Local Road journey times validate within 15% of the observed journey times in the eastbound direction, and are above the 15% envelope in the westbound direction. This route includes the southbound right-turn into Fargo Road, which was carefully calibrated to match the observed give-way behaviour.

ATC validation

13.8.40 ATC data were collected at the locations shown in Figure 13-43. These data are independent of the data used when building and calibrating the models and therefore provide independent validation of the modelled traffic flows.

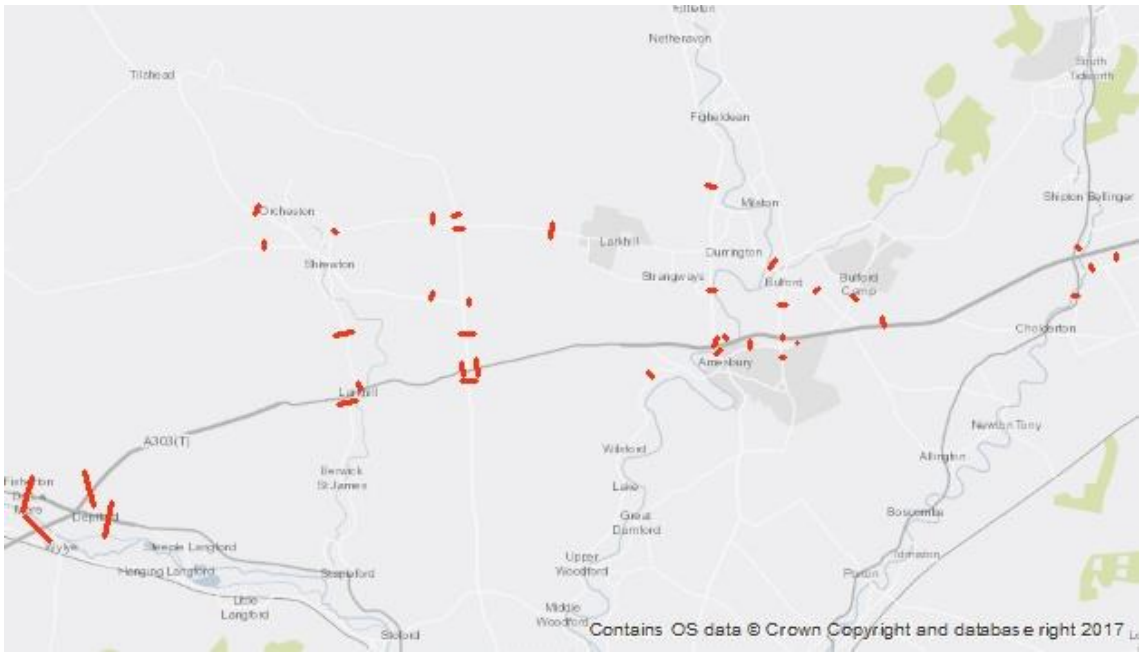


Figure 13-43: ATC sites

13.8.41 The modelled all vehicle, lights and heavy traffic flows were compared to the ATC data collected in the surveys on 18 August 2017 for both the A303 Mainline and Local Road models in the summer period, and 4 October 2017 in the neutral month periods. A detailed breakdown of the results can be found in Appendix D.

13.8.42 Table 13-25 shows the GEH values achieved for all ATC sites within the A303 summer Mainline model. This shows all sites are below a GEH of 5 across every hour in the model, and on average 98% of sites are within a GEH of 3. This shows the flows satisfy the WebTAG criterion.

Table 13-25: ATC comparison GEH values for A303 summer Mainline model

Class	GEH	Hour 1	Hour 2	Hour 3	Hour 4	Hour 5	Hour 6	Average
All Vehicles	<3	31	29	28	28	28	28	29
		100%	100%	97%	97%	97%	97%	98%
	<5	31	29*	29*	29*	29*	29*	29*
		100%	100%	100%	100%	100%	100%	100%
Lights	<3	31	29	28	28	28	29	29
		100%	100%	97%	97%	97%	100%	98%
	<5	31	29	29	29	29	29	29
		100%	100%	100%	100%	100%	100%	100%
Heavies	<3	30	29	29	29	29	29	29
		97%	100%	100%	100%	100%	100%	99%
	<5	31	29	29	29	29	29	29
		100%	100%	100%	100%	100%	100%	100%

*ATC C27 failed within the second hour, hence differing total number of ATC counts

13.8.43 The Local Road model summer ATC validation shows all sites have a total vehicle and light vehicle GEH of below 3 across every hour in the model, showing the flows have validated to the WebTAG criterion.

Table 13-26: ATC comparison GEH values for the summer Local Roads model

Class	GEH	Hour 1	Hour 2	Hour 3	Hour 4	Hour 5	Hour 6	Average
All Vehicles	<3	16	16	16	16	16	16	16
		100%	100%	100%	100%	100%	100%	100%
Lights	<3	16	16	16	16	16	16	16
		100%	100%	100%	100%	100%	100%	100%
Heavies	<3	16	15	15	15	15	12	15
		100%	94%	94%	94%	100%	75%	93%

13.8.44 The neutral month ATC A303 Mainline model comparison is in Table 13-27 and shows within each peak, all vehicle and light flows at all sites are below a GEH of 5 and, as such, the traffic flows validate for the neutral month A303 Mainline models to the WebTAG criterion.

Table 13-27: ATC comparison GEH values for A303 neutral mainline model

Class	GEH	AM	IP	PM
All Vehicles	<3	29	31	31
		94%	100%	100%
	<5	31	31	31
		100%	100%	100%
Lights	<3	30	31	30
		97%	100%	97%
	<5	31	31	31
		100%	100%	100%
Heavies	<3	26	28	29
		84%	90%	94%
	<5	30	29	31
		97%	94%	100%

13.8.45 The neutral month Local Road ATC comparison is in Table 13-28 and shows all sites in the IP model are within a GEH of 5, and AM and PM peak models have 94% of sites within a GEH of 5. This shows the models validate for traffic flows to WebTAG tolerances.

Table 13-28: ATC comparison GEH values for neutral Local Roads model

Class	GEH	AM	IP	PM
All Vehicles	<3	14	14	14
		88%	88%	88%
	<5	15	16	15
		94%	100%	94%
Lights	<3	14	15	14
		88%	94%	88%
	<5	15	16	16
		94%	100%	100%
Heavies	<3	14	14	14
		88%	88%	88%
	<5	15	16	15
		94%	100%	94%

Model stability

13.8.46 Base model results are provided for an average of ten seeds (1 to 10). Results from multiple seed values are used to 'smooth out' outliers and check that outturn model results are stable with marginally varying parameter values, such as vehicle input, speed and dwell time distributions, contained within each seed run.

13.8.47 Figure 13-44 below shows summer journey times on the A303 Mainline and The Packway for each of the 10 seed runs and the average. The journey times on each of the seed runs are close to the average journey time indicating that the summer models are stable with little variation across seeds.

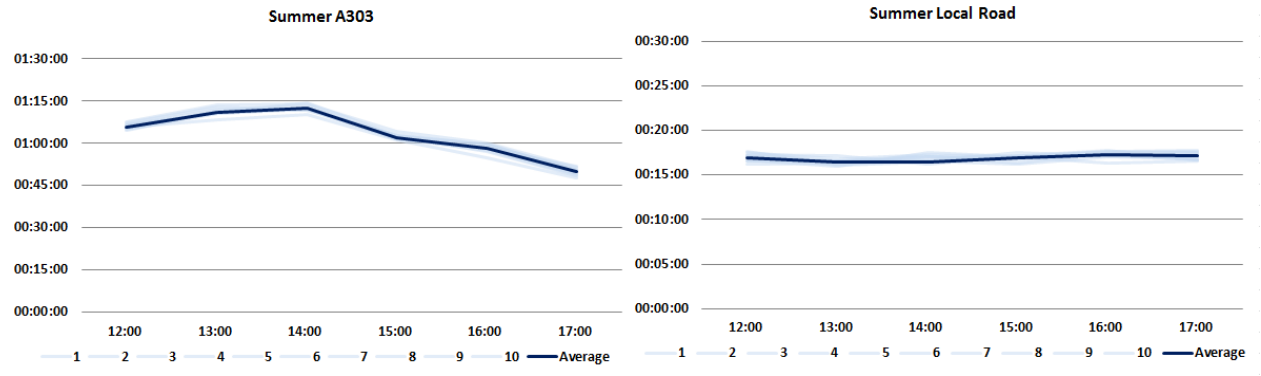


Figure 13-44: Summer model – journey times – random seed results

13.8.48 Figure 13-45 to Figure 13-47 below shows neutral month journey times on the A303 Mainline and The Packway for each of the 10 seed runs and the average. The journey times on each of the seed runs are close to the average journey time indicating that the neutral month models are stable with little variation across seeds.

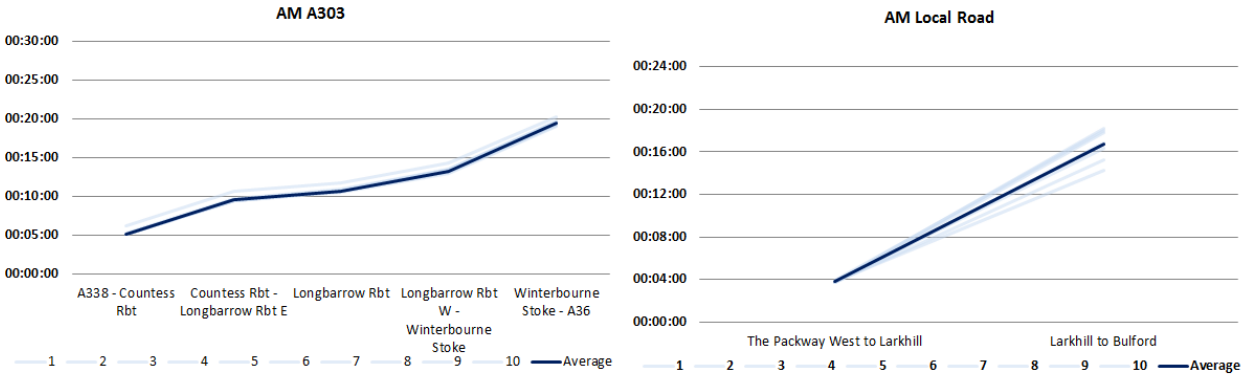


Figure 13-45: Neutral model – journey times – random seed results – AM

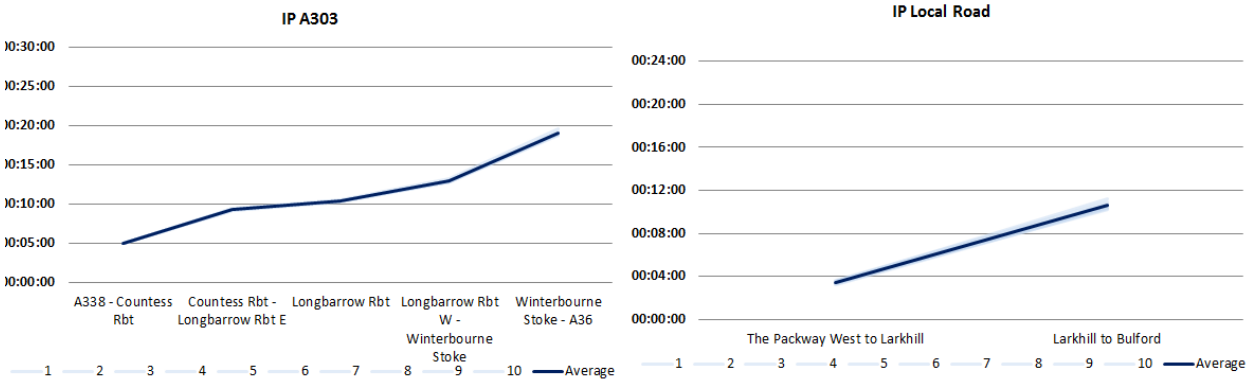


Figure 13-46: Neutral model – journey times – random seed results – IP

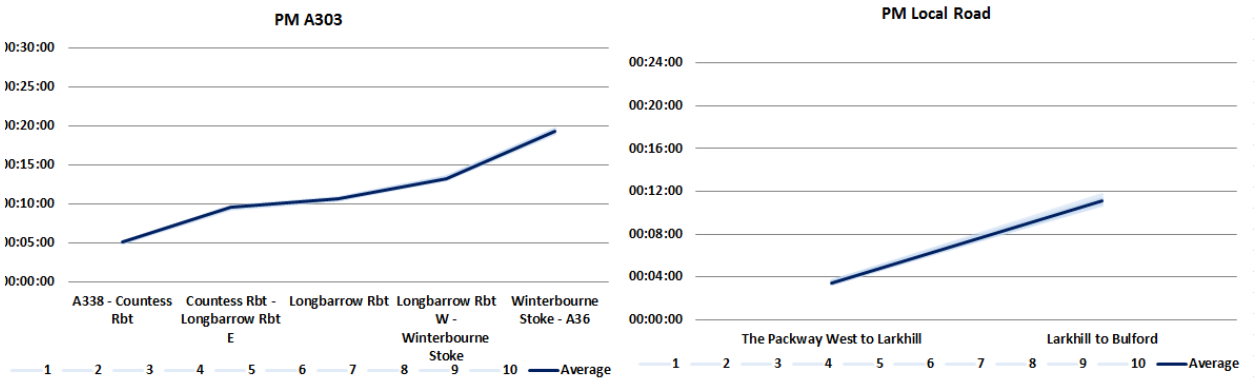


Figure 13-47: Neutral model – journey times – random seed results – PM

13.9 Calibration and validation summary

13.9.1 Both the A303 Mainline and the Local Road model were developed from suitable data and calibrated to site observations, video footage and MCTC data. Independent validation was undertaken using ATC link count data and ANPR journey time data.

A303 Mainline model

13.9.2 Visual inspection and turn flow calibration demonstrates that the model represents the turning flows and queueing at junctions within acceptability guidelines. A balance was reached between visual queue calibration and journey time validation in the summer model, resulting in higher journey times modelled in the westbound direction compared to observed journey times. The neutral month models journey times are within acceptability guidelines. The models validate within acceptability guidelines to ATC data.

13.9.3 The models are intended to test operational performance of the junctions and network. While the journey time is not represented to the WebTAG tolerances in the summer, the model does appropriately represent substantial delay from traffic congestion. This ability to represent congestion, taken together with the representation of observed queueing behaviours is sufficient for the model to be used in testing operational impacts, subject to particular care should the forecasts indicate that the demand forecasts are near the capacity thresholds, i.e. the point where queues form.

Local Road model

13.9.4 A good level of calibration was achieved and the models validate well against ATC and journey time data. The neutral month models journey time validation is within acceptability guidelines.

13.9.5 These models are suitable to use for further work and scheme testing.

14 Summary of model development

14.1 Summary of model development

14.1.1 Highways England is progressing the development of the A303 Amesbury to Berwick Down scheme, one of the most significant schemes in the first period of the Roads Investment Strategy. The Scheme is being developed by the Complex Infrastructure Projects (CIP) team, part of Highways England's Major Projects directorate.

14.1.2 Transport modelling is required to provide an evidence base for the Scheme. The evidence base needs to be able to assess the impacts of the Scheme in normal traffic conditions and during the busy summer and holiday periods where significant congestion is currently observed. Two separate transport models have been developed: a refined strategic model, based on Highways England's South West Regional Traffic Model (SWRTM), and A303 and local road microsimulation operational models.

14.1.3 The strategic model has been developed by augmenting information derived from SWRTM Design Freeze 3.0 (DF3.0) and the PCF Stage 2 options model. Local demand data, local traffic counts and network refinements pertinent to the single scheme being taken forward at Stage 3 have been introduced. Given the specific issues on the A303 caused by holiday traffic, a summer time period model has also been developed to cover the busy summer Friday, Saturday and Sunday times during July and August. The refined model is known as the 'A303 Stonehenge SWRTM (DCO)' model.

14.1.4 New traffic surveys were undertaken in August and October 2017 to provide local demand data and traffic volumes. These included ANPR, ATC, MCC and MCTC surveys. These data have been processed in accordance with guidance given in WebTAG Unit M1.2.

14.1.5 The model has been developed, calibrated and validated in accordance with guidance: this includes appropriate elements of WebTAG, particularly units M2 (VDM) and M3.1 (Highway Assignment Modelling). In addition, guidelines produced during the development of the Highways England Regional Traffic Models (RTMs) have been followed, including use of the network coding manual to ensure consistency in network development.

14.2 Summary of standards achieved

'A303 Stonehenge SWRTM (DCO)' model

14.2.1 The validation of the out-turn trip matrices, following matrix estimation has been demonstrated using the WebTAG screenline acceptability guidelines for the local AoDM. The five local screenlines meet the WebTAG criteria (total modelled flow differences within ±5% of total observed flows) and acceptability guidelines.

14.2.2 Against observed data in the AoDM, the model meets or exceeds WebTAG acceptability guidelines for individual link flow calibration, independent link and turning count validation and journey time route and segment validation.

14.2.3 The wider highway assignment model, in the Fully Modelled Area, has met the RTM validation criteria for trip matrices (screenlines), individual link flow calibration and validation, and journey time validation. The 'A303 Stonehenge SWRTM (DCO)' model shows no material change from the SWRTM DF3.0 model in terms of matrix validation or assignment calibration / validation to link flows and journey times. Thus the wider regional trip volumes and patterns remain appropriately represented.

Operational modelling

14.2.4 Visual inspection and turn flow calibration of the microsimulation model demonstrates that the model represents the turning flows and queueing at junctions within acceptability guidelines. A balance was reached between visual queue calibration and journey time validation in the summer model, resulting in higher journey times modelled in the westbound direction compared to observed journey times. The neutral month model journey times are within acceptability guidelines. The models validate within acceptability guidelines to ATC data.

14.3 Robustness of model

Forecasting

14.3.1 As demonstrated, the model has achieved a robust set of standards in the base year, meeting and exceeding WebTAG acceptability criteria for calibration and validation in the AoDM and with no material change to the Fully Modelled Area when compared to SWRTM DF3.0.

14.3.2 Realism testing has demonstrated that the demand elasticities established for SWRTM DF3.0 have not been materially affected by the local model development, and thus retaining the acceptable demand model responsiveness.

14.3.3 Overall, the model has been developed in-line with RTM guidance and the AoDM has been refined in accordance with guidance given in WebTAG. The model therefore provides a sound basis from which to forecast.

14.3.4 The specific A303 Amesbury to Berwick Down scheme appraisal will need to consider local development and infrastructure uncertainty in greater detail than regional applications of SWRTM DF3.0, following scheme-specific assessment guidance in WebTAG Unit M4.

A303 Amesbury to Berwick Down scheme appraisal

'A303 Stonehenge SWRTM (DCO)' model

14.3.5 The model is intended to assess the impact of the A303 Amesbury to Berwick Down scheme. The model has been shown to be well validated to both link flows, turning counts and observed travel times along the A303 corridor in the vicinity of the Scheme. WebTAG acceptability guidelines for each of these measures have been met.

14.3.6 Furthermore, the local road network that is likely to be affected has also been well validated, with turning counts at key junctions shown to compare well with observed values. Travel times on these local routes are also all validated to WebTAG criteria. With regards to strategic re-routeing, travel times on the alternative M4 / M5 corridor and the A31 / A35 routes are also well represented.

14.3.7 Independent link flow validation has also been undertaken on the edges of the AoDM, to provide confidence in the use of model outputs for these areas in environmental analyses, where the Affected Road Network (ARN) may extend beyond the AoDM. These independent link validation sites meet WebTAG acceptability guidance for link flow validation.

14.3.8 The robust performance of the model within the AoDM against link, turning count and journey time validation additionally suggests that the model is suitable for cordoning to provide demand inputs to future year operational modelling.

Operational models

14.3.9 The models are intended to test operational performance of the junctions and network. While the journey time is not represented to the WebTAG tolerances in the summer, the model does appropriately represent substantial delay from traffic congestion. This ability to represent congestion, taken together with the representation of observed queueing behaviours is sufficient for the model to be used in testing operational impacts, subject to particular care should the forecasts indicate that the demand forecasts are near the capacity thresholds, i.e. the point where queues form.

14.3.10 The operational models are considered suitable to use for further work and scheme testing.

14.4 Recommendations

14.4.1 It is recommended that the strategic and operational models developed be taken forward for appraisal of the A303 Amesbury to Berwick Down scheme. The performance of the models against both calibration data and independent validation data have shown that they tend to represent traffic movements and volumes both local to the Scheme and across the wider area well.

14.4.2 Whilst the models have demonstrated sound performance and their development has followed appropriate guidance, it is recommended that any subsequent use of model outputs by other workstreams is undertaken in close coordination with the traffic model team and Highways England to ensure data are used in an appropriate manner.

Abbreviations List

AADT	Annual Average Daily Traffic
AAWT	Annual Average Weekday Traffic
AM	Morning peak
ANPR	Automatic Number Plate Recognition
AoDM	Area of Detailed Modelling
AQMA	Air Quality Management Area
ARN	Affected Road Network
ATC	Automatic Traffic Count
BRES	Business Register and Employment Survey
BYFM	Base Year Freight Matrices
CAA	Civil Aviation Authority
CIP	Complex Infrastructure Projects
ComMA	Combined Modelling and Appraisal Report
CSR	Client Scheme Requirements
CSRGT	Continuing Survey of Roads Goods Traffic
DCO	Development Consent Order
DEFRA	Department for Environment, Food & Rural Affairs
DfT	Department for Transport
DIADEM	Dynamic Integrated Assignment and Demand Modelling
DMRB	Design Manual for Roads and Bridges
DVLA	Driver and Vehicle Licensing Agency
EB	Eastbound
END	Environmental Noise Directive
ES	Environmental Statement
FMA	Fully Modelled Area
GIS	Geographic Information Systems

GOR	Government Office Region
HDV	Heavy Duty Vehicle
HEIDI	Highways England Integrated DIADEM Interface
HGV	Heavy Goods Vehicle
IAN	Interim Advice Note
IP	Interpeak
JtW	(Census) Journey to Work
km	Kilometre
km/h	Kilometres per Hour
LAD	Local Authority District
LGV	Light Goods Vehicle
LMVR	Local Model Validation Report
LSOA	(Census) Lower Super Output Area
MCC	Manual Classified Count
MCO	Moving Car Observer
MCTC	Manual Classified Turning Count
mph	Miles per Hour
MPOD	Mobile Phone Origin Destination
MVR	Model Validation Report
NAPALM	National Air Passenger Allocation Model
NB	Northbound
NCSD	National Coach Services Database
NSIP	Nationally Significant Infrastructure Project
NTEM	National Trip End Model
NTM	National Transport Model
NTS	National Travel Survey
NUTS	Nomenclature of Territorial Units for Statistics
O-D	Origin-Destination

OGV1	Ordinary Goods Vehicle type 1 (2 and 3 axle rigid vehicles)
OGV2	Ordinary Goods Vehicle type 2 (4 axle rigid, 3+ axle articulated vehicles)
PCF	Project Control Framework
PCU	Passenger Car Unit
PM	Evening peak
PPK	Pence Per Kilometre
PPM	Pence Per Minute
PSV	Public Service Vehicle
PT	Public Transport
RIS	Roads Investment Strategy
RoFMA	Rest of Fully Modelled Area
RSI	Roadside Interview
RTM	Regional Traffic Model
SB	Southbound
SGVC	Specialised Goods Vehicle Counts
SLA	Select Link Analysis
SRN	Strategic Road Network
SWARMMS	South West Area Multi-Modal Study
SWRTM	South West Regional Traffic Model
TCG	Technical Consistency Group
TDCR	Traffic Data Collection Report
TEMPro	Trip End Model Presentation programme
TEN-T	Trans-European Network-Transport
TIS	Highways England's Trip Information System
TMP	Transport Model Package
TNDS	Traveline National Dataset
TPG	Highways England's Transport Planning Group
TSGB	Transport Statistics Great Britain

UNESCO	The United Nations Educational, Scientific and Cultural Organization
VAT	Value Added Tax
VCI	Visitor Centre Interview
VDM	Variable Demand Model(ling)
VOC	Vehicle Operating Cost
VoT	Value of Time
WB	Westbound
WebTAG	Web-based Transport Analysis Guidance
WebTRIS	Web-based Traffic Information System
WHS	World Heritage Site

Appendices

Appendix A Area of detailed modelling

A.1 Introduction

A.1.1 Context

A.1.1.1 As the A303 Amesbury to Berwick Down scheme moves into the Development phase of works (PCF Stage 3), the traffic model will need to be refined to answer detailed questions on the scheme impacts, providing an evidence base for the Development Consent Order (DCO).

A.1.1.2 Three traffic models have been developed and used to-date. The existing London to South West and South Wales Multi-Modal Study (SWARMMS) model was used at PCF Stage 0; a hybrid model combining the network from Highways England's South West Regional Traffic Model (SWRTM) with refined SWARMMS 2013 base year matrices was used at PCF Stage 1; and PCF Stage 2 made use of an early release version of the SWRTM with local enhancements made in the vicinity of Amesbury and Berwick Down. The PCF Stage 2 model is henceforth referred to as the 'A303 Stonehenge SWRTM' and is the model that will be refined for use at Stage 3.

A.1.1.3 The model developed for PCF Stage 2 needed to have an Area of Detailed Modelling (AoDM) – the area over which the impacts of the Scheme are likely to be strong – that was wide enough to test the different scheme options emerging from PCF Stage 1. As the modelling moves to PCF Stage 3, the development of a single scheme option, the AoDM needs to be redefined and refocussed for the appraisal of a single option. The definition of the AoDM is an early task in the refinement of the A303 Stonehenge SWRTM as it will define those locations where the most detailed refinements are required.

A.1.2 Appendix A purpose and structure

A.1.2.1 This appendix sets out the specification and results of an 'Area of Influence' test using the existing A303 Stonehenge SWRTM to help to define the extents of the refined highway model that will be used as the evidence base for the DCO application. Specification of the extents of the refined highway model is a pre-requisite to the model build and subsequent calibration and validation process.

A.1.2.2 The appendix draws on guidance given in the Department for Transport's (DfT) Web-based Transport Analysis Guidance (WebTAG), with a particular focus on WebTAG Unit M3.1 'Highway Assignment Models'. Other relevant guidance documents and resources are referred to where relevant.

A.1.2.3 Following this introductory section the remainder of this appendix is structured as follows:

a. section 2 – Modelled area types and the Area of Influence test;

b. section 3 – Extent of modelled impacts;

c. section 4 – Environmental considerations; and

d. section 5 – Summary, conclusions and next steps.

A.2 Modelled area types and the area of influence test

A.2.1 Modelled area types

A.2.1.1 The level of detail within a transport model varies by location. Models should be more detailed within the Study Area and become less detailed with increasing distance from the Study Area. This reduction in the level of detail should be graduated and not stark, commensurate with the requirements to ensure a good representation of routeing into the Study Area.

A.2.1.2 The geographic coverage of the new model needs to be sufficient enough that:

a. the strategic re-routeing impacts of interventions can be modelled;

b. areas outside of the main Study Area, which are potential alternative diversions, are properly represented; and

c. the full lengths of trips are represented.

A.2.1.3 WebTAG Unit M3.1 §2.2 provides guidance on defining the level of detail within a transport model. This defines the types of model area and the role that they should play in ensuring the representation of trips in the Study Area is appropriate. The purpose for which the refined highway assignment model will be used is very specific: for testing the impact of a package of interventions on the A303, principally between Amesbury in the east and Berwick Down in the west.

A.2.1.4 The specific nature of the package of interventions to be tested aids in the definition of the boundaries of the model area types. WebTAG denotes three types of modelled area, which are set out in Table A-1.

Table A-1 Modelled area type

Area Type	Intervention impacts	Characteristics
Fully Modelled Area (FMA), of which…		
… Area of Detailed Modelling (AoDM)	Significant impacts are certain	All trip movements included; Small, detailed zones; High-level of network detail; Junction modelling (simulation coding)
… Rest of the Fully Modelled Area (RoFMA)	Impacts are likely but weak in magnitude	All trip movements included; More aggregate zones; Mixture of speed-flow curve modelling and

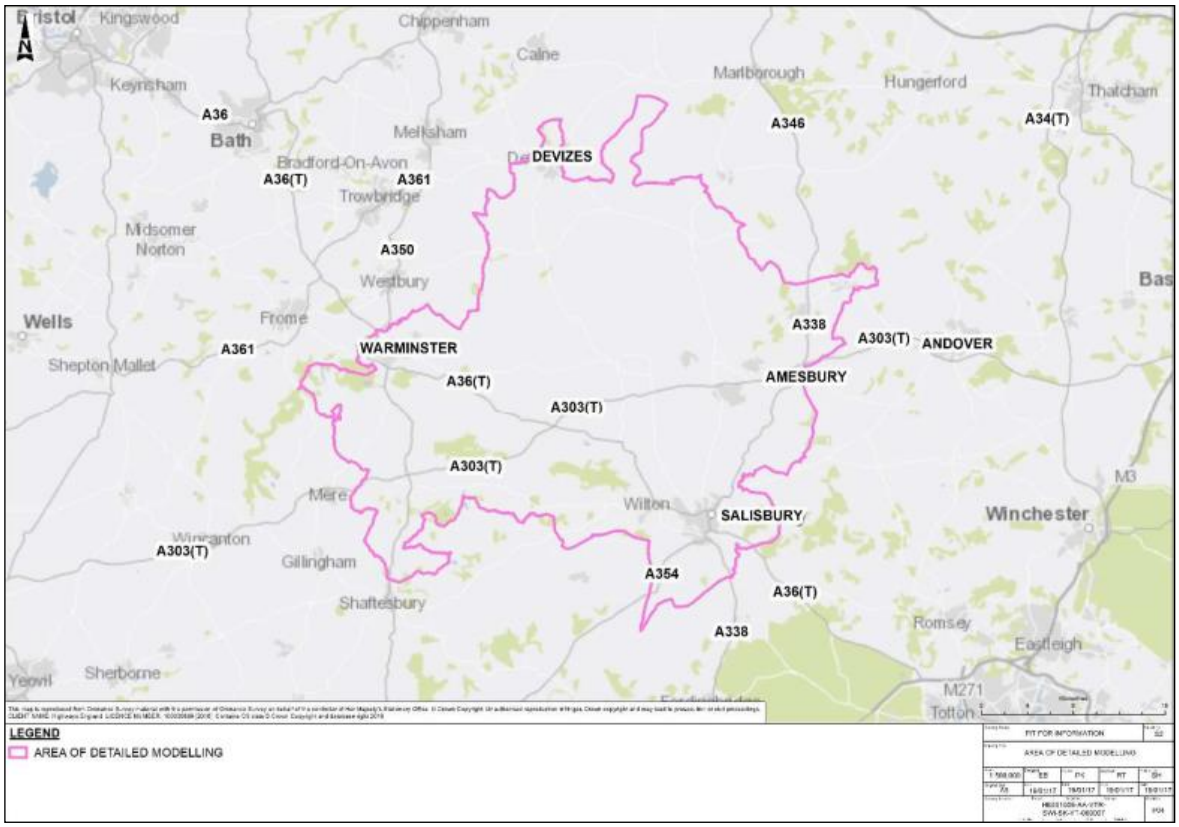
		key junctions.
External Area	Small to negligible impacts	Skeletal coverage of rest of Great Britain; Large zones; Fixed speeds (for variable demand model compatibility).

A.2.1.5 It is important to adequately define the boundaries of the different model area types. Failure to do so could result in a model that does not have suitable coverage to assess the traffic re-routeing impacts for the tests to which it will be applied. An Area of Detailed Modelling that is too small, for instance, may not provide adequate coverage for noise and air quality assessments.

A.2.1.6 To provide an evidence base for the definition of the modelled areas, an Area of Influence test has been undertaken using the existing A303 Stonehenge SWRTM. This test has been undertaken in accordance with the guidance provided in WebTAG Unit M3.1 §2.2.8. The remainder of this section sets out the results of this test.

A.2.2 The existing study area

A.2.2.1 The Area of Detailed Modelling (AoDM), as defined at PCF Stage 2, was developed during PCF Stage 1 following an assessment of the extents of impact of interventions in the vicinity of Stonehenge. This reflects judgement incorporating the need then to assess a range of corridor options. The AoDM from PCF Stage 2 is shown in Figure A-1.



Source: Figure 9-1, A303 Stonehenge Amesbury to Berwick Down Scheme Assessment Report Volume 1 (September 2017)

Figure A-1: PCF Stage 2 Area of Detailed Modelling

A.2.2.2 As the figure demonstrates, the AoDM previously defined extends from Devizes, Wiltshire in the north to Salisbury, Wiltshire and Shaftesbury, Dorset in the south. The eastern extent of the AoDM is Amesbury, Wiltshire, whilst the western extent is to the west of Warminster, Wiltshire.

A.2.2.3 The AoDM was defined to assess the impacts across a number of different scheme options, as part of the PCF Stage 2 'Options' phase. As part of the PCF Stage 3 'Development' phase, the focus of scheme assessment and appraisal will switch to a single option; this will allow for a more focussed AoDM to be determined and thus more focussed development effort in terms of refining the strategic traffic model.

A.2.3 The Area of Influence test

A.2.3.1 WebTAG Unit M3.1 §2.2.8 notes that an evidence-based approach to the definition of the Area of Detailed Modelling and the Rest of the Fully Modelled Area is to make use of an existing model where one is available. This involves undertaking initial high-level tests of the types of intervention that will be undertaken in the new model and for which the new model will be expected to provide a robust evidence base. These Area of Influence tests will help to define the areas over which the impacts of the proposed interventions are expected to be strong, weak or negligible.

A.2.3.2 A proviso of this approach is that the existing model should have 'geographic coverage that is as wide, or wider, than that of the proposed model'. The area covered by the extant A303 Stonehenge SWRTM is considered more than appropriate for these tests, as the model covers the whole of the south west of England – extending from Cornwall in the west to Southampton in the east. The extent of the simulation network (Fully Modelled Area) in SWRTM is shown in Figure A-2.

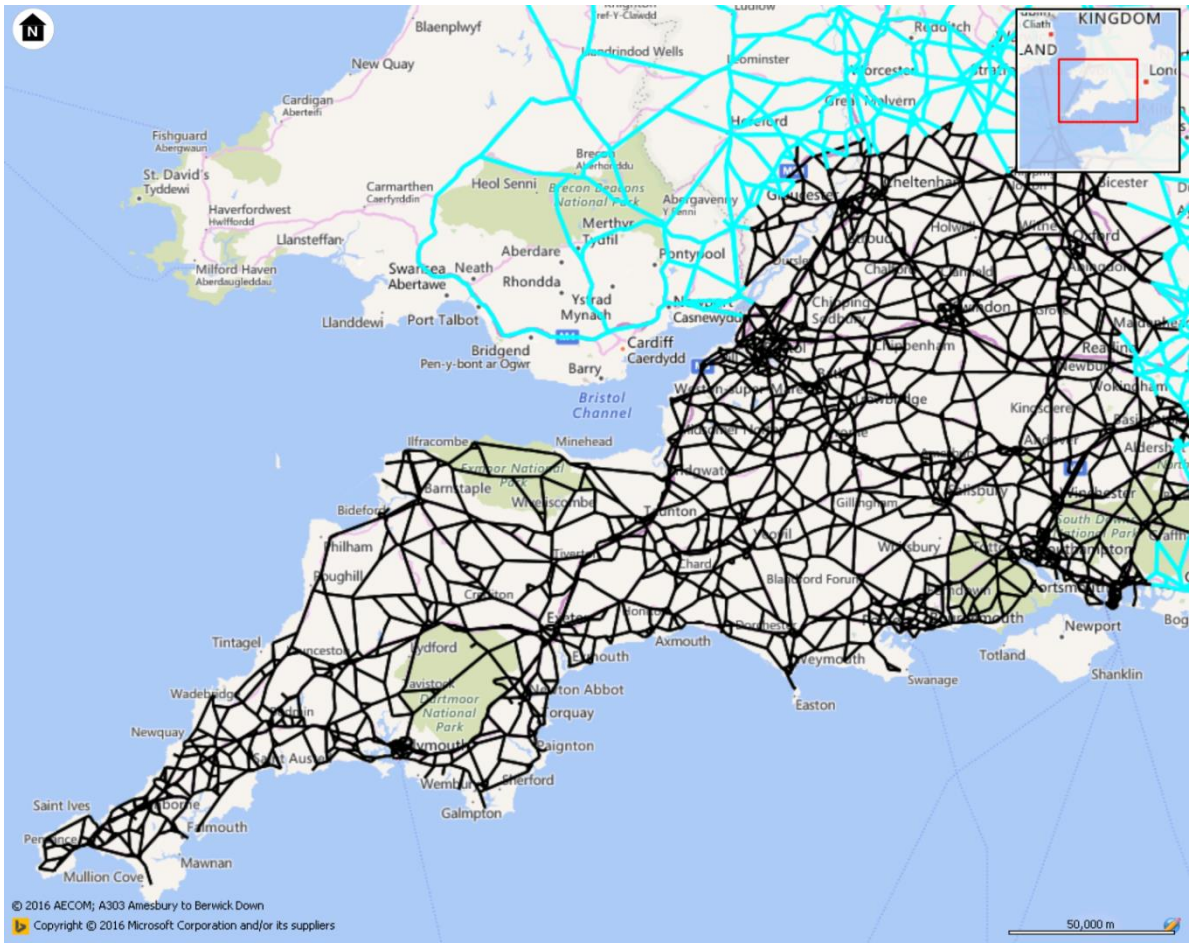


Figure A-2: Extent of the FMA in SWRTM (black links)

A.2.3.3 Definitions of 'strong' or 'weak' impacts are not given in WebTAG. It can be readily assumed that 'negligible' is defined as there being no change in flows between modelled scenarios or where changes are within the bounds of accuracy of the modelling platform or normal variation of traffic volumes.

A.2.3.4 The '*Guidance for Traffic Impact Assessment*' (Institution of Highways and Transportation 1994) notes that significant impacts to highway capacity may occur if:

a. peak hour traffic flow increases by more than ten percent; or

b. peak hour traffic flow increases by more than five percent where the network is sensitive (i.e. where there is a congested road network).

A.2.3.5 In the case of the Study Area, the A303 itself is likely to be defined as 'congested' in the peak hours. The existing A303 Stonehenge SWRTM has been interrogated, with Volume-over-Capacity ratios (V/Cs) analysed to identify congested locations. Figure A-3 and Figure A-4 show those links in the vicinity of the Scheme that the Stage 2 model notes as approaching capacity (V/C greater than 90%). These data are taken from the existing base year model.

A.2.3.6 Aside from the A303 itself, the model highlights some areas of congestion on the local road network, including:

a. northbound approach to Countess roundabout;

b. southbound approach to Solstice Park junction;

c. the centre of Amesbury; and

d. a number of the approaches to Salisbury.

Figure A-3: V/C ratios greater than 90%, 2015 base year AM average hour

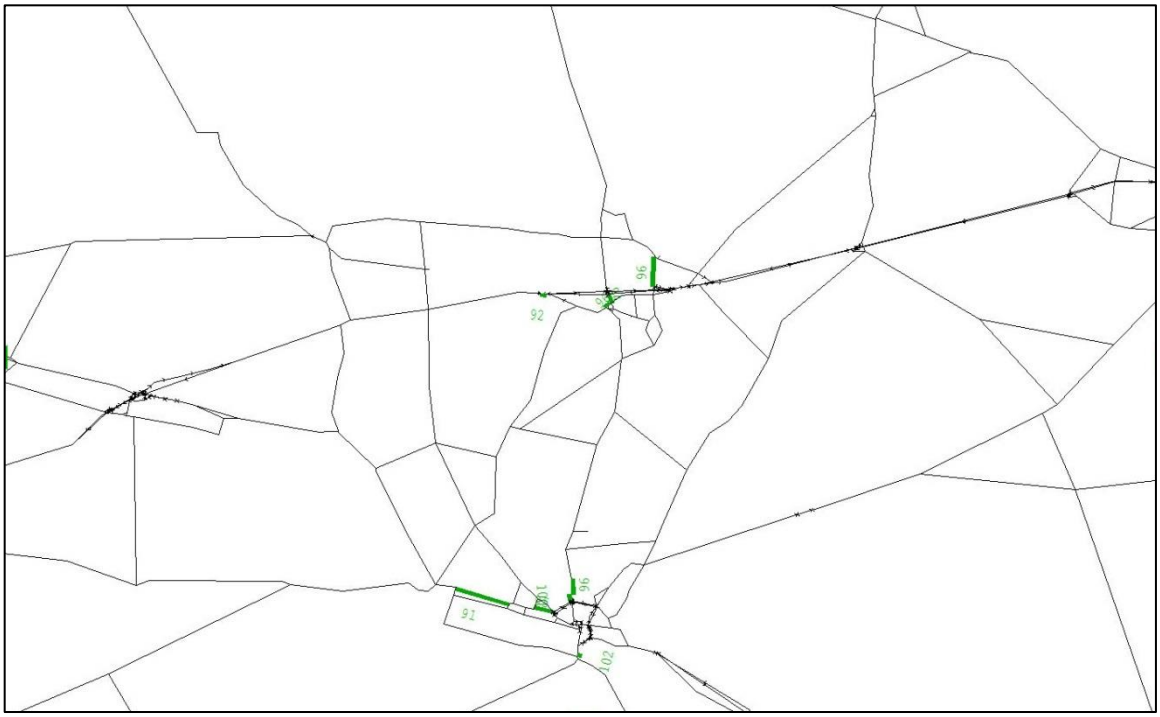


Figure A-4: V/C ratios greater than 90%, 2015 base year PM average hour

A.2.3.7 Sensitivity of the network should not, however, just be defined by a congestion metric. Other sensitivity metrics exist and are worthy of consideration. In particular, noise and air quality are two key considerations that need to be borne-in-mind. Section A.4 of this appendix explores these metrics in greater detail.

A.2.4 Model scenarios and assumptions

A.2.4.1 It is important to understand the assumptions that have been made in the models referred to above, which will be used to define the extent of modelled impacts and thus the spatial requirements of the Area of Detailed Modelling. Both growth and infrastructure assumptions can change over time and may have an impact on traffic forecasts; it is therefore essential to understand the decisions made based on assumptions at a single point in time.

A.2.4.2 A single intervention scenario has been modelled in the A303 Stonehenge SWRTM to help define the Area of Influence. The scenario is a network-based intervention, including version D081c of the Amesbury to Berwick Down scheme.

A.2.4.3 The coding for the Scheme has been taken from the work undertaken at PCF Stage 2 by the previous consultants. However, reflecting the evolving nature of the Scheme, AmW has made adjustments to close off local roads to the east of Solstice Park, reflecting severance that would occur (and is to be assessed as part of the scheme development) as part of Highways England's vision of a high quality dual carriageway along the A303/A358 corridor. The local roads that have been closed are:

a. Amesbury Road (north of the A303, between the A303 and A3028);

b. A3028 Double Hedges; and

c. Allington Track.

A.2.4.4 It should be noted that the Amesbury Road from Cholderton (between the A338 and A303) and the minor Amesbury Road between Milton Road, Amesbury and the A303 would also be stopped-up as part of the vision to create a high quality dual carriageway to the South West. However, these roads are not currently modelled within the PCF Stage 2 A303 SWRTM.

A.2.4.5 The details of the modelled scenarios used are set out in Table A-2 below.

Table A-2 Modelled scenarios and assumptions

Model assumptions	Reference Case ('Do Minimum')	Intervention Case ('Do Something')
Modelled years	2026, 2051	2026, 2051
Highway assumptions	Standard SWRTM committed schemes	Standard SWRTM committed schemes

Additional highway interventions	N/A	• D081c Amesbury to Berwick Down scheme (as coded at PCF Stage 2);
		• Local road closures on:
		  ○ Amesbury Road (A303 – A3028);
		  ○ A3028 Double Hedges
		  ○ Allington Track

Demand assumptions	National Trip End Model v7.2 (NTEM), Development allocations provided by Wiltshire County Council	National Trip End Model v7.2 (NTEM), Development allocations provided by Wiltshire County Council
Additional demand interventions	N/A	N/A

A.3 Extent of modelled impacts

A.3.1.1 The Area of Influence has first been assessed in accordance with the '*Guidance for Traffic Impact Assessment*' noted above.

A.3.1.2 The 2026 Do Minimum model has been compared to the 2026 Do Something model to determine the level of changes on the surrounding highway network in response to the proposed D081c Amesbury to Berwick Down scheme and local road closures. This test was undertaken to understand the extent of the impacts of the A303-related highway interventions. Figure A-5 shows the change in actual flows, which indicate that significant changes (those greater than 50 Passenger Car Units (PCUs)) are present only in the vicinity of the Scheme. Whilst the areas of Andover and Salisbury show some changes in traffic volumes, these are minor changes within the urban areas that are not fully represented in SWRTM. The strategic roads around the towns are modelled in detail due to the strategic nature of the SWRTM on which these models are based.

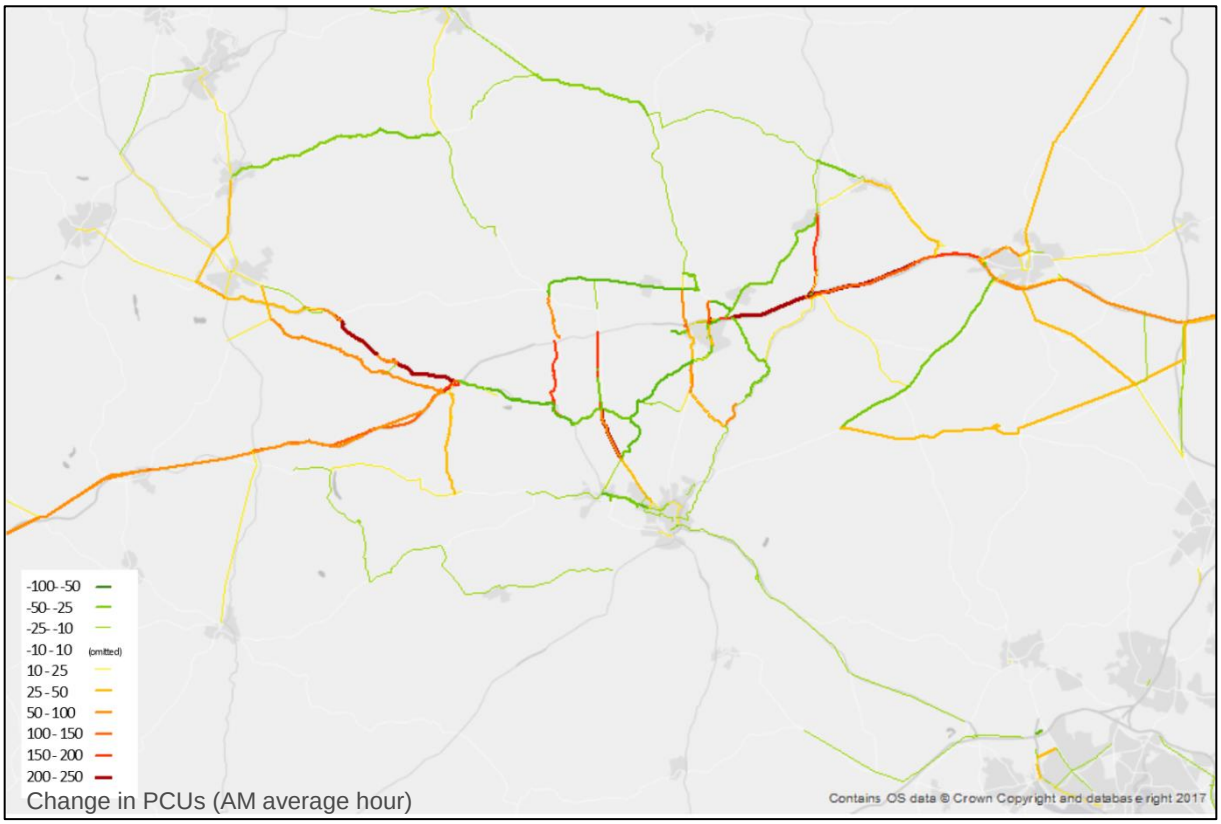


Figure A-5: Comparison of flows (PCUs) between 2026 DM and DS (AM)

A.3.1.3 Figure A-6 shows the extent of the impacts consisting of at least a 5% change in assigned flow volume. The links shaded in green have at least a 5% decrease in total link flows compared with the 'Do Minimum' scenario. The links highlighted in red have at least a 5% increase in flows compared to the 'Do Minimum'. As the figures highlight, the sphere of influence of the D081c alignment including road closures east of Solstice Park extends towards Salisbury to the south and Andover to the east. Impacts to the north are only noted on the local road network around Larkhill and Bulford.

A.3.1.4 Whilst providing a starting point to the definition of the Area of Influence, the 5% increase in traffic volumes is, however, but one measure of the areas that are likely to receive some impact. The remainder of this note considers if further analyses of different metrics, assessed in accordance with relevant guidance, further extend the area that needs to be covered in detail by the refined highway model.

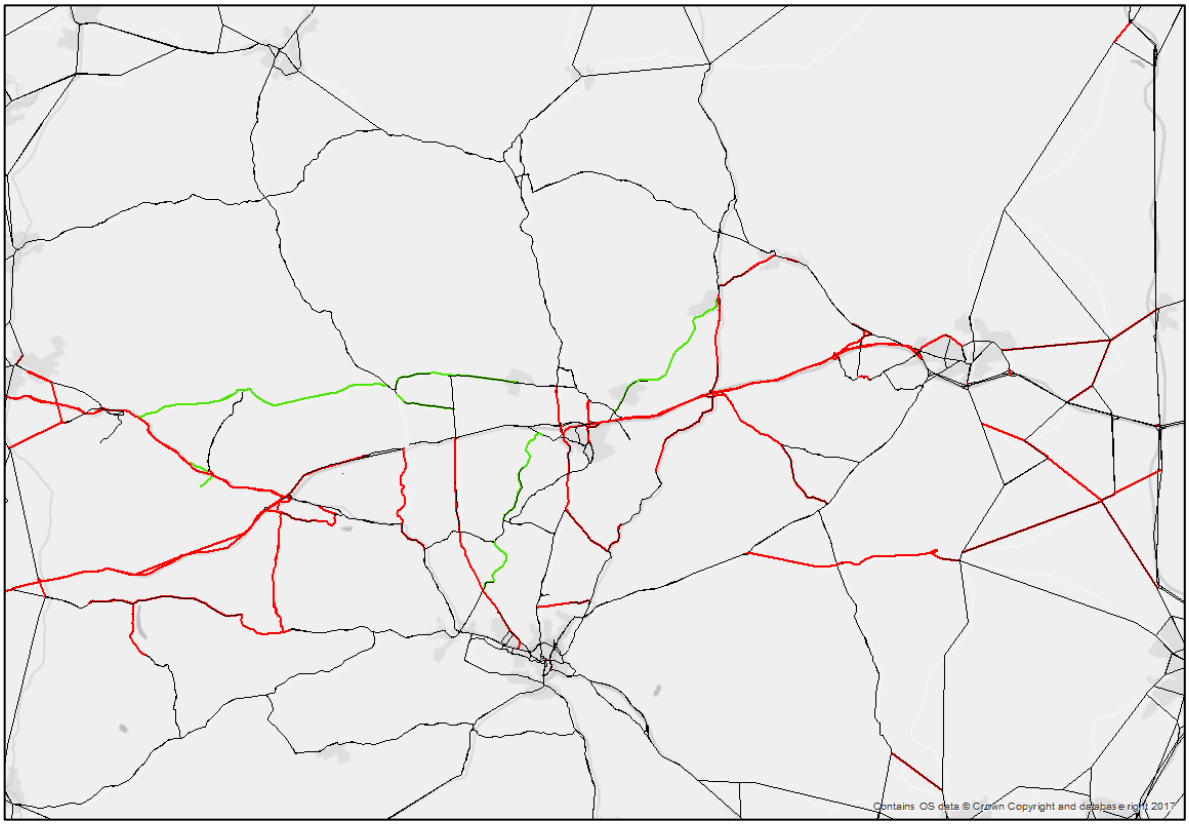


Figure A-6: Extent of 5% impact on flows, AM average hour

A.4 Environmental considerations

A.4.1 Introduction

A.4.1.1 As previously noted, areas that are sensitive to noise and air quality issues should be considered as part of the definition of the Area of Detailed Modelling. Such areas are likely to be particularly sensitive in the context of a DCO application for interventions in the vicinity of the World Heritage site.

A.4.1.2 The transport model does not directly contain information on areas that are sensitive to noise or air quality, although its outputs can be converted into information required for noise and air quality assessments. The key roads in sensitive areas should be represented within the traffic model.

A.4.1.3 The Department for Environment Food and Rural Affairs (DEFRA) provides information to the public free-of-charge. The locations of Air Quality Management Areas (AQMAs) where the Local Authority is responsible for monitoring air quality are provided for use in Geographic Information Systems (GIS) software. Noise mapping is also provided by DEFRA, highlighting the levels of noise along road corridors. Both of these datasets have been cross-referenced against the model data noted in the previous sections of this appendix.

A.4.2 UNESCO World Heritage Site

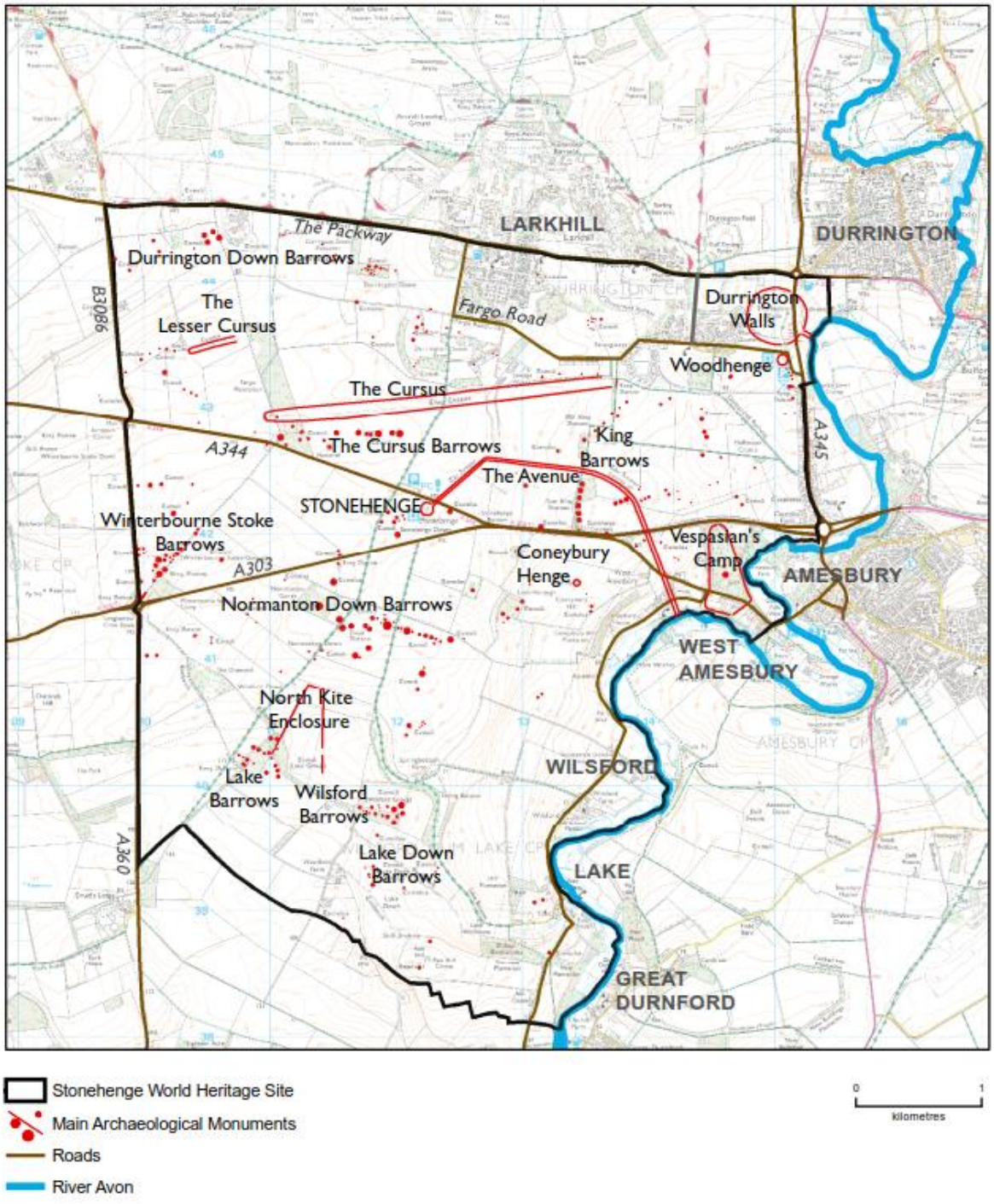
A.4.2.1 The Stonehenge site is a designated United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage site and thus is afforded protection by the UK government.

A.4.2.2 The UNESCO website[7] states that the Stonehenge site has protection in two ways: firstly as a protected monument and landscape under the Planning Act 1990 and the Ancient Monuments and Archaeological Areas Act 1979; and secondly through the UK Spatial Planning system under the provisions of the Town and Country Planning Act.

A.4.2.3 Further to this, the UNESCO website states: "Government guidance on protecting the Historic Environment and World Heritage is set out in National Planning Policy Framework and Circular 07/09. Policies to protect, promote, conserve and enhance World Heritage properties, their settings and buffer zones are also found in statutory planning documents." The proximity of the Scheme and A303 to Stonehenge must be taken into account, as impacts are likely to fall within the aforementioned buffer zone.

A.4.2.4 It is essential therefore that the entirety of the World Heritage site be contained within the Area of Detailed Modelling for the refined traffic model. A map highlighting the boundaries of the World Heritage site is provided in Figure A-7.

[7] http://whc.unesco.org/en/list/373



Source: Map 1: The Stonehenge World Heritage Site. English Heritage

Figure A-7: Boundaries of the Stonehenge World Heritage Site

A.4.3 Air quality assessment

A.4.3.1 Air quality assessments will be required along the length of the scheme route alignment. It is also essential to ensure that the air quality assessments can be expanded to a wider area if required. Air quality assessment will require data from the traffic model for which there is sufficient confidence in its quality and accuracy. Thus any data are likely to be required from the Fully Modelled Area, where the network is modelled in simulation-style coding.

A.4.3.2 DEFRA provides air quality targets for Local Authorities for particulates, nitrogen dioxide (NO_2 / NO_x) and ozone (O_3). Where a Local Authority is unable to meet these targets it must declare an Air Quality Management Area (AQMA) and produce a Local Air Quality Action Plan to improve the air quality. Thus, by definition, AQMAs are in areas of poorer air quality.

A.4.3.3 The location of all AQMAs in place as of October 2016 has been obtained from DEFRA. Figure A-8 shows the location of the AQMAs in the vicinity of the study area, highlighted in blue. A single AQMA, in the centre of Salisbury, Wiltshire, is identified.

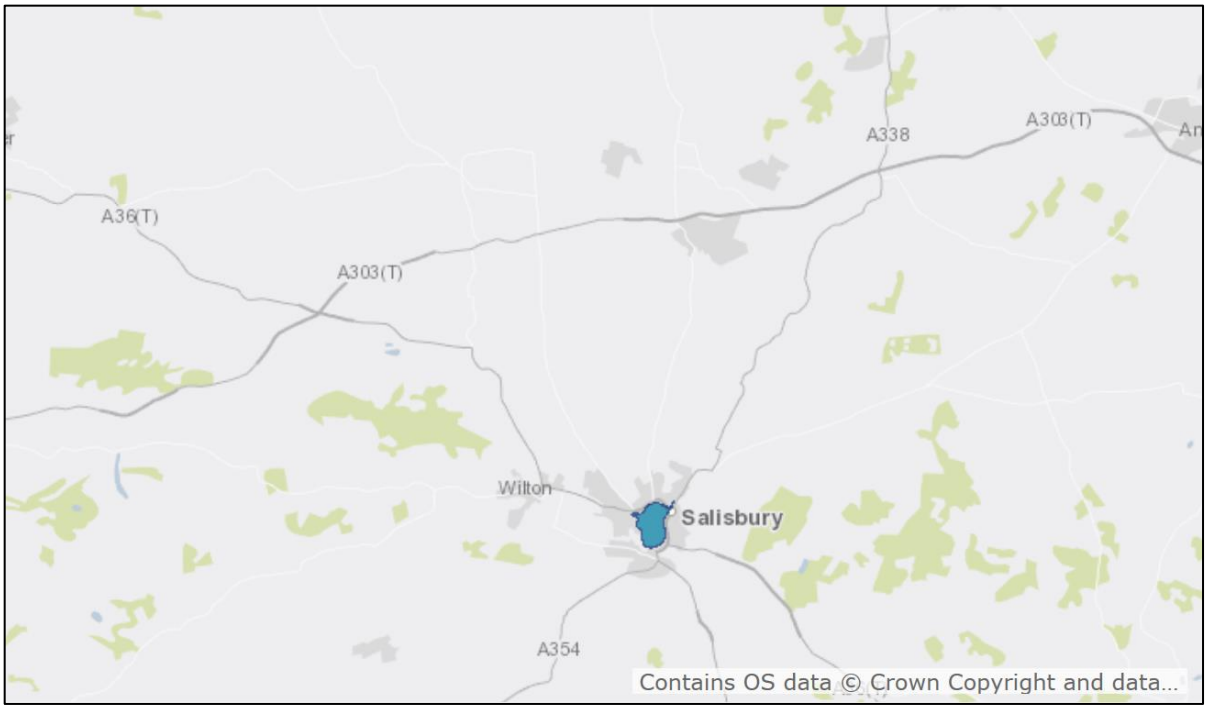


Figure A-8: Location of AQMAs in vicinity of A303 Stonehenge

A.4.3.4 This AQMA location has been cross-referenced against the areas of flow change indicated by assignments of the existing model. Whilst the approach routes to Salisbury are indicated as being congested, scheme impacts of greater than 5% or more have not extended to the city.

A.4.3.5 WebTAG Unit A3 'Environmental Impact Appraisal' notes that scoping of the air quality environmental assessment should be undertaken in line with guidance provided in the Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 1 (DMRB 11.3.1 'Air Quality').

A.4.3.6 DMRB 11.3.1 notes that air quality should be assessed at both the local and regional level.

A.4.3.7 At the local level, the areas where there are likely to be significant impacts associated with a scheme or development can be considered by comparison of traffic data between a 'Do Minimum' and 'Do Something' scenario and affected roads are those that meet any of the following criteria:

a. road alignments will change by 5 metres or more; or

b. daily traffic flow will change by 1,000 Annual Average Daily Traffic (AADT) or more; or

c. heavy Duty Vehicle (HDV) flows will change by 200 AADT or more; or

d. daily average speed will change by 10 kilometres per hour (km/h) or more; or

e. peak hour speed will change by 20 km/h or more.

A.4.3.8 At the regional level, DMRB 11.3.1 notes that affected roads may be those where it is expected that there may be:

a. a change of more than 10% in AADT; or

b. a change of more than 10% to the number of HDVs; or

c. a change in daily average speeds of more than 20km/h.

Local level assessment against DMRB criteria

A.4.3.9 The existing PCF Stage 2 A303 Stonehenge SWRTM data have again been used for this assessment. Outputs from the models represent an average hour during the peak and inter-peak periods: AM peak period – 07:00-10:00; Inter-peak period – 10:00-16:00; and PM peak period – 16:00-19:00. These three average hours have been converted to the peak period through the use of a factor equivalent to the number of hours in the period.

A.4.3.10 The three modelled periods, representing a total of 12 hours, have subsequently been factored to a 24-hour AADT through the use of factors developed from traffic count data from two locations on the A303. The process to produce these factors was undertaken during PCF Stage 2 and has been used here without any further checking. The Do Something scenario has been compared with the Do Minimum.

A.4.3.11 Figure A-9 and Figure A-10 show the area over which total traffic experiences a change in AADT of greater than ±1,000 vehicles, whilst Figure A-11 and Figure A-12 show the area across which HDV flows are forecast to change by more than ±200 vehicles AADT. These correspond to the criteria identified for local level air quality impacts.

A.4.3.12 The figures show that links that exceed the criteria are located in the vicinity of Amesbury, along the A303 itself and the majority of the more minor connecting roads, including the A345 and the A360.

A.4.3.13 The strategic roads affected are also shown. The impact along the M4 indicates rerouting of traffic onto the A303 from the M4/M5 corridor as a result of the Scheme, with the A303 ‘pinch-point’ at Stonehenge relieved by the Scheme. These two routes provide the main links between London and the South West. As SWRTM is one of Highways England’s five Regional Traffic Models (RTMs), the main sections of the affected M4 motorway are already coded in detailed simulation coding.

A.4.3.14 The effect on HDVs is less pronounced, with only a few locations where changes exceed the identified criterion. The effects are located in similar areas, namely along the A303 and the M4.

A.4.3.15 The plots also identify areas of change in the centres of Bristol and Swindon. These changes are on individual, sporadic links rather than along whole routes through the urban areas. The SWRTM maintenance team has previously identified these urban areas as exhibiting 'noise' in assignment of the model and it is reasonable in this case to attribute the flow differences shown to model noise.

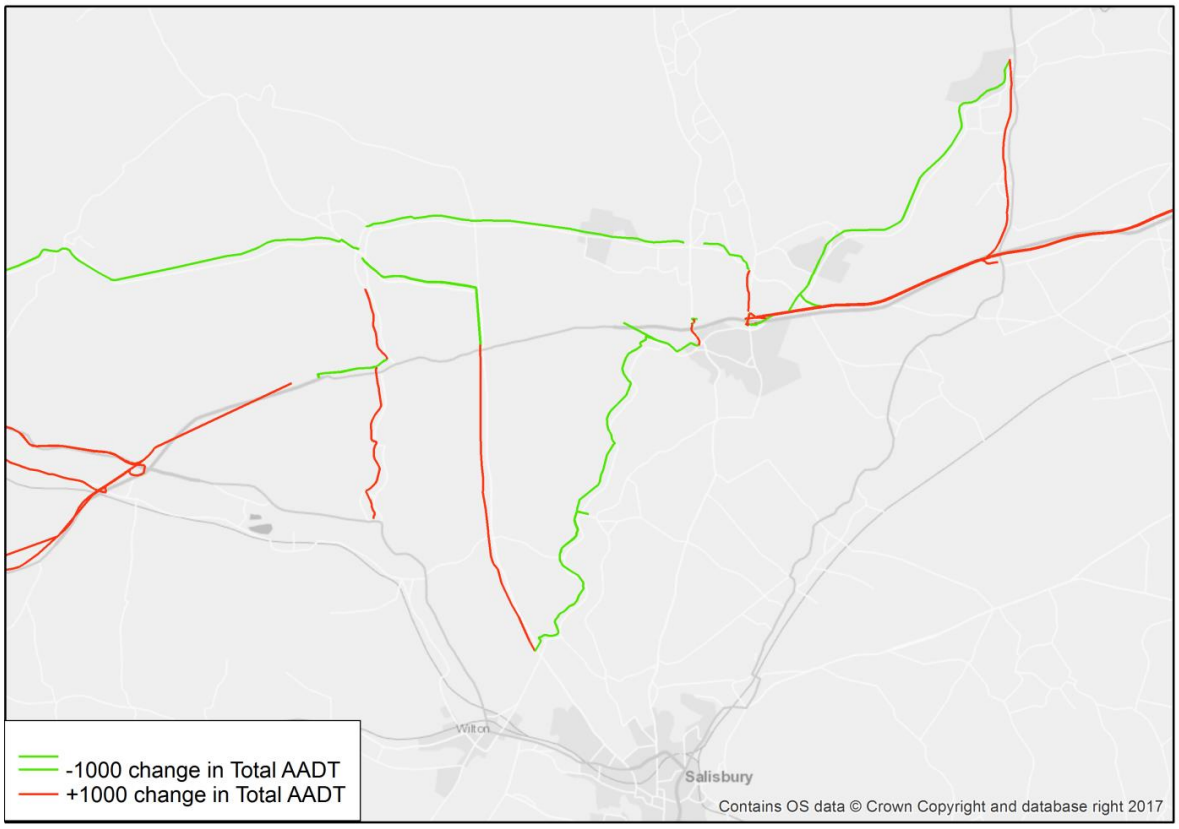


Figure A-9: Change in total vehicle AADTs ±1,000 (Do Minimum –vs– Do Something)

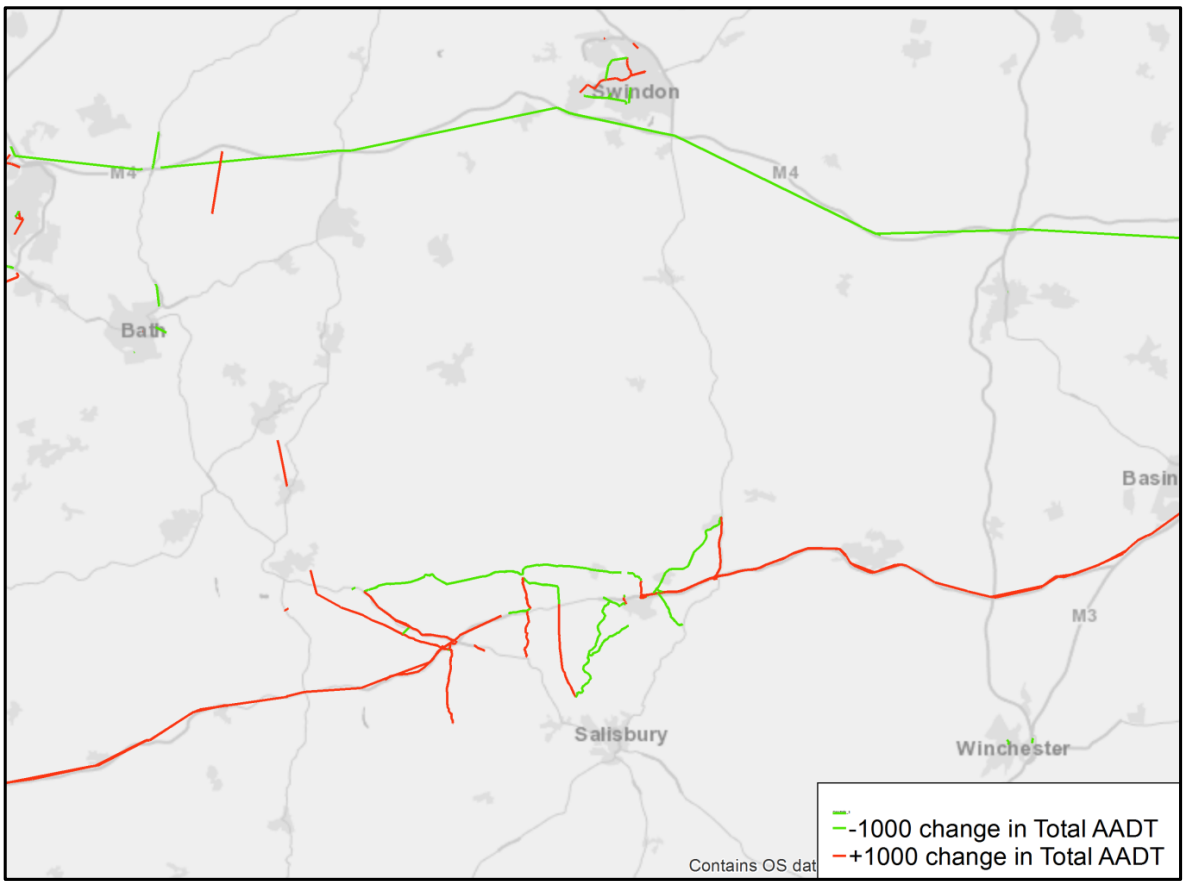


Figure A-10: Change in total vehicle AADTs ±1,000 (Do Minimum –vs– Do Something)

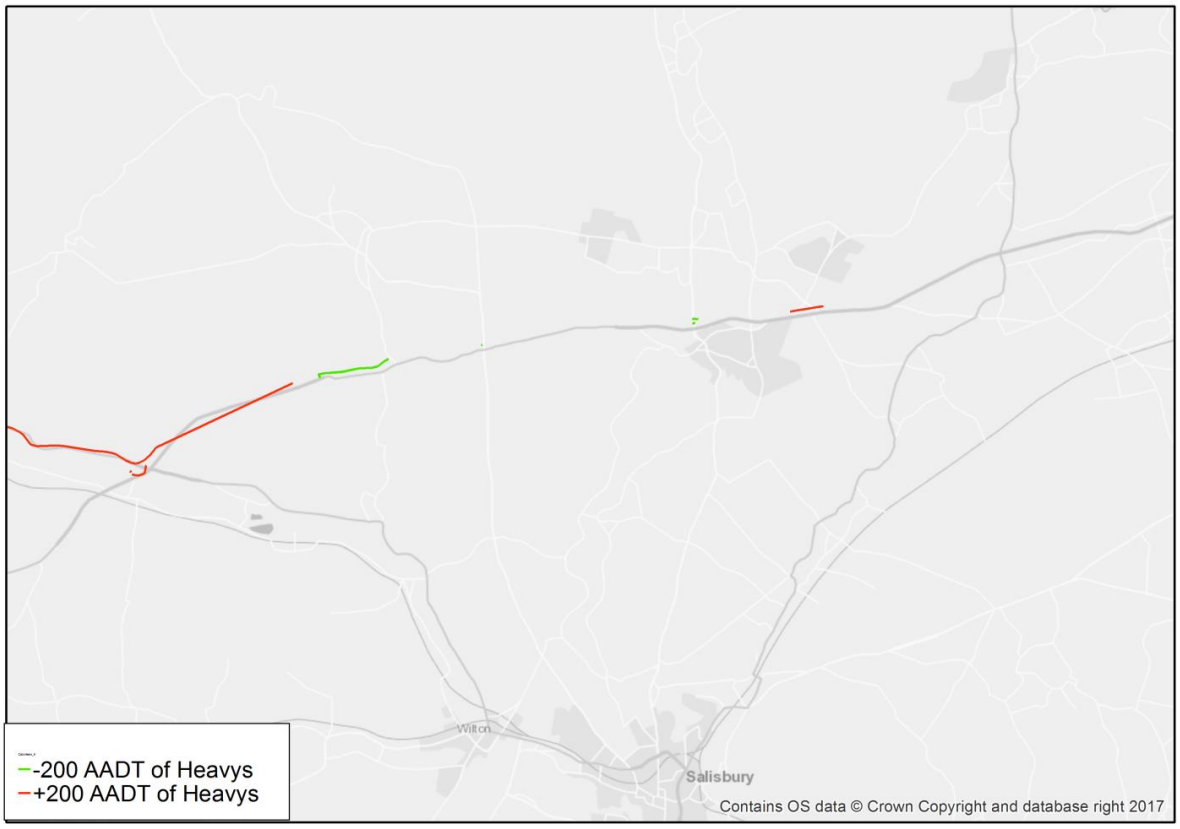


Figure A-11: Change in HDV AADTs of ±200 (Do Minimum –vs– Do Something)

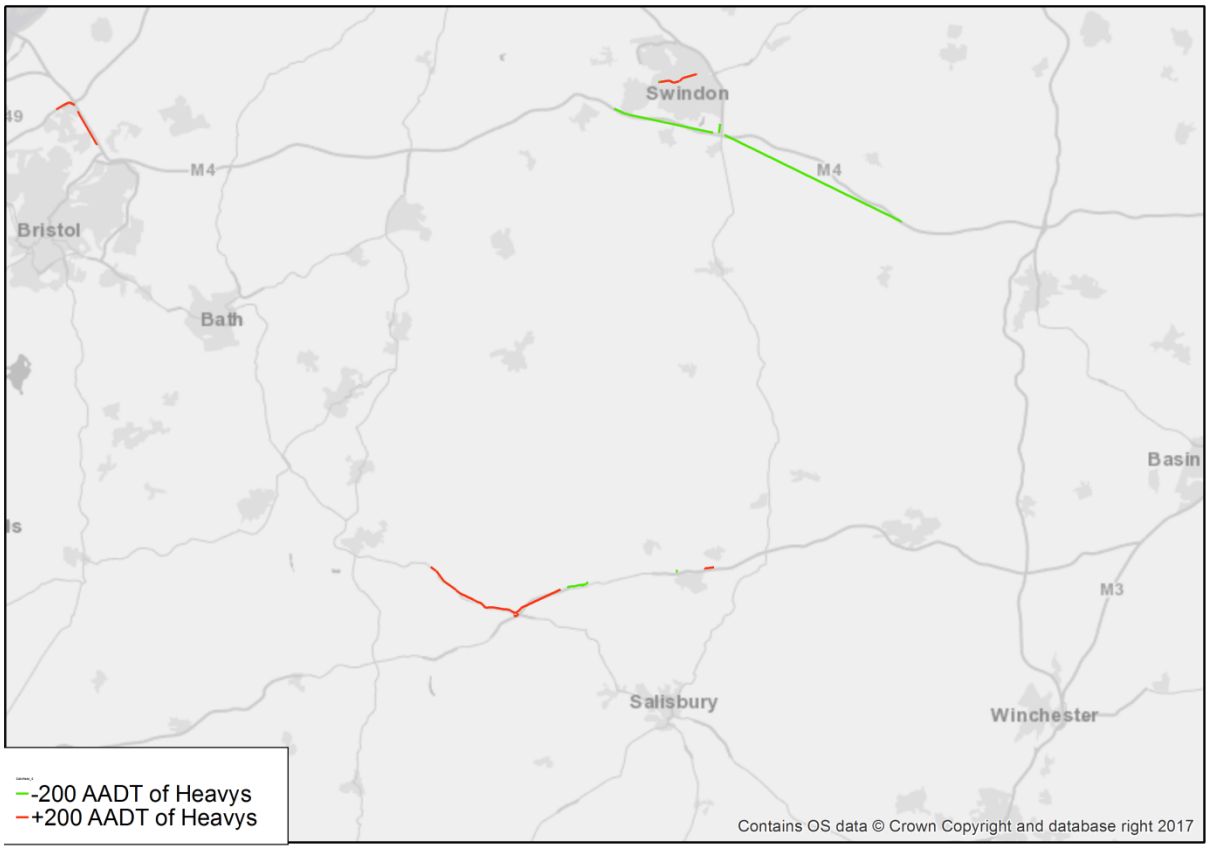


Figure A-12: Change in HDV AADTs of ±200 (Do Minimum –vs– Do Something)

A.4.3.16 In addition to the change in AADTs for total vehicles and HDVs, the change in speed has been assessed as per the criteria given in DMRB. Figure A-13 shows the areas where daily average speeds show a change of greater than 10km/h whilst Figure A-14 and Figure A-15 show the change in peak hour speeds for the AM and PM respectively that are greater than 20km/h.

A.4.3.17 The majority of links highlighted in Figure A-13 demonstrate a change in daily average speed greater than 10km/h because they are roads which are closed to traffic in the 'Do Something' scenario. The exception to this, and the only area where there is a significant change in speed, is the B3083 which benefits in an increase in speed due to the effects of re-routeing traffic.

A.4.3.18 All other links highlighted can have their inclusion attributed to either model noise, or having zero flow in one of the modelled scenarios and extremely low flow in the other. In the latter case, this results in a very large change in daily average speed (the software posits that zero flow is equivalent to 0km/h speed), but is of negligible impact due to the extremely small flow changes. Thus, changes indicated other than those discussed in A.4.3.17 can be disregarded.

A.4.3.19 The changes in daily average and peak hour speeds do not highlight any areas not already covered by the change in either total or HDV AADT flows previously noted.

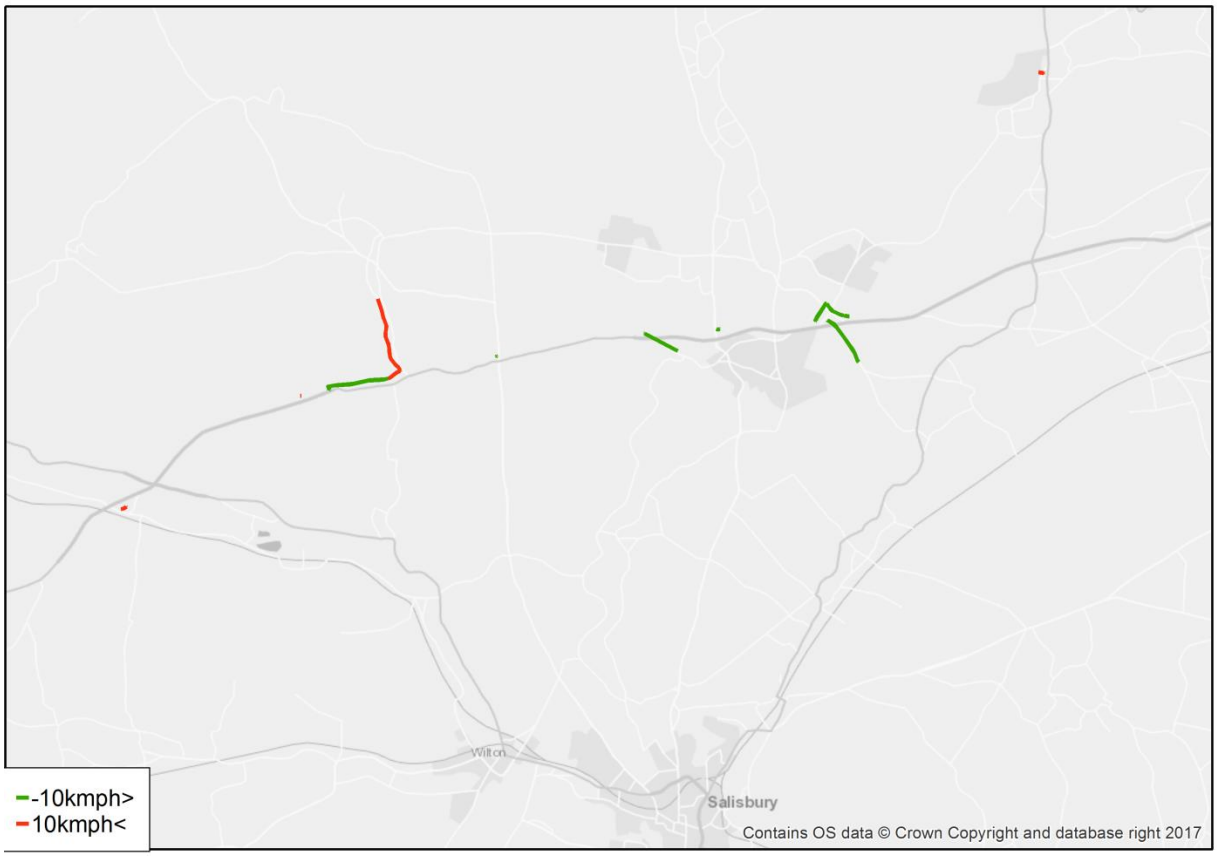


Figure A-13: Change in daily average speed, greater than ±10km/h

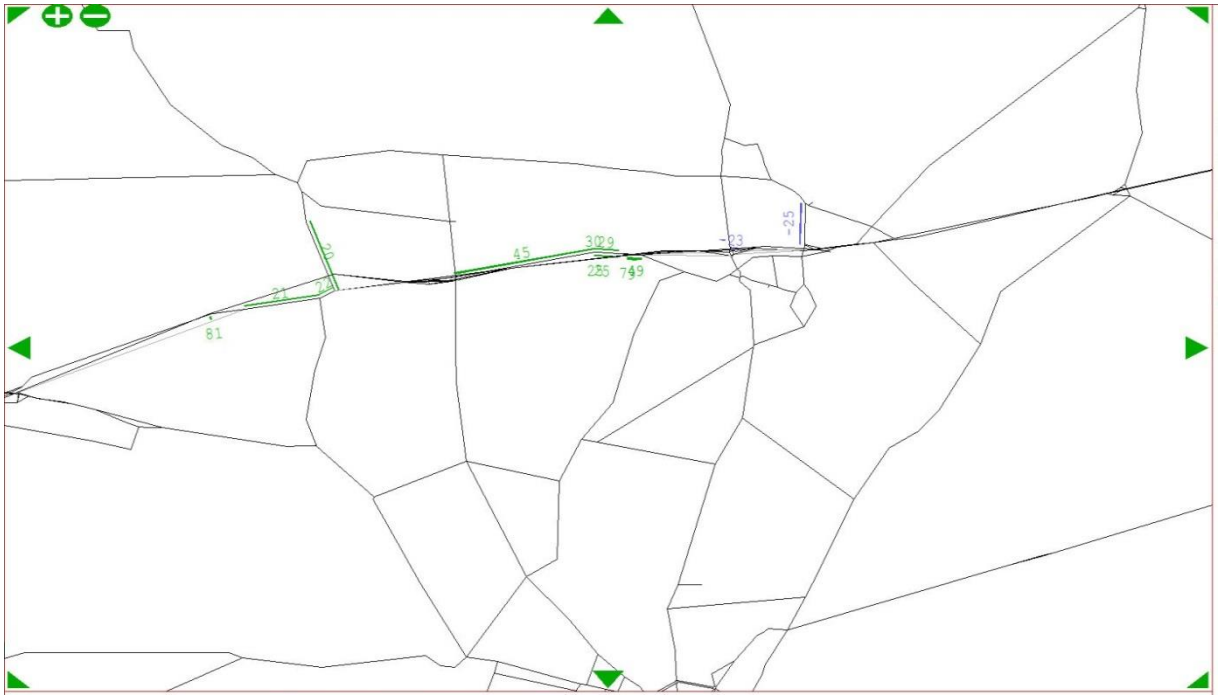


Figure A-14: Change in AM hour speed greater than ±20km/h

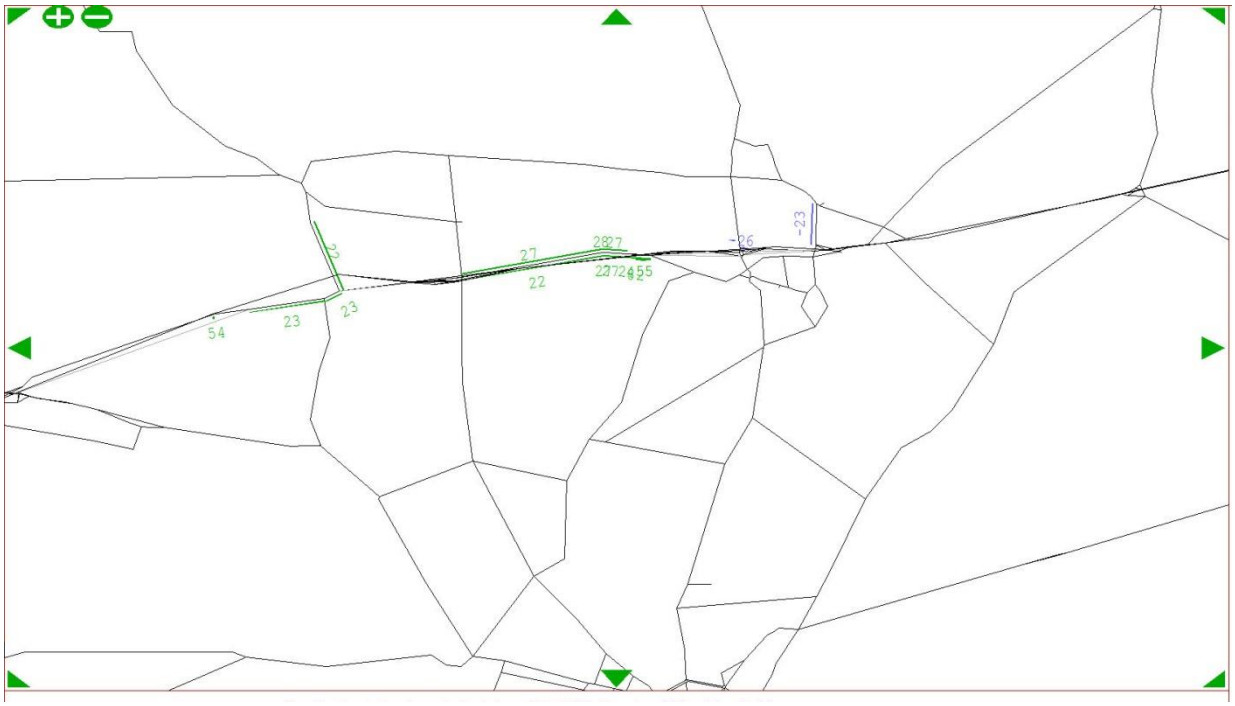


Figure A-15: Change in PM hour speed greater than ±20km/h

Regional level assessment against DMRB criteria

A.4.3.20 At the regional level, DMRB guidance notes that: changes of more than 10% in total AADT; changes of more than 10% to the number of HDVs (AADT); or a change in daily average speeds of more than 20km/h should be assessed. Figures demonstrating links with changes exceeding the flow criteria are given in Figure A-16 and Figure A-17 respectively. Changes in daily average speed by greater than 20km/h are not shown, as the analysis indicates that this area is smaller than that given in Figure A-13.

A.4.3.21 Both the change in total and HDV AADT figures show that changes forecast by the SWRTM assignment are concentrated in the vicinity of the scheme area, which is expected given the interventions included. The change in HDV volumes emphasises the potential changing importance of the A303 corridor into London (which shows increases in HDV volumes) as traffic reroutes here from local roads. These routes will need to be modelled in detail in the new model and so included in the simulation coding area.

A.4.3.22 Figure A-18 shows some changes across a wider area. The locations highlighted tend to be concentrated on single links and are sporadic. There are a number of reasons that these changes may exist: low flow links where a small absolute change can result in a larger percentage change; or the re-routeing or 'flipping' of trips between links and zone connectors as a result of locations of poorer assignment stability in the existing model. It is unlikely that many of the areas highlighted are the result of true impacts of reassignment due to the Scheme.

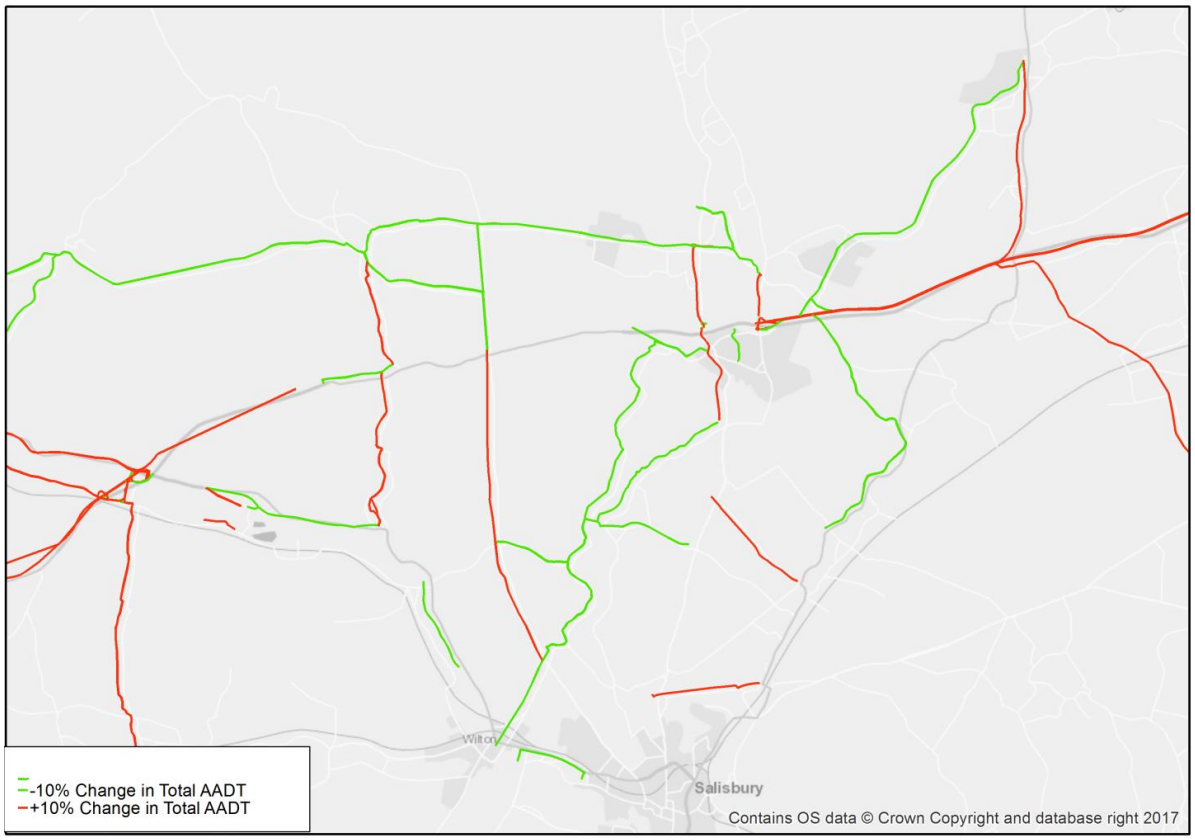


Figure A-16: Change in total vehicle AADTs of ±10% or greater

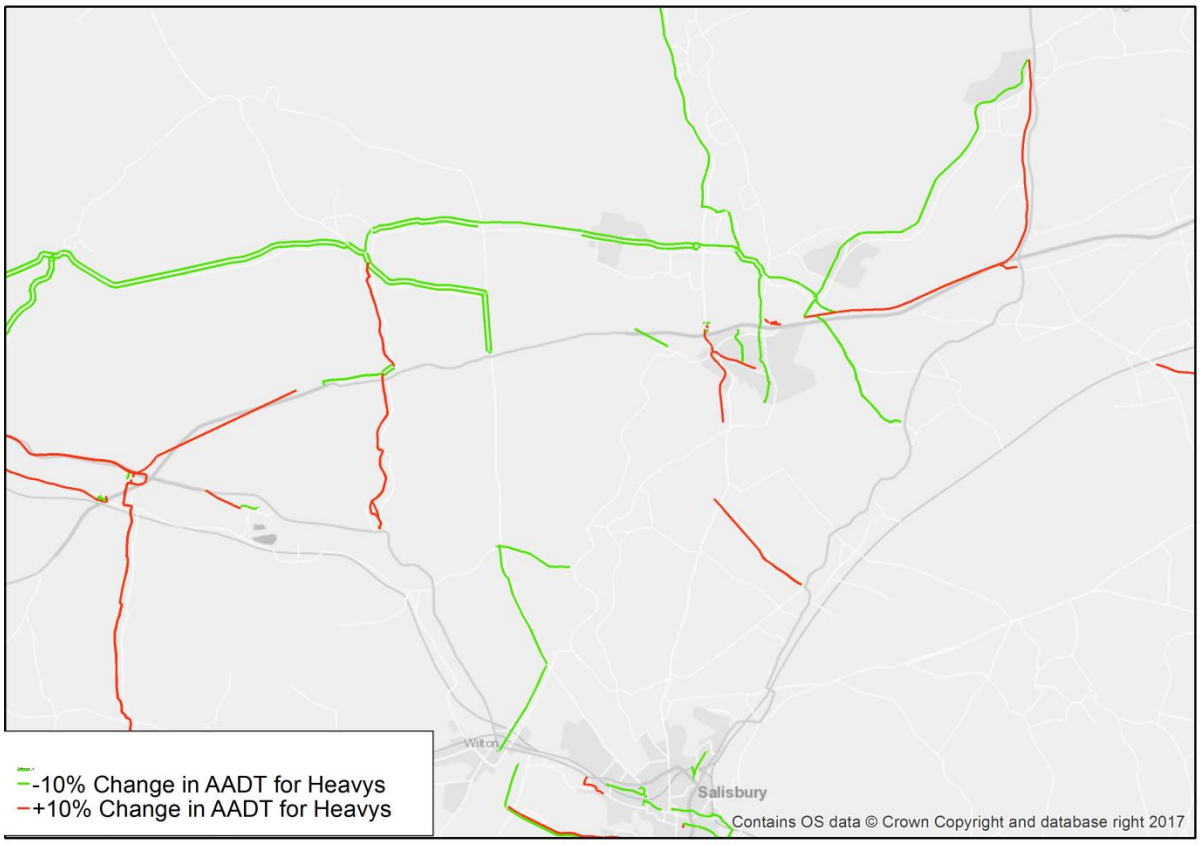


Figure A-17: Change in HDV AADTs of ±10% or greater

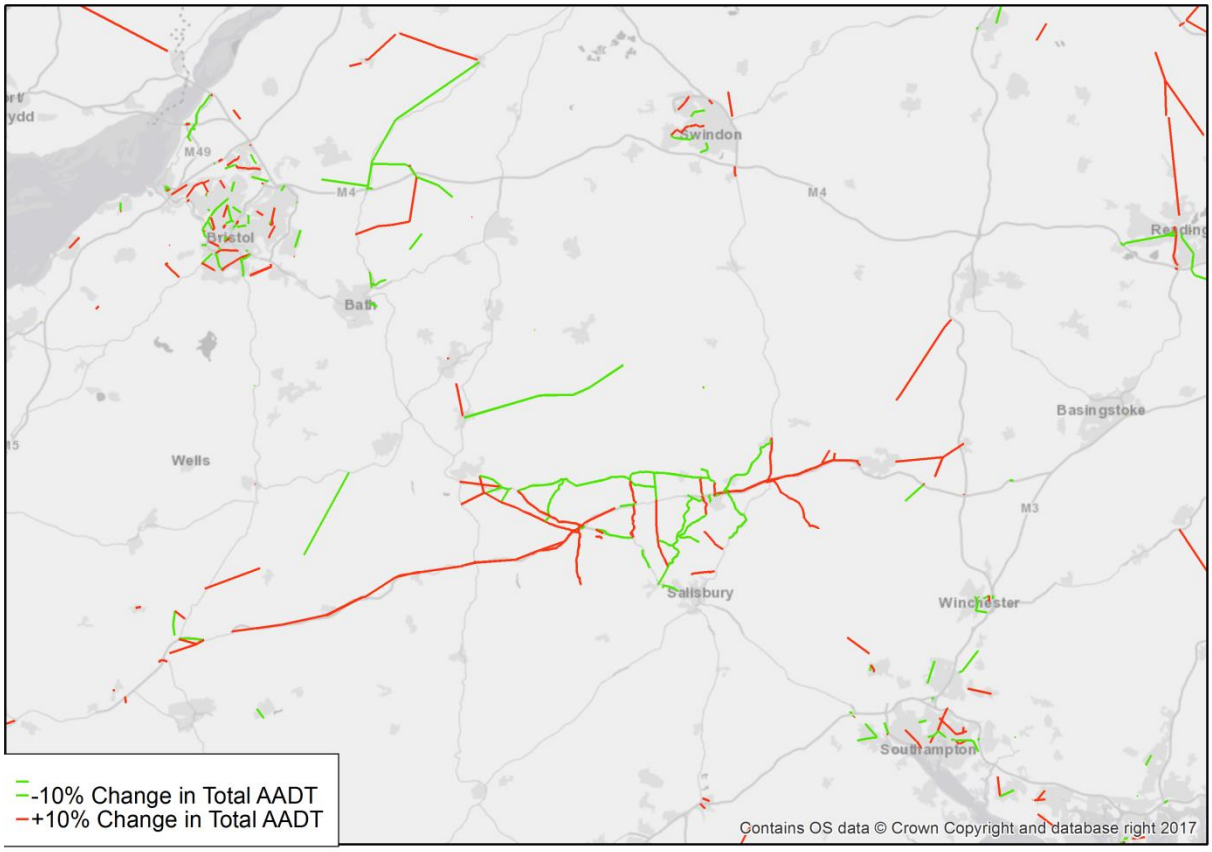


Figure A-18: Change in total vehicle AADTs of ±10% or greater, wide area

A.4.4 Noise sensitive areas

A.4.4.1 It is noted that the overall assessment area for noise is different to that of air quality. Whilst the noise assessment study area is still to be formally defined, it will likely be informed through:

a. the extent of new and altered roads (i.e. the locations of the A303 scheme interventions);

b. where traffic volumes are forecast to change on the existing network; and

c. consultation on the scope of the assessment.

Noise assessment team requirements

A.4.4.2 As the requirements for the noise assessment are confirmed, the noise assessment team has produced an initial working note on the likely traffic data requirements[8]. This includes assessment for the Opening Year (2026) and 15-year Design Year (2041) of:

a. all modelled links within 1.5 to 2 km of the Scheme and existing route; and

b. assessment of 'affected routes'. Whilst the exact definition of 'affected routes' is not defined, the working note suggests a rule-of-thumb whereby 18-hour Annual Average Weekday Traffic (AAWT) experiences a change of 25% or more between the 'Do Minimum' and 'Do Something' scenarios.

A.4.4.3 Figure A-19 shows a two kilometre boundary around both the existing and proposed A303 alignment (as indicated by the extant SATURN model). The extents have been taken as far east as the junction of the A303 / A338, which would become the next junction available east of Solstice Park in the event of the intermediate local road connections being severed as part of the Scheme or other proposed improvements on the corridor.

A.4.4.4 As the figure demonstrates, the two kilometre boundary captures all of the areas identified by the analysis given above and does not introduce any further areas to be captured in the AoDM.

[8] A303 – Traffic Data Information Requirements for Noise". AmW. 03 July 2017.

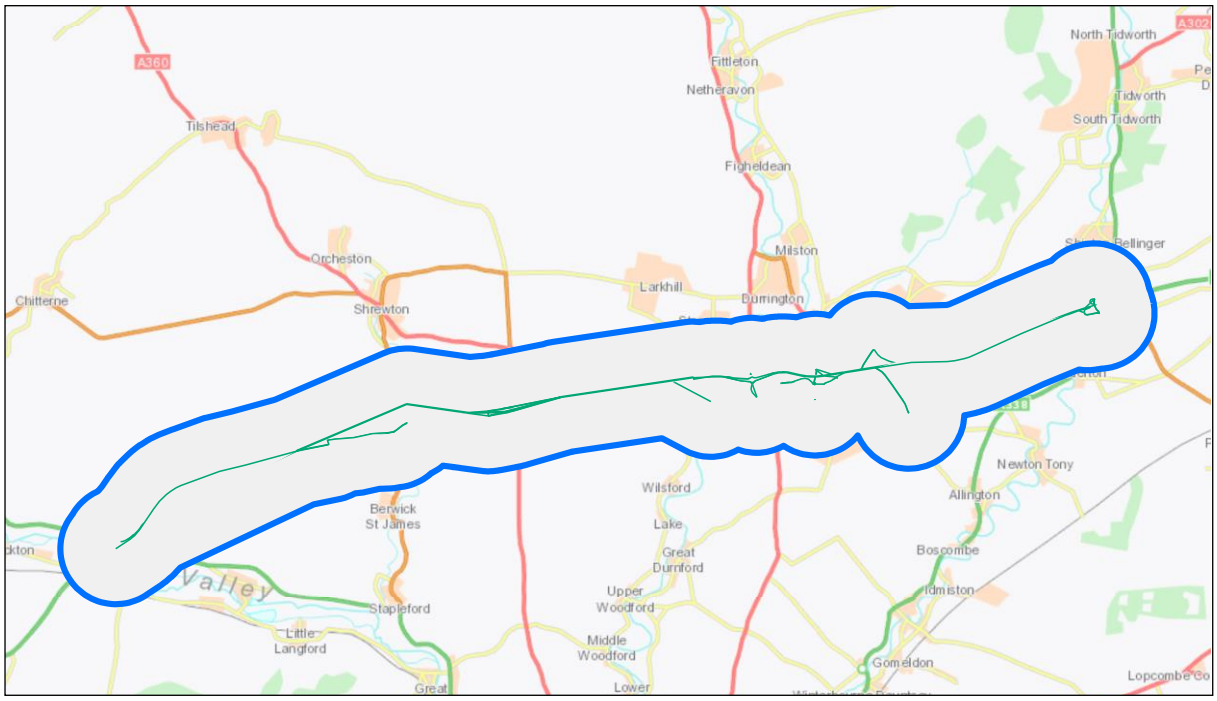


Figure A-19: 2 kilometre boundary around existing and proposed A303

A.4.4.5 Figure A-20 and Figure A-21 show the extent of the links where the AAWT changes by more than 25% between the Do Minimum and Do Something schemes for 2026 and 2041 respectively.

A.4.4.6 The area covered is within that already defined by the Air Quality assessment analysis. The isolated affected link in the Westbury area can be attributed to model noise and disregarded.

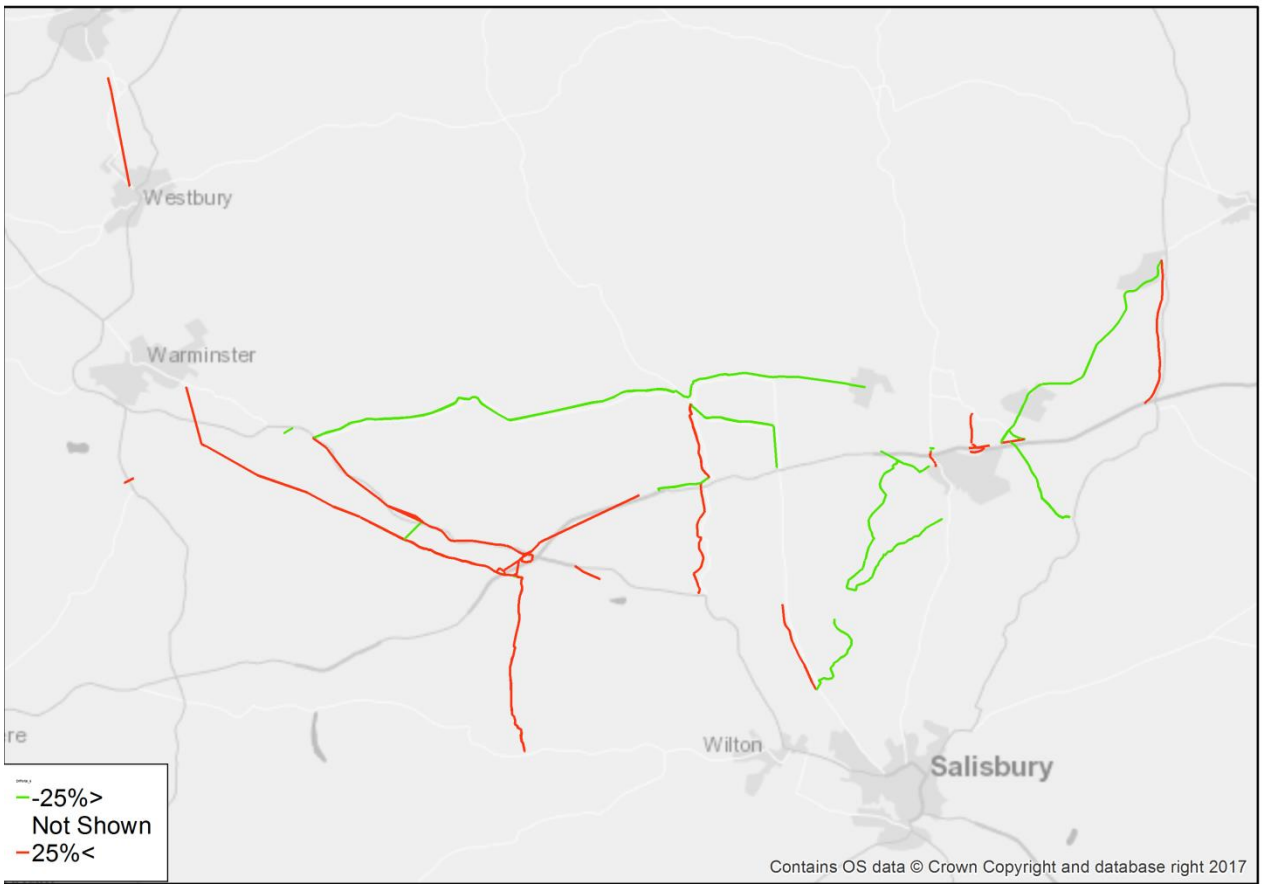


Figure A-20: 18 hour AAWT comparison, 2026 (DM –vs- DS)

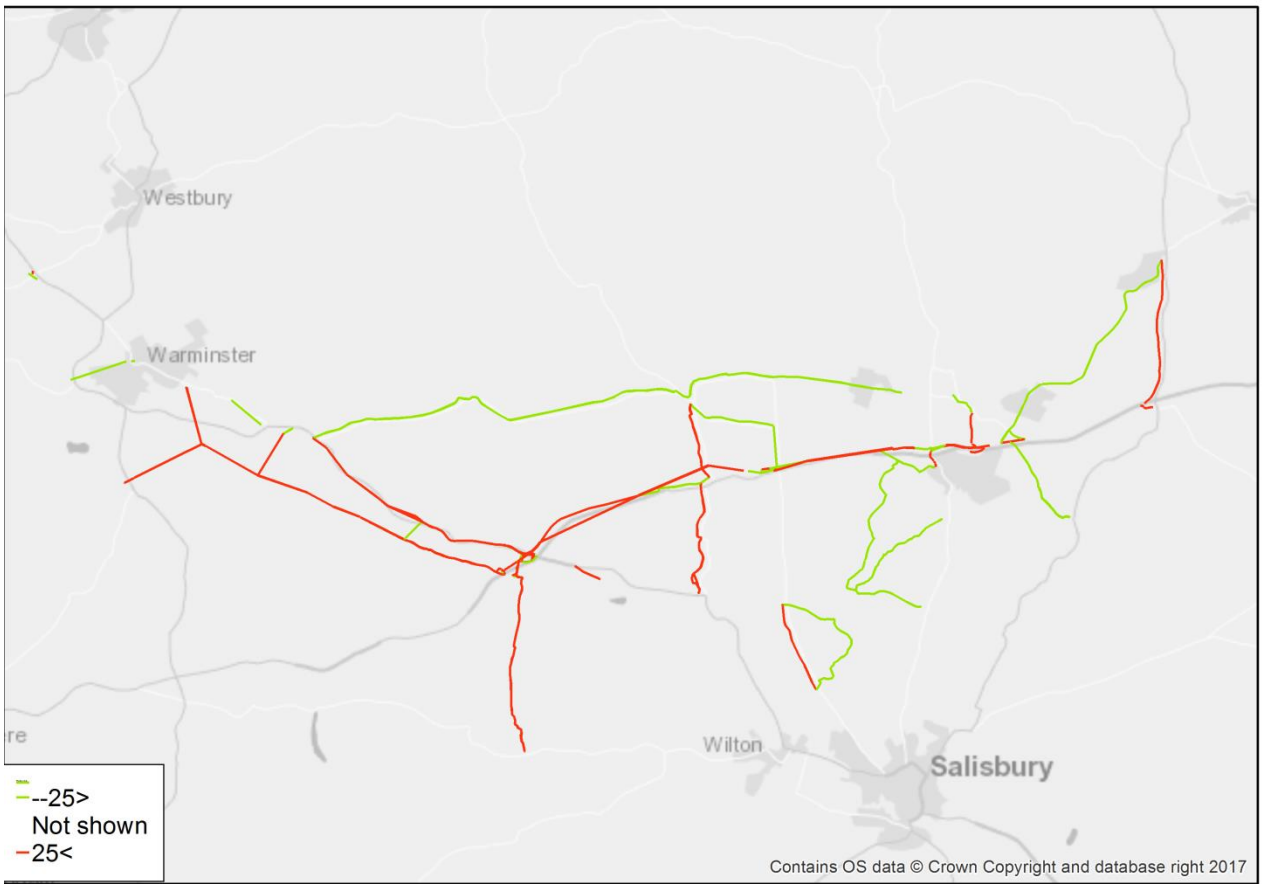


Figure A-21: 18 hour AAWT comparison, 2041 (DM –vs- DS)

DEFRA noise mapping

A.4.4.7 DEFRA produces a series of noise maps to inform the production of noise action plans for large urban areas, major transport sources, and significant industrial sites in England. These are published to meet the requirements of the Environmental Noise (England) Regulations 2006 and the Environmental Noise Directive (END) of the European Commission (2002/49/EC). As the noise mapping covers only major roads (greater than 6 million vehicles a year) and large urban areas (agglomerations of greater than 250,000 people), much of the area in the vicinity of Amesbury and Berwick Down is not covered.

A.4.4.8 Maps from DEFRA showing the level of noise by bands along key roads are available for the country at high-level, with additional detail available for specific locations meeting the Environmental Noise (England) Regulations specifications. Mapping is available for daytime and overnight noise levels. An example of the detailed mapping is given in Figure A-22 for roads in the direct vicinity of the A303 Amesbury to Berwick Down scheme.

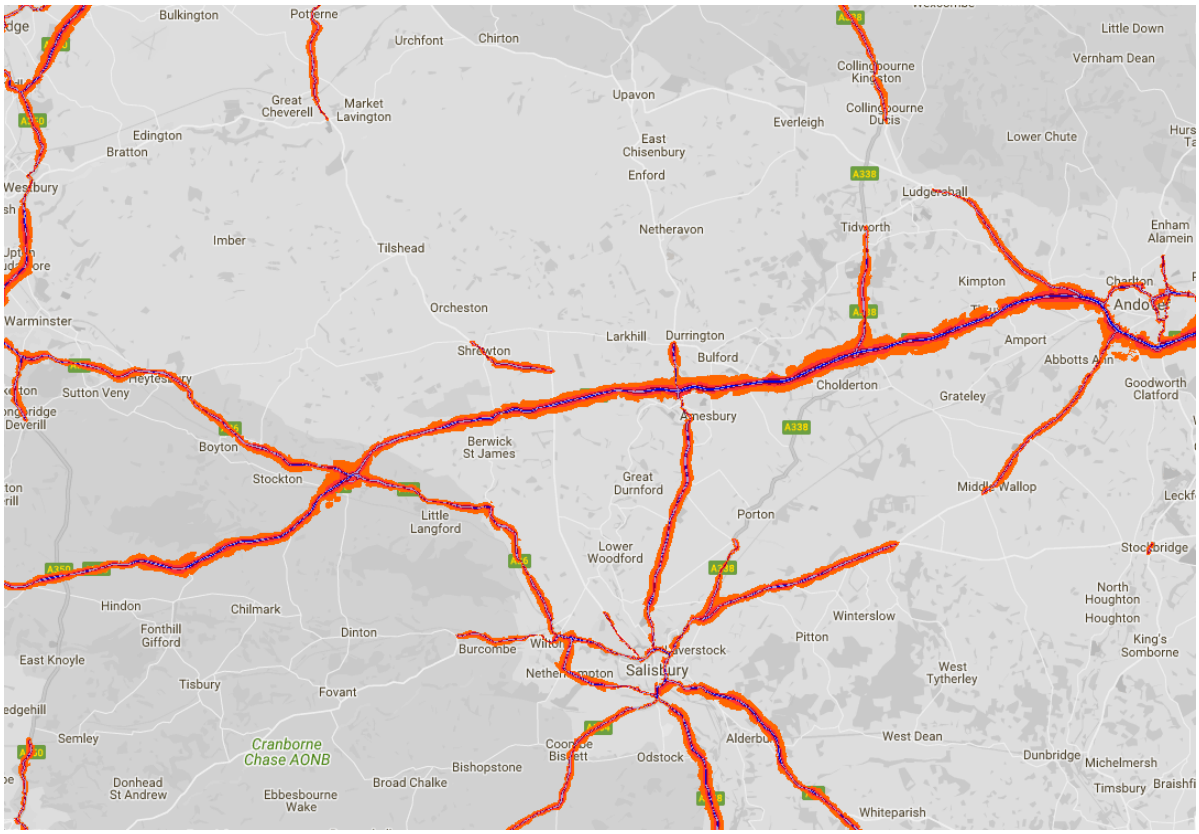


Figure A-22: DEFRA noise mapping – L_{den} (24 hour annual average noise level, decibels)

A.4.4.9 Analysis of the mapping available from DEFRA has been cross checked against the changes predicted by the A303 Stonehenge SWRTM (as noted above) and against the additional analysis for Air Quality assessments. The impact areas indicated by the previous work encompass the higher noise banded roads indicated in the DEFRA mapping, within the vicinity of the Scheme.

A.5 Summary and Conclusions

A.5.1 Summary

A.5.1.1 AmW, in its role as Technical Partner to Highways England, is progressing development of the A303 Amesbury to Berwick Down scheme. Traffic modelling has previously been undertaken at PCF Stages 0, 1 and 2 as part of the options identification and testing work.

A.5.1.2 As the Scheme progresses through the PCF to the Development phase, PCF Stage 3, the traffic model needs to be re-focussed to allow for refinement of the PCF Stage 2 A303 Stonehenge SWRTM, with a view to appraising the impacts of a single preferred route alignment. This refocussing requires a review of the Area of Detailed Modelling (AoDM).

A.5.1.3 The PCF Stage 2 models have been used in order to ascertain the extent of scheme related impacts. The 'Do Something' scenario has been modified from the D081c model previously tested in order to incorporate closures to lower quality merges and give-way junctions onto the A303 east of Solstice Park.

A.5.1.4 The extent of the impacts has been benchmarked against a number of different criteria, including a review against potentially sensitive environmental locations. Standard criteria have been used in the absence of any specific data being provided by the environmental workstream.

A.5.2 Proposed model areas

A.5.2.1 The results of the above analyses have been overlaid in GIS. The data have then been reviewed to isolate the effects of the Scheme from 'noise' in the wider traffic model. A polygon has then been drawn around the impacted areas to define a preliminary AoDM; this has been 'snapped' to the SWRTM zone boundaries to ensure that modelled zones are either wholly within or external to the AoDM. The standard SWRTM zoning system has been used for this purpose as the local area zoning will be reviewed as part of the model refinement at PCF Stage 3.

A.5.2.2 Figure A-23 presents the AoDM for the PCF Stage 3 model. As only one route option will be assessed in the Development phase of the PCF, the resultant AoDM is more focussed and is smaller than that derived during the Options phase.

A.5.2.3 As the figure shows, the refined AoDM extends north on the Salisbury Plain, north of Larkhill and Bulford, and south to the northern extents of Wilton and Salisbury. The eastern extent of the AoDM extends to the east of the A338, whilst the area extends towards Warminster in the west, incorporating the A36.

A.5.2.4 It is noted that re-routeing is forecast from the M4/M5 onto the A303. As the model has been developed from the SWRTM, the motorway network is fully coded in simulation coding through the area, and so the M4/M5 are already well represented.

A.5.2.5 The Fully Modelled Area will retain the network structure of the remainder of the SWRTM outside of the AoDM. The External Area will remain as per that of SWRTM but with the option to extend this by converting the outskirts of the simulation area (potentially Cornwall, Devon and the Welsh border) from simulation coding, or through means of some other form of fixing the simulation coding (e.g. Fixed Cost Function in SATURN). This will help to reduce model 'noise' and reduce the need for masking in economic appraisal. Figure A-24 presents the modelled areas, with the AoDM highlighted red, the Rest of the Fully Modelled Area in blue, and with the External Area highlighted in green.

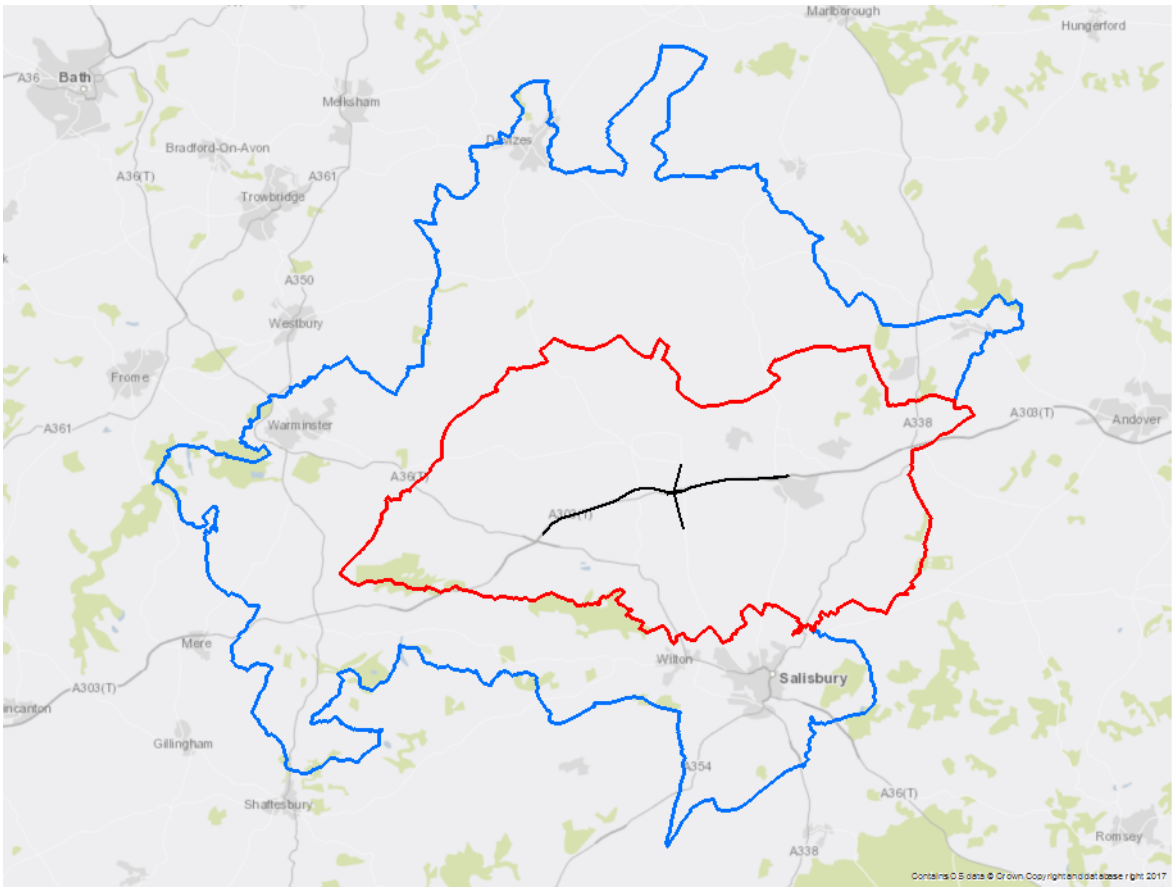


Figure A-23: Proposed PCF Stage 3 Area of Detailed Modelling

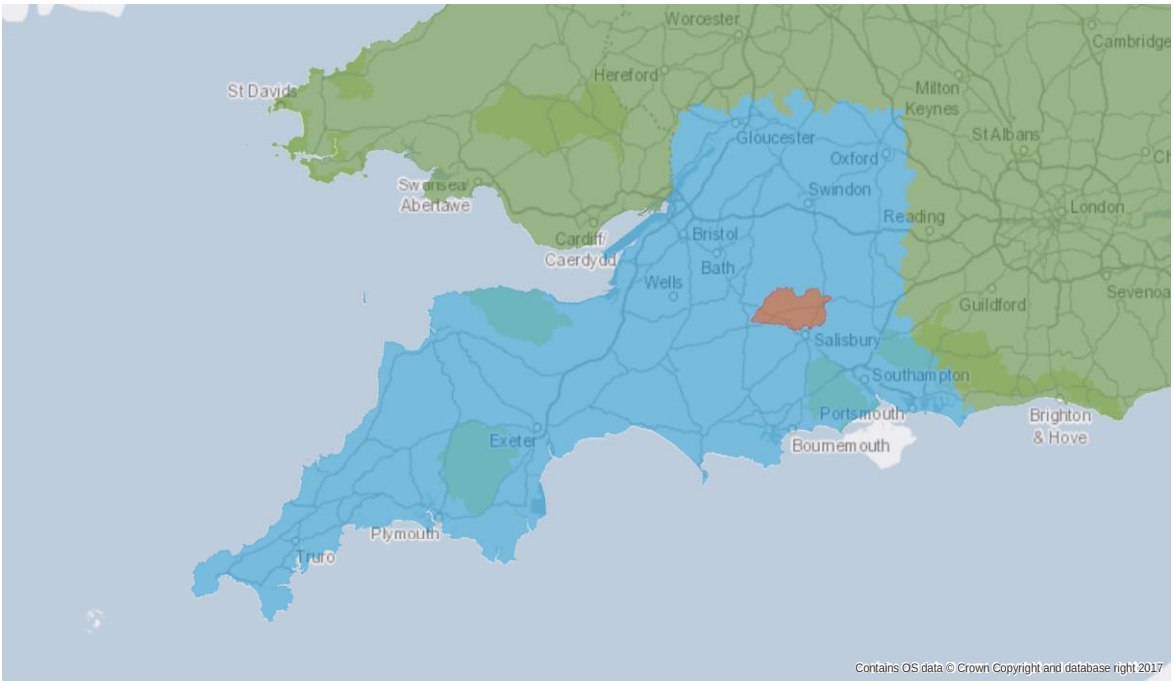


Figure A-24: Proposed modelled areas

Appendix B Summer matrix derivation

B.1 Technical Note on the use and application of TIS data

MOTT MACDONALD

Technical Note

Project:	A303 Sparkford to Ilchester Dualling		
Our reference:	389107 TN002B		
Prepared by:	Geraint Moore/Gerard Lovett	**Date:**	07/12/2017
Approved by:	Chris White	**Checked by:**	Sansaka Sirivadidurage
Subject:	Summer weekend matrix derivation - DRAFT		

1 Introduction

A proposed methodology for deriving demand matrices from Highways England's Trip Information System (TIS) data was set out in a previous Technical Note issued in October 2017. In summary, the proposed methodology involves adjusting existing 2015 March weekday inter peak (IP) matrices with the use of factors derived from 2016 TIS data.

This Technical Note provides some additional detail on the methodology and briefly outlines the results of implementing the process. The process is summarised in a flow chart presented in Figure 1.

2 Sector System

The TIS data was obtained at a zone system consisting of 123 zones, formed by the following:

- Local Authorities within the South West Regional Transport Model (SWRTM) Region of Focus (RoF) and intermediate model areas;
- Counties in the External Model Area within the vicinity of the intermediate model area; and
- Aggregations of Counties (or regions) further afield.

During initial attempts at implementing the proposed methodology, it became apparent that the 123 zone system was too coarse to provide a sufficient sample of TIS trips from which to derive reliable March to summer adjustment factors. In some instances, the derived factors were approaching 20000 and, when applied to even a relatively small volume of March trips, these resulted in clearly erroneous summer trip volumes.

It was decided to aggregate the TIS data and to derive the adjustment factors at a sector system formed by 18 sectors, as shown in Figure 2. Within the South West region and areas immediately adjacent, the sectors are formed by historic counties, while the sectors are formed by regions (or aggregations thereof) outside the South West.

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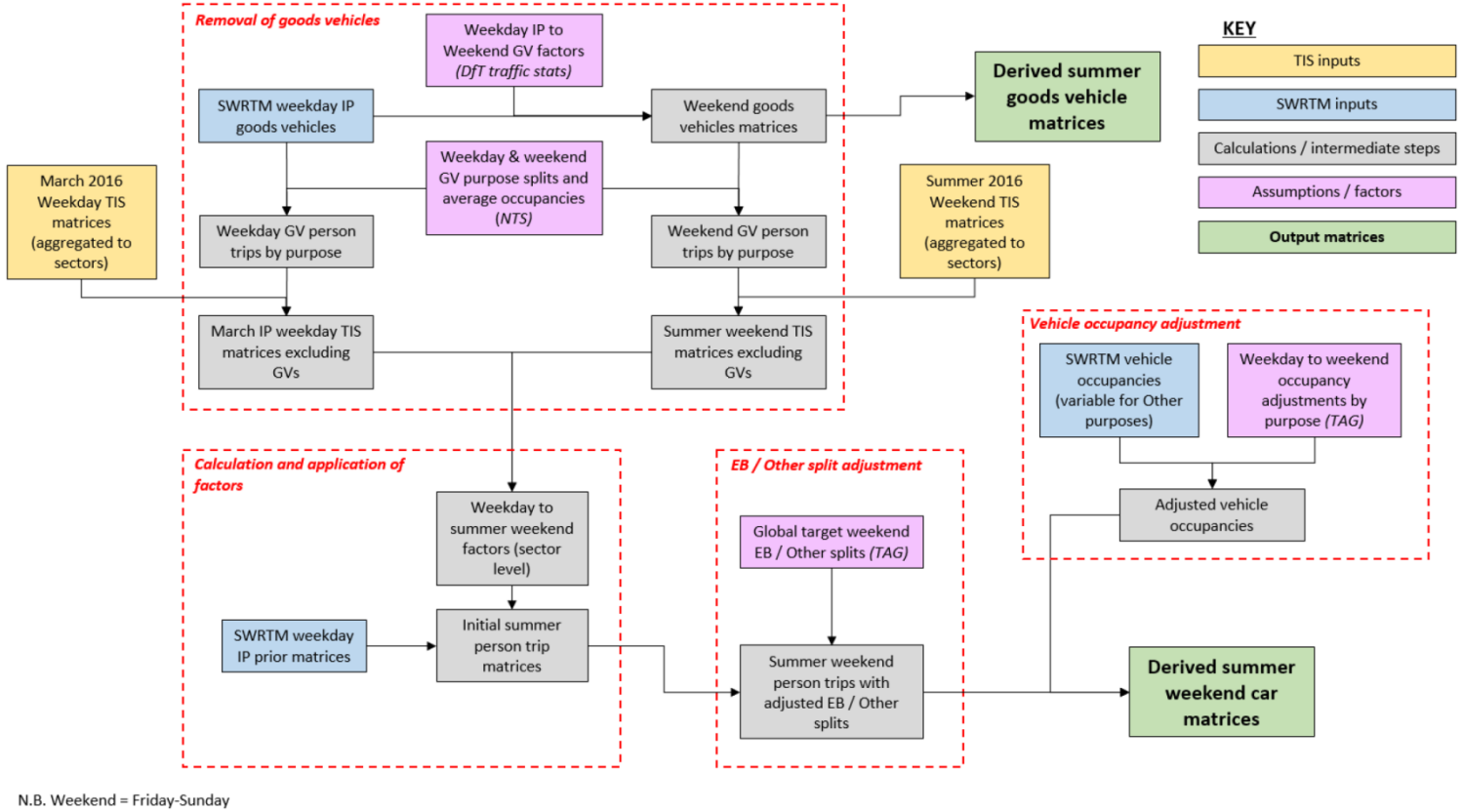
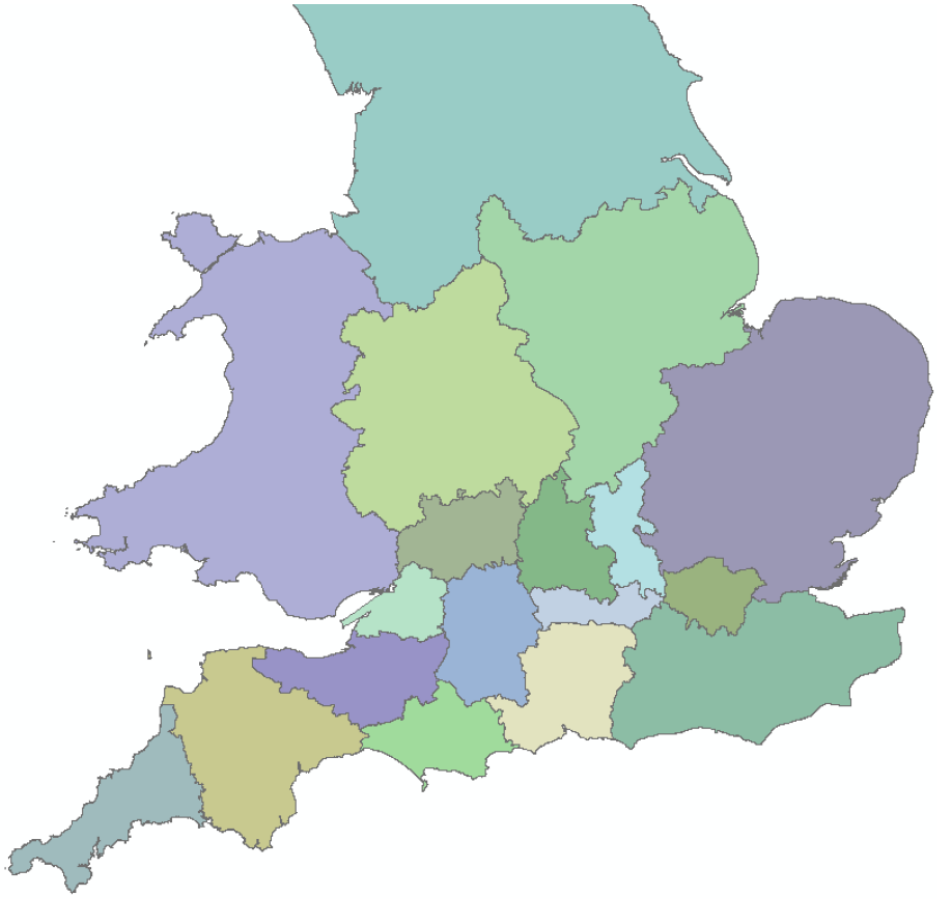
Figure 1: Summer matrix derivation process



N.B. Weekend = Friday-Sunday

Figure 2: 18 Sector System



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For Home Based Work (HBW) trips, the sample of TIS trips between most sectors at the 18 sector system were still too low to provide a robust set of factors. Therefore, the HBW adjustments from March to summer have been undertaken at a global level.

3 Derivation of Adjustment Factors

3.1 Removal of Goods Vehicles

TIS data includes person trips undertaken by all motorised road trips and, as such, includes person trips undertaken in goods vehicles. Before deriving March to summer adjustment factors, an attempt has therefore been undertaken to remove goods vehicles at the 18 sector system level from both the March TIS and summer TIS matrices.

Goods vehicles have been removed from the March TIS data in the same manner adopted during the SWRTM prior matrix build. This involved converting the SWRTM prior goods vehicle matrices into person trips and splitting them into each purpose type prior to their removal from the TIS. Average LGV occupancies from the July 2017 WebTAG databook and LGV purpose splits from the National Travel Survey (NTS) were used to produce LGV person trips. HGVs were assumed to have an average occupancy of 1.0 with all trips defined as being Non-Home Based (NHB).

When removing goods vehicle from the summer TIS matrices, global factors were used to convert the SWRTM March IP goods vehicle matrices into weekend (Friday-Sunday) goods vehicle matrices. These factors were derived from Department for Transport (DfT) Road Traffic Statistics[1] and are presented in Table 1.

Table 1: Monday-Friday (10:00-16:00) to Friday-Sunday (10:00-19:00) Goods Vehicle Factors

Vehicle Class	Adjustment Factor
LGV	0.852
HGV	0.467

Note: Factors are calculated and applied at an average hour level

Once the weekend goods vehicle matrices were derived, they were removed from the summer TIS matrices using the same approach adopted for the weekday goods vehicle matrices. Using the same sources as used for the weekday matrices (i.e. NTS and WebTAG), weekend specific LGV occupancies and purpose splits were derived when excluding goods vehicles from the TIS data.

3.2 Person Trip Adjustment Factors

Once goods vehicle person trips were removed from the TIS data, the resulting matrices were used to derive a set of adjustment factors with which to convert the SWRTM March IP prior person matrices into summer weekend person matrices. Separate factors were calculated for the following trips types:

- Home Based Work (HBW) From Home (FH);
- HBW To Home (TH);
- Home Based Other (HBO) FH;
- HBO TH; and
- Non-Home Based (NHB).

These factors were derived and applied at the 18 sector system except for HBW trips, which were adjusted globally.

[1] Table TRA0308: Traffic distribution on all roads by time of day and day of the week, for selected vehicle types, Great Britain: 2016 (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/610673/tra0308.ods)

As proposed in the previous Technical Note, these adjustment factors were applied to the relevant purposes within the prior IP matrices, as follows:

- HBW factors applied to HBW prior matrix (FH and TH separately);
- HBO factors applied to Home Based Employers' Business (HBEB) and HBO prior matrices (FH and TH separately); and
- NHB factors applied to NHBEB and NHBO prior matrices.

3.3 Employers' Business / Other Adjustments

As identified in the previous Technical Note, applying the factors as outlined above resulted in the correct total of trips in HBO combined (i.e. HBEB+HBO) and NHB combined (i.e. NHBEB+NHBO), but the split of EB and Other was essentially retained from the March weekday matrices. The EB / Other splits in the base SWRTM matrices which differed for HB and NHB trips, were based on the National Travel Survey (NTS), and varied by distance (with the proportion of EB trips generally increasing with distance).

The split of EB / Other in the initial summer matrices has been revised to make it more representative of weekends (Friday-Sunday). The July 2017 WebTAG databook (Table A1.3.4) was used to identify the split between EB and Other trips for the weekday IP and Friday-Sunday periods (5.6% EB and 2.7% EB respectively). To retain consistency with the weekday matrices, which were derived from NTS and differed for HB and NHB trips, the 2.7% target global EB proportion was not applied directly but rather the initial global EB proportions were adjusted in line with the ratio identified above (2.7 / 5.6 = 0.48). This was adopted for HB and NHB trip purposes separately.

A furnessing process was then adopted whereby the total number of HBO and NHB trips for each *ij* pair were maintained whilst also achieving, at a global level, target purpose splits set out in Table 2. The target purpose splits were derived in the manner as set out above (i.e. by factoring the initial global HBEB and NHBEB proportions by 0.48).

Table 2: Target Weekend EB / Other Splits

Purpose	Purpose Split
HBEB	0.0195
HBO	0.9805
NHBEB	0.0940
NHBO	0.9060

3.4 Creation of Summer Car Vehicle Trips

Following the adjustment of the split of EB / Other trips, the person trip matrices have been converted into vehicle matrices using assumed vehicle occupancy factors based on those used in the SWRTM IP matrix build.

In the SWRTM average vehicle occupancy factors of 1.10, 1.11 and 1.18 were used for HBW, HBEB and NHBEB trips respectively. SWRTM occupancies for the Other purposes vary by trip distance (with average occupancies increasing by distance) and area types (with trips produced in rural areas having lower occupancies than trips produced in urban areas). As part of the SWRTM matrix build, occupancy factors for Other trips were calculated for each *ij* pair.

The July 2017 WebTAG databook (Table A1.3.3) was used to derive weekday IP to weekend (Friday-Sunday) occupancy adjustment factors, as presented in Table 3.

Table 3: Occupancy Adjustment Factors

User Class	Weekday IP Occupancy	Friday-Sunday Occupancy	Adjustment Factor
HBW	1.154	1.215	1.053
EB	1.194	1.233	1.032
Other	1.649	1.820	1.104

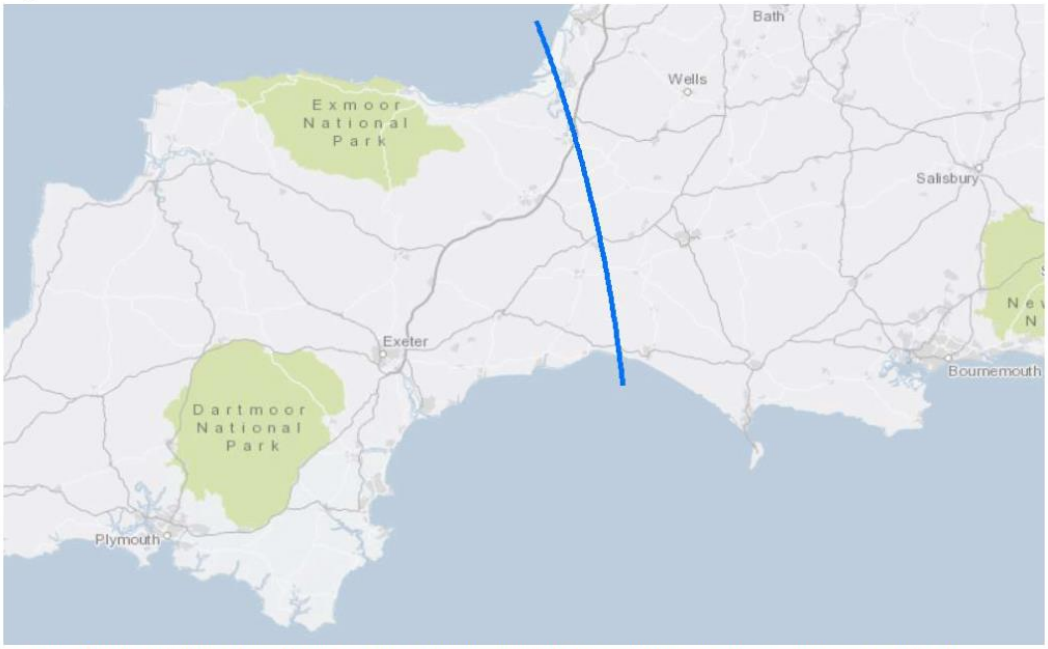
The SWRTM occupancy factors, at *ij* level, were adjusted using the above factors to provide a set of weekend vehicle occupancies. These resulting weekend occupancy factors were used to convert the summer person matrices into vehicle matrices.

4 Analysis of Summer Matrix

4.1 Matrix total across a screenline

For the purposes of undertaking initial sense checks of the derived summer matrices, a screenline was drawn between Lyme Regis in the south and Bridgwater in the north. This screenline divided the model into two sectors.

Figure 3: East – West screenline



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Zones to the west of the screenline were assigned to sector 1, all other zones were assigned to sector 2. The car trips in the March IP Prior matrix originating on one side of the screenline and ending on the other are shown in Table 4.

Table 4: March IP Prior trips across screenline (average hour)

	Car Persons	Average Occupancy	Car Vehicles	Car Vehicle Split
HBW	1,442	1.10	1,311	14%
EB	2,232	1.13	1,968	22%
Other	10,446	1.82	5,742	64%
Total	14,119	1.57	9,021	100%

Table 5 shows the trips across the screenline for the summer matrix.

Table 5: Summer trips across screenline (average hour)

	Car Persons	Average Occupancy	Car Vehicles	Car Vehicle Split
HBW	1,113	1.16	961	9%
EB	2,359	1.18	2,003	18%
Other	16,443	2.07	7,942	73%
Total	19,916	1.89	10,906	100%

Table 6: Goods vehicle trips across screenline (average hour)

	March Trips (pcus)	Summer Trips (pcus)
LGV	1,751	1,586
HGV	2,874	1,339

The car person trips across the screenline increases between March IP and the summer by 41%. There is an increase in Other trips and a reduction in HBW and EB trips. To achieve a higher proportion of Other trips during the summer weekend, EB trips in the March IP are re-allocated to Other in the summer weekend.

All car purposes have higher occupancy factors during the summer weekend. As a result, when the person trips are converted to vehicle trips, the 41% increase in person trips reduces to a 21% increase in car vehicle trips.

The goods vehicle (GV) trips across the screenline decrease between the March IP matrix and the summer weekend matrix. The HGV trips reduce by more than 50%, while the reduction in LGV trips is less pronounced. These reductions are due to the lower summer weekend proportions for GVs.

4.2 Trip Length Distributions

The following figures show the change in sector-sector trip length distribution (TLD) between March IP and the summer weekend periods. With the exception of HBW, all purposes show an increase in longer distance trips and a reduction in shorter distance trips in the summer weekend period compared to the March IP period. There is very little difference between the March IP and summer weekend TLDs for HBW trips.

The increase in the proportion of longer distance trips is a result of longer distance trips having greater factors applied to them.

Figure 4: HBEB TLD

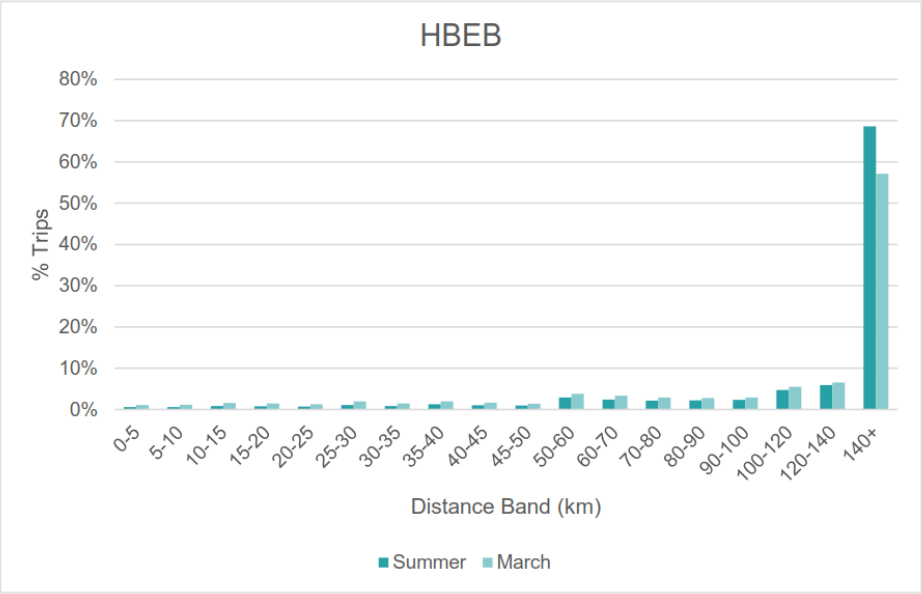


Figure 5: HBW TLD

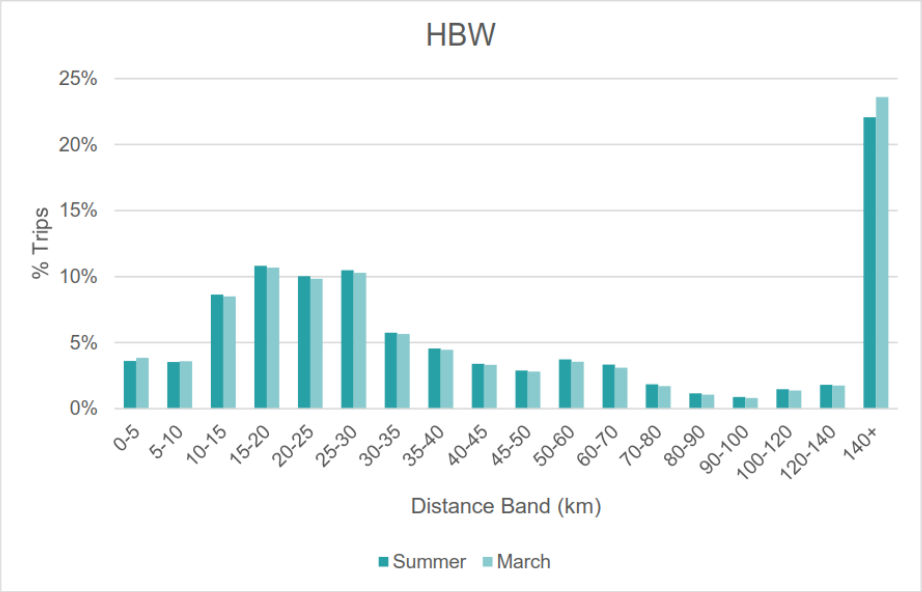


Figure 6: HBO TLD

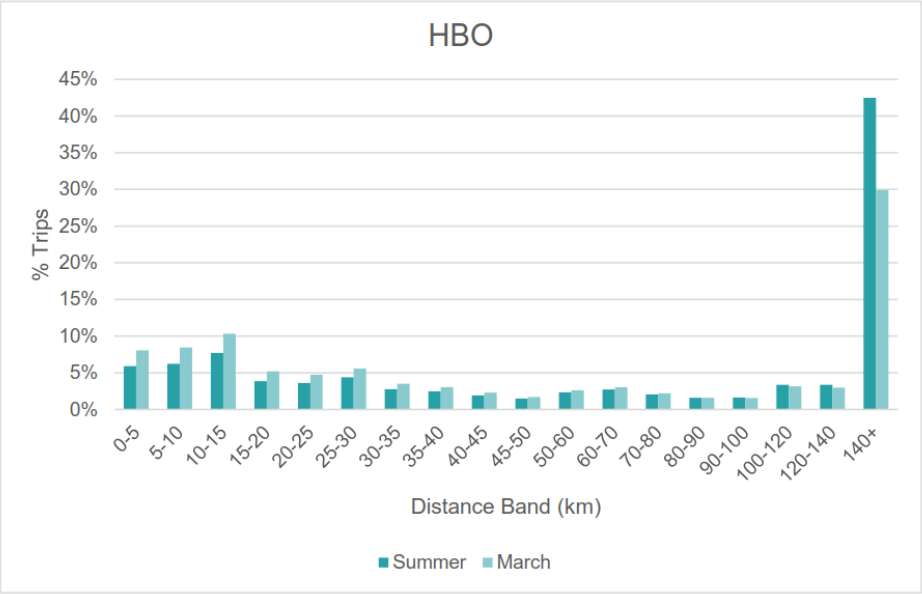


Figure 7: NHBEB TLD

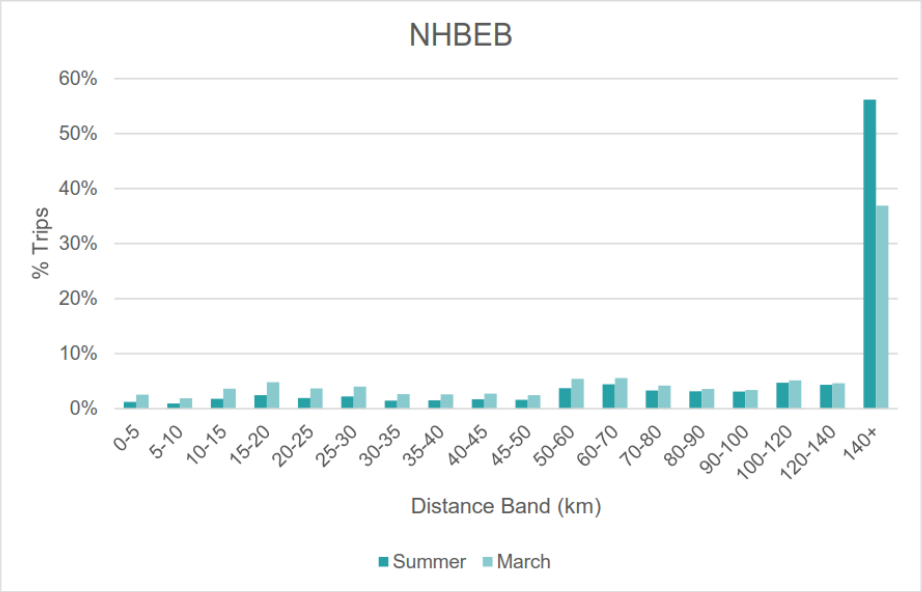
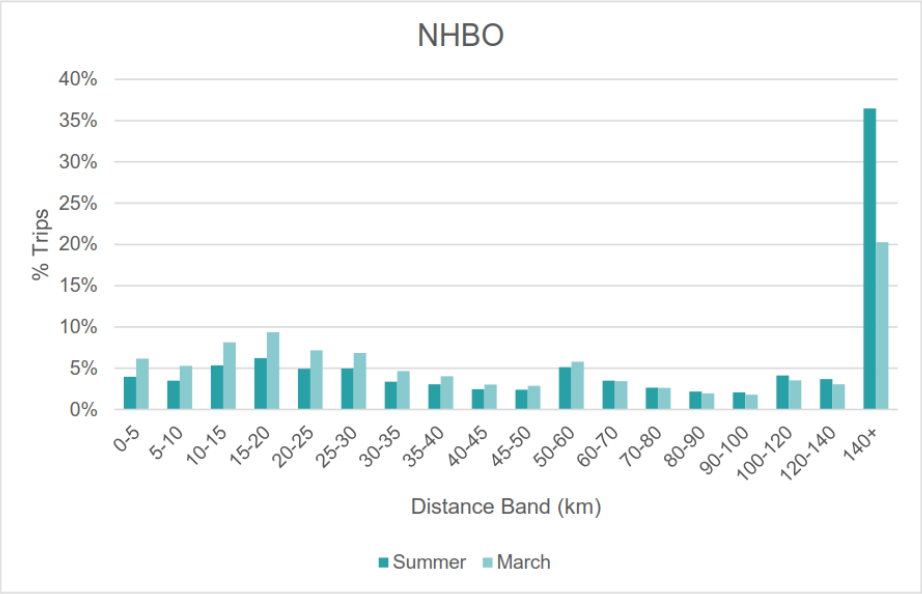


Figure 8: NHBO TLD



5 Recommendations

Given the limitations of the data available to derive summer matrices the process detailed in the technical note issued in October 2017 recommends a proportionate approach. The matrix derived using this proportionate approach could be used as the starting matrix (prior matrix) to derive a summer model. The prior matrix should be converted from the SWRTM zoning system to the local zoning system before assigning it to the network. Matrix estimation should be carried out to achieve a better match between observed counts and modelled flows.

Appendix C Route choice calibration

C.1 Select link analyses

Figure C-1: A303 eastbound past Stonehenge

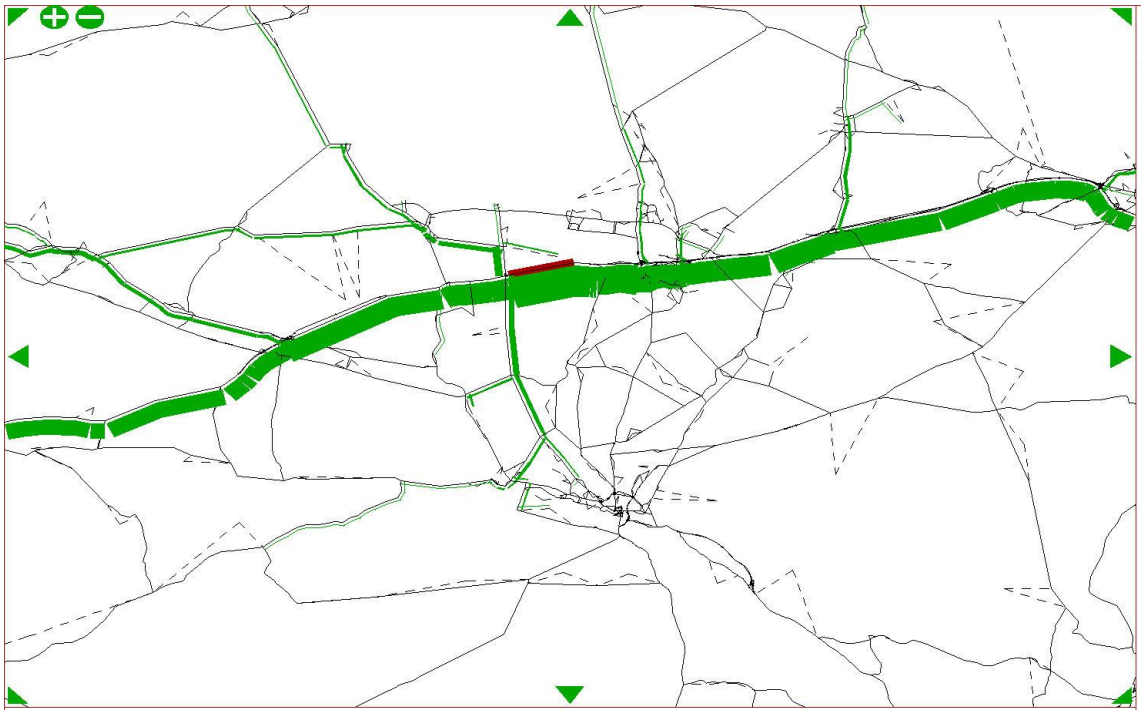


Figure C-2: A303 westbound past Stonehenge

Figure C-3: Eastbound along A303 east of A36 junction

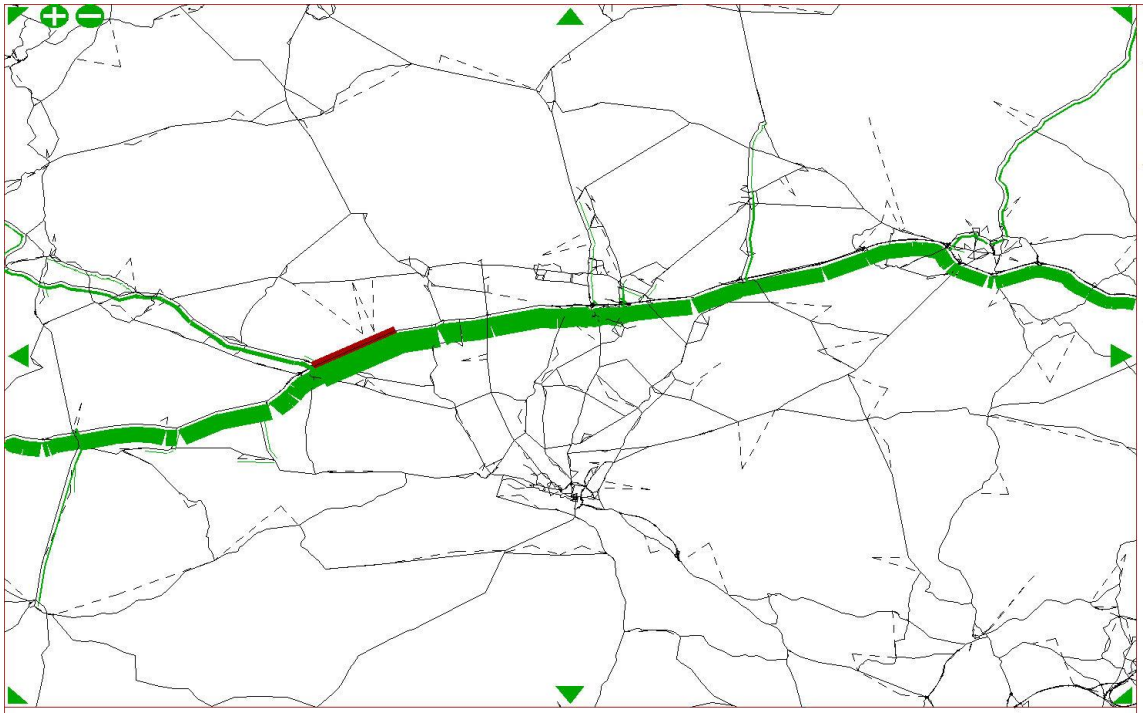


Figure C-4: Westbound along A303 east of A36 junction

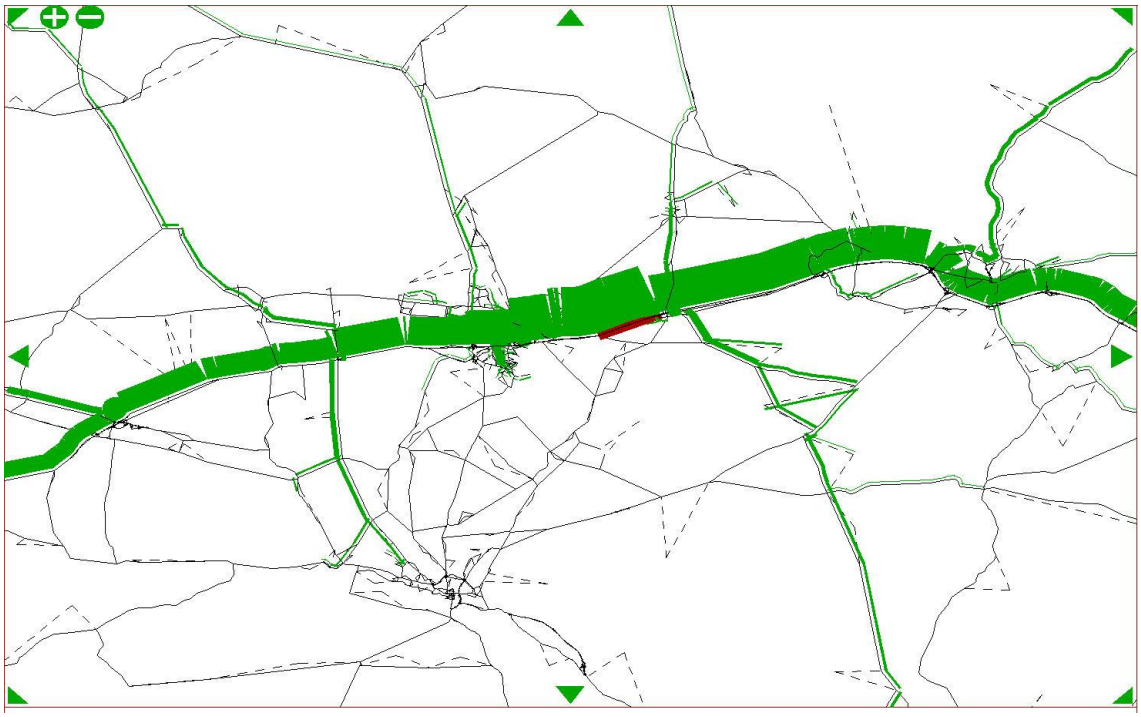


Figure C-5: Eastbound along A303 west of A338 junction

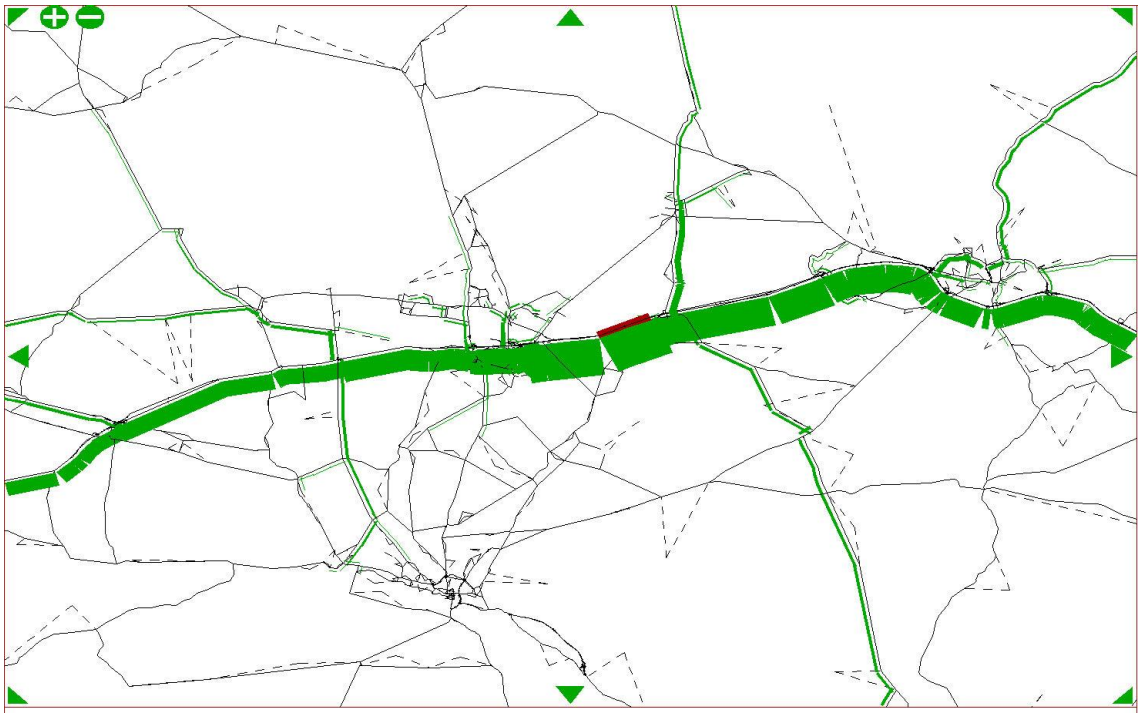


Figure C-6: Westbound along A303 west of A338 junction

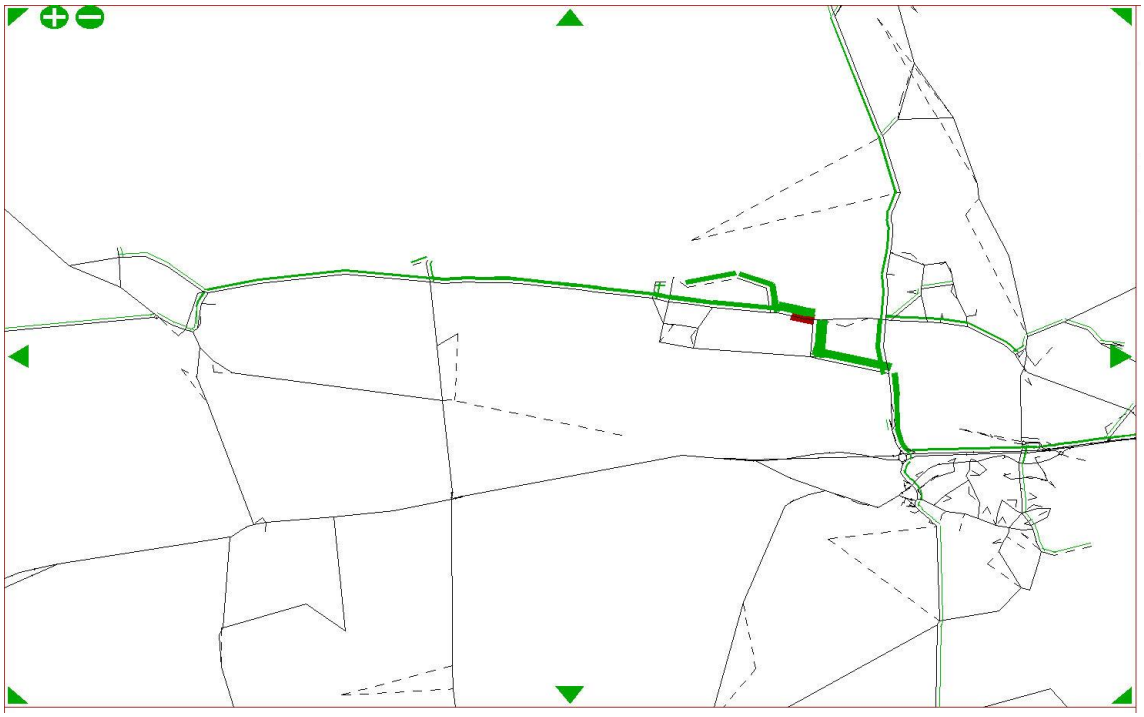


Figure C-7: Eastbound along The Packway in Larkhill

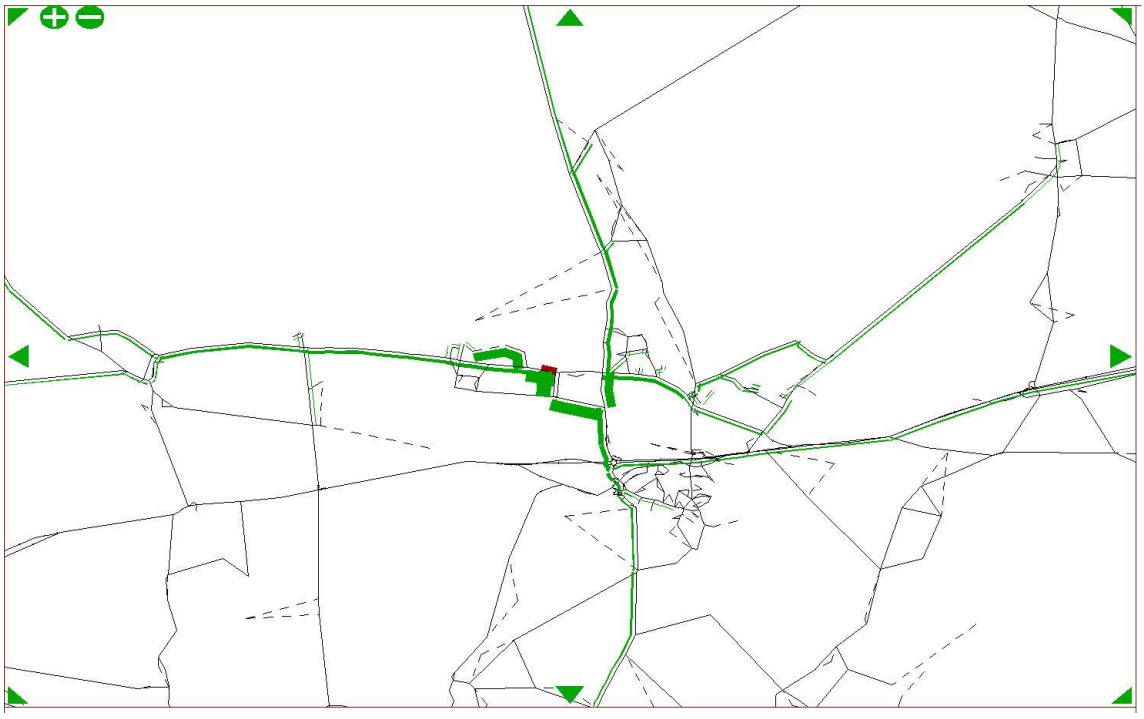


Figure C-8: Westbound along The Packway in Larkhill

Figure C-9: Northbound along A360 south of A303 Longbarrow roundabout

Figure C-10: Southbound along A360 south of A303 Longbarrow roundabout

Figure C-11: Northbound along A345 north of Countess roundabout

Figure C-12: Southbound along A345 north of Countess roundabout

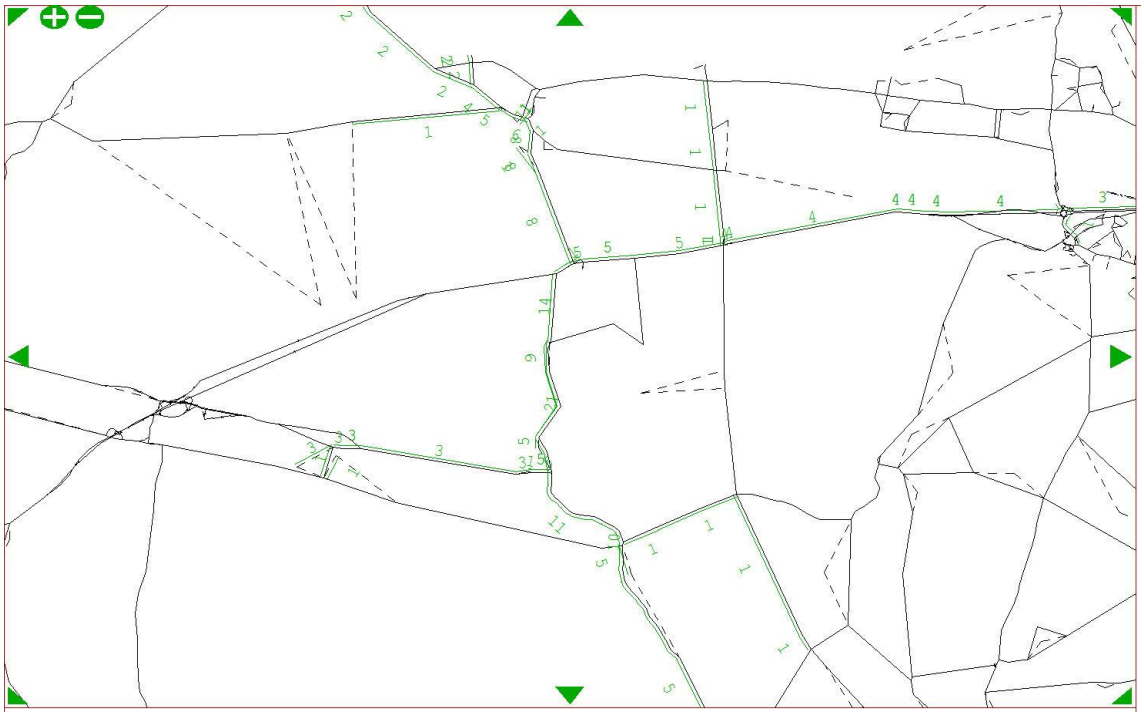


Figure C-13: Northbound along B3083 through Berwick St James

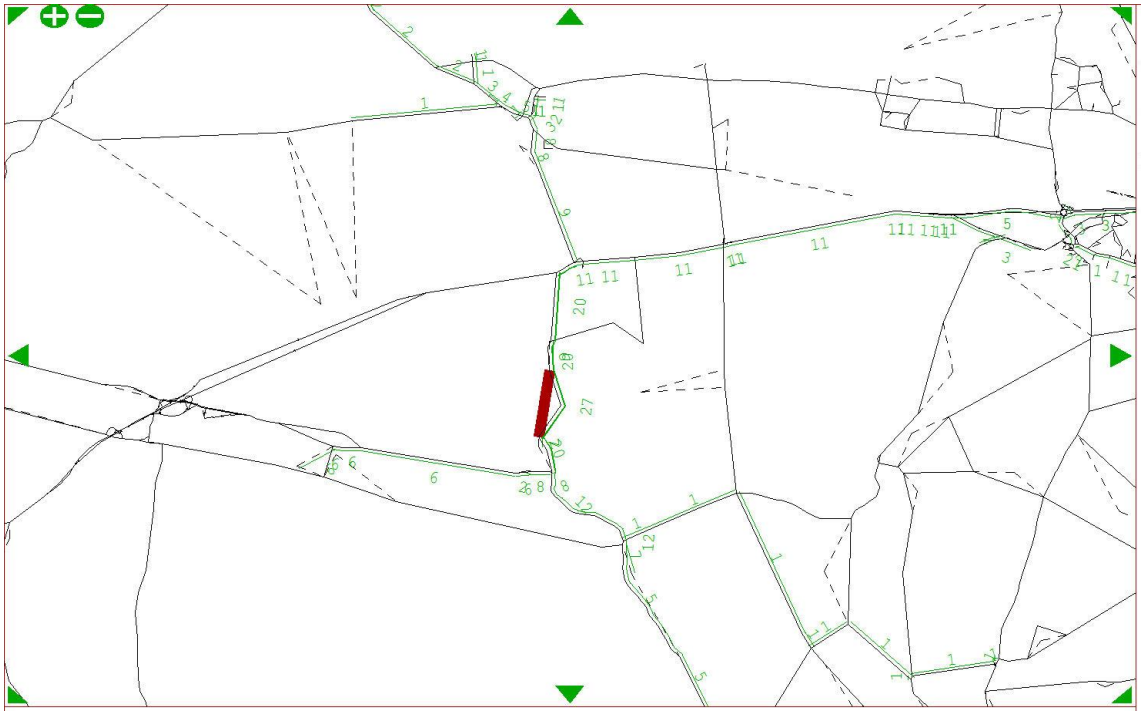


Figure C-14: Northbound along B3083 through Berwick St James

Figure C-15: Eastbound along A360 between Shrewton and Stonehenge

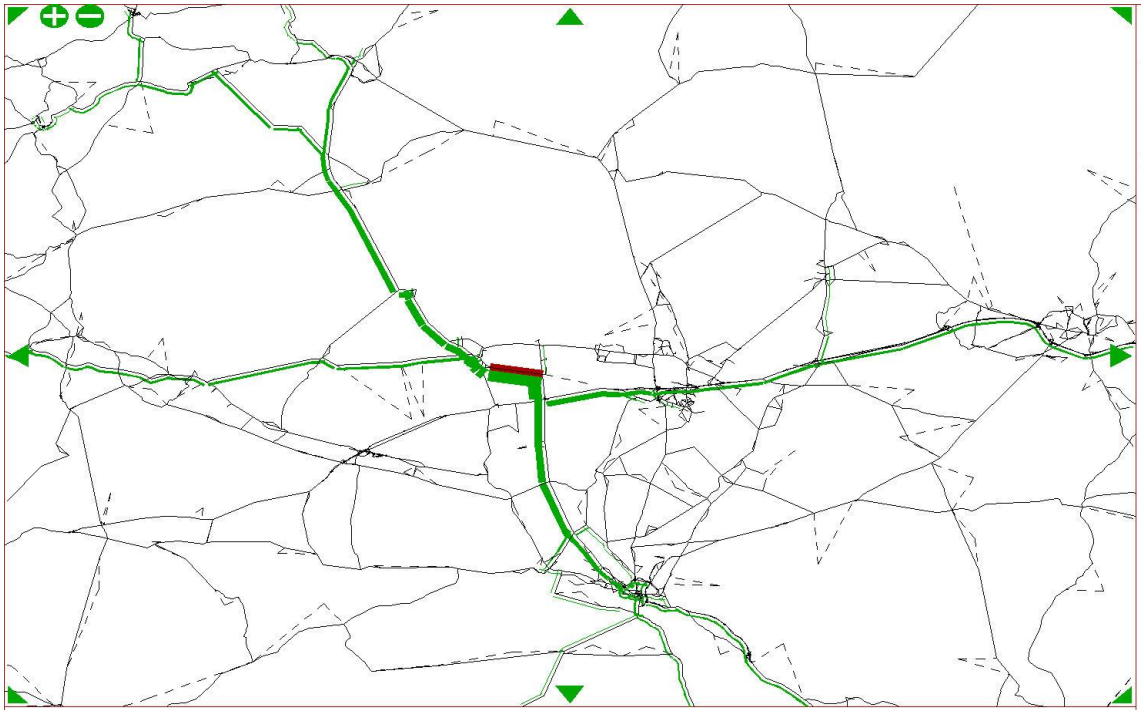


Figure C-16: Westbound along A360 between Shrewton and Stonehenge

C.2 Minimum cost O-D paths

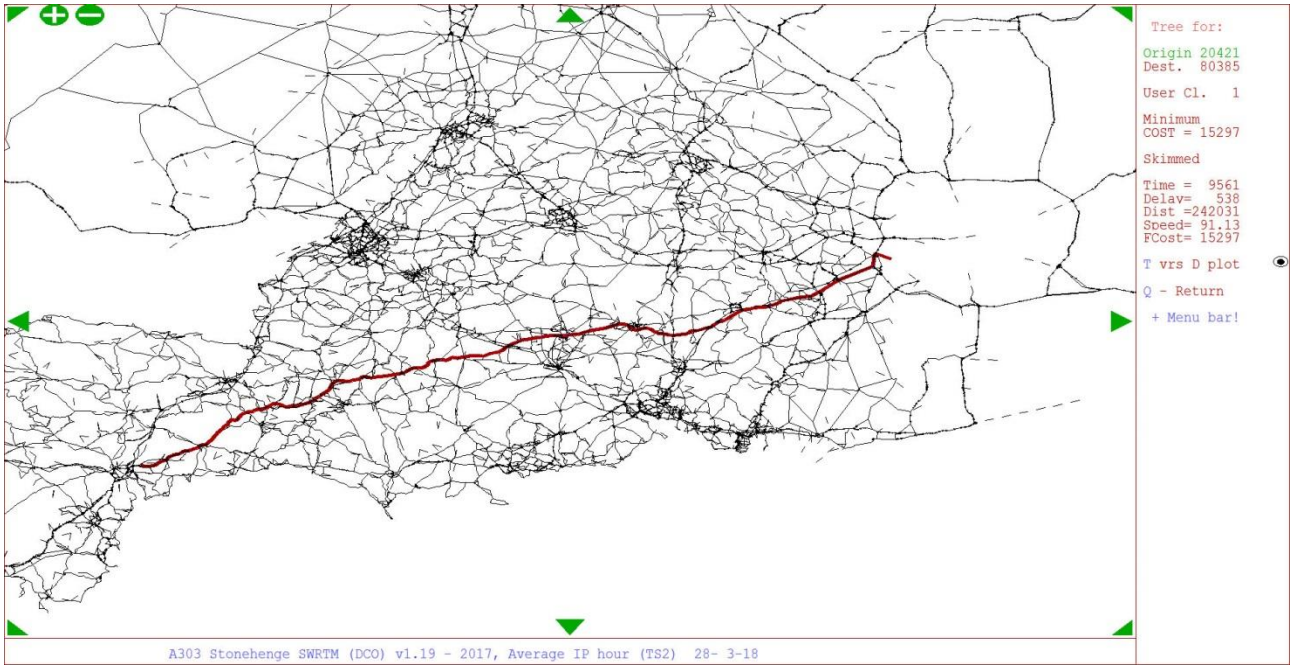


Figure C-17: Exeter to west London

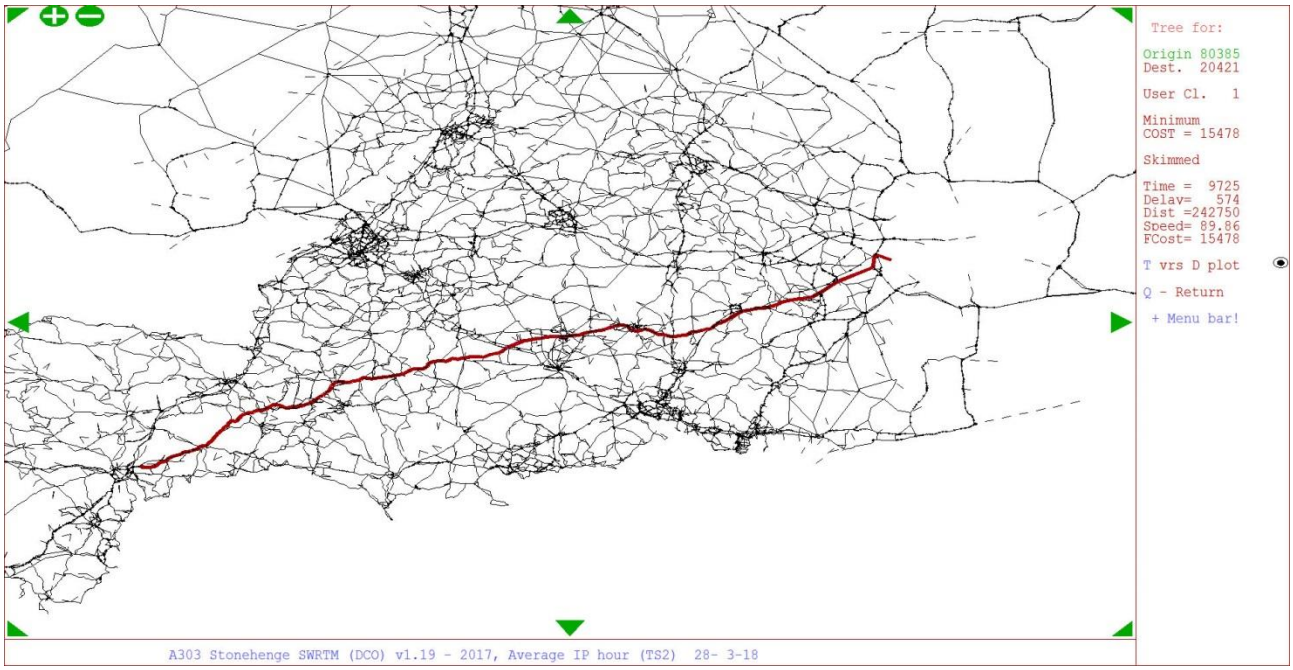


Figure C-18: West London to Exeter

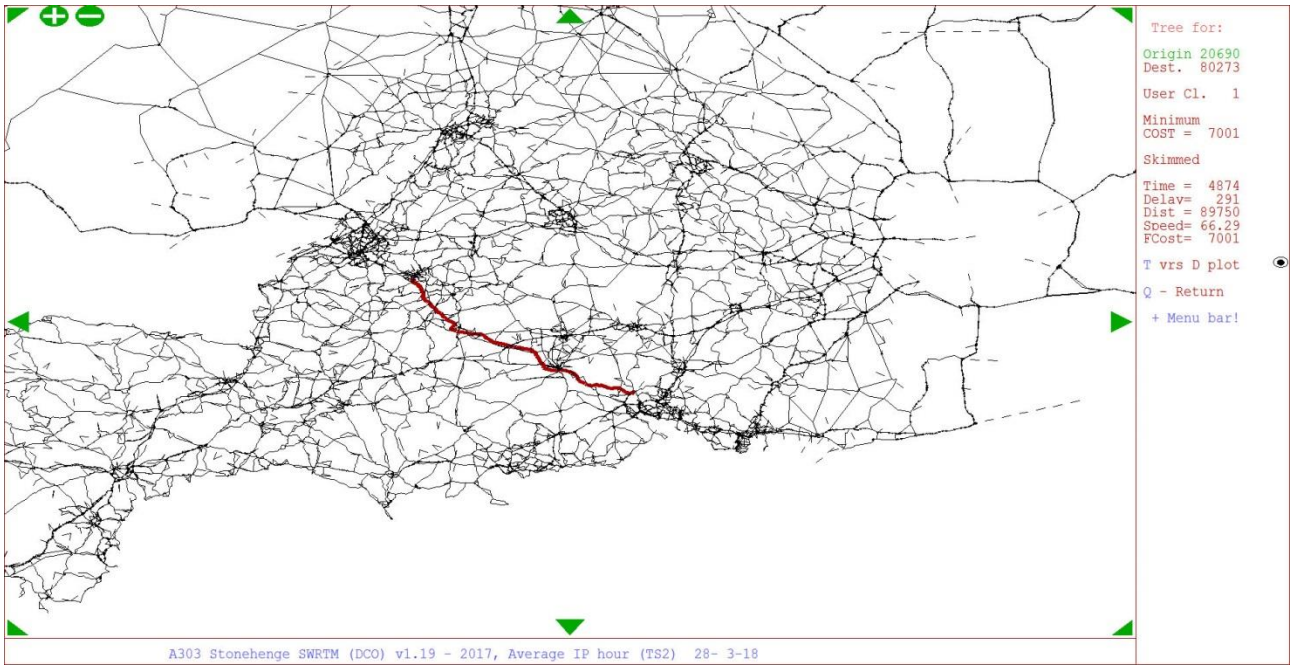


Figure C-19: Bath to Romsey / Southampton

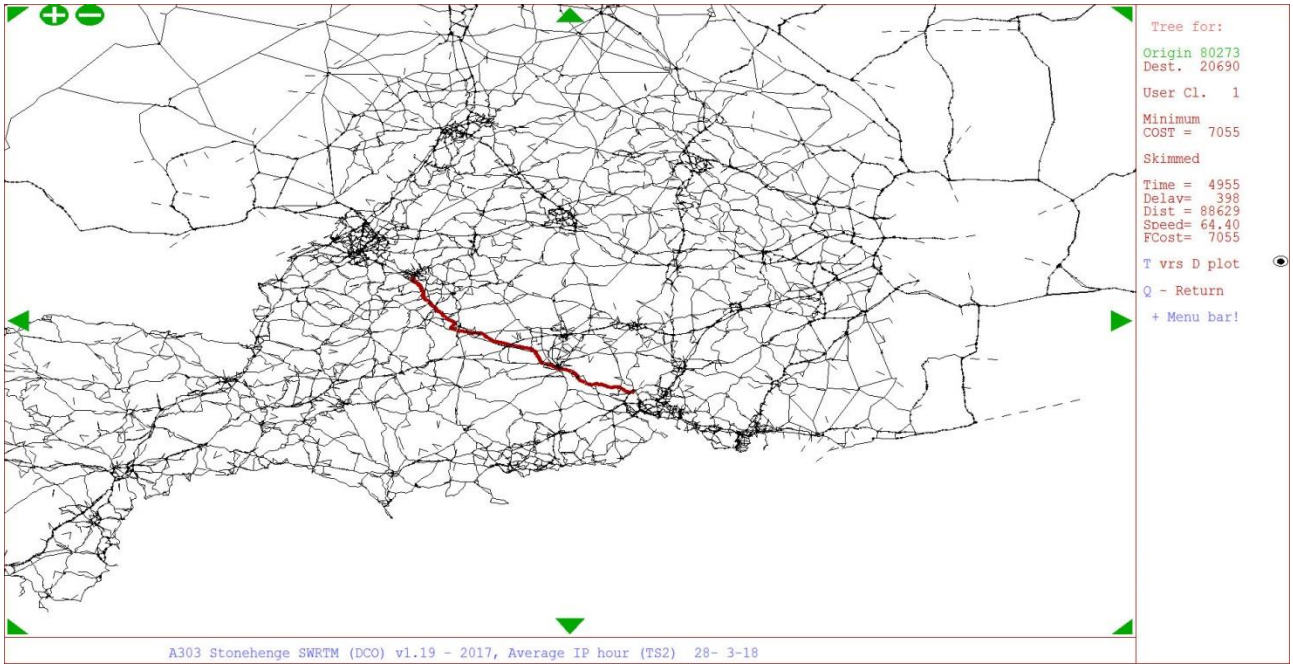


Figure C-20: Romsey / Southampton to Bath

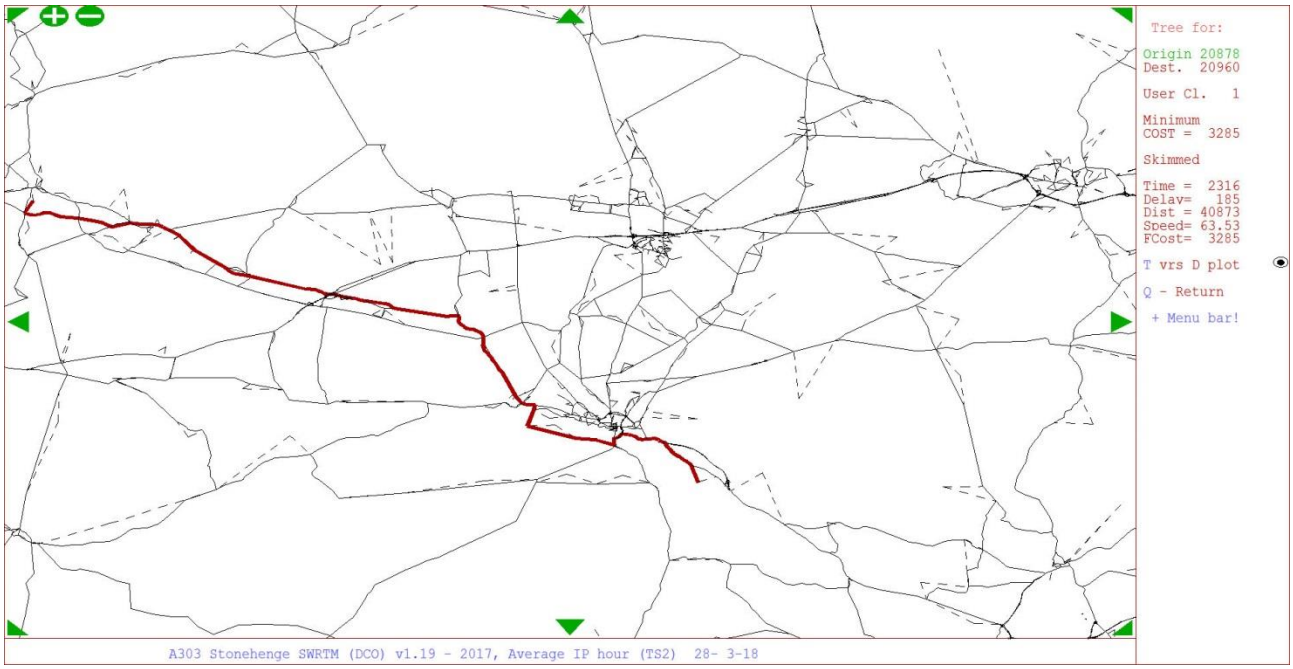


Figure C-21: Warminster to Salisbury

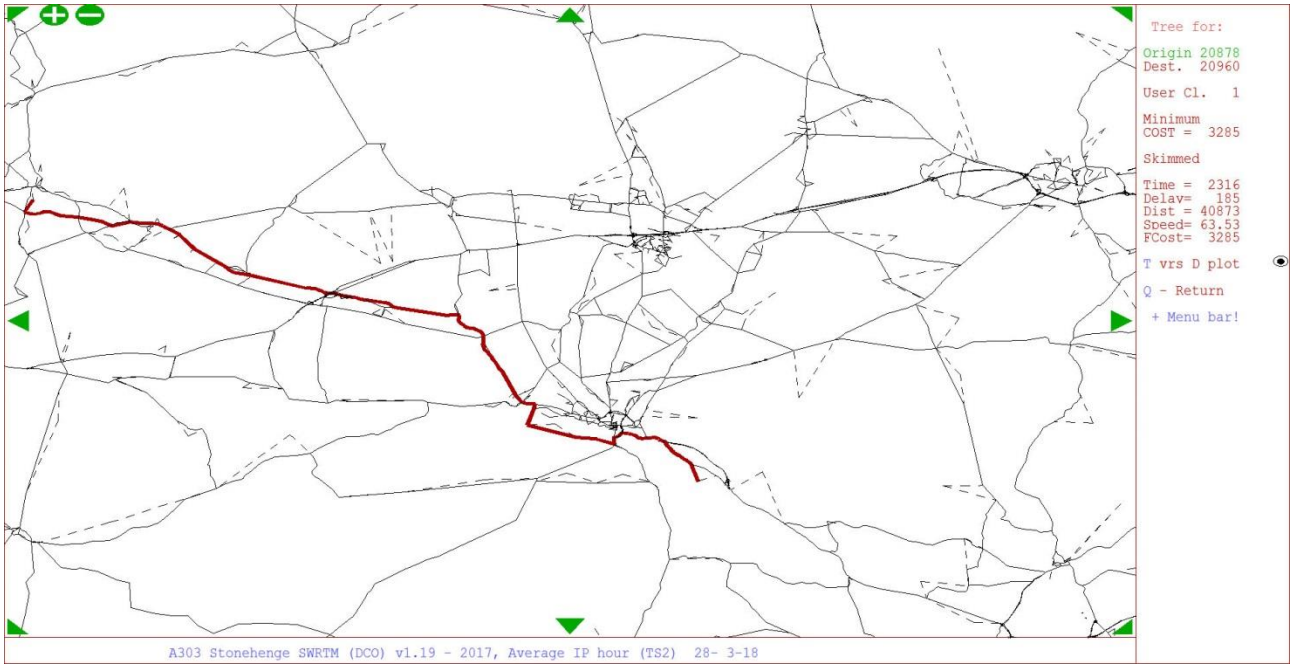


Figure C-22: Salisbury to Warminster

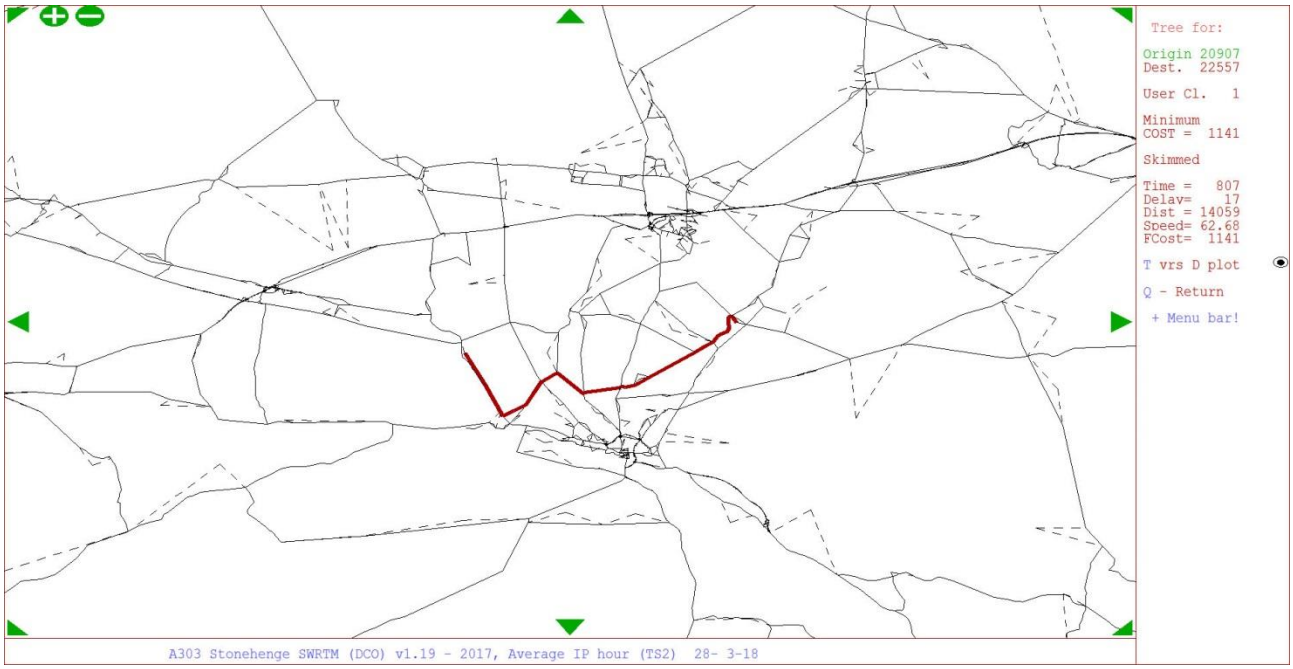


Figure C-23: Great Wishford / South Newton to Porton

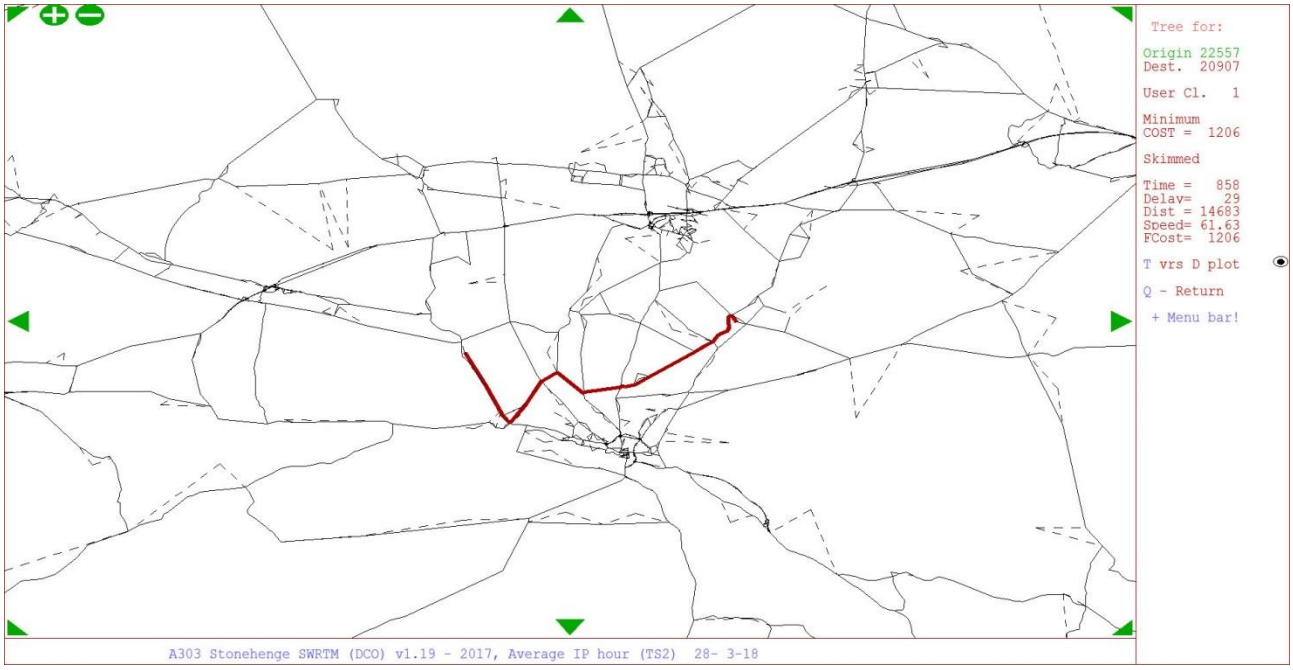


Figure C-24: Porton to Great Wishford / South Newton

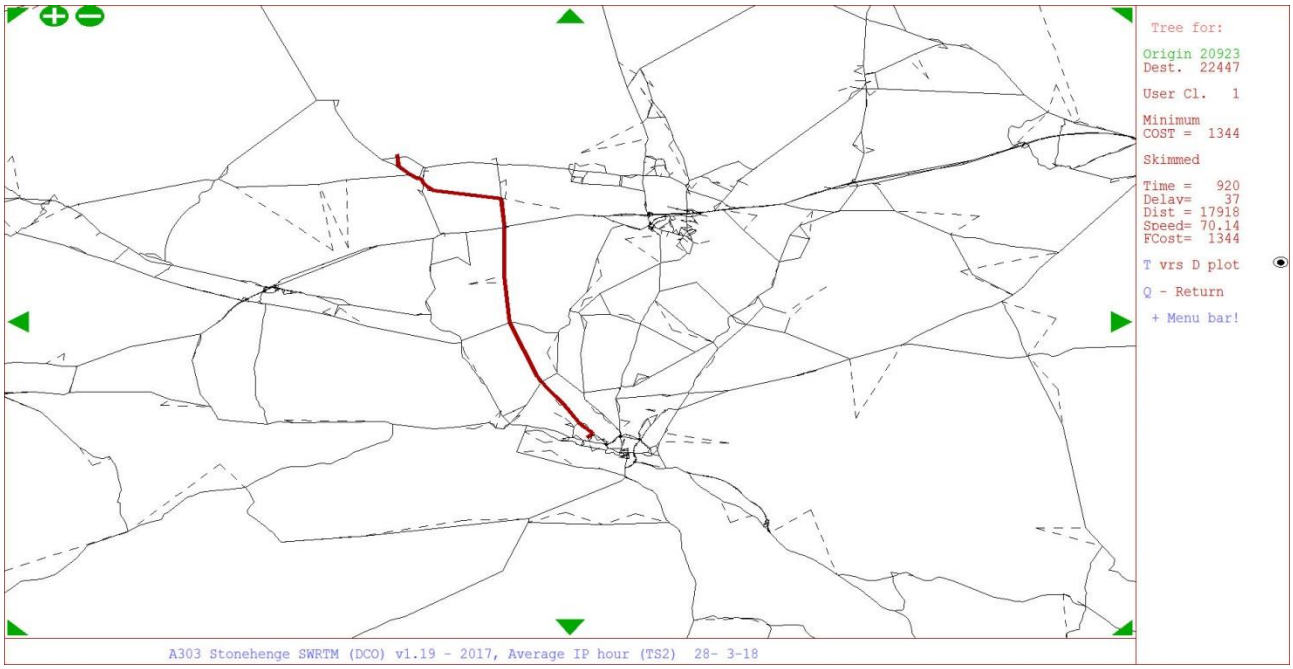


Figure C-25: Orcheston to Salisbury

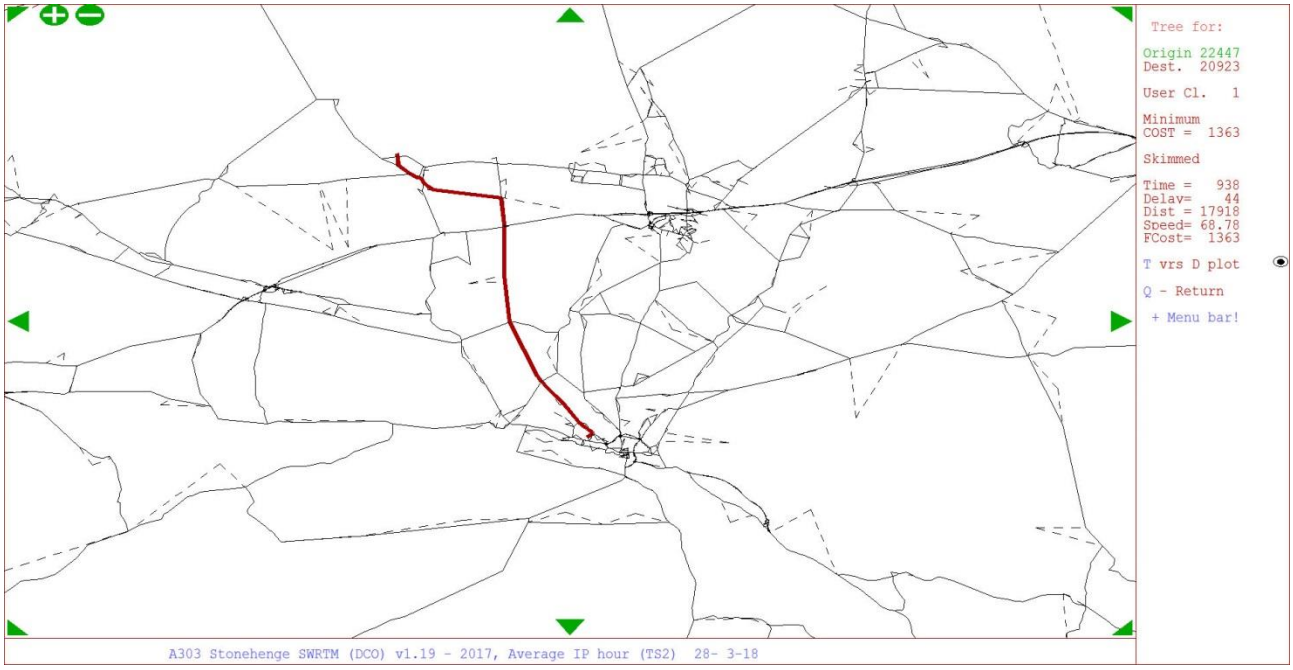


Figure C-26: Salisbury to Orcheston

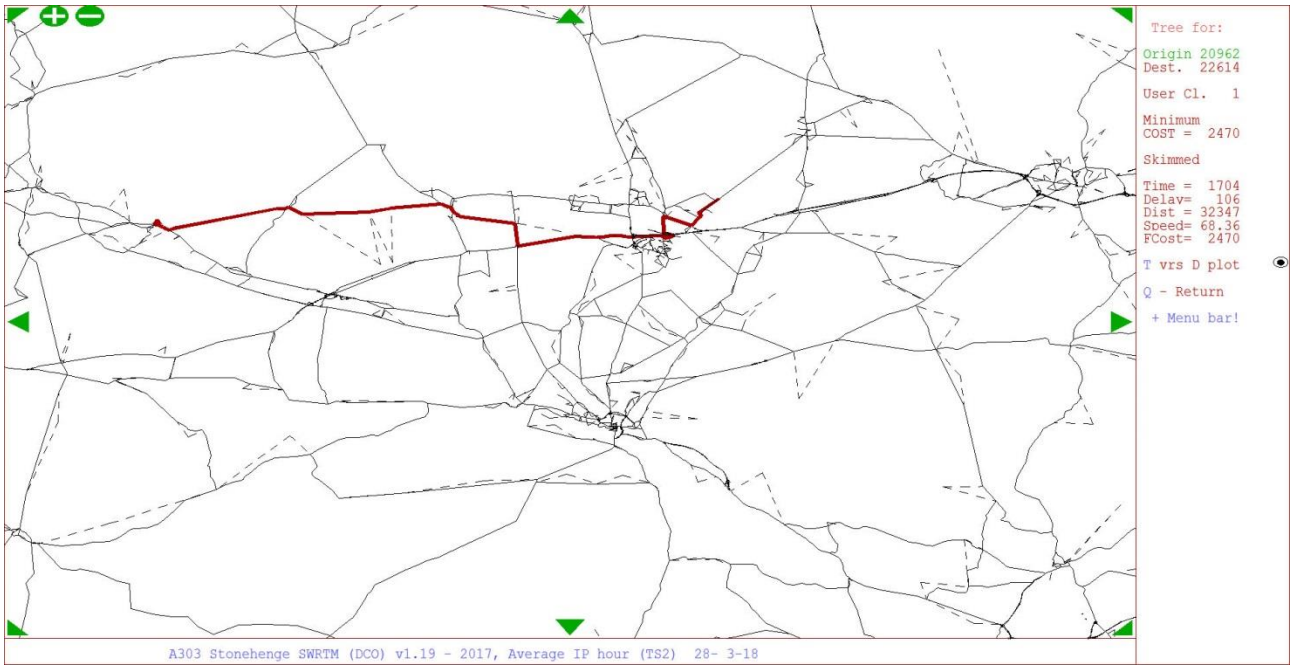


Figure C-27: Heytesbury to Bulford

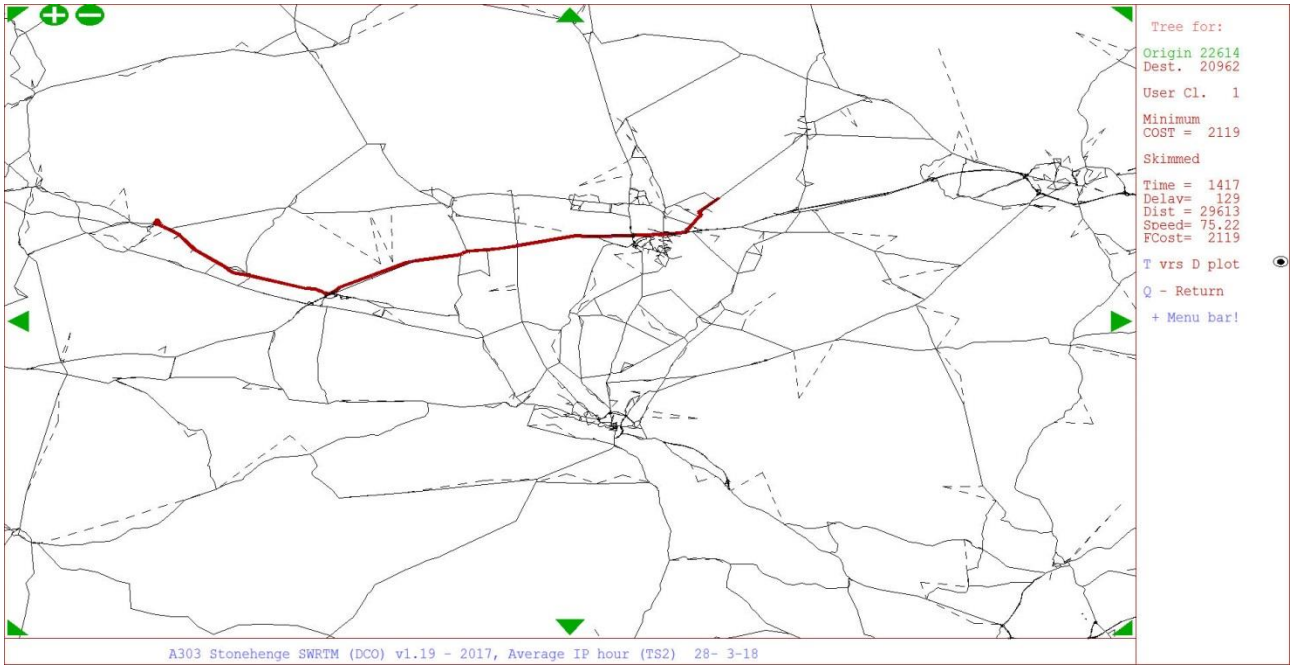


Figure C-28: Bulford to Heytesbury

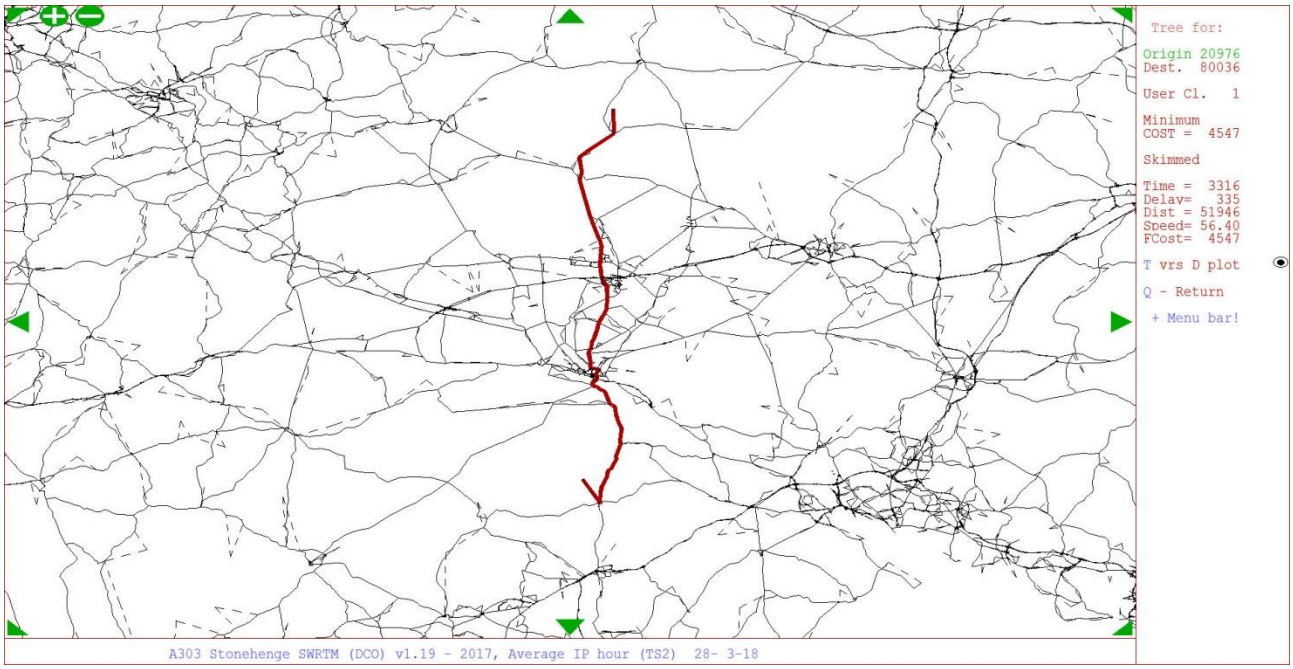


Figure C-29: Upavon to Fordingbridge

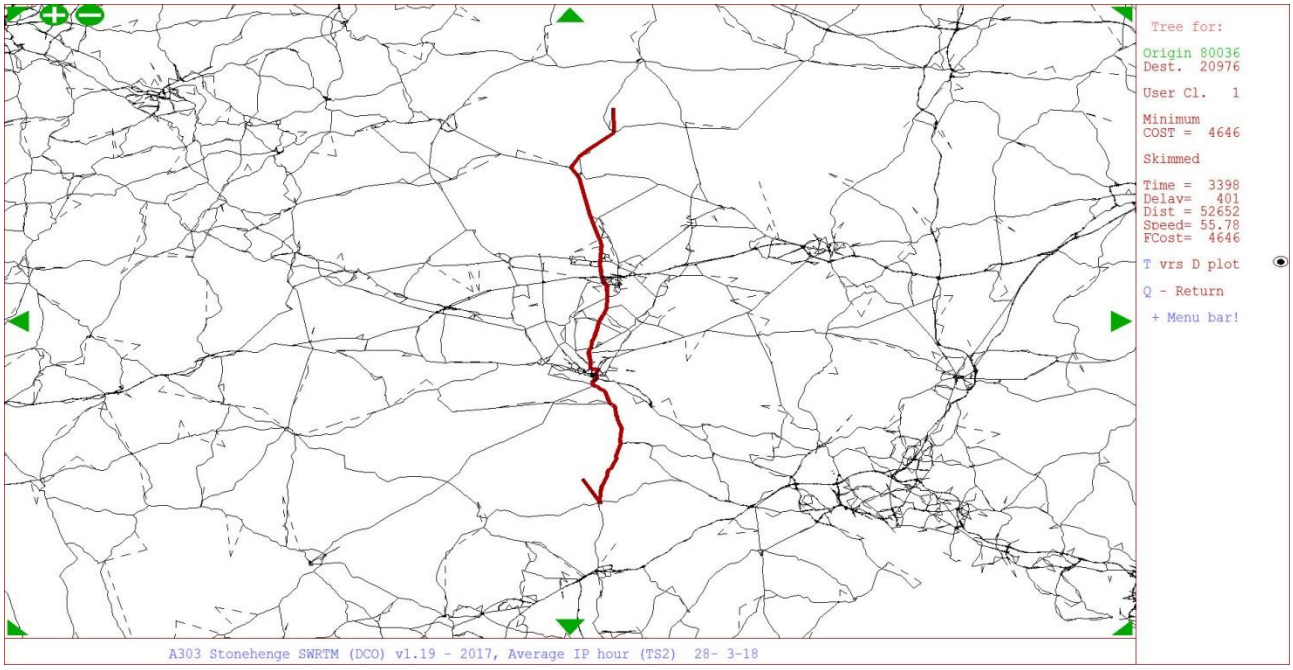


Figure C-30: Fordingbridge to Upavon

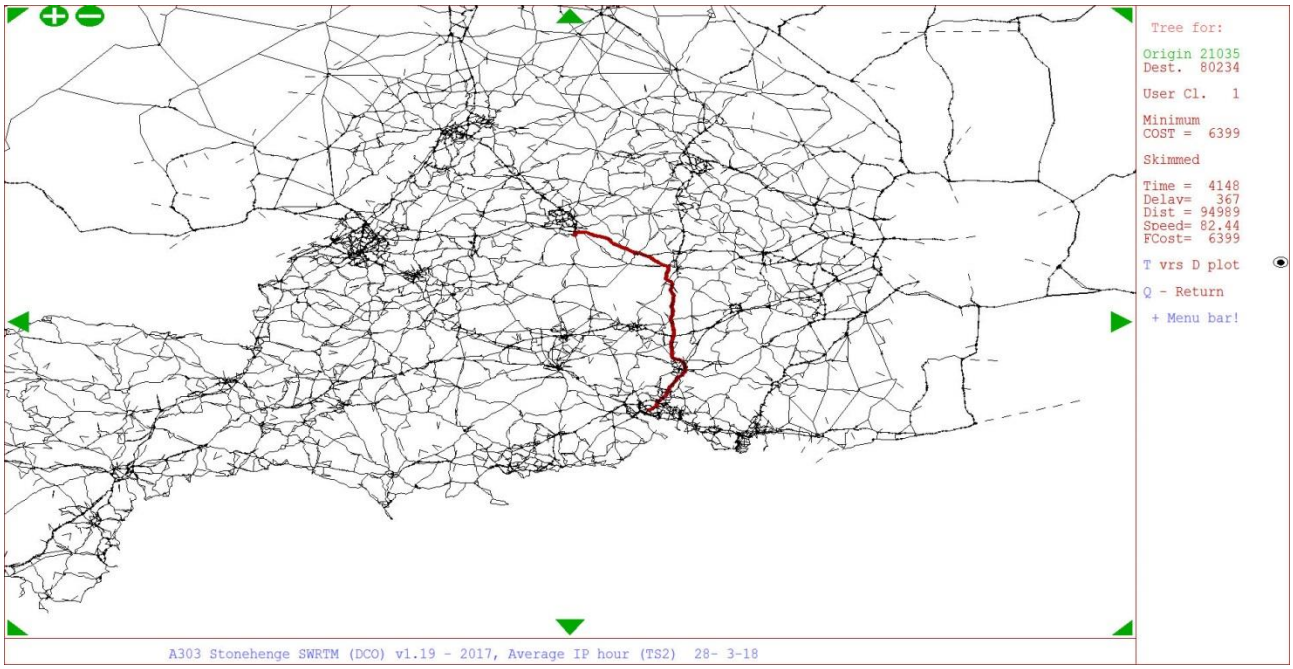


Figure C-31: Swindon to Southampton

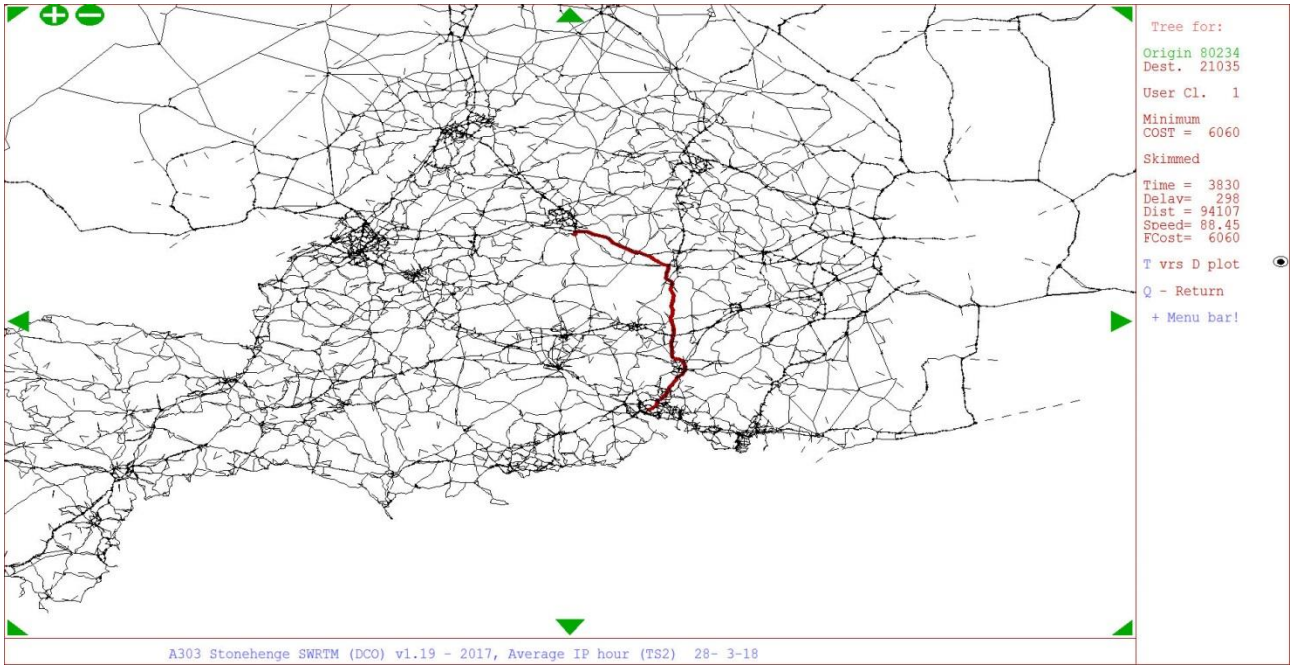


Figure C-32: Southampton to Swindon

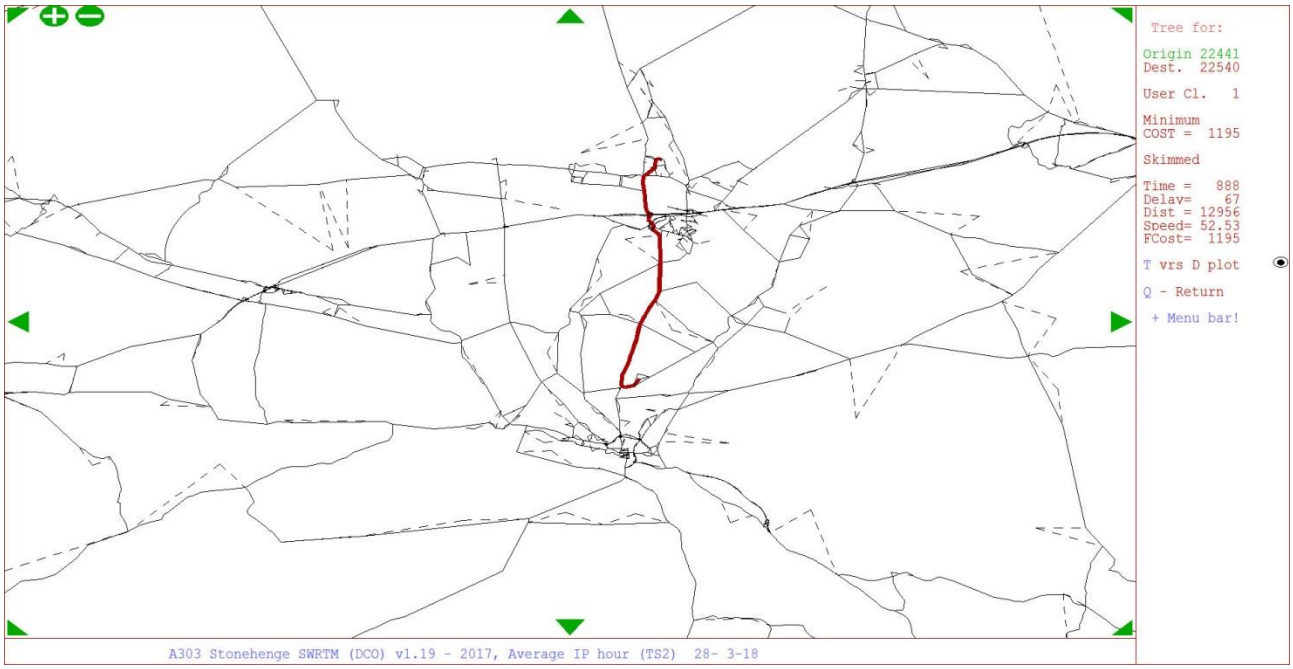


Figure C-33: Durrington to Old Sarum

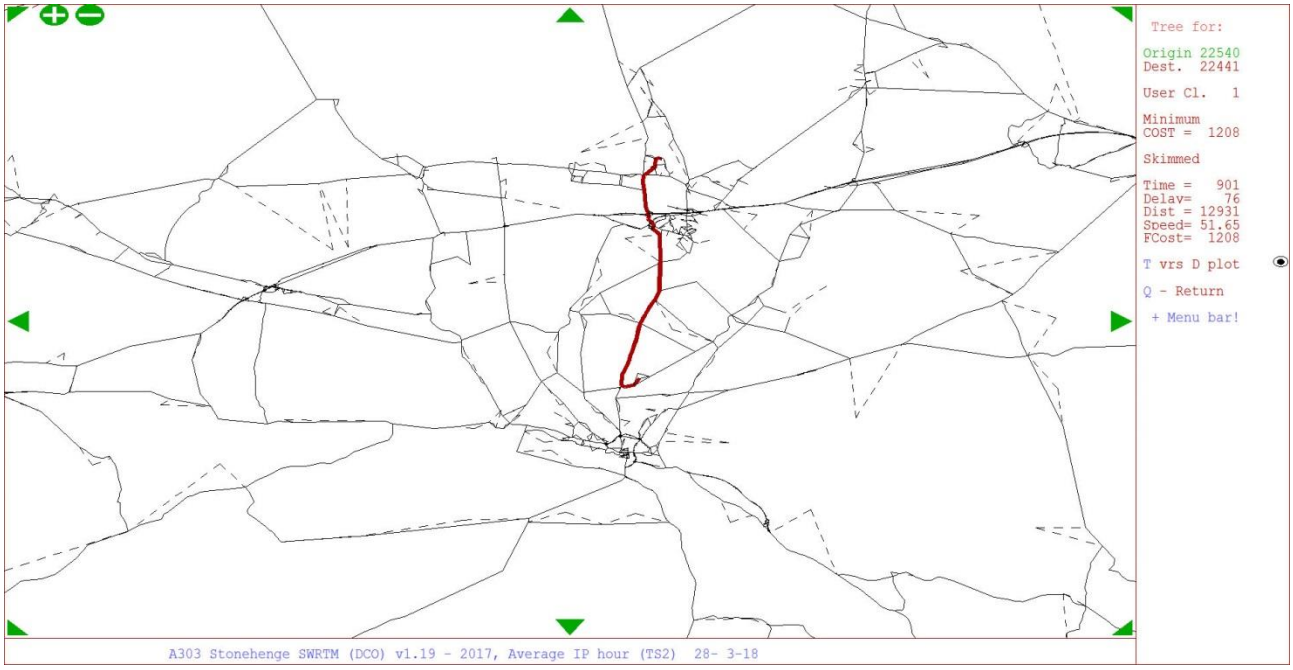


Figure C-34: Old Sarum to Durrington

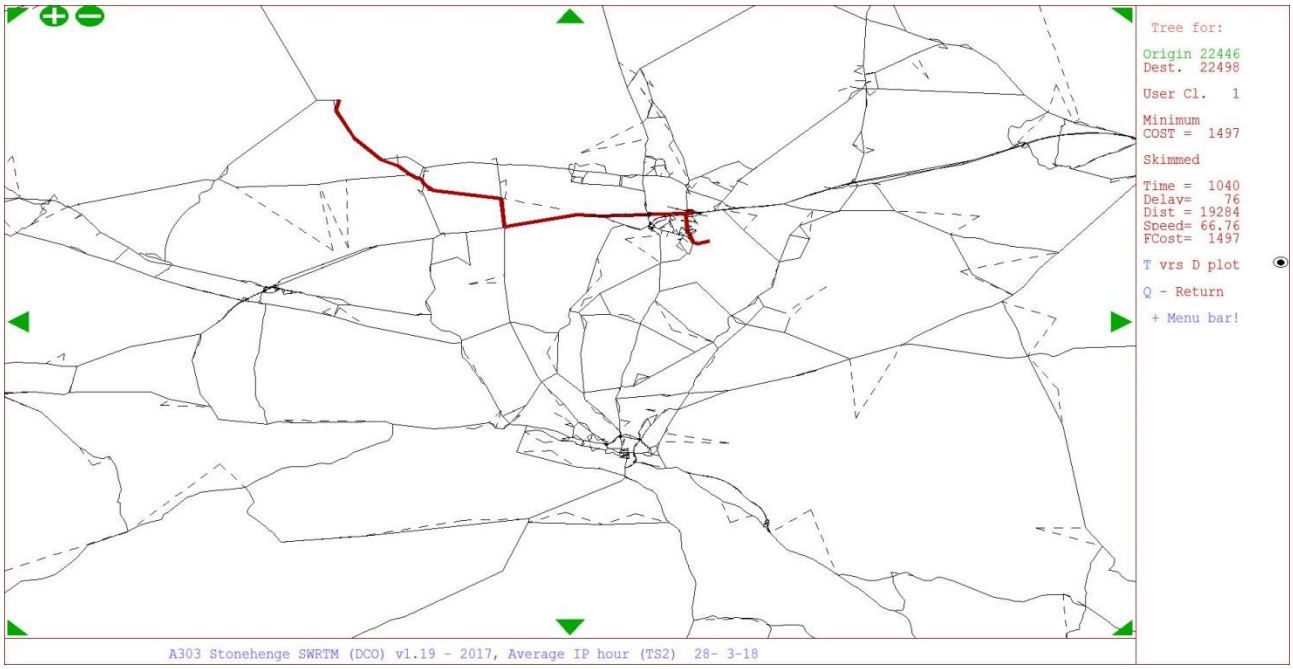


Figure C-35: Tilshead to Boscombe Down

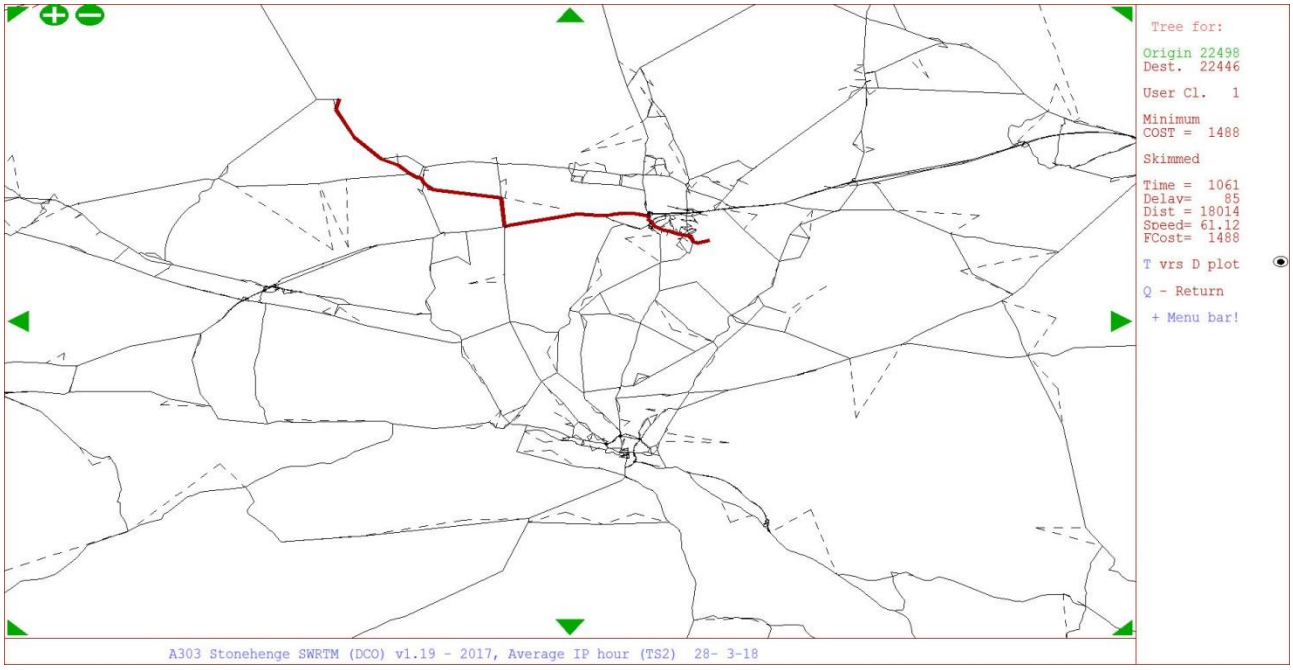


Figure C-36: Boscombe Down to Tilshead

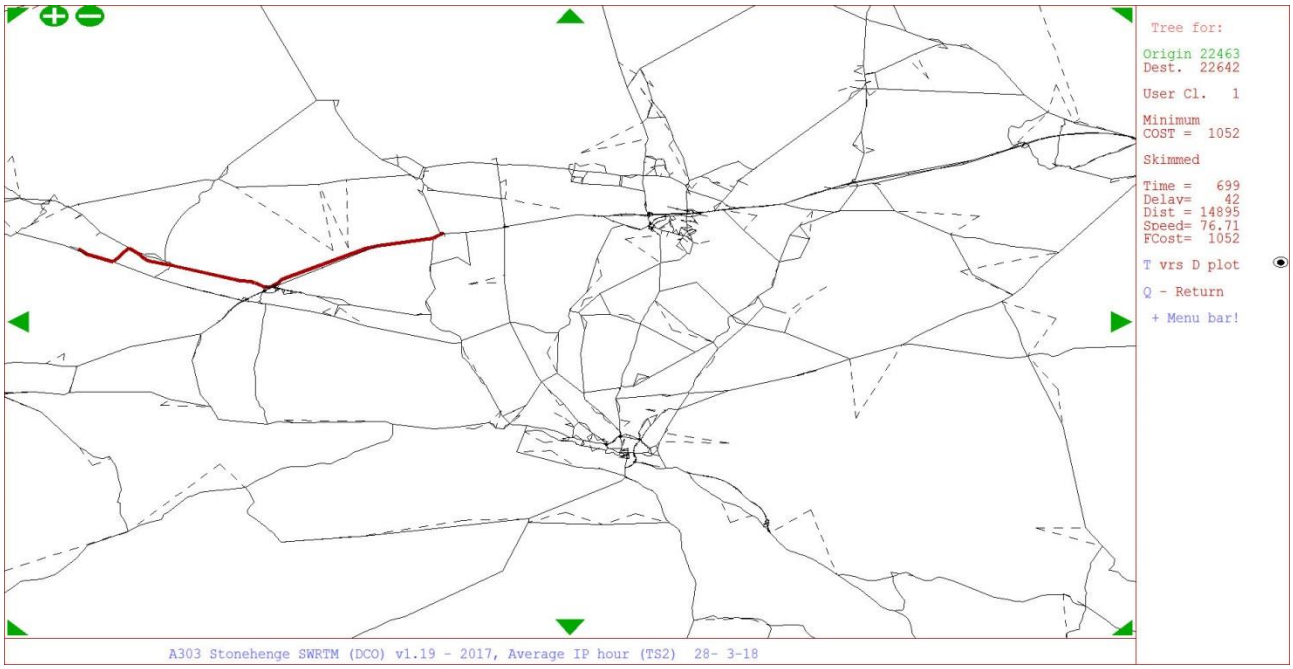


Figure C-37: Winterbourne Stoke to Sherrington / Boynton / Corton

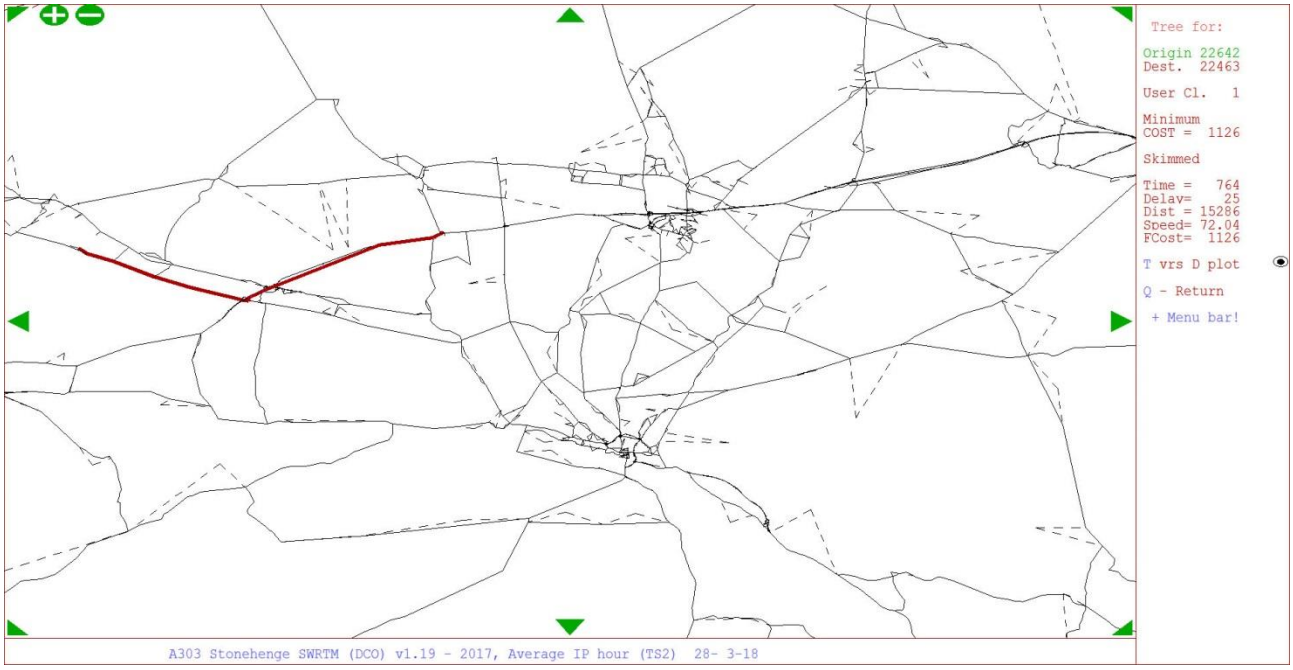


Figure C-38: Sherrington / Boynton / Corton to Winterbourne Stoke

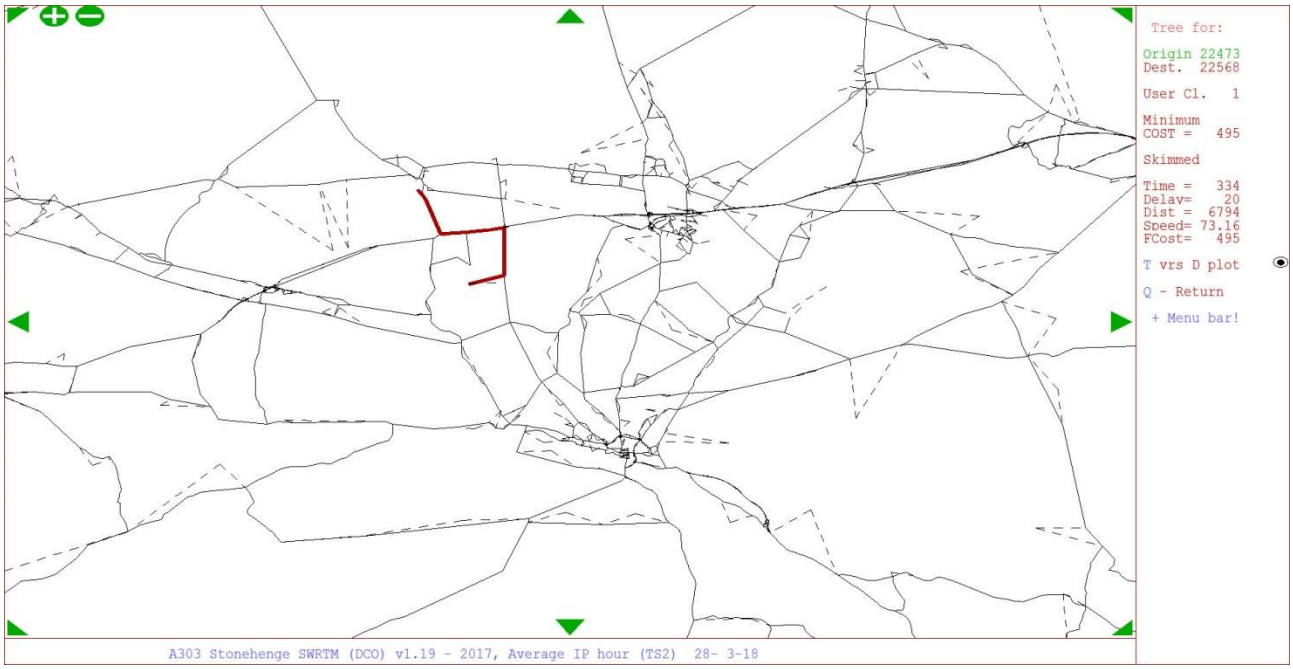


Figure C-39: Druid's Head Farm to Parsonage Down

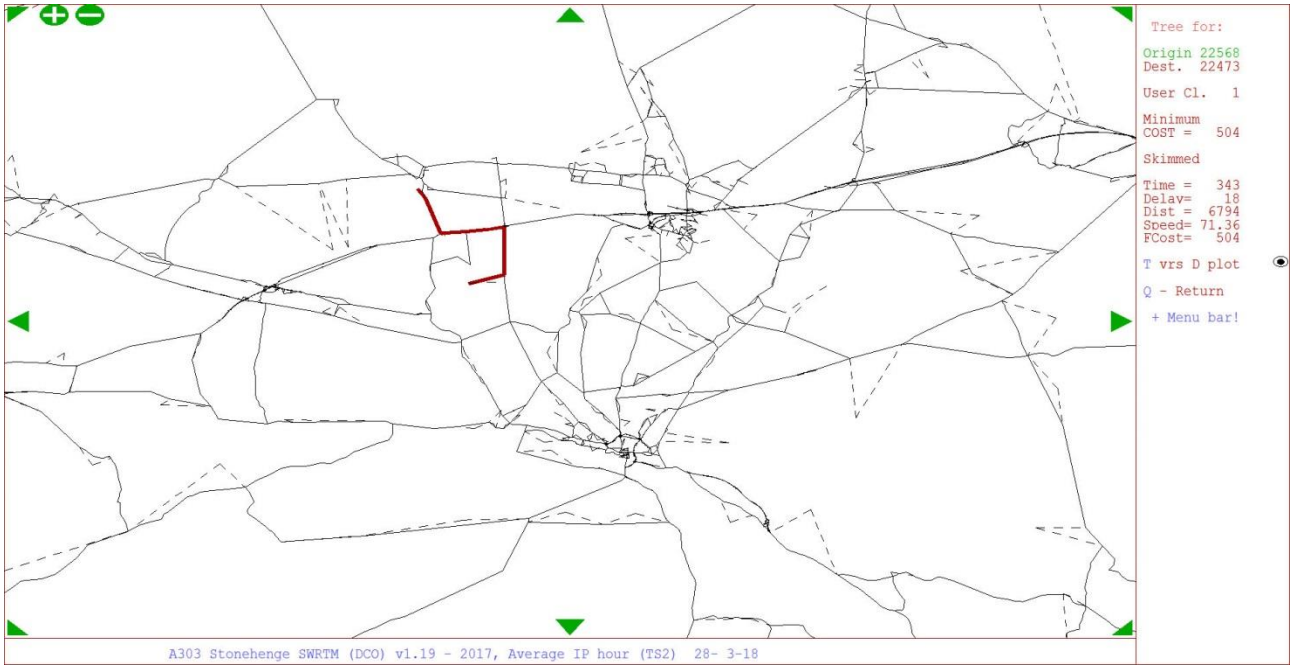


Figure C-40: Parsonage Down to Druid's Head Farm

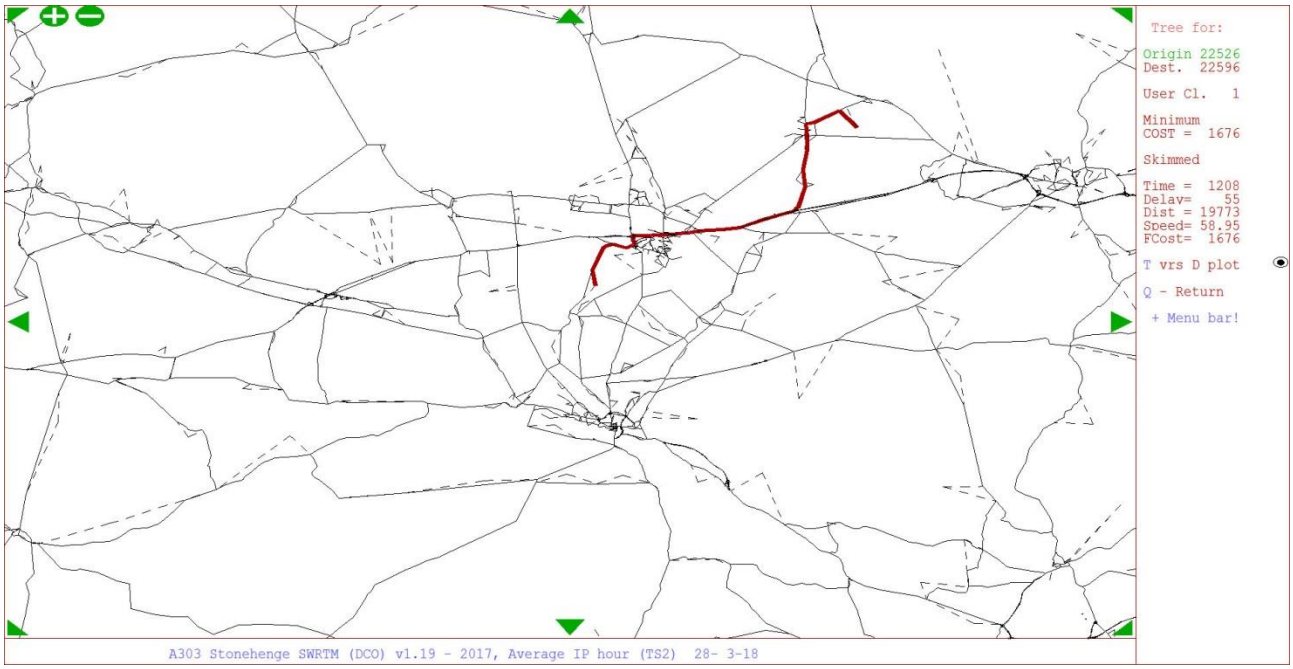


Figure C-41: Perham Down to Upper Woodford

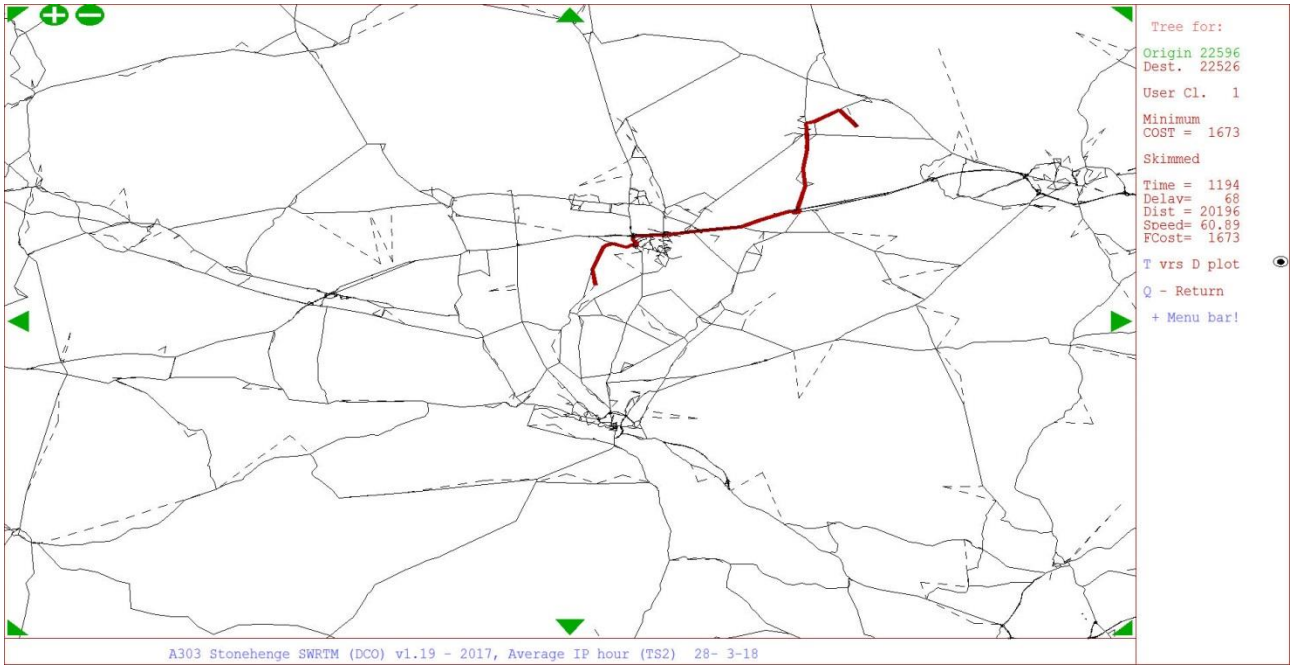


Figure C-42: Upper Woodford to Perham Down

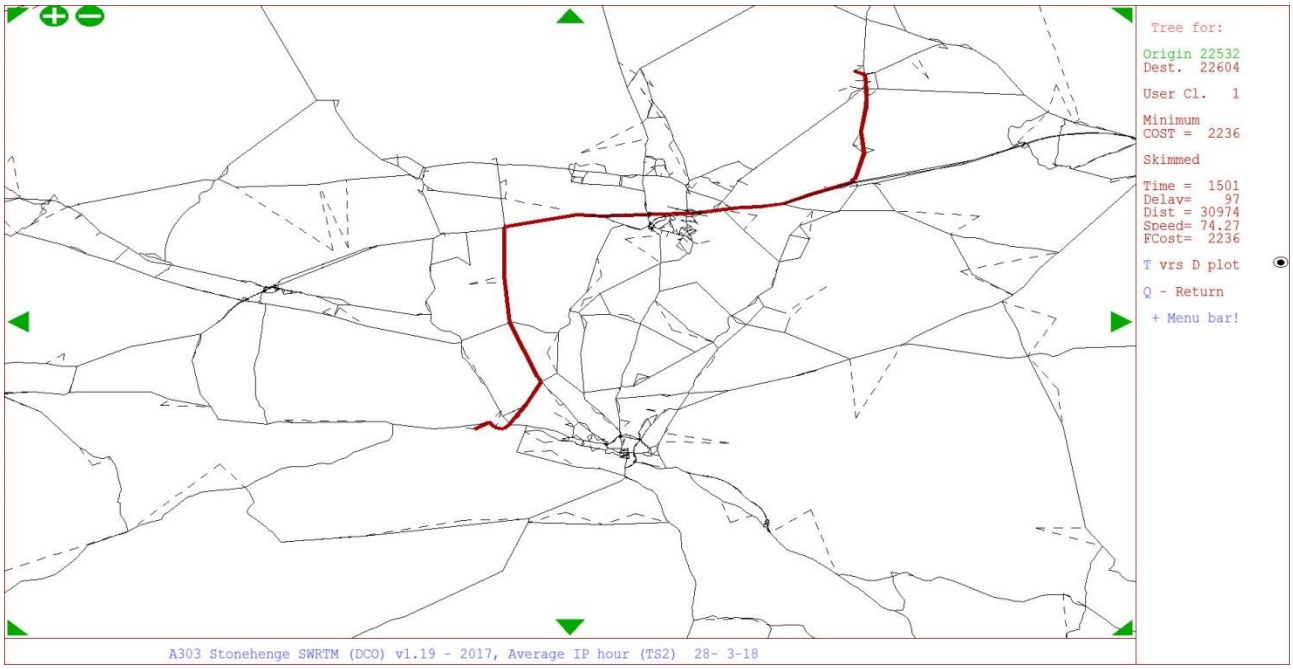


Figure C-43: Wilton to Tidworth

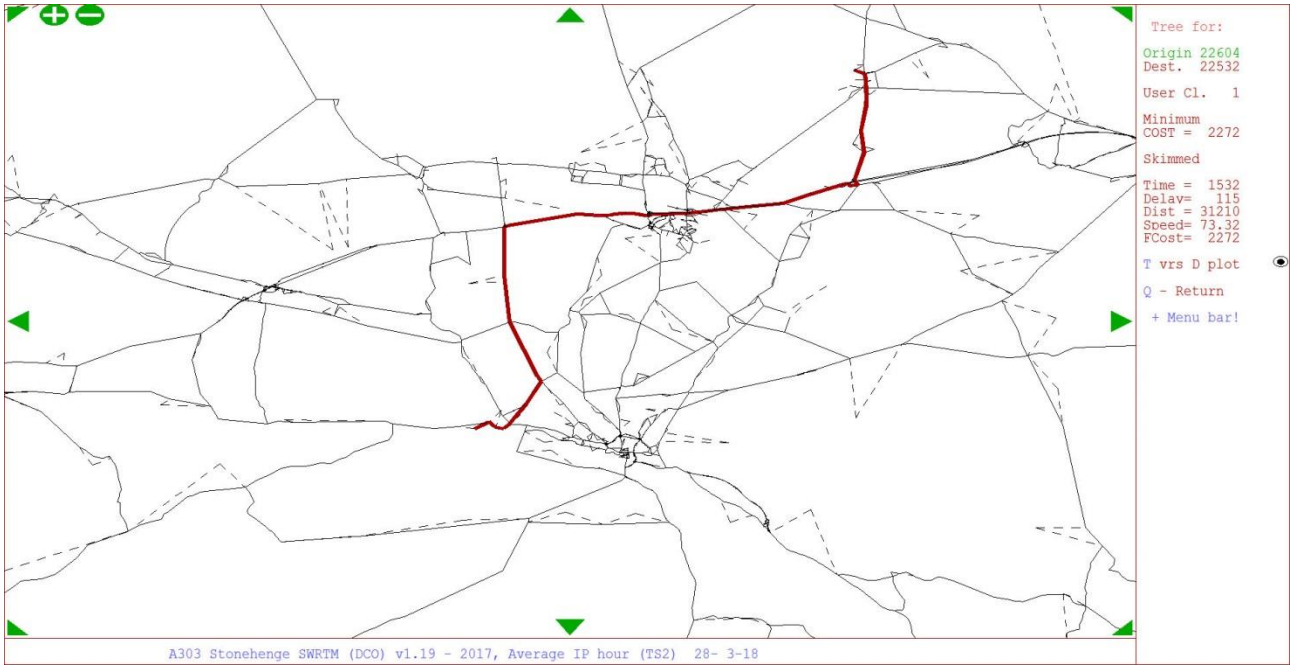


Figure C-44: Tidworth to Wilton

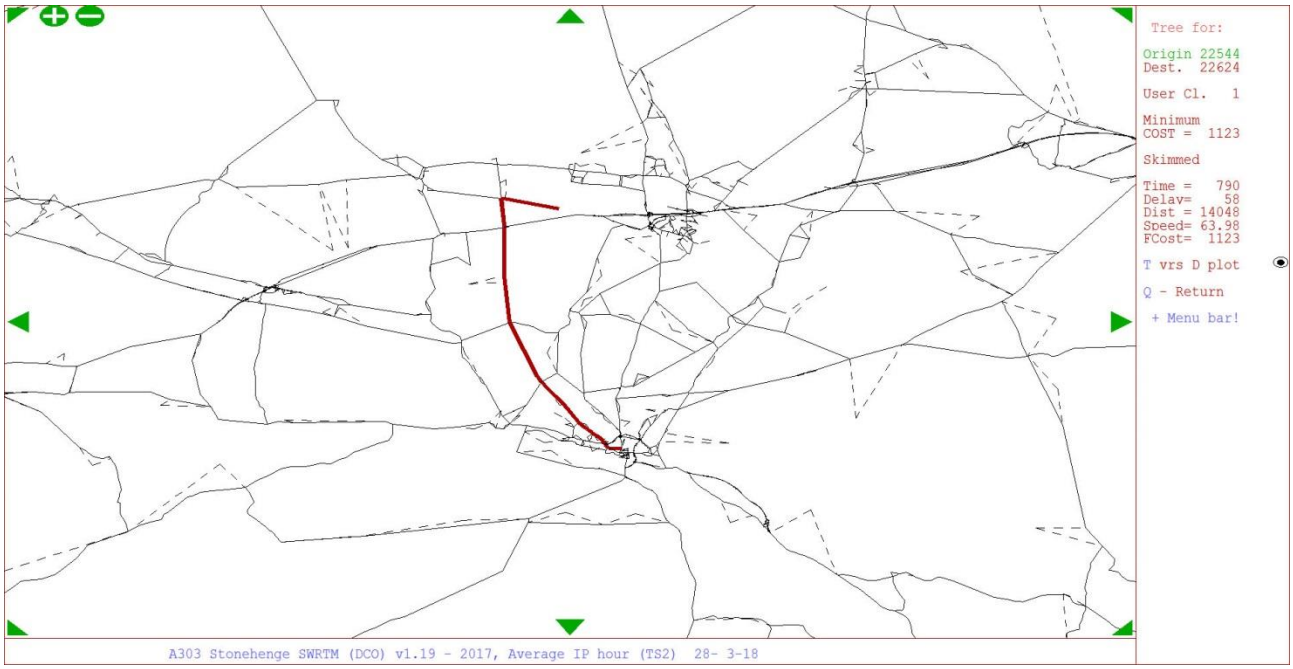


Figure C-45: Salisbury to Stonehenge Visitor Centre

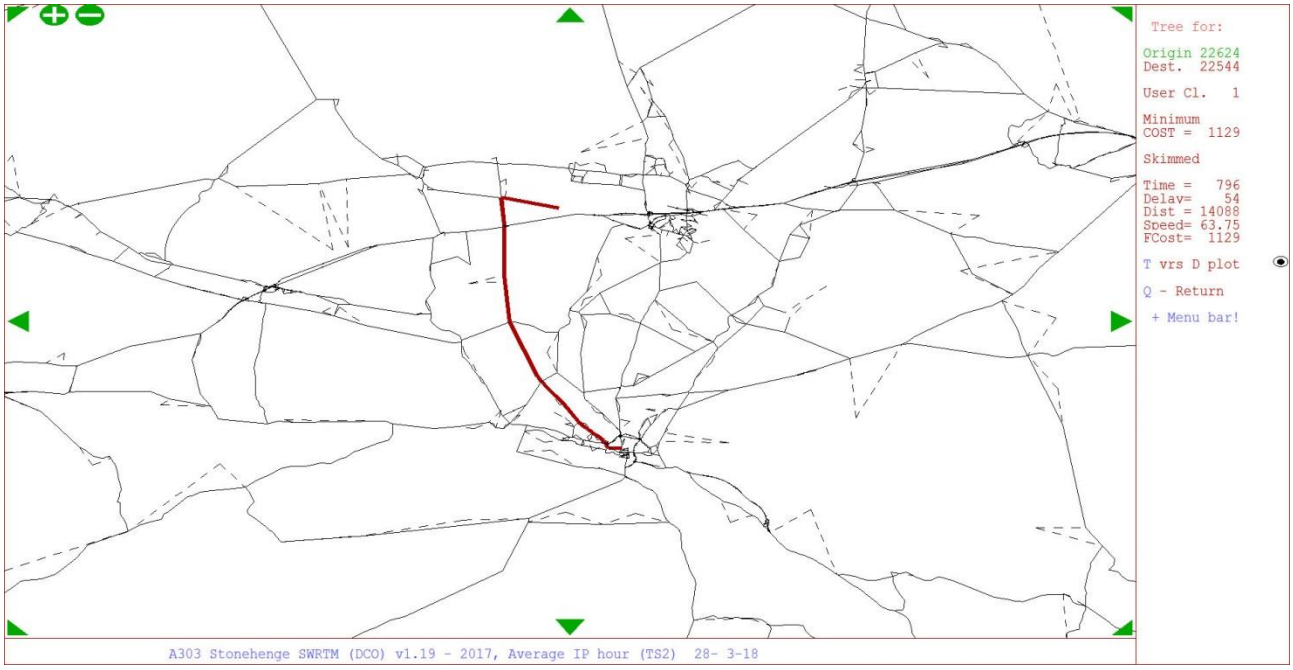


Figure C-46: Stonehenge Visitor Centre to Salisbury

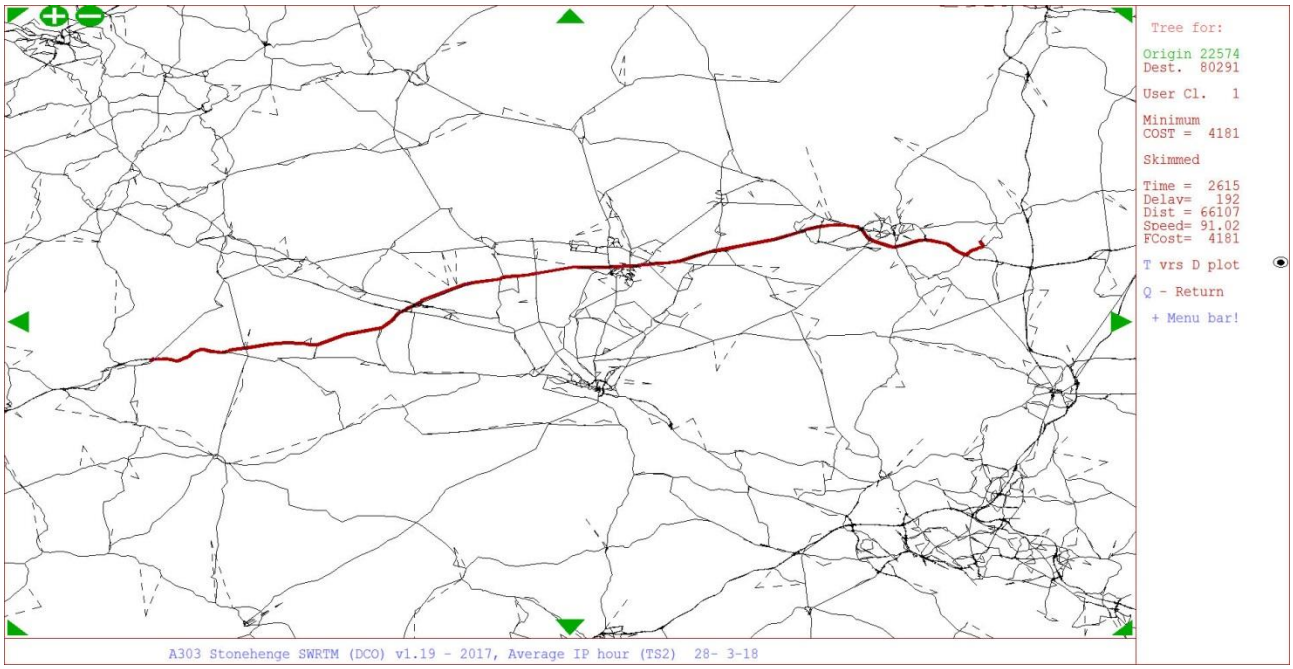


Figure C-47: Mere to Andover

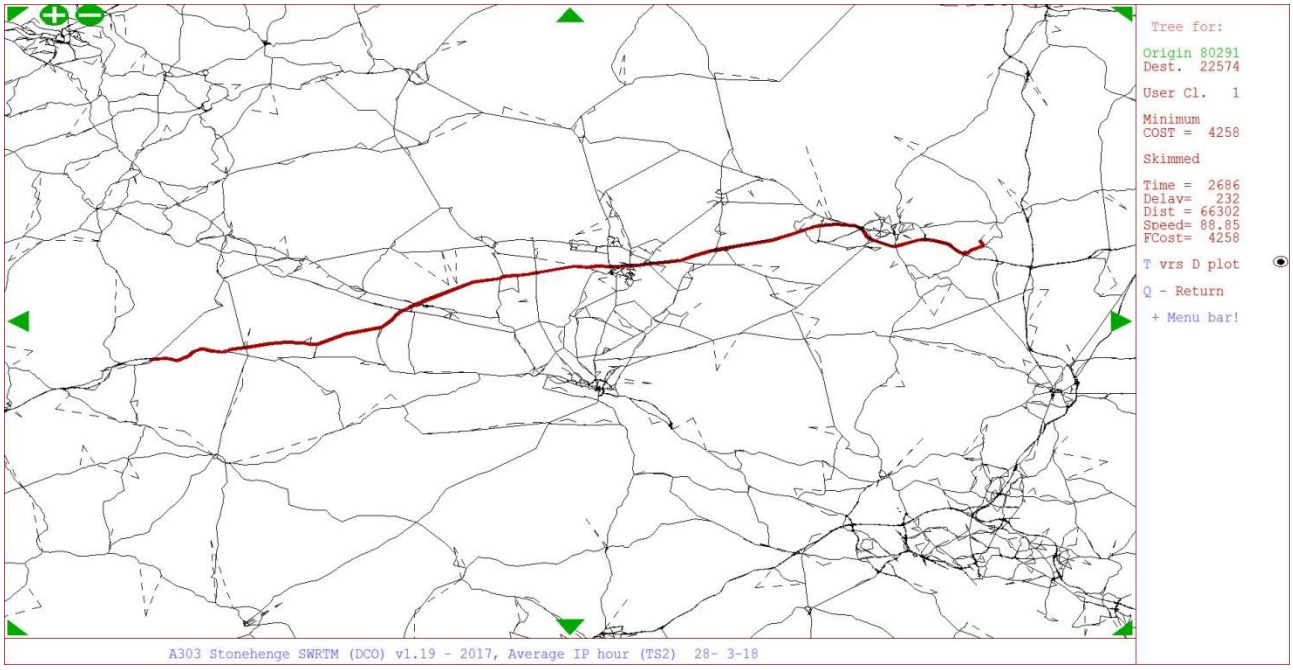


Figure C-48: Andover to Mere

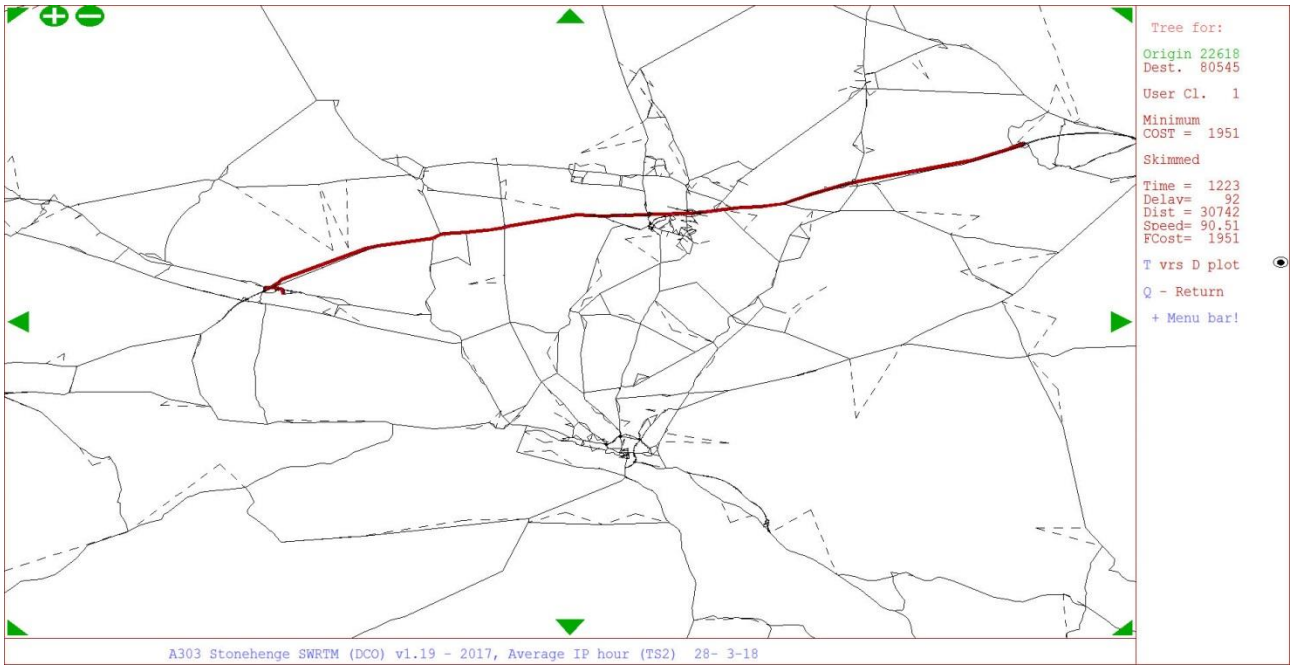


Figure C-49: Thruxton to Deptford

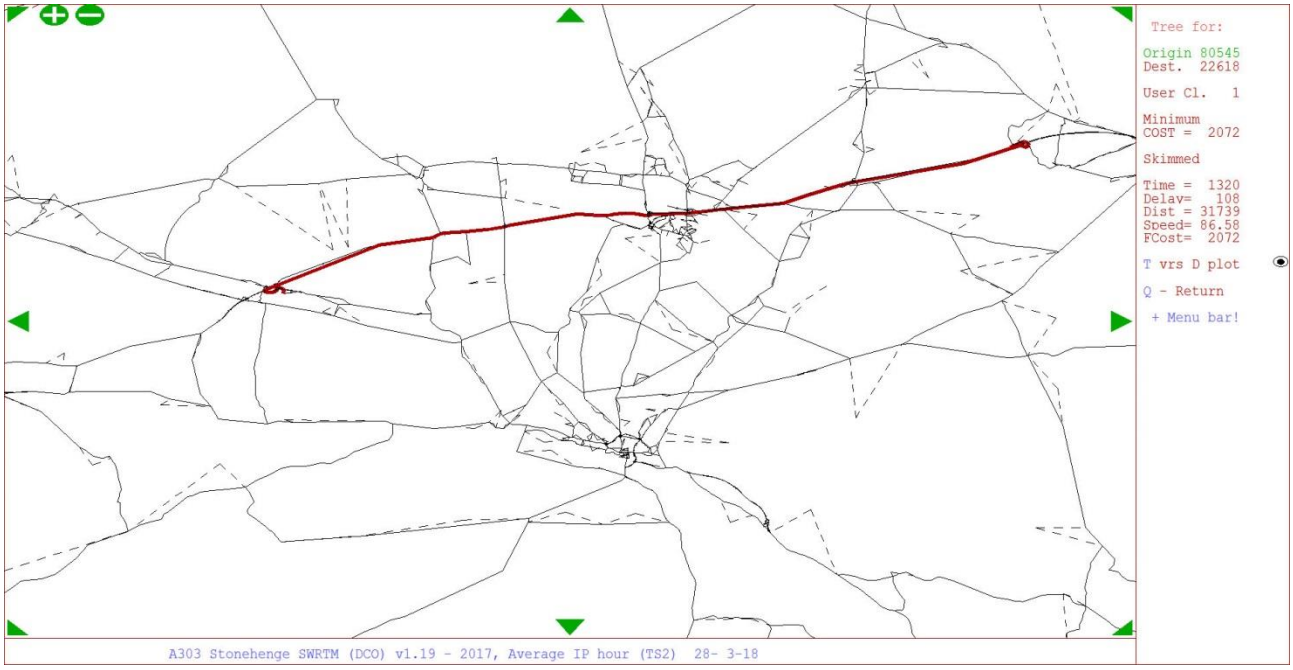


Figure C-47: Deptford to Thruxton

Appendix D Operational model: turn count calibration

D.1 Summer A303 mainline turn count calibration

A303 Mainline Network Node Result Table			12:00			13:00			14:00			15:00			16:00			17:00		
			Observed	Modelled	GEH	Observed	Modelled	GEH	Observed	Modelled	GEH	Observed	Modelled	GEH	Observed	Modelled	GEH	Observed	Modelled	GEH
Junction	From	To	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All
A303 / B3083 Berwick Rd	A303 E	B3083 S	17	15	0.5	23	17	1.3	29	24	1.0	48	36	1.9	57	49	1.1	31	46	2.4
	A303 E	A303 W	1069	1084	0.5	1017	1028	0.3	1075	1068	0.2	1054	1143	2.7	1070	1109	1.2	1030	1091	1.9
	A303 W	A303 E	803	824	0.7	712	791	2.9	712	836	4.5	839	823	0.6	807	859	1.8	731	816	3.1
	A303 W	B3083 S	7	7	0.0	8	8	0.0	25	19	1.3	16	23	1.6	19	20	0.2	16	21	1.2
	B3083 S	A303 E	29	27	0.4	27	25	0.4	38	35	0.5	47	41	0.9	33	36	0.5	34	32	0.3
	B3083 S	A303 W	3	4	0.5	4	4	0.0	9	8	0.3	13	15	0.5	8	8	0.0	6	8	0.8
A303 / B3083	A303 W	B3083 N	98	86	1.3	79	83	0.4	200	145	4.2	231	216	1.0	211	252	2.7	220	208	0.8
	A303 W	A303 E	729	755	1.0	666	724	2.2	563	730	6.6	647	650	0.1	603	653	2.0	526	630	4.3
	A303 E	A303 W	1043	1053	0.3	995	991	0.1	1054	1036	0.6	1039	1112	2.2	1039	1068	0.9	978	1061	2.6
	A303 E	B3083 N	12	6	2.0	13	10	0.9	14	10	1.2	16	11	1.4	17	14	0.8	11	14	0.8
	B3083 N	A303 E	4	2	1.2	8	8	0.0	8	8	0.0	6	4	0.9	6	4	0.9	8	7	0.4
	B3083 N	A303 W	41	43	0.3	52	55	0.4	53	56	0.4	63	67	0.5	89	91	0.2	79	80	0.1
A303 / Church Street	A303 W	A303 E	715	752	1.4	661	728	2.5	564	729	6.5	641	647	0.2	602	657	2.2	496	624	5.4
	A303 W	Church Street	1	0	1.4	4	2	1.2	7	7	0.0	5	7	0.8	4	7	1.3	9	8	0.3
	A303 E	A303 W	1040	1050	0.3	991	994	0.1	1033	1044	0.3	1028	1116	2.7	1046	1073	0.8	973	1074	3.2
	A303 E	Church Street	5	4	0.5	4	4	0.0	1	1	0.0	2	0	2.0	5	3	1.0	8	4	1.6
	Church Street	A303 W	8	8	0.0	4	4	0.0	5	4	0.5	6	7	0.4	7	8	0.4	2	4	1.2
	Church Street	A303 E	0	0	0.0	1	0	1.4	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
A303 / Eden Livestock Rd	A303 W	A303 E	745	715	1.1	657	706	1.9	558	747	7.4	633	636	0.1	578	669	3.6	476	615	6.0
	A303 E	A303 W	1051	1050	0.0	996	988	0.3	1033	1043	0.3	1031	1111	2.4	1038	1061	0.7	985	1070	2.7
	A303 E	Eden Livestock Rd	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
	Eden Livestock Rd	A303 W	6	6	0.0	3	4	0.5	9	10	0.3	7	8	0.4	11	12	0.3	2	4	1.2
	Eden Livestock Rd	A303 E	0	0	0.0	0	0	0.0	1	0	1.4	1	0	1.4	0	0	0.0	1	0	1.4
A3028 / Amesbury Rd N	Amesbury Rd	A3028 S	1	0	1.4	1	0	1.4	0	0	0.0	0	0	0.0	3	0	2.4	0	0	0.0
	Amesbury Rd	A3028 N	5	4	0.5	5	5	0.0	2	1	0.8	1	0	1.4	3	0	2.4	5	4	0.5
	Amesbury Rd	Amesbury Rd N	130	121	0.8	143	138	0.4	155	145	0.8	121	132	1.0	123	127	0.4	136	130	0.5
	A3028 N	A3028 S	34	35	0.2	37	38	0.2	39	40	0.2	29	33	0.7	37	37	0.0	40	41	0.2
	A3028 N	Amesbury Rd	1	0	1.4	2	2	0.0	2	2	0.0	4	4	0.0	1	0	1.4	1	0	1.4
	A3028 N	Amesbury Rd N	18	17	0.2	19	20	0.2	28	27	0.2	26	27	0.2	15	16	0.3	10	10	0.0
	Amesbury Rd N	A3028 S	45	55	1.4	52	61	1.2	41	48	1.0	52	65	1.7	40	49	1.3	26	28	0.4
	Amesbury Rd N	Amesbury Rd	11	12	0.3	10	10	0.0	9	10	0.3	16	16	0.0	7	8	0.4	4	4	0.0
	Amesbury Rd N	A3028 N	150	150	0.0	110	112	0.2	149	150	0.1	156	159	0.2	148	148	0.0	89	92	0.3
A303 / Allington Track	A303 E	A303 W	1574	1558	0.4	1576	1569	0.2	1665	1598	1.7	1735	1678	1.4	1966	1919	1.1	1856	1811	1.1
	A303 E	Allington Track	5	4	0.5	4	4	0.0	12	11	0.3	5	4	0.5	3	4	0.5	8	8	0.0
	A303 W	A303 E	1360	1259	2.8	1322	1323	0.0	1345	1281	1.8	1424	1334	2.4	1405	1290	3.1	1402	1304	2.7
	A303 W	Allington Track	34	31	0.5	21	23	0.4	27	24	0.6	33	30	0.5	27	28	0.2	26	25	0.2
	Allington Track	A303 E	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	1	13	4.5	0	0	0.0
	Allington Track	A303 W	37	36	0.2	29	29	0.0	45	46	0.1	65	65	0.0	82	68	1.6	60	61	0.1
A303 / Amesbury Rd N	Amesbury Rd N	A303 E	11	12	0.3	10	13	0.9	11	12	0.3	20	20	0.0	8	9	0.3	5	5	0.0
	A303 E	A303 W	1618	1594	0.6	1617	1598	0.5	1712	1641	1.7	1798	1743	1.3	2047	1987	1.3	1928	1871	1.3
	A303 W	Amesbury Rd N	133	123	0.9	148	143	0.4	160	147	1.0	122	132	0.9	129	128	0.1	143	133	0.9
	A303 W	A303 E	1385	1279	2.9	1420	1332	2.4	1358	1293	1.8	1442	1344	2.6	1418	1309	3.0	1408	1324	2.3
A303 / Solstice Park Slip Rds S	A303 E	Solstice Park Slip Rds	823	811	0.4	803	811	0.3	827	765	2.2	734	702	1.2	744	695	1.8	668	617	2.0
	A303 E	A303 W	788	785	0.1	802	788	0.5	883	876	0.2	1066	1038	0.9	1304	1291	0.4	1248	1255	0.2
	Solstice Park Slip Rds	A303 W	110	162	4.5	103	142	3.5	102	169	5.8	114	166	4.4	125	165	3.3	113	157	3.8
Solstice Park Ave / Solstice Park Slip Rds	Solstice Park Off Slip	Solstice Park Ave	812	804	0.3	784	795	0.4	812	754	2.1	733	704	1.1	738	689	1.8	664	617	1.9
	Solstice Park Off Slip	Equinox Drive	11	9	0.6	19	17	0.5	15	12	0.8	1	1	0.0	6	4	0.9	4	3	0.5
	Solstice Park Ave	Solstice Park Off Slip	109	161	4.5	99	138	3.6	101	168	5.8	110	164	4.6	121	161	3.4	109	152	3.8
	Solstice Park Ave	Equinox Drive	12	17	1.3	35	36	0.2	17	21	0.9	22	26	0.8	14	16	0.5	14	18	1.0
	Equinox Drive	Solstice Park Off Slip	1	0	1.4	4	4	0.0	1	0	1.4	4	3	0.5	4	4	0.0	4	4	0.0
	Equinox Drive	Solstice Park Ave	34	35	0.2	25	26	0.2	47	49	0.3	34	37	0.5	28	28	0.0	23	26	0.6
Solstice Park Ave / Porton Rd	Solstice Park Ave	Porton Rd N	441	326	5.9	424	308	6.1	434	311	6.4	311	217	5.8	318	220	6.0	340	227	6.7
	Solstice Park Ave	Porton Rd S	245	259	0.9	314	318	0.2	275	278	0.2	343	335	0.4	343	335	0.4	308	313	0.3
	Solstice Park Ave	London Rd	297	308	0.6	297	301	0.2	306	309	0.2	266	267	0.1	249	248	0.1	179	184	0.4
	Porton Rd N	Solstice Park Ave	148	134	1.2	147	130	1.4	115	107	0.8	109	110	0.1	116	110	0.6	133	124	0.8
	Porton Rd N	Porton Rd S	228	222	0.4	190	191	0.1	159	161	0.2	220	220	0.0	222	219	0.2	166	169	0.2
	Porton Rd N	London Rd	168	157	0.9	138	137	0.1	164	157	0.6	143	148	0.4	183	178	0.4	166	169	0.2
	Porton Rd S	Solstice Park Ave	116	114	0.2	127	125	0.2	95	92	0.3	85	85	0.0	79	78	0.1	99	102	0.3
	Porton Rd S	Porton Rd N	254	252	0.1	232	232	0.0	276	277	0.1	246	246	0.0	293	291	0.1	299	293	0.3
	Porton Rd S	London Rd	193	198	0.4	128	133	0.4	148	147	0.1	160	163	0.2	171	171	0.0	149	155	0.5
	London Rd	Solstice Park Ave	87	88	0.1	87	82	0.5	101	100	0.1	72	74	0.2	81	81	0.0	76	81	0.6
	London Rd	Porton Rd N	244	243	0.1	257	258	0.1	233	237	0.3	235	232	0.2	270	267	0.2	277	274	0.2
	London Rd	Porton Rd S	158	161	0.2	134	139	0.4	127	128	0.1	136	141	0.4	135	137	0.2	149	157	0.6
Porton Rd / Salisbury Rd	Porton Rd	Slip Rd	395	267	7.0	397	270	7.0	397	279	6.4	322	230	5.5	348	272	4.3	378	280	5.4
	Porton Rd	Salisbury Rd	549	554	0.2	520	529	0.4	549	544	0.2	472	467	0.2	517	503	0.6	524	515	0.4
	Slip Rd	Porton Rd	103	90	1.3	104	99	0.5	86	87	0.1	82	86	0.4	75	76	0.1	74	72	0.2
	Slip Rd	Salisbury Rd	7	10	1.0	4	8	1.6	5	10	1.8	12	14	0.6	4	9	2.0	20	19	0.2
	Salisbury Rd	Porton Rd	421	425	0.2	352	359	0.4	335	337	0.1	387	392	0.3	432	435	0.1	375	386	0.6
	Salisbury Rd	Slip Rd	32	32	0.0	29	29	0.0	19	17	0.5	29	30	0.2	28	33	0.9	27	27	0.0
A303 / Countess Rd Countess Roundabout	A303 W	A303 E	876	884	0.3	737	872	4.8	837	871	1.2	908	924	0.5	934	910	0.8	897	945	1.6
	A303 W	Countess Rd N	28	27	0.2	30	29	0.2	16	26	2.2	28	22	1.2	27	28	0.2	20	26	1.3
	A303 W	Countess Rd S	97	86	1.1	133	106	2.5	82	119	3.7	90	97	0.7	77	92	1.6	57	76	2.3
	A303 E	A303 W	608	534	3.1	515	526	0.5	619	526	3.9	593	643	2.0	656	696	1.5	677	717	1.5
	A303 E	Countess Rd N	257	261	0.2	263	267	0.2	389	339	2.6	476	494	0.8	658	649	0.4	498	575	3.3
	A303 E	Countess Rd S	74	74	0.0	68	74	0.7	114	104	1.0	113	126	1.2	150	156	0.5	200	210	0.7
	Countess Rd N	A303 W	137	113	2.1	167	150	1.4	131	137	0.5	125	140	1.3	91	97	0.6	103	119	1.5
	Countess Rd N	A303 E	312	318	0.3	341	343	0.1	340	353	0.7	374	381	0.4	300	305	0.3	314	303	0.6
	Countess Rd N	Countess Rd S	225	218	0.5	229	217	0.8	233	237	0.3	221	223	0.1	213	216	0.2	253	251	0.1
	Countess Rd S	A303 W	39	33	1.0	19	18	0.2	18	15	0.7	21	23	0.4	25	25	0.0	30	36	1.0
	Countess Rd S	A303 E	144	154	0.8	210	227	1.2	172	181	0.7	183	190	0.5	150	163	1.0	152	151	0.1
	Countess Rd S	Countess Rd N	282	277	0.3	233	228	0.3	326	319	0.4	293	295	0.1	363	357	0.3	359	361	0.1
A303 / Stonehenge Rd	A303 E	A303 W	721	681	1.5	671	696	1.0	752	675	2.9	736	822	3.1	766	811	1.6	857	898	1.4
	A303 W	A303 E	998	999	0.0	904	1019	3.7	956	1015	1.9	1026	1032	0.2	1047	1037	0.3	984	1036	1.6
	Stonhenge Rd	A303 W	166	164	0.2	187	185	0.1	209	209	0.0	169	171	0.2	203	202	0.1	134	138	0.3
A303 / A360 Longbarrow Roundabout	A303 W	A303 E	629	590	1.6	486	587	4.4	511	608	4.1	498	530	1.4	498	545	2.1	383	506	5.8
	A303 W	A360 S	80	68	1.4	58	67	1.1	60	69	1.1	60	66	0.8	57	74	2.1	46	62	2.2
	A303 W	A360 N	41	34	1.1	55	39	2.3	38	63	3.5	53	44	1.3	26	61	5.3	36	36	0.0
	A303 E	A303 W	703	727	0.9	728	737	0.3	747	749	0.1	757	842	3.0	814	844	1.0	799	873	2.6
	A303 E	A360 S	13	12	0.3	11	13	0.6	24	11	3.1	18	20	0.5	18	19	0.2	34	26	1.5
	A303 E	A360 N	123	115	0.7	126	129	0.3	115	124	0.8	147	136	0.9	136	148	1.0	117	138	1.9
	A360 S	A303 W	84	79	0.6	64	61	0.4	79	80	0.1	71	78	0.8	52	54	0.3	36	42	1.0
	A360 S	A303 E	97	104	0.7	142	148	0.5	104	105	0.1	189	189	0.0	160	164	0.3	221	218	0.2
	A360 S	A360 N	230	229	0.1	198	195	0.2	280	274	0.4	286	282	0.2	304	301	0.2	338	337	0.1
	A360 N	A303 W	264	244	1.3	196	190	0.4	219	213	0.4	198	193	0.4	177	164	1.0	143	156	1.1
	A360 N	A303 E	247	275	1.7	269	282	0.8	309	304	0.3	355	316	2.1	365	323	2.3	346	317	1.6
	A360 N	A360 S	152	149	0.2	213	212	0.1	325	316	0.5	340	303	2.1	388	336	2.7	366	327	2.1
A303 / Amesbury Rd S	A303 W	A303 E	1404	1330	2.0	1384	1407	0.6	1405	1353	1.4	1493	1421	1.9	1452	1379	1.9	1427	1356	1.9
	A303 W	Amesbury Rd S	16	15	0.3	17	15	0.5	12	14	0.6	8	9	0.3	15	12	0.8	10	11	0.3
	A303 E	A303 W	1549	1552	0.1	1546	1547	0.0	1638	1597	1.0	1695	1670	0.6	1950	1912	0.9	1845	1800	1.1
	A303 E	Amesbury Rd S	4	4	0.0	3	3	0.0	2	3	0.6	2	1	0.8	1	0	1.4	5	4	0.5
	Amesbury Rd S	A303 W	13	14	0.3	21	20	0.2	19	19	0.0	13	12	0.3	19	18	0.2	11	11	0.0
	Amesbury Rd S	A303 E	1	0	1.4	7	8	0.4	2	3	0.6	0	0	0.0	1	0	1.4	1	0	1.4
A338 / B338	A338 N	Slip Rd S	117	132	1.3	114	127	1.2	119	138	1.7	86	105	1.9	124	152	2.4	109	139	2.7
	A338 N	B3084	108	114	0.6	110	119	0.8	135	142	0.6	122	123	0.1	158	166	0.6	130	140	0.9
	A338 N	A338 S	178	190	0.9	202	216	1.0	217	229	0.8	219	239	1.3	210	226	1.1	179	198	1.4
	Slip Rd S	A338 N	55	61	0.8	54	58	0.5	74	77	0.3	82	84	0.2	88	92	0.4	101	102	0.1
	Slip Rd S	B3084	0	0	0.0	2	2	0.0	8	10	0.7	4	4	0.0	3	4	0.5	2	3	0.6
	Slip Rd S	A338 S	47	47	0.0	46	45	0.1	65	60	0.6	74	66	1.0	57	52	0.7	63	56	0.9
	B3084	A338 N	59	64	0.6	97	107	1.0	96	99	0.3	82	86	0.4	104	108	0.4	97	103	0.6
	B3084	Slip Rd S	77	72	0.6	139	131	0.7	69	65	0.5	58	57	0.1	99	93	0.6	102	101	0.1
	B3084	A338 S	27	24	0.6	36	34	0.3	18	16	0.5	26	24	0.4	24	20	0.9	34	30	0.7
	A338 S	A338 N	182	188	0.4	172	179	0.5	201	205	0.3	207	209	0.1	250	256	0.4	219	228	0.6
	A338 S	Slip Rd S	10	7	1.0	10	7	1.0	10	8	0.7	10	11	0.3	11	11	0.0	7	4	1.3
	A338 S	B3084	19	16	0.7	24	21	0.6	21	18	0.7	14	12	0.6	22	17	1.1	23	18	1.1
A338 / A303 Slip Rd	A338 S	Slip Rd N	35	36	0.2	48	52	0.6	40	41	0.2	39	40	0.2	60	64	0.5	46	47	0.1
	A338 S	A338 N	263	276	0.8	283	294	0.6	333	339	0.3	334	339	0.3	396	394	0.1	379	389	0.5
	Slip Rd N	A338 S	53	42	1.6	52	48	0.6	65	54	1.4	61	54	0.9	65	66	0.1	58	57	0.1
	Slip Rd N	A338 N	109	95	1.4	110	108	0.2	99	95	0.4	118	115	0.3	104	102	0.2	121	114	0.6
	A338 N	A338 S	347	392	2.3	380	413	1.7	397	455	2.8	365	414	2.5	429	476	2.2	363	420	2.9
	A338 N	Slip Rd N	103	115	1.1	104	119	1.4	89	106	1.7	80	89	1.0	96	112	1.6	66	69	0.4
A303 / A338 Slip Rd N	A303 W	Slip Rd N	162	137	2.0	162	154	0.6	164	148	1.3	179	169	0.8	169	169	0.0	179	171	0.6
	A303 W	A303 E	1243	1198	1.3	1229	1260	0.9	1243	1208	1.0	1314	1246	1.9	1284	1212	2.0	1249	1191	1.7
	Slip Rd N	A303 E	138	152	1.2	152	168	1.3	129	145	1.4	119	128	0.8	156	175	1.5	112	115	0.3
A303 / A338 Slip Rd S	Slip Rd S	A303 W	204	211	0.5	263	266	0.2	198	211	0.9	154	175	1.6	234	255	1.3	218	245	1.8
	A303 E	A303 W	1349	1346	0.1	1286	1281	0.1	1442	1392	1.3	1543	1499	1.1	1717	1668	1.2	1632	1553	2.0
	A303 E	Slip Rd S	102	107	0.5	102	104	0.2	147	146	0.1	160	154	0.5	148	145	0.2	166	161	0.4
A303 / Solstice Park Slip Rds N	Slip Rd	A303 E	427	298	6.8	426	299	6.7	416	297	6.3	351	260	5.2	376	305	3.8	405	305	5.3
	A303 W	A303 E	1090	1107	0.5	1033	1177	4.3	1105	1144	1.2	1208	1215	0.2	1161	1130	0.9	1123	1152	0.9
	A303 W	Slip Rd	110	100	1.0	108	108	0.0	91	98	0.7	94	100	0.6	79	85	0.7	94	90	0.4
A303 / Countess Rbt / Services Entrance	Countess Rbt	A303 E	1200	1213	0.4	1141	1284	4.1	1196	1239	1.2	1302	1318	0.4	1240	1209	0.9	1217	1246	0.8
	Countess Rbt	Services	150	136	1.2	163	159	0.3	183	167	1.2	172	178	0.5	163	168	0.4	149	153	0.3
Countess Rbt / Services Exit	Countess Rbt	Countess Rd N	580	565	0.6	571	520	2.2	717	686	1.2	820	806	0.5	1026	1036	0.3	866	962	3.2
	Countess Rd N	Countess Rbt	536	538	0.1	573	570	0.1	551	554	0.1	529	532	0.1	454	458	0.2	529	536	0.3
	Services	Countess Rbt	132	131	0.1	172	149	1.8	155	167	0.9	194	201	0.5	154	154	0.0	136	138	0.2
Solstice Park Avenue / Mid Summer Place / Meridian Way	Mid Summer Place	Solstice Park Avenue (ENE)	108	98	1.0	102	87	1.5	94	89	0.5	102	97	0.5	105	102	0.3	99	102	0.3
	Mid Summer Place	Meridian Way	18	20	0.5	26	27	0.2	17	16	0.2	12	12	0.0	9	8	0.3	14	16	0.5
	Mid Summer Place	Solstice Park Avenue (W)	306	315	0.5	314	332	1.0	289	293	0.2	255	264	0.6	244	249	0.3	244	247	0.2
	Solstice Park Avenue (ENE)	Mid Summer Place	227	237	0.7	193	198	0.4	178	178	0.0	184	178	0.4	167	164	0.2	164	163	0.1
	Solstice Park Avenue (ENE)	Meridian Way	40	40	0.0	53	52	0.1	43	44	0.2	24	24	0.0	24	20	0.9	16	16	0.0
	Solstice Park Avenue (ENE)	Solstice Park Avenue (W)	662	561	4.1	685	572	4.5	717	581	5.3	655	541	4.7	641	534	4.4	569	465	4.6
	Meridian Way	Mid Summer Place	8	10	0.7	5	7	0.8	7	8	0.4	3	4	0.5	1	0	1.4	10	11	0.3
	Meridian Way	Solstice Park Avenue (ENE)	10	8	0.7	8	8	0.0	11	14	0.8	8	8	0.0	2	2	0.0	8	8	0.0
	Meridian Way	Solstice Park Avenue (W)	20	17	0.7	23	21	0.4	27	24	0.6	12	11	0.3	24	23	0.2	13	12	0.3
	Solstice Park Avenue (W)	Mid Summer Place	261	260	0.1	245	247	0.1	202	204	0.1	169	178	0.7	182	183	0.1	235	238	0.2
	Solstice Park Avenue (W)	Solstice Park Avenue (ENE)	92	72	2.2	110	82	2.9	101	87	1.4	96	83	1.4	81	74	0.8	61	60	0.1
	Solstice Park Avenue (W)	Meridian Way	6	4	0.9	12	11	0.3	7	7	0.0	5	8	1.2	10	11	0.3	7	7	0.0

A303 Mainline Network Node Result Table			12:00				13:00				14:00				15:00				16:00				17:00			
			Diff Flow	% Diff	Diff Requirement	Criteria	Diff Flow	% Diff	Diff Requirement	Criteria	Diff Flow	% Diff	Diff Requirement	Criteria	Diff Flow	% Diff	Diff Requirement	Criteria	Diff Flow	% Diff	Diff Requirement	Criteria	Diff Flow	% Diff	Diff Requirement	Criteria
Junction	From	To	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All
A303 / B3083 Berwick Rd	A303 E	B3083 S	-2.0	11.8%	Flow within 100vph	Yes	-6.0	26.1%	Flow within 100vph	Yes	-5.0	17.2%	Flow within 100vph	Yes	-12.0	25.0%	Flow within 100vph	Yes	-8.0	14.0%	Flow within 100vph	Yes	15.0	48.4%	Flow within 100vph	Yes
	A303 E	A303 W	15.0	1.4%	Flow within 15%	Yes	11.0	1.1%	Flow within 15%	Yes	-7.0	0.7%	Flow within 15%	Yes	89.0	8.4%	Flow within 15%	Yes	39.0	3.6%	Flow within 15%	Yes	61.0	5.9%	Flow within 15%	Yes
	A303 W	A303 E	21.0	2.6%	Flow within 15%	Yes	79.0	11.1%	Flow within 15%	Yes	124.0	17.4%	Flow within 15%	No	-16.0	1.9%	Flow within 15%	Yes	52.0	6.4%	Flow within 15%	Yes	85.0	11.6%	Flow within 15%	Yes
	A303 W	B3083 S	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	-6.0	24.0%	Flow within 100vph	Yes	7.0	43.8%	Flow within 100vph	Yes	1.0	5.3%	Flow within 100vph	Yes	5.0	31.3%	Flow within 100vph	Yes
	B3083 S	A303 E	-2.0	6.9%	Flow within 100vph	Yes	-2.0	7.4%	Flow within 100vph	Yes	-3.0	7.9%	Flow within 100vph	Yes	-6.0	12.8%	Flow within 100vph	Yes	3.0	9.1%	Flow within 100vph	Yes	-2.0	5.9%	Flow within 100vph	Yes
	B3083 S	A303 W	1.0	33.3%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	-1.0	11.1%	Flow within 100vph	Yes	2.0	15.4%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	2.0	33.3%	Flow within 100vph	Yes
A303 / B3083	A303 W	B3083 N	-12.0	12.2%	Flow within 100vph	Yes	4.0	5.1%	Flow within 100vph	Yes	-55.0	27.5%	Flow within 100vph	Yes	-15.0	6.5%	Flow within 100vph	Yes	41.0	19.4%	Flow within 100vph	Yes	-12.0	5.5%	Flow within 100vph	Yes
	A303 W	A303 E	26.0	3.6%	Flow within 15%	Yes	58.0	8.7%	Flow within 100vph	Yes	167.0	29.7%	Flow within 100vph	No	3.0	0.5%	Flow within 15%	Yes	50.0	8.3%	Flow within 100vph	Yes	104.0	19.8%	Flow within 100vph	No
	A303 E	A303 W	10.0	1.0%	Flow within 15%	Yes	-4.0	0.4%	Flow within 15%	Yes	-18.0	1.7%	Flow within 15%	Yes	73.0	7.0%	Flow within 15%	Yes	29.0	2.8%	Flow within 15%	Yes	83.0	8.5%	Flow within 15%	Yes
	A303 E	B3083 N	-6.0	50.0%	Flow within 100vph	Yes	-3.0	23.1%	Flow within 100vph	Yes	-4.0	28.6%	Flow within 100vph	Yes	-5.0	31.3%	Flow within 100vph	Yes	-3.0	17.6%	Flow within 100vph	Yes	3.0	27.3%	Flow within 100vph	Yes
	B3083 N	A303 E	-2.0	50.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	-2.0	33.3%	Flow within 100vph	Yes	-2.0	33.3%	Flow within 100vph	Yes	-1.0	12.5%	Flow within 100vph	Yes
	B3083 N	A303 W	2.0	4.9%	Flow within 100vph	Yes	3.0	5.8%	Flow within 100vph	Yes	3.0	5.7%	Flow within 100vph	Yes	4.0	6.3%	Flow within 100vph	Yes	2.0	2.2%	Flow within 100vph	Yes	1.0	1.3%	Flow within 100vph	Yes
A303 / Church Street	A303 W	A303 E	37.0	5.2%	Flow within 15%	Yes	67.0	10.1%	Flow within 100vph	Yes	165.0	29.3%	Flow within 100vph	No	6.0	0.9%	Flow within 100vph	Yes	55.0	9.1%	Flow within 100vph	Yes	128.0	25.8%	Flow within 100vph	No
	A303 W	Church Street	-1.0	100.0%	Flow within 100vph	Yes	-2.0	50.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	2.0	40.0%	Flow within 100vph	Yes	3.0	75.0%	Flow within 100vph	Yes	-1.0	11.1%	Flow within 100vph	Yes
	A303 E	A303 W	10.0	1.0%	Flow within 15%	Yes	3.0	0.3%	Flow within 15%	Yes	11.0	1.1%	Flow within 15%	Yes	88.0	8.6%	Flow within 15%	Yes	27.0	2.6%	Flow within 15%	Yes	101.0	10.4%	Flow within 15%	Yes
	A303 E	Church Street	-1.0	20.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	-2.0	100.0%	Flow within 100vph	Yes	-2.0	40.0%	Flow within 100vph	Yes	-4.0	50.0%	Flow within 100vph	Yes
	Church Street	A303 W	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	-1.0	20.0%	Flow within 100vph	Yes	1.0	16.7%	Flow within 100vph	Yes	1.0	14.3%	Flow within 100vph	Yes	2.0	100.0%	Flow within 100vph	Yes
	Church Street	A303 E	0.0	0.0%	Flow within 100vph	Yes	-1.0	100.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes
A303 / Eden Livestock Rd	A303 W	A303 E	-30.0	4.0%	Flow within 15%	Yes	49.0	7.5%	Flow within 100vph	Yes	189.0	33.9%	Flow within 100vph	No	3.0	0.5%	Flow within 100vph	Yes	91.0	15.7%	Flow within 100vph	Yes	139.0	29.2%	Flow within 100vph	No
	A303 E	A303 W	-1.0	0.1%	Flow within 15%	Yes	-8.0	0.8%	Flow within 15%	Yes	10.0	1.0%	Flow within 15%	Yes	80.0	7.8%	Flow within 15%	Yes	23.0	2.2%	Flow within 15%	Yes	85.0	8.6%	Flow within 15%	Yes
	A303 E	Eden Livestock Rd	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes
	Eden Livestock Rd	A303 W	0.0	0.0%	Flow within 100vph	Yes	1.0	33.3%	Flow within 100vph	Yes	1.0	11.1%	Flow within 100vph	Yes	1.0	14.3%	Flow within 100vph	Yes	1.0	9.1%	Flow within 100vph	Yes	2.0	100.0%	Flow within 100vph	Yes
	Eden Livestock Rd	A303 E	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	-1.0	100.0%	Flow within 100vph	Yes	-1.0	100.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	-1.0	100.0%	Flow within 100vph	Yes
A3028 / Amesbury Rd N	Amesbury Rd	A3028 S	-1.0	100.0%	Flow within 100vph	Yes	-1.0	100.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	-3.0	100.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes
	Amesbury Rd	A3028 N	-1.0	20.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	-1.0	50.0%	Flow within 100vph	Yes	-1.0	100.0%	Flow within 100vph	Yes	-3.0	100.0%	Flow within 100vph	Yes	-1.0	20.0%	Flow within 100vph	Yes
	Amesbury Rd	Amesbury Rd N	-9.0	6.9%	Flow within 100vph	Yes	-5.0	3.5%	Flow within 100vph	Yes	-10.0	6.5%	Flow within 100vph	Yes	11.0	9.1%	Flow within 100vph	Yes	4.0	3.3%	Flow within 100vph	Yes	-6.0	4.4%	Flow within 100vph	Yes
	A3028 N	A3028 S	1.0	2.9%	Flow within 100vph	Yes	1.0	2.7%	Flow within 100vph	Yes	1.0	2.6%	Flow within 100vph	Yes	4.0	13.8%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	1.0	2.5%	Flow within 100vph	Yes
	A3028 N	Amesbury Rd	-1.0	100.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	-1.0	100.0%	Flow within 100vph	Yes	-1.0	100.0%	Flow within 100vph	Yes
	A3028 N	Amesbury Rd N	-1.0	5.6%	Flow within 100vph	Yes	1.0	5.3%	Flow within 100vph	Yes	-1.0	3.6%	Flow within 100vph	Yes	1.0	3.8%	Flow within 100vph	Yes	1.0	6.7%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes
	Amesbury Rd N	A3028 S	10.0	22.2%	Flow within 100vph	Yes	9.0	17.3%	Flow within 100vph	Yes	7.0	17.1%	Flow within 100vph	Yes	13.0	25.0%	Flow within 100vph	Yes	9.0	22.5%	Flow within 100vph	Yes	2.0	7.7%	Flow within 100vph	Yes
	Amesbury Rd N	Amesbury Rd	1.0	9.1%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	1.0	11.1%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	1.0	14.3%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes
	Amesbury Rd N	A3028 N	0.0	0.0%	Flow within 100vph	Yes	2.0	1.8%	Flow within 100vph	Yes	1.0	0.7%	Flow within 100vph	Yes	3.0	1.9%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	3.0	3.4%	Flow within 100vph	Yes
A303 / Allington Track	A303 E	A303 W	-16.0	1.0%	Flow within 15%	Yes	-7.0	0.4%	Flow within 15%	Yes	-67.0	4.0%	Flow within 15%	Yes	-57.0	3.3%	Flow within 15%	Yes	-47.0	2.4%	Flow within 15%	Yes	-45.0	2.4%	Flow within 15%	Yes
	A303 E	Allington Track	-1.0	20.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	-1.0	8.3%	Flow within 100vph	Yes	-1.0	20.0%	Flow within 100vph	Yes	1.0	33.3%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes
	A303 W	A303 E	-101.0	7.4%	Flow within 15%	Yes	1.0	0.1%	Flow within 15%	Yes	-64.0	4.8%	Flow within 15%	Yes	-90.0	6.3%	Flow within 15%	Yes	-115.0	8.2%	Flow within 15%	Yes	-98.0	7.0%	Flow within 15%	Yes
	A303 W	Allington Track	-3.0	8.8%	Flow within 100vph	Yes	2.0	9.5%	Flow within 100vph	Yes	-3.0	11.1%	Flow within 100vph	Yes	-3.0	9.1%	Flow within 100vph	Yes	1.0	3.7%	Flow within 100vph	Yes	-1.0	3.8%	Flow within 100vph	Yes
	Allington Track	A303 E	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	12.0	1200.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes
	Allington Track	A303 W	-1.0	2.7%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	1.0	2.2%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	-14.0	17.1%	Flow within 100vph	Yes	1.0	1.7%	Flow within 100vph	Yes
A303 / Amesbury Rd N	Amesbury Rd N	A303 E	1.0	9.1%	Flow within 100vph	Yes	3.0	30.0%	Flow within 100vph	Yes	1.0	9.1%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	1.0	12.5%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes
	A303 E	A303 W	-24.0	1.5%	Flow within 15%	Yes	-19.0	1.2%	Flow within 15%	Yes	-71.0	4.1%	Flow within 15%	Yes	-55.0	3.1%	Flow within 15%	Yes	-60.0	2.9%	Flow within 15%	Yes	-57.0	3.0%	Flow within 15%	Yes
	A303 W	Amesbury Rd N	-10.0	7.5%	Flow within 100vph	Yes	-5.0	3.4%	Flow within 100vph	Yes	-13.0	8.1%	Flow within 100vph	Yes	10.0	8.2%	Flow within 100vph	Yes	-1.0	0.8%	Flow within 100vph	Yes	-10.0	7.0%	Flow within 100vph	Yes
	A303 W	A303 E	-106.0	7.7%	Flow within 15%	Yes	-88.0	6.2%	Flow within 15%	Yes	-65.0	4.8%	Flow within 15%	Yes	-98.0	6.8%	Flow within 15%	Yes	-109.0	7.7%	Flow within 15%	Yes	-84.0	6.0%	Flow within 15%	Yes
A303 / Solstice Park Slip Rds S	A303 E	Solstice Park Slip Rds	-12.0	1.5%	Flow within 15%	Yes	8.0	1.0%	Flow within 15%	Yes	-62.0	7.5%	Flow within 15%	Yes	-32.0	4.4%	Flow within 15%	Yes	-49.0	6.6%	Flow within 15%	Yes	-51.0	7.6%	Flow within 100vph	Yes
	A303 E	A303 W	-3.0	0.4%	Flow within 15%	Yes	-14.0	1.7%	Flow within 15%	Yes	-7.0	0.8%	Flow within 15%	Yes	-28.0	2.6%	Flow within 15%	Yes	-13.0	1.0%	Flow within 15%	Yes	7.0	0.6%	Flow within 15%	Yes
	Solstice Park Slip Rds	A303 W	52.0	47.3%	Flow within 100vph	Yes	39.0	37.9%	Flow within 100vph	Yes	67.0	65.7%	Flow within 100vph	Yes	52.0	45.6%	Flow within 100vph	Yes	40.0	32.0%	Flow within 100vph	Yes	44.0	38.9%	Flow within 100vph	Yes
Solstice Park Ave / Solstice Park Slip Rds	Solstice Park Off Slip	Solstice Park Ave	-8.0	1.0%	Flow within 15%	Yes	11.0	1.4%	Flow within 15%	Yes	-58.0	7.1%	Flow within 15%	Yes	-29.0	4.0%	Flow within 15%	Yes	-49.0	6.6%	Flow within 15%	Yes	-47.0	7.1%	Flow within 100vph	Yes
	Solstice Park Off Slip	Equinox Drive	-2.0	18.2%	Flow within 100vph	Yes	-2.0	10.5%	Flow within 100vph	Yes	-3.0	20.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	-2.0	33.3%	Flow within 100vph	Yes	-1.0	25.0%	Flow within 100vph	Yes
	Solstice Park Ave	Solstice Park Off Slip	52.0	47.7%	Flow within 100vph	Yes	39.0	39.4%	Flow within 100vph	Yes	67.0	66.3%	Flow within 100vph	Yes	54.0	49.1%	Flow within 100vph	Yes	40.0	33.1%	Flow within 100vph	Yes	43.0	39.4%	Flow within 100vph	Yes
	Solstice Park Ave	Equinox Drive	5.0	41.7%	Flow within 100vph	Yes	1.0	2.9%	Flow within 100vph	Yes	4.0	23.5%	Flow within 100vph	Yes	4.0	18.2%	Flow within 100vph	Yes	2.0	14.3%	Flow within 100vph	Yes	4.0	28.6%	Flow within 100vph	Yes
	Equinox Drive	Solstice Park Off Slip	-1.0	100.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	-1.0	100.0%	Flow within 100vph	Yes	-1.0	25.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes
	Equinox Drive	Solstice Park Ave	1.0	2.9%	Flow within 100vph	Yes	1.0	4.0%	Flow within 100vph	Yes	2.0	4.3%	Flow within 100vph	Yes	3.0	8.8%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	3.0	13.0%	Flow within 100vph	Yes
Solstice Park Ave / Porton Rd	Solstice Park Ave	Porton Rd N	-115.0	26.1%	Flow within 100vph	No	-116.0	27.4%	Flow within 100vph	No	-123.0	28.3%	Flow within 100vph	No	-94.0	30.2%	Flow within 100vph	Yes	-98.0	30.8%	Flow within 100vph	Yes	-113.0	33.2%	Flow within 100vph	No
	Solstice Park Ave	Porton Rd S	14.0	5.7%	Flow within 100vph	Yes	4.0	1.3%	Flow within 100vph	Yes	3.0	1.1%	Flow within 100vph	Yes	-8.0	2.3%	Flow within 100vph	Yes	-8.0	2.3%	Flow within 100vph	Yes	5.0	1.6%	Flow within 100vph	Yes
	Solstice Park Ave	London Rd	11.0	3.7%	Flow within 100vph	Yes	4.0	1.3%	Flow within 100vph	Yes	3.0	1.0%	Flow within 100vph	Yes	1.0	0.4%	Flow within 100vph	Yes	-1.0	0.4%	Flow within 100vph	Yes	5.0	2.8%	Flow within 100vph	Yes
	Porton Rd N	Solstice Park Ave	-14.0	9.5%	Flow within 100vph	Yes	-17.0	11.6%	Flow within 100vph	Yes	-8.0	7.0%	Flow within 100vph	Yes	1.0	0.9%	Flow within 100vph	Yes	-6.0	5.2%	Flow within 100vph	Yes	-9.0	6.8%	Flow within 100vph	Yes
	Porton Rd N	Porton Rd S	-6.0	2.6%	Flow within 100vph	Yes	1.0	0.5%	Flow within 100vph	Yes	2.0	1.3%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	-3.0	1.4%	Flow within 100vph	Yes	3.0	1.8%	Flow within 100vph	Yes
	Porton Rd N	London Rd	-11.0	6.5%	Flow within 100vph	Yes	-1.0	0.7%	Flow within 100vph	Yes	-7.0	4.3%	Flow within 100vph	Yes	5.0	3.5%	Flow within 100vph	Yes	-5.0	2.7%	Flow within 100vph	Yes	3.0	1.8%	Flow within 100vph	Yes
	Porton Rd S	Solstice Park Ave	-2.0	1.7%	Flow within 100vph	Yes	-2.0	1.6%	Flow within 100vph	Yes	-3.0	3.2%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	-1.0	1.3%	Flow within 100vph	Yes	3.0	3.0%	Flow within 100vph	Yes
	Porton Rd S	Porton Rd N	-2.0	0.8%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	1.0	0.4%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	-2.0	0.7%	Flow within 100vph	Yes	-6.0	2.0%	Flow within 100vph	Yes
	Porton Rd S	London Rd	5.0	2.6%	Flow within 100vph	Yes	5.0	3.9%	Flow within 100vph	Yes	-1.0	0.7%	Flow within 100vph	Yes	3.0	1.9%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	6.0	4.0%	Flow within 100vph	Yes
	London Rd	Solstice Park Ave	1.0	1.1%	Flow within 100vph	Yes	-5.0	5.7%	Flow within 100vph	Yes	-1.0	1.0%	Flow within 100vph	Yes	2.0	2.8%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	5.0	6.6%	Flow within 100vph	Yes
	London Rd	Porton Rd N	-1.0	0.4%	Flow within 100vph	Yes	1.0	0.4%	Flow within 100vph	Yes	4.0	1.7%	Flow within 100vph	Yes	-3.0	1.3%	Flow within 100vph	Yes	-3.0	1.1%	Flow within 100vph	Yes	-3.0	1.1%	Flow within 100vph	Yes
	London Rd	Porton Rd S	3.0	1.9%	Flow within 100vph	Yes	5.0	3.7%	Flow within 100vph	Yes	1.0	0.8%	Flow within 100vph	Yes	5.0	3.7%	Flow within 100vph	Yes	2.0	1.5%	Flow within 100vph	Yes	8.0	5.4%	Flow within 100vph	Yes
Porton Rd / Salisbury Rd	Porton Rd	Slip Rd	-128.0	32.4%	Flow within 100vph	No	-127.0	32.0%	Flow within 100vph	No	-118.0	29.7%	Flow within 100vph	No	-92.0	28.6%	Flow within 100vph	Yes	-76.0	21.8%	Flow within 100vph	Yes	-98.0	25.9%	Flow within 100vph	Yes
	Porton Rd	Salisbury Rd	5.0	0.9%	Flow within 100vph	Yes	9.0	1.7%	Flow within 100vph	Yes	-5.0	0.9%	Flow within 100vph	Yes	-5.0	1.1%	Flow within 100vph	Yes	-14.0	2.7%	Flow within 100vph	Yes	-9.0	1.7%	Flow within 100vph	Yes
	Slip Rd	Porton Rd	-13.0	12.6%	Flow within 100vph	Yes	-5.0	4.8%	Flow within 100vph	Yes	1.0	1.2%	Flow within 100vph	Yes	4.0	4.9%	Flow within 100vph	Yes	1.0	1.3%	Flow within 100vph	Yes	-2.0	2.7%	Flow within 100vph	Yes
	Slip Rd	Salisbury Rd	3.0	42.9%	Flow within 100vph	Yes	4.0	100.0%	Flow within 100vph	Yes	5.0	100.0%	Flow within 100vph	Yes	2.0	16.7%	Flow within 100vph	Yes	5.0	125.0%	Flow within 100vph	Yes	-1.0	5.0%	Flow within 100vph	Yes
	Salisbury Rd	Porton Rd	4.0	1.0%	Flow within 100vph	Yes	7.0	2.0%	Flow within 100vph	Yes	2.0	0.6%	Flow within 100vph	Yes	5.0	1.3%	Flow within 100vph	Yes	3.0	0.7%	Flow within 100vph	Yes	11.0	2.9%	Flow within 100vph	Yes
	Salisbury Rd	Slip Rd	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	-2.0	10.5%	Flow within 100vph	Yes	1.0	3.4%	Flow within 100vph	Yes	5.0	17.9%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes
A303 / Countess Rd Countess Roundabout	A303 W	A303 E	8.0	0.9%	Flow within 15%	Yes	135.0	18.3%	Flow within 15%	No	34.0	4.1%	Flow within 15%	Yes	16.0	1.8%	Flow within 15%	Yes	-24.0	2.6%	Flow within 15%	Yes	48.0	5.4%	Flow within 15%	Yes
	A303 W	Countess Rd N	-1.0	3.6%	Flow within 100vph	Yes	-1.0	3.3%	Flow within 100vph	Yes	10.0	62.5%	Flow within 100vph	Yes	-6.0	21.4%	Flow within 100vph	Yes	1.0	3.7%	Flow within 100vph	Yes	6.0	30.0%	Flow within 100vph	Yes
	A303 W	Countess Rd S	-11.0	11.3%	Flow within 100vph	Yes	-27.0	20.3%	Flow within 100vph	Yes	37.0	45.1%	Flow within 100vph	Yes	7.0	7.8%	Flow within 100vph	Yes	15.0	19.5%	Flow within 100vph	Yes	19.0	33.3%	Flow within 100vph	Yes
	A303 E	A303 W	-74.0	12.2%	Flow within 100vph	Yes	11.0	2.1%	Flow within 100vph	Yes	-93.0	15.0%	Flow within 100vph	Yes	50.0	8.4%	Flow within 100vph	Yes	40.0	6.1%	Flow within 100vph	Yes	40.0	5.9%	Flow within 100vph	Yes
	A303 E	Countess Rd N	4.0	1.6%	Flow within 100vph	Yes	4.0	1.5%	Flow within 100vph	Yes	-50.0	12.9%	Flow within 100vph	Yes	18.0	3.8%	Flow within 100vph	Yes	-9.0	1.4%	Flow within 100vph	Yes	77.0	15.5%	Flow within 100vph	Yes
	A303 E	Countess Rd S	0.0	0.0%	Flow within 100vph	Yes	6.0	8.8%	Flow within 100vph	Yes	-10.0	8.8%	Flow within 100vph	Yes	13.0	11.5%	Flow within 100vph	Yes	6.0	4.0%	Flow within 100vph	Yes	10.0	5.0%	Flow within 100vph	Yes
	Countess Rd N	A303 W	-24.0	17.5%	Flow within 100vph	Yes	-17.0	10.2%	Flow within 100vph	Yes	6.0	4.6%	Flow within 100vph	Yes	15.0	12.0%	Flow within 100vph	Yes	6.0	6.6%	Flow within 100vph	Yes	16.0	15.5%	Flow within 100vph	Yes
	Countess Rd N	A303 E	6.0	1.9%	Flow within 100vph	Yes	2.0	0.6%	Flow within 100vph	Yes	13.0	3.8%	Flow within 100vph	Yes	7.0	1.9%	Flow within 100vph	Yes	5.0	1.7%	Flow within 100vph	Yes	-11.0	3.5%	Flow within 100vph	Yes
	Countess Rd N	Countess Rd S	-7.0	3.1%	Flow within 100vph	Yes	-12.0	5.2%	Flow within 100vph	Yes	4.0	1.7%	Flow within 100vph	Yes	2.0	0.9%	Flow within 100vph	Yes	3.0	1.4%	Flow within 100vph	Yes	-2.0	0.8%	Flow within 100vph	Yes
	Countess Rd S	A303 W	-6.0	15.4%	Flow within 100vph	Yes	-1.0	5.3%	Flow within 100vph	Yes	-3.0	16.7%	Flow within 100vph	Yes	2.0	9.5%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	6.0	20.0%	Flow within 100vph	Yes
	Countess Rd S	A303 E	10.0	6.9%	Flow within 100vph	Yes	17.0	8.1%	Flow within 100vph	Yes	9.0	5.2%	Flow within 100vph	Yes	7.0	3.8%	Flow within 100vph	Yes	13.0	8.7%	Flow within 100vph	Yes	-1.0	0.7%	Flow within 100vph	Yes
	Countess Rd S	Countess Rd N	-5.0	1.8%	Flow within 100vph	Yes	-5.0	2.1%	Flow within 100vph	Yes	-7.0	2.1%	Flow within 100vph	Yes	2.0	0.7%	Flow within 100vph	Yes	-6.0	1.7%	Flow within 100vph	Yes	2.0	0.6%	Flow within 100vph	Yes
A303 / Stonehenge Rd	A303 E	A303 W	-40.0	5.5%	Flow within 15%	Yes	25.0	3.7%	Flow within 100vph	Yes	-77.0	10.2%	Flow within 15%	Yes	86.0	11.7%	Flow within 15%	Yes	45.0	5.9%	Flow within 15%	Yes	41.0	4.8%	Flow within 15%	Yes
	A303 W	A303 E	1.0	0.1%	Flow within 15%	Yes	115.0	12.7%	Flow within 15%	Yes	59.0	6.2%	Flow within 15%	Yes	6.0	0.6%	Flow within 15%	Yes	-10.0	1.0%	Flow within 15%	Yes	52.0	5.3%	Flow within 15%	Yes
	Stonhenge Rd	A303 W	-2.0	1.2%	Flow within 100vph	Yes	-2.0	1.1%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	2.0	1.2%	Flow within 100vph	Yes	-1.0	0.5%	Flow within 100vph	Yes	4.0	3.0%	Flow within 100vph	Yes
A303 / A360 Longbarrow Roundabout	A303 W	A303 E	-39.0	6.2%	Flow within 100vph	Yes	101.0	20.8%	Flow within 100vph	No	97.0	19.0%	Flow within 100vph	Yes	32.0	6.4%	Flow within 100vph	Yes	47.0	9.4%	Flow within 100vph	Yes	123.0	32.1%	Flow within 100vph	No
	A303 W	A360 S	-12.0	15.0%	Flow within 100vph	Yes	9.0	15.5%	Flow within 100vph	Yes	9.0	15.0%	Flow within 100vph	Yes	6.0	10.0%	Flow within 100vph	Yes	17.0	29.8%	Flow within 100vph	Yes	16.0	34.8%	Flow within 100vph	Yes
	A303 W	A360 N	-7.0	17.1%	Flow within 100vph	Yes	-16.0	29.1%	Flow within 100vph	Yes	25.0	65.8%	Flow within 100vph	Yes	-9.0	17.0%	Flow within 100vph	Yes	35.0	134.6%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes
	A303 E	A303 W	24.0	3.4%	Flow within 15%	Yes	9.0	1.2%	Flow within 15%	Yes	2.0	0.3%	Flow within 15%	Yes	85.0	11.2%	Flow within 15%	Yes	30.0	3.7%	Flow within 15%	Yes	74.0	9.3%	Flow within 15%	Yes
	A303 E	A360 S	-1.0	7.7%	Flow within 100vph	Yes	2.0	18.2%	Flow within 100vph	Yes	-13.0	54.2%	Flow within 100vph	Yes	2.0	11.1%	Flow within 100vph	Yes	1.0	5.6%	Flow within 100vph	Yes	-8.0	23.5%	Flow within 100vph	Yes
	A303 E	A360 N	-8.0	6.5%	Flow within 100vph	Yes	3.0	2.4%	Flow within 100vph	Yes	9.0	7.8%	Flow within 100vph	Yes	-11.0	7.5%	Flow within 100vph	Yes	12.0	8.8%	Flow within 100vph	Yes	21.0	17.9%	Flow within 100vph	Yes
	A360 S	A303 W	-5.0	6.0%	Flow within 100vph	Yes	-3.0	4.7%	Flow within 100vph	Yes	1.0	1.3%	Flow within 100vph	Yes	7.0	9.9%	Flow within 100vph	Yes	2.0	3.8%	Flow within 100vph	Yes	6.0	16.7%	Flow within 100vph	Yes
	A360 S	A303 E	7.0	7.2%	Flow within 100vph	Yes	6.0	4.2%	Flow within 100vph	Yes	1.0	1.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	4.0	2.5%	Flow within 100vph	Yes	-3.0	1.4%	Flow within 100vph	Yes
	A360 S	A360 N	-1.0	0.4%	Flow within 100vph	Yes	-3.0	1.5%	Flow within 100vph	Yes	-6.0	2.1%	Flow within 100vph	Yes	-4.0	1.4%	Flow within 100vph	Yes	-3.0	1.0%	Flow within 100vph	Yes	-1.0	0.3%	Flow within 100vph	Yes
	A360 N	A303 W	-20.0	7.6%	Flow within 100vph	Yes	-6.0	3.1%	Flow within 100vph	Yes	-6.0	2.7%	Flow within 100v

D.2 Summer Local model turn count calibration

P'way Closed Network Node Result Table				12:00			13:00			14:00			15:00			16:00			17:00		
				Observed	Modelled	GEH	Observed	Modelled	GEH	Observed	Modelled	GEH	Observed	Modelled	GEH	Observed	Modelled	GEH	Observed	Modelled	GEH
Junction	**From**	**To**	**To Node**	**All**	**All**	**All**	**All**	**All**	**All**	**All**	**All**	**All**	**All**	**All**	**All**	**All**	**All**	**All**	**All**	**All**	**All**
The Packway / Bingham Rd / Ross Rd	Ross Rd	The Packway E	67	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
	Ross Rd	Bingham Rd	2033	1	0	1.4	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
	Ross Rd	The Packway W	65	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
	The Packway E	Ross Rd	2003	1	0	1.4	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
	The Packway E	Bingham Rd	2033	9	8	0.3	1	1	0.0	1	0	1.4	2	1	0.8	1	0	1.4	2	0	2.0
	The Packway E	The Packway W	65	457	450	0.3	387	401	0.7	479	469	0.5	562	534	1.2	604	612	0.3	523	528	0.2
	Bingham Rd	Ross Rd	2003	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
	Bingham Rd	The Packway E	67	2	0	2.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	2	0	2.0
	Bingham Rd	The Packway W	65	9	9	0.0	3	4	0.5	12	15	0.8	3	3	0.0	4	4	0.0	11	12	0.3
	The Packway W	Ross Rd	2003	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
	The Packway W	The Packway E	67	204	195	0.6	192	201	0.6	245	224	1.4	234	227	0.5	241	236	0.3	269	280	0.7
	The Packway W	Bingham Rd	2033	3	3	0.0	0	0	0.0	5	7	0.8	3	4	0.5	6	6	0.0	6	6	0.0
The Packway / Shops Exit	Shops	The Packway E	76	25	17	1.7	14	11	0.8	13	10	0.9	9	6	1.1	6	5	0.4	12	8	1.3
	Shops	The Packway W	74	35	42	1.1	22	29	1.4	25	28	0.6	26	27	0.2	23	26	0.6	34	37	0.5
	The Packway E	The Packway W	74	144	152	0.7	124	125	0.1	131	131	0.0	144	146	0.2	131	136	0.4	123	133	0.9
	The Packway W	The Packway E	76	131	119	1.1	138	114	2.1	158	125	2.8	143	135	0.7	120	123	0.3	158	149	0.7
The Packway / Glover Rd	Glover Rd	The Packway E	77	35	23	2.2	28	18	2.1	19	10	2.4	26	14	2.7	18	10	2.1	16	9	2.0
	Glover Rd	The Packway W	75	45	56	1.5	27	37	1.8	25	33	1.5	34	44	1.6	20	25	1.1	21	27	1.2
	The Packway E	Glover Rd	2008	4	1	1.9	9	4	2.0	11	5	2.1	14	4	3.3	5	2	1.6	6	3	1.4
	The Packway E	The Packway W	75	99	97	0.2	90	87	0.3	108	98	1.0	110	102	0.8	113	109	0.4	105	106	0.1
	The Packway W	Glover Rd	2008	19	20	0.2	16	18	0.5	11	17	1.6	7	14	2.2	9	16	2.0	14	18	1.0
	The Packway W	The Packway E	77	135	115	1.8	134	104	2.8	153	117	3.1	152	127	2.1	118	113	0.5	157	139	1.5
The Packway / Northern Terrace	Northern Terrace	The Packway E	78	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
	Northern Terrace	The Packway W	76	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
	The Packway E	Northern Terrace	2009	12	4	2.8	21	8	3.4	8	4	1.6	11	4	2.6	11	4	2.6	14	4	3.3
	The Packway E	The Packway W	76	102	99	0.3	105	91	1.4	118	102	1.5	122	108	1.3	119	111	0.7	112	110	0.2
	The Packway W	Northern Terrace	2009	11	17	1.6	8	21	3.4	7	13	1.9	9	15	1.7	7	14	2.2	8	17	2.5
	The Packway W	The Packway E	78	161	120	3.5	156	102	4.8	165	116	4.1	171	127	3.6	128	110	1.7	165	133	2.6
The Packway / Bidulph Rd	Bidulph Rd	The Packway E	79	13	8	1.5	15	8	2.1	10	5	1.8	16	9	2.0	8	6	0.8	12	5	2.4
	Bidulph Rd	The Packway W	77	9	13	1.2	12	17	1.3	9	13	1.2	8	15	2.1	5	8	1.2	11	16	1.4
	The Packway E	The Packway W	77	87	89	0.2	100	83	1.8	101	93	0.8	103	99	0.4	105	108	0.3	105	98	0.7
	The Packway W	The Packway E	79	141	120	1.8	139	102	3.4	142	115	2.4	143	126	1.5	108	109	0.1	151	133	1.5
The Packway / Wood Rd	The Packway E	Wood Rd	2026	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
	The Packway E	The Packway W	78	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
	Wood Rd	The Packway E	80	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
	Wood Rd	The Packway W	78	81	90	1.0	92	83	1.0	93	94	0.1	102	99	0.3	106	107	0.1	99	97	0.2
	The Packway W	The Packway E	80	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
	The Packway W	Wood Rd	2026	145	127	1.5	150	112	3.3	147	121	2.2	159	134	2.1	119	115	0.4	160	138	1.8
The Packway / A345 / Countess Rd / Larkhill Rd Roundabout	A345	Larkhill Rd	82	39	41	0.3	35	36	0.2	27	28	0.2	40	40	0.0	76	80	0.5	43	42	0.2
	A345	Countess Rd	2024	250	252	0.1	242	238	0.3	243	244	0.1	253	253	0.0	294	287	0.4	269	272	0.2
	A345	The Packway	80	3	0	2.4	9	0	4.2	8	0	4.0	1	0	1.4	0	0	0.0	0	0	0.0
	Larkhill Rd	A345	2011	108	111	0.3	100	98	0.2	120	125	0.5	79	82	0.3	87	88	0.1	69	72	0.4
	Larkhill Rd	Countess Rd	2024	352	345	0.4	351	337	0.8	314	305	0.5	253	264	0.7	191	186	0.4	175	180	0.4
	Larkhill Rd	The Packway	80	3	0	2.4	1	0	1.4	0	0	0.0	0	0	0.0	1	0	1.4	1	0	1.4
	Countess Rd	A345	2011	287	288	0.1	248	255	0.4	293	286	0.4	380	370	0.5	440	438	0.1	343	346	0.2
	Countess Rd	Larkhill Rd	82	222	220	0.1	194	198	0.3	218	203	1.0	246	228	1.2	229	227	0.1	269	255	0.9
	Countess Rd	Countess Rd	2024	53	44	1.3	62	47	2.0	64	58	0.8	86	62	2.8	107	80	2.8	104	72	3.4
	Countess Rd	The Packway	80	2	0	2.0	1	0	1.4	2	0	2.0	0	0	0.0	2	0	2.0	0	0	0.0
	The Packway	A345	2011	2	0	2.0	8	0	4.0	0	0	0.0	1	0	1.4	0	0	0.0	0	0	0.0
	The Packway	Larkhill Rd	82	3	0	2.4	3	0	2.4	0	0	0.0	0	0	0.0	1	0	1.4	1	0	1.4
	The Packway	Countess Rd	2024	5	0	3.2	6	0	3.5	3	0	2.4	12	0	4.9	5	0	3.2	5	0	3.2
Stongehenge Rd / Larkhill Rd	Stonehenge Rd	Larkhill Rd E	83	12	12	0.0	8	8	0.0	8	6	0.8	15	14	0.3	21	24	0.6	13	12	0.3
	Stonehenge Rd	Larkhill Rd W	81	62	61	0.1	70	71	0.1	71	72	0.1	58	56	0.3	47	46	0.1	69	71	0.2
	Larkhill Rd E	Stonehenge Rd	2012	18	18	0.0	16	15	0.3	15	14	0.3	15	15	0.0	19	19	0.0	22	22	0.0
	Larkhill Rd E	Larkhill Rd W	81	399	397	0.1	393	363	1.5	364	359	0.3	278	288	0.6	234	231	0.2	177	181	0.3
	Larkhill Rd W	Stonehenge Rd	2012	72	72	0.0	82	83	0.1	86	85	0.1	86	86	0.0	98	101	0.3	91	89	0.2
	Larkhill Rd W	Larkhill Rd E	83	195	189	0.4	156	152	0.3	160	143	1.4	203	180	1.7	212	205	0.5	219	209	0.7
Larkhill Rd / Philip Rd	Philip Rd	Larkhill Rd E	85	18	19	0.2	13	15	0.5	7	7	0.0	11	13	0.6	10	11	0.3	10	9	0.3
	Philip Rd	Larkhill Rd W	83	3	3	0.0	5	3	1.0	4	0	2.8	5	4	0.5	4	0	2.8	2	0	2.0
	Larkhill Rd E	Philip Rd	2014	14	13	0.3	13	13	0.0	16	16	0.0	16	17	0.2	23	23	0.0	19	22	0.7
	Larkhill Rd E	Larkhill Rd W	83	434	424	0.5	406	390	0.8	393	393	0.0	303	312	0.5	258	262	0.2	230	223	0.5
	Larkhill Rd W	Philip Rd	2014	4	4	0.0	9	6	1.1	8	8	0.0	2	1	0.8	7	8	0.4	8	5	1.2
	Larkhill Rd W	Larkhill Rd E	85	200	202	0.1	179	162	1.3	162	153	0.7	220	196	1.7	227	231	0.3	224	209	1.0
The Packway / Willoughby Rd / Watson Rd	Watson Rd	The Packway E	68	23	26	0.6	13	13	0.0	14	16	0.5	21	17	0.9	11	17	1.6	3	0	2.4
	Watson Rd	Willoughby Rd	2032	22	18	0.9	14	13	0.3	16	13	0.8	11	13	0.6	20	13	1.7	2	2	0.0
	Watson Rd	The Packway W	66	23	20	0.6	21	22	0.2	37	39	0.3	43	46	0.4	56	57	0.1	8	8	0.0
	The Packway E	Watson Rd	2004	14	12	0.6	17	14	0.8	12	8	1.3	7	4	1.3	3	1	1.4	5	3	1.0
	The Packway E	Willoughby Rd	2032	14	39	4.9	9	35	5.5	11	24	3.1	16	31	3.1	11	18	1.8	11	29	4.0
	The Packway E	The Packway W	66	105	134	2.7	114	129	1.4	122	136	1.2	142	152	0.8	162	174	0.9	137	161	2.0
	Willoughby Rd	Watson Rd	2004	9	10	0.3	8	12	1.3	12	13	0.3	2	6	2.0	5	5	0.0	1	5	2.3
	Willoughby Rd	The Packway E	68	19	32	2.6	18	33	3.0	15	34	3.8	13	32	4.0	5	24	5.0	12	29	3.8
	Willoughby Rd	The Packway W	66	335	304	1.7	256	252	0.3	326	294	1.8	379	340	2.1	378	382	0.2	381	359	1.1
	The Packway W	Watson Rd	2004	5	7	0.8	9	10	0.3	6	8	0.8	3	4	0.5	7	8	0.4	1	2	0.8
	The Packway W	The Packway E	68	124	123	0.1	133	118	1.3	157	132	2.1	144	136	0.7	149	142	0.6	181	176	0.4
	The Packway W	Willoughby Rd	2032	74	68	0.7	52	73	2.7	83	84	0.1	84	90	0.6	87	85	0.2	91	106	1.5
Bulford Hill / Larkhill Rd	Bulford Rd	Bulford Hill	86	170	173	0.2	127	131	0.4	140	142	0.2	126	128	0.2	151	153	0.2	147	147	0.0
	Bulford Hill	Bulford Rd	2015	173	176	0.2	173	173	0.0	163	166	0.2	194	194	0.0	267	270	0.2	257	260	0.2
	Bulford Rd	Larkhill Rd	84	47	47	0.0	54	53	0.1	54	53	0.1	45	46	0.1	43	44	0.2	53	54	0.1
	Bulford Hill	Larkhill Rd	84	399	395	0.2	351	350	0.1	351	352	0.1	271	282	0.7	236	239	0.2	194	192	0.1
	Larkhill Rd	Bulford Rd	2015	53	58	0.7	51	49	0.3	55	60	0.7	46	45	0.1	52	53	0.1	70	68	0.2
	Larkhill Rd	Bulford Hill	86	155	163	0.6	145	130	1.3	101	101	0.0	174	164	0.8	178	187	0.7	152	151	0.1
High Street / Church Lane	Church Ln	High St E	2056	2	3	0.6	1	0	1.4	3	2	0.6	2	2	0.0	1	1	0.0	3	3	0.0
	Church Ln	High St W	85	2	4	1.2	0	0	0.0	0	0	0.0	1	0	1.4	3	2	0.6	0	0	0.0
	High St E	Church Ln	87	2	2	0.0	4	4	0.0	0	0	0.0	3	4	0.5	4	4	0.0	1	0	1.4
	High St E	High St W	85	572	570	0.1	521	521	0.0	522	515	0.3	454	475	1.0	509	508	0.0	453	448	0.2
	High St W	Church Ln	87	2	0	2.0	1	0	1.4	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
	High St W	High St E	2056	324	337	0.7	276	262	0.9	243	242	0.1	297	289	0.5	328	342	0.8	298	299	0.1
High Street / Camilla Close	High Street W	Camilla Close	2055	4	4	0.0	2	0	2.0	6	5	0.4	1	0	1.4	4	5	0.5	4	3	0.5
	High Street W	High Street E	2054	323	335	0.7	274	259	0.9	241	242	0.1	299	290	0.5	327	338	0.6	298	300	0.1
	Camilla Close	High Street W	86	1	0	1.4	1	0	1.4	2	2	0.0	3	2	0.6	4	4	0.0	2	0	2.0
	Camilla Close	High Street E	2054	2	4	1.2	8	8	0.0	5	6	0.4	14	16	0.5	9	8	0.3	10	10	0.0
	High Street E	High Street W	86	575	571	0.2	524	527	0.1	517	514	0.1	456	477	1.0	509	507	0.1	452	448	0.2
	High Street E	Camilla Close	2055	4	4	0.0	2	2	0.0	10	10	0.0	11	13	0.6	13	12	0.3	13	13	0.0
High Street / Orchard End	High Street W	Orchard End	2053	88	91	0.3	86	85	0.1	53	54	0.1	79	77	0.2	81	82	0.1	75	71	0.5
	High Street W	High Street E	91	236	246	0.6	195	183	0.9	193	194	0.1	230	228	0.1	255	264	0.6	233	239	0.4
	Orchard End	High Street W	2056	112	109	0.3	116	114	0.2	98	98	0.0	110	111	0.1	135	135	0.0	90	88	0.2
	Orchard End	High Street E	91	7	8	0.4	10	10	0.0	6	4	0.9	8	8	0.0	6	6	0.0	11	12	0.3
	High Street E	High Street W	2056	465	467	0.1	411	414	0.1	426	426	0.0	360	378	0.9	389	387	0.1	374	372	0.1
	High Street E	Orchard End	2053	8	8	0.0	4	4	0.0	7	8	0.4	6	5	0.4	7	8	0.4	5	4	0.5
Salisbury Rd / A3208 / Double Hedges	Salisbury Rd N	Double Hedges	2022	13	14	0.3	15	15	0.0	11	12	0.3	7	8	0.4	12	12	0.0	11	12	0.3
	Salisbury Rd N	Salisbury Rd S	2023	135	138	0.3	146	149	0.2	117	121	0.4	114	117	0.3	139	140	0.1	126	129	0.3
	Salisbury Rd N	A3028	2054	9	5	1.5	7	3	1.8	3	3	0.0	8	8	0.0	5	4	0.5	3	3	0.0
	Double Hedges	Salisbury Rd N	90	4	4	0.0	1	0	1.4	4	4	0.0	5	5	0.0	3	4	0.5	9	9	0.0
	Double Hedges	Salisbury Rd S	2023	116	121	0.5	87	89	0.2	103	103	0.0	113	113	0.0	113	114	0.1	72	75	0.3
	Double Hedges	A3028	2054	44	43	0.2	37	35	0.3	43	40	0.5	48	48	0.0	47	46	0.1	18	18	0.0
	Salisbury Rd S	Salisbury Rd N	90	131	134	0.3	143	145	0.2	150	155	0.4	147	149	0.2	168	174	0.5	184	184	0.0
	Salisbury Rd S	Double Hedges	2022	11	12	0.3	11	11	0.0	12	12	0.0	14	15	0.3	11	12	0.3	7	8	0.4
	Salisbury Rd S	A3028	2054	418	425	0.3	374	378	0.2	389	391	0.1	327	329	0.1	341	342	0.1	350	356	0.3
	A3028	Salisbury Rd N	90	5	3	1.0	10	8	0.7	9	8	0.3	5	4	0.5	13	11	0.6	3	2	0.6
	A3028	Double Hedges	2022	42	41	0.2	38	34	0.7	52	51	0.1	46	45	0.1	42	43	0.2	42	42	0.0
	A3028	Salisbury Rd S	2023	203	209	0.4	158	153	0.4	136	140	0.3	189	188	0.1	207	217	0.7	199	207	0.6
The Packway / Rollestone Camp / B3086	Rollestone Camp	The Packway E	66	4	0	2.8	6	4	0.9	6	2	2.0	10	9	0.3	5	4	0.5	4	4	0.0
	Rollestone Camp	B3086	103	4	5	0.5	6	8	0.8	11	12	0.3	5	4	0.5	11	12	0.3	5	5	0.0
	Rollestone Camp	The Packway W	2001	3	4	0.5	6	8	0.8	6	8	0.8	3	4	0.5	6	8	0.8	7	8	0.4
	The Packway E	Rollestone Camp	2002	10	8	0.7	4	5	0.5	15	10	1.4	6	6	0.0	14	10	1.2	5	5	0.0
	The Packway E	B3086	103	260	259	0.1	234	236	0.1	246	240	0.4	252	237	1.0	230	239	0.6	185	183	0.1
	The Packway E	The Packway W	2001	195	197	0.1	160	171	0.9	239	227	0.8	300	284	0.9	357	366	0.5	357	363	0.3
	B3086	Rollestone Camp	2002	6	7	0.4	5	6	0.4	3	3	0.0	9	11	0.6	6	8	0.8	5	7	0.8
	B3086	The Packway E	66	100	95	0.5	83	86	0.3	111	99	1.2	107	100	0.7	98	94	0.4	138	134	0.3
	B3086	The Packway W	2001	10	9	0.3	13	11	0.6	18	16	0.5	24	24	0.0	19	16	0.7	16	15	0.3
	The Packway W	Rollestone Camp	2002	5	4	0.5	2	3	0.6	4	4	0.0	3	4	0.5	11	11	0.0	9	10	0.3
	The Packway W	The Packway E	66	104	103	0.1	108	108	0.0	134	131	0.3	124	122	0.2	148	145	0.2	150	152	0.2
	The Packway W	B3086	103	25	27	0.4	31	32	0.2	27	27	0.0	30	31	0.2	19	21	0.4	42	40	0.3
A360 / Stonehenge / B3086	B3086	Stonehenge	102	47	47	0.0	36	37	0.2	50	44	0.9	27	27	0.0	16	14	0.5	15	12	0.8
	B3086	A360 S	2036	223	215	0.5	223	207	1.1	196	197	0.1	221	207	1.0	211	196	1.1	183	175	0.6
	B3086	A360 W	2037	37	26	2.0	38	33	0.8	40	37	0.5	49	43	0.9	69	59	1.3	50	44	0.9
	Stonehenge	B3086	65	9	6	1.1	17	16	0.2	19	17	0.5	17	15	0.5	14	13	0.3	17	18	0.2
	Stonehenge	A360 S	2036	114	119	0.5	179	182	0.2	177	179	0.1	158	164	0.5	135	137	0.2	132	134	0.2
	Stonehenge	A360 W	2037	25	25	0.0	38	38	0.0	52	51	0.1	29	29	0.0	42	42	0.0	31	32	0.2
	A360 S	B3086	65	76	75	0.1	65	69	0.5	66	67	0.1	86	90	0.4	73	71	0.2	85	85	0.0
	A360 S	Stonehenge	102	147	149	0.2	151	153	0.2	106	108	0.2	94	95	0.1	79	82	0.3	63	62	0.1
	A360 S	A360 W	2037	176	183	0.5	170	169	0.1	260	259	0.1	308	304	0.2	318	318	0.0	337	333	0.2
	A360 W	B3086	65	31	30	0.2	21	19	0.4	39	36	0.5	34	31	0.5	34	36	0.3	56	54	0.3
	A360 W	Stonehenge	102	35	36	0.2	48	48	0.0	46	46	0.0	45	43	0.3	51	49	0.3	51	50	0.1
	A360 W	A360 S	2036	270	275	0.3	274	276	0.1	413	412	0.0	552	549	0.1	477	486	0.4	524	523	0.0
The Packway / Watson Rd	Watson Rd	The Packway E	69	3	2	0.6	6	4	0.9	1	0	1.4	3	2	0.6	1	0	1.4	2	0	2.0
	Watson Rd	The Packway W	67	0	0	0.0	0	2	2.0	0	0	0.0	0	0	0.0	1	2	0.8	3	4	0.5
	The Packway E	The Packway W	67	132	184	4.1	132	177	3.6	141	168	2.2	155	185	2.3	175	192	1.3	150	188	2.9
	The Packway W	The Packway E	69	162	181	1.5	160	164	0.3	186	179	0.5	165	184	1.4	163	182	1.4	195	206	0.8
The Packway / Wilson Rd	The Packway E	Wilson Rd	2031	16	11	1.4	7	5	0.8	6	4	0.9	16	10	1.7	4	3	0.5	9	7	0.7
	The Packway E	The Packway W	68	124	172	3.9	136	170	2.7	140	162	1.8	155	181	2.0	175	188	1.0	144	178	2.7
	Wilson Rd	The Packway E	70	5	4	0.5	3	3	0.0	4	3	0.5	3	0	2.4	2	0	2.0	6	4	0.9
	Wilson Rd	The Packway W	68	12	12	0.0	6	7	0.4	3	6	1.4	4	4	0.0	2	4	1.2	9	10	0.3
	The Packway W	The Packway E	70	161	171	0.8	158	155	0.2	178	168	0.8	169	174	0.4	163	177	1.1	189	199	0.7
	The Packway W	Wilson Rd	2031	11	13	0.6	11	13	0.6	11	11	0.0	8	12	1.3	4	6	0.9	6	8	0.8
The Packway / Unamed Rd	Unamed Rd	The Packway E	2060	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
	Unamed Rd	The Packway W	69	0	0	0.0	0	0	0.

P'way Closed Network Node Result Table			12:00				13:00				14:00				15:00				16:00				17:00			
			Diff Flow	% Diff	Diff Requirement	Criteria	Diff Flow	% Diff	Diff Requirement	Criteria	Diff Flow	% Diff	Diff Requirement	Criteria	Diff Flow	% Diff	Diff Requirement	Criteria	Diff Flow	% Diff	Diff Requirement	Criteria	Diff Flow	% Diff	Diff Requirement	Criteria
Junction	From	To	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All	All
The Packway / Bingham Rd / Ross Rd	Ross Rd	The Packway E	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes
	Ross Rd	Bingham Rd	-1.0	100.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes
	Ross Rd	The Packway W	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes
	The Packway E	Ross Rd	-1.0	100.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes
	The Packway E	Bingham Rd	-1.0	11.1%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	-1.0	100.0%	Flow within 100vph	Yes	-1.0	50.0%	Flow within 100vph	Yes	-1.0	100.0%	Flow within 100vph	Yes	-2.0	100.0%	Flow within 100vph	Yes
	The Packway E	The Packway W	-7.0	1.5%	Flow within 100vph	Yes	14.0	3.6%	Flow within 100vph	Yes	-10.0	2.1%	Flow within 100vph	Yes	-28.0	5.0%	Flow within 100vph	Yes	8.0	1.3%	Flow within 100vph	Yes	5.0	1.0%	Flow within 100vph	Yes
	Bingham Rd	Ross Rd	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes
	Bingham Rd	The Packway E	-2.0	100.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	-2.0	100.0%	Flow within 100vph	Yes
	Bingham Rd	The Packway W	0.0	0.0%	Flow within 100vph	Yes	1.0	33.3%	Flow within 100vph	Yes	3.0	25.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	1.0	9.1%	Flow within 100vph	Yes
	The Packway W	Ross Rd	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes
	The Packway W	The Packway E	-9.0	4.4%	Flow within 100vph	Yes	9.0	4.7%	Flow within 100vph	Yes	-21.0	8.6%	Flow within 100vph	Yes	-7.0	3.0%	Flow within 100vph	Yes	-5.0	2.1%	Flow within 100vph	Yes	11.0	4.1%	Flow within 100vph	Yes
	The Packway W	Bingham Rd	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	2.0	40.0%	Flow within 100vph	Yes	1.0	33.3%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes
The Packway / Shops Exit	Shops	The Packway E	-8.0	32.0%	Flow within 100vph	Yes	-3.0	21.4%	Flow within 100vph	Yes	-3.0	23.1%	Flow within 100vph	Yes	-3.0	33.3%	Flow within 100vph	Yes	-1.0	16.7%	Flow within 100vph	Yes	-4.0	33.3%	Flow within 100vph	Yes
	Shops	The Packway W	7.0	20.0%	Flow within 100vph	Yes	7.0	31.8%	Flow within 100vph	Yes	3.0	12.0%	Flow within 100vph	Yes	1.0	3.8%	Flow within 100vph	Yes	3.0	13.0%	Flow within 100vph	Yes	3.0	8.8%	Flow within 100vph	Yes
	The Packway E	The Packway W	8.0	5.6%	Flow within 100vph	Yes	1.0	0.8%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	2.0	1.4%	Flow within 100vph	Yes	5.0	3.8%	Flow within 100vph	Yes	10.0	8.1%	Flow within 100vph	Yes
	The Packway W	The Packway E	-12.0	9.2%	Flow within 100vph	Yes	-24.0	17.4%	Flow within 100vph	Yes	-33.0	20.9%	Flow within 100vph	Yes	-8.0	5.6%	Flow within 100vph	Yes	3.0	2.5%	Flow within 100vph	Yes	-9.0	5.7%	Flow within 100vph	Yes
The Packway / Glover Rd	Glover Rd	The Packway E	-12.0	34.3%	Flow within 100vph	Yes	-10.0	35.7%	Flow within 100vph	Yes	-9.0	47.4%	Flow within 100vph	Yes	-12.0	46.2%	Flow within 100vph	Yes	-8.0	44.4%	Flow within 100vph	Yes	-7.0	43.8%	Flow within 100vph	Yes
	Glover Rd	The Packway W	11.0	24.4%	Flow within 100vph	Yes	10.0	37.0%	Flow within 100vph	Yes	8.0	32.0%	Flow within 100vph	Yes	10.0	29.4%	Flow within 100vph	Yes	5.0	25.0%	Flow within 100vph	Yes	6.0	28.6%	Flow within 100vph	Yes
	The Packway E	Glover Rd	-3.0	75.0%	Flow within 100vph	Yes	-5.0	55.6%	Flow within 100vph	Yes	-6.0	54.5%	Flow within 100vph	Yes	-10.0	71.4%	Flow within 100vph	Yes	-3.0	60.0%	Flow within 100vph	Yes	-3.0	50.0%	Flow within 100vph	Yes
	The Packway E	The Packway W	-2.0	2.0%	Flow within 100vph	Yes	-3.0	3.3%	Flow within 100vph	Yes	-10.0	9.3%	Flow within 100vph	Yes	-8.0	7.3%	Flow within 100vph	Yes	-4.0	3.5%	Flow within 100vph	Yes	1.0	1.0%	Flow within 100vph	Yes
	The Packway W	Glover Rd	1.0	5.3%	Flow within 100vph	Yes	2.0	12.5%	Flow within 100vph	Yes	6.0	54.5%	Flow within 100vph	Yes	7.0	100.0%	Flow within 100vph	Yes	7.0	77.8%	Flow within 100vph	Yes	4.0	28.6%	Flow within 100vph	Yes
	The Packway W	The Packway E	-20.0	14.8%	Flow within 100vph	Yes	-30.0	22.4%	Flow within 100vph	Yes	-36.0	23.5%	Flow within 100vph	Yes	-25.0	16.4%	Flow within 100vph	Yes	-5.0	4.2%	Flow within 100vph	Yes	-18.0	11.5%	Flow within 100vph	Yes
The Packway / Northern Terrace	Northern Terrace	The Packway E	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes
	Northern Terrace	The Packway W	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes
	The Packway E	Northern Terrace	-8.0	66.7%	Flow within 100vph	Yes	-13.0	61.9%	Flow within 100vph	Yes	-4.0	50.0%	Flow within 100vph	Yes	-7.0	63.6%	Flow within 100vph	Yes	-7.0	63.6%	Flow within 100vph	Yes	-10.0	71.4%	Flow within 100vph	Yes
	The Packway E	The Packway W	-3.0	2.9%	Flow within 100vph	Yes	-14.0	13.3%	Flow within 100vph	Yes	-16.0	13.6%	Flow within 100vph	Yes	-14.0	11.5%	Flow within 100vph	Yes	-8.0	6.7%	Flow within 100vph	Yes	-2.0	1.8%	Flow within 100vph	Yes
	The Packway W	Northern Terrace	6.0	54.5%	Flow within 100vph	Yes	13.0	162.5%	Flow within 100vph	Yes	6.0	85.7%	Flow within 100vph	Yes	6.0	66.7%	Flow within 100vph	Yes	7.0	100.0%	Flow within 100vph	Yes	9.0	112.5%	Flow within 100vph	Yes
	The Packway W	The Packway E	-41.0	25.5%	Flow within 100vph	Yes	-54.0	34.6%	Flow within 100vph	Yes	-49.0	29.7%	Flow within 100vph	Yes	-44.0	25.7%	Flow within 100vph	Yes	-18.0	14.1%	Flow within 100vph	Yes	-32.0	19.4%	Flow within 100vph	Yes
The Packway / Bidulph Rd	Bidulph Rd	The Packway E	-5.0	38.5%	Flow within 100vph	Yes	-7.0	46.7%	Flow within 100vph	Yes	-5.0	50.0%	Flow within 100vph	Yes	-7.0	43.8%	Flow within 100vph	Yes	-2.0	25.0%	Flow within 100vph	Yes	-7.0	58.3%	Flow within 100vph	Yes
	Bidulph Rd	The Packway W	4.0	44.4%	Flow within 100vph	Yes	5.0	41.7%	Flow within 100vph	Yes	4.0	44.4%	Flow within 100vph	Yes	7.0	87.5%	Flow within 100vph	Yes	3.0	60.0%	Flow within 100vph	Yes	5.0	45.5%	Flow within 100vph	Yes
	The Packway E	The Packway W	2.0	2.3%	Flow within 100vph	Yes	-17.0	17.0%	Flow within 100vph	Yes	-8.0	7.9%	Flow within 100vph	Yes	-4.0	3.9%	Flow within 100vph	Yes	3.0	2.9%	Flow within 100vph	Yes	-7.0	6.7%	Flow within 100vph	Yes
	The Packway W	The Packway E	-21.0	14.9%	Flow within 100vph	Yes	-37.0	26.6%	Flow within 100vph	Yes	-27.0	19.0%	Flow within 100vph	Yes	-17.0	11.9%	Flow within 100vph	Yes	1.0	0.9%	Flow within 100vph	Yes	-18.0	11.9%	Flow within 100vph	Yes
The Packway / Wood Rd	The Packway E	Wood Rd	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes
	The Packway E	The Packway W	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes
	Wood Rd	The Packway E	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes
	Wood Rd	The Packway W	9.0	11.1%	Flow within 100vph	Yes	-9.0	9.8%	Flow within 100vph	Yes	1.0	1.1%	Flow within 100vph	Yes	-3.0	2.9%	Flow within 100vph	Yes	1.0	0.9%	Flow within 100vph	Yes	-2.0	2.0%	Flow within 100vph	Yes
	The Packway W	The Packway E	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes
	The Packway W	Wood Rd	-18.0	12.4%	Flow within 100vph	Yes	-38.0	25.3%	Flow within 100vph	Yes	-26.0	17.7%	Flow within 100vph	Yes	-25.0	15.7%	Flow within 100vph	Yes	-4.0	3.4%	Flow within 100vph	Yes	-22.0	13.8%	Flow within 100vph	Yes
The Packway / A345 / Countess Rd / Larkhill Rd Roundabout	A345	Larkhill Rd	2.0	5.1%	Flow within 100vph	Yes	1.0	2.9%	Flow within 100vph	Yes	1.0	3.7%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	4.0	5.3%	Flow within 100vph	Yes	-1.0	2.3%	Flow within 100vph	Yes
	A345	Countess Rd	2.0	0.8%	Flow within 100vph	Yes	-4.0	1.7%	Flow within 100vph	Yes	1.0	0.4%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	-7.0	2.4%	Flow within 100vph	Yes	3.0	1.1%	Flow within 100vph	Yes
	A345	The Packway	-3.0	100.0%	Flow within 100vph	Yes	-9.0	100.0%	Flow within 100vph	Yes	-8.0	100.0%	Flow within 100vph	Yes	-1.0	100.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes
	Larkhill Rd	A345	3.0	2.8%	Flow within 100vph	Yes	-2.0	2.0%	Flow within 100vph	Yes	5.0	4.2%	Flow within 100vph	Yes	3.0	3.8%	Flow within 100vph	Yes	1.0	1.1%	Flow within 100vph	Yes	3.0	4.3%	Flow within 100vph	Yes
	Larkhill Rd	Countess Rd	-7.0	2.0%	Flow within 100vph	Yes	-14.0	4.0%	Flow within 100vph	Yes	-9.0	2.9%	Flow within 100vph	Yes	11.0	4.3%	Flow within 100vph	Yes	-5.0	2.6%	Flow within 100vph	Yes	5.0	2.9%	Flow within 100vph	Yes
	Larkhill Rd	The Packway	-3.0	100.0%	Flow within 100vph	Yes	-1.0	100.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	-1.0	100.0%	Flow within 100vph	Yes	-1.0	100.0%	Flow within 100vph	Yes
	Countess Rd	A345	1.0	0.3%	Flow within 100vph	Yes	7.0	2.8%	Flow within 100vph	Yes	-7.0	2.4%	Flow within 100vph	Yes	-10.0	2.6%	Flow within 100vph	Yes	-2.0	0.5%	Flow within 100vph	Yes	3.0	0.9%	Flow within 100vph	Yes
	Countess Rd	Larkhill Rd	-2.0	0.9%	Flow within 100vph	Yes	4.0	2.1%	Flow within 100vph	Yes	-15.0	6.9%	Flow within 100vph	Yes	-18.0	7.3%	Flow within 100vph	Yes	-2.0	0.9%	Flow within 100vph	Yes	-14.0	5.2%	Flow within 100vph	Yes
	Countess Rd	Countess Rd	-9.0	17.0%	Flow within 100vph	Yes	-15.0	24.2%	Flow within 100vph	Yes	-6.0	9.4%	Flow within 100vph	Yes	-24.0	27.9%	Flow within 100vph	Yes	-27.0	25.2%	Flow within 100vph	Yes	-32.0	30.8%	Flow within 100vph	Yes
	Countess Rd	The Packway	-2.0	100.0%	Flow within 100vph	Yes	-1.0	100.0%	Flow within 100vph	Yes	-2.0	100.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	-2.0	100.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes
	The Packway	A345	-2.0	100.0%	Flow within 100vph	Yes	-8.0	100.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	-1.0	100.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes
	The Packway	Larkhill Rd	-3.0	100.0%	Flow within 100vph	Yes	-3.0	100.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	-1.0	100.0%	Flow within 100vph	Yes	-1.0	100.0%	Flow within 100vph	Yes
	The Packway	Countess Rd	-5.0	100.0%	Flow within 100vph	Yes	-6.0	100.0%	Flow within 100vph	Yes	-3.0	100.0%	Flow within 100vph	Yes	-12.0	100.0%	Flow within 100vph	Yes	-5.0	100.0%	Flow within 100vph	Yes	-5.0	100.0%	Flow within 100vph	Yes
Stongehenge Rd / Larkhill Rd	Stonehenge Rd	Larkhill Rd E	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	-2.0	25.0%	Flow within 100vph	Yes	-1.0	6.7%	Flow within 100vph	Yes	3.0	14.3%	Flow within 100vph	Yes	-1.0	7.7%	Flow within 100vph	Yes
	Stonehenge Rd	Larkhill Rd W	-1.0	1.6%	Flow within 100vph	Yes	1.0	1.4%	Flow within 100vph	Yes	1.0	1.4%	Flow within 100vph	Yes	-2.0	3.4%	Flow within 100vph	Yes	-1.0	2.1%	Flow within 100vph	Yes	2.0	2.9%	Flow within 100vph	Yes
	Larkhill Rd E	Stonehenge Rd	0.0	0.0%	Flow within 100vph	Yes	-1.0	6.3%	Flow within 100vph	Yes	-1.0	6.7%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes
	Larkhill Rd E	Larkhill Rd W	-2.0	0.5%	Flow within 100vph	Yes	-30.0	7.6%	Flow within 100vph	Yes	-5.0	1.4%	Flow within 100vph	Yes	10.0	3.6%	Flow within 100vph	Yes	-3.0	1.3%	Flow within 100vph	Yes	4.0	2.3%	Flow within 100vph	Yes
	Larkhill Rd W	Stonehenge Rd	0.0	0.0%	Flow within 100vph	Yes	1.0	1.2%	Flow within 100vph	Yes	-1.0	1.2%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	3.0	3.1%	Flow within 100vph	Yes	-2.0	2.2%	Flow within 100vph	Yes
	Larkhill Rd W	Larkhill Rd E	-6.0	3.1%	Flow within 100vph	Yes	-4.0	2.6%	Flow within 100vph	Yes	-17.0	10.6%	Flow within 100vph	Yes	-23.0	11.3%	Flow within 100vph	Yes	-7.0	3.3%	Flow within 100vph	Yes	-10.0	4.6%	Flow within 100vph	Yes
Larkhill Rd / Philip Rd	Philip Rd	Larkhill Rd E	1.0	5.6%	Flow within 100vph	Yes	2.0	15.4%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	2.0	18.2%	Flow within 100vph	Yes	1.0	10.0%	Flow within 100vph	Yes	-1.0	10.0%	Flow within 100vph	Yes
	Philip Rd	Larkhill Rd W	0.0	0.0%	Flow within 100vph	Yes	-2.0	40.0%	Flow within 100vph	Yes	-4.0	100.0%	Flow within 100vph	Yes	-1.0	20.0%	Flow within 100vph	Yes	-4.0	100.0%	Flow within 100vph	Yes	-2.0	100.0%	Flow within 100vph	Yes
	Larkhill Rd E	Philip Rd	-1.0	7.1%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	1.0	6.3%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	3.0	15.8%	Flow within 100vph	Yes
	Larkhill Rd E	Larkhill Rd W	-10.0	2.3%	Flow within 100vph	Yes	-16.0	3.9%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	9.0	3.0%	Flow within 100vph	Yes	4.0	1.6%	Flow within 100vph	Yes	-7.0	3.0%	Flow within 100vph	Yes
	Larkhill Rd W	Philip Rd	0.0	0.0%	Flow within 100vph	Yes	-3.0	33.3%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	-1.0	50.0%	Flow within 100vph	Yes	1.0	14.3%	Flow within 100vph	Yes	-3.0	37.5%	Flow within 100vph	Yes
	Larkhill Rd W	Larkhill Rd E	2.0	1.0%	Flow within 100vph	Yes	-17.0	9.5%	Flow within 100vph	Yes	-9.0	5.6%	Flow within 100vph	Yes	-24.0	10.9%	Flow within 100vph	Yes	4.0	1.8%	Flow within 100vph	Yes	-15.0	6.7%	Flow within 100vph	Yes
The Packway / Willoughby Rd / Watson Rd	Watson Rd	The Packway E	3.0	13.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	2.0	14.3%	Flow within 100vph	Yes	-4.0	19.0%	Flow within 100vph	Yes	6.0	54.5%	Flow within 100vph	Yes	-3.0	100.0%	Flow within 100vph	Yes
	Watson Rd	Willoughby Rd	-4.0	18.2%	Flow within 100vph	Yes	-1.0	7.1%	Flow within 100vph	Yes	-3.0	18.8%	Flow within 100vph	Yes	2.0	18.2%	Flow within 100vph	Yes	-7.0	35.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes
	Watson Rd	The Packway W	-3.0	13.0%	Flow within 100vph	Yes	1.0	4.8%	Flow within 100vph	Yes	2.0	5.4%	Flow within 100vph	Yes	3.0	7.0%	Flow within 100vph	Yes	1.0	1.8%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes
	The Packway E	Watson Rd	-2.0	14.3%	Flow within 100vph	Yes	-3.0	17.6%	Flow within 100vph	Yes	-4.0	33.3%	Flow within 100vph	Yes	-3.0	42.9%	Flow within 100vph	Yes	-2.0	66.7%	Flow within 100vph	Yes	-2.0	40.0%	Flow within 100vph	Yes
	The Packway E	Willoughby Rd	25.0	178.6%	Flow within 100vph	Yes	26.0	288.9%	Flow within 100vph	Yes	13.0	118.2%	Flow within 100vph	Yes	15.0	93.8%	Flow within 100vph	Yes	7.0	63.6%	Flow within 100vph	Yes	18.0	163.6%	Flow within 100vph	Yes
	The Packway E	The Packway W	29.0	27.6%	Flow within 100vph	Yes	15.0	13.2%	Flow within 100vph	Yes	14.0	11.5%	Flow within 100vph	Yes	10.0	7.0%	Flow within 100vph	Yes	12.0	7.4%	Flow within 100vph	Yes	24.0	17.5%	Flow within 100vph	Yes
	Willoughby Rd	Watson Rd	1.0	11.1%	Flow within 100vph	Yes	4.0	50.0%	Flow within 100vph	Yes	1.0	8.3%	Flow within 100vph	Yes	4.0	200.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	4.0	400.0%	Flow within 100vph	Yes
	Willoughby Rd	The Packway E	13.0	68.4%	Flow within 100vph	Yes	15.0	83.3%	Flow within 100vph	Yes	19.0	126.7%	Flow within 100vph	Yes	19.0	146.2%	Flow within 100vph	Yes	19.0	380.0%	Flow within 100vph	Yes	17.0	141.7%	Flow within 100vph	Yes
	Willoughby Rd	The Packway W	-31.0	9.3%	Flow within 100vph	Yes	-4.0	1.6%	Flow within 100vph	Yes	-32.0	9.8%	Flow within 100vph	Yes	-39.0	10.3%	Flow within 100vph	Yes	4.0	1.1%	Flow within 100vph	Yes	-22.0	5.8%	Flow within 100vph	Yes
	The Packway W	Watson Rd	2.0	40.0%	Flow within 100vph	Yes	1.0	11.1%	Flow within 100vph	Yes	2.0	33.3%	Flow within 100vph	Yes	1.0	14.3%	Flow within 100vph	Yes	1.0	100.0%	Flow within 100vph	Yes	1.0	100.0%	Flow within 100vph	Yes
	The Packway W	The Packway E	-1.0	0.8%	Flow within 100vph	Yes	-15.0	11.3%	Flow within 100vph	Yes	-25.0	15.9%	Flow within 100vph	Yes	-8.0	5.6%	Flow within 100vph	Yes	-7.0	4.7%	Flow within 100vph	Yes	-5.0	2.8%	Flow within 100vph	Yes
	The Packway W	Willoughby Rd	-6.0	8.1%	Flow within 100vph	Yes	21.0	40.4%	Flow within 100vph	Yes	1.0	1.2%	Flow within 100vph	Yes	6.0	7.1%	Flow within 100vph	Yes	-2.0	2.3%	Flow within 100vph	Yes	15.0	16.5%	Flow within 100vph	Yes
Bulford Hill / Larkhill Rd	Bulford Rd	Bulford Hill	3.0	1.8%	Flow within 100vph	Yes	4.0	3.1%	Flow within 100vph	Yes	2.0	1.4%	Flow within 100vph	Yes	2.0	1.6%	Flow within 100vph	Yes	2.0	1.3%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes
	Bulford Hill	Bulford Rd	3.0	1.7%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	3.0	1.8%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	3.0	1.1%	Flow within 100vph	Yes	3.0	1.2%	Flow within 100vph	Yes
	Bulford Rd	Larkhill Rd	0.0	0.0%	Flow within 100vph	Yes	-1.0	1.9%	Flow within 100vph	Yes	-1.0	1.9%	Flow within 100vph	Yes	1.0	2.2%	Flow within 100vph	Yes	1.0	2.3%	Flow within 100vph	Yes	1.0	1.9%	Flow within 100vph	Yes
	Bulford Hill	Larkhill Rd	-4.0	1.0%	Flow within 100vph	Yes	-1.0	0.3%	Flow within 100vph	Yes	1.0	0.3%	Flow within 100vph	Yes	11.0	4.1%	Flow within 100vph	Yes	3.0	1.3%	Flow within 100vph	Yes	-2.0	1.0%	Flow within 100vph	Yes
	Larkhill Rd	Bulford Rd	5.0	9.4%	Flow within 100vph	Yes	-2.0	3.9%	Flow within 100vph	Yes	5.0	9.1%	Flow within 100vph	Yes	-1.0	2.2%	Flow within 100vph	Yes	1.0	1.9%	Flow within 100vph	Yes	-2.0	2.9%	Flow within 100vph	Yes
	Larkhill Rd	Bulford Hill	8.0	5.2%	Flow within 100vph	Yes	-15.0	10.3%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	-10.0	5.7%	Flow within 100vph	Yes	9.0	5.1%	Flow within 100vph	Yes	-1.0	0.7%	Flow within 100vph	Yes
High Street / Church Lane	Church Ln	High St E	1.0	50.0%	Flow within 100vph	Yes	-1.0	100.0%	Flow within 100vph	Yes	-1.0	33.3%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes
	Church Ln	High St W	2.0	100.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	-1.0	100.0%	Flow within 100vph	Yes	-1.0	33.3%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes
	High St E	Church Ln	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	1.0	33.3%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	-1.0	100.0%	Flow within 100vph	Yes
	High St E	High St W	-2.0	0.3%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	-7.0	1.3%	Flow within 100vph	Yes	21.0	4.6%	Flow within 100vph	Yes	-1.0	0.2%	Flow within 100vph	Yes	-5.0	1.1%	Flow within 100vph	Yes
	High St W	Church Ln	-2.0	100.0%	Flow within 100vph	Yes	-1.0	100.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes
	High St W	High St E	13.0	4.0%	Flow within 100vph	Yes	-14.0	5.1%	Flow within 100vph	Yes	-1.0	0.4%	Flow within 100vph	Yes	-8.0	2.7%	Flow within 100vph	Yes	14.0	4.3%	Flow within 100vph	Yes	1.0	0.3%	Flow within 100vph	Yes
High Street / Camilla Close	High Street W	Camilla Close	0.0	0.0%	Flow within 100vph	Yes	-2.0	100.0%	Flow within 100vph	Yes	-1.0	16.7%	Flow within 100vph	Yes	-1.0	100.0%	Flow within 100vph	Yes	1.0	25.0%	Flow within 100vph	Yes	-1.0	25.0%	Flow within 100vph	Yes
	High Street W	High Street E	12.0	3.7%	Flow within 100vph	Yes	-15.0	5.5%	Flow within 100vph	Yes	1.0	0.4%	Flow within 100vph	Yes	-9.0	3.0%	Flow within 100vph	Yes	11.0	3.4%	Flow within 100vph	Yes	2.0	0.7%	Flow within 100vph	Yes
	Camilla Close	High Street W	-1.0	100.0%	Flow within 100vph	Yes	-1.0	100.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	-1.0	33.3%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	-2.0	100.0%	Flow within 100vph	Yes
	Camilla Close	High Street E	2.0	100.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	1.0	20.0%	Flow within 100vph	Yes	2.0	14.3%	Flow within 100vph	Yes	-1.0	11.1%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes
	High Street E	High Street W	-4.0	0.7%	Flow within 100vph	Yes	3.0	0.6%	Flow within 100vph	Yes	-3.0	0.6%	Flow within 100vph	Yes	21.0	4.6%	Flow within 100vph	Yes	-2.0	0.4%	Flow within 100vph	Yes	-4.0	0.9%	Flow within 100vph	Yes
	High Street E	Camilla Close	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph	Yes	0.0	0.0%	Flow within 100vph

D.3 Neutral A303 mainline turn count AM calibration

A303 Mainline Network Node Result Table (AM)						07:30			07:30			
						Observed	Modelled	GEH	Diff Flow	% Diff Flow	Diff Requirement	Criteria Fulfilled?
Junction	Node	From	From Node	To	To Node	All	All	All	All	All	All	All
A303 / B3083 Berwick Rd	6	A303 E	7	B3083 S	1003	20	25	1.1	5	25%	Flow within 100vph	Yes
	6	A303 E	7	A303 W	1001	638	675	1.4	37	6%	Flow within 100vph	Yes
	6	A303 W	1001	A303 E	7	936	987	1.6	51	5%	Flow within 15%	Yes
	6	A303 W	1001	B3083 S	1003	3	4	0.5	1	33%	Flow within 100vph	Yes
	6	B3083 S	1003	A303 E	7	29	24	1.0	-5	17%	Flow within 100vph	Yes
	6	B3083 S	1003	A303 W	1001	1	2	0.8	1	100%	Flow within 100vph	Yes
A303 / B3083	7	A303 W	6	B3083 N	1002	40	36	0.6	-4	10%	Flow within 100vph	Yes
	7	A303 W	6	A303 E	8	930	977	1.5	47	5%	Flow within 15%	Yes
	7	A303 E	8	A303 W	6	620	666	1.8	46	7%	Flow within 100vph	Yes
	7	A303 E	8	B3083 N	1002	11	9	0.6	-2	18%	Flow within 100vph	Yes
	7	B3083 N	1002	A303 E	8	13	16	0.8	3	23%	Flow within 100vph	Yes
	7	B3083 N	1002	A303 W	6	34	33	0.2	-1	3%	Flow within 100vph	Yes
A303 / Church Street	8	A303 W	7	A303 E	9	927	989	2.0	62	7%	Flow within 15%	Yes
	8	A303 W	7	Church Street	1004	4	5	0.5	1	25%	Flow within 100vph	Yes
	8	A303 E	9	A303 W	7	618	660	1.7	42	7%	Flow within 100vph	Yes
	8	A303 E	9	Church Street	1004	2	3	0.6	1	50%	Flow within 100vph	Yes
	8	Church Street	1004	A303 W	7	11	11	0.0	0	0%	Flow within 100vph	Yes
	8	Church Street	1004	A303 E	9	18	13	1.3	-5	28%	Flow within 100vph	Yes
A303 / Eden Livestock Rd	9	A303 W	8	A303 E	101	953	1006	1.7	53	6%	Flow within 15%	Yes
	9	A303 E	101	A303 W	8	615	668	2.1	53	9%	Flow within 100vph	Yes
	9	A303 E	101	Eden Livestock Rd	1005	7	1	3.0	-6	86%	Flow within 100vph	Yes
	9	Eden Livestock Rd	1005	A303 W	8	0	0	0.0	0	0%	Flow within 100vph	Yes
	9	Eden Livestock Rd	1005	A303 E	101	2	1	0.8	-1	50%	Flow within 100vph	Yes
A3028 / Amesbury Rd N	18	Amesbury Rd	94	A3028 S	92	1	0	1.4	-1	100%	Flow within 100vph	Yes
	18	Amesbury Rd	94	A3028 N	1016	6	5	0.4	-1	17%	Flow within 100vph	Yes
	18	Amesbury Rd	94	Amesbury Rd N	1017	440	392	2.4	-48	11%	Flow within 100vph	Yes
	18	A3028 N	1016	A3028 S	92	128	115	1.2	-13	10%	Flow within 100vph	Yes
	18	A3028 N	1016	Amesbury Rd	94	0	2	2.0	2	100%	Flow within 100vph	Yes
	18	A3028 N	1016	Amesbury Rd N	1017	65	62	0.4	-3	5%	Flow within 100vph	Yes
	18	Amesbury Rd N	1017	A3028 S	92	81	82	0.1	1	1%	Flow within 100vph	Yes
	18	Amesbury Rd N	1017	Amesbury Rd	94	8	10	0.7	2	25%	Flow within 100vph	Yes
	18	Amesbury Rd N	1017	A3028 N	1016	139	127	1.0	-12	9%	Flow within 100vph	Yes
A303 / Allington Track	93	A303 E	92	A303 W	94	1190	1228	1.1	38	3%	Flow within 15%	Yes
	93	A303 E	92	Allington Track	1024	1	0	1.4	-1	100%	Flow within 100vph	Yes
	93	A303 W	94	A303 E	92	1679	1693	0.3	14	1%	Flow within 15%	Yes
	93	A303 W	94	Allington Track	1024	0	0	0.0	0	0%	Flow within 100vph	Yes
	93	Allington Track	1024	A303 E	92	0	0	0.0	0	0%	Flow within 100vph	Yes
	93	Allington Track	1024	A303 W	94	23	23	0.0	0	0%	Flow within 100vph	Yes
A303 / Amesbury Rd N	94	Amesbury Rd N	18	A303 E	93	7	12	1.6	5	71%	Flow within 100vph	Yes
	94	A303 E	93	A303 W	95	1226	1251	0.7	25	2%	Flow within 15%	Yes
	94	A303 W	115	Amesbury Rd N	18	449	396	2.6	-53	12%	Flow within 100vph	Yes
	94	A303 W	115	A303 E	93	1691	1682	0.2	-9	1%	Flow within 15%	Yes
A303 / Solstice Park Slip Rds S	95	A303 E	94	Solstice Park Slip Rds	96	447	403	2.1	-44	10%	Flow within 100vph	Yes
	95	A303 E	94	A303 W	117	766	848	2.9	82	11%	Flow within 15%	Yes
	95	Solstice Park Slip Rds	96	A303 W	117	170	162	0.6	-8	5%	Flow within 100vph	Yes
Solstice Park Ave / Solstice Park Slip Rds	96	Solstice Park Off Slip	95	Solstice Park Ave	2042	437	395	2.1	-42	10%	Flow within 100vph	Yes
	96	Solstice Park Off Slip	95	Equinox Drive	1026	10	8	0.7	-2	20%	Flow within 100vph	Yes
	96	Solstice Park Ave	2042	Solstice Park Off Slip	95	167	157	0.8	-10	6%	Flow within 100vph	Yes
	96	Solstice Park Ave	2042	Equinox Drive	1026	31	41	1.7	10	32%	Flow within 100vph	Yes
	96	Equinox Drive	1026	Solstice Park Off Slip	95	3	3	0.0	0	0%	Flow within 100vph	Yes
	96	Equinox Drive	1026	Solstice Park Ave	2042	19	27	1.7	8	42%	Flow within 100vph	Yes
Solstice Park Ave / Porton Rd	97	Solstice Park Ave	2042	Porton Rd N	98	198	116	6.5	-82	41%	Flow within 100vph	Yes
	97	Solstice Park Ave	2042	Porton Rd S	1027	250	267	1.1	17	7%	Flow within 100vph	Yes
	97	Solstice Park Ave	2042	London Rd	1028	92	97	0.5	5	5%	Flow within 100vph	Yes
	97	Porton Rd N	98	Solstice Park Ave	2042	153	133	1.7	-20	13%	Flow within 100vph	Yes
	97	Porton Rd N	98	Porton Rd S	1027	493	436	2.6	-57	12%	Flow within 100vph	Yes
	97	Porton Rd N	98	London Rd	1028	189	155	2.6	-34	18%	Flow within 100vph	Yes
	97	Porton Rd S	1027	Solstice Park Ave	2042	107	109	0.2	2	2%	Flow within 100vph	Yes
	97	Porton Rd S	1027	Porton Rd N	98	605	547	2.4	-58	10%	Flow within 100vph	Yes
	97	Porton Rd S	1027	London Rd	1028	120	116	0.4	-4	3%	Flow within 100vph	Yes
	97	London Rd	1028	Solstice Park Ave	2042	29	46	2.8	17	59%	Flow within 100vph	Yes
	97	London Rd	1028	Porton Rd N	98	176	187	0.8	11	6%	Flow within 100vph	Yes
	97	London Rd	1028	Porton Rd S	1027	69	68	0.1	-1	1%	Flow within 100vph	Yes
Porton Rd / Salisbury Rd	98	Porton Rd	97	Slip Rd	115	694	589	4.1	-105	15%	Flow within 100vph	No
	98	Porton Rd	97	Salisbury Rd	1014	263	259	0.2	-4	2%	Flow within 100vph	Yes
	98	Slip Rd	115	Porton Rd	97	205	175	2.2	-30	15%	Flow within 100vph	Yes
	98	Slip Rd	115	Salisbury Rd	1014	17	20	0.7	3	18%	Flow within 100vph	Yes
	98	Salisbury Rd	1014	Porton Rd	97	621	554	2.8	-67	11%	Flow within 100vph	Yes
	98	Salisbury Rd	1014	Slip Rd	115	94	82	1.3	-12	13%	Flow within 100vph	Yes
A303 / Countess Rd Countess Roundabout	99	A303 W	100	A303 E	117	1221	1229	0.2	8	1%	Flow within 15%	Yes
	99	A303 W	100	Countess Rd N	118	70	75	0.6	5	7%	Flow within 100vph	Yes
	99	A303 W	100	Countess Rd S	1013	160	142	1.5	-18	11%	Flow within 100vph	Yes
	99	A303 E	117	A303 W	100	686	742	2.1	56	8%	Flow within 100vph	Yes
	99	A303 E	117	Countess Rd N	118	215	202	0.9	-13	6%	Flow within 100vph	Yes
	99	A303 E	117	Countess Rd S	1013	64	65	0.1	1	2%	Flow within 100vph	Yes
	99	Countess Rd N	118	A303 W	100	166	142	1.9	-24	14%	Flow within 100vph	Yes
	99	Countess Rd N	118	A303 E	117	266	273	0.4	7	3%	Flow within 100vph	Yes
	99	Countess Rd N	118	Countess Rd S	1013	381	412	1.6	31	8%	Flow within 100vph	Yes
	99	Countess Rd S	1013	A303 W	100	85	82	0.3	-3	4%	Flow within 100vph	Yes
	99	Countess Rd S	1013	A303 E	117	155	159	0.3	4	3%	Flow within 100vph	Yes
	99	Countess Rd S	1013	Countess Rd N	118	301	305	0.2	4	1%	Flow within 100vph	Yes
A303 / Stonehenge Rd	100	A303 E	99	A303 W	101	936	964	0.9	28	3%	Flow within 15%	Yes
	100	A303 W	101	A303 E	99	1459	1451	0.2	-8	1%	Flow within 15%	Yes
	100	Stonhenge Rd	1012	A303 W	101	89	75	1.5	-14	16%	Flow within 100vph	Yes
A303 / A360 Longbarrow Roundabout	101	A303 W	9	A303 E	100	858	862	0.1	4	0%	Flow within 15%	Yes
	101	A303 W	9	A360 S	1010	57	50	1.0	-7	12%	Flow within 100vph	Yes
	101	A303 W	9	A360 N	1011	37	38	0.2	1	3%	Flow within 100vph	Yes
	101	A303 E	100	A303 W	9	585	626	1.7	41	7%	Flow within 100vph	Yes
	101	A303 E	100	A360 S	1010	272	244	1.7	-28	10%	Flow within 100vph	Yes
	101	A303 E	100	A360 N	1011	159	158	0.1	-1	1%	Flow within 100vph	Yes
	101	A360 S	1010	A303 W	9	23	23	0.0	0	0%	Flow within 100vph	Yes
	101	A360 S	1010	A303 E	100	196	215	1.3	19	10%	Flow within 100vph	Yes
	101	A360 S	1010	A360 N	1011	276	267	0.5	-9	3%	Flow within 100vph	Yes
	101	A360 N	1011	A303 W	9	32	23	1.7	-9	28%	Flow within 100vph	Yes
	101	A360 N	1011	A303 E	100	360	382	1.1	22	6%	Flow within 100vph	Yes
	101	A360 N	1011	A360 S	1010	394	351	2.2	-43	11%	Flow within 100vph	Yes
A303 / Amesbury Rd S	106	A303 W	92	A303 E	111	1833	1841	0.2	8	0%	Flow within 15%	Yes
	106	A303 W	92	Amesbury Rd S	1025	58	49	1.2	-9	16%	Flow within 100vph	Yes
	106	A303 E	112	A303 W	92	1173	1212	1.1	39	3%	Flow within 15%	Yes
	106	A303 E	112	Amesbury Rd S	1025	0	0	0.0	0	0%	Flow within 100vph	Yes
	106	Amesbury Rd S	1025	A303 W	92	23	18	1.1	-5	22%	Flow within 100vph	Yes
	106	Amesbury Rd S	1025	A303 E	111	0	0	0.0	0	0%	Flow within 100vph	Yes
A338 / B338	108	A338 N	109	Slip Rd S	112	212	208	0.3	-4	2%	Flow within 100vph	Yes
	108	A338 N	109	B3084	1021	203	226	1.6	23	11%	Flow within 100vph	Yes
	108	A338 N	109	A338 S	1022	218	221	0.2	3	1%	Flow within 100vph	Yes
	108	Slip Rd S	112	A338 N	109	127	134	0.6	7	6%	Flow within 100vph	Yes
	108	Slip Rd S	112	B3084	1021	2	3	0.6	1	50%	Flow within 100vph	Yes
	108	Slip Rd S	112	A338 S	1022	59	59	0.0	0	0%	Flow within 100vph	Yes
	108	B3084	1021	A338 N	109	114	114	0.0	0	0%	Flow within 100vph	Yes
	108	B3084	1021	Slip Rd S	112	69	72	0.4	3	4%	Flow within 100vph	Yes
	108	B3084	1021	A338 S	1022	17	14	0.8	-3	18%	Flow within 100vph	Yes
	108	A338 S	1022	A338 N	109	248	240	0.5	-8	3%	Flow within 100vph	Yes
	108	A338 S	1022	Slip Rd S	112	7	5	0.8	-2	29%	Flow within 100vph	Yes
	108	A338 S	1022	B3084	1021	49	47	0.3	-2	4%	Flow within 100vph	Yes
A338 / A303 Slip Rd	109	A338 S	108	Slip Rd N	111	76	69	0.8	-7	9%	Flow within 100vph	Yes
	109	A338 S	108	A338 N	1019	422	420	0.1	-2	0%	Flow within 100vph	Yes
	109	Slip Rd N	111	A338 S	108	142	141	0.1	-1	1%	Flow within 100vph	Yes
	109	Slip Rd N	111	A338 N	1019	171	174	0.2	3	2%	Flow within 100vph	Yes
	109	A338 N	1019	A338 S	108	498	513	0.7	15	3%	Flow within 100vph	Yes
	109	A338 N	1019	Slip Rd N	111	187	190	0.2	3	2%	Flow within 100vph	Yes
A303 / A338 Slip Rd N	111	A303 W	106	Slip Rd N	109	313	315	0.1	2	1%	Flow within 100vph	Yes
	111	A303 W	106	A303 E	1020	1520	1522	0.1	2	0%	Flow within 15%	Yes
	111	Slip Rd N	109	A303 E	1020	263	261	0.1	-2	1%	Flow within 100vph	Yes
A303 / A338 Slip Rd S	112	Slip Rd S	108	A303 W	106	288	284	0.2	-4	1%	Flow within 100vph	Yes
	112	A303 E	1020	A303 W	106	885	931	1.5	46	5%	Flow within 15%	Yes
	112	A303 E	1020	Slip Rd S	108	188	197	0.6	9	5%	Flow within 100vph	Yes
A303 / Solstice Park Slip Rds N	115	Slip Rd	98	A303 E	94	788	670	4.4	-118	15%	Flow within 15%	Yes
	115	A303 W	117	A303 E	94	1379	1412	0.9	33	2%	Flow within 15%	Yes
	115	A303 W	117	Slip Rd	98	222	196	1.8	-26	12%	Flow within 100vph	Yes
A303 / Countess Rbt / Services Entrance	117	Countess Rbt	99	A303 E	115	1601	1607	0.1	6	0%	Flow within 15%	Yes
	117	Countess Rbt	99	Services	1029	55	55	0.0	0	0%	Flow within 100vph	Yes
Countess Rbt / Services Exit	118	Countess Rbt	99	Countess Rd N	1015	582	581	0.0	-1	0%	Flow within 100vph	Yes
	118	Countess Rd N	1015	Countess Rbt	99	754	773	0.7	19	3%	Flow within 15%	Yes
	118	Services	1029	Countess Rbt	99	59	58	0.1	-1	2%	Flow within 100vph	Yes
Solstice Park Avenue / Mid Summer Place / Meridian Way	2042	Mid Summer Place	2046	Solstice Park Avenue (ENE)	96	96	99	0.3	3	3%	Flow within 100vph	Yes
	2042	Mid Summer Place	2046	Meridian Way	2045	10	9	0.3	-1	10%	Flow within 100vph	Yes
	2042	Mid Summer Place	2046	Solstice Park Avenue (W)	97	193	199	0.4	6	3%	Flow within 100vph	Yes
	2042	Solstice Park Avenue (ENE)	96	Mid Summer Place	2046	99	120	2.0	21	21%	Flow within 100vph	Yes
	2042	Solstice Park Avenue (ENE)	96	Meridian Way	2045	29	33	0.7	4	14%	Flow within 100vph	Yes
	2042	Solstice Park Avenue (ENE)	96	Solstice Park Avenue (W)	97	340	269	4.1	-71	21%	Flow within 100vph	Yes
	2042	Meridian Way	2045	Mid Summer Place	2046	4	7	1.3	3	75%	Flow within 100vph	Yes
	2042	Meridian Way	2045	Solstice Park Avenue (ENE)	96	2	6	2.0	4	200%	Flow within 100vph	Yes
	2042	Meridian Way	2045	Solstice Park Avenue (W)	97	17	13	1.0	-4	24%	Flow within 100vph	Yes
	2042	Solstice Park Avenue (W)	97	Mid Summer Place	2046	177	185	0.6	8	5%	Flow within 100vph	Yes
	2042	Solstice Park Avenue (W)	97	Solstice Park Avenue (ENE)	96	108	95	1.3	-13	12%	Flow within 100vph	Yes
	2042	Solstice Park Avenue (W)	97	Meridian Way	2045	9	7	0.7	-2	22%	Flow within 100vph	Yes

D.4 Neutral A303 mainline turn count IP calibration

A303 Mainline Network Node Result Table (IP)						10:00 - 16:00 (AVG)			10:00 - 16:00 (AVG)			
						Observed	Modelled	GEH	Diff Flow	% Diff Flow	Diff Requirement	Criteria Fulfilled?
Junction	Node	From	From Node	To	To Node	All	All	All	All	All	All	All
A303 / B3083 Berwick Rd	6	A303 E	7	B3083 S	1003	19	19	0.1	1	3%	Flow within 100vph	Yes
	6	A303 E	7	A303 W	1001	701	686	0.6	-15	2%	Flow within 15%	Yes
	6	A303 W	1001	A303 E	7	694	684	0.4	-10	1%	Flow within 100vph	Yes
	6	A303 W	1001	B3083 S	1003	3	3	0.1	0	6%	Flow within 100vph	Yes
	6	B3083 S	1003	A303 E	7	20	21	0.2	1	5%	Flow within 100vph	Yes
	6	B3083 S	1003	A303 W	1001	4	5	0.6	1	30%	Flow within 100vph	Yes
A303 / B3083	7	A303 W	6	B3083 N	1002	22	20	0.3	-2	7%	Flow within 100vph	Yes
	7	A303 W	6	A303 E	8	690	687	0.1	-3	0%	Flow within 100vph	Yes
	7	A303 E	8	A303 W	6	700	689	0.4	-11	2%	Flow within 15%	Yes
	7	A303 E	8	B3083 N	1002	8	9	0.4	1	15%	Flow within 100vph	Yes
	7	B3083 N	1002	A303 E	8	8	6	0.7	-2	23%	Flow within 100vph	Yes
	7	B3083 N	1002	A303 W	6	16	18	0.6	3	16%	Flow within 100vph	Yes
A303 / Church Street	8	A303 W	7	A303 E	9	691	689	0.1	-2	0%	Flow within 100vph	Yes
	8	A303 W	7	Church Street	1004	4	4	0.1	0	4%	Flow within 100vph	Yes
	8	A303 E	9	A303 W	7	700	694	0.2	-6	1%	Flow within 100vph	Yes
	8	A303 E	9	Church Street	1004	6	5	0.4	-1	17%	Flow within 100vph	Yes
	8	Church Street	1004	A303 W	7	5	6	0.4	1	16%	Flow within 100vph	Yes
	8	Church Street	1004	A303 E	9	4	3	0.3	-1	14%	Flow within 100vph	Yes
A303 / Eden Livestock Rd	9	A303 W	8	A303 E	101	698	692	0.2	-6	1%	Flow within 100vph	Yes
	9	A303 E	101	A303 W	8	707	698	0.4	-9	1%	Flow within 15%	Yes
	9	A303 E	101	Eden Livestock Rd	1005	3	3	0.3	1	20%	Flow within 100vph	Yes
	9	Eden Livestock Rd	1005	A303 W	8	2	4	1.5	3	167%	Flow within 100vph	Yes
	9	Eden Livestock Rd	1005	A303 E	101	0	0	0.6	0	100%	Flow within 100vph	Yes
A3028 / Amesbury Rd N	18	Amesbury Rd	94	A3028 S	92	0	0	0.6	0	100%	Flow within 100vph	Yes
	18	Amesbury Rd	94	A3028 N	1016	4	0	2.8	-4	100%	Flow within 100vph	Yes
	18	Amesbury Rd	94	Amesbury Rd N	1017	131	124	0.6	-7	5%	Flow within 100vph	Yes
	18	A3028 N	1016	A3028 S	92	21	18	0.6	-3	14%	Flow within 100vph	Yes
	18	A3028 N	1016	Amesbury Rd	94	1	0	1.3	-1	100%	Flow within 100vph	Yes
	18	A3028 N	1016	Amesbury Rd N	1017	26	29	0.6	3	13%	Flow within 100vph	Yes
	18	Amesbury Rd N	1017	A3028 S	92	29	32	0.5	3	9%	Flow within 100vph	Yes
	18	Amesbury Rd N	1017	Amesbury Rd	94	8	12	1.4	5	60%	Flow within 100vph	Yes
	18	Amesbury Rd N	1017	A3028 N	1016	121	124	0.3	3	2%	Flow within 100vph	Yes
A303 / Allington Track	93	A303 E	92	A303 W	94	1055	1043	0.4	-12	1%	Flow within 15%	Yes
	93	A303 E	92	Allington Track	1024	1	0	1.3	-1	100%	Flow within 100vph	Yes
	93	A303 W	94	A303 E	92	1001	968	1.0	-33	3%	Flow within 15%	Yes
	93	A303 W	94	Allington Track	1024	5	6	0.6	1	29%	Flow within 100vph	Yes
	93	Allington Track	1024	A303 E	92	0	3	2.3	3	1700%	Flow within 100vph	Yes
	93	Allington Track	1024	A303 W	94	18	16	0.5	-2	12%	Flow within 100vph	Yes
A303 / Amesbury Rd N	94	Amesbury Rd N	18	A303 E	93	8	12	1.3	4	50%	Flow within 100vph	Yes
	94	A303 E	93	A303 W	95	1086	1059	0.8	-27	3%	Flow within 15%	Yes
	94	A303 W	115	Amesbury Rd N	18	135	124	1.0	-11	8%	Flow within 100vph	Yes
	94	A303 W	115	A303 E	93	993	959	1.1	-34	3%	Flow within 15%	Yes
A303 / Solstice Park Slip Rds S	95	A303 E	94	Solstice Park Slip Rds	96	321	339	1.0	18	6%	Flow within 100vph	Yes
	95	A303 E	94	A303 W	117	752	720	1.2	-32	4%	Flow within 15%	Yes
	95	Solstice Park Slip Rds	96	A303 W	117	117	157	3.4	40	34%	Flow within 100vph	Yes
Solstice Park Ave / Solstice Park Slip Rds	96	Solstice Park Off Slip	95	Solstice Park Ave	2042	311	330	1.1	19	6%	Flow within 100vph	Yes
	96	Solstice Park Off Slip	95	Equinox Drive	1026	10	10	0.1	0	3%	Flow within 100vph	Yes
	96	Solstice Park Ave	2042	Solstice Park Off Slip	95	109	152	3.8	43	40%	Flow within 100vph	Yes
	96	Solstice Park Ave	2042	Equinox Drive	1026	27	28	0.2	1	3%	Flow within 100vph	Yes
	96	Equinox Drive	1026	Solstice Park Off Slip	95	8	5	1.2	-3	39%	Flow within 100vph	Yes
	96	Equinox Drive	1026	Solstice Park Ave	2042	30	31	0.2	1	4%	Flow within 100vph	Yes
Solstice Park Ave / Porton Rd	97	Solstice Park Ave	2042	Porton Rd N	98	191	121	5.6	-70	37%	Flow within 100vph	Yes
	97	Solstice Park Ave	2042	Porton Rd S	1027	152	159	0.5	7	4%	Flow within 100vph	Yes
	97	Solstice Park Ave	2042	London Rd	1028	135	138	0.3	3	2%	Flow within 100vph	Yes
	97	Porton Rd N	98	Solstice Park Ave	2042	117	105	1.1	-12	10%	Flow within 100vph	Yes
	97	Porton Rd N	98	Porton Rd S	1027	159	152	0.5	-7	4%	Flow within 100vph	Yes
	97	Porton Rd N	98	London Rd	1028	139	133	0.5	-6	4%	Flow within 100vph	Yes
	97	Porton Rd S	1027	Solstice Park Ave	2042	78	80	0.3	3	3%	Flow within 100vph	Yes
	97	Porton Rd S	1027	Porton Rd N	98	192	183	0.7	-9	5%	Flow within 100vph	Yes
	97	Porton Rd S	1027	London Rd	1028	115	122	0.6	7	6%	Flow within 100vph	Yes
	97	London Rd	1028	Solstice Park Ave	2042	66	69	0.4	3	5%	Flow within 100vph	Yes
	97	London Rd	1028	Porton Rd N	98	171	165	0.4	-6	3%	Flow within 100vph	Yes
	97	London Rd	1028	Porton Rd S	1027	112	119	0.6	7	6%	Flow within 100vph	Yes
Porton Rd / Salisbury Rd	98	Porton Rd	97	Slip Rd	115	275	210	4.2	-65	24%	Flow within 100vph	Yes
	98	Porton Rd	97	Salisbury Rd	1014	268	257	0.6	-11	4%	Flow within 100vph	Yes
	98	Slip Rd	115	Porton Rd	97	91	74	1.9	-17	19%	Flow within 100vph	Yes
	98	Slip Rd	115	Salisbury Rd	1014	8	11	0.9	3	35%	Flow within 100vph	Yes
	98	Salisbury Rd	1014	Porton Rd	97	315	317	0.1	2	1%	Flow within 100vph	Yes
	98	Salisbury Rd	1014	Slip Rd	115	13	9	1.1	-4	29%	Flow within 100vph	Yes
A303 / Countess Rd Countess Roundabout	99	A303 W	100	A303 E	117	738	749	0.4	12	2%	Flow within 15%	Yes
	99	A303 W	100	Countess Rd N	118	53	40	1.8	-13	24%	Flow within 100vph	Yes
	99	A303 W	100	Countess Rd S	1013	80	67	1.5	-13	16%	Flow within 100vph	Yes
	99	A303 E	117	A303 W	100	746	707	1.4	-39	5%	Flow within 15%	Yes
	99	A303 E	117	Countess Rd N	118	96	105	0.9	9	9%	Flow within 100vph	Yes
	99	A303 E	117	Countess Rd S	1013	54	68	1.9	15	27%	Flow within 100vph	Yes
	99	Countess Rd N	118	A303 W	100	73	76	0.4	3	4%	Flow within 100vph	Yes
	99	Countess Rd N	118	A303 E	117	173	162	0.9	-11	6%	Flow within 100vph	Yes
	99	Countess Rd N	118	Countess Rd S	1013	228	231	0.2	3	1%	Flow within 100vph	Yes
	99	Countess Rd S	1013	A303 W	100	54	57	0.4	3	5%	Flow within 100vph	Yes
	99	Countess Rd S	1013	A303 E	117	109	110	0.1	1	1%	Flow within 100vph	Yes
	99	Countess Rd S	1013	Countess Rd N	118	235	232	0.2	-3	1%	Flow within 100vph	Yes
A303 / Stonehenge Rd	100	A303 E	99	A303 W	101	871	840	1.1	-31	4%	Flow within 15%	Yes
	100	A303 W	101	A303 E	99	870	867	0.1	-3	0%	Flow within 15%	Yes
	100	Stonhenge Rd	1012	A303 W	101	40	40	0.0	0	0%	Flow within 100vph	Yes
A303 / A360 Longbarrow Roundabout	101	A303 W	9	A303 E	100	641	647	0.3	7	1%	Flow within 100vph	Yes
	101	A303 W	9	A360 S	1010	29	26	0.6	-3	11%	Flow within 100vph	Yes
	101	A303 W	9	A360 N	1011	27	21	1.3	-6	23%	Flow within 100vph	Yes
	101	A303 E	100	A303 W	9	673	634	1.5	-39	6%	Flow within 100vph	Yes
	101	A303 E	100	A360 S	1010	120	130	0.9	10	8%	Flow within 100vph	Yes
	101	A303 E	100	A360 N	1011	115	123	0.7	8	7%	Flow within 100vph	Yes
	101	A360 S	1010	A303 W	9	24	29	1.0	5	22%	Flow within 100vph	Yes
	101	A360 S	1010	A303 E	100	73	72	0.1	-1	2%	Flow within 100vph	Yes
	101	A360 S	1010	A360 N	1011	191	190	0.0	-1	0%	Flow within 100vph	Yes
	101	A360 N	1011	A303 W	9	30	36	1.1	6	21%	Flow within 100vph	Yes
	101	A360 N	1011	A303 E	100	153	148	0.4	-5	3%	Flow within 100vph	Yes
	101	A360 N	1011	A360 S	1010	171	169	0.2	-2	1%	Flow within 100vph	Yes
A303 / Amesbury Rd S	106	A303 W	92	A303 E	111	1030	1014	0.5	-16	2%	Flow within 15%	Yes
	106	A303 W	92	Amesbury Rd S	1025	14	12	0.6	-2	16%	Flow within 100vph	Yes
	106	A303 E	112	A303 W	92	1048	1029	0.6	-19	2%	Flow within 15%	Yes
	106	A303 E	112	Amesbury Rd S	1025	4	4	0.3	1	14%	Flow within 100vph	Yes
	106	Amesbury Rd S	1025	A303 W	92	14	13	0.3	-1	7%	Flow within 100vph	Yes
	106	Amesbury Rd S	1025	A303 E	111	2	0	1.7	-2	100%	Flow within 100vph	Yes
A338 / B338	108	A338 N	109	Slip Rd S	112	119	123	0.4	4	4%	Flow within 100vph	Yes
	108	A338 N	109	B3084	1021	94	93	0.1	-1	1%	Flow within 100vph	Yes
	108	A338 N	109	A338 S	1022	135	136	0.1	1	0%	Flow within 100vph	Yes
	108	Slip Rd S	112	A338 N	109	66	80	1.6	14	21%	Flow within 100vph	Yes
	108	Slip Rd S	112	B3084	1021	3	4	0.7	1	50%	Flow within 100vph	Yes
	108	Slip Rd S	112	A338 S	1022	32	36	0.8	5	14%	Flow within 100vph	Yes
	108	B3084	1021	A338 N	109	54	53	0.1	-1	1%	Flow within 100vph	Yes
	108	B3084	1021	Slip Rd S	112	43	41	0.3	-2	5%	Flow within 100vph	Yes
	108	B3084	1021	A338 S	1022	13	13	0.1	0	3%	Flow within 100vph	Yes
	108	A338 S	1022	A338 N	109	129	129	0.0	0	0%	Flow within 100vph	Yes
	108	A338 S	1022	Slip Rd S	112	10	9	0.4	-1	13%	Flow within 100vph	Yes
	108	A338 S	1022	B3084	1021	13	12	0.3	-1	8%	Flow within 100vph	Yes
A338 / A303 Slip Rd	109	A338 S	108	Slip Rd N	111	28	24	0.7	-4	13%	Flow within 100vph	Yes
	109	A338 S	108	A338 N	1019	225	239	0.9	14	6%	Flow within 100vph	Yes
	109	Slip Rd N	111	A338 S	108	53	50	0.3	-3	5%	Flow within 100vph	Yes
	109	Slip Rd N	111	A338 N	1019	121	106	1.4	-15	12%	Flow within 100vph	Yes
	109	A338 N	1019	A338 S	108	302	304	0.1	2	1%	Flow within 100vph	Yes
	109	A338 N	1019	Slip Rd N	111	75	72	0.3	-3	4%	Flow within 100vph	Yes
A303 / A338 Slip Rd N	111	A303 W	106	Slip Rd N	109	173	155	1.4	-18	10%	Flow within 100vph	Yes
	111	A303 W	106	A303 E	1020	859	862	0.1	4	0%	Flow within 15%	Yes
	111	Slip Rd N	109	A303 E	1020	103	95	0.8	-8	7%	Flow within 100vph	Yes
A303 / A338 Slip Rd S	112	Slip Rd S	108	A303 W	106	172	174	0.2	2	1%	Flow within 100vph	Yes
	112	A303 E	1020	A303 W	106	879	858	0.7	-21	2%	Flow within 15%	Yes
	112	A303 E	1020	Slip Rd S	108	101	118	1.7	18	17%	Flow within 100vph	Yes
A303 / Solstice Park Slip Rds N	115	Slip Rd	98	A303 E	94	288	220	4.3	-68	24%	Flow within 100vph	Yes
	115	A303 W	117	A303 E	94	841	864	0.8	23	3%	Flow within 15%	Yes
	115	A303 W	117	Slip Rd	98	99	84	1.6	-15	15%	Flow within 100vph	Yes
A303 / Countess Rbt / Services Entrance	117	Countess Rbt	99	A303 E	115	940	949	0.3	9	1%	Flow within 15%	Yes
	117	Countess Rbt	99	Services	1029	73	72	0.1	-1	1%	Flow within 100vph	Yes
Countess Rbt / Services Exit	118	Countess Rbt	99	Countess Rd N	1015	385	377	0.4	-8	2%	Flow within 100vph	Yes
	118	Countess Rd N	1015	Countess Rbt	99	402	397	0.2	-5	1%	Flow within 100vph	Yes
	118	Services	1029	Countess Rbt	99	72	72	0.0	0	0%	Flow within 100vph	Yes
Solstice Park Avenue / Mid Summer Place / Meridian Way	2042	Mid Summer Place	2046	Solstice Park Avenue (ENE)	96	89	88	0.1	-1	1%	Flow within 100vph	Yes
	2042	Mid Summer Place	2046	Meridian Way	2045	11	10	0.2	-1	6%	Flow within 100vph	Yes
	2042	Mid Summer Place	2046	Solstice Park Avenue (W)	97	179	176	0.2	-3	2%	Flow within 100vph	Yes
	2042	Solstice Park Avenue (ENE)	96	Mid Summer Place	2046	109	110	0.1	1	1%	Flow within 100vph	Yes
	2042	Solstice Park Avenue (ENE)	96	Meridian Way	2045	21	24	0.6	3	14%	Flow within 100vph	Yes
	2042	Solstice Park Avenue (ENE)	96	Solstice Park Avenue (W)	97	278	227	3.2	-51	18%	Flow within 100vph	Yes
	2042	Meridian Way	2045	Mid Summer Place	2046	7	8	0.6	2	23%	Flow within 100vph	Yes
	2042	Meridian Way	2045	Solstice Park Avenue (ENE)	96	9	12	0.9	3	33%	Flow within 100vph	Yes
	2042	Meridian Way	2045	Solstice Park Avenue (W)	97	20	16	1.0	-4	21%	Flow within 100vph	Yes
	2042	Solstice Park Avenue (W)	97	Mid Summer Place	2046	162	163	0.1	1	1%	Flow within 100vph	Yes
	2042	Solstice Park Avenue (W)	97	Solstice Park Avenue (ENE)	96	93	81	1.2	-12	12%	Flow within 100vph	Yes
	2042	Solstice Park Avenue (W)	97	Meridian Way	2045	9	9	0.1	0	4%	Flow within 100vph	Yes

D.5 Neutral A303 mainline turn count PM calibration

A303 Mainline Network Node Result Table (PM)						17:00			17:00			
						Observed	Modelled	GEH	Diff Flow	% Diff Flow	Diff Requirement	Criteria Fulfilled?
	Node	From	From Node	To	To Node	All	All	All	All	All	All	All
A303 / B3083 Berwick Rd	6	A303 E	7	B3083 S	1003	20	19	0.2	-1	5%	Flow within 100vph	Yes
	6	A303 E	7	A303 W	1001	906	955	1.6	49	5%	Flow within 15%	Yes
	6	A303 W	1001	A303 E	7	669	683	0.5	14	2%	Flow within 100vph	Yes
	6	A303 W	1001	B3083 S	1003	2	2	0.0	0	0%	Flow within 100vph	Yes
	6	B3083 S	1003	A303 E	7	17	16	0.2	-1	6%	Flow within 100vph	Yes
	6	B3083 S	1003	A303 W	1001	5	6	0.4	1	20%	Flow within 100vph	Yes
A303 / B3083	7	A303 W	6	B3083 N	1002	20	23	0.6	3	15%	Flow within 100vph	Yes
	7	A303 W	6	A303 E	8	663	677	0.5	14	2%	Flow within 100vph	Yes
	7	A303 E	8	A303 W	6	878	933	1.8	55	6%	Flow within 15%	Yes
	7	A303 E	8	B3083 N	1002	8	8	0.0	0	0%	Flow within 100vph	Yes
	7	B3083 N	1002	A303 E	8	3	0	2.4	-3	100%	Flow within 100vph	Yes
	7	B3083 N	1002	A303 W	6	35	37	0.3	2	6%	Flow within 100vph	Yes
A303 / Church Street	8	A303 W	7	A303 E	9	658	672	0.5	14	2%	Flow within 100vph	Yes
	8	A303 W	7	Church Street	1004	7	6	0.4	-1	14%	Flow within 100vph	Yes
	8	A303 E	9	A303 W	7	881	935	1.8	54	6%	Flow within 15%	Yes
	8	A303 E	9	Church Street	1004	16	14	0.5	-2	13%	Flow within 100vph	Yes
	8	Church Street	1004	A303 W	7	4	4	0.0	0	0%	Flow within 100vph	Yes
	8	Church Street	1004	A303 E	9	2	0	2.0	-2	100%	Flow within 100vph	Yes
A303 / Eden Livestock Rd	9	A303 W	8	A303 E	101	670	673	0.1	3	0%	Flow within 100vph	Yes
	9	A303 E	101	A303 W	8	898	939	1.4	41	5%	Flow within 15%	Yes
	9	A303 E	101	Eden Livestock Rd	1005	2	2	0.0	0	0%	Flow within 100vph	Yes
	9	Eden Livestock Rd	1005	A303 W	8	3	4	0.5	1	33%	Flow within 100vph	Yes
	9	Eden Livestock Rd	1005	A303 E	101	2	1	0.8	-1	50%	Flow within 100vph	Yes
A3028 / Amesbury Rd N	18	Amesbury Rd	94	A3028 S	92	0	0	0.0	0	0%	Flow within 100vph	Yes
	18	Amesbury Rd	94	A3028 N	1016	10	11	0.3	1	10%	Flow within 100vph	Yes
	18	Amesbury Rd	94	Amesbury Rd N	1017	244	236	0.5	-8	3%	Flow within 100vph	Yes
	18	A3028 N	1016	A3028 S	92	33	33	0.0	0	0%	Flow within 100vph	Yes
	18	A3028 N	1016	Amesbury Rd	94	1	1	0.0	0	0%	Flow within 100vph	Yes
	18	A3028 N	1016	Amesbury Rd N	1017	36	37	0.2	1	3%	Flow within 100vph	Yes
	18	Amesbury Rd N	1017	A3028 S	92	68	85	1.9	17	25%	Flow within 100vph	Yes
	18	Amesbury Rd N	1017	Amesbury Rd	94	11	11	0.0	0	0%	Flow within 100vph	Yes
	18	Amesbury Rd N	1017	A3028 N	1016	247	242	0.3	-5	2%	Flow within 100vph	Yes
A303 / Allington Track	93	A303 E	92	A303 W	94	1771	1724	1.1	-47	3%	Flow within 15%	Yes
	93	A303 E	92	Allington Track	1024	0	0	0.0	0	0%	Flow within 100vph	Yes
	93	A303 W	94	A303 E	92	1248	1189	1.7	-59	5%	Flow within 15%	Yes
	93	A303 W	94	Allington Track	1024	19	16	0.7	-3	16%	Flow within 100vph	Yes
	93	Allington Track	1024	A303 E	92	0	0	0.0	0	0%	Flow within 100vph	Yes
	93	Allington Track	1024	A303 W	94	51	49	0.3	-2	4%	Flow within 100vph	Yes
A303 / Amesbury Rd N	94	Amesbury Rd N	18	A303 E	93	11	12	0.3	1	9%	Flow within 100vph	Yes
	94	A303 E	93	A303 W	95	1827	1773	1.3	-54	3%	Flow within 15%	Yes
	94	A303 W	115	Amesbury Rd N	18	255	245	0.6	-10	4%	Flow within 100vph	Yes
	94	A303 W	115	A303 E	93	1221	1194	0.8	-27	2%	Flow within 15%	Yes
A303 / Solstice Park Slip Rds S	95	A303 E	94	Solstice Park Slip Rds	96	716	658	2.2	-58	8%	Flow within 15%	Yes
	95	A303 E	94	A303 W	117	1106	1121	0.4	15	1%	Flow within 15%	Yes
	95	Solstice Park Slip Rds	96	A303 W	117	151	171	1.6	20	13%	Flow within 100vph	Yes
Solstice Park Ave / Solstice Park Slip Rds	96	Solstice Park Off Slip	95	Solstice Park Ave	2042	716	658	2.2	-58	8%	Flow within 15%	Yes
	96	Solstice Park Off Slip	95	Equinox Drive	1026	0	0	0.0	0	0%	Flow within 100vph	Yes
	96	Solstice Park Ave	2042	Solstice Park Off Slip	95	146	167	1.7	21	14%	Flow within 100vph	Yes
	96	Solstice Park Ave	2042	Equinox Drive	1026	15	18	0.7	3	20%	Flow within 100vph	Yes
	96	Equinox Drive	1026	Solstice Park Off Slip	95	5	4	0.5	-1	20%	Flow within 100vph	Yes
	96	Equinox Drive	1026	Solstice Park Ave	2042	30	33	0.5	3	10%	Flow within 100vph	Yes
Solstice Park Ave / Porton Rd	97	Solstice Park Ave	2042	Porton Rd N	98	333	217	7.0	-116	35%	Flow within 100vph	No
	97	Solstice Park Ave	2042	Porton Rd S	1027	324	328	0.2	4	1%	Flow within 100vph	Yes
	97	Solstice Park Ave	2042	London Rd	1028	233	234	0.1	1	0%	Flow within 100vph	Yes
	97	Porton Rd N	98	Solstice Park Ave	2042	174	157	1.3	-17	10%	Flow within 100vph	Yes
	97	Porton Rd N	98	Porton Rd S	1027	280	277	0.2	-3	1%	Flow within 100vph	Yes
	97	Porton Rd N	98	London Rd	1028	187	182	0.4	-5	3%	Flow within 100vph	Yes
	97	Porton Rd S	1027	Solstice Park Ave	2042	135	133	0.2	-2	1%	Flow within 100vph	Yes
	97	Porton Rd S	1027	Porton Rd N	98	444	448	0.2	4	1%	Flow within 100vph	Yes
	97	Porton Rd S	1027	London Rd	1028	135	136	0.1	1	1%	Flow within 100vph	Yes
	97	London Rd	1028	Solstice Park Ave	2042	81	81	0.0	0	0%	Flow within 100vph	Yes
	97	London Rd	1028	Porton Rd N	98	237	239	0.1	2	1%	Flow within 100vph	Yes
	97	London Rd	1028	Porton Rd S	1027	154	153	0.1	-1	1%	Flow within 100vph	Yes
Porton Rd / Salisbury Rd	98	Porton Rd	97	Slip Rd	115	449	371	3.9	-78	17%	Flow within 100vph	Yes
	98	Porton Rd	97	Salisbury Rd	1014	554	534	0.9	-20	4%	Flow within 100vph	Yes
	98	Slip Rd	115	Porton Rd	97	104	97	0.7	-7	7%	Flow within 100vph	Yes
	98	Slip Rd	115	Salisbury Rd	1014	15	18	0.7	3	20%	Flow within 100vph	Yes
	98	Salisbury Rd	1014	Porton Rd	97	518	520	0.1	2	0%	Flow within 100vph	Yes
	98	Salisbury Rd	1014	Slip Rd	115	18	17	0.2	-1	6%	Flow within 100vph	Yes
A303 / Countess Rd Countess Roundabout	99	A303 W	100	A303 E	117	831	854	0.8	23	3%	Flow within 15%	Yes
	99	A303 W	100	Countess Rd N	118	82	78	0.4	-4	5%	Flow within 100vph	Yes
	99	A303 W	100	Countess Rd S	1013	109	106	0.3	-3	3%	Flow within 100vph	Yes
	99	A303 E	117	A303 W	100	885	908	0.8	23	3%	Flow within 15%	Yes
	99	A303 E	117	Countess Rd N	118	287	290	0.2	3	1%	Flow within 100vph	Yes
	99	A303 E	117	Countess Rd S	1013	80	88	0.9	8	10%	Flow within 100vph	Yes
	99	Countess Rd N	118	A303 W	100	68	65	0.4	-3	4%	Flow within 100vph	Yes
	99	Countess Rd N	118	A303 E	117	241	252	0.7	11	5%	Flow within 100vph	Yes
	99	Countess Rd N	118	Countess Rd S	1013	293	288	0.3	-5	2%	Flow within 100vph	Yes
	99	Countess Rd S	1013	A303 W	100	36	34	0.3	-2	6%	Flow within 100vph	Yes
	99	Countess Rd S	1013	A303 E	117	108	120	1.1	12	11%	Flow within 100vph	Yes
	99	Countess Rd S	1013	Countess Rd N	118	452	446	0.3	-6	1%	Flow within 100vph	Yes
A303 / Stonehenge Rd	100	A303 E	99	A303 W	101	988	1011	0.7	23	2%	Flow within 15%	Yes
	100	A303 W	101	A303 E	99	1034	1035	0.0	1	0%	Flow within 15%	Yes
	100	Stonhenge Rd	1012	A303 W	101	129	130	0.1	1	1%	Flow within 100vph	Yes
A303 / A360 Longbarrow Roundabout	101	A303 W	9	A303 E	100	634	639	0.2	5	1%	Flow within 100vph	Yes
	101	A303 W	9	A360 S	1010	35	31	0.7	-4	11%	Flow within 100vph	Yes
	101	A303 W	9	A360 N	1011	13	12	0.3	-1	8%	Flow within 100vph	Yes
	101	A303 E	100	A303 W	9	807	855	1.7	48	6%	Flow within 15%	Yes
	101	A303 E	100	A360 S	1010	147	157	0.8	10	7%	Flow within 100vph	Yes
	101	A303 E	100	A360 N	1011	152	157	0.4	5	3%	Flow within 100vph	Yes
	101	A360 S	1010	A303 W	9	36	34	0.3	-2	6%	Flow within 100vph	Yes
	101	A360 S	1010	A303 E	100	173	182	0.7	9	5%	Flow within 100vph	Yes
	101	A360 S	1010	A360 N	1011	367	361	0.3	-6	2%	Flow within 100vph	Yes
	101	A360 N	1011	A303 W	9	57	55	0.3	-2	4%	Flow within 100vph	Yes
	101	A360 N	1011	A303 E	100	204	212	0.6	8	4%	Flow within 100vph	Yes
	101	A360 N	1011	A360 S	1010	252	244	0.5	-8	3%	Flow within 100vph	Yes
A303 / Amesbury Rd S	106	A303 W	92	A303 E	111	1294	1273	0.6	-21	2%	Flow within 15%	Yes
	106	A303 W	92	Amesbury Rd S	1025	36	32	0.7	-4	11%	Flow within 100vph	Yes
	106	A303 E	112	A303 W	92	1724	1698	0.6	-26	2%	Flow within 15%	Yes
	106	A303 E	112	Amesbury Rd S	1025	3	3	0.0	0	0%	Flow within 100vph	Yes
	106	Amesbury Rd S	1025	A303 W	92	30	28	0.4	-2	7%	Flow within 100vph	Yes
	106	Amesbury Rd S	1025	A303 E	111	2	3	0.6	1	50%	Flow within 100vph	Yes
A338 / B338	108	A338 N	109	Slip Rd S	112	135	130	0.4	-5	4%	Flow within 100vph	Yes
	108	A338 N	109	B3084	1021	157	158	0.1	1	1%	Flow within 100vph	Yes
	108	A338 N	109	A338 S	1022	190	190	0.0	0	0%	Flow within 100vph	Yes
	108	Slip Rd S	112	A338 N	109	133	141	0.7	8	6%	Flow within 100vph	Yes
	108	Slip Rd S	112	B3084	1021	3	3	0.0	0	0%	Flow within 100vph	Yes
	108	Slip Rd S	112	A338 S	1022	78	79	0.1	1	1%	Flow within 100vph	Yes
	108	B3084	1021	A338 N	109	84	88	0.4	4	5%	Flow within 100vph	Yes
	108	B3084	1021	Slip Rd S	112	133	127	0.5	-6	5%	Flow within 100vph	Yes
	108	B3084	1021	A338 S	1022	20	21	0.2	1	5%	Flow within 100vph	Yes
	108	A338 S	1022	A338 N	109	259	261	0.1	2	1%	Flow within 100vph	Yes
	108	A338 S	1022	Slip Rd S	112	16	16	0.0	0	0%	Flow within 100vph	Yes
	108	A338 S	1022	B3084	1021	22	21	0.2	-1	5%	Flow within 100vph	Yes
A338 / A303 Slip Rd	109	A338 S	108	Slip Rd N	111	52	57	0.7	5	10%	Flow within 100vph	Yes
	109	A338 S	108	A338 N	1019	424	432	0.4	8	2%	Flow within 100vph	Yes
	109	Slip Rd N	111	A338 S	108	76	74	0.2	-2	3%	Flow within 100vph	Yes
	109	Slip Rd N	111	A338 N	1019	157	140	1.4	-17	11%	Flow within 100vph	Yes
	109	A338 N	1019	A338 S	108	416	402	0.7	-14	3%	Flow within 100vph	Yes
	109	A338 N	1019	Slip Rd N	111	102	113	1.1	11	11%	Flow within 100vph	Yes
A303 / A338 Slip Rd N	111	A303 W	106	Slip Rd N	109	233	214	1.3	-19	8%	Flow within 100vph	Yes
	111	A303 W	106	A303 E	1020	1063	1061	0.1	-2	0%	Flow within 15%	Yes
	111	Slip Rd N	109	A303 E	1020	154	169	1.2	15	10%	Flow within 100vph	Yes
A303 / A338 Slip Rd S	112	Slip Rd S	108	A303 W	106	284	272	0.7	-12	4%	Flow within 100vph	Yes
	112	A303 E	1020	A303 W	106	1443	1431	0.3	-12	1%	Flow within 15%	Yes
	112	A303 E	1020	Slip Rd S	108	214	222	0.5	8	4%	Flow within 100vph	Yes
A303 / Solstice Park Slip Rds N	115	Slip Rd	98	A303 E	94	467	390	3.7	-77	16%	Flow within 100vph	Yes
	115	A303 W	117	A303 E	94	1001	1051	1.6	50	5%	Flow within 15%	Yes
	115	A303 W	117	Slip Rd	98	119	115	0.4	-4	3%	Flow within 100vph	Yes
A303 / Countess Rbt / Services Entrance	117	Countess Rbt	99	A303 E	115	1120	1160	1.2	40	4%	Flow within 15%	Yes
	117	Countess Rbt	99	Services	1029	70	66	0.5	-4	6%	Flow within 100vph	Yes
Countess Rbt / Services Exit	118	Countess Rbt	99	Countess Rd N	1015	816	814	0.1	-2	0%	Flow within 15%	Yes
	118	Countess Rd N	1015	Countess Rbt	99	537	540	0.1	3	1%	Flow within 100vph	Yes
	118	Services	1029	Countess Rbt	99	63	63	0.0	0	0%	Flow within 100vph	Yes
Solstice Park Avenue / Mid Summer Place / Meridian Way	2042	Mid Summer Place	2046	Solstice Park Avenue (ENE)	96	84	80	0.4	-4	5%	Flow within 100vph	Yes
	2042	Mid Summer Place	2046	Meridian Way	2045	14	14	0.0	0	0%	Flow within 100vph	Yes
	2042	Mid Summer Place	2046	Solstice Park Avenue (W)	97	228	231	0.2	3	1%	Flow within 100vph	Yes
	2042	Solstice Park Avenue (ENE)	96	Mid Summer Place	2046	128	124	0.4	-4	3%	Flow within 100vph	Yes
	2042	Solstice Park Avenue (ENE)	96	Meridian Way	2045	36	34	0.3	-2	6%	Flow within 100vph	Yes
	2042	Solstice Park Avenue (ENE)	96	Solstice Park Avenue (W)	97	635	534	4.2	-101	16%	Flow within 100vph	No
	2042	Meridian Way	2045	Mid Summer Place	2046	5	7	0.8	2	40%	Flow within 100vph	Yes
	2042	Meridian Way	2045	Solstice Park Avenue (ENE)	96	10	10	0.0	0	0%	Flow within 100vph	Yes
	2042	Meridian Way	2045	Solstice Park Avenue (W)	97	21	19	0.4	-2	10%	Flow within 100vph	Yes
	2042	Solstice Park Avenue (W)	97	Mid Summer Place	2046	277	269	0.5	-8	3%	Flow within 100vph	Yes
	2042	Solstice Park Avenue (W)	97	Solstice Park Avenue (ENE)	96	110	94	1.6	-16	15%	Flow within 100vph	Yes
	2042	Solstice Park Avenue (W)	97	Meridian Way	2045	6	7	0.4	1	17%	Flow within 100vph	Yes

D.6 Neutral Local model turn count AM calibration

Local P'way Closed Network Node Result Table (AM)						07:30			07:30			
						Observed	Modelled	GEH	Diff Flow	% Diff Flow	Diff Requirement	Criteria Fulfilled?
Junction	Node	From	From Node	To	To Node	All	All	All	All	All	All	All
The Packway / Bingham Rd / Ross Rd	66	Ross Rd	2003	The Packway E	67	1	0	1.4	-1	100%	Flow within 100vph	Yes
	66	Ross Rd	2003	Bingham Rd	2033	0	0	0.0	0	0%	Flow within 100vph	Yes
	66	Ross Rd	2003	The Packway W	65	2	2	0.0	0	0%	Flow within 100vph	Yes
	66	The Packway E	67	Ross Rd	2003	1	0	1.4	-1	100%	Flow within 100vph	Yes
	66	The Packway E	67	Bingham Rd	2033	0	0	0.0	0	0%	Flow within 100vph	Yes
	66	The Packway E	67	The Packway W	65	131	130	0.1	-1	1%	Flow within 100vph	Yes
	66	Bingham Rd	2033	Ross Rd	2003	0	0	0.0	0	0%	Flow within 100vph	Yes
	66	Bingham Rd	2033	The Packway E	67	0	0	0.0	0	0%	Flow within 100vph	Yes
	66	Bingham Rd	2033	The Packway W	65	1	0	1.4	-1	100%	Flow within 100vph	Yes
	66	The Packway W	65	Ross Rd	2003	3	3	0.0	0	0%	Flow within 100vph	Yes
	66	The Packway W	65	The Packway E	67	407	416	0.4	9	2%	Flow within 100vph	Yes
	66	The Packway W	65	Bingham Rd	2033	4	3	0.5	-1	25%	Flow within 100vph	Yes
The Packway / Shops Exit	75	Shops	2063	The Packway E	76	29	37	1.4	8	28%	Flow within 100vph	Yes
	75	Shops	2063	The Packway W	74	27	29	0.4	2	7%	Flow within 100vph	Yes
	75	The Packway E	76	The Packway W	74	362	360	0.1	-2	1%	Flow within 100vph	Yes
	75	The Packway W	74	The Packway E	76	361	378	0.9	17	5%	Flow within 100vph	Yes
The Packway / Glover Rd	76	Glover Rd	2008	The Packway E	77	46	48	0.3	2	4%	Flow within 100vph	Yes
	76	Glover Rd	2008	The Packway W	75	21	25	0.8	4	19%	Flow within 100vph	Yes
	76	The Packway E	77	Glover Rd	2008	274	256	1.1	-18	7%	Flow within 100vph	Yes
	76	The Packway E	77	The Packway W	75	346	339	0.4	-7	2%	Flow within 100vph	Yes
	76	The Packway W	75	Glover Rd	2008	103	114	1.1	11	11%	Flow within 100vph	Yes
	76	The Packway W	75	The Packway E	77	287	301	0.8	14	5%	Flow within 100vph	Yes
The Packway / Northern Terrace	77	Northern Terrace	2009	The Packway E	78	0	0	0.0	0	0%	Flow within 100vph	Yes
	77	Northern Terrace	2009	The Packway W	76	0	0	0.0	0	0%	Flow within 100vph	Yes
	77	The Packway E	78	Northern Terrace	2009	11	8	1.0	-3	27%	Flow within 100vph	Yes
	77	The Packway E	78	The Packway W	76	622	596	1.1	-26	4%	Flow within 100vph	Yes
	77	The Packway W	76	Northern Terrace	2009	8	14	1.8	6	75%	Flow within 100vph	Yes
	77	The Packway W	76	The Packway E	78	324	336	0.7	12	4%	Flow within 100vph	Yes
The Packway / Bidulph Rd	78	Bidulph Rd	2010	The Packway E	79	33	34	0.2	1	3%	Flow within 100vph	Yes
	78	Bidulph Rd	2010	The Packway W	77	43	41	0.3	-2	5%	Flow within 100vph	Yes
	78	The Packway E	79	The Packway W	77	583	563	0.8	-20	3%	Flow within 100vph	Yes
	78	The Packway W	77	The Packway E	79	326	335	0.5	9	3%	Flow within 100vph	Yes
The Packway / Wood Rd	79	The Packway E	80	Wood Rd	2026	0	0	0.0	0	0%	Flow within 100vph	Yes
	79	The Packway E	80	The Packway W	78	2	1	0.8	-1	50%	Flow within 100vph	Yes
	79	Wood Rd	2026	The Packway E	80	0	0	0.0	0	0%	Flow within 100vph	Yes
	79	Wood Rd	2026	The Packway W	78	587	559	1.2	-28	5%	Flow within 100vph	Yes
	79	The Packway W	78	The Packway E	80	3	0	2.4	-3	100%	Flow within 100vph	Yes
	79	The Packway W	78	Wood Rd	2026	354	368	0.7	14	4%	Flow within 100vph	Yes
The Packway / A345 / Countess Rd / Larkhill Rd Roundabout	81	A345	2011	Larkhill Rd	82	112	106	0.6	-6	5%	Flow within 100vph	Yes
	81	A345	2011	Countess Rd	2024	385	466	3.9	81	21%	Flow within 100vph	Yes
	81	A345	2011	The Packway	80	1	0	1.4	-1	100%	Flow within 100vph	Yes
	81	Larkhill Rd	82	A345	2011	62	70	1.0	8	13%	Flow within 100vph	Yes
	81	Larkhill Rd	82	Countess Rd	2024	399	448	2.4	49	12%	Flow within 100vph	Yes
	81	Larkhill Rd	82	The Packway	80	1	0	1.4	-1	100%	Flow within 100vph	Yes
	81	Countess Rd	2024	A345	2011	290	299	0.5	9	3%	Flow within 100vph	Yes
	81	Countess Rd	2024	Larkhill Rd	82	295	301	0.3	6	2%	Flow within 100vph	Yes
	81	Countess Rd	2024	Countess Rd	2024	14	13	0.3	-1	7%	Flow within 100vph	Yes
	81	Countess Rd	2024	The Packway	80	13	0	5.1	-13	100%	Flow within 100vph	Yes
	81	The Packway	80	A345	2011	3	0	2.4	-3	100%	Flow within 100vph	Yes
	81	The Packway	80	Larkhill Rd	82	1	0	1.4	-1	100%	Flow within 100vph	Yes
	81	The Packway	80	Countess Rd	2024	2	0	2.0	-2	100%	Flow within 100vph	Yes
	82	Stonehenge Rd	2012	Larkhill Rd E	83	47	42	0.7	-5	11%	Flow within 100vph	Yes
Stongehenge Rd / Larkhill Rd	82	Stonehenge Rd	2012	Larkhill Rd W	81	167	198	2.3	31	19%	Flow within 100vph	Yes
	82	Larkhill Rd E	83	Stonehenge Rd	2012	27	18	1.9	-9	33%	Flow within 100vph	Yes
	82	Larkhill Rd E	83	Larkhill Rd W	81	309	321	0.7	12	4%	Flow within 100vph	Yes
	82	Larkhill Rd W	81	Stonehenge Rd	2012	97	93	0.4	-4	4%	Flow within 100vph	Yes
	82	Larkhill Rd W	81	Larkhill Rd E	83	313	314	0.1	1	0%	Flow within 100vph	Yes
Larkhill Rd / Philip Rd	84	Philip Rd	2014	Larkhill Rd E	85	58	54	0.5	-4	7%	Flow within 100vph	Yes
	84	Philip Rd	2014	Larkhill Rd W	83	20	21	0.2	1	5%	Flow within 100vph	Yes
	84	Larkhill Rd E	85	Philip Rd	2014	14	14	0.0	0	0%	Flow within 100vph	Yes
	84	Larkhill Rd E	85	Larkhill Rd W	83	293	313	1.1	20	7%	Flow within 100vph	Yes
	84	Larkhill Rd W	83	Philip Rd	2014	9	7	0.7	-2	22%	Flow within 100vph	Yes
	84	Larkhill Rd W	83	Larkhill Rd E	85	350	343	0.4	-7	2%	Flow within 100vph	Yes
The Packway / Willoughby Rd / Watson Rd	67	Watson Rd	2004	The Packway E	68	36	41	0.8	5	14%	Flow within 100vph	Yes
	67	Watson Rd	2004	Willoughby Rd	2032	0	7	3.7	7	0%	Flow within 100vph	Yes
	67	Watson Rd	2004	The Packway W	66	12	12	0.0	0	0%	Flow within 100vph	Yes
	67	The Packway E	68	Watson Rd	2004	194	189	0.4	-5	3%	Flow within 100vph	Yes
	67	The Packway E	68	Willoughby Rd	2032	17	7	2.9	-10	59%	Flow within 100vph	Yes
	67	The Packway E	68	The Packway W	66	103	96	0.7	-7	7%	Flow within 100vph	Yes
	67	Willoughby Rd	2032	Watson Rd	2004	15	19	1.0	4	27%	Flow within 100vph	Yes
	67	Willoughby Rd	2032	The Packway E	68	36	33	0.5	-3	8%	Flow within 100vph	Yes
	67	Willoughby Rd	2032	The Packway W	66	20	22	0.4	2	10%	Flow within 100vph	Yes
	67	The Packway W	66	Watson Rd	2004	154	153	0.1	-1	1%	Flow within 100vph	Yes
	67	The Packway W	66	The Packway E	68	246	243	0.2	-3	1%	Flow within 100vph	Yes
	67	The Packway W	66	Willoughby Rd	2032	7	19	3.3	12	171%	Flow within 100vph	Yes
Bulford Hill / Larkhill Rd	85	Bulford Rd	2015	Bulford Hill	86	422	416	0.3	-6	1%	Flow within 100vph	Yes
	85	Bulford Hill	86	Bulford Rd	2015	186	179	0.5	-7	4%	Flow within 100vph	Yes
	85	Bulford Rd	2015	Larkhill Rd	84	78	94	1.7	16	21%	Flow within 100vph	Yes
	85	Bulford Hill	86	Larkhill Rd	84	222	237	1.0	15	7%	Flow within 100vph	Yes
	85	Larkhill Rd	84	Bulford Rd	2015	52	56	0.5	4	8%	Flow within 100vph	Yes
	85	Larkhill Rd	84	Bulford Hill	86	358	342	0.9	-16	4%	Flow within 100vph	Yes
High Street / Church Lane	86	Church Ln	87	High St E	2056	1	2	0.8	1	100%	Flow within 100vph	Yes
	86	Church Ln	87	High St W	85	2	2	0.0	0	0%	Flow within 100vph	Yes
	86	High St E	2056	Church Ln	87	0	1	1.4	1	0%	Flow within 100vph	Yes
	86	High St E	2056	High St W	85	402	413	0.5	11	3%	Flow within 100vph	Yes
	86	High St W	85	Church Ln	87	2	2	0.0	0	0%	Flow within 100vph	Yes
	86	High St W	85	High St E	2056	778	756	0.8	-22	3%	Flow within 15%	Yes
High Street / Camilla Close	2056	High Street W	86	Camilla Close	2055	14	12	0.6	-2	14%	Flow within 100vph	Yes
	2056	High Street W	86	High Street E	2054	759	744	0.5	-15	2%	Flow within 15%	Yes
	2056	Camilla Close	2055	High Street W	86	7	9	0.7	2	29%	Flow within 100vph	Yes
	2056	Camilla Close	2055	High Street E	2054	34	28	1.1	-6	18%	Flow within 100vph	Yes
	2056	High Street E	2054	High Street W	86	399	407	0.4	8	2%	Flow within 100vph	Yes
	2056	High Street E	2054	Camilla Close	2055	37	26	2.0	-11	30%	Flow within 100vph	Yes
High Street / Orchard End	2054	High Street W	2056	Orchard End	2053	237	225	0.8	-12	5%	Flow within 100vph	Yes
	2054	High Street W	2056	High Street E	91	555	546	0.4	-9	2%	Flow within 100vph	Yes
	2054	Orchard End	2053	High Street W	2056	208	213	0.3	5	2%	Flow within 100vph	Yes
	2054	Orchard End	2053	High Street E	91	22	22	0.0	0	0%	Flow within 100vph	Yes
	2054	High Street E	91	High Street W	2056	227	219	0.5	-8	4%	Flow within 100vph	Yes
	2054	High Street E	91	Orchard End	2053	4	4	0.0	0	0%	Flow within 100vph	Yes
Salisbury Rd / A3208 / Double Hedges	91	Salisbury Rd N	90	Double Hedges	2022	21	27	1.2	6	29%	Flow within 100vph	Yes
	91	Salisbury Rd N	90	Salisbury Rd S	2023	214	227	0.9	13	6%	Flow within 100vph	Yes
	91	Salisbury Rd N	90	A3028	2054	7	4	1.3	-3	43%	Flow within 100vph	Yes
	91	Double Hedges	2022	Salisbury Rd N	90	3	5	1.0	2	67%	Flow within 100vph	Yes
	91	Double Hedges	2022	Salisbury Rd S	2023	98	110	1.2	12	12%	Flow within 100vph	Yes
	91	Double Hedges	2022	A3028	2054	47	39	1.2	-8	17%	Flow within 100vph	Yes
	91	Salisbury Rd S	2023	Salisbury Rd N	90	108	147	3.5	39	36%	Flow within 100vph	Yes
	91	Salisbury Rd S	2023	Double Hedges	2022	9	15	1.7	6	67%	Flow within 100vph	Yes
	91	Salisbury Rd S	2023	A3028	2054	172	180	0.6	8	5%	Flow within 100vph	Yes
	91	A3028	2054	Salisbury Rd N	90	8	14	1.8	6	75%	Flow within 100vph	Yes
	91	A3028	2054	Double Hedges	2022	164	163	0.1	-1	1%	Flow within 100vph	Yes
	91	A3028	2054	Salisbury Rd S	2023	422	392	1.5	-30	7%	Flow within 100vph	Yes
The Packway / Rollestone Camp / B3086	65	Rollestone Camp	2002	The Packway E	66	7	7	0.0	0	0%	Flow within 100vph	Yes
	65	Rollestone Camp	2002	B3086	103	8	10	0.7	2	25%	Flow within 100vph	Yes
	65	Rollestone Camp	2002	The Packway W	2001	7	10	1.0	3	43%	Flow within 100vph	Yes
	65	The Packway E	66	Rollestone Camp	2002	8	8	0.0	0	0%	Flow within 100vph	Yes
	65	The Packway E	66	B3086	103	58	51	0.9	-7	12%	Flow within 100vph	Yes
	65	The Packway E	66	The Packway W	2001	59	72	1.6	13	22%	Flow within 100vph	Yes
	65	B3086	103	Rollestone Camp	2002	21	20	0.2	-1	5%	Flow within 100vph	Yes
	65	B3086	103	The Packway E	66	170	178	0.6	8	5%	Flow within 100vph	Yes
	65	B3086	103	The Packway W	2001	25	20	1.1	-5	20%	Flow within 100vph	Yes
	65	The Packway W	2001	Rollestone Camp	2002	9	8	0.3	-1	11%	Flow within 100vph	Yes
	65	The Packway W	2001	The Packway E	66	212	234	1.5	22	10%	Flow within 100vph	Yes
	65	The Packway W	2001	B3086	103	29	29	0.0	0	0%	Flow within 100vph	Yes
A360 / Stonehenge / B3086	103	B3086	65	Stonehenge	102	5	2	1.6	-3	60%	Flow within 100vph	Yes
	103	B3086	65	A360 S	2036	79	81	0.2	2	3%	Flow within 100vph	Yes
	103	B3086	65	A360 W	2037	10	5	1.8	-5	50%	Flow within 100vph	Yes
	103	Stonehenge	102	B3086	65	1	0	1.4	-1	100%	Flow within 100vph	Yes
	103	Stonehenge	102	A360 S	2036	4	6	0.9	2	50%	Flow within 100vph	Yes
	103	Stonehenge	102	A360 W	2037	2	4	1.2	2	100%	Flow within 100vph	Yes
	103	A360 S	2036	B3086	65	196	206	0.7	10	5%	Flow within 100vph	Yes
	103	A360 S	2036	Stonehenge	102	19	26	1.5	7	37%	Flow within 100vph	Yes
	103	A360 S	2036	A360 W	2037	279	320	2.4	41	15%	Flow within 100vph	Yes
	103	A360 W	2037	B3086	65	12	14	0.6	2	17%	Flow within 100vph	Yes
	103	A360 W	2037	Stonehenge	102	8	12	1.3	4	50%	Flow within 100vph	Yes
	103	A360 W	2037	A360 S	2036	712	773	2.2	61	9%	Flow within 15%	Yes
The Packway / Watson Rd	68	Watson Rd	2005	The Packway E	69	3	3	0.0	0	0%	Flow within 100vph	Yes
	68	Watson Rd	2005	The Packway W	67	1	2	0.8	1	100%	Flow within 100vph	Yes
	68	The Packway E	69	The Packway W	67	310	288	1.3	-22	7%	Flow within 100vph	Yes
	68	The Packway W	67	The Packway E	69	315	317	0.1	2	1%	Flow within 100vph	Yes
The Packway / Wilson Rd	69	The Packway E	70	Wilson Rd	2031	84	79	0.6	-5	6%	Flow within 100vph	Yes
	69	The Packway E	70	The Packway W	68	296	282	0.8	-14	5%	Flow within 100vph	Yes
	69	Wilson Rd	2031	The Packway E	70	28	40	2.1	12	43%	Flow within 100vph	Yes
	69	Wilson Rd	2031	The Packway W	68	12	4	2.8	-8	67%	Flow within 100vph	Yes
	69	The Packway W	68	The Packway E	70	291	294	0.2	3	1%	Flow within 100vph	Yes
	69	The Packway W	68	Wilson Rd	2031	27	25	0.4	-2	7%	Flow within 100vph	Yes
The Packway / Unamed Rd	70	Unamed Rd	2006	The Packway E	2060	0	0	0.0	0	0%	Flow within 100vph	Yes
	70	Unamed Rd	2006	The Packway W	69	0	0	0.0	0	0%	Flow within 100vph	Yes
	70	The Packway E	2060	Unamed Rd	2006	0	0	0.0	0	0%	Flow within 100vph	Yes
	70	The Packway E	2060	The Packway W	69	383	360	1.2	-23	6%	Flow within 100vph	Yes
	70	The Packway W	69	Unamed Rd	2006	0	0	0.0	0	0%	Flow within 100vph	Yes
	70	The Packway W	69	The Packway E	2060	320	337	0.9	17	5%	Flow within 100vph	Yes
Countess Rd / Fargo Rd	2038	Countess Rd N	2024	Countess Rd S	2040	515	635	5.0	120	23%	Flow within 100vph	No
	2038	Countess Rd N	2024	Fargo Rd	2041	297	291	0.3	-6	2%	Flow within 100vph	Yes
	2038	Countess Rd S	2040	Countess Rd N	2024	371	389	0.9	18	5%	Flow within 100vph	Yes
	2038	Countess Rd S	2040	Fargo Rd	2041	291	285	0.4	-6	2%	Flow within 100vph	Yes
	2038	Fargo Rd	2041	Countess Rd N	2024	235	227	0.5	-8	3%	Flow within 100vph	Yes
	2038	Fargo Rd	2041	Countess Rd S	2040	205	179	1.9	-26	13%	Flow within 100vph	Yes
The Packway / Shops Entrance	2060	The Packway E	71	Shops	2062	33	40	1.2	7	21%	Flow within 100vph	Yes
	2060	The Packway E	71	The Packway W	70	377	359	0.9	-18	5%	Flow within 100vph	Yes
	2060	The Packway W	70	Shops	2062	34	32	0.3	-2	6%	Flow within 100vph	Yes
	2060	The Packway W	70	The Packway E	71	285	305	1.2	20	7%	Flow within 100vph	Yes
The Packway / Alanbrooke Rd	71	The Packway E	74	Alanbrooke Rd	2030	16	16	0.0	0	0%	Flow within 100vph	Yes
	71	The Packway E	74	The Packway W	2060	378	372	0.3	-6	2%	Flow within 100vph	Yes
	71	Alanbrooke Rd	2030	The Packway E	74	66	65	0.1	-1	2%	Flow within 100vph	Yes
	71	Alanbrooke Rd	2030	The Packway W	2060	33	28	0.9	-5	15%	Flow within 100vph	Yes
	71	The Packway W	2060	The Packway E	74	278	300	1.3	22	8%	Flow within 100vph	Yes
	71	The Packway W	2060	Alanbrooke Rd	2030	7	5	0.8	-2	29%	Flow within 100vph	Yes
The Packway / Lightfoot Rd	74	The Packway E	75	Lightfoot Rd	2027	3	6	1.4	3	100%	Flow within 100vph	Yes
	74	The Packway E	75	The Packway W	71	388	382	0.3	-6	2%	Flow within 100vph	Yes
	74	Lightfoot Rd	2027	The Packway E	75	16	15	0.3	-1	6%	Flow within 100vph	Yes
	74	Lightfoot Rd	2027	The Packway W	71	9	8	0.3	-1	11%	Flow within 100vph	Yes
	74	The Packway W	71	The Packway E	75	346	363	0.9	17	5%	Flow within 100vph	Yes
	74	The Packway W	71	Lightfoot Rd	2027	2	0	2.0	-2	100%	Flow within 100vph	Yes

D.7 Neutral Local model turn count IP calibration

Local P'way Closed Network Node Result Table (IP)						10:00 - 16:00 (AVG)			10:00 - 16:00 (AVG)			
						Observed	Modelled	GEH	Diff Flow	% Diff Flow	Diff Requirement	Criteria Fulfilled?
Junction	Node	From	From Node	To	To Node	All	All	All	All	All	All	All
The Packway / Bingham Rd / Ross Rd	66	Ross Rd	2003	The Packway E	67	1	0	1.4	-1	100%	Flow within 100vph	Yes
	66	Ross Rd	2003	Bingham Rd	2033	0	0	0.0	0	0%	Flow within 100vph	Yes
	66	Ross Rd	2003	The Packway W	65	0	0	0.8	0	100%	Flow within 100vph	Yes
	66	The Packway E	67	Ross Rd	2003	1	0	1.3	-1	100%	Flow within 100vph	Yes
	66	The Packway E	67	Bingham Rd	2033	0	0	0.6	0	100%	Flow within 100vph	Yes
	66	The Packway E	67	The Packway W	65	114	101	1.2	-13	11%	Flow within 100vph	Yes
	66	Bingham Rd	2033	Ross Rd	2003	0	0	0.0	0	0%	Flow within 100vph	Yes
	66	Bingham Rd	2033	The Packway E	67	0	0	0.8	0	100%	Flow within 100vph	Yes
	66	Bingham Rd	2033	The Packway W	65	1	0	1.2	-1	100%	Flow within 100vph	Yes
	66	The Packway W	65	Ross Rd	2003	0	0	0.0	0	0%	Flow within 100vph	Yes
	66	The Packway W	65	The Packway E	67	87	81	0.7	-6	7%	Flow within 100vph	Yes
	66	The Packway W	65	Bingham Rd	2033	0	0	0.8	0	100%	Flow within 100vph	Yes
The Packway / Shops Exit	75	Shops	2063	The Packway E	76	30	30	0.1	1	2%	Flow within 100vph	Yes
	75	Shops	2063	The Packway W	74	29	25	0.7	-4	13%	Flow within 100vph	Yes
	75	The Packway E	76	The Packway W	74	186	179	0.5	-7	4%	Flow within 100vph	Yes
	75	The Packway W	74	The Packway E	76	165	134	2.5	-31	19%	Flow within 100vph	Yes
The Packway / Glover Rd	76	Glover Rd	2008	The Packway E	77	61	61	0.1	1	1%	Flow within 100vph	Yes
	76	Glover Rd	2008	The Packway W	75	30	31	0.2	1	4%	Flow within 100vph	Yes
	76	The Packway E	77	Glover Rd	2008	38	37	0.1	-1	1%	Flow within 100vph	Yes
	76	The Packway E	77	The Packway W	75	156	159	0.3	4	2%	Flow within 100vph	Yes
	76	The Packway W	75	Glover Rd	2008	22	20	0.3	-2	7%	Flow within 100vph	Yes
	76	The Packway W	75	The Packway E	77	174	147	2.1	-27	16%	Flow within 100vph	Yes
The Packway / Northern Terrace	77	Northern Terrace	2009	The Packway E	78	0	0	0.0	0	0%	Flow within 100vph	Yes
	77	Northern Terrace	2009	The Packway W	76	0	0	0.0	0	0%	Flow within 100vph	Yes
	77	The Packway E	78	Northern Terrace	2009	9	10	0.3	1	11%	Flow within 100vph	Yes
	77	The Packway E	78	The Packway W	76	195	197	0.2	3	1%	Flow within 100vph	Yes
	77	The Packway W	76	Northern Terrace	2009	20	18	0.5	-2	11%	Flow within 100vph	Yes
	77	The Packway W	76	The Packway E	78	215	191	1.7	-24	11%	Flow within 100vph	Yes
The Packway / Bidulph Rd	78	Bidulph Rd	2010	The Packway E	79	10	9	0.4	-1	11%	Flow within 100vph	Yes
	78	Bidulph Rd	2010	The Packway W	77	13	16	0.7	3	22%	Flow within 100vph	Yes
	78	The Packway E	79	The Packway W	77	189	192	0.2	3	1%	Flow within 100vph	Yes
	78	The Packway W	77	The Packway E	79	215	190	1.7	-25	11%	Flow within 100vph	Yes
The Packway / Wood Rd	79	The Packway E	80	Wood Rd	2026	0	0	0.0	0	0%	Flow within 100vph	Yes
	79	The Packway E	80	The Packway W	78	0	0	0.0	0	0%	Flow within 100vph	Yes
	79	Wood Rd	2026	The Packway E	80	0	0	0.0	0	0%	Flow within 100vph	Yes
	79	Wood Rd	2026	The Packway W	78	191	191	0.0	0	0%	Flow within 100vph	Yes
	79	The Packway W	78	The Packway E	80	0	0	0.0	0	0%	Flow within 100vph	Yes
	79	The Packway W	78	Wood Rd	2026	226	198	1.9	-28	12%	Flow within 100vph	Yes
The Packway / A345 / Countess Rd / Larkhill Rd Roundabout	81	A345	2011	Larkhill Rd	82	26	25	0.3	-1	5%	Flow within 100vph	Yes
	81	A345	2011	Countess Rd	2024	176	174	0.1	-2	1%	Flow within 100vph	Yes
	81	A345	2011	The Packway	80	1	0	1.3	-1	100%	Flow within 100vph	Yes
	81	Larkhill Rd	82	A345	2011	44	45	0.2	1	3%	Flow within 100vph	Yes
	81	Larkhill Rd	82	Countess Rd	2024	187	198	0.8	11	6%	Flow within 100vph	Yes
	81	Larkhill Rd	82	The Packway	80	3	0	2.4	-3	100%	Flow within 100vph	Yes
	81	Countess Rd	2024	A345	2011	175	173	0.1	-2	1%	Flow within 100vph	Yes
	81	Countess Rd	2024	Larkhill Rd	82	194	197	0.2	3	2%	Flow within 100vph	Yes
	81	Countess Rd	2024	Countess Rd	2024	14	16	0.7	3	19%	Flow within 100vph	Yes
	81	Countess Rd	2024	The Packway	80	8	0	3.9	-8	100%	Flow within 100vph	Yes
	81	The Packway	80	A345	2011	1	0	1.2	-1	100%	Flow within 100vph	Yes
	81	The Packway	80	Larkhill Rd	82	1	0	1.5	-1	100%	Flow within 100vph	Yes
	81	The Packway	80	Countess Rd	2024	11	0	4.7	-11	100%	Flow within 100vph	Yes
Stongehenge Rd / Larkhill Rd	82	Stonehenge Rd	2012	Larkhill Rd E	83	16	16	0.1	1	3%	Flow within 100vph	Yes
	82	Stonehenge Rd	2012	Larkhill Rd W	81	65	67	0.3	2	4%	Flow within 100vph	Yes
	82	Larkhill Rd E	83	Stonehenge Rd	2012	19	21	0.6	3	14%	Flow within 100vph	Yes
	82	Larkhill Rd E	83	Larkhill Rd W	81	170	174	0.3	4	2%	Flow within 100vph	Yes
	82	Larkhill Rd W	81	Stonehenge Rd	2012	80	77	0.3	-3	3%	Flow within 100vph	Yes
	82	Larkhill Rd W	81	Larkhill Rd E	83	143	147	0.3	4	3%	Flow within 100vph	Yes
Larkhill Rd / Philip Rd	84	Philip Rd	2014	Larkhill Rd E	85	12	12	0.1	1	4%	Flow within 100vph	Yes
	84	Philip Rd	2014	Larkhill Rd W	83	7	6	0.4	-1	14%	Flow within 100vph	Yes
	84	Larkhill Rd E	85	Philip Rd	2014	13	12	0.4	-1	10%	Flow within 100vph	Yes
	84	Larkhill Rd E	85	Larkhill Rd W	83	183	182	0.1	-1	1%	Flow within 100vph	Yes
	84	Larkhill Rd W	83	Philip Rd	2014	11	11	0.1	0	3%	Flow within 100vph	Yes
	84	Larkhill Rd W	83	Larkhill Rd E	85	151	150	0.1	-1	1%	Flow within 100vph	Yes
The Packway / Willoughby Rd / Watson Rd	67	Watson Rd	2004	The Packway E	68	72	68	0.4	-4	5%	Flow within 100vph	Yes
	67	Watson Rd	2004	Willoughby Rd	2032	8	12	1.4	5	60%	Flow within 100vph	Yes
	67	Watson Rd	2004	The Packway W	66	27	24	0.7	-3	12%	Flow within 100vph	Yes
	67	The Packway E	68	Watson Rd	2004	43	46	0.4	3	7%	Flow within 100vph	Yes
	67	The Packway E	68	Willoughby Rd	2032	10	9	0.2	-1	7%	Flow within 100vph	Yes
	67	The Packway E	68	The Packway W	66	81	71	1.1	-10	12%	Flow within 100vph	Yes
	67	Willoughby Rd	2032	Watson Rd	2004	7	4	1.4	-3	45%	Flow within 100vph	Yes
	67	Willoughby Rd	2032	The Packway E	68	26	16	2.1	-10	37%	Flow within 100vph	Yes
	67	Willoughby Rd	2032	The Packway W	66	9	8	0.2	-1	6%	Flow within 100vph	Yes
	67	The Packway W	66	Watson Rd	2004	19	19	0.1	0	2%	Flow within 100vph	Yes
	67	The Packway W	66	The Packway E	68	68	56	1.6	-12	18%	Flow within 100vph	Yes
	67	The Packway W	66	Willoughby Rd	2032	4	5	0.7	2	43%	Flow within 100vph	Yes
Bulford Hill / Larkhill Rd	85	Bulford Rd	2015	Bulford Hill	86	142	141	0.1	-1	0%	Flow within 100vph	Yes
	85	Bulford Hill	86	Bulford Rd	2015	141	143	0.2	3	2%	Flow within 100vph	Yes
	85	Bulford Rd	2015	Larkhill Rd	84	54	56	0.2	2	3%	Flow within 100vph	Yes
	85	Bulford Hill	86	Larkhill Rd	84	144	141	0.2	-3	2%	Flow within 100vph	Yes
	85	Larkhill Rd	84	Bulford Rd	2015	57	58	0.2	1	2%	Flow within 100vph	Yes
	85	Larkhill Rd	84	Bulford Hill	86	98	102	0.4	4	4%	Flow within 100vph	Yes
High Street / Church Lane	86	Church Ln	87	High St E	2056	2	3	0.4	1	29%	Flow within 100vph	Yes
	86	Church Ln	87	High St W	85	2	0	1.7	-2	100%	Flow within 100vph	Yes
	86	High St E	2056	Church Ln	87	1	0	1.6	-1	100%	Flow within 100vph	Yes
	86	High St E	2056	High St W	85	284	283	0.0	-1	0%	Flow within 100vph	Yes
	86	High St W	85	Church Ln	87	1	3	1.1	2	125%	Flow within 100vph	Yes
	86	High St W	85	High St E	2056	241	242	0.1	2	1%	Flow within 100vph	Yes
High Street / Camilla Close	2056	High Street W	86	Camilla Close	2055	3	4	0.6	1	41%	Flow within 100vph	Yes
	2056	High Street W	86	High Street E	2054	241	241	0.0	0	0%	Flow within 100vph	Yes
	2056	Camilla Close	2055	High Street W	86	4	4	0.1	0	4%	Flow within 100vph	Yes
	2056	Camilla Close	2055	High Street E	2054	6	6	0.1	0	3%	Flow within 100vph	Yes
	2056	High Street E	2054	High Street W	86	280	279	0.1	-1	0%	Flow within 100vph	Yes
	2056	High Street E	2054	Camilla Close	2055	6	8	0.7	2	30%	Flow within 100vph	Yes
High Street / Orchard End	2054	High Street W	2056	Orchard End	2053	88	86	0.2	-2	2%	Flow within 100vph	Yes
	2054	High Street W	2056	High Street E	91	158	164	0.5	7	4%	Flow within 100vph	Yes
	2054	Orchard End	2053	High Street W	2056	101	101	0.0	0	0%	Flow within 100vph	Yes
	2054	Orchard End	2053	High Street E	91	8	6	0.6	-2	22%	Flow within 100vph	Yes
	2054	High Street E	91	High Street W	2056	184	186	0.1	2	1%	Flow within 100vph	Yes
	2054	High Street E	91	Orchard End	2053	6	7	0.3	1	11%	Flow within 100vph	Yes
Salisbury Rd / A3208 / Double Hedges	91	Salisbury Rd N	90	Double Hedges	2022	8	8	0.1	0	2%	Flow within 100vph	Yes
	91	Salisbury Rd N	90	Salisbury Rd S	2023	109	113	0.4	4	4%	Flow within 100vph	Yes
	91	Salisbury Rd N	90	A3028	2054	4	4	0.1	0	4%	Flow within 100vph	Yes
	91	Double Hedges	2022	Salisbury Rd N	90	3	4	0.4	1	26%	Flow within 100vph	Yes
	91	Double Hedges	2022	Salisbury Rd S	2023	95	97	0.2	2	2%	Flow within 100vph	Yes
	91	Double Hedges	2022	A3028	2054	32	28	0.7	-4	13%	Flow within 100vph	Yes
	91	Salisbury Rd S	2023	Salisbury Rd N	90	111	113	0.2	2	2%	Flow within 100vph	Yes
	91	Salisbury Rd S	2023	Double Hedges	2022	11	12	0.2	1	7%	Flow within 100vph	Yes
	91	Salisbury Rd S	2023	A3028	2054	157	160	0.3	4	2%	Flow within 100vph	Yes
	91	A3028	2054	Salisbury Rd N	90	8	7	0.2	-1	9%	Flow within 100vph	Yes
	91	A3028	2054	Double Hedges	2022	34	34	0.0	0	0%	Flow within 100vph	Yes
	91	A3028	2054	Salisbury Rd S	2023	125	130	0.4	5	4%	Flow within 100vph	Yes
The Packway / Rollestone Camp / B3086	65	Rollestone Camp	2002	The Packway E	66	8	8	0.0	0	0%	Flow within 100vph	Yes
	65	Rollestone Camp	2002	B3086	103	10	9	0.2	-1	7%	Flow within 100vph	Yes
	65	Rollestone Camp	2002	The Packway W	2001	6	7	0.6	2	27%	Flow within 100vph	Yes
	65	The Packway E	66	Rollestone Camp	2002	7	4	1.1	-3	38%	Flow within 100vph	Yes
	65	The Packway E	66	B3086	103	46	44	0.3	-2	5%	Flow within 100vph	Yes
	65	The Packway E	66	The Packway W	2001	57	55	0.3	-2	4%	Flow within 100vph	Yes
	65	B3086	103	Rollestone Camp	2002	6	7	0.3	1	14%	Flow within 100vph	Yes
	65	B3086	103	The Packway E	66	32	27	0.9	-5	16%	Flow within 100vph	Yes
	65	B3086	103	The Packway W	2001	8	8	0.1	0	2%	Flow within 100vph	Yes
	65	The Packway W	2001	Rollestone Camp	2002	6	6	0.1	0	6%	Flow within 100vph	Yes
	65	The Packway W	2001	The Packway E	66	43	46	0.5	4	8%	Flow within 100vph	Yes
	65	The Packway W	2001	B3086	103	13	12	0.2	-1	5%	Flow within 100vph	Yes
A360 / Stonehenge / B3086	103	B3086	65	Stonehenge	102	5	4	0.5	-1	23%	Flow within 100vph	Yes
	103	B3086	65	A360 S	2036	72	57	1.9	-15	21%	Flow within 100vph	Yes
	103	B3086	65	A360 W	2037	9	4	1.8	-5	53%	Flow within 100vph	Yes
	103	Stonehenge	102	B3086	65	3	0	2.3	-3	100%	Flow within 100vph	Yes
	103	Stonehenge	102	A360 S	2036	65	70	0.6	5	7%	Flow within 100vph	Yes
	103	Stonehenge	102	A360 W	2037	17	16	0.1	-1	3%	Flow within 100vph	Yes
	103	A360 S	2036	B3086	65	42	37	0.7	-5	11%	Flow within 100vph	Yes
	103	A360 S	2036	Stonehenge	102	91	90	0.1	-1	1%	Flow within 100vph	Yes
	103	A360 S	2036	A360 W	2037	214	213	0.1	-1	0%	Flow within 100vph	Yes
	103	A360 W	2037	B3086	65	5	4	0.4	-1	17%	Flow within 100vph	Yes
	103	A360 W	2037	Stonehenge	102	14	14	0.0	0	1%	Flow within 100vph	Yes
	103	A360 W	2037	A360 S	2036	219	221	0.1	2	1%	Flow within 100vph	Yes
The Packway / Watson Rd	68	Watson Rd	2005	The Packway E	69	6	7	0.5	1	20%	Flow within 100vph	Yes
	68	Watson Rd	2005	The Packway W	67	2	3	1.0	2	100%	Flow within 100vph	Yes
	68	The Packway E	69	The Packway W	67	133	124	0.8	-9	7%	Flow within 100vph	Yes
	68	The Packway W	67	The Packway E	69	165	139	2.1	-26	16%	Flow within 100vph	Yes
The Packway / Wilson Rd	69	The Packway E	70	Wilson Rd	2031	37	35	0.3	-2	5%	Flow within 100vph	Yes
	69	The Packway E	70	The Packway W	68	126	119	0.6	-7	5%	Flow within 100vph	Yes
	69	Wilson Rd	2031	The Packway E	70	16	18	0.6	2	15%	Flow within 100vph	Yes
	69	Wilson Rd	2031	The Packway W	68	7	4	1.1	-3	38%	Flow within 100vph	Yes
	69	The Packway W	68	The Packway E	70	159	132	2.2	-27	17%	Flow within 100vph	Yes
	69	The Packway W	68	Wilson Rd	2031	11	11	0.1	0	3%	Flow within 100vph	Yes
The Packway / Unamed Rd	70	Unamed Rd	2006	The Packway E	2060	0	0	0.0	0	0%	Flow within 100vph	Yes
	70	Unamed Rd	2006	The Packway W	69	0	0	0.0	0	0%	Flow within 100vph	Yes
	70	The Packway E	2060	Unamed Rd	2006	0	0	0.0	0	0%	Flow within 100vph	Yes
	70	The Packway E	2060	The Packway W	69	164	153	0.9	-11	7%	Flow within 100vph	Yes
	70	The Packway W	69	Unamed Rd	2006	0	0	0.0	0	0%	Flow within 100vph	Yes
	70	The Packway W	69	The Packway E	2060	175	149	2.1	-26	15%	Flow within 100vph	Yes
Countess Rd / Fargo Rd	2038	Countess Rd N	2024	Countess Rd S	2040	269	273	0.3	4	2%	Flow within 100vph	Yes
	2038	Countess Rd N	2024	Fargo Rd	2041	122	112	0.9	-10	8%	Flow within 100vph	Yes
	2038	Countess Rd S	2040	Countess Rd N	2024	282	287	0.3	5	2%	Flow within 100vph	Yes
	2038	Countess Rd S	2040	Fargo Rd	2041	91	90	0.1	-1	1%	Flow within 100vph	Yes
	2038	Fargo Rd	2041	Countess Rd N	2024	109	97	1.2	-12	11%	Flow within 100vph	Yes
	2038	Fargo Rd	2041	Countess Rd S	2040	128	116	1.1	-12	9%	Flow within 100vph	Yes
The Packway / Shops Entrance	2060	The Packway E	71	Shops	2062	32	28	0.8	-4	13%	Flow within 100vph	Yes
	2060	The Packway E	71	The Packway W	70	163	153	0.8	-10	6%	Flow within 100vph	Yes
	2060	The Packway W	70	Shops	2062	28	27	0.2	-1	4%	Flow within 100vph	Yes
	2060	The Packway W	70	The Packway E	71	148	119	2.5	-29	20%	Flow within 100vph	Yes
The Packway / Alanbrooke Rd	71	The Packway E	74	Alanbrooke Rd	2030	22	20	0.4	-2	8%	Flow within 100vph	Yes
	71	The Packway E	74	The Packway W	2060	185	174	0.8	-11	6%	Flow within 100vph	Yes
	71	Alanbrooke Rd	2030	The Packway E	74	24	20	0.8	-4	16%	Flow within 100vph	Yes
	71	Alanbrooke Rd	2030	The Packway W	2060	11	10	0.2	-1	5%	Flow within 100vph	Yes
	71	The Packway W	2060	The Packway E	74	141	114	2.4	-27	19%	Flow within 100vph	Yes
	71	The Packway W	2060	Alanbrooke Rd	2030	7	4	1.4	-3	45%	Flow within 100vph	Yes
The Packway / Lightfoot Rd	74	The Packway E	75	Lightfoot Rd	2027	11	10	0.4	-1	10%	Flow within 100vph	Yes
	74	The Packway E	75	The Packway W	71	205	194	0.8	-11	5%	Flow within 100vph	Yes
	74	Lightfoot Rd	2027	The Packway E	75	5	4	0.2	-1	11%	Flow within 100vph	Yes
	74	Lightfoot Rd	2027	The Packway W	71	3	0	2.4	-3	100%	Flow within 100vph	Yes
	74	The Packway W	71	The Packway E	75	161	131	2.5	-30	19%	Flow within 100vph	Yes
	74	The Packway W	71	Lightfoot Rd	2027	4	4	0.1	0	4%	Flow within 100vph	Yes

D.8 Neutral Local model turn count PM calibration

Local P'way Closed Network Node Result Table (PM)						17:00			17:00			
						Observed	Modelled	GEH	Diff Flow	% Diff Flow	Diff Requirement	Criteria Fulfilled?
Junction	Node	From	From Node	To	To Node	All	All	All	All	All	All	All
The Packway / Bingham Rd / Ross Rd	66	Ross Rd	2003	The Packway E	67	2	2	0.0	0	0%	Flow within 100vph	Yes
	66	Ross Rd	2003	Bingham Rd	2033	0	0	0.0	0	0%	Flow within 100vph	Yes
	66	Ross Rd	2003	The Packway W	65	0	0	0.0	0	0%	Flow within 100vph	Yes
	66	The Packway E	67	Ross Rd	2003	0	0	0.0	0	0%	Flow within 100vph	Yes
	66	The Packway E	67	Bingham Rd	2033	0	0	0.0	0	0%	Flow within 100vph	Yes
	66	The Packway E	67	The Packway W	65	361	354	0.4	-7	2%	Flow within 100vph	Yes
	66	Bingham Rd	2033	Ross Rd	2003	0	0	0.0	0	0%	Flow within 100vph	Yes
	66	Bingham Rd	2033	The Packway E	67	1	0	1.4	-1	100%	Flow within 100vph	Yes
	66	Bingham Rd	2033	The Packway W	65	0	0	0.0	0	0%	Flow within 100vph	Yes
	66	The Packway W	65	Ross Rd	2003	0	0	0.0	0	0%	Flow within 100vph	Yes
	66	The Packway W	65	The Packway E	67	101	92	0.9	-9	9%	Flow within 100vph	Yes
	66	The Packway W	65	Bingham Rd	2033	0	0	0.0	0	0%	Flow within 100vph	Yes
The Packway / Shops Exit	75	Shops	2063	The Packway E	76	25	25	0.0	0	0%	Flow within 100vph	Yes
	75	Shops	2063	The Packway W	74	21	20	0.2	-1	5%	Flow within 100vph	Yes
	75	The Packway E	76	The Packway W	74	389	378	0.6	-11	3%	Flow within 100vph	Yes
	75	The Packway W	74	The Packway E	76	205	192	0.9	-13	6%	Flow within 100vph	Yes
The Packway / Glover Rd	76	Glover Rd	2008	The Packway E	77	131	128	0.3	-3	2%	Flow within 100vph	Yes
	76	Glover Rd	2008	The Packway W	75	61	60	0.1	-1	2%	Flow within 100vph	Yes
	76	The Packway E	77	Glover Rd	2008	36	37	0.2	1	3%	Flow within 100vph	Yes
	76	The Packway E	77	The Packway W	75	334	314	1.1	-20	6%	Flow within 100vph	Yes
	76	The Packway W	75	Glover Rd	2008	18	17	0.2	-1	6%	Flow within 100vph	Yes
	76	The Packway W	75	The Packway E	77	215	201	1.0	-14	7%	Flow within 100vph	Yes
The Packway / Northern Terrace	77	Northern Terrace	2009	The Packway E	78	0	0	0.0	0	0%	Flow within 100vph	Yes
	77	Northern Terrace	2009	The Packway W	76	1	0	1.4	-1	100%	Flow within 100vph	Yes
	77	The Packway E	78	Northern Terrace	2009	11	10	0.3	-1	9%	Flow within 100vph	Yes
	77	The Packway E	78	The Packway W	76	370	350	1.1	-20	5%	Flow within 100vph	Yes
	77	The Packway W	76	Northern Terrace	2009	17	16	0.2	-1	6%	Flow within 100vph	Yes
	77	The Packway W	76	The Packway E	78	325	314	0.6	-11	3%	Flow within 100vph	Yes
The Packway / Bidulph Rd	78	Bidulph Rd	2010	The Packway E	79	14	13	0.3	-1	7%	Flow within 100vph	Yes
	78	Bidulph Rd	2010	The Packway W	77	8	8	0.0	0	0%	Flow within 100vph	Yes
	78	The Packway E	79	The Packway W	77	370	353	0.9	-17	5%	Flow within 100vph	Yes
	78	The Packway W	77	The Packway E	79	328	313	0.8	-15	5%	Flow within 100vph	Yes
The Packway / Wood Rd	79	The Packway E	80	Wood Rd	2026	0	0	0.0	0	0%	Flow within 100vph	Yes
	79	The Packway E	80	The Packway W	78	0	0	0.0	0	0%	Flow within 100vph	Yes
	79	Wood Rd	2026	The Packway E	80	0	0	0.0	0	0%	Flow within 100vph	Yes
	79	Wood Rd	2026	The Packway W	78	370	351	1.0	-19	5%	Flow within 100vph	Yes
	79	The Packway W	78	The Packway E	80	0	0	0.0	0	0%	Flow within 100vph	Yes
	79	The Packway W	78	Wood Rd	2026	342	326	0.9	-16	5%	Flow within 100vph	Yes
The Packway / A345 / Countess Rd / Larkhill Rd Roundabout	81	A345	2011	Larkhill Rd	82	44	42	0.3	-2	5%	Flow within 100vph	Yes
	81	A345	2011	Countess Rd	2024	257	259	0.1	2	1%	Flow within 100vph	Yes
	81	A345	2011	The Packway	80	0	0	0.0	0	0%	Flow within 100vph	Yes
	81	Larkhill Rd	82	A345	2011	79	82	0.3	3	4%	Flow within 100vph	Yes
	81	Larkhill Rd	82	Countess Rd	2024	214	232	1.2	18	8%	Flow within 100vph	Yes
	81	Larkhill Rd	82	The Packway	80	0	0	0.0	0	0%	Flow within 100vph	Yes
	81	Countess Rd	2024	A345	2011	336	332	0.2	-4	1%	Flow within 100vph	Yes
	81	Countess Rd	2024	Larkhill Rd	82	379	372	0.4	-7	2%	Flow within 100vph	Yes
	81	Countess Rd	2024	Countess Rd	2024	15	17	0.5	2	13%	Flow within 100vph	Yes
	81	Countess Rd	2024	The Packway	80	0	0	0.0	0	0%	Flow within 100vph	Yes
	81	The Packway	80	A345	2011	3	0	2.4	-3	100%	Flow within 100vph	Yes
	81	The Packway	80	Larkhill Rd	82	2	0	2.0	-2	100%	Flow within 100vph	Yes
	81	The Packway	80	Countess Rd	2024	5	0	3.2	-5	100%	Flow within 100vph	Yes
Stongehenge Rd / Larkhill Rd	82	Stonehenge Rd	2012	Larkhill Rd E	83	27	23	0.8	-4	15%	Flow within 100vph	Yes
	82	Stonehenge Rd	2012	Larkhill Rd W	81	86	88	0.2	2	2%	Flow within 100vph	Yes
	82	Larkhill Rd E	83	Stonehenge Rd	2012	41	41	0.0	0	0%	Flow within 100vph	Yes
	82	Larkhill Rd E	83	Larkhill Rd W	81	211	224	0.9	13	6%	Flow within 100vph	Yes
	82	Larkhill Rd W	81	Stonehenge Rd	2012	204	199	0.4	-5	2%	Flow within 100vph	Yes
	82	Larkhill Rd W	81	Larkhill Rd E	83	221	216	0.3	-5	2%	Flow within 100vph	Yes
Larkhill Rd / Philip Rd	84	Philip Rd	2014	Larkhill Rd E	85	8	8	0.0	0	0%	Flow within 100vph	Yes
	84	Philip Rd	2014	Larkhill Rd W	83	6	5	0.4	-1	17%	Flow within 100vph	Yes
	84	Larkhill Rd E	85	Philip Rd	2014	33	34	0.2	1	3%	Flow within 100vph	Yes
	84	Larkhill Rd E	85	Larkhill Rd W	83	246	264	1.1	18	7%	Flow within 100vph	Yes
	84	Larkhill Rd W	83	Philip Rd	2014	14	12	0.6	-2	14%	Flow within 100vph	Yes
	84	Larkhill Rd W	83	Larkhill Rd E	85	236	225	0.7	-11	5%	Flow within 100vph	Yes
The Packway / Willoughby Rd / Watson Rd	67	Watson Rd	2004	The Packway E	68	68	69	0.1	1	1%	Flow within 100vph	Yes
	67	Watson Rd	2004	Willoughby Rd	2032	7	8	0.4	1	14%	Flow within 100vph	Yes
	67	Watson Rd	2004	The Packway W	66	71	68	0.4	-3	4%	Flow within 100vph	Yes
	67	The Packway E	68	Watson Rd	2004	36	41	0.8	5	14%	Flow within 100vph	Yes
	67	The Packway E	68	Willoughby Rd	2032	17	4	4.0	-13	76%	Flow within 100vph	Yes
	67	The Packway E	68	The Packway W	66	283	266	1.0	-17	6%	Flow within 100vph	Yes
	67	Willoughby Rd	2032	Watson Rd	2004	5	4	0.5	-1	20%	Flow within 100vph	Yes
	67	Willoughby Rd	2032	The Packway E	68	20	14	1.5	-6	30%	Flow within 100vph	Yes
	67	Willoughby Rd	2032	The Packway W	66	11	19	2.1	8	73%	Flow within 100vph	Yes
	67	The Packway W	66	Watson Rd	2004	7	6	0.4	-1	14%	Flow within 100vph	Yes
	67	The Packway W	66	The Packway E	68	91	82	1.0	-9	10%	Flow within 100vph	Yes
	67	The Packway W	66	Willoughby Rd	2032	7	5	0.8	-2	29%	Flow within 100vph	Yes
Bulford Hill / Larkhill Rd	85	Bulford Rd	2015	Bulford Hill	86	235	232	0.2	-3	1%	Flow within 100vph	Yes
	85	Bulford Hill	86	Bulford Rd	2015	322	323	0.1	1	0%	Flow within 100vph	Yes
	85	Bulford Rd	2015	Larkhill Rd	84	64	67	0.4	3	5%	Flow within 100vph	Yes
	85	Bulford Hill	86	Larkhill Rd	84	218	227	0.6	9	4%	Flow within 100vph	Yes
	85	Larkhill Rd	84	Bulford Rd	2015	101	100	0.1	-1	1%	Flow within 100vph	Yes
	85	Larkhill Rd	84	Bulford Hill	86	132	137	0.4	5	4%	Flow within 100vph	Yes
High Street / Church Lane	86	Church Ln	87	High St E	2056	2	0	2.0	-2	100%	Flow within 100vph	Yes
	86	Church Ln	87	High St W	85	2	0	2.0	-2	100%	Flow within 100vph	Yes
	86	High St E	2056	Church Ln	87	3	1	1.4	-2	67%	Flow within 100vph	Yes
	86	High St E	2056	High St W	85	534	549	0.6	15	3%	Flow within 100vph	Yes
	86	High St W	85	Church Ln	87	3	3	0.0	0	0%	Flow within 100vph	Yes
	86	High St W	85	High St E	2056	360	367	0.4	7	2%	Flow within 100vph	Yes
High Street / Camilla Close	2056	High Street W	86	Camilla Close	2055	5	4	0.5	-1	20%	Flow within 100vph	Yes
	2056	High Street W	86	High Street E	2054	357	363	0.3	6	2%	Flow within 100vph	Yes
	2056	Camilla Close	2055	High Street W	86	5	4	0.5	-1	20%	Flow within 100vph	Yes
	2056	Camilla Close	2055	High Street E	2054	17	16	0.2	-1	6%	Flow within 100vph	Yes
	2056	High Street E	2054	High Street W	86	531	544	0.6	13	2%	Flow within 100vph	Yes
	2056	High Street E	2054	Camilla Close	2055	11	13	0.6	2	18%	Flow within 100vph	Yes
High Street / Orchard End	2054	High Street W	2056	Orchard End	2053	140	140	0.0	0	0%	Flow within 100vph	Yes
	2054	High Street W	2056	High Street E	91	235	240	0.3	5	2%	Flow within 100vph	Yes
	2054	Orchard End	2053	High Street W	2056	162	163	0.1	1	1%	Flow within 100vph	Yes
	2054	Orchard End	2053	High Street E	91	11	11	0.0	0	0%	Flow within 100vph	Yes
	2054	High Street E	91	High Street W	2056	380	395	0.8	15	4%	Flow within 100vph	Yes
	2054	High Street E	91	Orchard End	2053	14	13	0.3	-1	7%	Flow within 100vph	Yes
Salisbury Rd / A3208 / Double Hedges	91	Salisbury Rd N	90	Double Hedges	2022	13	13	0.0	0	0%	Flow within 100vph	Yes
	91	Salisbury Rd N	90	Salisbury Rd S	2023	146	148	0.2	2	1%	Flow within 100vph	Yes
	91	Salisbury Rd N	90	A3028	2054	4	4	0.0	0	0%	Flow within 100vph	Yes
	91	Double Hedges	2022	Salisbury Rd N	90	4	4	0.0	0	0%	Flow within 100vph	Yes
	91	Double Hedges	2022	Salisbury Rd S	2023	198	199	0.1	1	1%	Flow within 100vph	Yes
	91	Double Hedges	2022	A3028	2054	59	58	0.1	-1	2%	Flow within 100vph	Yes
	91	Salisbury Rd S	2023	Salisbury Rd N	90	206	206	0.0	0	0%	Flow within 100vph	Yes
	91	Salisbury Rd S	2023	Double Hedges	2022	24	23	0.2	-1	4%	Flow within 100vph	Yes
	91	Salisbury Rd S	2023	A3028	2054	340	346	0.3	6	2%	Flow within 100vph	Yes
	91	A3028	2054	Salisbury Rd N	90	7	7	0.0	0	0%	Flow within 100vph	Yes
	91	A3028	2054	Double Hedges	2022	48	49	0.1	1	2%	Flow within 100vph	Yes
	91	A3028	2054	Salisbury Rd S	2023	189	192	0.2	3	2%	Flow within 100vph	Yes
The Packway / Rollestone Camp / B3086	65	Rollestone Camp	2002	The Packway E	66	5	4	0.5	-1	20%	Flow within 100vph	Yes
	65	Rollestone Camp	2002	B3086	103	9	11	0.6	2	22%	Flow within 100vph	Yes
	65	Rollestone Camp	2002	The Packway W	2001	2	4	1.2	2	100%	Flow within 100vph	Yes
	65	The Packway E	66	Rollestone Camp	2002	3	1	1.4	-2	67%	Flow within 100vph	Yes
	65	The Packway E	66	B3086	103	136	134	0.2	-2	1%	Flow within 100vph	Yes
	65	The Packway E	66	The Packway W	2001	231	223	0.5	-8	3%	Flow within 100vph	Yes
	65	B3086	103	Rollestone Camp	2002	5	8	1.2	3	60%	Flow within 100vph	Yes
	65	B3086	103	The Packway E	66	38	36	0.3	-2	5%	Flow within 100vph	Yes
	65	B3086	103	The Packway W	2001	15	16	0.3	1	7%	Flow within 100vph	Yes
	65	The Packway W	2001	Rollestone Camp	2002	1	0	1.4	-1	100%	Flow within 100vph	Yes
	65	The Packway W	2001	The Packway E	66	54	52	0.3	-2	4%	Flow within 100vph	Yes
	65	The Packway W	2001	B3086	103	20	19	0.2	-1	5%	Flow within 100vph	Yes
A360 / Stonehenge / B3086	103	B3086	65	Stonehenge	102	2	1	0.8	-1	50%	Flow within 100vph	Yes
	103	B3086	65	A360 S	2036	137	140	0.3	3	2%	Flow within 100vph	Yes
	103	B3086	65	A360 W	2037	23	22	0.2	-1	4%	Flow within 100vph	Yes
	103	Stonehenge	102	B3086	65	5	4	0.5	-1	20%	Flow within 100vph	Yes
	103	Stonehenge	102	A360 S	2036	60	63	0.4	3	5%	Flow within 100vph	Yes
	103	Stonehenge	102	A360 W	2037	10	10	0.0	0	0%	Flow within 100vph	Yes
	103	A360 S	2036	B3086	65	45	47	0.3	2	4%	Flow within 100vph	Yes
	103	A360 S	2036	Stonehenge	102	19	22	0.7	3	16%	Flow within 100vph	Yes
	103	A360 S	2036	A360 W	2037	454	453	0.0	-1	0%	Flow within 100vph	Yes
	103	A360 W	2037	B3086	65	8	6	0.8	-2	25%	Flow within 100vph	Yes
	103	A360 W	2037	Stonehenge	102	2	3	0.6	1	50%	Flow within 100vph	Yes
	103	A360 W	2037	A360 S	2036	295	296	0.1	1	0%	Flow within 100vph	Yes
The Packway / Watson Rd	68	Watson Rd	2005	The Packway E	69	8	8	0.0	0	0%	Flow within 100vph	Yes
	68	Watson Rd	2005	The Packway W	67	4	4	0.0	0	0%	Flow within 100vph	Yes
	68	The Packway E	69	The Packway W	67	329	308	1.2	-21	6%	Flow within 100vph	Yes
	68	The Packway W	67	The Packway E	69	179	164	1.1	-15	8%	Flow within 100vph	Yes
The Packway / Wilson Rd	69	The Packway E	70	Wilson Rd	2031	22	22	0.0	0	0%	Flow within 100vph	Yes
	69	The Packway E	70	The Packway W	68	325	301	1.4	-24	7%	Flow within 100vph	Yes
	69	Wilson Rd	2031	The Packway E	70	18	25	1.5	7	39%	Flow within 100vph	Yes
	69	Wilson Rd	2031	The Packway W	68	12	7	1.6	-5	42%	Flow within 100vph	Yes
	69	The Packway W	68	The Packway E	70	175	162	1.0	-13	7%	Flow within 100vph	Yes
	69	The Packway W	68	Wilson Rd	2031	11	10	0.3	-1	9%	Flow within 100vph	Yes
The Packway / Unamed Rd	70	Unamed Rd	2006	The Packway E	2060	0	0	0.0	0	0%	Flow within 100vph	Yes
	70	Unamed Rd	2006	The Packway W	69	0	0	0.0	0	0%	Flow within 100vph	Yes
	70	The Packway E	2060	Unamed Rd	2006	0	0	0.0	0	0%	Flow within 100vph	Yes
	70	The Packway E	2060	The Packway W	69	346	324	1.2	-22	6%	Flow within 100vph	Yes
	70	The Packway W	69	Unamed Rd	2006	0	0	0.0	0	0%	Flow within 100vph	Yes
	70	The Packway W	69	The Packway E	2060	197	185	0.9	-12	6%	Flow within 100vph	Yes
Countess Rd / Fargo Rd	2038	Countess Rd N	2024	Countess Rd S	2040	332	339	0.4	7	2%	Flow within 100vph	Yes
	2038	Countess Rd N	2024	Fargo Rd	2041	181	175	0.4	-6	3%	Flow within 100vph	Yes
	2038	Countess Rd S	2040	Countess Rd N	2024	553	552	0.0	-1	0%	Flow within 100vph	Yes
	2038	Countess Rd S	2040	Fargo Rd	2041	227	228	0.1	1	0%	Flow within 100vph	Yes
	2038	Fargo Rd	2041	Countess Rd N	2024	165	162	0.2	-3	2%	Flow within 100vph	Yes
	2038	Fargo Rd	2041	Countess Rd S	2040	203	197	0.4	-6	3%	Flow within 100vph	Yes
The Packway / Shops Entrance	2060	The Packway E	71	Shops	2062	32	32	0.0	0	0%	Flow within 100vph	Yes
	2060	The Packway E	71	The Packway W	70	337	324	0.7	-13	4%	Flow within 100vph	Yes
	2060	The Packway W	70	Shops	2062	15	16	0.3	1	7%	Flow within 100vph	Yes
	2060	The Packway W	70	The Packway E	71	183	171	0.9	-12	7%	Flow within 100vph	Yes
The Packway / Alanbrooke Rd	71	The Packway E	74	Alanbrooke Rd	2030	43	41	0.3	-2	5%	Flow within 100vph	Yes
	71	The Packway E	74	The Packway W	2060	359	347	0.6	-12	3%	Flow within 100vph	Yes
	71	Alanbrooke Rd	2030	The Packway E	74	26	28	0.4	2	8%	Flow within 100vph	Yes
	71	Alanbrooke Rd	2030	The Packway W	2060	10	8	0.7	-2	20%	Flow within 100vph	Yes
	71	The Packway W	2060	The Packway E	74	176	159	1.3	-17	10%	Flow within 100vph	Yes
	71	The Packway W	2060	Alanbrooke Rd	2030	9	11	0.6	2	22%	Flow within 100vph	Yes
The Packway / Lightfoot Rd	74	The Packway E	75	Lightfoot Rd	2027	12	12	0.0	0	0%	Flow within 100vph	Yes
	74	The Packway E	75	The Packway W	71	395	385	0.5	-10	3%	Flow within 100vph	Yes
	74	Lightfoot Rd	2027	The Packway E	75	8	8	0.0	0	0%	Flow within 100vph	Yes
	74	Lightfoot Rd	2027	The Packway W	71	3	1	1.4	-2	67%	Flow within 100vph	Yes
	74	The Packway W	71	The Packway E	75	197	185	0.9	-12	6%	Flow within 100vph	Yes
	74	The Packway W	71	Lightfoot Rd	2027	3	1	1.4	-2	67%	Flow within 100vph	Yes

Appendix E ATC link validation

E.1 Summer ATC validation

A303 Mainline Network ATC Comparison Table (All Vehicles)

Location:	Site	12:00				13:00				14:00				15:00				16:00				17:00			
		Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH
A303, Great Bathampton	C1 (N-bound)	1003	996	-7	0.1	817	823	6	0.1	933	877	-56	0.9	944	837	-107	1.8	785	732	-53	1.0	1005	1004	-1	0.0
Cottage	C1 (S-bound)	1073	1089	16	0.2	1044	1042	-2	0.0	1157	1066	-91	1.4	1161	1153	-8	0.1	1189	1116	-73	1.1	1171	1104	-67	1.0
A345 Totterdown Clump	C14 (N-bound)	590	565	-25	0.5	557	520	-37	0.8	704	683	-21	0.4	817	803	-14	0.2	971	1024	53	0.8	856	975	119	2.0
	C14 (S-bound)	547	538	-9	0.2	554	573	19	0.4	527	551	24	0.5	506	531	25	0.5	468	456	-12	0.3	501	535	34	0.7
A303 W of Amesbury Road	C17 (E-bound)	1529	1350	-179	2.4	1480	1422	-58	0.8	1519	1366	-153	2.0	1569	1429	-140	1.8	1543	1391	-152	2.0	1543	1371	-172	2.3
	C17 (W-bound)	1612	1565	-47	0.6	1619	1570	-49	0.6	1727	1611	-116	1.4	1811	1684	-127	1.5	2062	1924	-138	1.5	1946	1818	-129	1.5
A303 W of Amesbury Road	C18 (E-bound)	1001	1003	2	0.0	892	1009	117	1.9	948	1024	76	1.2	992	1029	37	0.6	1031	1038	7	0.1	948	1037	89	1.4
	C18 (W-bound)	780	687	-93	1.7	678	694	16	0.3	768	678	-90	1.7	828	806	-22	0.4	834	815	-19	0.3	847	869	22	0.4
B3084, Winscott	C19 (E-bound)	131	130	-1	0.0	136	141	5	0.2	150	169	19	0.8	142	140	-2	0.1	177	185	8	0.3	169	161	-8	0.3
	C19 (W-bound)	149	161	12	0.5	259	272	13	0.4	218	179	-39	1.4	152	166	14	0.6	222	223	1	0.0	237	234	-3	0.1
B3083, south of A303 junction	C2 (N-bound)	36	30	-6	0.5	30	30	-1	0.0	51	44	-7	0.5	62	57	-5	0.3	44	45	1	0.1	42	40	-2	0.2
	C2 (S-bound)	30	21	-9	0.9	35	25	-11	1.0	49	42	-7	0.5	58	59	1	0.1	78	69	-9	0.5	58	65	7	0.4
A338 N of A303	C20 (N-bound)	367	370	3	0.1	417	400	-17	0.4	432	433	1	0.0	456	453	-3	0.1	494	496	1	0.0	505	501	-4	0.1
	C20 (S-bound)	466	507	41	0.9	508	532	24	0.5	509	559	50	1.1	494	502	8	0.2	544	588	44	0.9	433	488	55	1.3
A338 N of Home Farm	C21 (N-bound)	217	212	-5	0.2	219	208	-11	0.4	229	232	3	0.1	232	232	-1	0.0	284	285	1	0.0	256	250	-6	0.2
	C21 (S-bound)	282	280	-2	0.1	290	293	3	0.1	306	303	-3	0.1	321	328	7	0.2	288	297	9	0.3	278	285	7	0.2
Countess Rd S of A303	C23 (N-bound)	469	468	-1	0.0	458	468	10	0.2	492	521	29	0.6	496	502	6	0.1	524	541	17	0.4	539	550	11	0.2
	C23 (S-bound)	396	379	-17	0.4	432	399	-34	0.8	442	457	15	0.3	414	452	38	0.9	446	464	18	0.4	507	537	30	0.7
Countess Rdbt W/B exit	C28 (E-bound)	1209	1209	0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solstice Park Ave: East of Meridian Way	C33 (E-bound)	943	946	3	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
	C33 (W-bound)	1356	1214	-142	2.0	1311	1283	-28	0.4	1386	1238	-148	2.0	1477	1318	-159	2.1	1407	1209	-198	2.7	1372	1246	-126	1.7
A303, south of A36 junction (ANPR site) - video	C37 (N-bound)	206	179	-27	1.0	207	175	-32	1.2	206	190	-16	0.6	211	190	-21	0.7	181	177	-4	0.1	168	169	1	0.0
	C37 (S-bound)	945	839	-107	1.8	917	820	-97	1.6	954	803	-151	2.6	864	742	-122	2.2	848	716	-132	2.4	742	642	-100	1.9
A303 west of Longbarrow Rdbt	C4 (E-bound)	1136	998	-138	2.1	976	819	-157	2.6	1007	878	-129	2.1	1110	837	-273	4.4	909	731	-178	3.1	1069	1008	-61	0.9
	C4 (W-bound)	1179	1092	-87	1.3	1116	1041	-76	1.1	1360	1064	-296	4.2	1260	1150	-110	1.6	1228	1126	-102	1.5	1213	1095	-118	1.7
A303 east of Longbarrow Rdbt	C5 (E-bound)	758	690	-68	1.3	621	692	71	1.4	605	739	134	2.6	626	636	10	0.2	596	683	87	1.7	461	604	143	3.1
	C5 (W-bound)	1049	1050	1	0.0	994	989	-5	0.1	1048	1043	-5	0.1	1033	1112	79	1.2	1043	1060	17	0.3	986	1070	84	1.3
A360 near Cattands Hill	C6 (N-bound)	993	969	-24	0.4	882	1016	134	2.2	948	1019	71	1.1	1042	1033	-9	0.1	1026	1032	6	0.1	946	1042	96	1.5
	C6 (S-bound)	943	857	-86	1.4	894	879	-15	0.2	955	880	-75	1.2	941	1001	60	1.0	1007	1007	0	0.0	987	1038	51	0.8

Local P'way Closed Network ATC Comparison Table (All Vehicles)

Location:	Site	12:00				13:00				14:00				15:00				16:00				17:00			
		Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH
The Packway, Rollestone Clump	C10 (E-bound)	126	139	13	1	134	150	16	1	156	165	9	0	143	163	20	1	168	189	21	1	186	200	14	1
	C10 (W-bound)	201	203	2	0	165	203	38	1	247	283	36	1	331	351	20	1	365	391	26	1	383	378	-5	0
Rollestone Camp access Rd	C11 (N-bound)	20	18	-2	0	11	13	2	0	23	22	-1	0	15	23	8	1	28	25	-3	0	20	19	-1	0
	C11 (S-bound)	12	14	2	0	14	19	5	1	24	18	-6	1	18	18	0	0	22	19	-3	0	18	16	-2	0
The Packway east of Bingham Rd	C12 (W-bound)	458	443	-15	0	396	416	20	0	499	514	15	0	534	579	45	1	601	592	-9	0	558	522	-36	1
	C12 (E-bound)	224	199	-25	1	200	211	11	0	255	235	-20	1	228	234	6	0	253	263	10	0	290	290	0	0
A345, S of Clover Lane	C13 (N-bound)	445	379	-66	2	405	366	-39	1	519	432	-87	2	489	489	0	0	472	486	15	0	455	403	-52	1
	C13 (S-bound)	293	286	-7	0	307	268	-39	1	359	282	-77	2	333	327	-6	0	353	350	-3	0	345	304	-41	1
A345 Totterdown Clump	I4 Local (N-bour	590	578	-12	0	558	613	55	1	709	755	46	1	820	890	70	1	972	947	-25	0	858	831	-27	0
	I4 Local (S-bour	545	550	5	0	555	522	-33	1	518	530	12	0	509	486	-23	1	469	480	11	0	501	521	20	0
A3028, W of Amesbury Rd	C15 (E-bound)	58	63	5	0	60	65	5	0	69	70	1	0	54	65	11	1	65	65	0	0	62	57	-5	0
	C15 (W-bound)	161	147	-14	1	130	133	3	0	138	160	22	1	156	163	7	0	165	135	-30	1	100	99	-1	0
A3028: West of Church Lane	C26 (E-bound)	326	303	-23	1	279	248	-31	1	244	260	16	1	293	322	29	1	330	325	-5	0	302	285	-17	0
	C26 (W-bound)	574	551	-23	0	525	502	-23	1	526	502	-24	1	456	491	35	1	516	490	-26	1	454	436	-18	0
High St: South of London Rd	C32 (S-bound)	292	286	-6	0	270	261	-9	0	280	280	0	0	290	277	-13	0	260	252	-8	0	230	213	-17	1
	C32 (N-bound)	123	105	-18	1	103	112	9	0	133	126	-7	0	145	125	-20	1	125	138	13	1	157	155	-2	0

A303 Mainline Network ATC Comparison Table (Lights)

		12:00				13:00				14:00				15:00				16:00				17:00			
Location	Site	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH
A303, Great Bathampton Cottage	0	937	935	-2	0.0	764	771	7	0.1	885	834	-51	0.9	897	799	-98	1.7	748	698	-50	0.9	964	965	1	0.0
	0	1012	1039	27	0.4	972	982	10	0.2	1080	1008	-72	1.1	1090	1086	-4	0.1	1111	1059	-52	0.8	1139	1064	-75	1.1
A345 Totterdown Clump	0	536	555	19	0.4	513	504	-9	0.2	638	664	26	0.5	751	782	31	0.6	899	1012	113	1.8	811	964	153	2.6
	0	491	517	26	0.6	513	552	39	0.8	472	527	55	1.2	473	509	36	0.8	431	442	11	0.3	473	529	56	1.3
A303 W of Amesbury Road	0	1445	1287	-158	2.1	1384	1346	-38	0.5	1445	1289	-156	2.1	1486	1362	-124	1.6	1484	1336	-148	2.0	1494	1327	-167	2.2
	0	1500	1478	-22	0.3	1509	1479	-30	0.4	1631	1538	-93	1.2	1734	1617	-117	1.4	1992	1868	-124	1.4	1903	1779	-124	1.4
A303 W of Amesbury Road	0	951	949	-2	0.0	828	951	123	2.1	895	960	65	1.1	941	980	39	0.6	980	990	10	0.2	911	992	81	1.3
	0	735	652	-83	1.6	631	658	27	0.5	719	641	-78	1.5	778	764	-14	0.3	787	780	-7	0.1	826	850	24	0.4
B3084, Winscott	0	116	118	2	0.1	117	136	19	0.8	132	161	29	1.2	121	129	8	0.4	166	179	13	0.5	161	160	-1	0.0
	0	132	147	15	0.6	214	252	38	1.2	201	173	-28	1.0	136	153	17	0.7	202	220	18	0.6	224	233	9	0.3
B3083, south of A303 Junction	0	25	28	3	0.3	24	26	2	0.2	40	43	3	0.2	58	57	-1	0.1	42	45	3	0.2	39	39	0	0.0
	0	24	18	-6	0.7	28	22	-6	0.6	45	37	-8	0.6	47	56	9	0.6	73	67	-6	0.4	53	64	11	0.7
A338 N of A303	0	332	351	19	0.5	377	376	-1	0.0	391	412	21	0.5	403	435	32	0.8	461	485	34	0.8	465	491	26	0.6
	0	410	478	68	1.6	461	514	53	1.2	455	533	78	1.8	446	478	32	0.7	500	571	71	1.5	413	482	69	1.6
A338 N of Home Farm	0	198	203	5	0.2	196	197	1	0.0	205	225	20	0.7	211	229	18	0.6	267	281	14	0.4	246	246	0	0.0
	0	232	253	21	0.7	264	285	21	0.6	277	298	21	0.6	290	323	33	0.9	261	291	30	0.9	265	284	19	0.6
Countess Rd S of A303	0	425	444	19	0.5	413	442	29	0.7	447	495	48	1.1	454	476	22	0.5	488	525	37	0.8	521	539	18	0.4
	0	351	361	10	0.3	397	372	-25	0.6	395	433	38	0.9	378	433	55	1.4	394	440	46	1.1	470	511	41	0.9
Countess Rdbt W/B exit	0	1149	1143	-6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solstice Park Ave: East of Meridian Way	0	895	908	13	0.2	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
	0	1290	1149	-141	2.0	1231	1213	-18	0.3	1313	1162	-151	2.1	1410	1249	-161	2.2	1357	1157	-200	2.8	1327	1200	-127	1.8
A303, south of A36 junction (ANPR site) - video	0	192	165	-27	1.0	187	160	-27	1.0	198	176	-22	0.8	196	178	-18	0.7	171	172	1	0.0	153	160	7	0.3
	0	821	781	-40	0.7	808	784	-24	0.4	867	766	-101	1.8	798	711	-87	1.6	753	695	-58	1.1	686	628	-58	1.1
A303 west of Longbarrow Rdbt	0	1080	936	-144	2.3	930	768	-162	2.8	969	836	-133	2.2	1067	799	-268	4.4	873	698	-175	3.1	1029	970	-59	0.9
	0	1135	1041	-94	1.4	1067	982	-85	1.3	1278	1006	-272	4.0	1194	1082	-112	1.7	1153	1069	-84	1.3	1178	1055	-123	1.8
A303 east of Longbarrow Rdbt	0	713	645	-68	1.3	571	642	71	1.4	567	690	123	2.5	591	601	10	0.2	568	643	75	1.5	436	572	136	3.0
	0	989	997	8	0.1	934	934	0	0.0	985	984	-1	0.0	975	1048	73	1.1	997	1002	5	0.1	965	1035	70	1.1
A360 near Oatlands Hill	0	945	916	-29	0.5	826	955	129	2.2	895	959	64	1.1	997	985	-12	0.2	979	984	5	0.1	911	1001	90	1.5
	0	883	807	-76	1.3	837	827	-10	0.2	899	830	-69	1.2	879	936	57	0.9	954	948	-6	0.1	961	1001	40	0.6

Local P'way Closed Network ATC Comparison Table (Lights)

		12:00				13:00				14:00				15:00				16:00				17:00			
Location	Site	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH
The Packway, Rollestone Clump	0	114	128	14	1	116	142	26	1	145	155	10	0	132	156	24	1	153	182	29	1	172	190	18	1
	0	183	196	13	0	143	198	55	2	226	274	48	2	299	339	40	1	337	382	45	1	361	375	14	0
Rollestone Camp access Rd	0	15	15	0	0	7	14	7	1	17	21	4	0	13	22	9	1	25	25	0	0	18	19	1	0
	0	9	14	5	1	10	19	9	1	16	18	2	0	15	18	3	0	17	17	0	0	17	15	-2	0
The Packway east of Bingham Rd	0	396	435	39	1	337	407	70	2	439	505	66	2	468	573	105	2	545	589	44	1	526	520	-7	0
	0	198	195	-3	0	175	204	29	1	232	230	-3	0	206	232	26	1	221	261	40	1	266	288	22	1
A345, S of Clover Lane	0	401	369	-32	1	369	352	-17	0	463	419	-44	1	444	482	38	1	437	481	44	1	434	396	-38	1
	0	268	279	11	0	269	261	-8	0	319	275	-44	1	308	324	16	0	330	346	17	0	329	301	-28	1
A345 Totterdown Clump	0	536	565	29	1	513	594	81	2	638	735	97	2	751	875	124	2	899	936	37	1	811	821	10	0
	0	491	527	36	1	513	503	-11	0	472	508	36	1	473	471	-2	0	431	467	36	1	473	515	42	1
A3028, W of Amesbury Rd	0	51	63	12	1	56	62	6	0	55	68	13	1	49	65	16	1	58	65	7	0	56	57	1	0
	0	151	144	-7	0	119	129	10	0	128	158	30	1	146	162	16	1	157	134	-23	1	99	98	-1	0
A3028: West of Church Lane	0	289	298	9	0	261	242	-19	1	221	252	31	1	267	315	48	1	318	320	2	0	283	281	-2	0
	0	521	534	13	0	478	487	9	0	482	487	5	0	422	478	56	1	472	480	8	0	433	432	-1	0
High St: South of London Rd	0	251	270	19	1	223	246	23	1	238	260	22	1	247	264	17	1	231	241	10	0	215	202	-13	0
	0	95	96	1	0	79	101	22	1	103	113	10	0	118	113	-5	0	103	130	27	1	145	152	7	0

A303 Mainline Network ATC Comparison Table (Heavies)

		12:00				13:00				14:00				15:00				16:00				17:00			
Location:	Site	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH
A303, Great Bathampton	0	49	61	12	0.8	44	53	9	0.6	30	42	12	1.0	28	39	11	1.0	20	33	13	1.3	25	39	14	1.2
Cottage	0	40	51	11	0.8	41	60	19	1.3	48	58	10	0.7	39	66	27	1.9	43	57	14	1.0	12	39	27	2.7
A345 Totterdown Clump	0	3	11	8	1.5	3	16	13	2.1	3	21	18	2.6	6	21	15	2.0	2	13	11	2.0	4	11	7	1.3
	0	6	21	15	2.0	4	21	17	2.4	5	24	19	2.5	2	22	20	2.9	1	15	14	2.5	3	5	2	0.5
A303 W of Amesbury Road	0	43	63	20	1.4	71	76	5	0.3	49	78	29	1.8	53	68	15	1.0	34	56	22	1.6	31	44	13	1.1
	0	59	86	27	1.6	58	90	32	1.9	54	74	20	1.3	46	67	21	1.4	32	55	23	1.7	26	38	12	1.1
A303 W of Amesbury Road	0	31	54	23	1.8	49	58	9	0.6	37	63	26	1.8	37	50	13	1.0	30	48	18	1.4	25	46	21	1.8
	0	26	37	11	1.0	28	37	9	0.8	31	39	8	0.7	32	42	10	0.8	25	35	10	0.9	11	19	8	1.0
B3084, Winscott	0	3	13	10	1.8	0	6	6	1.7	3	9	6	1.2	2	11	9	1.8	1	7	6	1.5	0	1	1	0.7
	0	3	14	11	1.9	6	20	14	1.9	3	6	3	0.7	0	14	14	2.6	3	4	1	0.3	2	2	0	0.0
B3083, south of A303	0	1	2	1	0.4	0	4	4	1.4	0	2	2	1.0	1	0	-1	0.7	0	1	1	0.7	0	0	0	-
junction	0	0	4	4	1.4	0	3	3	1.2	0	4	4	1.4	0	5	5	1.6	0	2	2	1.0	0	0	0	-
A338 N of A303	0	5	19	14	2.0	6	24	18	2.3	2	22	20	2.9	4	17	13	2.0	2	11	9	1.8	6	11	5	0.9
	0	9	28	19	2.2	10	18	8	1.1	10	25	15	1.8	8	25	17	2.1	7	17	10	1.4	2	7	5	1.2
A338 N of Home Farm	0	3	10	7	1.4	2	11	9	1.8	2	8	6	1.3	0	3	3	1.2	1	5	4	1.2	2	4	2	0.6
	0	2	8	6	1.3	1	8	7	1.6	5	6	1	0.2	2	6	4	1.0	2	8	6	1.3	0	3	3	1.2
Countess Rd S of A303	0	1	25	24	3.3	4	26	22	2.8	4	27	23	2.9	5	24	19	2.5	5	18	13	1.9	2	11	9	1.8
	0	9	18	9	1.2	3	26	23	3.0	3	23	20	2.8	6	19	13	1.8	8	24	16	2.0	7	27	20	2.4
Countess Rdbt W/B exit	0	37	66	29	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Solstice Park Ave: East of	0	33	39	6	0.5	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0	0	0	0	0.0
Meridian Way	0	38	67	29	2.0	61	69	8	0.5	54	77	23	1.4	51	68	17	1.1	30	54	24	1.9	35	46	11	0.9
A303, south of A36 junction	0	1	14	13	2.4	3	16	13	2.1	0	14	14	2.6	2	12	10	1.9	1	6	5	1.3	2	11	9	1.8
(ANPR site) - video	0	12	57	45	3.8	12	38	26	2.6	12	38	26	2.6	11	29	18	2.0	12	21	9	1.1	7	14	7	1.1
A303 west of Longbarrow	0	44	61	17	1.2	33	52	19	1.5	27	43	16	1.4	26	40	14	1.2	26	33	7	0.6	29	39	10	0.9
Rdbt	0	26	51	25	2.0	36	59	23	1.7	61	58	-3	0.2	49	68	19	1.2	53	57	4	0.3	22	40	18	1.6
A303 east of Longbarrow	0	34	44	10	0.8	40	51	11	0.8	34	49	15	1.2	25	36	11	1.0	18	41	23	2.1	20	33	13	1.3
Rdbt	0	44	52	8	0.6	42	54	12	0.9	45	59	14	1.0	40	65	25	1.7	38	58	20	1.4	13	35	22	2.2
A360 near Oatlands Hill	0	36	52	16	1.2	44	60	16	1.1	39	59	20	1.4	36	48	12	0.9	31	48	17	1.4	28	41	13	1.1
	0	42	51	9	0.7	40	51	11	0.8	37	51	14	1.1	47	65	18	1.2	45	60	15	1.0	16	38	22	2.1

Local P'way Closed Network ATC Comparison Table Comparison Table (Heavies)

		12:00				13:00				14:00				15:00				16:00				17:00			
Location:	Site	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH
The Packway, Rollestone	0	0	10	10	2	0	7	7	2	1	10	9	2	0	8	8	2	1	8	7	2	1	8	7	2
Clump	0	0	7	7	2	0	5	5	2	0	9	9	2	3	12	9	2	0	8	8	2	1	3	2	1
Rollestone Camp access Rd	0	1	1	0	0	0	0	0	-	0	0	0	0	1	1	-1	0	2	0	-2	1	0	0	0	-
	0	0	1	1	1	1	1	0	0	0	0	0	-	0	2	2	1	2	1	-1	0	0	0	0	-
The Packway east of	0	4	7	3	1	2	9	7	2	0	9	9	2	2	5	3	1	0	4	4	1	2	3	1	0
Bingham Rd	0	0	3	3	1	0	7	7	2	1	5	4	1	1	2	1	0	2	2	0	0	1	0	-1	1
A345, S of Clover Lane	0	5	9	4	1	4	14	10	2	5	14	9	1	1	6	5	1	2	5	4	1	2	7	5	1
	0	1	7	6	1	1	6	5	1	1	7	6	1	0	3	3	1	1	3	2	1	3	4	1	0
A345 Totterdown Clump	0	3	13	10	2	3	19	16	2	3	20	17	3	6	14	8	1	2	10	8	2	4	11	7	1
	0	6	22	16	2	4	18	14	2	5	21	16	2	2	14	12	2	1	13	12	2	3	7	4	1
A3028, W of Amesbury Rd	0	0	1	1	1	0	3	3	1	1	2	1	1	0	0	0	-	0	0	0	-	0	0	0	-
	0	2	3	1	0	0	4	4	1	0	2	2	1	1	1	0	0	0	1	1	1	0	0	0	-
A3028: West of Church Lane	0	1	5	4	1	0	7	7	2	0	8	8	2	0	7	7	2	0	5	5	2	0	4	4	1
	0	4	17	13	2	5	17	12	2	6	15	9	1	2	13	11	2	1	10	9	2	0	5	5	2
High St: South of London Rd	0	11	17	6	1	11	16	5	1	8	19	11	2	8	14	6	1	8	11	3	0	10	11	1	0
	0	9	9	0	0	4	11	7	1	5	14	9	1	12	13	1	0	12	8	-4	1	3	3	0	0

E.2 Neutral A303 mainline AM ATC validation

		A303 Mainline Network ATC Comparison Table (AM - 07:30)											
		All Vehicles				Lights				Heavies			
Location:	Site	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH
A303, Great Bathampton Cottage	C1 (N-bound)	958	988	30	0.5	871	905	34	0.6	52	83	31	1.9
	C1 (S-bound)	636	658	22	0.4	544	563	19	0.4	73	94	21	1.2
A345 Totterdown Clump	C14 (N-bound)	638	582	-56	1.1	532	566	34	0.7	2	16	14	2.3
	C14 (S-bound)	718	780	62	1.1	688	759	71	1.3	5	21	16	2.2
A303 W of Amesbury Road	C17 (E-bound)	2150	1891	-259	2.9	2036	1809	-227	2.6	57	82	25	1.5
	C17 (W-bound)	1239	1231	-8	0.1	1131	1129	-2	0.0	69	102	33	1.8
A303 W of Amesbury Road	C18 (E-bound)	1485	1447	-39	0.5	1381	1370	-11	0.1	51	77	26	1.6
	C18 (W-bound)	938	965	27	0.4	848	877	29	0.5	67	88	21	1.2
B3084, Winscott	C19 (E-bound)	249	275	26	0.8	234	261	27	0.9	2	14	12	2.1
	C19 (W-bound)	198	198	0	0.0	171	190	19	0.7	4	8	4	0.8
B3083, south of A303 junction	C2 (N-bound)	28	25	-3	0.3	17	24	7	0.7	0	2	2	1.0
	C2 (S-bound)	22	28	6	0.6	18	27	9	0.9	0	1	1	0.8
A338 N of A303	C20 (N-bound)	576	594	18	0.4	525	569	44	0.9	13	25	12	1.4
	C20 (S-bound)	689	704	15	0.3	614	673	59	1.2	11	31	20	2.2
A338 N of Home Farm	C21 (N-bound)	314	292	-22	0.6	290	286	-4	0.1	1	6	5	1.4
	C21 (S-bound)	309	292	-17	0.5	283	282	-1	0.0	2	10	8	1.6
Countess Rd S of A303	C23 (N-bound)	541	547	6	0.1	488	521	33	0.7	3	27	24	3.1
	C23 (S-bound)	539	619	80	1.7	474	588	114	2.5	10	31	21	2.3
A303 at Solstice Park Overbridge	C27 (E-bound)	1509	1609	100	1.3	1490	1526	36	0.5	19	83	64	4.5
	C27 (W-bound)	850	1009	159	2.6	822	913	91	1.5	28	97	69	4.3
Countess Rdbt W/B exit	C28 (E-bound)	1541	1607	66	0.8	1528	1525	-3	0.0	13	82	69	5.0
Solstice Park Ave: East of Meridian Way	C33 (E-bound)	228	198	-30	1.0	203	178	-25	0.9	3	20	17	2.5
	C33 (W-bound)	495	422	-73	1.7	436	395	-41	1.0	14	27	13	1.4
A303, south of A36 junction (ANPR site) - video	C37 (N-bound)	793	986	193	3.2	722	904	182	3.2	35	83	48	3.1
	C37 (S-bound)	509	657	148	3.1	444	562	118	2.6	48	96	48	2.8
A303 west of Longbarrow Rdbt	C4 (E-bound)	960	975	15	0.2	873	899	26	0.4	51	76	25	1.6
	C4 (W-bound)	636	671	35	0.7	544	579	35	0.7	73	92	19	1.1
A303 east of Longbarrow Rdbt	C5 (E-bound)	1472	1462	-10	0.1	1382	1384	2	0.0	47	78	31	2.0
	C5 (W-bound)	1034	1028	-7	0.1	941	937	-4	0.1	66	90	24	1.4
A360 near Oatlands Hill	C6 (N-bound)	504	509	5	0.1	430	486	56	1.3	16	23	7	0.8
	C6 (S-bound)	651	644	-7	0.1	594	616	22	0.4	9	28	19	2.2

E.3 Neutral A303 mainline IP ATC validation

		A303 Mainline Network ATC Comparison Table (IP - AVG 10:00 - 16:00)											
		All Vehicles				Lights				Heavies			
Location:	Site	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH
A303, Great Bathampton Cottage	C1 (N-bound)	697	680	17	0.3	596	596	0	0.0	73	84	-11	0.6
	C1 (S-bound)	696	703	-7	0.1	597	623	-26	0.5	71	81	-10	0.6
A345 Totterdown Clump	C14 (N-bound)	373	376	-4	0.1	265	355	-90	2.6	3	21	-18	2.5
	C14 (S-bound)	400	399	1	0.0	362	379	-17	0.4	3	19	-16	2.3
A303 W of Amesbury Road	C17 (E-bound)	1129	1025	104	1.6	999	924	75	1.2	86	101	-15	0.8
	C17 (W-bound)	1102	1043	59	0.9	979	941	38	0.6	81	101	-20	1.1
A303 W of Amesbury Road	C18 (E-bound)	878	857	20	0.3	766	766	-1	0.0	79	93	-14	0.8
	C18 (W-bound)	855	840	15	0.3	751	767	-16	0.3	73	74	-1	0.1
B3084, Winscott	C19 (E-bound)	112	109	3	0.1	91	98	-8	0.4	4	12	-8	1.5
	C19 (W-bound)	113	107	6	0.3	90	101	-11	0.6	3	8	-5	1.0
B3083, south of A303 junction	C2 (N-bound)	19	25	-5	0.6	12	21	-9	1.1	0	5	-5	1.4
	C2 (S-bound)	22	20	2	0.2	19	19	0	0.0	0	1	-1	0.7
A338 N of A303	C20 (N-bound)	348	344	4	0.1	297	315	-18	0.5	11	30	-19	2.1
	C20 (S-bound)	377	375	2	0.1	315	346	-31	0.9	10	29	-19	2.2
A338 N of Home Farm	C21 (N-bound)	183	151	32	1.2	162	143	19	0.7	3	9	-6	1.2
	C21 (S-bound)	156	186	-30	1.2	132	174	-43	1.7	3	12	-9	1.7
Countess Rd S of A303	C23 (N-bound)	427	402	25	0.6	376	373	3	0.1	9	29	-20	2.3
	C23 (S-bound)	334	366	-32	0.9	295	337	-42	1.2	6	29	-23	2.7
A303 at Solstice Park Overbridge	C27 (E-bound)	802	946	-144	2.4	783	848	-65	1.1	19	98	-79	5.1
	C27 (W-bound)	759	878	-120	2.1	734	796	-63	1.1	25	82	-57	3.9
Countess Rdbt W/B exit	C28 (E-bound)	950	948	2	0.0	932	852	80	1.3	19	98	-80	5.2
Solstice Park Ave: East of Meridian Way	C33 (E-bound)	212	180	32	1.1	190	157	33	1.3	3	23	-20	2.8
	C33 (W-bound)	435	358	77	1.9	373	322	51	1.4	15	36	-21	2.1
A303, south of A36 junction (ANPR site) - video	C37 (N-bound)	639	678	-39	0.8	556	595	-39	0.8	59	85	-26	1.5
	C37 (S-bound)	636	698	-63	1.2	557	618	-61	1.3	52	81	-29	1.8
A303 west of Longbarrow Rdbt	C4 (E-bound)	702	694	8	0.1	594	598	-4	0.1	77	95	-18	1.0
	C4 (W-bound)	693	698	-5	0.1	597	621	-24	0.5	71	77	-6	0.3
A303 east of Longbarrow Rdbt	C5 (E-bound)	884	865	19	0.3	770	775	-5	0.1	77	91	-14	0.8
	C5 (W-bound)	908	882	26	0.4	802	804	-2	0.0	74	78	-4	0.2
A360 near Oatlands Hill	C6 (N-bound)	255	290	-35	1.1	195	271	-77	2.5	8	20	-12	1.6
	C6 (S-bound)	281	324	-44	1.3	235	303	-68	2.1	9	22	-14	1.7

E.4 Neutral A303 mainline PM ATC validation

		A303 Mainline Network ATC Comparison Table (PM - 17:00)											
		All Vehicles				Lights				Heavies			
Location:	Site	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH
A303, Great Bathampton Cottage	C1 (N-bound)	678	672	6	0.1	623	623	0	0.0	46	49	-3	0.2
	C1 (S-bound)	909	981	-72	1.2	856	926	-70	1.2	32	55	-23	1.7
A345 Totterdown Clump	C14 (N-bound)	795	815	-20	0.4	640	805	-165	3.1	1	11	-10	2.0
	C14 (S-bound)	531	540	-9	0.2	495	535	-40	0.9	5	5	0	0.0
A303 W of Amesbury Road	C17 (E-bound)	1487	1306	181	2.4	1419	1239	180	2.5	49	68	-19	1.2
	C17 (W-bound)	1843	1725	118	1.4	1767	1659	108	1.3	49	65	-16	1.1
A303 W of Amesbury Road	C18 (E-bound)	1058	1037	21	0.3	990	981	9	0.1	50	56	-6	0.4
	C18 (W-bound)	1005	1006	-1	0.0	946	956	-10	0.2	34	49	-15	1.2
B3084, Winscott	C19 (E-bound)	194	182	12	0.4	182	178	4	0.1	2	4	-2	0.6
	C19 (W-bound)	234	234	0	0.0	210	231	-21	0.7	3	4	-1	0.3
B3083, south of A303 junction	C2 (N-bound)	21	21	1	0.1	15	18	-3	0.4	0	2	-2	1.0
	C2 (S-bound)	21	21	0	0.0	19	19	0	0.0	0	2	-2	1.0
A338 N of A303	C20 (N-bound)	566	571	-5	0.1	533	559	-26	0.6	7	12	-5	0.8
	C20 (S-bound)	516	515	1	0.0	477	499	-22	0.5	5	15	-10	1.6
A338 N of Home Farm	C21 (N-bound)	288	297	-9	0.3	270	293	-23	0.7	1	4	-3	0.9
	C21 (S-bound)	297	288	9	0.3	280	282	-2	0.1	1	7	-6	1.5
Countess Rd S of A303	C23 (N-bound)	633	601	32	0.6	596	583	13	0.3	6	19	-13	1.8
	C23 (S-bound)	459	481	-22	0.5	429	467	-38	0.9	2	13	-11	2.0
A303 at Solstice Park Overbridge	C27 (E-bound)	1051	1165	-114	1.7	1036	1104	-68	1.0	15	61	-46	3.7
	C27 (W-bound)	1190	1291	-101	1.4	1172	1234	-62	0.9	18	57	-39	3.2
Countess Rdbt W/B exit	C28 (E-bound)	1149	1159	-10	0.2	1137	1099	38	0.6	12	62	-50	4.1
Solstice Park Ave: East of Meridian Way	C33 (E-bound)	224	186	38	1.3	205	172	33	1.2	0	14	-14	2.6
	C33 (W-bound)	815	690	125	2.3	738	670	68	1.3	17	21	-4	0.5
A303, south of A36 junction (ANPR site) - video	C37 (N-bound)	622	671	-49	1.0	577	622	-45	0.9	35	50	-15	1.2
	C37 (S-bound)	827	991	-164	2.7	772	936	-164	2.8	29	54	-25	1.9
A303 west of Longbarrow Rdbt	C4 (E-bound)	675	678	-3	0.1	622	629	-7	0.1	44	50	-6	0.4
	C4 (W-bound)	906	943	-37	0.6	856	891	-35	0.6	32	53	-21	1.6
A303 east of Longbarrow Rdbt	C5 (E-bound)	1042	1032	10	0.2	979	976	3	0.0	46	57	-11	0.8
	C5 (W-bound)	1093	1166	-73	1.1	1042	1114	-72	1.1	35	52	-17	1.3
A360 near Oatlands Hill	C6 (N-bound)	560	575	-15	0.3	503	563	-60	1.3	8	13	-5	0.8
	C6 (S-bound)	385	433	-48	1.2	365	423	-58	1.5	3	10	-7	1.4

E.5 Neutral Packway closed AM ATC validation

		Local P'way Closed Network ATC Comparison Table (AM - 07:30)											
		All Vehicles				Lights				Heavies			
Location:	Site	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH
The Packway, Rollestone Clump	C10 (E-bound)	253	273	20	0.6	205	270	65	2.1	2	4	2	0.6
	C10 (W-bound)	84	100	16	0.8	70	95	25	1.4	0	6	6	1.7
Rollestone Camp access Rd	C11 (N-bound)	39	35	-4	0.3	35	34	-1	0.1	0	1	1	0.7
	C11 (S-bound)	18	28	10	1.0	15	28	13	1.4	0	1	1	0.7
The Packway east of Bingham Rd	C12 (W-bound)	356	132	-224	7.2	315	123	-192	6.5	0	10	10	2.2
	C12 (E-bound)	392	422	30	0.8	351	411	60	1.5	1	12	11	2.2
A345, S of Clover Lane	C13 (N-bound)	334	363	29	0.8	305	353	48	1.3	3	11	8	1.5
	C13 (S-bound)	514	571	57	1.2	475	557	82	1.8	4	15	11	1.8
A345 Totterdown Clump	C14 Local (N-bound)	638	674	36	0.7	532	653	121	2.5	2	20	18	2.7
	C14 Local (S-bound)	718	812	94	1.7	688	783	95	1.8	5	28	23	2.8
A3028, W of Amesbury Rd	C15 (E-bound)	98	204	106	4.3	95	200	105	4.3	0	4	4	1.4
	C15 (W-bound)	136	155	19	0.8	123	149	26	1.1	0	7	7	1.9
A3028: West of Church Lane	C26 (E-bound)	776	756	-20	0.4	734	748	14	0.3	0	9	9	2.1
	C26 (W-bound)	403	416	13	0.3	367	404	37	0.9	1	12	11	2.2
High St: South of London Rd	C32 (S-bound)	95	90	-5	0.2	76	77	1	0.1	3	13	10	1.8
	C32 (N-bound)	217	218	1	0.0	178	204	26	0.9	1	15	14	2.5

* ATC data inconsistent with MCTCs

E.6 Neutral Packway closed IP ATC validation

		Local P'way Closed Network ATC Comparison Table (IP - AVG 10:00 - 16:00)											
		All				Lights				Heavie			
Location:	Site	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH
The Packway, Rollestone Clump	C10 (E-bound)	61	64	3	0.2	49	63	14	0.9	1	1	0	0.2
	C10 (W-bound)	68	68	-1	0.0	62	67	5	0.3	0	0	0	0.4
Rollestone Camp access Rd	C11 (N-bound)	20	15	-4	0.5	14	16	2	0.2	0	0	0	0.4
	C11 (S-bound)	24	24	-1	0.1	19	24	5	0.6	1	0	-1	0.5
The Packway east of Bingham Rd	C12 (W-bound)	186	102	-84	3.5	164	100	-64	2.8	1	4	3	0.9
	C12 (E-bound)	196	81	-114	4.9	164	78	-86	3.9	1	4	3	0.8
A345, S of Clover Lane	C13 (N-bound)	224	219	-5	0.2	189	209	20	0.7	3	10	8	1.5
	C13 (S-bound)	204	200	-4	0.2	175	194	19	0.7	2	7	5	1.2
A345 Totterdown Clump	C14 Local (N-bound)	373	377	4	0.1	265	356	91	2.6	3	23	20	2.7
	C14 Local (S-bound)	400	389	-11	0.3	362	373	11	0.3	3	18	15	2.2
A3028, W of Amesbury Rd	C15 (E-bound)	26	54	28	2.2	24	52	28	2.3	0	1	1	0.4
	C15 (W-bound)	127	127	0	0.0	113	123	10	0.4	1	4	3	0.8
A3028: West of Church Lane	C26 (E-bound)	245	244	-1	0.0	220	238	18	0.6	1	7	6	1.5
	C26 (W-bound)	287	283	-3	0.1	258	274	16	0.5	2	10	8	1.7
High St: South of London Rd	C32 (S-bound)	72	65	-7	0.4	52	61	9	0.6	3	5	2	0.5
	C32 (N-bound)	48	39	-9	0.7	33	34	1	0.1	3	4	2	0.4

E.7 Neutral Packway closed PM ATC validation

		Local P'way Closed Network ATC Comparison Table (PM - 17:00)											
		All Vehicles				Lights				Heavies			
Location:	Site	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH	Observed	Modelled	Difference	GEH
The Packway, Rollestone Clump	C10 (E-bound)	76	72	-4	0.2	61	72	11	0.7	0	0	0	-
	C10 (W-bound)	246	240	-6	0.2	236	239	3	0.1	0	3	3	1.2
Rollestone Camp access Rd	C11 (N-bound)	10	9	-1	0.2	9	9	0	0.0	0	0	0	-
	C11 (S-bound)	19	17	-3	0.3	17	15	-2	0.3	0	0	0	-
The Packway east of Bingham Rd *	C12 (W-bound)	402	355	-47	1.2	379	353	-26	0.7	1	3	2	0.7
	C12 (E-bound)	227	92	-135	5.3	197	88	-109	4.6	1	3	2	0.7
A345, S of Clover Lane	C13 (N-bound)	431	416	-15	0.4	403	411	8	0.2	1	6	5	1.3
	C13 (S-bound)	306	302	-4	0.1	279	298	19	0.6	2	5	3	0.8
A345 Totterdown Clump	C14 Local (N-bound)	795	781	-14	0.3	640	772	132	2.5	1	8	7	1.6
	C14 Local (S-bound)	531	536	5	0.1	495	528	33	0.7	5	8	3	0.6
A3028, W of Amesbury Rd	C15 (E-bound)	32	85	53	3.5	30	83	53	3.5	0	3	3	1.2
	C15 (W-bound)	268	259	-9	0.3	263	258	-5	0.2	0	0	0	-
A3028: West of Church Lane	C26 (E-bound)	365	368	3	0.1	337	361	24	0.6	0	7	7	1.9
	C26 (W-bound)	537	549	12	0.3	508	545	37	0.8	1	5	4	1.2
High St: South of London Rd	C32 (S-bound)	170	163	-7	0.3	157	160	3	0.1	1	2	1	0.4
	C32 (N-bound)	61	57	-4	0.3	50	51	1	0.1	2	6	4	1.0

*ATC incosistent with MCTC data

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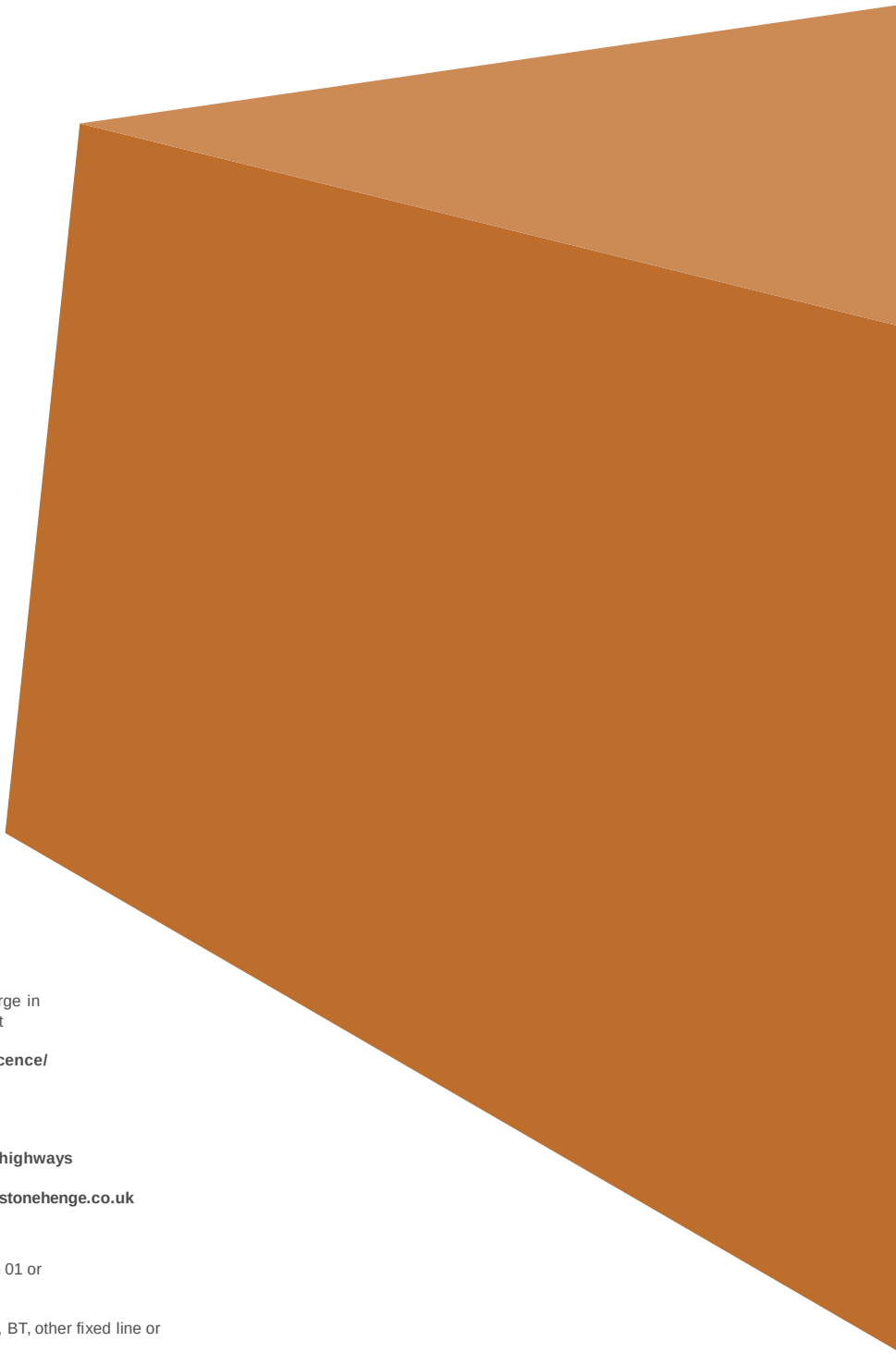

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